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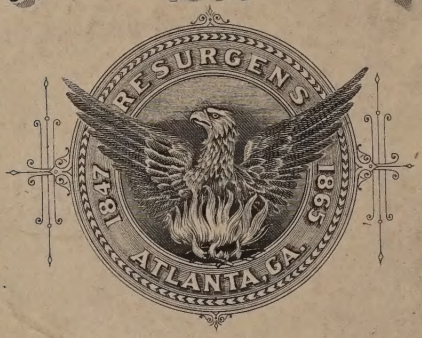

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Mass Production Methods Used in Airplane Plant

BY BURNHAM FINNEY*

EMPLOYING mass production methods similar to those long used in the automobile industry, the Waco Aircraft Co., Troy, Ohio, has recently put into operation a new plant which is now turning out more than six fuselages a day and which has the capacity for manufacturing ten or more a day.

Since the founding of the company in 1921, it has specialized in building three-place open cockpit commercial types of airplanes. The basic model has always been so designed as to allow for additional improvements and refinements without attempting to create yearly models. This method has permitted rapid adoption of new ideas and quantity production of service parts.

Models now being built are the "90," with 90-hp. "OX-5" motor; the "150," with Hisso 150-hp. motor; the "180," with Hisso 180-hp. motor; the "165" Straight-Wing, with 165-hp. Wright Whirlwind motor (five-cylinder); the "220" Straight-Wing, with 220-hp. Wright Whirlwind motor (nine-cylinder); the "220" Taper-Wing, with 220-hp. Wright Whirlwind motor (nine-cylinder); and the "300" Taper-Wing, with 300-hp. Wright Whirlwind motor (nine-cylinder). The Taper-Wing sport models are powered with either the 220-hp. or 300-hp. Wright Whirlwind motor (nine-cylinder).

Comprising eight buildings, the new plant has approximately 100,000 sq. ft. of floor space, of which 80,000 sq. ft. is in the main manufacturing building. Other structures consist of the office and administration building, heat and power plant, acetylene generator building, paint and oil storage building, repair hangar, sales department hangar and cafeteria. Adjoining the plant is the company's airport, which is of sufficient size to accommodate or test the largest planes. It has two runways, each of which is 3000 ft. long. One runway is 1300 ft. wide and the other 400 ft.

The main manufacturing building is of monitor-type construction and is exceptionally free from supporting columns, thereby affording excellent natural light and ventilation. The walls and flooring are concrete and the columns, trusses and sashes, steel. Rough actinic glass is used throughout to minimize heat and sun glare. Fire protection is afforded by an automatic sprinkler system, with an additional automatic deluge system in paint spray booths. A 75,000-gal. tank tower provides a source of water auxiliary to the city water system.

Stockroom Centrally Located

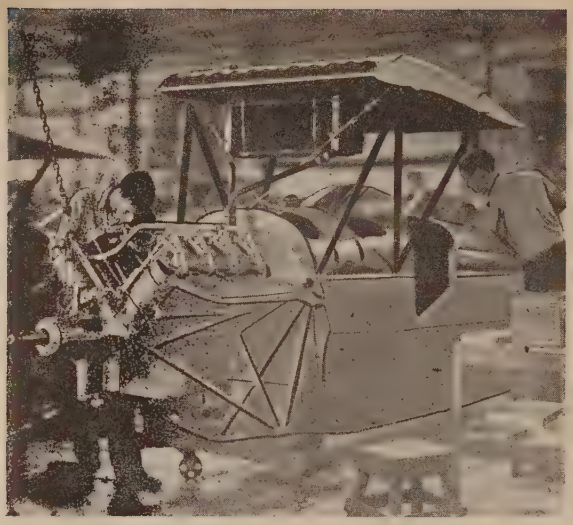
In the center of the building is a large rectangular stockroom, from which parts and raw materials go out to the sub-assembly and final assembly departments. Occupying one complete section of the building are woodworking, wing-rib assembly and wing assembly departments. Running the length of one side of the plant are the machine shop, sheet metal shop, fuselage and tail surface assembly jigs, welding jigs, motor and propeller sections, and sand-blast room.

All metal parts, such as cockpit cowlings, motor cowlings, instrument boards and spinners, are cut out and fitted to master molds in the metal department to insure uniformity of fit and to provide for interchangeability of parts for each airplane of a specified model. Rough edges are curled over a metal wire shaper, which acts as a stiffener for the beading. Thus, no sharp or serrated edges are allowed to come in contact with the pilot or passengers of a plane.

The cockpit cowling is drilled at close intervals around the upper edge, and through these holes are fastened the thickly padded, upholstered leather beading. Streamline metal covers for the oleo strut are cut out and constructed in the metal department.

Wherever a bolt attaches entirely through a wooden member, a steel plate is used to cover both ends of the bolt hole, thereby increasing its strength. Brace wires, for instance, are connected with jutted wings, which are an integral part of such a steel plate. This method has been

*THE IRON AGE, New York.



Fuselage Finished to Cockpit Covering, Motor Fairings and Gas Tank

substituted for washers wherever they have shown a tendency to grind themselves into the wood. All internal fittings, such as brace wires, bolts, screws, nuts, plates and control members, are cadmium-plated to prevent rust. Incidentally, all metal parts and fittings are tested and inspected according to military standards.

Close Attention to Detail in Rib Construction

In the construction of taper wings, tubular steel members of an ingenious design are added for interior bracing. They account, in part, for the sheer maneuverability of this type of wing. By the use of jigs of special design, wing ribs are rapidly fabricated by operators who specialize on this one operation. Stock for this purpose is prepared in the woodworking department and is conveyed to the jig, where it is placed in a group of small compartments close to the operator. With glue and a sufficient quantity of brads at his side, the operator quickly assembles the wing ribs. Jigs are constructed of steel blanks mounted on a solid steel plate, this structure being bolted to a rigid wood and steel unit waist high to the operator. This rigid set-up makes possible a uniformity of construction in each wing-rib.

The rib is built in the manner of a truss design with two long members of spruce, to which are attached five shorter members of spruce at proper cross-sections. At each intersection of the main and cross members, plywood plates are attached with brads. Following the custom of bridge engineering, these plywood plates are triangular in shape and attach equally to three points of the rib. Each brad is so placed as to strengthen and bind a member without causing splits or fractures.

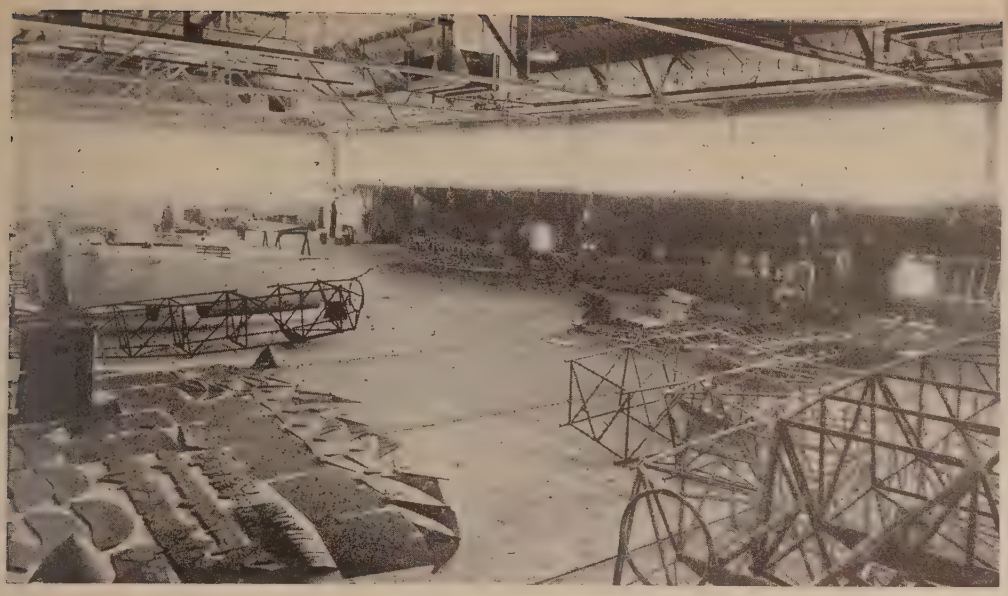
Over 200 brads are used in connecting plywood plates in the wing-rib assembly. The brads are of special design and weight and are cement-coated and diamond-tipped. In addition to the cement coating, several ferruled serrations are added to the shank. Together they act as preventives to loosening or pulling out. Twenty triangular plates of plywood are employed in the wing rib. Each member is glued in place before the brads are inserted. When dried, wing ribs are thoroughly buffed to remove sharp corners and rough edges. Ailerons are constructed in separate jigs with a similar accuracy in detail.

Finished ribs and ailerons are carried to the main wing assembly department, where ribs are attached to the wing spars. The latter are of first-grade, clear-grained spruce. Specifications call for first-cut stock, not routed stock, and no latitudes are allowed.

Six long ribs are first attached to the spars and then six shorter ribs, with which are connected the ailerons. As each rib is set in place, it is nailed to the wing spar. To prevent its sliding or shifting, it is wedged in place by plywood buttresses at each side, the top and the bottom. These buttresses also are nailed in place. The wing-walk is next added, and then tie rods and ailerons. The curved bow is attached to the wing end, the leading and trailing edges are set in place, and finally the dural intermediate nose ribs are added. The trailing edge is of double-coppered steel plate.

Fitted with wiring attachments and tubular aileron controls, wings pass final inspection and are conveyed to

At Final Assembly Line Wings Are Rigged and Final Check Is Made of All Parts and Controls



Paint Department, Showing Wing Being Sprayed in Spray Booth in Background

the paint room to be sprayed with varnish as a preservative from moisture. The wing fabric is attached when the varnish is dry. The fabric is rib-sewed to a strip of reinforcing tape running completely around the rib contour.

Wings then return to the paint room to receive a number of coats of "dope" until sufficient tautness is obtained, when spray guns give them several finish coats of lacquer. From this point wings pass to the final assembly line for rigging and lining up to the fuselage. Tail surfaces, center section and fuselage fabric covers are treated in the same manner as wings.

Tubing Stockroom Adjoins Machine Shop

In the metal shop are constructed the oleo struts used in the landing gear, propeller guards and spinners, pilot's and passengers' seats, fuselage, deck covers, cockpit cowlings, engine cowlings, instrument boards, wing and motor inspection plates, gas tanks, radiator shutters, crankcase covers, exhaust stacks, fire-walls, fairings and other special metal parts. All small parts, such as wing and aileron hinges and braces, are manufactured in the company's machine shop. Here the metal tubing for fuselage and tail-surface control assemblies is specially milled on a radius to give it a curve-out instead of a sheer cut. This permits each tube to fit snugly against the next member so that the welding operation covers the surface of both members without having any crevices to fill. Certain tube sections are spline-cut in addition to having the milling operation. They are used wherever more than two members are to be joined and welded. For the convenience of the machine operators, a storeroom for rough tubing is maintained close to the machine shop. After being machined, tubular members are placed in compartments near the operators of the fuselage and tail surface assembly jigs.

Side-wall members of the fuselage are fabricated and welded in three operations. The first operation is for the cockpit sections, the second for the motor and gas tank, and the third for the tail surface. Because each of these sections performs different functions in flight and has separate weight-carrying abilities and stresses, they are constructed of tubing of different gages. After the side-walls have been fabricated and welded, they are placed in a box jig, where the cross members are fitted and welded. Tail surface members are fabricated and welded in separate jigs designed for that purpose. Three separately-constructed box-like structures are then joined and welded in a larger jig, and the fuselage is complete. Gas for welding is piped to each jig from a central source and is available for the operator at the turn of a valve.

Assembly Line for Fuselage

The motor mounting is drilled and the holes are fitted with metal bosses. The fuselage and tail surfaces are conveyed to the sand-blast room, where they receive treatment similar to the etching of propellers. Immediately after this operation they are inspected and tested and are taken to the paint department to be sprayed with paint. From the paint department the fuselage goes to the assembly line and the tail surfaces to the covering section to receive their fabric cover.

In the assembly line the fuselage receives the floorboard seats, gas and oil tanks, stick, rudder, tubular control members, tail skid, instrument boards, safety belts, upholstering and doors. The gas tank is hung on steel wire cables and is bound in the same manner. To prevent chafing and slipping the cables are attached over heavy felt padding. The control tubing extends from the fuselage to the tail and to prevent binding in operation is

Three Separately Constructed Box-Like Structures Being Joined and Welded in Large Jig, Completing Fuselage

Assembly Line, Looking Down Main Aisle

carried through fiber tubes larger in diameter than the control tubes. The fiber tubes are greased and are so situated as to be inspected, replaced or greased quickly.

Specially designed blocks of wood are taped to the fuselage at intervals. They serve for the use of screws or bolts in attaching the members described above, and also to preserve the metal tubing from weakening through the introduction of screw or bolt holes.

After the fire-walls, fairings and special attachments have been added, the fuselage is ready for the skeleton frame to which is fitted the fabric cover. This cover receives the same treatment of "doping" and painting as the wing fabrics. The painted fuselage is then returned to the motor department, where the motor is added. Here also are attached the laced cockpit padding, windshields, instruments, motor cowlings, tail surfaces, center wing section, spinner and prop, oleo struts, landing gear (certain models are equipped with brakes), and fuselage striping.

In view of the fact that motors of various kinds are used, several arrangements have been made for mounting them. In the case of the OX-5 motor, the mounting is on braced tubular arms welded to the main fuselage section, the arms being drilled at regular intervals and fitted with steel bosses. Wright Whirlwind motors are similarly mounted on circular braced steel tubing.

Planes Subjected to Rigid Tests

At the final assembly line the wings are rigged and lined up and a final check of all parts and controls is made. The plane then is rolled to the field about 50 yd. distant for a test flight. Each plane is flight-tested before delivery. The performance of the engine is first tested on the ground, and notations are made accordingly. All instruments are checked to see that they are functioning properly. The plane is checked for take-off, landing and stability in the air and is put through a series of maneuvers to check the performance. After landing, it is inspected for oil or fuel leaks. The test pilot certifies to its air-worthiness.

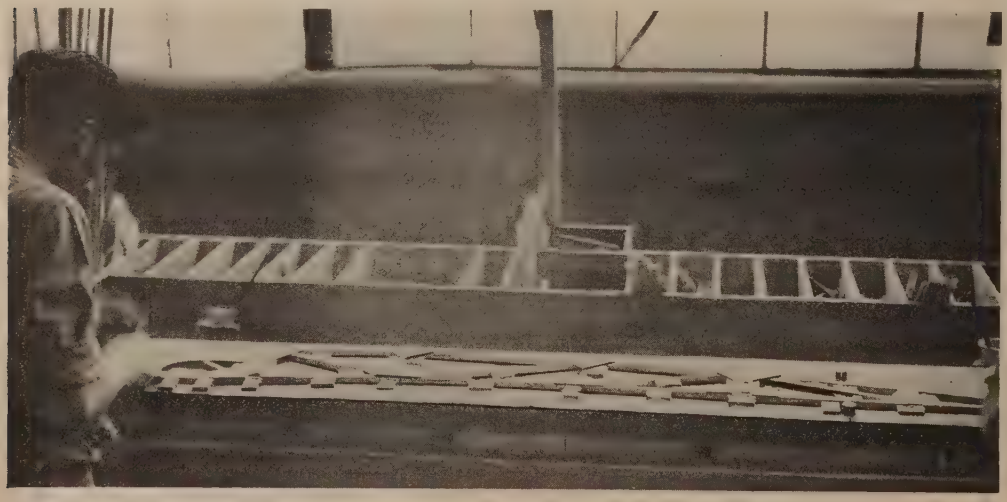
The fuselage and tail surfaces, as well as the landing gear "Vs," are made of S.A.E. No. 1025 mild carbon steel tubing, which is readily welded and which gives a better strength-weight ratio than S.A.E. No. 1020 low-carbon steel. It is less expensive than S.A.E. No. 4130 chrome molybdenum steel and can be purchased in large shipments without delay. Chrome molybdenum steel, however, is used for the axles of the planes, because they are subjected to high bending stresses.

Instrument panels, wheel disks, cowling, baggage compartment doors, inspection doors, seats, spinners and head streamline are constructed of aluminum, which also is employed in many other places where lightness of weight is a major consideration. The degree of hardness of the aluminum used in various parts is determined by the bends and the stiffness required.

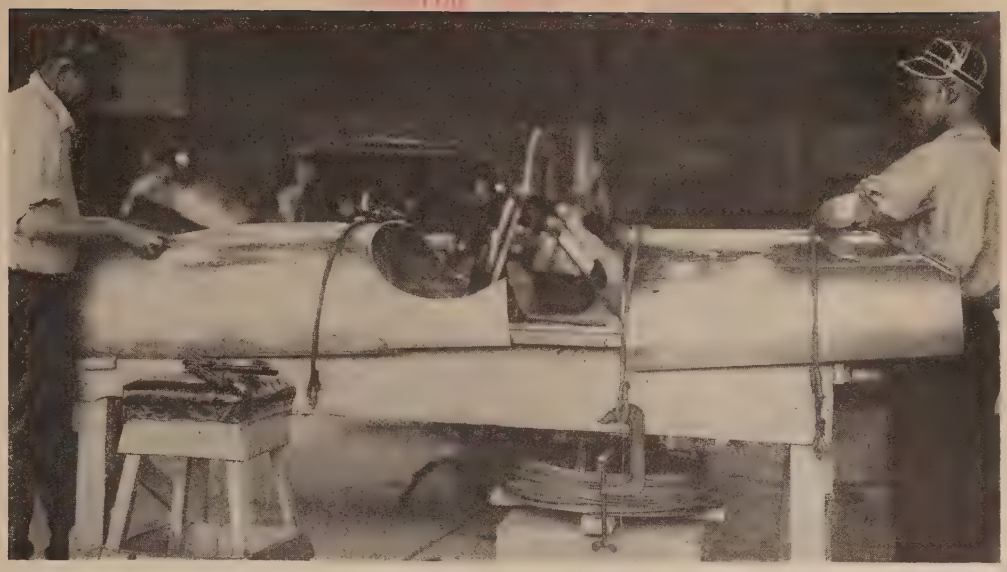
Wings Edged with Duralumin

For the leading edge of the wings to support the fabric between the ribs in the tapered wing model, duralumin is used. This material has been given the preference over aluminum in certain places where considerable stiffness and strength are necessary.

Fire-walls and fuel tanks are made of terne plate,



Cockpit Cowling Being Cut Out and Fitted to Master Mold



Sidewalls of Fuselage, Placed in Box-Like Jig, with Cross Members Being Welded

which may readily be soldered. This is especially advantageous in the case of fuel and oil tanks. The low melting point of aluminum precludes its use for fire-walls. Fittings are made almost entirely of S.A.E. No. 1025 mild carbon steel. Wherever high physical properties are required chrome molybdenum steel is used.

Plant Served by Spur Railroad Track

The plant is served by a spur track of the Big Four railroad. This track, suppressed to the floor level, extends through 200 ft. of heated shipping and receiving sections of the main manufacturing building, affording protection to materials in inclement weather. Electric hoists have been installed at one end of the platform to facilitate the transfer of material to railroad cars or to motor trucks, which also are loaded at this point.

From its inception in 1921 the Waco Aircraft Co., until recently known as the Advance Aircraft Co., has built an airplane in which the attainment of high aerodynamical ability at an economical cost for commercial purposes has been stressed. The founder of the company, Clayton J. Bruckner, is president and chief engineer. Heading the administrative division, as vice-president and general manager, is Lee N. Brutus.

By Use of Jigs of Special Design, Wing Ribs Are Rapidly Fabricated by Operators Specializing on This Operation

Gas Welding Operation in Building Fuselage. In foreground is cut-out of tubing enlarged to show radial cut

Cast Iron as Engineering Material

Testing Society Stages Symposium to Demonstrate Many Advantageous Qualities—How Test Bars May Represent Casting—Impact, Wear and Heat Treatment

WITH the object of calling the attention of engineers to the many excellent physical properties of cast iron, a symposium was arranged for the thirty-second annual meeting of the American Society for Testing Materials at Atlantic City, last week, June 24 to 28. The symposium was comprehensive and was made up of brief papers dealing with various phases of this broad field. It was organized by committee A-3 on cast iron. A large attendance revealed the keen interest in the subject.

An introduction to the symposium was presented by H. Bornstein, director of laboratories, Deere & Co., Moline, Ill., and chairman of the committee. There has not been the same progress in the classification of cast irons as there has been in steels and also in the determination of their physical properties, said Mr. Bornstein. Accurate information as to cast iron has not been widely disseminated to the engineering profession. Therefore some suspicion has arisen as to the value of such iron as an engineering material. Considerable progress has been made in cast iron metallurgy and irons of high physical properties are now available. Specifications have not kept abreast of practice. Cast iron is a reliable engineering material and knowledge as to its properties is necessary to encourage its proper use in industry.

The purpose of committee A-3, said Mr. Bornstein, has been to assemble a group of papers outlining the classification of physical properties of cast irons, according to a plan formulated a year ago. The presentation is realized as far from complete. Only a beginning has been made.

How Gray Irons Should Be Classified

IT is necessary to classify gray irons before an intelligent general study can be undertaken, said J. W. Bolton, chief chemist and metallurgist, Lunkenheimer Co., Cincinnati, who introduced the symposium and took as his subject "Classification of Gray Iron Alloys." The most logical classification seems a primary one according to causative factors. These are:

1. Chemical composition—initial, incidental and final.
2. Structural and mechanical makeup of charge.
3. Melting process.
4. Thermal and mechanical history—furnace spout to cooled casting.
5. Design and workmanship.

Mr. Bolton advocates a primary classification based on chemical analysis and a secondary one upon cooling rate. He shows how a mathematical formula can be applied to determine relative cooling rates of simple shapes. His chemical classification is divided into four groups of eight subdivisions each, based on the carbon and silicon contents respectively.

Section and Composition Affect Properties

THE question of the effect of section and various compositions on the physical properties of cast iron was discussed by R. S. MacPherran, chief chemist, Allis-Chalmers Mfg. Co., West Allis, Wis. The author's tests were conducted with a threefold object: To determine the effect of increased section on the tensile strength of cast iron; second, to determine the effect on hardness of the removal of various amounts of stock; and third, to determine if the high-test iron followed the same laws as the weaker grades. His conclusions were as follows:

> The effect of increasing the section of certain types is to materially and progressively lower the tensile strength.
>
> Removal of extra stock in these types is progressively accompanied by loss of hardness.
>
> Under cooling conditions similar to those described in the paper, the high-test iron reported on has practically equal Brinell hardness throughout the section.
>
> The grain of the high-test iron is somewhat more open as the center of the casting is approached.
>
> The tensile strength of the high-test iron tends to fall off as the section is increased or as the cooling is retarded, though not to the extent shown by the other two types.

Correlating the Test Bar with the Casting

THAT the test bar does not represent the casting is generally acknowledged in the case of gray iron. An attempt to correlate cast iron test bars and castings was made in a paper by W. H. Rother and V. M. Mazurie, metallurgist and assistant metallurgist respectively, Buffalo Foundry & Machine Co., Buffalo.

The authors report briefly on the work undertaken by various investigators and state that few really tangible facts have been established. Investigators agree that more than one size of test bar is necessary where any account is to be taken of the variation of strength with thickness. Cast iron, as produced in the modern foundry, is really a series of alloys and any attempt at a correlation of test bar with casting is futile unless this fact is recognized.

Through a proper interpretation of the cooling rate of iron it is felt by the authors that the physical properties of a test bar can be correlated with the properties of the casting. This does not imply that a single size will be applicable in every case. It is believed that specifications in the future will cover test bars of every size and that, with an intelligent choice of test bar, the properties of the casting will be predicted accurately from the properties of the test bar.

Strength of Plain and Alloy Iron

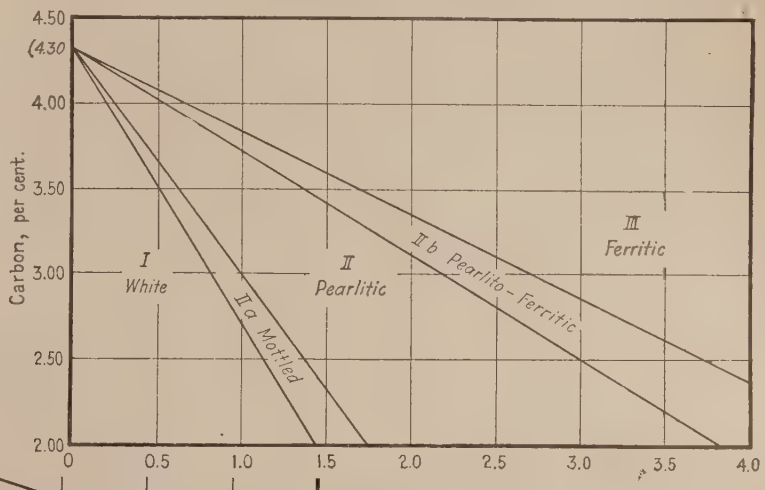
ANOTHER contribution to the symposium was entitled, "Static Strength of Plain and Alloy Cast Iron," by F. B. Coyle, research metallurgist, International Nickel Co., New York. In the opinion of Mr. Coyle the only tests for strength of cast iron which are really absolute are those for tension and compression. His contribution presents data covering the tensile strength only of cast iron. He starts with the Maurer diagram which shows the relation between structure and composition and presents a series of diagrams, some of which are reproduced herewith, showing an extension of the range of composition, which will produce a pearlitic structure and maximum strength. The elements, nickel and chromium, are used as examples of alloy iron. These diagrams should not be considered, says the author, a sole criterion

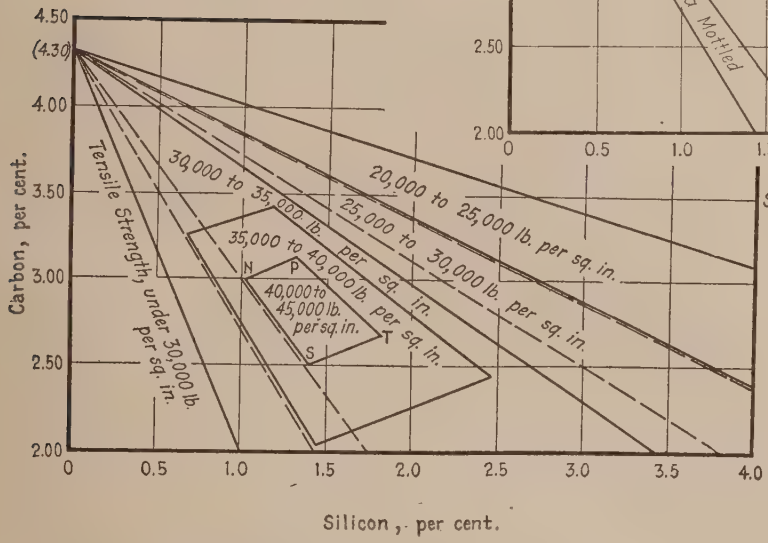
on the production of castings. Other practical modifying characteristics, such as hardness and tendency to chill, should be taken into account as well as strength, in the production of suitable castings.

Cast Iron Has Elastic and Fatigue Properties

ELASTIC properties of cast iron were interestingly discussed by J. T. McKenzie, chief chemist, American Cast Iron Pipe Co., Birmingham. Elasticity is that property of a body which enables it to return to its former shape after undergoing strain, and the modulus of elasticity, in tension or compression is the quotient of stress divided by linear strength.

MAURER'S Constitutional Diagram (Right) of Cast Iron (F. B. Coyle's Paper on Static Strength of Cast Irons





CAST Iron's Constitutional and Strength Diagram (Left) as Conceived by F. B. Coyle in His Paper on Static Strength of Plain and Alloy Iron

When applied under clearly defined conditions, the modulus of elasticity is one of the most useful indications of the quality of cast iron. It is very closely related to the analysis when cooling conditions are uniform and therefore is a good index of the casting properties of the iron. The results of some of the author's work on this problem are presented by tables and charts in the paper, one of which is here reproduced.

Another of the engineering characteristics of cast iron included in the symposium was the fatigue properties. This problem was discussed by J. B. Kommers, professor of mechanics, University of Wisconsin, Madison, Wis. His contribution, "Fatigue Properties of Cast Iron," reports the results obtained in casting four lots of cast iron at the University of Illinois and 10 different cast irons at the University of Wisconsin.

In the first case, the fatigue strength of cast iron was found to be markedly increased by oft-repeated strength below the endurance limit. Grooves in cast iron test specimens reduced the endurance limit only a small amount. At elevated temperatures there was found to be no great reduction in the fatigue, tension, and Brinell hardness tests up to a temperature of about 800 deg. Fahr. In the other tests, the materials used ranged from low-strength to high-strength cast irons and the ratio of endurance limit to tensile strength showed an average value of 0.49 and the ratio of endurance limit to modulus of rupture showed an average value of 0.26.

Testing Cast Iron for Impact and Wear Resistance

ENGINEERS in general are interested in the impact resistance value of cast iron, particularly in the case of water pipe. A contribution to this phase of the symposium was made by H. Bornstein in a brief paper entitled "Impact Testing of Cast Iron."

There is no standard test or method for measuring the resistance to impact of cast iron, said Mr. Bornstein, although several methods have been proposed. There is need for a standard method of test. The results of most of the proposed methods are not in general agreement. It is the consensus of opinion, however, that irons high in static strength are also high in impact value. In many cases the shock or impact test is of greater value in predicting results in service than are static tests, particularly where the casting is to be subjected to shock.

Another property of cast iron for which there is no general agreement among investigators as to the best method of testing is wear resistance. They not only do not agree as to test methods but there are also differences of opinion regarding the influence of various elements in cast iron upon resistance to wear. "Wear Testing of Cast Iron" was discussed by A. L. Boegehold, metallurgist, General Motors Research Laboratories, Detroit. As to wear testing in the case of cast iron automobile engine cylinder blocks, the author describes a method of test which he uses. He discusses the difficulties encountered in trying to conduct a test for wear when a lubricant is present. That the kind of cylinder iron used has no influence upon the result because of good lubrication be-

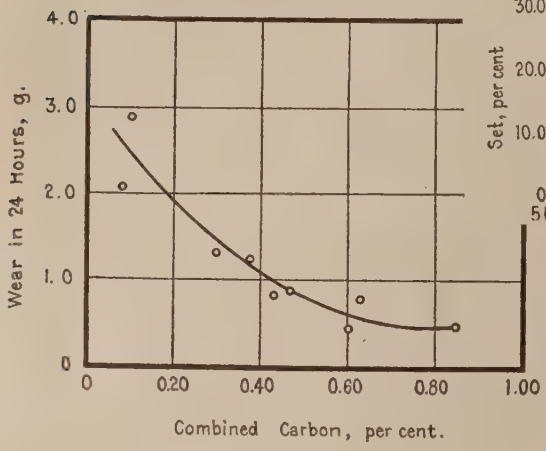
tween the piston and the cylinder is demonstrated by a brief description of a wear test conducted on an automobile engine constructed of individual cylinders of four different kinds of cast iron after running 20,000 miles.

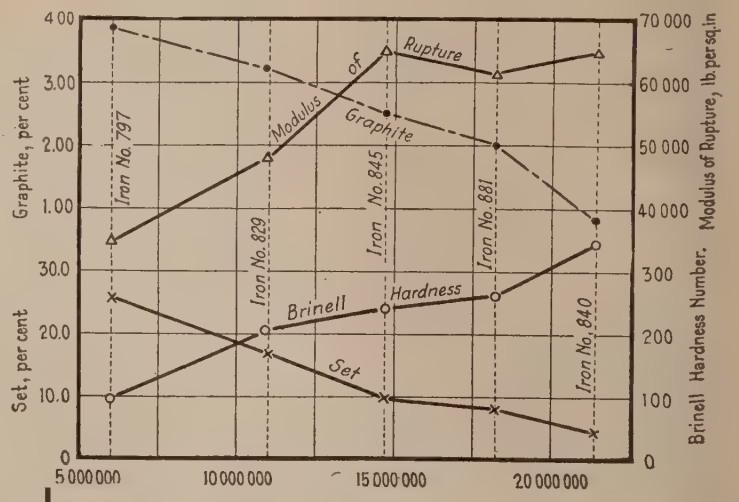
Mr. Boegehold declares that a universal wear test is undesirable but that laboratory wear tests in which service conditions are imitated give valuable data. When lubricants are present, a wear test is difficult. The largest factors in cylinder wear are stated to be grit and lack of lubrication. It is recommended that investigators of cast iron wear should have a comprehensive knowledge of cast iron.

The greatest resistance to wear is to be found in cast irons containing about 0.75 per cent combined carbon in sand-cast gray iron, according to the results of a series of tests and as shown by one of the charts here reproduced.

VALUES for Plastic Deformation (Set) in Six Repeated Loadings to Three-Fourths Ultimate Strength Plotted (Right) Against Ultimate Modulus of Elasticity with Trend of Strength, Hardness and Graphite Indicated (MacKenzie)

Influence of Combined Carbon on Wear (Boegehold)





Corrosion and Heat Treatment

IN the majority of cases studied, cast iron is slightly superior to steel or wrought iron in corrosion-resistance in the atmosphere, says H. O. Forrest in a contribution to the symposium entitled "Corrosion of Cast Iron." The author is director of the research laboratory of applied chemistry, Massachusetts Institute of Technology, Cambridge, Mass. Corrosion tests in soils point to the fact that in general the nature of the soil rather than the types of metal of certain classes is the factor governing the rate of corrosion. There are many cases in which cast iron is superior to other ferrous metals as in the handling of various chemical materials.

In general, factors affecting the corrosion of cast iron include not only the characteristics of the metal itself, but also, to a greater extent, the composition of the corroding medium and the type of protective coating employed. There is a need for the use of a proper protective coating before pipe is put into service or else for treatment of the corroding medium with chemicals to bring about the precipitation of protective scales or films.

Heat treatment of cast iron is comparatively a new subject. One of the commendable undertakings of committee A-3 is an extensive digest of the literature of the heat treatement of cast iron now being prepared.

F. B. Coyle discussed this subject briefly, dwelling upon some of the important features involved. If alloying elements can produce considerable increase in the relative values of properties of steel, it is inferred that alloying elements should produce a like improvement in cast iron. This seems true because cast iron is essentially a steel whose continuity is broken up by free graphite. The intrinsic value of alloy steel is only brought out by heat treatment and it is reasonable to assume that cast iron in general should also be benefited by heat-treating processes.

Mr. Coyle states that there are four important factors to be considered in subjecting cast iron to heat: Artificial aging, alteration of chemical and physical properties, growth, and rustproofing. These factors are considered by the author at three different ranges of temperature for heat treatment. The author believes that systematic investigation in this field of study will disclose that the applicability of heat treatment to cast iron will be of distinct economic value to industry in general.

Views in General

SOME disappointment was evident from the fact that the symposium did not bring out a broad range of discussion. The length of the program militated to some extent against this. Mr. Bornstein emphasized the need of knowledge as to machinability and wear of gray iron and the desirability of some measure of these properties. Dr. Richard Moldenke said that all those interested in cast iron want wear and machinability in the product but one great difficulty is the fact that so "many kinds of castings are poured from one mixture. American practice is far behind Europe in this respect."

Alloys Are Not Cure-Alls

Mr. Coyle called attention to the fact that addition of alloys to cast iron do increase the resistance to wear and that his files show many special results of this kind. It is, of course, often necessary to use different mixtures, but alloying elements are not cure-alls but are a great aid for certain purposes. N. L. Mochel offered two valuable illustrated discussions, one on the question of the correlation of test bars and castings, showing some results which he had obtained. He also expressed regret that the symposium did not include the welding properties of cast iron on which he had done some work. Some of his results were interestingly presented.

Testing Society's Largest Meeting

Membership at Record High—New Standing Committees Bring Total to 48—Marburg Lecture a Feature —Research Inaugurated

ADDING still more prestige to an already enviable record, the American Society for Testing Materials held the largest convention in its history last week. It was the thirty-second annual gathering, held in the traditional place, Atlantic City, June 24 to 28. This location has become so fixed a policy that attempts to break away from it have not been very successful. French Lick, Ind., was the place two years ago. Plans were seriously debated last week of holding one convention every three years elsewhere, probably in the Middle West. Chicago is being considered for 1930. As in the recent past the Chalfonte-Haddon Hall was its headquarters.

Unusual activity marked the work of the very many committees. The zeal and earnestness of these committees is always keen and can be matched by no other society in the world. Starting in early Monday, June 24, there were sessions of committees morning, afternoon and evening and much was accomplished. Each year also witnesses new committees formed and new fields entered for fact-finding or specification purposes.

New high records in attendances were made. The total registration by Wednesady evening of 850 men and 245 women had surpassed all figures for the third day. Final registration totals gave 934 men. This compared with 895 men last year. The previous high record was 905 in 1926.

Marked Progress Reported by Executive Committee

A REVIEW of the progress and aims of the society is contained in the annual report of the executive committee which was presented by Secretary-Treasurer C. L. Warwick at the annual meeting. Some of its important features are as follows:

New Standing Committees Organized

Three new standing committees have been organized within the year: Committee A-10 on iron-chromium, iron-chromium-nickel and related alloys; committee B-5 on copper and copper alloys, cast and wrought, and committee B-7 on light metals and alloys, cast and wrought.

Committee A-10 has had assigned to it a most important group of alloys, in which there is much need of coordinated research on the corrosion resistance and other properties of these alloys. In the organization of this committee it has been necessary to consider the relationship of its field of work to that of committee B-4, originally entitled "metalic materials for electrical heating," which deals with a portion of the alloys in the iron-chromium-nickel system, used especially for electrical heating purposes. Some conflict has developed between the two committees as to their relative jurisdiction. At a meeting of committee A-10 last week a settlement of this controversy was put up to the executive committee of the society. The temporary organization of committee A-10 was voted to continue until the regular time for election of officers. Jerome Strauss continues as temporary chairman, with N. L. Mochel as temporary secretary.

The organization of the new committees B-5 and B-7 is part of a reorganization of committee activities in the non-ferrous metals group, which has come about through recommendation made by committee B-2 on non-ferrous metals and alloys.

After a careful study of the standardization activities of the society, particularly from the administrative viewpoint, and in consultation with the standardizing committees through committee E-5, the executive committee has authorized the organization of a new committee to be known as committee E-10 on standards. It is believed that the new committee will develop into a most important administrative one, particularly with respect to the problem of extending the society's standardization work over the entire field of engineering materials and the relationship of standardization activities with those of other bodies.

Corrosion Work to be Coordinated

A coordinating committee on corrosion has been formed to correlate the corrosion studies of the four committees of the society that are dealing with this important subject as applied to different groups of materials, namely, committee A-5 on corrosion of iron and steel; A-10 iron-chromium, iron-chromium-nickel and related alloys; B-3 on corrosion of non-ferrous metals and alloys, and B-4 on high temperature electric resistance alloys. Each committee has appointed two representatives on the coordinating committee.

With these new organizations the number of standing committees is brought to 48.

Executive Committee Enlarged

Preliminary modifications of the by-laws involve an increase in the number of members of the executive committee from 8 to 10, which, with the four officers and the last three past presidents, will make a total membership of 17. The other modifications provide a method for acceptance and publication of proposed new standards as tentative standards in the interim between annual meetings of the society, a saving of time being thus effected.

Total Membership at New High—4244

Membership of the society made a net gain for the year ended June 1, 1929, of 52. The number of new members for the year was 365, which is slightly better than for 1928 although not so large as that of two or three years ago. Total membership as of June 1, this year, is 4244 as against 4192 a year ago.

Activities on the Pacific Coast

During the past year the executive committee decided to investigate plans that had been under consideration for some time for the establishing of a closer relationship between the society's general activities and the members on the Pacific Coast. As a first step in this direction Secretary-Treasurer C. L. Warwick visited the members in the three Coast States of California, Oregon and Washington last fall. A comprehensive report has been submitted to the executive committee. Among several recommendations is one to the effect that a study be made of the feasibility of devising some means by which Pacific Coast members may function as a group, and means by which groups of members representing producers and consumers may be formed into divisions, affiliated with and functioning as a part of the standing committee.

It was also recommended that the executive committee give consideration to the possibility of arranging for occasional meetings of the Pacific Coast members under official auspices, and that local committees of society members in the Los Angeles, San Francisco, Portland and Seattle districts be appointed for the purpose of promoting the usefulness and extending the influence of the society in those districts. The various recom-

mendations are being carefully considered by the executive committee.

The New International Association

Preliminary arrangements for the participating of the society in the next congress of the International Association to be held at Zurich, Switzerland, in 1931, are now being made by the society's representative on the permanent committee of the New International Association for Testing materials, past-president W. H. Fulweiler. On June 1, 1929, there were 243 members of the A. S. T. M. who became members of the international association, 38 being companies and 205 individual members.

To Take Part in World Engineering Congress

The executive committee has accepted an invitation for the society to participate in the World Engineering Congress to be held in Tokio, Japan, this year, under the sponsorship of the Japanese Government. As part of the American participation in the congress, Prof. H. F. Moore, University of Illinois, and past-president of the society, has prepared a paper on "Engineering Materials" for presentation at the congress.

Marburg Lecturer Brings Physicist and Engineer Closer Together

A FEATURE in the last three years has been the Edgar Marburg lecture, founded in 1926 in memory of the society's first secretary.

This year Dr. Saul Dushman was selected to deliver the fourth lecture. The choice was eminently fitting, the address bringing out the close relationship between the physicist and the engineer. Dr. Dushman is assistant director of the research laboratory of the General Electric Co., Schenectady, N. Y. Educated at the University of Toronto, from which he was graduated in 1904, he was a lecturer there before joining the research staff of the General Electric Co. in 1912. The subject of his lecture was "The Nature of Cohesive Forces in Solids." An abstract follows:

The Bohr theory of the origin of spectra led to definite conclusions regarding the arrangement of electrons in the atoms of the different elements. It has been shown that the electronic configuration and a large number of properties of the elements vary in a periodic manner with the atomic number. At least four cohesional properties show this periodic relation with electronic arrangement. These are as follows: The reciprocal of the melting point on the absolute scale, the atomic volume, and coefficients of compressibility and expansion.

Ductility and Malleability of Metals Dependent on Structure

The crystal structure of pure metals also shows a similar connection with electronic arrangements, and certain properties, such as ductility and malleability, are observed to be intimately dependent upon the type of lattice structure. The fact that atoms are arranged in regular lattice formations leads to revised views on the nature of so-called secondary valence of forces. Cohesional forces are essentially no different from chemical forces except in order of magnitude.

While it is not possible as yet to formulate a theory of cohesion in solids based upon atomic structure, it is possible to calculate the magnitude of such forces by introducing plausible assumptions regarding the laws of attraction and repulsion between atoms. As shown by Grumeisen for the case of pure metals and by Born for ionic lattices (such as rock salt), there must exist definite relations between the theoretical cohesive force between atoms and such experimentally observed values as density, latent heat of evaporation and coefficients of expansion and compressibility. The cohesive forces, calculated on the basis of this theory, are found to be from 10 to 100 times greater than the rupture strengths actually observed.

In explanation of this discrepancy, Griffiths and Smekal suggested the presence of fine cracks, crevices or inhomogeneities in the crystal structure. Various observations made by these and other investigators are found to be in good accord with such an assumption. The theory has been extended quite recently by Zwicky and evidence adduced to show that the distribution of such cracks must be governed by the lattice structure and that this accounts for the fairly definite values actually obtained technically for rupture strength of different materials.

Most interesting results have been obtained from investigations on the tensile behavior of single crystals. The application of such results to the observations in the case of polycrystalline materials leads to similar views as those postulated by Griffiths, Smekal and Zwicky.

Cohesive Forces and Strength of Metals at High Temperatures

The effect of temperature on the rupture strength is discussed at length by Dr. Dushman. A plot of the observed data against temperature shows two distinct portions, one below a definite inflection temperature which is approximately linear, and the other, which extends from the inflection temperature upward, shows a very much more rapid decrease in strength with temperature. In explanation of these observations an extension is suggested of the theory previously postulated by Jeffries and Archer with regard to the relative strength of crystalline and intercrystalline material. The inflection point in the plot of rupture strength versus temperature is probably to be identified with the so-called equi-cohesive temperature. Above this point deformation occurs by viscous flow, and consequently the rate of decrease in tensile strength with temperature is dependent upon the rate of decrease with increase in temperature coefficient of viscosity.

Analogy with other reactions, both chemical and physical, whose rates change with temperature in the same manner suggests that, from the temperature coefficient of the rupture strength, it should be possible to calculate the energy required to cause relative translational motion of atoms or grains such as occurs in plastic flow of solids. The values of the energy thus calculated are found to lie between the heats of fusion and evaporation. The nature of the previous treatment of the metal and other factors affect the value of the energy as actually observed.

Similarly, from the rate of grain growth, rate of diffusion, electrolytic conductivity of salts, viscosity of glass, rate of flow of metals, each of which changes rapidly with temperature, it is possible to calculate the energy involved in the reaction. Thus the study of the effect of temperature on all these phenomena furnishes a means of determining the particular type of cohesive forces which are involved.

Marburg Lecturer and Dudley Medalists

SAUL DUSHMAN

L. W. SPRING

J. J. KANTER

Two Recipients of the Dudley Medal

IT is customary each year to award the Charles B. Dudley medal to the author or authors of the paper adjudged to be the best one presented at the previous annual convention. The third award was made this year to J. J. Kanter and L. W. Spring, joint authors of the paper, "Long-Time Flow Tests of Carbon Steels at Various Temperatures with Particular Reference to Stresses Below the Proportional Limit."

During the last four years Mr. Kanter, who is testing engineer of the Crane Co., Chicago, has been engaged in the development of creep test apparatus and in investigations in this important field of high temperature

President, Vice-President and Retiring President

T. D. LYNCH

F. O. CLEMENTS

G. W. THOMPSON

testing of metals. Mr. Spring is active in the A. S. T. M., A. S. S. T., and other technical societies, and is chief chemist and metallurgist of the Crane Co. His technical articles in chemical and physical testing have been numerous.

Presentation of the medals followed the Marburg lecture. President G. W. Thompson made the presentation speeches, and both recipients responded, Mr. Spring outlining some facts leading up to the work referred to in the paper and giving some history of high temperature testing.

Standardization and Good Will

IN his annual address as the retiring president, G. W. Thompson, chief chemist, National Lead Co., New York, took as his subject "Standardization and Good Will." Some of the chief points he made were as follows:

The President of the United States, Herbert Hoover, when he was Secretary of Commerce made many speeches and issued many communications to the public in the general advocacy of standardization. While not attempting to present Mr. Hoover's views in detail, there is one thought that runs through all of his addresses on this subject to which I would direct your attention. In the United States, industries are conducted on a large scale. In order that these industries should be profitable it is necessary, so far as is practicable, that the products manufactured be simplified as to number and kind so that large production of unit types of products can be made day in and day out. In order to do this the products must be standardized to meet the demands of the consumer. The only limitation to this point of view is that the standards should not go so far as to prevent the obtainment by the consumer of materials that are best suited to his needs.

If there ever was a democratic organization in the best sense of the term, our society is one. In theory at least, and actually I believe, our committees are made up of those who have common ends approached from different standpoints. Our committee meetings are in principle those of the round table where, while you have nominal chairmen, there is no head nor foot but all sit down at the table with equality. If it ever so happened that our committee meetings became in the nature of the long table with a head and a foot, unfortunate it would be for our society.

What is more, our society has wide-open doors and if any consumer, or group of consumers, has an interest in the standardization of materials for engineering he finds the spirit of our society welcoming him as a member, and the same is true with regard to the producers.

One Great Difficulty Confronting the Society

We may as well speak openly about one of the great difficulties that confronts our society. There are a large number of industrial organizations in this country that are inclined to resist standardization on the ground that it substitutes something for the good will their organizations are trying to build up by the expenditure of large sums of money for advertising. They consider that standardization and the building up of good will are incompatible. To a certain extent I sympathize with this view although my better sense condemns it in so far as it relates to the standards of this society.

So far as consumers are concerned, they have specifications of their own if they are not more generally standardized by a body such as ours. Therefore, standardization by our society, as it affects the large consumer, substitutes general standards for isolated standards. The large consumer will generally buy in the open market on more or less of a competitive basis. He may have his preferences and he may prefer to give his orders to certain producers, but this depends largely upon other things being equal, such as price and quality of product. I must emphasize, however, that what I say has relation only to those materials which are bought in relatively large quantities for specific purposes.

What I say does not relate to the purchase of small quantities of material for very indefinite purposes which materials have been found by experiment and use to satisfy the needs of the consumer. It is not for me to draw the line between these two groups of materials and their uses but that there is a distinction between them is clear. Of course, specification of materials used in large quantities will also cover the use of these materials in small quantities, which is of advantage to the general public.

Let us think on the other hand as to the effect upon the producer and the good will he is endeavoring to build up when he has a record of having furnished some standard product to a large consumer year in and year out with extreme satisfaction to the consumer. It is presumed that the consumer has examined carefully the products delivered to him by this producer. The weights and volumes have been checked, analyses have been made of the product, and this product has been uniformly found to conform to standard specifications. Does this add anything to the value of the good will of the producer? I am sure it does add a great deal to that value.

All consumers naturally want to buy in the cheapest market. This desire exists whether there are standard specifications or not. Suppose there are no standard specifications, what will the consumer do? He will buy in the cheap market just the same, but he will be far more subject to those blandishments of the salesmen with which we have in the past been too familiar.

It is said that standard specifications are often compromises. As a statement of fact this is undoubtedly true. As a basis of criticism it is unsound. A standard specification, whether it is good or bad, has only the same kind of value which attaches to everything else. It is good or bad according to the way it works. All specifications, when we study the history of them, began with what are called "bad specifications," or, as some would say, imperfect specifications, using what I consider a very improper designation. It is the order of progress that what we did yesterday should be bad and imperfect as compared with what we do today, but we must remember that what we do today is based upon what we did yesterday.

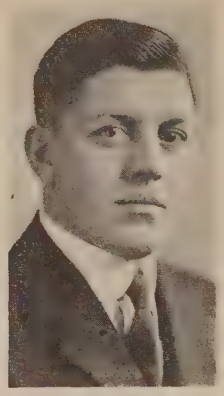
Standard Specifications Subject to Change

Standard specifications are not fixed things; they are constantly subject to change. They should not be adopted prematurely, neither should they be amended prematurely, but they should show constant growth. In our society, with our standing committees made up of both producers and consumers constantly studying the problems covered by specifications, there is a quick response as to the efficiency of specifications. Sometimes producers and sometimes consumers will not use specifications. Time only can tell whether they are right or whether they are wrong. As to the criticism that standard specifications are usually compromises, that we admit and we admit cheerfully in that we do not know of anything in life that is not a compromise.

Permit me to sum up this talk with these few words. Our society occupies an impregnable position, impregnable so long as we perform our functions rationally, justly, and with a continuous process of development. We have no desire to break down any good structure in industrial life. Our object is to build as far as we can on sound foundations, going only as far and as fast as we feel that the circumstances justify. We aim to move constantly forward, requiring no push or prod, for our aims are clear and our methods of procedure have stood the test of time. If, however, our society would live up to its great purpose none of its members and none of its committees must stand in the way of general progress along the lines of proper development. I trust that our future will far exceed in brilliance our past in the service which we are rendering to in-

New Directors for Next Year

CHARLES R. HOOK



G. E. WARREN

H. E. SMITH

G. B. HAVEN

dustry, to our country, and to the world at large.

New Work of Some Prominent Committees

AMONG the many committees whose annual reports were adopted, several should be mentioned.

Committee A-1 on steel, the society's largest one, presented new specifications for heat-treated carbon steel helical springs and a complete revision of the standard specifications for carbon steel forgings for locomotives. The immediate adoption of revisions of the standard specifications for carbon and alloy steel blooms, billets and slabs for forgings and for wrought solid carbon steel wheels for steam railroad service was recommended.

An Old Contest Revised and Settled

Revival of an old contest was brought to the floor of the convention. When the advancement to standard of tentative standard specifications for carbon steel castings for valves, flanges and fittings for high temperature service (A95-28T) was brought up for adoption, there were decided objections.

For six years the question of discriminating against the converter process for making such castings and of adopting definite chemical limits has been debated with some bitterness. This year the familiar arguments were again voiced. John Howe Hall, A. H. Jameson, and Prof. Bradley Stoughton argued against the adoption of the specifications as standard while L. W. Spring, V. T. Malcolm and R. A. Bull favored the adoption. When the final vote was taken, 43 favored the advancement to standard with 11 voting negative.

Splendid Work of Committee on Cast Iron

Undoubtedly one of the most active committees in the ferrous phase of the society's work is now A-3 on cast iron. During the year it successfully organized a symposium on the engineering properties of cast iron, which was a valuable contribution to a revival of interest in this product. A review of this symposium is printed on other pages. Too high praise cannot be voiced for this effort.

Arbitration Bar Adopted

After several years of investigation and debate, a committee recommended for adoption as standard the specifications for the arbitration test bar and tension test specimen as a revision of standard specification for gray iron castings, cast iron pipe and fittings and high-test gray iron castings. It also recommended new specifications for gray iron castings for valves, flanges and pipe fittings, as well as for chilled tread cast iron car wheels, as a revision of the present standard specifications.

Tin and Arsenic Harmful to High-Speed Steel

Report of the research committee on the effect that tin and arsenic have on high-speed tool steel, was that special heats had been made containing respectively 0.40 per cent of arsenic and 0.40 per cent tin. Service tests of tools made of this steel,

New Officers and Directors for 1929-1930

President:

T. D. Lynch, consulting metallurgical engineer, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

Vice-President:

F. O. Clements, technical director, Research Laboratories, General Motors Corporation, Detroit.

Members of Executive Committee:

G. B. Haven, professor of machine design, in charge of textile laboratory, Massachusetts Institute of Technology, Cambridge, Mass.

C. R. Hook, vice-president and general manager, American Rolling Mills Co., Middletown, Ohio.

H. E. Smith, engineer of materials, New York Central Lines, New York.

G. E. Warren, assistant general manager, Portland Cement Association, Chicago.

such as cutters, reamers and twist drills, showed conclusively that such steel was unsuited for twist drills, and that it was detrimental in service for cutters and reamers.

High Temperature Committee to Be Reorganized

A report by the joint research committees of A. S. T. M. and A. S. M. E. on the effect of temperature on the properties of metals was not made. This committee is undergoing a reorganization. Chairman G. W. Swaathoff has resigned, and C. E. MacQuigg has been selected as temporary chairman, pending a permanent organization.

At some of the sessions on metals several papers of importance were presented. There were three in particular on fatigue of metals, and one by L. W. Fry, Standard Steel Co., Burnham, Pa., on "The Effect of Reduction from Ingot to Forging on Steel Forgings." These will be briefly reviewed in later issues of THE IRON AGE.

There were two sessions on nonferrous metals, at which various committee reports as well as original papers were presented. These will be the subject of review in later issues of THE IRON AGE.

Prominent Men as New Officers

AS president for the next year, the society has selected T. D. Lynch, consulting metallurgical engineer, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. He was graduated from West Virginia University in 1891. From 1922 to 1923, he was president of the American Society for Steel Treating. He is also a member of the Engineering Society of Western Pennsylvania and of the International Society for Testing Materials and is active in the committee work of the American Foundrymen's Association and of the American Standards Association.

For vice-president, F. O. Clements has been elected. He is technical director, research laboratories, General Motors Corporation, Detroit. He is a graduate of Otterbein College, Westerville, Ohio, in 1896. He has been chemist successively for the Pennsylvania Railroad, Union Pacific Railroad, National Cash Register Co. (1905 to 1917) as chief chemist and engineer of tests, and director of research, Dayton Metal Products Co., Dayton, Ohio. He has held his present position since 1920. He is a member of the American Chemical Society, the A. S. T. M., the A. A. A. S., the A. S. S. T., the American Electrochemical Society, the Institute of Metals (Britain) and the S. A. E.

Four new directors were chosen, one of whom is G. B. Haven, who is professor of machine design, Massachusetts Institute of Technology, was a graduate of that institution in 1894. For 11 years he was associated with the late Prof. Peter Schwab. He has been in his present position since 1910, in charge of textile research.

Another director is Charles R. Hook, vice-president and general manager, American Rolling Mill Co., Middletown, Ohio. Graduated from the Walnut Hills High School of Cincinnati, he secured his first position as office boy with the Cincinnati Rolling Mill & Tin Plate Co. Next he became night superintendent of the company he has been with ever since. He is president of several banks and a director in several corporations.

The third director is H. E. Smith, well known among railroad men. He was graduated in chemistry from the Massachusetts Institute of Technology. He has been connected with several railroads, particularly the New York Central, of which he is now engineer of materials in charge of specifications and special investigations of materials.

As the fourth new director, the society has chosen G. E. Warren, assistant general manager, Portland Cement Association, Chicago. He was graduated from the University of Illinois and has served on several important cement committees.

Metal Lath Makers Adopt Trade Rules

WASHINGTON, June 29.—A code trade practice, including 24 rules, was adopted for the metal lath industry here on Thursday when the Associated Metal Lath Manufacturers held a trade practice conference with the Federal Trade Commission, represented by Commissioner W. E. Humphrey and M. Markham Flannery, director, Trade Practice Conference Division. The rules set up at the conference cover largely the scope that is treated in such conferences. Breach of contract, misbranding or misrepresentation, misrepresenting competitors' prices, defamation of competitors, secret rebates and selling below cost were among practices that were condemned.

Approval was given to the principle of a reasonable differential in prices charged to dealers and to contractors when sold equal qualities and in substantially equal amounts, and to the practice of each individual member independently publishing and circulating his own current prices, and also notices of all advances, declines or other changes in price. The principle that there shall be no discrimination as between purchasers of the same class was adopted, with the provision that there was no obligation to maintain any price any length of time.

Sale or offering for sale of any product of the industry at carload prices when shipped in less-than-carload quantities was condemned as an unfair trade practice, as was the sale or offering for sale of any product under any form of guarantee, to the purchaser or proposed purchaser, against advance or protection against decline in prices. Blanket contracts were condemned, while approval was given to standard contracts. The practice of dumping surplus stock of metal lath and accessories, at low discriminatory prices, was declared to be an unfair method of competition.

Tests of Interlocking Steel System

Laboratory tests at the Rensselaer Polytechnic Institute, Troy, N. Y., have been made of the Wait interlocking steel system, consisting of two-story bents and of column construction. The tests were under the direction of Prof. T. R. Lawson, head of the department of civil engineering. An illustrated pamphlet describing the system and the tests to which the members were subjected has been published by Wesley Wait, Newburgh, N. Y.

Comparative tests were made on two-story bents of riveted structures, interlocked structures and interlocked welded structures. In each case the test was carried to the point where some member buckled.

Production and Shipment of Raw Materials and Finished Products in May

	May, 1929	April, 1929	May, 1928
Enameled sanitary ware shipments (a), pieces	341,927	348,385	461,124
Babbitt metal (a), consumption, lb.	5,472,008	6,046,445	4,606,899
Steel boilers, new orders: (a)			
Number	1,749	1,706	1,836
Heating surface, sq. ft.	2,143,257	1,769,427	1,661,173
Steel furniture: (a)			
New orders	$2,845,826	$2,880,395	$3,085,638
New orders, 5 months	15,562,878	.....	15,828,337
Shipments	2,791,306	2,844,939	3,213,291
Steel shelving: (a)			
New orders	1,127,431(b)	1,095,329	732,921
New orders, 5 months	5,387,524	.....	3,824,735
Shipments	990,651	1,131,362(c)	768,988
Electric power production (d)	8,093,373	7,881,620	.....
Made by water-power (d)	3,485,021	3,285,154	.....
Bituminous coal mined (e), net tons	40,172,000	36,888,000	36,624,000
Anthracite mined (e), net tons	6,308,000	6,441,000	8,124,000

(a) United States Department of Commerce.
(b) Second largest total ever recorded; exceeded only by March, with $1,145,632.
(c) Largest total ever shipped.
(d) United States Geological Survey; figures represent thousands of kwhr.
(e) United States Bureau of Mines.

Foundrymen Hold London Meeting

Representatives of Many Nations at Third International Congress—Test Bar Correlation and Alloy Irons Fully Discussed—Large Exhibitions a Feature

(Special Correspondence)

LONDON, ENGLAND, June 17.—The Third International Foundrymen's Congress was held in London from June 11 to 15, at the same time as the twenty-sixth annual convention of the Institute of British Foundrymen, and in conjunction with the largest working exhibitions of foundry and shop equipment ever held in Europe. Many of the delegates, in particular those from America, arrived in London last month.

Foundrymen from America Banqueted

The American delegation, among whom were S. T. Johnson, president; Fred Erb, vice-president; S. W. Utley, past-president; C. E. Hoyt, secretary, and R. E. Kennedy, technical secretary of the American Foundrymen's Association, were welcomed on their arrival in London at a banquet held on May 23, over which Sir Hugo Hirst presided. This was followed by an extensive tour of the industrial and other parts of the country, which lasted until June 9, and in the course of which the delegates visited, as the guests of the local branches of the Institute of British Foundrymen, Birmingham and Coventry, Manchester, Oldham and district, Glasgow, Edinburgh and Sheffield, in addition to Shakespeare's country, the Derby and Matlock and the lake districts. The Congress was preceded on Monday, June 10, by the annual general meeting of the Institute of British Foundrymen, when Wesley Lambert was elected president for the coming year, with F. P. Wilson and A. Harley, vice-presidents.

Two Medals Presented

The congress which has just closed is the third of the series of triennial international foundrymen's congresses, the first of which was held in Paris in 1923 and the second in Detroit in 1926. It opened on June 11 in the Grand Council Chamber of the historic Guildhall in London, which was crowded with delegates from Great Britain, and many countries overseas. This in itself is a notable tribute to the importance of the foundry industry, and to the improved status which has come about as a result of the untiring efforts of a number of able and farseeing men in the industry.

Sir Kynaston Studd, Lord Mayor of London, extended a cordial welcome to the delegates, and presented two medals. The first, a gold medal, was awarded to Prof. T. Turner, late professor of metallurgy, University of Birmingham, and a past-president of the Institute of Metals, as a permanent souvenir of a presentation made to him two years ago, on behalf of the Institute of British Foundrymen and the British Cast Iron Research Association, on the occasion of his retirement from his professorial duties at Birmingham. Professor Turner returned thanks for this expression of approval of the work he had been able to do, and also took the opportunity to thank his American friends for having presented to him, through his son, at Detroit, nearly three years ago, their Siemens medal.

The second medal, the Oliver Stubbs Medal, was presented to the president, Wesley Lambert. This is awarded annually to the member of the Institute of British Foundrymen who has contributed the most meritorious services during the year, and it is the first time the medal has been awarded to a representative of the non-ferrous side of the industry.

A pleasant feature of the Guildhall meeting was the delivery of short addresses by the heads of delegations from the various countries overseas. The countries the representatives of which spoke were America, Germany, France, Belgium, Italy, Holland, Poland, Spain, Luxemburg, Czecho-Slovakia and Denmark.

Progress of the Foundry Traced by the President

In his presidential address Wesley Lambert traced the progress of the foundry industry through improvement in building design and construction, planning and layout of the foundry, and the installation of machinery. Touching upon progress in the art of molding, Mr. Lambert said that the journeyman molder had progressed so far today that he was making high-duty complicated castings with intricate cored parts which the old-time craftsman would have considered to be beyond the bounds of possibility.

Commenting upon the development of the aluminum casting industry, the president predicted that in the not very distant future even lighter alloys, mainly composed of magnesium, would become a serious rival for the engineer's favor. Chemical and superheat plant engineers are giving enthusiastic testimony to the progress which had been attained in the fabrication of special irons and non-ferrous alloys to meet their particular requirements.

One of the most outstanding applications in foundry practice is the extended use of oil-sand cores which have rendered possible the mass production of intricately-cored castings which at one time would have taxed the skill of even the most painstaking craftsman.

The laboratory side of the modern foundry has also progressed considerably, along with technical progress, and what is of equal importance is the great improvement that has taken place in the general design of the buildings and of their equipment for the welfare of the workers.

Immense Possibilities for the Future

The future of the foundry industry holds immense possibilities, said the president. It is common knowledge that in so comparatively recent times as the reign of Queen Elizabeth only seven or eight metals were known, of which only four, iron, copper, tin and zinc, were in use for the compounding of constructional — as distinct from ornamental—alloys, whereas today, as a result of intensive scientific research, 61 metals are now available, and, year by year, one or more of the previously rarely used metals is being harnessed to the service of mankind in the form of alloys for industrial uses, the immense possibilities of the utilization in the foundry of these later discovered metals affords subject matter for fascinating conjecture.

It may be seen, by the use of a simple formula, that if a complete series of binary alloys of all the known metals were compounded in merely one uniform proportion, such as 50:50, the number of alloys resulting would be 1830; if ternary—three-metal—alloys were made also in one definite proportion only, the number of different alloys would total 35,990. To go but one step further, if a complete series of quartenary, or four-metal, alloys, in one uniform proportion, such as 25 per cent of each of the four metals constituting any one

alloy were attempted, 521,855 separate alloys would have to be produced before each of the known metals was thus proportionately employed in its own group in this series of alloys.

In concluding his address, the president paid a tribute to the foundrymen from overseas who were attending the congress, all of whom had generously contributed toward improving the condition, the efficiency, and the output of the industry. He hoped to see closer association among institutes and organized bodies representing the foundry industry of the world, which would result in raising that industry to the high status which its science and craftsmanship so fully merited.

Some of the Technical Papers

Abstracts of some of the many papers and discussions presented at the various sessions are as follows:

Inter-Relationships in Gray Iron Metallurgy

PRESENTED on behalf of the American Foundrymen's Association by J. W. Bolton, the Lunkenheimer Co., Cincinnati, the paper on the above subject deals with schemes of correlation, and discusses two important problems:

(1) Study of the influence of manufacturing practice on given grades of cast iron; and

(2) Relationship of test results to engineering properties of the casting.

The first problem is solved as follows: Arrange a classification of irons according to composition: and make an intensive study of each grade. In this study it is necessary to give consideration to the influence of the four following factors:

Chemical composition of metal, initial, incidental and final;

Structural, mechanical and chemical make-up of charge (all materials);

Melting process, conditions chemical, thermal and mechanical; and

Thermal, chemical and mechanical history, furnace spout to finish casting.

On the second problem two viewpoints predominate—one that of many British and Americans, who believe that test results can be correlated so that properties of castings may be predicted therefrom with reasonable accuracy, and the other that of the French and other Continental investigators, who hold that tests must be made on the castings themselves.

It is logical to expect that if a ladle of the same grade of iron is divided into two parts and each part subjected to exactly the same treatment, the two resultant materials will be the same.

Correlation Necessary or Research Is Futile

Reasonable correlation of tests to the properties of the castings themselves must be established or cast-iron research is futile. That it is possible to tell a great deal about the quality of the metal in the casting, is evident from the following considerations:

(a) Many working properties of steel and other metals are predicted regularly from tests. Granting the limitations of the tests and the difficulty of their exact interpretation, which, by the way, applies to all materials, no one would deny that great progress has been made by use of tests. In a general way tests are used every day to determine properties of commercial metals.

(b) If in two or more cases exactly the same grade of material is accorded the same or equivalent treatment, the altered materials will still be the same, one to another.

(c) Test bars are castings of certain specified shape and dimensions. If castings and test bars all of the same analysis and cooling rate are poured at the same time from the same material, one would expect to find similar metal in each. The problems encountered are: (1) to make test bars whose cooling rates are like those of the castings, and (2) to use common sense in making allowance for peculiarities in design and foundry practice—particularly those which may promote shrinkage or other defects and those which call for slow or fast pouring of castings.

(d) These points are borne out because the foundryman of wide experience can take an analysis and a result on one of the so-called arbitration test bars and many times predict quite closely what the iron in the casting will be like.

It then is possible to solve the second problem—relationship of test results to the properties of the casting. What is needed is cooperation in accumulation and interpretation of sufficient data. Careful study must be made of test methods. In the correlation shown in the examples above, the general agreement becomes more remarkable when it is considered that (a) the metal flow in the castings may be slower than in the bar; (b) that the machined tensile bar is in case of the castings closer to the cooling surfaces than in the tensile bars—thus neglecting the well-known and demonstrated differences due to cooling gradients of unlike sections of similar volume surface-area relationship. This is most apparent in larger sections.

The usual commercial impracticability of the French scheme of trepanning a small shear sample from actual castings appears a barrier to the widespread use of this method. In America, attempts to get similar tests into specifications for steel castings have been opposed. There may be some merit in the idea of cast-on bars for certain types of casting. The work of the late George K. Elliott, Willard Rother, and the writer demonstrate certain objectionable features in the original Fremont test. This test, as proposed, was hardly precise enough for use in commercial specifications. The machine did not seem sufficiently rigid and the method of preparation of the test bar by a hollow drill is open to criticism.

Accurately-machined bars are an absolute necessity, and a rigid and accurate machine is needed. The test piece proposed was too small to be representative of the general properties of the iron. On the other hand, the basic idea of the French engineers is very good. With proper modification, the shear test is quite useful in research work.

Larger Test Specimens Necessary, Says American

Referring to the trepanning of specimens and the attempt to correlate the results of tests on bars taken from the castings and on cast specimens, R. F. Harrington, metallurgist, Hunt-Spiller Mfg. Corporation, Boston, said it is becoming more fully realized that it is necessary to use larger test specimens than had been used hitherto, in order that the results obtained may be more strictly comparable. He anticipated that the A. F. A. will be able to shed more light on that particular subject. He was glad that Mr. Bolton had emphasized, above all, the fact that foundrymen have to sell castings, and not test bars, and that they are concerned to turn out proper castings by the adoption of sound foundry methods.

J. T. MacKenzie, chief chemist, American Cast Iron Pipe Co., Birmingham, Ala., said that the work of the A. F. A.'s committee on gray cast iron is concerned with the examination of the properties of the iron in the molten state, with the idea of determining the properties which make for the production of sound castings or otherwise. They have just completed some work of considerable magnitude on the determination of the temperatures, and have shown up the faults of the optical pyrometer in that regard. Following that, they are engaged upon a study of the shrinkage of cast iron in the freezing range. If they are successful in developing a test for that, it will be extended to the contraction from the freezing point to room temperature, which will include shrinkage as we now know it. Mr. MacKenzie said he could not emphasize too strongly his belief that the soundness of the casting had more to do with the quality of the cast iron than with the tensile strength of the test bar.

Results put forward in the paper represent a considerable amount of practical work, and, combined with it, an attempt at scientific correlation, said Prof. T. Turner, Birmingham, England. In earlier investigations of subjects of this kind we have been content to say that a thing is good or bad, or very good or very bad, and we have had no quantitative values. We do not become scientific until we can express many of the properties

in figures, but he uttered the warning that if we do use figures, we must be sure that they are correct, because there is nothing more misleading than wrong figures.

Intermediate Forms of Graphite Exist

Discussing the amount and form of graphite in the castings, Professor Turner said that graphite is sometimes very fine indeed, like soot; sometimes it is in the form of curved flakes, and sometimes in the form of flat flakes. Those are simple kinds of graphite, but there are also intermediate qualities, each of which corresponds to entirely different physical properties in the material, and when describing graphite one should endeavor to state to which class it belongs, or whether it is a mixture of more than one class. Some graphite is so small that it can hardly be seen with the aid of a microscope, while some is in the form of flakes almost as large as one's finger nail, and there are other sizes between these extremes. He urged that there should be evolved some method of classifying graphite microscopically, as, for instance, in terms of inches or millimeters.

That the paper was a condemnation of the use of test pieces cast separately from the actual castings was suggested by E. V. Ronceray of France. He was glad to note that the author attached great importance to the soundness of castings, because at the Foundry High School in France the students are taught that the first four important factors are (1) soundness; (2) tensile strength or internal strain, (3) strength of material and (4) cost.

The author's remarks as to the importance of the melting conditions were confirmed by J. G. Pearce, director, British Cast Iron Research Association. Discussing the problem of the volume/surface-area ratio, he said he had carried out some work on the mechanical properties of cylindrical bars, and had tried to relate the strength of the bars of different thicknesses to the diameter. The cylindrical bar is a very simple casting, and the ratio might work in simple cases, but, in regard to the more complicated castings, he was not so optimistic.

Excellent American Work on Correlation

After paying a tribute to the American foundrymen for their wonderful work on correlation, J. E. Fletcher, consultant, British Cast Iron Research Association, said that the research association has been trying to correlate as far as it could the various properties of cast iron as influenced by cooling rate and composition. There is one phase of this subject, however, which is sometimes left out of consideration, namely, the conditions of the making of the raw material in the blast furnace, which influence in such a serious fashion the ordinary casting, and he suggested that foundrymen should try to obtain from the blast furnace people a good deal more information than they have hitherto vouchsafed to give.

Discussing the test results relationship, John Shaw, consultant, Southsea, England, said he would not care to accept the tensile result of a bar of the same composition as the casting, if that bar had not been cast out of the same ladle of metal; neither would a shear result converted into a tensile be acceptable. While it might be granted that, under the very closely controlled conditions specified by Mr. Bolton, approximations in both cases are possible, and their use for works information and research of great value, these approximations cannot be acceptable to the buyer of the casting.

Chromium, Manganese and Nickel in Cast Iron

INVESTIGATIONS carried out in the Works of Scott's Shipbuilding & Engineering Co., Ltd., Greenock, said Dr. J. W. Donaldson, in a paper "The Influence of Chromium on Cast Iron," show that chromium added to gray cast iron in quantities up to 0.90 per cent increases the stability of the combined carbon at temperatures up to 550 deg. C. This increase in stability is probably due to the presence of chromium carbide in the cementite of the pearlite, and is reflected in the increased strength both at ordinary and elevated temperatures and in the Brinell hardness. Better heat-resisting irons are, therefore, obtained, but there is difficulty in machining irons with over 0.4 per cent of chromium.

Chromium and Manganese as Alloys

Influence of chromium on volume changes at temperatures below the critical range is erratic, but the general effect is to produce a contraction. The nature of this contraction is difficult to explain or define. With chromium up to 0.4 per cent the thermal conductivity is increased by about 8 per cent. Small additions of chromium reduce very slightly the corrosion of gray cast iron. The effect is most noticeable with sea water, and to a lesser extent with strong acids. With weak acid, tap water, and ammonium chloride little advantage is gained.

Gray cast irons, which contain only traces of sulphur and manganese have abnormally high combined-carbon contents, e.g., 1.3 per cent, says Dr. A. L. Norbury in a paper, "Manganese in Cast Iron." Increasing the manganese from traces up to 0.3 per cent causes the combined carbon to drop to normal (e.g., 0.8 per cent), and causes a decrease in the tendency to chill. Further additions of manganese up to 1 or 2 per cent tend to increase the combined carbon and increase the tendency to chill. The explanation put forward is that the graphitizing action, found on increasing the manganese from 0 to 0.3 per cent, is an indirect one due to the manganese combining with and nullifying the carbide-stabilizing action of traces of iron sulphide. It appears that about 0.3 per cent manganese in excess of the amount theoretically required to form MnS is required to do this.

Approximately the same excess of manganese, e.g., 0.3 per cent, is required in irons containing higher sulphur contents, e.g., 0.1 and 0.2 per cent sulphur. The high combined-carbon contents found in gray irons containing only traces of manganese and sulphur are due to hard spots of cementite — austenite — iron-carbide eutectic plus secondary cementite, and to patches of secondary cementite, stabilized in each case by traces of iron sulphide. Apart from its indirect graphitizing-action, due to its combining with and neutralizing iron sulphide, the normal action of manganese is to stabilize iron carbide and to increase the tendency to chill.

Application of Nickel in Cast Iron

Its equalizing action on the structure of thick and thin sections of a casting is the basis of the application of nickel in cast iron, said Dr. A. B. Everest. It has been established that whereas an ordinary iron cast in a ⅛-in. section will show a white chilled structure, at the same time this iron will be open and soft in a heavier section of 1 in. or more. Nevertheless, in the corresponding nickel iron, the tendency to chilling is eliminated, so that the thin section is gray and machinable and at the same time the heavier section is appreciably hardened, owing particularly to the action of nickel on the matrix of the iron. Records show that in some cases a hardness difference of about 200 Brinell between the ⅛-in. and 1-in. section of a casting may be reduced to about 20 points in a casting suitably alloyed with nickel, and at the same time the iron is appreciably hardened and strengthened in the heavier sections.

The practical result of this equalization is that the nickel iron shows a much greater latitude as compared with the ordinary iron, so that uniform structure may be obtained over a wide range of section thickness. This has an important application in the foundry in enabling certain diffi-

cult castings to be made satisfactorily, in which high hardness and strength is required in heavy sections; or sections which cool slowly owing to casting design, while the metal quality is determined by the machinability of some thin section on the outside of the casting.

As an example, reference is made to the case of motor cylinder blocks, where the hardness and closeness of the cylinder bores and of the valve seats are of paramount importance in obtaining maximum wear, and yet the quality of iron is often determined by the machining requirements on some small water-exit boss situated in the middle of a thin section water-jacket. The use of nickel in cast iron tends toward a general uniformity of product, which is of great value in production work where variation in machinability is to be avoided.

These three papers were discussed together.

Little Progress in Control of Shrinkage

It would be useful to hear from Dr. Norbury something about the shrinkage in gray cast iron which gives trouble in the foundry, viz., draw holes shrinkages, said Mr. Field. A certain amount of work has been done by Cook and others but, in general, foundry practice has progressed little in the past 20 years in the control of draws and shrinkages through the analysis of the iron used. This is undoubtedly one of the greatest difficulties which the general iron founder, making a large range of work, has to deal with. Mr. Field said he believed it was generally recognized that Derbyshire iron gives less trouble with draws and shrinkage than Northamptonshire iron. He has proved this time after time in separate experimental heats running into hundreds, and has come to the conclusion that the manganese in the Derbyshire iron, which is greater than in the Northamptonshire iron, has a great deal to do with the immunity of the Derbyshire iron from shrinkage.

Favorable Results from Nickel in America

R. S. MacPherran, chief chemist, Allis-Chalmers Mfg. Co., Milwaukee, remarked that experience in the United States entirely confirmed statements by Dr. Everest. From ½ to 1 per cent nickel is used in castings for cylinder liners, crank-heads, etc., and in that way castings had been obtained which otherwise would not have been machinable. By adding 1 per cent nickel something like 0.5 per cent silicon is taken out and a machinable casting obtained. So far there has not yet been developed in the United States a satisfactory machine for testing wear in cylinders or frictional wear generally. As regards shrinkage, this had been reduced in the United States by using a lower phosphorus content. In that way the good castings had been increased, keeping the phosphorus below 0.2 per cent.

That mere reduction of silicon to any extent is necessarily a step in the direction of increasing solidity and the absence of porosity cannot be claimed as a general proposition, said J. Longden. There must be a certain minimum line beyond which there is no reduction of porosity. It does not follow that the reduction of the silicon from 1.3 to 1.2 or 1.1 per cent and the addition of a certain percentage of nickel will reduce the porosity. He said he had recently cast a gear blank without reducing the silicon but adding about 2 per cent nickel, he was sorry to say, porosity showed itself in the rim without any additional work by chilling.

R. F. Harrington, A. F. A., said he was a firm believer in the use of nickel for the purpose of removing internal shrinkage. He believed nickel had its definite application as suggested by Dr. Everest in that it prevented waste castings by providing a more uniform structure.

Adding Manganese to Cast Iron Advantageous

That further evidence has been published of the advantage of adding manganese to cast iron, especially in the case of thick sections, was appreciated by John Shaw. Nickel is being used by him for special purposes and he said that, in the case of cylinders for air compressors which had to withstand a pressure of 3000 lb., whereas with a specially refined iron bad results were obtained, the addition of 1 per cent of nickel enabled castings to be obtained which indicated no leakage under this test.

H. J. Young, speaking with regard to nickel, said he was recently at a meeting where there were some chief chemists and big founders and one man said he had put in ½ per cent to 1 per cent of nickel into his castings and had reduced his costs from 10s. to 5s. throughout his foundry. That sounded very good but another chemist from an equally large foundry said it was "all bunkum" and that he had used nickel but had not got rid of the wasters.

Definite Ratio of Manganese to Sulphur Advantageous

Thirty-three years ago, F. J. Cook said, he found that manganese caused hardness, and decided that if manganese were three times the sulphur with a maximum of 0.4, the sulphur being 0.12, and the manganese 0.4 per cent, the best results are obtained. If he got above or below that percentage of manganese there was a tendency to chill and a very definite tendency if he got above 0.4 per cent.

Nickel Will Not Make a Bad Iron Good

Dr. Everest, replying to the discussion on his paper, said we do not know very much about the influence of nickel in irons which are predominantly ferric but, if the combined carbon in an iron is such that the structure is pearlitic, then nickel can be used to advantage. There are cases in which the silicon is as high as 3 per cent in engineering castings and anything up to 2 per cent of nickel could be added effectively. He said he did not wish to put nickel forward as a cure-all. It will improve a good iron but it will not render a bad iron good.

With regard to wear tests, mentioned by Mr. MacPherran, the paper mentioned accelerated tests because in the laboratory there are no means by which the conditions of wear inside a cylinder, say of an automobile engine, can be reproduced. It is impossible to reproduce the conditions of lubrication, the correct bearing pressure, speed, oscillations, etc., and in the wear of cast iron the general experience is that any change in one of these conditions will totally alter the results. He believed that in certain cases nickel is effective in eliminating porosity but he would not recommend it for that specific purpose. The true benefit from nickel is the reduction of silicon. A great many claims are made for nickel based on the fact that the silicon is reduced and the nickel gives the necessary machinability.

In reply to Mr. Harrington, he said that the experiments had been carried out on piston valve liners for locomotive work and nickel had proved effective in eliminating porosity. In this country the average casting for that purpose would be centrifugally cast and the question of porosity would not then arise.

Mr. Harrington said he was glad Dr. Everest had pointed out that fundamentally the reason for improvement with the use of nickel was in the reduction of silicon but his own observations suggested that something more than that happened. There must be a change in the elements other than the silicon and he agreed that nickel could not be regarded as a cure-all. Dr. Everest said he did not agree with Mr. Harrington that there must be a change in the other elements than silicon and he knew of cases in which porosity had been entirely removed by the addition of nickel although he did not recommend nickel for the specific purpose of eliminating porosity.

Reviews of other papers and discussions will be published from time to time in later issues.

An account of the exhibition will also follow later.

United States Civil Service Commission announces an open competitive examination for a technical editor, at $3,500 a year, to fill a vacancy in the Bureau of Mines, Washington. Applications must be on file with the Commission at Washington not later than July 31. Full information may be obtained from the Commission, or from the Board of Examiners at the post office or customhouse in any city.

Industrial Activity Passing Peak

May Was High Month and Reaction Now Due—Supply of Commodities Exceeds Normal Demand

BY DR. LEWIS H. HANEY

DIRECTOR, NEW YORK UNIVERSITY BUREAU OF BUSINESS RESEARCH

Favorable Factors

1. *Sustained employment and payrolls.*
2. *Improvement in retail trade.*
3. *High railroad freight traffic and earnings.*
4. *Large earnings and dividends by industrial corporations.*
5. *Machine tool orders at new high, considering the season.*
6. *Gold imports; strong Reserve Bank position.*
7. *Recovery in wheat prices; farm relief bill passed.*
8. *Absence of commodity price inflation.*
9. *Light mercantile inventories.*
10. *Strong financial position of most leading companies.*
11. *Reparations settlement; Mexican concord.*

Unfavorable Factors

1. *Member banks over-loaned; brokers' loans excessive; crisis money rates; bonds decline.*
2. *P-V line falls below normal, indicating supply in excess of demand.*
3. *Declining building activity affects cement, brick, lumber, plumbing fixtures, etc.*
4. *Declining exports, and unfavorable trade balance.*
5. *Reduced farm purchasing power, with agricultural prices considerably under a year ago.*
6. *Declining bank clearings.*
7. *Declining net demand deposits.*
8. *Automobile production lower, sales spotty, dealer inventories increased.*
9. *Total industrial production at peak levels.*
10. *Less favorable statistical position of oil, textile and copper industries.*
11. *Tariff uncertainties.*

CHIEF among the business barometer changes which have occurred during the past month are: Building activity resumed its declining trend, after a temporary April spurt; recession in this field is now generally recognized, and its effects are apparent in several important building materials. Employment and payrolls, though well sustained, show a tendency to round off; this is notably true of the index compiled by the National Metal Trades Association. There was a rather pronounced decline in net demand deposits at the reporting member banks, which often occurs near the peak of a period of business expansion. Overproduction of textiles and oil developed again, or became worse, and stocks of copper showed a considerable increase. The bond market resumed its gradually declining trend.

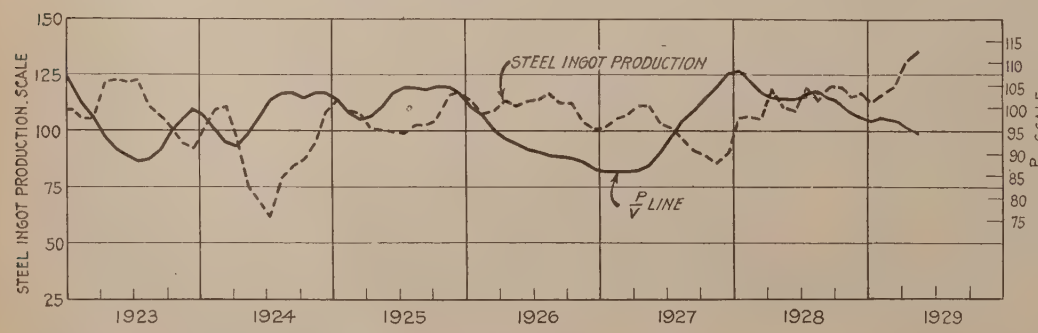
These changes are on the debit side.

Among the credits we find, first, an improvement in retail trade during May, accompanying better weather conditions. Grain prices recovered from the extreme low point to which they had fallen, and the passage of the farm relief bill without the radical debenture plan promises some ultimate good. At least, it removes a threat of harm. Commodity prices in general have become more stable. The settlement of the reparations question and the establishment of peace between the Mexican State and church are helpful long-range factors.

In other respects, the balance sheet remains unchanged. It is still true that business is very active and that the anticipated let-down is not yet definitely in sight. Perhaps the continued decline in bank clearings indicates the beginning of a slackening in trade. The automobile business, which has been so important, appears to be rounding off further. We note below some decrease in the volume of finished steel sales. But total industrial production and railroad car loadings continue at record levels.

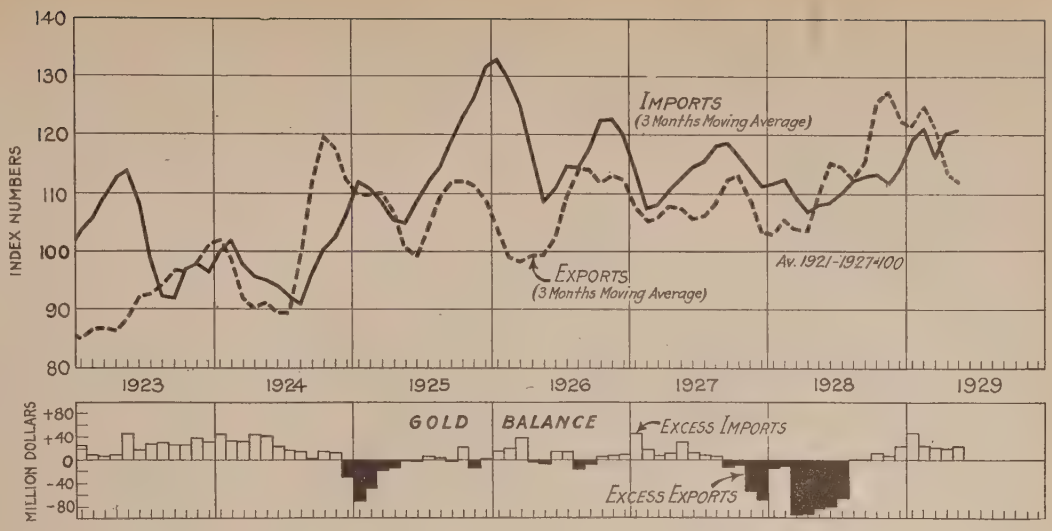
Barometers Indicate Approaching Decline

WE may conclude that business in May made a new peak, but that the gain was smaller than in preceding months, and that indications of the approach of some reaction became somewhat more evident. Among these indications, we would note the following: A very high ratio of bank loans to deposits, declining net de-

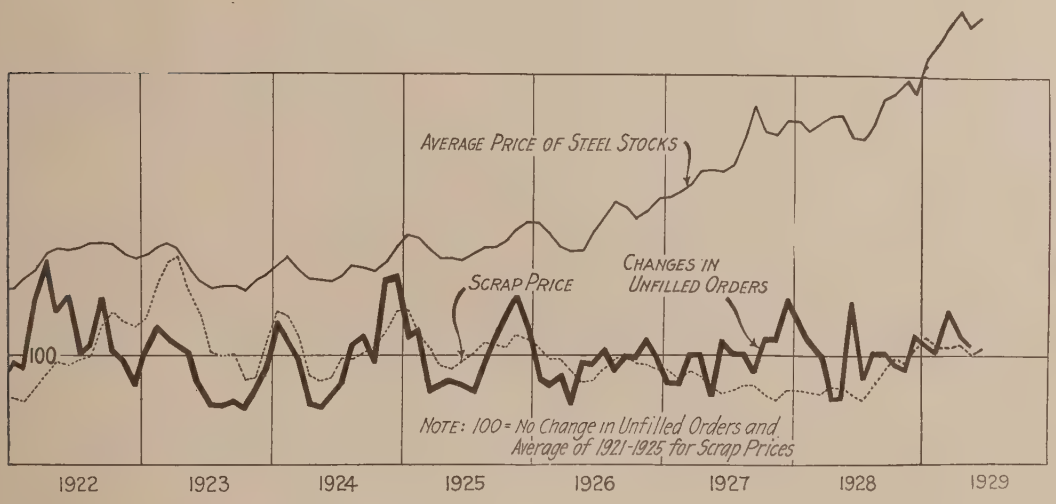


Downward Movement of P-V Line Has Now Carried It Below Normal. Steel production cannot much longer maintain its tremendous pace

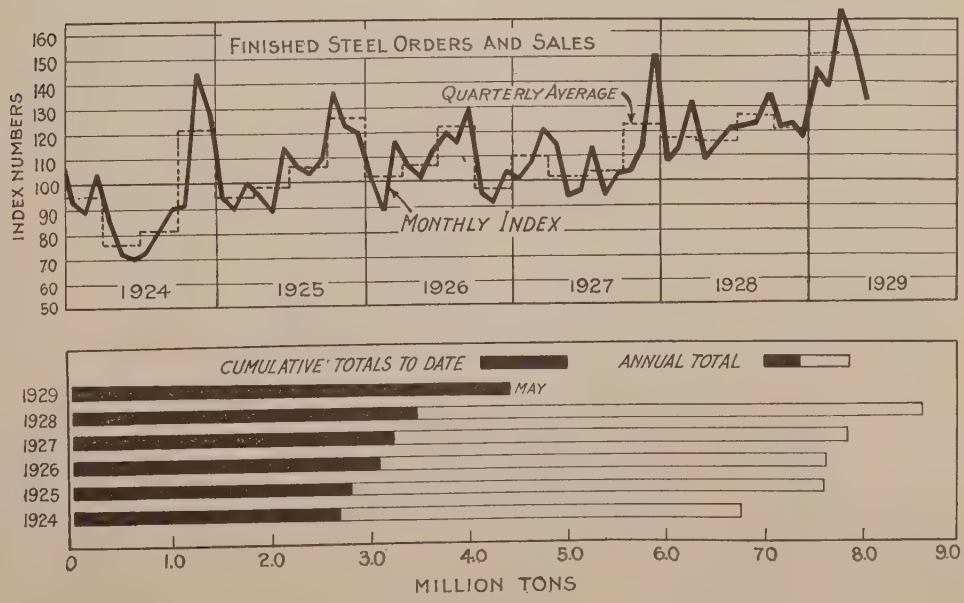
Imports, Which Are Regarded as a Good Index of Domestic Industrial Activity, Were Higher Than Exports in May, for the First Time in More Than Three Years. Gold movements are slight and contradictory



Unfilled Orders, While Still Upward, Showed a Smaller Gain. Stock prices have perhaps passed their high points and scrap prices, higher than for several years, are holding well above normal



Buying of Finished Steel Was Much Lower in May, But Higher Than for Any Previous May. The cumulative total is far ahead of any other year



mand deposits, crisis levels for money rates with the yields on stocks and bonds relatively low, high imports with declining exports, iron and steel production at abnormally high levels after a long period of rise, steel prices high in comparison with the general level (with the latter declining), and the fall of the P-V line below its normal level.

From the point of view of the business forecaster, each item in this list may be considered as more or less unfavorable in its bearing on the future trend of industry. To be sure, business forecasting is not sufficiently scientific to enable us to draw exact conclusions. To a considerable extent, we must rely upon analogy when we try to "catch the turns."

At present, however, analogies with conditions at the peaks of past business cycles are so strong that it is hard to escape the conclusion, either (1) that the course of business cycles has been changed or (2) that business activity is now near a peak. (We find such phenomena as the late run-up in copper prices followed by recession, the decline in wheat prices, the prevalence of mergers and large flotations of new stocks—all of which are often symptomatic of the approaching termination of a boom period.) It seems therefore that we should lean toward the latter conclusion, though we must recognize that definite forecasts as to the timing of business turns is highly uncertain, and the absence of inflation in business, together with the strong financial position of the Reserve Banks and our great industrial corporations, constitutes a sustaining factor.

Commodity Supply Above Demand

The P-V line (a ratio of commodity prices to the physical volume of trade) has now crossed normal on the decline. This we take to indicate that the general supply of commodities is distinctly above normal in comparison with the strength of the demand for such commodities. In the past, this development has usually indicated the approximate peak of the business cycle. In 1923, under similar circumstances, steel production (adjusted) held at the peak level for three months longer, or through July. In 1926 it held up for four months after the P-V line fell below normal, or through August.

Now it looks as though similar developments may be expected. After increasing in May, the ingot output has probably fallen off less than usual for the season in June and there is no reason to expect any large decrease in July. Present indications, however, suggest that production will decline more than seasonally by August at the latest.

Imports Exceed Exports in May

DECLINE in exports during May was listed above as one of the unfavorable factors. Considering the season, a recession in our total exports of merchandise has now been apparent for three months in succession. The same may be said of iron and steel exports. This is notable as fulfilling the predictions of economists that our high money rates, by curtailing foreign bond issues, would result in the decline in foreign trade.

Moreover, May imports increased, again considering the season, and were actually the largest for the month since 1920. This, of course, resulted in a so-called unfavorable balance of trade, which is the first monthly excess of imports over exports since April, 1926. It is the first time an unfavorable balance has occurred in May since 1923.

Finished Steel Sales Drop Sharply

PERHAPS it is significant that May sales of finished steel showed a relatively large decrease for a single month. While the decline may be partly attributed to a natural reaction from the record peak attained in March, the combined drop during April and May is the sharpest for the period since 1923, and the total sales for the second quarter are likely to be found further below the first quarter than in any year since 1924.

Sales of sheets and steel castings show declines considerably greater than usual for the season. Plates and structural steel sales made good increases, though not phenomenal ones. The total sales for May were the highest found in that month of any year on record. It seems fair to say, however, that a declining trend existed and that this is the more significant as the sales of sheets and castings are the most barometric of the various items included.

Speculation Holds Up Steel Shares

MEANWHILE, the common stocks of representative steel companies have shown a good recovery from the May decline. At this writing, they range all the way from 15 points below their old high levels of the year up to some which are at new high levels. The average is but little below the year's peak. The strength in steel stocks, doubtless, reflects large earnings which must be accruing from the active operations of the industry, together with a fairly satisfactory level of prices. As long as the renewed speculative interest is maintained, there is no reason to expect anything but strength in stocks.

Of course, no mechanical barometer is certain. Our rate-of-change index of unfilled steel orders, which often has been a good barometer of steel stocks, points downward. But it is still above the base line, which means that our adjusted index of unfilled orders is actually increasing. Steel scrap prices have recovered slightly thus far in June, though the movement continues to be one that may be called irregular and sidewise.

Taken together, the two barometers present no very clear picture. About all we can say is that they do not indicate a rise in steel stocks. Perhaps the conclusion may be that if the advances now talked of in speculative circles do occur, they will be based on speculative enthusiasm rather than on any new improvement in the steel outlook.

Iron and Steel Shipments to Be Heavy in Third Quarter

WASHINGTON, July 2.—Shipments of iron and steel products during the third quarter of the current year are estimated by Shippers' Regional Advisory Boards of the American Railway Association to amount to 519,419 cars, an increase of 10.3 per cent over the 470,873 cars shipped during July, August and September of last year. Estimates for machinery and boilers are 63,375 cars for the present quarter, an increase of 7.2 per cent over the 59,095 cars shipped during the corresponding quarter of 1928. Coal and coke shipments are expected to be 2,852,553 cars, or an increase of 14.6 per cent over 2,488,545 cars shipped during the third quarter of last year. The estimate for ore and concentrates is 914,863 cars, a gain of 7.7 per cent over the 849,732 cars shipped during the same quarter in 1928. For the 29 principal commodities dealt with, it is estimated that shipments in the current quarter will be approximately 9,816,948 cars, an increase of 632,287 cars, or 6.9 per cent, over the corresponding quarter of last year. The only regional boards of the 13 which estimated a decrease are the Southwest and Pacific Northwest, both of which expect only a small reduction.

Migration of Industry from City to Country

Among the trends noted by the National Bureau of Economic Research in its survey for the Committee on Recent Economic Changes is the shift of industry from city to country. Between 1918 and 1925, it is reported, the 25 largest cities in the country lost 326,800 wage earners, about 12 per cent of the average number employed. Cities between 100,000 and 250,000 population are said to have shown an even heavier loss, while during the same period the rural area is said to have gained 55,204. Increased manufacturing activity in rural areas is reported shown in the East North Central, South Atlantic, and Pacific divisions.

The National Association of Power Engineers will hold its forty-seventh annual convention and power show in Chattanooga, Tenn., Sept. 9 to 13. This will be in conjunction with the National Exhibitors' Association. Eugene H. Schimpf of J. H. Allison & Co., Chattanooga, is chairman of the executive committee.

New Rates Will Increase Competition

Mileage Scale Expected to Alter Situation Between Various Steel Producing Districts—Whole Effect Still in Doubt

BY L. W. MOFFETT

WASHINGTON, July 2.—The whole effect on competitive conditions in the iron and steel industry from the decision of the Interstate Commerce Commission setting up an entirely new scale of rates on manufactured products throughout Official Classification territory can be definitely known only after the new rates become effective on Oct. 20, in the opinion of traffic experts here who have followed the proceeding.

There is a consensus of view that the new scale will bring about greater uniformity, and that as a result there will be sharper competition in markets equidistant between producing centers and at points to which rates have been increased from one producing center and decreased from another.

Representative of the situation as it applies to so-called equidistant markets between Chicago and Pittsburgh are consuming destinations in Ohio. Under the existing rates the advantage for the most part rests with Chicago mills, but under the new scale it will swing in some instances to Pittsburgh mills while giving the latter a parity which does not now prevail, or more nearly approach a level with the Chicago district.

The present Chicago-Toledo rate is 26c., and it will be reduced 2c. to 24c., while the present Pittsburgh-Toledo rate is 26.5c. and it will be decreased by 3.5c. to 23.5c., thus changing the advantage to Pittsburgh by 0.5c. as against its present disadvantage of 0.5c. The Chicago-Cincinnati rate will remain at 27c., while the Pittsburgh-Cincinnati rate will be reduced from 28c. to 26c., a cut of 2c., so that the 1c. higher rate from Pittsburgh now prevailing will be changed to an advantage of 1c. To Deshler, Ohio, the rate from Chicago will be reduced 1.5c. from 26c. to 24.5c., while the rate from Pittsburgh will be reduced 3.5c. from 26c. to 22.5c., again turning a disadvantage for Pittsburgh into an advantage.

Because fifth-class rates generally, though not entirely, existent as to iron and steel products in Official Classification territory apply from East St. Louis to many important Indiana markets, while Chicago rates to these Indiana points are based on the Jones & Laughlin scale, but actually carrying rates below the scale, the new scale will narrow the spread to these points by 3.5c. to 7c. for 100 lb. in favor of East St. Louis. This is brought about by the fact that the scale to these Indiana points will mean reduced rates from East St. Louis and increased rates from Chicago. Illustrative of the changed condition that will result is the fact that the East St. Louis-Vincennes rate now is 23c., or 1c. higher than the Chicago-Vincennes rate of 22c., but under the new scale the rate from East St. Louis will be lowered by 4c. to 19c., while the rate from Chicago will be increased by 1.5c. to 23.5c., thus removing the present disadvantage of 1c. against East St. Louis and turning it into an advantage of 4.5c.

Effect of Long-Haul Reductions

The new scale manifestly reduces rates on long hauls, for the most part, and while the vast bulk of iron and steel shipments does not move in excess of 300 miles, there was much striving on the part of Middle Western mills especially to get lower rates on hauls beyond this distance. A striking example of the change the new scale will bring about for long hauls, and it is typical of a rather general situation, concerns rates from Pittsburgh and Buffalo to Lynchburg, Va. At present the rate from Pittsburgh and Buffalo is the same, 38c. Under the new scale the rate from Pittsburgh will be reduced 6c. to 32c., while the rate from Buffalo will be unchanged. In this instance, the so-called long haul of 418 miles from Pittsburgh will take a lower rate, while the still longer haul of 597 miles from Buffalo will take the same rate. This emphasizes the fact that to say long-haul rates will be reduced is a generality, with notable exceptions, and at the same time it gives force to the view that greater uniformity, on a mileage basis, will be established.

Application of the fifth-class rates from Pittsburgh to important markets in the East and of commodity rates lower than fifth class from the Eastern steel producing points to these markets was the source of complaint by Pittsburgh manufacturers, and on the whole the latter will benefit by the new scale while Eastern mills will be in a less strong position as to those markets, yet this will not be uniformly true. For example, the rate of 22.5c. from Bethlehem, Pa., to Albany, N. Y., will be reduced 1c. to 21.5c., while the Pittsburgh-Albany rate will remain at 34c., thus increasing the advantage to Bethlehem. Breaking up of the New England blanket rate will work to the advantage of mills in eastern Pennsylvania and surrounding sections nearest to New England markets, while working to the disadvantage of

Steel Rates Effective Oct. 20 Compared with Present Rates

(In Cents per 100 Lb.)

To	From Pittsburgh: New Rates	Present Rates	Change —Decrease +Increase	From Johnstown, Pa.: New Rates	Present Rates	Change —Decrease +Increase	From Buffalo: New Rates	Present Rates	Change —Decrease +Increase
New York	33	34	—1	29	32.5	—3.5	31	32	—1
Trenton, N. J.	30	34	—4	26.5	32.5	—6	31	32	—1
Philadelphia	29	32	—3	25.5	30.5	—5	31	32	—1
Berwick, Pa.	25	32	—7	21.5	30.5	—9	25.5	28	—2.5
Lancaster, Pa.	26	32	—6	22	30.5	—7.5	29	32	—3
Wilmington, Del.	29	32	—3	25.5	30.5	—5	32	32	None
Baltimore	27	31	—4	24.5	29.5	—5	31	32	—1
Syracuse, N. Y.	30	28.5	+1.5	27	28.5	—1.5	19	17.5	+1.5
Elmira, N. Y.	25.5	28.5	—3	22	28.5	—6.5	19	17.5	+1.5
Oswego, N. Y.	30	28.5	+1.5	28	28.5	— .5	19	21.5	—2.5
Utica, N. Y.	32	31.5	+ .5	29	30.5	—1.5	21.5	21.5	None
Albany, N. Y.	34	34	....	31	32.5	—1.5	26.5	21.5	+5
Norfolk, Va.	36	38	—2	34	36.5	—2.5	39	38	+1
Lynchburg, Va.	32	38	—6	30	36.5	—6.5	38	38	None

New Rates from Pittsburgh, Buffalo and Bethlehem to Points in Central and Eastern Districts

From Pittsburgh to	New Rates	Present Rates	Change —Decrease +Increase
New Kensington, Pa.	8	7.5	+ .5
Brackenbridge, Pa.	9	7.5	+1.5
Donora, Pa.	9.5	7	+2.5
Butler, Pa.	10	7.5	+2.5
Oil City, Pa.	17.5	15.5	+2.5
Erie, Pa.	19	22	+3
Parkersburg, W. Va.	19.5	19.5	None
From Johnstown, Pa., to			
Butler, Pa.	15	11	+4
Cumberland, Md.	15	13	+2
Du Bois, Pa.	16	18.5	—2.5
Wheeling, W. Va.	18.5	17.5	+1
From Buffalo to			
Erie, Pa.	15	13.5	+1.5
Warren, Pa.	15	15.5	— .5
North Tonawanda, N. Y.	7	5	+2
From Bethlehem, Pa., to			
Lancaster, Pa.	9.5	9	+ .5
Pottstown, Pa.	12	14.5	—2.5
Harrisburg, Pa.	15.5	17.5	—2
Baltimore	19.5	19	+ .5
Elmira, N. Y.	21.5	22.5	—1
Syracuse, N. Y.	23.5	22.5	+1
Utica, N. Y.	24	22.5	+1.5
Norfolk, Va.	27	28.5	—1.5
York, Pa.	16	19	—3
Scranton, Pa.	16	13	+3

those farther removed. This situation will apparently have considerable effect on the so-called Philadelphia group, which the commission said was too wide.

Short-haul rates are sharply increased under the decision. But it is doubted that where the hauls are comparatively a few miles distant, as, for instance from Pittsburgh to nearby consuming centers, the competitive conditions will change. The mills being so close to the market, it is contended that producing plants at greater distances will be unable to break into such markets. On the other hand, it is maintained that the new and higher scale for these short hauls will mean more revenue for the carriers and this is one reason for the assertion of some traffic experts that the new scale will mean more revenue for the carriers, rather than less, as predicted by Commissioner Woodlock.

Scale May Wipe Out Cross Hauling

There are those who have said that broadly the tendency of the decision will be to further "localize" the steel industry, but this statement also is held to be subject to modification on the ground that where long haul rates are reduced the tendency will be to centralize and that the exact situation will not be known until after the new scale has been under operation long enough to give it a test. Those holding the latter view contend that abolition of the Pittsburgh basing system has not "localized" industry so much as many had predicted. At the same time they are inclined to think that the new scale will have a tendency to wipe out cross hauling to an important extent.

A feature of the decision that is of considerable importance is the fact that the commission declined to comply with suggestions of many shippers and of central carriers that minimum as well as maximum rates should be established. The commission pointed out that it had exercised its power to prescribe minimum rates rarely and only under special circumstances.

The railroads thus are given leeway, within reasonable bounds, to establish rates lower than those prescribed in the basic scale, but it is doubted whether they will avail themselves of this privilege to any extent, first, because to do so might rob them of some revenue, and, second, the granting of special rates in one district would only invite requests from shippers in other districts for similar concessions, and thus start all over again the circle of preferential rates.

The commission's paragraph is very specific on this point, and some traffic experts point to it as the most vital statement in the decision. The commission said:

"The prescription of an inflexible scale would result in a rigidity in the rate structure which is both undesirable and unnecessary. Nevertheless, it is clearly to the advantage of both carriers and shippers generally that a uniform system of rates once established should not be constantly threatened by the granting of concessions from the scale in favor of certain localities or particular traffic. And it is obvious that, if the rate structure herein prescribed is to fulfill one of its primary purposes, that of removing and preventing undue prejudice and preference, departures therefrom should be made only when there is important necessity therefor, and only when such departures can be fully justified under section 3 of the act." (Sec. 3 forbids giving undue preference or advantage to a locality, etc., and likewise makes it unlawful to subject a locality to undue prejudice or disadvantage).

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Greater Use of Trucks and Water Forecast in Chicago

CHICAGO, July 1.—Chicago producers, in making an analysis of the decision of the Interstate Commerce Commission to establish mileage rates on iron and steel, find that the scale which is to become effective Oct. 20, will decrease rates from Eastern centers of production into the Illinois-Indiana territory and will increase rates on short hauls that fall within the district that local shippers claim is their natural territory and in which, they say, over 50 per cent of their iron and steel tonnage moves.

It is anticipated that the higher short haul rates may force the use of trucks and water where possible, thereby affecting the revenue of the carriers. It is computed by some that trucks will be used on hauls from Chicago to such points as Milwaukee, with savings of more than 50 per cent, as compared with the new mileage scale. The buyer will have the additional advantage that he will get more prompt service and save the cost of haulage from freight house or steam track.

Points of importance, as viewed by local shippers, are: That groups of origin, including switching territory are permitted when not exceeding 20 miles in width, but no destination groups are authorized. The decision permits groups of origin which are left to the carriers to establish.

An analysis reveals that the decision raises many short hauls ½c. over the mileage scale that was proposed late last year. The long haul rates are virtually unchanged. Twenty-three out of 31 rates are raised to that number of points of destination within a radius of 285 miles of Chicago. St. Louis, which is 279 miles from Chicago and 612 miles from Pittsburgh, will have rates lowered from Pittsburgh and raised

Comparison of New Rates From East St. Louis and Chicago to Points in Indiana

	From East St. Louis			From Chicago		
To*	New Rates	Present Rates	Change —Decrease +Increase	New Rates	Present Rates	Change —Decrease +Increase
Vincennes	19	23	—4	23.5	22	+1.5
Evansville	20	23.5	—3.5	26	23.5	+3.5
Lafayette	23.5	26.5	—3	17.5	15	+2.5
Indianapolis	23.5	27	—4.5	21	18	+3
Frankfort	24	27	—3	18.5	16.5	+2
Kokomo	25	27.5	—2.5	18.5	16.5	+2
Anderson	25.5	27.5	—2	20	18	+2
Muncie	26.5	28.5	—2	20.5	18	+1.5
Richmond	27	29	—2	22.5	20	+2.5
South Bend	27	30	—3	15	12.5	+1.5
Fort Wayne	28	30.5	—2.5	19	16.5	+2.5

*Fifth class rates apply generally from East St. Louis to these Indiana points, while from the Chicago district group rates based on the Jones & Laughlin scale apply, but those established are actually under that scale. It will be seen that under the new scale, if literally followed, the spreads between East St. Louis and Chicago to these Indiana points will be narrowed from 3.5c. to 7c. per 100 lb.

from Chicago. The present rate from Chicago to St. Louis is 22c., and this will be raised to 25.5c. by the decision. The old rate from Pittsburgh was 40.5c., while the new rate will be 39c. on a point to point basis, or, as computed by some, 37c. if a group is permitted.

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Pittsburgh Mills Look Upon Rate Decision Favorably

PITTSBURGH, July 1.—Although Pittsburgh district steel companies are generally inclined to view with favor the recent decision of the Interstate Commerce Commission prescribing a basic mileage scale of freight rates on iron and steel products in Official Classification Territory, a number of points remain to be settled before its effect on shippers in this territory can be fully measured. Insofar as the decision places Pittsburgh on the same basis as other steel producing centers with regard to freight rates, it is regarded as a victory by shippers in this territory. For the decision recognizes the principle of a definite mileage basis for freight rates which has long been urged by Pittsburgh companies and abolishes the so-called discrimination against producers in this district which they have sought to correct.

Several points in the decision remain to be settled, some of them of particular interest to Pittsburgh district shippers. The Pittsburgh origin group is criticized, but no definite remedy is suggested. It is the understanding here that the carriers must decide what disposition is to be made, and their action will be watched with interest. If the various steel producing points are placed on a strict mileage basis, companies located to the east and west of Pittsburgh will be penalized in their rates in one direction, while in the other direction they will enjoy lower rates than Pittsburgh.

Some Uncertainty as to Effects

Settlement of the shortest routes over which traffic can move will also prove important to shippers, as rather marked changes in mileages are expected to result. These mileages are now being computed and, until this work has been completed, traffic departments are not certain just how the new schedules will affect them.

The more or less general increase in short haul rates will not influence Pittsburgh companies particularly, as none of the old relationships will be disturbed. Also the rates prescribed are maximum rates and the carriers will not likely make them effective where possible loss of business might result or well defined movements be interrupted.

Changes in the rates from Pittsburgh to more distant competitive points were generally covered in THE IRON AGE last week. Lower rates to Atlantic seaboard points, notably Baltimore and Philadelphia, will be of particular benefit to Pittsburgh, while the lower Pittsburgh-St. Louis rate, coupled with a higher Chicago-St. Louis tariff, places Pittsburgh in a much better position to compete with Chicago in the St. Louis territory. The action of the commission is raising the carload minimum from 36,000 lb. to 40,000 lb. is also generally favored in this district.

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Cleveland Mills to Gain Some Advantages

CLEVELAND, July 1.—The proposed changes in iron and steel freight rates will result in some advantage to Cleveland mills. These mills will be slightly benefited because of a greater reduction in the rate from Cleveland to Detroit than from other producing points to Detroit. Cleveland mills will also be benefited in the local market by the increase in rates from Youngstown to Cleveland. On the other hand, Youngstown mills will suffer as far as Cleveland market is concerned.

Rates to Detroit are reduced 3.50c. a 100 lb. from Cleveland, while the reduction to Detroit is 2.50c. from Pittsburgh, 3c. from Youngstown and 2c. from Chicago. Consequently Cleveland mills will have a net reduction of 10c. a ton in the Detroit rate, as compared with Youngstown, and 20c., as compared with Pittsburgh. The present rate from Pittsburgh to Cleveland is 19c. and from Youngstown to Cleveland 9.5c. This spread will be reduced materially by the decrease of the Pittsburgh rate to 18.50c. and by a 3.50c. increase of the Youngstown rate to 13c.

Valley Mills Must Absorb Higher Rates

As Cleveland is used as the basing point for steel bars, this advance will mean that Valley mills will be compelled to absorb a higher freight rate to sell their bar mill products in Cleveland. In addition, in selling sheets and other products that carry a Pittsburgh base, the Youngstown mills will be in a less advantageous position than heretofore, as compared with Pittsburgh, in selling steel in Cleveland. Cleveland mills claim to suffer from a relative disadvantage as compared with Pittsburgh and Youngstown in the Indiana, Illinois and western Ohio districts. This disadvantage will be eliminated in the new rates.

Present and Mileage Carload Rates on Iron and Steel in Cents per 100 lb. to Western Consuming Points

To	From Chicago		From Pittsburgh	
	Present	New	Present	New
Decatur, Ill.	18	20	36	36
Jacksonville, Ill.	20	22½	40½	38
LaSalle, Ill.	13	16	38½	37
Moline, Ill.	17	20	43	39
Peoria, Ill.	16½	19½	36	37
Quincy, Ill.	20	25	43	41
Rockford, Ill.	12	15	38½	37
Springfield, Ill.	18	21	38	37
Evansville, Ind.	23½	26	37	36
Fort Wayne, Ind.	16½	19	26	27
Indianapolis	18	21	29	30
Kokomo, Ind.	16½	18½	29	30
Michigan City, Ind.	8	11½	31	33
South Bend, Ind.	12½	15	30	31
Terre Haute, Ind.	18	20½	34	34
Vincennes, Ind.	22	23½	35	35
Detroit	27½	25½	29	27
Grand Rapids, Mich.	25½	21	33	32
Holland, Mich.	23½	19½	34½	34
Muskegon, Mich.	26	21½	35	34
Saginaw, Mich.	29½	26½	32½	31
Clinton, Iowa	17	18½	43	39
Dubuque, Iowa	17	20½	43	40
Keokuk, Iowa	20	24	43	41
St. Louis	22	25½	40½	39
Cincinnati	28	26	27	27
Hamilton, Ohio	27½	25	27	26
Toledo, Ohio	26½	23½	26	23½
Beloit, Wis.	12	15½	44	37
Madison, Wis.	14	18	46	38
Milwaukee	9½	14½	37	37

Owing to the great number of nonmembers of the Institute of Metals (British) who are anxious to take part in the Düsseldorf meeting of the institute, to be held Sept. 9 to 12, the council of the institute will meet specially on July 4 to consider applications for membership. Only members of the institute will be able to take part in the various functions in connection with the Düsseldorf conference, which will be very largely attended and is expected to be a great success. The institute is visiting Germany at the invitation of the Verein Deutscher Ingenieure and the Deutsche Gessellschaft für Metallkunde.

Comparison of New Rates From Pittsburgh and Chicago to Points in Ohio

To*	From Pittsburgh			From Chicago		
	New Rates	Present Rates	Change —Decrease +Increase	New Rates	Present Rates	Change —Decrease +Increase
Toledo	24	26	—2	23.5	26.5	—3.5
Forest	23	26	—3	23.5	26.5	—3.5
Dayton	25	26	—1	25	27.5	—2.5
Hageman	26	27	—1	26	28	—2
Deshler	24.5	26	—1.5	22.5	26	—3.5
Lima	25	26	—1	22	26	—4
Hamilton	26.5	27	— .5	25	27.5	—2.5
Cincinnati	27	27	None	26	28	—2

*Points approximately equidistant from Chicago and Pittsburgh.

Tariff Views Are in Conflict

Widely Varying Testimony at Washington Hearings, Particularly on Manganese Ore—Pig Iron Producers Ask for $3 Duty

BY L. W. MOFFETT

WASHINGTON, July 2.—Hearings on the iron and steel schedule of the tariff before a subcommittee of the Senate Committee on Finance originally carried a list of approximately 120 witnesses, the largest for any of the schedules, and while the number is being pared down somewhat through the practice of having one or two present the common views of a greater number, it is improbable that the hearings will be completed before the end of next week.

This is due to the program announced by Senator Reed of Pennsylvania, chairman of the subcommittee, who explained that the hearings would not be continuous. They were begun on Wednesday of last week, ran through Friday, and were resumed yesterday, when they were postponed until next Monday, in the hope that they would be ended before the following Saturday. No hearings will be held on the latter day. There are about 75 witnesses still listed.

Testimony regarding schedules on raw materials, semi-finished and finished rolled products, however, has been practically completed. The iron and steel industry, which, for the first time, spoke through a single organization, the American Iron and Steel Institute, at the hearings before the Ways and Means Committee of the House, continued that practice before the Senate subcommittee. Had this not been done the length of the hearings would have been appreciably extended.

The steel industry's general position was explained by John A. Topping, vice-president of the institute, and chairman of the Republic Iron & Steel Co. Suggestions for specific changes in rates, phraseology, etc., were laid before the subcommittee by the institute's tariff representative, Thomas J. Doherty, while its request for removal of the duty on manganese ore was made by L. E. Block, chairman, Inland Steel Co., Chicago, and Dr. C. K. Leith, University of Wisconsin, Madison, Wis. The statements of Mr. Topping and Mr. Doherty were published in THE IRON AGE of June 27, page 1775.

The members of the subcommittee consist of three Republicans, Senator Reed, Senator Edge, New Jersey, and Senator Smoot of Utah, chairman of the Finance Committee, and two Democrats, Senator King of Utah and Senator Barkley of Kentucky. The three members who have consistently sat at the hearings, and manifested deep interest in the proceedings, as shown by the many questions asked and comments made, are Senator Reed, Senator Edge and Senator King. At brief periods Senator Barkley participated in the hearings. Senator Smoot, occupied with other hearings, has not attended the hearings on the iron and steel schedule.

High Spots of Metal Tariff Hearings

STEEL industry asks for free manganese ore. Domestic ore producers plead for higher duty to protect their industry.

Merchant pig iron producers urge increase in pig iron duty from $1.12½ to $3 a ton.

Uniform duty of ½c. a lb. on muck bars and bar iron valued at less than 2½c. a lb. requested.

Manufacturers of tool steel and other fine steels propose sliding scale of duties, based on values, with rates generally higher.

Forging Manufacturers' Association asks that duty of 6/10c. a lb. on axles and other forgings be increased to 2c. a lb.

Importers generally object to higher rates proposed in House bill, and in some instances want reductions instead. Particular objections voiced to alloys in steels, hollow drill steel, sheet steel piling and sponge iron.

House Bill Not Satisfactory

In a large measure the hearings are similar to those held before the House committee, though the Senate hearings show more intensity of views on both sides. It is evident that the House bill is not satisfactory to either side, except in a few instances.

Likewise, it is apparent that the Senate subcommittee is not satisfied with the House bill, and it may be expected that, if the majority views of the subcommittee prevail, the iron and steel schedule will be greatly changed. At the same time there is necessarily a division of opinion within the subcommittee, and this does not seem to be due entirely to its bi-partisan character. As to steel rates, it is conceivable, in the absence of specific evidence to the contrary, that the Republicans are in agreement and that their views were reflected when Senator Reed, in the course of questioning Mr. Topping, said that it may safely be assumed that rates on steel will not be decreased, though he did not indicate that they would be increased, as the institute asked, at least not to the extent requested.

Both Senator Reed and Senator Edge made it plain that they think the steel schedule requires considerable reclassification so that there will be more uniformity as to duties and paragraphs on products of similar or nearly similar values and of like stages of manufacture. An example of this position was expressed by both senators regarding such products as plates, shapes and bars, some of which are lumped with raw steel and semi-finished steel.

Favor Removing Manganese Ore Duty

Statements of Senator Reed and Senator Edge also indicated they are in agreement in favoring the removal of the duty on manganese ore and reduction of the duties on ferromanganese, tungsten ore, tungsten metal and tungsten scrap. It seems doubtful that this view is shared, at least wholly, by the other senators. Although their tariff views are about as far apart as the poles, it is believed that Senator Smoot and Senator King, the former a high protectionist, and the latter a low-tariff advocate, will oppose a reduction in the duty of 1c. a lb. on manganese ore, and it is the impression that Senator Barkley is in accord with Senator Smoot and Senator King. This apparently curious alinement may be attributed to the fact that Senators Smoot, King and Barkley represent States producing manganese ore, and there is a strong political sentiment back of the request of American producers of this ore for an increase in the duty, though an increase is held to be unlikely.

Senator Oddie, Republican, of Nevada, is the author of a proposed amendment increasing manganese ore duties, which is being earnestly supported by domestic producers and as strongly opposed by the iron and steel industry. There is also much political support from the West of the duties on tungsten ore and metal. The matter of a duty on ferroman-

ganese necessarily is related to that on manganese ore, and Senator Reed implied that if manganese ore were made free of duty that of 1⅞c. a lb. on ferromanganese should be reduced to ⅞c. a lb.

Senator Reed made this suggestion when John J. Howard of the Lavino Furnace Co. was on the stand, and went further when Nelson B. Franklin, Washington, mining expert, was before the subcommittee and asked to justify the duty of 50c. a lb. carried in the House bill on tungsten ore, an increase from the present duty of 45c. Senator Reed said that, though he is a high protectionist, he is inclined to reduce duties on tungsten ore, tungsten metal and tungsten scrap, the latter given a duty of 72c. a lb., tungsten content, as against the general steel scrap rate of 75c. a ton.

When Dr. J. A. Mathews of the Crucible Steel Co. of America was before the subcommittee, Senator Edge indicated some of his tariff views, after explaining, as Senator Reed did, that he, too, was a high protectionist.

"Industries Encouraged without Result"

"Raw materials, such as manganese, tungsten and others, were given duties to see if it were possible to encourage their commercial output," said Senator Edge. "We have had seven years to try out the experiment. It is now proper to ask whether it has been successful." In the case of manganese and tungsten, he added, they have not been produced in quantities to meet domestic needs.

"We have been encouraging these industries without any result," interjected Senator Reed. "Do you not think it time to end that experiment?"

Dr. Mathews said that he was not in favor of wiping out these duties. On the contrary, he felt that domestic industries producing these raw materials should be encouraged.

It was during the course of Mr. Doherty's testimony that Senator Reed expressed the view shared by Senator Edge, and perhaps other senators of the subcommittee, that the steel schedule should be subjected to considerable reclassification. Senator Reed told Mr. Doherty that he was very much impressed by the lack of symmetry in the paragraphs covering plates and shapes and previously he had commented on a similar condition as to other paragraphs. In commenting on the paragraphs covering plates and shapes, Senator Reed pointed out that they represent the same degree of manufacture and carry approximately the same prices, yet plates take higher duties and are imported in much smaller quantities than shapes.

"It would seem," said Senator Reed, "that either the duties on plates are too high or those on shapes are too low."

Mr. Doherty expressed the opinion that one important controlling factor was demand in the domestic market.

Domestic Manganese Ore Producers and Steel Makers at Odds

AS had been anticipated, the most vigorously contested item was manganese ore. The subcommittee showed an unusual interest in the subject, evidently being aware of the wide difference of views existing between the steel industry on the one hand and domestic manganese producers on the other. Steel manufacturers asked that the duty be removed entirely. Domestic manganese producers asked for an increase in the duty, the latter favoring the amendment proposed by Senator Oddie providing for a duty of ½c. a lb. of contained manganese of 10 per cent to 20 per cent metallic manganese; 1c. a lb. for 20 to 25 per cent manganese and 1½c. a lb. for 25 per cent and more manganese. The present duty is 1c. a lb. of contained manganese in excess of 30 per cent.

The lively interest manifested in the subject was indicated by the fact that 13 witnesses had been listed to appear, although through the consolidation of common views the list was reduced somewhat. Broadly, the contest was between the American Iron and Steel Institute, as representative of the domestic steel industry, and the American Manganese Producers' Association.

Speaking on behalf of the institute and the industry generally were L. E. Block, chairman, Inland Steel Co., Chicago, and Dr. C. R. Leith, University of Wisconsin, Madison, Wis., consulting geologist, who also spoke for Feodore E. Foss, Wheeling Steel Corporation, Wheeling, W. Va. Others who asked for removal of the manganese ore duty were R. T. Caldwell, American Rolling Mill Co., Ashland, Ky., and Percival Chrystie, Taylor-Wharton Iron & Steel Co., High Bridge, N. J. These witnesses also asked for a reduction in the duty on ferromanganese, the institute seeking a cut to 25 per cent ad valorem.

The position of domestic manganese ore producers was laid before the subcommittee by J. Carson Adkerson, president, American Manganese Producers' Association, Washington, and several others.

It was contended by the steel interests that there are no high grade manganese deposits of importance in the United States, that promises of the domestic producers to develop processes for the manufacture of high grade material from low grade ores on a commercial and reasonable price basis had not been fulfilled and give no indication of being fulfilled, and that the duty is an unnecessary burden on consumers.

In direct contrast, domestic manganese producers maintained that processes for the beneficiation of low grade ores for the production of standard ferromanganese on a commercial basis at reasonable prices are being developed, enormous deposits of material which can be treated for this purpose exist and have been discovered, and some plants now are making high grade ore, and if given further protection the domestic producers will be able to supply the domestic requirements satisfactorily.

Steel makers asked for the conservation of such supplies as exist in case of necessity in times of emergency. Manganese interests on the other hand asked for added protection in order to develop any industry which will be able to supply necessary requirements in times of emergency. Senator Oddie submitted a brief in support of his amendment.

Appearing for David Taylor & Co., importer, Denver, Colo., former United States Senator C. S. Thomas protested against the House bill increasing the duty on tungsten ore from 45c. to 50c. a lb. of tungsten content. He said that no duty that Congress might place on tungsten ore will increase domestic production. He also opposed the House action in reclassifying tungsten scrap, giving it a duty of 72c. a lb. of tungsten content in excess of 0.2 per cent. The committee, including both Senators Reed and Edge, also seemed to think the increase on tungsten ore and tungsten scrap was not justified and called Nelson Franklin, Washington, mining expert, to explain the reason. He said that the duty of 50c. on the metallic content of tungsten ore represented a specific duty of a little over $500 on the 47.5 per cent grade. The duty would work out at $532, due to the difference in costs in China and the United States.

"I am a high protectionist," said Senator Reed, "but my inclination is to reduce the duties on tungsten ore, tungsten metal and tungsten scrap."

"If you do," said Mr. Franklin, "the price will go out of sight." It apparently was the view of Mr. Franklin that domestic production would cease if duties were lowered, leaving the country dependent solely upon foreign material.

Importers Voice Protests

Fred Truempy, Truempy, Faesy & Besthoff, New York importers, protested against the separate classification of silicon aluminum, aluminum silicon, alsimin, ferrosilicon aluminum and ferroaluminum silicon, providing a duty of 5c. a lb., and said that these items should be included under the section providing a duty of 25 per cent on all alloys used in the manufacture of steel or iron. He was especially critical of the duty as it affects alsimin, which was given a

higher classification by a Treasury decision and then written into the house bill.

M. K. Tholand, Ekstrand & Tholand, New York importers, protested against sponge iron being classified with muck bars, and being given a duty of 3/10c. a lb. He said the old rate was 30 per cent, but that sponge iron ought to be classified with and given the same duty as pig iron. There is no commercial production in the United States, but he admitted steel companies of the United States are experimenting with sponge iron with a view to getting into production. His firm imports the product from Sweden.

Pig Iron Producers Ask for $3 a Ton Duty

MERCHANT blast furnace interests asked for a duty of $3 a ton on pig iron. A plea for this rate was made before the House Committee on Ways and Means, but the House bill provided for a duty of $1.12½, which has prevailed since March 25, 1927, when by presidential proclamation it was increased by 50 per cent under the flexible provision of the Fordney-McCumber law. Contention was made by merchant producers that this duty is not sufficient to meet competition from abroad, which was said to affect Eastern furnaces most vitally, but to reach back to furnaces in the Middle West.

Pig iron makers in the central and adjoining sections of the country were represented before the subcommittee by Colonel F. B. Richards of the Hanna Furnace Co., Cleveland, while Eastern seaboard manufacturers and others presented their case through John W. Logan, Alan Wood Steel Co., Conshohocken, Pa., who indorsed the request of Coloned Richards for a duty of $3.

Colonel Richards was questioned closely by Senator King, Democrat, of Utah, as to domestic production and imports, earnings, consolidations, etc., who sought to bring out the point that incoming shipments were extremely small when compared with domestic output. Making a distinction between iron in pigs, such as that produced by merchant furnaces, and pig iron, made by steelworks stacks for consumption in the molten state, Colonel Richards explained that the tariff deals with iron in pigs sold by merchant furnaces and in some instances a small part of the production of a few of the steel companies which is sold in the market.

Colonel Richards said that, of the total production of 37,401,638 tons last year, 25,924,323 tons was used by steelmakers in molten condition, while 3,753,649 tons was iron in pigs for makers' own use and was the accumulation of iron made by blast furnaces and was available in the open market. Importations, he said, were 441,425 tons in 1925; 445,773 tons in 1926; 132,568 tons in 1927 and 140,694 tons in 1928. Between 91 and 92 per cent of these importations, it was stated, were landed at Northeast Atlantic ports from Philadelphia to Boston and in this area, served by furnaces in New York, Pennsylvania and Massachusetts, there is an approximate melt, when the foundries are running, of about 2,000,000 tons of iron in pigs. This territory, it was said, is where foreign competition is most severe. Explanation was given of prices over a period of years and differences in costs of production in the United States and abroad, the latter, as shown by a report of the Tariff Commission averaging in 1924 $7.16 under domestic costs. The countervailing duty against iron from India and the anti-dumping order against German iron brought about reduction in importations in 1927 and 1928. Neither of these penalties now applies, and Colonel Richards told the subcommittee that domestic producers are now in the same position as in 1924, and, "with reparations settled, from now on we may expect the keenest competition from German iron."

Cannot Keep Out Indian Iron

"We cannot hope, with a $3 duty, to keep out the iron from India, as they have a surplus of about 250,000 tons, part of which is bound to come to the United States, but as their product is widely distributed we are hoping the amount sent to the United States will be only a reasonable percentage of this surplus," said Colonel Richards.

"We may also expect competition from the Dutch furnaces, which have been built within the past few years, and in a short time they will have four modern furnaces. There is very little fabrication in the manufacturing field in the Netherlands, and the production of the four furnaces will be shipped abroad. As we understand it, these furnaces were largely financed by the cities of Amsterdam and Rotterdam, which use the gas produced by the by-product ovens.

"At the present time there is a measure of prosperity, and we are getting more for our iron. There is a shortage of pig iron in England, so it is reported, as well as coke, and the Germans and Dutch are shipping large tonnages to Great Britain. So far as one of these countries is concerned, the $1.12½ duty provided in the House bill is approximately no protection at all, and we have every reason to believe that they will use every effort, with reparations settled, when necessary in the future to again invade New England, New York and Pennsylvania markets with 400,000 to 500,000 tons of pig iron a year, which they can easily do under the present tariff, and force our prices down again to a point where we have tremendous losses in the manufacture of our iron."

Colonel Richards said that internal competition will keep prices in this country for many years to come entirely within reasonable bounds and the purchasers of pig iron will not in any way suffer by reason of the tariff asked for.

Compares Costs Here and Abroad

India, Netherlands, and Germany were said to have efficient plants, many of the furnaces in Germany having a capacity of 800 tons of pig iron a day. To build a furnace of this capacity in the United States at this time, including by-product coke ovens and power plants to use the waste heat from the furnaces, would cost over $8,000,000, the subcommittee was told. Colonel Richards said that it has been stated by an engineer, who made the appraisal of the plants which formed the United Steel Co. in Germany, that they could be reproduced with 45 per cent of the capital required in the United States.

Figuring the capital charge at 5 per cent and depreciation at 7 per cent, the American blast furnace today, it was pointed out, would have to face, as a capital and depreciation charge, $960,000 a year, and this, on a production of 292,000 tons of pig iron, would be $3.28 a ton. Figuring the German outlay in the same way, taking the capital charge at 5 per cent and the depreciation charge at 7 per cent on the same tonnage, it was stated, would mean a cost of $1.48 per ton on this production. The labor, supplies and all costs at the American furnace were placed at $1.50 per ton and at the German furnace 76c. per ton. This would make the capital and depreciation charges and costs, without figuring any interest on any other overhead, and not including general insurance, $4.78 per ton for the American furnace and $2.24 per ton for the German furnace, which, it was pointed out, would give an advantage to the German built and operated furnace of $2.54 per ton on capital and depreciation charges and labor, Colonel Richards said, explaining that he was assuming that the cost of shipping iron to New York City from the German furnaces, including any rail, freight and ocean carrying charges, would be about 17 shillings, or about $4.25 and even less. The open quotations, f.o.b. vessel channel ports today, it was stated, are $15.76 and the transportation about 12 shillings, or roughly about $3, making an open quotation delivered New York $18.76, without duty.

"We are paying to the railroad companies double the freight on all materials to be assembled, as well as on the finished products going out, as against the freight of 1913," Colonel

Richards said. "We are paying from two and one-half to three times more for labor than is paid in European countries, while the wages in India, we understand, run from 14c. to 16c. a day. The freight from Buffalo to the metropolitan district of New York and New England is $4.91 a ton. Iron can be transported from Holland to Atlantic ports for only 16c. a ton more than the present rate from Philadelphia to Bridgeport, Conn., the respective rates being $3.81 and $3.65 per ton.

"In November a cargo of about 3700 tons of Indian iron was received in Philadelphia and the customs invoice was sworn to at $12.61 a ton. It costs about $5.03 a ton to bring this iron from Tata, India, through Calcutta and deliver it in New York harbor. Recent reports from India show that they have reduced their costs from $13.36 per ton, as found by the Federal Tariff Commission in 1924, to $9.76 per ton at Tata, India, and it is owing to this fact that we make the statement that a duty of $3 a ton will not keep out Indian iron."

Merchant Furnaces Losing Money

Colonel Richards submitted a consolidated statement showing net losses of 32 merchant furnaces extending from Chicago to east Atlantic ports, for 1926, 1927 and 1928, the figures being $1,085,818.39; $2,751,832.92 and $1,241,189.13 respectively. On the other hand, Colonel Richards said, the most recent earnings of the iron and steel industry show that on a capital of about $39,000,000,000, it earned 5.71; on average shares of common stock, $10.58 per share and on book value, 5.41 per cent. These figures were said to include losses in the statement relating to the merchant blast furnaces. The companies for which he appeared were the St. Louis Gas & Coke Corporation, Granite City, Ill.; Federal furnaces of By-Products Coke Corporation, Chicago; Zenith Furnace Co., Duluth, Minn.; Toledo Furnace Co., Toledo, Ohio; Adrian Furnace Co., DuBois, Pa.; Davison Coke & Iron Co., Shenango Furnace Co. and Reliance Coke & Furnace Co., Pittsburgh; Marting Iron & Steel Co., Ironton, Ohio, and the Hanna Furnace Co., Cleveland.

Testimony of a similar character was presented by Mr. Logan, who said that Eastern seaboard merchant furnaces were the hardest hit by imports. Pig iron, he said, needs and is entitled to a duty in line with that on its products, which were said to have protective duties as high or higher than those existing when pig iron had a duty of $2.50 a ton. Almost 80 per cent of the entire production of pig iron in the United States was said to be made by steel companies for their own use.

Mr. Logan appeared for the following producers: Mystic Iron Works, Boston; Witherbee, Sherman & Co., Port Henry, N. Y.; Hudson Valley Coke & Products Corporation, Troy, N. Y.; Chateaugay Ore & Iron Co., Lyon Mountain, N. Y.; E. & G. Brooke Iron Co.; Birdsboro, Pa.; Colonial Iron Co., Riddlesburg, Pa.; Delaware River Steel Co., Chester, Pa.; Reading Iron Co. and Thomas Iron Co., Reading, Pa.; Alan Wood Steel Co., Conshohocken, Pa.; Pulaski Iron Co., Pulaski, Va.; Roane Iron Co., Rockwood, Tenn.; Central Iron & Coal Co., Holt, Ala.; Sloss Sheffield Steel & Iron Co., Birmingham, Woodward Iron Co., Woodward, Ala.; Columbia Steel Corporation, Provo, Utah.

Asks Higher Duty on Bar Iron

A uniform duty of ½c. a lb. on muck bars and bar iron valued at less than 2½c. a lb. was asked for by Charles Hart, Wrought Iron Co. of America, Philadelphia. The House bill, which made no change in muck bar and bar iron duties, provides 2/10c. a lb. when the value is not over 1c.; 3/10c. a lb. when valued at 1c. and not over 1½c., and 5/10c. a lb. when valued above 1½c. and not above 2½c. Mr. Hart said that imports of bar iron come into the United States at less than the American prices and affect the domestic market adversely. He said bar iron producers are also affected by imports of steel bars. He approved of the action of the House in specifically naming sponge iron and placing it in the muck bar and bar iron paragraph. He said that sponge iron competes with muck bar and is made in Sweden.

Wants Lead Duties Raised

George E. Collins, Denver, appointed by a committee of the Colorado State Legislature, the first witness before the subcommittee, asked for an increase of 33 1/3 per cent in the present tariff rates on lead ores, lead products and metallic lead; for a duty of 1½c. a lb. on zinc ore, regardless of its metallic content, and for an increase of 50 per cent in the duty on tungsten ore.

Tool and Fine Steel Makers Suggest Sliding Scale

APPEARING on behalf of the tool and fine steel industry Dr. J. A. Mathews, Crucible Steel Co. of America, asked for a sliding scale of rates as the values increase. These products coming under paragraph 304, carry a flat rate of about 20 per cent, and Doctor Mathews said this rate does not take into consideration the fact that higher prices represent greater labor costs on a given unit of material. For that reason he asked that the duties progress upward with prices. The scale he proposed ranges from 20 per cent to 35 per cent on carbon steels valued at over 16c. a lb. The subcommittee was told that about 34,000 tons was imported in 1927 under paragraphs 304, 308, 313, 315 and 316, and that it was all material that would resell in the United States at 5c. a lb. or higher, thereby bringing it into the category of tool and fine steels.

Tonnage producers, he said, are interested in imports valued below 2½c. a lb., such steel representing more than 99 per cent of the domestic production, while tool and fine steels represent 0.5 per cent in volume. At the end of the war, Doctor Mathews declared, about 40 plants were making tool and fine steels. Eleven of those were declared to have gone out of business and most of them have been scrapped. Two other companies were said to have undergone two complete reorganizations with loss to the stockholders and one was said to have undergone one reorganization. The Crucible Steel Co., Doctor Mathews said, has dismantled one plant and closed down another.

Dealing with paragraph 304, relating to rates on carbon steel of a value of 2½c. a lb. and upward, Doctor Mathews urged the following changes:

Valued at 2½c. and up to 3½c. a lb. from 8/10c. to 1c. a lb.

Valued at 3½c. and up to 5c. a lb. from 1c. to 1½c. a lb.

Valued at 5c. and up to 8c. a lb. from 1 7/10c. to 2 4/10c. a lb.

Valued at 8c. and up to 12c. a lb. from 2½c. to 3 6/10c. a lb.

Valued at 12c. and up to 16c. a lb. from 3½c. to 5c. a lb.

Valued at 16c. a lb. from 20 to 35 per cent ad valorem.

The additional rate, "Provided that on steel circular saw plates, etc.," from ½c. to 1c. a lb.

Insertion of the words "seamless tubes" be made in provision for hollow bars, and hollow drill steel valued at more than 4c. a lb., and House bill duty of 1 3/10c. a lb. be increased to 2c. a lb.

In paragraph 307, rates on plates, valued at over 3c. a lb., increase from 20 to 35 per cent.

In paragraph 308, covering high grade tool and fine steel sheets valued at 3c. a lb., increase from 20 to 35 per cent.

In paragraph 313, last clause, covering "bars and strips of iron and steel in either long or short lengths not especially provided for," increase from 25 to 35 per cent.

In paragraph 315, on material valued at over 4c. a lb., which the House bill increased to 20 per cent, increase further to 35 per cent; increase additional of ¼c. on material "tempered, treated or partly manufactured" to ½c. a lb.; increase additional duty of ⅛c. on "cold-rolled, cold-drawn, cold-hammered or polished in any way," etc., to 1c. a lb.; increase additional extra duty of 2/10c. on "blued, brightened, tempered or polished" material to 5/10c. a lb.

In paragraph 316, increase duty on wire, valued at 6c. a lb. and over to 35 per cent.

Representing the Southern Tariff Association, George W. Armstrong, president of the Texas Steel Co., Fort Worth, Tex., resumed a plea made before the House Committee on Ways and Means for a duty of 1c. a lb. on

iron and steel bars, including reinforcement concrete grades. He also was of the opinion that all bars should be included in a single paragraph. Senators Reed and Edge said that they thought not only bars but plates and other products should be reclassified so that there would be greater uniformity as to the processed condition of the products, ranging from raw to semi-finished to finished material.

Importer Asks for Changes

George E. Dix, New York importer, president, Steel Union Co. and Sheet Piling Co., Inc., approved of the House bill providing a definite classification for rolled interlocking steel sheet piling in the structural paragraph and continuing the duty at 1/5c. a lb., and protested against the recommendation of the American Iron and Steel Institute for a duty of 5/10c. a lb. He asked that deformed or concrete reinforcing bars, specifically mentioned in paragraph 304 in the House bill and made dutiable at $6 a ton, be restored to the structural paragraph, 312, and given a duty of $4 a ton. Request also was made for changes downward in the duties on ordinary plates, baling buckles, bale ties and woven wire netting. Because they sell for the same or almost the same price as structural shapes, he asked that plates take the same duties as shapes.

In accordance with this suggestion he asked that paragraph 307 be changed and that a duty of $4 per net ton or 20c. a 100 lb. be fixed on tank plates, universal mill plates, ship hull steel plates, plates meeting standard specifications for structural steel and other plates valued at 2c. a lb.; for plates valued at over 2c. a lb. and not over 2½c. a lb. a rate of $5 per ton, or 25c. a 100 lb.; for plates valued above 2½c. a lb. up to 3c. a lb., $6 a net ton, or 30c. a 100 lb.; for plates valued at over 3c. a lb., $10 per net ton or 5/10c. a lb. He said that it is on the ordinary plates of structural or tank grade that are of no special analysis and which require no excessive extras or price that the duty of $10 per net ton appears to be excessive and burdensome.

It was declared by Mr. Dix that the schedule suggested would permit some importations of plates, especially in localities where foreign freight rates were advantageous, and where prices are now high because of the long inland freight haul from manufacturing points.

Wants Changes on Hoops, Bale Ties

Taking up paragraph 314, Mr. Dix called attention to the fact that it permits the importation of hoops and bands, cut to length, with or without buckles, for baling cotton or other commodities, the duty being 1/4c. a lb., and he asked that the paragraph be so clarified that buckles and fastenings for baling ties may be admitted at the same rate of duty as when shipped together with the hoops or bands. In the majority of cases, it was stated, buckles or fastenings are shipped with the bands or ties, but occasionally the buckles are forwarded in separate shipments, and, when that occurs, under the decisions of the Customs authorities, paragraph 399, covering "articles not specially provided for, 40 per cent ad valorem duty" is the paragraph under which the material is admitted. Mr. Dix said it would appear clearly to be the intention of Congress to admit not only the hoops and bands, but the buckles and fastenings as well.

Pointing out that the last two lines of the paragraph read, "All wire commonly used for baling hay or other commodities, ½c. a lb.," Mr. Dix said that under the ruling of the Customs division it is impossible to import wire for baling hay, for the reason that there is nothing in the nature of the wire itself, or the manner in which it is supplied, to identify ordinary wire for use in baling purposes and that therefore this portion of the paragraph is ineffective. He suggested that the paragraph be changed to read "All wire commonly used for baling hay or other commodities and all wire bale tie, ½c. a lb." A bale tie, he said, consists of a straight length of the wire with a loop twisted at one end, but under the ruling of the appraisers this is classified under paragraph 399 as "articles or wares not specially provided for, if composed wholly or in chief value of iron or steel, 40 per cent ad valorem." It was declared to have been evidently the intention of Congress to allow baling wire and bale ties of wire which are used principally by the farmers, to "enjoy a reasonable duty of ½c. a lb. instead of 40 per cent ad valorem."

Request also was made that the committee include in paragraph 318, which covers woven wire cloth and fabrics of various kinds, a provision for woven wire netting composed of steel with an ad valorem duty of not to exceed 25 per cent, "in harmony with the rate of duty provided for the much finer products already included in paragraph 318." Mr. Dix said that failure to classify and specifically mention netting in the existing law has worked great hardship on the importers and users of this class of material.

Sheet Steel Piling Competition

In discussing sheet piling, Mr. Dix said that since the hearings before the Ways and Means Committee last February several striking examples of the competitive situation on this product have come up. On June 1, it was stated, there was a public letting at Palm Beach of a sea wall to be constructed of steel sheet piling of a total length of 7330 lineal ft. There were four bidders, Mr. Dix said, at the following delivered figures: Bethlehem Steel Co., $51.20 per net ton; Sheet Piling, Inc., offering Larssen piling, made by the United Steel Co., Germany, $50; Carnegie Steel Co., $49.20; Jones & Laughlin Steel Corporation, $47.50. The business, it was stated, was placed with Sheet Piling, Inc., despite the fact that it was the next to the highest bidder, the reason given by Mr. Dix being based "on the efficiency and strength of the piling section."

It was said that it is evident that there is no price advantage by which Larssen piling is adversely affecting the American market, and Mr. Dix added that there is no justification in the demand for an increase of duty. Rather, he urged, it would be more proper that the duty be reduced.

Proposes Increase on Forgings

Appearing for the Forging Manufacturers' Association, representing 85 manufacturers of forgings, G. H. Weiler asked that the duty of 6/10c. a lb. on axles, etc., be increased to 2c. a lb. and that crank forgings be specifically mentioned.

C. Frank Schwep, Ingersoll Rand Co., New York, opposed the House provision which specifically named hollow drill steel and gave it an additional duty of 1 3/10c. a lb. when valued at over 4c. a lb. above other products named in paragraph 304. Mr. Schwep said the proposed duty will either prohibit importations of hollow drill steel or place a burden upon the mining industry using rock drills. The House bill, he said, would increase the duty $60 a ton, and make it 3c. a lb. His company, Mr. Schwep says, imports hollow drill steel from Sweden, and he stated the reason the material was imported is that it is superior to the domestic product.

Objects to Alloy Steel Rate

Representing 16 importers who receive from 90 to 95 per cent of the incoming shipments of fine steels, W. D. Thomas, New York, strongly objected to the duty of 8 per cent on alloy steel and asked that it be reduced to 2 per cent. He protested also against the provision relating to determination by Customs authorities as to whether imports were or were not alloy steel. The point was made that the provision would be confusing and difficult of administration because of the difficulty of accurate analysis. He proposed instead specific duties on the alloy content. Retention of the 8 per cent duty in paragraph 305, he said, would impose three duties on alloy steels in addition to those on carbon steels. He also protested against the duty on cylindrical steel rolls.

Mr. Thomas said that importations of fine steels are less than 2 per cent of domestic production and that the imported material was higher in price, the claim being that it is superior in quality to American-made material.

Construction work was scheduled to be started on additions to two merchant mills of the Algoma Steel Corporation at Sault Ste. Marie, Ont. The improvements will cost $2,500,000 and are expected to be completed by Jan. 1 next. The additions will about double the capacity of the two mills and increase the finished steel production by about 50,000 tons a year.

Promising Markets for Sheets Disclosed

Conference of Flat Rolled Steel Executives Last Week Devoted to Trade Extension Work

MARKED increase in interest in trade extension work was evidenced in the meeting last week at White Sulphur Springs, W. Va., of the executives of flat rolled steel manufacturers. A three-day conference, with afternoons left for golf and other recreation, brought before the makers of steel sheets and hot and cold rolled strips two analyses of potential markets and concrete suggestions to cultivate them. It heard a carefully considered estimate of the trade extension problem by President James A. Farrell of the United States Steel Corporation. It focussed on the active movement among many industries to eradicate unethical and uneconomical commercial practices by agreements among the elements of the industry either under the auspices of the Federal Trade Commission or outside its influence. The note sounded in all the gatherings was one of satisfaction in respect to the progress made in trade extension and a steadfastness of purpose to carry on in a larger way if possible. Following are some of the high points of the conference.

Analyses of Rural and Urban Demands for Sheets and Strips

IN THE IRON AGE of last week, page 1784, were outlined the early features of the meeting. These included a farm market survey presented by Ray H. Griswold, of the Griswold-Eshleman Co., Cleveland. As explained last week this indicated a potential market in galvanized roofing alone of 1,600,000 tons against a present consumption of 429,000 tons, part of which is believed to go to towns and cities. Considerable emphasis was placed on the channels of distribution, with hardware stores in the premier place by a wide margin, and on the need of better compensation for the dealers, and on the highly receptive attitude of the farmers for steel products. Besides a formidable array of charts covering consumption and distribution studies, Mr. Griswold had a number of impressive exhibits of industry advertising, which he used effectively as follows:

One long panel was headed by the legend: "Shall I buy a product made of steel or a product made of—," immediately under it being the appeals of makers of products competitive with steel. These advertisements culled from various publications were bordered by a legend below to the effect: "The answer to this question must be made by the whole steel industry speaking as one voice." Another panel was entitled, "Today's business battle is being fought between industries not between firms," and below the advertising exhibit of companies extolling various materials was the injunction: "Steel mills should fight together for more of the consumer's dollars instead of fighting each other for his dimes."

It was pointed out that among the specimens of advertising were those of fabricators dilating more or less emphatically on the fact that steel entered into their products. The conspicuous illustrations of this class were advertisements of the General Electric Co., particularly of the company's electric refrigerator of which the all-steel character was advanced as a factor of prime importance. A letter from the company gave credit to the flat rolled steel makers campaign for stressing the idea of steel in its selling efforts.

Howard Spohn, of the Gardner Advertising Agency, New York, presented charts covering preliminary studies into the market possibilities of sheet steel and strip steel in the general field. They touched on steel furniture, shelving, steel lath (consumption of 110,000 tons a year against prospects of 569,500 tons), barrels, tote boxes, enameled wall tile, steel ceilings, roof decks (360,000 tons potential and 15,000 tons actual), doors and trim, steel industrial buildings, toilet and shower partitions, office and factory partitions, metal lumber, box and refrigerator cars, boiler jackets, trucks, etc.

Summed up, the two speakers left the impression that both the rural and urban markets presented broad fields for cultivation, the one measured in part by its annual creation of new wealth to the amount of 20 billions of dollars and the other as offering a 7-million ton consumption where now it takes but 535,000 tons. Both were convincing that manufacturing steel consumers are beginning to see the value of stressing steel as a point in selling. Also, as was mentioned in last week's account, it was urged that fabricators be induced to use slogans in their trade development work; the advertising of the flat rolled steel makers, as explained, is in part written around "save with steel" arguments in reaching the general buyer and around "galvanized steel protects" in rural campaigns.

Mr. Farrell on Trade Development

MR. FARRELL addressed himself to the same topic of trade development and his remarks substantially in full were as follows:

"The work of trade associations, properly performed, is useful. The American Iron and Steel Institute, since its inception, has endeavored to bring about friendly intercourse among its members, and cooperation in technical research, which have been of vast benefit during the 20 years of its existence. Any efforts designed to promote new uses of steel products or to expand their present usage, to assist both the manufacturing and consuming trade to a better understanding of the problems of initial manufacture and re-manufacture, are worth while.

"There has been an increased trend in recent years toward the formation of trade associations covering practically every line of manufacture and many commercial activities. It is said that there are some 15,000 of these associations in the United States. It is to be hoped that in their operations and ramifications the inhibitions imposed by our laws will be scrupulously observed.

"It is gratifying to note in this connection the helpful attitude of the Federal Trade Commission following further interpretations of the Sherman Law by the Supreme Court. The hearings which have taken place at the request of a number of these associations have no doubt served to clarify the limitations of these associations as to their methods of operation and permissible functions.

"It is obvious that the American Iron and Steel Institute can only serve as a general clearing house for the exchange of thought and plans for the benefit of the industry as a whole. It must be left to individual and company initiative, and the mutuality of efforts in respective lines of manufacture, to develop the respective interests of the several sections of the steel trade.

"There is a serious and important aspect, however, as to the extent to which the industry should actively participate other than in technical discussion and research. The border line of collaboration under the law, when such cooperation might be interpreted by the courts as restraint of trade, does not seem to have been

clearly defined. It is realized that one of the purposes of the Federal Trade Commission is supposed to be to clear up such mysteries; but it is not understood that their suggestions offer more than helpful aid to those seeking such assistance in formulating methods and plans to come within the law.

"Without wishing to discuss at this time the practical advisability of business associations seeking any measure of control under governmental auspices, in the expectation of having a mantle of legality enshroud its operations, it appears to some well informed observers that it is not essential or desirable to solicit that form of governmental intervention in business.

How Large Companies Can Assist

"Another trend of the times appears to be toward the merger or consolidation of manufacturers having collateral interests; and when these have been and can be accomplished legally, it would seem that the integration thereby made possible would serve in a large measure to accomplish the purposes of disintegrated organizations seeking through an association the solidarity in research and technical development which is economically beneficial.

"It would therefore remain for the larger companies with their effective bureaus of research, sales and advertising, to assist by every proper means the efforts of associates in similar lines of work to promote the common interest in the more intelligent use and distribution of their product. This assistance might well comprise through collaborative and cooperative efforts to accomplish a stabilization of practices, costs and compensatory returns on investment.

"It is felt that such reciprocal effort will enable the industry, with their facilities for the accomplishment of similar purposes, to develop every possible means of improvement to the industry, and in collaboration to stimulate and promote customer uses of product, with such exchange of data and result with associations of its competitors as may be found proper and expedient.

"It would seem that the units of the industry itself should have sufficient respect for each other's welfare voluntarily to refrain from unfair trade practices inveighed against by numerous associations which have sought the assistance of the Federal Trade Commission and by close observance of ordinary commercial ethics and reciprocal consideration.

An Industry's Excessive Claims of Superiority

"Remedies of any ills affecting our business are in our own hands. For instance, the orgy of excessive claims for the superiority of products differing but slightly, if at all, from those of other manufacturers, has assumed fantastic proportions. It incites competitive and expensive effort along similar lines by all competitors, with a mass of assertions and refutations which, in the end merely serve to confuse the mind of the buyer or promote harmful conflict among manufacturers. If this is intended to be a challenge as to the lengthiest pocketbook in advertising achievement and promotional publicity, the challenge will of course be met by the interests who naturally resent insinuations as to the superiority of competitive product or the inferiority of their own. It is in effect a form of salesmanship universally abhorred, of decrying the wares of a competitor, or vaunting unfounded or unprovable claims of excellence of products whose chief merit may be in the assumption of a peculiar or meaningless name.

"Possibly much of this competitive effort as been instigated by extraordinary pretentions of those who offer substitutes for steel and attempt to convince the public, and especially readers of literary journals, instead of readers of technical publications, which would seem to be the logical media for imparting technical information that the world has at last found what it has been waiting for.

"The only result from these claims is likely to be at the expense of the long-suffering industry, which has only recently emerged from the blight of over-capacity, under-consumption and meager profits. You can hardly term such effort as unethical, but rather as unnecessary and inadvisable. One of the best achievements which associations in the industry could accomplish would be to frown on illogical and unwise claims in selling policies.

"There is much to be said as to the advantages of association work to both makers and consumers in assisting toward proper publicity methods in refuting visionary suggestions of the superiority of substitutes; but much of this work would be minimized if the members themselves refrained from claims irreconcilable with the facts.

"Another boomerang to be averted, if possible, is the stimulation of unnecessary capacity through exciting ourselves over the prospect of more than a normal increase in annual average consumption consequent upon growing population and prosperity.

"There is a wide line of demarcation between normal and natural efforts to protect our industries and expand the use of their product along sane and normal lines, with due regard for the interests of others—and a scramble for business, with a heavy and burdensome budget of questionable utility, on the assumption of an unlimited increase in demand.

"There have been occasions in our industry when we were inclined to be more fearful than hopeful. At such moments we have felt that our business had fallen on parlous times; at such times the future of our industry was not pleasant to contemplate, but we recover quickly from moods of this sort. At present and for some time past we have had capacity operations. The indications are that we will have a reasonably full operation for some time to come. When business does slacken, we should act well and wisely. There is no reason why reasonable profits should not accrue on a less rate of operation.

"Until we have gained the wisdom, which we have not always had, of being satisfied with our normal share of the business going, we can do the industry incalculable damage and retard its normal development. We should by this time have attained that control of ourselves which will avert its misapplication to unbusinesslike methods and its resulting consequences. If we are seeking permanent economic factors they can be largely accomplished through cooperation."

Other Notable Addresses

The attitude of cooperation and general helpfulness now so conspicuous on the part of the Federal Trade Commission and its fostering of trade practice conferences were discussed at length at a banquet given by the association to members and guests on Monday, June 24, by the Hon. W. E. Humphrey, of the Federal Trade Commission.

Severn P. Ker, president, Sharon Steel Hoop Co., presided at the banquet and at the Wednesday morning session. The most important thing the steel industry has to do, said he, is to care for distribution. The executives today, in his opinion, are giving closer attention to distribution problems than at any time in the past, and he said there are signs of their desire to help industry as a whole. He regarded they had no other obligation than friendship for their associates and interest in the industry.

In introducing Mr. Farrell, he described him as knowing more of trade development than any one else. He referred to his efforts to export steel and how he proved able all alone to build up the export organization of the United States Steel Corporation two years after the formation of the corporation, resulting in a taking of 3,000,000 tons of steel off the American market and sending it to the world against low cost labor. Mr. Farrell, he said, is the undisputed chief executive officer of the greatest steel corporation of the world.

Among the notable addresses of the conference was that of George H. Charls, president of the National Association of Flat Rolled Steel Manufacturers. So well received was it that special requests were made from the floor that copies be made available for careful reading by all of the manufacturers, members and nonmembers alike. Those who entered into the discussion included C. R. Hook, vice-president and general manager, American Rolling Mill Co., Severn P. Ker, W. S. Horner, vice-president, American Rolling Mill Co., Walter E. Watson, Youngstown Sheet & Tube Co., F. C. Gifford, vice-president and general sales manager, Acme Steel Co., Chicago, A. N. Flora, of the association, Frank R.

Frost, of the Superior Steel Corporation, and others. What Mr. Charls had to say respecting trade extension is as follows:

Defines Rational Trade Extension

"Trade extension has been removed from the plane of intellectual abstractions and the sphere of the intangible. It has become a concrete, effective, recognized function of modern business.

"Cooperative trade development is no longer the abstract theorem among the problems of industry. It remains so only to those who willfully insist on remaining blind to its merit, or those who are frankly uninformed and unversed in its mechanism, operations and outstanding achievement.

"Collective trade extension has become a vital force for the protection of an industry and the preservation of its future. It not only extends the demand for the product of an industry, but it extends the very life of the industry itself.

"If charlatans have made it an abstruse affair, practical salesmanship and business ingenuity have unscrewed the inscrutable, exposed the hokum and vitalized the practical. It is no longer a speculative truth, that judiciously expended time and money in trade extension expands markets, but a fact which has been demonstrated.

"Regardless of the just criticism that vast sums of money have been wasted in misguided and misdirected efforts of trade extension, out of these mistakes have come a true knowledge of how to spend money judiciously to produce actual results in holding and creating new markets.

"In our industry, the responsibility of each and every corporation producing flat rolled steel to put its shoulder to the wheel, in our efforts to extend markets for our products, must be realized, appreciated and acted upon. Each must realize how effective he makes the whole by being a part of it—how doubtful he makes the plan by being out of it.

"If we are going to do this work in the biggest, most effective way, the industry expects every unit within it to do its duty.

"Our conception of trade extension advertising is to keep it on a purely educational basis and to hold it to the exploiting of the utility, beauty, weight saving, space saving, uninflammable nature of products made from steel and, most important, to make it a powerful force in influencing all fabricators of steel products and their distributers to increase their sales and advertising efforts, so that a $500,000 trade extension program on sheets, strip sheets, hot rolled and cold rolled, will bring about an expenditure of $5,000,000 among all those who buy the flat products—devoted to influencing the minds of 120 millions of people in favor of steel as opposed to competing products."

Eugene P. Thomas, vice-president of the United States Steel Corporation, in charge of sales, supplemented the speech of President Farrell by stating that the results of the extensive research work in progress by the Steel Corporation would be placed ultimately in the possession of the industry as a whole. He discussed also how the workings of the cartels and syndicates abroad, institutions not permissible here, had been helpful in promoting larger uses of manufactured as well as primary forms of steel, until the consumption of the non-manufacturing steel countries was last year 20 million tons, or 25 per cent more than in the preceding year, which year showed an increase of 13 per cent over its predecessor.

National Fuels Meeting to Be Held in Fall

Engineers interested in fuels, whether from the point of view of production or of utilization, will meet in Philadelphia, Oct. 7 to 10, under the auspices of the American Society of Mechanical Engineers. This will be the third National Fuels Meeting which that society has sponsored. Among the subjects to be covered are the following:

Economics of reclamation of anthracite culm.
Burning refuse fuels.
Low-temperature carbonization.
Atomic basis of combustion theory.
Economics of gas, coal and oil fuels.
Economics of oil production.
Heat value of fuel.
Coal pre-treatment.
Slag accumulations on boiler tubes.
Air needed for combustion of different fuels.
Design of furnace for tunnel kilns.
Development of refractories to meet needs of users.
Producer gas in brick kilns.
Burning pulverized anthracite.
Recent developments in stoker design (four papers).
Burning coarse coal in supension.
Proper methods of pulverized-fuel sampling.
Methods of recording smoke (three papers).

Refractories Institute Elects Officers

At the annual meeting of the American Refractories Institute on June 25, in Cleveland, the following officers and directors were elected: President, P. S. Kier, Kier Fire Brick Co.; first vice-president, W. B. Coullie, Harbison-Walker Refractories Co.; second vice-president, Roger A. Hitchins, General Refractories Co.; treasurer, C. C. Edmunds, McLain Fire Brick Co.; secretary, Dorothy A. Texter, Oliver Building, Pittsburgh.

Directors for the three year term 1929-1932: U. S. Clark, Howard Co.; G. R. McClintock, Osceola Silica & Fire Brick Co.; P. S. Kier, Kier Fire Brick Co.; E. F. Myers, Ironton Fire Brick Co.; J. Claire Evans, Denver Fire Clay Co.; J. T. Roberts, Stockton Fire Brick Co.; J. L. Green, Laclede-Christy Clay Products Co.; C. H. King, Evens & Howard Fire Brick Co.

New England Foundrymen to Meet at Taunton

The July meeting of the New England Foundrymen's Association will be held Wednesday, the tenth, at the Wampanoag Motor Club, Taunton, Mass. Following a luncheon, golf matches will be run off, and there will be a baseball game and other sports. The dinner in the evening will be informal. Luther Anthony, Glenwood Range Co., is chairman of the entertainment committee.

Industrial Conference to Be Held at Lake Geneva

The twelfth mid-western industrial conference will be held at Lake Geneva, Wis., July 18 to 21, inclusive, according to an announcement by J. A. Hiller, executive secretary of the conference, 19 South La Salle Street, Chicago. The 1929 program is planned for senior and junior executives and their representatives, and for the first time the labor group, which heretofore has been excluded from the conferences, will participate.

Westinghouse Agent Jobbers Elect Officers

Karr Parker, treasurer and engineering manager McCarthy & Ford, Buffalo, was elected president of the Westinghouse Agent Jobbers Association at its seventeenth annual meeting at Hot Springs, Va. Other officers named were E. D. Kilburn, vice-president Westinghouse Electric & Mfg. Co., vice-president; H. M. Gansman, vice-president H. C. Roberts Electrical Supply Co., Philadelphia, secretary; and H. T. Pritchard, merchandising department, Westinghouse Co., Mansfield, Ohio, assistant secretary and treasurer.

The following were elected members of the executive committee: A. E. Allen, vice-president Westinghouse Lamp Co., New York; Samuel Adams Chase, special representative Westinghouse Co., Mansfield; W. I. Bickford, president Iron City Electric Co., Pittsburgh; B. E. Finucano, general manager Rochester Electric Supply Co., Rochester, N. Y.; W. W. French, vice-president and general manager Moore Handley Hardware Co., Birmingham; M. C. Morrow, sales manager merchandising department, Westinghouse Co., Mansfield; T. J. Pace, director of sales, Westinghouse Co., East Pittsburgh, Pa.; J. C. Schmidtbauer, president Julius Andrae & Sons Co., Milwaukee; C. E. Stephens, northeastern manager Westinghouse Co., New York; N. G. Symonds, northwestern manager Westinghouse Co., Chicago; and Walter Williamson, vice-president and general manager Alpha Electric Co., New York.

New Automatic Chucking Machine

Hydraulic Feed Mechanism Applied to Both Platen and Automatic Indexing Turret Types

AN automatic chucking machine featuring hydraulic feed, has been brought out by the Foster Machine Co., Elkhart, Ind., under the trade name of Fastermatic. It is built in platen and automatic indexing turret types, each of which is available in four sizes, with 17, 22, 25½ and 33-in. swing over the bed, respectively.

Feeding of the tool-carrying units is actuated by a ram or piston inclosed in a hydraulic cylinder into which oil is forced by an Oilgear pump. The pump is located on the head end of the machine and is driven through silent chain from the main drive shaft. During the period of feeding, positive pressure is maintained on each side of the piston, the back pressure on the side of the piston opposite to that to which the feeding pressure is applied being necessary to maintain uniform feeding movement to the tooling when the cuts are intermittent or of irregular depth. These pressures are regulated automatically through the action of the Oilgear unit.

Feeds range from 0 to approximately 40 in. per min. The feed changes are effected through varying the capacity of the pump and its delivery of oil to the piston. Adjustable cams are provided for obtaining the desired feed. The arrangement provides for automatic rapid return of the tooling from the work at the completion of machining operations, as well as for rapid approach of the tooling into position for beginning the cuts. At the completion of the cycle, the tooling is retained in the returned position until the feed is re-engaged by hand. Rapid traverse can be effected automatically during any part of the feeding movement, which reduces the time on pieces having wide spaces between bored or turned lengths.

The tool-carrying units of the platen type machine consist of a front and a rear cross-slide and a main slide, all of which are mounted on a platen. Actuated by the hydraulic mechanism, the platen carries the tooling into position for beginning the machining operations, and away from the work, to the initial starting position, after the tooling units have receded. Although ordinarily rapid, the movements to the platen are fully controllable and, when desirable, can be reduced automatically to any rate of travel that may be required for feeding auxiliary tooling bolted to the platen.

With the indexing turret type Fastermatic the tool-carrying units consist of a front and a rear cross-slide, mounted on a bridge that spans the bed, and an automatically indexed hexagon turret. The cross-slides are adjustable longitudinally.

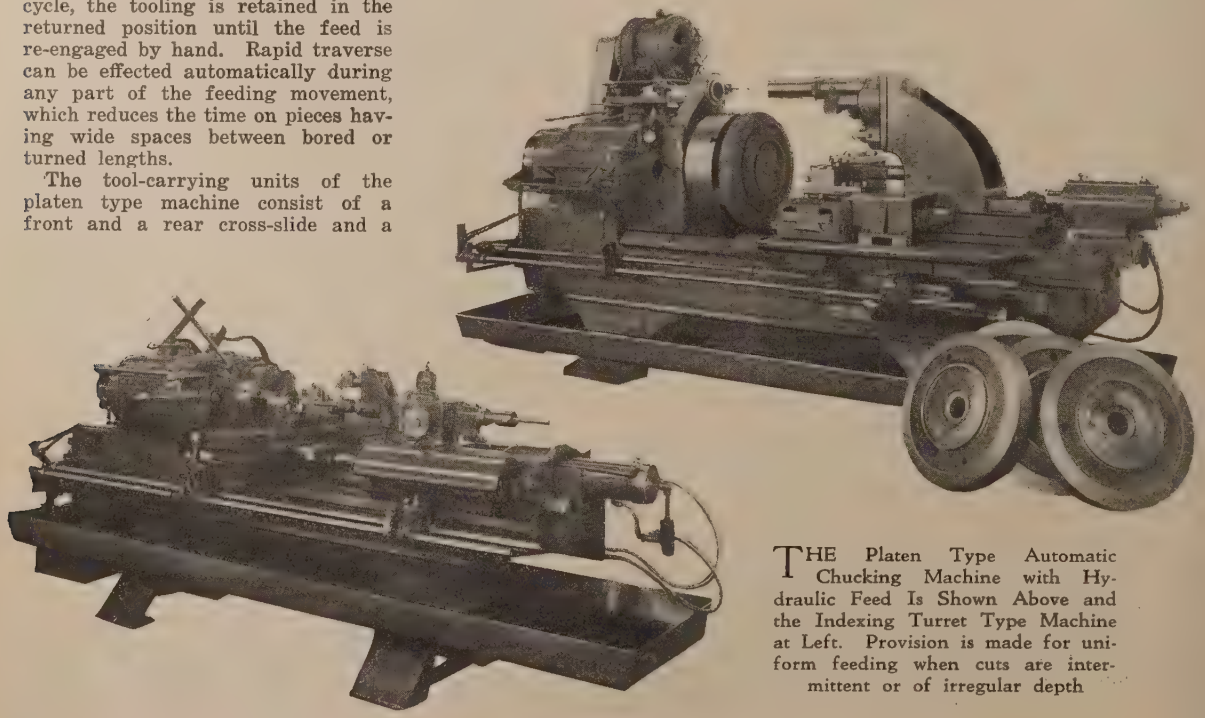
The hexagon turret advances and returns automatically, and the entire action is effected by means of the ram in a hydraulic cylinder located between the ways at the rear. A rapid traverse places the turret in position for starting the boring and turning operations; from this position the turret continues to feed at a predetermined rate. Longitudinal movements of the turret are controlled by cams, one for each face. The cams are carried on a spool and index automatically in correct relation to the faces of the turret. Each cam is adjustable and a separate and independent feed for each face of the turret is readily available. The turret can be adjusted to remain at any fixed return position, or the full travel backward and forward may be accomplished without indexing.

The cross-slides can be operated simultaneously or independently, and can be timed to operate in conjunction with any of the turret faces. The cross action is effected by cams beneath the slides and is controlled by the movement of the turret. At the completion of the cycle the entire tooling is moved clear of the work until the feed is re-engaged by hand. Provision is made for the use of both overhead and centrally piloted tooling, and chucks such as usually used on lathes are readily adaptable to these machines.

Eight spindle speeds are obtainable on the Nos. 1-F and 2-F machines, and 12 speeds on the Nos. 3-F and 4-F. All of the machines are equipped with Timken bearing spindles, ball-bearing back shafts, multiple-disk clutches and steel gearing that runs in oil.

Competitive Exhibit of Plated Finishes

AN exhibit of metals finished in nickel, copper, brass, silver, lead, cadmium, gold and chromium is being sponsored by the American Electroplaters' Society of America for its seventeenth annual convention, Hotel Statler, Detroit, July 8 to 11. This competition will take the place of the usual supply men's exhibit. Three prizes will be awarded to firms submitting best samples of electroplated metal. The usual technical and educational features of these conventions are to be continued.

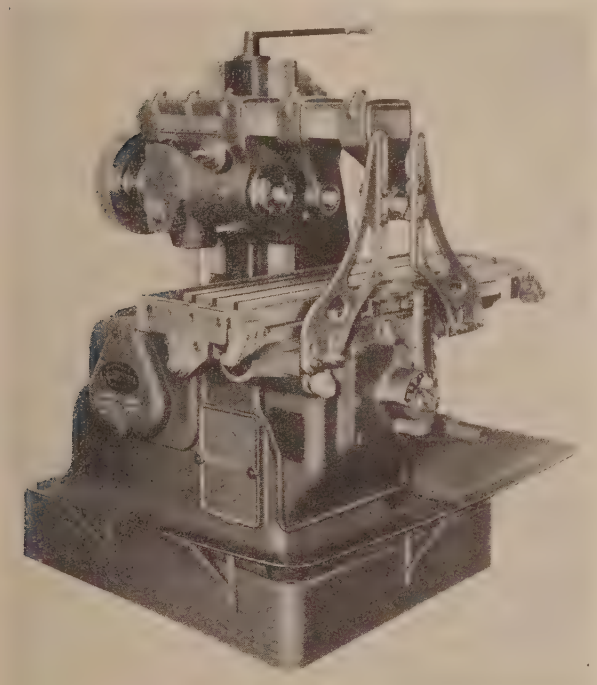


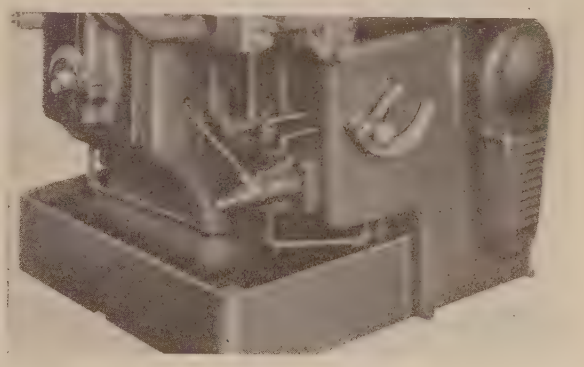
THE Platen Type Automatic Chucking Machine with Hydraulic Feed Is Shown Above and the Indexing Turret Type Machine at Left. Provision is made for uniform feeding when cuts are intermittent or of irregular depth

New Rigidmil Has Hydraulic Feeds

Feed Range Is From 0 to 50 In. and Rapid Traverse 103 In. Per Min.—Mechanical Feed Also Furnished

FOR both general purpose and high-production milling operations, the Sundstrand Machine Tool Co., Rockford, Ill., is bringing out a new Rigidmil that is slightly smaller than its No. 3 machine and is equipped with hydraulic table feed. Mechanical feed can also be furnished, the machine being readily changed from one type of feed to the other at any time.





Manual Feed Control Levers Are Shown in View Above. The lever at left controls the direction of feed and rapid traverse, and that at right the rate of feed

Hydraulic feed is obtained by means of an Oilgear pump in the base of the machine. It provides an extensive variety of feeds within the range of 0 to 50m. per min., rapid approach, automatic relief if the cutter becomes overloaded, dwell at completion of cut; and automatic quick return to starting position. Rapid traverse is at the rate of 103 in. per min. The feed rate best suited to the work can be obtained instantly. When the cutter is overloaded, the hydraulic feed automatically retards and then accelerates to the set rate when normal conditions return. The manual control of feed is through a lever on the front of the saddle, and may be set in five positions: Rapid traverse, to left; feed, to left; neutral; feed, to right; and rapid traverse, to right, the direction of feed or rapid traverse being the same as the lever movement.

Automatic table control is governed by two stop blocks with nine dogs located between them, all adjustable. The blocks will cause the table feed to throw-out within plus or minus 0.002 in. of a selected point. The dogs may be used in various combinations to obtain any desired cycle of feed and rapid traverse.

The mechanical feed unit comprises a gear box for pick-off gears and a longer drive shaft than used with the hydraulic unit. Three pairs of pick-off gears for six feeds, from 1.49 to 22 in. per min., are supplied as standard.

The base-column-saddle casting is made in one piece. The spindle-head is compact and is mounted on the column with narrow guides for alinement. The forged steel spindle carried in Timken bearings front and rear, has the National Standard nose, with hole 2¾ in. in diameter at the large end, and 3½ in. taper per ft. The entire spindle assembly is carried in a hardened and ground steel quill and has 4-in. traverse adjustment.

Smooth spindle drive is obtained through a coarse pitch spiral-bevel pinion and gear, the pinion and shaft being of one piece and mounted in Timken bearings. Pick-off gears, located in the main casting just below the column, provide changes of speed and direction of rotation for the spindle. A fly-wheel on the spindle serves to minimize vibration and chatter from heavy or irregular cuts. The overarm is a solid steel rectangular forging and is adjustable by a rack and pinion.

The main drive clutch of multiple disk type, is compact and sensitive; it runs in a bath of oil and is easily adjusted. The drive is by motor only, a 5-hp., 1200-r.p.m. motor being recommended. The motor is mounted in the base on an adjustable plate and drives the primary shaft through a silent chain. Coolant is contained in a large reservoir in the main casting of the machine. Extra equipment includes a vertical spindle-head and rotary table.

Specifications include: Table working surface, 14½ x 50 in. standard, 14½ x 70 in. special; spindle adjustment, 10¾ in. vertical, 3 in. horizontal; and distance center of spindle to overarm, 6½ in., to table 13⅜ in. maximum and 2⅝ in. minimum. The distance of the spindle face to the outer edge of the table is 14⅜ in. maximum and 11⅜ in. minimum. The distance from the floor to the top of the table is 35 in. The net weight of the machine, which is designated as the No. 30, is 5100 lb.

Side-Discharge Billet Heating Furnace

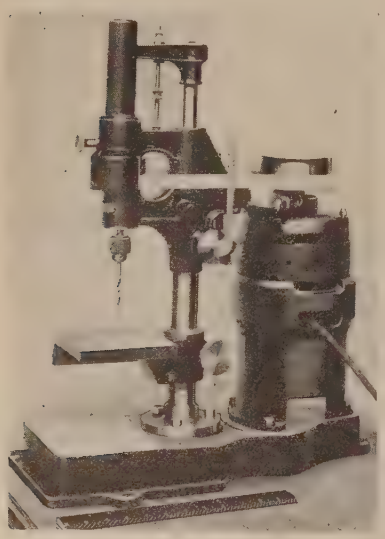
At its new strip mill at Leechburg, Pa., the West Leechburg Steel Co., Pittsburgh, will install a double-fired billet heating furnace. It will be built by the Rust Engineering Co., Pittsburgh, will heat billets and slabs 20 ft. long and will be charged and discharged from the side. Zone control firing will be employed to obtain flexibility in operation with minimum scale losses, despite the varying tonnages of steel heated. The mill will operate at rates ranging from 10 to 25 tons an hour, according to the order being rolled.

Two tiers of burners will be employed, one heating the small soaking chamber at the discharge end which controls the temperature of the discharge steel. The secondary firing ports are to be located behind the soaking chamber and the firing rates are varied in accordance with the tonnage to be heated.

The increasing use of X-rays to determine the internal structure of steel castings, aluminum castings, metal transmission tubes and a variety of other metal objects is described in a booklet entitled "X-rays in Industry," published by the Eastman Kodak Co., Rochester, N. Y.

High-Speed Sensitive Drilling Machine

A NEW high-speed precision sensitive drilling machine that will drill holes up to ¼-in. in diameter to the center of a 6-in. circle is being manufactured by the High Speed Hammer Co., Rochester, N. Y. Spindle speeds of the standard machine, designated as the model R-53, are 2700 and 5500 r.p.m.; with three step pulleys available as extras, speeds of 1500, 3000 and 6000 r.p.m. are obtainable.



The Capacity Is for Holes Up to ¼ In. Standard speeds are 2700 and 5500 r.p.m.

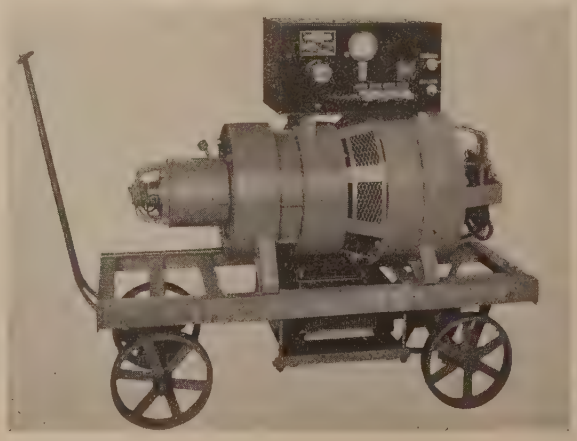
The hardened and ground spindle is guided by a vertical quill supported by ball bearings which take all belt pull. Two ball thrust bearings carry the top of the spindle at the feed arm. The parts ground accurately to size and alinement include the spindle, quill, feed column, main column, table (horizontal surface and apron), and base. Spindle travel may be set accurately by means of a depth gage provided; the maximum travel 2¼ in. The table can also be quickly adjusted in height, or entirely removed if necessary. It has a self-cleaning taper to prevent injury to the ground main column by chips. The base measures 10 x 20 in. overall and has a ground working surface 4 in. x 6 in.

Either direct or alternating current motor can be furnished. Extra equipment includes a foot treadle and rod and a pedestal base. The overall height of the machine illustrated is 24¼ in. and the weight 108 lb. net.

New "Stable-Arc" Welder Has Unified Control

UNIFICATION of the controls of both motor and generator, making for simplified operation, is an outstanding feature of the new "Stable Arc" welder recently placed on the market by the Lincoln Electric Co., Cleveland. The control mechanism is inclosed in a ventilated steel cabinet, while hand regulators and switches are mounted on the panel that forms a side of the cabinet. The control panel contains rheostat regulator, diverter switch, safety starter switch, volt-ammeter and wing-nut cable terminals. In being mounted directly over the motor generator, the control cabinet is not only accessible, but also permits removal of the motor generator armature without disturbing any other parts. In addition, it makes possible use of shorter chassis frame or base than in previous models of the "Stable Arc" welder. The shorter base offers the advantage of less floor space occupied by the welder, as well as smaller turning radius for the portable models.

By means of the volt-ammeter provided the voltage and amperage may be read from the one dial. This volt-ammeter is said to assure longer instrument life because it eliminates use of a separate delicate ammeter that would be given excessive wear on a Lincoln welder due to large output keeping the ammeter jammed against the high limit pin on the dial. Terminals for the lead cables are equipped with winged nuts, which facilitates making connections, especially when it is desired to reverse the polarity of welding current, and eliminates the necessity of a switch for reversing polarity. The company's new safety push-button switch, which eliminates accidental starting, is also a feature of the control mechanism of the new machine. Inclosed wiring of all operating controls, as well as a metal-backed rheostat, are made possible by the unified control cabinet.



Mounting the Control Cabinet Over the Motor-Generator Facilitates Operation, and Permits Removing Generator Armature Without Disturbing Other Parts

Devises Cutting-Torch Tip for Removing Rivets

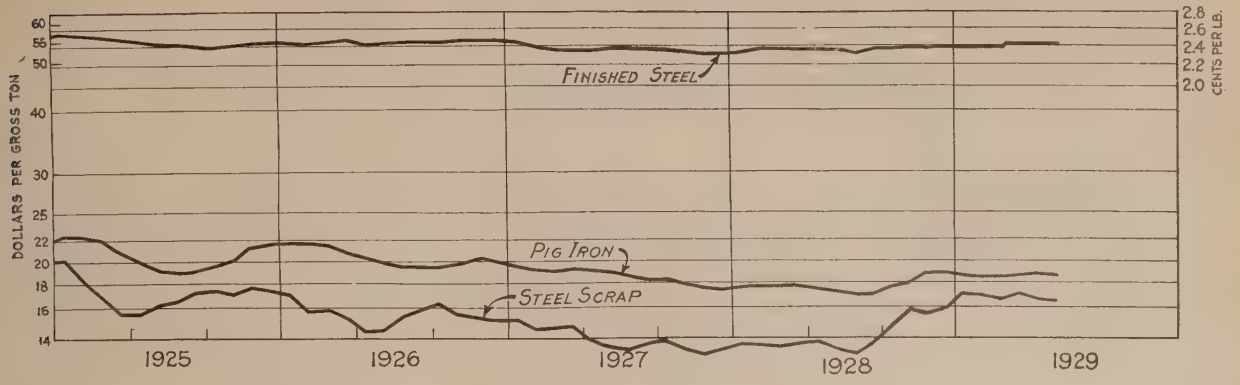
REMOVAL of 7/8-in. rivets at the rate of 7 to 9 per min. is claimed for the rivet piercing tip brought out recently by the Alexander Milburn Co., Baltimore, for use in connection with cutting torches.

The device, which is interchangeable with other forms of tips used on such torches, is centered over the rivet head and the head preheated to the melting point, which results in the forming of a ring as shown. Simultaneously, the body of the rivet is pierced and, due to the expansion and contraction of the plate, the rivet drops out or may be backed out with slight effort. These operations leave the sheet or plate uninjured and are said to meet inspection and tests required by the I. C. C. regulations. Savings in gas and minimum loss of side-sheets due to imperfect cutting, as well as increase in speed, are claimed for this method of rivet removal. The tip is of one piece and of non-flashback design.

The Rivet Piercing Tip Is Interchangeable with Other Tips. The ring formed in cutting the rivet head is shown above

Philadelphia offices of the Diamond Machine Co. and Builders Iron Foundry, affiliated companies, have been removed to 903 Riverson Building. Main plants are at Providence, R. I.

Scrap Prices Have Held Closely to Those for Pig Iron for Nearly a Year. By contrast finished steel has varied scarcely at all in the past several years



Scrap Prices Drop from Peak

Steady Decline from Early April Brings Second Quarter Below First—April Highest Month of First Half

AVERAGE prices of heavy melting steel scrap at Chicago, Philadelphia and Pittsburgh reached a spring peak the first week of April and held it until after the middle of the month. Since then there has been a practically uninterrupted decline until the end of June. The average for April was the highest for any month since the close of 1925.

Maximum prices on the weekly basis were reached at the end of January, but the April average was higher than the January average. It stood at $17.18, and the level has since fallen to $16.39 for June. The last quotation in June was $16.33.

For the second quarter of the year the average price was $16.70. This shows a decline from the $16.90 average for the first quarter. With that exception it was the highest since 1925.

Meanwhile, the average price for pig iron was somewhat higher for the second quarter than for the first—$18.62 against $18.39—also being at the highest level since the second quarter of 1927, when $19.07 was registered.

Finished steel has undergone few price changes since early in 1927. The entire second quarter of this year had the one figure of 2.412c. a lb., and the entire first quarter had 2.391c. a lb. The present price of 2.412c. is the highest since 1927, while the lowest in that period was the 2.318c. average of January, 1928.

Comparative figures for the past 18 months covering steel scrap, pig iron and finished steel are given in the table. The diagram carries the story of these changing prices over a period of four and a half years.

COMPOSITE PRICES

	(Gross Ton) Steel Scrap	Pig Iron	Finished Steel, Lb.
1925 average	*$17.12*	*$20.58*	*2.465c.*
1926 average	*15.48*	*20.42*	*2.439c.*
1927 average	*14.00*	*18.55*	*2.357c.*
January, 1928	13.70	17.63	2.318c.
February	13.71	17.73	2.361c.
March	13.65	17.73	2.362c.
April	13.81	17.67	2.359c.
May	13.90	17.45	2.350c.
June	13.52	17.23	2.341c.
July	13.13	17.10	2.325c.
August	13.75	17.11	2.348c.
September	14.75	17.54	2.348c.
October	15.85	17.94	2.363c.
November	15.73	18.46	2.368c.
December	15.97	18.51	2.385c.
Year's average	*14.29*	*17.67*	*2.352c.*
January, 1929	17.02	18.43	2.391c.
February	16.96	18.38	2.391c.
March	16.71	18.36	2.391c.
April	17.18	18.52	2.412c.
May	16.54	18.70	2.412c.
June	16.39	18.65	2.412c.
Half year	*16.80*	*18.51*	*2.402c.*

New Records in Steel Barrel Production and Shipment

WASHINGTON, June 28.—Production and shipments of steel barrels in May, totaling 836,532 and 834,699 units respectively, established records since these data were first compiled by the Department of Commerce, from the beginning of 1925. Output was at the rate of 72 per cent of capacity. The previous records in production and shipments were made in April, according to the Department's figures, and amounted to 771,584 and 775,481 units respectively, operations being at the rate of 64.8 per cent of capacity.

Unfilled orders at the end of May for delivery within 30 days amounted to 316,882 barrels, against 333,614 at the end of April, while unfilled orders for delivery beyond 30 days were 899,090 and 935,430 barrels respectively. Stocks at the end of May were 56,936 barrels, compared with 55,103 barrels at the end of April.

Production during the first five months, representing 58.8 per cent of capacity, totaled 3,476,171 barrels, against 2,995,813 barrels for the corresponding period of last year, at 52.5 per cent of capacity. Shipments were 3,465,700 and 2,989,834 barrels respectively. Production showed a gain of 16 per cent and shipments a similar gain.

Mileage Rates on Slag Are Proposed

WASHINGTON, July 2.—A mileage scale to cover rates on slag from Reading and Swedeland, Pa., is proposed in a report by Examiner Joseph G. Cooper to the Interstate Commerce Commission, made public last week. The scale runs from 100 to 350 miles, with the scale ranging from $1.50 to $2.50 a ton and would be subject to the addition of 70c. a ton for hauls involving carfloat or lighterage services in the New York harbor district. The report was made in connection with a complaint by Cartier & Sons Co., Providence, R. I. The examiner held that rates on slag from all points involved were not unreasonable, but that those from Reading and Swedeland would be unreasonable in the future to the extent they exceeded those proposed in the scale. Other origin points named in the complaint are Hokendaqua and Bethlehem, Pa. Destination points were Providence, Auburn, Esmond and Cranston, R. I.

Chicago Employment Shows Slight Gain

Volume of employment of factories in the seventh Federal Reserve District showed a slight increase for the period April 15 to May 15, but was offset by a decline of 1.4 per cent in the amount of payrolls. The metals and metal products group, says the report of the Federal Reserve Bank of Chicago, reported a slight decline in the number of men employed, the first since July, 1928.

Further expansion in the form of an addition of 35,000 sq. ft. of manufacturing space has been announced by the Surface Combustion Co., Toledo, Ohio. This will give the company a combined floor area for production purposes of 90,000 sq. ft.

Steel Capacities by Districts Published

Interstate Commerce Commission Compiled Data in Its Review and Decision in the Freight Rate Case

IN its decision and review of the rate structure investigation as applying to iron and steel products, the Interstate Commerce Commission published several tables giving ingot capacities by districts and cities, also capacities for manufactured iron and steel articles. These tables are reproduced below.

The accompanying tables give the rated ingot and finished steel and iron capacities by districts and by cities:

Producing Points	Ingot Capacity (Gross Tons)	Capacity for Manufactured Iron and Steel Articles (Net Tons)
EASTERN DISTRICT:		
New England—		
Worcester, Mass.	180,000	172,000
Bridgeport, Conn.	125,000	100,000
Bridgewater, Mass.	.....	35,000
New Haven, Conn.	.....	30,000
New Britain, Conn.	34,000	12,000
Eastern New York—		
Syracuse	63,160	49,300
Troy	.....	60,000
Rensselaer	.....	47,000
New Jersey—		
Trenton-Kinkora	150,000	90,000
Harrison	83,350	34,400
Perth Amboy	50,000	35,000
Maryland—		
Sparrows Point	1,020,000	480,000
Baltimore	.....	60,000
Cumberland	.....	30,000
Delaware—		
Claymont	360,000	225,000
New Castle	160,000	.....
Eastern Pennsylvania—		
Bethlehem	1,512,000	1,085,000
Coatesville	1,226,480	818,200
Steelton	776,000	130,000
Ivy Rock	529,000	125,000
Harrisburg	325,000	266,000
Philadelphia	294,540	135,000
Pencoyd	240,000	222,000
Phoenixville	225,000	150,000
Pottsville	200,000	180,000
Reading	46,128	225,000
Lebanon	.....	221,500
Burnham	165,000	45,000
MIDDLE DISTRICT:		
New York-Buffalo District—		
Lackawanna	1,824,000	690,000
Buffalo	690,000	470,000
Western Pennsylvania—		
Pittsburgh	2,144,000	2,648,040
Munhall	2,548,500	1,677,000
Johnstown	1,928,000	825,000
Duquesne	1,388,800	822,500
Woodlawn	1,140,000	840,000
Braddock	1,474,000	215,000
McKeesport	686,600	729,800
Monessen	665,000	606,000
Clairton	636,000	504,000
New Castle	770,000	232,400
Farrell	624,000	299,500
Midland	600,000	264,000
Donora	550,000	224,000
Brackenridge	372,000	218,000
Vandergrift	324,000	226,000
Butler	360,000	131,500
Etna	.....	231,000
Leechburg	.....	230,600
Elwood City	.....	226,500
Sharon	.....	205,000
McKees Rocks	.....	202,000
Economy	.....	200,000
Homestead	.....	165,000
Erie	112,500	20,000
West Virginia—		
Weirton	570,000	375,000
Benwood	453,000	157,000
Wheeling	.....	149,600
Follansbee	84,000	57,900
Eastern Ohio—		
Youngstown	5,180,000	2,486,200
Cleveland	2,631,000	1,485,400
Canton	1,070,000	912,000
Lorain	1,365,000	519,000
Steubenville	600,000	565,000
Warren	500,000	537,600
Massillon	400,000	488,000
Mingo Junction	600,000	.....
Bellaire	420,000	.....
Struthers	.....	376,000
Niles	.....	360,000
Lowelville	.....	360,000
McDonald	.....	340,000
Zanesville	.....	218,000
Toronto	92,400	53,600
WESTERN DISTRICT:		
Western Ohio—		
Portsmouth	448,000	312,000
Middletown	507,000	163,260
Mansfield	185,000	100,000
Ironton	.....	50,000
Kentucky—		
Ashland	520,000	134,480
Newport	300,000	131,000
Michigan—		
Springwells	50,000	210,000
Ecorse	.....	50,000
Indiana—		
Gary	3,240,000	2,980,800
Indiana Harbor	2,440,000	1,129,000
East Chicago	.....	220,000
Kokomo	120,000	120,000
Illinois—		
South Chicago	2,772,000	1,157,200
Chicago	952,400	598,800
Joliet	708,000	437,700
Granite City	360,000	230,000
Peoria	140,000	125,000
Alton	150,000	90,000
Waukegan	.....	190,000
Chicago Heights	86,435	101,000
Wisconsin—		
Milwaukee	.....	327,800

Summary of Steel Capacities

	Ingot Capacity (Gross Tons)	Manufactured Iron and Steel Articles (Net Tons)
Eastern District:		
New England	403,650	403,000
Eastern New York	120,160	279,000
New Jersey	329,850	341,500
Maryland-Delaware	1,579,000	795,000
East. Pennsylvania	5,688,148	4,546,450
Totals, eastern district	8,120,808	6,364,950
Middle District:		
Buffalo district, New York	2,545,350	1,399,000
West. Pennsylvania	16,789,250	13,058,250
West Virginia	1,108,000	980,900
Eastern Ohio	13,218,400	9,326,735
Totals, middle district	33,661,000	24,764,885
Western District:		
Western Ohio	1,155,000	710,760
Indiana	5,800,000	4,812,600
Michigan	57,200	332,000
Kentucky	820,000	280,480
Illinois	5,168,835	3,347,700
Wisconsin	24,500	363,800
Totals, western district	13,025,535	9,847,340
Grand totals	54,807,343	40,977,175

Capacities of 16 Other Companies

Other producing companies having an ingot capacity of 500,000 gross tons or over are shown below. These 16 companies, together with the two mentioned above, control approximately 85 per cent of the ingot capacity of the entire territory.

Name of Company	Ingot Capacity (Gross Tons)
Youngstown Sheet & Tube Co.	
Youngstown	2,400,000
Indiana Harbor, Ind.	840,000
Jones & Laughlin Steel Corp.	
Pittsburgh	1,860,000
Woodlawn, Pa.	1,140,000
Inland Steel Co.	
Indiana Harbor, Ind.	1,600,000
Republic Iron & Steel Co.	
Youngstown	1,800,000
Wheeling Steel Corporation	
Steubenville, Ohio	600,000
Portsmouth, Ohio	448,000
Benwood, W. Va.	225,000
United Alloy Steel Corporation	
Canton, Ohio	1,000,000
McKinney Steel Co.	
Cleveland	1,000,000
American Rolling Mill Co.	
Middletown, Ohio	507,000
Ashland, Ky.	330,000
International Harvester Co.	
Chicago	700,000
Lukens Steel Co.	
Coatesville, Pa.	686,480
Pittsburgh Steel Co.	
Monessen, Pa.	600,000
Pittsburgh Crucible Steel Co.	
Midland, Pa.	600,000
Weirton Steel Co.	
Weirton, W. Va.	570,000
Donner Steel Co.	
Buffalo	540,000
Alan Wood Steel Co.	
Ivy Rock, Pa.	529,000
Total	17,975,480

The Interstate Commerce Commission points out that the most important markets for steel are in the States where most of the steel is manufactured, Michigan being the sole exception, as follows:

State	Percentage
Pennsylvania	21.7
Illinois	14.32
Ohio	9.70
Michigan	8.08
Indiana	6.93
New York	5.31
New England States	3.75
New Jersey	3.23
Delaware, Maryland and District of Columbia	1.59
Virginia	1.02
Total of above	75.63

Capacities of United States Steel Corporation and Bethlehem Steel Corporation Compared

	Ingot Capacity (Gross Tons)	Per Cent of District	Manufactured Iron and Steel (Net Tons)	Per Cent of District
Eastern district, totals	8,120,808	..	6,364,950	..
Bethlehem Steel Co.	3,848,000	47.3	2,174,500	34
United States Steel Corporation	420,000	5	578,000	9
Middle district, totals	33,661,000	..	24,764,885	..
Bethlehem Steel Co.	3,752,000	11	1,515,000	6
United States Steel Corporation	14,040,300	41.7	8,941,100	36
Western district, totals	13,025,535	..	9,847,340	..
Bethlehem Steel Co.	.....	...	.....	...
United States Steel Corporation	6,720,000	51.5	5,241,300	53
Grand totals	54,807,343	..	40,977,175	..
Bethlehem Steel Co.	7,600,000	13.9	3,689,500	9
United States Steel Corporation	21,180,300	38.6	14,760,400	36

This Issue in Brief

Increased strength at ordinary and high temperatures is imparted to gray iron by adding chromium up to 0.90 per cent. Improved heat resistance qualities are probably due to presence of chromium carbide in the cementite of the pearlite.—Page 16.

* * *

Freight rate increases for short hauls will encourage motor truck transportation. Chicago steel producers expect savings as high as 50 per cent to result from motor truck deliveries, giving consumers prompter service and saving them cost of hauling from railroad.—Page 22.

* * *

Iron and steel tariff bill is evidently not satisfactory to Senate subcommittee. If majority views prevail, the schedule will be greatly changed.—Page 24.

* * *

"Orgy of excessive claims for superiority of (steel) products differing but slightly, if at all, from those of other manufacturers, has assumed fantastic proportions," says James A. Farrell. The industry as a whole suffers thereby, he says, urging trade associations to frown upon illogical and unwise claims in selling policies.—Page 30.

* * *

Decline in bank clearings may indicate the beginning of a slackening in trade, says Dr. Haney. Building activity is declining, and automobile business appears to be rounding off, he says.—Page 18.

* * *

Machinery exports decline for second successive month. May shipments out of the country were valued at 48 million dollars, against 51.4 millions in April. Total for the first five months is, however, 37 per cent above same period of 1928.—Page 70.

Airplane builder uses mild-carbon steel tubing for fuselage and tail surfaces, as it is readily welded and gives a better strength-weight ratio than low-carbon steel, at the same time being less expensive than chrome-molybdenum steel. The alloy steel is, however, used for axles, which are subjected to high bending stresses.—Page 4.

* * *

Conflict on manganese ore tariff reflects desires of senators' constituents. High-tariff and low-tariff senators in manganese ore-producing States ally against senators in steel-producing areas. Steel manufacturers favor reduction or elimination of manganese ore tariff.—Page 24.

* * *

Sharper competition for steel business in areas lying between producing centers will result from new freight rates. New schedule is largely in favor of Pittsburgh producers in the competitive territories.—Page 21.

* * *

Steel exports increase while imports decline. Exports for first five months of 1929 were 23 per cent above same period of 1928, while imports declined 11 per cent.—Page 65.

* * *

Price average of finished steel products unusually stable. It showed no change at all during second quarter. Scrap price average, however, declined in June to the lowest average monthly price this year, after reaching a three-year peak in April.—Page 35.

* * *

Machining gray iron castings results in loss of hardness. But under certain cooling conditions, high-test iron holds its Brinell hardness throughout the section.—Page 6.

Finds cast iron slightly superior to steel or wrought iron in atmospheric corrosion resistance, in majority of cases studied. Investigator points out that in soil corrosion the governing factor is the nature of the soil.—Page 8.

* * *

"Fight together for more of the consumer's dollars instead of fighting each other for his dimes," is advice given to steel producers and consumers. Makers of finished steel products are urged to develop promising markets by stressing steel as a sales point.—Page 29.

* * *

Fatigue strength of cast iron is markedly increased by oft-repeated stresses below the endurance limit. Up to 800 deg. Fahr. there is no great reduction in fatigue and tension strengths and in Brinell hardness.—Page 7.

* * *

Pig iron daily output for June averaged 2 per cent under May, having been 123,255 tons a day. On July 1 there were 218 furnaces in blast, a net loss of one for the month. New half year record was established with output of 21,621,363 tons, 3.75 per cent above previous record, made in first six months of 1923.—Page 42.

* * *

Cutting tools made of high-speed steel containing tin and arsenic will not stand up well. A. S. T. M. research committee reports. Special heats were made of steel containing 0.40 per cent arsenic and 0.40 per cent tin. Service tests of cutters, reamers and twist drills made from this steel revealed the steel to be unsuitable for the purpose.—Page 12.

A. I. FINDLEY
Editor

THE IRON AGE

W. W. MACON
Managing Editor

ESTABLISHED 1855

Swings in Finished Steel Demand

EITHER there will be a wider gap than ever between the steel making and the steel finishing capacity of the country, within a year or so, or the amount of new construction of steel making units will be quite out of line with the well considered advice given at the spring meeting of the American Iron and Steel Institute. In finishing departments no little new construction is going forward, with other work intended as soon as plans can be matured. Yet there is little new construction as to steel making.

Some definite reasons can be given for greater increase in steel finishing capacity at this time than in producing capacity. There have been remarkable swings in the relative demand for different finished steel products. Now that a half year has been completed a general review is in order. Commenting on the 1928 production statistics THE IRON AGE of May 9 noted that, while there was a large gain in total finished steel production from 1926 to 1928, there had rarely been such a period of sweeping changes in the character of steel demand. Rails, plates, skelp and miscellaneous showed substantial decreases, so that other lines had to show all the greater increases, and these increases were supplied very largely by sheets, strips and bars.

Now with another half year passed one can observe that some of these swings have continued, instead of there being a tendency back toward the 1926 distribution. While this year's total steel production promises to make a new record by a substantial margin, rails are likely to show a further decrease. Production of sheets and strips, on the other hand, has continued increasing at the remarkable pace shown in 1928.

Plate demand has reacted. It fell off from 1926 to 1928, with a decrease of 287,554 tons, while this year plates are going very strong. History indicates that we should expect wide fluctuations in plate demand, rather than a continued swing, such as there is in strips.

Within the general class of tubular goods, to complicate matters further, there are swings in processes of manufacture more than in total demand; first, the gains in seamless over fire welded, and now also the new vogue of electric welding, which started only a couple of years ago in large diameter pipe and is extending to smaller diameters.

The increasing specialization of rolling mills or finishing departments naturally adds its own contribution to the gap between steel making and steel finishing capacity. Each "finishing department" of the steel industry is generally divided into several finishing departments, making different sizes. And with it all, consumers have become punctilious as to precisely how much steel they want and exactly when they want it.

Railroad Outlay for Steel

CAPITAL expenditures of Class I railroads are summarized and discussed in a pamphlet (Miscellaneous Series No. 48) just issued by the Bureau of Railway Economics, Washington. Expenditures for current operation are also considered. In 1923 capital expenditures were slightly over a billion dollars, and year by year, except for a bulge in 1926, they decreased until they ran just over two-thirds of a billion in 1928. The figures are by no means a direct measure of the amount of steel absorbed. To make steel tonnage the best way for railroads to spend money is in freight cars and locomotives. Rails are another way, but the rail purchases are chiefly for replacement. There is some capital expenditure in them, however, for increased weight is carefully charged to capital. Thus, in 1928 the rail expenditures charged to maintenance amounted to $92,181,000, while in addition there was charged to capital $47,192,000 for "heavier rail," this being 69 per cent more than the amount so charged five years earlier.

From 1923 to 1928 there was a decrease of $382,484,000 in total capital expenditures, but for locomotives and freight cars the decrease was $450,581,000; i.e., capital expenditures for all other purposes actually increased by $68,097,000, which is 15 per cent of such expenditures in 1923.

In six years there has been a large turnover in locomotives and freight cars, installations slightly exceeding retirements in the case of freight cars but falling far short in the case of locomotives. The pamphlet mentioned gives tables of equipment installed and retired by years, 1923 to 1928 inclusive. During this period both locomotives and freight cars rapidly decreased, 1928 compared with 1923 showing only 31 per cent as many locomotives and 24 per cent as many freight cars installed. Locomotive retirements were relatively constant, while freight car retirements greatly decreased. The sum totals for the six years show 13,560 locomotives installed and 18,562 retired; 749,116 freight cars installed and 747,915 retired.

By referring to statistics of equipment in service Dec. 31, 1922, the turnover in the following six years may be computed. Relative to number in service at that date, the locomotive installations were 21 per cent and the retirements 29 per cent, while the freight car installations and retirements both figure out ap-

proximately 32 per cent. Thereby the railroads must have worked their equipment into pretty good shape.

The relative consumption of steel by the railroad and automotive industries is interesting. It is a curious coincidence that, according to the annual findings of THE IRON AGE, the combined percentages were precisely the same for four years, 1923 to 1926 inclusive, whereupon there was a drop. The percentages of total steel were as follows:

	Railroad	Automotive	Total
1923.....	27	11	38
1924.....	28	10	38
1925.....	25	13	38
1926.....	23½	14½	38
1927.....	19	14	33
1928.....	16	18	34

At the middle of a year a forecast of railroad absorption of steel for the entire year would be largely conjectural. Substantially this would be true of the automotive industry, particularly as we do not know what the year's total steel production will be. It is possible to apply factors of usual seasonal variation, however, for both automobiles and steel and such a computation brings out 22 per cent as the 1929 automotive proportion. It would require 16 per cent by the railroads to restore the former 38 per cent for the two, and that seems hardly probable.

Copper Curtailment

A SOMEWHAT contradictory situation has developed in the copper market. Visible stocks, on which good statistics are available, are very low and increased but slightly in May. Large foreign buying is said to be necessary to cover July and August requirements. Some American consumers have been asking for prompt delivery of copper ordered for July. The refinery price has been stationary at 17¾c. for about three months. Yet with supplies small, demand large, and a market price yielding excellent returns, one of the leading producers has curtailed mine output 25 per cent.

Several reasons for such a move could be given. Officials of that mining company may believe that the large demand from copper and brass fabricators during the last six months represents a peak in the latter's business, and that normal consumption can be adequately supplied by a less-than-capacity operation at the mines. Such a view may be correct, since the producer that has curtailed is highly integrated, and the mine production could well be governed by the condition of the order books of the brass-making subsidiary.

On the other hand, it might be argued that curtailment is primarily in the interest of stabilization. Actual sales of copper have been in small volume for some weeks; the price has been regulated by the necessity of custom smelters to sell a relatively small tonnage. What is to be the price of copper when consumers come seriously into the market, when they have used up all the high-priced metal they scrambled to buy during the first quarter? While the law of supply and demand has been often amended or nullified, it remains true that if a necessity is scarce it commands a high price. On the other hand, if plenty of copper is available, consumers are likely to get it cheaper.

As a matter of fact an ordinary producer of copper could make nearly the same profit at 75 per cent operation, if thereby the price could be maintained at the present level, as at full capacity operation with the price a cent lower.

To Lift Europe by Lifting Wages

BY raising the standard of wages in European countries, Henry Ford believes that some measure of the prosperity which the United States is enjoying can be brought to the manufacturing nations abroad. Mr. Ford has persuaded the Twentieth Century Fund to donate $25,000 to the International Labor Office of the League of Nations to secure data on employment conditions in Europe, upon which the Ford Motor Co. can equalize real wages in its plants in all countries.

That "America's prosperity is largely due to the unprecedented increase in the purchasing power of the people," is the statement of the president of the fund, Edward A. Filene of Boston, in making the announcement of the $25,000 donation. He goes on to say that "the same policies that produce prosperity in the United States will produce prosperity in France or Germany or England or any other nation."

Although not a few American manufacturers were skeptical of the wisdom of the high minimum daily wage when it was first established in the Ford plants in this country, the opinion is now widely held that well-paid labor has contributed a large part to our present prosperity. Mr. Schwab, in his presidential address to the American Iron and Steel Institute at its May meeting, said: "All of us have come to recognize the great economic importance of maintaining a high wage scale."

Just as the prosperity of every man's neighbors in our own country helps both his and the general prosperity, the Twentieth Century Fund believes that increased prosperity in European countries will help us in the sense that "prosperous neighbors fill each other's pocketbooks" and that "any increase in the purchasing power of the masses of the people in any nation will be of inestimable benefit, not only to that nation, but also to the world at large."

Right Handling of Technical Sessions

WHO that has served any considerable term in attending engineering society meetings has not learned that what the chairman does or fails to do goes far toward making a session a success or a failure? The program may be outfitted with prominent names; the session subject may be of high timeliness, and moot enough to sharpen interest and loosen tongues; but unless there be animated and well-directed leadership from the chair, the outcome, in free and worth-while discussion, will be lamentably small.

The custom of bestowing session chairmanships on past officers or on men who have earned prominence by laboratory work or contributions to literature is entirely understandable. But it may be suggested that doing honor to one who has worthily achieved in his special field should not be the first consideration in making such selections. "Professor Brown," leading

research chemist, may very naturally be thought of to preside over a session on nitriding, but if he lacks that "gift of people" which would draw out expression from the right men at the right juncture this long-time custom might better be honored in the breach than in the observance.

The late Dr. Charles B. Dudley, who for seven years presided over the meetings of the American Society for Testing Materials, was a master of the art of drawing out discussion. None who attended the Atlantic City meetings of 20 to 25 years ago can forget that the charm of his personality, his rich experience and his way of stimulating free expression by those best fitted to speak on the subject in hand made many a session memorable. Makers of programs, in all our engineering societies, may well take a leaf from the Dudley memoir and bring technical discussions to the old-time place of service and distinction.

Studying the Lesser Savings

MANUFACTURING economies do not always fall in the category of higher speed of operation, fewer men for a given task, greater use of mechanical conveyors, less cross-hauling of parts, and maximum use of automatic machinery. Frequently a change that appears insignificant cuts the cost of an important piece and, through much repetition in the production of that part, converts itself into a sizable sum on the right side. It may take the form of an engineering innovation or its bearing may be chiefly commercial. A single case will illustrate the point:

Automobile crankshafts have been forged from round steel bars cut to length and from square billets of equivalent cross-section. It was thought in the engineering department of one plant that the round bars were necessary for best results. But tests showed this was not the case. Hence the practice changed to the use of square billets, for two reasons: They were a bit cheaper to buy; they were considerably less costly in freight charges, as they took the rate for semi-finished steel. An added advantage was that they overcame the tendency occasionally noticed with the rounds, of piling up in their progress down the gentle slope of the heating furnace hearth.

Here the commercial factor, reduced cost of delivered raw stock, and the practical or engineering consideration of less trouble in heating combined to suggest a change in shape. Not always is the advisability of a departure so clearly indicated. More frequently, perhaps, it is a case of striking a balance between prospective advantages from one source and disadvantages likely to result from some other condition involved in the proposed practice.

CORRESPONDENCE

Resistance of Steel Pipe to Soil Corrosion

To the Editor:—The article entitled "Pipe Steel Resists Corrosion Poorly" (page 1569, THE IRON AGE, June 6), gives me the impression of overemphasizing the tendency of steel pipe to corrode compared with other kinds of ferrous metals, in spite of the brief abstract from a paper by the writer which is placed at the end of your article. A prominent steel casting manufacturer wrote me in regard to this abstract, thinking that it was striking at his product, which is made to resist wear. Apparently he did not get the idea that the remarks credited to the writer were made solely with reference to the corrosion of ferrous metals. A brief abstract without an explanatory note is likely to be misunderstood.

One inference from the article is that steel should not be used by itself to resist corrosion. As a matter of fact, 90 per cent of the steel oil and gas mains are laid without any protection. The Bureau of Standards soil tests to which you refer indicate that cast iron is penetrated at least as deeply as steel where the soil is corrosive. Cast iron, however, is not mentioned in your article.

Another interesting fact not brought out by these tests is that the rate of corrosion varies about 30 to 1 in different soils, whereas the difference between the average rate of corrosion of different classes of ferrous metals is only about 12 per cent, which does not include cast iron.

I would also take exception to the remark that "Pitting under a good protective coating has been noted on pipe which had not properly been de-scaled and dried." This may have been true in certain specific cases, but it is still a question among engineers as to whether it pays to de-scale pipe before coating. The moisture in these cases probably came from the soil after the pipe was laid. Experiences show that all such action can be prevented by closer attention to the character of the coating.

The data given to support the theory that 0.22 per cent carbon steel is less susceptible to corrosion than 0.08 per cent carbon steel include tests of a few weeks' duration in solutions approximating some ground waters. Much more extensive data exist to disprove the effect of carbon under these conditions. In any case such tests do not include contact with the soil and are therefore not relevant to the case. This and the de-scaling discussion are obviously exploiting the contentions of the company mentioned in connection with this article. The discussion of this article at the Bureau of Standards meeting tended to clear up some of the points referred to above. About 35 papers on the subject of soil corrosion were presented at this conference, which was of a rather private nature.

F. N. SPELLER,
Director Department of Metallurgy and Research, National Tube Co.

Pittsburgh, June 22.

Against Use of Word Only in Advertising

To the Editor: "Not All the People All the Time" sure enough is right. The editorial (June 27, page 1788) should be broadly distributed to every paper in the land, or better pasted up in about 50,000 sales offices in various industries in the country.

Public distrust is one thing, disgust is quite another, and that is present also.

You miss one very highly important point, and that is the use or abuse of the expression only. This is an out and out abuse, and just what the moral and the legal situation is I have never seen expressed.

I refer to such expressions: Electric ice box, only $240; vacuum cleaner, only $75; radio, only $175, or only $25 down and only $10 a month; auto, only your old car down, and $40 a month.

The situation in this good old U. S. A. is not vastly different from what it was some years ago. The average income of the average individual is not better than $1,200 per year, or $100 per month, and that is just ahead of starvation, and I should think that seeing on all sides that word only would drive thousands mad.

SIDNEY CORNELL,
Professional engineer.

New York.

CARNEGIE LIBRARY OF ATLANTA

Steel Founders Plan Broader Association

Following Summer Studies Will Formulate Definite Objectives in Fall Meeting

WITH plans for an expansion in association activity, executives of steel foundries met at White Sulphur Springs, W. Va., June 27 and 28. What is in mind is a much larger organization than now represented in the Steel Founders' Society of America and possibly such additional services to the industry as studies in trade development. Granville P. Rogers has been engaged as managing director of the society, with headquarters at 932 Graybar Building, New York, and in the next two or three months Mr. Rogers is to make an intensive investigation of the steel foundry's commercial and economic problems. A meeting of the society is then likely to be held in September with the presentation of definite objectives. Meanwhile an effort will be made to increase the membership two or three times the 48 foundries now enrolled and regularly reporting on the state of bookings, operations and shipments.

The sessions at White Sulphur were largely informal, the one stated address being made by Homer J. Buckley, president, Buckley, Dement & Co., Chicago, advertising specialists, who devoted himself to what he emphasized as creative salesmanship. He touched on the place of the association in meeting the big problem of the economics of distribution, pointing out that three objectives of an association, the getting of new members, expanding production and securing better prices, are virtually all solved if widened use of products is achieved.

A. H. Jamieson, Malleable Iron Fittings Co., Brantford, Conn., reported on the action of the American Society for Testing Materials in respect to a standard for valves, fittings, flanges and the like for high temperature service. That society would take no account of steel made by the converter process but allows alone for the open-hearth and electric furnace processes, as a result of the force of the contentions of the buyers of such products that the steel must meet highly specialized service. The consensus of opinion was that the steel castings society needs to take an active part in the negotiations over standards to see that nothing intentionally unfair is allowed to be written in the testing society's specifications but to be awake to the fact that such specifications are commonly influenced by engineers of consumers without the full checks of the knowledge of the producers. That the situation is a practical one was brought out in the announcement of plans of the testing society to draw up a standard for alloy steel castings.

Reports from 48 members having a monthly capacity of 38,000 tons showed that May operations averaged 92 per cent.

Shipments in May were at a rate of 93½ per cent of capacity. Bookings for June, according to preliminary estimates, appeared to be at about an 86½ per cent rate.

The officers of the society are: President, J. E. McCauley, Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.; vice-presidents, W. H. Worrilow, Lebanon Steel Foundry, Lebanon, Pa., and A. Simonson, Falk Corporation, Milwaukee; treasurer, G H. Friesel, United Engineering & Foundry Co., Pittsburgh.

Members of executive committee, J. P. Allen, Union Steel Casting Co., Pittsburgh; H. E. Field, Wheeling Mold & Foundry Co., Wheeling, W. Va.; J. E. Galvin, Ohio Steel Foundry Co., Lima, Ohio; H. J. Koch, Fort Pitt Steel Casting Co., McKeesport, Pa.; J. T. Osler, Hubbard Steel Foundry Co., East Chicago, Ind.; S. W. Utley, Detroit Steel Casting Co., Detroit; and H. F. Wahr, Mesta Machine Co., Pittsburgh.

June Automobile Production Heavy

Chevrolet Sets New Record for One Month's Production—Seasonal Decline Is Unusually Slow

DETROIT, July 2.—Despite the fact that the peak of activity in the automobile industry has passed, several production records were established by manufacturers during the past month. The seasonal decline in output this year has been unusually slow, and only one company, which has made public its figures for June, showed a decrease in shipments compared with the same month of 1928.

The Chevrolet Motor Co. set a new record for one month's production by turning out 151,297 units. This is nearly 20,000 more than the 132,800 units built in June, 1928. For the first half of 1928 the company manufactured 845,469 six-cylinder cars, the largest production ever reported by a company making six-cylinder models. This is a substantial gain in number of units compared with the 751,542 four-cylinder cars produced by Chevrolet in the first six months of last year. W. S. Knudsen, president, predicts that total output for 1929 will reach 1,250,000 units.

The Oldsmobile division of General Motors shipped 67,389 units in the first half of 1929, compared with 50,070 in the same period of 1928. Shipments of Vikings are not included in these figures.

The Buick Motor Co. division of General Motors produced 14,665 cars in June, of which 10,400 were Buicks and 4265 Marquettes. In the previous month total production was about 12,000 cars. The July schedule calls for 31,408 cars, consisting of 23,408 Buicks and 8000 Marquettes.

Shipments of the Hudson Motor Car Co. in the first half of the year amounted to 226,318 units, including Hudson and Essex cars. This is the highest production for a six months' period in the company's history. June shipments were 31,137 cars.

The Reo Motor Car Co. shipped 3042 cars and trucks during June, compared with 6132 units in June, 1928, and 4453 units in May, 1929. For the first six months of 1929 shipments aggregated 23,127 units, compared with 26,031 units in the same months last year.

Shipments of 1405 cars were made in June by the H. H. Franklin Mfg. Co. This is a gain of 74 per cent over June, 1928. For the first six months shipments totaled 8719, a new record and an increase of 135 per cent over the similar period of 1928.

The Auburn Automobile Co. reports June shipments of 3144 cars, a new monthly record and a gain of 124 per cent over June, 1928.

The Packard Motor Car Co. produced 46,702 cars in the 10 months ended June 30, compared with 41,131 cars in the corresponding period of the previous fiscal year.

Durant cars shipped to Canada during the first five months of 1929 showed an almost 100 per cent increase over the same period of 1928. In that period Durant Motors of Canada, Ltd., earned $1.19 a share, compared with $1.02 a share in the same period last year.

Cooperative School Students Graduated

Bristol, Conn., has just graduated the first students in its cooperative industrial school, founded in 1925. During the first year of their schooling the boys spent part, and during the last three years and during vacation periods, much of their time in manufacturing plants securing practical experience. They completed 6750 shop hours, received 20 to 30c. an hour and earned during the course approximately $1,660 each.

Connecticut companies giving financial and practical support to the school are the Wallace Barnes Co., American Silver Co., E. Ingraham Co., New Departure Mfg. Co., and Veeder-Root, Inc.

Carboloy Co., Inc., 350 Madison Avenue, New York, has opened a New England sales office at Bridgeport, Conn., with H. R. Hayter, 515 City National Bank Building, in charge.

New June Record in Iron Output

Daily Rate Less Than May by 2490 Tons or 2 Per Cent—New Six Months' Record—Net Loss of One Furnace

NEW records for June were made in pig iron last month. The production was not only the largest for that month ever recorded but a new high in totals for six months was registered. The May record still stands at the top.

Telegraphic reports on July 2, with only one furnace estimated, show that the June pig iron output was 3,697,628 gross tons, or 123,255 tons per day for the 30 days. This is a loss of 2490 tons or about 2 per cent from the 125,745 tons per day for the 31 days in May. The best previous June record was 3,676,445 tons or 122,548 tons per day in 1923.

A New Six Months' Record

For the six months to July 1, the production was 21,621,363 tons. The best previous half year was 20,841,534 tons to July 1, 1923, so that this year's output is 3.75 per cent in excess of the 1923 total. In 1918, the third largest six months, the total was 20,503,477 tons to July 1. No other six months ever reached 20,000,000 tons nor did any six months' period ever attain these heights.

Operating Rate on July 1

On July 1 there were 218 furnaces active, having an estimated daily operating rate of 121,945 tons. This contrasts with 126,150 tons per day for the 219 furnaces active on June 1. There has been a decided slacking in operating rate for the larger furnaces during the month which accounts largely for the considerably lower operating rate with only one

Daily Average Production of Coke Pig Iron in the United States by Months Since Jan. 1, 1925—Gross Tons

	1925	1926	1927	1928	1929
Jan.	108,720	106,974	100,123	92,573	111,044
Feb.	114,791	104,408	105,024	100,004	114,507
Mar.	114,975	111,032	112,366	103,215	119,822
Apr.	108,632	115,004	114,074	106,183	122,087
May	94,542	112,304	109,385	105,931	125,745
June	89,115	107,844	102,988	102,733	123,255
½ year	105,039	109,660	107,351	101,763	.....
July	85,936	103,978	95,199	99,091	.....
Aug.	87,241	103,241	95,073	101,180	.....
Sept.	90,873	104,543	92,498	102,077	.....
Oct.	97,528	107,553	89,810	108,832	.....
Nov.	100,767	107,890	88,279	110,084	.....
Dec.	104,853	99,712	86,960	108,705	.....
Year	99,735	107,043	99,266	103,382	.....

Pig Iron Production by Districts, Gross Tons

	June (30 days)	May (31 days)	April (30 days)	March (31 days)
New York and Mass.	246,124	265,512	257,299	259,771
Lehigh Valley	102,302	108,803	93,506	96,978
Schuylkill Valley	70,265	74,312	69,684	71,002
Lower Susq. and Lebanon Valleys	44,651	33,392	31,150	34,490
Pittsburgh district	787,313	814,944	780,896	779,013
Shenango Valley	148,675	157,952	143,260	134,854
Western Pennsylvania	126,978	159,960	152,942	153,483
Maryland, Va. and Ky.	114,416	135,073	118,785	110,748
Wheeling district	133,450	147,933	142,470	146,546
Mahoning Valley	371,607	380,129	364,373	372,329
Central and North'n Ohio	374,138	388,958	318,678	326,677
Southern Ohio	46,345	47,635	44,139	47,600
Illinois and Indiana	771,295	795,902	768,307	790,784
Mich., Minn., Mo., Wis., Colo. and Utah	131,462	145,840	135,191	134,987
Alabama	219,218	235,117	235,787	249,079
Tennessee	9,389	6,620	6,158	6,132
Total	3,697,628	3,898,082	3,662,625	3,714,473

Daily Rate of Pig Iron Production by Months—Gross Tons

	Steel Works Iron	Merchant Iron*	Total
June, 1928	81,630	21,103	102,733
July	79,513	19,578	99,091
August	82,642	18,538	101,180
September	82,590	19,487	102,077
October	88,051	20,781	108,832
November	88,474	21,610	110,084
December	85,415	23,290	108,705
January, 1929	85,530	25,514	111,044
February	89,246	25,261	114,507
March	95,461	24,361	119,822
April	95,680	26,407	122,087
May	100,174	25,571	125,745
June, 1929	99,813	23,442	123,255

*Includes pig iron made for the market by steel companies.

Coke Furnaces in Blast

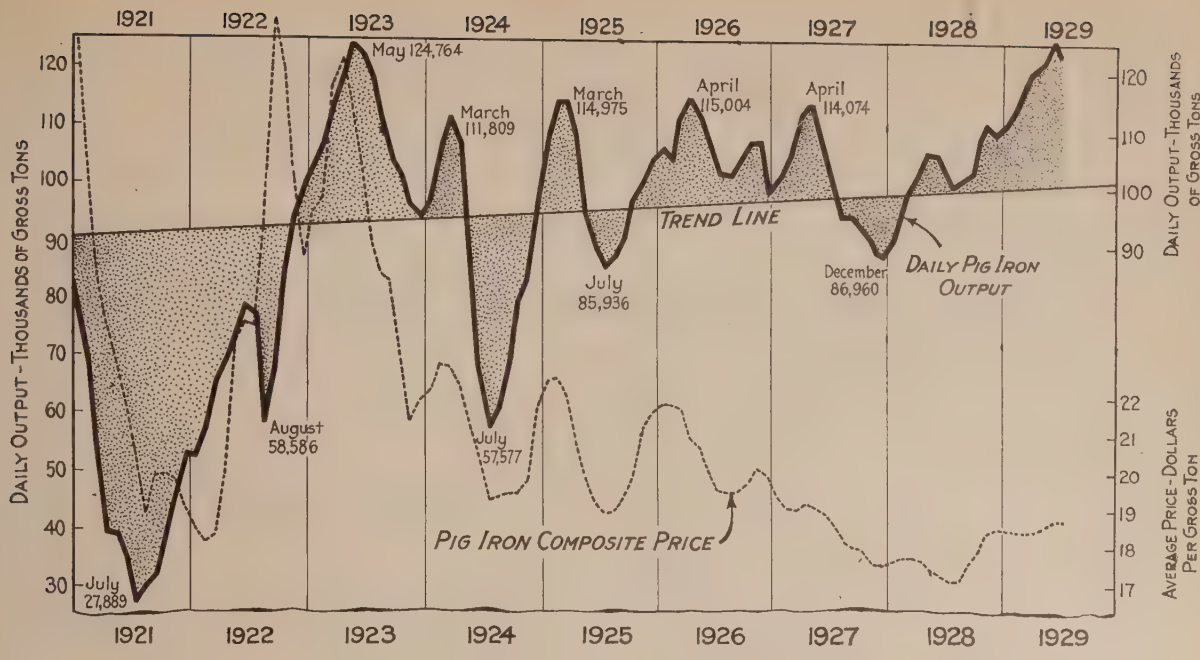
Furnaces	July 1 Number in Blast	July 1 Gross Tons per Day	June 1 Number in Blast	June 1 Gross Tons per Day
New York:				
Buffalo	14	7,275	14	7,455
Other N. Y. and Mass.	3	930	3	1,110
New Jersey	0	....	0	....
Pennsylvania:				
Lehigh Valley	8	3,410*	8	3,510*
Schuylkill Valley	5	2,340	5	2,400
Susquehanna Valley	3	1,495	2	1,075
Ferromanganese	0	....	0	....
Lebanon Valley	0	....	0	....
Ferromanganese	0	....	0	....
Pittsburgh District	40	25,575	40	25,860
Ferromanganese	3	470	2	325
Shenango Valley	9	4,955	9	5,095
Western Pennsylvania	8	3,680	9	4,750
Ferromanganese	3	550	2	410
Maryland	6	3,075	6	3,580
Wheeling District	7	4,290	8	4,770
Ohio:				
Mahoning Valley	19	12,030	20	12,600
Central and Northern	20	12,470	20	12,545
Southern	3	1,545	3	1,530
Illinois and Indiana	35	25,105	36	25,675
Mich., Wis. and Minn.	7	3,160	7	3,470
Colo., Mo. and Utah	3	1,225	3	1,230
The South:				
Virginia	0	....	0	....
Ferromanganese	1	90	1	95
Kentucky	2	650	2	730
Alabama	17	7,310	17	7,585
Ferromanganese	0	....	0	....
Tennessee	2	315	2	350
Total	218	121,945	219	126,150

*Includes spiegeleisen.

Production of Coke Pig Iron in United States by Months Beginning Jan. 1, 1927—Gross Tons

	1927	1928	1929
Jan.	3,103,820	2,869,761	3,442,370
Feb.	2,940,679	2,900,126	3,206,185
Mar.	3,483,362	3,199,674	3,714,473
Apr.	3,422,226	3,185,504	3,662,625
May	3,390,940	3,283,856	3,898,082
June	3,089,651	3,082,000	3,697,628
½ year	19,430,678	18,520,921	21,621,363
July	2,951,160	3,071,824	.....
Aug.	2,947,276	3,136,570	.....
Sept.	2,774,949	3,062,314	.....
Oct.	2,784,112	3,373,806	.....
Nov.	2,648,376	3,302,523	.....
Dec.	2,695,755	3,369,846	.....
Year*	36,232,306	37,837,804	.....

*These totals do not include charcoal pig iron. The 1928 production of this iron was 142,960 gross tons.



Production of Pig Iron in June Represented an Average Output per Furnace Close to 565 Tons

Inclined line represents the gradually increasing theoretical needs of the country, ascertained by a balancing of the ups and downs in production. It shows an average yearly increase in consumption of about 423,000 tons

less furnace. Three furnaces were blown in and four were blown out during June.

The Steel Corporation blew in one and shut down two furnaces as did also the independent steel companies. One merchant furnace was blown in, the net loss being one steel making stack.

Steel-Making Iron Output Still Large

Production of steel-making iron in June was 99,813 tons per day, the second largest on record. In May the 100,174 tons per day was the record. Merchant iron output fell off sharply in June or 23,442 tons compared with 25,571 tons per day in May.

Very Large Ferromanganese Output

Ferromanganese output at 33,363 tons in June is the largest in over 30 months. In July 1928, the 32,909 tons was the best previous recent record. Seven furnaces are now making this alloy. Only two are producing spiegeleisen.

Furnaces Blown In and Out

Among the furnaces blown in during June were one furnace at the Steelton plant of the Bethlehem Steel Corporation in the Susquehanna Valley, one Duquesne furnace of the Carnegie Steel Co. and the Neville Island furnace of the Davison Coke & Iron Co. in the Pittsburgh district. The four furnaces shut down were one Duquesne furnace of the Carnegie Steel Co. in the Pittsburgh district, one Ohio furnace of the Carnegie Steel Co. in the Mahoning Valley, the Martin's Ferry furnace of the Wheeling Steel Corporation in the Wheeling district and one Iroquois furnace of the Youngstown Sheet & Tube Co. in the Chicago district.

Possibly Active Stacks Reduced

The Thomas furnace of the Milwaukee Blast Furnace Co., Chicago, has been scrapped. Thus the number of possibly active stacks in the United States has been reduced from 319 to 318.

Production of Steel Companies for Own Use—Gross Tons

	Total Pig Iron Spiegel and Ferromanganese			Ferromanganese*		
	1927	1928	1929	1927	1928	1929
Jan.	2,343,881	2,155,133	2,651,416	31,844	22,298	28,208
Feb.	2,256,651	2,274,880	2,498,901	24,560	19,320	25,978
Mar.	2,675,417	2,588,158	2,959,295	27,834	27,912	24,978
Apr.	2,637,919	2,555,500	2,826,028	24,735	18,405	22,413
May	2,619,078	2,652,872	3,105,404	28,734	29,940	25,896
June	2,343,409	2,448,905	2,951,168	29,232	32,088	33,363
½ year	14,876,355	14,675,448	16,992,612	166,939	149,963	160,836
July	2,163,101	2,464,896	.....	26,394	32,909	.....
Aug.	2,213,815	2,561,904	.....	21,279	24,583	.....
Sept.	2,090,200	2,477,695	.....	20,675	22,278	.....
Oct.	2,076,722	2,729,589	.....	17,710	23,939	.....
Nov.	1,938,043	2,654,211	.....	17,851	29,773	.....
Dec.	1,987,652	2,647,863	.....	20,992	28,618	.....
Year	27,345,888	30,211,606	.....	291,840	312,061	.....

*Includes output of merchant furnaces.

Unloading Capacity of 3600 Tons an Hour

Three 17-ton electric unloaders recently purchased from Wellman-Seaver-Morgan Co., Cleveland, for the new docks of the Hocking Valley Railroad Co., at Toledo, Ohio, will have hourly capacity for handling 1200 tons each. The trolley with its bucket will be designed for one trip in 50 sec. with a 17-ton load. The travel speed will be from 75 to 100 ft. a minute. The unloaders will operate on tracks spaced 72 ft. 6 in. apart, each track consisting of a pair of rails on 24-in. centers with the forward track center 5 ft. 6 in. from the face of the dock.

These unloaders are designed to excavate from the ore-carrying boats and to load into railroad cars standing on any of the four tracks inside of the span or to stock under a cantilever beyond the rear leg, through disk hoppers and traveling scale larry cars.

Iron and Steel Markets

Pig Iron Production Still High

June Daily Rate Second Only to May Average—July Steel Output to Be Heavy—100,000 Tons for Pipe Line Placed

THE rate of pig iron production in June, at 123,255 tons a day, was the second highest for any month on record, being exceeded only by the daily average of 125,745 tons for May. The decline from the previous month was less than 2 per cent, according to blast furnace returns to THE IRON AGE.

Most of the loss was in merchant pig iron, the recession in the output of steel-making iron having been only 361 tons a day. This showing is not surprising in view of the reduced operations of such large users of merchant iron as the cast iron pipe plants, the makers of radiators and heating equipment and producers of sanitary ware, in contrast with the well-sustained activity of the steel mills.

Throughout June steel ingot output was at close to capacity and variations in operations were due chiefly to the physical limitations of equipment, making weekly percentage estimates of production futile. While accurate statistics for June will not be available until the American Iron and Steel Institute publishes its monthly report, it can safely be said that ingot output in the first half of 1929 approximated 29,000,000 tons, establishing a new six months' record by a margin of nearly 16 per cent over the last half of 1928.

Steel output in the first week of July will be adversely affected by the holiday, with some mills scheduled to shut down from Wednesday night until the end of the week. Advantage will be taken of this interruption to make greatly needed repairs. The outlook for the rest of July is excellent; in fact, a leading steel producer looks for no appreciable change in the operating rate for the next two months. Fluctuations in the output of different kinds of finished products have thus far tended to neutralize one another, leaving the demand for crude steel substantially unchanged.

Mills catering to the automobile industry continue to reduce their backlogs, but unfilled orders for the industry as a whole have held up exceptionally well. Although the Steel Corporation is expected to report a reduction in its unfilled tonnage as of June 30, the decline will probably be small.

The mid-summer falling off in the steel requirements of the motor car builders has been rendered less severe than usual by the sustained operations of makers of low-priced automobiles. The July schedule of the Ford company calls for the manufacture of 190,000 cars.

Rail mills, as a result of supplementary orders, will maintain present operations through July and August instead of undergoing the customary seasonal curtailment. The Norfolk & Western has distributed orders, subject only to formal confirmation, for 39,000 tons of rails. The Pennsylvania has exercised options on 20,000 tons.

Pipe lines are again conspicuous for their contribution to mill commitments. The National Tube Co. and the A. O. Smith Corporation share equally in 100,000 tons of steel for a 22-in. gas line connecting Birmingham with Atlanta. A projected line from Texas to Omaha has been revived, with the probability that it will be placed soon. A 1000-mile gas line is in prospect and the laying of lines to the populous centers along the Eastern seaboard is now receiving serious consideration.

Structural steel awards, at 42,000 tons, were in fair volume, and the large total of pending work was augmented by 37,000 tons.

The buoyancy of steel demand in the face of seasonal influences is particularly notable at Chicago, where specifications again equal shipments and sales for the week were the fifth largest this year.

Prices of semi-finished steel are not yet well defined. The extension of contracts at second quarter prices and the fact that little third quarter business has yet been closed raise doubt in the minds of buyers as to whether advances can be maintained, although some mills are taking a firm stand at $35 for billets and slabs.

Pig iron shipments are being suspended in some instances by automotive foundries, but June deliveries of merchant iron in the Central West declined only about 10 per cent from those of May and shipping orders have shown no further reduction in the first week of July. Western furnaces have a substantial backlog of third quarter business, as a result of steady buying over a number of weeks rather than a concentration of contracting. In other districts melters are still slow in acting on their requirements for the quarter, both on account of a carryover of tonnage and uncertainty as to price.

Total pig iron production for June, at 3,697,628 tons, showed a decline from May's 3,898.082 tons, but was the largest for any 30-day month. Output for the first half of the year, at 21,621,363 tons, established a new six months' peak, exceeding the previous record, made in the first half of 1923, by 3.75 per cent. Furnaces in blast July 1 numbered 218, a net loss of one compared with June 1.

Both of THE IRON AGE composite prices are unchanged. Pig iron is $18.63 a gross ton for the fourth week and finished steel stands at 2.412c. a lb., from which it has not deviated since April 1.

A Comparison of Prices

Market Prices at Date, and One Week, One Month and One Year Previous, Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron, Per Gross Ton:	July 2, 1929	June 25, 1929	June 4, 1929	July 2, 1928
No. 2 foundry, Philadelphia	$21.76	$21.76	$21.76	$20.76
No. 2, Valley furnace	18.50	18.50	18.50	16.75
No. 2 Southern, Cin'ti	18.69	18.69	18.69	19.19
No. 2, Birmingham	15.00	15.00	15.00	15.50
No. 2 foundry, Chicago*	20.00	20.00	20.00	18.00
Basic, del'd eastern Pa	20.25	20.25	20.25	19.00
Basic, Valley furnace	18.50	18.50	18.50	16.00
Valley Bessemer, del'd P'gh	20.76	20.76	20.76	18.76
Malleable, Chicago*	20.00	20.00	20.00	18.00
Malleable, Valley	19.00	19.00	19.00	17.00
Gray forge, Pittsburgh	19.76	19.76	19.76	18.01
L. S. charcoal, Chicago	27.04	27.04	27.04	27.04
Ferromanganese, furnace	105.00	105.00	105.00	105.00
Rails, Billets, Etc., Per Gross Ton:				
Rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Light rails at mill	36.00	36.00	36.00	36.00
Rerolling billets, Pittsburgh	**35.00**	34.00	36.00	32.00
Sheet bars, Pittsburgh	35.00	35.00	36.00	32.00
Slabs, Pittsburgh	35.00	35.00	36.00	32.00
Forging billets, Pittsburgh	**40.00**	39.00	41.00	38.00
Wire rods, Pittsburgh	42.00	42.00	42.00	42.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb	1.85	1.85	1.85	1.85
Finished Steel, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Bars, Pittsburgh	1.95	1.95	1.95	1.85
Bars, Chicago	2.05	2.05	2.05	2.00
Bars, Cleveland	1.95	1.95	1.95	1.85
Bars, New York	2.29	2.29	2.29	2.19
Tank plates, Pittsburgh	1.95	1.95	1.95	1.85
Tank plates, Chicago	2.05	2.05	2.05	2.00
Tank plates, New York	2.22½	2.22½	2.22½	2.17½
Structural shapes, Pittsburgh	1.95	1.95	1.95	1.85
Structural shapes, Chicago	2.05	2.05	2.05	2.00
Structural shapes, New York	2.19½	2.19½	2.19½	2.14½
Cold-finished bars, Pittsburgh	2.30	2.30	2.30	2.10
Hot-rolled strips, Pittsburgh	1.90	1.90	1.90	1.75
Cold-rolled strips, Pittsburgh	2.75	2.75	2.75	3.00

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

Finished Steel, *Per Lb. to Large Buyers:*	July 2, 1929 Cents	June 25, 1929 Cents	June 4, 1929 Cents	July 2, 1928 Cents
Sheets, black, No. 24, P'gh	2.85	2.85	2.85	2.65
Sheets, black, No. 24, Chicago dist. mill	3.05	3.05	3.05	2.75
Sheets, galv., No. 24, P'gh	3.60	3.60	3.60	3.50
Sheets, galv., No. 24, Chicago dist. mill	3.80	3.80	3.80	3.60
Sheets, blue, No. 13, P'gh	2.35	2.35	2.35	2.10
Sheets, blue, No. 13, Chicago dist. mill	2.45	2.45	2.45	2.20
Wire nails, Pittsburgh	2.65	2.65	2.65	2.55
Wire nails, Chicago dist. mill	2.70	2.70	2.70	2.60
Plain wire, Pittsburgh	2.50	2.50	2.50	2.50
Plain wire, Chicago dist. mill	2.55	2.55	2.55	2.55
Barbed wire, galv., Pittsburgh	3.30	3.30	3.30	3.35
Barbed wire, galv., Chicago dist. mill	3.35	3.35	3.35	3.40
Tin plate, 100 lb. box, P'gh	$5.35	$5.35	$5.35	$5.25
Old Material, Per Gross Ton:				
Heavy melting steel, P'gh	$18.25	$18.25	$18.25	$14.00
Heavy melting steel, Phila	**16.50**	16.00	16.00	13.00
Heavy melting steel, Ch'go	14.75	14.75	15.00	12.25
Carwheels, Chicago	14.00	14.00	14.50	13.00
Carwheels, Philadelphia	16.00	16.00	16.00	15.50
No. 1 cast, Pittsburgh	15.50	15.50	15.00	14.25
No. 1 cast, Philadelphia	16.50	16.50	16.50	15.50
No. 1 cast, Ch'go (net ton)	14.50	14.50	15.00	13.50
No. 1 RR. wrot., Phila	16.00	16.00	16.00	13.50
No. 1 RR. wrot., Ch'go (net)	13.50	13.50	14.00	11.00
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$2.75	$2.75	$2.75	$2.60
Foundry coke, prompt	3.75	3.75	3.75	3.75
Metals, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Lake copper, New York	18.12½	18.12½	18.12½	14.87½
Electrolytic copper, refinery	17.75	17.75	17.75	14.50
Tin (Straits), New York	**44.62½**	44.25	43.62½	46.12½
Zinc, East St. Louis	6.70	6.70	6.55	6.20
Zinc, New York	7.05	7.05	6.90	6.55
Lead, St. Louis	6.80	6.80	6.80	6.15
Lead, New York	7.00	7.00	7.00	6.30
Antimony (Asiatic), N. Y	8.75	8.75	8.87½	9.62½

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Pittsburgh

Completing a Record Half Year, the Steel Industry Faces a Summer of Unusual Activity

PITTSBURGH, July 2.—With many records achieved, the steel industry has completed what has apparently been the most prosperous six months in its history and now faces a summer of considerable activity. In the Pittsburgh and tributary districts, June seems to have established a number of records for that month, notably in ingot production, shipments of flat-rolled products and probably in the production of pig iron. But this was accomplished in the face of a gradual decline in the demand for steel and may have been the result of a carryover of the high momentum of the earlier months of the year rather than an extraordinary current demand.

The gradual decline in specifications for some products was checked slightly last week, but this was more likely due to the clearing up of old contracts rather than to a general acceleration in demand. With fairly comfortable backlogs, mills are not yet unduly anxious for business, but another month will find their position somewhat changed, even though the summer decline in specifications does not reach marked proportions.

At present, operations of open-hearth furnaces are still at close to physical capacity, but a marked curtailment is scheduled this week on account of the holiday. Mills are taking advantage of the interruption to make greatly needed repairs to their equipment, and most of the sheet and tin mills in this and nearby districts will be closed down Wednesday night for the remainder of the week.

July promises to be a good month in production. Sheet orders now on company books are sufficient for more than a month's operations, and the same thing is true of plates. On other products delivery promises range from two to four weeks, and in many cases shipments have been just about equal to specifications, allowing little opportunity for improving deliveries.

Efforts of sellers of semi-finished steel to get higher prices for their products than were received in the second quarter on contract business are meeting with indifferent success. Users generally have enough steel on hand or remaining on old contracts to last for several weeks and are not anxious to assume future obligations at higher prices.

On certain finished products, notably galvanized sheets, structural shapes and cold-rolled strip, price irregularities have developed. Except in the case of galvanized sheets, this tendency is not sufficiently extended to make the market quotably lower.

Dullness still prevails in the pig iron and scrap market. Third quarter buying in pig iron still lags, although the week before last brought out some sizable inquiries, some of which are still outstanding. No. 1 heavy melting steel is still quotable at $18 to $18.50, and sales of compressed sheets in the last week have established this grade at the same level.

Pig Iron—Sales are confined largely to small lots, and buyers are hesitant about covering their third quarter requirements. No large inquiries have been reported during the week, although the Westinghouse Electric &

Mfg. Co. has not yet closed against its Trafford City, Pa., tonnage. Consumers are said to have enough iron on contract to carry ther into July, but cannot defer their purchases very long after the middle of the month. The foundry melt in this district during June was rather low, the most active users having been the steel foundries, which are busy on railroad business, and steel mill equipment makers. The same situation exists in the Valleys, where non-integrated steel companies are nearly all covered for July and August and where buying by foundries has been negligible. In the face of quiet demand, prices are steady, with small tonnages moving at the full market quotations of $18.50, Valley, for basic and foundry and $19 for malleable and Bessemer. In the immediate Pittsburgh district shading has occurred only on basic iron and on transactions in which details are lacking.

Prices per gross ton, f.o.b. Valley furnace:

Basic	$18.50
Bessemer	19.00
Gray forge	18.00
No. 2 foundry	18.50
No. 3 foundry	18.00
Malleable	19.00
Low phos., copper free	27.00

Freight rate to Pittsburgh or Cleveland district, $1.76.

Prices per gross ton f.o.b. Pittsburgh district furnace:

Basic	$19.00
No. 2 foundry	19.00
No. 3 foundry	18.50
Malleable	19.50

Freight rates to points in Pittsburgh district range from 63c. to $1.13.

Semi-Finished Steel.—The supply of semi-finished steel in this district has not yet become plentiful, and, with production holding close to physical limits, market interest is centered chiefly in prices. The $36 price on sheet bars, billets and slabs, which prevailed for a time on spot purchases, is no longer widely adhered to, although it is still quoted by companies which have little or no steel to spare at this time. Sheet bars are well established at $35, Pittsburgh or Youngstown, the price which prevailed on second quarter business. On billets, slabs and forging billets, the latter ordinarily carrying a $5 premium over rerolling billets, the going prices are not so clearly defined. Billets are obtainable at $35, Pittsburgh or Youngstown, but large consumers are reluctant to pay this price on their third quarter contract tonnage, as it represents an advance of $1 a ton over the second quarter price. Although a sale of slabs was reported to have been made recently in this district at $34, it seems not to have been made by a Pittsburgh or Youngstown producer, and fairly large buyers of billets and slabs in this district have not been able to get this price on their third quarter requirements. As a result, very little tonnage has been closed. Users have enough steel on contract to last them for a month or more, and until contracts are closed the price may not readily be determined. In view of the fact that sellers are nominally quoting $36 and consumers are quite willing to pay $34, the market on billets and slabs is probably most fairly represented at $35, Pittsburgh or Youngstown, a price which has been done on small transactions and which might likely become the ruling quotation if the supply of crude steel does not become more plentiful in the next 30 days.

Bars, Shapes and Plates.—New business improved in the last week of the month. In plates, June was one of the best months the industry has ever experienced. Little or no reduction in backlogs occurred during the month, and plate mills enter the second half of the year with orders sufficient for at least six weeks operations, and no decline in specifications is in view. In bars and shapes, the situation is not so good, shipments during the past month having been generally ahead of specifications. On bars, delivery promises now average about three weeks, with still better shipments possible on shapes. Fabricating shops in the district are fairly well engaged, but business is spotty, leaving plenty of room for small orders which seem to be rather scarce. Fabricated prices are also rather weak and, although this has not been generally reflected in the price of shapes, reports of occasional quotations lower than 1.95c., Pittsburgh, are not lacking. On bars, this price seems to be holding, and the plate quotation is unusually firm. Reinforcing bars are quoted at 2.05c., Pittsburgh, for 40, 50 and 60 ft. lengths, and the price is well maintained in the face of an active demand.

Rails and Track Supplies.—The Norfolk & Western is inquiring for 39,000 tons of rails, and the market is showing additional activity in view of prospective supplementary purchases by the Pennsylvania. June turned out to be a good month in the track supply business, at least from the standpoint of shipments, although specifications declined seasonably.

Wire Products.—Heavy specifications last week occasioned by the end of the quarter made the week one of the best of the year in the wire business. Demand for manufacturers' wire is holding up well in spite of the reported decline in the requirements of the automobile industry, and there is a satisfactory movement of agricultural wire products. Nails are dull, but this condition is generally accepted as permanent, and makers are no longer disappointed by unsatisfactory tonnages. Price weakness is confined to competitive districts, quotations being adhered to in the immediate Pittsburgh territory.

Tubular Goods.—The pipe market is rather quiet, with an unsatisfactory demand for the buttwelded products and little activity just now in the line pipe field. With one possible exception, no large line pipe projects are now before the trade, and oil country business leaves something to be desired. The California fields are requiring very little pipe; reports of improving demand are conflicting. The situation in the Texas and Oklahoma region is somewhat better. Demand for mechanical and boiler tubing is holding up unusually well, and prospects are good for a steady summer demand.

Sheets.—With the best six months in its history behind it, the sheet industry enters the second half of the year with orders sufficient for a month's operations, and schedules in

The Iron Age Composite Prices

Finished Steel

July 2, 1929, 2.412c. a Lb.

One week ago	2.412c.
One month ago	2.412c.
One year ago	2.341c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products make 87 per cent of the United States output of finished steel.

	High		Low	
1929	2.412c.,	April 2;	2.391c.,	Jan. 8
1928	2.391c.,	Dec. 11;	2.314c.,	Jan. 3
1927	2.453c.,	Jan. 4;	2.293c.,	Oct. 25
1926	2.453c.,	Jan. 5;	2.403c.,	May 18
1925	2.560c.,	Jan. 6;	2.396c.,	Aug. 18

Pig Iron

July 2, 1929, $18.63 a Gross Ton

One week ago	$18.63
One month ago	18.71
One year ago	17.25
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low	
1929	$18.71,	May 14;	$18.29,	March 19
1928	18.59,	Nov. 27;	17.04,	July 24
1927	19.71,	Jan. 4;	17.54,	Nov. 1
1926	21.54,	Jan. 5;	19.46,	July 13
1925	22.50,	Jan. 13;	18.96,	July 7

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base per Lb.
F.o.b. Pittsburgh mill	1.95c.
F.o.b. Chicago	2.05c. to 2.15c.
Del'd Philadelphia	2.27c.
Del'd New York	2.29c.
Del'd Cleveland	1.95c. to 2.00c.
F.o.b. Cleveland	1.95c.
F.o.b. Lackawanna	2.05c.
F.o.b. Birmingham	2.15c.
C.i.f. Pacific ports	2.35c.
F.o.b. San Francisco mills	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills, 40, 50, 60-ft.	2.05c.
F.o.b. Pittsburgh mills, cut lengths	2.30c.
F.o.b. Birmingham, mill lengths	2.15c.

Rail Steel

F.o.b. mills, east of Chicago dist.	1.85c. to 1.90c.
F.o.b. Chicago Heights mill	1.95c.
Del'd Philadelphia	2.27c.

Iron

Common iron, f.o.b. Chicago	2.05c. to 2.10c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	2.12c.
Common iron, del'd New York	2.14c.

Tank Plates

	Base per Lb.
F.o.b. Pittsburgh mill	1.95c.
F.o.b. Chicago	2.05c.
F.o.b. Birmingham	2.15c.
Del'd Cleveland	2.14c.
Del'd Philadelphia	2.15c.
F.o.b. Coatesville	2.05c.
F.o.b. Sparrow Point	2.05c.
F.o.b. Lackawanna	2.05c.
Del'd New York	2.22½c.
C.i.f. Pacific ports	2.35c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh mill	1.95c.
F.o.b. Chicago	2.05c. to 2.15c.
F.o.b. Birmingham	2.15c.
F.o.b. Lackawanna	2.05c.
F.o.b. Bethlehem	2.05c.
Del'd Cleveland	2.14c.
Del'd Philadelphia	2.01c. to 2.06c.
Del'd New York	2.14½c.
C.i.f. Pacific ports	2.35c.

Hot-Rolled Hoops, Bands and Strips

	Base per Lb.
6 in. and narrower, P'gh	2.00c.
Wider than 6 in., P'gh	1.90c.
6 in. and narrower, Chicago	2.20c.
Wider than 6 in., Chicago	2.10c.
Cooperage stock, P'gh	2.20c.
Cooperage stock, Chicago	2.30c.

Cold-Finished Steel

	Base per Lb.
Bars, f.o.b. Pittsburgh mill	2.30c.
Bars, f.o.b. Chicago	2.30c.
Bars, Cleveland	2.35c.
Shafting, ground, f.o.b. mill	*2.65c. to 3.60c.
Strips, P'gh	2.75c. to 2.85c.
Strips, Cleveland	2.75c. to 2.85c.
Strips, del'd Chicago	3.05c. to 3.15c.
Strips, Worcester	2.90c. to 3.00c.
Fender stock, No. 20 gage, Pittsburgh or Cleveland	4.25c. to 4.35c.

*According to size.

Wire Products

(Carload lots, f.o.b. Pittsburgh and Cleveland, to jobbers and retailers.)

	Base per Keg
Wire nails	$2.65 to $2.75
Galvanized nails	4.65 to 4.75
Galvanized staples	3.35 to 3.45
Polished staples	3.10 to 3.20
Cement coated nails	2.65 to 2.75
	Base per 100 Lb.
Bright plain wire, No. 6 to No. 9 gage	$2.50 to $2.60
Annealed fence wire	2.65 to 2.75
Spring wire	3.50 to 3.60
Galv'd wire, No. 9	3.10 to 3.20
Barbed wire, galv'd	3.30 to 3.40
Barbed wire, painted	3.05 to 3.15
Woven wire fence (per net ton to retailers)	65.00

Chicago district mill and delivered Chicago prices are $1 per ton above the foregoing. Birmingham mill prices $3 a ton higher; Worcester, Mass., (wire) mill $3 a ton higher on production of that plant; Duluth, Minn., mill $2 a ton higher; Anderson, Ind., $1 higher.

Cut Nails

	Per 100 Lb.
Carloads, Wheeling, Reading or Northumberland, Pa.	$2.70
Less carloads, Wheeling or Reading	2.80

Light Plates

No. 10, blue annealed, f.o.b. P'gh	2.20c.
No. 10, blue annealed, f.o.b. Chicago dist.	2.30c.
No. 10, blue annealed, del'd Phila.	2.42c. to 2.52c.
No. 10, blue annealed, B'ham	2.35c.

Sheets

Blue Annealed

	Base per Lb.
No. 13, f.o.b. P'gh	2.35c.
No. 13, f.o.b. Chicago dist.	2.45c.
No. 13, del'd Philadelphia	2.67c.
No. 13, blue annealed, B'ham	2.50c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh	2.85c. to 2.95c.
No. 24, f.o.b. Chicago dist. mill	3.05c.
No. 24, del'd Philadelphia	3.17c. to 3.27c.
No. 24, f.o.b. Birmingham	3.00c. to 3.10c.

Metal Furniture Sheets

No. 24, f.o.b. P'gh	4.10c. to 4.20c.

Galvanized

No. 24, f.o.b. Pittsburgh	3.50c. to 3.70c.
No. 24, f.o.b. Chicago dist. mill	3.80c.
No. 24, del'd Cleveland	3.79c. to 3.89c.
No. 24, del'd Philadelphia	3.92c. to 4.02c.
No. 24, f.o.b. Birmingham	3.75c. to 3.85c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	3.00c.
No. 28, f.o.b. Chicago dist. mill	3.10c.

Automobile Body Sheets

No. 28, f.o.b. Pittsburgh	4.10c.

Long Ternes

No. 24, 8-lb. coating, f.o.b. mill	4.00c.

Vitreous Enameling Stock

No. 24, f.o.b. Pittsburgh	3.90c.

Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills	$5.35
Standard cokes, f.o.b. Gary	5.45

Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)
(Per Package, 20 x 28 in.)

8-lb. coating I.C.	$11.20
15-lb. coating I.C.	14.00
20-lb. coating I.C.	15.30
25-lb. coating I.C.	$16.70
30-lb. coating I.C.	17.75
40-lb. coating I.C.	19.85

Alloy Steel Bars

(F.o.b. makers' mill)

Alloy Quality Bar Base, 2.65c. to 2.75c. per Lb.

S.A.E. Series Numbers		Alloy Differential
2000	(½% Nickel)	0.25
2100	(1½% Nickel)	0.55
2300	(3½% Nickel)	1.50
2500	(5% Nickel)	2.25
3100	Nickel Chromium	0.55
3200	Nickel Chromium	1.35
3300	Nickel Chromium	3.80
3400	Nickel Chromium	3.20
4100	Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50
4100	Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600	Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel)	1.05
5100	Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100	Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100	Chromium Spring Steel	0.20
6100	Chromium Vanadium Bars	1.20
6100	Chromium Vanadium Spring Steel	0.95
9250	Silicon Manganese Spring Steel (flats)	0.25
	Rounds and squares	0.50
	Chromium Nickel Vanadium	1.50
	Carbon Vanadium	0.95

Above prices are for hot rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is ¾c. per lb. higher. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis.

Billets under 4 x 4 in. carry the steel bar base. Slabs with a sectional area of 16 in. or over carry the billet price. Slabs with sectional area of less than 16 in. carry the bar price.

Rails

	Per Gross Ton
Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	36.00
Light (from rail steel), f.o.b. mill	34.00
Light (from billets), f.o.b. Ch'go mill	36.00

Track Equipment

	Base per 100 Lb.
Spikes, ⅜ in. and larger	$2.80
Spikes, ½ in. and smaller	2.80
Spikes, boat and barge	3.00
Tie plates, steel	2.15
Angle bars	$2.75
Track bolts, to steam railroads	$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel Inches	Black	Galv.	Iron Inches	Black	Galv.
⅛	45	19½	¼ and ⅜	+11	+36
¼ to ⅜	51	25½	½	23	5
½	56	42½	¾	28	11
¾	60	48½	1 and 1¼	31	15
1 to 3	62	50½	1½ and 2	35	18

Lap Weld

2	55	43½	2	23	9
2½ to 6	59	47½	2½ to 3½	28	18
7 and 8	56	43½	4 to 6	30	17
9 and 10	54	42½	7 and 8	29	16
11 and 12	53	40½	9 to 12	26	11

Butt Weld, extra strong, plain ends

⅛	41	24½	¼ and ⅜	+13	+48
¼ to ⅜	47	30½	½	23	7
½	53	42½	¾	28	12
¾	58	47⅞	1 to 2	34	18
1 to 1½	60	49½			
2 to 3	61	50½			

Lap Weld, extra strong, plain ends

2	53	42½	½	29	13
2½ to 4	57	46½	2½ to 4	34	20
4½ to 6	56	45½	4½ to 6	33	19
7 to 8	52	39½	7 and 8	31	17
9 and 10	45	32½	9 to 12	21	8
11 and 12	44	31½			

On carloads the above discounts on steel pipe are increased on block by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Steel		Charcoal Iron	
2 in. and 2¼ in.	40	1½ in.	1
2½ in.—2¾ in.	48	1¾ in.	8
3 in.	54	2 in.—2¼ in.	13
3¼ in.—3¾ in.	56	2½ in.—2¾ in.	16
4 in.	59	3 in.	17
4½ in. to 6 in.	48	3¼ in. to 3½ in.	18
		4 in.	20
		4½ in.	21

On lots of a carload or more, the above base discounts are subject to a preferential of two fives on steel and of 10 per cent on charcoal iron tubes. Smaller quantities are subject to the following modifications from the base discounts:

Lap Welded Steel—Under 10,000 lb., 6 points under base and one five; 10,000 lb. to carload, 4 points under base and two fives. Charcoal Iron—Under 10,000 lb., 2 points under base; 10,000 lb. to carload, base and one five.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	63	3 in.	48
1¼ to 1½ in.	55	3¼ to 3½ in.	50
1¾ in.	39	4 in.	53
2 to 2¼ in.	34	4½, 5 and 6 in.	42
2½ to 2¾ in.	42		

Hot Rolled

2 and 2¼ in.	40	3¼ to 3½ in.	56
2½ and 2¾ in.	48	4 in.	59
3 in.	54	4½, 5 and 6 in.	48

Beyond the above base discounts a preferential discount of 5 per cent is allowed on carload lots. On less than carloads to 10,000 lb. base discounts are reduced 4 points with 5 per cent preferential; on less than 10,000 lb., base discounts are reduced 6 points, with no preferential. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage take mechanical tube list and discounts. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30%, base (carloads)	55
Carbon, 0.30% to 0.40%, base	50

Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

some cases run well into August. Hot weather curtailed production slightly during the last two weeks of June, but shipments were at a record for the month. Mills have had little opportunity to catch up on deliveries, especially of blue annealed sheets, on which six weeks is still considered a representative shipping promise. At some mills a slight recession would almost be welcomed, as wear on equipment is becoming a more important factor in production. In some cases the mid-week is being utilized for repairs. The leading interest, along with several independents, does not expect to operate its mills this week after Wednesday night. Operations last week were at about 95 per cent of theoretical capacity in this and nearby districts, a figure which approaches the physical limits of the mills during the summer months. Prices are fairly satisfactory, except on galvanized sheets, where concessions of $2 a ton from the recent minimum are still met in sales to jobbers. This develops a range of 3.50c. to 3.70c., Pittsburgh, but the market is well represented at 3.60c., with sales reported at both the top and bottom of the range. The 3.50c. price is said to be made only by companies which sell the run of the mill on sheets for roofing purposes and thus are able to realize a greater profit by shading the market $2 a ton than by offering seconds to the trade. On black sheets, the market is represented by a range of 2.85c. to 2.95c., the amount of the tonnage and the urgency of delivery usually determining the price. Blue annealed sheets and light plates are well established at the quoted prices, and concessions are seldom reported on automobile body or furniture sheets.

Tin Plate.—Specifications are still rather slow, but sentiment in the market at the end of the month was probably better than at the beginning. Crop reports are now generally more optimistic, and it is now thought that the loss in the California fruit pack will be practically offset by increased vegetable canning. No serious losses have been reported in other parts of the country, and tin plate makers are again voicing the opinion that the year will prove a record in production. Though the first five months were unusually busy ones, the recent recession in demand had threatened a more serious slump than has actually developed. The leading interest operated its mills last week at 90 per cent of capacity, a slightly better rate than was maintained by the independents. Operations will not be resumed at most mills this week after the Thursday holiday.

Strip Steel.—Shipments of strip steel in June ran from 10 to 15 per cent under May, but the month was considered satisfactory by most makers in view of the expected decline at this time of the year. Tonnage releases during the month were just about equal to shipments, so mill backlogs were not materially reduced. On the narrower widths of hot-rolled material, delivery promises average three or four weeks, but much better shipments are possible on the wider sizes. On the cold-rolled material, the situation is hardly so good. Mills are having difficulty in maintaining the quoted prices on cold-rolled strip. The 2.75c., Pittsburgh, minimum is holding fairly well, but the $2 premium asked for small orders and difficult specifications is more difficult to get, largely because a few producers are more anxious than they were to fill out production schedules.

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.25c.
Hoops	4.25c.
Black sheets (No. 24), 25 or more bundles	3.80c.
Galv. sheets (No. 24), 25 or more bundles	4.55c.
Blue ann'l'd sheets (No. 10), 1 to 10 sheets	3.45c.
Galv. corrug. sheets (No. 28), per square	$4.43
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count,	60 per cent off list
Machine bolts, 100 count,	60 per cent off list
Carriage bolts, 100 count,	60 per cent off list
Nuts, all styles, 100 count,	60 per cent off list
Large rivets, base per 100 lb.	$3.50
Wire, black soft ann'l'd, base per 100 lb.	$3.00 to 3.10
Wire, galv. soft, base per 100 lb.	3.00 to 3.10
Common wire nails, per keg	3.00
Cement coated nails, per keg	3.05

Cold-Finished Steel Bars.—Business showed a declining tendency during June, but the last week brought a check in the form of more encouraging specifications. If the present rate can be maintained in July the summer would be very satisfactory, but demand is rather spotty. Conflicting reports from the automobile industry, normally a large consumer, add to the uncertainty of the situation. Orders on mill books are sufficient for two to three weeks' operations. Prices are well maintained at 2.30c., base, Pittsburgh.

Coke and Coal.—The market on foundry coke is very quiet, and shipments last week again declined. Hot weather is partly responsible for lack of foundry activity, but slow operations among many of the large consumers in the district are fully reflected in the coke market. Merchant producers of furnace coke continue to curtail production and the market owes its apparent strength to the close adjustment of supply to demand. The price is unchanged at $2.75 to $2.85 a ton, Connellsville. Coal prices are still badly demoralized, but improvement is expected in a few weeks with the resumption of domestic demand. Pennsylvania producers have sold a small amount of Lake coal, principally in special grades, as they cannot compete with West Virginia producers in this market on the regular run of business.

Old Material.—The scrap market has passed through another quiet week, with sales confined entirely to lots of less than 5000 tons and prices well within the $18 to $18.50 range on No. 1 heavy melting steel. A very recent mill purchase at $18 on this grade might be construed as giving the market a weaker tone, but the Pennsylvania Railroad steel is said to have brought slightly more than $19. Details of this sale are not yet generally known in this district, but, as the steel is reported to have gone principally to one consumer which is usually willing to pay a 50c. premium over the market for regular No. 1 steel, the market does not seem to be quotably lower on this grade. On the other hand, sales of hydraulic compressed sheets have been made at $18.50 as well as at $18.25, an advance of 25c. a ton over last week. Compressed sheets have entered this district very freely in the last week or two, resulting in holdups at at least two points, but recent sales indicate that this has not yet had a depressing influence on the price. Sales of machine shop turnings and of borings and turnings at slightly lower prices, however, have resulted in a decline of 25c. a ton on these grades. The Baltimore & Ohio list, which will close July 8, contains 19,000 tons.

Prices per gross ton delivered consumers yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$18.00 to $18.50
No. 2 heavy melting steel	15.50 to 16.00
Heavy melting car sides	17.00 to 17.50
Scrap rails	17.25 to 17.75
Compressed sheet steel	18.00 to 18.50
Bundled sheets, sides and ends	16.25 to 16.75
Cast iron carwheels	16.00 to 16.50
Sheet bar crops, ordinary	18.50 to 19.00
Heavy breakable cast	12.50 to 13.00
No. 2 railroad wrought	18.00 to 18.50
Hvy. steel axle turnings	16.00 to 16.50
Machine shop turnings	11.25 to 11.75
Acid Open-Hearth Grades:	
Railr. knuckles and couplers	21.00 to 21.50
Railr. coil and leaf springs	21.00 to 21.50
Rolled steel wheels	21.00 to 21.50
Low phos. billet and bloom ends	22.00 to 22.50
Low phos., mill plates	22.00 to 22.50
Low phos., light grades	20.00 to 20.50
Low phos., sheet bar crops	20.00 to 21.00
Heavy steel axle turnings	16.00 to 16.50
Electric Furnace Grades:	
Low phos., punchings	19.50 to 20.50
Hvy. steel axle turnings	16.00 to 16.50
Blast Furnace Grades:	
Short shoveling steel turnings	11.75 to 12.25
Short mixed borings and turnings	11.75 to 12.25
Cast iron borings	11.75 to 12.25
Rolling Mill Grades:	
Steel car axles	21.50 to 22.00
Cupola Grades:	
No. 1 cast	15.00 to 16.00
Rails 3 ft. and under	20.00 to 21.00

Ohio Foundries Association, Inc., will hold its annual convention the latter part of September aboard an Ohio River steamer en route from Cincinnati to Ashland, Ky., and return. The trip is expected to take three days.

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

Billets and Blooms

	Per Gross Ton
Rerolling, 4 in. and under 10 in., Pittsburgh	$35.00
Rerolling, 4 in. and under 10 in., Youngstown	35.00
Rerolling, 4 in. and under 10 in., Cleveland	35.00
Rerolling, 4 in. and under 10 in., Chicago	37.00
Forging quality, Pittsburgh	$40.00 to 41.00

Sheet Bars

(Open Hearth or Bessemer)

	Per Gross Ton
Pittsburgh	$35.00
Youngstown	35.00
Cleveland	35.00

Slabs

(8 in. x 2 in. and under 10 in. x 10 in.)

	Per Gross Ton
Pittsburgh	$35.00
Youngstown	35.00
Cleveland	35.00

Skelp

(F.o.b. Pittsburgh or Youngstown)

	Per Lb.
Grooved	1.85c. to 1.90c.
Universal	1.85c. to 1.90c.
Sheared	1.85c. to 1.90c.

Wire Rods

(Common soft, base)

	Per Gross Ton
Pittsburgh	$42.00
Cleveland	42.00
Chicago	43.00

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.80
Old range non-Bessemer, 51.50% iron	4.65
Mesabi Bessemer, 51.50% iron	4.65
Mesabi non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.40

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algerian	10.00c.
Iron ore, low phos., Swedish, average 68% iron	10.00c.
Iron ore, basis Swedish, average 65% iron	9.00c.
Manganese ore, washed, 52% manganese, from the Caucasus	33.00c. to 35.00c.
Manganese ore, Brazilian, African or Indian, basic 50%	33.00c. to 35.00c.
Tungsten ore, high grade, per unit, in 60% concentrates	$15.00 to $15.50

	Per Gross Ton
Chrome ore, 45 to 50% Cr_2O_3, crude, c.i.f. Atlantic seaboard	$22.00 to $24.00

	Per Lb.
Molybdenum ore, 85% concentrates of MoS_2, delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$2.75 to $2.85
Foundry, f.o.b. Connellsville prompt	3.75 to 4.85
Foundry, by-product, Ch'go ovens	8.00
Foundry, by-product, New England, del'd	11.00
Foundry, by-product, Newark or Jersey City, delivered	9.00 to 9.40
Foundry, by-product, Phila	9.00
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry by-prod., del'd St. Louis	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.25 to $1.75
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, ¾-in. f.o.b. Pa. mines	1.90 to 2.00
Mine run gas coal, f.o.b. Pa. mines	1.65 to 1.75
Steam slack, f.o.b. W. Pa. mines	80c. to 90c.
Gas slack, f.o.b. W. Pa. mines	1.00 to 1.10

Ferromanganese

	Per Gross Ton
Domestic, 80%, seaboard	$105.00
Foreign, 80%, Atlantic or Gulf port, duty paid	105.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$31.00 to $34.00
Domestic, 16 to 19%	29.00 to 32.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$83.50
75%	130.00

	Per Gross Ton Furnace		Per Gross Ton Furnace
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	45.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio Furnace

	Per Gross Ton		Per Gross Ton
10%	$31.00	12%	$35.00
11%	33.00		

Silvery Iron

F.o.b. Jackson County, Ohio Furnace

	Per Gross Ton		Per Gross Ton
6%	$24.00	10%	$29.00
7%	25.00	11%	31.00
8%	26.00	12%	33.00
9%	27.00		

Other Ferroalloys

Ferrotungsten, per lb., contained metal del'd	$1.40 to $1.50
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.15 to $3.65
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	$160.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton	$91.00
Ferrophosphorus, electric 24%, f.o.b. Anniston, Ala., per gross ton	$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride not over 5% silicon, gravel, f.o.b. Illinois and Kentucky mines	$18.00
No. 2 lump, Illinois and Kentucky mines	20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	$18.00 to $18.50
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines	32.50

Fire Clay Brick

	Per 1000 f.o.b. Works: High-Heat Duty Brick	Intermediate Heavy Duty Brick
Pennsylvania	$43.00 to $46.00	$35.00 to $38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	.....
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00
Standard size	45.00

Chrome Brick

	Per Net Ton
Standard size	$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts, blank or tapped, hexagons	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	7.00c. to 6.75c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled thread up to and including ⅛ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagons nuts	70
Semi-finished hexagons castellated nuts, S.A.E.	70
Stove bolts in packages, P'gh	75, 20, 10 and 5
Stove bolts in packages, Chicago	75, 20, 10 and 5
Stove bolts in packages, Cleveland	75, 20, 10 and 5
Stove bolts in bulk, P'gh	75, 20, 10, 5 and 2½
Stove bolts in bulk, Chicago	75, 20, 10, 5 and 2½
Stove bolts in bulk, Cleveland	75, 20, 10, 5 and 2½
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55, 60 per cent apply.

Large Rivets

(½-In. and Larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$3.10
F.o.b. Chicago	3.20

Small Rivets

(⅞-In. and Smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70 and 10
F.o.b. Cleveland	70 and 10
F.o.b. Chicago	70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10 and 5
Milled standard set screws, case hardened,	80 and 5
Milled headless set screws, cut thread	75 and 10
Upset hex. head cap screws, U.S.S. thread	85
Upset hex. cap screws, S.A.E. thread	85
Upset set screws	80, 10 and 5
Milled studs	70

Chicago

Steel Order Books Unusually Heavy as Second Half Begins—Contracts and Specifications Large

CHICAGO, July 2.—Chicago steel mills have established a new six-months' record. Shipments for January to June, inclusive, were fully 15 per cent heavier than in the corresponding period last year, while sales and also specifications were 20 to 25 per cent larger. Order books are considerably heavier than at this time last year.

Sales in the past week were the fifth largest this year, with forward buying gaining rapidly. Mill order books are unusually heavy, and a high rate of operations seems assured for the summer months. Current sales totals are little influenced by new purchases of rails. Contracts for semi-finished steel are larger than is usually expected at the opening of the third quarter. Finished steel specifications are easily equal to the average week this year and well above the rate in 1928. Releases match shipments. Ingot production remains at capacity.

The tendency for deliveries of finished steel to improve, as noted a week ago, has been checked.

It is interesting that not a single Chicago steel mill blast furnace has been taken out of service for relining in three months nor for lack of orders since the beginning of the year.

The Chicago & North Western has postponed until fall the purchase of 1000 to 2500 box cars.

Structural awards are augmented by an award for 3000 tons for a bridge at Peoria, Ill.

Pig Iron.—Iroquois furnace No. 5 has been taken out of service for relining. Plans are to have it in blast again in 30 days. Merchant stacks now in blast are one at Duluth, two Federal and two Iroquois. Shipments from local furnaces in the past six months were the largest in history. Current releases are large, and pressure for prompt delivery is as urgent as in recent months.

Sellers' order books are large, and there is a growing disposition on the part of buyers to seek tonnage for the remainder of the year. Local furnaces are holding to $20 a ton, while offerings of boat iron are to be had at 50c. a ton less. Many foundries in this district will take more than the one holiday this week. Charcoal iron is active in lots up to 200 tons at $24 a ton, furnace. Southern iron is moving in here in small quantities.

Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	$20.00
N'th'n No. 1 fdy., sil. 2.25 to 2.75	20.50
Malleable, not over 2.25 sil	20.00
High phosphorus	20.00
Lake Super. charcoal, sil. 1.50	27.04
So'th'n No. 2 fdy. (all rail)	$20.51 to 21.01
Low phos., sil. 1 to 2, copper free	29.50
Silvery, sil. 8 per cent	30.79
Bess. ferrosilicon, 14-15 per cent	46.29

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Ferroalloys.—This market is quiet in new sales. Specifications against past commitments show little change from the average in recent weeks.

Prices delivered Chicago: 80 per cent ferromanganese, $112.56; 50 per cent ferrosilicon, $83.50 to $88.50; spiegeleisen, 19 to 21 per cent, $40.76.

Structural Material.—Awards for the week total 7500 tons, and inquiries are for not less than 5500 tons. It is reported here that the Peoria, Ill., bridge, requiring 3000 tons, is being held in check while details of the general contract are being arranged. This market is more active both in Milwaukee and locally.

Mill prices on plain material, per lb.: 2.05c. to 2.15c. base, Chicago.

Cast Iron Pipe.—Demand for cast iron pipe in this district still drags. The outlook is none too promising, though some in the trade foresee more active inquiry toward the end of the summer months. It is reported here that pipe foundries are operating at between 60 and 70 per cent of capacity. Deliveries are prompt on most sizes. Railroads are finding little use for cast iron pipe at this time. Nor are public utilities interested in additional tonnages, but they are specifying freely against commitments made earlier in the year. Carload buyers are less numerous this week than in the closing days of June. The American Cast Iron Pipe Co. will furnish 100 tons of 6 to 10-in. pipe for Monroe, Mich., and the Alabama Pipe Co. will ship 200 tons to Niles Center, Ill. The National Cast Iron Pipe Co. has taken 24,000 ft. of 6 and 8-in. pipe for Weston, Ohio, and 400 tons of 6 and 8-in. pipe for Dearborn Township, Mich. Hinsdale, Ill., will open bids July 21 on a round tonnage of cast iron pipe for a sewage disposal plant.

Prices per net ton, del'd Chicago: Water pipe, 6-in. and over, $45.20 to $46.20; 4-in., $49.20 to $50.20; Class A and gas pipe, $3 extra.

Hot-Rolled Strips.—Specifications from automobile frame manufacturers are slightly smaller. Other users, however, are still taking liberal quantities. Prices are steady. Third quarter contracts bulk large.

Semi-Finished Steel.—This commodity is still scarce, and producers find it necessary to continue the practice of careful apportionment among various finishing mills. Allotment to non-integrated users is still as strict as it was a month ago. Forward contracts are well covered and in the aggregate bulk larger than at the opening of the second quarter.

Sheets.—Prices remain steady in the nearby Chicago territory. Mill quotations are 2.45c. a lb. for blue annealed sheets, 3.80c. for galvanized and 3.05c. for black sheets. Quotations are demoralized in the Southwest, where mills served by the Gulf ports and inland waterways meet in sharp competition. Buying for the third quarter continues, but the pace is slow, and, as a result, books for the coming three months are not heavy. Releases against commitments are liberal, and local hot mills continue to produce at the rate of 85 per cent of capacity. Output for this week will be curtailed because of the holiday. Jobbers are taking liberal quantities, but agricultural machinery manufacturers find their needs are not as heavy as recently. There is also more spottiness in the demand from miscellaneous sources, such as locker and light tank makers.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 3.10c.; No. 24 galv., 3.85c.; No. 10 blue ann'l'd, 2.35c. Deliv'd prices at other Western points are equal to the freight from Gary, plus the mill prices, which are 5c. per 100 lb. lower than Chicago delivered prices.

Rails and Track Supplies.—Foremost among rail inquiries is one for 39,000 tons for the Norfolk & Western. Western producers do not expect to participate in the tonnage. Purchases from local mills total more than 10,000 tons, 3500 tons from an Illinois railroad, 5000 tons from frog and switch makers and about 600 tons in small miscellaneous lots. Several new inquiries are in the making. Western railroads have ordered 3000 tons of track fastenings, and fresh inquiry before the trade is for not less than 9000 tons. Additional releases of standard-section rails now assures an unchanged rate of output for all of July. Track supply departments are operating at normal capacity for this time of the year. Several carloads of light rails have been ordered.

Prices f.o.b. mill, per gross ton: Standard section open-hearth and Bess. rails, $43; light rails, rolled from billets, $36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.15c.; angle bars, 2.75c.

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars	3.00c.
Reinforc'g bars, billet steel	2.10c. to 2.40c.
Reinforc'g bars, rail steel	1.90c. to 2.05c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Bands (¼ in. in Nos. 10 and 12 gages)	3.20c.
Hoops (No. 14 gage and lighter)	3.75c.
Black sheets (No. 24)	4.05c.
Galv. sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.35c.
Spikes, ⅜ in. and larger	3.55c.
Track bolts	4.55c.
Rivets, structural	4.00c.
Rivets, boiler	4.00c.

	Per Cent Off List
Machine bolts	60
Carriage bolts	60
Coach or lag screws	60
Hot-pressed nuts, sq., tap. or blank	60
Hot-pressed nuts, hex., tap. or blank	60
No. 8 black ann'l'd wire, per 100 lb.	$3.45
Com. wire nails, base per keg	3.20
Cement c't'd nails, base per keg	3.20

Wire Products.—June shipments of wire and wire products, taken as a whole, were heavier than in any sixth month for the past six years. Deliveries for the first half have established a record in all products except nails and woven wire fencing. Demand for these last-named commodities has been spotty through most of the year, nails influenced by building operations in general, and fencing by unseasonable weather. On the whole, demand is well sustained by most users, with the exception of automobile and farm implement manufacturers. Forward contracting by the manufacturing trade has progressed rapidly, and the total of orders on producers' books compares favorably with the volume at the opening of the second quarter. Shipments to the jobbers in June were above normal and requirements are not changed as the second half opens. Wire mill output is steady at 70 per cent of capacity. Prices for nails are less steady to the west and southwest of Chicago.

Reinforcing Bars.—Building permits are still seasonably small, averaging 40 per cent below June last year. This situation is having a marked effect not only in the matter of tonnage booked, but also in prices, which lack strength because of keen competition for going tonnages. Shops have been pressed for delivery in recent weeks against old projects. This stress is growing less and new business is not sufficient to support current pending operations. On the brighter side of the market is the fact that June sales topped those of May by a fair margin, but the outlook for July is not particularly promising from the viewpoint of pending tonnage. Fresh inquiry is quiet.

Bolts, Nuts and Rivets.—Specifications are a trifle lighter, as manufacturers of farm machinery find their needs are less urgent. Users generally have not built up stocks, and only moderate assortments are in the hands of producers. Spot orders are more numerous. Prices are firm.

Old Material.—June shipments to consumers were equal to the volume in May. Brokers' books are large, and efforts are being directed largely toward covering old orders. Heavy melting steel is moving freely to local mills, which are finding less reason to reject incoming scrap. Steel foundries are operating at a steady rate, while the malleable foundry business is growing spotty. Pressure placed on sellers for prompt shipment of carloads reflects the low condition of stocks at most foundries. New demand for railroad malleable is light, and brokers are having little difficulty in obtaining this grade at $17.25 a gross ton, delivered. One mill is holding back shipments of bundles. Sellers are having difficulty in placing this tonnage as it appears on tracks. Cast iron car wheels have been purchased locally for delivery to Kokomo, Ind., at $13.60 a gross ton on track. This is equivalent to $14.10 a gross ton, delivered Chicago. The price paid at Kokomo was $16. The Chicago & North Western is offering 6000 tons.

Prices deliv'd Chicago district consumers:

	Per Gross Ton	
Basic Open-Hearth Grades:		
Heavy melting steel	$14.75 to	$15.25
Shoveling steel	14.75 to	15.25
Frogs, switches and guards, cut apart, and misc. rails	16.25 to	16.75
Hydraul. compressed sheets	13.00 to	13.50
Drop forge flashings	10.50 to	11.00
No. 1 busheling	13.00 to	13.50
Forg'd cast and r'l'd steel carwheels	18.25 to	18.75
Railroad tires, charg. box size	18.50 to	19.00
Railroad leaf springs cut apart	18.50 to	19.00
Acid Open-Hearth Grades:		
Steel couplers and knuckles	16.75 to	17.25
Coil springs	19.00 to	19.50
Electric Furnace Grades:		
Axle turnings	14.50 to	15.00
Low phos. punchings	16.50 to	17.00
Low phos. plates, 12 in. and under	16.50 to	17.00
Blast Furnace Grades:		
Axle turnings	10.75 to	11.25
Cast iron borings	9.75 to	10.25
Short shoveling turnings	9.75 to	10.25
Machine shop turnings	7.00 to	7.50
Rolling Mill Grades:		
Iron rails	16.00 to	16.50
Rerolling rails	17.50 to	18.00
Cupola Grades:		
Steel rails less than 3 ft.	18.00 to	18.50
Steel rails less than 2 ft.	18.50 to	19.00
Angle bars, steel	17.00 to	17.50
Cast iron carwheels	14.00 to	14.50
Malleable Grades:		
Railroad	17.25 to	17.75
Agricultural	15.75 to	16.25
Miscellaneous:		
*Relaying rails, 56 to 60 lb.	23.00 to	25.00
*Relaying rails, 65 lb. and heav.	26.00 to	31.00
	Per Net Ton	
Rolling Mill Grades:		
Iron angle and splice bars	15.00 to	15.50
Iron arch bars and transoms	21.00 to	21.50
Iron car axles	26.00 to	26.50
Steel car axles	16.50 to	17.00
No. 1 railroad wrought	13.50 to	14.00
No. 2 railroad wrought	13.00 to	13.50
No. 1 busheling	9.00 to	9.50
No. 2 busheling	7.00 to	7.50
Locomotive tires, smooth	14.50 to	15.00
Pipes and flues	10.00 to	10.50
Cupola Grades:		
No. 1 machinery cast	14.50 to	15.00
No. 1 railroad cast	13.75 to	14.25
No. 1 agricultural cast	13.25 to	13.75
Stove plates	12.25 to	12.75
Grate bars	11.75 to	12.25
Brake shoes	10.50 to	11.00

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Bars.—Current demands for mild steel bars are lighter by a small margin. Steel shipments to the automobile trade continue to taper, but the change is slight and the effect is noticeable mostly in the medium-priced car field, for which July shipping schedules will be sharply below those for June. Farm implement manufacturers, though feeling free to make liberal contracts, are finding less immediate need for steel. Some look on this situation solely as a seasonal influence. Forgers, though still operating at a high rate, are feeling the effects of a duller demand from automobile builders. Shipments to road machinery manufacturers have not changed in many weeks. New buying in iron bars is dull; specifications are of moderate size. The bulk of car builders' needs are filled for the present. Output of alloy steel bars is holding at 85 per cent of capacity. Prices are firm. Third quarter contracts total about the same as at the opening of the second quarter. Specifications for rail steel bars are equal to production and to shipments. Buyers are taking more interest in future needs. Mills near Chicago are operating on a double turn basis. The mill at Moline, Ill., will be down for repairs until about July 15.

Plates.—Forward contracting is active, tank builders alone in this district accounting for more than 8000 tons. A refiner in the Southwest has ordered 1500 tons of tank plates. The White Star Refining Co., Detroit, is in the market for 2000 to 3000 tons of plates. Total inquiry for tank work now before the trade is impressive at 15,000 tons. The consumption of plates is heavy in this district. Shipments are holding to the rate of recent weeks and specifications are in such size that improvement in deliveries, noted a week ago, has been checked. Western car builders appear to be at the peak of their present construction programs and their needs for steel are large. It is estimated in some quarters that they have about two months' work ahead. Plate demands for pipe manufacture are heavy.

Coke.—The Chicago market is active in spot sales. Shipments are curtailed somewhat this week as a result of the holiday, which in some instances will extend over Thursday, Friday and Saturday.

O'Fallon Decision Should Stimulate Buying

That the recent decision of the United States Supreme Court in the O'Fallon case should have a favorable effect on the general railroad situation and should stimulate the interest of carriers in acquiring new equipment is the opinion expressed by W. H. Woodin, president American Car & Foundry Co., in the thirtieth annual report of the company. Mr. Woodin states that "fortunately the company's earning capacity is not entirely dependent upon its manufacture and sale of railroad equipment. Unceasing care has been given to the extension of its business in miscellaneous products. That branch of its activities is now one of very considerable magnitude and produces a substantial proportion of its earnings."

Net earnings for the year ended April 30, 1929, were $2,715,174.28, compared with $3,754,555.05 in the previous fiscal year.

An engineering and sales office has been opened by Carrier Engineering Corporation, Newark, N. J., in the Buhl Building, Detroit, in charge of Herbert Peacock. This takes the place of temporary engineering offices in Detroit occasioned by large work in process there in air conditioning, cooling and ventilating systems. Mr. Peacock has been engineering assistant to the sales manager of the company.

New York

Pig Iron Buyers Still Cautious — Structural Activity Continues—Other Steel Buying Steady

NEW YORK, July 2.—The opening of the third quarter finds the pig iron market quiet. Sales in this district for the week totaled only 6000 or 7000 tons, and inquiries are not numerous. Inventory considerations may partly explain the attitude of buyers and a certain amount of second quarter tonnage is still to be delivered, but the general lack of interest in contracts is probably accounted for mainly by the price situation. Melters see no object in obligating themselves for the next three months when there are no indications of an advancing market. Moreover, the possibility of more active competition in this district on the part of Alabama furnaces is regarded as a further reason for caution. On the other hand, those who count on larger offerings of merchant iron by steel companies may be disappointed, since steel production promises to show little diminution in the next month or two. The inquiry for 2000 tons by the General Fire Extinguisher Co., Providence, R. I., is still open, but the General Electric Co. has closed for at least part of the 6000 tons on which it took figures. Two current inquiries calling for deliveries to plants outside of this district involve a total of 10,000 tons. Northern brands of foundry iron continue to range from $17.50 to $18, base Buffalo, or the equivalent.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	$22.41 to $22.91
*Buf. No. 2, del'd east. N. J.	20.78 to 21.28
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	21.39 to 22.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	21.89 to 23.02

Freight rates: $4.91 from Buffalo, $1.39 to $2.52 from eastern Pennsylvania.

*Price delivered to New Jersey cities having rate of $3.28 a ton from Buffalo.

Ferroalloys.—Sales of ferromanganese in the past week or two have totaled several hundred tons at the regular quotation of $105, seaboard basis. The Ford Motor Co. is inquiring for 800 tons. Demand for spiegeleisen is confined to carload and small lots. Specifications on contract for both of these alloys and for other standard ferroalloys are very heavy.

Reinforcing Bars.—The Jones & Laughlin Steel Corporation will supply 1400 tons of bars for the automobile storage building of the New York Central Railroad at West End Avenue and Sixty-fifth Street. Otherwise, awards have consisted only of small tonnages. Inquiries are scarce. Prices, however, are firm and unchanged.

Billet steel reinforcing bars in 40, 50 and 60-ft. lengths, 2.05c. per lb., Pittsburgh, and 2.30c. per lb., Pittsburgh warehouse, for cut lengths. Out of New York warehouse, 2.90c. per lb. for lots of 5 tons or more, 3.05c. for lots of 2 to 5 tons and 3.30c. for less than 2 tons, all delivered at job.

Finished Steel.—Although steel business continues good in nearly all branches, the structural field is leading in strictly new business. Among the projects which have come up for bids are five which total more than 25,000 tons. These are: 9500 tons for subway work, 6000 tons for a building at Fifth Avenue and Fifty-eighth Street, 4000 tons for a building for the New York Telephone Co., 3900 tons for repairs to the Queensborough bridge and 1725 tons for a New York Central Railroad viaduct. In specifications and new business, June was an exceptionally good month, though the total tonnage of most of the local steel offices fell below that of May. With respect to consumers' requirements in July and August, the general opinion is that no severe curtailment in consumption in this district is in sight. The demand for full finished and special finished sheets is especially strong.

Mill prices per lb., deliv'd New York: Soft steel bars, 2.29c.; plates, 2.22½c.; structural shapes, 2.19½c.; bar iron, 2.14c.

Warehouse Business.—June sales from stock have not quite measured up to the May total, which was one of the largest for any month in the first half of the year. Business in structural steel has declined slightly, and other steel products are less active. Black and galvanized sheet prices are still subject to shading of $1 and $2 a ton. Jobbers have not yet revised their quotations on blue annealed sheets to the new mill bases.

Cast Iron Pipe.—New inquiry for pressure pipe is limited to small lots to complete contracts. Yonkers, N. Y., opens bids July 5 on 1000 tons of 12-in. and 1800 tons of 18-in. water pipe. At the recent opening of bids at Hyattsville, Md., by the Washington suburban sanitary district, on 1675 tons of 6 to 12-in. water pipe, low bids were submitted for both sand cast and centrifugally cast pipe by the United States Pipe & Foundry Co. as follows: On 10,000 ft. of 6-in., Class B, $36 a ton; Class 150, $0.4949 a ft.; 15,000 tons of 8-in. Class B, $36.60 a ton; Class 150, $0.6972 a ft.; 6000 tons of 10-in. Class B, $37 a ton; Class 150, $0.9579 a ft.; 3000 ft. of 12-in. Class B, $36.60 a ton; Class 150, $1.2425 a ft. The freight rate from Northern foundries to the Washington district is about $3.70 a net ton.

Prices per net ton deliv'd New York: Water pipe, 6-in. and larger, $33.60 to $35.60; 4-in. and 5-in., $36.60 to $38.60; 3-in., $43.60 to $45.60. Class A and gas pipe, $3 extra.

Coke.—Demand is light and prices are unchanged. Standard furnace is quoted at $2.75 to $2.85 a net ton, Connellsville. Special brands of beehive coke are $4.85 a net ton, ovens, or $8.56, delivered to northern New Jersey, Jersey City and Newark and $9.44 to New York and Brooklyn. By-product coke is quoted at $9 to $9.40 per net ton, Newark or Jersey City and $10.06, New York or Brooklyn.

Old Material.—No. 1 heavy melting steel is being bought by brokers at

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.30c.
Soft steel bars, small shapes	3.25c.
Iron bars	3.24c.
Iron bars, Swed. charcoal	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Cold-roll. strip, soft and quarter hard	5.15c. to 5.40c.
Hoops	4.25c.
Bands	3.75c.
Blue ann'l'd sheets (No. 10)	3.85c. to 3.90c.
Long terne sheets (No. 24)	5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galv. annealed	5.15c.
Tire steel, 1½ x ½ in. and larger	3.30c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.65c.
Open-hearth spring steel, bases,	4.50c. to 7.00c.

	Per Cent Off List
Machine bolts, cut thread:	
¾ x 6 in. and smaller	60
1 x 30 in. and smaller	50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	60
¾ x 20 in. and smaller	50 to 50 and 10
Coach screws:	
½ x 6 in. and smaller	60
1 x 6 in. and smaller	50 to 50 and 10

	Per 100 Ft.
Boiler Tubes—	
Lap welded, 2-in.	$17.33
Seamless steel, 2-in.	20.24
Charcoal iron, 2-in.	25.00
Charcoal iron, 4-in.	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
½-in. butt	46	29
¾-in. butt	51	37
1-3-in. butt	53	39
2½-6-in. lap	48	35
7 and 8-in. lap	44	17
11 and 12-in. lap	37	12
Wrought Iron—		
½-in. butt	5	+19
¾-in. butt	11	+ 9
1-1½-in. butt	14	+ 6
2-in. lap	5	+14
3-6-in. lap	11	+ 6
7-12-in. lap	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box	$6.45	$6.20
Charcoal, per Box—	A	AAA
IC	$9.70	$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating	$10.00 to $11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets, Box Annealed—Black, C. R. One Pass

	Per Lb.
Nos. 18 to 20	3.80c.
No. 22	3.95c.
No. 24	4.00c.
No. 26	4.10c.
No. 28*	4.25c.
No. 30	4.50c.

Sheets, Galvanized

	Per Lb.
No. 14	4.40c.
No. 16	4.25c.
No. 18	4.40c.
No. 20	4.50c.
No. 22	4.60c.
No. 24	4.75c.
No. 26	5.00c.
No. 28*	5.25c.
No. 30	5.65c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

CARNEGIE LIBRARY ATLANTA

$15.50 to $15.75 a ton, delivered Claymont, Del., and at $16 a ton, delivered Coatesville, Conshohocken or Bethlehem, Pa. Occasionally brokers offer $16.25 a ton, delivered to Coatesville and Conshohocken. No. 2 heavy melting steel is quoted at $13 a ton, delivered Harrisburg, Pa., and up to $13.75 a ton, delivered to Conshohocken or Pencoyd, Pa. The available supply of No. 2 steel is not large, and prices are firm. Other grades of scrap are inactive, and prices are unchanged.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel	$12.00 to $13.35
Heavy melting steel (yard)	8.00 to 9.50
No. 1 hvy. breakable cast.	10.75 to 12.00
Stove plate (steel works).	7.75 to 8.25
Locomotive grate bars....	8.25 to 8.75
Machine shop turnings....	7.25 to 7.50
Short shoveling turnings..	7.25 to 7.50
Cast borings (blast furn. or steel works).....	7.00 to 7.25
Mixed borings and turnings	6.75 to 7.25
Steel car axles.....	19.25 to 19.75
Iron car axles.....	24.00 to 25.00
Iron and steel pipe (1 in. dia., not under 2 ft. long)	11.25
Forge fire	9.50 to 10.00
No. 1 railroad wrought....	12.00 to 12.50
No. 1 yard wrought, long..	11.00 to 11.50
Rails for rolling.....	13.00 to 13.50
Cast iron carwheels.....	12.00 to 12.25
Stove plate (foundry)....	8.25 to 8.50
Malleable cast (railroad).	14.00 to 14.50
Cast borings (chemical)..	10.00 to 10.50

Prices per gross ton, deliv'd local foundries:

No. 1 machry. cast.....	$17.00
No. 1 hvy. cast (columns, bldg. materials, etc.), cupola size.....	15.00
No. 2 cast (radiators, cast boilers, etc.)	14.50

E. Arthur Tutein, Inc., Awarded $302,500

E. Arthur Tutein, Inc., of Boston and New York, has been awarded a verdict of $302,500 by the arbiters in the proceeding brought against the Hudson Valley Coke & Products Corporation, Troy, N. Y.

The Tutein company was appointed agent for the Troy blast furnace and coke ovens in the sale of pig iron and coke, but the contract was terminated with some years still to run, and the Tutein company brought action under an agreement by which any disputes were to be submitted to arbitration.

Sherman Whipple, Boston lawyer, was arbiter for the Tutein company and United States Senator Wagner of New York served in like capacity for the Hudson Valley company. The third arbiter, Louis K. Comstock of New York, was appointed by Charles M. Schwab in his capacity of president of the American Iron and Steel Institute, a mode of selection which the arbitration contract called for.

It is stated that the damages assessed against the Hudson Valley company are for lost profits and do not cover an investment of $250,000 which E. Arthur Tutein made in the stock of the company.

In May jobbing foundries of Worcester, Mass., and vicinity produced 5,231,926 lb. of gray and malleable iron castings, the largest month's total thus far this year. Compared with May, 1928, the increase was from 3,683,065 lb., or 41.8 per cent.

Cleveland

Large Steel Operations Through July Assured By Present Backlogs—Automotive Orders Continue to Decline

CLEVELAND, July 2.—July started with enough business in finished steel on mill books to assure good operations through the month, although some of the sheet and strip mills could take on additional tonnage for late in July. Backlogs have been reduced and deliveries on most products have improved. However, not much gain has been made in shipments of steel bars, for which there is still pressure for delivery. Plate mills also have backlogs.

The volume of specifications the past week showed little change from recent weeks. Consuming industries outside the automotive field appear to continue at recent operations, and the demand for steel is expected to hold up well during the summer months.

Orders from the automotive industry continue to decline. With the seasonal slowing down in that field and curtailment due to bringing out new models, the July output of cars will show a sharp decline from that of June.

Quite a few parts manufacturers have received suspensions or cancellations that are reducing their operations. However, the industry will be well sustained during the summer months by production of some of the makers of low-priced cars. The July schedule of the Ford Motor Co. is understood to call for the production of 190,000 cars, or an increase over recent months.

With better mill deliveries and uncertainty over future schedules automobile companies are not buying steel for as extended requirements as a few weeks ago. Most consumers of steel bars, plates and structural shapes have covered with third quarter contracts. Waiving of chemical extras is reported in some cases on spring steel, but base prices are firm.

Structural inquiry is fair. Awards during the week included 4000 tons for a Toledo bank.

The Nickel Plate Railroad has placed 1000 tons of rails and the Wheeling & Lake Erie 1500 tons with a Pittsburgh district mill, supplementing their purchases early in the year. Steel bars are quoted at 1.95c., Cleveland and Pittsburgh, and plates and structural material at 1.95c., Pittsburgh.

Pig Iron.—Sales increased during the past week. Cleveland interests took orders for 36,000 tons of foundry and malleable iron, as compared with 17,000 tons in the previous week. An Ohio foundry purchased 4000 tons for last half. This company inquired for the same amount of iron for the first half of 1930, but furnaces declined to quote for shipment beyond January. The General Electric Co. closed for 1200 tons of foundry iron for its Erie works, and another Erie consumer bought 1000 tons. The inquiry from the Westinghouse Electric & Mfg. Co. for foundry iron for its Cleveland plant is still pending. Foundries, with few exceptions, are confining their purchases to the third quarter, and furnaces are not attempting to make sales for the entire last half. With the steady buying that has been going on for a number of weeks, most producers have a very good backlog of third quarter business. June shipments declined only about 10 per cent from those of May.

Shipping orders to the automotive industry and other consumers have started this month at about the same rate as during June. Little interest is being taken in prices, as quotations that have prevailed for some time are being maintained. Cleveland furnaces quote foundry and malleable iron at $18.50, furnace, for outside shipment and at $19 for local delivery. In Michigan, the market is $20 on both grades. A sale of 200 tons of Southern foundry iron at $15, Birmingham, for shipment into this territory seems to establish that as the ruling price for small-lot business.

Prices per gross ton at Cleveland:

N'th'n fdy., sil. 1.75 to 2.25	$19.50
S'th'n fdy., 1.75 to 2.25...	21.00
Malleable	19.50
Ohio silvery, 8 per cent...	29.00
Basic Valley furnace.....	18.50
Stand. low phos., Valley..	26.50 to 27.00

Prices except on basic and low phosphorus are delivered Cleveland. Freight rates: 50c. from local furnaces; $3 from Jackson, Ohio; $6 from Birmingham.

Iron Ore.—The heavy movement of ore from the Lake Superior district, which started with the opening of navigation, continues. Shipments by water during June were 10,174,424 tons, an increase of 1,248,208 tons over June, last year. The total movement until July 1 was 22,239,938 tons, a gain of 7,944,813 tons, or more than 55 per cent above the same period last year.

Sheets.—With the decrease in the demand from the automotive industry, mill backlogs have been materially reduced, and some producers now need orders for auto body sheets, having only enough to keep their hot mills busy for two weeks. Some mills have also well caught up on black sheets. Others are well filled for from four to six weeks. Orders for round tonnages of auto body and black sheets for manufacturing 80,000 bodies for Chevrolet cars were distributed among several mills during the week. Good orders also came from barrel manufacturers. Resistance to the 2.95c., Pittsburgh, price on black sheets has become more pronounced, and 2.85c. is now fairly common. On galvanized sheets, 3.60c. has become more general. While there has been only slight reduction in mill operations, a number of mills

will not resume operations after the holiday shutdown until next Monday.

Strip Steel.—Specifications for both hot and cold-rolled strip have fallen off considerably, and deliveries are much better than recently except on hot strip in very narrow sizes, of which some of the mills have enough business on their books to carry them through August. Deliveries on wide hot-rolled strip can be secured in two weeks and on cold-rolled material in three weeks. Prices are firm. Most consumers have covered for the third quarter at regular quotations.

Alloy Steel.—Specifications were heavy during the last few days of June, considerable business being brought out by the price advance effective on third quarter contracts on small billets and slabs in certain sizes that resulted from putting these on a bar base. Mills also took a good volume of specifications for bars for July shipment. However, mill backlogs have been reduced considerably by the decreased demand from the automotive industry. Prices are firm.

Semi-Finished Steel.—There has not been much contracting for the third quarter, but contracts that have been closed have been at $35, Cleveland and Youngstown, for sheet bars, billets and slabs. This is the same price at which sheet bar contracts were written for the second quarter, but is an advance of $1 a ton for billets and slabs. That consumers are rather slow in placing contracts is evidently due partly to the fact that those receiving their supplies from a Cleveland mill will be securing shipments for about three weeks against second quarter contracts, as that producer is that far behind on deliveries. Until these shipments are completed these buyers will be getting billets and slabs at the $34 price.

Bolts, Nuts and Rivets.—June made a good showing in bolt and nut orders, but the volume of business was considerably less than in May. That the market will experience the usual seasonal decline in July is indicated by a further falling off in orders in the past few days. Production has been curtailed, manufacturers now operating their plants from 65 to 70 per cent of capacity. Rivet orders also show a decline. Prices are firm.

Coke.—Prices on some of the cheaper grades of Connellsville foundry coke have declined about 25c. a ton, but the better grades are firm at recent quotations. Ohio by-product coke is quoted at $8.25, Painesville, for July shipment. Specifications are fair.

Cold-Finished Steel.—Demand for screw stock has declined materially, but orders for alloy and high carbon wire from cap and set screw makers continue heavy, and deliveries on such material show no improvement.

Wire Products.—Nails are irregular, with $2.50 a keg not an uncommon price. Recent weakness in wire seems to have disappeared. Specifications are rather light.

Warehouse Business.—New extras on blue annealed sheets were generally adopted July 1. The base is unchanged at 3.25c. Warehouse business continues fairly good.

Old Material.—While the market is dull, most prices are holding to recent quotations. No. 1 heavy melting steel will be supplied to a Valley district mill during July at $17.50, the same price that it paid during June. Dealers are paying $17.50 to $17.75 for the heavier grades of No. 1 heavy melting steel to cover $18 contracts with Youngstown district mills. A Cleveland mill which has been restricting shipments of steel making scrap has cut off shipments entirely on this grade of material, evidently because of large stocks that it has accumulated in water shipments from Detroit. Dealers are buying blast furnace scrap in moderate quantities for shipment to a Cleveland consumer at quoted prices. Cast scrap is lower.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	$15.00 to $15.50
No. 2 heavy melting steel	14.50 to 15.00
Compressed sheet steel	14.50 to 15.00
Light bundled sheet stampings	12.00 to 12.50
Drop forge flashings	13.00 to 13.25
Machine shop turnings	9.25 to 9.50
No. 1 railroad wrought	13.50 to 14.00
No. 2 railroad wrought	16.00 to 16.50
No. 1 busheling	13.00 to 13.50
Pipes and flues	9.00 to 9.50
Steel axle turnings	12.50 to 13.00
Acid Open-Hearth Grades	
Low phos., forging crops	17.75 to 18.00
Low phos., billet, bloom and slab crops	18.50 to 18.75
Low phos., sheet bar crops	18.00 to 18.50
Low phos. plate scrap	18.00 to 18.50
Blast Furnace Grades	
Cast iron borings	10.75 to 11.00
Mixed borings and short turnings	10.75 to 11.00
No. 2 busheling	10.75 to 11.00
Cupola Grades	
No. 1 cast	16.75 to 17.25
Railroad grate bars	11.00 to 12.00
Stove plate	12.00 to 12.50
Rails under 3 ft.	18.50 to 19.00
Miscellaneous	
Railroad malleable	18.00 to 18.50
Rails for rolling	16.25 to 16.50

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and struc. shapes	3.00c.
Soft steel bars	3.00c.
Reinforc. steel bars	2.25c. to 2.50c.
Cold-fin. rounds and hex.	3.65c.
Cold-fin. flats and sq.	4.15c.
Hoops and bands, No. 12 to ⅛ in., inclusive	3.25c.
Hoops and bands, No. 13 and lighter	3.65c.
Cold-finished strip	*5.95c.
Black sheets (No. 24)	3.70c. to 3.90c.
Galvanized sheets (No. 24)	4.60c. to 4.75c.
Blue ann'l'd sheets (No. 10)	3.25c.
No. 9 ann'l'd wire, per 100 lb.	$2.95
No. 9 gal. wire, per 100 lb.	3.40
Com. wire nails, base per keg	2.95

*Net base, including boxing and cutting to length.

Philadelphia

Sheet Prices Less Firm—Billet Market Steadier at $35 for New Contracts—Pig Iron Quiet

PHILADELPHIA, July 2.—Steel contracting for third quarter has been at about the same level as in the previous quarter. Specifications from consumers have been lighter recently, but mill operations are being maintained at a high level with deliveries slightly earlier than a few weeks ago. While production at certain steel mills has been curtailed somewhat in the past few weeks, the reduction has been largely necessitated by repairs to open-hearth furnaces, which will be returned to production as soon as possible.

Concessions of $1 to $2 a ton in the prices of black and galvanized sheets have become rather general.

Pig Iron.—Foundry iron prices are being maintained at $21 to $21.50 per ton, furnace, eastern Pennsylvania producers showing no inclination to meet the quotations of Southern sellers. Sales of Southern pig iron have been limited to occasional small lots of foundry and some trial shipments of basic bought a number of weeks ago. In many cases consumers are apparently unwilling to change the analysis of iron in their mixture, as the present low prices for Birmingham iron are considered a temporary condition, which will disappear when the present large stocks in the Birmingham district have been reduced. A test of the present price of eastern Pennsylvania iron appears likely from the inquiry of the National Radiator Co., Johnstown, Pa., for 3500 tons of foundry for its Trenton, N. J., plant. No sales of basic have been made since the recent purchase of 10,000 tons by a Claymont, Del., consumer at about $20 per ton, furnace.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil.	$21.76 to $22.26
East. Pa. No. 2X, 2.25 to 2.75 sil.	22.26 to 22.76
East. Pa. No. 1X	22.76 to 23.26
Basic (del'd east. Pa.)	20.25 to 21.00
Gray forge	20.50 to 21.00
Malleable	21.25 to 21.75
Stand. low phos. (f.o.b. N. Y. State furnace)	22.00 to 23.00
Cop. b'r'g low phos. (f.o.b. furnace)	23.50 to 24.00
Va. No. 2 plain, 1.75 to 2.25 sil.	24.04
Va. No. 2X, 2.25 to 2.75 sil.	24.54

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces; $4.54 from Virginia furnaces.

Billets.—Following a few extensions of contracts into third quarter at $34 a ton, Pittsburgh, for rerolling billets, although $36 had been announced as the third quarter contract price, the market has apparently become stable at $35 a ton, Pittsburgh, for rerolling

billets and $40, Pittsburgh, for forging quality. Consumers are reported as well supplied with stocks, and, with shipments coming to them on old contracts, they are in most cases covered for part of this month.

Bars.—Contracting has been slightly less in volume for third quarter, partly because of diminished buying by automobile manufacturers. Deliveries have been reduced to two and three weeks for ordinary specifications. Mills are maintaining a high rate of operation. New contracts are being made at 1.95c., Pittsburgh, or 2.27c., delivered Philadelphia.

Shapes.—Mills have fair backlogs, but deliveries can be had in from one to two weeks, depending upon the specification. Prices are still irregular, ranging from 1.95c. to 2.05c. a lb., f.o.b. nearest mill to consumer, or 2.01c. to 2.11c. a lb., delivered Philadelphia.

Plates.—Third quarter contracting has been substantial, and, if consumers specify as freely as in the past quarter, continued operation at full capacity is expected. Railroads and car builders are providing substantial business. Quotations are unchanged at 2.05c., Coatesville, or 2.15c., delivered Philadelphia.

Sheets.—Although automobile body builders are not buying so freely as in the second quarter, blue annealed sheet prices are being maintained with No. 13 gage at 2.35c. a lb., Pittsburgh, or 2.67c., delivered Philadelphia, and light plates, blue annealed, at 2.20c., Pittsburgh, or 2.52c., Philadelphia for No. 10 gage. Large preferred buyers, such as automobile body builders, usually obtain concessions of $2 a ton or more. Shading of black and galvanized sheet prices is increasing, and sales have been made at 2.85c. to 2.90c. a lb., Pittsburgh, or 3.17c. to 3.22c., Philadelphia, for black and at 3.60c. to 3.65c., Pittsburgh, or 3.92c. to 3.97c., Philadelphia, for galvanized.

Warehouse Business.—June has compared favorably with May in the total of shipments from stock, but the latter part of the month brought a slight decline in business. Prices are well maintained.

Imports.—In the week ended June 29, arrivals of chrome ore at this port totaled 2855 tons, of which 2500 tons was from Portuguese Africa and 355 tons from British India. Imports of Algerian iron ore amounted to 6600 tons. Steel imports consisted of 346 tons of structural shapes, 52 tons of steel bars and 60 tons of steel bands from Belgium, 18 tons of steel rods from Germany, four tons of drill steel from Sweden and 24 tons of steel scrap from the United Kingdom.

Old Material.—No. 1 heavy melting steel is quotable at $16.50 per ton on the basis of recent purchases. The available supply of good No. 1 steel is said by dealers to be sufficient at the present level of prices, but efforts to buy at lower prices result in curtailment of the tonnage secured. Specification pipe has been bought by a Lebanon, Pa., consumer at $15 a ton, delivered, a decline in the price of 50c. a ton. The latest purchase of stove plate by a Harrisburg mill was at $12 a ton, delivered. On a recent sale of steel shafting the price was $19.50 a ton, and this was followed by further small sales at $19 a ton, delivered.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel		$16.50
Scrap T rails		16.00
No. 2 heavy melting steel	$12.50 to	14.00
No. 1 railroad wrought	16.00 to	16.50
Bundled sheets (for steel works)		11.50
Hydraulic compressed, new	14.50 to	15.00
Hydraulic compressed, old	12.00 to	12.50
Machine shop turnings (for steel works)		11.50
Heavy axle turnings (or equiv.)	14.00 to	14.50
Cast borings (for steel works and roll. mill)	11.00 to	11.50
Heavy breakable cast (for steel works)		15.00
Railroad grate bars	12.00 to	12.50
Stove plate (for steel works)	11.50 to	12.00
No. 1 low phos., hvy., 0.04% and under	22.00 to	23.00
Couplers and knuckles	20.00 to	21.00
Rolled steel wheels	20.00 to	21.00
No. 1 blast f'nace scrap	10.50 to	11.00
Wrot. iron and soft steel pipes and tubes (new specific.)		15.00
Shafting	19.00 to	19.50
Steel axles	23.00 to	23.50
No. 1 forge fire		14.00
Cast iron carwheels	16.00 to	16.50
No. 1 cast	16.50 to	17.00
Cast borings (for chem. plant)		14.50
Steel rails for rolling	16.50 to	17.00

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.70c.
Plates, ⅜-in.	2.90c.
Structural shapes	2.70c.
Soft steel bars, small shapes, iron bars (except bands)	2.80c.
Round-edge iron	3.50c.
Round-edge steel, iron finished 1½ x 1½ in.	3.50c.
Round-edge steel, planished	4.30c.
Reinforc. steel bars, sq. twisted and deform.	2.60c. to 2.80c.
Cold-fin. steel, rounds and hex.	3.60c.
Cold-fin. steel, sq. and flats	4.10c.
Steel hoops	3.55c.
Steel bands, No. 12 to ⅛-in. inclus.	3.30c.
Spring steel	5.00c.
*Black sheets (No. 24)	4.10c.
†Galvanized sheets (No. 24)	4.85c.
Light plates, blue annealed (No. 10)	3.25c.
Blue ann'l'd sheets (No. 13)	3.40c.
Diam. pat. floor plates—	
¼-in.	5.30c.
⅜-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

*For 50 bundles or more; 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.
†For 50 bundles or more; 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

Chicago Steel Companies Object to Southwest Rates

Chicago district iron and steel interests, in cooperation with the Chicago Association of Commerce, have filed with Interstate Commerce Commission a brief against attempts by Eastern railroads to discriminate further against the Middle West in rates on iron and steel shipments to the Southwest. Suspension of proposed rates is asked pending further investigation.

The proposed lower tariffs, filed by the New York Central, Pennsylvania, Erie and Baltimore & Ohio, would establish new lower rail-water rates to Louisiana, Oklahoma, Texas and Arkansas from Wheeling, W. Va., and Cleveland, Canton and Youngstown, Ohio. These new schedules on shipments via steamship lines from North Atlantic ports to Gulf ports and the rail lines beyond would be, it is contended, on a lower basis than prescribed by the commission to cover all-rail routes from Chicago.

It is the contention of Chicago interests that no changes should be made in the present rail-water-rail adjustment to the Southwest until the commission decides the general case now pending and involving rates on all freight traffic between the East and Southwest.

Forecast Record Third Quarter in Motor Cars

Completing the greatest first half year of its history, the automotive industry enters the third quarter with every indication that business will continue at a high rate, says *Automotive Industries*, Philadelphia. Many motor car leaders who have made a careful analysis of the market predict that the third quarter will likewise set an all-time production mark when compared with the third quarter of other years. Sales leaders indicate that the demand for new cars is becoming well distributed throughout the country.

New car stocks, which were built up as a result of the record output, apparently reached the peak at the start of the spring selling season, and with a strong retail demand continuing, the number of cars in the field has been gradually reduced as the season progressed. However, there are more cars in the field now than there were a year ago. A large part of the increase can be attributed to Ford, whose stocks at the corresponding period last year were not a factor. Indications are that there is a slight increase in the number of new cars in the field other than Fords, but the increase is so close to the retail demand that the situation as a whole is not alarming.

As in former years, many manufacturers will start to reduce production during July. Manufacturers who are preparing new models for introduction will operate at a high production rate, which will have a tendency to stabilize the production figure of the industry as a whole on a high plane.

An attractive pamphlet of 32 pages has been issued by C. O. Bartlett & Snow Co., 6200 Harvard Avenue, Cleveland, entitled "The Foundry Book." It is designated Bulletin No. 63 and is elaborately illustrated. It describes various types of equipment for mechanically operated foundries, which, it is claimed, result in increased production and decreased costs. Foundry sand conditioning and mold conveying equipment predominates.

Pacific Coast

Steel Demand Continues Active—10,000 Tons of Plates Required for Pipe Line—Prices Steady

SAN FRANCISCO, June 29 (*By Air Mail*).—During the first half of the year awards of cast iron pipe, bars, plates and shapes, as reported each week in THE IRON AGE, exceeded or equalled the aggregate placed during the first half of 1928. A decided increase in the tonnage of plates and shapes booked to date this year was noted over the corresponding period of last year, the totals, as compiled from known projects, being 179,676 tons for the first half of this year and 87,075 tons for the same period a year ago.

Demand continues active. Important developments of the week included the award of 3570 tons of plates for oil storage tanks in Los Angeles and the placing of 4500 tons of shapes for the Shell Oil Building, San Francisco. Prices generally are holding firmly to levels established some time ago.

Pig Iron.—Foundry operations both in the bay district and in the southern part of the State have increased somewhat, and demand for foundry iron is improving. No large sales or inquiries are reported, but importers and dealers say that orders are more numerous. About 1300 tons of Indian iron has arrived on the Coast to be applied against contracts placed some time ago. Prices are unchanged.

Prices per gross ton at San Francisco.

*Utah basic	$25.00 to $26.00
*Utah fdy., sil. 2.75 to 3.25	25.00 to 26.00
**Indian fdy., sil. 2.75 to 3.25	25.00 to 26.00

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Bars.—During the first half of this year 42,100 tons of reinforcing steel bars was reported placed. This compares with 41,834 tons for the same period last year. The largest letting of the week was 2550 tons for the Cushman dam project at Tacoma, placed with an unnamed interest. A paving project in San Diego County, Cal., required 156 tons. Pending business is of fair proportions and includes 256 tons for a bridge over the Salinas River and 208 tons for paving in Alameda County, Cal. In the San Francisco district, 2.20c., base, applies on lots of 250 tons or more, 2.30c., on carload lots and 2.60c. on smaller tonnages. Merchant bar material continues unchanged at 2.35c., c.i.f., though demand is far from active, most sales and inquiries being limited to small lots.

Plates.—Interest this week centers in the call for bids for a 48-in. riveted steel pipe line for the Cedar River project in Seattle, involving 10,000 tons of plates. Bids on this work will be opened July 5. The Western Pipe & Steel Co. took 15 118,000-bbl. oil storage tanks, calling for 5370 tons, for the Texas Oil Co. This company also secured 400 tons for three gas holders for the Pacific Gas & Electric Co. at Hayward, Cal. Prices appear to be firm at 2.35c., c.i.f.

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and struc. shapes	3.15c.
Soft steel bars	3.15c.
Small angles, ¾-in. and over	3.15c.
Small angles, under ¾-in.	3.55c.
Small channels and tees, ¾-in. to 2¾-in.	3.75c.
Spring steel, ¼-in. and thicker	5.00c.
Black sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.80c.
Galv. sheets (No. 24)	5.30c.
Struct. rivets, ½-in. and larger	5.65c.
Com. wire nails, base per keg	$3.40
Cement c't'd nails, 100 lb. keg	3.40

Shapes.—The largest structural award of the week went to the Moore Dry Dock Co. and called for 4500 tons for the Shell Oil Building, San Francisco. The McClintic-Marshall Co. took 850 tons for a Medical-Dental Building in Phoenix and 350 tons for a bridge in San Bernardino, Cal. An overhead crossing at Barstow, Cal., and a viaduct in Tacoma, Wash., were placed, involving 605 tons and 576 tons respectively. New inquiries include 252 tons for two bridges for the Pacific Electric Railway, Los Angeles, and 2700 tons for two hotels in San Francisco. Bids were opened on 630 tons for a bridge over the Salinas River in California. No change in quotations on plain structural shapes is noted, 2.35c., c.i.f., being firm.

Cast Iron Pipe.—The only award of over 100 tons reported this week called for 224 tons of 12-in. Class D pipe for the improvement of Westlake Avenue North, Seattle, Wash., and was placed with Argentieri & Colorossi. B. W. Kuhn was low bidder on 208 tons of 4-in. Class C pipe for the improvement of Coldwater Canyon Road, Los Angeles. The United States Pipe & Foundry Co. was low on 1425 tons of 8-in. Class B pipe for Los Angeles, and the Grinnell Co. was low on 1148 tons of 24-in. Class C pipe for the same city. San Diego, Cal., will open bids on July 8 for 145 tons of 4 to 12-in. Class B pipe. The East Bay Municipal Utility District, Oakland, will open bids on July 3 for 260 tons of 12-in. pipe. Santa Monica, Cal., will open bids on July 18 for 185 tons of 4 to 12-in. Class B pipe.

Coke.—About 5000 tons of English beehive and by-product foundry coke arrived on the Coast this week.

Boston

Pig Iron Prices Still Unsettled—Export Movement of Scrap Gains as Domestic Mills Hold Up Shipments

BOSTON, July 2.—The General Fire Extinguisher Co., Providence, R. I., last week failed to close on 2000 tons of No. 2X and No. 1X pig iron, and action on 2000 tons of three grades of iron wanted by the Chapman Valve Co., Springfield, Mass., has been deferred two weeks, while the General Electric Co. apparently is in no hurry to close on its Lynn and Everett, Mass., third quarter requirements. Consequently the price situation is still more or less unsettled. Sales the past week totaled about 6000 tons, and included 1000 tons for a General Electric Co. New Jersey plant and 750 tons for its Pittsfield, Mass., plant; a round tonnage of malleable for a Bridgeport, Conn., foundry; as well as several 200 and 300 ton lots to various companies. In addition to 2000 tons of No. 2X and No. 1X for Providence, the General Fire Extinguisher Co. will take 500 tons of malleable for its Toronto foundry. A Connecticut maker of fittings recently purchased 1200 tons of Buffalo malleable.

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars, small shapes	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway rounds	6.60c.
Norway squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tie steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold-rolled steel—	
Rounds and hex	*3.55c. to 5.55c.
Spares and flats	*4.05c. to 7.05c.
Toe calk steel	6.00c.
Rivets, structural or boiler	4.50c.

	Per Cent Off List
Machine bolts	50 and 5
Carriage bolts	50 and 5
Lag screws	50 and 5
Hot-pressed nuts	50 and 5
Cold-punched nuts	50 and 5
Stove bolts	70 and 10

*Including quantity differentials.

Foundry iron prices per gross ton deliv'd to most New England points:

*Buffalo, sil. 1.75 to 2.25	$22.41 to $23.41
*Buffalo, sil. 2.25 to 2.75	22.91 to 23.91
East. Penn., sil. 1.75 to 2.25	24.65
East. Penn., sil. 2.25 to 2.75	25.15
Va., sil. 1.75 to 2.25	25.21
Va., sil. 2.25 to 2.75	25.71
Ala., sil. 1.75 to 2.25	21.91 to 23.77
Ala., sil. 2.25 to 2.75	22.41 to 24.27

Freight rates: $4.91 all rail from Buffalo; $3.65 from eastern Pennsylvania; $5.21 all rail from Virginia; $6.91 to $8.77 from Alabama.

*All rail rate.

Reinforcing Bars.—Current sales of billet steel reinforcing bars are in small tonnages. Competition for business is keen, but sellers are holding to 2.66½c. a lb., base, from stock. The market for rail steel bars is quiet, with some withdrawals of prospective tonnages from the market. The open-

ly quoted price for such bars is 2.26½c. per lb., base, delivered common Boston freight rate points.

Cast Iron Pipe.—New Haven, Conn., is reported to have closed on 3000 tons of 42-in. pipe with an Eastern foundry. East Providence, R. I., has bought 120 tons of 6 and 8-in. pipe from the Warren Foundry & Pipe Co. Boston bought 396 ft. of 12 and 16-in. from R. D. Wood & Co. Hopkinton, Mass., closes bids July 9 on 1000 tons of pipe and fittings and will also buy pumping equipment, hydrants, valves and valve boxes. Woodsville, N. H., is about to purchase 1500 tons of 10 and 12-in. pipe, and Ossipee, N. H., will place a round tonnage of 6-in. Salem, Mass., closed bids July 2 on 100 tons of 6 and 8-in. pipe. The market for 4-in. pipe is firm at $47.10 a ton, delivered common Boston freight rate points, and 6 to 12-in. at $43.10, but that for 16 to 20-in. pipe is unsettled at $42.10. A $3 differential is asked on Class A and gas pipe.

Old Material.—The holding up of shipments by three or four Pennsylvania steel mills has slowed down the scrap market somewhat, but, owing to the scarcity of most materials, prices, with the exception of those for pipe, are holding firmly. Rails for rerolling are higher, and there is less of a spread in quotations for forge flashings. The falling off in business for domestic delivery is more than offset by increased activity in the export market. The steamer Emperor, which completed loading 2500 tons of scrap some time ago, last week sailed for Skeltin, Germany; another steamer with 1464 tons cleared June 27 for Danzig. Another steamer will arrive this week to load 3500 tons for Danzig, to be followed by one steamer to load 1500 tons, also for Danzig. Until last week all exports of scrap were by tramp steamers. Arrangement has been made with a regular line of steamers to export approximately 1500 tons monthly or fortnightly to Danzig, depending on the amount of material available.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$12.00 to $12.25
Scrap T rails	11.50 to 12.00
Scrap girder rails	10.50 to 11.25
No. 1 railroad wrought	12.00 to 12.50
No. 1 yard wrought	9.50 to 10.00
Machine shop turnings	6.50 to 6.60
Cast iron borings (steel works and rolling mill)	6.50 to 6.60
Bundled skeleton, long	9.50 to 10.25
Forge flashings	10.00 to 10.50
Blast furnace borings and turnings	6.00 to 6.25
Forge scrap	8.75 to 9.00
Shafting	14.00 to 14.25
Steel car axles	17.00 to 17.50
Wrought pipe 1 in. in diameter (over 2 ft. long)	9.75 to 10.00
Rails for rolling	12.50 to 12.75
Cast iron borings, chemical	10.00 to 10.25

Prices per gross ton deliv'd consumers' yards:

Textile cast	$14.50 to $14.75
No. 1 machinery cast	15.00 to 15.25
No. 2 machinery cast	13.00 to 13.25
Stove plate	11.50 to 12.00
Railroad malleable	18.50 to 19.00

Cincinnati

Pig Iron Consumers Slow to Cover Forward Requirements —Specialty Sheets in Good Demand

CINCINNATI, July 2.—Sales of pig iron in June were well up to the May level, but slightly below the usual end of the quarter volume. Except for a sale of 3000 tons of Northern iron to a southern Ohio melter for second half, orders were for small quantities for third quarter needs. Although Northern iron has been firm at about $18.50, base furnace, continued weakness of Southern iron and the reluctance of some consumers to cover for third quarter requirements have made dealers uneasy, giving the Northern market a slight undertone of softness. Shipments on current contracts in June also were about equal to the May volume, but the demand is expected to slump during July, when melters dispose of surpluses before the annual inventory period. A Michigan consumer is reported to have placed an order for 1000 tons of silvery.

Prices per gross ton, deliv'd Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25	$19.89 to $20.39
Ala. fdy., sil. 1.75 to 2.25	18.69 to 19.19
Ala. fdy., sil. 2.25 to 2.75	19.19
Tenn. fdy., sil. 1.75 to 2.25	19.19
S'th'n Ohio silvery, 8 per cent	27.89 to 28.89

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

Coke.—While the volume of new business for foundry coke during the past month slumped noticeably, specifications on current contracts have been better than in the preceding 30 days.

Finished Material.—A well sustained demand for specialty sheets, especially from electrical manufacturers and for metal furniture, is keeping district mills at capacity production. Following the annual shutdown during this month, the trade anticipates a demand for sheets equal to the capacity of mills. Production of cold-rolled strip is catching up with the demand as a result of a reduction in bookings from automobile manufacturers. Mills are now making deliveries on cold-rolled strip in four to six weeks.

Old Material.—Continued steadiness of prices of scrap iron and steel has brought the market into a firmer position. Shipments against contracts have been sustained, but new business has been in small lots for immediate use.

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel	$13.00 to $13.50
Scrap rails for melting	13.75 to 14.25
Loose sheet clippings	9.25 to 9.75
Bundled sheets	10.50 to 11.00
Cast iron borings	9.00 to 9.25
Machine shop turnings	8.50 to 8.75
No. 1 busheling	10.50 to 11.00
No. 2 busheling	6.75 to 7.00
Rails for rolling	14.50 to 15.00
No. 1 locomotive tires	14.25 to 14.75
No. 2 railroad wrought	13.00 to 13.50
Short rails	18.50 to 19.00
Cast iron carwheels	12.75 to 13.25
No. 1 machinery cast	19.25 to 19.75
No. 1 railroad cast	15.25 to 15.75
Burnt cast	10.25 to 10.75
Stove plate	10.25 to 10.75
Brake shoes	10.25 to 10.75
Railroad malleable	15.25 to 15.75
Agricultural malleable	14.25 to 14.75

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and struc. shapes	3.40c.
Bars, soft steel or iron	3.30c.
New billet reinforc. bars	3.15c.
Rail steel reinforc. bars	3.00c.
Hoops	4.05c.
Bands	3.50c.
Cold-fin. rounds and hex.	3.85c.
Squares	4.35c.
Black sheets (No. 24)	4.05c.
Galvanized sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.45c.
Structural rivets	3.85c.
Small rivets	65 per cent off list
No. 9 ann'l'd wire, per 100 lb.	$3.00
Com. wire nails, base per keg	2.85
Cement c't'd nails, base 100 lb. keg	2.85
Chain per 100 lb	8.75
	Net per 100 Ft.
Lap-weld steel boiler tubes, 2-in.	$16.00
4-in.	33.00
Seamless steel boiler tubes, 2-in.	17.00
4-in.	34.00

Canada

Third Quarter Buying of Pig Iron Gains

TORONTO, ONT., July 2.—New business has gained in the Canadian pig iron markets during the past week or 10 days. A number of large tonnage contracts have been placed. According to local blast furnace representatives, upward of 80 per cent of those who place contracts are now covered for third quarter. Others are coming forward, and it is expected that the majority will have booked up by the end of next week. In addition to those who have placed orders for the entire quarter, a number of melters have made known their requirements for the next six weeks. While forward buying has been active, sales on spot account have slumped. Canadian pig iron prices continue firm. Producers have again introduced the 50c. differential on No. 1 over No. 2 foundry iron, with No. 1 now quoted at $24.60 and No. 2, $24.10, Toronto.

Prices per gross ton:

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75	$24.60
No. 2 fdy., sil. 1.75 to 2.25	24.10
Malleable	24.60
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75	$26.00
No. 2 fdy., sil. 1.75 to 2.25	25.50
Malleable	26.00
Basic	24.50
Imported Iron, Montreal Warehouse	
Summerlee	$33.50
Carron	33.00

Structural Steel.—While the demand for structural steel continues steady and in large total volume, new orders for the week were chiefly confined to lots under 1000 tons. Building activities throughout Canada are brisk and large tonnages of steel are on order. The steel work on the new Canadian Bank of Commerce Build-

ing at Toronto, involving 15,000 tons, will be started almost immediately. Several other large structures are in prospect, and it is estimated that projects to be closed within the next month or six weeks exceed 30,000 tons.

Old Material.—The demand is comparatively small, with new business mostly confined to spot orders. Forward buying is at a standstill. The demand for heavy melting steel and turnings in the Montreal district is on the decline. Iron scrap grades continue to move in fair volume. Prices are firm but unchanged.

Dealers' buying prices:

	Per Gross Ton	
	Toronto	Montreal
Heavy melting steel.	$10.00	$8.50
Rails, scrap	11.00	9.00
No. 1 wrought	10.00	12.00
Machine shop turnings	7.50	5.00
Boiler plate	7.50	6.00
Heavy axle turnings	8.00	7.50
Cast borings	7.50	5.00
Steel turnings	7.50	6.50
Wrought pipe	6.00	6.00
Steel axles	15.00	20.00
Axles, wrought iron	17.00	22.00
No. 1 machinery cast	....	17.00
Stove plate	....	13.00
Standard carwheels	....	16.00
Malleable	....	13.00
	Per Net Ton	
No. 1 mach'ry cast	$16.00	....
Stove plate	12.00	....
Standard carwheels	15.00	....
Malleable scrap	14.00	....

Youngstown

Some Mill Shutdowns for Holiday and Repairs

YOUNGSTOWN, July 2.—Mill schedules for the first week in July are interrupted by suspensions for holiday observance. Mill managers will take advantage of the lull to make repairs to rolling mill equipment. Sheet mills, for the most part, will suspend Wednesday afternoon for remainder of the week. Of 120 sheet mills in the Mahoning Valley, 106 started rolling on Monday.

Strip mills, on the other hand, will suspend for Thursday only and will start again Friday morning. Of the 20 pipe mills in the Valley, 13 started the week and will stop for the Fourth only. Tube mill operations are much better than early in the spring, with an improved outlook for the next few months.

Blast furnace schedules are reduced, owing to the blowing out of No. 4 stack in the Ohio Works group of the Carnegie Steel Co. for relining, leaving 30 of 34 blast furnaces in this area in action.

Independent tin mills suspend for the week in this district. The A. M. Byers Co. likewise suspends its puddle mill operations at the Girard works down for the full week.

The Youngstown Sheet & Tube Co. and the Republic Iron & Steel Co. are maintaining production at between 80 and 90 per cent, with the Carnegie Steel Co. averaging from 85 to 88 per cent.

St. Louis

Southern Price Reduction Stops Pig Iron Buying Movement—Steel Operations Continue Virtually at Capacity

ST. LOUIS, July 2.—The price reduction of 50c. a ton on Southern iron had the effect of abruptly ending a buying movement which began in the preceding week. Melters are now holding off on placing their requirements for third quarter. A leading Southern maker sold 750 tons to various melters at the reduced price. The Granite City maker sold only about 2500 tons, including 1000 tons to a jobbing foundry in Illinois, 800 tons to an implement manufacturer and 450 tons of malleable to a Tennessee melter. Shipments of the Granite City maker for the first 26 days in June averaged 1126 tons daily, compared with 1115 daily in the same period in May.

Finished Iron and Steel.—All departments of the Granite City Steel Co. are being operated at capacity, with the exception of tin plate, on which the rate is 85 to 90 per cent. While the company's specifications for June were not quite as heavy as in May, they were equal to shipments. Demand for galvanized sheets continues good, and this item is expected to show strength during the third quarter. Business in structural steel expected as a result of the settlement of the building strike has not materialized. The Laclede Steel Co. got an order for 300 tons of rail steel reinforcing bars for the Kirkwood Hotel, Des Moines, Iowa. The only pending project is 500 tons of reinforcing bars for a building for Kenrick Seminary, near here.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill.	$20.00
Malleable, f.o.b. Granite City	20.50
N'th'n No. 2 fdy., deliv'd St. Louis	22.16
Southern No. 2 fdy., deliv'd	19.42
Northern malleable, deliv'd	22.16
Northern basic, deliv'd	22.16

Freight rates: 75c. (average) Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

Old Material.—The market for old materials is dull. Dealers complain of a scarcity of material. There is very little coming in from Southern dealers because of hot weather. Railroad lists are light. Consumers are buying, but dealers are unwilling to sell any considerable tonnages at prevailing prices. Railroad lists: Pennsylvania, 46,892 tons; Union Pacific, 2500 tons; Big Four Lines, 1100 tons; Missouri Pacific, 100 carloads; Mobile & Ohio, 26 carloads; Nickel Plate, 32 carloads; Frisco, 14 carloads; Nashville, Chattanooga & St. Louis, 10 carloads.

Dealers' buying prices per gross ton, f.o.b. St. Louis district:

No. 1 heavy melting or shoveling steel	$13.50 to $14.00
No. 2 heavy melting or shoveling steel	12.75 to 13.25
No. 1 locomotive tires	15.00 to 15.50
Miscel. stand.-sec. rails including frogs, switches and guards, cut apart	15.50 to 16.00
Railroad springs	17.00 to 17.50
Bundled sheets	9.50 to 10.00
No. 2 railroad wrought	13.50 to 14.00
No. 1 busheling	10.00 to 10.50
Cast iron borings and shoveling turnings	9.50 to 10.00
Iron rails	15.00 to 15.50
Rails for rolling	16.00 to 16.50
Machine shop turnings	8.00 to 8.50
Heavy turnings	9.75 to 10.00
Steel car axles	19.00 to 19.50
Iron car axles	26.50 to 27.00
Wrot. iron bars and trans.	22.00 to 22.50
No. 1 railroad wrought	13.00 to 13.50
Steel rails, less than 3 ft.	17.50 to 18.00
Steel angle bars	14.25 to 14.75
Cast iron carwheels	14.25 to 14.75
No. 1 machinery cast	15.50 to 16.00
Railroad malleable	15.50 to 16.00
No. 1 railroad cast	15.00 to 15.50
Stove plate	11.50 to 12.00
Agricult. malleable	15.00 to 15.50
Relay. rails, 60 lb. and under	20.50 to 23.50
Relay. rails, 70 lb. and over	26.50 to 29.00

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-fin. rounds, shafting, screw stock	3.75c.
Black sheets (No. 24)	4.25c.
Galv. sheets (No. 24)	5.10c.
Blue ann'l'd sheets (No. 10)	3.45c.
Black corrug. sheets (No. 24)	4.30c.
Galv. corrug. sheets	5.15c.
Structural rivets	3.95c.
Boiler rivets	3.95c.
	Per Cent Off List
Tank rivets, ⅞-in. and smaller, 100 lb. or more	65
Less than 100 lb.	60
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-pressed nuts, sq., blank or tapped, 200 lb. or more	60
Less than 200 lb.	50
Hot-pressed nuts, hex., blank or tapped, 200 lb. or more	60
Less than 200 lb.	50

Detroit Scrap Unchanged

DETROIT, July 2.—There have been no price changes on scrap in this district during the past week. Due to change of models in the automotive industry and the holiday this week, production of old material for the month will probably show 10 to 15 per cent decline, as compared with last month.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Hvy. melting and shov. steel	$13.75 to $14.25
Borings and short turnings	9.00 to 9.50
Long turnings	7.50 to 8.00
No. 1 machinery cast	12.50 to 13.00
Automobile cast	13.00 to 13.50
Hydraul. comp. sheets	13.50 to 14.00
Stove plate	9.00 to 9.50
New No. 1 busheling	12.00 to 12.50
Old No. 1 busheling	11.00 to 11.50
Sheet clippings	8.50 to 9.00
Flashings	12.50 to 13.00

A. M. Byers Co., Pittsburgh, has awarded a contract for design and construction of two special open-hearth tilting slag melting furnaces, for use at its new Ambridge, Pa., plant, to S. R. Smythe Co., Inc., Oliver Building, Pittsburgh.

Birmingham

Pig Iron Inquiries Increase—Light Shrinkage in Some Steel Orders Offset by Gains Elsewhere

BIRMINGHAM, July 2.—Pig iron buying has been on a conservative basis in the 10-day period since books were opened for the third quarter at the base price of $15. Orders have been in moderate lots. The principal development during the past week was a marked increase in inquiries. Several open inquiries involving large tonnages are reported. Negotiations are under way for important tonnages for outside points. Shipments continue in about the same volume, though foundries are working on small stocks. Of the 17 furnaces in blast, nine are on foundry, seven on basic and one on recarburizing iron.

Prices per gross ton, f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil.	$15.00
No. 1 fdy., 2.25 to 2.75 sil.	15.50
Basic	15.00

Finished Steel.—A light shrinkage in orders in some lines is being offset by increases in others. Sheet bookings are beginning to gain with the approach of the regular mid-summer buying period. The Tennessee company has received an order from the Southern Pacific Railroad for 13,168 tons of rails, and inquiries are still numerous. Improvement is reported in railroad accessory buying. Mill operations in the district continue at the same high rate as in June. Several fabricated structural steel orders in lots less than 400 tons have been received. The Ingalls Iron Works Co. has booked an order for 350 tons for the S. H. Kress Co. store at Montgomery, Ala. New orders of the Virginia Bridge & Iron Co. include 300 tons for addition to the Pepperell Mfg. Co. plant at Opelika, Ala.; 120 tons for plant of Cadet Knitting Mills at Columbia, Tenn., and 150 tons for highway bridges in Winston County, Ala. Reinforcing bar demand is up to the average of recent weeks. Twenty-two open hearths are active, the same as a week ago.

Cast Iron Pipe.—A normal run of small orders, interspersed with a few round tonnages from distant points, maintained backlogs through late June. The American Cast Iron Pipe Co. booked an order for about 2200 tons for Los Angeles and shared in the Philippine tonnage to the extent of 4500 tons. Contracts have not been announced on the 6650 tons for New Orleans, for which bids were opened last week. Griffin, Ga., has asked for bids on 1000 tons of 16 to 20-in. pipe. A project at Hollywood, Fla., requiring about 700 tons, has been postponed until July 15. A new order of the United States Pipe & Foundry Co. calls for 3670 ft. of 16-in. and 5810 ft. of 12-in. pipe for Macon, Ga. The base prices of $37 to $38 are unchanged.

Coke.—Nearly all contract buyers have renewed their contracts for third and fourth quarter requirements, and the market is again on a spot basis. Production by merchant ovens is steady at near capacity rates. Prices remain at $5, base.

Old Material.—Stove plate is being quoted at $11.50 to $12, a reduction of $1.50 from the price of the past several weeks. A reduction of 50c. a ton has been made on No. 1 cast, cast iron car wheels and scrap steel rails. Other prices are the same. New business continues at the slow rate that made the June total the lowest for any month of the year.

Prices per gross ton, deliv'd Birmingham dist. consumers' yards:

Heavy melting steel	$12.50
Scrap steel rails	12.50
Short shoveling turnings	9.00
Cast iron borings	9.00
Stove plate	$11.50 to 12.00
Steel axles	21.00
Iron axles	23.00
No. 1 railroad wrought	$10.00 to 10.50
Rails for rolling	14.00 to 15.00
No. 1 cast	13.50
Tramcar wheels	13.00
Cast iron carwheels	12.50 to 13.00
Cast iron borings, chem.	13.50 to 14.00

Buffalo

Pig Iron Market More Active—Steel Operations Show No Falling Off—Scrap Quiet

BUFFALO, July 2.—The pig iron market shows a little more activity. A New York State melter is inquiring for 1500 tons of foundry and malleable, and a radiator manfacturer is seeking 500 to 1000 tons of foundry. A New England company is in the market for 2000 tons of foundry and there are miscellaneous inquiries for 200, 250 and 500 tons. The price in the district is firm at $19.50, base. All of the furnaces have good backlogs.

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and struc. shapes	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.95c.
Cold-fin. flats, sq. and hex.	4.45c.
Rounds	3.95c.
Cold-rolled strip steel	5.85c.
Black sheets (No. 24)	4.20c.
Galv. sheets (No. 24)	4.85c.
Blue ann'l'd sheets (No. 10)	3.50c.
Com. wire nails, base per keg	$3.60
Black wire, base per 100 lb.	3.75

Prices per gross ton, f.o.b. furnace:

No. 2 fdy., sil. 1.75 to 2.25	$19.50
No. 2X fdy., sil. 2.25 to 2.75	20.00
No. 1 fdy., sil. 2.75 to 3.25	21.00
Malleable, sil. up to 2.25	20.00
Basic	18.50
Lake Superior charcoal	27.28

Finished Iron and Steel.—Operations at Buffalo mills show no falling off. Prices are firm and demand is good. Lackawanna, N. Y., will buy 400 tons of structural steel for the Ridge Road bridge. A new elevator will require 400 tons of reinforcing bars. Warehouse business has been very good, particularly in sheets.

Old Material.—A small quantity of No. 1 heavy melting steel was bought at $17.25, but this seems to have been the only outstanding transaction in the past week. No. 1 cast and stove plate are both easier, one of the largest consumers here being idle at present. Consumption of other grades of scrap is holding up very well. Quite a tonnage of No. 2 steel which would ordinarily come to Buffalo has gone to Valley points because of the strong market there. Weirton is offering $16.50.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	$17.00 to $17.25
No. 2 heavy melting steel	14.75 to 15.00
Scrap rails	16.50 to 17.00
Hydraul. comp. sheets	14.50 to 14.75
Hand bundled sheets	12.00 to 12.50
Drop forge flashings	14.75 to 15.00
No. 1 busheling	15.50 to 16.50
Hvy. steel axle turnings	14.00 to 14.50
Machine shop turnings	7.50 to 7.75
No. 1 railroad wrought	13.00 to 13.50
Acid Open-Hearth	
Knuckles and couplers	19.00
Coil and leaf springs	19.00
Rolled steel wheels	19.00
Low phos. billet and bloom ends	20.00 to 20.50
Electric Furnace Grades	
Short shov. steel turnings	12.00 to 12.50
Blast Furnace Grades	
Short mixed borings and turnings	11.00 to 11.50
Cast iron borings	11.00 to 11.50
No. 2 busheling	10.00 to 10.50
Rolling Mill Grades	
Steel car axles	18.75 to 19.25
Iron axles	21.00 to 22.00
Cupola Grades	
No. 1 machinery cast	16.00 to 17.00
Stove plate	12.50 to 13.00
Locomotive grate bars	12.50 to 13.00
Steel rails, 3 ft. and under	19.00 to 19.50
Cast iron carwheels	14.00 to 14.50
Malleable Grades	
Industrial	18.50 to 19.00
Railroad	18.50 to 19.00
Agricultural	18.50 to 19.00
Special Grades	
Chemical borings	12.50 to 13.50

Curtiss, Wright, Keystone Aviation Companies Merge

A merger of the Curtiss Aeroplane & Motor Co., the Wright Aeronautical Corporation and the Keystone Aircraft Co. has been announced. A holding company which will be known as the Curtiss-Wright Corporation, with assets of more than $70,000,000, has been formed to take over the various properties.

Richard F. Hoyt, vice-president of the banking house of Hayden, Stone & Co., New York, and chairman of the Wright Aeronautical Corporation, will be chairman of the board of the new company and C. M. Keys, head of the Curtiss Company, will be president.

Fabricated Structural Steel

Fresh Inquiries, Totaling 37,000 Tons, Largest in Past Month—Awards Aggregate 42,000 Tons

FRESH inquiries for structural steel, totaling about 37,000 tons, were the largest since early in June. Among new projects which appeared during the past week were the Cedar River pipe line at Seattle, Wash., calling for 10,000 tons of plates, and a subway section in Brooklyn requiring 9500 tons. A building for the New York Telephone Co. on West Fiftieth Street, New York, will take 4000 tons. Awards, aggregating more than 42,000 tons, were considerably less than in the previous week. The largest contract consisted of 5370 tons of plates for 15 tanks for the Texas Co. at Los Angeles, Cal. Other major transactions were 4500 tons for an office building at San Francisco, 4000 tons for a bank building at Toledo, Ohio, and 3000 tons for a bridge at Peoria, Ill. Awards follow:

BANGOR & AROOSTOOK RAILROAD, 550 tons, five bridges, to Bethlehem Steel Co.

BOSTON & MAINE RAILROAD, 200 tons, bridge at Lawrence, Mass., to Boston Bridge Works, Inc.

BOSTON, Hyde Park district, 120 tons, Edison Electric Illuminating Co. garage and store room, to unnamed fabricator.

NORTH ADAMS, MASS., 100 tons, James Hunter Machine Co. addition, to Haarmann Steel Co.

STATE OF NEW YORK, 275 tons, highway bridges at Esperance, to McClintic-Marshall Co.

STATE OF NEW YORK, 270 tons, two highway bridges, to American Bridge Co.

NEW YORK, 350 tons, garage on West Sixty-sixth Street, to Easton Structural Steel Co.

HAMILTON, N. Y., 550 tons, chemistry building and chapter house, to Utica Steam Engine & Boiler Works.

STATE COLLEGE, PA., 720 tons, main building for Pennsylvania State College, to Anthracite Bridge Co.

PHILADELPHIA, 800 tons, factory for Proctor & Schwartz, to Shoemaker Bridge Co.

PHILADELPHIA, 740 tons, building for Bank of Philadelphia & Trust Co., to American Fabricators, Inc.

BALTIMORE, 1000 tons, office building for Curtiss-Caproni Corporation, to McClintic-Marshall Co.

MONTGOMERY, ALA., 350 tons, S. H. Kress Co. store, to Ingalls Iron Works.

WINSTON COUNTY, ALA., 150 tons, highway bridges, to Virginia Bridge & Iron Co.

COLUMBIA, TENN., 120 tons, plant of Cadet Knitting Mills, to Virginia Bridge & Iron Co.

BUTLER, PA., 100 tons, bank building, to Guibert Steel Co.

LEECHBURG, PA., 100 tons, bank building, to Guibert Steel Co.

NEW KENSINGTON, PA., 1300 tons, Aluminum Co. of America, to McClintic-Marshall Co.

BUFFALO, 125 tons, National Aniline & Chemical Co., to Lackawanna Steel Co.

GUELPH, ONT., 150 tons, horticultural building for Ontario Agricultural College, to London Structural Steel Co.

LIVERPOOL, N. S., 100 tons for Mersey Power Co., to Dominion Bridge Co.

PERE MARQUETTE RAILROAD, 350 tons, two bridges in Michigan, to American Bridge Co.

FLINT, MICH., 825 tons, addition for Chevrolet Motor Co., to R. C. Mahon.

FLINT, 2400 tons, freight loading equipment for Chevrolet Motor Co. to Whitehead & Kales Co.

GRAND RAPIDS, MICH., 800 tons, school, to Russell Steel Construction Co.

TOLEDO, 4000 tons, Ohio Savings Bank & Trust Co. building, to American Bridge Co.

TOLEDO, 450 tons, Edward Ford Plate Glass Co., to McClintic-Marshall Co.

CHESAPEAKE & OHIO RAILROAD, 250 tons, bridges at Miami, Ohio, to Bethlehem Steel Co.

STATE OF INDIANA, 600 tons, building for Automobile Specialties Mfg. Co., to Indiana Bridge Co.

BALTIMORE & OHIO, 185 tons, bridge in Chicago, to McClintic-Marshall Co.

CHICAGO, 500 tons, Thompson-Starrett Building, to American Bridge Co.

CHICAGO, 500 tons, Hoops Building, to American Bridge Co.

CHICAGO, 1000 tons, garage on Plymouth Court, to unnamed bidder.

CHICAGO, MILWAUKEE, ST. PAUL & PACIFIC, 550 tons, girder spans and track scales, to American Bridge Co.

CHICAGO, 300 tons, addition to Continental Illinois Co. building, to American Bridge Co.

PEORIA, ILL., 3000 tons, bridge, to McClintic-Marshall Co.

MILWAUKEE, 2500 tons, Milwaukee Gas Light Co. building, to Worden-Allen Co.

MILWAUKEE, 400 tons, addition to Cold Spring shops, Milwaukee Electric Railway & Light Co., to Worden-Allen Co.

SOUTH MILWAUKEE, WIS., 200 tons, locomotive shop for Bucyrus-Erie Co., to Worden-Allen Co.

TWO RIVERS, WIS., 400 tons, warehouse for Aluminum Goods Mfg. Co., to Worden-Allen Co.

UNION PACIFIC RAILROAD, 1000 tons, train shed, to Milwaukee Bridge Co.

WEYBURN, SASK., 500 tons, hospital building for Department of Public Works, Regina, to Dominion Bridge Co.

PHOENIX, ARIZ., 850 tons, Medical-Dental Building, to McClintic-Marshall Co.

LOS ANGELES, 5370 tons plates, 15 118,000-bbl. tanks for Texas Oil Co., to Western Pipe & Steel Co.

SAN BERNARDINO, CAL., 350 tons, bridge on La Cadena Street, to McClintic-Marshall Co.

HAYWARD, CAL., 400 tons plates, one 100,000 and two 200,000-cu. ft. gas holders for Pacific Gas & Electric Co., to Western Pipe & Steel Co.

SAN FRANCISCO, 4500 tons, Shell Oil Co. building, to Moore Dry Dock Co.

SACRAMENTO, CAL., 605 tons, overhead crossing at Barstow, to unnamed bidder.

WENATCHEE, WASH., 133 tons, re-decking bridge over Columbia River, to unnamed bidder.

OLYMPIA, WASH., 576 tons, viaduct in Tacoma, to unnamed bidder.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

SALEM, MASS., 300 tons, theater.

BOSTON, 200 tons, River Street bridge.

STATE OF VERMONT, 190 tons, bridges at Jamaica and Warren.

SPRINGFIELD, MASS., 175 tons, high school.

STATE OF NEW HAMPSHIRE, 100 tons, two bridges.

NEW YORK, 4000 tons, building on West Fiftieth Street for New York Telephone Co.

NEW YORK, 6000 tons, office building, Fifty-eighth Street and Fifth Avenue; bids in.

NEW YORK, 3900 tons, additional roadway on Queensborough Bridge; Bersin & Romm, New York, low bidder on second opening.

NEW YORK CENTRAL RAILROAD, 1725 tons, viaduct at 241st Street station; bids in.

PORT CHESTER, N. Y., 400 tons, building for United Hospital; bids in.

BROOKLYN, 9500 tons, subway section; Di Marco & Reimann, New York, general contractor.

STATE OF NEW JERSEY, 5450 tons, bridge over Hackensack River; Strobel Steel Construction Co., Chicago, low bidder on general contract.

STATE OF PENNSYLVANIA, 500 tons, three highway bridges; bids in.

STATE OF PENNSYLVANIA, 350 tons, highway bridge in Luzerne County; Anthracite Bridge Co., low bidder.

PHILADELPHIA, 2850 tons, Ridge Avenue section of subway; bids opened July 19.

DELAWARE, LACKAWANNA & WESTERN RAILROAD, 4000 tons, catenary supports; American Bridge Co., low bidder.

HAMILTON, ONT., 300 tons, secondary school for Board of Education.

LACKAWANNA, N. Y., 400 tons; Ridge Road bridge.

CLEVELAND, 110 tons, building for Energine Refining & Mfg. Co.

CLEVELAND, 200 tons, addition for Reliance Electric & Engineering Co.

MILWAUKEE, 2750 tons, addition to Northwestern Mutual Life office building; Holabird & Roche, Chicago, architects.

MADISON, WIS., 800 tons, bids rejected on field house for University of Wisconsin.

CHICAGO, 600 tons, Ruth automatic garage.

CHICAGO, 800 tons, Blackstone Gift Shop.

CHICAGO, 3600 tons, John R. Thompson Co. building.

BELLEVILLE, ILL., 500 tons, hotel.

SEATTLE, 10,000 tons plates, Cedar River pipe line 48-in. riveted steel; bids July 5.

SACRAMENTO, CAL., 630 tons, bridge over Salinas River; bids opened.

LOS ANGELES, 126 tons, bridge over Los Angeles River for Pacific Electric Railway Co.; bids being taken.

LOS ANGELES, 126 tons, bridge over Tujunga Wash for Pacific Electric Railway Co.; bids being taken.

Illinois Steel Co. to Expand

The United States Steel Corporation has decided to expand the capacity of the Illinois Steel Co., Chicago, in its open-hearth, plate mill and structural mill departments. Details have not yet been fully determined.

The Chicago Steel & Wire Co. has organized a subsidiary, the Fusion Welding Corporation, to sell all the welding rods manufactured by the parent company. Home offices are in Chicago and ten branches have been established. The new corporation will also handle Fuzon welding equipment and accessories.

Non-Ferrous Metal Markets

Copper Quiet But Firm, Tin Inactive, Sales of Lead and Zinc Light, Prices Unchanged

NEW YORK, July 2.

None of the markets is active because of the approaching holiday, but all quotations are firm.

Copper.—Late last week there was a spurt in demand from foreign consumers. On one day sales amounted to 3000 tons and they were fairly large on one or two other days. Since then export demand has fallen off. Domestic consumers continue to buy only what is absolutely necessary. They are well covered through July, and it is evident that they will not purchase August and future requirements until necessary. Foreign consumers are evidently overbought because they did not come into the market for the expected June consumption. As a result, the market in general continues very quiet. Quotations are decidedly firm at the levels that have prevailed for over two months. Electrolytic copper is quoted at 18c., delivered in the Connecticut Valley, with the price of Copper Exporters, Inc., at 18.30c., c.i.f. usual European ports. Present needs are still being met by custom smelters, primary producers being still out of the market. A heavy demand may develop almost any day because foreign consumers must buy considerable metal for July and August, and domestic consumers must cover for future requirements. Some feel that there is danger in this situation in that too large a demand may advance prices. Lake copper is quiet and steady at 18c. to 18.12½c., delivered.

Copper Averages.—The average price of Lake copper for June, based on daily quotations in THE IRON AGE, is 18.12½c., delivered, New York. The average price of electrolytic copper is 17.75c., refinery, or 18c., delivered in the Connecticut Valley.

Tin.—Sales of Straits tin were just under 1000 tons for the week ended Saturday, June 29. Demand is light, and there is practically none for distant futures. Spot tin, because it is plentiful, is selling at a discount, and most of the orders are for spot delivery. Partial statistics, just issued for June, show a decrease in the world's visible supply of 1016 tons. The "London group" continues its purchases and its attempts to support the market, but it has made little progress in advancing prices to 57.50c., as "a stabilized level." The market here today was decidedly in-

THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY

	July 2	July 1	June 29	June 28	June 27	June 26
Lake copper, New York	18.12½	18.12½	18.12½	18.12½	18.12½	18.12½
Electrolytic copper, N. Y.*	17.75	17.75	17.75	17.75	17.75	17.75
Straits tin, spot, N. Y.	44.62½	44.62½	....	44.50	44.37½	44.37½
Zinc, East St. Louis	6.70	6.70	6.70	6.70	6.70	6.70
Zinc, New York	7.05	7.05	7.05	7.05	7.05	7.05
Lead, St. Louis	6.80	6.80	6.80	6.80	6.80	6.80
Lead, New York	7.00	7.00	7.00	7.00	7.00	7.00

*Refinery quotation; price ¼c. higher delivered in the Connecticut Valley.

Rolled Products

Prices on rolled non-ferrous products are unchanged from those prevailing one week ago.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—
- High brass 23.25c
- Copper, hot rolled ..... 26.75c.
- Zinc ..... 10.25c.
- Lead (full sheets) ... 11.00c. to 11.25c.

Seamless Tubes—
- High brass ..... 28.25c.
- Copper ..... 29.25c.

Rods—
- High brass ..... 21.25c.
- Naval brass ..... 24.00c.

Wire—
- Copper ..... 19.87½c.
- High brass ..... 23.75c.

Copper in Rolls ..... 26.75c.

Brazed Brass Tubing ..... 30.87½c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also to St. Louis on shipments to points west of that river.

- Sheets, 0 to 10 gage, 3 to 30 in. wide ..... 33.00c.
- Tubes, base ..... 42.00c.
- Machine rods ..... 34.00c.

Chicago Warehouse

(Prices Cover Trucking to Customers' Doors in City Limits)

Sheets—	Base per Lb.
High brass	23.25c.
Copper, hot rolled	27.75c.
Copper, cold rolled, 14 oz. and heavier	30.00c.
Zinc	10.00c.
Lead, wide	11.90c.
Seamless Tubes—	
Brass	28.25c.
Copper	29.25c.
Brass Rods	21.25c.
Brazed Brass Tubes	31.00c.

New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass	21.12½c. to 22.12½c.
Copper, hot rolled, base sizes	27.75c. to 28.75c.
Copper, cold rolled 14 oz. and heavier, base sizes	30.00c. to 31.00c.
Seamless Tubes—	
Brass	26.00c. to 27.00c.
Copper	29.12½c. to 30.12½c.
Brazed Brass Tubes	29.12½c. to 30.12½c.
Brass Rods	18.87½c. to 19.87½c.

New York Warehouse

Delivered Prices, Base Per Lb.

- *Zinc sheets (No. 9), casks* ..... 10.50c. to 11.00c.
- *Zinc sheets, open* ..... 11.50c. to 12.00c.

Metals from New York Warehouse

Delivered Prices, Per Lb.

- Tin, Straits pig ..... 46.50c. to 47.50c.
- Tin, bar ..... 48.50c. to 49.50c.
- Copper, Lake ..... 19.50c.
- Copper, electrolytic ..... 19.25c.
- Copper, casting ..... 19.00c.
- Zinc, slab ..... 7.75c. to 8.25c.
- Lead, American pig ..... 7.75c. to 8.25c.
- Lead, bar ..... 9.75c. to 10.25c.
- Antimony, Asiatic ..... 10.50c. to 11.00c.
- Aluminum No. 1 ingots for remelting (guaranteed over 99% pure) ..... 25.00c. to 26.00c.
- Alum. ingots, No. 12 alloy, 24.00c. to 25.00c.
- Babbitt metal, commercial grade, 30.00c. to 40.00c.
- Solder, ½ and ½ ..... 30.00c. to 31.00c.

Metals from Cleveland Warehouse

Delivered Prices Per Lb.

- Tin, Straits pig ..... 49.63c.
- Tin, bar ..... 51.63c.
- Copper, Lake ..... 19.50c.
- Copper, electrolytic ..... 19.25c.
- Copper, casting ..... 18.75c.
- Zinc, slab ..... 7.75c. to 8.00c.
- Lead, American pig ..... 7.75c. to 8.00c.
- Lead, bar ..... 10.00c.
- Antimony, Asiatic ..... 16.00c.
- Babbitt metal, medium grade ..... 19.00c.
- Babbitt metal, high grade ..... 53.75c.
- Solder, ½ and ½ ..... 31.25c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged customers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	14.50c.	16.00c.
Copper, hvy. and wire	14.25c.	15.625c.
Copper, light and bottoms	12.50c.	13.50c.
Brass, heavy	8.50c.	9.50c.
Brass, light	7.50c.	8.50c.
Hvy. machine composition	11.50c.	12.75c.
No. 1 yel. brass turnings	9.25c.	10.00c.
No. 1 red brass or compos. turnings	11.25c.	12.25c.
Lead, heavy	5.50c.	6.00c.
Lead, tea	4.50c.	5.50c.
Zinc	3.50c.	4.25c.
Sheet aluminum	14.00c.	16.00c.
Cast aluminum	12.25c.	14.25c.

active, with spot Straits tin quoted at 44.62½c., New York. Prices in London today were a little higher than a week ago, with spot standard quoted at £201 15s., future standard at £205 and spot Straits at £205 10s. The Singapore market today is £208.

Lead.—Prices continue unchanged and firm at 6.80c., St. Louis, and 7c., New York, the latter being the contract quotation of the leading interest. Consumers are limiting their inquiries and purchases to cover carload lots for immediate needs. The order books of producers are comfortably filled, and there is no need to press sales.

Zinc.—Prime Western zinc, which has developed considerable firmness in recent weeks, continues steady, though demand could be considerably better. Such sales as are made are mostly at 6.70c., East St. Louis, though some factors which were at this level a week ago are asking 6.75c., and one or two others have made sales at 6.80c. The tendency continues upward. Ore prices were again unchanged last week at $44, Joplin. Output was large at about 13,000 tons, and shipments nearly equaled this at 12,856 tons, the largest since April. Surplus stocks of ore are estimated at about 37,100 tons at the end of June, compared with about 34,000 tons at the end of May and with about 20,800 tons at the end of April.

Antimony.—There has been practically no change in demand or prices, and Chinese metal is still quoted at 8.75c., New York, duty paid, for all positions.

Nickel.—Ingot nickel in wholesale lots is quoted at 35c. per lb., with shot nickel at 36c. and cathodes of electrolytic nickel at 35c.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is obtainable at the published price of 23.90c. per lb., delivered.

Non-Ferrous Metals at Chicago

CHICAGO, July 2.—Prices for copper are higher while quotations for antimony are lower. New buying is spotty and shipments against old orders are lighter. The old metal market is quiet.

Prices per lb., in carload lots: Lake copper, 18.50c.; tin, 45.62½c.; lead, 6.90c.; zinc, 6.80c.; in less-than-carload lots: antimony, 9.75c. On old metals we quote copper wire, crucible shapes and copper clips, 14c.; copper bottoms, 11.50c.; red brass, 11.50c.; yellow brass, 8c.; lead pipe, 4.50c.; zinc, 3.25c.; pewter, No. 1, 24.50c.; tin foil, 26c.; block tin, 36c.; aluminum, 12.87½c.; all being dealers' prices for less-than-carload lots.

Reinforcing Steel

Awards of 5600 Tons — New Projects Smallest in Weeks

MORE than two-thirds of the total tonnage booked in the past week went into two jobs. The Cushman project at Tacoma, Wash., will require 2550 tons of reinforcing bars and an automobile storage building at New York for the New York Central Railroad will take 1400 tons. The remainder of the week's total of about 5600 tons consisted of small contracts. Fresh inquiries were the lowest in many weeks, amounting to less than 1700 tons. Awards follow:

NEW YORK, 1400 tons, automobile storage building for New York Central Railroad at West End Avenue and Sixty-fifth Street, to Jones & Laughlin Steel Corporation.

PENNSYLVANIA RAILROAD, 300 tons, warehouse in Philadelphia at Thirty-first and Chestnut Streets, to Gilmour-Roslyn Steel Co.

CEMENTON, PA., 225 tons, building for Whitehall Cement Mfg. Co., to Jones & Laughlin Steel Corporation.

EVANSTON, ILL., 285 tons, Illinois Bell Telephone Co. building, to Concrete Steel Co.

CHICAGO, 110 tons, apartment building at 1242 Lake Shore Drive, to Joseph T. Ryerson & Sons.

CHICAGO, 400 tons, Goldblatt store, to Kalman Steel Co.

DES MOINES, IOWA, 300 tons, Hubbel Hotel, to Laclede Steel Co.

TACOMA, WASH., 2550 tons, Cushman project, unit No. 2, to unnamed bidder.

SACRAMENTO, 156 tons, paving in San Diego County, to unnamed bidder.

GLENDALE, 140 tons, apartment building, 132 South Orange Street, to unnamed bidder.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

NEW YORK, 200 tons, building at Mitchell Flying Field.

BUFFALO, 400 tons; cooperative elevator.

CLEVELAND, 200 tons, parcel post station.

WARREN, OHIO, 150 tons, highway bridge.

ST. LOUIS, 500 tons, boys' preparatory school for Kenrick Seminary; bids opened July 15.

SACRAMENTO, 208 tons, paving in Alameda County; bids July 17.

Railroad Equipment

Pennsylvania Expected to Buy 4000 More Car Bodies

THE railroad equipment market has been quiet the past week, and few sales and inquiries were made. The Buffalo & Susquehanna has ordered 200 50-ton steel hopper cars, while the Northern Pacific has purchased 100 flat cars. The Pennsylvania, which contracted for the construction of 4000 steel box car bodies a week ago, is expected to buy an additional 4000 soon. Details of the week's business follow:

Buffalo & Susquehanna has ordered 200 50-ton steel hopper cars from Pressed Steel Car Co.

Pennsylvania Railroad, which ordered 4000 steel box car bodies, as reported a week ago, is expected to order an additional 4000 soon.

Carnegie Steel Co. has ordered 22 gondola car bodies from Greenville Steel Car Co.

General Chemical Co. is inquiring for 46 tank cars.

Northern Pacific has ordered 100 flat cars from Pressed Steel Car Co., in addition to 200 recently reported.

Ford Motor Co. will buy six eight-wheel switching locomotives.

Timken Roller Bearing Co. has ordered an experimental locomotive from American Locomotive Co.

Obituary

WILLIAM M. JEFFERYS, director and superintendent of the Hanging Rock Iron Co., and also superintendent of the Union Iron Furnace, Ironton, Ohio, died at his home in Hanging Rock, Ohio, June 17. He had been connected with the Hanging Rock Iron Co. since 1901, when he joined the company as manager and superintendent of the Hamilton furnace. In April, 1928, he purchased the property of the company.

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CHARLES H. DOELGER, one of the founders and senior member of Doelger & Kirsten, Milwaukee, manufacturers of alligator shears, died June 25 following an illness of six months. He was born in Milwaukee in 1865, and in partnership with Oscar F. Kirsten, established a machine shop in 1889, which for thirty years has been devoted exclusively to the production of all-steel shearing equipment. The company will continue with no changes in personnel.

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IRVING J. BUDLONG, formerly head of the American Woodworking Machinery Co., died June 17 at his home in Saginaw, Mich., aged 60 years. Mr. Budlong at the time of his death was vice-president of the Merchon Mfg. Co., Saginaw.

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MORRIS L. FOX, president, Pioneer Iron & Metal Co., and a resident of Racine, Wis., for thirty years, died June 27, aged 65 years.

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EDWARD J. CARNES, president, E. J. Carnes Co., Medford, Mass., steel erector died suddenly at his home on June 30. Prior to the formation of the E. J. Carnes Co., he was for many years in charge of erecting for the New England Structural Co.

100,000 Tons of Steel Pipe Awarded

The A. O. Smith Corporation and National Tube Co. each have been awarded 50,000 tons of steel pipe for the Birmingham-Atlanta gas line.

Foundations for a battery of 70 new coke ovens have been completed at the Indiana Harbor, Ind., plant of the Inland Steel Co., Chicago.

PERSONAL

F. A. MERRICK, formerly vice-president and general manager, has been elected president of the Westinghouse Electric & Mfg. Co., East Pittsburgh, succeeding E. M. HERR, who has been made vice-chairman of the

F. A. MERRICK

E. M. HERR

board of directors. He is a graduate of Lehigh University, Bethlehem, Pa., and soon afterward became associated with the Steel Motors Co., a subsidiary of the Lorain Steel Co., as manager and chief engineer. When the Steel Motors Co. was acquired by the Westinghouse company, he was made superintendent of the Canadian Westinghouse Co. Ltd., and assisted in its organization. He later became vice-president and general manager of the Canadian company. During the World War Mr. Merrick was assigned to organize the operations of the New England Westinghouse Co. After the war he was located in London for two years as special representative of the Westinghouse Electric International Co., and then returned to Canada to resume his duties as vice-president and general manager of the Canadian company. He has been a director of the company since 1925, at which time he was elected vice-president and general manager. Under Mr. Merrick's direction, the various Westinghouse plants were reorganized as separate units for greater efficiency.

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ROBERT E. BELKNAP has resigned as New England manager of the Bethlehem Steel Co. He was appointed to that position in 1922, following the acquisition of the Lackawanna Steel Co. and the Midvale Steel Co. by the Bethlehem Steel Co. He started in the steel business with the Pennsylvania Steel Co., first at New York and subsequently at Chicago. Mr. Belknap has been in poor health for some time and he plans to take a long rest before engaging in business again. He is succeeded as manager by ROBERT B. WALLACE. Mr. Wallace was manager of the company's New England business prior to Mr. Belknap, and is one of the most widely known steel men in New England. He has been connected with the Bethlehem Steel Co. for 19 years, for seven years as salesman and from 1917 until 1922 as sales agent. In recent years he served as sales manager of structural steel and plates. THOMAS DRANSFIELD, sales engineer for the past two years in the Boston office, succeeds Mr. Wallace as manager of structural steel and plate sales.

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E. F. MYERS has been elected president of the Ironton Fire Brick Co., Ironton, Ohio. Other officers are W. P. Lewis and C. E. Bales, vice-presidents, and W. D. Lewis, secretary.

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C. A. DUNN, Detroit, has been elected to the board of directors of the Appleton Steel Tube Co. Appleton, Wis. He succeeds HUGH G. CORBETT, of Kenosha, Wis., who recently resigned.

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H. M. FOSTER, for the past 10 years with Wheelock-Lovejoy & Co., Cambridge, Mass., and for a number of years New York district sales manager, has been appointed general manager of sales of the Rhinegold Steel Products Co., 225 Broadway New York, agent in the United States for the Gewerkschaft Rheingold, Düsseldorf, Germany, distributer of special steels made by Stahlwerk Becker A. G., Willich, near Krefeld.

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SAMUEL C. REBMAN has resigned his position as New York representative of the Sweets' Steel Co., Williamsport, Pa., to become as of July 1 manager of sales of tubing and allied products for the Danville Structural Steel Co., of Danville, Pa. Mr. Rebman was for many years with the Danville Structural Tubing Co., but severed that connection in 1926. In 1928 the business was reorganized as the Danville Structural Steel Co., and an extensive program of building and expansion was begun.

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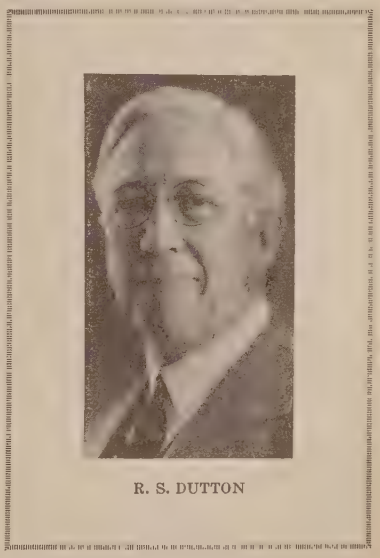
R. S. DUTTON, who for 35 years has been with the firm of Pickands, Brown & Co., Chicago, retired July 1. He will continue to make his home in Chicago but plans to occupy much of his time in traveling. Mr. Dutton went to Chicago in 1890 and accepted a position with the Illinois Steel Co. at the old Union works, which has been dismantled. At that time Robert Forsythe was general manager. In 1891 he was transferred to the cost department at South Works. One year later he entered the office of H. A. Gray, comptroller for the Illinois Steel Co. He accepted the position of bookkeeper for Pick-



R. S. DUTTON

ands, Brown & Co. in 1895. Later he became cashier for the company, and in 1911 he was made manager of sales, the position he occupied at the time of his retirement. In the intervening 35 years he watched the office force grow from six to more than 75. Mr. Dutton is succeeded by SNELLING S. ROBINSON, who has been assistant manager of sales since October, 1928. Mr. Robinson went to Chicago from the Erie, Pa., office of Pickands, Mather & Co.

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JOHN V. W. REYNDERS, New York, sailed June 27 on the Olympic for a brief business trip to England and the Continent, and expects to return shortly after Aug. 1.

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W. EARLE PASHLEY has been elected second vice-president and a director of the C. F. Pease Co., Chicago, manufacturer of blue-printing machinery.

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W. C. SUTHERLAND, who has been general superintendent, Pittsburgh

Steel Co., Pittsburgh, has been appointed assistant to the president of the company, succeeding the late A. R. MAXWELL. He went with the company 12 years ago, having previously been identified with the Illinois Steel Co. at its Gary, Ind., works. After serving for a time as superintendent, Allenport, Pa., works, of the Pittsburgh company, he went with the Pittsburgh Steel Products Co. in a similar capacity, and when the manufacturing departments of the two companies were combined, he was made general superintendent. He has been succeeded in this position by D. P. KING, recently assistant superintendent. Mr. King has been with the company for 28 years, having served continuously in the operating departments.

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O. H. ESCHHOLZ has been appointed manager of the patent department, Westinghouse Electric & Mfg. Co., East Pittsburgh, succeeding O. S. SCHAIRER, who has resigned to go with the Radio Corporation of America New York, in a similar capacity. Mr. Eschholz was graduated from the Worcester Polytechnic Institute, Worcester, Mass., in 1910, and immediately became associated with the Westinghouse company. He has been prominently identified with the electric arc-welding activities of the company, and during the war participated in the work of the welding committee of the Emergency Fleet Corporation. In 1924 he became production engineer for the Standard Gauge Steel Co., Beaver Falls, Pa., but returned to Westinghouse the following year to enter the patent department.

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WILLIAM G. MARSHALL, since 1926 director of personnel for the Philadelphia Co. and affiliated corporations, has been appointed assistant to T. P. Gaylord, vice-president of the Westinghouse Electric & Mfg. Co., East Pittsburgh, and will be in charge of employee relations. He is a graduate of Washington and Jefferson College, Washington, Pa., and of the University of Pittsburgh law school. He has been identified with the Philadelphia Co. for the past 10 years.

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H. W. NEWTON, who has been connected with the Stephens-Adamson Mfg. Co., Aurora, Ill., for several years as a designing engineer, has been appointed district manager of the Birmingham office of the company, succeeding W. E. HARRIS.

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W. H. KAY has been appointed district sales manager at Kansas City for the Surface Combustion Co., Toledo. He has been associated with the company for several years, first in the erection department and then in the estimating and sales departments.

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E. F. TALMAGE, formerly with the Halcomb Steel Co., at Cleveland, has become Chicago district sales manager of the Timken Steel & Tube Co., with headquarters at 360 North Michigan Avenue.

MAGNUS W. ALEXANDER, president, National Industrial Conference Board, New York, sailed June 29 on the Statendam for the Netherlands, to keep an engagement to address the fifth general congress of the International Chamber of Commerce at Amsterdam, on July 9, on "International Industrial Statistics as an Aid to World Progress." He is chairman of the American National Committee of the International Chamber for the development of international industrial statistics.

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HARRY HOLIDAY, general manager of sales of the American Rolling Mill Co's. forged steel wheel division, has been appointed general superintendent of Butler works, Butler, Pa., the company's Columbia division. Mr. Holiday joined Armco in 1923 as assistant to the vice-president, in charge of construction of steel works. Later he was appointed assistant to the president, and after the Columbia Steel Co. was purchased, he was elected a vice-president of that division. He has been general manager of sales since December, 1927, with headquarters in Pittsburgh.

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JOHN A. TOPPING, chairman, Republic Iron & Steel Co., was injured in a taxicab collision in Washington on Tuesday of last week. He was taken to a hospital, where three stitches were taken in a cut in his forehead. He is now back at his office at 17 Battery Place, New York. Mr. Topping was in Washington to testify on behalf of the American Iron and Steel Institute at a hearing on the metal tariff schedules.

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GEORGE H. WALKER, president, W. A. Harriman & Co., and WILLIAM F. CUTLER, vice-president, American Brake Shoe & Foundry Co., have been elected directors of the National Bearing Metals Corporation.

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ROBERT R. BRIDGMAN has been appointed manager of the Buffalo office of the O'Brien Steam Specialty Co., Syracuse. He is a graduate of Cornell University, and recently has been with the Stewart Motor Corporation of Buffalo as engineer in charge of Bendix four-wheel brakes. The company's Buffalo office is at 333 Jackson Building.

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WILLIAM ROBBINS has been appointed district manager in charge of the Chicago office of the Chisholm-Moore Hoist Corporation, Tonawanda, N. Y.

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J. MARVIN DOYLE, who has been engaged in the sheet and tin plate trade for the past 20 years, has severed his connection with Dickerson, Van Dusen & Co., New York.

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C. E. POSTLEWAITE has been appointed assistant vice-president and F. O. SCHRAMM general sales manager of the Pressed Steel Car Co., effective July 1.

A. A. Stevenson Retires from Standard Steel Works Co.

ON July 1, A. A. Stevenson retired from the vice-presidency of the Standard Steel Works Co., Burnham, Pa., after 41 years of continuous service with that company. He successively occupied the position of traveling engineer, which he assumed Aug. 1, 1888; manager of wheel department in 1893; engineer in 1898; assistant superintendent in 1901; superintendent in 1903; vice-president in 1908; vice-president and engineer in 1917 and vice-president in charge of manufacture since 1920.

He entered the employ of Southwark Foundry & Machine Co., Philadelphia, as draftsman in July, 1881, remaining there until March, 1886, when he was foreman of the drafting room. He then went to Cambria Steel Co., Johnstown, Pa., as draftsman in the chief engineer's office. In July, 1887, he was made foreman of the forge and axle plant, and a year later he joined the Standard company.

A. A. STEVENSON

Mr. Stevenson has been active in various technical and engineering societies. He was the first chairman of the iron and steel committee of the American Institute of Mining Engineers, appointed in June, 1908, and was elected vice-president of the Association of American Steel Manufacturers in March, 1909, becoming president in March, 1911, holding that position for three years. He became a member of the executive committee of the American Society for Testing Materials in October, 1911, and was elected vice-president in 1914, serving two years, and in 1916 he was elected president. At the annual convention of the A. S. T. M. at French Lick, Ind., in June, 1927, Mr. Stevenson was made an honorary member of the society. Mr. Stevenson will continue to carry on many of the technical activities in which he has been engaged for several years, including that of the American Standards Association, of which he is past chairman.

Exports Running Far Above 1928

Total in Five Months Up 23 Per Cent; Rolled and Finished Steel, 25 Per Cent Higher—Imports 10 Per Cent Less in 1929

WASHINGTON, July 27.—The decline of 16,064 gross tons in iron and steel exports of the United States in May to 261,516 tons, from 277,580 in April, as noted in THE IRON AGE of June 27, was reflected in several lines, while the increase of imports to 74,272 tons from 54,337 tons, an upturn of 19,935 tons also made in a number of products, was apparently due to possible increases in tariff duties. The average daily movement of exports during the 30 days of June was 8711 tons, against an average of 8954 tons during the 31 days of May. The average daily receipts were 2476 tons in May, against 1811 tons in April.

For the five months of the current year exports showed a sharp increase over the corresponding period of last year, the respective totals being 1,344,028 tons and 1,096,595 tons. A contrary situation characterized the import movement. Incoming shipments for the first five months of the current year aggregated only 294,210 tons, against 327,486 tons for the corresponding period of 1928.

Where the Chief Sales Were Made

More than one-fifth of the export movement in June was in scrap, 55,916 tons going abroad, distributed among principal consuming countries as follows: Japan, 12,295 tons; Canada, 11,273 tons; Poland, 11,069 tons; and Italy 10,399 tons. Exports of plain structural material rose to 30,331 tons in May (20,790 tons in April), and Canada took 28,570 tons. Of the 20,185 tons of plates exported in May (18,006 tons in April) Canada took 18,291 tons. Canada also took the bulk of the 15,244 tons of skelp exported in May. This movement reflected an increase of 3867 tons over that of April.

Tin plate exports declined to 14,537 tons in May (25,991 tons in April). In May Canada took 4051 tons; Japan, 2310 tons; Mexico, 1228 tons; and Argentina, 1171 tons. Of the 13,740 tons of black steel sheets exported in May (14,615 tons in April), 9532 tons went to Canada and 1643 tons to Japan. Exports of galvanized sheets in May dropped to 11,342 tons from 14,404 tons. Of the May shipments, 2810 tons went to Canada; 1508 tons to the Philippine Islands and 1146 tons to Mexico.

Steel bar exports in May were 14,720 tons (22,032 tons in April), ship-

Exports of Iron and Steel from the United States

(In Gross Tons)

	May		Five Months Ended May	
	1929	1928	1929	1928
Pig iron	8,088	3,701	27,689	19,655
Ferromanganese	88	1,060	909	4,523
Scrap	55,916	59,633	206,904	186,213
Pig iron, ferroalloys and scrap	*64,092*	*64,394*	*235,502*	*210,391*
Ingots, blooms, billets, sheet bar	6,704	1,386	20,852	9,544
Skelp	15,244	17,335	40,121	42,086
Wire rods	3,197	3,551	20,286	13,711
Semi-finished steel	*25,145*	*22,272*	*81,259*	*65,341*
Steel bars	14,720	13,726	100,371	56,952
Alloy steel bars	974	1,877	10,469	6,216
Iron bars	341	255	2,583	1,660
Plates, iron and steel	20,185	13,163	89,656	57,197
Sheets, galvanized	11,342	14,175	73,816	64,635
Sheets, black steel	13,740	15,272	77,045	71,088
Sheets, black iron	1,526	1,203	6,172	5,876
Hoops, bands, strip steel	6,233	6,282	36,583	22,877
Tin plate; terne plate	14,537	22,462	118,080	102,823
Structural shapes, plain material	30,331	18,498	114,598	70,517
Structural material, fabricated	6,652	7,181	47,308	30,820
Steel rails	10,499	18,251	78,177	96,641
Rail fastenings, switches, frogs, etc.	2,318	2,637	13,824	25,576
Boiler tubes	1,613	1,260	8,274	6,957
Casing and oil-line pipe	7,314	10,193	64,465	44,299
Black and galvanized welded pipe	8,327	8,994	56,212	43,477
Malleable iron screwed pipe fittings	701	694	5,148	3,494
Plain wire	3,518	3,808	22,348	19,015
Barbed wire and woven wire fencing	5,409	7,156	29,293	31,426
Wire cloth and screening	142	119	762	680
Wire rope	505	402	3,184	2,148
Wire nails	513	1,830	7,006	7,307
Other nails and tacks	537	772	4,421	4,167
Horseshoes	8	37	138	179
Bolts, nuts, rivets and washers, except track	1,234	1,227	6,921	5,219
Rolled and finished steel	*163,219*	*171,474*	*976,854*	*781,246*
Cast iron pipe and fittings	2,729	3,447	13,678	14,261
Car wheels and axles	1,584	1,501	11,019	5,922
Iron castings	1,174	1,030	6,264	5,630
Steel castings	1,011	1,180	5,060	4,428
Forgings	996	1,379	6,550	3,677
Castings and forgings	*7,494*	*8,537*	*42,571*	*33,918*
All other	1,566	1,213	7,842	5,699
Total	261,516	267,890	1,344,028	1,096,595

Imports of Iron and Steel into the United States

(In Gross Tons)

	May		Five Months Ended May	
	1929	1928	1929	1928
Pig iron	14,393	9,732	62,065	63,496
Ferromanganese*	4,756	5,094	27,050	18,535
Ferrosilicon†	733	133	3,576	1,345
Ferrochrome‡	121	38	220	262
Scrap	6,837	3,961	36,615	15,129
Pig iron, ferroalloys and scrap	*26,840*	*18,958*	*129,526*	*98,767*
Steel ingots, blooms, billets and slabs	2,863	3,712	10,712	9,816
Wire rods	2,778	1,824	7,260	8,298
Semi-finished steel	*5,641*	*5,536*	*17,972*	*18,114*
Rails and splice bars	744	863	1,728	6,364
Structural shapes	14,744	16,010	56,333	74,404
Boiler and other plates	75	482	2,350	942
Sheets and saw plates	3,199	3,247	8,164	12,729
Steel bars	3,912	9,681	15,102	44,576
Bar iron	222	118	1,311	933
Hoops, bands and cotton ties	5,039	1,722	11,433	12,536
Tubular products (wrot.)	4,170	4,125	18,024	18,282
Nails, tacks, staples	1,099	821	3,461	3,155
Tin plate	23	384	115	550
Bolts, nuts, rivets and washers	11	39	104	126
Round iron and steel wire	467	239	2,971	1,688
Barbed wire	360	308	2,353	1,566
Flat wire; strip steel	346	332	941	1,073
Steel telegraph and telephone wire	.....	82	.....	118
Wire rope and strand	206	121	1,008	619
Other wire	77	46	264	277
Rolled and finished steel	*34,694*	*38,620*	*126,162*	*179,938*
Cast iron pipe	6,907	9,150	19,595	28,992
Castings and forgings	190	214	955	1,675
Total	74,272	72,478	294,210	327,486
Manganese ore*	27,767	16,449	112,849	71,267
Iron ore	275,762	211,270	1,223,783	1,079,520
Magnesite (dead burned)	.....	1,871	8,599	15,184

*Manganese content only.
†Silicon content only.
‡Chromium content only.

Destination of Iron and Steel Exports from the United States

(In Gross Tons)

Country of Destination	May, 1929	January Through May 1929	January Through May 1928
North and Central America and West Indies	*150,930*	*675,302*	*526,167*
Canada and Newfoundland	134,559	558,558	434,287
Cuba	5,031	31,728	25,902
Guatemala	472	3,492	5,297
Honduras	636	5,991	3,522
Mexico	6,870	35,209	31,824
Panama	1,170	9,181	7,061
Salvador	184	3,979	1,217
British West Indies	471	10,723	3,357
Other West Indies	998	12,257	10,451
Other Central America	539	4,184	3,249
South America	*21,421*	*188,295*	*184,068*
Argentina	5,700	45,367	39,372
Brazil	4,322	28,835	39,677
Chile	2,930	28,962	34,147
Colombia	2,354	22,007	29,517
Peru	829	15,307	11,057
Uruguay	288	5,067	3,657
Venezuela	4,263	40,124	23,803
Other South America	735	2,626	2,838
Europe	*42,079*	*161,053*	*107,845*
Belgium	80	1,635	6,404
France	783	8,290	1,962
Germany	4,412	11,958	11,258
Italy	12,945	53,937	30,639
Netherlands	193	1,346	1,151
Poland and Danzig	11,075	40,356	23,046
Rumania	232	1,623	1,271
Soviet Russia	88	1,953	1,402
United Kingdom	5,595	25,856	21,503
Other Europe	6,676	14,099	9,209
Far East	*45,296*	*310,536*	*272,256*
British Malaya	517	4,323	3,281
China	3,321	36,764	50,666
Netherlands East Indies	1,798	33,552	11,135
India and Ceylon	1,809	9,806	12,194
Japan	29,661	159,184	141,135
Kwantung	118	7,262	2,905
Philippine Islands	5,031	41,973	40,777
Australia	1,734	8,854	5,991
New Zealand	704	2,569	952
Other Asia and Far East	603	6,249	3,170
Africa	*1,790*	*8,842*	*6,259*
Union of South Africa	817	3,164	2,792
Egypt	533	4,095	2,461
Mozambique	436	816	320
Other Africa	4	767	686
Total	261,516	1,344,028	1,096,595

ments going largely to Canada, which took 9802 tons; Japan, 1677 tons; United Kingdom, 1077 tons. Of the 10,499 tons of rails exported in May, 3690 tons went to Canada and 2047 tons to Japan.

Whence the Chief Incoming Supplies

Structural shapes constituted the largest item of importation in May, amounting to 14,744 tons (12,300 tons in April), of which 5865 tons came from Belgium, 5117 tons from Germany and 3542 tons from France. Pig iron imports rose to 14,393 tons in May (6693 tons in April), coming largely from the United Kingdom, British India and the Netherlands. Of the 6907 tons of cast iron pipe imported in May, 6003 tons came from France and 716 tons from Belgium.

Belgium supplied 2397 tons; Germany, 1239 tons, and France, 944 tons of the 5039 tons of hoops, bands and cotton ties, imported in May. Imports of wrought pipe, largely seamless tubes totaled 4170 tons, of which Germany furnished 2691 tons; Canada 404 tons; United Kingdom, 351 tons; Sweden 318 tons; and France, 315 tons.

UNITED STATES IMPORTS OF IRON AND STEEL PRODUCTS

(In Gross Tons)

	May	April
Austria	60	24
Belgium	13,577	10,015
Czechoslovakia	55	30
France	12,281	5,744
Germany	15,579	11,031
Italy	256	310
Netherlands	3,066	1,261
Norway	291	3,217
Sweden	3,927	3,483
Switzerland	59	19
United Kingdom	9,517	5,981
Europe	*58,668*	*41,115*
Canada	10,982	11,226
Mexico	32	31
Cuba	0	61
Virgin Islands	0	75
British India	4,314	1,826
British Malaya	275	0
Japan	1	3
Total	74,272	54,337

Of the 4756 tons of ferromanganese imported 3090 tons came from Canada and 1425 tons from the United Kingdom. Soviet Russia furnished 20,375 tons of the 27,767 tons of manganese ore imported while 6851 tons came from Brazil and 255 tons from India.

American Exports This Year Are Largest Since 1920

American exports in the fiscal year 1928-1929 will be the largest since 1920, amounting to close to $5,400,000 estimates the National Foreign Trade Council. This means that at the dollar value of 1913 the United States is shipping more than 40 per cent more goods abroad than before the war. The export balance will be nearly a billion dollars, or about one-third larger than for the average of the past five years. Many of the reasons for this rapid growth of American foreign trade are explained in "American Foreign Trade in 1929," the annual handbook of the National Foreign Trade Council which has just been published. The handbook contains a record of the sixteenth national foreign trade convention at Baltimore this spring.

Japanese Steel Output Increasing

WASHINGTON, June 28.—Pig iron production in Japan during January and February totaled 259,904 metric tons, compared with 236,174 tons in the corresponding period of last year, while steel ingot output increased to 350,177 tons from 282,591 tons, according to a report received by the Department of Commerce from Tokio.

Production of rolled steel products increased to 290,994 tons from 252,413 tons, as follows: Sheets less than 0.7 mm. thick, 25,890 tons, compared with 15,072 tons in the first two months of 1928; bars, 103,677 tons, compared with 79,100 tons; shapes, 40,232 tons, compared with 36,736 tons; rails, 46,365 tons, compared with 41,603 tons; wire rods, 10,130 tons, compared with 9880 tons; pipe, 10,002 tons, compared with 9441 tons; and miscellaneous products, 6079 tons, compared with 5968 tons. Plate output, alone, registered a decline from 54,613 tons in the first two months of 1928 to 48,619 tons in January and February of this year.

New Record in Industrial Electric Consumption

Activity in manufacturing plants as measured by their consumption of electric energy is reported by *Electrical World* to have made a new high record in May. The index was 136.9, on the basis of 100 as the average for 1923-1925. The increase over April, which showed 136.4, was only fractional. Compared with May of last year, however, in which the index was 119, there was a substantial gain.

At the head of the list stands the automobile industry, including parts. This showed 161.8 in May, compared with 170.6 in April and with 141.6 a year ago. Rubber and its products, mainly tires, was in second position, with 157.6 in May, a slight increase over April. The metal industries group, in third position, was 154.8 in May, compared with 149.9 in April, and with 123.6 a year ago.

Metal industries were broken into two parts. Rolling mills and steel plants showed a new high record at 172.2, compared with 153.3 in April and only 125 a year ago. Other metal-working plants, both ferrous and non-ferrous, were 144.2, a slight recession from the 148.3 of April, but well above the 122.7 of May, 1928.

CARNEGIE LIBRARY OF ATLANTA

Improvement in European Steel Continues

England and Continent Share in Better Demand—Mergers and Associations Hold Interest—Export Restriction Irks Germany

(By Cable)

LONDON, ENGLAND, July 1.

THE shortage of Cleveland pig iron continues, but more local mines and additional coke ovens are resuming operations. By autumn it is expected that fully 50 Northeast Coast furnaces will be operating. Meanwhile makers are declining to sell for the last quarter.

Hematite iron prices are firm and output is to be increased this month by blowing in the Linthorpe-Dinsdale furnace. Costs of production are increasing and, with good export sales, prices are expected to go higher.

Continental material is quiet here, as consumers are generally disinterested. Continental mills are seeking orders for semi-finished material and merchant bars, but are still firm on plates and shapes.

Tin plate is quiet but some good inquiries are in the market for domestic and export shipment. Most mills are well situated, but prompt tin plate is inclined toward easiness, as certain mills have vacant spaces in their schedules.

Galvanized sheets are dull, but prices are being maintained. Japanese demand for black sheets is quiet.

Steel Industries of Great Britain, Ltd., with a capital stock of £11,000,000 ($53,350,000) is now registered to acquire the United Steel Co.'s and the United Strip & Bar Mills, Ltd., to enter into an agreement with the Austin Friars Trust and to carry on the business of steel and iron manufacture. Negotiations for acquiring other interests are reported well advanced, but no details are available.

Belgian production in May was 348,000 tons of pig iron, 330,000 tons of raw steel and 299,000 tons of rolled products. On May 31, there were 56 furnaces in blast.

The German raw steel output in May established a new post-war record, with 1,421,000 tons. The Luxemburg output in May was 248,000 tons of pig iron. and 230,000 tons of raw steel. The Saar output in May was 186,000 tons of pig iron, 187,000 tons of raw steel and 138,000 tons of rolled steel.

British Pig Iron Makers Well Sold Ahead

LONDON, ENGLAND, June 21.—Interest continues to be centered in the pig iron market, where a strong condition prevails. The virtual withdrawal of Continental competition has placed British furnaces in a much stronger position in the domestic market. Moreover, foreign demand for British pig iron has increased. The high and uncertain cost of production, however, prevents producers from materially increasing their output. Furnaces in blast at the end of May totaled 159, the largest number for any month since October, 1927, and by the end of June there will have been a further increase.

Scarcity of pig iron is most acute in the Cleveland district, where furnaces are already sold out until October and are not inclined to consider contracts for the last quarter. Consumers in that area who need immediate supplies of iron are buying from other districts, as the tonnages in the hands of merchants are unimportant and high in price. A similar situation prevails in the hematite iron market, except that July deliveries of East Coast mixed numbers are still obtainable in small tonnages.

More of the semi-finished material being consumed now is from British producers, who are operating at a good rate. In certain inland districts British semi-finished steel sells at less than Continental, but on the coast and in Wales, Continental material is still rather widely used. Recently demand for foreign semi-finished steel has declined, particularly among sheet bar users, but this has been caused by slackening business in sheets, which has forced certain mills to curtail operations.

Finished steel business in general is good. Shape and small bar mills are heavily booked, but the capacity

British and Continental European Export prices per gross ton, f.o.b. United Kingdom Ports, Hamburg and Antwerp, with the £ at $4.85

British Prices, f.o.b. United Kingdom Ports

Cleveland No. 3 foundry	£3	12½s.				$17.58	
East Coast Hematite	3	14½	to £3	15s.		18.06	to $18.18
Ferromanganese, export	14	0				67.90	
Billets, open hearth	6	10	to 6	12		31.52	to 32.12
Sheet bars, open hearth	6	10				31.52	
Black sheets, Japanese specifications	13	5				64.26	
Tin plate, per base box	0	18¼	to 0	18½		4.42	to 4.48
Rails, 60-lb. and heavier	7	15	to 8	15		37.59	to 42.43
						Cents per Lb.	
Steel bars, open hearth	7	15	to 8	10		1.67	to 1.84
Beams, open hearth	7	2½	to 7	12½		1.55	to 1.65
Channels, open hearth	7	7½	to 7	17½		1.60	to 1.71
Angles, open hearth	8	2½	to 8	12½		1.76	to 1.86
Ship plates, open hearth	7	12½	to 8	2½		1.66	to 1.76
Black sheets, No. 24 gage	10	5	to 10	10		2.21	to 2.27
Galvanized sheets, No. 24 gage	13	10	to 13	12½		2.92	to 2.94

Continental Prices F.O.B. Antwerp or Hamburg

Foundry iron, 2.50 to 3.00 per cent sil., 0.50 to 0.90 per cent phos.	£3	10s.	to £3	14½s.		$16.97	to $18.06
Foundry iron, 2.50 to 3.00 per cent sil., 1.00 per cent and more phos.	3	12				17.45	
Billets, Thomas	5	3	to 5	7½		24.98	to 26.07
Sheet bars, Thomas	5	7	to 5	7½		25.94	to 26.07
Wire rods Low C., No. 5 B.W.G.	6	5	to 6	6¼		30.31	to 30.61
Black sheets, No. 31 gage, Japanese	12	10				60.62	
Rails, 60 lb. and heavier	6	10*				31.52	
Rails, light	6	1½				29.46	
						Cents per Lb.	
Steel bars, merchant	5	16	to 6	0		1.25	to 1.29
Steel bars, deformed	5	15½	to 5	18		1.25	to 1.28
Beams, Thomas, British standard	5	5	to 5	9½		1.13	to 1.14
Channels, Thomas, American sections	6	1				1.31	
Angles, Thomas, 4-in. and larger, over ⅝-in. thick	5	9				1.14	
Angles, Thomas, 3-in.	6	0				1.30	
Ship plates, open-hearth, inspected	7	10				1.62	
Hoop and strip steel, over 6-in. base	6	2½				1.32	
Wire, plain, No. 8 gage	7	10				1.62	
Wire, galvanized, No. 8 gage	9	10	to 9	12½		2.06	to 2.12
Wire, barbed, 4-pt. No. 12 B.W.G.	12	0½				2.60	
Wire nails, base	8	0½				$1.74	per keg
Wire nails, assortments, 1 to 6-in. keg	10	9				2.26	

*Open-hearth steel, 10s. ($2.42) per ton extra.

of plate mills is still too large and there is keen competition for plate tonnage, with makers seeking uninterrupted operation.

Germany Seeks Cancellation of Export Restriction

HAMBURG, GERMANY, June 17.—At the next meeting of the International Steel Cartel, at Vienna, it is understood that German steel producers will ask that all export restrictions on the German steel quota be abandoned. Germany has an export allotment of 330,000 metric tons a month, which was fixed when the German mills complained of the high total of fines paid for overproduction, when most of the excess was to supply a heavy domestic demand in Germany. At that time the German penalty for excess output was reduced from $4 to $2 a ton, with the understanding that the excess was for domestic consumption and that exports would be limited. None of the other members operates under an export restriction.

German mills estimate that, because of reduced consumption of steel in Germany, it will be necessary to export 475,000 to 500,000 tons a month in the next few years—42 to 45 per cent of the total output of the country instead of, as at present, about 33 per cent. It is expected that the German delegates will make continued adherence to the cartel conditional on a cancellation of the export restriction.

To Cut German Scrap Exports

HAMBURG, GERMANY, June 17.—The Verein Eisen und Stahl Industrieller, representing steel scrap consumers, has been informed by the Government that the export embargo on heavy melting steel and machinery cast scrap will be tightened in the future. Special export licenses will only be granted when there is an abundant supply of scrap in the German market. Meanwhile scrap has been advancing from its usual level, which is 20 per cent lower than the market abroad.

British Furnaces Renew Price Control

LONDON, ENGLAND, June 21.—The blast furnaces of the Midlands are so well satisfied with their experiment in cooperative marketing and price control that they have renewed their agreement for another 12 months. Only one producer remained outside the pool. Some Midland furnaces believe that they could sell more pig iron than they are now producing, but are not prepared to risk blowing in more stacks, partly because of the uncertain coke supply. Increased supplies of coke will be required for furnaces being blown in other districts, and Midland smelters do not desire to accentuate the competition for fuel during the present shortage.

New German Association Formed

Manufacturing Consumers of Steel Combine to Protect Interests—May Not Renew Producers' Syndicates

BERLIN, GERMANY, June 15.—Manufacturers of finished products other than machinery, made from iron, steel and non-ferrous metals, have formed the Centralverband der Eisen, Metal und Blechverarbeitenden Industrie to protect their interests. Members of the new association employ more than 500,000 and include all hardware makers and most of the producers of finished metal products. The administration of the association is in the hands of Commercial Councilor Neitzert of Fulda, Herr Hager of Remscheid and Commercial Councilor Schwarz of the Bing Werke in Nuremberg.

Prospects for the renewal of domestic steel syndicates have not improved. The director of the Mannesmann Tube Co. has stated that, if the Friedrich Krupp A. G. persists in its plan to erect a tube mill with an annual capacity of 150,000 tons, the entire German syndicate system will fail. There are two groups among the steel companies—one, of which the Vereinigte Stahlwerke A. G. is representative, advocates renewal of all syndicates or none; the other, represented by the Friedrich Krupp A. G., sees no advantage in the renewal of any of the syndicates. Both groups agree that unless the syndicates are renewed Germany cannot remain in the International Steel Cartel.

Continuance of the International Steel Cartel, which expires next fall, depends on the action taken on the German domestic syndicates. Probably the International cartel will be renewed temporarily for six months or a year. If so, it is certain that Germany will demand an increase in its quota. According to German estimates, the French quota is 90.3 per cent of the largest French monthly production, the Luxemburg quota is 87.3 per cent, and the Belgian quota 82.9 per cent, while Germany's quota is only 71.2 per cent of its highest monthly output. It is also claimed that Germany's capacity has increased more than that of other members since formation of the cartel.

German Plant to Make Steel From Sponge Iron

HAMBURG, GERMANY, June 17.—A steel plant being erected at Bochum by the Vereinigte Stahlwerk A. G., Düsseldorf, and the Friedrich Krupp A. G., Essen, for the production of special steel under the Norsk Staal patents is to have a capacity of 42,000 to 45,000 metric tons a year instead of about 20,000 tons as originally announced. Sponge iron is to be used as a raw material. The plant will be completed earlier than had been planned and will probably be in operation some time in October.

Since its formation, the German Dye Stuff Corporation has secured a part interest in the company formed to build the plant, and is represented on the board of directors. The German Dye Stuff Corporation is a producer of non-ferrous metals, controlling the entire output of "electron" (magnesium) metal, but has heretofore had no financial interest in the steel industry. The holding company for the Norsk Staal patents, which will dispose of licenses in other countries, has increased its capital stock to 4,000,000 m. ($956,000), all of which is held by the Vereinigte Stahlwerk A. G., Friedrich Krupp A. G., and the German Dye Stuff Corporation.

The annual report of Schubert & Salzer, Chemnitz, largest builders of stocking knitting machinery in Germany, shows that their exports to the United States have trebled. Unfilled orders from the United States total about $3,500,000.

Increase in German Export Bounties Urged

BERLIN, GERMANY, June 15.—As part of the negotiations for the renewal of the domestic syndicates, which expire this year or in 1930, a modification of the agreement under which the Ingot Steel Syndicate grants price rebates to steel consumers manufacturing products for export is being considered.

The manufacturers' association, "Avi," is expected to demand an increase in rebates equal to the full difference between German and lower world market prices. Under the present plan, rebates do not quite represent the full difference in prices. The manufacturers also demand that the rebates shall be paid in cash, instead of being booked to their credit and applied on subsequent orders.

Three Leading Italian Plants May Merge

MILAN, ITALY, June 15.—The three leading Italian steel works—Societa Anonima Ilva, with plants at San Giovanni, Torre Annunziata, Balzaneto, Bagnoli and Sestri Ponente; the Societa Anonima Terni at Terni, and the Societa Ferriere de Voltri, with plants at Voltri and Oneglia—have entered into negotiations for a merger, under the suggested name of United Italian Steel Works. Should this combination be made, the new corporation would control about two-thirds of the total steel production of Italy.

German Foreign Trade Improving

Mills Dependent on Exports to Maintain Operating Rates —Small Producers Suffer from Lack of Capital

BERLIN, GERMANY, June 15.—Business has begun to show improvement, with an increasing demand from both domestic and export consumers and a continued decline in unemployment. A rapid revival of industry, however, is prevented by a shortage of capital, as it is almost impossible to market bonds either in Germany or abroad. In the iron and steel industry the small companies are seriously affected. In some instances manufacturers of small hardware have been compelled to refuse large orders because of inadequate finances. A renewed influx of foreign capital is not expected until the new Young plan is in force.

The credit stringency is checking building activity and demand for structual steel is smaller than a year ago. Steel bars and sheets are inactive, and orders from shipyards have declined. With the steel industry increasingly dependent upon foreign trade to maintain operating rates, there has been steady improvement in exports, especially of semifinished material to other European countries and of pig iron to consumers not receiving sufficient tonnage from British furnaces, which are heavily booked with orders. Foreign trade in wire rods and wire products has been good, April shipments totaling 85,772 tons compared with 52,180 tons in March, and exports of wire products to the United States show a rising tendency. Exports of iron and steel in four months through April were 1,726,622 metric tons, against imports of 567,734 tons.

Exports of cutlery, principally from Solingen, are rapidly increasing, but average prices are lower because the larger portion of sales are to Asiatic markets. Exports of cutlery in April totaled 738 metric tons, compared with 586 tons in March. Sales to India and the Dutch East Indies have increased, and business with Argentina has doubled.

German Motor Car Builders May Erect American Plants

HAMBURG, GERMANY, June 17.—Manufacturers of high-priced automobiles here are giving increased attention to the United States as a market for their products, and it is believed that one and possibly two German motor car builders may establish assembly plants in America.

The Mercedes-Benz company, which has been long interested in the United States market, is mentioned among the possible builders of American assembly plants. This company is now selling Diesel engine trucks and 120 180-hp. compressor-type passenger automobiles in the United States.

Japanese Black Sheet Prices Decline

NEW YORK, July 1.—Exporters in close contact with the market in Japan report dealers there overstocked with light-gage black sheets, continued high operating rates of the Japanese sheet mills and declining business with China in galvanized sheets. These conditions have depressed prices of black sheets in the Japanese market, and recent quotations of the Kawasaki Dockyard Co., Kobe, have been 187 yen ($82.28) per ton, delivered to Tokio warehouses. Deducting from this delivered price the duty of 33.06 yen ($14.55) per ton and the freight rate from Yokohama to Tokio of 2 yen (88c.) per ton, imported light-gage sheets would have to be sold at 151.94 yen ($66.85) per ton, c.i.f.

The Government steel works is quoting even lower prices, asking 180.83 yen ($79.57) per ton, or, deducting the duty and freight rate from Yokohama to Tokio warehouses, the equivalent of 145.77 yen ($64.14) per ton c.i.f. Exporters are not seeking new sheet business in Japan, with the domestic price too low for British or American competition.

Increase in Imports of Pig Iron in May

WASHINGTON, June 27.—Imports of pig iron in May advanced to 14,393 gross tons, or almost as much as the April and March tonnages combined—6693 tons and 8572 tons. The May total, however, was lower than the 16,299 tons in February. It was about 50 per cent above the 9732 tons of May, 1928.

For the five months, imports at 62,065 tons have been slightly less than the 63,496 tons of last year. There has not been much change in the line-up of countries of origin, although tonnage from Great Britain has fallen off nearly 20 per cent in favor of additions to the amounts received from British India, Netherlands, Norway, etc.

United Kingdom, British India and Netherlands, in that order of magnitude, furnished nearly 95 per cent of the May total and more than 95 per cent of the total for the month a year ago.

UNITED STATES IMPORTS OF PIG IRON BY COUNTRIES OF SHIPMENT
(In Gross Tons)

	May		Five Months Ended May	
	1929	1928	1929	1928
United Kingdom	6,342	4,556	23,832	29,251
British India	4,314	3,026	21,536	19,988
Germany	50	.....	103	40
Netherlands	2,916	1,888	13,874	12,621
Canada	36	.....	422	378
France	.....	.....	.....	.....
Belgium	.....	.....	184	202
Norway	228	41	876	41
Sweden	200	190	803	792
All others	307	31	435	183
Total	14,393	9,732	62,065	63,496

Steel Industry in Germany Well Occupied

(*By Radio*)

BERLIN, GERMANY, July 1.—All of the Steel Syndicate's domestic prices for July remain unchanged from June. The price of unsyndicated thin sheets has been advanced by 5 m. ($1.19) since the beginning of June.

Production of pig iron and steel is being well maintained and orders are coming in satisfactorily. The domestic market for structural steel is improved and export outlets are active, at advancing prices.

As a result of the Railroad Corporation's orders, the market for steel rails is more active. But bars are weakening in both domestic and export markets.

Machinery manufacturers report a continuation of the rapid increase in export orders. General improvement in the European market is expected by Rhenish-Westphalian experts.

German Non-Ferrous Cartel

BERLIN, GERMANY, June 16.—All the German non-ferrous metal associations have agreed to establish a central organization, with headquarters here, which will combine all existing associations and syndicates, including the producers of aluminum and the manufacturers of aluminum products. No name for the new association has yet been selected.

Industrial Engineering & Equipment Co., 1341 Syndicate Trust Building, St. Louis, has been appointed sales representative in southern Illinois and south central Missouri by the Despatch Oven Co., Minneapolis, Minn., manufacturer of industrial ovens, which include core and mold ovens, special drying ovens and conveyor ovens for high-speed production.

Machinery Exports Continue Large

May Total Greater Than for Any Month Between January, 1921, and January, 1929—Imports Much Heavier

WASHINGTON, June 27.—Exports of machinery of all kinds from the United States in May declined to $48,085,615 from $51,371,056 in April, making a drop for the second successive month. Imports of machinery and vehicles, on the other hand, continued to rise, apparently by reason of pending tariff legislation, and totaled $4,059,694, against $3,949,218. Imports listed in THE IRON AGE table totaled $3,191,787 in May and $3,015,094 in April. Exports in May of this year showed a substantial increase over those for the corresponding month of last year, with a total of $44,687,939.

Taking the first five months of the year, sharp increases were made in both exports and imports, the former rising to $255,357,842 from $186,666,589 for last year. Imports of machinery and vehicles aggregated $18,143,355 and $11,401,935 respectively. Imports of machinery listed in THE IRON AGE table were valued at $14,223,769 for the first five months, against $8,706,883 last year, while imports for May of last year, at $2,029,893, were far below the current figure.

Exports of industrial machinery in May were $22,158,220, according to the classification of the Division of Statistics, Department of Commerce, against $23,516,044 in April and $20,103,213 in May of last year. For the first five months of 1929 and 1928 respectively they were $116,061,209 and $88,479,157. Imports of industrial, office and printing machinery in May were $2,213,314, compared with $2,103,589 in April and $1,457,391 in May, 1928. For the first five months they were $10,374,581 in 1929, against $6,684,804 last year.

Power-driven metal-working machinery to the value of $2,354,826 was exported in May, compared with $2,804,788 in April and $1,966,866 in May of last year. For the five months of 1929 and 1928 the values were $14,045,444 and $9,787,716 respectively. Outgoing shipments of hand-driven metal-working machinery in May were $7,997,162, against $8,165,535 in April and $7,208,990 in May of last year. Exports for the first five months were valued at $40,784,846, against $32,083.946 for the corresponding period of last year.

Hours and Earnings in Metal-Working Plants

Studies of the Bureau of Labor Statistics of the United States Department of Labor show that the hourly earnings in the motor-vehicle industry in 1928 averaged 75c., compared with 72.3c. in 1925 and with 65.7c. in 1922. Owing to a slight reduction in the average length of the working week, which dropped from 50.3 hr. in 1925 to 49.4 hr. in 1928, the weekly earnings did not show so substantial an increase as did those measured by the hour. Average full-time weekly earnings were $32.92 in 1922, $36.37 in 1925 and $37.05 in 1928.

Entrance wage rates for common labor, as of last January, averaged 55.9c. an hour for the automobile industry. This average was the highest reported for any industry. The lowest was 30.8c., in saw mills, and the average for all industries about 45c. These figures are based on reports from plants employing nearly 140,000 common laborers.

Machinery Exports from the United States

(By Value, in Thousands of Dollars)

	May		Five Months Ended May	
	1929	1928	1929	1928
Locomotives	$101	$125	$793	$904
Other steam engines	94	221	405	452
Boilers	150	140	766	453
Accessories and parts	28	103	334	301
Automobile engines	1,303	1,714	6,898	6,876
Other internal combustion engines	811	712	4,485	3,040
Accessories and parts	472	388	2,059	1,572
Electric locomotives	13	368	298	939
Excavating machinery	867	929	3,577	3,525
Concrete mixers	80	117	616	445
Road-making machinery	427	274	1,428	894
Elevators and elevator machinery	317	414	2,117	1,775
Mining and quarrying mach'ry	1,633	1,429	6,989	5,538
Oil well machinery	1,872	1,107	10,930	5,635
Pumps	834	611	5,195	2,784
Bending and power presses	250	102	1,398	633
Forging machinery	65	54	574	310
Machine tools*	1,209	1,970	7,826	9,788
Other metal-working machinery and parts	624	581	3,179	2,461
Textile machinery	1,120	1,315	5,964	5,665
Sewing machines	810	820	4,343	3,700
Shoe machinery	177	149	937	774
Flour-mill and gristmill machinery	58	41	265	206
Sugar-mill machinery	257	310	1,128	1,880
Paper and pulp mill mach'ry	238	253	1,237	1,505
Sawmill machinery	67	82	395	384
Other woodworking mach'ry.	209	168	971	764
Refrigerating and ice-making machinery	1,216	1,011	6,363	3,376
Air compressors	587	727	3,249	2,706
Typewriters	1,792	2,371	10,176	9,797
Power laundry machinery	183	148	846	482
Typesetting machines	509	450	2,666	1,894
Printing presses	791	730	3,196	2,642
Agricultural machinery and implements	11,263	10,144	60,027	43,719
All other machinery and parts	17,609	14,610	93,728	58,848
Total	$48,086	$44,688	$255,358	$186,667

*Principal items detailed in another table.

Imports of Machinery Into the United States

(By Value)

	May		Five Months Ended May	
	1929	1928	1929	1928
Metal-working machine tools	$62,865	$90,182	$489,689	$269,491
Agricultural machinery and implements	1,103,485	507,778	4,648,081	2,579,811
Electrical machinery and apparatus	194,172	202,991	948,945	960,486
Other power-generating machinery	148,862	40,482	488,965	72,552
Other industrial machinery	1,135,078	931,932	5,477,914	3,647,659
Vehicles, except agricultural	547,325	256,528	2,170.175	1,176,884
Total	$3,191,787	$2,029,893	$14,223,769	$8,706,883

Exports of Power-Driven Metal-Working Machine Tools

	May, 1929		April, 1929	
	No.	Value	No.	Value
Engine lathes	54	$115,415	98	$188,086
Turret lathes	25	84,163	49	164,387
Other lathes	105	180,531	83	136,701
Vertical boring mills and chucking machines	34	38,920	8	19,034
Thread-cutting and automatic screw machines	73	115,911	75	83,687
Knee and column type milling machines	24	64,001	43	107,132
Other milling machines	32	63,715	50	123,672
Gear-cutting machines	42	141,879	44	118,722
Vertical drilling machines	27	23,482	28	35,425
Radial drilling machines	14	48,296	4	8,241
Other drilling machines	160	36,397	187	100,272
Planers and shapers	33	50,461	35	50,864
External cylindrical grinding machines	47	95,843	54	146,800
Internal grinding machines	47	66,007	31	77,970
Metal-working tool-sharpening machines	95	48,177	290	47,067
Total	812	$1,173,198	1,079	$1,408,060

Machinery Markets and News of the Works

June Sales Satisfactory

Large Number of Unexpected Orders Is Feature of Machine Tool Buying—Heavy Production Continues

JUNE was a satisfactory month for the machine tool industry, though sales fell somewhat below those in May.

A feature of current buying is the number of unexpected orders placed by companies which are rushed with demands for their own products. Moreover, many of the purchases have been made by users who for months have shown little or no interest in new equipment.

Bookings have been in large enough volume to keep machine tool plants busy well into the fall. A leading lathe manufacturer expects to maintain production 50 per cent above normal until September, and this condition is not unusual with other companies.

Transactions in the past week included equipment for the General Electric Co., an airplane maker and a printing press company. Four railroads have bought heavy-duty equipment from a Cincinnati lathe builder, while the New York Central and the Burlington each have purchased small lots of tools. The Rock Island and the Chicago & North Western are in the market for a few machines. Railroad buying this year, however, has been disappointing.

The United States Air Corps, Wright Field, Dayton, Ohio, has taken bids on seven geared-head, motor-driven lathes. The Cleveland Union Terminals Co. has not yet bought 25 tools for which it recently inquired.

At Chicago, a farm implement manufacturer is reported ready to place orders for a large number of tools.

Indications are that demand for machine tools will continue steady.

New York

NEW YORK, July 2.—Buying of machine tools in good volume has continued the past week. Orders were received from the New York Central Railroad, the General Electric Co. and several others. An airplane company also bought a number of tools. Another buyer was a manufacturer of printing presses. A feature of current buying is the number of orders which are unexpected, the decision to purchase being quickly made by companies which are rushed with orders for their own products. Local sellers consider the outlook promising for steady demand during the midsummer months.

Contract has been let by Metropolitan Engineering Co., 1250 Atlantic Avenue, Brooklyn, manufacturer of protective devices and equipment, to T. E. Murray, 88 Lexington Avenue, New York, for extensions and improvements in two-story plant, to cost about $45,000 with equipment. E. W. Helms, New York address noted, is architect.

Ward-LaFrance Motor Truck Corporation, 276 Jackson Avenue, New York, has leased a building at Long Island City for a new service and repair plant.

Art Steel Co., 401 East Twenty-third Street, New York, manufacturer of steel boxes and containers, etc., is said to be planning a new local plant to cost over $150,000 with equipment. Present works will be removed to new location.

Officials of Electric Boat Co., 11 Pine Street, New York, manufacturer of motor boats, submarines, etc., with plants at Groton, Conn., and Bayonne, N. J., have organized Alto-Elco Aircraft Co., a subsidiary, to manufacture aircraft and parts. It is proposed to establish parts and assembling departments at one of present plants.

M. J. Ort, 424 East 149th Street, New York, architect, has plans for a six-story automobile service, repair and garage building, to cost about $125,000 with equipment.

Transport Aircraft Corporation has been organized to take over and succeed to Kaess Mfg. Corporation, Lindenhurst, L. I., manufacturer of airplanes and parts. New organization plans for sale of 40,000 shares of stock, no par value, part of proceeds to be used for expansion.

Shell Union Oil Corporation, 65 Broadway, New York, operating oil refineries, storage and distributing plants, pipe lines, etc., in California, Mid-Continent field, Texas and other points, is disposing of a preferred stock issue of $40,000,000, part of proceeds to be used for expansion. Company has arranged for purchase of New Orleans Refining Co., New Orleans, and will consolidate. Shell Eastern Petroleum Products, Inc., a subsidiary, has begun construction of new oil storage and distributing plant in Raritan Bay district, near Woodbridge, N. J., to cost more than $125,000 with equipment.

Schaefer & Rutkins, 2408 Grand Concourse, New York, architects, have plans for a six-story automobile service, repair and garage building, to cost about $300,000 with equipment.

New York Steam Corporation, 280 Madison Avenue, New York, has plans for an addition to power plant on Water Street, including improvements in present station, to cost more than $225,000 with equipment.

Segal Lock & Hardware Co., 155 Leonard Street, New York, with main plant at 55 Ferris Street, Brooklyn, is arranging an expansion program, including acquisition of property in Middle West, for a branch plant. Company has authorized an increase in capital stock, part of proceeds to be used for expansion noted.

Board of Education, Peekskill, N. Y., plans installation of manual training equipment in three-story high school, to cost $750,000, for which bids had been asked on general contract. Wilson Potter, 22 East Seventeenth Street, New York, is architect.

Perth Amboy Tile Works, Sayre Avenue, Perth Amboy, N. J., manufacturer of floor and wall tile, plans rebuilding part of plant recently destroyed by fire with loss estimated at over $300,000 including equipment. Company is a division of Beaver Falls Art Tile Co., Beaver Falls, Pa.

United States Aluminum Co., Garwood, N. J., has awarded general contract to Wigton Abbott Co., 705 Park Avenue, New York, for one-story addition, 60 x 120 ft., including improvements in present plant, to cost $45,000 with equipment. Company is affiliated with Aluminum Co. of America, Inc., Oliver Building, Pittsburgh.

Gold Seal Mfg. Co., Inc., 127 South Fifteenth Street, Newark, manufacturer of radio tubes and equipment, has acquired Rosasco Mfg. Co., 267 Wyckoff Street, Brooklyn, manufacturer of kindred apparatus, and will consolidate. Purchased plant will be continued in operation and a capacity output arranged, totaling close to 10,000 tube units and other equipment daily.

Jersey Central Power & Light Co., 20 South Street, Asbury Park, N. J., will soon begin construction of steam-operated electric generating plant at South Amboy, N. Y., with main unit, one story, 160 x 160 ft., to cost about $5,000,000 with transmission system. Electric Management & Engineering Corporation, 57 William Street, New York, is engineer, and will supervise erection.

Watson Flagg Engineering Co., 120 Liberty Street, New York, manufacturer of mechanical equipment, has awarded general contract to John W. Ferguson Co., Paterson, N. J., for one-story machine shop to plant at 843-7 East Twen-

ty-fifth Street, Paterson, 75 x 122 ft., to cost $35,000.

Herpers Brothers, 18 Crawford Street, Newark, jewelry manufacturers, will soon begin construction of two-story and basement addition, 26 x 62 ft., to cost about $30,000 with equipment. Edward A. Wurth, Jr., 207 Market Street, is architect.

East New York Iron & Wire Works, structural steel fabricator, formerly at 825 Sackman Street, Brooklyn, has moved to 47-71 East 100th Street, Brooklyn.

Luna Metal Craft Corporation, sheet metal specialties, stampings, etc., formerly located on West Twenty-first Street, New York, has moved to 38-40 Emerson Place, Brooklyn. H. A. Nodler is president.

Rheinegold Steel Products Co., 225 Broadway, New York, has been incorporated as agent in United States for Gewerkschaft Rheingold, Dusseldorf, Germany, export distributer of carbon and alloy steels, high speed steel and ball bearing material made by Stahlwerk Becker A. G., Willich near Krefeld, Germany.

Meurer Steel Barrel Co. has moved its offices to its new plant at 105 Avenue L, Newark, N. J., which will have capacity of 4000 barrels daily. Company will be in position to make prompt shipments by motor truck to all sections of New York metropolitan district.

Philadelphia

PHILADELPHIA, July 1.—Bids are being asked until July 8 by W. E. S. Dyer, Land Title Building, Philadelphia, architect and engineer, for a power plant at mill of Skenandoa Rayon Corporation, Utica, N. Y., to cost over $200,000 with equipment. Company also has plans by same engineer for additions to main mill, to cost more than $2,500,000 with machinery.

Philadelphia Insulated Wire Co., 200 North Third Street, Philadelphia, has taken over adjoining building, totaling about 7500 sq. ft. floor space, for expansion.

Hess-Bright Mfg. Co., Front Street and Erie Avenue, Philadelphia, manufacturer of ball bearings, has taken bids on general contract for a two-story and basement addition, to cost over $100,000 with equipment.

Vacuum Oil Co., 61 Broadway, New York, has awarded general contract to Turner Construction Co., Graybar Building, Philadelphia, for storage and distributing plant at Philadelphia, where property was recently acquired, to cost about $200,000 with equipment. Project will include one-story service, repair and garage building for company motor trucks.

Plant addition of Proctor & Schwartz, Inc., Seventh Street and Tabor Road, Philadelphia, manufacturer of drying and air-conditioning machinery, etc., referred to in these columns last week, will cost about $250,000 with equipment, instead of smaller amount previously noted. It is understood that unit will be occupied by Proctor & Schwartz Electric Co., a recently organized subsidiary, to manufacture electrical equipment used in conjunction with machinery of parent company. Simon & Simon, Fidelity-Philadelphia Building, are architects.

Philadelphia Salt Co., Pier 36, North Wharves, Philadelphia, has plans by A. C. Wood, 1411 Walnut Street, engineer, for one-story power plant, to cost $50,000 with equipment.

Acosta Aircraft Corporation, Trenton, N. J., operating at recently established plant on Whitehead Road, formerly used by Mercer Automobile Co., will establish a department for production of metal speed motor-boats, in addition to regular airplane manufacture. Boats will average about 12 ft. long, with beam measurement of 4 ft., and V-type step bottom, designed to use any type of outboard motor. George H. Stewart is general manager.

Thermoid Rubber Co., Whitehead Road, Trenton, N. J., has taken out a permit for a one-story addition, 100 x 170 ft., primarily for manufacture of automobile brake lining, to cost about $45,000.

Sylvania Products Co., Emporium, Pa., manufacturer of radio tubes and equipment, has leased a building at Lock Haven, Pa., and will remodel for branch plant to cost about $40,000.

J. E. Horton, 146 North Eleventh Street, Reading, Pa., and associates have organized Empire Steel Castings Co., and plan operation of foundry at Frush Valley, Berks County, to manufacture iron, steel and metallic alloy castings. Wallace E. Belcher, 313 South Broad Street, Philadelphia, is interested in new organization.

Best Body Corporation, Coatesville, Pa., has been organized to manufacture dump bodies for trucks and trailers and will let contracts for fabrication of bodies. R. C. Templin is president, and A. Brezovitz, vice-president.

The Crane Market

FEW sales of electric overhead or locomotive cranes have been reported in the past week, but some substantial business is pending, especially for overhead cranes, including four lists, one for seven cranes, one for nine cranes and two for 10 cranes each. Other overhead inquiries include a 3-ton, 20-ft. radius hand power jib crane and a 3-ton chain block for the Phoenix Utility Co., 71 Broadway, New York. Locomotive crane inquiries include two 25-ton cranes still pending for the New York Central Railroad and one 25-ton crane for the Atlantic Coast Line Railroad.

Among recent purchases are:

Baltimore & Ohio Railroad, Baltimore, eight 25-ton, Diesel engine-driven locomotive cranes from Industrial-Brownhoist Corporation.

National Tube Co., McKeesport, Pa., two 10-ton, 80-ft. 2-in. span overhead electric cranes for seamless tube mill from Alliance Machine Co.

Elmira Foundry Co., Elmira, N. Y., 22-ton, 8-wheel locomotive crane from Orton Crane & Shovel Corporation.

Buffalo

BUFFALO, July 1.—Superstructure will soon begin by Garlock Packing Co., Palmyra, N. Y., manufacturer of mechanical packing products for power plants, for a one-story addition, totaling about 10,000 sq. ft. floor space, to cost about $45,000 with equipment.

Oneida Community, Ltd., Oneida, N. Y., manufacturer of plated ware, animal traps, etc., is disposing of a note issue of $2,000,000, to be used in part for purchase of controlling interest in William A. Rogers, Ltd., Niagara Falls, N. Y., and Hartford and Wallingford, Conn., manufacturer of plated wares, cutlery, etc. Last noted organization will be continued under present name and plants maintained at existing locations; expansion in output will be arranged. Pierrepont B. Noyes is president of purchasing company.

Board of Education, Little Falls, N. Y., is considering installation of manual training equipment in new two-story junior high school to cost $275,000, for which plans have been drawn by F. Haug, Little Falls, architect; A. R. Acheson, Eckel Building, Syracuse, N. Y., is mechanical engineer.

William Weinert, 1 Newfield Street, Buffalo, and associates have organized Greenite Co., to operate a local foundry for manufacture of castings. Production is planned at early date. Harold J. Tillou, 21 Charham Drive, is also interested in new company.

Fire, June 24, destroyed welding shop at plant of American Laundry Machinery Co., Rochester, N. Y. It is planned to rebuild at once.

Pittsburgh

PITTSBURGH, July 1.—June business in this district was considerably ahead of May and probably one of the best summer months experienced in the industry. Nor has there been any marked decrease in the amount of business pending. Third quarter lists of large buyers are coming out, and the bulk of prospective purchases of the Westinghouse Electric & Mfg. Co. is expected to be released very soon. Railroad buying is rather quiet. The Pennsylvania Railroad is inquiring for a radius grinder.

Purchases are being made regularly for the large steel plant extensions under way in the Pittsburgh district. The A. M. Byers Co. is closing regularly on equipment for its new plant at Ambridge, Pa., and is also making purchases for its Warren, Ohio, plant, preparatory to turning that unit into a sheet bar mill, with pipe operations concentrated at Ambridge. Steel Corporation subsidiaries are active buyers for various plants.

Contract has been let by Gulf Refining Co., Frick Annex, Pittsburgh, to John N. Gill Construction Co., Franklin Trust Building, Philadelphia, for one and two-story addition to oil refinery at Girard Point, Philadelphia, to cost $330,000 with equipment. E. B. Lee, Seventh Avenue and Smithfield Street, Pittsburgh, is architect. Company has approved plans for construction of steam-turbo power plant at its refinery, Port Arthur, Tex., to cost more than $100,000 with equipment. United Engineers & Constructors, Inc., 112 North Broad Street, Philadelphia, will prepare plans for extensions and improvements in power house, tank department, pipe lines and other divisions at branch refinery on Staten Island, N. Y., to cost over $300,000 with equipment.

Coshocton Iron Co., Monongahela, Pa., manufacturer of castings, mining equipment, etc., has plans for a one-story addition, 160 x 480 ft., to cost about $130,000 with equipment. Company is a subsidiary of Combustion Engineering Corporation, 200 Madison Avenue, New York.

Service Mfg. Co., Erie, Pa., recently formed by K. C. Eagley, 1058 West Sixth Street, and associates, is said to be planning early operation of local plant to manufacture lubricating devices and equipment.

Wayne United Gas Co., Charleston, W. Va., operating natural gas properties, pipe lines, etc., in Wayne County, W. Va., and

in Kentucky, has arranged for a bond issue of $1,500,000, part of proceeds to be used for extensions and improvements.

Acme Steel Construction Co., Inc., 401 Third Avenue, Pittsburgh, is planning to rebuild part of plant destroyed by fire June 22.

Pittsburgh Plate Glass Co., Frick Building, Pittsburgh, has awarded general contract to W. S. Bellows, Herskowitz Building, Oklahoma City, Okla., for construction of a machine shop, storage and distributing building, and other units at Henryetta, Okla., where new sheet glass plant will be constructed, to cost about $2,000,000. Other building awards have been made to Rust Engineering Co., 606 Grant Street, Pittsburgh; contracts for main buildings will be let soon.

Detroit

DETROIT, July 1.—Property at Adrian, Mich., heretofore held by Adrian Improvement Co., has been purchased by Titan Electric Co., Butler, Ind., manufacturer of motors, generating apparatus and other electrical equipment. Plant will be removed from Butler to new location and additional equipment installed.

Sparta Foundry Co., Sparta, Mich., manufacturer of piston rings, etc., is arranging for expansion to cost about $100,000, including two new one-story units to provide about 20,000 sq. ft. additional floor space, and installation of equipment.

Buhl Aircraft Co., Marysville, Mich., has awarded contract to A. J. Zemmer, Port Huron, Mich., for hangar at airport near St. Clair, Mich., partly for airplane assembling, as well as for storage, to cost more than $45,000 with equipment.

Wolverine Screw Co., St. Jean Avenue, Detroit, has awarded general contract to W. J. C. Kaufmann Co., 10610 Shoemaker Street, for one-story addition, to cost over $40,000 with equipment.

Detroit Gasket Mfg. Co., 6209 Hamilton Street, Detroit, is arranging for a stock issue to total about $1,150,000, part of fund to be used for expansion and improvements.

Weatherproof Body Corporation, Corunna, Mich., manufacturer of automobile bodies, a division of Allied Motor Industries, Inc., Detroit, has purchased former plant of Field Body Corporation, Owosso, Mich., defunct, totaling about 200,000 sq. ft. floor space, and will occupy for branch plant. Equipment will be installed for production of bodies for commercial cars, truck cabs, body parts, etc. E. C. Morine is president of purchasing company.

Cadillac Aircraft Corporation, Detroit, recently organized with capital of 25,000 shares of stock, no par value, has taken over former plant and property of Stinson Aircraft Co., Northville, Mich., which recently removed its works to Wayne, Mich., and will occupy for manufacture of airplanes and parts. Initial production will be given over to amphibian units, designed to carry four persons, with parts manufacturing and assembling departments; engines will be purchased from outside sources. H. G. McCarroll is vice-president.

Simon Iron & Steel Corporation, Lansing, Mich., has awarded general contract to A. R. Foster, Lansing, for one-story storage and distributing plant, to cost over $35,000 with equipment.

Ford Motor Co., Detroit, has authorized an expansion program at aircraft manufacturing plant at Dearborn, Mich., to increase present floor space over 150 per cent. All departments will be enlarged, including parts division, which will take over work heretofore carried out at River Rouge plant. Production of one complete all-metal air transport daily is planned. Program is reported to cost over $450,000 with equipment.

Sky Specialties Corporation, 3651 Hart Avenue, Detroit, has been organized as consolidation of Simon Airplane Appliance Co. and Heywood Starter Corporation. Capitalization consists of 200,000 shares of stock of which 125,303 are outstanding. Company will manufacture self-starters and other airplane parts. Arthur L. Cash is president; F. L. Riggin, vice-president, and S. D. Den Uyl, secretary and treasurer.

Peoples Clamp Corporation, Twelfth and Sycamore Streets, Wyandotte, Mich., has been organized to take over Peoples Clamp Corporation of New York. Company will manufacture patented double-wrapped hose clamp for automobiles, airplanes, motors and all hose connections. Purchase of new machinery is contemplated.

Ex-Cell-O Tool & Mfg. Co., Detroit, has changed its name to Excello Aircraft & Tool Corporation because of large increase in its production of aviation parts. A public issue of stock will be made shortly, proceeds of which will be devoted to plant expansion. Present plant, built in 1928, has 50,000 sq. ft. of floor space. Company expects to manufacture several additional parts for airplanes and Diesel motors.

Cleveland

CLEVELAND, July 1.—Machine tool sales were good the past week. While inquiry has fallen off, dealers closed on a good volume of single tools that had been pending for some time. June, on the whole, was a very satisfactory month for the machine tool industry, although business fell somewhat below that of May. A local turret lathe manufacturer, who broke previous sales records in May, reports a decline of only 20 per cent from its May volume.

The Air Corps, War Department, Wright Field, Dayton, Ohio, received bids June 27 for three 14-in. x 6-ft. and four 16-in. x 8-ft. geared head motor-driven lathes for shipment to various points. There were five bidders, the bids ranging from about $16,000 to $20,000. Cleveland Union Terminals Co. has not yet purchased the 25 machines for which it recently inquired.

Ohio Seamless Tube Co., Shelby, Ohio, has approved plans for a 40 per cent increase in its plant capacity which will involve an expenditure of about $400,000 in buildings and equipment.

Contract has been let by Franklin Steel Co., 5426 Lake Court, Cleveland, to Boldt-Rapp Co., 5511 Euclid Avenue, for one and two-story addition to plant, to be used in part for shear department and storage and distribution, to cost about $40,000 with equipment.

Pennsylvania-Ohio Power & Light Co., 25 East Boardman Street, Youngstown, has plans for a steel tower transmission line from generating station at Toronto, Ohio, to Akron and vicinity, consisting of 580 towers, switching facilities, etc., to cost more than $500,000. Stevens & Wood, Inc., 20 Pine Street, New York, are engineers.

Lakeland Aviation Co., Inc., Union Trust Building, Cleveland, is considering new one-story plant for aircraft manufacture, to cost about $40,000 with equipment. J. E. Mathews is president.

Kasle Iron & Metal Co., 1102 Lagrange Street, Toledo, Ohio, has awarded general contract to Kopitke Construction Co., 321 Wabash Street, for one-story plant, to cost about $40,000 with equipment. Forster & Wernert, Nicholas Building, are architects.

Ohio Fibrated Asphalt & Rubber Co., Sandusky, Ohio, recently organized by H. R. Greenlee, president of former Erie Rubber Co., Sandusky, has taken over plant of latter company and will remodel for manufacture of mechanical rubber goods, including molded specialties, and fibrated asphalt products for expansion joints, etc.

Bender Body Co., 6409 Barberton Avenue, Cleveland, manufacturer of automobile bodies, has awarded general contract to A. M. Higley Co., Plymouth Building, for one-story addition, 135 x 170 ft., to cost about $140,000 with equipment.

New England

BOSTON, July 1.—Dealers report a decline in machine tool sales. Transactions included a number of lathes, two milling machines, grinders, punches and other presses. Fresh inquiry is scarcer and the outlook is not encouraging in view of the fact that metal-working plants wanting tools and unable to secure fairly prompt deliveries have stated that purchases will not be made until after the opportunity to inspect tools on exhibition at the national show in September. Business in used tools is dull.

June sales of small tools totaled larger than expected. Bookings, however, were less than in May. Deliveries on certain types of tools are still quite extended.

Dewey & Almy Chemical Co., 235 Harvey Street, Cambridge, Mass., will build a machine shop.

J. W. Greer Co., 119 Windsor Street, Cambridge, Mass., confectionery and baking machinery, has plans for a manufacturing plant at Waltham, Mass.

American Mineral Products Co., Inc., 983 Main Street., Hartford, Conn., will soon ask bids on a one-story, 36 x 200 ft. plant, at Walpole, N. H.

James Hunter Machine Co., 2 Main Street, North Adams, Mass., is erecting a one-story, 72 x 154 ft. machine shop addition. Aberthaw Co., Boston, is contractor.

J. T. Healy & Son, 196 Main Street, Attleboro, Mass., jewelry manufacturers, are erecting a one-story manufacturing plant, 26 x 96 ft. Buffing tools are under consideration.

Electric Boat Co., New London, Conn., has formed Alto-Elco Aircraft Co. to manufacture airplanes. Details of production have not yet been worked out.

Worcester Brass & Electric Plating Co., 316 Shrewsbury Street, Worcester, Mass., lost by fire all enameling ovens and accessories. Company plans to install new equipment soon.

Wireless Specialty Apparatus Co., 76 Atherton Street, Roxbury district, Boston, has plans for a one-story, shipping room and platform 25 x 100 ft. Conveying equipment is under consideration.

A. G. Spalding & Brothers, Center Street, Chicopee, Mass., sporting goods, has started work on a two-story machine shop 30 x 80 ft., and one-story forging unit, 30 x 84 ft.

Warren Telechrone Co., Ashland, Mass., has plans for an addition. Details will be given out soon.

Westfield Boys Trade School, Westfield, Mass., has plans for a three-story

trade school addition, 75 x 180 ft. C. Derby is principal.

City of Westfield, Mass., will have plans ready about July 17 for a trade school addition to cost $80,000. New mechanical equipment will be needed.

City of Hartford, Conn., will close bids next week on a one-story repair shop addition, 32 x 92 ft. Miscellaneous small tools will be required.

American Coal & Chemical Co., 55 Derby Street, Salem, Mass., has plans for a one-story, 45 x 80 ft. coal pocket. Coal handling equipment will be purchased.

City of Meriden, Conn., has plans for a three-story trade school, 60 x 250 ft.

Bids will be taken at once by Fletcher-Thompson, Inc., 542 Fairfield Avenue, Bridgeport, Conn., architect and engineer, for new steam power plant at Stamford Hall Sanitarium, 70 Summer Street, Stamford, Conn., including three 150 hp. boilers, three stokers, flue stack and auxiliary equipment.

Chemical Paper Mfg. Co., Holyoke, Mass., manufacturer of processed papers, has asked bids on general contract for two new units, two stories, 50 x 195 ft. and 35 x 75 ft., to cost about $200,000 with equipment.

Butchart-Nicholls Co., Glenbrook, Conn., manufacturer of golf clubs, irons, etc., has purchased former plant of British-American Mfg. Co., in Springdale district, Stamford, Conn., and is said to be planning early occupancy of part of property for expansion.

North Dighton Stove Co., 1 Railroad Avenue, Taunton, Mass., is rebuilding part of plant, including foundry and assembling department, recently destroyed by fire, to cost over $85,000 with equipment.

James Hunter Machine Co., North Adams, Mass., is planning one-story addition, 70 x 160 ft., primarily for an assembling and erecting shop, to cost over $50,000.

Boston & Albany Railroad Co., South Station, Boston, is planning extensions and improvements in engine house and shops at West Springfield, Mass., to cost about $500,000 with equipment.

Providence Spring Bed Mfg. Co., 355 Washington Street, Providence, R. I., has been organized to manufacture springs, metal beds, etc. Company is in market for materials.

St. Louis

ST. LOUIS, July 1.—Plans are being drawn by Air Terminal Corporation, Kansas City, Mo., care of Buckley & Van Brunt, Gloyd Building, architects, for airport near city, consisting of steel hangars, repair shops, oil storage and other units, to cost more than $500,000 with equipment.

American Eagle Aircraft Corporation, Kansas City, Mo., is planning establishment of factory branches and distributing plants at Chicago, Portland, Minneapolis, Dallas, Tex., and Atlanta, Ga., each one story, entire group to cost more than $100,000 with equipment.

Cities Service Oil Co., Tulsa, Okla., has plans for new storage and distributing plant at Perry, Okla., to cost about $50,000 with equipment. O. P. Blankenburg is construction superintendent in charge.

Gardner Motor Co., Main and Rutger Streets, St. Louis, is arranging for sale of 200,000 shares of stock, totaling about $2,500,000, a considerable part of proceeds to be used for expansion. Company has contracted with Sears, Roebuck & Co., Chicago, mail order distributers, for production of light type automobile to retail at $500, and will develop quantity output of new car within five to six months. Regular line of Gardner cars will be continued as heretofore. Part of appropriation noted will be used for development of Parks Aircraft Co., a subsidiary, operating at a recently established plant in East Side district; three types of monoplanes will be constructed, to retail from $3,500 to $12,000, and complete facilities for parts manufacture and assembling will be provided. Amos O. Payne is chief engineer of Parks organization.

City Council, Columbia, Mo., has plans for addition to municipal electric light and power plant, to cost more than $40,000 with equipment. Burns & McDonnell Engineering Co., Interstate Building, Kansas City, Mo., is engineer.

Manhattan Motor Co., Manhattan, Kan., has awarded general contract to M. J. Green, Manhattan, for two-story service, repair and garage building, 100 x 150 ft., to cost about $100,000 with equipment. A. H. Brewer, 250 East Ohio Street, Chicago, is architect.

Fairfax Airport Co., Kansas City, Mo., will soon take bids for a two-story mechanical shop, 50 x 160 ft., to cost over $40,000 with equipment. Charles A. Smith, Finance Building, is architect.

Chicago, Burlington & Quincy Railroad Co., Omaha, Neb., is reported planning extensions and improvements in engine house at McCook, Neb., to cost about $45,000 with equipment.

South Atlantic

BALTIMORE, July 1.—Bids have been asked by W. A. Fingles, Inc., 29 South Howard Street, Baltimore, operating a sheet metal works, for a two-story plant to cost about $65,000 with equipment. E. B. Glank, 330 North Charles Street, is architect. William A. Fingles is president.

Curtiss-Caproni Corporation, 27 Broadway, New York, and Munsey Building, Baltimore, has approved plans for initial units of new plant to manufacture aircraft on site recently acquired at Baltimore, to be one-story, 400 x 500 ft., including foundry, forge and machine shops and other departments for parts production and assembling, to cost over $350,000 with equipment. A one-story power plant will also be built. Additions will be made later to cost close to like sum. Company is affiliated with Curtiss Aeroplane & Motor Co., Buffalo.

Overhead Door Co., Richmond, Va., recently formed with capital of $500,000 by M. R. Mills, Jr., Rockbridge and High Point Avenues, and associates, plans development of local plant to manufacture doors for garages and other service, including door hangars and accessories.

City Council, Brunswick, Ga., is said to be planning establishment of a municipal airport, including hangars, repair shop, oil storage and other units, to cost more than $70,000 with equipment.

Carolina Casket Co., High Point, N. C., is planning to rebuild machine and cabinet departments destroyed by fire June 23.

A. Ten Eyck Brown, Forsyth Building, Atlanta, Ga., architect, has awarded general contract to J. S. McCauley Co., Bona Allen Building, for three-story and basement automobile service, repair and garage building, 100 x 125 ft., to cost about $125,000 with equipment.

Chief of engineers, United States Army, Washington, has authorized an early call for bids by district engineer, New Orleans, for 1,500,000 linear feet of galvanized wire rope.

Dixie Flying Service, Inc., Malcolm G. Robinson, vice-president, 41 Maiden Lane, New York, recently organized, is planning establishment of airport at Charlottesville, Va., where 125-acre tract has been acquired, to include all-steel hangar, repair and reconditioning shop, and other units, to cost about $75,000 with equipment.

Stanley Manganese Mines, Luray, Va., about eight miles from city, have been acquired by new interests, and will be reopened at once; property has been shut down for a number of months. Plans are under way for improvements, including installation of additional equipment to cost about $50,000.

Board of Education, Columbia, S. C., has plans for addition to senior high school, including a manual training shop, to cost more than $150,000 with equipment. Appropriation has been approved in amount of $500,000 for this and other school work, including new junior high school where manual training department is planned. J. B. Urquhart, Palmetto Building, is architect.

United Motors Service, Inc., Atlanta, Ga., O. J. Coe, manager, a subsidiary of General Motors Corporation, Detroit, has leased structure to be erected at West Peachtree Street and Grant Place, for new service, repair and garage building, to cost $200,000 with equipment. Ivey & Crook, Candler Building, are architects in charge.

Electric Storage Battery Co., Philadelphia, has recently placed in operation new factory branch at 210 Walker Street, S. W., Atlanta, where Exide batteries for automobiles and for various industrial purposes will be assembled. New plant is headquarters of sales and engineering staffs operating in South under direction of Mark C. Pope, Jr., manager.

Milwaukee

MILWAUKEE, July 1.—Machine-tool builders are entering the last half of the year with the largest volume of unfilled orders most of them have ever had at this season. In most shops June business fell but slightly below the average of the preceding five months, and some report bookings as large as in May. Little progress has been made toward prompt delivery, and shipment on current orders cannot be promised earlier than four to six months. Inquiries indicate continued good demand.

Milwaukee Electric Railway & Light Co., 217 Michigan Street, Milwaukee, is awarding contracts for an addition to its Cold Spring car building and maintenance shops which will require considerable new equipment. Estimated investment will be about $150,000. R. H. Pinkley, assistant general manager, is in charge.

Waukesha Motor Co., Waukesha, Wis., manufacturer of industrial gasoline engines, rail motors, etc., is considering establishment of an aircraft engine division which will not require immediate new construction, but additional precision equipment. Harry L. Horning is president and chief engineer.

Bell Machine Co., 35-59 Jackson Street, Oshkosh, Wis., is in market for miscellaneous equipment for a two-story machine shop addition, 50 x 85 ft., to be ready early in September.

Wrought Washer Mfg. Co., 46-54 South Bay Street, Milwaukee, is about to start work on a two-story addition, 75 x 140 ft. Orders have been placed for nearly all equipment required.

Nash Motors Co., Kenosha, Wis., has broken ground for a one-story extension, 42 x 145 ft., to its foundry at main works in Kenosha.

Common Council of West Allis, suburb of Milwaukee, will take bids about July 15 or 20 for installation of a 1,000,000-gal. elevated steel tank and tower and connecting main in municipal waterworks system. Bond issue of $64,000 has been made to cover cost. William Darby is city engineer.

Miami Engineering Co., Dayton, Ohio, which recently established an office and drafting room in Commerce Building, Milwaukee, is considering the installation of a plant for manufacturing tools, dies, fixtures and special machinery. A decision is expected shortly. A. V. Regan is manager at Milwaukee.

Snap-On Wrench Co., 1270 South Pierce Street, Milwaukee, manufacturer of mechanics' tools, is preparing to build a new plant costing about $85,000 for joint use with Blue Point Tool Co., 317 Mineral Street, Milwaukee, which its officers control. Present force will be doubled in new quarters. William Seideman is secretary and treasurer.

Indiana

INDIANAPOLIS, July 1.—Plans have been filed by Edwards Iron Works, Inc., 2101 South Main Street, South Bend., for storage and distributing plant, consisting of two one-story units, 75 x 360 ft., and 40 x 360 ft., to cost about $55,000 with equipment.

W. A. Gingerick, Arkon, near Peru, and associates have organized a company to manufacture iron and other metal castings, capitalized at $50,000. Plans have been approved for initial foundry unit, one story, 66 x 100 ft., to cost about $35,000 with equipment.

Norris Fertilizer Co., Rushville, has awarded general contract to D. Meinken & Son, 2143 Bernard Street, Cincinnati, for rebuilding part of commercial fertilizer plant recently destroyed by fire.

Interstate Public Service Co., Wild Building, Indianapolis, is planning construction of power transmission line from Indianapolis to Bloomington, Martinsville and vicinity; a substation and switching station will be erected on 4-acre tract at Bloomington. Project will cost about $500,000, with steel towers and other equipment.

Western Oil Co., 310 North Meridian Street, Indianapolis, has plans for a one-story machine shop and service station at Kokomo, to cost about $50,000 with equipment; similar works will be constructed at Brazil, Ind., to cost like amount. Bishop-Knowlton & Carson, 312 North Meridian Street, are architects.

United States Corrugated Fibre Box Co., 1315 Martindale Avenue, Indianapolis, has plans for new one and two-story and basement plant totaling 100,000 sq. ft. floor space, to cost $200,000 with equipment. Charles E. Bacon, Odd Fellows Building, is architect. H. J. Lacey is president.

Board of Education, Speedway City, has authorized installation of manual training equipment in addition to local school, to cost about $100,000, for which bids are being asked on general contract until July 11. McGuire & Shook, 941 North Meridian Street, Indianapolis, are architects.

Davidson Enamel Products, Inc., Lima, Ohio, has started operations in a branch plant at Connersville.

Chicago

CHICAGO, July 1.—Machine tool sales in June declined slightly from the total for May. Business is more spotty, some dealers finding sales larger, while others report smaller bookings.

There is a dearth of railroad business. The only list of note was that of the Santa Fe, and the number of tools purchased was not comparable with those bought in recent years. The Rock Island is asking for prices on an axle lathe and several grinders. The Chicago & North Western is in the market for several floor grinders. The Burlington has purchased two shapers and two lathes. One farm implement manufacturer is ready to place a large number of tools and another plans to buy equipment about Oct. 1. Continental Motors Corporation, Muskegon, Mich., is said to be in the market.

K. B. Auto-Radio Laboratories, Inc., manufacturer of radio sets exclusively for installation in automobiles, has leased factory at 2925 Calumet Avenue, Chicago, containing 15,000 sq. ft. of space.

Chester A. Phillips has organized Chester A. Phillips & Co., with offices at 37 West Van Buren Street, Chicago, to deal in contractors', marine, quarry, railroad and industrial equipment, both new and used.

Contract has been let by Ostrander-Seymour Co., 1900 South Fifty-fourth Avenue, Cicero, Ill., manufacturer of machinery and parts, to G. P. Cullen, 2940 West Lake Street, Chicago, for one-story addition, to cost about $45,000 with equipment.

Jensen Radio Co., Clearing industrial district, Chicago, has plans for one-story addition, totaling about 25,000 sq. ft. floor space, to cost about $70,000 with equipment.

J. H. Murphy, care of W. G. Uffendell, 39 South State Street, Chicago, architect, has plans for a two-story power house, 65 x 120 ft., to cost about $40,000 with equipment.

Davenport Machine & Foundry Co., West Fourth Street, Davenport, Iowa, has awarded general contract to Arthur H. Newman & Co., Des Moines, Iowa, for one-story foundry addition, to cost about $50,000 with equipment. Clausen, Kruse & Klein, Kahl Building, are architects.

John Deere Tractor Co., Waterloo, Iowa, manufacturer of tractors, gas and gasoline engines, etc., has awarded general contract to H. A. Main Construction Co., Marsh Place Building, for three-story addition, 60 x 122 ft., to cost about $50,000 with equipment.

Northern Pacific Railroad Co., Railroad Building, St. Paul, Minn., has plans for extensions and improvements in engine house at Mississippi and York Streets, with shop facilities, to cost $40,000. O. M. Rognan is company architect.

Flour City Ornamental Iron Co., Minneapolis, Minn., has begun work on an expansion program to double capacity of plant, to cost about $85,000 with equipment. Company was recently acquired by General Bronze Corporation, Pittsburgh, and will be a unit of that organization.

Northfield Iron Co., Northfield, Minn., has work under way on one-story addition, 40 x 95 ft. C. L. Brown is president and manager.

Willis J. Spaulding, commissioner of public property, City Hall, Springfield, Ill., will receive bids until July 15 for extensions and improvements in municipal power plant, including boiler, underfeed or chain grate stoker, air preheater, economizer, superheater and auxiliary equipment. Burns & McDonnell Engineering Co., Interstate Building, Kansas City, Mo., is consulting engineer.

Monarch Aircraft Co., Rockford, Ill., H. L. Millington, superintendent, has awarded general contract to Tolmie Brothers, 919 Taylor Street, for one-story unit, 120 x 140 ft., for parts production and assembling, to cost more than $50,000 with equipment.

National Parking Garages, Inc., care of Walter W. Ahlschlager, 65 East Huron Street, Chicago, architect, has awarded general contract to Starrett Building Co., 8 South Dearborn Street, for multi-story service, repair and garage building, to cost more than $2,000,000 with equipment.

Cincinnati

CINCINNATI, July 1.—Buyers of machine tools have placed sufficient orders with manufacturers to keep local plants busy well into the fall. The demand is diversified and consists of small lots of machines. A leading lathe builder states that current bookings are sufficient to maintain production 50 per cent above normal into September. A number of orders have been placed by purchasers who have shown little or no interest in new equipment for many months.

Four railroads have purchased several heavy-duty lathes from a local manufacturer.

Department of Service, City Hall, Cincinnati, has awarded a general contract to William Miller & Son, 1950 Central Parkway, for steel hangar at municipal airport, 485 ft. long, with shop and repair facilities, to cost about $75,000 with equipment. Kruckemeyer & Strong, St. Paul Building, are architects.

Firestone Tire & Rubber Co., Akron, Ohio, will soon take bids on general contract for multi-story factory branch and distributing plant at Cincinnati, to cost about $150,000 with equipment. Samuel Hannaford & Son, Dixie Terminal Building, Cincinnati, are architects.

Murray Corporation of America, Inc., 1424 Aberle Avenue, Detroit, has awarded general contract to Rock City Construction Co., Nashville, Tenn., for second unit at plant at Memphis, Tenn., one story, 575 x 640 ft., to cost about $1,000,000 with equipment. Albert Kahn, Inc., Detroit, is architect and engineer.

Sterling Wood Products Co., Knoxville, Tenn., has work under way on one-story addition to automobile body parts plant, to cost over $85,000, for which general contract recently was let to J. M. Dunn & Son, 245 Broad Street.

Crane Co., 836 South Michigan Avenue, Chicago, has leased a two-story and basement building, 75 x 175 ft., to be erected at 179-81 Third Avenue, North, Nashville, Tenn., by Nashville Trust Co., for new factory branch and distributing plant, to cost about $100,000 with equipment. Hart, Freeland & Roberts, Independent Life Building, Nashville, are architects.

Reynolds Metal Co., 2934 Grand Avenue, Louisville, subsidiary of United States Foil Co., has plans by Arthur G. Tafel, 142 South Third Street, architect, for initial unit of new three-story plant, to cost about $150,000 with equipment.

Other structures will be erected later. Entire project will represent investment of over $500,000.

Tennessee-Eastman Corporation, Kingsport, Tenn., subsidiary of Eastman Kodak Co., Rochester, N. Y., has awarded general contract to Gauger-Korsmo Construction Co., Memphis, Tenn., for two of group of four new units, for production of cellulose acetate, acetic acid, and kindred products. Main building will be one and three stories, 100 x 320 ft. Entire project will cost more than $1,000,000 with equipment. Contract for additional units will be let soon, including power plant; plans for latter are being drawn by Baker & Spencer, 17 Battery Place, New York, engineers.

Board of Education, North Olmsted, Ohio, is considering installation of manual training equipment in two-story senior and junior high school to cost about $300,000, for which bids are being asked on general contract until July 10. Walker & Norwick, Third and Main Streets, Dayton, Ohio, are architects.

Gulf States

BIRMINGHAM, July 1.—A 50-acre tract partly on ship channel at Houston, Tex., has been acquired by Phillips Petroleum Co., Bartlesville, Okla., and plans are under consideration for new oil refinery to cost about $600,000.

El Paso Electric Co., El Paso, Tex., is disposing of bond issue of $4,000,000, part of proceeds to be used for extensions and improvements, including a new steam-operated electric power plant, additional equipment in present power station for utilization of natural gas as fuel, and additions to transmission lines.

Mississippi Power & Light Co., Jackson, Miss., has plans for one-story car barn, 110 x 115 ft., with inspection and shop facilities, to cost about $40,000 with equipment. N. W. Overstreet, Mississippi Fire Insurance Building, is architect.

Republic Iron & Steel Co., Youngstown, is said have plans for extensions and improvements in iron ore properties, known as Spaulding mines, near Birmingham, including electrification of mines, installation of electrically-operated loaders, mining machinery, crushers, etc., to cost about $175,000.

Southern Gas Co., San Antonio, Tex., has arranged for sale of a preferred stock issue to total $1,187,000, part of proceeds to be used for extensions and improvements in natural gas properties, including pipe line construction.

Dallas Airport Utilities Corporation, Dallas, Tex., is being organized under direction of Dallas Chamber of Commerce, Charles W. Davis, chairman of organization committee, to carry out an airport project at Love Field. Corporation will have capital of $500,000, to be secured through public subscriptions. Plans are under way for initial hangar, 200 x 300 ft., with shop and repair facilities, to cost $75,000.

Scobey Fireproof Storage Co., 315 North Medina Street, San Antonio, Tex., has plans for a seven-story electrically-operated cold storage and refrigerating plant, to cost about $400,000 with equipment.

Arkansas-Louisiana Pipe Line Co., Ardis Building, Shreveport, La., a subsidiary of Arkansas Natural Gas Corporation, same address, has plans for a natural gas compressor plant at Sterlington, La., about 20 miles from natural gas fields at Monroe, La., to cost about $1,000,000 with machinery. Station will be used in connection with new pipe line from Monroe to Shreveport, about 100 miles, and will have an initial capacity of 10,000 hp., to be increased to 16,000 hp. later.

Texas & Pacific Railway Co., Fort Worth, Tex., is planning construction of eight-story and basement storage and distributing warehouse, 100 x 600 ft., with cold storage and refrigerating division, to cost $2,000,000 with power equipment and other machinery. Wyatt C. Hendrick is company architect.

Globe Oil & Refining Co., Blackwell, Okla., has acquired property at Corpus Christi, Tex., and is said to be planning construction of new oil refinery, to cost more than $250,000 with equipment.

Houston Independent School District, Houston, Tex., has plans for a new vocational school, to cost $100,000 with equipment. Other units will be constructed later. J. W. Northrop, Kirby Building, is architect; H. L. Mills is business manager.

Pacific Coast

SAN FRANCISCO, June 27.—Pacific Gas & Electric Co., 245 Market Street, San Francisco, has plans for one-story equipment storage and distributing plant to cost $100,000. Engineering department of company is in charge.

Swanson & Peterson, Pasadena, Cal., manufacturers of furniture, have awarded general contract to M. Magnuson, Altadena, Cal., for one-story, sawtooth roof factory, 70 x 140 ft., to cost about $60,000 with equipment. Swasey & Hayne, Security Building, Los Angeles, are architects.

Columbia Steel Co., Pittsburg, Cal., plans rebuilding part of plant destroyed by fire June 22.

Standard Auto Body Works, Inc., 1501 South Central Avenue, Los Angeles, has plans for one-story addition, 100 x 140 ft., to cost $70,000 with equipment. C. Godfrey Bailey, Hillstreet Building, is architect.

Paramount Portland Cement Co., 2030 Wilshire Boulevard, Los Angeles, recently organized, has awarded general contract to Hellbush & Co., Los Angeles, for new mill at Torrance, including machine shop, power house, packing house and other units, entire project to cost about $1,500,000 with equipment.

City Council, Baker, Ore., has authorized employment of engineer to make surveys relative to establishment of municipal electric light and power plant, to cost $100,000 with equipment.

L. D. Bohnett, Bank of San Jose Building, San Jose, Cal., attorney, represents local interests organizing a company to construct and operate an airport on Alum Rock Avenue, where tract, 500 x 5280 ft., is being secured. Project will include hangars, repair and reconditioning shops and other units, to cost $150,000 with equipment.

Idaho American Phosphate Co., Nampa, Idaho, H. B. A. Arment, vice-president, has plans for new phosphate mill in Bloomington Canyon, about 3 miles from Paris, to cost over $100,000 with equipment.

Firestone Tire & Rubber Co., Akron, Ohio, has begun work on addition to branch tire and rubber tube plant at Los Angeles, to cost more than $3,000,000 with equipment.

Board of Education, Nebo School District, Springville, Utah, has plans for new mechanics art building, one story, 65 x 105 ft., to cost about $90,000 with equipment. Ashton & Evans, Vermont Building, Salt Lake City, Utah, are architects.

Canada

TORONTO, July 1.—Machine tool sales for June showed a slight improvement over those for May. Large lists were few, but a steady demand prevailed for single tools. Sales the last few days of the month showed general falling off. The Dominion Day holiday had some effect on business, and a number of prospective buyers postponed purchases until after the first of July. The outlook continues bright, and builders and selling agencies look for a large volume of business from inquiries on hand.

Alemite Products of Canada, Ltd., Belleville, Ont., will start work immediately on a two-story factory to cost $60,000. W. H. Patterson Construction Co., Patterson Block, is general contractor.

Hayes Wheel & Forgings, Ltd., Chatham, Ont., has started work on an addition, 180 x 400 ft., to cost about $500,000. E. P. Muntz, Ltd., Temple Building, Toronto, has general contract. Equipment has not yet been purchased.

Chestnut Canoe Co., Fredericton, N. B., has awarded contract to John Powers, 262 O'Dell Avenue, for an addition to cost $22,000.

Newton Construction Co., Ltd., Sherbrooke, Que., has been awarded contract by Textile Co. of Canada, Ltd., Louisville, Que., for a factory to cost $250,000. Philip Fainer, 1470 Peel Street, Montreal, is president. Charles P. Main, Boston, Mass., is engineer.

Canadian Ohio Brass Co., Ltd., Chippewa, Ont., will start work at once on a one-story addition. Smith Brothers, 1740 Ellen Avenue, are general contractors. Findlay & Faulis, 644 Erie Avenue, Niagara Falls, Ont., are architects.

William Collins & Son, Barrington Street, Halifax, N. S., have awarded general contract to Emile Bianco, 1 Kane Place, for a two-story machine shop, to cost $15,000.

Hart Battery Co., St. Johns, Que., has awarded general contract to Walter G. Hunt & Co., 1405 Bishop Street, for two one-story factories, to cost $45,000.

Canadian Gas & Equipment Co., Ltd., Montreal, has awarded general contract to John MacGregor, 1410 Stanley Street, for a two-story factory, to cost $20,000.

Western Canada

International Paper Co., Montreal, is contemplating building 500-ton paper mill at Beaver Cove on Vancouver Island, to cost about $4,000,000.

Town Council, Cardston, Alberta, has plans by Lee Gilchrist, architect, for erection of a power plant to cost $37,000.

Excavation has been started for first unit of an aircraft factory at 1927 Georgia Street, West, Vancouver, B. C., to cost $55,000, for Hoffar-Beeching Shipyards, Ltd. George Hoffar is architect. Austin Co. of Canada, Ltd., 1009 Rogers Building, has general contract.

Brunette Lumber Co., Ltd., Sapperton, B. C., is having plans prepared for a planing mill at New Westminster, B. C., to replace one recently destroyed by fire. New mill will cost $100,000.

Bids are being received by consulting engineers, Underwood & McLellan, Saskatoon, Sask., for waterworks pumping station, sewage disposal plant, etc., for town of Melville, Sask.

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Handling Parts in Skids on Trucks

Boxes Designed for Multiple Lifting—Electric Lift Trucks Carry Full Loads on Established Routes

BY FRED L. PRENTISS*

TRANSPORTATION problems in a small plant are often complex and more difficult of solution than in a large factory, where, with mass production of similar parts, long hauls and straight-line routing, the use of electric trucks is often regarded as an almost indispensable method of economically handling materials in process. While readily admitting their advantage for transportation in large-production plants, the manager of a small plant may assert that electrical trucking of material would not be practical or economical in his plant.

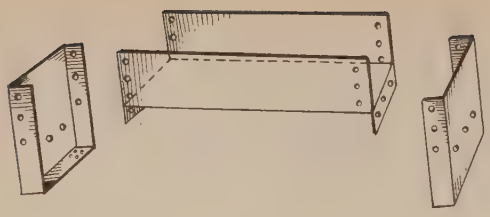
While the Elwell-Parker Electric Co., Cleveland, has used trucks for many years in its own plant, it has recently evolved a system which has improved its transportation methods and solved its handling problems. These are of a character similar to those in many plants of like size, and which include handling of material in process and, from the finished stockroom, numerous parts in comparatively small quantities. This is a plant with approximately 100,000 sq. ft. of floor space, manufacturing being done for the most part in one main four-story building. Not only does the plant as arranged require considerable cross hauling, but the work has to be carried to different floors.

The company's activities are confined to making electric industrial trucks of some 40 types. Large, standardized parts are handled on large load skids, small standardized parts in small skid boxes, and nuts, bolts and similar small pieces in nesting pans, so that the number of pieces may vary from 20 to 500.

Transporting parts economically in relatively small quantities with a standard truck is done by this company by the use of small skid boxes and tote pans, so designed

*Resident editor, THE IRON AGE, Cleveland.

A Crane Truck Loads Truck Frames on to Another Electric Truck for Transportation from the Fabricating Department to the Assembly Department. In the case of large pieces, such as this, skids of course are not needed. The crane truck can make deliveries, but is most serviceable in its own character



SKID Used for Transporting Small Parts and One of the Tote Pans for Parts Smaller Than Those Handled in the Skids (Right). Above are the three pieces of sheet steel of which the skid frame is made

that the truck can carry a load of near its capacity, made up of a number of different parts. Three of these skids are usually transported at one time. This method is used in conveying all work except some standard parts, usually moved in large enough quantities to make large single skid loads. In addition, a routing system is provided for a truck in the production department, and a card system for controlling the truck and material movements.

Manner of Obtaining Full Loads

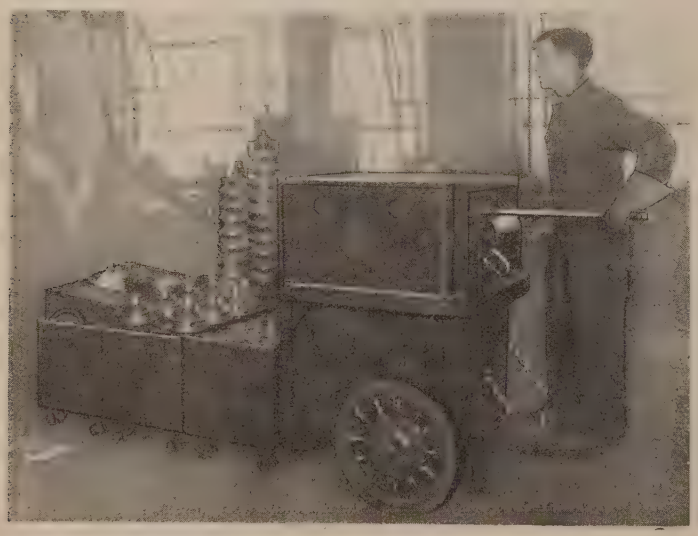
By the use of small skid boxes and handling three skids on an electric lift platform truck at one time, each skid carrying a different kind of parts, a good sized load can be moved. Tote pans, set in the skid boxes, are used for smaller parts than are carried loose in the skid boxes. With the skids and pans, a full load of various parts can be moved at one time. The saving would not be so marked in handling small loads on the electric truck, except for the element of speed. With the use of skids for handling different parts at the same time, there is a gain in speed, the electric trucks moving three times as fast as the hand trucks, and also a gain in tonnage, this being in a ratio of approximately nine to one.

Skids, designed by the company, are 36 in. long, 18 in. wide and 9 in. deep, their capacity being 3⅜ cu. ft., or 1200 lb. each. They have 11½-in. clearance from the floor to the bottom of the box, permitting a lift platform truck to be run beneath. They are made of steel plates; instead of having four legs, the ends are of solid box construction. At each corner is mounted a double-wheel caster, making the trucks convenient to be moved by hand around the machines, as well as to move to the unloading stations.

The truck serving in the production department, on which these skid boxes are handled, is of 4000 lb. capacity with a 26½ x 54-in. platform. This truck picks up one, two or three skids and can set down any one of the skid boxes making up the load. If it is carrying three boxes, it sets the three on the floor, withdraws the platform and shoves out of line the box to be left. Then the truck platform is driven under the remaining boxes, to deliver them to another point.

Tote pans are 18 in. long, 11 in. wide and 5 in. deep, and hold 60 lb. They have handles at each end and are usually set on the skids with handles resting on the edge of the skid, as shown in one illustration. The loads in the skid boxes as a rule are not flush with the skid tops, so that there is room for the tote pans to rest on the skids without disturbing the material in the skids. Each skid has a hook-hole in each end and the tote pans a hook-hole in each handle, for convenience in dragging on the floor by a hook-rod, from machine tool to the department loading point. The plant uses 185 of the skids and 500 tote pans. In addition, there are 19 large skids, 60 in. long and 36 in. wide, which are used for handling parts too large to be carried in the box skids.

Four electric trucks are in service in the plant. In addition to the one for handling the skids, a second truck is provided in the production department for carrying



METHOD of Loading the Truck. Three skids and several tote pans can be carried at one time, making a full truckload of numerous small parts. Material for a certain number of assemblies or subassemblies may thus be handled all together, facilitating the work of putting parts together

frames from the fabricating department to the assembly department, a 5000-lb. non-lifting truck for handling raw stock and a 10-ton tow tractor for moving the completed trucks before batteries are installed in them for test or shipment.

Incoming material is unloaded by means of an overhead hoist from motor trucks on to a lift truck skid, or on to the stationary platform truck, to which a trailer is attached when bar stock is being handled. This truck takes the stock to the rough stock inspection department, and then to the rough stores department if it is not needed immediately for production. This truck also takes, directly to the finished materials inspection department, parts like electric meters, bearings, horns and tires, which are completely finished when received.

Trucks Follow a Prescribed Route

A regular route is laid out for the lift truck in the production department and the operator covers this route at least once an hour. Usually the round trip does not take over 30 min., and, unless his time is taken up in special trips, the operator starts on his next regular trip before the hour is up. The routing of this truck, starting with the raw materials inspection department, is successively through the lathe and screw machine department, automatic machine and punch press department, milling machine department, drill press department, inspection department, finished stockroom, motor and controller department, assembly departments and then back to the receiving department. Two elevators are used for carrying the truck from floor to floor.

In each department are conveniently located stations for incoming and outgoing stock. From the incoming stations stock is pushed a short distance on the caster-mounted skids to the machines on which operations are to be done, and when finished, the skid is pushed back to the outgoing station. However, as the truck operator usually knows to what machine the parts are going, he frequently takes a loaded skid directly to the machine, instead of leaving it at the station. The truck carries finished parts, either on skids or in tote pans, from the finished stockroom to the truck assembly or motor assembly departments, and delivers spare parts and pans to the shipping department.

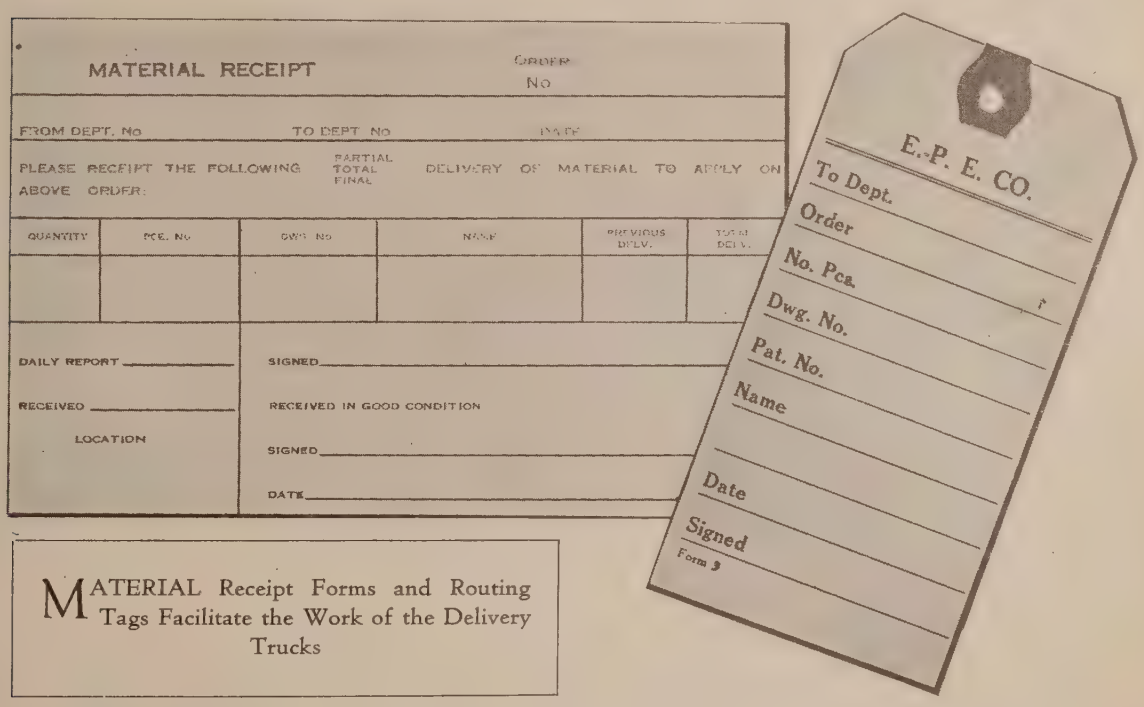
Forms Used in Controlling Material Dispatch

The truck operator gets his instructions for moving of parts by means of tags in two colors, placed on the work. Parts bearing manila tags go from one department to another; those bearing a similar orange tag go to the finished stockroom, where the tag is signed by the inspector, with the date of inspection. This card stays with the work. On these tags are spaces for listing the order number, number of pieces, drawing number, name of part and date.

Another form used is a material receipt, which is made out in duplicate for each movement of material. This receipt follows the work and shows the order number, the department from which the parts are sent, the department in which they are received, the number of pieces, the drawing number, name of part, number previously delivered, the total number delivered and whether a partial or final delivery is being made. This material receipt is signed by the foreman of the department from which the parts come and by the foreman of the department receiving them. One copy goes to the office and the other to the head of the department receiving the parts.

When parts are to be issued from the finished storerooms a material list or requisition is issued by the order department, usually covering a number of items. The head of the finished stockroom copies each item on a separate form, designating the pieces, the number and the drawing number. The pieces called for are put in tote boxes and the truck delivers them to the assembly floor. The assembly department counts the pieces as a check against the storeroom. After the requisition is filled, the stockkeeper enters on the material list the number of pieces of each item delivered, and sends the list to the assembly department, which O. K.'s it and returns it to the stockroom.

In case of shortage of some parts in the stockroom, this is indicated on the requisition by the difference between the number of parts called for and the number delivered. The stockkeeper issues to a stock chaser a shortage



MATERIAL Receipt Forms and Routing Tags Facilitate the Work of the Delivery Trucks

list, showing what is required to complete the order. Then the stockkeeper sends a copy of the material list, showing the shortage, to the stock ledger department, where a perpetual inventory is kept. The stockkeeper retains the original material list with its record of shortages. Parts to supply these shortages come from the different departments through the inspector, being accompanied with a partial "turnout" signed by the foreman. As parts to fill the shortages are received they are trucked to the assembly department.

Much Better Time Is Achieved

This system has resulted in speeding up shipments of spare parts. Formerly parts to fill these orders were picked up only once a day in a standard skid box, having 15 compartments on each side and carried by a lift truck. Now, these orders are taken care of at once and parts are prepared for shipment immediately on receipt. These orders often come by telegraph, as users of this type equipment usually wait until actually requiring parts for replacement before ordering. Very few users stock any spare parts.

Spare part orders, on arriving at the mail department, are sent through a tube to the order department, where the order is written out on manifold blanks. A copy of this is dispatched by aerial cableway from the second floor of the office building to the finished stockroom on the third floor of the factory. The order is filled at once and the electric truck takes it to the shipping room on its next trip. This plan practically assures shipping of all standard part orders the day they are received.

Since power trucks have been used for years in this plant, and the present system has been gradually developed, the principal saving has been in smoothing out schedules that assure an even flow of materials to match the speed of the machine tools through which they pass.

Marked European Progress in Non-Ferrous Die Casting

IN his paper on "Die Casting," before the Third International Foundrymen's Congress in London, June 11 to 14, D. H. Munday said that investigations, in which he had played an important part, into the die casting of copper-rich alloys confirmed his own personal experience obtained in practice, namely, that when a new die is put into operation, there is invariably a period of trial while small corrections are made, adjustments of gates and vent effected, before the most skillful workers are able to produce regularly and continuously satisfactory castings.

As to aluminum alloys, he is fairly convinced that if satisfactory castings cannot be produced under commercial manufacturing conditions in 12-per cent silicon alloy, they cannot be produced at all, for as a general rule they are less liable to "hot-shortness." They are easier to cast, have good tensile strength, generally greater elongation and impact values, and are more resistant to corrosion.

It would appear that gravity die castings are preferable when the mechanical properties of the finished castings are the chief consideration, and that pressure die castings are to be preferred when accuracy of dimension and elimination of machining are of first importance.

In spite of these conclusions, the marked success, achieved by the author's work in the production of die castings in air-pressure machines, makes one feel that there is little to be desired as to soundness of castings when prepared under the best conditions.

Much industrial research has been done to overcome all the difficulties by the Doehler Die Casting Co. in the United States, by some firms on the continent, and by the author's colleagues in Fry's Metal Foundries, Ltd., of London. The last-named company recently acquired a new process in the manufacture of die castings in yellow metals, which promises to revolutionize this section of the industry. The improvements and modifications have passed far beyond the experimental stage, and the results in actual manufacturing conditions are quite satisfactory.

How Size of Section Affects Strength of Gray Cast Iron

TO suggest a method which enables comparisons to be made between different irons melted under the same conditions, and the same irons melted under different conditions, is the aim of J. G. Pearce, British Cast Iron Research Association, in his paper, "Influence of Size of Section on the Strength of Gray Cast Iron," delivered before the Third International Foundrymen's Congress in London, June 11 to 14. The transverse test, of course, is only one mechanical test and may offer little guidance as to the ability of the metal to withstand fatigue, fluid pressure, abrasive wear, corrosion or heat. If a series of bars from a cast be tested in tension on the same-sized test piece, the values will not, under ordinary conditions, depart far from the mean, and the same applies to transverse tests. For the particular mixture and the sizes of test bars chosen there will, therefore, be a definite ratio of transverse to tensile strength. For ordinary irons and the usual standard bars this ratio is about 1.8 to 2.

Through the courtesy of Vickers-Armstrongs, Ltd., Barrow-in-Furness, England, the author tested bars of 1.2 in. and 2.2 in. cylinder iron in transverse, averaging three results in each case. The broken bars were then turned to tensile pieces of different diameters, varying in 1.2 in bars from 1 in. and on 2.2 in. bars from 1.9 to 0.2 in. It was found that tensile strength falls off very rapidly as the machined diameter increases, but that at the specified British Engineering Standard Association diameter for each size of bar the tensile strength falls within the range represented by transverse strength divided by 1.8 to 2.0. The ratio of transverse to tensile depends on the size of the test piece, and tests on other compositions will enable the influence of composition to be determined.

In a set of bars of four compositions provided by Metropolitan Vickers, Ltd., a 1.2-in. transverse bar was broken and one half turned to the standard tensile diameter of 0.564 in. and the other to the standard tensile diameter of 0.798 in. The transverse/tensile ratio varied between 1.59 and 2.18. Further examination is needed.

The strength of cast iron is determined by its composition and its structure, these factors being fixed in part by constitution of the charge and in part by the melting conditions.

Knowing Men Is Keystone of Management

"A Machine Will Do a Known Quantity of Work in a Known Time—a Man Will Do Such Work as He Is Willing and Capable of Doing"

BY ALFRED KAUFFMANN*

"ADVANCING waves of other people's progress sweep over the unchanging man and wash him out."

That statement, made by C. F. Kettering of the General Motors Corporation several years ago, is as true today as it was 35 years ago when as a boy I entered the shops of the General Electric Co. at Schenectady, N. Y.

But before we dwell on the present day situation, let's project ourselves back to the work day of 1894 and thereabouts, when we passed through the check-in gate at seven in the morning and out again at six in the evening, with one-half hour for lunch.

Those were the days when the workman bought his own wooden wash pail, soap and towel, which he kept under his bench, and hauled out a few minutes before quitting time providing the foreman or "super" wasn't looking. If luck was with you, you got home by seven; if you missed your car, no telling when you reached home. There were compensations, however; if you were tired and needed a little nap, all you did was to set your planer, shaper or lathe to cut the air, and your buddy tipped you off when the boss's feet were heard. No piece work, bonus or premium. Some contract work in rare cases, but mostly a flat day rate, and not so very much at that. Quantity and high quality of employee production, at lowest possible unit cost, meant nothing to the average employee then. He knew little of the customer's side of the picture—seldom shared in any of the gains, consequently was interested only in putting in a day's work.

*Abstract of an address before the National Association of Foremen at Indianapolis, June 8.

The Buying Public Is the Boss

And in those early years we had every so often our nice little strikes because one or the other of us didn't want to do this or that, and as we all sympathized with each other we quit, sulked, lost our pay, and finally came back, all because the fellow that hired us thought he was boss and we thought we were boss—when all the time neither of us was boss—but we hadn't learned yet that "the buying public is the boss of us all."

No matter what position we hold, workman, foreman, superintendent, manager, president, or what not, let us fail to give or to make good products, then see how quickly we'll be called to account for our work by the buying public.

Of course, the waves of progress taught us that millions were wasted in unnecessary strikes—we also learned that many losses were due to neglect on the part of the manufacturers to give the same consideration and attention to the human element of their factory as they gave to their machinery. The employees learned also that the employer was their agent who found purchasers for the product of their labor. So between the two we learned that many years of labor were needed for a worker to recover his wasted savings, or for the manufacturer to replenish his loss.

Treat 'em rough, and tell 'em nothing, was not very

A. O. KAUFFMANN

PRESIDENT of the Link-Belt Co., Chicago, Alfred O. Kauffmann has been associated with that organization since 1901. Born in Esslingen, Germany, Aug. 20, 1879, he came to this country at the age of three. After attending the public schools of New York and Rutherford, N. J., Mr. Kauffmann apprenticed himself at the age of 15 to the General Electric Co., at Schenectady, N. Y. He worked in the tool room of that plant until August, 1895, when he entered the machine shop of Robert Hoe & Co., New York, manufacturers of printing presses. While with the Hoe Company he studied at Cooper Union, New York, and in 1898 entered Pratt Institute, Brooklyn, from which he was graduated in 1901 with the degree of mechanical engineer. Immediately afterward he entered the service of the Link-Belt Co. as a draftsman in its Philadelphia branch. In 1906 he was made superintendent of construction and in 1909 he was appointed sales engineer in charge of the West Virginia territory. In January, 1913, he was made assistant to the president, at Chicago, and in July of that year was appointed manager of the Philadelphia plant in charge of operations of the company's Eastern division. In October, 1914, he was transferred to Indianapolis and in February, 1915, was chosen vice-president and general manager, the position he held until his election as president a few years ago.

far from the true relationship between management and employees in manufacturing plants in the early days.

Today, just the opposite views are held by executives whose function is the handling of employees. Men today want to know what it's all about. They are intelligent enough to comprehend the facts, and to use them constructively, and it's good business to give them the information.

Keeping Down Customer Turnover

Old customers are the backbone of any business. If we keep them satisfied with price and quality and delivery we will have less customer turnover. When these facts are brought home to employees, it will stimulate them to appreciate that their performance has a direct bearing upon the marketability of the product. Losses and wastes invariably are reduced by the arousal of interest. So I say again, consider the factory employees as part of the sales force, and tell them everything.

Modern business is organized in such large units today that in an ever-increasing number of cases men who 25 or 30 years ago would have been in business for themselves are today important factors in large corporations. Men with high qualifications devote their talents to marketing, production, accounting or some other phase of the company's business, but irrespective of its many ramifications, the fundamental principles underlying business success are few in number and simple in character.

To start with, the object of being in business is to make profits, and the index of success is the ratio of the profits actually earned to the real profit-making possibilities of the business.

Having determined what these profit-making possibilities are, the next step is to ascertain what the causes are that contribute to failure to realize these potential profits.

We must find out to what extent this failure is due to manufacturing inefficiencies—to excessive sales costs—to short-sighted or incorrect company policies—to defective accounting methods—to ineffective or inadequate advertising, or to still other conditions.

Mergers No Substitute for Good Management

Bear this in mind—mergers of small companies into one large company provide no substitute for competent management. After they are set up and operating as a unit, their earnings, as in any other form of business, depend entirely on the sound judgment and foresight of the management.

But with big business and mergers an entirely new condition was created. Industry, instead of belonging to the privileged few, is passing into the hands of the many. Today there is an army of employee-owners in every large organization. Does not this put an added responsibility on the management? The passing of a dividend becomes a serious matter, if the action hits the pocketbooks of the workmen, foreman, superintendent and company officers. Also workers who are now part owners of their companies are beginning to have a better understanding of the duties and difficulties of management.

Now what part do we play in this picture? Most of us in this room are interested in the manufacturing end. What proportion of the failure to get the best out of our plants can be pinned on us? We all know that an industrial plant is only a mass of junk unless some one is around to see that the bricks, mortar and machinery become tools of production. And that takes human beings.

There may be all kinds of trends in industry—mergers, consolidations and what are sometimes called vertical trusts; or history may bring about the cutting up of the big units into small ones again, but what will always be needed will be men to do things. Men are not such certain quantities as money, materials and machinery. A machine will do a known quantity of work in a known time. A man will do such work as he is willing and capable of doing.

Men, then, are the most important factors in the conduct of any business. And what difference does it make whether we mention this before a gathering of foremen, salesmen or executives, when the cry is always the same. Forget the title tacked on to our names, and look at it from the big opportunity standpoint. Men grow by having responsibility laid upon them. You may be a foreman today and a superintendent or manager tomorrow. The same applies to the workman under you. In a sense you are his manager. Encourage him, let him know that he has a chance to get ahead, and that his chance lies in himself, and you will get further than through any scheme of profit sharing, bonus, or welfare work, though they all may be very helpful.

Employees Need Encouragement

The chance to say "Yes" to the question, "Am I getting on?" is what appeals to most men.

You men here who are foremen—

You know better than I do the many petty things that come up during the day or week, the burden of which must be borne by you. You know the most important factor is maintaining high quality and low cost. Why tell you anything about the direct loss due to spoiled work, or that rush jobs are always more expensive than regular jobs?

Some of you may, but all of you should, have practical knowledge of manufacturing economies and accounting—have a clear insight into such overhead items as equipment depreciation—tool cost—scrap charges—supply costs—supervision and inspection charges and the like—in their relation to direct charges and total costs.

But more important than all is a working knowledge of *human beings.*

Unreduced Oxides in Pig Iron

A STUDY of the origin of non-metallic matter in pig iron and its behavior in steel-making processes, being conducted at the Pittsburgh experiment station of the United States Bureau of Mines, in cooperation with the open-hearth committee of the American Institute of Mining and Metallurgical Engineers and the Bourne-Fuller Co., Cleveland, has shown that it is always present in any grade of pig iron, but that it is present in fairly small amounts unless the blast furnace is working irregularly. The average percentage in 61 samples of basic pig iron was 0.0272, in 50 samples of Bessemer iron, 0.0223, and in 15 samples of foundry iron, 0.0078. The oxide content of the metal is increased during transfer from one vessel to another, such as from the blast furnace to the mixer or from the mixer to the open-hearth, due to oxidation of the metalloids in the iron. When the blast furnace is operating irregularly the proportion of non-metallic matter may go as high as 0.15 to 0.20 per cent.

These non-metallics are composed of silica, and iron and manganese silicates, and analyze approximately 50 per cent silica, 30 per cent iron oxide, 15 per cent manganese oxide and 5 per cent alumina. When pig iron is converted into steel some of these unreduced oxides remain in the steel and it has been shown that high temperatures, high residual manganese and fluid slags are favorable for their elimination. In certain cases, the quality of the steel could be related directly to the amount of unreduced oxides in the iron used in making the steel.

Fine Springs Need Close Tolerances

Small Errors in Size and Shape Result in Large Variation in Load-Carrying Ability—Heat Treatment Affects Elasticity and Fatigue

BY R. W. COOK*

THIS paper will endeavor to indicate some of the things which a spring maker can and cannot do, and how variations in sizes (which may seem quite negligible to the uninitiated) have a large influence on the work which the spring will be able to perform.

For some reason spring manufacture has commonly been looked upon as an art rather than an applied science, and there has always been an atmosphere of mystery surrounding the so-called "art of tempering." Many people are under the impression that the spring maker, through some uncanny power, can make a spring stronger or weaker by some change in the heat treatment. To dispel these errors it will be demonstrated, first, that a spring to support predetermined loads is the result of good engineering design and not of heat treatment; and, second, that a spring made of annealed wire would support as much load as one of the same shape and size that was heat treated or cold drawn provided the elastic limit of the soft material is not exceeded.

Metal in the form of springs has the same physical characteristics as though it were used for other engineering parts. For instance, it obeys Hook's law, which states that stress is proportionate to strain up to the elastic limit of the material. In other words, if a spring deflects 1 in. when supporting 100 lb., it will take 200 lb. to deflect it 2 in.

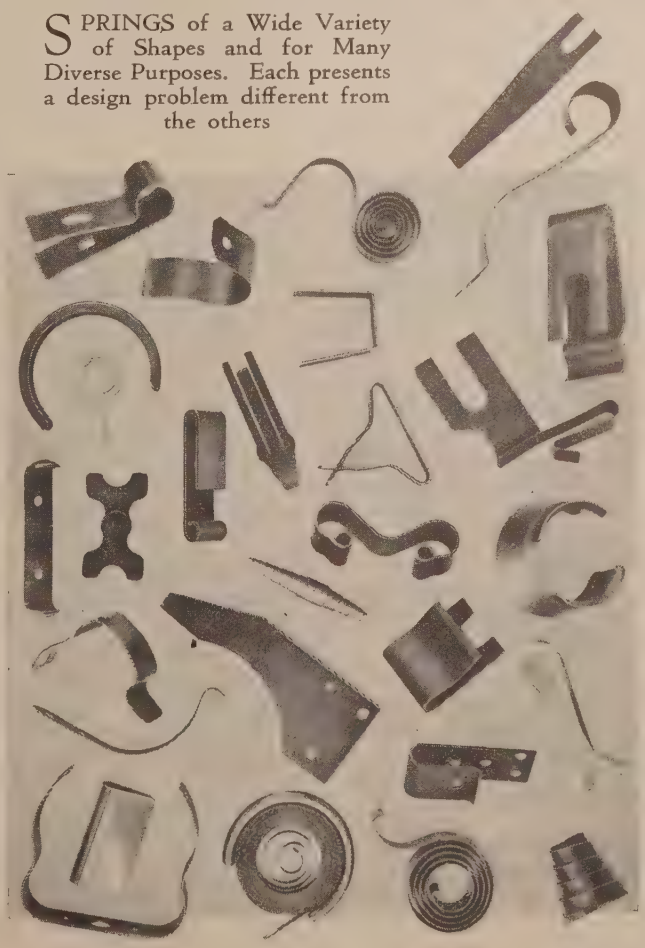
The physical properties used for designing or laying out springs are the same as the engineer would use in designing a bridge, a gear or an automobile axle—the major difference being that, instead of designing the spring as he would a bridge to sustain certain loads with as little deflection as possible, he plans them to deflect a definite distance under a definite load, to return to exactly the same position when the load is removed, and to repeat this exacting operation indefinitely.

Some materials are fine for springs and some are no good at all. For instance, cast iron is useless for spring purposes; a piece of stick sulphur would take no deflection whatsoever before breaking; a piece of rubber, which might be capable of being stretched a great distance and return to its original length, would make a poor spring because it moves too far for a small load. In spring steels we not only have a high elastic limit, but we have a high resistance to stress (or "stiffness"). These two are the important characteristics; the total usefulness of a piece of metal, as far as the manufacture of springs is concerned, is expressed by a combination of its stiffness and its elastic limit.

Stiffness Measured by Young's Modulus

This matter of stiffness is expressed in standard terms, so that one material can be compared with another, by means of Young's modulus of elasticity. Young first discovered that the stiffness of a material and the amount that it could be deflected were two entirely separate factors. Young's modulus is found experimentally by dividing the load on a test piece by the amount it stretches. It is expressed, therefore, in pounds per square inch. If we are talking of Young's modulus in tension, we mean the number of pounds which it would require to stretch a 1-in. block of the material until it measured 2 in., assuming that this could be done without passing the elastic limit.

The peculiar part of this physical property is that Young's modulus for all steels is approximately the same number. The slight variations noted in the experimental determinations are not brought about by heat treatment but by other factors, such as



SPRINGS of a Wide Variety of Shapes and for Many Diverse Purposes. Each presents a design problem different from the others

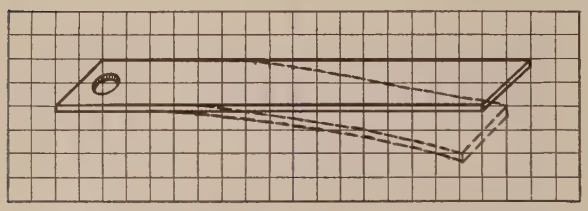
*Vice-president and factory manager, Wallace Barnes Co., Bristol, Conn.

chemical analysis and size of test piece. For all ordinary spring calculations we can treat the modulus as a constant; for steel in tension use 30,000,000 lb. per sq. in., and 12,000,000 lb. per sq. in. for steel in torsion. Of course, if bronze or some other metal is to be used, we then have to substitute the modulus for that metal in the formula.

We therefore find that formulas for unit loads on springs contain constant factors or physical dimensions. Consequently *design* alone, and not heat treatment, controls the unit load.

Deflection Controlled by Elastic Limit

The other physical property of metals used in spring engineering is the elastic limit, which controls the distance that a spring can be deflected without permanent set.



Flat Spring Deflected at One End. 0.0005 in. variation in thickness of 0.010-in. strip makes error of 16 per cent in load-deflection test

Elastic limit is directly dependent on the quality of the material and its heat treatment, it enters into the formula for total capacity of a spring, but is the limiting factor only when springs are to be used at maximum capacity. Needless to say, this condition should be avoided when possible, but is encountered in some important spring work, such as clock springs.

Either the elastic limit or the ultimate strength of the metal is also connected with the endurance of springs on repeated loadings. Not nearly enough is yet known about this important subject. Since heat treatment can affect the elastic limit and the ultimate strength, it also must have some indirect relationship to the endurance. Some authorities who have studied metal in straight test pieces claim that the endurance limit (that is, the load which can repeatedly be placed on the metal without ultimately breaking it) is raised as the tensile strength goes up, either by alloying or heat treating. This appears contrary to the old, old rule of thumb in the spring industry: "for fatigue conditions use the lowest temper* that will do the work without taking set."

Test Results Affect Manufacturing Conditions

Another method of testing used in the laboratory of Wallace Barnes Co. is to deflect springs under definite operating conditions until they break, and continue to vary the manufacturing conditions one at a time until the combination is found which gives best results. One definite finding may be noted: overheating, especially of steels containing more than 0.90 per cent carbon, is a prolific cause of erratic performance. We have also been able to prove that the rule of thumb mentioned above has a basis in fact, namely, that a low tempered spring will actually do far more work than a high tempered spring.

Therefore, a most important result of heat treatment is to be found in producing uniformly good fatigue properties, and this field of research is yet only in its infancy. Probably we will eventually find that a certain microstructure and hardness will deliver more work than any other.

To conclude this portion of the discussion, springs should be designed so that their work is well within not only the elastic limit but the predetermined endurance limit for that particular metal. All of which substantiates what has been indicated so many times in practice, that if springs have suitable hardness and still do not perform, the design should be changed rather than hardness increased. The latter results in erratic fatigue resistance.

*"Low temper" here means low carbon or low hardness, rather than low drawing temperature.

Close Tolerances Frequently Necessary

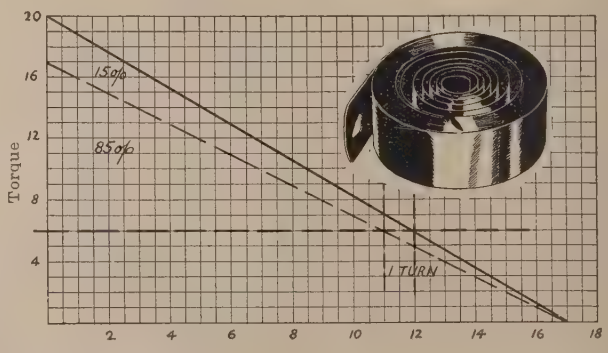
Having indicated the limitations of heat treatment as relates to the performance of springs, the matter of tolerances may now be considered briefly. By taking a few examples a great amount of light can be shed on spring design in general, and a new idea acquired of the degree of accuracy required in the manufacturing of small springs.

Take the insignificant lever spring in the distributer of an automobile engine. It gets scant attention, but it must return the circuit breaker lever to its original position with correct tension within two ounces, plus or minus. It will do this 250,000,000 times while an eight-cylinder car runs 25,000 miles. Or we might consider the control which advances or retards the spark as the throttle is opened or shut; it is actuated by a spring which will not vary in length over 0.005 in. under a given loading. Such examples could be multiplied indefinitely.

Such limitations mean the accurate control of more dimensions than are met with in most machine parts.

Causes of Variations in Wire Size

One of these is dimensional tolerance in the material itself. Without discussing this in detail it is interesting to note a few causes of variation in cold rolling a strip of steel, such as variation in size and quality of the hot rolled bars, change of temperature in the rolls, bending of the rolls during cold rolling; "give" in the roll necks and bearings; eccentric grinding of the rolls; and extreme difficulty of gaging strip while it is traveling at 100 ft. per min. Similar causes of variation might be found in wire drawing, and while these variations might amount to only 0.001 in., or even a quarter as much, they affect vitally the action of the spring, as will be demonstrated later. Then come



Clock Spring, Normally 0.020-In. Thick, if 0.001 In. Undersize Would Lose 15 Per Cent of Total Energy and 8 1/3 Per Cent of Running Time

the difficulties of fabricating the spring itself, not only in forming it to the correct shape, but the much more difficult task of heat treating it without deformation.

Thickness of Flat Wire Most Important Dimension

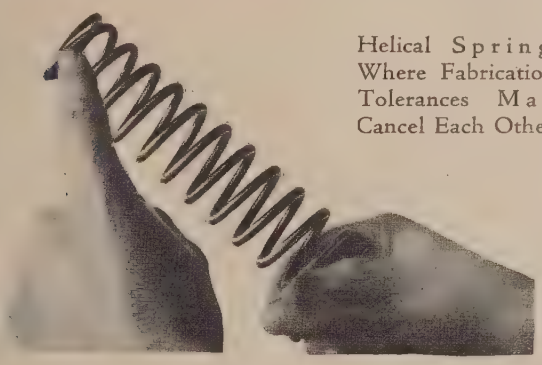
For the first example to show how these slight variations affect the test or performance of the spring, assume a sample flat spring, such as many illustrated in the group on the first page of this article. It is fixed at one end, like a cantilever beam. It has 6 in. effective length, it is 1 in. wide and 0.065 in. thick. It will deflect

approximately 1 in. if 10 lb. is hung on the free end, according to the formula—

$$f = \frac{4pl^3}{Ebh^3}$$

In this, f equals the deflection, p the load, l the length, E the modulus of elasticity in tension, b the width of the stock, and h the thickness. It will be noted that the deflection varies directly as the first power of load and as the cube of the length, and varies inversely as the modulus (which is a constant), the width, and the cube of the thickness.

In such a spring all these factors can be easily controlled except the thickness. It is subject to variation due to the conditions in the rolling mill previously mentioned.



Helical Spring, Where Fabrication Tolerances May Cancel Each Other

Note that the thickness has a very important effect on the load (or the deflection, as the case may be), since it enters into the formula in the third power. Suppose the spring is bought under a specification which says that the load to cause a deflection of 1 in. shall be 10 lb. plus or minus 5 per cent. That means that the thickness of a nominally 0.065-in. strip can vary only plus or minus 0.0015 in. This is less than the commercial tolerance for rolling this thickness of material.

Variations in thickness become more important as the spring gets thinner. Thus, assume a tolerance of plus or minus 0.0005 in. for a 0.010-in. strip (which would be considered excellent accuracy in rolling). That alone would cause a variation of plus or minus 16 per cent in the load required to give standard deflection.

Another good illustration is a clock or phonograph driving spring, such as shown at the bottom of the illustration on the first page. The formula is

$$f = \frac{12plr^2}{Ebh^3}$$

Here also the load varies as the cube of the thickness. If the thickness of an ordinary phonograph spring is decreased from say 0.020 in. to 0.019 in., other factors being equal, the maximum torque would drop from 20 lb. to 17 lb., a loss in maximum torque and total energy of 15 per cent. If such a spring 0.020 in. would give 12 effective turns on its arbor under the working condition, and the steel were 0.001 in. undersize, one total turn would be lost. This means 8⅓ per cent of the running time of the spring-driven motor.

Errors in Helical Springs May Mutually Counterbalance

Variations in size have even more noticeable effect on helical springs, such as valve springs, but fortunately there are several variables entering into that formula. Some of these variables will run over and some under, with the net result falling within the specified tolerance for length or compressibility. For instance, an actual specification calls for a valve spring 2 7/16 in. long, 1 7/16 in. mean diameter, with 7¾ coils of 0.162-in. wire. It is required to be 2 in. long under 30.25 lb. plus or minus 1 lb., and 1 7/16 in. long when loaded to 61.5 lb. plus or minus 1.5 lb. The formula for the unit load of such a spring is

$$\frac{P}{f} = \frac{d^4G}{64nr^3}$$

The unit load varies directly as the fourth power of the wire diameter and the modulus in torsion, and indirectly as the number of coils and the cube of the mean radius.

In order to be within the tolerance allowed in the load test, the wire diameter must be correct to 0.001 in., other dimensions being exact. Or we may take 0.010 in. tolerance on the diameter of the spring, or allow one-seventh of a coil on the number of coils, or 0.015 in. on the length. Each of these figures taken separately is too close a limit for mass production. The ordinarily accepted tolerances on such a spring would be plus or minus 0.002 in. on the wire size, plus or minus 1/32 in. on the diameter, plus or minus 3/32 in. on the length of the spring, and plus or minus one-half coil on the number of coils. Fortunately some of these errors in production will be on the high side while others fall on the low side, and thus partly counterbalance each other. Otherwise it would be a matter of great good fortune to find a spring which would fall within the specified acceptance limits.

While spring makers who take pride in their product like to work to close tolerances (and like to collect the premium which precision always warrants), the above explanation indicates that the limits should be chosen with judgment. Accuracy should be asked for where accuracy is actually needed, and latitude allowed where latitude is possible. If a designer who is used to dimensioning machine parts to plus or minus 0.002 in. should do this out of mere force of habit when ordering springs, he may inadvertently place conditions upon their manufacture which will cause exasperating delay and unwarranted expense.

Nitrogen Content of Steel Is Harmful

There has for a long time been controversy as to the effect of nitrogen in steel, many claiming that it is harmful. A Norwegian, Hjalmar Braune, discusses various problems connected with this subject in a Norwegian technical paper, according to the London *Iron and Coal Trades Review*.

When pig iron is made in charcoal blast furnaces, nitrogen is usually present in the iron in quantities of about 0.002 to 0.003 per cent, if the furnace is worked at a moderate speed and without excessive preheating of the blast. However, with hot-blast and high-speed working, the nitrogen content will be considerably higher—often 0.020 to 0.025 per cent, owing to the increased formation of cyanogen compounds in the furnace. It has long been known by manufacturers and consumers of high-grade pig iron that furnace working conditions have a great influence on the quality of the iron, even if the ordinary analyses are identical with exceedingly low contents of sulphur and phosphorus.

According to the author, it has always been almost impossible to make a first-grade steel from hot-blast iron —a fact recognized as a function of the nitrogen content, which causes an excessive brittleness in the hardened steel. Buyers of Swedish pig iron, therefore, often used to stipulate that the iron should be produced under fixed working conditions, such as cold blast (not above 150 deg. C.), moderate speed, etc.—conditions which cannot easily be controlled by the consumer. It is recommended, therefore, in such cases to adopt the determination of the nitrogen content as the standard test, since this can easily be determined, and will give clear evidence of furnace working conditions.

Automobile Hardware to Be Forged

Transition from Castings and Stampings Suggested—Methods of Production and Heat Treatment in a Versatile Plant

BY F. W. MANKER*

BETTERING the quality of materials and workmanship, a trend of craftsmanship in the times of our forefathers, also dominates the present age of mass production. Probably the outstanding example of this today is the trend in the automobile industry toward better performance, greater endurance, longer life and greater beauty in lines.

This applies to the individual parts just as forcibly as it does to the completely assembled car. Among the parts that go to make up a car the automobile hardware includes such items as crankshafts, steering knuckles, clutches, brakes and accelerating pedals, shift levers, yoke end assemblies, brake band assemblies, disk clutch plates, etc.

Organized in 1881 for the manufacture of vehicle hardware, the Cleveland Hardware Co., Cleveland, is today the largest maker of vehicle hardware in the world and the only one in the United States that produces a full line. During its early years it made hardware for buggies, sleighs, farm wagons, etc.; with the advent of the automobile this line was added. This company made the hardware for the first commercial automobile—the Winton. At present 85 per cent of its output goes into automobiles and tractors, but it is still making hardware for farm wagons. Every American car today carries some parts made in the plant of this company.

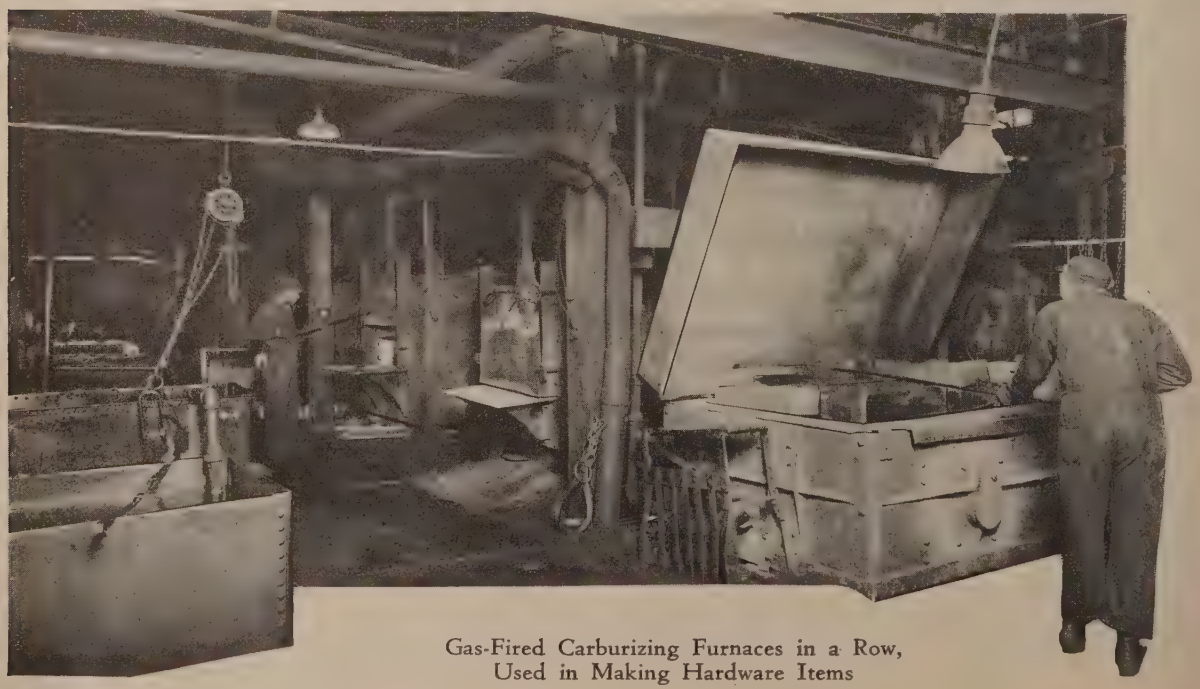
Originally the metal parts of buggies and farm wagons were castings, but this company saw the gradual transition to wrought iron and steel. This same transition is just starting in the automobile industry and, while castings and stampings are still largely in vogue, there is little doubt that the automobile hardware of tomorrow will be of completely forged parts.

At least 75 per cent of the line manufactured by the Cleveland Hardware Co. includes some part which is drop forged. While this company makes and stocks thousands of parts of different types, approximately 60 per cent of its output is special work made on contract, and according to the blueprints and specifications of its customers.

This firm operates its own rolling mill, where it rolls special shapes. Much of this steel is later put through the upsetting or forging processes. There are two plants, five miles apart, each a duplicate of the other, except that the rolling mill at No. 1 does for both.

In the rolling mill are six stands in one train, and an independent mill; all are three-high. Two sizes of billets are used, 2 x 2 in. and 4 x 4 in. These are heated in two regenerative billet furnaces which are fired with gas, a temperature of 2200 deg. Fahr. being maintained. The hearths are 7 x 12 ft. and 7 x 14 ft. Each furnace has two gas burners on each side, and the standard reversing

*Assistant to the president of the Great Lakes Steel Corporation, Detroit, but, when article was written, vice-president of the Surface Combustion Co., Toledo, Ohio.



Gas-Fired Carburizing Furnaces in a Row, Used in Making Hardware Items

Corner of Heat-Treating Department, with Two Rows of Gas-Fired Furnaces

Mechanical Handling of Parts to and from Heat-Treating Furnaces Is Provided for by the Hand-Operated Overhead Crane. Pyrometric control of these furnaces insures repetitive results

Long Line of Trimming Presses Served by Belt Conveyor Which Carries the Parts to Tumbling Barrels for Cleaning

mechanism. Natural draft is supplied through a 175-ft. chimney.

The independent mill is used to roll ruptured bar stock, which saves certain operations in forging. A row of board drop hammers, up to 2 tons in capacity, as well as bulldozers, presses, etc., are used to work the steel. Hot-trim presses are placed alongside the hammers, while the cold-trim presses are in an adjoining department.

These latter are arranged in a long line, supplied by a traveling belt conveyor. The forgings are placed on this in the hammer room and are carried along just back of the presses. The operators on the different presses pick off the parts which their particular press is equipped to trim, trim off the flash and drop the parts on to a short conveyor running at right angles to the supply conveyor.

These short conveyors dump the parts on to another long conveyor running parallel to the first conveyor, which delivers them to the tumbling barrels in another section. When full, these barrels are put on to stands and revolved.

This ganging system, of belt conveyors to bring work to and remove it from the operators and machines, is used throughout the plant wherever applicable, thus eliminating as much trucking, hauling, etc., as possible. The forge shop is equipped with an overhead traveling crane of 120-ft. span, while the other shops and machine divisions are served with overhead monorail systems and electric hoists.

The company makes its own tools, dies, jigs, etc., in a completely equipped and modern tool room. The various forged and cast parts are finished in the machine division, which is fully equipped with milling machines, drill presses, reamers, thread cutters, etc. Several types of special machines are provided for special operations.

Exceptionally modern and up-to-date equipment, arranged for the most effective and efficient operation is found in the heat-treating room. There are 18 gas-fired furnaces in this room, a row of nine on each side with quenches in between, and a traveling overhead crane to assist in handling the work. These furnaces are 7 ft. wide, 5 ft. deep and 6 ft. high and are all alike.

They are used interchangeably for all kinds of heat treating, annealing, etc. Each has automatic pyrometric control and is both overfired and underfired, with two burners located in the crown and two alongside the hearth. These are provided with Surface Combustion Co. (Toledo, Ohio) inspirators and combustion equipment, through which gas is supplied at 15 lb. pressure.

A battery of six recording pyrometers is set on the wall of the metallurgist's room, together with a switchboard to which is wired the thermocouple in each furnace. In this way an exact control is maintained over the operation of each unit.

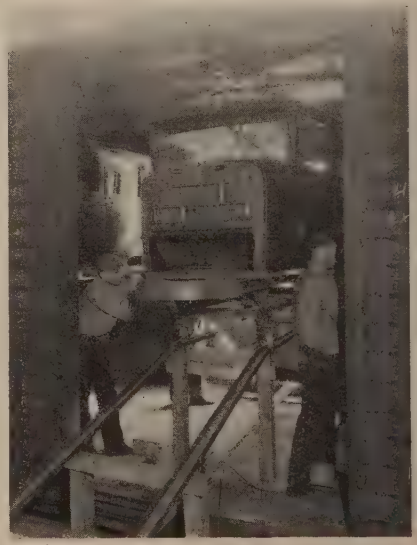
For hardening die blocks the practice is to heat them up to from 1400 to 1600 deg. Fahr. and soak them for from 8 to 12 hr., according to size and physical requirements. They are then drawn at temperatures ranging from 800 to 900 deg., after being quenched in oil. These quenches are cooled by recirculation. This gives a hard face and tough matrix. The drawing is accomplished on cast iron plates set in brick and underfired with four burners.

Great improvement in performance of modern over obsolete equipment is shown by these furnaces, as disclosed by tests with the old combustion system and the new equipment. In heat treating forgings, when the temperature was maintained constant, and the cold work was regularly charged into a hot furnace, a saving in fuel consumption of 46 per cent has been effected, together with a 25 per cent increase in production. And there is a material reduction in furnace maintenance and scale loss.

These economies were effected through the use of inspirators, or gas-air proportioners, by which the gas-air ratio is regulated to give either a reducing or an oxidizing furnace atmosphere. The desired ratio once attained is then maintained automatically, regardless of the flow of gas.

Shipping Automobile Bodies to Utilize All the Space Available in a Box Car

INTERIOR of Freight Cars (Left) Is Arranged to Accommodate Three Tiers of Touring Car Bodies, with 20 Bodies to a Car. Sedan bodies (right), being taller, are loaded in freight cars, two high, for shipment to Detroit, from Graham - Paige Body Corporation, Evansville, Ind.



Europe's Industrial and Political Future Pivots on Coal and Iron Ore

Four Countries Hold the Key to the Reparations Problem—All Must Increase Greatly Their Production for Export—Some Economic Dislocation Ahead

BY EDWIN C. ECKEL*

THIS study of the coal and iron ore supplies of the different European countries is not primarily geologic, nor is it concerned with a very hypothetical future exhaustion of coal and ore reserves. On the contrary it is concerned with the immediate future, industrial and political, also with the bearing on that future of these coal and iron resources and their development. For I am, as will appear, an advocate of the very unpopular theory that we are *not* now living in a new age of economic miracles, but still in a cold, prosaic world where effects are produced by causes.

Today, after a speculative mania such as has never before been seen, every security market in the world is in a hopelessly unsound position. Under normal conditions the inevitable remedy for this would be a speculative collapse, which might cause great individual suffering but not necessarily any great general economic loss. But in the present case the situation is irretrievably compromised by the colossal mass of inter-governmental obligations arising from the war—obligations which must in the long run be paid for by the export of goods on a most tremendous scale. And it may be noted that whatever paper agreement may be reached on the German reparations matter the economic dislocation will be more severe than anything the industrial world has yet seen. [As Mr. Eckel wrote, the reparations conferees at Paris were still in disagreement.—EDITOR.]

There are several countries which must secure reparations in full in order to avoid bankruptcy. There are other countries whose furnaces and mills might as well shut down for the 50 or 60 years during which such payments are in progress. It is obvious that the coal and iron industries, which are after all the only real bases for German earning power, are the ones most keenly interested in the whole matter. And that gives a certain point and timeliness to the present study.

Europe's Coal Percentage Half That of Ore

Before considering actual and probable future developments in Europe itself, it will be well to note very briefly the status of the European continent as a whole, with regard to coal and iron ore reserves and output.

In dealing with unmined reserves it is never necessary to waste energy on any attempt at precision, since such factors as grades, depths and workability are subject to a wide range of individual judgment. So in the present case we will deal with the subject in very round tonnages and percentages, feeling that this will bring out all the really important points with sufficient definiteness.

With regard to coal, we may then note that, on any possible basis of comparison, Europe ranks third, and a rather bad third, to North America and Asia as a holder of unmined coal reserves. The total high-grade coal in Europe, at reasonable depths, may run to some 750 thousand million tons. This is equal to between 15 per cent and 20 per cent of the total world coal reserve, figured on the same basis. Low as compared with the two other continents named, the European reserves are still enormous as compared with those of the three remaining continents, and probably three or four times as great as those of South America, Africa and Australia combined. As against this reserve tonnage, all Europe combined will mine this year not much over 800,000,000 tons of coal and lignite of all grades.

With regard to iron ore, the European situation is even more favorable. On whatever basis we may figure, the European total reserve will fall between 30 per cent and 40 per cent of the total known iron ore reserves of the world. This is being drawn against this year at the rate of something under 100,000,000 tons. The ore mined in Europe has from 1912 on ranged between 50 per cent and 60 per cent of the world total output.

Racial and Raw Material Factors

If we dropped consideration of Europe with this brief summary of its coal and iron resources, however, we would be missing most of the story. For we have in addition to take into consideration certain other facts, physical and human. On the one hand we must consider that Europe has on the whole a climate fitted for white occupation; that its irregular and deeply indented coast line gives access to most of its coal and iron ore deposits, and that the vast bulk of these deposits look toward the Atlantic basin as an outlet. On the other hand, we must consider the facts that Europe was, if not the birthplace, at least the nursery of the white race; that it is still the home of at least 75 per cent of that race; also that more than nine-tenths of all our progress in art, science and technology, during our slow advance from barbarism, has originated in Europe. To which I might add, as a purely personal judgment, that this percentage has not decreased in recent years and is likely to increase, rather than decrease, in the next few decades. For the richer the country, the stupider it is likely to become, since invention and discovery are direct functions of hard necessity rather than of comfort and luxury.

As a final matter of interest, we might pay a little attention to the manner in which these European coal and iron resources and outputs are concentrated, for it will be seen almost immediately that they are not distributed generally and evenly over the face of the continent of Europe. They are, as a matter of fact, concentrated to a very surprising degree. For as regards iron ore, seven countries possess about 95 per cent of the total iron ore reserves of Europe, while four of these account for over 72 per cent of the total European iron ore reserve. As to actual iron ore output, the production is in almost exactly the same ratios—the same seven countries produce 94 per cent of the total European output; the same four produce 72 per cent at least.

As to coal, we have again seven countries producing over 95 per cent of the total European coal output, and possessing over 96 per cent of the total European coal reserve. And of these seven, four produce over 80 per

*Mr. Eckel is spending several months in France and Germany, in the interest of American clients.

cent of the total output and possess over 83 per cent of the entire European coal reserve.

Four Countries Control Coal and Iron Ore

To give final precision to this matter, the European countries are listed below in the order of their current iron ore and coal outputs:

	Coal Output	Iron Ore Output
Germany	1	4
Great Britain	2	5
France and Sarre	3	1
Poland	4	..
Czechoslovakia	5	..
Russia	6	6
Belgium and Luxemburg	7	3
Sweden	..	2
Spain	9	7

It will be seen that the four countries which consistently rank highest as regards coal and iron ore resources and outputs are Germany, France, Great Britain and Belgium, while those which rank relatively high in one of these two basal products, but not in both, are Poland, Czechoslovakia, Russia, Sweden, Spain.

A number of countries which figure on the European map are not mentioned in either of the lists above. Such are Italy, Portugal, Greece, Turkey, Roumania, Bulgaria, Ireland, Denmark, Norway, Latvia, Lithuania, Esthonia, Finland, Holland, Switzerland. Some of these may be fit placements for American loans; some may be interesting tourist resorts. But from our present coldly materialistic viewpoint, none of them can be considered as serious factors in the future of the world. None of them can ever have any serious output of manufactured products for export; none of them can ever supply the materials necessary to keep an army or a fleet in action. None of them, by consequence, will ever be taken seriously in any diplomatic or political dispute. For this world is not ruled by charity or kindness but by steel

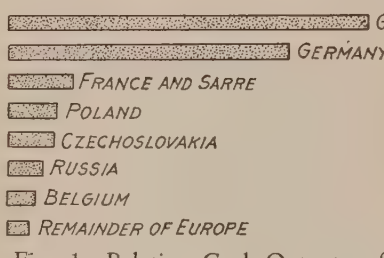


Fig. 1: Relative Coal Outputs of European Nations in 1913, Based on Their Post-War Boundaries so as to Permit Direct Comparison with Later Results, as in Fig. 2

and coal, and a nation which cannot produce either of these may be a very interesting geographical expression—but nothing more.

Concentration of Coal Industry

In merely naming the European coal producing countries without considering their geographic locations we are apt to miss one point of supreme importance—the intense geographic concentration of the European coal industry, disregarding national boundaries. In 1913, for example, all of Europe was producing some 720 million tons of coal and lignite annually. But of this total practically 600 million tons or 83 per cent was produced in northwest Europe alone, leaving only 120 million tons for the total output of central, southern and eastern Europe. And today, after 15 years of war and reconstruction, we find that the old relations are almost exactly re-established, for out of an 800 million ton output in 1928 northwest Europe produced over 665 million tons as against 135 million tons in the rest of the continent.

We have heard a good deal—chiefly in connection with new loan flotations—about the rapid development of the repaired or newly made countries of central and eastern Europe. But after all it is the old coal and manufacturing territory of Germany, France, Belgium, Holland and England which has not only regained its former status but has increased its pre-war lead in all lines of industry.

Europe as a whole increased its coal output about 11 per cent in 15 years. This is a very low rate of increase,

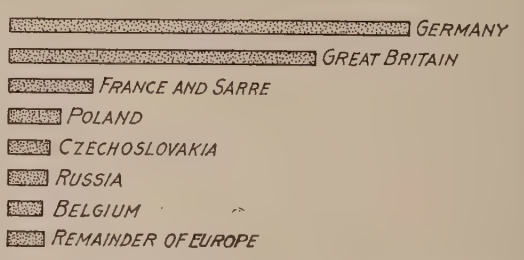


Fig. 2: Relative Coal Outputs of European Nations in 1928, Same Scale as Fig. 1. It will be seen that except for loss of leadership by Great Britain to Germany there has been no change in rank of the seven leading coal-producing countries

probably by far the lowest for any equal period in the last 150 years. But in the closely placed group of five nations above named, the group increase was somewhat over 12 per cent. And this in spite of the fact that one of its leading members, Great Britain, showed an actual loss of some 25 per cent during that period, which was more than compensated for by an increase of 35 per cent in the German output and lesser percentages in the others.

We have, therefore, not the slightest reason for assuming that the New Europe in industrial, financial or military power will be balanced nationally much differently from the old pre-war Europe. From any of these viewpoints there are after all only three real countries in Europe, and they face us on the Atlantic: England, France and Germany, with Belgium, Luxemburg and Holland forming parts of the same close geographic grouping.

France and Germany More Nearly Self-Contained

There is one very important difference, however, which separates these nations into two groups; and since this difference has serious financial and political consequences, it may be noted here. On the one hand, both France and Germany are essentially self-contained so far as necessary food and clothing supplies are concerned. Their chief imports, except for luxuries which could be cut off in time of war or other urgent necessity, are of certain raw materials destined in large part to be re-exported as manufactured goods. Under these circumstances both have always maintained high protective tariffs on manufactured goods and lower rates or free entry for raw materials. Both could, circumstances necessitating it, close their ports to both imports and exports without actually starving their populations. At present the pressure of debts makes this less and less a possibility; and an export balance is necessary for each.

Great Britain and Belgium, on the other hand, cannot support their populations on home produce. They import

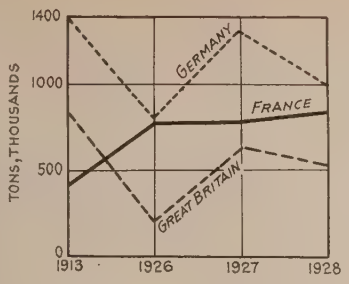


Fig. 3.—Monthly Pig Iron Output of Three Leading European Nations, 1913, 1926, 1927 and 1928. Figures at left are in thousands of metric tons. The important point is the growth of French output

not only raw materials but foodstuffs. So that since a tariff would only raise living costs without doing any good to industry, they have tended toward absolute free trade. At present, in Great Britain, the leaning is toward protection of certain key industries. It is questionable if it can be justified there except as insurance against war.

Under present conditions, of a huge mass of international reparation and debt payments, the differences between these two groups tend to disappear. All four of these countries will have to produce increased amounts of manufactured goods for export; and they will have to do this under pressure for some 60 years. And that is the chief reason for the American industrialist's interest in either debts or reparations. Every politician and every banker in every country has a patented and foolproof method of avoiding this difficulty. It will be of interest to see what happens when they meet cold facts.

Before going on to discuss the coal and iron situation of the separate nations it may clarify that discussion if we precede it by a summary of the leading facts:

Coal and Iron Situation in Summary

COUNTRY	COAL STATUS	IRON ORE STATUS	IRON AND STEEL STATUS
Germany	Coal reserves and output very large; ample for export	Iron ore reserve small; heavy imports necessary	Iron and steel capacity large; heavy exports
Great Britain	Coal reserves and output very large; ample for export. Labor costs high	Large reserve of low grade ore; heavy imports	Iron and steel capacity large; heavy exports
France	Coal reserves small; imports necessary	Enormous reserves; heavy exports	Iron and steel capacity moderate; exports not large
Belgium-Luxemburg	Coal reserves and output small; imports necessary	Iron ore reserves small; output too large; imports desirable	Iron and steel production relatively large; mostly exported
Sweden	No coal	Reserves very large; exports	Small high-grade output
Spain	Very little coal	Moderate reserves, all exported	Non-existent
Russia	Coal reserves moderate; development retarded	Moderate ore reserve	Small but growing industry for local use
Poland	Coal reserves moderate but lack of local use permits relatively heavy exports	Nothing serious	Small
Czechoslovakia	Coal reserves moderate; fully employed locally	Moderate	Relatively intense manufacturing development
Italy	Coal reserve unimportant	Iron reserve slight	Practically zero
Austria	Coal reserve small	Iron reserve moderate	Too great for existing area of the country
Jugoslavia	Coal reserves (mostly lignite) moderate	Small	Very slight

Paris, May, 1929.

[*Concluded in* THE IRON AGE *of July* 18]

Has Made 100,000 Heats of Converter Steel

ON July 1, the 100,000th heat of steel was made in the 3-ton bottom-blown converters of the Taylor-Wharton Iron & Steel Co., High Bridge, N. J. The accompanying reproduction of a photograph shows the two converters. The one on the right has been in service since 1892 and the other since 1917.

The first blow in the older converter was made on Sept. 24, 1892, and the first manganese steel blow on Oct. 29, 1892. This was the tenth blow produced in this converter and is believed to be the first manganese steel made for regular production in this country.

During the nearly 37 years that converter steel has been made at the High Bridge plant there has been regularly produced, in addition to 12 per cent manganese steel and ordinary carbon steel, a considerable tonnage of nickel and nickel-chrome steel for castings, and a number of heats of chrome steel for armor piercing shells for the United States Government. A number of these shells in sizes up to 13 in. were used by the Navy during the Spanish-American War.

In June, 1909, the first steel for castings with manganese of 1.25 per cent was produced at High Bridge and for about seven or eight years thereafter steel of this composition was used for gold dredging buckets. The converters were used also to produce steel for gun carriage castings, powder press cylinders and ship stern frames and rudder posts during the World War.

Welding 26 Miles of Pipe a Day

Use of Automatic Equipment, Both Processing and Conveying, Converts A. O. Smith Plant into a Huge Machine

MAKING pipe-line pipe by electric butt-welding of plates, as done in the A. O. Smith plant, has created an unusual amount of interest. Perhaps still more comment has been caused by the impinging of this new-type pipe upon established lines of supply of pipe made by the conventional fire-welded method. For these reasons the story here, of how that pipe is made, should help to fill the gap in our recording of processes of steel manufacture.

ABOUT 100,000 tons of steel a month is moving by rail and water to Milwaukee, where it is being fabricated by the A. O. Smith Corporation into electrically welded pipe at the rate of 26 miles in 24 hr. The application of the electric arc is in itself an interesting development, but there are also the features of extensive use of automatic conveyors, machines for rigidly testing each length of pipe and the use of special equipment which reduces manual labor to the minimum.

Over a period of many years, this company has acquired extensive experience in the designing of automatic machinery and in the electric arc process of welding. In 1920 the company built an automatic plant for the manufacture of automobile frames [see THE IRON AGE, March 22, 1928, page 794, for description], and for several years it has been electrically welding thick steel plates into pressure vessels for use in the oil-refining industry. Today it is applying this accumulated experience to the manufacture of electrically welded pipe, the output of many miles a day of which is in diameters ranging from 8⅝ in. to 26 in.

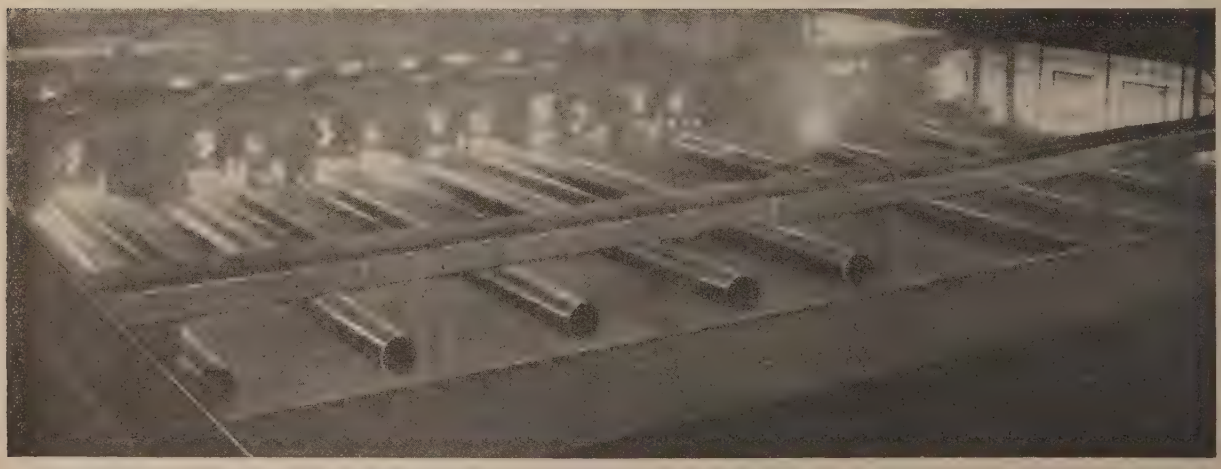
The original pipe plant was conceived, designed and built in the short period of four months and, when put in operation, had a daily production of 6 miles. This later was increased to 10 miles a day. In February of this year a second pipe mill was built, bringing the total output to 26 miles a day. Unit lengths made in the first plant are 30 ft., while the new plant was built for manufacturing units in 40-ft. lengths.

Skelp is bought on rigid specifications and is chemically and physically inspected at the mill as well as at the A. O. Smith Corporation plant before it can enter the production line. The steel most commonly used is 0.20 to 0.30 per cent carbon, having a minimum tensile strength of 60,000 lb. to the sq. in. Thicknesses range from ¼ in. to ½ in., inclusive.

The steel storage yard, 720 ft. long, is traversed by an 80-ft. span overhead electric crane. An inclosed storage building is now under construction, where various sizes of pipe will be held in stock.

Railroad cars, loaded at the mills, are switched beneath the steel yard crane. Skelp removed by the crane may either be deposited in the storage yard or put upon a wide conveyor, which extends from the storage yard into the main building. This conveyor places the material in position for the first operation, which is that of pickling. Here the skelp is picked up in special carriers and put through a pickling and cleaning process by which all mill scale is removed. As the pipe is formed cold, scale is not produced again in the course of manufacture.

After having been prepared for fabrication, the skelp is automatically conveyed to hydraulic presses, where it is formed by a series of operations into cylinders of the required diameter. The cylinders are then moved by conveyors into the automatic electric welding machines. These conveyors run parallel and each one passes through a welding machine, which is under the supervision of an



This Battery of Welding Machines Produces 10 Miles of Pipe in 24 Hr. This is equivalent to 1760 pieces of 30-ft. pipe

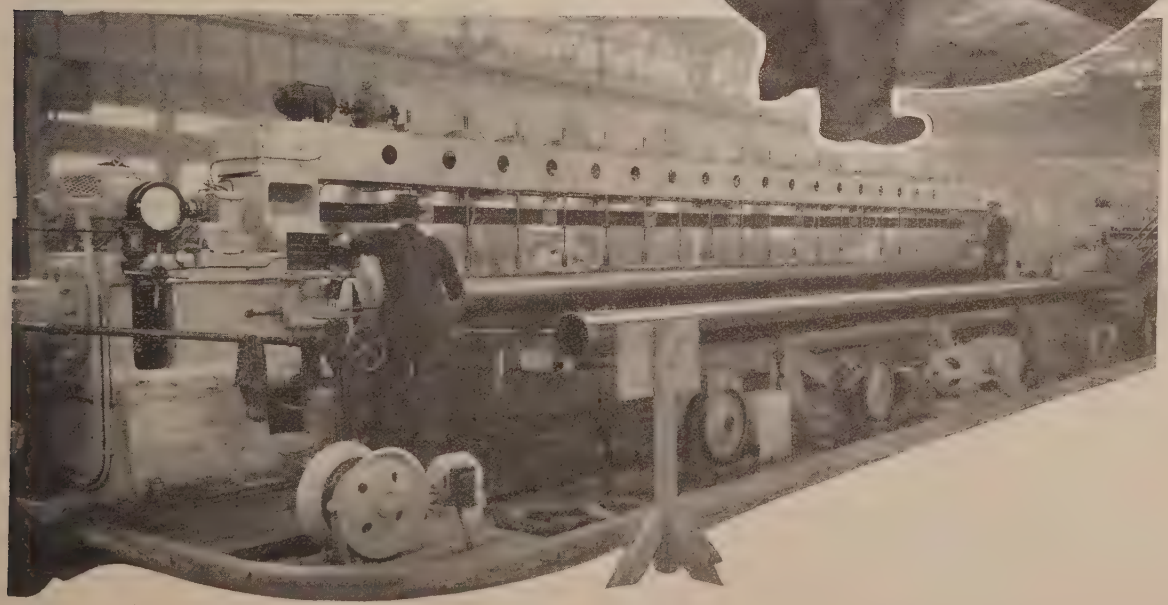
SKELP Is Unloaded by Means of a Magnet Equipped Crane. It is moved to the first operation by the conveyor shown in the foreground

* * *

An Aluminum Gage with a Steel Insert (Right) Is Used to Test for Accuracy of Roundness

* * *

Metal in Each Length of Pipe Is Stressed to 22,000 Lb. to the Sq. In. in this Automatic Hydraulic Testing Machine (Below). Before the pressure is released the weld is hammered by the weights suspended from the overhead member



An Elevated Platform Facilitates Loading Pipe into Gondola Cars. The lengths are raised to the platform by the flight conveyor appearing at left

operator. Close watch is kept on the operation of the machine and the character of the arc, to insure that quality of work which will successfully pass future tests.

Conveyors pick up the pipe at the outgoing end of the welding machines and carry it a short distance laterally to a row of milling machines. Here the welding bead is removed for a short distance at each end, to meet requirements of coupling the joints in the field. If the pipe is to be equipped for bell and spigot joint, one end is expanded cold to form the bell part, and the other end is upset cold so that a bead is thrown up on the outside of the pipe. This bead is valuable, because it assures a positive gage for the correct stabbing distance, and further it forms, with the end of the joining pipe, a well, which facilitates welding in the field.

Hammer Test Is Applied Automatically

It might be well at this point to emphasize that all operations, from pickling to and including welding, are performed in a straight line. The welded cylinders are then transported by a return conveyor to hydraulic testing machines, which stand in a row parallel with this conveyor. The pipe is automatically delivered to each machine, which tests one length at a time. The pressure used is sufficient to produce a stress in the pipe walls of 22,000 lb. to the sq. in. This pressure is held for about 10 sec., during which time the weld is continuously hammered by a series of weights, which are automatically operated and which form an integral part of each testing machine. After the hammer test the pressure is lowered about 50 per cent and the weld is inspected from end to end.

Conveyors Are Timed and Automatically Loaded

After a length of pipe has passed the hydrostatic and hammer tests it is released from the machine and is rolled out on a sloping table, which feeds to a return conveyor. A timing device releases one length at a time and places it on the conveyor. The loading arrangement is timed so that, with all testing machines in operation, one piece of pipe cannot be piled on top of another as it is passing by on the conveyor.

Tested lengths of pipe are fed to a cross conveyor, which forms essentially another link in the chain of inspections that this product must undergo. One of the principal tests made is for roundness. For this, aluminum gages with steel inserts are used; the gages are light in weight and prevent fatigue of the inspectors.

Pipe lengths which have passed all inspection are automatically delivered to a conveyor traveling practically the full length of the shop. One length at a time is placed on this conveyor, which passes through a housing equipped with numerous nozzles for spraying a washing solution over the pipe. This solution is heated and thereby the pipe is warmed so that moisture is quickly evaporated and the pipe is dry before it reaches the paint spray.

The next operation on the line is painting the pipe. The conveyor passes through a housing on the inside of which are mounted paint spray nozzles. Both washing and painting machines are operated by automatic trips, so that the sprays are in action only during the time that a length of pipe is passing through a housing. In other words, the spray is cut off automatically as the trailing end of the pipe passes from its reach. The space between wash and paint housings is so gaged that the pipe is dry, but still warm, when the paint is sprayed on the pipe.

An extension of this conveyor runs past three parallel flight conveyors, which deliver pipe to an elevated platform. Automatic trips are set so that the flight conveyors can be loaded in rotation, or as desired.

The method of loading this pipe into gondola cars is of interest. The load below the level of the car sides is tied in as one unit. Then the load above the car sides is tied in as another unit. Finally, both are tied together, resulting in a single unit that does not shift in transit.

Tests have been made on this pipe in some variety. One of the most interesting was on a 30-ft. length of 16-in. outside diameter pipe with ¼-in. wall thickness. This pipe was first put through rolls to flatten it. with the weld at one edge, where the stress is greatest. This part of the test left the pipe in a hoop-like shape, with the walls pressed together like a deflated inner tube. Heads were welded on the ends and the pipe put under hydraulic pressure. As the pressure was increased the pipe straightened out to within a foot of being perfectly straight, and it came within 3/16 in. of a true circle. The pipe burst at an internal pressure of 1910 lb., producing a stress of 60,800 lb. to the square inch or five times the working pressure.

Willis L. King Finds Sharp Contrasts in His Sixty Years in Iron and Steel

WILLIS L. KING

COMING into the industry only four years after the close of the Civil War, Willis L. King, vice-president of the Jones & Laughlin Steel Corporation, Pittsburgh, has had a longer experience with the ups and downs of iron and steel manufacture in the United States than any of his contemporaries. In July, 1869, at the age of 18, he entered the employ of the firm of Jones & Laughlin, so that the present month marks the completion of 60 years of continuous connection with an interest that has long been named among the three or four leading producers of American steel. Only four years before 1869 was the first "blow" of Bessemer steel made at the famous Troy works, and 15 years passed before the production of Bessemer ingots had climbed to a million tons.

Most important of the changes that have come in Mr. King's long career—one that was fairly revolutionary in the case of his own company—was the practical abandonment of the manufacture of finished iron and the substitution of steel for all rolled products. In the case of the Jones & Laughlin company this has meant an advance from an output of 100 tons of iron a day to more than 10,000 tons of steel ingots daily. For many years Mr. King has been a prominent figure in the councils of the industry, particularly so since the death of B. F. Jones, head of the Jones & Laughlin company, in 1903, following Mr. Jones' long service as president of the American Iron and Steel Association. Since the organization of the American Iron and Steel Institute in 1908, Mr. King has been one of its directors and for most of the interval one of its vice-presidents. Within the past year he was made its honorary vice-president.

With the thought of marking the very unusual anniversary of this month, THE IRON AGE asked Mr. King for an expression concerning the contrasts between 1869 and 1929. We are gratified in presenting below his reply, which adds another to his valuable reminiscences of an eventful period in our iron and steel history:

Mr. A. I. Findley,
Editor THE IRON AGE, *New York.*

DEAR SIR:—I have received your letter of June 20, suggesting that I set down for THE IRON AGE some recollections of my long connection with the iron and steel industry and opinions as to its future. If a brief summary will suffice, I am glad to comply.

100 Tons of Iron Daily, 60 Years Ago

I have been permitted to live in the most interesting period of the metal industry, having participated in the later years of the iron era, having seen the beginning of the age of steel, and having had a modest part in its wonderful development. The most impressive fact of all to me is the amazing growth of steel production.

Having no statistics at hand of the increase in iron and steel over this long period, I may be pardoned, perhaps, for want of a better comparison, in referring to Jones & Laughlin, then a partnership, as typical iron manufacturers, who started operations in 1852, and when I came to them in 1869 made 100 tons of iron per day, and at that were among the largest producers. They changed from iron to steel in 1882, and are now making over 10,000 tons of steel ingots daily. Only our great country, rich in everything material to the progress and well-being of its people, could have made such results possible.

Contrasted Eras

It may be interesting to compare the men and the times. There were no facilities then for communication except limited mail and telegraph service. Letters were hand-written, and banks could not always discount customers' notes, which caused many failures. Competition was severe, not voluntary so much as a necessity for running mills to secure payrolls. Yet, with all their handicaps, the manufacturers were able to supply the limited wants of the time in iron. No great fortunes were made. Mr. Carnegie's star arose after he commenced the manufacture of steel, and he was no more prominent than some others in the iron industry. He was the first to see the coming of steel as a substitute for iron; he had the courage to make vast expenditures, for those days, in building his steel plant, and was fully entitled to the fame and fortune he received. Other prominent iron manufacturers, more conservative, followed him into steel later, and the era of steel was well under way in 1890, in which year 4,277,000 tons of steel ingots were produced. Last year 51,544,000 tons were produced, and at the rate of production over the first six months of this year 58,000,000 tons may be reached in 1929.

Time, perhaps, has cast a glamour over the men of those early days; but it seems to me they had much more than average ability. They were the owners of their properties and had a greater incentive for success. There were not a few outstanding men of unusual force and vision, whose talents would have made them successful as chief executives in the big and strenuous business of today.

New Forces in Selling and in Transport

In looking back I am impressed by the fact that, as business increased, facilities kept pace with its necessities, and always at a time when most needed. History is repeating itself, for at this flood time of business we have two new major agencies which will greatly increase efficiency in operation, merchandising and distribution. One is the recent trade associations, of which many hundreds have been authorized by the Federal Trade Commission, to be guided by the reasonable interpretation of the anti-trust laws by the Supreme Court, which seems to encourage reputable business in cooperation rather than punish it; but they must keep within bounds. The other is the completion of the canalization of numerous rivers, notably the great Ohio and its tributaries. Over 1000 miles from its headwaters at Pittsburgh to Cairo, here is a broad all-the-year waterway through the Mississippi to New Orleans and the Gulf ports. Our corporation has practically had full use of the river for over two years, sending out at intervals tows of 8000 to 10,000 tons of various steel products, although the 53d lock above Cairo has not been entirely completed until recently.

Outlook Highly Favorable

Time has solved many of the troubles of the industry. The money shortage of early days has long passed. A

more recent cause of friction, the question of contract obligations, has been in great part settled by the "hand-to-mouth" buying of the last few years and the nice balance between production and consumption. Overproduction seems have been inherent in the industry from early days, and that trouble, I fear, is ahead of the industry, unless extensions and improvements are kept within reasonable limits. But the natural growth of the country will require more steel; new uses will be found; the railroads, building trades and automobile makers will still be large consumers, and overproduction cannot affect the nearby future. The country is prosperity-minded, and only a great shock can disturb its optimism. Conditions seem to be as ideal as we can ever hope for, and the year 1929 will, I believe, hold the record in tonnage and profits.

Yours very truly,

WILLIS L. KING.

Pittsburgh, July 5.

Hardening Copper and Outdoing the Ancients

AN editorial in THE IRON AGE of June 20 on "Tempering Copper" called attention to the futility of the efforts to which so much attenion is given at intervals in the daily press to rediscover the "lost art of making copper as hard as steel." As no reference was made in the article to what modern metallurgy has done in copper hardening, we give space below to a leaflet on the subject, issued as No. 7, Vol. 7 of "Research Narratives" by the United Engineering Society for its Engineering Foundation. The author is William G. Schneider, research department, Copper and Brass Research Association, 25 Broadway, New York:

"Hardened Copper—A Recovered Art"

"There exists, on the part of those not intimately connected with the working of copper, a belief that the ancients had a method of hardening that metal, with which art we today are not familiar. The fact of the matter is that our present-day metallurgists not only understand how the ancients hardened their copper and bronze, but also know how to produce copper and bronze products that are even harder than those left to us and which represent the evidence of the so-called lost art of hardening copper.

"Cutting edges developed on swords, daggers, knives and other implements by the ancients were obtained by hammering the metal, or in other words cold working. Those old metal workers not only hand hammered their copper implements but also used the same means to harden their bronze articles. The heating of many of these products in open fires resulted in the formation of considerable copper oxide, which alloyed with the copper and hardened it. One of the most common mistakes of persons claiming to have rediscovered 'the lost art of hardening copper' is to heat it in a forge and in this way saturate it with copper oxide, which combines with the copper to form a much harder and much more brittle product.

Two Methods—Alloying and Cold Working

"There are really two methods of hardening copper that are regularly practiced nowadays, just as centuries ago. One consists in alloying the copper with some other metal or several other metals such as zinc, tin, nickel, cadmium, chromium, cobalt, silicon, aluminum, iron, beryllium and arsenic. The second method consists in cold working the metal or copper alloy. In fact, it is possible to work the metal to such a stage of hardness that a slight amount of additional work will cause it to break. The explanation of all copper hardening may be attributed to one of these methods or a combination of them. Microphotographs of an ancient copper spearhead indicated that it was extremely hard and that apparently this hardness had been obtained by cold working the metal.

"Copper scissors, knives and other cutting tools may be obtained. Unless, however, a special reason exists for their use, they offer no advantages over tools made from steel. Occasionally, however, it becomes necessary to use copper or bronze tools, such as knives. Around a powder plant, for instance, where all sparks must be avoided, bronze knives are almost essential.

No Comparison with Steel

"The actual hardness of annealed commercial copper as determined by the Brinell machine is from 40 to 50. The hardness of cold-worked pure copper probably does not ever exceed 120 Brinell. The hardness of copper that has been alloyed with some other metal or a number of metals rarely exceeds 250 Brinell, although a hardness just over 300 has been attained as an upper limit. As a basis of comparison for readers unfamiliar with measurements of the hardness of metals, it may be stated that the Brinell hardness of very 'soft' iron is around 80 and of steel used in common cutlery, such as in a finished pocket knife, about 420 Brinell.

"Not only do many persons spend a short while endeavoring to rediscover an art that never was lost, but some of them devote a whole lifetime to this effort. The tragedy, or rather the denouement, occurs when they have evolved a hard copper. They next endeavor to find some use for it and then learn that, unless it has some special properties, no market exists. Copper wire, hard drawn, has a tensile strength of about 65,000 lb. per sq. in. and an elongation in 10 in. of about 1 per cent, with a conductivity of about 97 per cent. This affords some basis on which to work when endeavoring to develop the hardening of copper. If, for example, it were possible to harden copper so that the tensile strength were materially increased above that just stated, without reducing the conductivity, a worthwhile discovery would have been made.

"Some recent methods of hardening copper by alloying have, to a certain extent, come about as near to actually 'tempering' copper as would seem possible. In these methods the metal silicon plays a most important part because it forms silicides with other metals which in turn form eutectics with the copper. The deoxidizing effect that silicon by itself exerts plays no unimportant part in finally allowing the metal to be worked and by heat treatment to develop a high strength, with a relatively high conductivity. This latter, however, is considerably below that of pure copper and second only, speaking of alloys from the standpoint of both strength and conductivity, to those of copper and cadmium. Alloys of copper with cadmium give, for a stated conductivity, higher strengths than those with silicon."

A program of eight research studies in coal mining and metallurgy will be carried on during the year 1929-30, under the joint auspices of the United States Bureau of Mines, the Carnegie Institute of Technology, and Mining and Metallurgical Advisory Boards composed of mining and metallurgical engineers and executives, it is announced. Eight college graduates have been appointed to research fellowships to make the investigations.

German Foundrymen Meet in Berlin

Committees Active in Many Fields—Suggestions to Improve Electric Furnace Operation—Calory Consumption for Foundry Labor

IN his presidential address before the annual convention of the German Foundry Engineers' Association, held in Berlin, May 24 to 26, Dr. C. Humperdinck, director of the Bruderus Works, Wetzlar, welcomed the 400 delegates coming from all parts of Germany, Austria, Hungary and other countries to the twentieth annual gathering of the association. He emphasized the continued interest in the spirit of research which was accomplishing so much for the good of the industry, and deplored the carelessness with which money is spent for all kinds of purposes in spite of the heavy loads nations have to carry since the cataclysm of the war. This is disastrous to the foundry where the penny must be watched most carefully.

It is the duty of foundry engineers, said the president, to work continually for the recognition of economic requirements in industry, as also in the political progress of the world, and not be swept along with the tide of the times. The time will come when manufacturers can no longer equalize mounting costs with mechanical improvements, and this will react on the ability to market the product. Further, when socialistic endeavor by the state gets to supersede private initiative and the striving for individual profit, these so necessary factors in the prosperity of a country will be crippled and eventually lost. Unless, therefore, an entire realinement of ideas takes place in the near future, the outlook is black and disaster, unemployment and the bread-line are bound to come.

Secretary F. Bock, in his annual report, stated that employment conditions are a little better than last year, but still very bad, as many foundry engineers are unable to find places. Much activity has prevailed in research, this being carried on chiefly by standing committees. The molding sands of Germany are being investigated by one committee, another one has just presented a final report on the number and capacities of arc-electric furnaces. Also there is ready to publish a bibliography of the electric furnace. Another committee is making a series of investigations on high-test cast iron, while other committees are working with brass, bronze and aluminum alloys.

Much attention is being given the subject of the technological education of engineers for the foundry, the final agreement being to have all the societies and trade associations, which are interested, work through the sponsorship of the respective committee of the German Iron and Steel Institute. An investigation is being made on the desirable chemical and physical constitution of foundry coke for melting purposes. Also, there has been taken up the study of alloy additions to cast iron. Apprentice training and cost accounting in connection with the steel, malleable, gray iron and non-ferrous fields complete the program of work being done and still ahead. Much of this is intended to be spread about through courses of lectures and class-room studies.

In connection with the series of papers read at the sessions, the following has been abstracted*:

Improvements in Electric Furnace Practice

K. von Kerpele of Roumania discussed the subject of "Quality in the Electric Steel Foundry." He described a small steel foundry pouring ingots for making steel wire. The entire hearth and walls of the furnace are of standard magnesia brick, the roof being of silica brick. The hearth itself consists of three layers of the brick and a dry-rolled bath bottom on top. This method served better than the usual rammed-up bottom, 20 per cent of patching material being saved in regular operation. At the right of the tapping spout, in the second course of brick, there is left a slit, or opening, 2¾ in. square, to allow a very slight air intake which, coursing under the roof, effectually prevents dripping of the brick. The roof lasts 80 to 90 charges, the period of refining being 2 hr. Consumption of Acheson-Graphite electrodes is 15.4 lb. per 1000 kwhr. Ferrotitanium additions result in high-quality steel. Melting is very hot, pouring slow.

Calories Involved in Foundry Labor

A very odd and interesting paper was read by G. Stern of Frankfort on the "Demand Upon the Operative in Performing Separate Pieces of Work." Mr. Stern has visited the United States and studied production methods. After classifying the steps incident to world-wide production and distribution of castings, he narrows down to a dissection of the slogan "Power-Saving with Profit-Increase," holding that it is necessary, in studying the production of an operative within a given time period, to include the actual consumption of calories, or other units, in this production.

A labor-physiologist, Dr. Simonson, undertook to measure the calories involved in a labor-effort by gaging the consumption of oxygen of the man during the period, as well as getting the carbon dioxide discharged. These figures were obtained for ramming up sand in a mold by hand, by squeezer-press, and by the hydraulic press. Thus, actual figures were obtained showing the great gains in production for the same effort by changing the type of machine for greater efficiency.

Calories Expended Per Mold

In the above example, per mold made, the calories expended were respectively 11,479, 9569 and 5820. On the other hand, the time element comes in also, for the expenditures of calories per minute to obtain this great gain in results were respectively 4049, 5110 and 5640, or an increase. The results brought to parts of a mold per minute, respectively, were 0.353, 0.518 and 0.978. It would follow that it is desirable not only to save time by normalizing mechanical practice, but also to reduce the effort expended per minute without, however, reducing the production intensity.

Tabulating these studies of calory consumption for the separate motions or operations will show the desirability of doing away with operations involving a high expenditure of calories to save the men. These expensive-effort operations are usually connected with work extraneous to the actual objective. Thus, in making a mold, there is the movement of flask parts, shoveling sand, striking off, etc., much of which can be obviated by the designer of molding machinery who knows his business. Easing the labor in squeezing the mold by effective mechanical arrangement, etc., all intended to save the man while increasing his production, should be the watchword of advancing civilization.

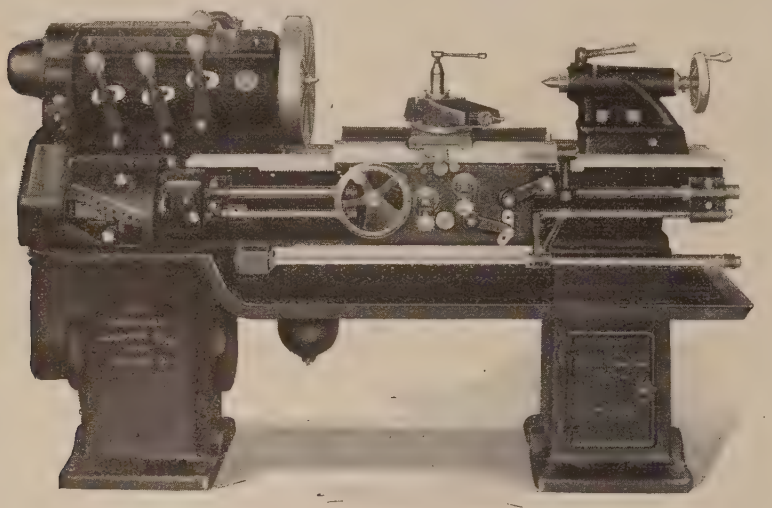
*By Dr. Richard Moldenke, Watchung, N. J.

Designs Lathe for Tungsten Carbide Cutting Tools

TO meet the demand for lathes that will operate smoothly and quietly at much higher than the usual spindle speeds, the Monarch Machine Tool Co., Sidney, Ohio, has brought out a new line. Sizes range from 14 to 36 in. swing, and spindle speeds from 600 to 1500 r.p.m. The machines are said to meet the specifications drawn by research engineers for obtaining the best results with Carboloy, Widia and other tungsten-carbide cutting tools.

Helical gears and Timken roller bearings, features of previous Monarch lathes, supply two main essentials for the higher spindle speeds, and therefore only moderate changes were necessary to adapt them for the tungsten-carbide tools. It is said that work may be turned at speeds never before attempted with high-speed steel tools, and even at top speed no vibration or gear tooth marks are shown. Cast iron is being machined at from 500 to 700 ft. per min. and other materials at corresponding speeds. The new machines may be used economically also at the slower speeds necessary for steel tools.

Tests are said to show that to secure maximum results with the new tungsten-carbide cutting tools, at least twice the power is required as for a lathe designed to use high-speed steel tools, this being due to the much greater amount of metal removed in a given time.

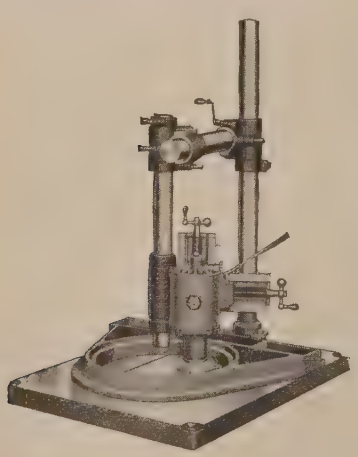


Helical Gears and Tapered Roller Bearings Are Among the Features Adapting the Lathe for Use at Speeds Up to 1500 R.P.M.

Grinder for Surfacing Die Blocks and Other Work

FOR surfacing die blocks, grinding manholes and flat work within a minimum circumference of 24 in. the United States Electrical Tool Co., Cincinnati, has designed the special electric grinder here illustrated. The drive is by a 2-hp. Westinghouse motor running on SKF ball bearings, the lower bearing being of combination radial and thrust type. The surface of the base, which is machined true, is 36 x 48 in. The T-slots provided for clamping down work start from the rear and extend about three-fourths of the distance across the base.

The upright column is made from 3½-in. steel tubing and is 48 in. high. The upright is equipped with a stop collar. The cross arm, also of 3½-in. steel tubing, is 36 in. long. The arm holding the grinder is 3-in. diameter cold rolled steel and the grinder mounting collar is equipped top and bottom with ball bearings. The mounting has two adjustments, 6-in. vertical and 8-in. horizontal. The dovetail slides have adjustable gibs. The machine is regularly equipped with a 6-in. cup wheel and 12 ft. of rubber covered cable with attachment plug.

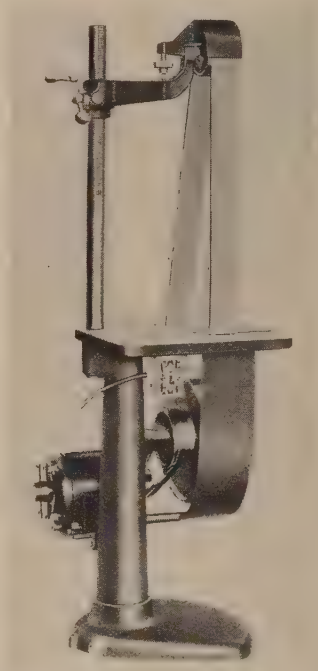


The Grinder Mounting Is Adjustable 6-In. Vertically and 8-In. Horizontally

Irregular Belt Sander and Grinder

A PORTABLE motor-driven sander and grinder weighing 265 lb. net is being put out by the Porter-Cable Machine Co., Syracuse, N. Y. This machine, as shown in the illustration, has a table 13 by 19 in., which is 33¾ in. from the floor. It uses belts ½ to 3 in. in width and with lengths of 95 to 125 in.

Abrasive belt speed is either 1975 ft. a minute for wood or 3425 ft. a minute for metal. Power is transmitted from the motor to the drive pulley by a belt. This fact, together with the rubber covering on the pulleys over which the abrasive band travels, insures quiet operation.



Metal or Wooden Pieces of Irregular Shape May Be Sanded Conveniently

Overall dimensions are 22 by 27 in. by 65¾ in. high. A motor of ½ hp., with ball bearings, is standard equipment.

Safe Practices in Handling Material

A pamphlet of 12 pages devoted to handling material with mechanical equipment has been published by the National Safety Council, 108 East Ohio Street, Chicago. This is called "Safe Practices Pamphlet No. 55." It is a compilation of experiences in accident prevention and is largely illustrated. It follows a previous pamphlet on handling materials by hand and by truck. Many types of equipment are shown in use, and the possibilities of danger in connection with this equipment are pointed out.

Lapping Soft and Hardened Gears

Carborundum Brand Compounds Developed for Variety of Conditions—Methods of Application Described

BY H. J. WILLS*

LAPPING is an important operation wherever quiet and smooth running gears are essential. It removes cutter marks, imperfections in tooth profile and spacing, and corrects distortions caused by heat treatment. Many gears formerly scrapped because of minor surface imperfections are now reclaimed by the lapping process.

Soft metallic gears are usually mounted on an arbor between the centers of a lapping machine having adjustments for varying the mesh of the gears. Because of their comparatively small diameters, hardened steel gears are usually mounted on a lathe and lapped on centers only. If the lapping machine equipment has adjustments for varying the mesh of the gears, it is recommended that the gears be lapped in all three positions, that is, on close, wide and on running centers.

Carborundum brand finishing compound should be applied with a paint brush after the gear has been mounted and is in motion. Sufficient compound should be used to wet the entire surface of the gear teeth and in the case of very large gears, the surface of the teeth should be moistened with kerosene or machine oil before applying the compound. Best results are obtained if the gears are lapped under light load and at speeds that will not cause the compound to fly, a speed just below the point where the compound would be thrown from the gears being the most desirable. Frequent examination of the lapping action is necessary on the first gears lapped in order to determine the time required to obtain the desired results.

Successful operation of any compound depends a great deal upon selection of the proper grading for each specific class of work. For the lapping of soft metallic gears, Carborundum brand finishing compound in WL5-4 coarse, WO5-4 medium or WR5-4 fine, depending on the size and condition of the gears, may be used. For exceptionally high finish, the grading HX2-40 is recommended.

For the lapping of hardened steel gears, the RL4-4 grading may be used for a fast cut on rough gears, but where the gears are small and smooth finish essential, a special and finer grade, the RT4-4 has been developed. For hardened steel gears lapped in with soft metallic companion gears, the compound recommended for soft gears should be applied.

Lapping of worms and wormwheels is one of the simplest of all gear lapping processes. When lapping worms only, the worm is mounted between centers on a driven spindle. A cast-iron, brass or micarta lap made to the same form as the companion worm-wheel is mounted on a two-way carriage and after pressing the lap firmly into the worm threads, the machine is started and the compound applied with a brush while the lap traverses the worm once in each direction the full length of the threads. Worms up to about 2 in. in diameter are lapped by this method in from 5 to 10 sec. The most suitable grade of Carborundum brand compound for the larger diameters is the RT4-4; for the smaller worms the grading RU4-9 is more efficient. Where tool marks are deep, regardless of the diameter of the worm, the grading RS4-9, which is a faster cutting compound, is the most satisfactory.

When lapping worms and wormwheels simultaneously, the machine set-up is the same as in lapping worms only, except that the wormwheel takes the place of the manufactured lap. The grading WR5-4 is usually suitable for this operation unless a coarser grading is required, when the WO5-4 grading is recommended.

The foregoing methods apply to lapping on a production basis. Where production is small and more or less intermittent, or where lapping machine equipment is not available, the worms and gears can be assembled and lapped in their housings. If this method is employed, the compound should be applied sparingly so that it will not flow or drip into the bearings or housings.

Although the abrasive content in the compound does not charge or impregnate the metal, the parts should be thoroughly cleaned after lapping to remove any loose particles of abrasive. This cleansing is best accomplished by brushing or spraying the gears either with kerosene or hot water.

*Engineer, Carborundum Co., Niagara Falls, N. Y.

New ¼-Ton Electric Hoist

A YALE ¼-ton electric hoist, providing rapid and safe handling for lifting light loads, has been added to the line of the Yale & Towne Mfg. Co., Stamford, Conn. Suspension is structural steel plate arranged for either hook or trolley type of hoist. The trolley is adjustable to fit I-beams from 4 in. to 9 in. The hoist has been designed to operate where space is limited and close headroom is required.

Trolley wheels are made of pressed steel and are mounted on ball bearings. Zerk fittings are provided, for grease lubrication. The fully inclosed motor has ball bearings. As a. c. and d. c. motors are built to the same dimensions, they are interchangeable on the hoist frame. The motor has a magnetic brake to stop the machine quickly, and prevent coasting when the current is shut off.

This hoist can be furnished in either the manual or push-button type. Controllers are ruggedly constructed and all parts are accessible. A planetary gear reduction is used, operating in oil in a fully inclosed housing. The chain drive from the motor to the sprocket and all the lowering brake parts are fully inclosed in a housing and operate in oil.

The load sheave is a bronzed bushed, electric steel casting, turned and ground to concentricity for the large chrome-vanadium steel bearing races. The driving pinion that passes through the load sheave is machined from a single drop forging, then heat-treated, with the bearing surfaces on the shaft ground to 0.001 in.

An automatic stop mechanically connected with the controller shuts off the power when the upper or lower limit of hook travel is reached. The brakes are immediately applied and hoist brought to a stop.

STRUCTURAL Steel Plate Forms the Suspension Member of the New Low-Head Hoist Illustrated. Limit stops provide for safety

Proportional Freight Rates Allowed

Interstate Commerce Commission Approves Tariffs Giving Lower Rail-and-Water Rates to Southwest

WASHINGTON, July 9.—The Interstate Commerce Commission this afternoon decided not to suspend the proportional rates on iron and steel products proposed by the Pennsylvania Railroad and the Central Freight Association territory railroads. The tariffs will become effective July 10.

Protests were made by the Chicago Association of Commerce, in behalf of Chicago iron and steel producers; by the Youngstown Chamber of Commerce, in behalf of steel companies in that district, and by the Bethlehem Steel Corporation.

By this decision, steel companies at McKeesport, Pa., and Bessemer, Pa., Depew, N. Y., and at other points in or very near to the Pittsburgh and Buffalo steel-producing districts will be able to ship their products to the Southwest at rail-and-water rates via the Mallory, Morgan and Southern steamship lines and their connections in the Southwest. These tariffs have been in effect since Feb. 21, 1928, but the rates have not applied from the points which now are to receive this benefit.

Tariffs filed by the ocean lines and their Southwestern connections make rates from some middle steel district points to the Southwest on the basis of the ocean lines absorbing the local rates of the Eastern railroads to the North Atlantic ports. For example, they publish a rate of 74c. on wrought pipe from McKeesport, Pa., to Dallas, Tex. The local rate on pipe from McKeesport to New York is 34c. a 100 lb. The ocean-and-rail lines stand the cost of getting the pipe to the port, including lighterage, or other service, if any. They have left for themselves 40c. a 100 lb.

While McKeesport and Bessemer, Pa., are in the Pittsburgh rate district and the rate to New York is the same as the rate from Pittsburgh, Pittsburgh is not one of the points from which the ocean-and-rail rates apply. If the Pittsburgh steel company desires to use the ocean-and-rail rate to the Southwest, it must pay to get its steel to New York.

To overcome the handicap caused by that situation, the Pennsylvania proposed a proportional rate, applicable only on traffic going beyond McKeesport, of 10c. a net ton. In that way the Pittsburgh shipper will be able to get to Dallas on a 74.5 cent rate or only ½c. higher than the McKeesport shipper.

From Youngstown it is proposed to establish a proportional rate of 3.5c., which is exactly the difference between the local rates from Youngstown and McKeesport to New York. From Cleveland to McKeesport the proportional rate named in the tariffs is 6c. a 100 lb.

By means of these proportional rates the railroads serving mill points other than those named in the ocean-and-rail tariffs propose to put those points on an equality with McKeesport, Bessemer and other points from which the ocean carriers have published the rates.

In every instance the Eastern railroads, under the proposed rates, will collect all or more than their local rates to the ports. Youngstown will get into Dallas, for instance, on a rate of 77.5c. on pipe. At present Youngstown, if it ships pipe to Dallas, must pay a local rate of 11c. to McKeesport, plus the 74c. ocean-and-rail rate from that point.

This sort of an adjustment is to apply from all the eastern Ohio, western Pennsylvania and New York and northern West Virginia mill ports to all the North Atlantic ports via which the ocean-and-rail routes and rates are in operation, subject to the customary port differential adjustment.

The Chicago Association of Commerce, in its petition, said, it spoke for the Acme Steel Co., Clayton Mark & Co., Inland Steel Co. and the Interstate Iron and Steel Co. They ship on all-rail rates to the Southwest. The proportionals will increase the area from which competition with them in the Southwest will come. The Bethlehem corporation protested on account of the increased competition brought about in the way indicated.

Canadian Output of Iron and Steel Products Increased

TORONTO, ONT., July 9.—Iron and steel products manufactured in Canada during 1928 were valued at $607,731,226, or $82,000,000 above the total for 1927, according to preliminary statistics issued by the Dominion Bureau of Statistics. The estimate is based on reports from 1163 manufacturing establishments. Fixed and operating capital reported by these concerns totaled $721,454,764, employees numbered 118,869, salaries and wages totaled $166,837,357, materials cost $306,764,663 and value added by manufacturing was $300,966,563. In 1927, the number of plants was 1148, capital was $638,914,893, number of employees was 106,293 and materials cost $261,102,679. Plants in the iron and steel industry are classified in 13 industrial groups, arranged according to principal products. Twelve of these groups had a higher output in 1928 than in the previous year.

Imports into Canada of iron and steel products during 1928 were valued at $322,959,144, compared with $248,151,554 in 1927. Over 91 per cent, or $295,114,281, of the imports in this class came from the United States and about 5 per cent, or $17,762,561, from the United Kingdom.

Canadian exports of iron and steel in 1928 reached a value of $70,665,677, as against $67,831,374 in 1927. The principal countries to which Canada exported iron and steel goods in 1928 were: United States, $9,216,896; United Kingdom, $8,416,250; Argentina, $6,784,262; Australia, $7,387,236; British India, $6,377,739; New Zealand, $5,421,763; Brazil, $3,162,412; British South Africa, $2,953,139; British East Indies, Chile, Germany and Dutch East Indies, over $1,000,000 each. In addition to the above, foreign iron and steel products reexported from Canada during 1928 was valued at $4,164,254, compared with $3,113,235 in 1927. Of this year's total, $3,952,464 went to the United States and $117,318 to the United Kingdom.

New Company to Build Long Gas Lines

The Central States Natural Gas Co. has been incorporated under the laws of Delaware for the purpose of building a pipe line for natural gas from the Texas Panhandle to Chicago, as well as to other cities en route. This corporation will acquire the natural gas rights and natural gas wells on 132,000 acres of land in the Texas Panhandle from the Texas, Phillips, Skelly and Columbian Carbon companies. It is also reported that the same interests have in mind the construction of a natural gas pipe line from the Texas Panhandle to points in Nebraska, Iowa and other areas.

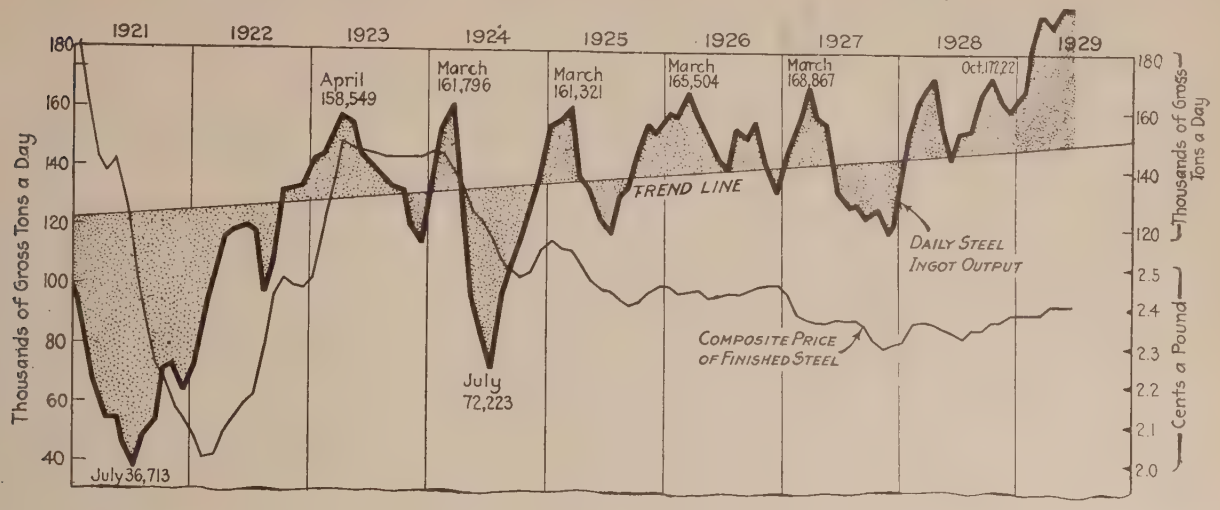
Directors of the Central States Natural Gas Co., will be R. C. Holmes, president, Texas Co.; R. Ogarrio, vice-president, Texas Co.; Frank Phillips, president, Phillips Petroleum Co.; W. G. Skelly, president, Skelly Oil Co., and Reid L. Carr, secretary, Columbian Carbon Co.

Imports British Airplane and Axle Tubing

Aeronautical tubing, including the streamline, round, oval, crescent, cowl ring, letter D, square, hexagon and other sections, made by the Reynolds Tube Co., Ltd., Birmingham, England, can now be obtained from A. Milne & Co., 745 Washington Street, New York. According to H. S. Hoyt, of the Milne company, who recently returned from a trip to England, the tubing is available under United States Government specifications, and that axle tubes, taper gage tubes and other products of the Reynolds company are included in the American representation arranged by Mr. Hoyt.

Civil service examinations for physicist, $3,800 a year, associate physicist, $3,200, and assistant physicist, $2,600, for Government Bureaus are announced. Applications must be on file not later than Aug. 14 with the United States Civil Service Commission, Washington.

Ingot Production in June Held Closely to the Record-Breaking Daily Rate of May. The trend line shows a normal growth of about 1,013,000 tons a year. Prices in June were 3 per cent better than at midyear of 1928



Record Half-Year in Steel Ingots

June Production Brings Total Close to 29,000,000 Tons—Four Successive Months Each Higher Than Any Month in Any Preceding Year

WHILE production of steel ingots in June showed a drop of almost 400,000 tons from the record-breaking total of May, it represented nevertheless the largest month's tonnage, by more than 200,000 tons, which had ever been achieved previous to last March. On the daily basis, the May record of 195,302 tons for each of the 27 working days of the month was almost precisely equalled with 195,255 tons daily for 25 days in June.

Open-hearth production in June fell off 9 per cent from that of May. Bessemer production fell off 12 per cent from the highest Bessemer tonnage which had been made in many months.

For the first half of the year the calculated monthly output, as reported by the American Iron and Steel Institute, was 28,967,174 gross tons. This is 17 per cent ahead of the 24,798,073 tons for the first half of last year, which was the largest first half ever before reached. The current tonnage is almost 4,000,000 tons ahead of the 25,067,122 tons of the second half of 1928, which was the largest half-year's tonnage previous to the present.

All of these figures relate to open-hearth and Bessemer ingots only, as electric and crucible steel ingots are no longer reported monthly by the Institute. Ingots of those two types of steel amounted to 460,208 tons in 1928. This works out at an average of about 1480 tons a day. A figure of some such magnitude would have to be added to each of the recent daily averages to obtain the total outpouring of steel ingots from American furnaces.

For a full year, July 1, 1928, to June 30, 1929, production of Bessemer and open-hearth ingots has been 54,034,296 gross tons. This figure may be compared with 49,865,185 tons, the record-breaking tonnage of the calendar year 1928. The advance, allowing for one less working day in the current figures, is 8.7 per cent.

Particulars for the past 18 months are shown in the table. The diagram traces the course of ingot production and finished steel prices over the past 8½ years.

PRODUCTION OF OPEN-HEARTH AND BESSEMER STEEL INGOTS
(GROSS TONS)

1928 Months	Reported by Companies Which Made 94.51 Per Cent of the Steel Ingots in 1928		Calculated Monthly Output All Companies	No. of Working Days	Approximate Daily Output All Companies
	Open-Hearth	Bessemer			
January	3,273,294	498,691	3,990,902	26	153,496
February	3,300,407	521,250	4,043,457	25	161,738
March	3,692,648	567,330	4,507,217	27	166,934
April	3,505,104	564,110	4,305,382	25	172,215
May	3,394,301	582,128	4,207,212	27	155,823
June	3,010,341	528,193	3,743,903	26	143,996
Six months	20,176,095	3,261,702	24,798,073	156	158,962
July	3,068,257	528,588	3,805,598	25	152,224
August	3,379,625	569,771	4,178,610	27	154,763
September	3,375,654	544,710	4,147,893	25	165,916
October	3,795,800	599,098	4,649,968	27	172,221
November	3,442,112	590,669	4,266,835	26	164,109
December	3,301,114	496,679	4,018,208	25	160,728
Year	40,538,657	6,591,217	49,865,185	311	160,339
1929					
January	3,694,218	549,616	4,490,354	27	166,309
February	3,599,224	489,279	4,326,000	24	180,250
March	4,183,869	596,691	5,058,258	26	194,548
April	4,026,576	640,351	4,938,025	26	189,924
May	4,276,186	707,484	5,273,167	27	195,302
June	3,990,798	622,585	4,881,370	25	195,255
Six months	23,770,871	3,606,006	28,967,174	155	186,885

Orders for steel building products received by the Truscon Steel Co., Youngstown, Ohio, during the first six months of 1929 were 33 per cent greater than in the same period last year. A considerable percentage of the tonnage was for material for airplane hangars, such as doors, windows, roofs, floodlight towers, reinforcing steel and complete hangars.

Staccato Touches on Industrial Economics

Paragraphic Review of Address to Salesmen By President Roy C. McKenna

OFFERING it as an industrialist's view of economics, Roy C. McKenna, president Vanadium-Alloys Steel Co. and the Colonial Steel Co., made an extended address to a joint sales convention of the two companies held June 27 and 28. Following are high lights of the address:

Our credit system should become more flexible, and capable of taking care of consumer needs. Instalment selling is a step in this direction, and when applied to suitable commodities, and used with sound business sense, it is desirable.

I do not believe that our present system of payment by wages is infallible or final. It is only a step from serfdom and slavery to a more enlightened system of compensation that will be worked out from generation to generation. In America practically all corporations, large or small, welcome the public, and particularly employees, as stockholders. Generally speaking, most employees are capitalists to the extent that they are stockholders; and almost without exception every capitalist is also a worker. The management of industry is more and more coming into the hands of experts, men who themselves are not large stockholders, and cannot be considered as owners. These men value the good opinion of their fellow-workers and associates as much, if not more, than that of the stockholders.

Labor is being more and more treated as overhead, and capital is being treated less and less as overhead. The tendency is toward labor employing capital rather than capital employing labor. This trend shows up in new financing, for when additional money is needed it is more often secured by the sale of equity stock rather than by the issuing of bonds.

Education enables labor to change more easily from job to job as conditions demand. We must continue to give our boys and girls the best of education at the minimum of individual expense. Much of labor that is unemployed is really nonemployable.

Mass production must be accompanied by mass consumption, and mass consumption is attainable only by intensive salesmanship. Yet intensive salesmanship and mass production are incompatible. Mass production implies simplification and standardization. Intensive salesmanship demands that the whims and fancies of the buyer must be met and that changes be made that render apparatus obsolete or out-of-date before its usefulness is ended.

Our successful industries are those which are leaders in research and in the application of scientific knowledge. The American investor recognizes this, and places less value upon tangible assets than upon the intangible value of a loyal, progressive organization under good leadership. Tangible assets are valuable only in so far as they can be utilized.

Many thinkers of our older civilizations "view with alarm" what they call the "Americanization" of the world. Is it not self-evident that a civilization which requires less of man's time and energy to provide him with food and clothing, and allows him more leisure for reading, studying and amusement, will develop art and science?

America can best serve the world as an example. If we can successfully build a superior civilization based upon mechanical power, it will show the way to the rest of the world. There is no other place in the world where new economic theories can be tested out with equal probability of success, and less penalty to the whole in case of failure. Half of the purchasing power of the world is concentrated in America.

Papers on Welding at the National Metal Congress

The American Welding Society, through Chairman P. W. Swain of the meetings and papers committee, announces the papers to be presented during the fall meeting of the society to be held in Cleveland the week of Sept. 9 as its part of the National Metal Congress. The iron and steel divisions of the Mining and Metallurgical Engineers and of the American Society of Mechanical Engineers, the Institute of Metals and the American Society for Steel Treating will have conventions in Cleveland during the same week. During the National Metal Congress the National Metal Exposition will be held, of which over 10,000 sq. ft. will be devoted to exhibits of welding and cutting equipment and supplies. Some 30 firms dealing in this material already have made reservations.

The papers to be presented by the American Welding Society are as follows:

"Non-destructive Tests of Welds," by Elmer A. Sperry, Sperry Development Co., Brooklyn.

"X-Ray Investigation of Welds," by Dr. H. H. Lester, Watertown Arsenal, Watertown, Mass.

"Oxy-acetylene Welding of Pipe Lines in the Field," by W. R. Ost, Air Reduction Sales Co., New York.

"Welding of Pipe Lines," by H. C. Price, manager, Welding Engineering Co., Bartlesville, Okla.

"A Metallographic Study of Some Metallic Arc Welds," by Prof. H. M. Boylston, Case School of Applied Science, Cleveland.

"Welding of Copper and Copper Alloys," by Mr. Hook, research laboratory, American Brass Co.

"Welded High Strength Aluminum Alloys for the Aircraft Industry," by Mr. Dawson, research laboratory, Linde Air Products Co., New York.

"Foreign Practice in Welding of Boilers, Tubes and Drums," by G. A. Orrok, consulting engineer, New York.

"Stress-Strain Characteristics of Welded Joints," by Prof. J. H. Smith, University of Pittsburgh.

"Study of Nitroid Needles," by P. Alexander, General Electric Co.

"Cutting and Welding Steel Parts to Replace Castings," by W. J. Buchanan, Bessemer Gas Engine Co., Grove City, Pa.

"Testing Equipment Used in the Welding Industry," by V. G. Tatnall, Southwark Foundry & Machine Co., Philadelphia.

"Machinery Design as Influenced by Electric Welding," by H. G. Boist, General Electric Co.

Truscon Steel Co. to Sell Stock to Employees

More than 5000 employees of the Truscon Steel Co. will have opportunity to subscribe to 20,000 shares of Truscon common stock. The new issue was authorized at a meeting of the board of directors in June. It is to be sold to employees at $40 a share. The present market value is about $60.

Each employee may purchase stock up to 20 per cent of his 1928 earnings. The company reserves the right to pro-rate the issue if it is over-subscribed. A partial payment plan is offered.

Stove Pipe Makers Form Trade Group

A new group has recently been formed in the Metalware Institute, Inc., 342 Madison Avenue, New York, composed of manufacturers of stove pipe, elbows and drip pans. It is functioning along lines recognized as legal and proper and some of the objects of the stove pipe group are: To discuss legislation, transportation, insurance, manufacturing and related problems; to establish a system for investigating credits and collecting information concerning the character and standing of purchasers; to establish a bureau of statistics for stocks on hand, production, unfilled orders, shipments, orders received, actual prices at which orders accepted were sold, etc.; to cooperate with the Division of Simplified Practice existing in the Department of Commerce to obtain the elimination of obsolete or unnecessary varieties, styles, and sizes; and to collect quarterly departmental labor costs and labor efficiency ratios.

Automobile Output Attains New High Record

With June production of cars, trucks, and buses totaling approximately 536,309 units, the National Automobile Chamber of Commerce estimates that the automobile industry set a new record in the first half of 1929 in manufacturing 3,380,088 vehicles. This exceeds the same period of 1928 by 1,053,579, or 45 per cent. June output was the highest for that month and showed a gain of 26 per cent over June, 1928.

Cast Iron Pipe Makers Want Higher Duty

Approve 30 Per Cent Ad Valorem Rate Fixed in House Bill—Importer Protests Increase

WASHINGTON, July 9.—American cast iron pipe producers are generally satisfied with the duty of 30 per cent ad valorem fixed in the House tariff bill, according to testimony given befor the Senate sub-committee which is considering the metal schedule.

Filing a brief for 10 cast iron pipe foundries, F. S. Russell, United States Pipe & Foundry Co., Burlington, N. J., asked for a duty of 30 per cent with a proper method of determining foreign costs, or, preferably a specific duty. A similar request was made by Walter Wood, R. D. Wood Co., Philadelphia, who definitely suggested a specific duty of 6/10c. a lb.

"The bill as passed by the House gave a 30 per cent ad valorem duty," said the brief filed by Mr. Russell. "If the administrative features of the bill are such that the importer must prove to the satisfaction of the Government that valuations at which they are importing are not lower than prices at which similar material is offered for sale in the usual quantities in their home market, and if the American manufacturer is permitted to be a party to such proceedings, the members of the industry which I represent, while preferring a specific duty, acquiesce in the rates given by the Ways and Means Committee. I firmly believe, however, that past experience has shown that, in the absence of an American valuation as a basis of ad valorem duties, specific duties would work out to the best interests of all concerned."

Says Industry is "At War"

Mr. Wood said that the duty of 30 per cent would be protective, but not prohibitive, and would mean a strong struggle against French importations. He said that imports are to be compared with production of American pipe foundries along the seaboard, and not with the total production. Mr. Wood told the committee that he had been told that the French pipe price in France is $35 to $37 a ton, much less than the price at which it is sold in the United States, thus implying that the French product is being dumped in the American market. American costs at the plant were said to be $35 to $36 per net ton.

"But you have been selling at $30, haven't you?" inquired Senator King.

"Certainly, sir; we are 'at war,'" said Mr. Wood.

Senator Reed asked Mr. Wood if the latter had imported pig iron from England. Declaring that he understood he was going to be "twitted" about the matter, Mr. Wood admitted that he had bought pig iron from England and had to do so in order to keep his plant going and his workmen employed. The price of the English iron at the time was said to have ranged from 50c. to $1 a ton under domestic prices. Mr. Wood said he could not have paid the latter prices and kept his plant going. He said that no imports of any size are now coming from England, France or Germany, but he thought Indian imports would continue because of the extremely low wages paid in India. Mr. Wood said he never used Indian iron because it goes into better manufactures than cast iron pipe. Replying to a query by Senator Reed, Mr. Wood expressed the opinion that pig iron is entitled to a somewhat higher duty than that of $1.125. Merchant furnaces in this country, he stated, can barely live at the present duty.

Herbert Kennedy, Herbert Kennedy Co., New York, importer, protested against the increase to 30 per cent provided in the House bill for cast iron pipe. The existing duty is 20 per cent. He said that the cost of production at the Pont-à-Mousson foundry in France, which he represents, is never below $20 a net ton and that the difference in French and American costs are not great enough, when other charges, such as the duty, inspection, freight rates, etc., are taken into account, to justify a higher tariff. He also said that imports of cast iron pipe from France are decreasing and indicated that this was due in part to increased efficiency by American producers through the use of the centrifugal process. He told the committee that he is head of Intercontinental Pipe & Mining Co., recently organized, with a view to erecting a plant in Massachusetts to meet domestic requirements. His company, he stated, would be satisfied with the duty of 20 per cent.

A. C. Dinkey, Midvale Co., Philadelphia, asked for an increase to 60 per cent in the duty on reaction chambers. The House bill carries a duty of 40 per cent.

French Cast Iron Pipe Plant Here Going Ahead

The Intercontinental Pipe & Mining Co., 475 Fifth Avenue, New York, recently incorporated in the United States by the Société Anonyme des Hauts Fourneaux et Fonderies de Pont-à-Mousson at Pont-à-Mousson, France, to build a plant here, has engaged Fay, Spofford & Thorndike, 44 School Street, Boston, as consulting engineers for the project. A contract for construction of a wharf and bulkhead and for dredging and filling in the river on the company's property at Chelsea, Mass., has been awarded to the Bay State Dredging & Contracting Co., Boston, and work will begin at once. The Boston & Maine Railroad is building a spur and siding on the property. Plans for the foundry, which will have an annual capacity of 150,000 tons of cast iron pipe, ranging from 4 in. to 24 in., have been completed and the company will probably award the contract for its construction in a few weeks.

According to Herbert Kennedy, agent for the Pont-à-Mousson Works in the United States and an officer of the Intercontinental Pipe & Mining Co., equipment for the foundry will be purchased from American manufacturers, except for certain special machinery used in a development of sand-spun centrifugal pipe, the patents on which are owned by the Pont-à-Mousson Works in France.

The wharf being constructed at Chelsea is to serve the twofold purpose of shipping cast iron pipe by water and importing North African iron ore from two mines controlled by the Pont-à-Mousson Works, the ore to be furnished to the furnace at Everett, Mass., adjacent to the company's plant.

Chicago Railroads Denied Lower Rate to Milwaukee

Western railroads which serve Milwaukee from Chicago have been refused by the Interstate Commerce Commission permission to establish a 7c. rate on iron and steel moving between these two points.

The Chicago & North Western, Chicago, Milwaukee, St Paul & Pacific, Elgin, Joliet & Eastern and the Minneapolis, St. Paul & Sault Ste. Marie entered this plea on the contention that lower rates are necessary to meet water competition.

Denial was based on the fact that this request is contrary to the intent of the long and short haul clause of the fourth section of the act to regulate commerce. These railroads are now preparing to enter a plea for an 8c. rate between these two points.

With the opening of navigation, round tonnages of steel moved by boat from Chicago mills to Milwaukee, and as the season has advanced an increasing number of cargoes of steel have moved from Western mills to points of consumption on the Great Lakes.

Illinois Steel Expansion Will Be 1;500,000 Tons

Illinois Steel Co. has announced that it will increase steel producing capacity at its South and Gary Works to the extent of 1,500,000 tons annually. This plan includes the construction of 14 open-hearth furnaces, blooming and slabbing mills, a structural mill and two plate mills. Construction will be commenced at once. The steel ingot capacity of mills in the Chicago district is normally computed at 10,200,000 tons annually. The construction program which is being undertaken by the Illinois Steel Co. will increase output in that district by about 15 per cent.

Industrial Leaders Direct Standardization

On July 9 the first board of directors of the American Standards Association, a national federation of 40 technical, trade, and industrial organizations and Government departments will organize. Recognition by industrial executives of the savings to be made through standardization led to reorganization of the association to place control of standardization policies into the hands of industrial leaders. Announcement of the move was made by James A. Farrell, president United States Steel Corporation, and, since 1925, chairman of the advisory committee of the American Standards Association.

The board of directors will include in its membership Matthew S. Sloan, president of the New York Edison and affiliated electric companies; L. A. Downs, president Illinois Central Railroad; Bancroft Gherardi, vice-president American Telephone & Telegraph Co.; F. E. Moskovics, president Improved Products Corporation; Quincy Bent, vice-president Bethlehem Steel Co.; Howard Coonley, president Walworth Co.; C. L. Collins, president Reliance Electric & Engineering Co., and Dr. George K. Burgess, director United States Bureau of Standards.

One of the questions to be considered is that of American participation in international standardization activities. The International Standards Association, an affiliation of the national standardizing bodies of Austria, Belgium, Czechoslovakia, Denmark, Finland, France, Germany, Holland (with reservation), Hungary, Italy, Norway, Russia, Sweden and Switzerland has formally invited the American Standards Association to its membership. Although the American body was represented in the organization of the International Standards Association, membership has been kept pending to await the action of the board of directors. The International Standards Association now maintains an office at Baden, Switzerland.

The full control of national standardization policies, since the organization of the American Standards Association as the American Engineering Standards Committee in 1919 has been entirely in the hands of engineers and scientists. The reorganization which led to the formation of the board resulted from the increasing interest of industrial executives in national standardization work. The meeting of the board is expected to be followed by an intensive campaign to finance national standardization activities on a larger scale than heretofore.

Human Relations Is Topic of Conference

Stability of employment, the older worker's place in industry, getting the most out of the personnel department and larger conceptions of safety are among the major themes to be discussed at the twelfth annual conference on human relations in industry at Silver Bay, Lake George, N. Y., Aug. 28 to Sept. 1. The conference will be preceded by industrial leadership courses beginning Aug. 20.

Industrial Advertisers to Meet in Cincinnati

The eighth annual convention of the National Industrial Advertisers Association will be held in Cincinnati, Sept. 30 and Oct. 1 and 2. Arrangements for the meeting are in the hands of Jesse R. Harlan, chairman of the convention committee of the Cincinnati Association of Industrial Advertisers. Mr. Harlan is advertising and sales manager of the Stuebing-Cowan Co., Cincinnati. Sub-committee chairmen are: Sherman Perry, American Rolling Mill Co., Middletown, Ohio, program; C. Kenneth Magers, Union Gas & Electric Co., Cincinnati, publicity; Samuel Glueck, Key Advertising Co., Cincinnati, exhibits and panels; R. W. Bohnett, Bohnett Co., Cincinnati, entertainment; Frederick B. Heitkamp, Cincinnati Milling Machine Co., attendance; George Gauff, *Manufacturers Record*, hotel and registration, and William Heilig, William Powell Co., Cincinnati, transportation.

Data Service in Steel Construction

A technical data bulletin service for the benefit of its members has been started by the American Institute of Steel Construction, New York. The first bulletin, which is of four pages, deals with the effect of temperature on structural steel. Succeeding bulletins will contain the results of engineering research and latest technical information regarding design and fabrication, and will outline the best methods to be pursued in designing or erecting steel structures.

Metallurgical Congress in Belgium Next Year

An international congress of mines, metallurgy and applied geology is to be held at Liége, Belgium, toward the end of June next year. A congress of the same description was held in Düsseldorf in 1910 by the Iron and Steel Institute (British), the Institution of Mechanical Engineers, the Institute of Metals, and five other organizations, but the handling of the coming congress will be directly in the hands of the association of alumni of the engineering school of Liége and the Belgian Geological Society. The congress has been scheduled for Liége because in 1930 will occur the Liége International Exhibition. O. Lepersonne, 16 Quai des Etats-Unis, is secretary general.

DR. GEORGE K. BURGESS, director Bureau of Standards

F. E. MOSKOVICS, president Improved Products Corporation

Four of the Directors of the American Standards Association

HOWARD COONLEY, president Walworth Co.

QUINCY BENT, vice-president Bethlehem Steel Co.

This Issue in Brief

Makes 46 per cent saving in fuel used in heat-treating by installing inspirators which regulate the gas-air ratio, to give either a reducing or oxidizing furnace atmosphere, regardless of the flow of gas.—Page 88.

* * *

Good design, not heat treatment, is the secret of successful spring manufacture, says maker. A spring made of annealed wire will support as much load as a heat-treated or cold-drawn spring, if elastic limit of the soft material is not exceeded. If springs have suitable hardness and still do not perform, the design should be changed rather than the hardness increased.—Page 84.

* * *

Low "customer turnover" is a major factor in earning adequate profits. Keeping customers satisfied with price, quality and delivery is the secret of low customer turnover, says successful manufacturer.—Page 82.

* * *

Mergers are no substitute for capable management, says Link-Belt president. As with small units, their earnings depend entirely on the sound judgment and foresight of the management.—Page 82.

* * *

Electrically welded pipe is made by first forming skelp into cylinders, which are moved by conveyors into electric welding machines. Conveyors at delivery end of machines pick up the pipe and carry it to milling machines, where the welding bead is removed for joint-coupling in the field.—Page 94.

* * *

Manufacturing losses and wastes can be reduced by making employees realize that their performance has a direct bearing on the marketability of the product. Employees should be considered as part of the sales force, and should be taught that their employer is simply the agent for securing customers for what they (the employees) produce.—Page 82.

Brittleness in hardened steel results from nitrogen content in the iron, says metallurgist. Hot blast and high-speed operation of the blast furnace increase nitrogen in the iron by the formation of cyanogen compounds in the furnace.—Page 85.

* * *

Harmful oxide content of iron is increased by transferring the molten metal from one vessel to another, due to oxidation of the metalloids in the iron. Average content of unreduced oxides in 61 samples of basic iron tested was 0.0272 per cent, but it may go as high as 0.15 to 0.20 per cent if the blast furnace is operating irregularly.—Page 82.

* * *

Predicts economic dislocation more severe than anything the world has yet seen. Every security market in the world is in hopelessly unsound condition, says economist. Colossal mass of inter-governmental obligations arising from the war compromises the situation. Obligations must be paid by export of goods on a tremendous scale.—Page 89.

* * *

"Lost art" of hardening copper is nothing but an interesting fable, says metallurgist. The ancients' secret was merely cold-working. The art has never been lost. Recent methods of hardening copper by alloying have come about as near to actual tempering as would seem possible.—Page 96.

* * *

Soundness of weld is automatically proved by hammer test. Electrically welded pipe is continuously hammered by a series of weights while pipe is under pressure in testing machine.—Page 94.

* * *

Pre-war status of European countries will return, says economist. World is ruled by steel and coal, and the New Europe in industrial, financial or military power will be balanced nationally much the same as Old Europe.—Page 90.

Cut your costs by giving foremen a practical knowledge of manufacturing economics. They should have a clear insight into such overhead items as depreciation, tool cost, scrap charges, supply costs, supervision and inspection charges and the like, says manufacturer.—Page 82.

* * *

Keeps customers satisfied by shipping repair parts the same day order is received. Order goes to stockroom as soon as it comes in. Stockroom makes up order at once, and it is trucked almost immediately to the shipping room, rather than waiting for a day's orders to accumulate.—Page 80.

* * *

Salvages gears with surface imperfections by lapping them. Soft metallic gears are usually mounted on an arbor between centers of a lapping machine having adjustments for varying the mesh of the gears. Hardened steel gears are usually mounted on a lathe and lapped on centers only.—Page 98.

* * *

Inspectors' fatigue reduced by making gages of aluminum. Roundness of welded pipe is tested with gages made of the light metal, with steel inserts for the gaging surface.—Page 94.

* * *

Physical effort put into each job is measured by gaging the calories expended in a minute by the operator. By changing the equipment and methods, as dictated by calory measurement, considerable gain in production per unit of labor-effort has been obtained.—Page 97.

* * *

Economy in transporting parts in small quantities from department to department has been obtained by using small skid boxes and tote pans, so designed that electric truck can carry a capacity load made up of a number of different parts. Trucks take three skids at one time, each skid containing a different kind of part.—Page 78.

A. I. FINDLEY
Editor

THE IRON AGE

W. W. MACON
Managing Editor

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A Year's Great Gain in Steel

PRODUCTION of steel ingots in what may be called the steel year through June 30 was approximately 54,675,000 tons, or 25,000 tons more than the forecast made in THE IRON AGE of four weeks ago. That is a full 15 per cent in excess of production in any period of 12 months ending in any month prior to a year ago. There is a gain of 9 per cent over the calendar year 1928, but that year included one-half of the year now under review.

The steel year contains 311 working days. The year through last month was a day short, beginning and ending with a Sunday, while there had been an extra day in February, 1928. Transferring one day's production to make years of equal length and adding to the production reported monthly an allowance for electric and crucible ingots, production has been as follows:

Year through June 30:	Gross Tons
1925	39,450,000
1926	45,900,000
1927	46,800,000
1928	44,650,000
1929	54,675,000

In two years there is a gain of 7,875,000 tons, or nearly 17 per cent, which is phenomenal, being 8 per cent per annum, against an average annual gain of 2.6 per cent from 1920 to 1928, or an average of 3.4 per cent from 1913 to 1928.

And the steel industry is not done making records, for production is now running far above that of a year ago. Given a continuance of the rate of production in the last two months, production in the 12 months through July will be about 1,100,000 tons more than that in the 12 months through June, while August would make a further contribution of about the same amount. Production would have to slip next October to a rate 12 per cent under the recent rate to stop this making of new totals for 12 consecutive months, for output in the last two months has been about 195,275 tons per working day, while last year October, the high month, showed 172,221 tons per day. July of last year ran only 152,224 tons a day. Thus for an indeterminate time to come we shall be producing more steel than a year previous. Nothing like an enlightened guess can be made as to how long this making of new records for periods of 12 months will continue. As time passes the pace of a year previous will be harder to exceed; but the outlook for records is promising, since the present rate is about 6,000,000 tons a year above the actual production in the last 12 months.

Mr. Schwab spoke with eminent conservatism, even with restraint, in telling the American Iron and Steel Institute in his May address that "it is not inconceivable that the average annual production of steel ingots for the next 10-year period will exceed 50,000,000 tons." And then he added: "At this rate the consumption of raw materials will soon reach the staggering total of a quarter of a billion tons a year."

The Rate Shift in Cast Iron Pipe

ABOUT 40 years ago, the cast iron pipe industry, which once was so largely a Northern development that pipe made near Philadelphia was laid in the streets of Birmingham, began its exodus to Alabama. There it was favored by low-priced labor and pig iron and was granted special freight rates by the Southern railroads to foster its growth. With these advantages, the industry flourished in the South to such an extent that now 60 per cent of the total capacity is in Alabama and Tennessee. Today the Southern pipe trade is disturbed by the prospect of losing some of its predominance because of the recent decision of the Interstate Commerce Commission that existing freight rates are prejudicial to Northern foundries and "unduly preferential" to those in the South.

Although the cast iron pipe case was not linked up with the general rate investigation on iron and steel products, the decision is along the same lines; that is, a mileage scale is now the basis of the rate structure. When the revised tariffs are published by the railroads they will work out to the advantage of Northern foundries to the extent of about $2 a ton on shipments to many points in the Northern territory; furthermore, Northern foundries will be able to compete at points south of the Potomac River for the first time in many years.

Just what the ultimate effect will be on the cast iron pipe industry, particularly that portion of it in Alabama and Tennessee, remains to be seen. In recent years the differential in pig iron costs in favor of the Southern foundries has not been so marked as before the war, and labor efficiency in the North has been to some extent an offset to the higher scale of wages paid by Northern foundries.

SOME unusual uses for alloy steels are appearing, uses that are amply justified. Not so long ago it would have been regarded as uneconomical and at all events unnecessary to make shovels or common tools from anything but ordinary carbon steels. Today one American producer of various grades of hand shovels employs an alloy steel extensively, with the result of increasing the life of his product and hence the de-

mand for it. Another company has incorporated an alloy steel in mine picks and other tools with excellent results—a harder tool and one whose edges or points hold up longer and better. Alloy steels and heat treatment have been the remaking of the automobile industry, and their increasing application to lesser industries is highly promising even though much less spectacular.

Wage Assignment Law Tightened

MASSACHUSETTS has just passed a law designed to reduce abuses that have grown up under the statute governing the assignment of wages. An amendment provides that unless an assignment be formally accepted by the employer it shall not be legally binding. Hereafter, in every instance where an employee desires to assign his wages as security for purchase or loan or for other reason, he must have the consent of those who employ him. Responsibility is thus placed where, for the good of the average worker, it should rest. The new provision is a protection against too readily going into debt and against persons who would take advantage of an employee's weakness.

In Massachusetts until now, as under the laws of most of the States, there was no necessity that the employer have any knowledge of employee transactions involving wages yet to be earned. An assignment had to be recorded with the town clerk, but only rarely was publicity given to these records. The company got its first knowledge when a merchant or money-lender presented the assignment papers, leaving no alternative except it were the discharge of the assignor. If the account was for less than $300, 25 per cent of the contents of the pay envelope had to be held out; if for more, a much larger per cent. The usual practice has been, in the growing leniency of owners, to retain the man, but the incident has often been regarded as a black mark.

The change in the law should operate automatically to reduce the number of assignments of wages, apart from employers' refusals to accept them, since in a majority of cases an employee will hesitate to ask an acceptance unless his reason is a good one. The average worker is not apt to go to the office for this sort of help in buying a radio set or electric refrigerator or motor boat or automobile. In one case, however, a corporation actually advised this method of purchasing a second-hand car to be run between the shop and a home which a man had built with his own hands some miles in the country. The car was judged an economic necessity. But generally speaking the new Massachusetts law will make it easier to resist the constant temptations of the installment plan and the pressure of certain dealers who specialize in sales to improvident wage-earners.

A NEW record for six months' pig iron output in the United States was made in the first half of the year—at 21,621,363 gross tons—and now a calculation is in order of the probable 1929 production. In 1923, the record pig iron year, when 40,361,146 tons was made, the first half output was 21,016,475 tons. The falling off in the last half was 1,671,804 tons, or practically 8 per cent. Assuming the same percentage of decrease this year, the output for the last half would be 19,892,000 tons, bringing the year's total to 41,513,000 tons. Even should the decline in the rest of the year approximate 10 per cent, the total for the 12 months would be close to 41,100,000 tons. It seems reasonably assured that the 1929 pig iron output will reach a new high peak at not less than 41,000,000 tons, with a fair probability of attaining 41½ millions.

Swings in Our Trade Balance

OUR foreign trade showed a favorable balance of $119,122,000 in January and only $15,195,000 in April. The average business man takes an interest in our foreign trade, but is quite unable on account of the mass of detail to observe even approximately just where and why the changes occur. Sometimes he is even hazy as to the economic bearing of the general result, whether a large trade balance is to be considered favorable as likely to produce good conditions at home or is unfavorable as showing that selling conditions at home have not been good.

Monthly figures for last year chanced to line up in such a way that a relatively simple analysis can be made as to the points at which our foreign trade underwent a wide variation. The year's favorable merchandise trade balance was $1,036,912,000, which was the largest since 1921. Incidentally that must not be taken as an invidious comparison, for while 1921 was a very poor year with us there were some remains of an exceptional export movement, and our imports were much smaller than in subsequent years.

There was, however, nothing like a uniform trade balance during last year. The low month was April, at $18,614,000, and the high month November, at $218,347,000. It chances that April was also the low month in exports and November was very close to the high month in exports; hence exports only need be considered for a general study of this remarkable fluctuation. Total exports were $363,928,000 in April and $544,912,000 in November, the difference being $178,034,000, representing a 50 per cent increase.

Five-sixths of this increase in exports is found in three items. Textiles increased $103,785,000 or 155 per cent; vegetable food products and beverages, $29,515,000 or 103 per cent, and tobacco $13,999,000 or 125 per cent. Clearly this was largely or wholly a seasonal matter, November against April.

Various gains—in iron and steel, non-ferrous metals, machinery, petroleum, etc.—make up the remainder of the increase and offset certain decreases. There was no increase in automobiles, parts and accessories, but a decrease of $183,000, though in itself insignificant—less than 1 per cent.

Having observed the principal causes of last year's change from April to November, April of this year may now be considered in connection with the preceding April—its favorable merchandise balance of $15,195,000 comparing with $18,614,000 a year previous. There was an increase of $61,944,000 in exports but a slightly larger increase, $65,363,000, in imports.

In brief, we are doing a larger foreign trade this year than last, in both exports and imports, and by the precedent of last year we may expect our trade balance to increase by a seasonal swing.

CORRESPONDENCE

Germany's Reparations Problem as Her Steel Men View It

To the Editor: Your comments on page 1657 of your issue of June 13 on "Germany's Reparations Bill" have aroused much interest in the German steel industry.

As you know, the president of the United Steel Works, Doctor Vogler, was one of the two German experts in Paris, but he refused to sign his name to the Young scheme. I have been requested on behalf of the Federation of German iron and steel producers to make a short reply to your statement, thinking that the opinions here expressed may interest you, inasmuch as the Young scheme will certainly have its economic influence upon Germany's industrial expansion in the years just ahead.

Before the war (exactly, on Aug. 1, 1914) the aggregate bank savings of the German population were 21 milliards (billions) of marks. This year (June 1) they were 7½ milliards. The national wealth of Germany at the end of 1928 was estimated to be 62 per cent of the wealth in 1913. When estimating the German payments it must not be forgotten that, apart from the two billion marks to be paid annually in accordance with the Young scheme, Germany has other war debts (internal debts, also those to neutral European powers, etc.), which, according to the recent publication in the Reichstag, are close to 1.9 billions annually, bringing the total payments on war debts to 4 milliards annually.

Among steel industrialists it is believed this amount could be paid, considering that taxation is now three times higher than in 1914, and in spite of the loss of Alsace-Lorraine, Upper Silesia, large eastern and western Prussian territories and North Schleswig. But 2 billions of marks annually have to be paid in foreign money, not in marks, and this is the whole problem in a nutshell. Germany has lost all her colonies, has lost all the loans to foreign countries, almost all the property invested abroad (sequestrated during the war). Besides this she has to pay the French and British armies in the Rhineland in foreign money; about 5 milliards to Belgium (marks spent there during the occupation); has to pay interest on foreign loans, etc.

The German Reichsbank published last month details of the adverse trade balance of Germany. Last year the visible and invisible imports (interest on loans, etc.) exceeded by 3¾ billion marks the visible and invisible exports. This huge balance has been covered by capital influx. Since 1924 Germany has borrowed approximately 19 billion marks abroad and has loaned ½ billion to foreign countries. So interest is rapidly accumulating (more than 1¼ billions annually already) and, in the opinion of men in the German steel industry, this capital import will not keep up very long. You know that the British experts have themselves said that all the payments made by the German Government since 1924 were from money borrowed in the United States, England and elsewhere. Germany could pay the 2 milliards, if her visible and invisible exports (I refer to the Dawes plan, which was built upon this suggestion) should exceed the visible and invisible imports. Since this is not the fact, Germany will be able to pay as long as the United States and the other countries are investing money in Germany and not one day longer.

A remedy is to be found in the giving back of the colonies, and the granting of access to the allied countries for German industrial products, etc., so that the trade balance might be changed. But there is nowhere any thought of returning the colonies, and as the customs walls are raised from year to year, there seems to be no way out of this problem.

The reparations solution is not a question of how much Germany can pay (and it is believed that the 2 milliards annually can be paid), but *how* she can pay it, since the deliveries of merchandise on reparations account also are to be stopped. If Germany pays, it has to be in dollars, pounds, francs, etc., and this money she can get only from a very heavy surplus of exports over imports, plus interest on nearly 20 milliards of foreign money, etc. This at the present moment is impossible.

PAUL FIDRMUC.

Hamburg, Germany, June 24.

Alloy Steels, Past and Future

To the Editor: My attention has just been called to an article in THE IRON AGE, May 16, page 1339, by W. J. Priestly, on the use of alloy steel, showing what great strides have been possible in recent years due to the use of this material in engineering structures.

The writer firmly believes that in works of considerable magnitude the use of alloy steels will make possible, in the next few years, very great changes in design and construction methods. Looking at the past, however, Mr. Priestly has made a misleading statement with regard to the use of alloy steel in aircraft. Ten years ago last month, namely June 14, the Atlantic was crossed in a British Vickers plane, piloted by Alcock and Brown, in the record time of 16 hr. and 12 min. It is true that for the next eight years no further direct crossing was made, but the fact remains that this feat was performed and the machine stood up to it.

It is well known that alloy steel was extensively used in Rolls-Royce engines and has been in fairly general use for high-grade engines much longer than the ten years mentioned in the article in question.

ROBERT W. A. BREWER,
Consulting Engineer.

Jenkintown, Pa.

Classification of Sponge Iron in the Tariff

To the Editor: In THE IRON AGE for July 4, page 29, your Washington correspondent reports, from the Senate hearings on the tariff, the writer's statement as a witness on sponge iron classification that the "old rate" was 30 per cent. The records of the hearings show that this report is not correct. The statement was that the old rate was the same as for pig iron, or $1.125 per gross ton.

The first imports of sponge iron occurred during 1926. The material continued to be imported during 1927 and 1928, mainly through the ports of New York and Philadelphia. From the beginning, and continuously since, the appraisers at these two ports classified the material with pig iron. Their classification and understanding of the material was logical and no protest was ever filed against their decision.

The first shipment ever taken in at Baltimore, however, was assessed according to paragraph 214, which covers earthy or mineral substances, etc., and provides a duty of 30 per cent ad valorem. Through a ruling by the customs authorities in Washington on Feb. 27, just before the change in administration, the Baltimore decision was upheld without a hearing, and is now duly protested. To anyone familiar with sponge iron, which, of course, is a metal and must be considered under the metal schedule, the ruling does not seem to have any foundation, and it is hoped it will be rectified in the customs courts.

The writer's protest in Washington was thus in no way a demand for the lowering of any duty rate, but was rather a plea that the classification of sponge iron should be continued under a paragraph at least not higher than paragraph 301, covering pig iron and scrap.

In view of the fact that no sponge iron is produced

at the present time in the United States, and that there is no prospect of its being produced for sale to the general steel trade at all for some time, the lowest possible duty would seem desirable to domestic interests. The steel industry has agreed that this is the case and the writer's testimony and application for the retention of a duty not higher than pig iron has been supported by the majority of the makers of high-grade steel.

Anyone familiar with the raw materials used in present-day steel making will realize that there is no competition between sponge iron and any other material regularly used. It seems entirely out of line to compare sponge iron with muck bars instead of with pig iron when considering the proper classification of the material. Both pig iron and sponge iron are initial products from the reduction of iron ore, but muck bars, as well as any other material mentioned in paragraph 303, are manufactured products—manufactured from pig iron or from sponge iron.

N. K. G. THOLAND,
Ekstrand & Tholand.

New York, July 6.

Casting Steel in a Water-Cooled Copper Ingot-Mold

ALTHOUGH the process of casting metals in water-cooled molds is not new, it has a number of advantages over the usual procedure and was therefore subjected to a careful experimental study by W. Oertel, who describes his results in *Stahl und Eisen*, May 9, 1929. An abstract follows:

The mold used contained 200 kg. (440 lb.) of steel and consisted of a copper tube 200 mm. (about 7.9 in.) inside diameter, 20 mm. wall thickness, and 1000 mm. in length. This was surrounded by a cast iron jacket which allowed an annular water space about 700 mm. wide (about 2.75 in.).

In casting, the steel solidifies very rapidly, so that in a few minutes the ingot may be removed from the mold. A small pipe occurs well up toward the upper surface of the ingot. Additional advantage over the uncooled mold arises from the excellent surface and the absence of segregation in ingots made in the copper mold.

In respect to crystalline structure of the ingot—the water-cooled mold offers definite advantages in that the grain-size is smaller througout than with the usual casting practice.

A number of heats of various grades were made in a small Heroult furnace. Each was cast in the water-cooled mold and in an ordinary mold. Comparison of the physical properties of the two ingots revealed practically no difference. If there is any, it is probably in the greater uniformity of the properties of the quickly-cooled ingot.

From an operating standpoint the following advantages may be cited:

The reduction in the cooling time of the mold.

Longer mold life, since cracking or cutting the surface does not take place.

Greater rolling mill yield due to the location of the pipe at the extreme top of the ingot, even without the use of a hot-top.

Excellent surface of the ingot, enabling it to be rolled without any preparation.

Improvements in Tool Steel

To indicate that progress in tool steel manufacture is still being rapidly made, H. E. Kershaw, chief research chemist of Edgar Allen & Co., Ltd., Sheffield, England, writing in *Edgar Allen News*, gives some figures on the proper speed of standard cut. A quotation from Harbord's "Metallurgy of Steel" shows the developments up to 1910:

Original high-carbon tool steels.....	16 ft. a minute
Mushet's self-hardening steel.....	26 ft. a minute
Taylor and White's high-speed steel....	60 ft. a minute
Modern high-speed steel.....	100 ft. a minute

Further advance that has been made up to the present is shown by tests on four different qualities of high-speed steel, carried out under identical conditions. The tools were all of the same size. The cutting speed was the same, the depth of cut and the traverse, and therefore the amount of metal removed per minute was the same. The tools were put to work on the same bar, which was of uniform hardness throughout.

The 14 per cent tungsten high-speed steel stood up for 4 min. 30 sec. The 18-per cent tungsten high-speed steel stood up for 8 min. 12 sec. The super-high-speed steel stood up for 14 min. 6 sec., and the very latest development in super-high-speed steels stood up for 23 min.

"The 14-per cent tungsten steel was a revelation when it was first introduced, and now there are steels on the market five times as efficient," concludes Mr. Kershaw.

Automatic Continuous Manufacturing

Simultation, a word coined by Edward Payson Blanchard, of the Bullard Co., Bridgeport, Conn., to define the ultimate in the use of machinery for manufacturing, is the theme of a discussion of the philosophy of production which Mr. Blanchard recently contributed to the *Financial Survey*, of Hartford. The principle, which comprehends a completely automatic continuous process, without hand work or man power, is calculated to bring, he says, the 4-hr. work period. It is the step beyond mass production, which itself has raised the issue of the 6-hr. shift, and it multiplies the problems of added leisure, though at the same time encouraging the scattering of homes and the maintenance of a high standard of living. In the nature of the case the article is speculative rather than prophetic.

The author is sure that job shops will still be essential and that the all-around mechanic, who prefers diversified jobs, will find his opportunity there. Also, says he, the industry which builds the complete automatic machinery for production will never be run on such a scale as that machinery is itself used. Further, there will always be a market among those people who are willing to pay an extra cost for distinction from the common mob of standardization; "there will always exist a birthright in originality."

Effect of Cold Work on Corrosion of Steel

To find out the effect of cold work on the liability of iron and steel to corrosion, a Japanese investigator, Hikozo Endo, has made an investigation. The specimens were subjected to strains different both in amount and kind (tension, torsion, compression and impact), and were subsequently submitted to the action of a 1 per cent sulphuric acid solution, the weight loss of each specimen being measured after the lapse of 72 hr.

From the results obtained, the investigator concludes that, if the stress is so large as to give rise to a permanent deformation of the specimen, its effect, consisting in the promotion of the corrosion of the latter, begins to appear, the degree of corrosion varying with the amount of deformation.

Iron and Steel Markets

Summer Steel Pace to Be High

Heavy July Operations Follow Record-Breaking Ingot Output of 28,967,174 Tons in First Half and Large June Total of 4,881,370 Tons

FRESH accumulations of steel orders and specifications since the opening of the third quarter give renewed assurance that the steel industry will operate through July and possibly even August at close to maximum capacity.

Though the pace of steel buying has slackened in some districts, Chicago sales were the largest for any week this year. Heavy releases were also received by Pittsburgh mills.

Coming on top of a record half year which exceeded the largest previous six months' ingot output by almost 4,000,000 tons, the vitality of current demand is the more surprising. No evidence of the usual midsummer letdown is in sight.

July output probably will not fall far short of the large June total of 4,881,370 tons, which was at a rate only fractionally below 100 per cent of capacity. The holiday, heat and special repair shutdowns are primary checks at the moment to continued high performance.

Last month's unexpectedly large total brought the aggregate for six months to 28,967,174 tons, which surpassed that of the same period in 1928 by 4,169,101 tons and the previous all-time six months' record of 25,067,122 tons in the last half of 1928 by 3,900,052 tons. The output of each of the past four months has been larger than any monthly total ever before achieved. For the full year to July 1, the ingot output was 54,034,296 tons.

Backlogs of some products are being reduced, with the result that earlier deliveries are possible, particularly on hot-rolled and cold-finished bars, structural shapes and strip steel. In plates and sheets, however, mills have orders that will carry them through the summer without important additions.

Over the midsummer inventory period, many consumers have permitted their steel stocks to run low, and the volume of specifications received so far in July indicates that most buyers are now fairly certain that their summer needs will not be appreciably lower than in the second quarter.

The slowing down in the demand for steel from the automobile industry probably will be less than summer usually brings. Some parts manufacturers have again speeded up schedules to meet the calls from motor car makers preparing to bring out new models. Previous records for July and August are expected to be broken because of the continued high operations of the two leading makers of low-priced cars.

June automobile production, at 536,309 units, broke all records for that month and made a half year's total of 3,380,088 motor vehicles of all types, exceeding the output in the first half of 1928 by 1,053,579 units.

Railroad inquiry for steel is noteworthy. Supplementary rail inquiries include 30,000 tons for the Great Northern and 5000 tons for other Northwestern roads. The Canadian Pacific has placed a large rail order with the Algoma mill. Bridges in New Jersey for the Pennsylvania will take 14,000 tons of shapes, and the Lackawanna Railroad has ordered 4000 tons for catenary supports as a beginning of its electrification program. The Wabash has bought a car ferry requiring 2500 tons. Meanwhile, car builders are taking steel heavily to complete recent car orders. Upward of 30,000 tons will be ordered for 4000 car bodies recently placed by the Pennsylvania. New railroad equipment buying is light.

Several large gas line projects are taking shape. A line from the Panhandle of Texas to Chicago, also one from the Southwest to Nebraska and Iowa and others which are less definite promise heavy tonnages of pipe. The Texas-Chicago line has the backing of important oil interests.

Structural steel activity is such that a leading producer expects the third quarter to rival the second in volume. The week's total of new projects, at 49,000 tons, is the largest reported since the first week of June, while lettings were 45,000 tons. Awards of buildings only in the New York metropolitan district in the first half of the year took 243,285 tons of steel against 182,800 tons in the same period last year, a gain of 33 per cent.

Southern pig iron presents the only marked sign of weakness in the whole iron and steel situation. A reduction of 50c. a ton, the second of that amount within a few weeks, has been made by the Alabama producers in an effort to move large stocks of iron, the accumulation of which has been due in part to the subnormal consumption by Southern cast iron pipe foundries. Price weakness has also developed on pig iron sales in New England, and moderate concessions in the Pittsburgh district have resulted from the extremely competitive situation existing there now. Pig iron buying is not in large volume.

Steel prices are fairly steady, though minor weakness has occurred in some districts on wire nails and black and galvanized sheets, while at Cleveland steel bars have dropped $1 a ton to 1.90c. a lb.

Heavy melting steel scrap has advanced 25c. a ton at Pittsburgh, and signs there and elsewhere point to a definite turn upward.

THE IRON AGE composite price for pig iron has declined to $18.54 from $18.63 last week. This is the second drop in five weeks from the year's high of $18.71. The finished steel composite price is unchanged at 2.412c.

A Comparison of Prices

Market Prices at Date, and One Week, One Month and One Year Previous, Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron, Per Gross Ton:	July 9, 1929	July 2, 1929	June 11, 1929	July 10, 1928
No. 2 fdy., Philadelphia	$21.76	$21.76	$21.76	$20.26
No. 2, Valley furnace	18.50	18.50	18.50	16.75
No. 2 Southern, Cin'ti	*18.19*	18.69	18.69	19.19
No. 2, Birmingham	*14.50*	15.00	15.00	15.50
No. 2 foundry, Chicago*	20.00	20.00	20.00	17.50
Basic, del'd eastern Pa.	20.25	20.25	20.25	19.00
Basic, Valley furnace	18.50	18.50	18.50	16.00
Valley Bessemer, del'd P'gh	20.76	20.76	20.76	18.76
Malleable, Chicago*	20.00	20.00	20.00	17.50
Malleable, Valley	19.00	19.00	19.00	17.00
Gray forge, Pittsburgh	19.76	19.76	19.76	18.01
L. S. charcoal, Chicago	27.04	27.04	27.04	27.04
Ferromanganese, furnace	105.00	105.00	105.00	105.00
Rails, Billets, Etc., Per Gross Ton:				
Rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Light rails at mill	36.00	36.00	36.00	36.00
Rerolling billets, Pittsburgh	35.00	35.00	36.00	32.00
Sheet bars, Pittsburgh	35.00	35.00	36.00	32.00
Slabs, Pittsburgh	35.00	35.00	36.00	32.00
Forging billets, Pittsburgh	40.00	40.00	41.00	38.00
Wire rods, Pittsburgh	42.00	42.00	42.00	42.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.85	1.85	1.85	1.85
Finished Steel, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Bars, Pittsburgh	1.95	1.95	1.95	1.85
Bars, Chicago	2.05	2.05	2.05	2.00
Bars, Cleveland	1.95	1.95	1.95	1.85
Bars, New York	2.29	2.29	2.29	2.19
Tank plates, Pittsburgh	1.95	1.95	1.95	1.85
Tank plates, Chicago	2.05	2.05	2.05	2.00
Tank plates, New York	2.22½	2.22½	2.22½	2.17½
Structural shapes, Pittsburgh	1.95	1.95	1.95	1.85
Structural shapes, Chicago	2.05	2.05	2.05	2.00
Structural shapes, New York	2.19½	2.19½	2.19½	2.14½
Cold-finished bars, Pittsburgh	2.30	2.30	2.30	2.10
Hot-rolled strips, Pittsburgh	1.90	1.90	1.90	1.75
Cold-rolled strips, Pittsburgh	2.75	2.75	2.75	3.00

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

Finished Steel, *Per Lb. to Large Buyers:*	July 9, 1929 Cents	July 2, 1929 Cents	June 11, 1929 Cents	July 10, 1928 Cents
Sheets, black, No. 24, P'gh	2.85	2.85	2.85	2.65
Sheets, black, No. 24, Chicago dist. mill	3.05	3.05	3.05	2.75
Sheets, galv., No. 24, P'gh	3.60	3.60	3.60	3.50
Sheets, galv., No. 24, Chicago dist. mill	3.80	3.80	3.80	3.60
Sheets, blue, No. 13, P'gh	2.35	2.35	2.35	2.10
Sheets, blue, No. 13, Chicago dist. mill	2.45	2.45	2.45	2.20
Wire nails, Pittsburgh	2.65	2.65	2.65	2.55
Wire nails, Chicago dist. mill	2.70	2.70	2.70	2.60
Plain wire, Pittsburgh	2.50	2.50	2.50	2.40
Plain wire, Chicago dist. mill	2.55	2.55	2.55	2.45
Barbed wire, galv., P'gh	3.30	3.30	3.30	3.20
Barbed wire, galv., Chicago dist. mill	3.35	3.35	3.35	3.25
Tin plate, 100 lb. box, P'gh	$5.35	$5.35	$5.35	$5.25
Old Material, Per Gross Ton:				
Heavy melting steel, P'gh	**$18.50**	$18.25	$18.25	$14.00
Heavy melting steel, Phila	16.50	16.50	16.00	13.00
Heavy melting steel, Ch'go	14.75	14.75	15.00	12.25
Carwheels, Chicago	14.00	14.00	14.25	12.75
Carwheels, Philadelphia	**16.50**	16.00	16.00	15.50
No. 1 cast, Pittsburgh	15.50	15.50	15.50	14.25
No. 1 cast, Philadelphia	16.50	16.50	16.50	15.50
No. 1 cast, Ch'go (net ton)	14.50	14.50	15.00	13.50
No. 1 RR. wrot., Phila	16.00	16.00	16.00	13.50
No. 1 RR. wrot., Ch'go (net)	13.50	13.50	13.50	11.00
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$2.75	$2.75	$2.75	$2.60
Foundry coke, prompt	3.75	3.75	3.75	3.75
Metals, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Lake copper, New York	18.12½	18.12½	18.12½	14.75
Electrolytic copper, refinery	17.75	17.75	17.75	14.50
Tin (Straits), New York	**45.12½**	44.62½	44.50	46.25
Zinc, East St. Louis	6.70	6.70	6.65	6.20
Zinc, New York	7.05	7.05	7.00	6.55
Lead, St. Louis	*6.70*	6.80	6.80	6.10
Lead, New York	*6.90*	7.00	7.00	6.20
Antimony (Asiatic), N. Y.	*8.50*	8.75	9.00	9.62½

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Pittsburgh

Operations Continue at Same High Rate and Deliveries Are Easing—Consumer Stocks Abnormally Low

PITTSBURGH, July 9.—Following a rather marked interruption last week occasioned by the holiday, steel operations in this district have been resumed again at about the same high rate which has prevailed for some time. But production is now somewhat heavier than current specifications warrant on most products, and, with the exception of sheets and plates, backlogs are being considerably reduced. Deliveries can now be made in two or three weeks or better on cold-finished bars, strip steel, merchant bars and shapes, and, although current demand is sufficient to assure better than usual summer operations, mills are having little trouble making shipments.

Consumer stocks of all forms of finished steel are abnormally low and the somewhat heavier specifications during the last few days indicate that users who have been slow to order out their July tonnage are now more certain of satisfactory business during the present month and early August.

The leading producer of automobiles in the low-priced field plans a record production during July, and the other maker of cars in this field is curtailing very little. The other automobile companies present a rather mixed picture, and their contracting operations are influencing the order books of makers of strip steel, cold-finished bars and even sheets. Under these conditions it is difficult to get a line on the market which might have a general application.

Makers of lap-welded tubing are in a comfortable position on account of recent large line-pipe orders, and a gas line extending from the Texas Panhandle to Chicago has been added to prospective business. Demand for standard pipe has failed to develop according to expectations.

Mills in this district have benefited from recent rail orders and railroad car builders are taking material at an undiminished rate. Structural shapes are not so active and operations of local fabricating shops are unsteady. On the other hand, barge builders are probably busier than they have ever been and business already on company books assures high activity for several months. Reinforcing bars are also active, although specifications on merchant bars have declined considerably in the last two or three weeks.

Prices are showing weakness on some products, but the larger mills are adhering rather firmly to recent quotations. Concessions of $2 a ton from the recent minimum on galvanized sheets are still reported, but are hardly representative of the general market. Wire nails are also weak in competitive districts, but this condition has persisted for a long time in the face of dull demand. Prices on semi-finished steel are still rather uncertain, with little buying of consequence.

Pig iron inquiry is more active. Concessions from recent market prices on foundry and basic iron have appeared in a few recent transactions, but the market is not quotably lower. Scrap is slightly stronger and seems to be definitely turning upward following several weeks of little fluctuation.

Semi-Finished Steel. — Unfinished steel is gradually becoming more plen-

tiful in this and nearby districts, and, for the first time in two or three months, sheet mills are being operated with a full supply of bars. A number of open-hearth furnaces in the district were down for repairs for the greater part of last week, advantage having been taken of the mid-week holiday interruption to get equipment in condition for heavy summer business. The price situation shows little change, with sellers apparently holding firm to a $35 quotation on billets, slabs and sheet bars and $40 on forging billets, while a few makers who have small tonnages for sale only occasionally are asking prices $1 a ton higher. Buying is confined to small lots, and large users in the territory have not yet covered their third quarter needs. Some of these users placed orders two or three months ago with two or more sources of supply in order to assure certain coverage of their needs, and, as some of this material is still to be shipped, they may not be forced to buy again for several weeks. This puts them in a position to resist higher asking prices at this time and prevents the market from becoming definitely established at either the asking or offering price. Wire rods are still fairly active, but demand for skelp is moderate.

Pig Iron.—Buyers are beginning to show more interest in their third quarter requirements and, while specific inquiries are not yet numerous, consumers are quietly sounding out the market. Shipments against second quarter contracts have not been completed in many cases and a few of the larger buyers may not have to cover their needs for two or three weeks. The leading merchant interest in this district reports very satisfactory business and shipments against contracts that are somewhat above the average for this time of the year. Considerable price competition is said to have developed in the recent purchase of 5000 tons of foundry iron by the Columbia Radiator Co., McKeesport, Pa. However, Valley interests which met the price of local and nearby furnaces did not get the business. The Westinghouse Electric & Mfg. Co. has not yet closed for the second-half requirements of its Trafford City, Pa., works, and the Pittsburgh Plate Glass Co. is inquiring for 400 tons of malleable iron for Ford City, Pa. An unnamed consumer is inquiring for 1800 tons of malleable iron. Other inquiries are said to be before the trade, and a large part of the current buying is being done quietly. Nevertheless it seems rather certain that considerably less than 50 per cent of the tonnage to be bought in this district for third quarter has been closed. Small lots of Bessemer iron are being taken regularly at $19, Valley, and this price is also holding well on malleable. The $18.50, Valley, and $19, Pittsburgh, local furnace prices on foundry and basic have been shaded in instances where competition was keen. However, the market is still quotable at those figures.

Prices per gross ton, f.o.b. Valley furnace:

Basic	$18.50
Bessemer	19.00
Gray forge	18.00
No. 2 foundry	18.50
No. 3 foundry	18.00
Malleable	19.00
Low phos., copper free	27.00

Freight rate to Pittsburgh or Cleveland district, $1.76.

Prices per gross ton, f.o.b. Pittsburgh district furnace:

Basic	$19.00
No. 2 foundry	19.00
No. 3 foundry	18.50
Malleable	19.50

Freight rates to points in Pittsburgh district range from 63c. to $1.13.

Bars, Shapes and Plates.—The new quarter has started out satisfactorily, considering the mid-week holiday, and some companies report unusually heavy specification to start off the new week. With no advance in price this quarter, there was no rush to place orders at the end of the last month, and the lull in business which occasionally occurs at the beginning of a new quarter seems to be missing this month. The plate business is still somewhat better than that in bars and shapes, but a heavier-than-usual movement of concrete reinforcing steel is adding considerable tonnage to bar shipments. Shapes are not so active, and, although a fair amount of business was added to fabricating shop schedules during June, operations are spotty, with occasional brief periods of practically no engagement. The heavy movement of plates is due partially to the large requirements of barge yards and railroad equipment builders. The former now have more than enough business to keep them well engaged for the entire quarter, and early reports indicate that a large number of barges will be placed in the fall for spring delivery. The high activity among barge builders this year, with consequent extended deliveries, is teaching buyers to anticipate their needs, and future business in this line is expected to be of a steadier nature. The plate price is very firm at 1.95c., Pittsburgh, and shading of bars and shapes is seldom reported in this district.

Wire Products.—Mills report another week of rather heavy specifications, but some makers report a decline in shipments of manufacturers' wire. However, the decline in automobile production seems to have had less effect on the movement of this product than in other cases, and business is considerably better than usual at this time of the year. Demand for fencing and barbed wire is declining, but warehouse stocks are not heavy and considerable consumer buying which was put off in the spring on account of unfavorable weather is expected to come out in the fall. The nail market continues to be dull, but prices on both wire and nails are holding satisfactorily in this immediate district.

Tubular Goods.—Several Western oil companies are interested in a contemplated gas line to extend from the Panhandle district of Texas into Chicago. Plans are still in the formative stage and considerable time will be required to complete investigations of the supply and probable consumption of gas before the pipe requirements of the project will be known. Plans are said to be under consideration for other large line-pipe projects, and the outlook for this type of work is growing more promising. Mills making lap-welded and seamless tubing in large sizes are fairly well engaged at present, and the third quarter is expected to be a better one from the standpoint of operations than its predecessor. Oil country demand could hardly be called active, but has

The Iron Age Composite Prices

Finished Steel

July 9, 1929, 2.412c. a Lb.

One week ago	2.412c.
One month ago	2.412c.
One year ago	2.326c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products make 87 per cent of the United States output of finished steel.

	High		Low	
1929	2.412c.,	April 2;	2.391c.,	Jan. 8
1928	2.391c.,	Dec. 11;	2.314c.,	Jan. 3
1927	2.453c.,	Jan. 4;	2.293c.,	Oct. 25
1926	2.453c.,	Jan. 5;	2.403c.,	May 18
1925	2.560c.,	Jan. 6;	2.396c.,	Aug. 18

Pig Iron

July 9, 1929, $18.54 a Gross Ton

One week ago	$18.63
One month ago	18.63
One year ago	17.09
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low	
1929	$18.71,	May 14;	$18.29,	March 19
1928	18.59,	Nov. 27;	17.04,	July 24
1927	19.71,	Jan. 4;	17.54,	Nov. 1
1926	21.54,	Jan. 5;	19.46,	July 13
1925	22.50,	Jan. 13;	18.96,	July 7

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base per Lb.
F.o.b. Pittsburgh mill	1.95c.
F.o.b. Chicago	2.05c.
Del'd Philadelphia	2.27c.
Del'd New York	2.29c.
Del'd Cleveland	1.92½c. to 2.00c.
F.o.b. Cleveland	1.90c. to 1.95c.
F.o.b. Lackawanna	2.05c.
F.o.b. Birmingham	2.15c.
C.i.f. Pacific ports	2.35c.
F.o.b. San Francisco mills	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills, 40, 50, 60-ft.	2.05c.
F.o.b. Pittsburgh mills, cut lengths	2.30c.
F.o.b. Birmingham, mill lengths	2.15c.

Rail Steel

F.o.b. mills, east of Chicago dist.	1.85c. to 1.90c.
F.o.b. Chicago Heights mill	1.95c.
Del'd Philadelphia	2.27c.

Iron

Common iron, f.o.b. Chicago	2.05c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	2.12c.
Common iron, del'd New York	2.14c.

Tank Plates

	Base per Lb.
F.o.b. Pittsburgh mill	1.95c.
F.o.b. Chicago	2.05c.
F.o.b. Birmingham	2.15c.
Del'd Cleveland	2.14c.
Del'd Philadelphia	2.15c.
F.o.b. Coatesville	2.05c.
F.o.b. Sparrow Point	2.05c.
F.o.b. Lackawanna	2.05c.
Del'd New York	2.22½c.
C.i.f. Pacific ports	2.35c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh mill	1.95c.
F.o.b. Chicago	2.05c.
F.o.b. Birmingham	2.15c.
F.o.b. Lackawanna	2.05c.
F.o.b. Bethlehem	2.05c.
Del'd Cleveland	2.14c.
Del'd Philadelphia	2.01c. to 2.06c.
Del'd New York	2.14½c.
C.i.f. Pacific ports	2.35c.

Hot-Rolled Hoops, Bands and Strips

	Base per Lb.
6 in. and narrower, P'gh	2.00c.
Wider than 6 in., P'gh	1.90c.
6 in. and narrower, Chicago	2.20c.
Wider than 6 in., Chicago	2.10c.
Cooperage stock, P'gh	2.20c.
Cooperage stock, Chicago	2.30c.

Cold-Finished Steel

	Base per Lb.
Bars, f.o.b. Pittsburgh mill	2.30c.
Bars, f.o.b. Chicago	2.30c.
Bars, Cleveland	2.35c.
Shafting, ground, f.o.b. mill	*2.65c. to 3.60c.
Strips, P'gh	2.75c. to 2.85c.
Strips, Cleveland	2.75c. to 2.85c.
Strips, del'd Chicago	3.05c. to 3.15c.
Strips, Worcester	2.90c. to 3.00c.
Fender stock, No. 20 gage, Pittsburgh or Cleveland	4.25c. to 4.35c.

*According to size.

Wire Products

(Carload lots, f.o.b. Pittsburgh and Cleveland, to jobbers and retailers.)

	Base per Keg
Wire nails	$2.65 to $2.75
Galvanized nails	4.65 to 4.75
Galvanized staples	3.35 to 3.45
Polished staples	3.10 to 3.20
Cement coated nails	2.65 to 2.75
	Base per 100 Lb.
Bright plain wire, No. 6 to No. 9 gage	$2.50 to $2.60
Annealed fence wire	2.65 to 2.75
Spring wire	3.50 to 3.60
Galv'd wire, No. 9	3.10 to 3.20
Barbed wire, galv'd	3.30 to 3.40
Barbed wire, painted	3.05 to 3.15
Woven wire fence (per net ton to retailers)	65.00

Chicago district mill and delivered Chicago prices are $1 per ton above the foregoing. Birmingham mill prices $3 a ton higher; Worcester, Mass., (wire) mill $3 a ton higher on production of that plant; Duluth, Minn., mill $2 a ton higher; Anderson, Ind., $1 higher.

Cut Nails

	Per 100 Lb.
Carloads, Wheeling, Reading or Northumberland, Pa.	$2.70
Less carloads, Wheeling or Reading	2.80

Light Plates

No. 10, blue annealed, f.o.b. P'gh	2.20c.
No. 10, blue annealed, f.o.b. Chicago dist.	2.30c.
No. 10, blue annealed, del'd Phila.	2.42c. to 2.52c.
No. 10, blue annealed, B'ham	2.35c.

Sheets

Blue Annealed

	Base per Lb.
No. 13, f.o.b. P'gh	2.35c.
No. 13, f.o.b. Chicago dist.	2.45c.
No. 13, del'd Philadelphia	2.67c.
No. 13, blue annealed, B'ham	2.50c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh	2.85c. to 2.95c.
No. 24, f.o.b. Chicago dist. mill	3.05c.
No. 24, del'd Philadelphia	3.17c. to 3.27c.
No. 24, f.o.b. Birmingham	3.00c. to 3.10c.

Metal Furniture Sheets

No. 24, f.o.b. P'gh	4.10c. to 4.20c.

Galvanized

No. 24, f.o.b. Pittsburgh	3.50c. to 3.70c.
No. 24, f.o.b. Chicago dist. mill	3.80c.
No. 24, del'd Cleveland	3.79c. to 3.89c.
No. 24, del'd Philadelphia	3.92c. to 4.02c.
No. 24, f.o.b. Birmingham	3.75c. to 3.85c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	3.00c.
No. 28, f.o.b. Chicago dist. mill	3.10c.

Automobile Body Sheets

No. 28, f.o.b. Pittsburgh	4.10c.

Long Ternes

No. 24, 8-lb. coating, f.o.b. mill	4.00c.

Vitreous Enameling Stock

No. 24, f.o.b. Pittsburgh	3.90c.

Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills	$5.35
Standard cokes, f.o.b. Gary	5.45

Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)
(Per Package, 20 x 28 in.)

8-lb. coating I.C.	$11.20
15-lb. coating I.C.	14.00
20-lb. coating I.C.	15.20
25-lb. coating I.C.	$16.70
30-lb. coating I.C.	17.75
40-lb. coating I.C.	19.85

Alloy Steel Bars

(F.o.b. makers' mill)

Alloy Quality Bar Base, 2.65c. to 2.75c. per Lb.

S.A.E. Series Numbers		Alloy Differential
2000	(½% Nickel)	0.25
2100	(1½% Nickel)	0.55
2300	(3½% Nickel)	1.50
2500	(5% Nickel)	2.25
3100	Nickel Chromium	0.55
3200	Nickel Chromium	1.35
3300	Nickel Chromium	3.80
3400	Nickel Chromium	3.20
4100	Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50
4100	Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600	Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel)	1.05
5100	Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100	Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100	Chromium Spring Steel	0.20
6100	Chromium Vanadium Bars	1.20
6100	Chromium Vanadium Spring Steel	0.95
9250	Silicon Manganese Spring Steel (flats)	0.25
	Rounds and squares	0.50
	Chromium Nickel Vanadium	1.50
	Carbon Vanadium	0.95

Above prices are for hot rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is ¾c. per lb. higher. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis.

Billets under 4 x 4 in. carry the steel bar base. Slabs with a sectional area of 16 in. or over carry the billet price. Slabs with sectional area of less than 16 in. carry the bar price.

Rails

	Per Gross Ton
Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	36.00
Light (from rail steel), f.o.b. mill	34.00
Light (from billets), f.o.b. Ch'go mill	36.00

Track Equipment

	Base per 100 Lb.
Spikes, ⅝ in. and larger	$2.80
Spikes, ½ in. and smaller	2.80
Spikes, boat and barge	3.00
Tie plates, steel	2.15
Angle bars	$2.75
Track bolts, to steam railroads	$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel Inches	Black	Galv.	Iron Inches	Black	Galv.
⅛	45	19½	¼ and ⅜	+11	+36
¼ to ⅜	51	25½	½	23	5
½	56	42½	¾	28	11
¾	60	48½	1 and 1¼	31	15
1 to 3	62	50½	1½ and 2	35	18

Lap Weld

2	55	43½	2	23	9
2½ to 6	59	47½	2½ to 3½	28	13
7 and 8	56	43½	4 to 6	30	17
9 and 10	54	42½	7 and 8	29	16
11 and 12	53	40½	9 to 12	26	11

Butt Weld, extra strong, plain ends

⅛	41	24½	¼ and ⅜	+13	+48
¼ to ⅜	47	30½	½	23	7
½	53	42½	¾	28	12
¾	58	47⅞	1 to 2	34	18
1 to 1½	60	49½			
2 to 3	61	50½			

Lap Weld, extra strong, plain ends

2	53	42½	½	29	13
2½ to 4	57	46½	2½ to 4	34	20
4½ to 6	56	45½	4½ to 6	33	19
7 to 8	52	39½	7 and 8	31	17
9 and 10	45	32½	9 to 12	21	8
11 and 12	44	31½			

On carloads the above discounts on steel pipe are increased on block by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Steel		Charcoal Iron	
2 in. and 2¼ in.	40	1½ in.	1
2½ in.—2¾ in.	48	1¾ in.	8
3 in.	54	2 in.—2¼ in.	13
3¼ in.—3¾ in.	56	2½ in.—2¾ in.	16
4 in.	59	3 in.	17
4½ in. to 6 in.	48	3¼ in. to 3½ in.	18
		4 in.	20
		4½ in.	21

On lots of a carload or more, the above base discounts are subject to a preferential of two fives on steel and of 10 per cent on charcoal iron tubes. Smaller quantities are subject to the following modifications from the base discounts:

Lap Welded Steel—Under 10,000 lb., 6 points under base and one five; 10,000 lb. to carload, 4 points under base and two fives. Charcoal Iron—Under 10,000 lb., 2 points under base; 10,000 lb. to carload, base and one five.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	63	3 in.	48
1¼ to 1½ in.	55	3¼ to 3½ in.	50
1¾ in.	39	4 in.	53
2 to 2¼ in.	34	4½, 5 and 6 in.	42
2½ to 2¾ in.	42		

Hot Rolled

2 and 2¼ in.	40	3¼ to 3½ in.	56
2½ and 2¾ in.	48	4 in.	59
3 in.	54	4½, 5 and 6 in.	48

Beyond the above base discounts a preferential discount of 5 per cent is allowed on carload lots. On less than carloads to 10,000 lb. base discounts are reduced 4 points with 5 per cent preferential; on less than 10,000 lb., base discounts are reduced 6 points, with no preferential. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage take mechanical tube list and discounts. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30%, base (carloads)	55
Carbon, 0.30% to 0.40%, base	50

Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

shown some improvement in the last few weeks. Shipments of mechanical tubing are declining slightly.

Sheets.—Production was curtailed sharply last week on account of the holiday, with only a few mills operating more than nine turns. Specifications held up fairly well and tonnage releases thus far in the present week have been heavy. Operations this week will also be at close to capacity, as the shortage of crude steel has now ceased to be an important factor. Nevertheless, hot weather is becoming a hindrance in production and mills are very anxious to catch up on shipments before more serious curtailment results. Deliveries on blue annealed sheets and light plates still average about six weeks, while on black and galvanized four weeks is not uncommon. Automobile production during July is expected to hold at about the present level, as the sheet requirements of the leading producers show little or no decrease in aggregate tonnage. Prices are unchanged, with galvanized sheets showing the only pronounced weakness.

Tin Plates.—Conditions in this market have shown some improvement in the last two weeks. Specifications are not noticeably heavier, but crop conditions are reported favorable, and, following a more or less general suspension of operations during the last days of the past week, production this week is expected to be at about 95 per cent of capacity.

Old Material.—After several weeks of comparative price stability, the scrap market seems to be turning definitely upward, and although advances are still rather difficult to place definitely, No. 1 heavy melting steel may now be quoted at $18.25 to $18.75, in the absence of large consumer purchases. This advance might be considered only nominal, but good scrap is less plentiful than ever and dealers are having more difficulty in buying against old orders. It is reasonably certain that no dealer would be willing to sell today for less than $18.25, and a large tonnage of railroad steel, or its equivalent, would bring more than $19. As stated last week, the Pennsylvania Railroad list brought over $19, and the trade believes the Baltimore & Ohio and Norfolk & Western lists, which close this week, will also bring high figures. The latter list, which will close on July 11, contains about 4500 tons of steel. Hydraulic compressed sheets are still quotable at $18 to $18.50, and No. 2 heavy melting steel has been sold at as high as $16.50. Specialties are very scarce and dealers are having considerable difficulty in buying against old orders for less than $21.50 on knuckles and couplers or rolled steel wheels. Machine shop turnings have been sold again at $12 and the blast furnace grades have advanced 25c. to a $12.50 top.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$18.25 to $18.75
No. 2 heavy melting steel	16.00 to 16.50
Scrap rails	17.50 to 18.00
Compressed sheet steel	18.00 to 18.50
Bundled sheets, sides and ends	16.50 to 17.00
Cast iron carwheels	16.00 to 16.50
Sheet bar crops, ordinary	18.50 to 19.00
Heavy breakable cast	12.50 to 13.00
No. 2 railroad wrought	18.25 to 18.75
Hvy. steel axle turnings	16.00 to 16.50
Machine shop turnings	11.50 to 12.00
Acid Open-Hearth Grades:	
Railr. knuckles and couplers	21.50 to 22.00
Railr. coil and leaf springs	21.50 to 22.00
Rolled steel wheels	21.50 to 22.00
Low phos. billet and bloom ends	22.00 to 22.50
Low phos., mill plates	22.00 to 22.50
Low phos., light grades	20.00 to 20.50
Low phos., sheet bar crops	20.00 to 21.00
Heavy steel axle turnings	16.00 to 16.50
Electric Furnace Grades:	
Low phos., punchings	19.50 to 20.50
Hvy. steel axle turnings	16.00 to 16.50
Blast Furnace Grades:	
Short shoveling steel turnings	12.00 to 12.50
Short mixed borings and turnings	12.00 to 12.50
Cast iron borings	12.00 to 12.50
Rolling Mill Grades:	
Steel car axles	21.50 to 22.00
Cupola Grades:	
No. 1 cast	15.00 to 16.00
Rails 3 ft. and under	20.00 to 21.00

Strip Steel.—No pronounced decline in strip steel specifications is reported, and business seems fairly well established at the levels which have prevailed for several weeks. Reports lack consistency, as some mills are considerably behind in their deliveries on the wider sizes of hot-rolled strip while operating on a hand-to-mouth basis on the narrower materials, and others report an almost opposite situation. This indicates a rather poorly diversified demand, with business largely dependent on the fluctuating requirements of large users. Cold-rolled strip is steadier, with deliveries generally averaging from two to three weeks. On the hot-rolled material prices are holding at 1.90c. and 2c., Pittsburgh, while occasional concessions from the 2.75c. to 2.85c. range on cold-rolled strip are reported.

Coal and Coke.—The coke market continues quiet, with the furnace grade holding at $2.75 to $2.85, Connellsville, and production by independent companies well adjusted to current demand. On the foundry grade shipments are near the low point of the year and prices have little strength. The premium brands are firm at $4.85, ovens. Coal prices have gained little strength, but production is holding up well for this time of the year and industrial consumption is large.

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.25c.
Hoops	4.25c.
Black sheets (No. 24), 25 or more bundles	3.80c.
Galv. sheets (No. 24), 25 or more bundles	4.55c.
Blue ann'l'd sheets (No. 10), 1 to 10 sheets	3.45c.
Galv. corrug. sheets (No. 28), per square	$4.43
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count,	60 per cent off list
Machine bolts, 100 count,	60 per cent off list
Carriage bolts, 100 count,	60 per cent off list
Nuts, all styles, 100 count,	60 per cent off list
Large rivets, base per 100 lb.	$3.50
Wire, black soft ann'l'd, base per 100 lb.	$3.00 to 3.10
Wire, galv. soft, base per 100 lb.	3.00 to 3.10
Common wire nails, per keg	3.00
Cement coated nails, per keg	3.05

Symington and National Malleable to Merge

Plans are under way for merger of Symington Co., Rochester, N. Y., manufacturer of railroad equipment, and National Malleable & Steel Castings Co., Cleveland, producer of iron and steel castings for railroad and other service. Consolidation will include Gould Coupler Co., Depew, N. Y., subsidiary of Symington Co., manufacturer of equipment for locomotives, passenger and freight cars, as well as its affiliated organization, Gould Storage Battery Co. The new organization will carry out expansion program for increased production. Present plants will be continued. These include iron foundries of National Malleable Company at Cleveland, Chicago, Indianapolis, Toledo and East St. Louis, Ill., and steel foundries at Sharon, Pa., Chicago and Melrose Park, Ill. Henry F. Pope is president of the National Malleable Company.

Shanghai Tungsten Exports to United States Double

Exports of tungsten ore from Shanghai to the United States in 1928 were more than twice the shipments in 1927, according to a report from Consul J. C. Huston, Shanghai, made public by the Department of Commerce. Reliable information is to the effect that existing contracts cover all stocks of tungsten ore now on hand in Shanghai.

It is reported that there are on hand at Kanchow, Kiangsi Province, near the tungsten deposits, stocks of tungsten concentrates variously estimated at between 600 and 1000 tons, of which 300 tons are contracted-for cargo, and the present asking price for the uncontracted balance is $7 per unit for September-October shipment from Shanghai. It is impossible to transport any of this stock to Shanghai for the time being, owing to the fact that the canals connecting the south of Kiangsi Province with the Yangtsze River are too shallow, due to lack of rains.

Declared exports of tungsten ore from Shanghai to the United States during the first quarter of 1929 amounted to 1,423,877 lb. valued at $187,867. There were no such shipments during the first quarter of 1928, owing to expectation of New York importers that the import duty on tungsten ore in the United States would be raised.

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

Billets and Blooms

	Per Gross Ton
Rerolling, 4 in. and under 10 in., Pittsburgh	$35.00
Rerolling, 4 in. and under 10 in., Youngstown	35.00
Rerolling, 4 in. and under 10 in., Cleveland	35.00
Rerolling, 4 in. and under 10 in., Chicago	37.00
Forging quality, Pittsburgh	$40.00 to 41.00

Sheet Bars

(Open Hearth or Bessemer)

	Per Gross Ton
Pittsburgh	$35.00
Youngstown	35.00
Cleveland	35.00

Slabs

(8 in. x 2 in. and under 10 in. x 10 in.)

	Per Gross Ton
Pittsburgh	$35.00
Youngstown	35.00
Cleveland	35.00

Skelp

(F.o.b. Pittsburgh or Youngstown)

	Per Lb.
Grooved	1.85c. to 1.90c.
Universal	1.85c. to 1.90c.
Sheared	1.85c. to 1.90c.

Wire Rods

(Common soft, base)

	Per Gross Ton
Pittsburgh	$42.00
Cleveland	42.00
Chicago	43.00

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.80
Old range non-Bessemer, 51.50% iron	4.65
Mesabi Bessemer, 51.50% iron	4.65
Mesabi non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.40

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algerian	10.00c.
Iron ore, low phos., Swedish, average 68% iron	10.00c.
Iron ore, basis Swedish, average 65% iron	9.00c.
Manganese ore, washed, 52% manganese, from the Caucasus	33.00c. to 35.00c.
Manganese ore, Brazilian, African or Indian, basic 50%	33.00c. to 35.00c.
Tungsten ore, high grade, per unit, in 60% concentrates	$15.00 to $15.50
	Per Gross Ton
Chrome ore, 45 to 50% Cr_2O_3, crude, c.i.f. Atlantic seaboard	$22.00 to $24.00
	Per Lb.
Molybdenum ore, 85% concentrates of MoS_2, delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$2.75 to $2.85
Foundry, f.o.b. Connellsville prompt	3.75 to 4.85
Foundry, by-product, Ch'go ovens	8.00
Foundry, by-product, New England, del'd	11.00
Foundry, by-product, Newark or Jersey City, delivered	9.00 to 9.40
Foundry, by-product, Phila	9.00
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry by-prod., del'd St. Louis	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.25 to $1.75
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, ¾-in. f.o.b. Pa. mines	1.90 to 2.00
Mine run gas coal, f.o.b. Pa. mines	1.65 to 1.75
Steam slack, f.o.b. W. Pa. mines	80c. to 90c.
Gas slack, f.o.b. W. Pa. mines	1.00 to 1.10

Ferromanganese

	Per Gross Ton
Domestic, 80%, seaboard	$105.00
Foreign, 80%, Atlantic or Gulf port, duty paid	105.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$31.00 to $34.00
Domestic, 16 to 19%	29.00 to 32.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$83.50
75%	130.00

Per Gross Ton Furnace		*Per Gross Ton Furnace*	
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	45.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio Furnace

Per Gross Ton		*Per Gross Ton*	
10%	$31.00	12%	$35.00
11%	33.00		

Silvery Iron

F.o.b. Jackson County, Ohio Furnace

Per Gross Ton		*Per Gross Ton*	
6%	$24.00	10%	$29.00
7%	25.00	11%	31.00
8%	26.00	12%	33.00
9%	27.00		

Other Ferroalloys

Ferrotungsten, per lb., contained metal del'd	$1.40 to $1.50
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.15 to $3.65
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	$160.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton	$91.00
Ferrophosphorus, electric 24%, f.o.b. Anniston, Ala., per gross ton	$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride not over 5% silicon, gravel, f.o.b. Illinois and Kentucky mines	$18.00
No. 2 lump, Illinois and Kentucky mines	20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	$18.00 to $18.50
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines	32.50

Fire Clay Brick

Per 1000 f.o.b. Works

	High-Heat Duty Brick	Intermediate Heavy Duty Brick
Pennsylvania	$43.00 to $46.00	$35.00 to $38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	.....
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick

Per 1000 f.o.b. Works

Pennsylvania	$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00
Standard size	45.00

Chrome Brick

	Per Net Ton
Standard size	$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts, blank or tapped, hexagons	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	7.00c. to 6.75c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled thread up to and including ⅛ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagons nuts	70
Semi-finished hexagons castellated nuts, S.A.E.	70
Stove bolts in packages, P'gh	75, 20, 10 and 5
Stove bolts in packages, Chicago	75, 20, 10 and 5
Stove bolts in packages, Cleveland	75, 20, 10 and 5
Stove bolts in bulk, P'gh	75, 20, 10, 5 and 2½
Stove bolts in bulk, Chicago	75, 20, 10, 5 and 2½
Stove bolts in bulk, Cleveland	75, 20, 10, 5 and 2½
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55, 60 per cent apply.

Large Rivets

(½-In. and Larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$3.10
F.o.b. Chicago	3.20

Small Rivets

(7/16-In. and Smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70 and 10
F.o.b. Cleveland	70 and 10
F.o.b. Chicago	70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10 and 5
Milled standard set screws, case hardened,	80 and 5
Milled headless set screws, cut thread	75 and 10
Upset hex. head cap screws, U.S.S. thread	85
Upset hex. cap screws, S.A.E. thread	85
Upset set screws	80, 10 and 5
Milled studs	70

Chicago

Heavy Buying of Steel Features Opening of Third Quarter —Mill Backlogs Again Increase

CHICAGO, July 9.—Sales of finished steel in the past week were larger than in any like period so far this year. A liberal number of users are closing for third quarter requirements, and in addition there have been sizable tonnages of plates placed for pipe construction. New orders for bars bulk large, and it is noteworthy that some of this business is coming from automobile parts manufacturers as they swing into larger production to meet the needs of automobile makers who are about to introduce new models.

As sales mount, specifications remain steady, being fully equal to shipments and affording mill output at capacity. Non-integrated mills, though still pressed for supplies of raw steel, are having less difficulty in picking up odd lots, though often at some distance from their plants. Producers of semi-finished steel find apportionment among finishing departments less pressing and as a result some finishing units, such as hot mills, are less restricted as to rate of output and are operating nearer rated capacity.

Heavier buying of steel is placing backlogs on a more substantial basis than they have been in a number of weeks. Users' willingness to make commitments is on a par with the attitude taken at the opening of the second quarter—a situation not usually expected at this time of the year when a midsummer lull is normally experienced.

Prices for all commodities, with the exception of nails, remain steady. Plates, shapes and bars are firm at 2.05c. a lb., Chicago.

The Moline rail steel bar mill of the Republic Iron & Steel Co. resumed operation today after having been down for three weeks for extensive repairs.

Pig Iron.—July shipments of Northern foundry iron are keeping pace with the rate in June, though it is apparent that hot weather threatens to affect output of local foundries. Forward contracting is steady, and most of the third quarter contracts have been closed. A few users continue to show interest in needs for the remainder of the year. Spot sales are fully up to normal for this season. Southern iron is off 50c. to $14.50 a ton, Birmingham, or $20.51, delivered all rail to Chicago. A sale of 2000 tons is reported in this district. The silvery market is quiet except in shipments; furnace stocks are reported low, and prices are steady on actual sales. A few scattered sales of charcoal iron have been made at $24 a ton, furnace. Shipments are especially large to roll foundries.

Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	$20.00
N'th'n No. 1 fdy., sil. 2.25 to 2.75	20.50
Malleable, not over 2.25 sil.	20.00
High phosphorus	20.00
Lake Super. charcoal, sil. 1.50	27.04
So'th'n No. 2 fdy. (all rail)	20.51
Low phos., sil. 1 to 2, copper free	29.50
Silvery, sil. 8 per cent	30.79
Bess. ferrosilicon, 14-15 per cent	46.29

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Plates—Foremost of interest in this market is the news that several large gas pipe projects are rapidly taking shape. Plans are being prepared for a line from the Panhandle of Texas to Chicago and intermediate points. Another pipe line will extend into Iowa and Nebraska. The latter is presumably a part of the project which was to have supplied Omaha, Neb., with natural gas from the Southwest fields. Plate sales during the week were unusually large because of additional third quarter contracts and placing of orders for plates needed for 50,000 tons of pipe, contracts for which were announced last week. New business of importance in railroad cars is lacking, but car builders' steel specifications, at 6000 tons, reflect the activity on old orders. The Bettendorf Co. has ordered 3000 tons of plates, shapes and bars for 300 gondola car bodies which it will build for the Rock Island. Demand for oil storage tanks remains large and shops are heavily engaged. A Texas refiner has ordered 4000 tons of plates, and another lot of 600 tons is for delivery in the Southwest. An oil company in San Francisco has need for 750 tons of plates. On the whole, inquiry before the trade is for not less than 10,000 tons. Chicago prices for plates are firm at 2.05c. a lb. Deliveries, though somewhat improved, are not better than eight to 10 weeks.

Structural Material.—This market is moderately active. Shops are finding a greater variety of small orders and fresh inquiries, but for work of this kind competition is very keen. Architects and engineers are busier, but it is too early for the results of their work to take tangible form in the way of requests for prices for steel. Railroad needs for bridges and girder spans are larger, but individual tonnages are small. Noteworthy among the larger projects is a 36-story building for the Garrett Biblical Institute, Chicago. Fabricating shops are ordering steel in larger quantities, more as a precaution against the delivery situation than as a reflection of wider activity in the structural field. Deliveries on shapes average six weeks. Prices are firm at 2.05c., Chicago.

Mill prices on plain material, per lb.: 2.05c. base, Chicago.

Ferroalloys.—This market remains quiet, except for a few scattered quotations for less than carload lots. Prices are firm.

Prices delivered Chicago: 80 per cent ferromanganese, $112.56; 50 per cent ferrosilicon, $83.50 to $88.50; spiegeleisen, 19 to 21 per cent, $40.76.

Sheets.—Uneasiness in prices for sheets is not shown in the immediate Chicago district. To the southwest and southeast, however, quotations are weak. Third quarter contracting continues, and a substantial volume of spot orders is being forwarded by users. Output is close to 85 per cent of capacity, a condition still dictated by the supply of raw steel. The roofing trade, especially in the North and Northwest, is more active. The jobbing trade is unusually active in the turnover of sheets. It has bought sparingly for the third quarter for the reason that a large part of second quarter contracts were not specified, and sellers are now allowing jobbers to draw against the old commitments.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 3.10c.; No. 24 galv., 3.85c.; No. 10 blue ann'l'd, 2.35c. Deliv'd prices at other Western points are equal to the freight from Gary, plus the mill prices, which are 5c. per 100 lb. lower than Chicago delivered prices.

Cast Iron Pipe.—Orders for cast iron pipe are scarce in the immediate Chicago territory. Outlying districts are bringing some business into the market, and there is a limited amount of private buying, though the bulk of this is in orders of car lot size. A Des Moines, Iowa, contractor has been awarded a general contract to lay 125 tons for Grand Rapids, Mich. Royal Oak, Mich., will take bids July 15 on 9600 ft. of 6-in. and 7800 ft. of 8-in. pipe. West Allis, Wis., is taking bids this week for the construction of 3200 ft. of 24-in. cast iron water main.

Prices per net ton, del'd Chicago: Water pipe, 6-in. and over, $45.20 to $46.20; 4-in., $49.20 to $50.20; Class A and gas pipe, $3 extra.

Bars.—New buying in mild steel bars is unusually heavy, as many users enter the market for third quarter requirements. The total of contracts at this time is fully on a par with the tonnage taken for the second quarter, while some buyers, anticipating steady use in the summer months, have signed contracts larger than those made for the second three months of this year. Specifications for the week are down a trifle, but in the aggregate they compare favorably

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars	3.00c.
Reinforc'g bars, billet steel	2.10c. to 2.40c.
Reinforc'g bars, rail steel	1.90c. to 2.05c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Bands (¼ in. in Nos. 10 and 12 gages)	3.20c.
Hoops (No. 14 gage and lighter)	3.75c.
Black sheets (No. 24)	4.05c.
Galv. sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.35c.
Spikes, ⅜ in. and larger	3.55c.
Track bolts	4.55c.
Rivets, structural	4.00c.
Rivets, boiler	4.00c.

	Per Cent Off List
Machine bolts	60
Carriage bolts	60
Coach or lag screws	60
Hot-pressed nuts, sq., tap. or blank	60
Hot-pressed nuts, hex., tap. or blank	60
No. 8 black ann'l'd wire, per 100 lb.	$3.45
Com. wire nails, base per keg	3.20
Cement c't'd nails, base per keg	3.20

with shipments. As far as can be ascertained, stocks in the hands of users are small. Deferred deliveries have caused buyers to anticipate their needs farther in advance and mills are having less difficulty in arranging rolling schedules. Some automobile specialty manufacturers are taking larger quantities of bars as they prepare to furnish parts of new models. Prices for mild steel bars are steady at 2.05c. a lb., Chicago. Spot buying in alloy steel bars is active and prices are firm. Demand is steady and specifications are equal to shipments, which represent 85 per cent of local mill capacity. The iron bar market is steady because of a uniform demand from railroads. Prices are firm at 2.05c. a lb., Chicago. Specifications for rail steel bars are larger than shipments and deliveries range two to three weeks. The bed industry is active. Barn equipment manufacturers are enjoying an active early summer business.

Bolts, Nuts and Rivets.—The average of output in this district was cut temporarily this week because several plants were down for inventory taking. Shipments, partly drawn from stocks, were at a uniform rate. Demand by the railroads is reported good for this time of the year.

Reinforcing Bars.—This market is quieter than it was a week ago. Dealers estimate that inquiries on hand are fully 30 per cent smaller in aggregate tonnage than they were a year ago at this time. Fresh inquiries this week are few in number and for the most part small in tonnage. This is contrary to the experience in previous years, when interest in buying usually expanded in July. Deliveries from mills still are unsatisfactory to dealers who have not held large stocks and who have had no opportunity to expand them in recent months. The market is highly competitive, and prices lack strength. Bar shops are moderately well engaged on a large number of small orders.

Wire Products.—A seasonal lull is keenly felt in wire products. New buying is dull and specifications for most products and from a large number of buyers are measurably smaller than a week ago. This situation, sensed by producers about 10 days ago, has not led to curtailment of output. Stocks at mills have been growing smaller all through the spring and early summer months, and it seems likely that mills will maintain output at 65 per cent for some time to come, while stocks are being rounded out for the fall trade. Prices are steady on all products, with the exception of nails, on which weakening in quotations has spread over much of the Central West. Jobbers, taken as a whole, are specifying freely for this time of the year. In some quarters it is expected that not much greater recession in orders will be experienced from the manufacturing trade. To strengthen this opinion, sellers point to added activity of automobile parts makers, who are now manufacturing for new automobile models that soon are to make their appearance.

Cold-Rolled Strip. — Specifications for this commodity are liberal and operations are near capacity. Delivery promises are still close to six weeks. Manufacturers of automobiles in the medium-price field are now taking this commodity for use in new models.

Rails and Track Supplies.—The Great Northern is inquiring for 30,000 tons of standard-section rails. Other miscellaneous requests for prices from Northwestern railroads total 5000 tons. Rolling programs on old contracts have now been arranged, and local mills have settled to an even pace for the completion of these obligations. New orders for track supplies total 3500 tons, and inquiry is for not less than 8000 tons, including 5000 tons, which is still open for the Pennsylvania. Light rails are in moderate demand. Rail mills are operating at 85 per cent of capacity and accessory departments are engaged at 75 per cent.

Prices f.o.b. mill, per gross ton: Standard section open-hearth and Bess. rails, $43; light rails, rolled from billets, $36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.15c.; angle bars, 2.75c.

Coke.—By-product foundry coke is firm at $8 a ton, Chicago ovens. Shipments have remained uniform in the first 10 days of July.

Old Material.—Shipments against old orders are large and well up to the average of recent weeks. Most users, with the possible exception of some foundries, continue to operate near the rate maintained in June. Brokers' obligations are large, and, with the new buying lacking, they are concentrating on filling old orders as fast as buyers will accept shipments. Incoming scrap balances well with current demand, and little trouble is being experienced with scrap appearing on track. There is one exception, however, to this and that is the fact that several mills have placed embargoes against hydraulic compressed bundles. Brokers, having no place to consign this grade, are not taking it out of yards, and dealers are being forced to pile bundles as they are made. Prices for cast grades are weak and demand is light, partly because last week many foundries closed for the full six days. Lists are being offered this week by the Missouri-Kansas-Texas, Santa Fe, Wabash, Great Northern and the Pullman Car & Mfg. Corporation.

Prices deliv'd Chicago district consumers:

Per Gross Ton

Basic Open-Hearth Grades:	
Heavy melting steel	$14.75 to $15.25
Shoveling steel	14.75 to 15.25
Frogs, switches and guards, cut apart, and misc. rails	16.25 to 16.75
Hydraul. compressed sheets	13.00 to 13.50
Drop forge flashings	10.50 to 11.00
No. 1 busheling	13.00 to 13.50
Forg'd cast and r'l'd steel carwheels	18.25 to 18.75
Railroad tires, charg. box size	18.50 to 19.00
Railroad leaf springs cut apart	18.50 to 19.00
Acid Open-Hearth Grades:	
Steel couplers and knuckles	16.75 to 17.25
Coil springs	19.00 to 19.50
Electric Furnace Grades:	
Axle turnings	14.50 to 15.00
Low phos. punchings	16.50 to 17.00
Low phos. plates, 12 in. and under	16.50 to 17.00
Blast Furnace Grades:	
Axle turnings	10.75 to 11.25
Cast iron borings	9.75 to 10.25
Short shoveling turnings	9.75 to 10.25
Machine shop turnings	7.00 to 7.50
Rolling Mill Grades:	
Iron rails	16.00 to 16.50
Rerolling rails	17.50 to 18.00
Cupola Grades:	
Steel rails less than 3 ft.	17.75 to 18.25
Steel rails less than 2 ft.	18.25 to 18.75
Angle bars, steel	17.00 to 17.50
Cast iron carwheels	14.00 to 14.50
Malleable Grades:	
Railroad	16.75 to 17.25
Agricultural	15.50 to 16.00
Miscellaneous:	
*Relaying rails, 56 to 60 lb.	23.00 to 25.00
*Relaying rails, 65 lb. and heav.	26.00 to 31.00

Per Net Ton

Rolling Mill Grades:	
Iron angle and splice bars	15.00 to 15.50
Iron arch bars and transoms	21.00 to 21.50
Iron car axles	26.00 to 26.50
Steel car axles	16.50 to 17.00
No. 1 railroad wrought	13.50 to 14.00
No. 2 railroad wrought	13.00 to 13.50
No. 1 busheling	9.00 to 9.50
No. 2 busheling	7.00 to 7.50
Locomotive tires, smooth	14.50 to 15.00
Pipes and flues	10.00 to 10.50
Cupola Grades:	
No. 1 machinery cast	14.50 to 15.00
No. 1 railroad cast	13.75 to 14.25
No. 1 agricultural cast	13.25 to 13.75
Stove plates	12.25 to 12.75
Grate bars	11.75 to 12.25
Brake shoes	10.50 to 11.00

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Iron Ore Imports Continue Heavy in May

WASHINGTON, July 6. — May imports of iron ore, while less than those for April, continued the heavy movement of the past few months. The total was 275,762 gross tons, compared with 284,134 tons in the preceding month and with 211,270 tons in May, 1928. For the five months the imports reached 1,223,783 tons, which is 13½ per cent higher than the total for the like period of last year.

Chile furnished a little less than half of the total imported in May. For the five months of the year, however, Chile's contribution was almost 53 per cent.

SOURCES OF AMERICAN IMPORTS OF IRON ORE
(In Gross Tons)

	May		Five Months Ended May	
	1929	1928	1929	1928
Canada	5	290	167	42,423
Cuba	56,400	33,000	269,900	164,786
Chile	130,316	141,800	646,085	624,700
Spain	13,048	.....	31,416	5,250
Sweden	22,723	.....	95,751	19,614
French Africa	25,800	34,375	84,980	194,021
Other countries	27,470	1,805	95,484	28,726
Total	275,762	211,270	1,223,783	1,079,520

New York

Structural Steel Market Active—Pig Iron Inquiries Increase—Scrap Exported to Japan

NEW YORK, July 9.—Foundry iron consumers in this district show no haste in covering their future requirements, in most cases having sufficient tonnage on hand or coming in on contracts to carry them well through the current month. Inquiry however, has increased, and upward of 8000 tons of business is in the market. Sales in the past week were about 5000 tons. Southern pig iron is not providing much competition in this district, but there is an increasing movement of Buffalo iron by barge to Central Railroad of New Jersey docks at Jersey City, where it is transferred to cars for rail delivery. Barge freight rates from Buffalo to New York were maintained at about $2.50 a ton in the spring, but, with barge operators facing competition from a low, all-rail rate to the East on grain, they are more inclined to book pig iron at rates of $2.25 a ton or less. The General Fire Extinguisher Co., Providence, R. I., has closed on about 2500 tons of foundry iron, about half with a New England furnace and the rest divided between a New York State furnace and Buffalo furnaces. The inquiry of the National Radiator Co., Johnstown, Pa., for 3500 tons of foundry iron for delivery to Trenton, N. J., is not yet reported closed, and another radiator manufacturer has about 4000 tons pending for shipment to plants outside the district. About 2000 tons of foundry is still to be bought by the Chapman Valve & Mfg. Co., Indian Orchard, Mass. The Bureau of Supplies and Accounts, Washington, will open bids July 23 on 15 tons of No. 1 and No. 3 foundry for Portsmouth, N. H., 95 tons of No. 2 and 3 foundry for the Boston Navy Yard, 100 tons of No. 2 and 3 foundry for the Philadelphia Navy Yard, 224 tons of No. 1 foundry for the Norfolk Navy Yard, and 25 tons of No. 3 foundry for Charleston, S. C. Buffalo furnaces are quoting $18 a ton, base, but while prices show greater firmness, $17.50 per ton, furnace, has not entirely disappeared.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	$22.41 to $22.91
*Buf. No. 2, del'd east. N. J.	20.78 to 21.28
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	21.39 to 22.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	21.89 to 23.02

Freight rates: $4.91 from Buffalo, $1.39 to $2.52 from eastern Pennsylvania.

*Price delivered to New Jersey cities having rate of $3.28 a ton from Buffalo.

Warehouse Business.—Jobbers report a slight slackening of business since the first of the month, but attribute this in part to the holiday. Structural shapes are in fair demand, and prices are well maintained. Galvanized sheets are active, but prices are still subject to occasional concessions of $1 or more a ton, and some shading is also reported on black sheets.

Cast Iron Pipe.—Prices quoted at recent openings of bids by municipalities show no tendency of the market to advance. Hartford, Conn., has opened bids on about 160 tons of 6, 8 and 12-in. water pipe. A Southern maker was low on about 85 tons of 6 and 12-in. pipe, and a Northern foundry was low on 75 tons of 8-in. The low bid on 370 tons of 8 and 12-in. pipe and 12 tons of fittings for Weston, Mass., was submitted by a Northern maker. Current buying of gas and water pipe is in most instances limited to small tonnages of about a carload to complete installations.

Prices per net ton deliv'd New York: Water pipe, 6-in. and larger, $33.60 to $35.60; 4-in. and 5-in., $36.60 to $38.60; 3-in., $43.60 to $45.60. Class A and gas pipe, $3 extra.

Reinforcing Bars.—The lull in buying continued the past week, and no sales or fresh inquiries of consequence are reported. Quotations, however, remain steady and unchanged.

Billet steel reinforcing bars in 40, 50 and 60-ft. lengths, 2.05c. per lb., Pittsburgh, and 2.30c. per lb., Pittsburgh warehouse, for cut lengths. Out of New York warehouse, 2.90c. per lb. for lots of 5 tons or more, 3.05c. for lots of 2 to 5 tons and 3.30c. for less than 2 tons, all delivered at job.

Ferroalloys.—Sales of several carloads and small lots of spiegeleisen are noted for early delivery at $34, furnace. There is almost no new demand for ferromanganese, but specifications on contract for both of these alloys are exceedingly heavy. This is also true of ferrosilicon and standard ferrochromium. Production of ferromanganese in June at 33,363 gross tons, according to returns to THE IRON AGE, was the largest since November, 1918, and brings the average output for the first six months to 26,700 tons a month, as compared with 26,000 tons a month in all of 1928.

Finished Steel.—The volume of buying of structural steel and plates continues at a high rate, although there has been a decided let-down during the past week in orders and specifications for most of the other forms of finished steel. A leading producer of structural shapes says that the volume of business in sight is in unprecedented amount, so that the third quarter "promises to be one of sustained high activity, rivaling the high mark during the second quarter." Awards of the week in New York included 6000 tons for the Downtown Athletic Club, 4100 tons for one telephone building and 2000 tons for another, and 4000 tons for catenary bridges for the Delaware, Lackawanna & Western Railroad. Outstanding new projects are 6000 tons for an apartment building, 2500 tons for a bank building and 3000 tons for an automobile plant, the latter to be built by the Chevrolet Motor Co. at Tarrytown, N. Y. Fabricated steel lettings in the New York metropolitan area in June amounted to 46,899 tons, compared with 34,575 tons in

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.30c.
Soft steel bars, small shapes	3.25c.
Iron bars	3.24c.
Iron bars, Swed. charcoal	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Cold-roll. strip, soft and quarter hard	5.15c. to 5.40c.
Hoops	4.25c.
Bands	3.75c.
Blue ann'l'd sheets (No. 10)	3.85c. to 3.90c.
Long terne sheets (No. 24)	5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galv. annealed	5.15c.
Tire steel, 1½ x ½ in. and larger	3.30c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.65c.
Open-hearth spring steel, bases,	4.50c. to 7.00c.

	Per Cent Off List
Machine bolts, cut thread:	
¾ x 6 in. and smaller	60
1 x 30 in. and smaller	50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	60
¾ x 20 in. and smaller	50 to 50 and 10
Coach screws:	
½ x 6 in. and smaller	60
1 x 6 in. and smaller	50 to 50 and 10

	Per 100 Ft.
Boiler Tubes—	
Lap welded, 2-in.	$17.33
Seamless steel, 2-in.	20.24
Charcoal iron, 2-in.	25.00
Charcoal iron, 4-in.	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
½-in. butt	46	29
¾-in. butt	51	37
1-3-in. butt	53	39
2½-6-in. lap	48	35
7 and 8-in. lap	44	17
11 and 12-in. lap	37	12
Wrought Iron—		
½-in. butt	5	+19
¾-in. butt	11	+ 9
1-1½-in. butt	14	+ 6
2-in. lap	5	+14
3-6-in. lap	11	+ 6
7-12 in. lap	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box	$6.45	$6.20
Charcoal, per Box—	A	AAA
IC	$9.70	$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating	$10.00 to $11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets, Box Annealed—Black, C. R. One Pass

	Per Lb.
Nos. 18 to 20	3.80c.
No. 22	3.95c.
No. 24	4.00c.
No. 26	4.10c.
No. 28*	4.25c.
No. 30	4.50c.

Sheets, Galvanized

	Per Lb.
No. 14	4.40c.
No. 16	4.25c.
No. 18	4.40c.
No. 20	4.50c.
No. 22	4.60c.
No. 24	4.75c.
No. 26	5.00c.
No. 28*	5.25c.
No. 30	5.65c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

May, states the Structural Steel Board of Trade. The total for the first half of the year was 243,285 tons, as against 182,800 tons in the corresponding period of 1928, a gain of approximately 33 per cent. These figures do not include subways, bridges and similar engineering work. Weakness in prices has developed on wire nails and galvanized sheets. On nails the $2.75 per keg price has virtually disappeared, and there have been concessions from $2.65. Galvanized sheets have been sold to jobbers at 3.50c., Pittsburgh. Otherwise the price situation seems to be fairly steady.

Mill prices per lb., deliv'd New York: Soft steel bars, 2.29c.; plates, 2.22½c.; structural shapes, 2.19½c.; bar iron, 2.14c.

Coke.—Demand for foundry coke is good, especially for by-product, but Connellsville furnace coke is quiet at $2.75 to $2.85 per net ton, ovens. Special brands of beehive coke are $4.85 a net ton, ovens, or $8.56, delivered to northern New Jersey, Jersey City and Newark and $9.44 to New York and Brooklyn. By-product coke is quoted at $9 to $9.40 per net ton, Newark or Jersey City and $10.06, New York or Brooklyn.

Old Material.—The only active grades of scrap are No. 1 and No. 2 heavy melting steel. In the past fortnight a substantial tonnage of both grades has been shipped for export to Japan, and brokers with these contracts are still buying for such shipment. The buyer specifies that at least half the cargo must be strictly No. 1 heavy melting steel, but the rest may be No. 2 and not more than a small percentage of what is classified as No. 3 steel. Brokers buying No. 1 steel for eastern Pennsylvania delivery are paying $16 a ton for shipment to Bethlehem, Pa., $16 to $16.25 per ton, delivered Claymont, Del., and $16.50 per ton, delivered Coatesville, Pa. No. 2 heavy melting steel is being bought at $13.50 to $13.75 a ton, delivered eastern Pennsylvania. Stove plate to local foundries is off slightly, with dealers paying $10 a ton, delivered, to a consumer at Mahwah, N. J. Specification pipe is off 50c. a ton on the basis of a recent sale to a Lebanon, Pa., consumer at $15 a ton, delivered.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel	$12.50 to $13.35
Heavy melting steel (yard)	8.00 to 9.50
No. 1 hvy. breakable cast.	10.75 to 12.00
Stove plate (steel works).	7.75 to 8.25
Locomotive grate bars....	8.25 to 8.75
Machine shop turnings....	7.25 to 7.50
Short shoveling turnings..	7.25 to 7.50
Cast borings (blast furn. or steel works).....	7.00 to 7.25
Mixed borings and turnings	6.75 to 7.25
Steel car axles.....	19.25 to 19.75
Iron car axles.....	24.00 to 25.00
Iron and steel pipe (1 in. dia., not under 2 ft. long)	10.75
Forge fire	9.50 to 10.00
No. 1 railroad wrought...	12.00 to 12.50
No. 1 yard wrought, long..	11.00 to 11.50
Rails for rolling.....	13.00 to 13.50
Cast iron carwheels.....	12.25 to 12.50
Stove plate (foundry)....	8.00 to 8.50
Malleable cast (railroad)..	14.00 to 14.50
Cast borings (chemical)..	10.00 to 10.50

Prices per gross ton, deliv'd local foundries:

No. 1 machry. cast.....	$17.00
No. 1 hvy. cast (columns, bldg. materials, etc.), cupola size.....	15.00
No. 2 cast (radiators, cast boilers, etc.)	14.50

Cleveland

Mill Committed Into August in Heavy Tonnage Lines—Specifications for Sheet Products Lighter

CLEVELAND, July 9.—Specifications and new business in all lines of finished steel declined during the week. The falling off in orders was probably partly due to the holiday. The seasonal slowing down of the automotive industry is reflected in lighter specifications for steel bars, sheets and strip steel from local forging and stamping plants, some of which have discontinued night operation. Production by some of the automobile manufacturers will be light for a few weeks until they bring out new models. However, the slowing down of the demand for steel from this industry probably will be less than usual in July and August. Previous output records for the two months are expected to be broken because of the heavy production schedules of the two largest manufacturers of low priced cars, the Ford company, which is still increasing its output, and the Chevrolet company, which has made only a small reduction in its production schedule.

Delivery of steel bars, plates and structural shapes show little, if any, improvement. Most mills are fully committed for three or four weeks, or with enough tonnage to carry them into August. Some cannot promise shipments of angles in less than eight to ten weeks.

The Wabash Railroad has placed a car ferry with the Toledo Shipbuilding Co. This will require 2500 tons of plates, which will be supplied by a Pittsburgh district mill. The Ralston Steel Car Co., Columbus, is inquiring for 6500 tons of plates for 800 box cars it recently took for the Pennsylvania Railroad.

Activity in the building field has declined sharply and few jobs are in prospect.

There is some irregularity in steel bars in the local market, Cleveland mills going in some cases to 1.90c., mill, for local delivery, necessitating an outside mill price of 1.92½c. delivered, Cleveland, to meet local competition. For outside shipment 1.95c., Cleveland, appears to be firmly maintained.

On plates and structural material 1.95c., Pittsburgh, is the ruling quotation.

Pig Iron.—The market was duller the past week than for some time, evidently because of the holiday. Sales by Cleveland interests totaled barely 10,000 tons in foundry and malleable grades. Inquiry is light. Many of the smaller Ohio foundries still have enough iron due on second quarter contracts to last them about a month and will not buy until their present contracts are cleaned up, as they see no prospect of higher prices. Merchant furnace interests are now wondering whether the demand of the open-hearth furnaces will decrease during the summer to an extent that steel makers will have pig iron to sell. Producers have added somewhat to their depleted stocks as a result of the decreased demand in June. Shipments to some of the large consumers in the automotive field are expected to show a gain this month over June. On the other hand, shipping orders from some of the Ohio foundries for July have declined. A 50c. reduction on Southern foundry iron to $14.50, Birmingham, is announced, and this cut will make Southern iron more of a competitive factor against Lake iron in the southern and central part of Ohio. Local prices are unchanged at $18.50, furnace, for foundry and malleable iron for outside shipment and $19 for local delivery. Both grades are quoted at $20, furnace, for Michigan delivery.

Prices per gross ton at Cleveland:

N'th'n fdy., sil. 1.75 to 2.25	$19.50
S'th'n fdy., 1.75 to 2.25....	20.50
Malleable	19.50
Ohio silvery, 8 per cent...	20.00
Basic Valley furnace.....	18.50
Stand. low phos., Valley..	$26.50 to 27.00

Prices except on basic and low phosphorus are delivered Cleveland. Freight rates: 50c. from local furnaces; $3 from Jackson, Ohio; $6 from Birmingham.

Semi-Finished Steel.—The leading local producer has covered practically all of its consumers for sheet bars, billets and slabs for the third quarter at $35, Cleveland, Youngstown or Pittsburgh, this being an advance of $1 a ton over the second quarter price for billets and slabs. However, shipments of billets and slabs are still being made against $34 second quarter contracts, although these will be cleaned up shortly. Specifications have fallen off somewhat and the pressure for deliveries that existed a short time ago is no longer in evidence.

Sheets.—The market was dull the past week, both in specifications and in new business. While deliveries have generally improved, some of the mills have enough business on their books to keep them operating at capacity for five to six weeks. Although the easing up in specifications is more noticeable on full finished

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and struc. shapes.....	3.00c.
Soft steel bars.....	3.00c.
Reinforc. steel bars.....2.25c. to	2.50c.
Cold-fin. rounds and hex.....	3.65c.
Cold-fin. flats and sq.....	4.15c.
Hoops and bands, No. 12 to ¼ in., inclusive	3.25c.
Hoops and bands, No. 13 and lighter	3.65c.
Cold-finished strip .....*5.95c.	
Black sheets (No. 24).....3.70c. to	3.90c.
Galvanized sheets (No. 24).4.60c. to	4.75c.
Blue ann'l'd sheets (No. 10).....	3.25c.
No. 9 ann'l'd wire, per 100 lb.....	$2.95
No. 9 gal. wire, per 100 lb.....	3.40
Com. wire nails, base per keg.....	2.95

*Net base, including boxing and cutting to length.

sheets than on other grades, the capacity of mills making wide auto body sheets is still well taken up and specifications have been issued for the wide material for deliveries as far extended as October. There are no new developments in the price situation. Price shading is rather common on black sheets to 2.85c. and on galvanized to 3.60c., Pittsburgh. Blue annealed sheets and blue annealed light plates are firm.

Iron Ore.—With all previous shipping records broken in the three months since the opening of navigation, the movement of ore shows no decrease this month. Nearly all the ore is going directly to furnaces. The dock balance July 1 was 4,082,400 tons as compared with 5,050,692 tons on the same date a year ago. Receipts at Lake Erie ports until July 1 were 14,928,976 tons as compared with 11,712,316 tons for the same period last year. Shipments from these ports to furnaces during the same period were 11,793,868 tons as against 9,326,909 tons for the same period last year.

Wire Products. — Manufacturers wire continues to move fairly well, although in not so good volume as recently. A slight slowing down of the bolt and nut industry has caused a decrease in the demand from that source. Regular prices on both nails and wire appear to be generally maintained in Cleveland, but prices are reported to be spotty in some of the competitive points.

Warehouse Business.—Orders show a moderate decline on all lines as compared with last month. New extras on blue annealed sheets are being maintained. Prices on black and galvanized sheets are holding well in spite of weakness of mill prices. Other prices are firm.

Strip Steel.—Specifications for both hot and cold-rolled strip steel were light the past week, and deliveries have materially improved except on very narrow hot strip or material 2 in. and less in width. Delivery promises on wide strip are from two to five weeks. Prices are firm. Some of the mills have become well caught up with deliveries on cold-rolled strip, and the 2.75c., Cleveland, price has become more common, mills finding it more difficult to get 2.85c. for small lots.

Coke.—Some third quarter contracts for by-product foundry coke were placed during the week subject to monthly price adjustments. This coke is quoted at $8.25, Painesville, for July shipment. By-product coke for domestic use shows more life than recently. The price is unchanged at $4.50, ovens, and $6 for Cleveland delivery. A price advance of 25c. a ton is reported in Detroit.

Old Material.—The market was very dull the past week. No lots of any size were purchased by mills. With shipments to local mills greatly restricted, dealers are not buying steel-making scrap for Cleveland delivery. As a result, considerable scrap is backing up in producers' and dealers' yards. Local quotations are unchanged, but there is not enough business in steel-making grades to test prices. Dealers are paying $11 for small lots of blast furnace scrap. There is a fair demand for steel-making scrap from the Youngstown district, and dealers are paying $17.50 for No. 1 heavy melting steel and $17 for compressed sheet steel for delivery to that district.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	$15.00 to $15.50
No. 2 heavy melting steel	14.50 to 15.00
Compressed sheet steel	14.50 to 15.00
Light bundled sheet stampings	12.00 to 12.50
Drop forge flashings	13.00 to 13.25
Machine shop turnings	9.25 to 9.50
No. 1 railroad wrought	13.50 to 14.00
No. 2 railroad wrought	16.00 to 16.50
No. 1 busheling	13.00 to 13.50
Pipes and flues	9.00 to 9.50
Steel axle turnings	12.50 to 13.00
Acid Open-Hearth Grades	
Low phos., forging crops	17.75 to 18.00
Low phos., billet, bloom and slab crops	18.50 to 18.75
Low phos., sheet bar crops	18.00 to 18.50
Low phos., plate scrap	18.00 to 18.50
Blast Furnace Grades	
Cast iron borings	10.75 to 11.00
Mixed borings and short turnings	10.75 to 11.00
No. 2 busheling	10.75 to 11.00
Cupola Grades	
No. 1 cast	16.75 to 17.25
Railroad grate bars	11.00 to 12.00
Stove plate	12.00 to 12.50
Rails under 3 ft.	18.50 to 19.00
Miscellaneous	
Railroad malleable	18.00 to 18.50
Rails for rolling	16.25 to 16.50

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.70c.
Plates, 3/16-in.	2.90c.
Structural shapes	2.70c.
Soft steel bars, small shapes, iron bars (except bands)	2.80c.
Round-edge iron	3.50c.
Round-edge steel, iron finished 1½ x 1½ in.	3.50c.
Round-edge steel, planished	4.30c.
Reinforc. steel bars, sq. twisted and deform.	2.60c. to 2.80c.
Cold-fin. steel, rounds and hex.	3.60c.
Cold-fin. steel, sq. and flats	4.10c.
Steel hoops	3.55c.
Steel bands, No. 12 to ⅛-in. inclus.	3.30c.
Spring steel	5.00c.
*Black sheets (No. 24)	4.10c.
†Galvanized sheets (No. 24)	4.85c.
Light plates, blue annealed (No. 10)	3.25c.
Blue ann'l'd sheets (No. 13)	3.40c.
Diam. pat. floor plates—	
¼-in.	5.30c.
3/16-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

*For 50 bundles or more; 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.
†For 50 bundles or more; 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

Philadelphia

Mill Operations Slacken—Railroads to Ask Suspension of Birmingham Rail and Water Rates

PHILADELPHIA, July 9.—Steel mill operations have been slightly reduced since the beginning of the month, partly because of a smaller volume of specifications on contracts and partly because of warm weather and need to repair equipment. Consumers, however, have only small stocks of material, and those who are specifying as a rule press for prompt delivery.

Except on black and galvanized sheets, prices are well maintained. The recent opening of bids by the Pennsylvania Railroad on 300,000 tie plates and 10,500 kegs of spikes brought out quotations of $2.80 per 100 lb. for ordinary spikes, $2.95 per 100 lb. for copper bearing spikes and $51 per ton for heavy duty copper bearing tie plates, all f.o.b. Pennsylvania Railroad at manufacturer's plant.

Inquiry for pig iron is improving, but sales of Birmingham iron in this district are still rather limited. Eastern railroads are preparing a petition to the Interstate Commerce Commission requesting suspension of the rail and water rates from Birmingham to Atlantic Coast ports, which were to be effective early in August. Should the petition be granted a long delay in applying these rates may ensue.

Pig Iron.—Birmingham foundry iron is being offered to consumers in eastern Pennsylvania at $14.50 per gross ton, furnace, and basic at $13.50 per ton, furnace. Although a rail and water freight rate, via Savannah, of $5.25 per ton, loaded on cars, Philadelphia, has been granted to become effective early in August, sellers of Birmingham iron are not quoting delivered prices on this rate, as eastern railroads are preparing a petition to the Interstate Commerce Commission which may delay its application for six to seven months pending an investigation by the commission. When encountering competition from Southern iron quoted at $20.87 per ton, delivered, on an all-rail rate of $6.37, or $19.64 per ton, alongside dock, Philadelphia, eastern Pennsylvania furnaces have only found it necessary to shade $21.50 per ton, delivered, by about 50c., as most small foundry users are unwilling to change the brand of their iron unless the saving is considerable. Among current inquiries is 1500 tons of cylinder iron for the Baldwin Locomotive Works, which was bought from an Alabama furnace on two previous orders for cylinder and floor iron. The Bureau of Supplies and Accounts, Washington, opens bids July 23 on about 400 tons of foundry iron for Navy Yards on the Atlantic Coast, and is also inquiring for small lots of iron for Puget Sound Navy Yard and for shipment to Cavite, Philippine Islands. The Panama Canal Commission is inquiring for about 100 tons of low phosphorus iron. The Consolidated

Machine Tool Corporation, Rochester, N. Y., has bought 600 tons of foundry iron for its Hilles & Jones plant from an eastern Pennsylvania furnace.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil.	$21.76 to $22.26
East. Pa. No. 2X, 2.25 to 2.75 sil.	22.26 to 22.76
East. Pa. No. 1X	22.76 to 23.26
Basic (del'd east. Pa.)	20.25 to 21.00
Gray forge	20.50 to 21.00
Malleable	21.25 to 21.75
Stand. low phos. (f.o.b. N. Y. State furnace)	22.00 to 23.00
Cop. b'r'g low phos. (f.o.b. furnace)	23.50 to 24.00
Va. No. 2 plain, 1.75 to 2.25 sil.	24.04
Va. No. 2X, 2.25 to 2.75 sil.	24.54

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces; $4.54 from Virginia furnaces.

Billets.—Contracts have been made at $35 per ton, Pittsburgh, for rerolling billets and $40, Pittsburgh, for forging quality. An effort to maintain forging billets at $41, Pittsburgh, or $6 a ton more than rerolling quality, has been abandoned.

Bars.—Deliveries range from two to three weeks with most mills, and prices are firm at 1.95c., Pittsburgh, or 2.27c., delivered Philadelphia. Operating rates of mills have receded slightly from the high level of the past quarter, partly because of the slackening of demand from automobile manufacturers.

Reinforcing Bars.—Projects requiring reinforced concrete are increasing and competition for tonnage is keen. About 400 tons of bars are still pending for a bridge over the Raritan River, and the building for the Woman's Medical College and Hospital in Philadelphia requires a substantial tonnage of bars. Billet steel bars are quoted at 2c. to 2.05c., Pittsburgh, or 2.32c. to 2.37c., delivered Philadelphia, by Pittsburgh mills. Occasionally eastern Pennsylvania mills rolling billet steel bars have quoted as low as 1.95c., Pittsburgh, or 2.27c., Philadelphia, without the usual extra of $5 a ton for cutting to length. Rail steel bar sellers quote about 1.95c. per lb., Franklin, Pa., or Tonawanda, N. Y., with no extra for cutting to length.

Shapes.—Prices continue irregular, ranging from 1.95c. to 2c., f.o.b. nearest mill to consumer, or 2.01c. to 2.06c., delivered Philadelphia. Occasional small tonnages bring up to 2.05c., mill, or 2.11c., Philadelphia. Fabricating shops are well booked with tonnage, especially bridge work. The Pennsylvania Railroad opens bids July 25, on two bridges over the Hackensack River at Marion, N. J., requiring about 14,000 tons. Two office buildings in Philadelphia will require about 4000 tons of fabricated steel.

Plates.—Car builders and the railroads are providing the greater part of the tonnage being rolled at present, but some substantial orders from shipyards are still pending award. About 4000 tons of plates will be required for each of the cruisers to be constructed by the New York Shipbuilding Corporation, Camden, N. J., and the Philadelphia Navy Yard. Plates are quoted at 2.05c., Coatesville, or 2.15c., delivered Philadelphia.

Old Material.—All grades of scrap are inactive, but No. 1 heavy melting steel is evidently stable at $16.50 per ton, as brokers with contracts are paying up to $16.50 to secure sufficient material. Heavy breakable cast is slightly stronger, a sale having been made last week at $15.25 per ton, delivered. Cast iron carwheels also show an advance in price, following sales at $16.50 and $16.75 per ton, delivered to eastern Pennsylvania consumers.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	$16.50
Scrap T rails	16.00
No. 2 heavy melting steel	$12.50 to 14.00
No. 1 railroad wrought	16.00 to 16.50
Bundled sheets (for steel works)	11.50
Hydraulic compressed, new	14.50 to 15.00
Hydraulic compressed, old	12.00 to 12.50
Machine shop turnings (for steel works)	11.50
Heavy axle turnings (or equiv.)	14.00 to 14.50
Cast borings (for steel works and roll. mill)	11.00 to 11.50
Heavy breakable cast (for steel works)	15.00 to 15.25
Railroad grate bars	12.00 to 12.50
Stove plate (for steel works)	11.50 to 12.00
No. 1 low phos., hvy., 0.04% and under	22.00 to 23.00
Couplers and knuckles	20.00 to 21.00
Rolled steel wheels	20.00 to 21.00
No. 1 blast f'nace scrap	10.50 to 11.00
Wrot. iron and soft steel pipes and tubes (new specific.)	15.00
Shafting	19.00 to 19.50
Steel axles	23.00 to 23.50
No. 1 forge fire	14.00
Cast iron carwheels	16.50 to 16.75
No. 1 cast	16.50 to 17.00
Cast borings (for chem. plant)	14.50
Steel rails for rolling	16.50 to 17.00

Sheets.—Black and galvanized sheets are being quoted at 2.85c. to 2.90c., Pittsburgh, or 3.17c. to 3.22c., Philadelphia, for black, and 3.60c. to 3.65c., Pittsburgh, or 3.92c. to 3.97c., Philadelphia, for galvanized. Blue annealed sheet prices are unchanged at 2.35c. per lb., Pittsburgh, or 2.67c., Philadelphia, for No. 13 gage, and light plates, blue annealed, are quoted at 2.10c. to 2.20c., Pittsburgh, or 2.42c. to 2.52c., Philadelphia, for No. 10 gage. The practice of granting reductions of as much as $2 a ton to large warehouse distributers has been renewed recently by some sellers of sheets, but blue annealed have apparently not been subject to such reductions except where they were included in an assortment bought by a jobber.

Imports.—In the week ended July 6, pig iron arrivals at this port totaled 805 tons of which 755 tons was from British India and 50 tons from the Netherlands. A total of 33 tons of manganese ore was received from Germany, and 40 tons of ferromanganese arrived from the United Kingdom. Steel imports consisted of 35 tons of steel bars, 53 tons of steel scrap and 112 tons of structural shapes from Germany and 475 tons of structural shapes from Belgium.

Advances on Some Grades of Scrap in Detroit

DETROIT, July 9.—Owing to the fact that several of the large mills and furnaces have come into the market, long turnings and new No. 1 busheling advanced 50c. a ton during the past week, with heavy melting and shoveling steel, hydraulic compressed, sheet clippings and flashings showing a 25c. rise.

Pig iron shipments are somewhat lower for the month in the district, but are equal to production of the furnaces supplying the Michigan melters.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Hvy. melting and shov. steel	$14.00 to $14.50
Borings and short turnings	9.00 to 9.50
Long turnings	8.00 to 8.50
No. 1 machinery cast	12.50 to 13.00
Automobile cast	13.00 to 13.50
Hydraul. comp. sheets	13.75 to 14.25
Stove plate	9.00 to 9.50
New No. 1 busheling	12.50 to 13.00
Old No. 1 busheling	11.00 to 11.50
Sheet clippings	8.75 to 9.25
Flashings	12.75 to 13.25

Steel Frame Houses to Be Built in South America

Materials for five steel frame houses have been assembled and shipped to Cartagena, South America, by the Broderick Firesafe Homes Association, New York. These houses, which are to be erected in a suburb of Cartagena by the National Construction Co. of that city, are designed to be not only fire-safe, but also quake-safe, and proof against attacks of white ants, an item of major importance in southern countries. In addition to the steel frame work and roof and floor members, the wire lath, plumbing fixtures and equipment, lighting and wiring equipment, hardware, woodwork, wrought iron, fencing and piping were included in the shipment.

MOVEMENT OF LAKE SUPERIOR ORE, IN GROSS TONS

	June, 1929	June, 1928	Season to July 1 — 1929	Season to July 1 — 1928
Escanaba	887,954	831,478	2,143,251	1,468,202
Marquette	718,570	558,212	1,627,994	875,248
Ashland	1,264,834	1,235,019	2,797,949	1,868,775
Superior	3,078,322	2,423,990	6,428,044	3,953,793
Duluth	3,175,027	2,899,024	6,945,315	4,568,912
Two Harbors	1,049,717	978,493	2,297,385	1,560,195
Total	10,174,424	8,926,216	22,239,938	14,295,125
Increase	1,248,208	.....	7,944,813	.....

Pacific Coast

Bids Opened on 10,000 Tons of Plates for Seattle Pipe Line —Holiday Checks Trade

SAN FRANCISCO, July 6 (*By Air Mail*).—Trading in iron and steel products this week was interrupted to some extent by the holiday. A number of plants shut down Wednesday night until the end of the week. The most important development of the week was the opening of bids on the Cedar River pipe line project at Seattle, involving 10,000 tons of plates. The price structure continues to hold to the levels established some time ago.

Pig Iron.—Little of importance has come into the market during the past week. Buying is confined to immediate needs. Prices are unchanged.

Prices per gross ton at San Francisco:

*Utah basic	$25.00 to $26.00
*Utah fdy., sil. 2.75 to 3.25	25.00 to 26.00
**Indian fdy. sil. 2.75 to 3.25	25.00 to 26.00

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Bars.—Awards of reinforcing steel bars this week exceeded 2300 tons and included 900 tons for the City-County Building addition, Seattle, and 200 tons for the Aeronautic Hall for the University of Washington, Seattle, both placed with the Northwest Steel Rolling Mills. The Pacific Coast Steel Co. took 500 tons for a store in Spokane and 150 tons for highway work for the State of Washington. Bids were called for this week on 1225 tons for the West Garfield Street bridge in Seattle. Pending business makes a fair tonnage. No change in out-of-stock quotations is noted in the San Francisco district, 2.30c., base, applying on carload lots and 2.60c. on smaller tonnages. Los Angeles prices continue at 2.40c., base, on carload lots and 2.70c. on less than carload lots. Merchant bar steel is firm at 2.35c., c.i.f. Coast ports.

Plates.—Only one award in excess of 100 tons was reported. This called for 110 tons for a penstock for the Cushman Dam project at Tacoma and was booked by the Seattle Boiler Works. Bids were opened this week on 10,000 tons for the Cedar River pipe line. Other pending business is confined to small tonnages. Prices remain firm at 2.35c., c.i.f.

Shapes.—Activity in the structural steel market this week was broken into by the holiday, and as a result awards were not numerous. The McClintic-Marshall Co. secured 600 tons for an exhibit building for Los Angeles County at Pomona and the Moore Dry Dock Co. secured 300 tons for a hospital at Eureka, Cal. The largest new inquiry involves 1375 tons for the West Garfield Street bridge, Seattle, bids on which open Aug. 2. Bids are being taken on 110 tons for a hangar in Seattle and on 150 tons for the Cushman Dam project, Tacoma. Plain material continues firm at 2.35c., c.i.f.

Cast Iron Pipe.—Cast iron pipe bookings exceeded 2700 tons. Los Angeles placed 1425 tons of 8-in. Class B pipe with the American Cast Iron Pipe Co. and 1148 tons of 24-in. Class C pipe with the same company. Argentieri & Colorossi secured 224 tons of 12-in. Class D pipe for Seattle. Los Angeles placed 208 tons of 4-in. Class C pipe with B. W. Kuhn Co. The United States Pipe & Foundry Co. was low bidder on 260 tons of 12-in. pipe for the East Bay Municipal Utility District, Oakland. The Daley Corporation was low bidder on 199 tons of 4 to 10-in. Class C pipe for San Diego. Great Falls, Mont., will open bids on July 8 for 162 tons of 6 and 8-in. Class B pipe, and Newport Beach, Cal., is calling for bids, to be opened July 15, on 724 tons of 4 to 12-in. Class B pipe.

Steel Pipe.—Movement of standard steel pipe recently has been confined to unimportant tonnages for the most part. The Huntington Iron Works secured 142 tons of 8-in. standard black pipe for the La Canada Irrigation District, La Canada, Cal. Los Angeles placed 227 tons of ¾ to 2-in. galvanized standard pipe with the Santa Fe Pipe & Supply Co. No large pipe line inquiries have come up recently. The 2263-ton inquiry of the Pacific Gas & Electric Co., San Francisco, for 8⅝-in. O. D. gas pipe for installation in Monterey, Gilroy and Salinas is still pending.

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and struc. shapes	3.15c.
Soft steel bars	3.15c.
Small angles, ⅞-in. and over	3.15c.
Small angles, under ⅞-in.	3.55c.
Small channels and tees, ¾-in. to 2¾-in.	3.75c.
Spring steel, ¼-in. and thicker	5.00c.
Black sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.80c.
Galv. sheets (No. 24)	5.30c.
Struct. rivets, ½-in. and larger	5.65c.
Com. wire nails, base per keg	$3.40
Cement c't'd nails, 100 lb. keg	3.40

Birmingham

Pig Iron Prices Reduced to a $14.50 Base—Now at Lowest Point Since 1916

BIRMINGHAM, July 9.—Effective last week, pig iron prices were reduced to $14.50, base, from $15. This is the second reduction of 50c. a ton in the past three weeks, as the price was reduced to $15 from $15.50 when books were opened for the third quarter on June 20. The new price of $14.50 is the lowest for Birmingham iron since September, 1916. Some sales have been made to outside points at the new price, but general buying has been held in check by the recent holiday period. Buying in the district has improved since the new price was announced, but the movement so far has not been important. A large part of the third quarter production is yet to be sold. Seventeen furnaces are active, this number having been in blast for several weeks. The No. 1 furnace of the Republic Iron & Steel Co. is to be blown out in about 30 days for repairs.

Prices per gross ton, f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil.	$14.50
No. 1 fdy., 2.25 to 2.75 sil.	15.00
Basic	14.50

Finished Steel.—Mills have entered the second half with more tonnage on the books than at this time in a number of years. The moderate let-up in new business during the last few weeks has checked the expansion in backlogs that had been continuous throughout the spring months, but they are only slightly reduced from what they were 30 days ago. Sheets were about the only important line to show improvement last week. All prices are the same. Structural steel fabricators are operating steadily at near-capacity rates. The Ingalls Iron Works Co. has booked an order for 2000 tons for the new steam power plant of the Georgia Power Co., near Atlanta, Ga. Twenty-two of a total of 23 open-hearths are active. The Tennessee company is working all of its eight at Fairfield and eight of nine at Ensley. The Gulf States Steel Co. has all six of its open-hearths at Alabama City in operation.

Old Material. — Buying is in small tonnages. There have been no price changes since the reductions reported last week.

Prices per gross ton, deliv'd Birmingham dist. consumers' yards:

Heavy melting steel	$12.50
Scrap steel rails	12.50
Short shoveling turnings	9.00
Cast iron borings	9.00
Stove plate	$11.50 to 12.00
Steel axles	21.00
Iron axles	23.00
No. 1 railroad wrought	$10.00 to 10.50
Rails for rolling	14.00 to 15.00
No. 1 cast	13.50
Tramcar wheels	13.00
Cast iron carwheels	12.50 to 13.00
Cast iron borings, chem.	13.50 to 14.00

Cast Iron Pipe. — New business of pressure pipe manufacturers has been above the average for the past two weeks. The project at New Orleans, requiring 4650 tons of 36 to 42-in. pipe, went to the United States Pipe & Foundry Co. This company also received an order from Asheville, N. C., for over three miles of 18-in. pipe and shared in a tonnage from Los Angeles to the extent of several hundred tons. Small order business has a good aggregate of pipe tonnage. Oakland, Cal., will open bids July 10 for 2200 tons of pipe. Bids were opened July 5 for a project at Houston, Miss., requiring 5300 ft. of 8-in. pipe and 15,540 ft. of 6-in. pipe. Shipments have been exceeding production during the

past few days. Prices remain at $37 to $38 for 6-in. and larger sizes.

Coke. — The movement of foundry coke has declined, owing to the observance of the Independence Day holiday period. New business is quiet. Prices are unchanged from $5, base.

Youngstown

Mills Operating at High Average of June

YOUNGSTOWN, July 9.—Following suspensions last week for the holiday observance, iron and steel companies in northeastern Ohio resumed operations this week at a rate closely approaching the high June average. Schedules reveal an average operating rate of 85 to 90 per cent.

President James A. Campbell of the Youngstown Sheet & Tube Co. believes that fall steel buying will begin earlier this year than usual, and that steel companies will feel the effect of such buying by the middle of August.

President E. T. McCleary of the Republic Iron & Steel Co. says that July business is holding up "surprisingly well" and much better than anticipated.

The Republic company is operating one machine for the manufacture of steel pipe by the electric welding process, producing tubing up to 7 in. in diameter, and is installing two additional machines to roll larger pipe.

The company is converting sheet mills at its Warren plant into tin mills and is installing modern heating furnaces. Plans are being completed for the electric power plant for the Youngstown property, designed to utilize waste gases from the blast furnaces. Electric drives are to be installed for the blooming mills.

The Liberty tin mills at Leavittsburg of the Republic Iron & Steel Co. resumed after five weeks' suspension.

The West Leechburg Steel Co., Leechburg, Pa., will install an electric drive on its new 12-in. hot strip mill, which replaces an old Belgian type mill. The motor equipment will be furnished by the Westinghouse Electric & Mfg. Co., East Pittsburgh.

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-fin. rounds, shaftings, screw stock	3.75c.
Black sheets (No. 24)	4.25c.
Galv. sheets (No. 24)	5.10c.
Blue ann'l'd sheets (No. 10)	3.45c.
Black corrug. sheets (No. 24)	4.30c.
Galv. corrug. sheets	5.15c.
Structural rivets	3.95c.
Boiler rivets	3.95c.

	Per Cent Off List
Tank rivets, ⅞-in. and smaller, 100 lb. or more	65
Less than 100 lb	60
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-pressed nuts, sq., blank or tapped, 200 lb. or more	60
Less than 200 lb	50
Hot-pressed nuts, hex., blank or tapped, 200 lb. or more	60
Less than 200 lb	50

St. Louis

Pig Iron Sales Improve but Uncertain Price Situation Checks Buying—Steel Demand Brisk

ST. LOUIS, July 9.—An improvement in pig iron sales during the week is reported. The St. Louis Gas & Coke Corporation sold 6100 tons, including 3000 tons of basic to an East Side melter, and 1000 tons of foundry to a local jobbing foundry; 500 tons to a Belleville stove foundry and 500 tons to a local jobbing foundry, all for third quarter shipment. As a whole, buying for third quarter has been very light, uncertainty as to the price situation caused by a second reduction of 50c. a ton by Alabama furnaces being one of the reasons assigned for the hesitancy by melters. Local makers have made no change in their prices, although it is reported that competition has been met in some instances. Southern iron is now on a $14.50 base. Most melters in the district closed their plants over the Fourth.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill.	$20.00
Malleable, f.o.b. Granite City	20.50
N'th'n No. 2 fdy., deliv'd St. Louis	22.16
Southern No. 2 fdy., deliv'd	18.92
Northern malleable, deliv'd	22.16
Northern basic, deliv'd	22.16

Freight rates: 75c. (average) Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

Finished Iron and Steel.—Sales of the Granite City Steel Co. for June were 45 per cent ahead of sales for June, 1928. Demand is exceedingly brisk for this time of year. Plates and blue annealed sheets are in greater demand than other flat-rolled products. Prices are said to be well maintained. Second quarter prices for plates, shapes and bars have been continued, and unexpired contracts are being carried over into the third quarter because of the inability of mills to make full deliveries. The structural steel trade continues dull. The Laclede Steel Co. was awarded 365 tons reinforcing bars for a hospital addition. The only new reinforcing job of consequence pending is a grain elevator for the Chicago, Burlington & Quincy Railroad, 500 tons.

Old Material.—Shipments of scrap by country dealers are light, and railroads are behind in their deliveries of items sold, with the result that dealers here are short against their contracts with the mills. It is said that the mills are willing to buy, but dealers are unwilling to sell at present levels. Cast iron car wheels are down 25c. a ton and stove plate is $1 higher. Otherwise prices are unchanged. Railroad lists: Baltimore & Ohio, 20,000 tons; Wabash, 3000 tons; Great Northern, 2500 tons; Texas & Pacific, 900 tons; Chicago & Eastern Illinois, 600 tons; Ann Arbor, 200 tons; New Orleans & Great Northern, 150 tons; Southern Pacific, 25 miles of 50 lb. rail.

Dealers' buying prices per gross ton, f.o.b. St. Louis district:

No. 1 heavy melting or shoveling steel	$13.50 to $14.00
No. 2 heavy melting or shoveling steel	12.75 to 13.25
No. 1 locomotive tires	15.00 to 15.50
Miscel. stand-sec. rails including frogs, switches and guards, cut apart	15.50 to 16.00
Railroad springs	17.00 to 17.50
Bundled sheets	9.50 to 10.00
No. 2 railroad wrought	13.50 to 14.00
No. 1 busheling	10.00 to 10.50
Cast iron borings and shoveling turnings	9.50 to 10.00
Iron rails	15.00 to 15.50
Rails for rolling	16.00 to 16.50
Machine shop turnings	8.00 to 8.50
Heavy turnings	9.75 to 10.00
Steel car axles	19.00 to 19.50
Iron car axles	26.50 to 27.00
Wrot. iron bars and trans.	22.00 to 22.50
No. 1 railroad wrought	13.00 to 13.50
Steel rails, less than 3 ft.	17.50 to 18.00
Steel angle bars	14.25 to 14.75
Cast iron carwheels	14.00 to 14.50
No. 1 machinery cast	15.50 to 16.00
Railroad malleable	15.50 to 16.00
No. 1 railroad cast	15.00 to 15.50
Stove plate	12.50 to 13.00
Agricult. malleable	15.00 to 15.50
Relay. rails, 60 lb. and under	20.50 to 23.50
Relay. rails, 70 lb. and over	26.50 to 29.00

Buffalo

Operations of Steel Mills Show No Slackening—Pig Iron Buying Chiefly in Small Lots

BUFFALO, July 9.—Buying of pig iron has been accumulating in small orders, but there has been no sizable tonnage placed here during the past week. A New York State melter is inquiring for 1500 tons of foundry and malleable and another is seeking 1000 to 1500 tons of foundry and malleable. From New England comes an inquiry for 1000 tons of foundry. The Buffalo price in the East is $18 to $18.50, furnace, with $18 being done in a good many instances where tonnage of any considerable size is involved. It is understood that a good deal of the business that is offering is going to Port Henry or Mystic. Port Henry is asking $18 to $18.50, base, for New England delivery, but has a $3.66 freight rate, as against the freight rate from Buffalo of $4.91. Some sellers are inclined to think that the major portion of the buying of pig iron has been done and that there will be little of a pronounced movement until the fall, while others think that there is a considerable tonnage to be purchased for the current quarter.

Prices per gross ton, f.o.b. furnace:

No. 2 fdy., sil. 1.75 to 2.25	$19.50
No. 2X fdy., sil. 2.25 to 2.75	20.00
No. 1 fdy., sil. 2.75 to 3.25	21.00
Malleable, sil. up to 2.25	20.00
Basic	18.50
Lake Superior charcoal	27.28

Finished Iron and Steel.—Business continues good in all lines, and operations of local mills show no slackening. There has been a curtailment of production at the American Radiator Co. plant because of a midsummer shutdown. Fabricated structural awards include two new schools at Lockport, N. Y., calling for 100 tons. The reinforcing bar market is more active. Another section of the Hertel Avenue sewer is being figured, involving 300 tons. Bids go in this week for a new building for the Jamestown Telephone Co., which will require 150 tons of reinforcing bars.

Old Material.—An inactive condition has prevailed in this market, which is almost devoid of feature. The mills are busy and consumption of scrap is keeping up, but there has been no new buying of consequence. The only prospective purchase is one which will probably be made in the next two weeks by a large user of stove plate and No. 1 machinery cast.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	$17.00 to $17.25
No. 2 heavy melting steel	14.75 to 15.00
Scrap rails	16.50 to 17.00
Hydraul. comp. sheets	14.50 to 14.75
Hand bundled sheets	12.00 to 12.50
Drop forge flashings	14.75 to 15.00
No. 1 busheling	15.50 to 16.50
Hvy. steel axle turnings	14.00 to 14.50
Machine shop turnings	7.50 to 7.75
No. 1 railroad wrought	13.00 to 13.50
Acid Open-Hearth	
Knuckles and couplers	19.00
Coil and leaf springs	19.00
Rolled steel wheels	19.00
Low phos. billet and bloom ends	20.00 to 20.50
Electric Furnace Grades	
Short shov. steel turnings	12.00 to 12.50
Blast Furnace Grades	
Short mixed borings and turnings	11.00 to 11.50
Cast iron borings	11.00 to 11.50
No. 2 busheling	10.00 to 10.50
Rolling Mill Grades	
Steel car axles	18.75 to 19.25
Iron axles	21.00 to 22.00
Cupola Grades	
No. 1 machinery cast	16.00 to 17.00
Stove plate	12.50 to 13.00
Locomotive grate bars	12.50 to 13.00
Steel rails, 3 ft. and under	19.00 to 19.50
Cast iron carwheels	14.00 to 14.50
Malleable Grades	
Industrial	18.50 to 19.00
Railroad	18.50 to 19.00
Agricultural	18.50 to 19.00
Special Grades	
Chemical Borings	12.50 to 13.50

American Hoist & Derrick Co., St. Paul, Minn., has opened a branch office and warehouse at 337 South Anderson Street, Los Angeles, Cal., in charge of W. H. Lummus, who has represented the company on the west coast for many years.

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and struc. shapes	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.95c.
Cold-fin. flats, sq. and hex. Rounds	4.45c. 3.95c.
Cold-rolled strip steel	5.85c.
Black sheets (No. 24)	4.20c.
Galv. sheets (No. 24)	4.85c.
Blue ann'l'd sheets (No. 10)	3.50c.
Com. wire nails, base per keg	$3.60
Black wire, base per 100 lb.	3.75

Boston

Low Prices Made on 2000 Tons of Pig Iron— Cast Iron Pipe Sales Increase

BOSTON, July 9.—The purchase of 2000 tons of pig iron, half No. 2X and half No. 1X, and 500 tons of malleable by a Providence, R. I., foundry in the past week was at low prices. The business was split four ways, according to report, 1000 tons of foundry and the malleable going to the Mystic Iron Works, 400 tons to a New York State furnace, and 400 tons to one and 200 tons to another Buffalo stack. Buffalo No. 2X was purchased at a little less than $17.50 a ton, furnace, New York State No. 2X at about $18 a ton, furnace, and Mystic No. 2X at less than $20 furnace. The delivered price on all iron bought was less than $22 a ton. Furnaces all quoted a 50c. a ton differential on No. 1X iron. The malleable iron, previously reported as for a Canadian subsidiary of the purchaser, is for Providence and was sold at around $23 a ton, delivered. In contrast with the Providence business, another large consumer closed on approximately 1000 tons of No. 2X and No. 1X at substantially higher prices. Sales otherwise were in small tonnages at prices equivalent to $18 a ton, base Buffalo. A Rhode Island foundry is in the market for 700 tons of No. 1X and 600 tons of No. 2X, and a Massachusetts plant for 1000 tons of No. 1X. Another 2000-ton Massachusetts inquiry probably will be closed next week.

Foundry iron prices per gross ton deliv'd to most New England points:

†Buffalo, sil. 1.75 to 2.25	$21.78 to $22.28
†Buffalo, sil. 2.25 to 2.75	22.28 to 22.78
*Buffalo, sil. 1.75 to 2.25	22.41 to 22.91
*Buffalo, sil. 2.25 to 2.75	22.41 to 22.91
East. Penn., sil. 1.75 to 2.25	24.65
East. Penn., sil. 2.25 to 2.75	25.15
Va., sil. 1.75 to 2.25	25.21
Va., sil. 2.25 to 2.75	25.71
Ala., sil. 1.75 to 2.25	21.41 to 23.27
Ala., sil. 2.25 to 2.75	21.91 to 23.77

Freight rates: $4.91 all rail from Buffalo, and $4.28 rail and water; $3.65 from eastern Pennsylvania; $5.21 all rail from Virginia; $6.91 to $8.77 from Alabama.

*All rail rate.
†Rail and water rate.

Reinforcing Bars.—The Concrete Steel Co. has taken 200 tons of billet steel bars for a local automobile service station, the largest transaction reported in some time. The market holds well at 2.66½c. a lb., base, from stock. The market for rail steel bars is inactive at 2.26½c., base, delivered common Boston freight rate points.

Shapes and Plates.—Fabricators took little work of consequence the past week, but are figuring on a fair amount of business. Competition among fabricators is still keen. Bids are being taken on a 3000-ton Boston office building.

Coke.—July shipments of by-product foundry coke from ovens to foundries to date are just about on a par with those of June. The price remains at $11 a ton, delivered, within a $3.10 freight rate zone.

Old Material.—The movement of scrap out of New England is freer, some Pennsylvania steel mills having rescinded holdup orders, but business is far from active. A further increase in shipments is expected, as all mills are now issuing shipping instructions. Materials are in limited supply and prices are quite firm. Exporters are scouring New England for scrap and may have to raise prices in order to load steamers scheduled to sail from here this month. Foundries are still absorbing a large weekly aggregate tonnage of textile and machinery cast.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$12.00 to $12.25
Scrap T rails	11.50 to 12.00
Scrap girder rails	10.50 to 11.25
No. 1 railroad wrought	12.00 to 12.50
No. 1 yard wrought	9.50 to 10.00
Machine shop turnings	6.50 to 6.60
Cast iron borings (steel works and rolling mill)	6.50 to 6.60
Bundled skeleton, long	9.50 to 10.25
Forge flashings	10.00 to 10.50
Blast furnace borings and turnings	6.00 to 6.25
Forge scrap	8.75 to 9.00
Shafting	14.00 to 14.25
Steel car axles	17.00 to 17.50
Wrought pipe 1 in. in diameter (over 2 ft. long)	9.75 to 10.00
Rails for rolling	12.50 to 12.75
Cast iron borings, chemical	10.00 to 10.25
Prices per gross ton deliv'd consumers' yards:	
Textile cast	$14.50 to $14.75
No. 1 machinery cast	15.00 to 15.25
No. 2 machinery cast	13.00 to 13.25
Stove plate	11.50 to 12.00
Railroad malleable	18.50 to 19.00

Cast Iron Pipe.—West Hartford will close bids on approximately 4500 tons of 36 and 42-in. pipe on July 17, and Hartford on 250 tons of 6, 8 and 10-in. Salem, Mass., has awarded 100 tons of 6 and 8-in. pipe to the United States Pipe & Foundry Co. Prices are steady on 4-in. pipe, but are at least $2 a ton lower on 6 to 12-in. and $3 or more on 16-in. and larger dimensions. Quotations made

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars, small shapes	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway rounds	6.60c.
Norway squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tie steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold-rolled steel—	
Rounds and hex	*3.55c. to 5.55c.
Spares and flats	*4.05c. to 7.05c.
Toe calk steel	6.00c.
Rivets, structural or boiler	4.50c.
	Per Cent Off List
Machine bolts	50 and 5
Carriage bolts	50 and 5
Lag screws	50 and 5
Hot-pressed nuts	50 and 5
Cold-punched nuts	50 and 5
Stove bolts	70 and 10

*Including quantity differentials.

openly are now: 4-in., $46.10 to $47.10 a ton, delivered common Boston freight rate points; 6 to 12-in., $40.10 to $41.10; and 16-in. and larger dimensions, $39.10. A $3 differential is asked on Class A and gas pipe. During the first week in July one foundry booked 16,000 tons of pipe business, the largest amount taken in any one week by this company.

Cincinnati

Further Decline of 50c. a Ton on Southern Pig Iron Checks Buying—Sheet Mills Maintain Output

CINCINNATI, July 9.—Although the pig iron melt is reported to be heavy and district foundries are busy, the sales of iron in this market have declined noticeably, which may be a reflection of the uncertainty over prices resulting from a formal reduction of 50c. a ton on Southern iron, the second of this amount within three weeks. This brings Birmingham iron down to $18.19, delivered Cincinnati, for the base grade. Contrasted with this weakness is the firmness of Northern iron, on which quotations of $18.50, base, are apparently being maintained. Melters are taking iron on current contracts at a satisfactory rate, but are extremely conservative in placing new orders. Most of the sales are of small lots for immediate shipment. Aside from two private inquiries, there is no sizable business befor the trade.

Prices per gross ton, del'v'd Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25	$19.89 to $20.39
Ala. fdy., sil. 1.75 to 2.25	18.19
Ala. fdy., sil. 2.25 to 2.75	18.69
Tenn. fdy., sil. 1.75 to 2.25	18.19 to 18.69
S'th'n Ohio silvery, 8 per cent	27.89 to 28.89

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

Coke.—Early July specifications for by-product foundry coke have been good, although new business consists wholly of spot orders from regular customers. Domestic coke prices have been increased 25c. a ton, effective July 15, making the new quotations for delivery at Cincinnati $6.25 for egg and $5.25 for walnut.

Finished Material. — Except for slight weakness in galvanized sheets in the South, where competition for roofing contracts has resulted in price concessions on quantity orders, sheets are still selling on a strong market. A slight decrease in bookings during the past week, due to the holiday, has not materially affected backlogs, and district sheet mills report that the continued heavy demand will maintain capacity production well into the future. Consumers are covered for third quarter needs and many are now specifying against new contracts, but deliveries are delayed six to seven weeks on heavy blue annealed and full pickled sheets and four to six weeks on light blue annealed and galvanized sheets. The demand continues to be diversified, with an increase in specifications for highway construction.

Old Material.—While consumers of scrap are taking shipments on old commitments, they are showing no haste to cover for the future, fresh bookings consisting of small orders for current needs. With dealers experiencing difficulty in obtaining good heavy melting steel, prices on this grade have been increased 25c., which, with the continued steadiness of prices on other grades, reflects the stability of this market. The usual monthly lists have been announced by the Southern Railway, Norfolk & Western, Louisville & Nashville and Chesapeake & Ohio.

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel	$13.25 to $13.75
Scrap rails for melting	13.75 to 14.25
Loose sheet clippings	9.25 to 9.75
Bundled sheets	10.50 to 11.00
Cast iron borings	9.00 to 9.25
Machine shop turnings	8.50 to 8.75
No. 1 busheling	10.50 to 11.00
No. 2 busheling	6.75 to 7.00
Rails for rolling	14.50 to 15.00
No. 1 locomotive tires	14.25 to 14.75
No. 2 railroad wrought	13.00 to 13.50
Short rails	18.50 to 19.00
Cast iron carwheels	12.75 to 13.25
No. 1 machinery cast	19.25 to 19.75
No. 1 railroad cast	15.25 to 15.75
Burnt cast	10.25 to 10.75
Stove plate	10.25 to 10.75
Brake shoes	10.25 to 10.75
Railroad malleable	15.25 to 15.75
Agricultural malleable	14.25 to 14.75

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and struc. shapes	3.40c.
Bars, soft steel or iron	3.30c.
New billet reinforc. bars	3.15c.
Rail steel reinforc. bars	3.00c.
Hoops	4.05c.
Bands	3.50c.
Cold-fin. rounds and hex	3.85c.
Squares	4.35c.
Black sheets (No. 24)	4.05c.
Galvanized sheets (No. 24)	4.90c
Blue ann'l'd sheets (No. 10)	3.45c
Structural rivets	3.85c
Small rivets	65 per cent off list
No. 9 ann'l'd wire, per 100 lb	$3.00
Com. wire nails, base per keg	2.85
Cement c't'd nails, base 100 lb. keg	2.85
Chain per 100 lb	8.75
	Net per 100 Ft.
Lap-weld steel boiler tubes, 2-in.	$16.00
4-in.	33.00
Seamless steel boiler tubes, 2-in.	17.00
4-in.	34.00

Canada

Canadian Pacific Orders Rails From Algoma Mill—Steel Plants Maintain High Operating Rates

TORONTO, ONT., July 9.—Recent developments in the iron and steel industry of Canada indicate that the present high rate of operations will be continued for some months.

The Canadian Pacific Railway has awarded a substantial rail contract to the Algoma Steel Corporation, Sault Ste. Marie, Ont., which assures double shift rolling at the rail mill for an indefinite period. The rails are to be used in connection with the proposed five-year construction program of the Canadian Pacific in Western Canada.

The Canadian Pacific Railway has closed another contract with the Canadian Car & Foundry Co., Montreal, Que., for 100 steel cars.

Rail and rolling stock orders of a substantial nature are expected almost any time from the Canadian National Railways. This railroad also has an extensive program of extension mapped out for the Canadian West, and at the same time is making improvements to its Eastern lines and equipment.

Structural Steel.—While new business is not appearing in large volume, a steady flow of orders is reported for small tonnages. Structural steel awards for the past week were considerably below those of previous weeks. Fabricators, however, are carrying large tonnage backlogs, which will keep them running at capacity for a considerable period.

Pig Iron.—Following an active forward buying movement, which resulted in the majority of large melters covering for third quarter needs, new business is again beginning to lag. Some inquiry is still coming out for future delivery iron, but this is from small interests which were in no hurry to get their orders placed. Third quarter contracting compares favorably with that of the first and second quarter. Pig iron prices are firm.

Prices per gross ton:

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75	$24.60
No. 2 fdy., sil. 1.75 to 2.25	24.10
Malleable	24.60
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75	$26.00
No. 2 fdy., sil. 1.75 to 2.25	25.50
Malleable	26.00
Basic	24.50
Imported Iron, Montreal Warehouse	
Summerlee	$33.50
Carron	33.00

Old Material.—The usual summer slump is now affecting the market, and, while new business is below that of a month or six weeks ago, it stands out well above that of any of the past summers. The demand for steel scrap has become almost a dead issue for the moment, although some deliveries are being made against old contracts. Prices are firm but unchanged.

Dealers' buying prices:

	Per Gross Ton	
	Toronto	Montreal
Heavy melting steel	$10.00	$8.50
Rails, scrap	11.00	9.00
No. 1 wrought	10.00	12.00
Machine shop turnings	7.50	5.00
Boiler plate	7.50	6.00
Heavy axle turnings	8.00	7.50
Cast borings	7.50	5.00
Steel turnings	7.50	6.50
Wrought pipe	6.00	6.00
Steel axles	16.00	20.00
Axles, wrought iron	17.00	22.00
No. 1 machinery cast	....	17.00
Stove plate	....	13.00
Standard carwheels	....	16.00
Malleable	....	13.00
	Per Net Ton	
No. 1 mach'ry cast	$16.00	....
Stove plate	12.00	....
Standard carwheels	15.00	....
Malleable scrap	14.00	....

Fabricated Structural Steel

Non-Industrial Projects Predominate in Week's Lettings and in Fresh Inquiries

PROJECTS of a non-industrial character were predominant in the past week's structural steel lettings, which totaled about 45,000 tons. Apartment, office, club and school buildings took more than one-half of the tonnage. Structures of this type will require approximately 27,000 tons of the 49,000 tons of new work which appeared in the past seven days. Inquiries were the largest since the first week of June and indicate well sustained activity in the steel fabricating industry during the latter part of the year. Major awards included 6600 tons for two gas holders at Chicago, 6000 tons for an athletic club in New York, 5850 tons for a New York office building and 4100 tons for a telephone exchange building in New York. Among pending jobs are 14,000 tons for two bridges for the Pennsylvania Railroad, 8000 tons for the Cuneo Tower in Chicago and 6000 tons for an apartment building in New York. Awards follow:

STATE OF NEW HAMPSHIRE, 100 tons, highway bridges, to unnamed fabricator.

SALEM, MASS., 300 tons, theater, to New England Structural Co.

WALPOLE, MASS., 150 tons, manufacturing plant, to New England Structural Co.

GARDNER, MASS., 100 tons, hospital, to western Massachusetts fabricator.

CAMBRIDGE, MASS., 100 tons, four tanks, to Pittsburgh-Des Moines Co.

BRIDGEPORT, CONN., 1000 tons, power house, to Levering & Garrigues Co.

DELAWARE, LACKAWANNA & WESTERN RAILROAD, 4000 tons, catenary supports, to American Bridge Co.

NEW YORK, 6000 tons, Downtown Athletic Club, West Street, to Hedden Iron Construction Co.

NEW YORK, 4100 tons, telephone exchange building on West Fiftieth Street, to Hedden Iron Construction Co.

NEW YORK, 5830 tons, office building at Fifty-eighth Street and Fifth Avenue, to McClintic-Marshall Co.

NEW YORK, 3975 tons, Queensborough Bridge roadway, to American Bridge Co.

BALTIMORE & OHIO RAILROAD, 525 tons, bridge at Keys, W. Va., to McClintic-Marshall Co.

TRENTON, N. J., 1250 tons, building for First Mechanics National Bank, to Belmont Iron Works.

ALLENTOWN, PA., 200 tons, garage, to Lehigh Structural Steel Co.

PENNSYLVANIA RAILROAD, 500 tons, four bridges, to McClintic-Marshall Co.

HARRISBURG, PA., 3300 tons, office building, to McClintic-Marshall Co.

ATLANTA, GA., 2000 tons, new steam power plant for Georgia Power Co., to Ingalls Iron Works.

BROCKVILLE, ONT., 100 tons, Nurses' Home, to Dominion Bridge Co.

BUFFALO, 300 tons, Firestone Tire & Rubber Co., John W. Cowper Co., general contractor, to McClintic-Marshall Co.

LOCKPORT, N. Y., 100 tons, two schools, to Kellogg Structural Steel Co.

MUNCIE, IND., 600 tons, Automotive Specialty Co., to Indiana Bridge Co.

ESCANABA, MICH., 250 tons, State highway bridge in Delta County, to McClintic-Marshall Co.

CHICAGO, 6600 tons, two gas holders for Peoples Gas Light & Coke Co., to an unnamed bidder.

CHICAGO, 380 tons, office building for Inland Steel Co., to Vanderkloot Steel Works, local.

CHICAGO, 440 tons, Blackstone shop, to McClintic-Marshall Co.

CHICAGO, MILWAUKEE, ST. PAUL & PACIFIC, 550 tons, girder spans, to American Bridge Co.

OMAHA, NEB., 500 tons, depot, to Milwaukee Bridge Co.

UNION PACIFIC, 200 tons, bridge, to American Bridge Co.

SASKATOON, SASK., 750 tons, building for Dominion Government, to Dominion Bridge Co.

TACOMA, WASH., 110 tons plates, penstock for Cushman project, to Seattle Boiler Works.

WALLA WALLA, WASH., 100 tons, prison building for women, to Hofius Steel & Equipment Co.

EUREKA, CAL., 300 tons, hospital, to Moore Dry Dock Co.

LONG BEACH, CAL., 125 tons, piers A and B, to unnamed interest.

LOS ANGELES, 500 tons, exhibit building at Pomona fair grounds, to McClintic-Marshall Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

BOSTON, 3000 tons, office building, Franklin and Federal Streets.

BOSTON, 400 tons, Massachusetts School of Arts.

BOSTON, 392 tons, Boston Insurance Co. building.

BOSTON, 160 tons, Lamson & Hubbard Co. store on Boylston Street.

BOSTON & MAINE RAILROAD, 250 tons, roundhouse at Somerville, Mass.

HOLYOKE, MASS., 130 tons, Chemical Paper Co. plant.

MONTREAL, 1000 tons, office building at 618 St. James Street for James T. Stranger & Co.

NEW YORK, 6000 tons, apartment building on West Fifty-ninth Street.

NEW YORK, 2500 tons, building for County Trust Co. on Eighth Avenue.

TARRYTOWN, N. Y., 3000 tons, Chevrolet Motor Co. plant.

PENNSYLVANIA RAILROAD, 14,000 tons, two bridges over the Hackensack River at Marion, N. J.; bids open July 25.

STATE OF NEW JERSEY, 100 tons, five highway bridges at Somerville, N. J.; general contract to Richards & Gaston, Inc.

PHILADELPHIA, 3000 tons, office building and garage, 1616 Walnut Street.

PHILADELPHIA, 1000 tons, office building, Seventeenth and Sansom Streets.

PHILADELPHIA, 200 tons, Woman's Medical College and Hospital; bids open July 17.

BUFFALO, 8000 tons, new City Hall; John W. Cowper Co., low bidder on general contract.

SELFRIDGE FIELD, MICH., 700 tons, bids rejected and project postponed one year.

CHICAGO, 1000 tons, Parker junior high school.

CHICAGO, 600 tons, for Edison Electrical Appliance Co.

CHICAGO, 8000 tons, Cuneo Tower.

ROCK ISLAND, ILL., 800 tons, power house and addition to motor building for International Harvester Co.

ST. PAUL, MINN., 1300 tons, viaduct.

COLUMBIA, MO., 300 tons, trusses for roof over gymnasium, Missouri State University.

REGINA, SASK., 200 tons, parts and service building for General Motors Corporation of Canada.

SEATTLE, 1375 tons, West Garfield Street bridge; bids Aug. 2.

SEATTLE, 110 tons, hangar for Boeing Airplane Co.; bids being taken.

TACOMA, WASH., 150 tons, second unit Cushman Dam project; bids being taken.

Simplified Practice on Skid Platforms

Taking up the work on elimination of waste through simplified commercial practice, recommendation R95-28 of the United States Department of Commerce relates to skid platforms. In accordance with unanimous action of a general conference of representative manufacturers and users of skid platforms, the clearance dimensions recommended for adoption include minimum horizontal distance inside of runners, or other supports, of 29 in., and a clear height of 8 in. or 12 in., in the two standards, from the bottom of the runner or other support to the underside of the platform.

In discussing the proposed standards, it is pointed out that a hand-lift truck can be used to handle any standard skid of either of the two heights mentioned. Interchangeability of skids is essential if greatest benefit is to be derived from their use. This is a large factor in determining that a standard size be adopted.

A survey made by manufacturers showed that the lifting platforms of more than 90 per cent of the power-lift trucks were approximately 11 in. high and hence could run under the 12-in. skid. Of the hand-lift skids, 60 per cent had platforms approximately 7 in. high in the lowest position, and hence could be run under the 8-in. skid. More than 80 per cent of both types of lift trucks had lifting platforms more than 27 in. wide, and consequently are readily usable with the proposed 29-in. clearance width.

For the manufacture of full-finished automobile sheets, the Apollo Steel Co., has placed orders for a continuous sheet normalizer, three walking beam type continuous sheet pack furnaces, four walking beam type continuous pair furnaces and 11 box annealing furnaces. The equipment will be supplied by the Surface Combustion Co. The Central Alloy Steel Co., Canton, Ohio, has ordered an additional continuous sheet pack furnace, of the walking beam type, for the mills at Massillon.

Non-Ferrous Metal Markets

Copper Inactive but Firm, Tin Quiet, Lead Lower, Zinc Sales Light

NEW YORK, July 9.

Interruptions due to the holiday have slowed up all the markets and they are now just beginning to recover. All prices are steady.

Copper.—Foreign consumers are the principal buyers and have been moderately active for a week. Sales this morning were 1000 tons, which is large under present conditions. For the past week they have averaged about 1000 tons a day. If foreign consumers should absorb their average requirements, based upon consumption for recent months, they must still buy about 30,000 tons for July delivery. They have not bought much metal for August or September, and it is estimated that, if they should become at all active, their requirements would be quite heavy. Indications are that they overbought early this year. Domestic consumers still are buying only what they actually need. They have considerable metal to purchase for August and have bought very little for September. It is figured that they must soon come into the market for fairly liberal tonnages because it is known that their orders for finished material are better than for some time, particularly in wire. Primary producers continue out of the market, sales being confined almost entirely to custom smelters. In general, the market is gradually returning to the hand-to-mouth buying policy which ruled so long before the scramble for metal advanced the price to 24c. early this year. Another factor possibly holding up purchases is the announcement of statistics for June, which should be out this week. It is freely acknowledged that this will reveal a liberal increase in stocks, but that the curtailment of output will begin to show up. Prices are unchanged and steady, with electrolytic copper quoted at 18c., delivered in the Connecticut Valley, and at 18.30c. c.i.f. usual European ports. Lake copper is moderately active and unchanged at 18c. to 18.12½c., delivered. Some buying for early July delivery is reported for both Lake and electrolytic copper.

Tin.—Sales of Straits tin for the week ended Saturday, July 6, were light, at 700 to 800 tons, mostly to consumers. The delivery involved has been principally nearby metal and the feature has been the steadi-

THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY

	July 9	July 8	July 6	July 5	July 3
Lake copper, New York	18.12½	18.12½	18.12½	18.12½	18.12½
Electrolytic copper, N. Y.*	17.75	17.75	17.75	17.75	17.75
Straits tin, spot, N. Y.	45.12½	45.12½	....	45.12½	45.12½
Zinc, East St. Louis	6.70	6.70	6.70	6.70	6.70
Zinc, New York	7.05	7.05	7.05	7.05	7.05
Lead, St. Louis	6.70	6.70	6.70	6.75	6.80
Lead, New York	6.90	6.90	6.90	6.90	7.00

*Refinery quotation; price ¼c. higher delivered in the Connecticut Valley.

Rolled Products

Prices on rolled non-ferrous products are unchanged from those prevailing one week ago.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—
- High brass .....23.25c.
- Copper, hot rolled .....26.75c.
- Zinc .....10.25c.
- Lead (full sheets) ...11.00c. to 11.25c.

Seamless Tubes—
- High brass .....28.25c.
- Copper .....29.25c.

Rods—
- High brass .....21.25c.
- Naval brass .....24.00c.

Wire—
- Copper .....19.87½c.
- High brass .....23.75c.

Copper in Rolls .....26.75c.
Brazed Brass Tubing .....30.87½c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also to St. Louis on shipments to points west of that river.

- Sheets, 0 to 10 gage, 3 to 30 in. wide .....33.00c.
- Tubes, base .....42.00c.
- Machine rods .....34.00c.

Chicago Warehouse

(Prices Cover Trucking to Customers' Doors in City Limits)

Sheets—	Base per Lb.
High brass	23.25c.
Copper, hot rolled	27.75c.
Copper, cold rolled, 14 oz. and heavier	30.00c.
Zinc	10.00c.
Lead, wide	11.90c.
Seamless Tubes—	
Brass	28.25c.
Copper	29.25c.
Brass Rods	21.25c.
Brazed Brass Tubes	31.00c.

New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—		
High brass	21.12½c.	to 22.12½c.
Copper, hot rolled, base sizes	27.75c.	to 28.75c.
Copper, cold rolled 14 oz. and heavier, base sizes	30.00c.	to 31.00c.
Seamless Tubes—		
Brass	26.00c.	to 27.00c.
Copper	29.12½c.	to 30.12½c.
Brazed Brass Tubes	29.12½c.	to 30.12½c.
Brass Rods	18.87½c.	to 19.87½c.

New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets (No. 9), casks	10.50c.	to 11.00c.
Zinc sheets, open	11.50c.	to 12.00c.

Metals from New York Warehouse

Delivered Prices, Per Lb.

Tin, Straits pig	46.50c. to 47.50c.
Tin, bar	48.50c. to 49.50c.
Copper, Lake	19.50c.
Copper, electrolytic	19.25c.
Copper, casting	19.00c.
Zinc, slab	7.75c. to 8.25c.
Lead, American pig	7.62½c. to 8.12½c.
Lead, bar	9.62½c. to 10.12½c.
Antimony, Asiatic	10.50c. to 11.00c.
Aluminum No. 1 ingots for remelting (guaranteed over 99% pure)	25.00c. to 26.00c.
Alum. ingots, No. 12 alloy,	24.00c. to 25.00c.
Babbitt metal, commercial grade,	30.00c. to 40.00c.
Solder, ½ and ½	30.00c. to 31.00c.

Metals from Cleveland Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	49.63c.
Tin, bar	51.63c.
Copper, Lake	19.50c.
Copper, electrolytic	19.25c.
Copper, casting	18.75c.
Zinc, slab	7.75c. to 8.00c.
Lead, American pig	7.75c. to 8.00c.
Lead, bar	10.00c.
Antimony, Asiatic	16.00c.
Babbitt metal, medium grade	19.00c.
Babbitt metal, high grade	53.75c.
Solder, ½ and ½	31.25c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged customers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	14.50c.	16.00c.
Copper, hvy. and wire	14.25c.	15.625c.
Copper, light and bottoms	12.50c.	13.50c.
Brass, heavy	8.50c.	9.50c.
Brass, light	7.50c.	8.50c.
Hvy. machine composition	11.50c.	12.75c.
No. 1 yel. brass turnings	9.50c.	10.25c.
No. 1 red brass or compos. turnings	11.25c.	12.25c.
Lead, heavy	5.50c.	5.75c.
Lead, tea	4.25c.	5.25c.
Zinc	3.50c.	4.25c.
Sheet aluminum	14.00c.	16.00c.
Cast aluminum	12.25c.	14.25c.

ness of prices, which have held close to 45c. Spot metal continues to sell at a discount, or about 1c. per lb. below December-January. Not much has been heard in the last week about activities of "the group" in London. They are still buying some metal to support the market and were more active today. Spot Straits tin is quoted today in a dull market at 45.12½c., New York. London prices today were about £3 per ton higher than week ago, with spot standard quoted at £204 10s., future standard at £207 15s. and spot Straits at £208. The Singapore price today was £210 5s.

Lead.—A change in its contract price from 7c. to 6.90c., New York, was made on Friday, July 5, by the American Smelting & Refining Co. Following this, the leading producer in the West lowered its quotation from 6.80c. to 6.75c., St. Louis, and later to 6.70c., which is now the market. Demand, particularly for spot and early delivery, is reported very good.

Zinc.—The price situation in prime Western zinc continues somewhat mixed. Demand is very light and is easily being absorbed by one or two companies, which are taking orders at 6.70c., East St. Louis. Another company is quoting 6.75c., and doing some business. Those producers which for some time have maintained their quotation of 6.80c., East St. Louis, still adhere to this policy and have been doing their share of the business. In fact, in one week during June, statistics of the American Zinc Institute show that, out of 2800 tons sold that week, 2200 tons went at 6.80c. It is felt that galvanizers in particular and some other consumers must soon come into the market, and it would not be surprising if a little later the quotation should reach 6.80c. as the minimum. One company placed a large order for delivery this month during the last week and may place a similar order before the month closes.

Antimony.—Because holders of Chinese metal prefer to make sacrifices rather than put the metal in warehouses, the market is somewhat depressed and the metal is selling at 8.50c. for spot and 8.62½c. for future, duty paid, New York.

Nickel. — Wholesale lots of ingot nickel are quoted at 35c. per lb., with shot nickel at 36c. and cathodes of electrolytic nickel at 35c.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is obtainable at the published price of 23.90c. per lb., delivered.

Non-Ferrous Metals at Chicago

CHICAGO, July 9.—This market was quiet during the early part of the week, but in recent days has turned more lively. Prices for tin are higher, while quotations on lead are lower. The old metal market is quiet.

Prices per lb., in carload lots: Lake copper, 18.50c.; tin, 45.75c.; lead, 6.85c.; zinc, 6.80c.; in less-than-carload lots: antimony, 9.75c. On old metals we quote copper wire, crucible shapes and copper clips, 14c.; copper bottoms, 11.50c.; red brass, 11.50c.; yellow brass, 8c.; lead pipe, 4.50c.; zinc, 3.25c.; pewter, No. 1, 24.50c.; tin foil, 26c.; block tin, 36c.; aluminum, 12.87½c.; all being dealers' prices for less-than-carload lots.

Railroad Equipment

Western Refrigerator Line Building 500 Cars

ABSENCE of railroad equipment buying on a large scale was noted during the past week. The dearth of inquiries indicates that the dullness which pervades the market will continue in the near future. The Western Refrigerator Line Co., recently organized, is building 500 refrigerator cars. The Manila Railroad has ordered 100 flat cars and 100 box cars, while the Canadian Pacific has bought 100 steel cars from a Canadian car manufacturer. The Reading is inquiring for 200 all-steel gondola cars. The Great Northern is expected to purchase 12 locomotives of the 4-8-4 type. Details of the week's business follow:

Canadian Pacific has ordered 100 steel cars from Canadian Car & Foundry Co.

Great Northern is inquiring for 12 locomotives of 4-8-4 type.

Chicago, North Shore & Milwaukee has ordered 25 interurban parlor motor cars from Standard Steel Car Co.

John A. Roebling's Sons Co., Trenton, N. J., has ordered 12 gondola cars from American Car & Foundry Co.

United Fruit Co. is inquiring for 50 banana cars.

Norfolk & Western will build 10 all-steel box express cars in its own shops.

Reading is inquiring for 200 all-steel gondola cars.

New York, New Haven & Hartford is inquiring for 50 70-ton brick cars.

Manila Railroad has ordered 100 flat cars and 100 box cars of 30-ton capacity from Gregg Co.

Savannah & Atlanta is inquiring for three switching locomotives.

American Locomotive Co. has received orders for one locomotive from Delaware & Hudson and one from Standard Oil Co. of Indiana. Baldwin Locomotive Works will furnish one locomotive to Illinois Northern.

Western Refrigerator Line Co., recently organized, is building for its own account 500 refrigerator cars in shops of American Car & Foundry Co.

Cudahy Packing Co. is in market for 50 refrigerator car underframes.

Chicago, Milwaukee, St. Paul & Pacific will buy 15 caboose car underframes.

The Weirton Steel Co., Weirton, W. Va., has acquired the Isabella mine of the Hecla Coal & Coke Co., near Brownsville, Pa. The purchase included 1200 acres of coal lying along the Monongahela River, which is fully developed and equipped with modern facilities for the preparation and shipment of coal by both rail and river.

Reinforcing Steel

Inquiries Are Heaviest Since Early in May

ALTHOUGH awards showed a decrease in the past week, inquiries were the heaviest since early in May. The largest letting was 1000 tons for a power plant at Michigan City, Ind., and a building at Seattle, Wash., will take 900 tons. The total business for the week was about 4700 tons. Pending jobs amounting to 4300 tons include 1225 tons for a highway bridge at Seattle, 1000 tons for a store at Dubuque, Iowa, and 500 tons for a grain elevator for the Burlington railroad at St. Louis. Awards follow:

BOSTON, 200 tons, automobile service station, to Concrete Steel Co.

NEW YORK, 200 tons, subway work, to McClintic-Marshall Co.

NEW YORK, 200 tons, route 1, section 19, of subway, to McClintic-Marshall Co.

HEMPSTEAD, N. Y., 100 tons, school, to Truscon Steel Co.

MICHIGAN CITY, IND., 1000 tons, power plant, to an unnamed bidder.

PEORIA, ILL., 300 tons, bridge, to Kalman Steel Co.

CHICAGO, 150 tons, Norwegian-American Hospital, to Concrete Engineering Co.

CHICAGO, 350 tons, Victor X-Ray Co., to Joseph T. Ryerson & Son.

ST. LOUIS, 265 tons, addition to Barnes Hospital group, to Laclede Steel Co.

SACRAMENTO, CAL., 150 tons, hotel, to W. S. Wetenhall Co.

SALINAS, CAL., 202 tons, sewer project, to unnamed bidder.

SAN FRANCISCO, 100 tons, fire wall, Sixteenth and Wisconsin Streets, to W. S. Wetenhall Co.

SPOKANE, WASH., 500 tons, Montgomery Ward building, to Pacific Coast Steel Co.

SEATTLE, 900 tons, City-County Building addition, to Northwest Steel Rolling Mills.

SEATTLE, 200 tons, Aeronautics Hall, University of Washington, to Northwest Steel Rolling Mills.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

JERSEY CITY, N. J., 135 tons, garage, general contract to Industrial Engineering Co.

BUFFALO, 300 tons, additional section, Hertel Avenue sewer.

JAMESTOWN, N. Y., 185 tons, telephone exchange building.

CLEVELAND, 250 tons, factory addition for Richman Brothers.

CINCINNATI, 200 tons of bars for sewer construction.

DUBUQUE, IOWA, 1000 tons, store; C. W. Nichol, architect.

BENTON HARBOR, MICH., tonnage not stated, theater and store; C. W. Nichol, architect.

CHICAGO, 200 tons, office building; McLellon Construction Co., contractor.

CHICAGO, 300 tons, for Victor X-Ray Co.; previously reported as 100 tons.

ST. LOUIS, 500 tons, grain elevator for Burlington Railroad.

SEATTLE, 1225 tons, West Garfield Street bridge; bids Aug. 2.

AMERICAN LAKE, WASH., 125 tons, hospital; bids being taken.

PERSONAL

HERBERT F. PERKINS, Chicago, the new president of the International Harvester Co., has long been a conspicuous figure in the Harvester organization. His ability and experience well equip him for the responsibilities which ALEXANDER LEGGE was

H. F. PERKINS

obliged to give up when President Hoover summoned him to the chairmanship of the Federal Farm Board. Mr. Perkins has had over 30 years of continuous service in the farm implement industry—three years with the McCormick Harvesting Machine Co. which he joined in 1898 to develop its purchasing department, and then more than 27 years among the executives of the Harvester company. Soon after the formation of the latter in 1902 he organized the purchasing department of the combined companies, and in 1906 was made operating manager of the steel and lumber properties. Later, when these properties were organized as the Wisconsin Steel Co. and the Wisconsin Lumber Co., he became president of both. Subsequently he was elected vice-president of the Harvester company in charge of manufacturing in the United States and abroad. In 1922 he was elected first vice-president, with general executive duties, aiding the president and substituting for him in his absence. During the war, Mr. Perkins spent a number of months in Washington as business adviser to the chairman of the War Labor Policies Board. He also served as representative of the Chamber of Commerce of the United States in President Wilson's first industrial conference. He is a vice-chairman of the National Industrial Conference board, and has been a director of various Chicago banks. He is in his sixty-fifth year.

H. R. SMALLMAN, for the past three years assistant to the sales manager of Hanson-Van Winkle-Munning Co., has been made manager of the Chicago office, with headquarters at 549 West Washington Boulevard. H. M. CHERRY, who has represented the company in Michigan for the past seven years, has been appointed manager of the Detroit office, 5415 Twelfth Street, and LOUIS M. HAGUE has become manager of the Pittsburgh and Cleveland office, with headquarters at 106 Liberty Avenue, Pittsburgh.

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THOMAS W. STONE has been elected a vice-president of the Western Gas Construction Co., Fort Wayne, Ind.

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J. P. ARMSTRONG has been appointed by Geuder, Paeschke & Frey Co., Milwaukee, to take over the management of the metal stampings contract division of the company for California, with headquarters in the Balboa Building, San Francisco.

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CHRISTIAN WILSON, JR., formerly general manager of the Montreal plant of the Bryden Neverslip Co., has been elected general superintendent of the Harrisburg Pipe & Pipe Bending Co., Harrisburg, Pa., succeeding F. D. ANDREWS, who resigned. After graduation from Lehigh University with the degree of mechanical engineer, Mr. Wilson became associated with the Bethlehem Steel Co. and later with the Pennsylvania Power & Light Co.

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WILLIAM L. DITGES has been elected vice-president in charge of engineering of the Mackintosh-Hemphill Co., Pittsburgh. He has been with the company since 1916, serving successively as chief draftsman, assistant chief engineer and chief engineer. He received his education at Cologne, Germany, and prior to going with Mackintosh-Hemphill Co. was connected with the Carnegie Steel Co. at New Castle, Pa., the Nichols Copper Co., New York, and the Bethlehem Steel Co. W. R. DUDA succeeds Mr. Ditges as chief engineer. He has been with this company for 11 years, for the past several years in the capacity of assistant chief engineer. His previous connections included five years with the United Engineering & Foundry Co. and four years with the American Sheet & Tin Plate Co.

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S. M. ALBERTSON has been appointed contact engineer for the Bantam Ball Bearing Co., South Bend, Ind. He was formerly connected with the Central Specialty Co., Detroit.

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THOMAS EVANS, vice-president, Merchant & Evans Co., Philadelphia, CHARLES R. HOOK, vice-president, American Rolling Mill Co., Middletown, Ohio, and CHARLES PIEZ, chairman, Link-Belt Co., Chicago, are members of a committee appointed to study immigration questions for the Chamber of Commerce of the United States.

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F. O. SCHRAMM, who has been appointed general manager of sales of the Pressed Steel Car Co., New York, as briefly mentioned in last week's

F. O. SCHRAMM

issue of THE IRON AGE, has been with the company for 22 years, having started at the age of 16 as a stenographer in the operating department of the Pressed Steel Car Co.'s subsidiary, the Western Steel Car & Foundry Co. He worked in various capacities in the operating and sales departments at the Hegewisch plant and in the Chicago office until Jan. 1, 1917, when he was transferred to the New York office. He became assistant secretary in 1921 and assistant general sales manager on Feb. 1, 1928. His appointment as general manager of sales took effect July 1. C. E. POSTLEWAITE, who has been made assistant vice-president of the Pressed Steel Car Co., entered the service of the company in 1897. Previous to that time he was engaged in railroad work, from 1883 to 1890 as rodman, telegraph operator and car clerk for the Pennsylvania Railroad and from 1890 to 1897 in various capacities ranging from chief clerk to general superintendent of the Norfolk & Western. Mr. Postlewaite went with the Schoen Pressed Steel Car Co. in 1897, continuing with the Pressed Steel Car Co. when the Schoen company was merged with Pressed Steel. He was appointed general sales manager of the company in 1915, and served in that capacity until July 1, when he was appointed assistant vice-president.

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THEODORE KIPP, vice-president and managing director of Kipp-Keppy Ltd., Winnipeg, Canada, and presi-

dent of the Winnipeg Service Co., has been reelected chairman of the new industries committee of the Industrial and Development Board of Manitoba. He recently returned from Europe and says that European manufacturers look with favor on establishing branch factories in Canada. He is also vice-president of the Canadian Engineering & Construction Co., vice-president of Sullivan-Kipp-Chase, director of William Hamilton, Ltd., and vice-president of the Canadian Novadel, Ltd.

—

L. H. BEYER, for many years connected with the American Radiator Co. in Buffalo and New York as manufacturing department executive and as director of purchases, has become

L. H. BEYER

sales director of the Durbar bearing bronze division of the Buffalo Bronze Die Cast Corporation, Buffalo.

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HENRY JACOBSON, who has been identified with the baling press industry for many years, has been appointed chief engineer of the Galland-Henning Mfg. Co., Milwaukee.

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T. W. BATTLE has been appointed district manager of the Combustion Engineering Corporation, for the Charlotte, N. C., territory, with office at 919 Johnston Building. I. S. FORDE has been made acting district manager of the Atlanta district to succeed T. J. CLEARY, resigned, with offices in the Candler Building, Atlanta. E. WALTHALL has been appointed district manager of the New Orleans territory, with office in the Union Indemnity Building.

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W. M. CUSAC has been appointed a member of the Chicago sales force of the American Hoist & Derrick Co., St. Paul, Minn. He was formerly connected with the McMyler-Interstate Co., Cleveland.

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FRANK W. FRY has become associated with Hausman & Wimmer Co., scrap dealer, New York.

H. J. FREYN, president Freyn Engineering Co., Chicago, sailed for Europe on the Aquitania July 7, on a business trip lasting until the end of the summer, including Russia, where his company is engaged in iron and steel engineering work.

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A. E. ADAMSON, heretofore of the Acme Steel Co., is now connected with the sales department of the Brainard Steel Corporation, Warren, Ohio. Mr. Adamson is a brother of W. J. Adamson, vice-president of the company. He was at one time connected with the American Tube & Stamping Co., Bridgeport, Conn., and prior to that was in the operating department of the Trumbull Steel Co.

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C. B. KARLSON, vice-president, Seamless Steel Equipment Corporation, 39 Broadway, New York, sailed July 6 for a six weeks' business trip to France, Germany and England.

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BURNHAM FINNEY, who for the past five years has been editorial representative of THE IRON AGE at Cincinnati, has been made a member of the New York staff, with broader activities. He has been succeeded at Cincinnati by ROBERT G. MCINTOSH, who formerly was associated with the Cincinnati *Enquirer* and for the past few years has represented several business papers.

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GEORGE F. BAIN has been made manager of the northeastern district, which includes New England and New York north of Westchester and Rockland counties, for the Copperweld Steel Co., Glassport, Pa. PAUL VAN WAGNER continues as district manager for New York, New Jersey, Pennsylvania and West Virginia. The headquarters for both will be at 30 Church Street, New York.

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H. L. RITTS, for the past 10 years sales manager of Holcroft & Co., Detroit, has become general sales manager of the William H. Nicholls Co., Inc., Richmond Hill, N. Y., and will be in charge of sales and engineering offices at 207 Curtis Building, Detroit. S. H. SUTTON, formerly of the Chicago Gas Light & Coke Co., has been appointed Chicago district manager. The company has expanded its line of molding machines to include a complete molding machine conveyor and sand-conditioning equipment.

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J. W. MORGAN has been appointed assistant secretary and treasurer of the Brainard Steel Corporation, Warren, Ohio.

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F. H. WILLCOX, vice-president Freyn Engineering Co., Chicago, returned July 2 on the Homeric from a six weeks' business trip in England in connection with consulting work for the Ford Motor Co.

Obituary

RALPH W. CLARK, one of the best known pig iron men in the East, died at State Hospital, Scranton, Pa., July 4, from complications following typhoid fever. His death came unexpectedly after he had passed the crisis of the fever itself. Mr. Clark had spent about 27 years in the pig iron business. He had only recently passed his 45th birthday. For about 20 years he was with the old firm of Rogers, Brown & Co., now Rogers, Brown-Crocker Brothers, Inc. He was for a time in the Buffalo office of that firm, and came to the New York office in 1906, continuing as salesman in the New York district

R. W. CLARK

until 1922, when he was appointed district sales agent in New York for Pilling & Co., of Philadelphia. A year later he was elected a vice-president of Pilling & Co. This position he resigned in September, 1928, to become connected with the Hudson Coal Co., Scranton, Pa., which is owned by the Delaware & Hudson Railroad Co. Effective Jan. 1, Mr. Clark became vice-president and general sales agent of the Chateaugay Ore & Iron Co. and the Chazy Marble Lime Co., both subsidiaries of the Hudson Coal Co., and at that time he took charge of the sale of Chateaugay pig iron, which had been handled for years by Pilling & Co.

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WILLIAM M. TOBIAS, until Sept. 1, 1925, general purchasing agent for the Bethlehem Steel Corporation, died at Lake Placid, N. Y., July 6, aged 64 years. He had been connected with the company for about 25 years, with the exception of about two years when he became associated with Milliken Brothers Mfg. Co., fabricator of steel transmission towers, returning to the Bethlehem company in 1909. Mr. Tobias started with the Bethlehem Iron Co. as purchasing agent, having had previous experience with the Long Island Railroad.

Construction Work Declined During June

Construction contracts awarded in the territory east of the Rocky Mountains during June amounted to $545,891,100, states the F. W. Dodge Corporation. This represents a decline of 7 per cent compared with the preceding month, but is modified by the fact that the normal seasonal decrease is 6 per cent. The total for June shows a falling off of 16 per cent compared with the corresponding month of 1928.

Despite the general decline, several districts reported encouraging developments. In the Middle Atlantic States new building and engineering work in June totaled 7 per cent more than in May, and in the Southeastern States the volume was 24 per cent greater than in May and 36 per cent greater than in June, 1928. In the Northwest (Minnesota, the Dakotas and northern Michigan) construction contracts, although showing a decline from May, were 44 per cent more in June than in the same month last year and work begun in the first six months of 1929 was 38 per cent greater in volume than in the first half of 1928.

International Statistical Bureau Suggested

Desirability of creating an agency to gather and disseminate international industrial statistics was emphasized by Magnus W. Alexander, president National Industrial Conference Board, New York, in an address delivered before the International Chamber of Commerce on July 9, at Amsterdam, The Netherlands.

Mr. Alexander pointed out the need in each country, unless the situation is already adequately met, of a national private organization to assemble and interpret economic statistics of various industries and to coordinate them into a comprehensive "intelligence service" for the nation as a whole, cooperating at all times with the statistical services of the Government and of other bodies and thus benefiting from them. "Such national agencies, similar in organization and using similar procedure, methods and nomenclature, would be in a position to supply promptly the comparable and authentic information needed for the development of current, comprehensive, international industrial statistics."

In each country associated in such an effort, stated Mr. Alexander, "a patient and persistent educational process will be needed to teach business not only the value of comprehensive trade statistics, but also that they will be of no value if they are treated in a spirit of secrecy and individual unrest as a weapon against others, rather than as a tool with which all may work together. If the development of statistics of industry in the United States may be briefly characterized, it may be said that they have ceased to be a by-product of business, and have become one of its potent instruments."

Governmental agencies cannot secure sufficiently comprehensive information to supply the requirements for business guidance without the prior development of such information through private cooperative effort, or without a system of machinery so costly and elaborate as to be out of proportion to the value of the results, stated Mr. Alexander. However, it would seem that one of the valuable services that government can render is to record and disseminate information gathered through private cooperative effort. The greatest service government can give is to stimulate such effort and to aid it in various ways.

Smaller Stocks of Industrial Coal on Hand

Industrial stocks of bituminous coal as of June 1 are estimated by the National Association of Purchasing Agents as being equivalent to 25 days' supply at current rates of consumption. This compares with 27 days' on May 1. By industries, the stocks include: 17 days' supply for by-product coke plants; 51 days' for electric utilities and coal gas plants; 21 days' for railroads; 25 days' for steel mills and 27 days' for other industries.

Estimated industrial consumption in May was 37,298,000 net tons, which is a reduction of something more than 1 per cent from April consumption and, with the exception of January, the smallest total since November. Industrial stocks are figured at 31,282,000 tons on June 1, compared with 33,468,000 tons a month earlier. The latest figure is much the smallest in more than a year. It compares with 40,890,000 tons on June 1, 1928.

Factory Wages Remain High

Average weekly earnings in representative New York State factories were $30.03 in May, according to a report of the State Industrial Commissioner. While this is below the $30.07 of April and the $30.35 of March, it is otherwise, with the exception of last December, the highest monthly average ever reached. It compares with $29.19 in May, 1928, and practically the same amount the year before.

Ingot Brass June Prices

CHICAGO, June 29.—The Non-Ferrous Ingot Metal Institute reports the average prices per pound received by its membership on commercial grades of the six principal mixtures of ingot brass during the 28-day period ended June 21. As there are, as yet, no generally accepted specifications for ingot brass, it must be understood that each item, listed below, is a compilation representing numerous sales of metal known to the trade by the designation shown, but each item in reality including many variations in formulas. Until the program of standardizing the principal specifications, now progressing in cooperation with the American Society for Testing Materials, is completed, the following specifications will be understood to refer to "commercial grades":

Commercial 80-10-10 (1 per cent impurities)	17.309c.
Commercial 78 per cent metal	15.45c.
Commercial 81 per cent metal	15.616c.
Commercial 83 per cent metal	16.024c.
Commercial 85-5-5-5	16.331c.
Commercial No. 1 yellow brass ingot	13.515c.

Sheet and Tin Mill Wages Up for July-August

For July-August, tonnage rates paid to sheet and tin mill workers in mid-Western mills operating under the sliding scale wage agreement of the Amalgamated Association of Iron, Steel & Tin Workers, advance to 27 per cent above base, from 25½ per cent, paid in May-June. The increase follows an increase in the average selling price of Nos. 26, 27 and 28 gage black sheets shipped during the 60 days ended June 30, to 3.05c. a lb., from 3c., the average disclosed two months before. The examination of sales sheets and the settlement were conducted last week at Youngstown, at the office of Elias Jenkins, secretary of the Western Sheet and Tinplate Manufacturers Association.

Production and Shipment of Raw Materials and Finished Products in June

	June, 1929	May, 1929	June, 1928
Railroad locomotives shipped (a), number	78	99	51
Total, 6 months (a)	319	...	314
Exports in 6 months (a)	39	...	23 (b)
Unfilled orders, end of month (a)	552	444	201
Bituminous coal mined (c), net tons	37,900,000	40,172,000	35,963,000
Anthracite mined (c), net tons	5,015,000	6,308,000	5,301,000
Beehive coke (c), net tons	600,200	597,400	301,600

(a) Department of Commerce.
(b) Includes two electric units.
(c) United States Bureau of Mines.

Output Higher in Britain and Germany

British Pig Iron Production Increased—German Steel Tonnage Highest Since War—Japan Has Increasing Demand

(*By Cable*)

LONDON, ENGLAND, July 8.

CLEVELAND pig iron prices are strong as a result of the shortage of supplies and makers are not accepting last quarter business. Merchant sellers of pig iron are obtaining 1s. (24c.) a ton more than the minimum prices for any available small lots.

Output is expected to be increased by blowing in four more furnaces before the end of August, as local ore and coke production is being increased.

Belgium and Italy have bought further tonnages of hematite iron and domestic consumers are also active.

New business in finished steel is moderate, but specifications against current contracts are coming in more freely and consumers are pressing for larger supplies, especially of ship material, before the Scottish plants begin their holidays on July 11. The South Durham Steel & Iron Co., Ltd., is resuming operation of its Stockton-on-Tees plate mill, after more than 12 months of idleness.

Continental iron and steel business here is quiet, consumers displaying only a meager interest, especially in semi-finished material. Continental mills now need orders and quotations are inclined to recede, except on plates and shapes.

Tin plate inquiry is well maintained, but business is inactive, as consumers are uncertain of the trend of prices. Mills needing orders have accepted less than 18s. 3d. ($4.42) per base box, f.o.b. works port, to fill gaps in their schedules, but others prefer to suspend operations and draw the under-production payments from the association. Output probably will be further reduced under the restriction plan, so that the market should respond quickly to any heavy buying movement.

Galvanized sheets are quiet and mills are in need of orders. Japan has bought a few small lots of heavy and light-gage black sheets.

Clyde shipbuilding output in June was 31 vessels of 49,000 tons.

Steel Cartel Agreement May Be Renewed

Prospects Improve for Continuing European Association, Although Participation Quotas May Be Changed

BERLIN, GERMANY, June 24.—The prospect for a renewal of the International Steel Cartel after October has improved. At the Paris meeting last week it was agreed in principle that renewal was desirable, but no formal agreement as to the conditions is likely to be reached before the September meeting, to be held in Vienna.

The German group's proposals, as was foreseen, contained a demand that participation quotas shall be re-fixed upon the basis of actual production during the past few years. The exact amount of the quotas would depend upon what period is chosen as the basis for the production figures. Germany's expectation is that its quota of 43.25 per cent will be raised by another five points. The West European groups are understood to oppose the German demand.

Germany's other demand is that the restriction of its export to 330,000 tons a month shall be abolished, or that there shall be export restriction for all countries. This demand has not been considered.

Against the renewal of the International Cartel still stands the obstacle that no progress has been made toward renewing the native German syndicates. At Paris the cartel decided to increase the total production program by 1,000,000 tons to 32,295,770 tons a year. This holds good for the third quarter of 1929 and thereafter unless altered. The effect is to increase Germany's penalty-free quota by approximately 430,000 tons a year.

British and Continental European Export prices per gross ton, f.o.b. United Kingdom Ports, Hamburg and Antwerp, with the £ at $4.85

British Prices, f.o.b. United Kingdom Ports

Cleveland No. 3 foundry	£3	12½s.	to	£3	13½s.	$17.58	to	$17.82
East Coast Hematite	3	14½	to	3	15	18.06	to	18.18
Ferromanganese, export	14	0				67.90		
Billets, open hearth	6	10	to	6	12	31.52	to	32.12
Sheet bars, open hearth	6	10				31.52		
Black sheets, Japanese specifications	13	5				64.26		
Tin plate, per base box	0	18¼	to	0	18½	4.42	to	4.48
Rails, 60-lb. and heavier	7	15	to	8	15	37.59	to	42.43
						Cents per Lb.		
Steel bars, open hearth	7	15	to	8	10	1.67	to	1.84
Beams, open hearth	7	2½	to	7	12½	1.55	to	1.65
Channels, open hearth	7	7½	to	7	17½	1.60	to	1.71
Angles, open hearth	8	2½	to	8	12½	1.76	to	1.86
Ship plates, open hearth	7	12½	to	8	2½	1.66	to	1.76
Black sheets, No. 24 gage	10	5	to	10	10	2.21	to	2.27
Galvanized sheets, No. 24 gage	13	7½	to	13	10	2.90	to	2.92

Continental Prices F. O. B. Antwerp or Hamburg

Foundry iron, 2.50 to 3.00 per cent sil., 0.50 to 0.90 per cent phos.	£3	10s.	to	£3	14½s.	$16.97	to	$18.06
Foundry iron, 2.50 to 3.00 per cent sil., 1.00 per cent and more phos.	3	12				17.45		
Billets, Thomas	5	2	to	5	6½	24.73	to	25.82
Sheet bars, Thomas	5	6½	to	5	7	25.82	to	25.94
Wire rods low C., No. 5 B.W.G.	6	5	to	6	6¼	30.31	to	30.61
Black sheets, No. 31 gage, Japanese	12	10				60.62		
Rails, 60 lb. and heavier	6	10*				31.52		
Rails, light	6	1½				29.46		
						Cents per Lb.		
Steel bars, merchant	5	16½	to	5	18	1.28	to	1.30
Steel bars, deformed	5	16	to	5	17	1.27	to	1.29
Beams, Thomas, British standard	5	5	to	5	9½	1.13	to	1.14
Channels, Thomas, American sections	6	1				1.33		
Angles, Thomas, 4-in. and larger, over ⅝-in. thick	5	8				1.13		
Angles, Thomas, 3-in.	5	18				1.30		
Ship plates, open-hearth, inspected	7	10				1.62		
Hoop and strip steel, over 6-in. base	6	2½				1.35		
Wire, plain, No. 8 gage	7	10				1.62		
Wire, galvanized, No. 8 gage	9	10	to	9	12½	2.06	to	2.12
Wire, barbed, 4-pt. No. 12 B.W.G.	12	0½				2.60		
Wire nails, base	8	0½				$1.74 per keg		
Wire nails, assortments, 1 to 6-in., keg	10	9				2.26		

*Open-hearth steel, 10s. ($2.42) per ton extra.

Germany's objection to the 330,000-ton a month limitation of exports has of late increased, owing to the fact that the proportion of its foreign to home orders is steadily rising.

The International Wire Rods Cartel has not yet been renewed. At the last meeting in Berlin in April renewal was agreed upon in principle, but Germany made certain reservations, including a right to withdraw if the native Ingot Steel Syndicate and the other native syndicates are not renewed. A revision of quotas all around is demanded. Germany's competitors complain that it has of late much exceeded its quota, and Germany in turn complains that its quota is based on production in 1926, a very bad year for the whole iron and steel industry. The revival of the International Wire Cartel, which was at one time considered a condition precedent to the renewal of the Wire Rods Cartel, has not been negotiated.

Czechoslovakian Wire Mills Seek Larger Export Trade

HAMBURG, GERMANY, June 21.—Competition in wire and wire products for export is expected to increase considerably as a result of efforts by the Czechoslovakian wire mills to secure a larger share of the trade. At a recent meeting in Prague, the mills pointed out that the Czechoslovakian domestic market would be unable to absorb the same tonnage of wire and wire products as last year and that the surplus must be sold for export. The mills are well equipped with modern machinery and wages are 45 to 50 per cent of the German scale. Continental agents for Czechoslovakian mills are offering galvanized wire, plain and barbed, and wire nails at low prices, which are expected to bring about a further reduction in the export quotations by other wire producing countries.

Krupp Grants Rebates on Nirosta Steel

HAMBURG, GERMANY, June 24.—The Krupp Co. has granted a considerable rebate to the German cutlery industry on purchases of Krupp Nirosta steel when used to manufacture cutlery for export. This will enable the German cutlery industry to reduce its export prices.

Belgian Production in May

BERLIN, GERMANY, June 26.—Belgium's production in May was: Pig iron, 348,400 tons as against 336,110 tons in April; steel ingots, 330,600 tons against 332,020 tons; rolling-mill products, 298,800 tons against 300,340 tons.

Orders are in satisfactory volume and prices are firm without, however, any marked rising tendency. English competition in pig iron has weakened.

German Steel Output Highest Since War

Confidence Returning Following Reparations Agreement—Export Trade Reported Very Favorable

BERLIN, GERMANY, June 24.—The increase in steel production, which began in March, continues. The May output was the highest for any month since the war. The increase was almost entirely in structural shapes and railroad permanent way materials, sales of which in May were between 50 and 200 per cent higher than in February. According to the Ingot Steel Syndicate's returns, the output of all steel is now around 5 per cent higher than the combined quotas of member firms, whereas in February it was 7 per cent below. Orders on the books are still increasing. Production figures are:

	1929	1928
Ingots:	Metric Tons	
May	1,421,047	1,250,256
January-May	6,892,882	6,627,696
Rolled Products:		
May	959,090	897,204
January-May	4,697,514	4,717,503

The general business situation has improved. The reserve shown by manufacturers during the period of uncertainty as to the outcome of the Paris reparations conference has given way to a feeling of confidence. This feeling is strengthened by the fact that in May, for the first time since 1926, the foreign trade balance was favorable.

Much of Germany's recent export steel business has come from England. French and Belgian producers were unable to sell, owing to their large home consumption, and England became increasingly dependent on Germany.

Of the steel market as a whole, authorities speak optimistically. The fact that the monthly average of ingot output so far this year has exceeded that of the boom year 1927 is considered proof that the steel-consuming industries are doing well. Further, the foreign demand for German machinery and for other steel and iron wares continues to increase, and at the same time the practical cessation of borrowing from abroad tends to check imports.

Change in German Steel Shipments to America

HAMBURG, GERMANY, June 24.—The German steel industry, which this year was leading in the export shipment of finished steel products to the United States, reports a change in the forms of steel shipped there. Formerly the shipments were principally structural shapes, plates and other construction material, whereas now the shipments are mostly tubing, cold-rolled strips and bars for the production of bolts, nuts and rivets.

Polish Competition May Be Factor in Steel Exports

HAMBURG, GERMANY, June 24.—In German steel trade circles the establishment of the Consolidated Silesian Steel Corporation is regarded with much interest. Through the organization of this company, the amalgamation of Upper Silesian steel works has been accomplished, and it is supposed in German steel circles that one of the first steps of this company will be to foster export business.

Poland offers special opportunities for a strong financial group to build up a remunerative export trade. Wages and transportation costs are low and the Government is facilitating the building up of export trade. Moreover, shipping facilities from Danzig have been greatly improved in recent years.

Lack of funds for modernization and export organizing has so far made it impossible for Poland to build up a large export business. An extension of sales in Poland is hardly possible, because the domestic Poland market will for some time be small. Therefore the expansion program will certainly be started with a view to selling steel abroad. It must be remembered that the Polish industry, which is now virtually under the control of the Harriman group of New York, is not a member of any cartel except the tube cartel, and, as an outsider, is in a unique position to improve its situation very much. There is little doubt in Continental export circles that the Polish competition will soon be strongly felt.

Japan's Sheet Requirements About 225,000 Tons

YOKOHAMA, JAPAN, June 15.—It will be necessary to import about 78,600 tons of light-gage black sheets, 13 to the bundle, during the present year according to certain large Japanese sheet consumers. This estimate is based on a yearly demand in Japan for 160,000 metric tons of galvanized sheets of light gage, 30,000 tons of sheets used in the manufacture of enameled and other kitchen ware and exports of about 35,000 tons of galvanized sheets, a total of about 225,000 tons. Japanese domestic output of light-gage sheets, which has increased in recent months, is about 146,400 metric tons, of which 110,000 tons is produced by the Kawasaki Dockyard Co., Kobe, 10,000 tons by the Nakayama Sheet Mfg. Co., 24,000 metric tons by the Government Steel Works and 2400 tons by the Nippon Kogyo Kaisha.

German Thin-Sheet Makers Combine

New Domestic Sales Agreement Believed to Provide Basis for Establishment of Thin-Sheet Syndicate

HAMBURG, GERMANY, June 15.—The Feinblechkontor G.m.b.H., with headquarters in Cologne, which has been formed by light gage sheet producers, includes in its membership the Vereinigte Stahlwerke A. G., Düsseldorf, and Otto Wolff & Co., Cologne. Hereafter it will be the exclusive sales agency in the German domestic market for thin sheets.

The sheet mills controlled by these two companies are the August Thyssen Hütte, Niederrheinische Hütte, Hoerder Verein, Huestener Gewerkschaft, Westfälische Union in Nachrodt, Meggener Walzwerke, Eichener Walzwerk, Walzwerk Weidenau, Sieghutter Eisenwerk, Schleifenbaum & Mattner in Siegen, Von der Zypen-Wissen, Bonzel & Co. in Olpe, Heggener Walzwerk in Heggen, Stahlschmidtsche Werke in Kreuzthal, Bruchs Wwe. in Weidenau, Rasselsteiner Eisenwerk Gesselschaft in Neuwied-Rasselstein. These mills produce about 50 per cent of all light gage steel sheets in Germany.

The new association is considered to have established a good basis for the formation of a thin sheet syndicate. The important outsiders producing light gage sheets include the Ohler Eisenwerke at Ohle, Storch & Schoenberg A. G., Geisweid, which is controlled by the Mannesmann interests, Bergbau und Hütten A. G., Friedrichshütte, controlled by Friedrich Thyssen & Co., Geisweider Eisenwerke A. G., controlled by the Thyssen and Kloeckner interests, Eisenwerk Gesselschaft Maximilianshütte in Rosenberg, Eisenhüttenwerk Thale at Thale, Capito & Klein A. G., at Benrath, controlled by the Krupp interests, Stahl und Walzer Hennigsdorf A. G., controlled by the Mitteldeutsche Stahlwerke A. G. and the Allgemeine Electricitäts Gesellschaft and the Eisen und Hüttenwerke A. G. in Bochum.

Japan Increasing Indian Pig Iron Imports

YOKOHAMA, JAPAN, June 15.—It is estimated that about 500,000 tons of Indian pig iron will be imported by Japanese consumers this year. In March, arrivals totaled 40,568 tons from Calcutta, bringing the imports for the first three months of this year to 118,035 tons, or 42,233 tons more than in the first quarter of 1928. At this rate, the total of imports should be close to 500,000 tons, about 150,000 tons more than last year. Domestic pig iron producers are seeking an adequate method of preventing such heavy importation of iron, and may find it necessary to reduce their quotations drastically to meet this competition.

Canadian Iron and Steel Output Up in May

TORONTO, ONT., July 5.—May coke pig iron output in Canada was 81,464 gross tons, an increase of 3 per cent over the 79,341 tons produced in April of this year, but 7 per cent under the total of 87,811 tons reported for May a year ago. The number of blast furnaces blowing on May 31 remained at six, the same number as on April 30. Active furnaces had a daily capacity of 2475 tons per day, or 60 per cent of the total capacity of all blast furnaces in Canada.

Since the first of June the Canadian Furnace Co., Port Colborne, Ont., blew in its Victoria furnace, with a capacity of 500 tons per day.

For the five months ended with May pig iron production amounted to 428,684 tons, as compared with 370,634 tons for the corresponding period of 1928, and 334,276 tons produced during the first five months of 1927.

Production of ferroalloys during May at 6351 tons was 11 per cent over the 5744 tons reported for April. Total production for the five months ended with May was 30,332 tons, as compared with 21,857 tons during the same five months of last year.

Output of steel ingots and direct steel castings during May amounted to 126,372 tons, as compared with 122,102 tons of April and 117,655 tons in May, 1928. As compared with figures for April, production for the month under review shows a gain in steel ingots to 120,015 tons, compared with 115,882 tons in the previous month, and an increase in steel castings to 6367 tons, compared with 6220 tons of April.

For the five months of this year the production of steel ingots and castings amounted to 619,337 tons, an increase of 17 per cent over the 631,808 tons of the corresponding period last year, and 45 per cent greater than the 427,370 tons produced in the first five months of 1927. This year's output includes 590,259 tons of steel ingots and 29,078 tons of direct steel castings.

Kawasaki Company's Large Sheet Bar Capacity

According to A. Cameron & Co., Kobe, Japan, the market for black sheets is depressed with prices continuing downward. By the end of June the Kawasaki Dockyard Co. at Kobe, the largest black sheet mill in Japan, is expected to be producing, with its new mills, 200,000 tons of sheet bars and 150,000 tons of black sheets a year. Imports of black sheets in April totaled 6143 metric tons, of which 3710 tons came from the United Kingdom, 1510 tons from Germany, 830 tons from the United States and 93 tons from other countries.

Congress of Metallurgists in Germany

The forthcoming congress of metallurgists to be held in Düsseldorf, Germany, Sept. 9 to 12, promises to be extraordinarily interesting. The congress will comprise the presentation and discussion of about 15 scientific and practical papers relating to metallurgical work; visits to works in or near Düsseldorf and Berlin, and receptions and other social functions.

G. Shaw Scott, 36 Victoria Street, London, S.W.1., is secretary of the Institute of Metals, under which the congress is to be held.

German Foreign Trade in Iron and Steel

(In Metric Tons)

Item	Exports April	Exports May	Imports April	Imports May
Pig iron and ferroalloys	35,904	44,275	12,729	11,495
Ingots, blooms and billets	68,157	52,795	7,653	8,045
Iron and steel bars, rods, angles	139,447	128,181	49,956	57,337
Structural shapes	8,093	10,868	313	691
Hoops and bands	19,689	14,936	6,492	7,313
Plates and sheets	58,985	68,840	5,011	6,565
Galvanized sheets	2,318	2,464	499	239
Tin plate	4,542	4,271	1,857	2,481
Cast iron pipe	11,120	14,952	5,962	6,918
Wrought iron pipe	42,636	38,411	2,615	2,888
Pipe fittings	4,587	4,773	77	95
Rails	44,268	48,147	12,068	8,591
Other railroad material	10,715	10,835	808	1,064
Plain wire	65,262	44,731	8,122	7,660
Barbed wire	7,058	5,635	369	293
Wire rope	1,629	1,439	90	116
Wire cloth	2,684	2,495	4	3
Other wire manufactures	905	840	69	78
Nails, tacks, rivets and washers	11,171	10,806	159	304
Castings and forgings	21,569	20,939	2,625	2,880
Other iron and steel manufactures	4,680	4,192	1,152	1,150
Total	565,419	534,825	118,630	126,706

From Bureau of Foreign and Domestic Commerce, Washington.

Machinery Markets and News of the Works

Tool Demand Declines

Holiday and Usual Seasonal Letup in Buying Are Responsible for Lessened Bookings

DEMAND for machine tools tapered off somewhat the past week on account of the Fourth of July holiday, together with the usual seasonal decline. The New York district, however, proved an exception, with the volume of sales holding up remarkably well.

Business continues to come from widely diversified classes of users for one or more machines each. For example, orders in the past week were placed by manufacturers of such varied lines as printing machinery, electric lamps, reduction gears, motor trucks, airplanes, conveying equipment, automobile trunks, steel, radios and ball bearings.

In some lines of tools, deliveries have improved, but many builders report the situation unchanged, with deliveries long deferred.

The Amtorg Trading Corporation, New York, is now inquiring for equipment for a large tractor plant to be built in Russia. Purchases are expected to include 15 to 20 turret lathes.

Inquiries from the Cleveland Union Terminals Co., listing 25 tools, and from the United States Air Corps, Dayton, Ohio, for seven lathes, are still pending.

Machine tool plants have accumulated enough orders in the past few months to operate at a high rate during July and August, even if bookings should decline considerably in the near future, a development which is not expected.

New York

NEW YORK, July 9.—Machine tool business in the first week of July has held up remarkably well. The holiday last week did not make the difference in the volume of orders that might have been expected. Orders are coming from widely diversified classes of users. For example, last week business was placed by such varied lines of manufacture as printing machinery, electric lamps, reduction gears, motor trucks, airplanes, conveying equipment, automobile trunks, steel, radios, ball bearings. While there was no outstanding buying, some orders called for two or three machines.

Ingersoll-Rand Co., 11 Broadway, New York, manufacturer of air compressors, rock drills, pumps, etc., has plans for one-story addition to Cameron plant at Phillipsburg, N. J., totaling about 36,000 sq. ft. floor space. A two-story unit, 40 x 140 ft., will also be erected for office and operating service. Entire expansion will cost over $100,000 with equipment.

Department of Parks, Arsenal Building, Sixty-fourth Street and Fifth Avenue, New York, W. R. Herrick, commissioner, will soon ask bids for a power house and service building, to cost more than $125,000 with equipment. Trowbridge & Livingston, 527 Fifth Avenue, are architects.

Metropolitan Engineering Co., 1250 Atlantic Avenue, Brooklyn, manufacturer of protective equipment and devices, has awarded general contract to S. F. Musselwhite, 806 St. Johns Place, for two-story plant unit, to cost about $45,000 with equipment. E. W. Helms, 88 Lexington Avenue, New York, is architect.

General Gas & Electric Corporation, 50 Pine Street, New York, operating electric light and power properties, has arranged for a preferred stock issue to total $23,750,000, part of proceeds to be used for expansion. Lexington Water Power Co., a subsidiary, has work under way on a hydroelectric power project on Saluda River, near Columbia, S. C., to cost more than $15,000,000 with transmission system.

Superior Fireproof Door & Sash Co., 1811 Carter Avenue, New York, manufacturer of metal-covered sash, doors, etc., will proceed with superstructure for a two-story plant, 100 x 200 ft., to cost about $140,000 with equipment. H. Ginsberg, 205 West Forty-second Street, is architect.

Moto-Meter Gauge & Equipment Co., 11 Wilbur Avenue, Long Island City, manufacturer of automobile accessories, is said to be planning an addition to cost over $50,000 with equipment.

New York Central Railroad Co., 466 Lexington Avenue, New York, will develop plans for electrification of west side freight line from Seventy-second Street to Spuyten Duyvil, and has been granted until January, 1931, to finish project. Engineering department is in charge.

Long Island Lighting Co., 50 Church Street, New York, operating electric light and power properties on Long Island, is arranging for a preferred stock issue to total $4,000,000, part of proceeds to be used for expansion.

Pioneer Instrument Co., 754 Lexington Avenue, Brooklyn, manufacturer of aviation flight and other navigation instruments, has awarded general contract to R. J. Murphy, Inc., 55 West Forty-second Street, New York, for addition to plant, including improvements in present factory to cost about $60,000 with equipment. Ralph H. Segal, 475 Fifth Avenue, New York, is architect. Company has been merged with Bendix Aviation Corporation, South Bend, Ind., affiliated with Bendix Brake Co., same address, and will be operated as unit of that organization. Further expansion is planned. Bendix company has also secured Eclipse Machine Co., 545 North Arlington Avenue, East Orange, N. J., manufacturer of starting equipment, generators, etc., for aircraft.

Brunswick Laundry, 222 Tonnele Avenue, Jersey City, N. J., will soon take bids for power house addition, 85 x 100 ft., installation to include a 500-hp. boiler unit with accessories, 600-kw. engine-generator, and auxiliaries. P. Simeone & Co., Inc., 22 Journal Square, is architect and engineer.

Elizabeth Iron Works, Inc., 137 Franklin Street, Elizabeth, N. J., is planning establishment of new iron and steel fabricating plant to cost about $40,000 with equipment. Present works will be removed to new location and capacity increased.

Lubrication Purification Sales Co., Third and Creek Streets, Long Island City, manufacturer of lubricating devices and equipment, has purchased property on Kings Wood Road, Weehawken, N. J., and is reported planning new factory to cost over $45,000 with equipment.

Board of County Freeholders, Morristown, N. J., has purchased property, 75 x 250 ft., improved with one-story building, at Mendham, for central machine and repair shop, and storage plant for road machinery and other equipment. Additional buildings are planned.

Newhall Chain Forge & Iron Co., 9 Park Place, New York, has purchased chain shop and other buildings of Rensselaer Chain Works, Rensselaer, N. Y. Rensselaer chain shop has been operated by Newhall company for several years. Newhall Chain Forge & Iron Co. is a division of Henry B. Newhall Corporation, Garwood, N. J., other divisions being Diamond Expansion Bolt Co. and New Jersey Foundry & Machine Co.

Charles Ahr Co., Inc., Lincoln, N. J., has been incorporated and will continue manufacture of forged products formerly made by Charles Ahr. F. P. MacKay is secretary-treasurer.

Buffalo

BUFFALO, July 8.—Firestone Tire & Rubber Co., Akron, Ohio, has plans for a three-story and basement factory branch and distributing plant at Buffalo, to cost about $150,000 with equipment. Lockwood, Greene Engineers, Inc., Hanna Building, Cleveland, is architect and engineer.

A. O. Fleet, Buffalo, will establish a new welding shop at 1681 Fillmore Avenue.

Lionite Abrasive Co., a subsidiary of General Abrasive Co., Niagara Falls, N. Y., has acquired 8-acre tract at Niagara Falls, Ont., and plans construction of new plant to cost over $100,000 with equipment. Allen V. Parker is president of Lionite organization.

John P. Todd, 1105 East Genesee Street, Syracuse, N. Y., and associates have organized Twentieth Century Aircraft Corporation, and plan early operation of local plant to manufacture airplanes and parts.

Universal Wireless Communication Co., Liberty Bank Building, Buffalo, William H. Fitzpatrick, chairman of board, will soon take bids for first unit of a radio transmitting station at Akron, N. Y., including steel towers, power plant, etc., to cost over $75,000. G. Morton Wolfe, 1377 Main Street, Buffalo, is architect.

Philadelphia

PHILADELPHIA, July 8.—Bids will be asked at once by United Motors Service, Inc., 342 North Broad Street, Philadelphia, subsidiary of General Motors Corporation, Detroit, for two-story service, repair and sales building, to cost over $150,000 with equipment. Albert Kahn, Inc., Marquette Building, Detroit, is architect and engineer.

Quaker City Iron Works, Tioga and Richmond Streets, Philadelphia, has acquired property, 200 x 353 ft., on Ontario Street, and 25 x 253 ft., on Tioga Street, for expansion.

Wilkening Mfg. Co., Fifteenth Street and Mount Vernon Avenue, Philadelphia, manufacturer of piston rings, radio equipment, etc., has awarded general contract to France & Messar, Inc., 6725 Yocum Street, for one-story addition, to cost about $25,000.

Atwater Kent Mfg. Co., Philadelphia, manufacturer of radio equipment and parts, has filed plans for a one-story and basement power plant, arranged in two units, 68 x 96 ft. and 60 x 71 ft., to cost about $250,000 with equipment. Ballinger Co., Twelfth and Chestnut Streets, is architect and engineer.

William M. Connery, president of Connery & Co., Second and Luzerne Streets, Philadelphia, manufacturer of boilers, tanks, etc., and associates have organized Connery Clarifying Equipment Co., a subsidiary, to manufacture iron and steel tanks and kindred equipment for clarifying and distilling oils and other solvents. Mr. Connery will be president of new organization; Edgar C. Aucott is treasurer.

Wilckes-Martin-Wilckes Co., Fifteenth and Pine Streets, Camden, N. J., manufacturer of lamp black and kindred products, is planning to rebuild part of plant destroyed by fire July 3, with loss reported at $100,000 including equipment. Headquarters are at 135 William Street, New York.

John A. Roebling's Sons Co., Trenton, N. J., manufacturer of wire rope, cables, etc., has awarded general contract to J. W. Ferguson Co., Paterson, N. J., for one-story addition, to cost about $125,000 with equipment.

Philadelphia Electric Co., Tenth and Chestnut Streets, Philadelphia, has plans for new power substations and switching plants at Bristol, Phoenixville and Wyncote, Pa., each to cost about $65,000 with equipment. Work will be carried out under direction of United Engineers & Constructors, Inc., 112 North Broad Street, an affiliated organization.

John F. O'Toole, 1107 Marion Street, Scranton, Pa., and associates have organized Electric City Mfg. Co., and plan early operation of local factory to manufacture electrical appliances and equipment. James J. Wisely, 614 Wheeler Avenue, and John J. Schofield, 1013 Bennett Street, are interested in new company.

Harrisburg Gas Co., Fourteenth Street and Market Square, Harrisburg, Pa., has plans for a one and three-story equipment storage and distributing plant, with repair department, to cost more than $70,000 with equipment. United Engineers & Constructors, Inc., 112 North Broad Street, Philadelphia, is architect and engineer.

The Crane Market

THE Fourth of July holiday was partially responsible for a quiet week in the crane market. The only feature was the purchase of 12 cranes by the Libbey-Owens Sheet Glass Co., Toledo, Ohio. The Bucyrus-Erie Co., Milwaukee, has bought a 20-ton foundry crane and a 7½-ton and a 3-ton crane. Most of the requirements of the Steel Corporation subsidiaries, which earlier in the year were estimated at 40 or more cranes, are yet to be placed. They include 29 cranes for the projected rebuilding of the McKeesport, Pa., plant of the National Tube Co. and a number of cranes for the Pittsburgh and Youngstown district plants of the Carnegie Steel Co. The Gulf States Steel Co., Alabama City, Ala., and the Great Lakes Steel Corporation, Detroit, are expected to buy cranes soon. Crane builders are busy and indications point to a continuance of this condition for the next three months or longer. Deliveries are reported to be more extended than a few weeks ago.

Recent purchases include:

Libbey-Owens Sheet Glass Co., Toledo, Ohio, 12 cranes from Cleveland Crane & Engineering Co.

Bucyrus-Erie Co., Milwaukee, 20-ton foundry crane and 7½-ton and 3-ton cranes from Milwaukee Electric Crane & Mfg. Corporation.

Taylor Forge & Pipe Works, Chicago, 10-ton magnet crane from Whiting Corporation.

Carnegie Steel Co., 10-ton bucket handling crane for Clairton works from Morgan Engineering Co.

St. Louis

ST. LOUIS, July 8.—Bids will soon be asked by Missouri Pacific Railway Co., Missouri Pacific Building, St. Louis, for new coaling station, storage and distributing plant at Durand, Kan., to cost about $40,000 with conveying, elevating and other equipment. E. A. Hadley is chief engineer.

Kansas City Tank Car Co., Kansas City, Mo., recently organized, has acquired local plant of Mid-Continent Tank Car Co., Tenth and Cherry Streets, for establishment of main works. Plans are under way for extensions, including one-story unit, to cost about $45,000 with equipment.

Board of Education, East St. Louis, Ill., has authorized installation of manual training department in new two and three-story junior high school at Caseyville Avenue and Fortieth Street, to cost over $300,000. W. J. Kennedy, First National Bank Building, East St. Louis, and N. S. Spencer & Son, 180 North Michigan Avenue, Chicago, are associated architects.

J. E. Crosbie, Central National Bank Building, Tulsa, Okla., and associates are said to be planning construction of oil refinery in Cary pool district, Okfuskee County, to cost about $90,000 with equipment.

Board of Trustees, Creighton University, Omaha, Neb., have plans for a new power house, to cost about $100,000 with machinery. L. A. Daly, Peters Trust Building, is architect.

McKecknie & Trask, Board of Trade Building, Kansas City, Mo., architects, will proceed with superstructure for an eight-story and basement automobile service, repair and garage building, to cost over $200,000 with equipment. Frank L. Brown, Orear-Leslie Building, is engineer.

Plant of United Iron Works Co., Iola, Kan., has been purchased by a group of local men who will operate it under name of Kirk-Morrow Iron Works Co. J. B. Kirk will be president.

Pittsburgh

PITTSBURGH, July 8.—While there has been some falling off in machine tool orders the past week, this is regarded merely as seasonal rather than a decline in requirements. More than 25 tools remain to be bought by the Aluminum Co. of America for its New Kensington works, and the Westinghouse Electric & Mfg. Co., has just completed its third quarter machine tool inquiry, which was issued in sections and contains over 100 items. This is easily the largest list the company has put out in recent years and it is interesting to note that some items are included which were originally intended to go into the inquiry for the last quarter of the year.

Deliveries of some classes of tools are not as prompt as at the beginning of the year, and some demands now are developing which call for earlier shipment than manufacturers dare to promise. Quotations are in on a large list for the Christy Park works of the National Tube Co. The Youngstown Sheet & Tube and Republic Iron & Steel companies are expected to be good buyers in the next few months. The steel and metal working industries are providing a good market for machine tools at present.

Contract has been let by Miller Printing Machinery Co., Reedsdale Street, North Side, Pittsburgh, to D. T. Riffle, 1007 Forbes Street, for one and two-story and basement plant unit, 50 x 175 ft., to cost over $70,000 with equipment.

Westinghouse Electric Elevator Co., East Pittsburgh, subsidiary of Westinghouse Electric & Mfg. Co., has purchased plant and business of Norton-Blair-Douglas, Inc., 432 West Forty-fifth Street,

New York, manufacturer of electric and manual door operators, elevator signal systems, etc., and will consolidate. It is proposed to continue acquired plant at present location.

Wilson-Snyder Mfg. Corporation, recently organized as an interest of Oil Well Supply Co., Clark Building, Pittsburgh, to take over and operate Wilson-Snyder Mfg. Co., Braddock, Pa., manufacturer of oil pumping machinery and parts, has disposed of bond issue of $850,000, part of fund to be used for expansion.

Pittsburgh Plate Glass Co., Frick Building, Pittsburgh, has awarded general contract to Public Service Production Co., 80 Park Place, Newark, N. J., for two additions to Newark branch plant, two stories, 81 x 100 ft., and one story 35 x 85 ft., to cost about $150,000 with equipment.

Hunter Steel Co., Pittsburgh, recently organized by A. W. McCandless, 620 Frick Building, and associates, plans operation of local iron and steel plant, primarily for fabricating.

Ruud Mfg. Co., Twenty-ninth and Smallman Streets, Pittsburgh, manufacturer of automatic gas water heaters, parts, etc., has arranged for an additional stock issue to total about $924,000, part of fund to be used for extensions. Work is under way on new two-story building and other facilities, to increase capacity about 20 per cent.

New England

BOSTON, July 8.—The past week was the quietest experienced so far this year by the machine tool trade. The national holiday and the closing of many plants from July 3 until today, with others busy on inventories or repairs, resulted in a marked shrinkage in inquiries. None of the local new tool houses reported any sales of importance. Business in used tools was largely confined to small equipment.

Fafnir Bearing Co., New Britain, Conn., is equipping an addition, and has plans for expansion in a Western subsidiary plant.

Barnum Forge Co., Stratford, Conn., has started work on a one-story forge shop, 60 x 97 ft.

Stamford Hall Sanatorium, North Stamford, Conn., has plans for a power house, 70 x 100 ft., to cost $50,000 with equipment.

Connecticut Power Co., Court and Broad Streets, Middletown, Conn., is revising plans for a two-story service station, 130 x 140 ft.

Taber Cadillac Co., Albany Avenue and Westbourne Parkway, Hartford, Conn., has awarded contract for a service department, 140 x 180 ft.

New England Flexible Door Co., Hartford, Conn., will occupy building of Automatic Refrigerator Co., Capitol Avenue and Laurel Street. Company has been located at Winsted, Conn.

Terry Steam Turbine Co., Windsor Street, Hartford, Conn., has plans for a one-story boiler plant, to cost over $50,000 with equipment. Westcott & Mapes, Inc., 139 Orange Street, New Haven, Conn., is engineer.

Moth Aircraft Corporation, South Lowell, Mass., manufacturer of light aircraft and parts, is considering an expansion program, including new buildings and equipment to double present capacity, to cost over $75,000. Minton M. Warren is president. Company has recently become a unit in Curtiss-Wright Corporation merger of aircraft companies.

Holyoke Water Power Co., Holyoke, Mass., has authorized plans for a new hydroelectric generating plant near mill of American Writing Paper Co., to cost over $100,000 with machinery.

Heald Machine Co., New Bond Street, Worcester, Mass., manufacturer of grinding machines, etc., has awarded general contract to E. J. Cross Co., Worcester, for one-story addition, 105 x 360 ft., to cost $100,000 with equipment.

Central Vermont Railway Co., St. Albans, Vt., has plans for new engine house, with repair facilities, at White River Junction, Vt., to cost about $50,000 with equipment. P. D. Fitzpatrick is chief engineer.

State Airport Commission, Providence, R. I., has authorized purchase of 350-acre tract in Hillsgrove section of Warwick, for State airport and flying field, and will have plans drawn at once for hangars, repair shop, oil storage and other buildings, to cost $145,000 exclusive of land.

J. B. Welch, 44 School Street, Boston, has awarded general contract to Thomas Mulcare, Inc., 66 Western Avenue, Brighton, Mass., for one-story foundry at Cambridge, to cost about $25,000 with equipment.

Rising Paper Co., Housatonic, Mass., has awarded general contract to J. R. Hampson & Co., Inc., 184 North Street, Pittsfield, Mass., for addition to mill at Great Barrington, Mass., to cost over $65,000 with equipment.

South Atlantic

BALTIMORE, July 8.—H. F. Baldwin, 339 St. Paul Street, Baltimore, architect, has asked bids on general contract for a three-story automobile service, repair and garage building, to cost about $150,000 with equipment. Kubitz & Koenig, Emerson Tower Building, are engineers.

Chesapeake & Ohio Railway Co., Richmond, Va., has awarded general contract to John W. Cowper Co., Inc., State Planters' Bank Building, for extensions and improvements in terminal and shops at Hinton, W. Va., to cost about $130,000 with equipment. C. W. Johns is chief engineer.

Continental Can Co., 1 Pershing Square, New York, has purchased plant and business of Eastern Shore Can Co., Hurlock, Dorchester County, Md., and will consolidate. Factory will be continued at present location and plans are under way for expansion.

Pennsylvania Water & Power Co., Lexington Building, Baltimore, is said to have plans for hydroelectric power plant at Safe Harbor, about 9 miles from Holtwood, Pa., to supplement similar generating station and steam power stand-by plant at last noted place, to cost more than $1,000,000.

Air Propellers, Inc., Hagerstown, Md., recently formed by Edwin J. Smead, 1134 Oak Hill Avenue, and associates, plans early operation of local factory to manufacture aircraft propellers and kindred airplane equipment.

Flintkote Co., Park Square Building, Boston, manufacturer of roofing products, has arranged for purchase of Atlanta plant of Logan-Long Co., Chicago, manufacturer of kindred specialties, and will take immediate possession. New owner will continue operation as a factory branch and plans expansion. C. E. Rahr is president of purchasing company.

American Oil Co., American Building, Baltimore, has revised plans for a new storage and distributing plant at Atlantic City, N. J., to cost about $80,000 with equipment. Company will also construct two new units at similar plant at Liberty Heights, Baltimore, to cost about $30,000 with equipment. T. J. O'Connell is company architect and engineer.

City Council, Concord, N. C., is asking bids until July 16 for equipment for municipal waterworks, including steel water tank and tower, electrically operated pumping machinery and auxiliary equipment.

Claude Neon Southern Corporation, Atlanta, Ga., has been organized to take over and consolidate Claude Neon Lights, Inc., Atlanta; Munn Sign & Advertising Co., Atlanta; and Elliott Claude Neon Lights of Florida, Inc., Miami and Tampa, Fla., all specializing in manufacture of electric signs and displays. Plans are in progress for expansion, including extensions in Munn plant at Atlanta, and establishment of new plants in Alabama and North and South Carolina. Miami and Tampa plants will be continued with increased production facilities. Entire program will cost more than $350,000. New company will be affiliated with Claude Neon Lights of New York, Inc., 50 East Forty-second Street, New York. R. L. Kester, Jr., vice-president of last noted, will be president of Southern organization; E. Frank Munn, Atlanta, heretofore president of Munn Sign & Advertising Co., will be vice-president.

Birmingham Machine & Foundry Co. and Joubert & Goslin Machine & Foundry Co., Birmingham, both engaged in manufacture of sugar mill machinery, have been consolidated as Goslin-Birmingham Mfg. Co.

Chicago

CHICAGO, July 8.—Sales the past week were in small volume, but in view of the amount of business in sight, dealers are inclined to account for this because of the holiday rather than as an indication of a sharp recession in the market. Inquiries before the trade bulk large and foreshadow a fair volume of sales in the coming months.

A buying program by one large farm machinery manufacturer is rapidly taking form. Generally, however, farm implement producers are moving with greater caution. Radio manufacturers are nearing the end of equipment purchases for fall production schedules. It is reported that a Western motor car builder is preparing to enter the market for a large number of machine tools. Deliveries are slowly improving. Demand for used tools is lighter but the supply is short and few prospective buyers are able to fill their needs.

R. C. Lydy, 205 West Wacker Drive, Chicago, will build a two-story garage, 101 x 181 ft., to cost $150,000.

Peoples Gas, Light & Coke Co., 122 South Michigan Avenue, Chicago, will build a steel gas holder, 123 ft. in diameter, to cost $123,000.

Western Electric Co., Hawthorne Station, Chicago, will erect a one-story addition, 91 x 120 ft., to cost $65,000. C. B. Barnes, Hawthorne Station, is architect.

Carlson Forging Co., 727 Fulton Street, Chicago, is erecting a plant unit to cost

$75,000. G. Kehl Sons have the general contract.

Englander Bed Spring Co., Fortieth Street and Low Avenue, Chicago, was partly destroyed by fire June 28, with loss estimated at $250,000.

Klein Mfg. Co., Burlington, Iowa, manufacturer of poultry equipment and hardware, is erecting an addition, 108 x 160 ft., to cost $30,000. About $10,000 will be expended for machinery and other equipment.

Kewanee Mfg. Co., 401 Tremont Street, Kewanee, Ill., manufacturer of laboratory furniture and other metal equipment, has taken bids on general contract for a one-story addition, to cost about $60,000 with equipment. Frank D. Chase, Inc., 720 North Michigan Avenue, Chicago, is architect and engineer.

Buda Co., Harvey, Ill., manufacturer of railroad equipment and supplies, engines, etc., has awarded contract to Austin Co., Cleveland, for one-story addition, to cost about $35,000.

Ruth Automatic Garage, Inc., 38 South Dearborn Street, Chicago, has awarded general contract to J. B. French Co., 30 North Michigan Avenue, for multi-story service, repair and garage building, to cost about $800,000 with equipment. A. S. Graven, Inc., 100 North La Salle Street, is architect.

International Harvester Co., 606 South Michigan Avenue, Chicago, has awarded general contract to G. E. Larson, Carver Building, Fort Dodge, Iowa, for one and three-story factory branch and distributing plant at Fort Dodge, to cost $160,000 with equipment. W. D. Price is superintendent of construction, in charge.

Chamber of Commerce, Cedar Rapids, Iowa, has approved plans for buildings for municipal airport, including hangar, machine and repair shop, and other structures, to cost about $50,000 with equipment. Earl Muzzy is chairman of committee, in charge.

Gardner-Denver Co., East Thirty-ninth Avenue, Denver, manufacturer of rock drills, mining machinery, etc., has authorized a one-story addition to branch plant at Quincy, Ill., totaling 40,000 sq. ft. floor space, to cost more than $100,000 with equipment.

Kunzel-Lenz Electric Mfg. Co., 1751 North Western Avenue, Chicago, has plans for a one-story addition, to cost about $40,000 with equipment. Zimmerman, Saxe & Zimmerman, 212 East Superior Street, are architects.

Board of Education, Quincy, Ill., is considering installation of manual training equipment in new high school, to cost $500,000, for which bids will be asked on general contract in about 30 days. Behrensmeyer & Haffner, W. C. U. Building, are architects.

Cleveland

CLEVELAND, July 8.—While demand for machine tools continues to taper slowly, business is still good. More seasonal slowing down in orders is looked for this month and during August. Deliveries of some lines have improved but on others show no appreciable change. Business is well diversified, although little is coming at present from the automotive industry. There is still a fair amount of buying by the airplane industry.

Definite inquiries have come through the Amtorg Trading Co., New York, for machine tool equipment for a large tractor plant to be built in Russia. Requirements will include 15 to 20 turret lathes. No new domestic inquiries of any size came out during the week. Lists of the Cleveland Union Terminals Co., containing 25 machines, and the seven lathes inquired for by the United States Air Corps, Dayton, Ohio, are still pending.

Bids have been asked on general contract by Cleveland Universal Jig Co., 2005 Rockwell Avenue, Cleveland, for one and two-story plant unit, to cost about $45,000 with equipment. Kalsch & Hoeffler, 4500 Euclid Avenue, are architects and engineers.

Patterson Foundry & Machine Co., East Liverpool, Ohio, is said to have plans for one-story addition to machine shop, to cost more than $50,000 with equipment.

Timken Roller Bearing Co., Canton, Ohio, has awarded general contract to Melbourne Construction Co., 225 Tuscarawas Street, West, for one-story addition 220 x 440 ft., to cost $225,000 with equipment.

Board of Education, Euclid Village, Ohio, is said to be planning installation of manual training equipment in three-story addition to high school, to cost $300,000, for which bids are being asked on general contract until July 15. Fulton & Taylor, 8120 Euclid Avenue, Cleveland, are architects.

Firestone Tire & Rubber Co., Akron, Ohio, has awarded general contract to Carmichael Construction Co., Central Savings & Trust Building, for two-story addition, to cost about $150,000 with equipment. Company is said to be planning other units later. Work has begun on two additions to branch mill at South Gate, near Los Angeles, to cost about $200,000 with machinery.

Patterson Steel Products Co., East Liverpool, Ohio, newly organized, has awarded contracts for a new building to cost $150,000, on a two-acre site. Company will manufacture forged and welded steel products, and part of its output will be taken by Patterson Foundry & Machine Co., jointly owned. D. G. Rhue, formerly of Morgan Engineering Co., Alliance, is general manager of new company.

Barnett Iron & Metal Co., Barberton, Ohio, has changed its name to I. A. Barnett Co.

Cincinnati

CINCINNATI, July 8.—The usual midsummer let-up in business has affected the machine tool market in this district and the brisk demand of a week ago has simmered down into an ordinary run of orders. A large manufacturer of lathes, who up to a week ago had maintained production well above normal, has reduced his daily output. Although fresh bookings are mostly for one or two machines, orders on hand are of sufficient volume to keep plants in operation throughout the summer.

Board of Works, City Hall, Columbus, Ohio, has awarded general contract to George H. Moor, Columbus, for hangar at municipal airport, with shop facilities, to cost $100,000 with equipment. Allied Architects Association, A. I. U. Building, is architect; W. H. Duffy is service director.

Union Solvents Corporation, Cincinnati, has been organized by Bernard E. Pollak, formerly an official of Pollak Steel Co., Temple Bar Building, and associates, to manufacture industrial alcohol, acetone and kindred products. Plant of Roseville Commercial Alcohol Corporation, Carthage, Ohio, has been purchased where initial production will be carried out.

Board of Education, Lebanon, Ohio, is considering installation of manual training equipment in two-story high and grade school, to cost $250,000, for which bids are being asked on general contract until July 24. Samuel Hannaford & Sons, Dixie Terminal Building, Cincinnati, are architects.

Commissioner of Public Utilities, Grounds and Buildings, City Hall, Chattanooga, Tenn., has plans for a hangar, 100 x 120 ft., with shop facilities and other units at municipal airport, Lovell field, to cost more than $50,000. Benjamin King & Associates, Hotel Patten, Chattanooga, and 1637 Massachusetts Avenue, N. W., Washington, are airport engineers in charge.

Stuebing-Cowan Co., 312 East Court Street, Cincinnati, manufacturer of electric lift trucks, tractors, platforms, etc., has work under way on first unit of new plant, one story, 160 x 300 ft., on 4-acre tract, with two-story office building, to cost about $200,000 with equipment. Other units are planned.

Girdler Corporation, Goss Avenue and Shelby Street, Louisville, recently organized by Walter H. Girdler and associates, will take over and consolidate Kentucky Oxygen Co., Vogt Instant Freeze Corporation, Vogt Processes, Inc., Cherry-Burrell-Vogt Co., and Helium Co., all with plants in this vicinity. Consolidated corporation will have assets of about $5,000,000, and will specialize in production of ice cream freezers, freezing machinery, helium gas specialties, commercial oxygen, etc. Expansion is planned. Mr. Girdler will be president of new company.

Marr & Holman, Stahlman Building, Nashville, Tenn., architects, have plans for six-story automobile service, repair and garage building, 100 x 175 ft., to cost over $200,000 with equipment.

W. H. Davis Die Co., 229 East Sixth Street, Cincinnati, has been incorporated to make cutting dies on contract. Harry A. Wiechman is vice-president.

Milwaukee

MILWAUKEE, July 8.—Production of machine tools continues at the high rate of recent months, with most shops unable to make any appreciable gains in delivery. New business is in good volume, although probably not so heavy as earlier in the year. However, nearly every line of metal working is represented, and while individual orders are small, the aggregate is large for this season of the year. The local pay-roll at the beginning of July was 253 less than on June 1, but nearly 7000 above a year ago.

Lakeside Bridge & Steel Co., Thirty-third Street and Lincoln Avenue, Milwaukee, is starting work on three shop extensions, 92 x 174 ft., 60 x 134 ft., and 40 x 67 ft., all 41 ft. high, costing about $40,000 without equipment. Charles G. Margwarth is vice-president and general manager.

S. Heller Elevator Co., 250 Milwaukee Street, Milwaukee, manufacturer of freight and passenger elevators, etc., has plans by W. Fred Dolke, Jr., consulting engineer, 9 S. Clinton Street, Chicago, for a third story addition and general alterations and improvements in plant and adjoining buildings recently acquired. About $50,000 will be spent for buildings and equipment. Leo K. Glueckstein is president.

Chicago & North Western Railway, 99 East Wisconsin Avenue, Milwaukee, is about to begin work on a $300,000 freight station and warehouse at Milwaukee.

Magnetic Mfg. Co., Milwaukee, is planning an addition to cost $30,000 with equipment. Machine tools will be purchased.

Karl Mfg. Co., Milwaukee, is being organized with $150,000 capital stock to manufacture metal appliances and devices for gas industry designed by Ray E. Gest, 899 Fifth Street, local. Company expects to start production about Oct. 1.

Northern Conveyor & Mfg. Co., Janesville, Wis., has broken ground for an extension, 40 x 157 ft. About $50,000 will be invested.

Milwaukee Specialty Co., 2017 Clybourn Street, Milwaukee, manufacturer of gas stove lighters and other appliances, will place contracts about July 15 for one-story shop extension, 35 x 73 ft., designed by Julius Leiser, architect, 105 Wells Street.

Acme Metal & Scrap Iron Co., 497 Virginia Street, Milwaukee, has plans by H. L. Kuehnel, consulting engineer, 4625 Woodlawn Court, for a one-story shop and warehouse addition, 45 x 110 ft.

Milwaukee Forge & Machine Co., Milwaukee, is having plans prepared for an addition.

Detroit

DETROIT, July 8.—Bids will soon be asked on general contract by Auto Specialties Mfg. Co., Edgewater Street, St. Joseph, Mich., for one-story addition, to cost over $350,000 with equipment. F. E. Davidson, 53 West Jackson Boulevard, Chicago, is architect and engineer.

Oakland Motor Car Co., Pontiac, Mich., has plans for a one-story addition to cost about $190,000 with equipment. Another one-story unit will also be constructed for storage and distribution, to cost $50,000.

Story & Clark Piano Co., Grand Haven, Mich., contemplates rebuilding part of local plant recently destroyed by fire. Company has lately become a unit of Walbert Mfg. Co., Chicago, manufacturer of radio equipment and parts.

Board of Education, 1354 Broadway, Detroit, will soon begin construction of one-story and basement addition to power plant on Linwood Avenue, to cost about $75,000 with equipment.

International Aircraft Co., Oncor, near Cincinnati, operating a local plant for parts production and assembling of airplanes, has plans for new plant at Reynolds field, municipal airport at Jackson, Mich., to cost more than $85,000 with equipment. Present works will be removed to new location and capacity increased. T. P. Funk chairman of board of Automotive Fan & Bearing Co., Jackson, is president of International company; D. G. Morrison, formerly general manager of Morrison Metal Stamping Co., is vice-president and general manager.

Campbell, Wyant & Cannon Foundry Co., Muskegon, Mich., manufacturer of heavy iron and steel castings, is concluding arrangements for purchase of plant and business of National Motor Castings Co., South Haven, Mich., manufacturer of pistons and other foundry products for automobiles, and will consolidate. Expansion will be carried out.

Department of Public Lighting, 138 East Atwater Street, Detroit, has plans for a one-story equipment storage and distributing plant to cost about $150,000 with equipment; repair facilities will be provided. Smith, Hinchman & Grylls, Marquette Building, are architects and engineers.

Ainsworth Mfg. Corporation, Dubois and Franklin Streets, Detroit, manufacturer of automobile metal stampings, is concluding negotiations for acquisition of Joseph N. Smith & Co., 5914 Federal Avenue, manufacturer of automobile locks, hinges, etc., and will consolidate. Purchasing company is arranging for additional stock issue, part of proceeds to be used for expansion in production.

Detroit Aircraft Corporation, Detroit, has organized and purchased 90 per cent of capital stock of Blackburn Aircraft Corporation of Michigan, which will manufacture commercial airplanes and flying boats. Blackburn Airplane & Motor Co., Ltd., of England, has agreed to assign design and patent rights to latter on entire line of Blackburn metal aircraft for North and South America, with exception of Brazil.

Tyler-Chapman Engineering Co., 3555 Holcomb Avenue, Detroit, has been organized to succeed Tyler Engineering Service. Company will specialize in designing and building of machinery and fixtures, and will also produce several products on which it owns patent rights, such as a drill press, multiple spindle drilling heads, drilling machinery and full automatic single spindle drill units. Tracey Brooks Tyler is president.

Gulf States

BIRMINGHAM.—Plans are being completed by Texas Aero Corporation, Temple, Tex., for new aircraft plant at Love Field, Dallas, Tex., with initial unit for parts production and assembling to cost about $100,000 with equipment. Factory at Temple will be removed to new location. Roy Sanderford is general manager.

Central Foundry Co., Eighth Avenue, Bessemer, Ala., has plans for a one-story addition at cast iron pipe plant, to cost about $20,000.

War Department, Washington, has begun work on army airport and aviation school on property about 5 miles square, near San Antonio, Tex., for which Congress recently granted appropriation of $7,531,000, to be increased to $14,000,000, estimated cost of development. Hangars and shops will be constructed to provide for 250 airplanes at one time with other units for aircraft building, oil storage, etc. Site will be known as Randolph Field and will include complete housing development for about 5000 persons.

Board of Education, Humble, Tex., plans installation of manual training equipment in new two-story high school to cost $150,000, for which superstructure will begin at once. Harry D. Payne, Kirby Building, Houston, Tex., is architect.

Bryan Compress Co., Bryan, Tex., has purchased local property as site for new cotton compress plant, to cost about $40,000 with equipment.

J. M. Spain, Millsaps Building, Jackson, Miss., architect, has awarded general contract to W. G. Wetmore Construction Co., Jackson, for two-story automobile service, repair and garage building, to cost about $100,000 with equipment.

United Carbon Co., Union Building, Charleston, W. Va., has approved construction of two new units at carbon black plant at Borger, Tex., to cost more than $90,000 with compressors and other equipment.

Southern Air Transport, Inc., Fort Worth National Bank Building, Fort Worth, Tex., subsidiary of Aviation Corporation of the Americas, Inc., 100 East Forty-second Street, New York, is planning aircraft school near San Antonio, Tex., initial units to consist of two hangars, each 100 x 200 ft.; machine and repair shop, 80 x 100 ft.; administration building and other structures, to cost over $175,000 with equipment. A. P. Barrett is president of Southern company.

Texas Citrus Fruit Growers' Exchange, Mission, Tex., plans installation of conveying machinery and other equipment in one-story packing plant, 100 x 125 ft., at La Feira, Tex., to cost $75,000. H. P. Smith, National Bank of Commerce Building, San Antonio, Tex., is architect.

New Orleans Public Service, Inc., Baronne and Union Streets, New Orleans, has revised plans for two-story equipment storage and distributing plant, 75 x 150 ft., with repair facilities, to cost over $85,000. Clark Steen, Balter Building, is architect.

Greenwood International Co. Greenwood, Miss., local representative for International Harvester Co., Chicago, has awarded general contract to Ferguson Construction Co., Dermon Building, Memphis, Tenn., for one-story storage and distributing plant, 100 x 150 ft., to cost about $65,000 with equipment.

Indiana

INDIANAPOLIS, July 8.—Contract has been let by Union Drawn Steel Co., 2700 East Fifth Avenue, Gary, to General Construction Co., 479 Broadway, for one-story addition, to cost more than $45,000 with equipment.

Warner Gear Co., Muncie, manufacturer of automobile gears and assemblies, has awarded general contract to Albert J. Glaser, 610 Jefferson Street, for one-story addition, 150 x 400 ft., to cost about $100,000 with equipment.

Excelsior Wire Works, Inc., 319 West Maryland Street, Indianapolis, manufacturer of wire goods, bird cages, etc., has leased space in building at Nineteenth Street and Martindale Avenue, totaling 15,000 sq. ft. floor space, for new plant, and will remove to new location.

Indian Refining Co., Lawrenceville, Ill., has plans for two-story oil storage and distributing plant at Fort Wayne, to cost about $60,000 with equipment.

City Council, Elkhart, is considering establishment of municipal airport, including hangar, repair shop and other operating units, to cost over $50,000 with equipment.

Board of Trustees, Indiana State Prison, Michigan City, has authorized installation of plant at institution to manufacture metal automobile license plates, road markers, etc., to cost about $65,000

Glascock Brothers Mfg Co, 1515 West Fifteenth Street, Muncie, manufacturer of bottle coolers, dispensers and kindred equipment, has asked bids on general contract for three one-story additions, 50 x 80 ft., 40 x 60 ft., and 20 x 60 ft., to cost about $45,000 with equipment.

In connection with reference in these columns last week to new foundry to be established by W. A. Gingerick and associates, typographical error occurred in plant location, given as Arkon, which should be Akron, near Peru.

Bantam Ball Bearing Co. of Connecticut, Bantam, Conn., has decided to dissolve, sell its plant and concentrate manufacturing activities at plant of Bantam

Ball Bearing Co., South Bend. Latter company's shipments and orders for first six months of 1929 were double those of any similar period since 1922.

C. & G. Foundry Co., Indianapolis, has taken over United Brass Works to enlarge its facilities. Charles J. Geisler is president.

Pacific Coast

SAN FRANCISCO, July 3.—Contract has been let by Perfect Caster Co., Long Beach, Cal., to J. D. Sherer & Son, 1865 East Anaheim Street, for one-story plant, 70 x 100 ft., to cost about $40,000 with equipment. R. D. Van Alstine, Heartwell Building, Long Beach, is architect.

Pittsburgh Plate Glass Co., Frick Building, Pittsburgh, has awarded general contract to Stone & Webster Engineering Corporation, Boston and Los Angeles, for new sheet glass plant at Santa Ana, Cal., with power house, machine shop and other departments, to cost $4,000,000 with machinery. Engineering department of company is in charge.

Board of Education San Diego, Cal., will build vocational training shops at new Herbert Hoover High School group at East San Diego, to cost $400,000, for which bids are being asked on general contract until July 29. T. C. Kistner & Co., Architects' Building, Los Angeles, and Spreckels Building, San Diego, are architects.

Chevrolet Motor Co., Detroit, has awarded general contract to F. J. Kirchoff Construction Co., 700 Lawrence Street, Denver., for factory branch, service and parts station at Salt Lake City, Utah, to cost about $180,000 with equipment.

City Council, Walla Walla, Wash., is planning establishment of municipal airport, including hangar, repair shop and other units, to cost $50,000. Bonds have been voted.

Bach Aircraft Co., Inc., Metropolitan Airport, Van Nuys, Cal., has awarded contract to George A. Chapman, Van Nuys for one-story unit, 100 x 100 ft., for parts production and assembling, to cost about $50,000 with equipment. It will replace part of plant recently destroyed by fire.

Board of Education, Los Angeles, plans manual training shop at new high school to be erected at South Gate, to cost $300,000, for which plans will be drawn by G. M. Lindsey and E. P. Eiden, Union Insurance Building, Los Angeles, associated achitects.

Municipal Light and Power Department, City Hall, Tacoma, Wash., is disposing of bond issue of $1,000,000 part of fund to be used for extensions and improvements in plans and system.

Meyer & Holler, Inc., Wright & Callender Building, Los Angeles, architects, have plans for a two-story automobile service, repair and garage building, 140 x 230 ft., to cost about $200,000 with equipment.

Canada

TORONTO, July 8.—Contracts will be awarded soon for additions and improvements to plant of Hull Iron & Steel undries, Ltd., Montcalm Street, Ottawa, Ont., to cost $200,000.

Folwell Engineering Co. has been awarded contract by Harbor Commissioners, Halifax, N. S., for addition to local grain elevator to cost between $3,000,000 and $4,000,000.

A two-story pumping station will be erected on Gouin Boulevard East for city of Montreal, to cost $107,000.

Additional airport construction is reported for city of Toronto. Canadian Airways will spend $100,000 on construction of an aerodrome; DeHaviland Aircraft Co. will spend $42,000 on an aerodrome and $100,000 on construction of a new plant; Canadian Colonial Airways have started work on an aerodrome to cost $100,000.

Ratepayers of Brantford, Ont., have authorized expenditure of $400,000 for a mechanical water filtration plant. Norman R. Wilson is waterworks engineer; W. S. & R. S. Lee, 1226 University Avenue, Montreal, are consulting engineers.

Anglo Canadian Wire Rope Co., Fairview Avenue, Lachine, Que., has started work on a one-story factory addition.

Consumers Gas Co., 19 Toronto Street, Toronto, has awarded general contract to Wells and Gray Ltd., Confederation Life Building, for a boiler and compressor building to cost $40,000.

Western Canada

West Kootenay Power & Light Co. has decided to proceed with power development on Pend Oreille River south of Nelson, B. C.

City of Cardstone, Alberta, is contemplating installing a new unit in electric light plant to cost $40,000.

Pool Construction Co. has been awarded contract for erection of a parts and service building at Regina, Sask., for General Motors of Canada, to cost $175,000.

Foreign

GOVERNMENT of Chile, Santiago, has authorized a fund of 40,000,000 Chilean pesos (about $4,800,000) for development of an iron and steel plant at Port Carral, where a State company is now operating a mill. Work will include new mills and other buildings, with installation of electric furnaces and other equipment, a large part of which, it is said, will be purchased in United States. Plant will be given over to production of rails, bars, plates, wire and kindred products.

Perryman Electric Co., 33 West Sixtieth Street, New York, manufacturer of radio tubes and equipment, is planning early establishment of new plant at London, England, to cost more than $100,000 with equipment.

Ruhr Chemical Corporation, Berlin, Germany, operating process nitrogen plants for production of fertilizers, has completed arrangements for sale of bonds in United States totaling $3,000,000, large part of proceeds to be used for expansion in plants. Considerable new equipment will be installed.

Ceskomoravska Engineering Co., Prague, Czechoslovakia, manufacturer of automobile parts, chassis, etc., has formed a subsidiary to operate in Poland. Property has been secured at Oswiccim, Cracow, for new plant to cost more than $250,000. Later division will be established for production of electrical equipment. New company will operate with capital of 2,000,000 zlotys.

General Motors China, Ltd., has been formed by officials of General Motors Corporation, Detroit, with capital of $200,000, to take over properties in China, heretofore conducted by another subsubsidiary, General Motors Japan, Ltd. Headquarters of new organization will be established at Shanghai, where expansion in assembling and service plants will be carried out later.

Gramophone Co., London, England, manufacturer of talking machines and parts, radio equipment, etc., will increase capital to £3,340,000, and will dispose of stock issue of 1,620,000 shares, considerable part of proceeds to be used for expansion in production and distribution. Company is controlled by Victor Talking Machine Co., Camden, N. J., and Radio Corporation of America, New York.

Plans are being considered by Spicer Mfg. Corporation, Toledo, Ohio, manufacturer of axles, universal joints and other automobile equipment, for a branch plant in France, to cost more than $250,000 with machinery. Charles A. Dana, president, has left for a trip abroad to secure site and complete details. Company is now operating a plant at Birmingham, England.

Swedish Ball Bearing Co. (Aktiebolaget Svenska Kullagerfabriken), Stockholm, Sweden, manufacturer of ball and roller bearings, etc., has arranged for a stock issue of 240,000 shares, of which 50,000 shares, totaling $3,433,000, will be sold in United States, proceeds to be used for expansion, including acquisition of other properties. Plants are operated in Sweden, Great Britain, France, Russia, Germany and United States, latter being known as S. K. F. Industries, with headquarters at 40 East Thirty-fourth Street, New York, and main plant at Hartford, Conn., operated under name of Skayef Ball Bearing Co. B. G. Prytz is managing director.

Petroleum Refineries, Ltd., London, England, recently formed with capital of £500,000 by Sir Arthur Grey Hazlerigg and associates, has plans for new plant at Killingholme, Lincolnshire, where property has been acquired, for production of refined oils. Division will be operated for manufacture of motor fuel oil under low temperature carbonization process. Entire project is reported to cost more than $600,000 with equipment.

New Trade Publications

Electric Welded Gas Line Pipe.—A. O. Smith Corporation, Milwaukee, Bulletin No. 505 gives impressive photographs of plant for making 26 miles of pipe daily, in any size from 8⅝ in. to 26 in., in uniform lengths of 30 or 40 ft. Tests for soundness and accuracy of size are described. A new feature is a corrugated expansion joint, also useful for short-radius bends.

Gears and Pinions.—Westinghouse Electric & Mfg. Co., East Pittsburgh. Booklet c-1579-F, describes Micarta gear material. Sections are devoted to design, application and distinctive features of gears. Data necessary to engineers for applying these gears to all classes of work are presented, with drawings and other illustrations.

Centrifugal Air Compressor.—Allen Air Appliance Co., 452 Lexington Avenue, New York. Bulletin A-50 of 12 pages illustrates and describes a line of centrifugal air compressors, with auxiliary equipment in the shape of vacuum cleaners for factory use, and other devices. These range from 50 to 150 hp. capacity in the stationary types and from 1½ to 10 hp. in the heavy-duty portable types.

Barometer and Vacuum Recorder.—Uehling Instrument Co., Paterson, N. J. Bulletin 150 of six pages illustrates and describes a combined barometer and vacuum recorder designed particularly for use in connection with steam turbines.

THE IRON AGE

New York, July 18, 1929

ESTABLISHED 1855

VOL. 124, No. 3

Quality of Heat Treating Improved

Increased Production in Same Floor Area and Reduction in Labor Costs Also Result from Electrification of Heat-Treating Department

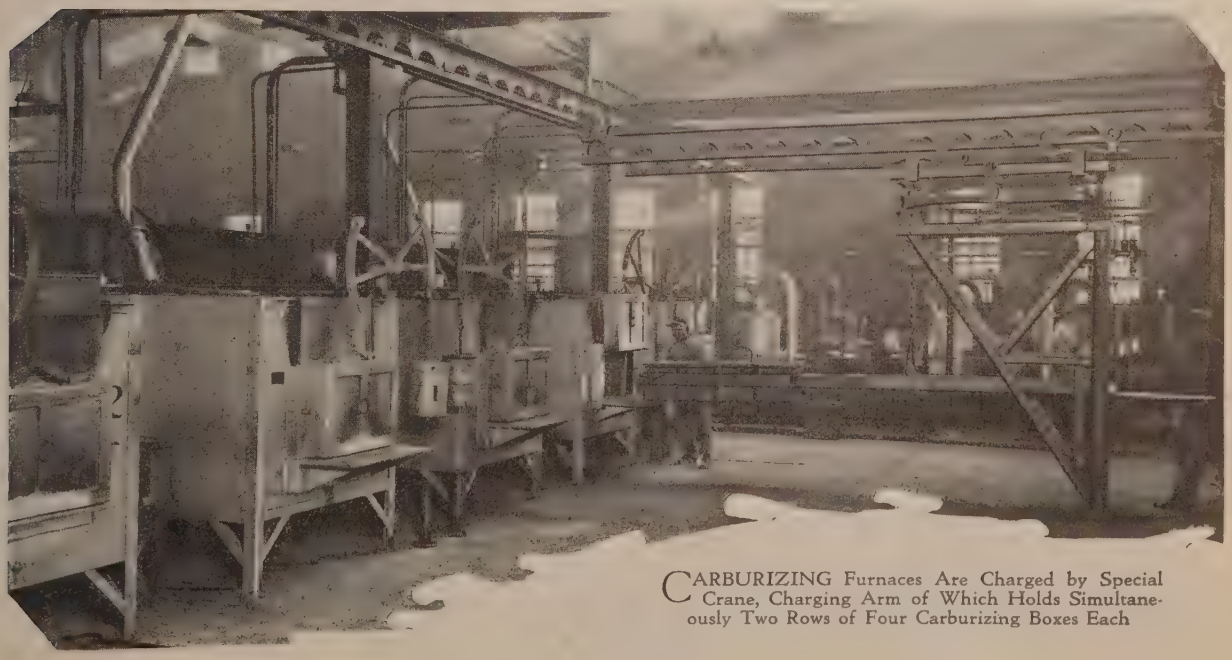
IMPROVEMENT in the quality of work, increased production in the same floor area formerly occupied, and elimination of a large amount of hand labor are major benefits derived from electrification of the heat-treating department of the National Cash Register Co., Dayton, Ohio, in which 6,000,000 cash register parts are heat treated each month. Conservation of manufacturing space has been accomplished by the installation of mechanical handling devices, an automatic transportation system now forming an integral part of the plan whereby material in process moves progressively through the department without any backtracking.

For carburizing purposes the department is equipped with five electric carburizing furnaces. Immediately behind them is a metal table on which carburizing boxes are loaded by hand. Connecting at right angles with the metal table and running alongside each furnace is a roller conveyor which carries filled boxes to a position near the front of the furnace. Here the boxes are picked up by a special charging crane, the charging arm of which holds simultaneously two rows of four boxes each. The arm then swings around and reaches into any of the five furnaces, depositing the eight boxes.

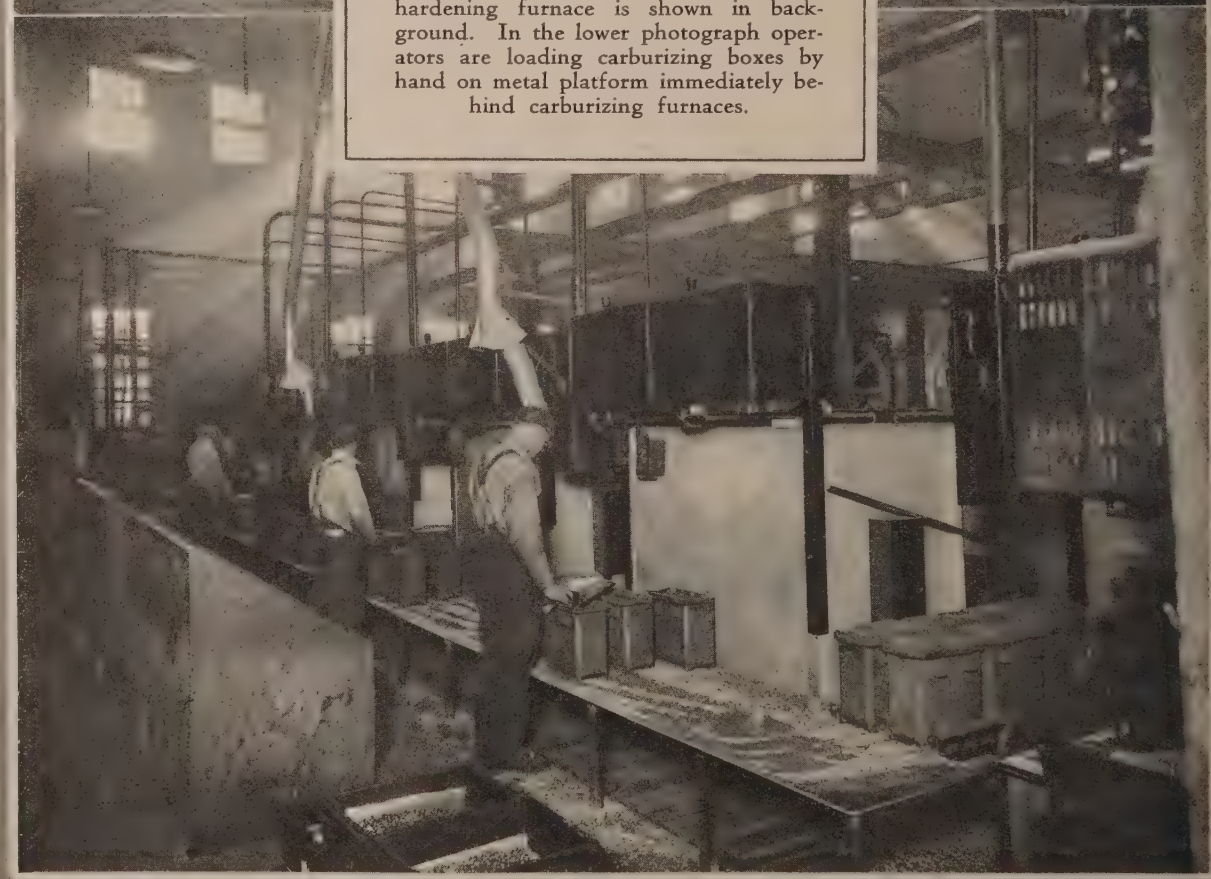
The time required for carburizing ranges from 3 to 7 hr. and the temperature varies from 1500 to 1650 deg. Fahr., both the time and the temperature depending upon the type of material being treated. Carburizing boxes are 12 in. long, 6 in. wide and 12 in. deep, and are of larger capacity than formerly. However, the change in size has been accomplished by increasing the height without altering the thickness of the box; otherwise, the temperature of the furnace would have to be increased to bring about the desired results.

Carburizing Furnaces Are on 24-hr. Schedule

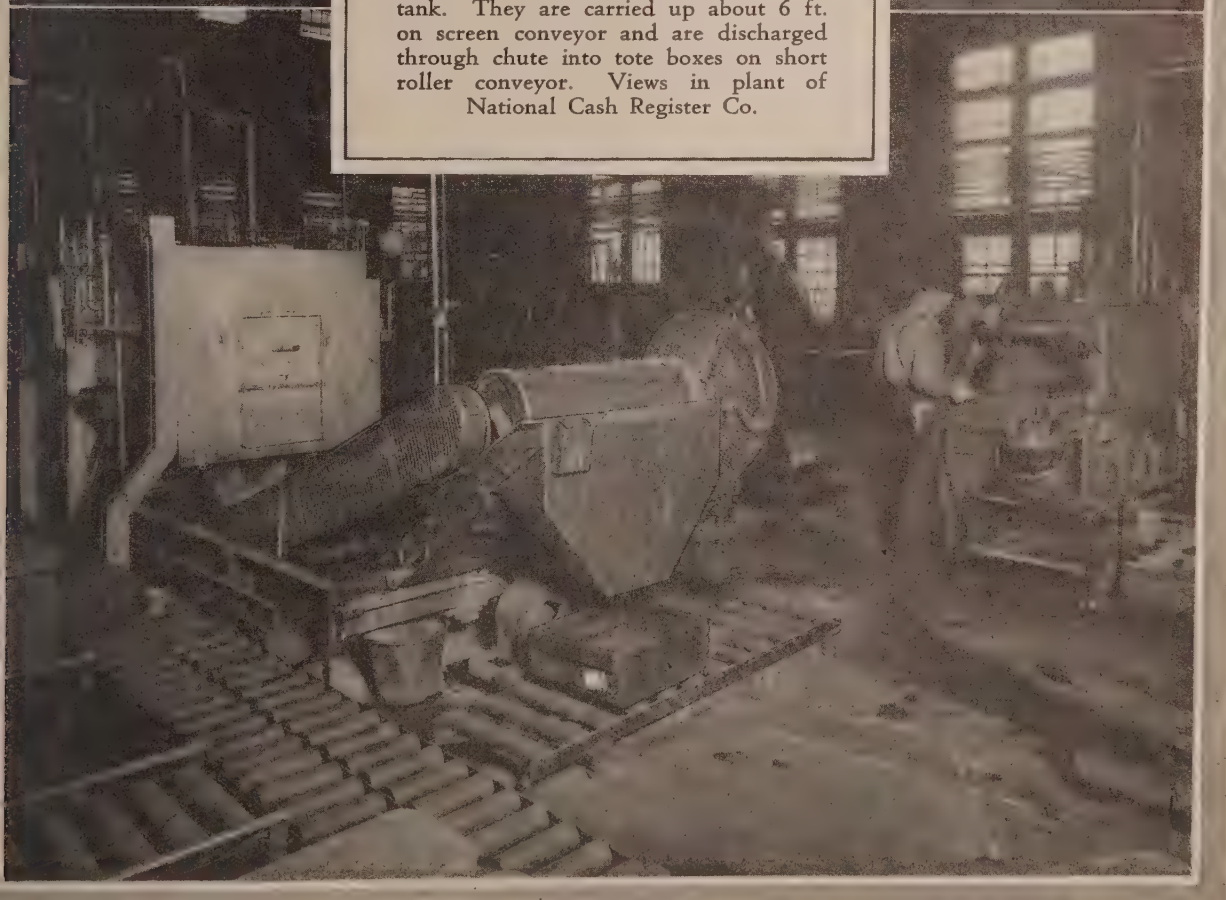
Carburizing furnaces are on a 24-hr. schedule, starting Monday morning and ending Saturday noon. The continuous operation provides a steady electrical power



CARBURIZING Furnaces Are Charged by Special Crane, Charging Arm of Which Holds Simultaneously Two Rows of Four Carburizing Boxes Each



IN the heat-treating department of the National Cash Register Co., Dayton, Ohio, carburizing boxes, after being removed from furnaces, are placed on cooling rolls (above). Continuous hardening furnace is shown in background. In the lower photograph operators are loading carburizing boxes by hand on metal platform immediately behind carburizing furnaces.

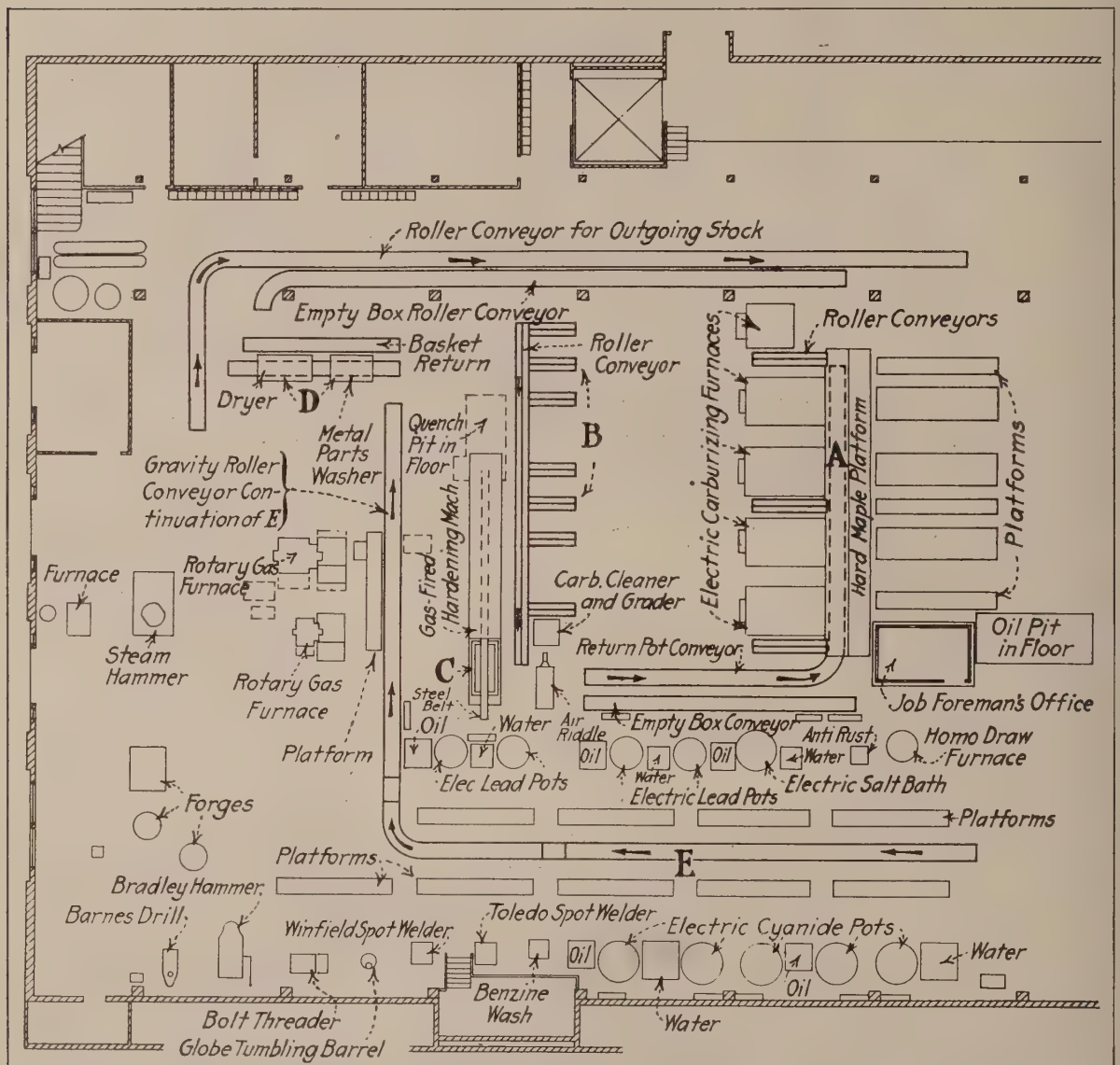


GRAVITY roller conveyor serves operators along line of lead pots and line of cyanide pots (above). At discharge end of hardening furnace (below), parts fall through chute into quenching tank. They are carried up about 6 ft. on screen conveyor and are discharged through chute into tote boxes on short roller conveyor. Views in plant of National Cash Register Co.

load and eliminates the necessity for cooling the furnaces at comparatively short intervals, thus adding substantially to the operating efficiency and to the output of the department.

At a distance of about 15 ft. from the front of the furnaces are unloading and cooling rolls, each roll having

When the boxes have cooled sufficiently, they are moved on a roller conveyor to the loading platform of a continuous hardening furnace, where the cash register parts are removed. The boxes, still on the roller conveyor, are returned to storage underneath the metal loading table behind the carburizing furnaces. The cash



PARTS to Be Heat Treated Are Loaded in Carburizing Boxes (A) and Are Moved to Front Side of Carburizing Furnaces on Roller Conveyors, Where They Are Picked Up by Charging Crane and Placed in Furnaces. After being heat treated, they are removed from furnaces by charging crane and are deposited on cooling rolls (B).

When sufficiently cooled, they go on roller conveyor to loading platform of continuous hardening furnace (C), where parts are removed and are fed by hand on to metal belt of continuous hardening furnace. Parts pass through furnace and thence through metal washing machine and drying oven (D), from which they are discharged into tote boxes.

After passing inspection, parts are transported on roller conveyor to storage position ready to go out of department.

For certain kinds of work, lead pots and cyanide pots are used. They are arranged so that gravity conveyor (E) runs between line of lead pots and line of cyanide pots, serving both.

a capacity of eight carburizing boxes. The charging crane removes the boxes from the furnaces in the same manner in which they were charged and deposits them on the cooling rolls, where they remain until they are cool enough to be handled by hand. Incidentally, each roll consists of two parallel roller conveyors 16 in. wide and placed 1½ ft. above the floor.

register parts are fed on to the metal belt of the continuous hardening furnace by a workman at the loading end of the furnace. At the discharge end the heat-treated parts fall through an air-tight chute into a quenching solution which fills a quenching tank built in the floor. The parts drop on to a metal screen conveyor which carries them upward about 6 ft., where they are discharged

through a chute into tote boxes resting on a short roller conveyor.

From this point the parts go through a washing machine for cleaning metals and thence through a drying oven from which they are discharged into tote boxes. When filled, the tote boxes are put on a roller conveyor, are carefully inspected and are transported to a storage position, where they are ready to be taken to the next department in the process of manufacture.

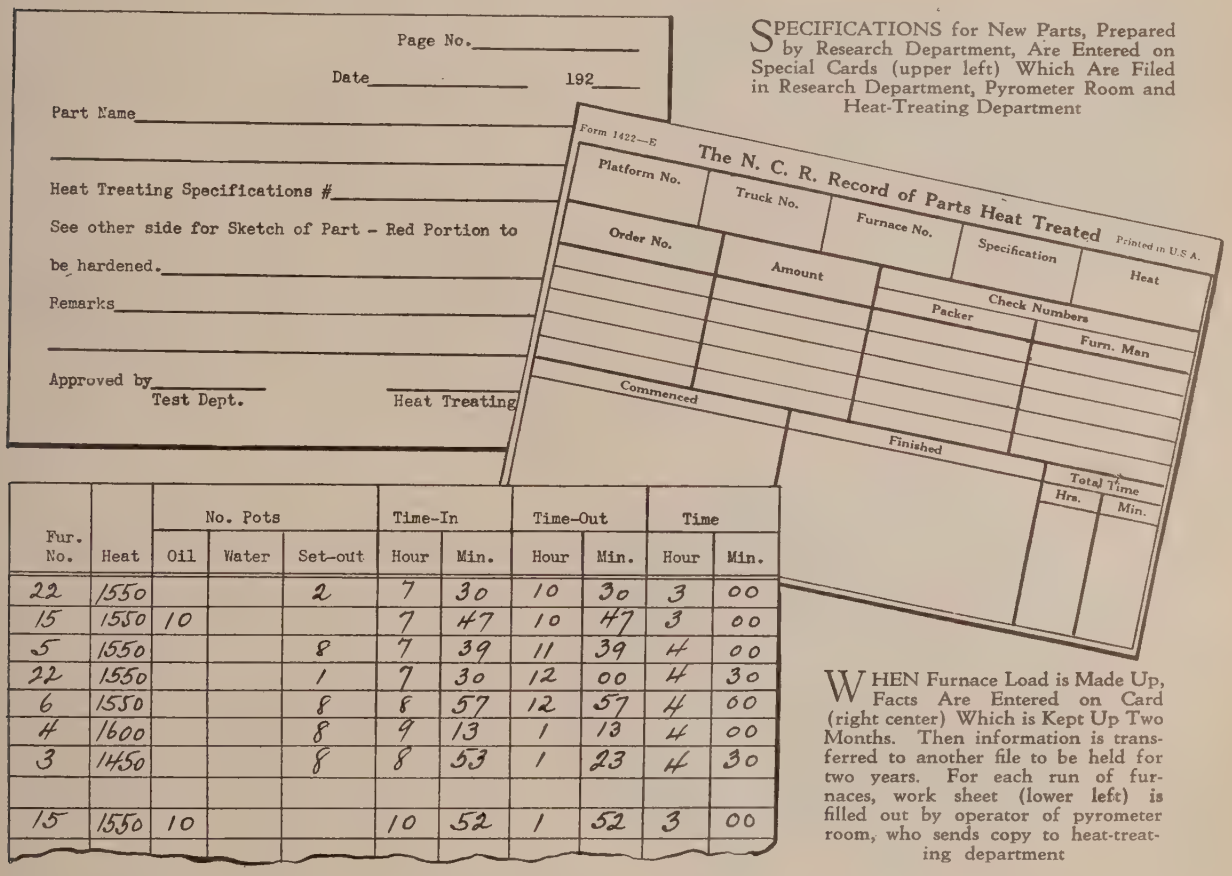
In connection with the continuous hardening furnace, the most difficult problem is timing the movement of the steel conveyor belt so that each different kind of part is properly hardened. Since there are thousands of various parts constantly passing through the department, close watch over the movement of the belt must be kept so as to assure readjustment of speed whenever necessary. The time required for passage of parts through the furnace ranges from 5 min. to 20 min., depending on the size of the part. The average temperature in the furnace is 1400 deg. Fahr.

For certain kinds of work lead pots and cyanide pots are used. They are so arranged that a gravity conveyor runs between a line of lead pots and a line of cyanide pots, serving both. Parts, contained in tote boxes, move down this conveyor which, at the end of the line of pots, turns at right angles and leads to the metal cleaning machine.

On certain cash register parts localized carburizing and hardening is necessary. In such cases special acetylene carburizing and hardening machines are used for spot hardening.

Furnaces in the heat-treating department are under close pyrometer control. The pyrometers are located in a special balcony room at the east end of the department and are controlled by an operator who is employed by and is under the supervision of the research department. Each tote box of cash register parts coming to the heat-treating department is accompanied by a stock card, which is delivered to the pyrometer room. The furnace loads are made up and specifications are assigned by the operator in charge of the pyrometer room.

In case a new part is to be heat treated, the pyrometer operator sends the stock card and a sample of the part to the research department, which prepares specifications for heat treatment and writes them on a special card for new parts. These cards are filed in the research department, in the pyrometer room, and in the heat-treating department according to the name and page number of the part.



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Date_____ 192____

Part Name_____

_____

Heat Treating Specifications #_____

See other side for Sketch of Part - Red Portion to

be hardened._____

Remarks_____

_____

Approved by_____ _____

Test Dept. Heat Treating

Form 1422—E

The N. C. R. Record of Parts Heat Treated

Printed in U.S.A.

Platform No. | Truck No. | Furnace No. | Specification | Heat

Order No. | Amount | Check Numbers: Packer | Furn. Man

Commenced | Finished | Total Time: Hrs. | Min.

SPECIFICATIONS for New Parts, Prepared by Research Department, Are Entered on Special Cards (upper left) Which Are Filed in Research Department, Pyrometer Room and Heat-Treating Department

Fur. No.	Heat	No. Pots: Oil	Water	Set-out	Time-In: Hour	Min.	Time-Out: Hour	Min.	Time: Hour	Min.
22	1550			2	7	30	10	30	3	00
15	1550	10			7	47	10	47	3	00
5	1550			8	7	39	11	39	4	00
22	1550			1	7	30	12	00	4	30
6	1550			8	8	57	12	57	4	00
4	1600			8	9	13	1	13	4	00
3	1450			8	8	53	1	23	4	30
15	1550	10			10	52	1	52	3	00

WHEN Furnace Load is Made Up, Facts Are Entered on Card (right center) Which is Kept Up Two Months. Then information is transferred to another file to be held for two years. For each run of furnaces, work sheet (lower left) is filled out by operator of pyrometer room, who sends copy to heat-treating department

When the operator of the pyrometer room receives stock cards of parts to be heat treated, he checks the specifications against the specifications for the same part contained in his files. This check serves as a guard against error.

When a load for a furnace is made up, facts are entered on a card which is called a "record of parts heat treated." Information includes the furnace number, specification, platform and truck number, order number, amount, identification of the packer and furnace man, the time the heat commenced and finished and the total time of heat treatment. This record is kept for two months, after which it is transferred to another file to be held for two years.

For each run of the furnaces a work sheet is made out by the operator of the pyrometer room, who sends a copy to the heat-treating department.

A yearly record of the operation of each furnace is filed for reference purposes on small cards giving the date and the number of parts heat treated. All pyrometer records are kept for two years so that facts regarding heat treatment of any part is at hand in case any question arises.

Trouble Shooting With Microscopes

Characteristic Microstructure Indicates Cause and Remedy for Many Common Troubles in Steel, Iron or Malleable Foundry

BY E. K. SMITH AND F. B. RIGGAN*

MANY foundrymen think the microscope is a tool for use only in the research department. From several years' experience, we have found it to be useful for the investigation and prevention of defects in castings and other metal products. When "trouble shooting," the microscope not only magnifies the foundryman's eyesight 100 to 1000 times, but also enables him to have a permanent record for future reference in the photomicrograph.

We will attempt to give some illustrative examples in this specialized use of the microscope for the location, investigation, and prevention of troubles often arising in the foundry. (Unless otherwise noted, the magnification is 100 diameters, reduced one-ninth.) The cost of the equipment is not excessive—usable microscopes cost as low as $250. Examination of a specimen may be made in one-half hour, and photographs can be completed in less than two hours. Supplementing chemical analysis, and as an aid in the maintenance of quality, we have found that the microscope has earned a place for itself in modern industry.

Figures 1 and 2 show a steel casting before and after the anneal. The coarse white grains of ferrite in the steel, as cast, form planes of weakness, hence unannealed steel castings are brittle. These large grains are broken up in the anneal, as shown in Fig. 2, producing a tough metal. The thoroughness of the annealing operation on carbon steel can be readily judged by the grain size.

One of the difficult problems in the manufacture of steel castings is to remove all the slag, or inclusions,

*Metallurgist and associate metallurgist, respectively, Stockham Pipe & Fittings Co., Birmingham.

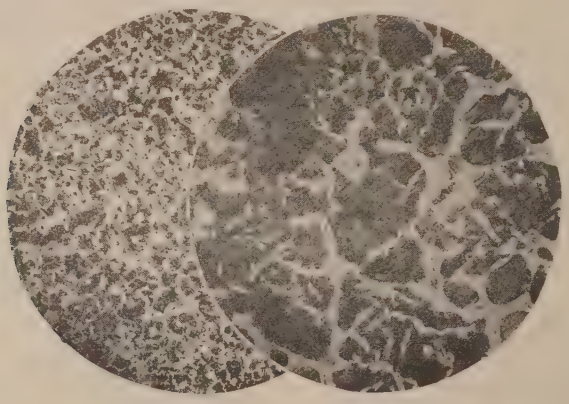


FIG. 1

FIG. 3

FIG. 2

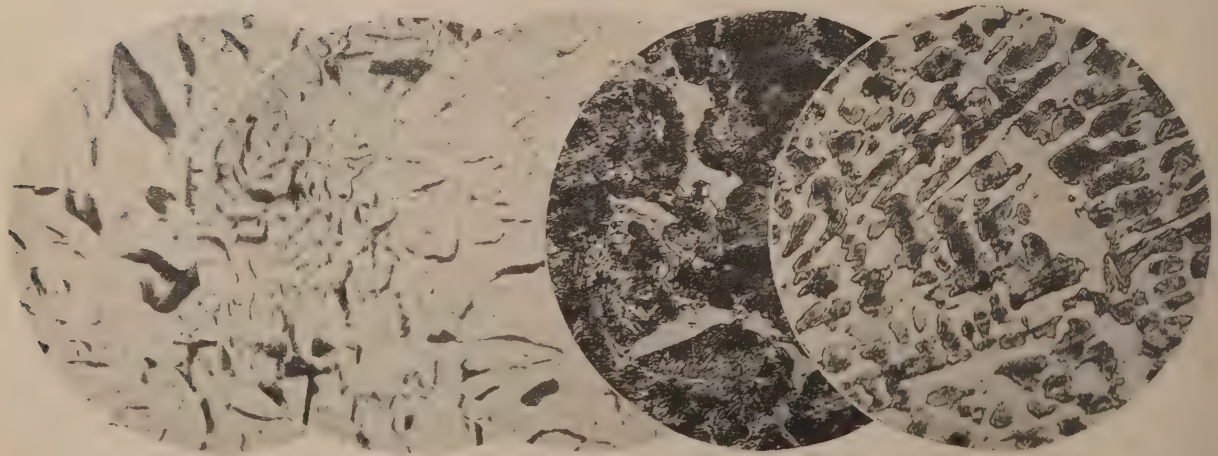


FIG. 4 FIG. 5 FIG. 6 FIG. 7 FIG. 8

incidental to the melting and refining processes. Examination of a polished sample, unetched will show such inclusions. Fig. 3 is an unrefined steel, containing large slag inclusions, indicating a very inferior metal. A clean electric steel would present an almost unblemished mirror, having only a light sprinkling of very small specks of non-metallics.

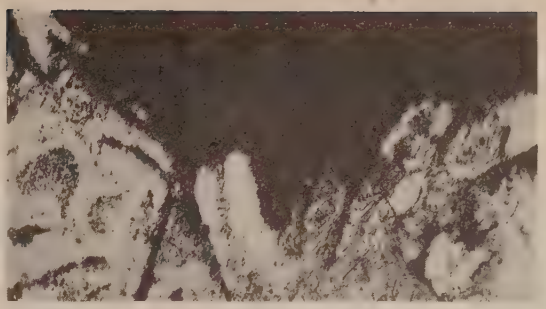
Micros 4 to 8 show cast irons of various degrees of machinability. Figures 4, 5, and 6 are unetched. The first of these is a gray iron with large flakes of graphite, which naturally causes planes of weakness. This iron is suitable only where ease of machining is more important than strength. The strength could be increased by lowering the carbon or silicon content, thus obtaining a finer grained graphite. Figure 5 shows such an iron combining machinability with great strength. Figure 6 illustrates an iron with still smaller graphite, due to a greater amount of carbon in the combined form. Combined carbon appears in mottled areas in the etched sample of the same iron, Fig. 7. This shows white patches of hard cementite (iron carbide) surrounded by striped or mottled areas of pearlite (small plates of iron carbide mixed with small crystals of pure iron). This casting could not be machined at high speed, unless annealed, because of the larger cementite masses caused by too quick cooling, or by excessively low silicon or carbon. Figure 8 is a very hard iron, almost unmachinable. The large areas of white are cementite, which is very hard and brittle.

Discovering Leaky Gray Iron Castings

Some types of gray iron are subjected to high pressures and it is difficult to prevent leaks in the older kinds of very soft gray iron. Leakage, as a rule, is due to two things: porous grain and shrinkage cavities. Figure 9 (X 500, reduced one-half) shows a weak, porous, gray iron, after etching. The black space is a drilled hole. The jagged part is where the drill has torn out a large plate of graphite. The microscope clearly shows why such a structure would not hold pressure, although, to the naked eye, the iron seems to have a close grain.

A view of a shrinkage cavity, X 1000, reduced one-half, (etched sample) is given in Fig. 10. Besides leaking under pressure, "shrinks" cause trouble in machining, due to the very hard edge shown as a white area around the black hole in the micrograph. The remedy is to feed the metal continuously while pouring so as to fill the cavities, to use metal which shrinks less, or, as a last resort, to change the design of the part.

The microscope has found an immediate place in the malleable foundry, since it is so well adapted for locating



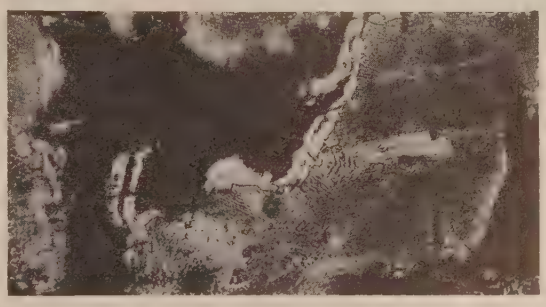


FIG. 9 (TOP) FIG. 10 (LOWER)

trouble in the anneal. Any difficulty due to composition can be located easily by chemical analysis; however, this tells us comparatively little about the heat treatment of a defective casting. Figure 11 shows the white iron, before the anneal (etched). The material is very hard and brittle, the structure being in a characteristic tree-like form called dendrites. If this hard iron had had even a very light anneal, some black spots of temper carbon would be seen, as in Fig. 12 (a partly annealed malleable). Spots of black temper carbon are surrounded by light rings of practically carbon-free iron (ferrite), but the general gray background shows that graphitization is not nearly complete. Figure 13 illustrates the structure of completely annealed malleable. The black spots are temper carbon, the light grains are ferrite.

Sometimes there is difficulty in machining malleable castings. If the microscope shows a "bull's-eye" structure, as in Fig. 12, the anneal was not sufficient for the composition of the metal. Sometimes the trouble is due to a hard edge, as shown in Fig. 14. This is usually traceable either to annealing conditions, or to faulty analysis.

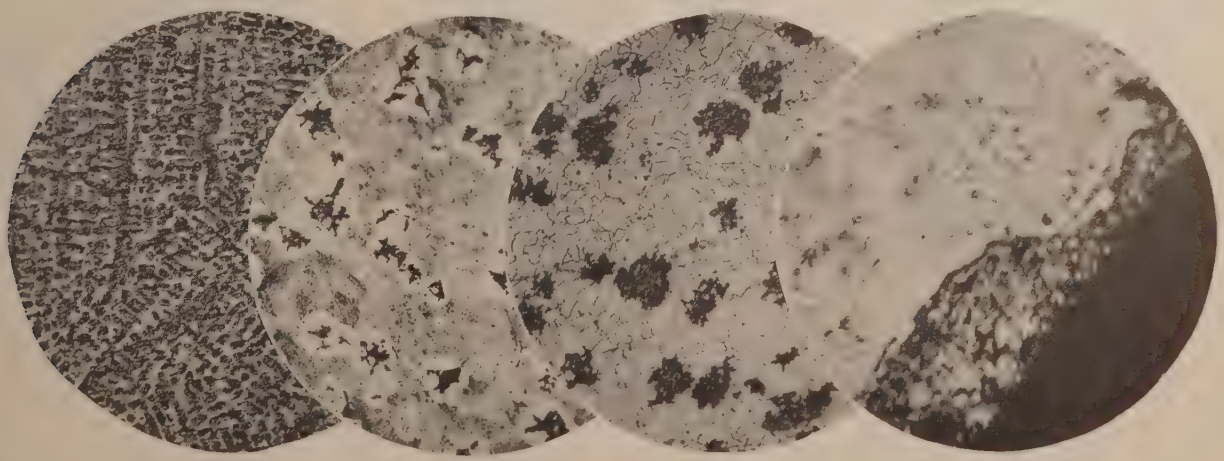
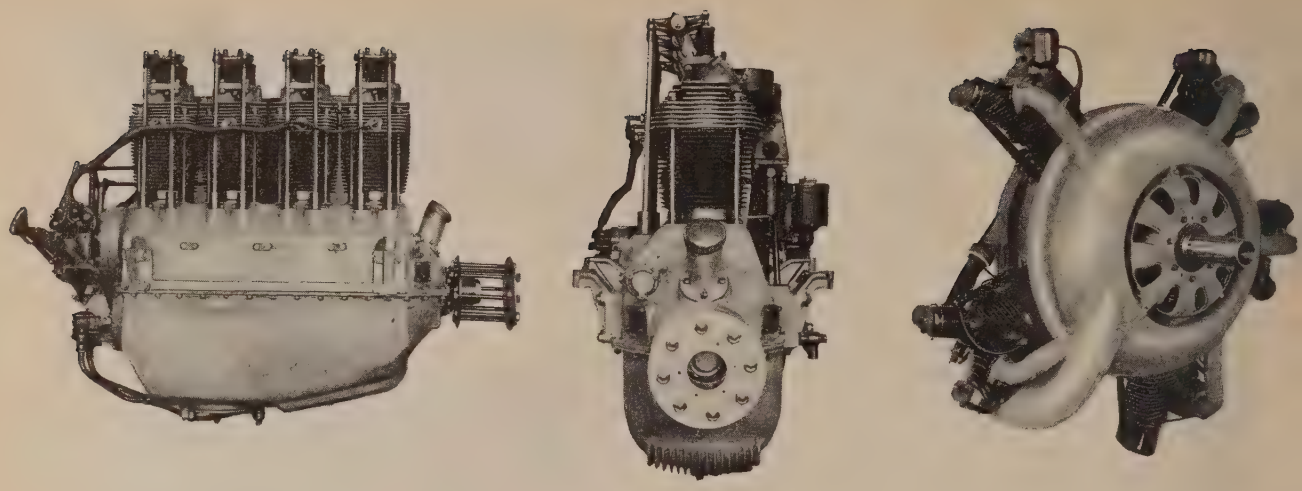


FIG. 11 FIG. 12 FIG. 13 FIG. 14



New Wright Aeronautical Engines

Three Units Have Many Parts Interchangeable— Manufacturing and Storing Problems Are Simplified

BY FAY LEONE FAUROTE

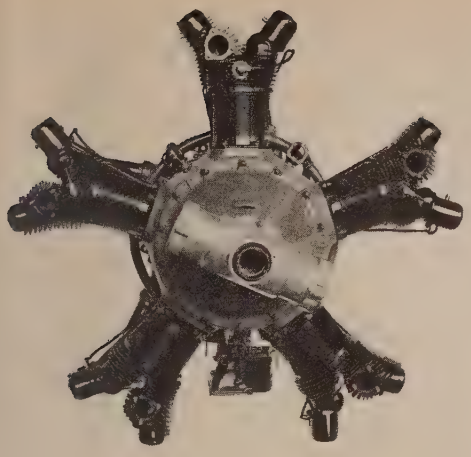
DURING the early part of 1928 there appeared in these pages a description of the Wright Whirlwind aeronautical engine, and its method of fabrication and assembly.* The property of the Wright Aeronautical Corporation then consisted of some seven acres of land. Manufacture was being carried on in a plant, part of which was rented, having an area of 125,000 sq. ft. There were some 1100 employees. The fixed assets amounted to about $2,100,000. The public's acceptance of flying as a safe means of transportation and the rapid growth of the aviation industry have, however, combined to produce an increase in aeronautical engine manufacture which hardly seemed possible a year ago.

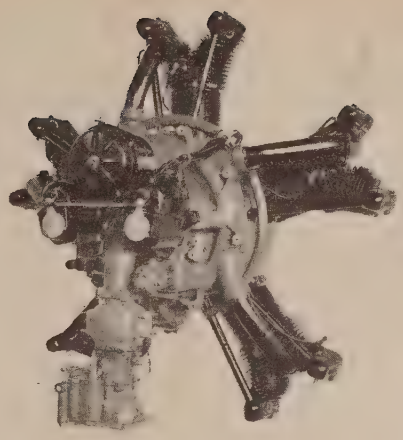
At present there are more than 2600 employees on the company's payrolls; the corporation owns some 28 acres of land adjacent to the main line of the Erie Railroad in Paterson, N. J.; has over 600,000 sq. ft. of manufacturing and testing space; an enlarged plant equipped with modern machinery, much of it of special design, capable of producing 500 engines a month on one shift. The gross investment in fixed assets at the end of February, 1929, according to information given me by James P. Prince, treasurer, exceeded $7,600,000. The profit for the year

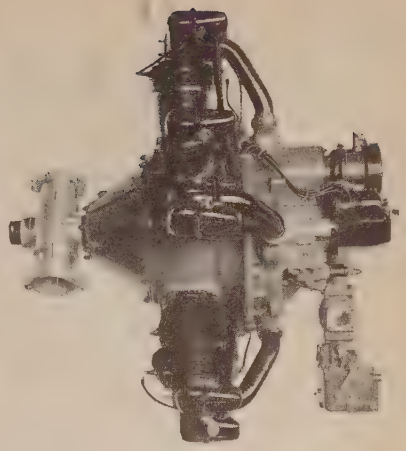
*See THE IRON AGE, Feb. 9, 1928, page 394; March 1, page 590; March 29, page 867. The present is the first installment in a series of articles dealing with the manufacture of the new Wright engines for aircraft.

AT Top of Page Are, Left to Right, the Gipsy 90-Hp. Engine of Four Cylinders, Side and End Views and a Three-Fourths Front View of the Five-Cylinder 165-Hp. Whirlwind Engine, with Exhaust Collector Ring and Nose Cowl in Place

At Bottom of Page Are, Left to Right, a Three-Fourths Front View of the Seven-Cylinder 225-Hp. Whirlwind Engine and Front and Side Views of the Nine-Cylinder 300-Hp. Unit







ended Dec. 31, 1928, amounted, after deduction of Federal taxes, to $2,433,771. Fifteen hundred and ten engines of the 225-hp. Whirlwind type constituted the bulk of the year's business. The company's sales in 1928 amounted to $8,781,516. This represented delivery of 1644 engines of various types, together with spare parts. Of these, 766 engines were sold to the United States Government, the remaining 878 to commercial manufacturers.

Following as a natural result of growth in aeronautical transportation, there has been a demand for a wider range of engine power. The Wright company has accordingly designed a new line of Whirlwind engines in five-, seven- and nine-cylinder sizes, developing 165, 225 and 300 hp. respectively. These new power plants are lighter than the earlier ones and contain several refinements and improvements in design which will make their description and method of fabrication of interest to all the readers of THE IRON AGE.

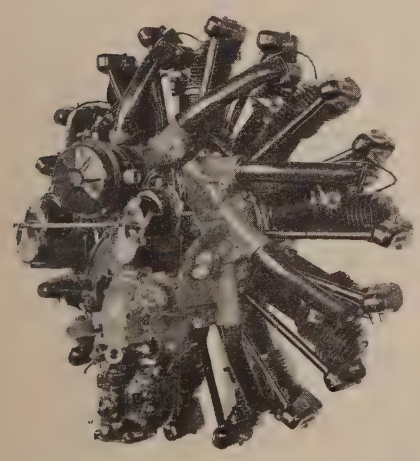
Of paramount importance is the fact that in these three new models there is a very complete interchangeability of parts, wherever possible. Furthermore, their manufacture, as now being carried on in the new Wright plant, is the first good example of the application of mass production methods to very close limits that I have seen in the airplane engine field. The new engines are now going into quantity production and about 25 a day are coming through. The ratio of production of the three types at present is 400 of the nine-cylinder 300 hp. (Model R-975), 50 of the seven-cylinder 225 hp. (Model R-760), and 50 of the five-cylinder 165 hp. unit (Model R-540).

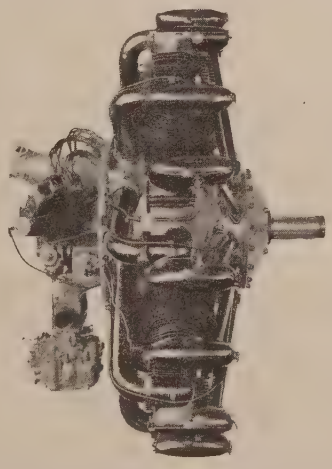
In addition to this, the engineers have developed in the experimental department an inverted V-type, 500-hp. air-cooled engine which promises much. According to Charles L. Lawrance, president of the company, this engine has successfully passed its 50-hr. official test, and an experimental contract for 14 of these engines has been placed by the United States Government. Mr. Lawrance says further that this type of engine will, it is believed, in a measure supersede the large radial air-cooled engines for heavy transport service, due to its greatly reduced head resistance for equivalent horsepower. While this engine has not been flight-tested, and no adequate performance data are yet available, it is said that the representatives of the Government have confidence in it as a type for observation and bombing planes.

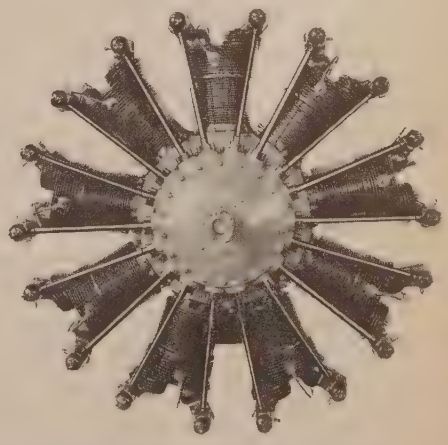
Arrangements have also been made with the de Haviland Aircraft Co., London, England, for the manufacturing and selling rights in the United States of the 90 to 100-hp. four-cylinder air-cooled Gipsy engine. It is expected that this engine will go into production during the summer. The Wright line of aeronautical engines will then comprise five models ranging from 100 to 525 hp.

Development of the Lawrance Engine

As early as 1914 Charles L. Lawrance attempted to demonstrate the value of the air-cooled aeronautical engine, building two-cylinder and three-cylinder types on

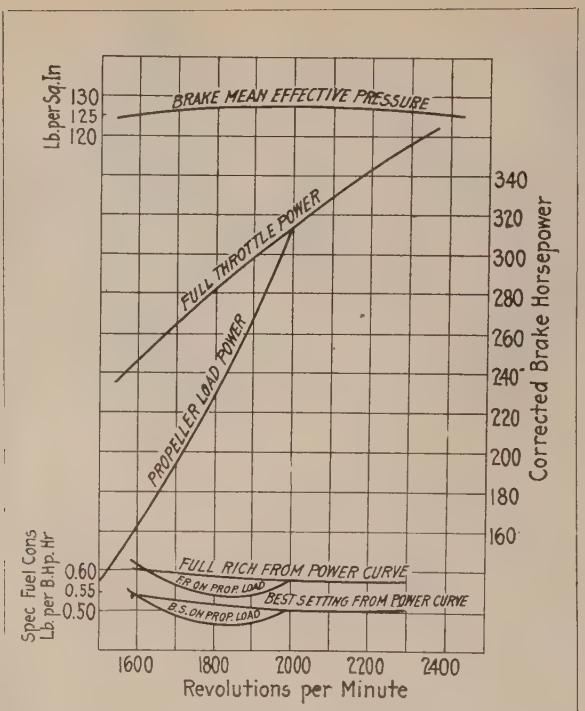






AT Top of Page Are, Left to Right, Front, Three-Fourths Rear and Side Views of the Five-Cylinder 165-Hp. Whirlwind Engine. Exhaust collector rings and nose cowls are not in place, but two views show the propeller hub

At Bottom of Page Are, Left to Right, a Rear View of the Nine-Cylinder 300-Hp. Whirlwind Engine and Side and Front Views of the Still Larger Cyclone Engine, Also with Nine Cylinders, but Developing 525 Hp.



WRIGHT Whirlwind Model R-975, 9-Cylinder Aircraft Engine, Power Curves at Full Throttle and on Propeller Load; Fuel Consumption at Full Rich and Best Setting; Compression Ratio 5.1 to 1, Using Aviation Gasoline

an experimental scale. Unfortunately, he was unable to bring his ideas to fruition during the World War, but both the English engineers and the American aviation authorities, realizing the value of the light weight and the simplicity of the air-cooled type, became interested. In 1923, through a merger effected between the Lawrance Aero Engine Corporation and the Wright company, all rights to the manufacture and sale of the Lawrance air-cooled engines were obtained; and finally, after a successful test, the Army gave the Wright company an order for a 350-hp. engine which was known in the shop as Model R-1. This was successfully designed, built and tested and was the first air-cooled radial engine to be operated successfully in the United States.

Later, Army and Navy orders for 150 and 200-hp. nine-cylinder air-cooled types came through. The smaller one was abandoned and the larger developed through stages into the Model J-1, an ancestor of the famous Whirlwind. Models J-3 and J-4, containing refinements and improvements, followed, the latter becoming a favorite with both the Navy and commercial manufacturers for planes requiring 200-hp. Finally the J-5 came into being, and this model was used by Lindbergh, Byrd, Chamberlain and others who successfully completed the amazing trans-oceanic and trans-continental flights during 1926, 1927 and 1928.

The new series which will replace the Wright J-5's will be known as the J-6 series and will retain the name "Whirlwind"; while the large type, developing 525-hp., has been christened, in accordance with the Wright practice of naming their engines after the winds, "Cyclone."

Three New Wright Whirlwinds

BELIEVING that it would be a great advantage if most of the major parts could be standardized and made interchangeable, the three new Wright Whirlwinds, having five, seven and nine cylinders respectively, have been built as radial engines with standard stationary cylinders and rotating crankshafts. They operate on the familiar four-stroke cycle principle, but contrary to the usual practice in automotive power plants there is only one crank throw for the entire set of pistons, instead of a separate throw for each piston. The connecting rod from the piston in the vertical cylinder is the only connecting rod attached directly to the crankshaft. This is known as the "master rod." The other connecting rods are, in turn, attached to the big end of the master rod by a linked pin, all connecting rods and pistons thus working together as the crankshaft revolves.

The crankshaft is of a single-throw two-piece type, made from an alloy-steel forging and counterbalanced to prevent vibration. It is drilled for oil passages, giving positive-pressure lubrication to the bearing surfaces. All the bearings are of ample size and generously lubricated. The connecting rods are of a forged alloy steel and consist of the one-piece master rod and the articulated rods, one for each cylinder. The wrist-pin and knuckle-pin bushings are of bronze, pressed into the articulated rods. The crankpin bearing is of anti-friction metal, steel backed, pressed and doweled into the big end of the master rod.

By a unique design it is possible in these models to do away with the two-piece master rod with its cap, formerly used in Wright Whirlwind engines, and to use in its place a one-piece rod cut out of a solid forging, which when the crankshaft is disassembled may be slid on from the open end of the crank.

Aluminum-Alloy Pistons Used

The pistons are made of aluminum-alloy, cross-ribbed on the under side of the head, and fitted with full-floating hollow pins held in place by expanding spring wire locks, so that the ends of the pins are prevented from destroying the cylinder walls. The piston pins and cylinder walls are lubricated by oil spray from the crank and knuckle-pin bearings. The upper external surface of the piston head is slightly concave, which in conjunction with the internal shape of the cylinder head results in an almost ideal spherical combustion chamber.

The whole valve mechanism, including push-rods, is completely inclosed as a protection against dust, salt-spray and the like, the rocker shafts being mounted in a housing cast integrally with the cylinder head. Hardened steel cam followers operate through hardened steel rollers running on the cam ring. The push-rods are of hollow steel tubing fitted with case-hardened steel ball ends. These actuate the forged steel rocker arms. The rocker arms are carried on ball bearings lubricated by an Alemite or a Zerk pressure system and have provisions for adjustments necessary for correct valve clearances.

Equipped with air-cooling fins carefully machined out of a solid steel barrel, the cylinders are attached to the crankcase by eight steel studs passing through the cylinder flange. The aluminum alloy head is screwed and shrunk on to the combustion end of the cylinder. The intake ports are at the rear of the cylinders, while the exhaust ports are placed on the forward side, to obtain the most effective cooling.

Crankcase Assembly of Four Castings

Four major castings of aluminum alloy make up the crankcase assembly. The cam follower ring, carrying the tappet guides, is cast integral with the main section of the crankcase, giving rigid and accurate support and perfect lubrication to the shafts, and resulting in a considerable saving in weight and in the elimination of a number of detailed parts. The rear section carries all accessory drives, such as those for magnetos, oil and fuel pumps, generator and rotary induction system. Pro-

vision is made also for the easy installation of a suitable generator and starter. The whole crankcase unit is strong, compact and light in weight.

All accessories on the engine are at the rear, including the valve-operating push-rods. By this arrangement the head resistance of the engine while in flight is reduced and simple, effective cowling design is possible. Accessories such as the magneto, etc., are protected also. Each engine is provided with a front exhaust manifold of the collector-ring type and with a nose cowling with shutters operated from the pilot's seat. These movable shutters permit the flow of air around the crankcase and cylinders to be regulated so as to give the maximum engine efficiency under varying climatic conditions and atmospheric temperatures.

Provision for Lubrication

Lubrication is provided by a pressure pump which carries the oil to the front or rear of the hollow crankshaft, from which point it is distributed to the various bearings of the equipment. The excess oil from all parts of the engine drains into a sump located in the main crankshaft casting, between the bottom cylinders. From this sump a single-suction pump delivers the oil to the main oil tank in the airplane, passing it through a strainer installed at a convenient point outside the engine. This strainer removes any foreign material that may have found its way into the lubricating system. The oil pressure is automatically regulated by an adjustable valve. The lubrication system has been carefully designed so as to eliminate all external oil pipes. Experience has shown that external oil pipes are liable to leakage and they have proved to be unsatisfactory in service, due to the excessive cooling of the oil in cold weather. By this new design troubles arising from these sources have been ended.

Magnetos and Carbureter Are in Rear

Two Scintilla magnetos, mounted behind the engine and operating independently, provide the ignition through two separate spark plugs in each cylinder. While both of these magnetos are normally in simultaneous use, the engine will operate in an emergency on one magneto, with a slight loss of speed.

A specially designed Stromberg carbureter of the single-barrel type, mounted on the rear section of the crankcase, supplies the fuel mixture. Passing through the carbureter into the diffuser chamber of the crankcase, the mixture is evenly distributed through all cylinders by a unique rotary impeller mounted in this diffuser chamber. This system of positive control of the distribution of the mixture produces a smoothly running engine and is of special value in the smaller types, eliminating the vibration caused by unequal distribution of the combustible mixture. A "hot spot" which thoroughly vaporizes the fuel mixture is provided above the carbureter. The temperature may be regulated by the pilot so that maximum efficiency and fuel economy may be obtained under all kinds of conditions.

The same type and diameter of mounting ring is used for all three of the new Wright Whirlwinds. All controls are placed at the rear of the engine, thus simplifying the installation.

Aside from the crankcase and other connective parts which are manifestly not interchangeable between the three models, all of the other parts, such as the cylinder, cylinder heads, valves, rocker arms, push-rods, pistons, piston pins and the like, are wholly interchangeable. This is proving to be a great advantage and will simplify greatly the maintenance and service problems, both on the field and in the shop.

Each engine is shipped complete with the following items: carbureter, air heater and cleaner, nose cowling, exhaust manifold, ignition switch, priming pump, tool kit, instruction book and domestic shipping box.

Engine Specifications

Type—Air cooled, four cycle, fixed radial			
Model No.	R-540	R-760	R-975
Number of cylinders	5	7	9
Bore	5 in.	5 in.	5 in.
Stroke	5½ in.	5½ in.	5½ in.
Displacement	540 cu. in.	756 cu. in.	975 cu. in.
Compression ratio	5.1:1	5.1:1	5.1:1
Guaranteed horsepower (sea level) at 2000 r.p.m.	165	225	300
Fuel consumption (maximum), per hphr.	0.55 lb.	0.55 lb.	0.55 lb.
Oil consumption (maximum), per hphr.	0.035 lb.	0.035 lb.	0.035 lb.
Length overall (no starter)	40⅝ in.	40$\frac{23}{32}$ in.	41$\frac{7}{16}$ in.
Mounting flange to propeller hub	28$\frac{23}{32}$ in.	28$\frac{23}{32}$ in.	28$\frac{23}{32}$ in.
Diameter overall	45 in.	45 in.	45 in.
WEIGHTS, EQUIPMENT AND ACCESSORIES			
Engine (including hot-spot)	370 lb.	425 lb.	520 lb.
Air cleaner and heater	6 lb.	6 lb.	6 lb.
Exhaust pipes and collector ring	20 lb.	23 lb.	27 lb.
Nose cowling	6 lb.	6 lb.	6 lb.
Total weight to standard specification	402 lb.	460 lb.	559 lb.
Shipping weight (including box)	825 lb.	880 lb.	980 lb.
Size of shipping box	85 cu. ft.	85 cu. ft.	85 cu. ft.

Extra accessories for all models, not included in the table, include Eclipse hand inertia starter, weighing 21 lb. approximately; Eclipse generator, 15-volt, 15-amp., 16 lb.; Eclipse generater control box, 2½ lb.; Fuel pump (Wright C-3 modified), 2 lb.; Standard steel propeller hub, 23 lb.

Relation of Power to R.P.M. and Fuel Used

Power curve diagrams, one of which is here reproduced, indicate the power output and fuel consumption of the engines at various speeds. The "Full Throttle Power" curve shows the average maximum power output at the engine speeds. The "Propeller Load" curve is based on the rated speed of each type of engine, showing the power output obtained at a given engine speed with the engine fitted with a propeller which will permit the engine to reach rated r.p.m. at full throttle. For example, the rated speed of the "Whirlwind Nine" is 2000 r.p.m.; reference to the "Propeller Load" curve for this engine shows a power output of 325 hp. at this speed; at 1800 r.p.m. the output is 236 hp., and so on through the range of the curve.

If the full throttle speed is above or below 2000 r.p.m., owing to the type of propeller fitted, then the propeller load curve will start at that point on the power curve corresponding to the maximum r.p.m. and will be similar in form to the propeller load curve drawn from 2000 r.p.m.

From the fuel consumption curve of the "Whirlwind Nine" it will be seen that, at the "Full Rich" position of the carbureter mixture control, the specific fuel consumption in pounds for each brake hphr. decreases from 0.60 at 1600 r.p.m. to 0.57 at 2200 r.p.m. on the "Full Throttle Power" curve. With the mixture control adjustment utilized to increase the proportion of air to fuel in the carbureter to the maximum point at which the engine still loses no r.p.m., the fuel consumption is as indicated on the "Best Setting" curve for full throttle power. The fuel burned ranges from 0.53 lb. to the brake hphr. at 1600 r.p.m. to 0.50 lb. at 2200 r.p.m.

These two curves show also how the fuel consumption

Main Plant of the Wright Aeronautical Corporation in Paterson, N. J.

can be varied at any fixed r.p.m. by using the mixture control. For example, at 1800 r.p.m. the fuel used varies from 0.518 lb. to 0.586 lb., according to the setting of the mixture control. The "Propeller Load" fuel curves indicate a similar variation of fuel consumption, corresponding to changes in r.p.m. and the position of the mixture control valve on the carbureter.

The upper "Propeller Load" fuel curve shows the fuel burned at various r.p.m. with a "full rich" mixture; the lower "Propeller Load" fuel curve demonstrates clearly the result of using the mixture control.

It should be noted that considerably lower fuel consumption than that indicated on the curves can be obtained in actual flight by intelligent use of the mixture control. The method of procedure is to set the mixture control at the "full rich" position and the throttle control at the point where the engine speed is from 25 to 30 r.p.m. above that required; the mixture control is then opened out to give the carbureter additional air until the engine r.p.m. have decreased to the required speed. The engine is then operating on the most economical mixture consistent with smooth running.

If it is desired to plot a fuel consumption curve for a propeller which allows a maximum engine speed above or below 2000 r.p.m., then the maximum r.p.m. of the required fuel consumption curve must correspond to the full throttle r.p.m. of the propeller load curve. The fuel consumption curve can then be plotted to follow in form the propeller load fuel curve on the diagram shown.

To convert the specific fuel consumption into gallons an hour, the specific consumption in pounds to the hphr. is multiplied by the horsepower output of the engine, the product being divided by the weight in pounds of a gallon of the fuel used. The resultant is the consumption in gallons an hour. The average weight of a gallon of aviation gasoline normally obtainable is 6 lb.

Synthetic Molding Sand Preferred by Dutch Foundryman

A FOUNDRY molding sand problem was discussed by H. Van Aarst in a paper "The Problem of Foundry Molding Sand," presented at the Third International Foundrymen's Congress in London, June 11 to 14. It was presented on behalf of the Dutch Foundry Technical Association.

As a result of experiments, the author prefers synthetic molding sand, because all natural sands, both as regards grain size and the clay content, are very irregular. From the beginning of 1928 the author has prepared loam, molding sand and core sand, using only river sand, sea sand, dune sand and clay. The loam consists of fine river sand, which is mixed with undried clay, to which flax waste and fine coal are added.

Two castings, made without a pattern, were cast in this loam. One was the half of a centrifugal pump (principal dimensions: length 14 ft., width 5¼ ft., height 9 ft., diameter of delivery tube 4.6 ft., weight 19,800 lb.; time required for casting, 45 sec.). The other casting was a stern tube for a motorship, which was cast vertically (time required for casting, 3½ min.; length 21.65 ft., weight 24,200 lb.).

Molding sand for dry molds is made of fine river sand, clay, flax waste and fine coal, mixed dry. In this sand both locomotive cylinders and the heaviest type of foundation plates are cast. It is also used for lighter castings, but it is then made up of a finer grain and without flax.

For core making, sea or dune sand is almost exclusively used, but for very large cores fine river sand is prepared. The sand is dried until quite free from water. Linseed oil is mainly used as a binding material.

Technical Paper No. 442 of the Bureau of Mines is entitled "The Blast Furnace Stock Column," by S. P. Kinney, North Central Experiment Station, United States Bureau of Mines, Minneapolis, Minn. It contains 148 pages and 62 illustrations and charts. It is a report covering another step taken by the bureau in investigations of iron blast furnace operations and discusses observations made of a 700-ton furnace, the previous studies having to do with a 300-ton and a six-ton furnace. Almost every phase of the operation of such a furnace has been investigated and the results are particularly valuable.

Europe's Industrial and Political Future Pivots on Coal and Iron Ore—II.

Old Systems of Assemblage and Distribution Cut Apart by Tariffs—Great Britain's Situation Most Serious—Germany Must Get Ore from France

BY EDWIN C. ECKEL*

IT is tempting to think of European mining and metallurgy as not having been seriously or permanently changed by the war; but that point of view embodies some serious errors. It is true, of course, that a shift in national boundaries gives to one country what was formerly controlled by another—to which extent no *total* change occurs. But if we stop at that point we overlook the fact that the old established metallurgical districts of Europe had certain long-standing relations with their raw material supplies and with their markets, and that in the new Europe many of these old systems of assemblage and distribution are now cut apart by tariff boundaries. So in speaking of the individual countries we must bear in mind these trade changes along with the more obvious changes in national control of raw materials and mills.

The Decline in British Mining and Metallurgy

Fifty years ago Great Britain was still the leading producer—as she had been for a century before that—of coal, pig iron and steel, and by far the leading exporter of each of these basal products. Today we see a Socialist-Labor party come into power in Great Britain chiefly because each of these three great industries is in a very serious condition, and because neither of the two old political parties could supply intelligence enough to meet those conditions. It is questionable, indeed, if the Labor party can do that; but it can at least attempt the task with a good will which has been lacking in the past.

Now, in trying to decide whether this decline of British industry is temporary or permanent—a matter of the first importance for all of us—there are several allied or related features which must be set aside for the moment if we are to reach any clear decision. We must not, for example, confuse Great Britain with the British Empire. We must not confuse industrial decline with financial weakness. For, whatever the condition and prospects of strictly British industry, the British Empire is still by far the greatest force in the world; and British financial strength is still not seriously weakened by her home industrial disturbances. In future, unless these industrial troubles be ended, these two statements will no longer be true; for imperial power and finance would decline in the long run with any permanent decline in the British coal and iron trade.

Unlike most of the other European countries, Great Britain did not gain or lose a single ton of coal or iron reserve as the direct result of the war. As in 1913, Great Britain ranks second to Germany among European coal-reserve nations, but still with a reserve tonnage equal to that of all the other European countries combined. As in 1913, Great Britain still has enormous reserves of very low-grade iron ore, and still habitually imports most of the ore from which she makes her iron tonnage.

The difference between conditions in 1913 and in 1929 is chiefly social and not strictly material. During the war Great Britain supplied coal and iron to all her allies, in the maximum tonnages possible—and at the maximum prices that could be secured. In order to produce this tonnage under war conditions wages were raised far above pre-war levels; and the Government aided mine owners where necessary to keep production up. After the war the laborers refused to have wages reduced as export prices fell. A shorter mine day was introduced, with resultant lower output per man employed.

Meantime the trade of the world in general fell off very sharply and has not yet recovered. Countries which were formerly good customers have erected steel plants and tariff barriers simultaneously, not the least of them being British dominions and colonies. With all these weights to carry, the British coal and iron industries have been stagnant at best and depressed at worst; and unemployment has risen to chronic and alarming proportions. It is this situation which has defeated the Conservative and wrecked the Liberal parties in England. It is this situation which, unless remedied, will drive the Labor party further and further into Socialistic remedies.

The weak points of the situation are that practically all foods and raw materials have to be imported from high-cost countries; so that English living costs and wages will normally be far above French or German levels. The strong points of the situation are the location of almost all the coal fields and most of the iron works on or near the coast, the preeminence of the British merchant marine, and the existence of old trading outlets in South America and elsewhere.

France Has Greatly Increased Ore Exports

Before the war France was a heavy exporter of iron ore, because most of the output of the Briey-Longwy basin went across the border to German furnaces. Since the war, though some of these same furnaces became French in nationality, the French ore export has been heavily increased. Over half of the Normandy-Anjou output goes to either English or German furnaces now.

With regard to coal supplies, France has gained little by the war. With the exception of two mines on the French edge of the Sarre basin, returned to France by the treaties, there has been no permanent accession of coal lands. The Sarre field itself, which is to be under French operation until 1935, will probably go back to German control by a plebiscite in that year, so that its 12,000,000 tons of annual coal output cannot be looked upon as French. Recent data on actual French coal outputs for 1927 and 1928 are as below in metric tons:

Coal Field	1927	1928
Pas de Calais	24,299,220	24,042,408
Nord	8,919,400	9,223,145
Moselle	5,365,800	5,554,660
Loire	3,970,540	3,716,023
Blanzy-La Mure	3,104,820	3,020,641
Gard-Graissessac	2,235,980	2,174,330
Carmaux	2,095,300	1,994,254
Other	1,787,470	1,640,316
Total coal	51,778,530	51,365,777
Total lignite	1,067,290	1,063,691

*Mr. Eckel is spending several months in Europe in the interest of American clients, this being the fourth of his extended investigations there since the war. His close-range study of industrial conditions in Western Europe began with his engineering service in the A. E. F. as major, from July, 1917, to July, 1919. One phase of that experience was the operation of several cement mills with troop and civilian labor. He is the author of two works dealing with cement materials, also of "Coal, Iron and War."

With regard to iron ore resources, the events of the past 15 years have placed France not only first in Europe but probably first in the world. For, in addition to gaining by conquest half of the largest of the world's ore fields, another of almost or quite equal size has been developed on her own soil.

Five Billion Tons of Lorraine Ore

In terms of reserve ore tonnage we may assume that France now has in the entire Lorraine basin some 5,000,000,000 tons of ore, capable of producing some 2,000,000,000 tons of pig iron. In the Anjou-Normandy basin recent work would suggest a total ore reserve of at least 2,000,000,000 to 3,000,000,000 tons of far higher grade than the Lorraine product, and capable of yielding between 1,000,000,000 and 1,500,000,000 tons of pig metal, perhaps more.

As against all this tonnage the reserve is being drawn upon in the fashion shown below, where for convenience of historic reference the old German districts are separated from the pre-war French Lorraine regions. The official figures for 1928, recently issued, are used, supplemented by earlier data for comparison:

Iron Ore Output of Present French Districts, 1913-1928—Metric Tons

District	1913	1927	1928
Briey-Longwy-Nancy ..	19,979,937	23,872,040	26,162,582
Metz-Thionville (German)	21,136,265	19,210,980	20,404,150
Anjou-Normandy	1,212,911	2,296,340	2,497,601
Other French districts.	726,023	291,560	263,509
Total French ore output	43,055,136	45,670,920	49,327,842

It will be seen that the old German Lorraine fields have shown a slight loss since 1913; that the old French Lorraine fields have increased some 35 per cent, and that the Anjou-Normandy-Brittany field has increased some 100 per cent.

German Coal and Iron

At the opening of the World War the German Empire was currently credited with possessing close to 60 per cent of the entire European coal reserve and some 30 per cent of the total iron ore reserves. The war has reduced these percentages—the coal not too seriously, for the German total is still close to half of the European reserve; but the iron ore very sharply, so that today the German Republic holds perhaps 7 to 8 per cent of the total. The coal decrease was due to the temporary alienation of the Sarre field and to perhaps more permanent losses in Silesia. The iron ore loss was due almost entirely to the loss of Lorraine, only a relative trifle being in the Silesian fields.

This leaves Germany with the Westphalian coal field intact and with every reason to press coal output there and to develop new utilizations for coal and for its by-products. But as regards iron and steel, it implies that to produce them on the old scale of output there must be heavy importations of iron ore. These importations, as we know, are actually in progress, chiefly from France, with Sweden, Algeria and Newfoundland following, at great distances, in the order named.

The extent to which the various basal industries have been reestablished since the war is well shown in the following comparison of average *monthly* outputs during 1913, 1926, 1927 and 1928. The figures are in thousands of metric tons:

	1913	1926	1927	1928
Coal output.....	15,849	12,114	12,298	12,500
Lignite output....	11,506	11,656	13,399	14,250
Pig iron.....	1,397	804	1,310	985
Steel output.....	1,412	1,028	1,371	1,210

It will be seen that lignite shows a very steady and rather surprising gain, while coal, iron and steel are still well below their pre-war levels of output. And if to these mere tonnage comparisons we add the fact that almost all the iron is made now from imported iron ore, we can see why the German credit balances on exports, never very large before the war, are now turned into deficits.

Germany still ranks second to the United States in the production of both pig iron and steel. But whereas in 1913 England occupied third place in both regards, and France only a very bad fourth place, today France has easily passed Great Britain and is surprisingly little behind Germany. I can see no reason, except perhaps the urgent pressure of reparations payments, for German retention of second rank in the output of pig iron for more than a few years now. Her hold on the finished steel industry is far more secure, since the factor of ore cost weighs less and less as the product is more and more highly finished.

Prospects of Central and Eastern Europe

In central and eastern Europe there are only three countries that seem to require consideration from the standpoint of international coal and iron trade, and each of these is limited in one way or other, so that it can never reach the levels attained by the United States, Great Britain, Germany or France.

First among the three as a future possibility is Russia, where even misrule cannot always cover up the fact that the Donetz Basin had large coal reserves and sufficient iron ore reserves to present possibilities of becoming some day a very serious mining and manufacturing region. The deficiency there has always been the relative lack of transportation and the poverty of the local markets. The outputs for all of Russia have just been published for two recent half-years as below, all in metric tons:

	Oct. 1-March 31, 1927-28	Oct. 1-March 31, 1928-29
Coal mined	18,503,000	19,744,000
Pig iron	1,622,000	1,877,000
Steel	2,109,000	2,314,000
Rolled products	1,702,000	1,874,000

It will be seen that while pig iron output increased almost 16 per cent for the year, coal output increased less than 7 per cent, which the Soviet report expressly states was due to "a certain lowering of working discipline in the coal fields."

Poland and Czechoslovakia, both remade countries, present certain possibilities and serious differences. Poland has secured coal in excess of her manufacturing needs or probabilities, and this coal is now depressing the German coal trade in all the Baltic region. Czechoslovakia, the best balanced of the new countries, has sufficient coal to be important, enough iron ore to use, and finishing plants on a relatively large scale, so that the mine and furnace output is readily absorbed nationally without affecting any international markets in basal products.

Diesel Engine Heads of Wrought Iron Joined with Copper

Many breakages have occurred in lower cylinder heads on double-acting marine Diesel engines. It is apparently impossible to arrange valve openings symmetrically, and temperature strains induced are too much for the best cast iron to resist.

An alternative successful design was described recently by F. Sass to the Institution of Engineers and Shipbuilders in Scotland. It consists of assembling the complicated head with all its passages from 18 pieces of wrought iron plate, tubes and angles. After these were tightly held together by suitable clamps, the proper amount of copper was wired at each joint, and the assembly heated in a hydrogen atmosphere to 1200 deg. C. Final cooling required 48 hr. The method is similar to the "coppering" process described at length in THE IRON AGE, May 10, 1928. Mr. Sass said the method had long been used for building up diaphragms in the turbine department of the German General Electric works (A.E.G.).

Pulverized Coal in Steel Furnaces

Application of Powdered Fuel to Metallurgical Work Outlined—Both Melting and Reheating Furnaces Served

BY WILLIAM O. RENKIN*

THERE have been approximately 200 pulverized coal plants installed in connection with the iron and steel industry in this country. These pulverized coal plants supply fuel to about 2500 furnaces of the following types:

Puddling and busheling furnaces
Wrought iron pile and faggot heating furnaces
Ingot, slab, billet and rod-heating furnaces
Forge heating furnaces
Rail reheating furnaces
Continuous heating furnaces
Open-hearth furnaces
Sheet and pair furnaces
Open and box annealing furnaces
Malleable iron melting furnaces.

In the paper the author has given information regarding results being secured, rather than to describe equipment. The paper is divided into nine sections:

1—Historical sketch of pulverized coal in metallurgical work, giving credit to Lord and Culliney, who did the pioneer work in this branch of the industry.
2—Types of furnaces using pulverized coal, giving some descriptive data.
3—Fuel costs per ton of product, giving some data on the preparation costs as well as relative costs per ton of steel heated with various fuels, such as: Hand firing with bituminous coal; producer-gas firing (bituminous coal); fuel oil firing; natural-gas firing; by-product coke oven gas firing and a curve chart showing the relative B.t.u. procurable for one cent.
4—Type of equipment required, giving a general description of pulverized coal plant operation rather than equipment details.
5—Advantages of pulverized coal firing, listing under 10 points the advantages and benefits to be derived by using pulverized coal.
6—Furnace efficiencies being secured, giving some data from operation.
7—Elimination of early difficulties, describing some of the early installation troubles and explaining methods of overcoming them, as found by experience.
8—Comparative outputs with different fuels, giving some examples of results obtained.
9—Conclusion, giving some general information and comparative fuel costs.

Some of the particular furnace applications are discussed in the following paragraphs:

Iron Blast Furnaces

Considerable work has been done in the blast furnace branch of the industry, but difficulty has been encountered in getting the pulverized coal to burn and not to precipitate. It has been found possible to feed the pulverized coal directly into the proper part of the blast furnace, thus overcoming, it is believed, the mechanical difficulties which have heretofore prevented proper injection of the coal. Introduction of fuel having a known analysis directly at the melting zone will, no doubt, prove a distinct advantage in correcting errors in mix immediately, instead of after some hours, as in present practice.

Air Furnaces

There are many malleable iron plants in which the melting is done with pulverized coal, and the furnaces for such fuel have been developed to a very high stage of efficiency. In the plant which holds the fuel-ratio record of the United States, 3.8 lb. of iron is melted with each pound of pulverized coal fed to the furnace, or 7,430,700 B.t.u. in the fuel to each 2000 lb. of iron melted. The proximate analysis of the coal used at this plant is:

	Per Cent
Volatile matter	34.8
Fixed carbon	59.0
Ash	5.5
Moisture	0.7
Sulphur, separately determined, less than	1.0

In addition to the exceptionally good fuel-ratio secured by fine grinding and proper drying, combined with an efficient burner arrangement, there has been noticed a decided improvement in the elimination of carbon and sulphur additions to the bath. Practically all air used for combustion of pulverized coal in this industry is at atmospheric temperature, and the present rapid development of suitable air heaters, using the furnace waste gases as a heating medium, will greatly assist in further reduction of fuel consumed.

Open-Hearth Furnaces

Owing to the early difficulties encountered with pulverized coal and the high state of development of these furnaces for gaseous and liquid fuels, there has been little incentive to push pulverized coal as a fuel for open-hearth work. However, the experience of plants operating with pulverized coal shows that this fuel can be used successfully and with a considerable saving compared with oil, natural gas, or city gas.

Open-hearth plants which have been using pulverized coal report successful operation, with fuel consumption ranging from 450 lb. to 600 lb. of coal for each ton of steel. The Eastern Steel Co.'s plant at Pottstown, Pa., has found that a coal having a higher ash content can be used, by grinding more uniformly and drying better.

Early troubles with checkers becoming clogged and deleterious additions of sulphur, as well as ash, to bath prevented the proper advance of this fuel. We have, however, found that these difficulties were mainly caused by improper preparation of the fuel. By getting the coal pulverized so that a sufficient percentage will pass through a 100-mesh screen, with the minimum amount of impalpable powder, we find that the sulphur and ash do not precipitate on the bath, but are carried over into the slag pockets at ends of furnace.

By elimination of checker bricks and the substitution of simple arches it is possible to secure sufficient preheat in the combustion air and get better control of the furnace. It is predicted that within the next few years open-hearth furnaces will be developed which will utilize finely pulverized coal at a fuel consumption of 400 lb. or less per ton of steel melted.

Reheating Furnaces

Many installations of hearth-type side-door furnaces, both in single-end-reverberatory and double-end-reversing design, are giving excellent results. Generally speaking,

*Combustion Engineering Corporation, New York. This is an abstract of a paper read June 20 before the Association of Iron and Steel Electrical Engineers at the annual meeting and exhibition, held in Pittsburgh.

the range in size of material heated in this type of furnace is so great that good efficiency cannot be secured. Yet in furnaces heating steel sections varying from billets weighing 150 lb. to ingots weighing 11,000 lb. the fuel consumption ranged between 350 and 450 lb. of coal per gross ton heated.

In one plant where the range is not so great, the size of material heated being from 4 in. square to 8 in. square, the fuel saving, compared to producer gas, was 100 lb. of coal. Forge furnaces heating slabs and ingots for heavy forge work, where the material must be given two heats, show fuel consumption of 600 lb. of coal per gross ton, including the production of approximately 100 boiler-hp. of steam.

Continuous furnaces are generally of either the end-discharge or side-discharge type. Experience has shown that length of skid pipe from knee to cold end wall and the width of furnace determine the output capacity. But the kind of fuel used greatly affects this output. In properly designed furnaces, pulverized coal will sometimes give an increase in output, over other fuels, as high as 60 per cent.

Heating of steel billets, blooms and slabs requires a mellow flame, with minimum luminous streaks, as this is the type of flame whose heat will penetrate the steel with the minimum surface damage and insure the quickest, most uniform heat throughout. Furnaces using pulverized coal require a lower damper than with other fuels, so as to keep the furnace well filled with heat.

Furnace design should be such as to insure practically complete combustion before the gases cross the bridge wall. The roof should be so designed as to insure the proper position of hot spot. Flat roofs of the suspended type give a more uniform heat across the furnace width than do arch roofs. Wherever possible the combustion chamber should be so placed that a portion of the heat can travel under the steel.

In heating sheet bar and sheets, owing to the need for low-temperature flame control, the central plant bin system has proved the most successful. Pulverized coal is today in successful use alike for high-grade, full-finish and ordinary sheets. Combination sheet and pair heating furnaces on ordinary-finish, or tight iron, are successfully producing sheets with 160 to 180 lb. of pulverized coal per net ton of sheets.

Continuous pair heating furnaces are in general use, and give exceptionally good results. In one 8-hr. turn, one mill, using pulverized coal, heated and rolled 400 pairs of bars, 16,320 lb., and put 1600 sheets, 30-gage, 36 x 72 in., weighing 11,780 lb., into warehouse without any wasters or cut-downs. The same mill heated 744 pairs weighing 22,989 lb. on another 8-hr. turn, and on a third it heated 546 pairs weighing 23,840 lb.

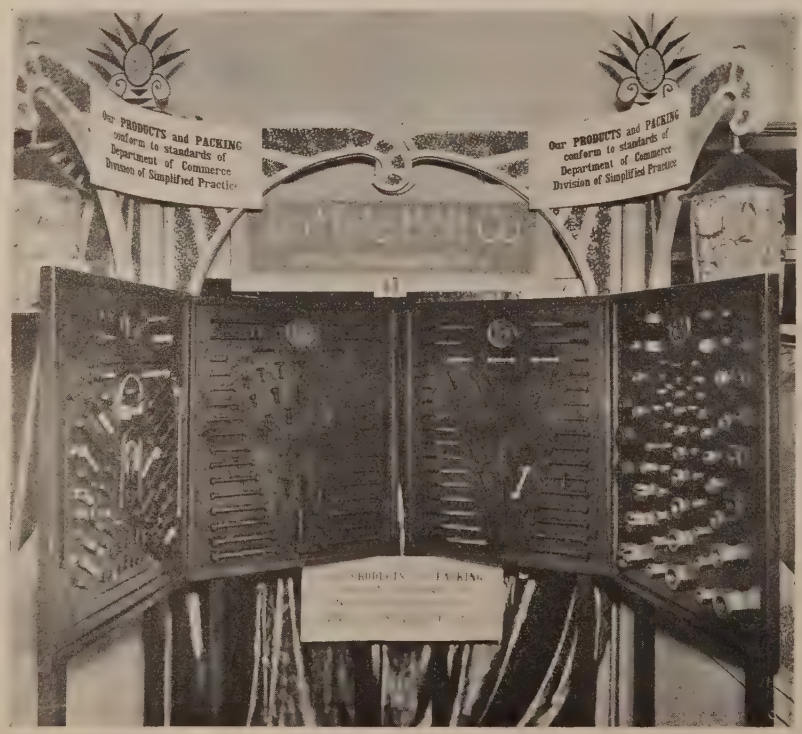
Sheet furnaces of the double-chamber type are operating successfully on pulverized coal, with an average fuel consumption of 151 lb. of pulverized coal per net ton of sheets heated. At the pulverized-coal-fired plant 356 lb. of coal per net ton of steel heated was required for sheet-and-pair-heating and annealing. The above results were all obtained on the production of tight or ordinary finished sheets. For the production of full-finished high-grade sheets specially designed furnaces are required, and the fuel consumption is slightly higher.

Annealing Furnaces

There are some open-flame and continuous type sheet annealing furnaces using pulverized coal successfully, but the principal use of this fuel is in connection with box annealing furnaces. Sheet annealing for both tight and full finish as well as electric steel is being done successfully in many plants. Fuel consumptions of 140 to 182 lb. per ton of sheets are being secured.

In annealing malleable castings fuel ratios of 5 to 1 are being secured, with practically all good castings.

Increase in life of boxes helps to reduce the cost of annealing. Box annealing furnaces in successful operation are of the single-box double-chamber, as well as double-box double-chamber type.


Our PRODUCTS and PACKING conform to standards of Department of Commerce Division of Simplified Practice
Our PRODUCTS and PACKING conform to standards of Department of Commerce Division of Simplified Practice

Company Emphasizes Approval of Simplification Program

TO further the work of the Division of Simplified Practice of the Department of Commerce in the simplification programs carried out in numerous industries, the Government department has requested manufacturers who exhibit at trade conventions to state that their products and packing conform to the standards agreed upon by the industry. The illustration shows the manner in which this was done by the Buffalo Bolt Co., North Tonawanda, N. Y., in its booth at the recent convention of the National Association of Purchasing Agents in Buffalo.

Colorimetric Carbon Test Improved

New Equipment Facilitates Comparison of Color Intensities—Details of Apparatus and Method

BY H. L. CAMPBELL*

ANALYSIS of steel for carbon by the colorimetric method is not a difficult task and may be performed satisfactorily by anyone after a little practice. The advantages of this method over other methods for determining carbon are the small amount of equipment required and the speed of obtaining the results of analyses. Much of that used today is crude. That described in this article was designed by the author and is offered as facilitating the comparison of intensity of color.

The equipment required for the color-carbon determination consists of an analytical balance, a water bath, a colorimeter with glass tubes, and some test tubes ⅝ in. in diameter and 6 in. long.

Water Bath and Colorimeter Simply Constructed

The design of the water bath is shown in Fig. 1. It consists of a copper tank 9½ in. in diameter and 7½ in. high. On the inside of this tank is a movable support for test tubes. A cylinder of sheet copper 8 in. in diameter and 5½ in. high is provided with holes ¾ in. in diameter near the bottom and near the top to assist the circulation of the water in the tank. A cover, which is attached to the top of the cylinder, has openings into which 16 test tubes may be placed. A piece of wire screen is soldered to the copper cylinder within 1½ in. from the bottom. The test tube support may be raised from the tank by a handle which is fastened to the center of the test tube support shown in Fig. 1. The level of water in the tank is indicated on the stem of a glass funnel which is inserted in a rubber stopper at the side of the tank. The water bath may be supported on a tripod or ring stand. Heat may be applied to the tank by means of a ring burner or any type of laboratory gas burner.

*Associate professor of metallurgical engineering, University of Michigan, Ann Arbor, Mich.

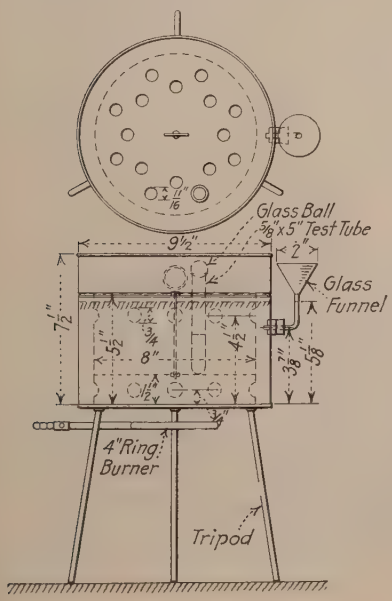


Fig. 1.—Design (Left) of the Improved Water Bath

Construction of the colorimeter is shown in Fig. 2. At one end of an inclosed wooden box an electrical connection is made to an electric light socket on the inside of the box. A blue, daylight bulb is used in this socket. At the other end of the box is a wooden tube through which observations are made. A block of wood forms a partition which divides the inside of the box in two compartments. In this wooden block two round holes are made 9/16 in. in diameter and 5⅛ in. long, as shown.

Directly in line with the opening in the wooden tube, a rectangular hole is cut through the block. A strip of sheet brass is placed across the center of this hole. This strip of brass serves to separate the two glass colorimeter tubes when they are placed in the colorimeter. The round holes 9/16 in. in diameter are continued through the cover of the box. These holes serve to hold the color-comparison tubes during a test. The colorimeter may be placed in any position which will permit convenient observations through the tube of the instrument.

Solution Required and Method Used

The solution required for dissolving the steel samples consists of equal volumes of nitric acid and distilled water. Details of this method of analysis are as follows:

Use 0.200-gram samples of steel and place in test tubes which are set in a bath of cold water. At the same time weight out a 0.200-gram sample of a standard steel which has approximately the same composition as the unknown steel.

A proper amount of nitric acid solution is added from a burette to each test tube; for carbon up to 0.3 per cent, use 3 cc. of acid; for carbon up to 0.5 per cent, use 4 cc. of acid; for carbon up to 0.8 per cent, use 5 cc. of acid; for carbon up to 1.0 per cent, use 6 cc. of acid.

The test tubes are left in the cold water until violent action ceases. Then the water is heated slowly up to 80 deg. C., which should require about ½ hr. The mouths of the test tubes are closed by glass balls to prevent drying of the iron salts on the sides of the tubes. The tubes are shaken several times during the heating periods. After the reactions are completed, the tubes are placed in a bath of cold water.

A solution of the standard steel is poured into one of the comparison tubes. The solution is diluted to a con-

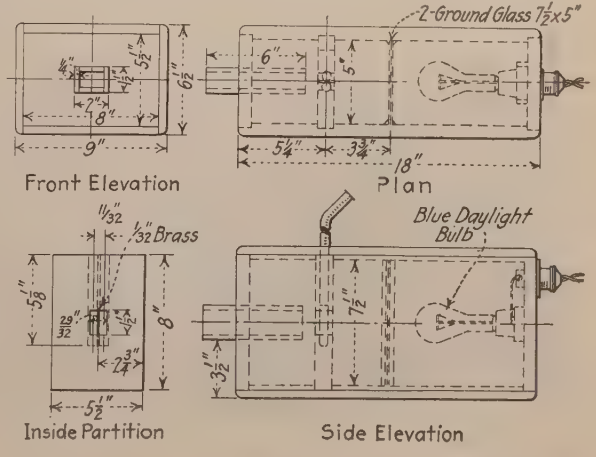


Fig. 2—Details (Right) of the Construction of the Colorimeter

venient multiple of the carbon content of the standard. For example, 0.45 per cent carbon sample may be diluted to 9 cc.; then each cc. will represent 0.05 per cent carbon.

In the other comparison tube, dilute the solution of one of the unknown steel samples until it matches the color of the standard.

Calculating Carbon Percentages

The percentages of carbon in the two samples are to each other as the volumes of the solutions in the comparison tubes. If each cubic centimeter of the solution of the standard represents 0.05 per cent carbon, and 13 cc. is the volume of the solution of the unknown steel when the colors match, the carbon content of the unknown steel is 0.65 per cent.

The standard steel used in this method must be of exactly the same kind as that to be tested, and also similar in its composition and of approximately the same carbon percentage.

Copper, cobalt and chromium interfere with this determination. High sulphur may make the solutions slightly turbid.

Standard samples of steels with different carbon contents may be obtained from the United States Bureau of Standards, Washington.

It is desirable to obtain a quantity of borings from a representative sample of the steel which is being produced and to use this material as a standard for color-carbon determinations, after establishing definitely the carbon content of the standard.

Fusion Welds in Duralumin

Fusion welds can readily be made in sheet or strip duralumin, according to *Oxy-Acetylene Tips* for June. If the adjoining edges are flanged and a corrugation made parallel to the seam about 2 in. from the weld, the expansion and contraction effects will be absorbed. The seams should be opened at one end an amount equal to ¼ in. per foot of weld. Welding should be continuous and produce a well-reinforced seam; rewelding cannot be done.

Welding rods of aluminum containing 5 per cent silicon are satisfactory; this alloy has a lower melting point than duralumin, and some of the contractions in the joint occur before the weld metal is entirely solid. Joints and rod should be scrupulously clean and coated with the flux ordinarily used for welding aluminum, mixed with water to a creamy paste. During welding the oxy-acetylene flame should be given a semi-circular motion with the rod at the center of the circle; the flame is so inclined as to preheat slightly the metal next to be welded. The finished joint should be scrubbed clean of flux with hot water.

Such welds, while perfectly tight against benzol, have a maximum tensile strength of 30,000 lb. per sq. in. If the completed part is quenched in cold water from about 900 deg. F. and then tempered in boiling water, the average tensile strength should be about 43,000 lb. per sq. in. (figured on the cross section of the sheets joined). This compares with 55,000 to 63,000 lb. per sq. in., the average strengths of common duralumin after heat treatment.

Polished Allegheny Metal Sheets Cover Corridor Bridge

ALLEGHENY metal with its glistening silver-like finish covers the pedestrian bridge which now connects the new Chicago Daily News Building and the Northwestern Railroad Terminal, Chicago. It is a chrome-nickel iron, proved to be practically impervious to the corrosive action of the elements, and to withstand severe weather conditions without losing its highly polished finish. Only an occasional wiping with a damp cloth is needed to maintain the luster.

The 5 tons required for the roofing, window frames, and siding of the 125 ft. span were furnished by Joseph T. Ryerson & Son, Inc. The bridge was built jointly by the Chicago *Daily News* and the Northwestern Railroad for the convenience of some 60,000 commuters, who in the past were forced to wait many minutes daily in crossing the heavily congested street between the two buildings. Incidentally, both buildings are using installations of Allegheny metal in their cafeterias. The sheet metal work was done by J. Smith and the windows by the Voigtman Co., Chicago. The bridge is shown below and its position between railroad station and the new building is shown by the arrow in the other picture.

Signs of Overproduction Appearing

Steel Output 45 Per Cent Above Normal, with Demand Falling Off—No Sharp Decline Expected

BY DR. LEWIS H. HANEY
DIRECTOR, NEW YORK UNIVERSITY BUREAU OF BUSINESS RESEARCH

OUR SURMISE that June would show a decided excess of steel production over indicated current requirements has been confirmed. In May, our "composite demand line," based on the activity of the chief consuming industries, declined while steel production increased, and preliminary estimates for June show a continuation of these divergent trends.

This is the first time that a similar situation has appeared since April and May in 1927. Even then, the indicated consumption declined less sharply than last month, and production of steel was relatively less in excess than now appears to be the case.

What this development may mean is uncertain, but apparently we can no longer say that steel production is well balanced with relation to current requirements. It seems fair to say that, on the average, production considerably exceeds requirements. Also it can be said that, if the production is not actually in excess of orders, then the orders are themselves being placed in excess of actual requirements. Statistics throw no light on the latter possibility. All we know is that unfilled orders decreased so much less than usual in June, in spite of the heavy production, as to be equivalent to a virtual increase.

The decline in the composite demand line during May resulted from a downward trend in our adjusted indexes of building activity, automobile production, mining, and exports of iron and steel. Declines in these items more than offset small increases in railroad transportation and in general manufacturing activity.

Chief Consumers Show Declines

Preliminary estimates for June, based on automobile, building and railroad figures (which industries taken together consume half of the steel output), indicate a somewhat larger decline in current requirements than occurred in May. Even allowing for the usual seasonal decline, automobile production was reduced more sharply than in May. It is still very large, but continues to point downward. Building activity was off again and showed the lowest annual rate since 1924. Railroad car loadings fell below May, declining a little more than usual for the season.

This gives a sufficient basis for estimating a downward trend and, as steel production increased sharply in June leads to the conclusion that unless the output is curtailed soon, a condition of over-supply is in the making.

Of course, the activity of consuming industries may pick up. But in what direction does this seem probable? Certainly no sustained advance in building activity is to be expected so long as money remains tight and the bond market is depressed. Automobile production promises to continue large, but its downward trend now seems well established, particularly in the heavier cars. Mining activity is limited, as coal is one of the depressed industries, while copper prices can be maintained only by curtailing production and the oil situation is uncertain, to say the least. Assuming the soundness of these statements, we can hardly expect railroad traffic to expand, considering the season, especially with the recently announced reduction in the estimates of the wheat crop. On the whole it seems that, in spite of the large construction projects, such as pipe lines, and a very good volume of railroad equipment business, steel requirements, both domestic and export, seem likely to decline moderately rather than to expand. The indicated requirements as of June, however, continue very large, being considerably greater than in most of the months of 1927.

Construction and Automobiles Both Point Downward

BRIEFLY, the facts concerning two of the steel industries' customers are as follows:

Building contracts, according to all measures, were off more than usual in June, and were much below a year ago. Our adjusted index based on floor space, and taking the average of the years 1921-1927 as 100, was 101.1. This compares with 109.7 in May and 130.6 last year. It represents the poorest showing made, probably, since November, 1924, and certainly since March, 1925. Moreover, the value of contemplated new construction declined, and permits were sharply reduced. Building permits in 180 cities, making due allowance for seasonal variation, were the lowest since 1921. This situation finds expression in the relatively unfavorable showing made by lumber, cement, brick, sanitary enameled ware, radiators, boilers, galvanized sheets and nails.

Preliminary estimates for automobile production put June at 536,300 cars and trucks, which is an average of about 21,450 a day, against 24,440 in May. This represents a more than seasonal drop and our preliminary adjusted index based on the average of 1921-1927 is 161 against 171 in May and 122 a year ago. May sales by General Motors made an unfavorable showing, as cars sold to consumers fell behind a year ago and dealer inventories showed an unseasonable increase. The two leading manufacturers of low-priced cars are running strongly, but the total production of all cars is evidently ahead of sales and a more than seasonal curtailment that began in May is still under way.

Though both of these industries are thus on the decline, building contracts are still above the average of recent years, and automobile production shows a rate about 60 per cent above that average.

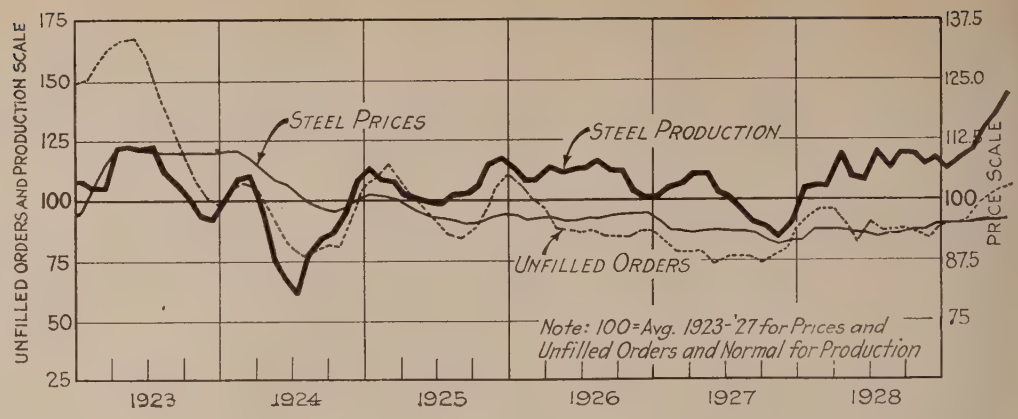
Outpouring of Steel Ingots at Record Rate

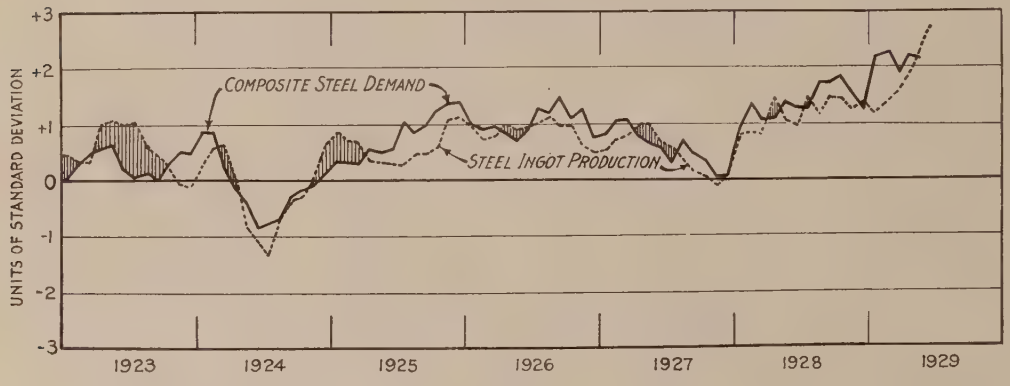
THERE was an extraordinary increase in our June index of average daily steel production. This is the only time since 1922 that steel production has increased considerably more than usual for the season in that month. In 1926 there was a slight gain, but it was not considerable. Only in 1922, during the rapid recovery from the depression of 1921, do we find such a rise at this season. And in 1922 steel prices were rising and unfilled orders rapidly increasing.

The index referred to as nearly 45 per cent above normal and stands at a level unapproached in any post-war year. Unless the industry is in the process of overturning all precedent, such an abnormal rate of production, in excess of indicated requirements, cannot long endure. Barring the unlikely event of an inflationary spurt in general business this fall, a declining trend is to be expected within a very few months.

Unfilled orders decreased slightly, but considerably less than usual for

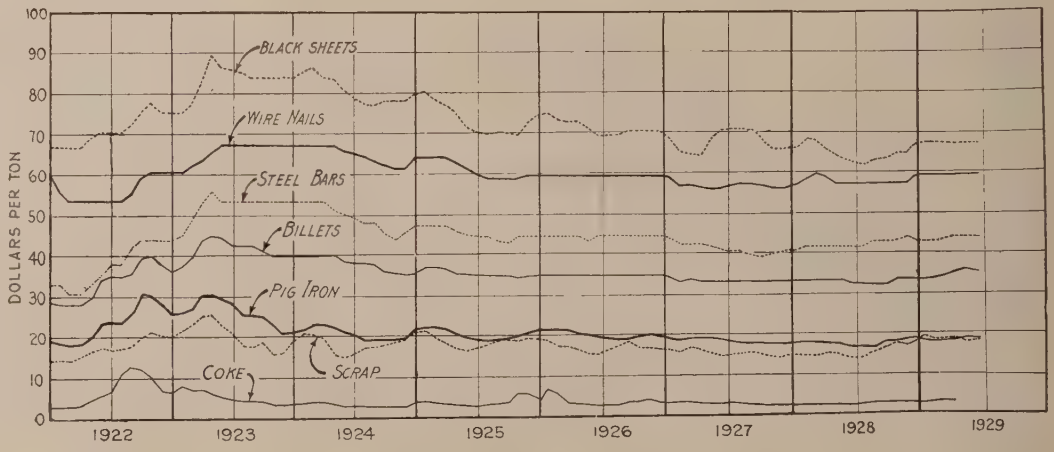
STEEL Production in May Was 36 Per Cent Above Normal Requirements and Went Up to 45 Per Cent in June. Prices may have reached a peak. Unfilled orders decreased by less than a seasonal amount

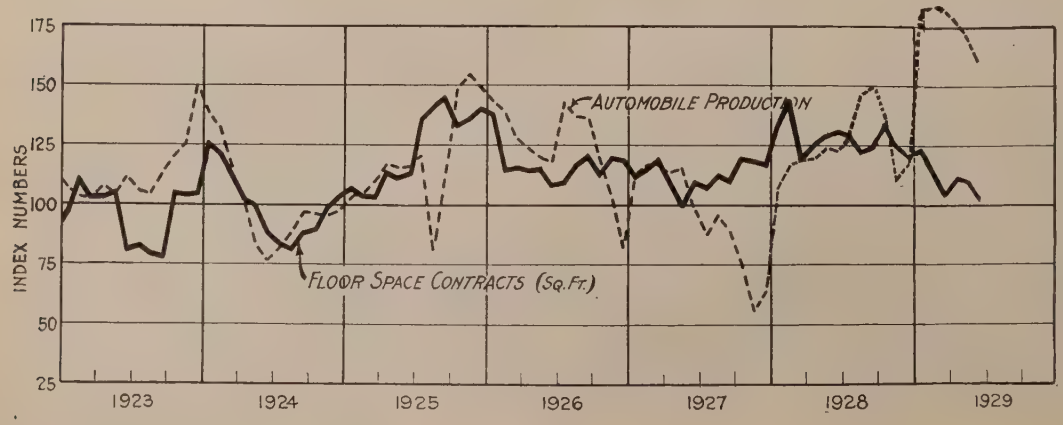




COMPOSITE Steel Demand Has Fallen Well Below the Level of Ingot Production (Adjusted). It is believed that demand will show a further moderate decline

COMPARED with Coke and Semi-Finished Steel Prices, Pig Iron Seems to Be in About a Normal Position; But It Is Relatively Cheap When Compared with Either Steel Scrap or Most of the Items of Finished Steel. It shows no present tendency of strengthening





AUTOMOBILE Output, at High-Record Levels, Has Declined and Will Drop Lower. Building has been moving downward again since the temporary April upturn

the season, our adjusted index rising to 105.5 per cent of the average for the five years 1923-1927, which compares with 90 per cent a year ago. This is the highest level of unfilled orders, considering the season, since January, 1926, when the index was 106.4. Evidently the usual sequence of events is working out and forward buying has increased more than had been anticipated. In view of the heavy production and shipments during June, the showing is remarkable.

Yet the average price of finished steel remains unchanged at only 95.6 per cent of the five-year average. This compares with 92.7 per cent a year ago. The failure of prices to advance, to say nothing of the reported weakness in some items, while unfilled orders and production have increased, suggests that the end of the expansion period is near. It indicates the approach of a decline in unfilled orders. The present rate of steel production can hardly be maintained without that result.

High Pig Iron Output Is Yet Below Steel

ON the other hand, pig iron production held practically level in June, at a rate of 26.7 per cent above estimated normal. This is a very high rate—the highest since July, 1923—but it is notable as being the lowest in comparison with steel production since July, 1922.

In 1922 there was a similar sustained mid-year output of steel, the production curve running above pig iron as much as it did last month. This is an interesting situation. Rarely do we find a peak in the steel cycle without pig iron production running relatively high as compared with steel production. Thus precedent in this respect suggests that further expansion in pig iron production lies ahead, although at present pig iron prices seem too low to allow such a development. At an average of $18.65 in June, THE IRON AGE composite price compares with $18.70 in May and is only 87.2 per cent of the five-year average.

Some Maladjustment in the Price Structure

WE thus find many unusual and conflicting indications. Perhaps the condition of pig iron prices is characteristic of the whole situation. Compared with coke, billets and bars, pig iron prices are about normal. Compared with steel scrap and the average price of finished steel, pig iron may be called cheap. Now that steel production is so high in comparison with pig iron production, a stronger pig iron market would ordinarily be considered probable.

Yet pig iron production has probably never been long maintained at the existing high levels without a decline in prices, and the monthly average of pig iron prices was lower in June (as predicted), a fact that generally has some significance, because this index rarely reverses itself abruptly. Moreover, the building situation has reduced the demand for heating and plumbing fixtures and the weakness of the bond market is reflected in the dullness of the cast iron pipe demand.

Probably this mixed situation means a mixed market, with no decided general trend in the very near future. In general, mixed trends seem probable as to steel prices, the markets varying with the demand, with some weakness where building or automobile uses are the chief factor.

June British Iron and Steel Output Large

LONDON, ENGLAND, July 15 (*By Cable*).—June production of pig iron was 657,800 gross tons and that of steel ingots and castings was 830,900 tons. The June pig iron output was the largest this year, while that of steel was the third largest, which was the 859,900 tons in March.

Comparisons of present output with other years is as follows:

	Pig Iron, Gross Tons	Steel Ingots and Castings, Gross Tons
1913—Av. monthly..	855,000	638,600
1920—Av. monthly..	669,500	755,600
1922—Av. monthly..	408,500	490,100
1923—Av. monthly..	620,000	706,800
1924—Av. monthly..	609,900	685,100
1925—Av. monthly..	519,700	616,400
1926—Av. monthly..	203,500	296,700
1927—Av. monthly..	607,800	758,200
1928—Av. monthly..	550,900	710,400
1929—Av. first quar..	558,000	801,400
1929—April	611,300	808,600
1929—May	654,800	840,400
1929—June	657,800	830,900

The monthly average pig iron output for the half year was 597,900 tons, exceeding the 1928 monthly average of 550,900 tons. Steel output for the first half has averaged 814,000 tons per month, comparing with 710,400 per month last year. The rate this year is the highest since the war.

Seek Funds for Industrial Standardization

The board of directors of the American Standards Association has decided to launch an extensive national campaign to finance industrial standardization activities on a basis merited by the savings which these activities are securing for American industry. A finance committee, consisting of Bancroft Gherardi, chairman, Quincy Bent and Howard Coonley, was appointed to head this effort.

The association is a national federation of 40 government, technical and trade associations and includes in its membership the United States Department of Commerce, of which the Bureau of Standards is a division. It serves to impart a definite status to standards which are prepared by industry in accordance with the association's procedure, through declaring them American standards, after a consensus has been reached among the various groups substantially concerned—producers, consumers, distributors and general interests.

Small Loss in Corporation's June Orders

A small decrease was registered in the unfilled orders on the books of the United States Steel Corporation in June after a fairly large decline in May. Previous to May there were five successive monthly increases. The June decrease was 47,257 tons as compared with 123,596 tons in May. A year ago there was an increase in June of 220,991 tons. The table gives the data for the last 18 months.

	1929	1928
Jan. 31.....	4,109,487	4,275,947
Feb. 28.....	4,144,341	4,398,189
Mar. 31.....	4,410,718	4,335,206
Apr. 30.....	4,427,763	3,872,133
May 31.....	4,304,167	3,416,822
June 30.....	4,256,910	3,637,009
July 31.....	.....	3,570,927
Aug. 31.....	.....	3,624,043
Sept. 30.....	.....	3,698,368
Oct. 31.....	.....	3,751,030
Nov. 30.....	.....	3,673,000
Dec. 31.....	.....	3,976,712

Civil service examinations for mechanical engineer on mine equipment are to be held by the United States Civil Service Commission, Washington. Applications must be on file not later than Aug. 14. The entrance salary is $3,800 a year. Information may be had from the commission or at the post office or custom house in any city.

Employment and Payroll Totals in Identical Plants in May and April (a)

	Establishments	Number on Payroll		Weekly Payroll (b)	
		May	April	May	April
Iron and steel.....	204	285,897	282,591	$9,585	$9,487
Foundry and machine shop.....	1,064	283,800	279,847	8,992	8,890
Machine tools.....	150	40,397	40,198	1,350	1,358
Hardware makers.....	68	32,823	32,618	865	852
Steam and hot-water appliances	112	33,199	34,585	982	1,022
Stoves	119	20,838	20,704	594	585
Structural ironwork.....	169	27,890	27,413	847	830
Cast iron pipe.....	41	12,009	11,777	280	275

(a) United States Bureau of Labor Statistics.
(b) Thousands of dollars.

Wooden Cable Reel Heads Bored in One Operation

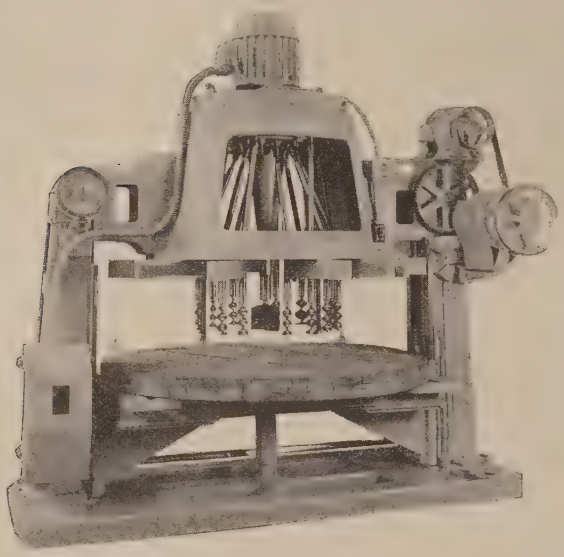
RUGGED construction, large universally adjustable spindles and powerful feed mechanism are basic features of a vertical multiple-spindle borer developed by the B. M. Root Co., York, Pa., for boring all the holes in the heads of wooden wire and cable reels. Clearance between the upright columns is 74 in., which permits handling reels 72 in. and less in diameter.

The machine has a heavy one-piece cast base, cored columns and two table supports. The latter have long square-lock gibbed bearing contact on the slideways of the columns, and carry a series of I-beams that provide a bed for attaching the wood top upon which the stock to be bored is mounted. The table is counterweighted to lessen the resistance of the feed works while boring. It drops by gravity when released by the knockout rod, its downward movement being controlled by two friction brakes and a pneumatic plunger. There are two motors, a 5-hp. feed motor mounted with the feed mechanism on the right-hand column, and a 15-hp. vertical spindle-drive motor, which is located on the spindle hood. Push button control is provided, both motors being started and stopped together.

Feed control is by means of a foot trip mounted on the base. When depressed, this trip causes the table to be raised automatically to the boring bits. An adjustable knockout rod releases the feed at any point, permitting the holes to be bored to a predetermined depth.

The spindle hood, attached to the upright columns, carries the spindle drive motor, the gear plate and the gear casing for the spindles. The transmission gears in the top of the case are of helical type and run in grease. All spindles except the center spindle, which is fixed, are of universal type, and are adjustable 6 in. in all directions from vertical. They are bronze bushed and equipped with ball bearings to take end thrust.

The distance from the spindle noses to the table in lowest position is 16 in. and distance from spindle noses to floor is 44½ in. The wood table measures 53 x 60 in. The height of the machine is 9½ ft. overall, and the floor space occupied is 5 ft. 2 in. by 10 ft. 4 in. The shipping weight is 8000 lb.



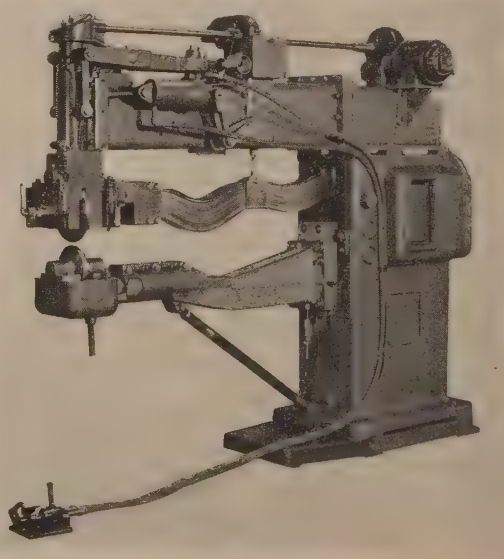
ALTHOUGH Designed for Boring Cable Reel Heads, the Machine May Be Used for Boring Other Wooden Pieces

Rugged Seam Welder for Continuous Operation

A SEAM welder known as Model 375, capable of making joints 48 in. from the nearest edge, has been developed by Thomson Electric Welding Co., Lynn, Mass. It is rated at 175 kva. and is air operated. Current control is automatic.

The upper roller or electrode is motor driven, as shown in the view; the lower roll idles. These and their bearings are unusually rugged to resist service abuse, yet easily replaced when repairs or dressing is necessary. Rollers are water cooled, and the whole machine is built for heavy-duty operation, 24 hr. a day.

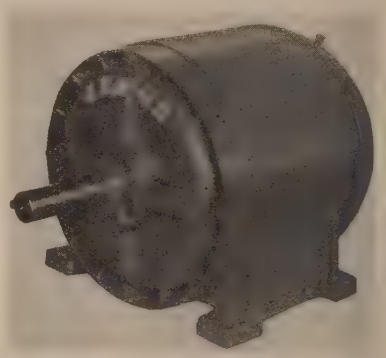
When a different class of work is to be done, the entire lower roll unit can be quickly replaced by another of appropriate design.



FLAT Sheets May Be Welded to Make Continuous Wide Strips. The depth of throat is 48 in. Automatic current control is provided

Abrasion-Proof Induction Motors Offered

A NEW line of inclosed electric motors, in ratings of from ½ to 50 hp., 550, 440 and 220 volts, 2 and 3-phase, 25 and 60 cycles, has been developed by the Armor Electric Mfg. Co., Erie, Pa. The motors are of the squirrel-cage induction type, and are said to be particularly suitable for use under conditions where the atmosphere is likely to be impregnated with explosive fumes or abrasive dust, such as chemical plants, coal mines, foundries or cement plants.



Completely Inclosed, This Motor Is Offered as Proof Against Abrasion or Explosion

The stator is of the skeleton-frame type, the frames being made of especially heavy castings, with the feet cast integral. Rigidity of construction is secured by heavy flanges and cross ribs. The core is made up of

high-silicon steel laminations, keyed to the stator ribs, and having partially closed slots. The core steel has been selected as a means of improving both the power factor and general efficiency of the motors. The windings are of the concentric type, with one phase to the slot. Timken roller bearings are used.

Clamshell Bucket Handles Variety of Material

A POWERFUL digging bucket that can be adjusted for the kind of material being dug has been brought out by the Erie Steel Construction Co., Erie, Pa. It has been named the Multi-Power from its working action, which combines the multiple rope and the lever arm principles. The former provides power, but slows up the action of the bucket, while the lever arm principle gives speed as well as power. It is stated that the combination provides better digging and

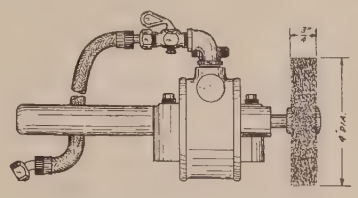
Bucket for Digging or Rehandling. It can be adjusted for kind of material being dug

faster operation and also enables designing a bucket requiring considerably less head room, with less line to overhaul. The bucket can be rigged with from two to six parts of line.

Scoops are made oversize with but little added bucket weight. Counterweights are in 100-lb. units which are attached to the bucket by two bolts and can be put on or taken off conveniently by one man. Stops are of improved design; they are relocated and made longer so that they add reinforcement to the arm. The main bearing has been made wider to better withstand shocks of digging and to eliminate excessive wear. All ropes end in a wedge and socket. Power arm sheaves may have either plain or roller bearings. The sheaves are of steel and are equipped with cleaners. Heavy down-thrust lugs are provided on the bucket scoops to relieve the rivets, the down thrust being on the edge of the bucket, thus forcing the scoops into the materials while closing. Lubrication is by the Alemite system.

Air-Operated Wire Brush

FOR the rapid removal of rust, scale and loose paint from the surface of steel and other materials before painting, the Paasche Airbrush Co., 1909 Diversey Parkway, Chicago, is offering a portable air-operated wire brush cleaner.



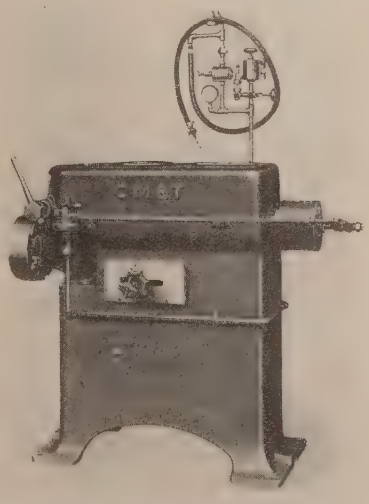
Wire Brush Machine Weighing 10 Lb. It is 4½ in. in diameter and 11 in. long

The machine weighs 10 lb., and is 4½ in. in diameter and 11 in. long. It may be equipped with a ¾ x 4 in. or 1 x 6-in. wire wheel. From 8 to 16 cu. ft. free air per minute is required, depending upon the speed of operation, which is regulated by means of an air valve.

Gear Burnisher Arranged for Rapid Operation

UNIFORMITY of pressure applied to the gears being burnished, minimum of set-up time, and rapid operation are features claimed for the Bolender gear burnishing machine marketed by the City Machine & Tool Works, Dayton, Ohio.

The uniform pressure is obtained by means of an air cylinder and valves which control the movement of a member carrying two burnishing rolls. The pressure applied is registered constantly on a dial gage and can be checked at a glance by the machine operator or foreman. Gears are burnished with their center line vertical, to assure a straight bearing on gears of any weight or length. Gears of various lengths or diameters are accommodated by moving the supporting member upward, downward or sidewise by means of hand knobs shown in the illustration. It is claimed that from 2300 to 3000 gears, 6-8 pitch, 16 to 30 teeth, can be burnished in a 9-hr. day.



From 2300 to 3000 Gears of 16 to 30 Teeth, 6-8 Diametral Pitch Can Be Burnished in 9-Hr. Day

Motor-Driven Grinders with 6 and 8-In. Wheels

NEW motor-driven grinders equipped with 6 and 8-in. wheels have been brought out by the Hill-Curtis Co., Kalamazoo, Mich. Either bench or pedestal mounting can be supplied and the motor may be either alternating or direct current of stand-

Bearings and Motor Are Fully Inclosed

ard specifications. Oversize ball bearings are mounted in the end head in close proximity to the wheels, and all bearings are entirely inclosed to protect them from dust and grit. There are no holes or open slots in the motor housing or end bells, which eliminates danger to the windings from accumulations of emery grit and dust.

Two-pole quick make-and-break switch is standard equipment. Wheel guards and tool rests are adjustable to the wear of the wheels, and can be removed conveniently when the character of the work does not permit their use. Single-phase, alternating current machines are equipped with an improved commutating-type repulsion-induction motor. Low voltage is said to have no objectionable effect, the starting current being unusually low, thereby adapting the machine for attachment to lighting circuit outlets.

Rights to manufacture the oscillating spindle sander, heretofore made by the Emmert Mfg. Co., Waynesboro, Pa., have been acquired by the Porter-Cable Machine Co., Syracuse, N. Y.

Advanced Method of Installing CO_2 Meters

A NEW method of installing CO_2 apparatus, working on the thermal conductivity principle, has been developed by the Brown Instrument Co., Philadelphia. In this system of analyzing gases, the relative capacity of air to conduct heat, as compared with the gas to be analyzed, is used to operate electrical indicating and recording instruments calibrated directly in per cent of CO_2.

In the illustration is shown the latest method of installing this apparatus, eliminating the trouble heretofore experienced due to clogging and gas leaks. A primary filter consisting of perforated metal, supporting asbestos cloth, projects into the flue or furnace. The pipe supporting this primary filter slopes downward from the filter, at 5 to 10 deg., so the moisture is drained off.

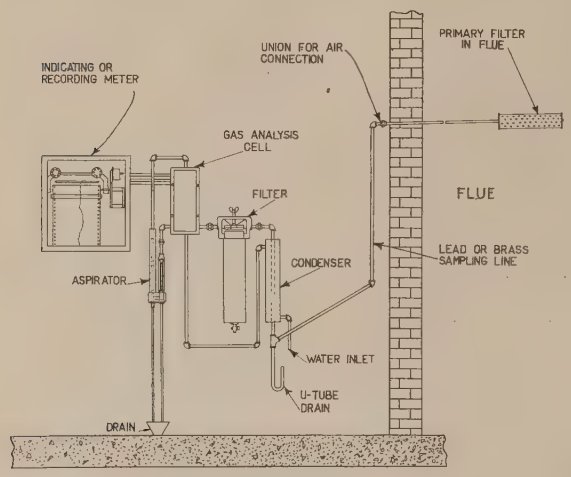
From here the sampling line runs directly down to the U-tube drain, which collects excess moisture and acid. The gas then passes through a condenser, where it is cooled to prevent any accumulation of moisture in the analysis cell.

A union connection is made at the sampling tube so the primary filter can be blown out occasionally. In practice, this blowing out is done infrequently. A secondary filter consisting of a container with steel wool and cotton is placed in the line in front of the cell.

In the thermal conductivity cell are four platinum filaments of comparatively heavy wire, mounted in gold plated cells with gold lined passages. Two of the cells contain air. The other two contain gas to be analyzed, the thermal conductivity of which is to be compared to air.

From the cell, a 5-wire cable runs to indicating or recording instrument calibrated directly in per cent of CO_2. This instrument may be located at a distance, without affecting the time lag.

This new piping arrangement, with improved condenser, filter and cell assembly, is said to mark a substantial advance in the perfection of CO_2 analyzing apparatus operating on the thermal conductivity principle.

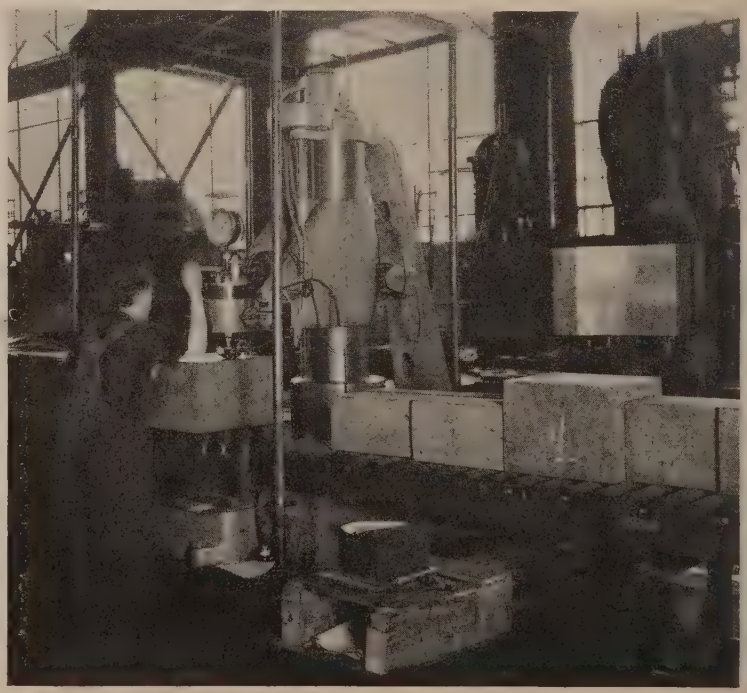


New Arrangement for Connecting Up Instruments for Measuring Carbon Dioxide Content of Flue Gases. This is said to provide exceptionally accurate results

Improved Accurate Method of Testing Die Blocks

A SPECIALLY built Brinell machine for the testing of all die blocks has been installed by the Heppenstall Forge & Knife Co., Pittsburgh, manufacturer of Hardtem die blocks, shear knives, electric induction steels, and miscellaneous heavy forgings.

The face surface of each die block is stamped near each Brinell ball impression, showing the diameter in millimeters of this impression. In conjunction with the company's engineers, this machine was built by the Pittsburgh Instrument & Machine Co. The illustration shows the machine in operation.



Die Blocks Being Tested for Brinell Hardness by a Specially Built Machine

Causes of Porosity in Cast Bronzes

ARGUMENTS which seek to blame the cause of porosity in bronze castings on oxides, gas occlusions, improper mixing or similar secondary matters, without full reference to the volume change on freezing and the freezing range, are likely to be very misleading; these two latter effects are of supreme importance, said H. C. Dews in his paper, "The Metallurgy of Cast Bronzes," before the Third International Foundrymen's Congress in London, June 11 to 14.

There seems to have been a general avoidance in the past of any discussion of such a point of view, and on account of this remission, there is at present a disappointing paucity of important fundamental data thereon. If foundrymen were to develop a more sympathetic attitude toward research and a greater freedom in discussing their troubles, there is little doubt that research could quickly be guided into channels of profitable incidence on practice.

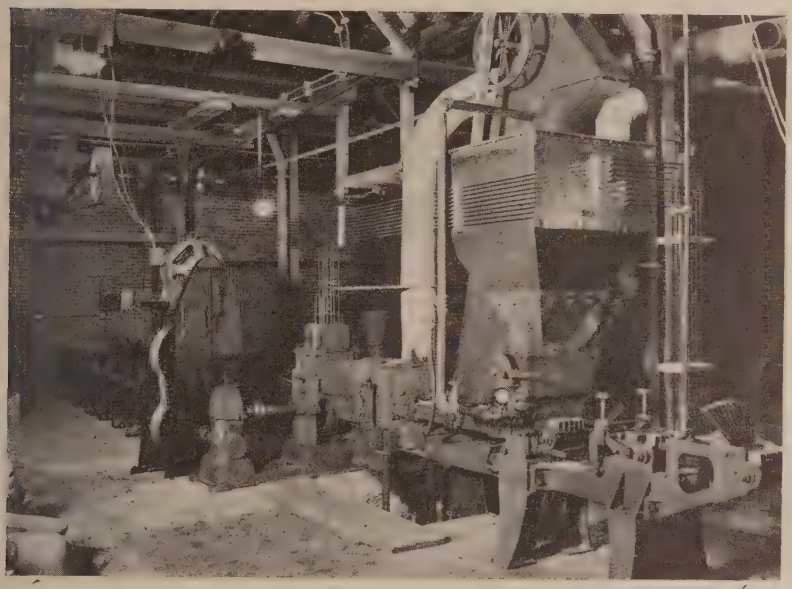
Cleaning Strip Steel Mechanically

New Machine Obviates Need for Pickling to Remove Scale

A MACHINE has been developed and put into operation for cleaning or removing scale from hot-rolled and annealed strip steel, eliminating the acid pickling process. This was designed and developed by C. A. Dreisbach and his associates of the Standard Equipment Co., Inc., New Haven, Conn. Mr. Dreisbach has designed various types of equipment used by foundries and manufacturing companies for cleaning and removing scale from castings, forgings, heat-treated springs and other articles. Most of these employ the principle of abrasive blasting with compressed air at low and high pressures. He attempted to use the same principle in cleaning cold-rolled steel-strip rod and wire but found that, although the abrasive material would remove the scale, it would at the same time produce pits in the stock. This, of course, was an objectionable feature. It was found by investigation that the depth and size of the pits thus formed varied in relation to the angle of impact.

After various tests covering the best kind of abrasive, the angle of impact and the compressed air operating pressure for producing the most effective results in removing scale and producing a pitless smooth surface, Mr. Dreisbach made the experimental machine which was then used for making further tests in cleaning hot-rolled and flat annealed stock up to 1 in. wide and also No. 5 rod and wire. The result was a machine which removed the scale and produced a smooth finish.

Further experiments were necessary to determine the most efficient sizes, designs and combinations of air nozzles, scouring chambers, etc., during which there was produced a combination that increased the linear cleaning feet to a maximum output with the lowest consumption of compressed air, abrasive and wear on the scouring chamber, air nozzles, etc. Finally a complete machine was designed, the parts of which may be removed and replaced in a few minutes, without taking out the strands of stock from the machine. This machine was found to remove scale and oxide from copper alloyed rod at the rate of 50 to 70 ft. per min. Another machine of the same model cleans steel golf shafts at the rate of 6 per min.



Scouring Machine Developed to Clean Strip Steel Instead of Pickling

A steel company which manufactures high and low-carbon cold-rolled strip steel installed the first model of these automatic scouring machines, shown in the illustration. This machine will take a continuous feed of one or more strips up to 7 in. wide and is cleaning two sides and edges of hot-rolled high-carbon steel at the rate of 35 to 45 ft. per min. and annealed and tempered stock at 40 to 60 ft. per min. in one pass.

The control levers for operating the pulling roll are within easy reach of the supply-stock man at the front end of the machine. Each winding drum, or reel, is provided with a clutch foot-lever control to stop the machine to remove the finished coil and take up and wind new coil coming through. The abrasive, or sand, in the scouring machine is used over and over, and the dust is removed by an exhaust system into a cloth screen dust arrester.

Another machine is now being designed which, it is claimed, will take one or more strands of stock up to 14 in. wide and wider models are contemplated. Other types of scouring machines will also handle wire and rod up to about ½-in. diameter in any number of strands equal to the width or capacity of the scouring chamber. The patents covering these machines are owned by the Standard Equipment Co., Inc.

Builds Ladder with Steel Safety Rungs

STEEL rung safety ladders and steel tread safety platform ladders are now being offered by the Lourie Mfg. Co., 410 Sharples Building, Chicago.

The steel rung safety ladder is made in straight and extension types; also in a combination extension and trestle with quick attaching and parting device for attaching the ladders in trestle formation and for separating them to make an extension. These ladders are equipped with flat surface steel rungs bolted to straight grained spruce side rails, each end of the rung being further reinforced by a penetrating ear which in assembly is embedded in the side rail.

The two points of contact at each end of the rung produce a bracing effect that serves to prevent twisting or weaving. With this system only 5/16-in. holes are required in the side rails instead of the usual 1-in. holes for wooden rungs, and there is no shrinking of rungs, of course. The extension ladders slide rail over rail, permitting ladders to be extended to within one foot of the total length. The ladders may be tightened with a wrench at any time.

Platform ladders are constructed of straight-grained spruce throughout and have a large working platform of ample size for two men. This platform has heavy steel angle supports with an automatic lock which cannot be released until the weight is removed from the ladder, when it can be easily operated with one hand. Steps are supported with steel angle brackets and tied to the side rails with bolts.

An addition to its by-product coke plant at Aliquippa, Pa., will be made for the Jones & Laughlin Steel Corporation by the Koppers Construction Co. The addition will consist of 81 Becker-type ovens with an annual coal carbonizing capacity of 850,000 net tons. Auxiliaries will include additions to by-product, benzol and material handling plants and boiler house. On completion, the plant at Aliquippa will have 203 Becker type ovens with an annual coal capacity of approximately 2,000,000 tons.

Mechanical Engineers' Part in Metal Congress

The iron and steel division of the American Society of Mechanical Engineers, from Sept. 11 to 13, will hold its fall meeting in Cleveland in conjunction with the National Metal Congress. The first session will be on Wednesday afternoon, Sept. 11, with presentation of the following papers:

"Developments in Blast Furnace Design and Practice," by Arthur G. McKee, Cleveland.

"Ore Handling Bridges," by Alexander C. Brown, president Industrial Brownhoist Corporation, Cleveland.

"Oil-Electric Locomotives in Steel Mill Transportation," by W. L. Garrison, assistant manager locomotive department, Ingersoll-Rand Co., New York.

On Wednesday evening there will be a dance and entertainment, and a plant inspection trip will be made Thursday morning. Thursday afternoon there will be a joint session with the American Welding Society, when the program will be as follows:

"Non-Destructive Tests of Welds," by Elmer A. Sperry, president American Society of Mechanical Engineers.

"Foreign Practice in Welding Boiler Tubes and Drums," by George A. Orrok, consulting engineer, New York.

"Automatic Arc Welding of Thin Sheets," by W. L. Warner, industrial heating and welding engineering department, General Electric Co., Schenectady, N. Y.

Friday morning two papers will be read, one on "Alloy Steels in Iron and Steel Mill Equipment," by M. J. R. Morris, Central Alloy Steel Co., Massillon, Ohio; and the other on "Evolution of Drives for Mill Table Rollers," by K. Feller, Schloemann Engineering Co., Pittsburgh.

The final session, held jointly with the American Society for Steel Treating, is scheduled for Friday afternoon, Sept. 13. The program includes the following papers:

"Distribution of Heat in Combustion Furnaces," by M. H. Mawhinney, Electric Furnace Co., Salem, Ohio.

"Advantages of Producer Gas as a Fuel Compared With Other Forms of Fuel," by Victor Windett, Wellman, Seaver, Morgan Co., Cleveland.

"Powered Coal Cupola," by D. H. Meloche, American Radiator Co., New York.

Charles Piez Nominated President of A. S. M. E.

Charles Piez, chairman of the board, Link-Belt Co., Chicago, has been nominated as president of the American Society of Mechanical Engineers and will be elected by letter ballot to take office at the time of the next annual meeting of the society in the first week of December. Nominees for vice-president for a two-year term are Paul Doty, chairman Minnesota State Board of Registration, St. Paul; R. E. Flanders, manager Jones & Lamson Machine Co., Springfield, Vt.; E. L. Jahncke, president and general manager Jahncke Dry Docks, Inc., New Orleans, La., and assistant secretary of the United States Navy; and Conrad Lauer, vice-president Day & Zimmermann, Inc., Philadelphia.

For the three-year term as manager the following have been nominated: Harold V. Coes, Ford, Bacon & Davis, Inc., New York; J. D. Cunningham, president Republic Flow Meters Co., Chicago; and C. F. Hirschfeld, Detroit Edison Co., Detroit.

Representatives of the society to the American Engineering Council for a two-year term will be L. P. Alford, editor *Manufacturing Industries*, New York; Thomas D. Campbell, president Campbell Farming Corporation, Hardin, Mont.; William B. Ferguson, production manager Newport News Shipbuilding & Dry Dock Co., Newport News, Va.; Charles E. Ferris, dean of engineering University of Tennessee, Knoxville, Tenn.; John L. Harrington, Harrington & Cortelyou, Kansas City, Mo.; William H. Kenerson, chairman division of engineering, Brown University, Providence, R. I.; John H. Lawrence, vice-president Thomas E. Murray, Inc., New York; R. C. Marshall, Jr., Sumner Sollitt Co., Chicago; A. A. Potter, dean of engineering schools at Purdue University, LaFayette, Ind.; and Charles Piez, ex-officio.

Advisory Committee for Distribution Census

An advisory committee of business men and economists which will cooperate with the Department of Commerce in formulating plans for taking the first national census of distribution in 1930 has been announced by Secretary of Commerce Robert P. Lamont, as follows:

F. M. Feiker, managing director, Associated Business Papers, Inc., 52 Vanderbilt Avenue, New York.

Dr. F. M. Surface, assistant director, Bureau of Foreign and Domestic Commerce, Washington.

Sydney Anderson, president, Millers' National Federation, Mills Building, Washington.

Dr. L. D. H. Weld, H. K. McKann Co., 285 Madison Avenue, New York.

Dr. Melvin T. Copeland, professor of marketing, Graduate School of Business Administration, Harvard University, Boston.

W. E. Freeland, Freeland & Warren, Inc., Statler Building, Boston.

E. D. Borden, manager, domestic distribution department, Chamber of Commerce of the United States, Washington.

William Nelson Taft, editor, *Retail Ledger*, Philadelphia.

C. J. Whipple, president, Hibbard, Spencer, Bartlett Co., Chicago.

Henry S. Dennison, president, Dennison Mfg. Co., Framingham, Mass.

E. M. West, Dodd & West, 11 West Forty-second Street, New York.

F. A. Gosnell, Brumback Realty Co., 37 Wilson Boulevard, Clarendon, Va.

Paul T. Cherington, J. Walter Thompson Co., 420 Lexington Avenue, New York.

Herbert P. Sheets, managing director, National Retail Hardware Association, Indianapolis.

The first meeting of the committee will be held Wednesday, July 17, at the Department of Commerce in Washington. Secretary Lamont and Dr. Julius Klein, assistant secretary of commerce, will be present at this meeting, in addition to William M. Steuart, director of the census, and Dr. Robert J. McFall, chief statistician for distribution, under whose immediate supervision the census of distribution will be taken.

It is expected that the scope of this first census of distribution will be determined at the meeting of the committee and that plans will be made for securing the cooperation of the business world. Subcommittees may be named to deal with particular phases of the census.

Scrap Institute to Survey "Direct Dealing"

A thorough survey of every phase of direct dealing between consumers and producers of scrap will be undertaken by the Institute of Scrap Iron and Steel, Inc., it was announced by Benjamin Schwartz, director general, at a meeting on July 10 of the Pittsburgh chapter, at the William Penn Hotel, in Pittsburgh. On the recommendation of Mr. Schwartz, the executive committe of the institute, at its last meeting, made an appropriation, authorizing the creation of a research bureau, the first object of which will be to study the subject of direct dealing.

This study will involve the marshalling of an array of economic facts and evidence by an entire industry. The survey, which will be under the supervision of the director general, will be placed at the disposal of consumers, producers and all agencies concerned with the scrap iron industry. The principle of reciprocity, in the sale of finished steel products and the purchase of scrap, and its effect on the steel industry, will also probably be included.

Abrasive Manufacturers' Export Association

The Durex Abrasives Corporation, an association of manufacturers of abrasive materials, has been organized under the Export Trade Act to export abrasive products. Offices will be maintained at 82 Beaver Street, New York. Officers are A. J. Sidford, president; W. L. McKnight, F. J. Tone and D. W. Fernhout, vice-presidents; R. W. Young, treasurer; and L. K. Southard, secretary.

Members of the association are: American Glue Co., Boston; Armour & Co., Chicago; Baeder Adamson Co., Philadelphia; H. H. Barton & Son Co., Philadelphia; United States Sandpaper Co., Williamsport, Pa.; Behr-Manning Corporation, Troy, N. Y.; Carborundum Co., Niagara Falls, N. Y.; Minnesota Mining & Mfg. Co., St. Paul, Minn.; and Wausau Abrasives Co., Wausau, Wis.

Toncan iron, a rust-resisting product of the Central Alloy Steel Corporation, Massillon, Ohio, has been specified for 1000 all-metal box cars recently placed by the Pennsylvania Railroad. Approximately 5000 tons of this steel will be required.

To Make Stainless Steel in Canadian Plant

Stainless steel will be manufactured by a plant at Shawinigan Falls, Quebec, which is now near completion, Assistant Trade Commissioner L. A. France, Montreal, reports to the Department of Commerce.

When completed the new plant will provide for the manufacture of alloy steel castings of all kinds, including stainless heat-resisting steels, corrosion-resisting steels, wear-resisting steels, carbon steels, specially annealed steels and other alloy steels.

The company owning the new plant will be the first in Canada to specialize in the manufacture of such products. Its equipment will include an electric heat-treating furnace and two electric steel furnaces of 1 ton and 2 tons' capacity.

To Locate New Sheet Mill at Tarentum, Pa.

A new company for the rolling of light-gage steel sheets up to 72 in. in width is being organized in the Pittsburgh district, with a mill to be located at Tarentum, Pa. The plant will be located on the site of the No. 2 factory of the Pittsburgh Plate Glass Co. at Tarentum, which was abandoned in 1914, and the company is to be known as the Tarentum Steel Corporation.

Griffith Robinson, industrial engineer, with offices at 1706 First National Bank Building, Pittsburgh, is active in the organization of the new company and will be its president. William Cole, who was identified with the West Penn Steel Co., Brackenridge, Pa., prior to its consolidation with the Allegheny Steel Co. earlier this year, will be works manager of the Tarentum company. He has been associated with the West Penn company for 20 years and previously was with the Seneca Iron & Steel Co., Buffalo, and the Eastern Rolling Mill Co., Baltimore. Virgil McClay, who has also been identified with the West Penn company for several years, most recently as assistant to the president, will also be associated with the new company.

The Tarentum plant will be equipped with a group of six mills and utilize the double-mill system of manufacture. A number of innovations in sheet rolling will be introduced, particularly relating to the handling of material in process and the saving of man power. The mill will have a capacity of 50,000 tons annually, and will employ from 400 to 500 men.

The capitalization will consist of 60,000 shares of preferred stock with a par value of $50 a share, and 100,000 shares of common with no par value. About half the stock is expected to be sold locally at Tarentum.

Scrap Institute to Apply for Revised Freight Rates

The executive committee of the Institute of Scrap Iron and Steel, Inc., has authorized the filing of a petition with the Interstate Commerce Commission for the examination and reconstruction of the entire freight rate structure in the United States on scrap iron and steel. It is expected that this hearing will be made under the Hoch-Smith resolution, as a result of which the freight structure for finished steel products was recently changed to a mileage basis.

In view of the fact that the decision of the Interstate Commerce Commission on finished steel products did not include scrap iron and steel, the Institute of Scrap Iron and Steel has decided to make a test case, in behalf of the entire industry, for the purpose of eliminating inequalities and broadening markets for scrap.

Sheet Steel Pulley Market Growing Rapidly

Fabricators of sheet steel pulleys have developed a market of fast growing proportions, states the current issue of "Making Markets," published by the Sheet Steel Trade Extension Committee. One of the advantages of these pulleys is their smoothness of groove, which minimizes wear on the belt and makes replacement less frequent.

Requests Amendment of Zinc Ore Tariff

WASHINGTON, July 16.—Stephen S. Tuthill, secretary American Zinc Institute, requested the metals subcommittee of the Senate Finance Committee to amend the zinc ore section of the present tariff act as follows: Zinc bearing ores of all kinds, except pyrites, containing not more than 3 per cent zinc, 1½c. per lb. on the zinc contained therein. The exception protects sulphur in pyrites chiefly used in making sulphuric acid, which in turn is essential to the manufacture of superphosphate, the most widely used farm fertilizer.

A PARK for employees' cars has been provided at the Zanesville, Ohio, plant of the American Rolling Mill Co. An oil and gas station stands at the entrance, giving the attendant control over cars entering or leaving. The station is open from 5 a. m. until midnight, thus covering all three turns of the steel workers. Attendants fix tires and grease cars at a nominal price.

Yale & Towne Mfg. Co. Buys Stuebing-Cowan

The Yale & Towne Mfg. Co., Stamford, Conn., has announced the purchase of the assets and good-will of the Stuebing-Cowan Co., Cincinnati, manufacturer of hand lift trucks. James C. Morgan of the Yale & Towne company will have supervision of the Stuebing-Cowan branch of the business. Walter C. Stuebing will be Mr. Morgan's assistant. William Stuebing will remain as superintendent of the plant in Cincinnati, where a large modern addition is being built to take care of the expanding business.

German Steel Exports Remain High

Although less by 30,594 metric tons, exports of iron and steel products from Germany maintained during May the greater part of the tremendous increase accomplished during April, Trade Commissioner James E. Wallis, Jr., Berlin, reports to the Department of Commerce. Trade totaled 534,825 tons in May, whereas during the preceding month it was 565,419 tons, the decrease amounting to approximately 5½ per cent.

German production increased during May, the output of pig iron rising from 1,105,098 tons in April to 1,133,134 tons in May, with comparable figures for steel at 1,414,916 tons and 1,421,047 tons, respectively. Furnaces in blast at the close of the month totaled 102, an increase of three over the number in operation at the end of April.

Reduction in Fuel Briquet Output in 1928

Fuel briquets produced in the United States in 1928 are reported by the Bureau of Mines at 947,423 net tons, valued at $7,705,617, or an average of $8.13 a ton. This represents a reduction from the figures for 1927 and 1926, but otherwise was the highest, both in quantity and value, ever reported. In 1927 there were 970,468 tons, valued at $7,985,165, or an average of $8.23 a ton; in 1926, 995,332 tons, valued at $8,533,179, or an average of $8.57 a ton.

Production is seasonal—October to January, inclusive, are the four big months, accounting for about one-half the year's total. While 1928 showed a loss of 2.4 per cent from 1927 in aggregate output, the Eastern States reported a gain of 16.3 per cent, being offset by heavy declines elsewhere.

General Electric Orders Gained 32 Per Cent

Orders received by the General Electric Co. for the three months ended June 30 amounted to $119,351,248, compared with $90,431,957 for the corresponding quarter of 1928, an increase of 32 per cent, President Gerard Swope has announced. For the six months ended June 30 orders received amounted to $220,716,456, compared with $170,357,797 for the first six months of last year, an increase of 30 per cent.

Truscon Has New Product

The Truscon Steel Co. has announced the manufacture of a new product, Truscon integral door jambs and trim. It combines door frame, bucks, lintels, jamb, casing, door stop, transom bar and transom casing in one piece which can quickly be erected as an integral part of the wall. Details and specifications of this product are set forth in leaflet No. 159, just published by the company.

More Steel Shipbuilding

A greater tonnage of merchant vessels (mainly steel ships) is now under construction in the United States than at any time for two years, according to Lloyd's Register of Shipping. The total is of 119,098 gross register tons, as of June 30, compared with 96,439 tons on March 31. Not since June 30, 1927, when 147,000 tons was on the ways, has so large a volume been reported. Of the present total, 25,200 tons will be propelled by internal combustion engines, mainly of the Diesel type.

The Long Island Machinery Exchange, dealer in new and used machine tools, has leased building at 12-10 Astoria Avenue, Astoria, Long Island.

Production and Shipment of Raw Materials and Finished Products in June

	June, 1929	May, 1929	June, 1928
Trackwork for tee-rail track (a), net tons..	14,838	16,333	13,716
Six months ended June 30	85,437	.....	77,129
Electric industrial trucks and tractors (b), shipments	201	211	116
Six months ended June 30	1,103	.....	726
Portland cement produced (c) (d)	16,775	16,151	17,497
Portland cement shipped (c) (d)	18,939	16,706	18,421
Portland cement stocks, end of month (c) (d)	27,433	29,597	25,029

(a) American Iron and Steel Institute.
(b) United States Department of Commerce.
(c) United States Bureau of Mines.
(d) Thousands of barrels.

Advances to Third Rank in Manufacturing

Illinois is now the third manufacturing State in the Union, with a total value of manufactured products in 1927 amounting to $5,386,003,235, an increase of about $383,000,000 over 1923, when Illinois was fourth in industrial work, says a bulletin issued by the Illinois Manufacturers' Association. Some of the 1927 census figures for Illinois, just made public by the United States Census Bureau, are as follows:

Horsepower employed	2,456,997
Agricultural implements produced	$102,206,815
Brass, bronze and other non-ferrous alloys	34,745,584
Car and general construction and repairs, steam railroad shops	101,340,406
Cars, electric and steam railroad, not built in railroad shops	75,585,816
Copper, tin and sheet iron and steel work	19,555,972
Forgings, iron and steel	18,672,992
Foundry and machine shop products, not otherwise specified	245,148,773
Iron and steel, blast furnaces	70,943,000
Iron and steel, steel works and rolling mills	208,563,956
Motor vehicles, not including motor cycles	35,631,587
Printing and publishing, job and book	167,874,087
Printing and publishing, newspaper and periodicals	169,623,924
Slaughtering and meat packing, wholesale	663,054,316
Smelting and refining, non-precious metals	25,543,803
Smelting and refining, zinc	19,696,455
Steam fittings and steam and hot water apparatus	57,608,342
Structural and ornamental iron and steel work	47,826,604
Tin cans and other tinware	49,416,023
Tools, not including edged tools, machine tools, files and saws	13,022,578
Wrought pipe	14,027,121

Although Illinois continues to hold first place in the production of corn, the State, generally speaking, has changed from an agricultural to a manufacturing State. When first admitted to the Union, nine-tenths of the people were engaged in agricultural pursuits, while now not more than one-tenth are employed on the farms.

The center of electricity production in the United States is at a point 3 miles from Urbana, Ill.

The Apollo Steel Co., Apollo, Pa., is installing a new normalizing furnace and other equipment to replace its present facilities, and which will increase production materially. Early in the year the company considered the construction of open-hearth furnaces adjoining its present plant, but that plan was postponed as a result of an assured supply of semi-finished steel. Other plans affecting the company's output, however, are being contemplated, announcement of which will be made in the near future.

The International Tube Cartel has established a central office in Luxemburg, which operates under the name "Office Statistique des Tuyaux en Fonte," and is popularly known as "Ostef."

This Issue in Brief

Welds duralumin sheet or strip by flanging adjoining edges and making a corrugation parallel to the seam, about 2 in. from the weld. This permits expansion and contraction effects to be absorbed.—Page 158.

* * *

Signs of steel overproduction appearing, says Dr. Haney. Output is no longer well balanced with current requirements, according to statistician.—Page 159.

* * *

Don't blame porosity in cast bronzes on oxides, gas occlusions, or improper mixing, without considering volume change on freezing and the freezing range. Foundrymen will mislead themselves if they leave freezing factor out of their calculations.—Page 164.

* * *

Considerable savings result from use of pulverized coal in open-hearth furnaces, compared with oil, natural gas or city gas, says combustion engineer. Clogging of checkers can be prevented by proper preparation of the fuel.—Page 155.

* * *

Determines carbon content of steel simply and quickly by means of the colorimeter method. Equipment required is inexpensive and the test is easy to make. Sample to be tested is compared with sample of known analysis.—Page 158.

* * *

World War placed France in commanding position as far as iron ore resources are concerned, says economist. France gained by conquest half of the largest of the world's ore fields, and another of almost equal size has been developed on her own soil, so she is now first in ore resources in Europe, and perhaps in the world.—Page 154.

Malleable foundry holding fuel-ratio record for the United States melts 3.8 lb. of iron for each pound of pulverized coal. Further reduction of fuel consumption is expected to result from use of furnace waste gases in operating air heaters.—Page 155.

* * *

Aluminum alloy pistons are used in new Wright Whirlwind engines. Pistons are cross-ribbed on the underside of the head and are fitted with full-floating hollow pins, held in place by expanding spring wire locks, to protect the cylinder walls.—Page 150.

* * *

Heat-treating furnace production records are kept for two years. Card record of each lot heat-treated gives furnace number, specification, truck number, order number, quantity, packer's and furnaceman's names, and total time of heat treatment.—Page 145.

* * *

Sharpest building decline since 1925, says economist. Adjusted index based on floor space was 101.1 for June, says Dr. Haney, as compared with 109.7 in May and 130.6 for June, 1928. Value of contemplated new construction is also lower, and building permits have declined considerably.—Page 159.

* * *

Feeds parts through hardening furnace on a continuous metal belt. Speed is regulated from 5 to 20-min. passage through furnace, depending on the size of the part. At discharge end parts fall through air-tight chute into a quenching tank, on to a conveyor, which carries them into tote boxes resting on a roller conveyor.—Page 145.

Leaky iron castings detected by use of microscope. The two main causes of leaks, porous grain and shrinkage cavities, can be readily observed under the microscope.—Page 147.

* * *

Heat-treating specifications for new parts are furnished by research department of cash register plant. Pyrometer operator, heat-treating department and research department, all are given cards containing the specifications.—Page 145.

* * *

Forward buying in steel greater than anticipated, says economist. Unfilled orders do not reflect falling off in current requirements, Dr. Haney thinks, indicating that buying is in excess of needs.—Page 161.

* * *

Recommends that foundrymen use microscope to detect faults in castings. Not simply a laboratory instrument, says metallurgist. Multiplying the power of the human eye by 100, it enables the foundryman to determine quickly the approximate strength, machinability and other properties of his castings. It also helps him ascertain what caused defects.—Page 146.

* * *

Machine tool purchases for July will run about 20 per cent below June, according to reports. Despite the seasonal recession in buying, it is estimated that current business shows a gain of about 20 per cent over July, 1928. —Page 197.

* * *

Chrome - nickel iron sheets, practically impervious to atmospheric corrosion, are used to cover outdoor corridor bridge. These alloy sheets will withstand severe weather conditions without losing their highly polished finish.—Page 158.

A. I. FINDLEY
Editor

THE IRON AGE

W. W. MACON
Managing Editor

ESTABLISHED 1855

Seven Years of Prosperity

IN less than three months we shall have completed a period of seven years of prosperity. There are definite reasons for fixing Oct. 1, 1922, as the date of beginning. The length is unprecedented. Why has the period been so long, and what does it mean?

There has been so much argument about "prosperity"—recalling the vogue two years or so ago of the expression "profitless prosperity"—that the gage we are here using to determine this period should be stated. We take it that to prosper is to get things which one wants. It will be granted that things produced are received by somebody and that production is confined to things which are wanted. In a succinct manner the Federal Reserve Board has presented monthly statistics since 1919 of "industrial production," including manufacturing and mining, the index numbers being weighted for seasonal variation. The computations are of course made purely on a quantity basis, with no reference to market value. The index of industrial production is therefore an index to "prosperity."

Fittingly the base period selected is the average of 1923-4-5, a very fair standard. Entirely failing to secure a prosperity rating are the years 1919, 1920 and 1921, for they showed only 83, 87 and 67 respectively. In 1922 there was a slow climb to 88 in September, whereupon there was a jump to 94 for October. That is when prosperity began. The month was entitled to be six points below the standard, as an annual increment must be allowed for the growth of the country.

There have been only short lulls in this general period of seven years of prosperity. The first lasted a few months, centering in July, 1924, and political uncertainties were chiefly responsible for it. For the second half of 1927 there was a mild lapse, much less pronounced than that in steel production, which had rather a poor half year.

No previous period of prosperity was anything like so long. After the Civil War came eight years of activity, but there were pronounced bad spells, and when the period ended with the panic of Sept. 19, 1873, it was found that much of the supposed wealth was in uncollectible promissory notes and a good deal of the physical property that had been created could not be employed. Afterward the longest period was the three years ended in October, 1907.

What has been called "true prosperity" has been defined as that which carries within it the means of its perpetuation. There lies the distinction between the older periods and the present one. Many commentators in recent years have referred to what they considered an anomaly, that apparently we had prosperity, but prices did not rise. Whatever goes up must come down. The most important thing a business man then had to know was when to "get on" and when to "get off." To misjudge by a few months was fatal.

With steady prices we have had the prosperity that can perpetuate itself, instead of that which brings about its dissolution. The latter sort was marked by the vicious spiral. Wages and prices rose, an advance in either bringing about a rise in the other. Advances in cruder materials were passed on with increments in more finished products. That was the ascending spiral and then came a corresponding descent. The faster the movement up the sooner it was over.

Things are done so quickly nowadays that if our prosperity had been according to the former fashion we should have had a shortening rather than a lengthening of the old-time period. The present period will end under the accumulated weight of our indiscretions, but the buoying forces promise to be in the ascendant for a considerable time longer.

Servants of the Public

HENRY FORD is now a very different man from him who financed a peace ship during the war, and expressed numerous economic vagaries. Even in his business administration his views have changed. No longer is he trying to manufacture all sorts of articles, and recently he became willing to part with his railroad.

In a recent interview he expressed himself favorably on the "formation of a nation-wide power monopoly as the best means of reducing the rigors of human toil and giving cheap light and power to the people." He asserted that all talk about exploitation by industrial combinations for private profit is of no importance, "the important thing being what the nation as a whole gets as the result of the economic and technical advantages of such combinations."

This evinces good sense. The telephone and telegraph companies, the light and power companies and the public service corporations generally (including the railroads) have given the people many enjoyments. Monopoly by them is the last thing in the world to be feared; for what they want naturally is to increase their business and not to strangle it.

Anyway, these corporations, as well as all other corporations, are mainly owned by the public, who as shareholders in them are reckoned by millions. The politicians who consider it good business for them-

selves to hit a corporation on the head whenever they see it, and who gravely organize investigations of power trusts and other mythical monsters, are behind the times. But politicians are never very good at their own business in a big way, their expertness seldom rising above petty chicane.

The chief differences between the American system of corporate management and the Russian system of state management are that the former is intelligent and efficient, while the latter is just the opposite; and that participation in the fruits of corporate management is reserved for thrifty people, while state control aims to take care of the unthrifty, in which, of course, it fails by virtue of its own ignorance and inefficiency, and consequently absence of means.

The American system makes managers servants of the public. It commands them to improve efficiency, reduce costs for the benefit of the public and surrender in income taxes a large portion of such personal salaries or profits as may accrue to them. It permits them to play golf, and in other ways to enjoy themselves, in order that their efficiency may be increased. In the end there is the inheritance tax as the final leveler.

These servants of the public may sometimes think of themselves as slaves, and may squirm at times. But they have become inoculated with the virus of working for the sake of accomplishment and are seldom able to quit. The myriads of people who live in good houses and have plenty of fuel, food and clothing; who ride around over good roads in 25 million automobiles; who live in well regulated communities, and who have a wide range of intriguing amusements, must agree that the American capitalistic system is better socialism than any the socialists themselves have ever been able to invent, seeing that the main results of the latter have been hunger, cold and general misery.

Human Side of High Productivity

AN analysis of employment in the Worcester, Mass., works of the American Steel & Wire Co., comparing the years 1920 and 1928, shows an extraordinary improvement in two of the most vital factors, labor turnover and absenteeism. In both respects the percentages of 1920 represented large unnecessary production costs. At the North works, for instance, it was necessary in 1920 to hire 2231 men in order to maintain a working force of 2500. Last year only 382 men were hired to maintain a force of 2000, and the actual turnover caused by the drift of workers in and out was reckoned as about 200, the remaining 182 representing the normal and unavoidable changes resulting from death, disability or retirement. Thus, where the turnover in 1920 was nearly 90 per cent, that of 1928 was about 10 per cent.

In the same works in 1920 absenteeism ran between 5 and 6 per cent. In 1928 it was little more than 1 per cent. In the one year 150 employees on an average were away from their tasks, in the other year the number was less than 25. In considering this and similar statistics, some correction should be made because 1920 was a peak year and 1928 only an average year. But at Worcester the first half of 1929, with increased plant activities, has shown little if any change in the attitude of workers toward their jobs. Neither turnover nor absenteeism has increased to an appreciable extent.

Taking up the slack of industrial unemployment, which has been in progress during the first half of 1929, signifies much more in the increase of production than ever before under like general conditions. For the worker's average output is much more than it used to be, partly because he is working more steadily and is not nearly so prone to shift his employment, but in a larger measure because owners have steadily continued the introduction of better equipment and methods. In the Worcester works, for example—and it is typical—it is found that the output of the 4500 men now on the payroll equals that of 1920, when the same plants were operating with over 6000 men.

A like change for the better is to be found in most lines of successful manufacture. As one plant manager who went through the experience has put it, the initial stimulus came in the war, when the urgent, menacing need for munitions gave industry a kick so vigorous that managements were fairly catapulted into action. The pressure for large-scale operation has continued through the intervening years until in many cases production per man-hour has increased to a degree that is nothing short of revolutionary.

Americanizing Industry Abroad

NOW that Ford automobile factories are being opened in Europe, we may expect the extension there of American mass production, whether or not there is emulation of the Ford practice of paying high wages. Obviously the real significance of the Ford colonization is in the extent to which it will implant in Europe the idea of intensive manufacture and the Ford demand for full output from the worker. The system grants wages as high as possible for results obtained. With it, thinking in terms of the buying power of the individual and fostering broad and sustained consumption is basic. When the principle is adopted by numerous industries, the better economic status of the wage earner is a corollary to high mechanization of the plant.

Only a little while ago the first signs of oncoming depression in the United States were commonly met with plans to reduce wages as the first move in getting lower costs. Talk of sustaining buying power by sustaining wages rarely entered into plans for the continued well-being of a given industry. Now the pay envelope is the very last resort in retrenchment, and since the war wage reductions have been almost wholly limited to industries known to be in a bad way.

In Europe on the other hand the old idea still prevails that wages must closely fluctuate with the tides of business volume and this view obtains widely because neither employer nor employee has yet conceived of the wage as dependent upon output. Europe still awaits the outstanding manufacturer who is daring and far-seeing and financially strong enough to put the new doctrine into practice.

Four years ago two talented young Britons, after widely touring the United States, returned home to write the book much read by industrialists on both sides of the water, "The Secret of High Wages."

Their most important conclusions were compressed into these two paragraphs:

> The very life of this country [Great Britain] depends on two things: deliberate adoption by employers of a policy of high wages, and intelligent understanding on the part of the men that every mechanical aid to efficiency must be used to the utmost.
>
> The organization of cheaper production on American lines must be accepted and restrictions on individual output must be swept away.

Our manufacturers would file no caveat against such European imitation of American production methods as is thus forcefully urged upon British industry. They realize that international trade relations would only be bettered were European manufacturers to follow Henry Ford in the effort to increase per capita consumption through efficient production, high wages, high demand, reduced manufacturing costs, lower prices, sustained worker earnings, continued demand—and so repeating around the circle. By that route more can be accomplished for rational competition in world trade and for higher standards of living than by all the protests that can be piled up at Washington against American tariffs, present or proposed.

Large Gain in Alloy Steels

THAT the American alloy steel industry has been making rapid strides is common knowledge. But no such increase in production as took place in 1928 was expected. The American Iron and Steel Institute reports 3,214,909 gross tons of alloy steel ingots and castings for last year, an increase of 683,100 tons or 27 per cent over the output of 1927. The latter year gained but 2.8 per cent over 1926, and in 1926, which was a large steel year, only 1.25 per cent more alloy steel was made than in 1925.

Undoubtedly an important factor in last year's increase was the use of large tonnages of rustless iron by synthetic nitric acid plants. Recent articles in THE IRON AGE have given details. The announcement last week concerning the employment of rustless iron for the roof and trimmings of the new 64-story Chrysler Building in New York points to a considerable development also in construction. The larger consumption in the motor industry is well known, as is that in aviation. It is to be noted that medium-manganese steel —1.00 to 1.75 per cent—is not included in the production figures. Such steel, for rails at least, is not now statistically classified as an alloy steel, though it well might be.

German Study of High-Frequency Steel Furnaces

SYSTEMATIC investigation of the metallurgy of the high-frequency induction furnace has been in progress at the Kaiser Wilhelm Institute für Eisenforschung in Düsseldorf, Germany, since 1926. The main objects of study are discussed in *Stahl und Eisen*, of May 9, 1929, by H. Neuhauss.

Larger Furnace Means Lower Power Per Ton Need

Increasing the size of the furnace results in pronounced decrease in power for melting. Thus, with a furnace of about 100 lb. capacity, between 1250 and 1300 kwhr. per ton are required when melting scrap. By going to the 600-lb. furnace, this figure can be reduced to about 700 kwhr. Indications are that a 1-ton furnace will compare favorably in power consumption with the latest types of arc furnaces.

The present usage in high-frequency melting resembles crucible practice in that no attempt is made to refine the charge, a high quality of raw materials being used. Two plants using this process for high-quality steel are Edgar Allen & Co., Sheffield, England, and the Heppenstall Forge & Knife Co., Pittsburgh.

Advantageous for Low-Carbon Steels

There are, however, several possibilities for refining operations where the "iron-less" induction furnace may be used most efficiently. One of these is the production of low-carbon steels such as Armco iron or Toncan metal. So rapid is the refining action that it is possible to desulphurize in an acid-lined furnace using a lime-fluorspar-ferrosilicon slag. On experimental 120-lb. melts, this slag was left on the bath for 3 min., giving a final sulphur content of 0.010 per cent. This is followed by a thick sand slag with addition of aluminum and manganese. Several minutes are then allowed for the inclusions to be eliminated. Meanwhile re-oxidation is prevented by blowing nitrogen on the slag. The metal is poured without further additions and has the following average analysis:

Carbon—0.02 per cent.
Manganese—0.04 to 0.10 per cent.
Silicon—0.1 to 0.3 per cent.
Sulphur—0.01 per cent.
Aluminum—Trace.

It is not in the least red-short and can be rolled into perfect seamless tubes. Such materials, due to extreme freedom from inclusions, would be exceptionally resistant to corrosion.

Duplexing With the Cupola

Another possibility is a combination with a cupola melting steel scrap and charging liquid pig iron into the induction furnace. Since the carbon content of the liquid iron can be rapidly lowered in the induction furnace, a means is offered whereby gray iron plants could produce simultaneously small steel castings. Experimentally 12 lb. of pig iron (3.25 per cent carbon) have been decarburized (to 0.04 per cent carbon) in 18 min. by means of a stream of hot air directed on the bath. The duplex process may also be useful in regions where no iron is produced, but where scrap is available.

Perhaps of more direct interest is the use of the induction furnace in making stainless steels. The following methods have been used:

> Alloying low-carbon steel with low-carbon ferrochrome.
>
> Decarburizing high-carbon ferrochrome in the induction furnace and adding to fluid low-carbon steel.
>
> Alloying low-carbon steel with cheap, high-carbon ferrochrome and decarburizing the melt.
>
> Production of a 15 per cent Cr pig iron in the induction furnace directly from chrome and iron ores, and decarburizing this iron to give a low-carbon stainless chrome-iron.

In decarburizing the chrome-iron alloys, the high-frequency furnace seems to offer definite advantages. Among these are the ability to reach a very high temperature, thus preventing loss of chromium, and the constant stirring action which results in very rapid refining.

To Use Rustless Iron in Chrysler Building

What appears to be first use on a large scale of rustless iron in building construction is noted in the case of the new Chrysler Building at Forty-second Street and Lexington Avenue, New York. There are several types of rustless iron sold under different trade names, but in general it is a low-carbon, alloy steel containing either a high percentage of chromium or a high percentage of chromium and nickel. The particular brand to be used in this building is stated to be Nirosta, which contains about 18 per cent chromium and 8 per cent nickel, with a carbon content of 0.10 per cent or less. The companies producing this material include Central Alloy Steel Corporation, Crucible Steel Co. of America, and the Ludlum Steel Co.

Rustless iron is to be incorporated in the dome of the building. The height of the dome itself is equivalent to about five stories. On several floors the doors and trimmings are to be made of rustless iron and it is pointed out that this is eminently suitable for this use because it can be given a velvety finish. On the outside of the building all the louvers, or ventilators, are to be made of this same rust-resisting material.

The metallurgists of the companies making this particular brand of rustless iron have cooperated with the metallurgists of the research laboratory of the Chrysler Motor Corporation in the selection of forms and finishes in which the rustless iron is to be used.

Metal Roofdecks Are Stocked in Detroit Warehouses

The Gemfire Steel Co. and the Truscon Steel Co., Youngstown, Ohio, have begun stocking sections of Armco ingot iron roofs in standardized lengths of 19½ ft. in Detroit warehouses to serve users in adjacent territory quickly. The roofdecks come in narrow sections which can be used in any desired lengths. Other warehouse stocks of metal roofdecks will be established by these companies in large cities throughout the country.

Oil Burner Company Makes Changes

Leod D. Becker, owner and publisher of *Fuel Oil Journal*, and a pioneer in the oil burner industry, having disposed of his publishing interests, has been elected president of Electrol, Inc., St. Louis, manufacturer of oil burners. Executive and sales offices will be moved to 227 East Forty-fifth Street, New York. W. T. Koken, who has been president of Electrol since 1925, becomes chairman of the board. M. E. Simpson, formerly general manager of the Electrol Distributing Corporation, which has been merged with Electrol, becomes vice-president in charge of sales. Lionel L. Jacobs continues as vice-president and general manager of the company. Han A. Kunitz, formerly technologist of the American Oil Burner Association, has been appointed chief of research engineering. Lewis L. Scott, inventor of the original Electrol burner, who is a vice-president, continues as general consultant on patents and engineering. The officers, with W. L. Bechtold, of G. H. Walker & Co., St. Louis investment bankers, and W. R. Bush, New York, constitute the directorate.

Manganese Ore Output Small in 1928

There has been little change in the rate of production and shipments of manganese ore, containing 35 per cent and more of manganese, in the United States, in the past three years, according to the United States Bureau of Mines. In 1928, 46,636 gross tons, valued at $1,212,679, was shipped, compared with 44,741 tons, valued at $1,151,918 in 1927, and 46,258 tons, valued at $1,228,663, in 1926. In 1928, 15,430 tons was chemical ore and 31,206 tons, metallurgical ore, compared with 17,011 tons of chemical ore and 27,730 tons of metallurgical ore in 1927, and with 19,728 tons of chemical ore and 26,530 tons of metallurgical ore in 1926.

It will be noted that there has been a falling off of approximately 2000 tons a year in the shipments of chemical ore during this period, which is a continuation of the decline from the peak of shipments, 24,637 tons in 1924. Shipments of metallurgical ore were 3500 and 4700 tons higher, respectively, than the shipments in 1927 and 1926.

Shipments of metallurgical ore from Montana were 12,044 tons in 1928, compared with 10,124 tons in 1927. The plant owned by the Domestic Manganese & Development Co. was put into operation during March and treated rhodochrosite from the Emma mine at Butte, Mont., operated by the Anaconda Copper Mining Co. It produced 11,118 tons of calcined and nodulized material containing 56.45 per cent of manganese. In 1927 the larger part of the metallurgical ore shipped from Montana was from mines at Philipsburg. High-grade shipments from New Mexico and Virginia increased somewhat and those from Nevada dropped off entirely.

Imports of manganese ore in 1928 totaled 427,708 tons, containing 207,808 tons of manganese, and valued at $5,395,949, compared with 622,067 tons, containing 308,630 tons of manganese, and valued at $8,487,016. There were large decreases in imports from all of the important producing countries.

Domestic shipments of ferromanganese in 1928 were 310,122 tons, the largest on record, with the exception of those for 1926, and indicated a consumption of approximately 620,000 tons of manganese ore. The domestic production of manganese ore has changed little in the past three years. Assuming that the metallurgical manganese ore produced in the United States in 1928 offset the ore imported for chemical uses, the total quantity of ore imported, 428,000 tons, was available for consumption in the manufacture of ferromanganese. This tonnage is 192,000 tons less than that required by the manufacturers of ferromanganese in 1928. The difference is explained largely by the decrease in stocks in bonded warehouse, officially reported as 183,477 tons of manganese content on December 31, 1927, and 114,497 tons on December 31, 1928, a difference of 68,980 tons of manganese content, equivalent to at least 138,000 tons of ore. The remainder of the ore required, approximately 55,000 tons, may have been taken from stocks at the plants of consuming companies.

British Foreign Trade in Iron and Steel Products

(In Gross Tons)

Item	Imports May	Imports June	Exports May	Exports June
Pig iron and ferroalloys	7,637	11,376	68,141	40,884
Ingots, blooms, billets and slabs	97,244	85,670	2,615	1,395
Iron bars, rods, angles	17,442	15,358	3,293	1,932
Steel bars, rods, angles	46,182	41,205	29,934	22,522
Structural steel	9,417	9,614	6,119	5,254
Hoops and strips	17,754	18,064	4,867	4,236
Plates and sheets	19,311	17,922	50,581	40,667
Galvanized sheets	....	....	71,723	43,531
Tin Plate	....	....	57,684	48,715
Cast tubes, pipe and fittings	3,910	2,909	12,330	6,151
Wrought tubes, pipe and fittings	8,915	6,639	33,173	22,783
Rails	1,093	868	32,342	22,714
Other railroad material	538	392	13,897	10,216
Wire	7,134	7,071	8,209	5,619
Wire cable and rope	....	....	2,501	1,608
Wire nails, including staples	6,474	5,448	260	145
Other wire manufactures	843	773	1,808	1,565
Nails, tacks, rivets and washers	1,364	1,377	1,919	1,332
Bolts, nuts, screws for metal	1,165	1,002	3,126	1,818
Iron and steel castings	1,388	1,361	352	193
Iron and steel forgings	707	461	124	112
Other manufactures of iron and steel	8,738	6,698	37,776	23,455
Total	257,256	234,208	442,774	306,847

From cablegram of William L. Cooper, commercial attaché, London, to the United States Department of Commerce.

Iron and Steel Markets

Deliveries Easier on Some Products

Common Sheets and Cold-Rolled Strip in Supply at Slight Price Concessions—Two Gas Lines Will Take 440,000 Tons of Pipe—Southern Pig Iron Weaker

NEW projects that will take large tonnages of steel continue to come into the market, offsetting the slight falling off in consumption in some manufacturing lines.

Gas pipe lines, building construction and railroad requirements figure prominently in actual and prospective business.

Evidence also of a stepping up in demands from the automobile industry comes in the form of requests for increased shipments to begin Aug. 1 from companies which had cut schedules preparatory to bringing out new models.

Farm machinery manufacturers, in estimating their steel requirements for the next three months, are planning for a high rate of output. Manufacturers of steam shovels and other road-building equipment are taking steel in undiminished quantities.

Notwithstanding the reduced volume of buying of some steel products, notably cold-rolled strip and some grades of sheets, on which production has caught up with the demand, the steel industry as a whole has felt no marked curtailment in general consumption.

The United States Steel Corporation subsidiaries are working virtually at capacity, and this is true also of most of the independent companies. Taking into account the slight losses in output due to heat and shutdowns for necessary repairs to equipment, present production is probably not five points below the 99 per cent operating rate of recent months.

The small loss in the unfilled tonnage of the Steel Corporation, as of June 30, gave evidence of the fact that the volume of buying last month kept close to the heavy shipments. The June decrease of 47,257 tons was less than one day's output.

Lessening of the extreme pressure for some lines of steel, while not materially reducing the total output, has made it easier for steel companies to arrange mill schedules, and better deliveries to consumers have resulted. A further effect is the relieving of the scarcity of semi-finished steel, which is now adequate to meet the needs, although mills have had little opportunity to replenish the reserves which have been used up in recent months.

Gas pipe lines, which so far this year have taken about 600,000 tons of steel, will provide further large orders. The line from the Texas Panhandle to Chicago, to be built by the Central States Natural Gas Co., requires 191,000 tons, most of which the Milwaukee fabricator of electrically welded pipe is expected to furnish. Another gas line from the Southwest into the Chicago district for Henry L. Doherty & Co., New York, calls for 250,000 tons, soon to be awarded. A group of public utility companies has been formed to lay a total of probably 1000 miles of pipe lines into Pennsylvania, New Jersey and New York.

In steel building construction fresh projects call for more than 74,000 tons, the largest amount reported in any one week this year. Included are 15,000 tons for a bridge at McKees Rocks, Pa., 18,000 tons for two buildings in Chicago and 8300 tons for subways in New York. Awards amounted to 26,000 tons. In Chicago, 40,000 tons of structural steel work is soon to be placed, not figuring the large tonnages for the mill buildings to be erected by the Illinois Steel Co.

Railroad buying has been chiefly in track material. The Great Northern bought 30,000 tons of rails and its orders for accessories will amount to 10,000 tons. The Northern Pacific and the Pennsylvania roads are expected to take 15,000 tons of rails each, and the latter will also buy 5000 tons of track supplies. The Norfolk & Western, following its orders for 39,000 tons of rails, will need 3500 tons of track supplies. Railroad buying of bridges and repair material has also been fairly large.

In the lines of steel in which buying has let down slight price weakness has developed. This has taken the form chiefly of giving the minimum quotations to a larger circle of buyers. Blue annealed sheets have now been affected along with black and galvanized, but full finished and specialty sheets are well sold up and quotations remain steady. Some makers of cold-rolled strip steel need orders, which are being freely taken at 2.75c., Pittsburgh, the premium of $2 a ton for small lots being waived in instances.

Active third-quarter buying has failed to develop in pig iron. Aggressive selling by Southern furnaces, which have heavy stocks of iron, has made Northern buyers more cautious. A few large sales of Southern iron have been made at $14, Birmingham, notably one of 15,000 tons to a Louisville melter. Southern basic iron has been offered at $13.50, furnace. Northern pig iron prices remain steady except in New England, where competition not directly attributable to the Southern situation has caused some unsettlement. Jackson County silvery iron has declined $1 a ton.

THE IRON AGE composite price of finished steel remains unchanged at 2.412c. a lb. for the sixteenth week, while the pig iron composite has dropped for the third time in six weeks, and is now $18.42, a decline from $18.54 last week. The year's high was $18.71 in May.

A Comparison of Prices

Market Prices at Date, and One Week, One Month and One Year Previous, Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron, Per Gross Ton:	July 16, 1929	July 9, 1929	June 18, 1929	July 17, 1928
No. 2 fdy., Philadelphia	$21.76	$21.76	$21.76	$20.26
No. 2, Valley furnace	18.50	18.50	18.50	16.75
No. 2 Southern, Cin'ti	*17.69*	18.19	18.69	19.19
No. 2, Birmingham	14.50	14.50	15.00	15.50
No. 2 foundry, Chicago*	20.00	20.00	20.00	17.50
Basic, del'd eastern Pa.	20.25	20.25	20.25	19.00
Basic, Valley furnace	18.50	18.50	18.50	16.00
Valley Bessemer, del'd P'gh	20.76	20.76	20.76	18.76
Malleable, Chicago*	20.00	20.00	20.00	17.50
Malleable, Valley	19.00	19.00	19.00	17.00
Gray forge, Pittsburgh	19.76	19.76	19.76	18.01
L. S. charcoal, Chicago	27.04	27.04	27.04	27.04
Ferromanganese, furnace	105.00	105.00	105.00	105.00
Rails, Billets, Etc., Per Gross Ton:				
Rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Light rails at mill	36.00	36.00	36.00	36.00
Rerolling billets, Pittsburgh	35.00	35.00	35.00	32.00
Sheet bars, Pittsburgh	35.00	35.00	35.00	32.00
Slabs, Pittsburgh	35.00	35.00	35.00	32.00
Forging billets, Pittsburgh	40.00	40.00	40.00	38.00
Wire rods, Pittsburgh	42.00	42.00	42.00	42.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.85	1.85	1.85	1.85
Finished Steel, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Bars, Pittsburgh	1.95	1.95	1.95	1.85
Bars, Chicago	2.05	2.05	2.05	2.00
Bars, Cleveland	1.95	1.95	1.95	1.85
Bars, New York	2.29	2.29	2.29	2.19
Tank plates, Pittsburgh	1.95	1.95	1.95	1.85
Tank plates, Chicago	2.05	2.05	2.05	2.00
Tank plates, New York	2.22½	2.22½	2.22½	2.17½
Structural shapes, Pittsburgh	1.95	1.95	1.95	1.85
Structural shapes, Chicago	2.05	2.05	2.05	2.00
Structural shapes, New York	2.19½	2.19½	2.19½	2.14½
Cold-finished bars, Pittsburgh	2.30	2.30	2.30	2.10
Hot-rolled strips, Pittsburgh	1.90	1.90	1.90	1.75
Cold-rolled strips, Pittsburgh	2.75	2.75	2.75	2.90

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

Finished Steel, *Per Lb. to Large Buyers:*	July 16, 1929 Cents	July 9, 1929 Cents	June 18, 1929 Cents	July 17, 1928 Cents
Sheets, black, No. 24, P'gh	2.85	2.85	2.85	2.60
Sheets, black, No. 24, Chicago dist. mill	3.05	3.05	3.05	2.75
Sheets, galv., No. 24, P'gh	3.60	3.60	3.60	3.50
Sheets, galv., No. 24, Chicago dist. mill	3.80	3.80	3.80	3.60
Sheets, blue, No. 13, P'gh	2.35	2.35	2.35	2.10
Sheets, blue, No. 13, Chicago dist. mill	2.45	2.45	2.45	2.20
Wire nails, Pittsburgh	2.65	2.65	2.65	2.55
Wire nails, Chicago dist. mill	2.70	2.70	2.70	2.60
Plain wire, Pittsburgh	2.50	2.50	2.50	2.40
Plain wire, Chicago dist. mill	2.55	2.55	2.55	2.45
Barbed wire, galv., Pittsburgh	3.30	3.30	3.30	3.20
Barbed wire, galv., Chicago dist. mill	3.35	3.35	3.35	3.25
Tin plate, 100 lb. box, P'gh	$5.35	$5.35	$5.35	$5.25
Old Material, Per Gross Ton:				
Heavy melting steel, P'gh	$18.50	$18.50	$18.25	$14.00
Heavy melting steel, Phila	16.50	16.50	16.00	13.00
Heavy melting steel, Ch'go	14.75	14.75	15.00	12.25
Carwheels, Chicago	14.00	14.00	14.25	12.75
Carwheels, Philadelphia	16.50	16.50	16.00	15.50
No. 1 cast, Pittsburgh	15.50	15.50	15.50	14.25
No. 1 cast, Philadelphia	16.50	16.50	16.50	15.50
No. 1 cast, Ch'go (net ton)	14.50	14.50	14.50	13.50
No. 1 RR. wrot., Phila	16.00	16.00	16.00	13.50
No. 1 RR. wrot., Ch'go (net)	13.50	13.50	13.50	10.75
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$2.75	$2.75	$2.75	$2.60
Foundry coke, prompt	3.75	3.75	3.75	3.75
Metals, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Lake copper, New York	18.12½	18.12½	18.12½	14.75
Electrolytic copper, refinery	17.75	17.75	17.75	14.50
Tin (Straits), New York	**47.25**	45.12½	44.62½	47.25
Zinc, East St. Louis	6.70	6.70	6.65	6.20
Zinc, New York	7.05	7.05	7.00	6.55
Lead, St. Louis	*6.55*	6.70	6.80	6.05
Lead, New York	*6.75*	6.90	7.00	6.20
Antimony (Asiatic), N. Y.	*8.25*	8.50	9.00	9.50

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Pittsburgh

Production Held Close to Full Capacity—Some Slight Declines in Demand With Little Price Weakness

PITTSBURGH, July 16.—With July half gone, Pittsburgh district steel makers have yet to feel any marked curtailment in the general demand for their products. Specifications on some lines have declined much more rapidly than production during the last two weeks, but a leading maker of sheets reports the heaviest specifications since early April and tonnage releases on plates, wire and pipe are fully equal to performance during the corresponding period of June.

Hot weather is now the principal factor in the curtailment of operations, although occasional interruptions are required for repairs to overworked equipment. The larger companies in this and nearby districts are still operating at close to physical capacity, but the actual production of steel is probably 5 points below the peak rate of the spring months. Producers hesitate to curtail in their blast furnace or coke oven departments, and there is a growing belief in the market that the full resources of the industry will again be taxed by heavy fall demand.

Increased August specifications from the automobile industry, although not widely scattered enough to be considered general, indicate a renewed call for steel from that consuming channel. Large pipe line projects are being figured and the oil industry seems to be showing slightly more interest in drilling materials as well as tankage facilities. Barge buying, while temporarily dormant, promises to be renewed as soon as builders have lessened present heavy commitments.

In the immediate Pittsburgh district extensive highway and bridge construction is taking heavy steel tonnage and a bridge across the Ohio River, for which plans are being prepared, will require about 15,000 tons of structural shapes. Railroad car builders in this district will be busy for several months on present work and have shared in recent orders.

Tin plate demand seems to have passed the doubtful status of 30 days ago and recent specifications have been generally satisfactory.

The steel price structure has reflected little weakness as demand for some products has declined slightly. On semi-finished steel, ruling quotations are somewhat in doubt, because of the hesitancy of large consumers to pay the advance on billets and slabs which mills are asking over second-quarter contract prices. Weakness in wire nail prices in nearby districts has not been carried into the Pittsburgh area, and occasionally reported concessions on steel bars and cold-rolled strip have not reached recognizable proportions. Softness continues in galvanized sheets, but many large mills are so well supplied with tonnage that they are not forced to compete for low-priced business in order to maintain satisfactory operations.

Active future buying has failed to develop in the pig iron market, but shipments are holding up fairly well and there is considerable small-lot purchasing at full quoted prices. A stronger undertone continues in scrap despite the absence of large purchases by the mills.

Pig Iron.—A large tonnage of third-quarter iron remains to be bought in this and the Valley districts, although a number of users, particularly of the basic grade, have quietly closed on their immediate requirements. The market is lacking in large inquiries, no new ones having been reported since last week. The Westinghouse Electric & Mfg. Co. has yet to close against the requirements of its Trafford City, Pa., plant. Shipments are holding up fairly well and there is a steady run of new buying in one and two carload lots. In such transactions the regularly quoted prices are being strictly adhered to, and under present conditions no immediate weakening seems likely. The Claire furnace at Sharpsville, Pa., is expected to go out for relining and repairs within a short time, leaving only four strictly merchant stacks operating in the Valley. This is a reduction of two furnaces since spring, and the blowing in of the Neville Island Furnace in the Pittsburgh district will only partly offset the resultant reduction in available merchant tonnage. Merchant furnace stocks are very low, and with one Valley furnace sold up until October, the present market situation seems to favor the sellers. Steel company stocks are also low and steel operations in the Pittsburgh and Valley districts leave little for outside sales. Freight rates prevent the entrance of Southern iron into this and the Valley districts, but considerable interest was aroused by the recent purchase of 15,000 tons of Southern foundry iron by a Louisville, Ky., sanitary ware maker at $14, Birmingham.

Prices per gross ton, f.o.b. Valley furnace:

Basic	$18.50
Bessemer	19.00
Gray forge	18.00
No. 2 foundry	18.50
No. 3 foundry	18.00
Malleable	19.00
Low phos., copper free	27.00

Freight rate to Pittsburgh or Cleveland district, $1.76.

Prices per gross ton, f.o.b. Pittsburgh district furnace:

Basic	$19.00
No. 2 foundry	19.00
No. 3 foundry	18.50
Malleable	19.50

Freight rates to points in Pittsburgh district range from 63c. to $1.13.

Semi-Finished Steel.—The supply of semi-finished steel in this and nearby districts is now entirely adequate to meet local demand, but non-integrated companies report occasional difficulty in securing tonnages in addition to the regular allotments. Mills have had little opportunity to build up reserve supplies of crude steel and the close adjustment of supply to demand was well illustrated during the Fourth of July week, when curtailment of open-hearth production forced many companies to cut down the operating rates of their finishing mills. In many cases open-hearth furnaces are down for repairs from time to time, and, although steel production in the district may still be said to be close to physical capacity, the actual rate is considerably below that of earlier months. Prices are still rather unsettled, notably on billets and slabs. Sheet bar contracts for this quarter have generally been closed at $35 Pittsburgh or Youngstown, and several companies are quoting this price on spot business. Others, however, with little tonnage for sale, are asking $36. Rerolling billets have not been widely sold at $35, and several large consumers are holding out for a lower price. The same situation applies to slabs, while forging billets are now well established at $40 a ton. On wire rods, the $42 price is holding and contract tonnage has been regularly covered at that figure.

Bars, Shapes and Plates.—Specifications are lagging slightly as compared to June, but do not suggest a summer slump of any marked proportions. On plates, neither shipments nor specifications have declined materially, and delivery promises still are from four to six weeks. Falling off in bar tonnage is attributed partly to the lesser requirements of the cold-finished makers, who are not operating at as high a rate as recently. In general, bar business is fairly well distributed, with reinforcing steel rather active. A large boulevard project in the district will require about 2100 tons of reinforcing bars and a bridge across the Ohio River at McKees Rocks will take 900 tons for approaches. The superstructure of this bridge, which will require about 15,000 tons of structural steel, will not come up for bids for several weeks. Structural awards in this district are not running into much tonnage, but a considerable amount of work is in prospect and local fabricators look for renewed activity in the late summer. A report that the Inland Waterways Corporation would soon take bids on 18 additional barges is unconfirmed, although this inquiry is expected in the fall. Barge business is not active, but builders are so well supplied with work that there is no anxiety for new orders. Prices are fairly well maintained, at least in the immediate Pittsburgh district. The 1.95c. Pittsburgh price on plates has never been better established, and occasional shading of this figure on bars usually takes the form of the same quotation on a Cleveland base. Prices on fabricated structural steel are feeling the depressing effects of keen competition, but concessions from the 1.95c., Pittsburgh, price on shapes are not common.

Rails and Track Supplies.—The Norfolk and Western is said to have closed against its recent inquiry for 39,000 tons of rails, but this road's inquiry for 3500 tons of tie plates and accessories still is pending. Other business in track accessories is confined largely to small lots. July business is somewhat behind that of June. Demand for light rails is almost entirely lacking, and some makers of light rails from billets have been forced to meet the competition of rerolled material, representing a concession of $2 a ton from the quoted price of $36, Pittsburgh mill.

Wire Products.—Conflicting reports as to the demand for manufacturers' wire indicate that business is not well distributed, although aggregate specifications seem to be holding well up to the June level. Jobber purchases have declined, but the movement into this channel is above the usual summer average. Prices on plain wire seem to be well established at 2.50c. to 2.60c., Pittsburgh or Cleveland. On nails, price weakness persists in competitive districts to the West and South, but sales at less than $2.65, base, per keg, in the immediate Pittsburgh territory, have not been reported.

Tubular Goods.—Considerable inter-

The Iron Age Composite Prices

Finished Steel

July 16, 1929, 2.412c. a Lb.

One week ago	2.412c.
One month ago	2.412c.
One year ago	2.319c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products make 87 per cent of the United States output of finished steel.

	High		Low	
1929	2.412c.,	April 2;	2.391c.,	Jan. 8
1928	2.391c.,	Dec. 11;	2.314c.,	Jan. 3
1927	2.453c.,	Jan. 4;	2.293c.,	Oct. 25
1926	2.453c.,	Jan. 5;	2.403c.,	May 18
1925	2.560c.,	Jan. 6;	2.396c.,	Aug. 18

Pig Iron

July 16, 1929, $18.42 a Gross Ton

One week ago	$18.54
One month ago	18.63
One year ago	17.09
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low	
1929	$18.71,	May 14;	$18.29,	March 19
1928	18.59,	Nov. 27;	17.04,	July 24
1927	19.71,	Jan. 4;	17.54,	Nov. 1
1926	21.54,	Jan. 5;	19.46,	July 13
1925	22.50,	Jan. 13;	18.96,	July 7

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base per Lb.
F.o.b. Pittsburgh mill	1.95c.
F.o.b. Chicago	2.05c.
Del'd Philadelphia	2.27c.
Del'd New York	2.29c.
Del'd Cleveland	1.92½c. to 1.95c.
F.o.b. Cleveland	1.90c. to 1.95c.
F.o.b. Lackawanna	2.05c.
F.o.b. Birmingham	2.15c.
C.i.f. Pacific ports	2.35c.
F.o.b. San Francisco mills	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills, 40, 50, 60-ft.	2.05c.
F.o.b. Pittsburgh mills, cut lengths	2.30c.
F.o.b. Birmingham, mill lengths	2.15c.

Rail Steel

F.o.b. mills, east of Chicago dist.	1.85c. to 1.90c.
F.o.b. Chicago Heights mill	1.95c.
Del'd Philadelphia	2.27c.

Iron

Common iron, f.o.b. Chicago	2.05c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	2.12c.
Common iron, del'd New York	2.14c.

Tank Plates

	Base per Lb.
F.o.b. Pittsburgh mill	1.95c.
F.o.b. Chicago	2.05c.
F.o.b. Birmingham	2.15c.
Del'd Cleveland	2.14c.
Del'd Philadelphia	2.15c.
F.o.b. Coatesville	2.05c.
F.o.b. Sparrow Point	2.05c.
F.o.b. Lackawanna	2.05c.
Del'd New York	2.22½c.
C.i.f. Pacific ports	2.35c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh mill	1.95c.
F.o.b. Chicago	2.05c.
F.o.b. Birmingham	2.15c.
F.o.b. Lackawanna	2.05c.
F.o.b. Bethlehem	2.05c.
Del'd Cleveland	2.14c.
Del'd Philadelphia	2.01c. to 2.06c.
Del'd New York	2.14½c.
C.i.f. Pacific ports	2.35c.

Hot-Rolled Hoops, Bands and Strips

	Base per Lb.
6 in. and narrower, P'gh	2.00c.
Wider than 6 in., P'gh	1.90c.
6 in. and narrower, Chicago	2.20c.
Wider than 6 in., Chicago	2.10c.
Cooperage stock, P'gh	2.20c.
Cooperage stock, Chicago	2.30c.

Cold-Finished Steel

	Base per Lb.
Bars, f.o.b. Pittsburgh mill	2.30c.
Bars, f.o.b. Chicago	2.30c.
Bars, Cleveland	2.35c.
Shafting, ground, f.o.b. mill	*2.65c. to 3.60c.
Strips, P'gh	2.75c. to 2.85c.
Strips, Cleveland	2.75c.
Strips, del'd Chicago	3.05c. to 3.15c.
Strips, Worcester	2.90c. to 3.00c.
Fender stock, No. 20 gage, Pittsburgh or Cleveland	4.25c.

*According to size.

Wire Products

(Carload lots, f.o.b. Pittsburgh and Cleveland, to jobbers and retailers.)

	Base per Keg
Wire nails	$2.65 to $2.75
Galvanized nails	4.65 to 4.75
Galvanized staples	3.35 to 3.45
Polished staples	3.10 to 3.20
Cement coated nails	2.65 to 2.75
	Base per 100 Lb.
Bright plain wire, No. 6 to No. 9 gage	$2.50 to $2.60
Annealed fence wire	2.65 to 2.75
Spring wire	3.50 to 3.60
Galv'd wire, No. 9	3.10 to 3.20
Barbed wire, galv'd	3.30 to 3.40
Barbed wire, painted	3.05 to 3.15
Woven wire fence (per net ton to retailers)	65.00

Chicago district mill and delivered Chicago prices are $1 per ton above the foregoing. Birmingham mill prices $3 a ton higher; Worcester, Mass., (wire) mill $3 a ton higher on production of that plant; Duluth, Minn., mill $2 a ton higher; Anderson, Ind., $1 higher.

Cut Nails

	Per 100 Lb.
Carloads, Wheeling, Reading or Northumberland, Pa.	$2.70
Less carloads, Wheeling or Reading	2.80

Light Plates

No. 10, blue annealed, f.o.b. P'gh.	2.10c. to 2.20c.
No. 10, blue annealed, f.o.b. Chicago dist.	2.30c.
No. 10, blue annealed, del'd Phila.	2.42c. to 2.52c.
No. 10, blue annealed, B'ham	2.35c.

Sheets

Blue Annealed

	Base per Lb.
No. 13, f.o.b. P'gh	2.25c. to 2.35c.
No. 13, f.o.b. Chicago dist.	2.45c.
No. 13, del'd Philadelphia	2.67c.
No. 13, blue annealed, B'ham	2.50c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh	2.85c. to 2.95c.
No. 24, f.o.b. Chicago dist. mill	3.05c.
No. 24, del'd Philadelphia	3.17c. to 3.27c.
No. 24, f.o.b. Birmingham	3.00c. to 3.10c.

Metal Furniture Sheets

No. 24, f.o.b. P'gh	4.10c. to 4.20c.

Galvanized

No. 24, f.o.b. Pittsburgh	3.50c. to 3.70c.
No. 24, f.o.b. Chicago dist. mill	3.80c.
No. 24, del'd Cleveland	3.69c. to 3.79c.
No. 24, del'd Philadelphia	3.92c. to 4.02c.
No. 24, f.o.b. Birmingham	3.75c. to 3.85c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	3.00c.
No. 28, f.o.b. Chicago dist. mill	3.10c.

Automobile Body Sheets

No. 28, f.o.b. Pittsburgh	4.10c.

Long Ternes

No. 24, 8-lb. coating, f.o.b. mill	4.00c.

Vitreous Enameling Stock

No. 24, f.o.b. Pittsburgh	3.90c.

Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills	$5.35
Standard cokes, f.o.b. Gary	5.45

Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)
(Per Package, 20 x 28 in.)

8-lb. coating I.C.	$11.20
15-lb. coating I.C.	14.00
20-lb. coating I.C.	15.30
25-lb. coating I.C.	$16.70
30-lb. coating I.C.	17.75
40-lb. coating I.C.	19.85

Alloy Steel Bars

(F.o.b. makers' mill)

Alloy Quality Bar Base, 2.65c. to 2.75c. per Lb.

S.A.E. Series Numbers		Alloy Differential
2000	(½% Nickel)	0.25
2100	(1½% Nickel)	0.55
2300	(3½% Nickel)	1.50
2500	(5% Nickel)	2.25
3100	Nickel Chromium	0.55
3200	Nickel Chromium	1.35
3300	Nickel Chromium	3.80
3400	Nickel Chromium	3.20
4100	Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50
4100	Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600	Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel)	1.05
5100	Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100	Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100	Chromium Spring Steel	0.20
6100	Chromium Vanadium Bars	1.20
6100	Chromium Vanadium Spring Steel	0.95
9250	Silicon Manganese Spring Steel (flats)	0.25
	Rounds and squares	0.50
	Chromium Nickel Vanadium	1.50
	Carbon Vanadium	0.95

Above prices are for hot rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is ¾c. per lb. higher. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis.

Billets under 4 x 4 in. carry the steel bar base. Slabs with a sectional area of 16 in. or over carry the billet price. Slabs with sectional area of less than 16 in. or less than 2½ in. thick, regardless of sectional area, take the bar price.

Rails

	Per Gross Ton
Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	36.00
Light (from rail steel), f.o.b. mill	34.00
Light (from billets), f.o.b. Ch'go mill	36.00

Track Equipment

	Base per 100 Lb.
Spikes, ⅝ in. and larger	$2.80
Spikes, ½ in. and smaller	2.80
Spikes, boat and barge	3.00
Tie plates, steel	2.15
Angle bars	$2.75
Track bolts, to steam railroads	$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel Inches	Black	Galv.	*Iron* Inches	Black	Galv.
⅛	45	19½	¼ and ⅜	+11	+36
¼ to ⅜	51	25½	½	28	5
½	56	42½	¾	28	11
¾	60	48½	1 and 1¼	31	15
1 to 3	62	50½	1½ and 2	35	18

Lap Weld

2	55	43½	2	23	9
2½ to 6	59	47½	2½ to 3½	28	13
7 and 8	56	43½	4 to 6	30	17
9 and 10	54	42½	7 and 8	29	16
11 and 12	53	40½	9 to 12	26	11

Butt Weld, extra strong, plain ends

⅛	41	24½	¼ and ⅜	+18	+48
¼ to ⅜	47	30½	½	23	7
½	53	42½	¾	28	12
¾	58	47½	1 to 2	34	18
1 to 1½	60	49½			
2 to 3	61	50½			

Lap Weld, extra strong, plain ends

2	53	42½	½	29	13
2½ to 4	57	46½	2½ to 4	34	20
4½ to 6	56	45½	4½ to 6	33	19
7 to 8	52	39½	7 and 8	31	17
9 and 10	45	32½	9 to 12	21	8
11 and 12	44	31½			

On carloads the above discounts on steel pipe are increased on block by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Steel		*Charcoal Iron*	
2 in. and 2¼ in.	40	1½ in.	1
2½ in.—2¾ in.	48	1¾ in.	8
3 in.	54	2 in.—2½ in.	13
3¼ in.—3¾ in.	56	2½ in.—2¾ in.	16
4 in.	59	3 in.	17
4½ in. to 6 in.	48	3¼ in. to 3½ in.	18
		4 in.	20
		4½ in.	21

On lots of a carload or more, the above base discounts are subject to a preferential of two fives on steel and of 10 per cent on charcoal iron tubes. Smaller quantities are subject to the following modifications from the base discounts:

Lap Welded Steel—Under 10,000 lb., 6 points under base and one five; 10,000 lb. to carload, 4 points under base and two fives. Charcoal Iron—Under 10,000 lb., 2 points under base; 10,000 lb. to carload, base and one five.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	63	3 in.	48
1¼ to 1½ in.	55	3¼ to 3½ in.	50
1¾ in.	39	4 in.	53
2 to 2¼ in.	34	4½, 5 and 6 in.	42
2½ to 2¾ in.	42		

Hot Rolled

2 and 2¼ in.	40	3¼ to 3½ in.	56
2½ and 2¾ in.	48	4 in.	59
3 in.	54	4½, 5 and 6 in.	48

Beyond the above base discounts a preferential discount of 5 per cent is allowed on carload lots. On less than carloads to 10,000 lb. base discounts are reduced 4 points with 5 per cent preferential; on less than 10,000 lb., base discounts are reduced 6 points, with no preferential. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage take mechanical tube list and discounts. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30%, base (carloads)	55
Carbon, 0.30% to 0.40%, base	50

Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

est is centered in line pipe projects. Mills are fairly well supplied with business in the larger sizes of pipe, and the promise of some heavy lettings in the fall, if fulfilled, will provide a satisfactory year's business. Oil country material is moving steadily, but not in large proportions. Business in mechanical tubing has failed to show any marked recession from recent levels.

Sheets.—One large maker reports its specifications last week as the best since early in April, and the industry as a whole seems to be continuing the high pace set earlier in the year. Operations last week were seriously curtailed by the hot weather, and all of the larger mills are still much more concerned in making deliveries than they are in new business. Only the common finishes of black sheets and occasionally galvanized material can be obtained in less than three or four weeks, and makers of blue annealed sheets and light plates hesitate to promise shipment before Sept. 1. This situation holds true to a lesser extent on automobile body and metal furniture sheets, the former as a result of heavy August specifications by several automobile makers. These tonnage releases also indicate a renewed demand from that source early in the fall. The price situation in sheets shows little change, with the principal weakness in the galvanized product. Concessions from the 3.60c., Pittsburgh, price to jobbers persist, but are not recognized as the market by leading makers, who are taking business at 3.60 and 3.70c. On black sheets, the market is quotable at 2.85c. to 2.95c., Pittsburgh, the lower figure applying only to very large buyers, principally in the automotive field.

Tin Plate.—Prospects are better than they were a month ago, and although mills are being operated largely on a week-to-week business, there is nothing to indicate any marked falling off in specifications during the summer. September tonnages of the leading container manufacturers, which are ordinarily specified prior to July 15, are up to expectations. Crop information is more encouraging, and only an unforeseen curtailment of demand in the closing months of the year will prevent the total tonnage from equaling last year's record production. Operations in the Pittsburgh district average 90 to 95 per cent of capacity.

Strip Steel.—The strip market is rather quiet, with specifications not far behind the June levels, but with mills having little difficulty in making deliveries on either the hot or cold-rolled material. Business is not so well diversified as might be desired. Shipments to the automobile industry are considerably below peak levels. Cold-rolled strip is quotable at 2.75c. to 2.85c., Pittsburgh or Cleveland, although the higher figure is now applying on little tonnage. The market on hot-rolled strip is well established at 1.90c. and 2c., depending upon the width.

Cold-Finished Steel Bars.—This market has again become established on the hand-to-mouth basis which usually applies in the case of normal demand. Specifications are holding up rather steadily for this time of the year and compare favorably with June business. Changes in extras, which have been in preparation for some time, are expected to be announced in a short time. The base price is unchanged at 2.30c., Pittsburgh.

Coal and Coke.—Furnace coke is more plentiful in the face of light demand, but operators hesitate to curtail production materially on account of an expected improvement in the near future. The H. C. Frick company is still operating about 3100 ovens in the Connellsville district, but most of the plants are being run on a five-day week basis. The market is quotable at unchanged prices, or $2.75 to $2.85 per net ton, Connellsville. Shipments of foundry coke are light, but demand is not below normal for this time of the year. Price weakness is confined to the less desirable grades.

Old Material.—A small sale of No. 1 heavy melting steel at $19 during the last week seems to give the market added strength. However, there has been little large buying by the mills, and the average price for No. 1 scrap seems to have changed little from $18.50, as quoted last week. In view of scattered sales at varied prices, a wider range on prices is needed to show the market fairly. The sale of a part of the recent Pennsylvania Railroad list to a mill in this district at close to $19.50 also bears out the strength of the market, as this steel ordinarily commands a premium of 50c. a ton over average No. 1 steel. In the absence of sizable transactions, compressed sheet steel is unchanged at recent levels, while heavy breakable cast has been advanced 50c. a ton on a recent transaction. The market is rather tight so far as buying by dealers is concerned, and purchases of heavy melting steel are reported at less than $18, as well as at more than $18.50. With steel operations extraordinarily high for this time of the year, sentiment in the scrap market is inclined to be of a bullish nature, although other dealers are inclined to view with caution the rather frequent rejections at many points and a hold-up at at least one large consuming center.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$18.00 to $19.00
No. 2 heavy melting steel	16.00 to 16.50
Scrap rails	17.50 to 18.00
Compressed sheet steel	18.00 to 18.50
Bundled sheets, sides and ends	16.50 to 17.00
Cast iron carwheels	16.00 to 16.50
Sheet bar crops, ordinary	19.00 to 19.50
Heavy breakable cast	13.00 to 13.50
No. 2 railroad wrought	18.25 to 18.75
Hvy. steel axle turnings	16.00 to 16.50
Machine shop turnings	11.50 to 12.00
Acid Open-Hearth Grades:	
Railr. knuckles and couplers	21.50 to 22.00
Railr. coil and leaf springs	21.50 to 22.00
Rolled steel wheels	21.50 to 22.00
Low phos. billet and bloom ends	22.00 to 22.50
Low phos., mill plates	22.00 to 22.50
Low phos., light grades	20.00 to 20.50
Low phos., sheet bar crops	20.00 to 21.00
Heavy steel axle turnings	16.00 to 16.50
Electric Furnace Grades:	
Low phos., punchings	19.50 to 20.50
Hvy. steel axle turnings	16.00 to 16.50
Blast Furnace Grades:	
Short shoveling steel turnings	12.00 to 12.50
Short mixed borings and turnings	12.00 to 12.50
Cast iron borings	12.00 to 12.50
Rolling Mill Grades:	
Steel car axles	21.50 to 22.00
Cupola Grades:	
No. 1 cast	15.00 to 16.00
Rails 3 ft. and under	20.00 to 21.00

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.25c.
Hoops	4.25c.
Black sheets (No. 24), 25 or more bundles	3.80c.
Galv. sheets (No. 24), 25 or more bundles	4.55c.
Blue ann'l'd sheets (No. 10), 1 to 10 sheets	3.45c.
Galv. corrug. sheets (No. 28), per square	$4.43
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count,	60 per cent off list
Machine bolts, 100 count,	60 per cent off list
Carriage bolts, 100 count,	60 per cent off list
Nuts, all styles, 100 count,	60 per cent off list
Large rivets, base per 100 lb.	$3.50
Wire, black soft ann'l'd, base per 100 lb.	$3.00 to 3.10
Wire, galv. soft, base per 100 lb.	3.00 to 3.10
Common wire nails, per keg	3.00
Cement coated nails, per keg	3.05

Productive Activity Sets Another Record

Manufacturing operations are believed to have made another high record in June, based on their consumption of electrical energy, according to *Electrical World.* While the index declined from 136.9 in May to 135.2 in June, seasonal correction, it is thought, would show a new high mark. There was a heavy falling off in the metal industries group, which dropped to 147.9 from 154.8 in May. Of the two components, rolling mills and steel plants, dropping from 172.2 to 154.3, showed the heavier loss. Other metal-working plants, ferrous and non-ferrous, declined to 143.4 from 144.2 in May.

Automobiles, including parts makers, dropped from 161.8 to 154. Gains were recorded in leather, forest products, paper and pulp, rubber, chemicals and allied products and stone, clay and glass.

The American electric rotary clay gun will be provided for one of the leading blast furnaces in England by the William M. Bailey Co., Pittsburgh.

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

Billets and Blooms

	Per Gross Ton
Rerolling, 4 in. and under 10 in., Pittsburgh	$35.00
Rerolling, 4 in. and under 10 in., Youngstown	35.00
Rerolling, 4 in. and under 10 in., Cleveland	35.00
Rerolling, 4 in. and under 10 in., Chicago	37.00
Forging quality, Pittsburgh	$40.00 to 41.00

Sheet Bars

(Open Hearth or Bessemer)

	Per Gross Ton
Pittsburgh	$35.00
Youngstown	35.00
Cleveland	35.00

Slabs

(8 in. x 2 in. and under 10 in. x 10 in.)

	Per Gross Ton
Pittsburgh	$35.00
Youngstown	35.00
Cleveland	35.00

Skelp

(F.o.b. Pittsburgh or Youngstown)

	Per Lb.
Grooved	1.85c. to 1.90c.
Universal	1.85c. to 1.90c.
Sheared	1.85c. to 1.90c.

Wire Rods

(Common soft, base)

	Per Gross Ton
Pittsburgh	$42.00
Cleveland	42.00
Chicago	43.00

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.80
Old range non-Bessemer, 51.50% iron	4.65
Mesabi Bessemer, 51.50% iron	4.65
Mesabi non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.40

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algerian	10.00c.
Iron ore, low phos., Swedish, average 68% iron	10.00c.
Iron ore, basis Swedish, average 65% iron	9.00c.
Manganese ore, washed, 52% manganese, from the Caucasus	33.00c. to 35.00c.
Manganese ore, Brazilian, African or Indian, basic 50%	33.00c. to 35.00c.
Tungsten ore, high grade, per unit, in 60% concentrates	$15.00 to $15.50

	Per Gross Ton
Chrome ore, 45 to 50% Cr_2O_3, crude, c.i.f. Atlantic seaboard	$22.00 to $24.00

	Per Lb.
Molybdenum ore, 85% concentrates of MoS_2, delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$2.75 to $2.85
Foundry, f.o.b. Connellsville prompt	3.75 to 4.85
Foundry, by-product, Ch'go ovens	8.00
Foundry, by-product, New England, del'd	11.00
Foundry, by-product, Newark or Jersey City, delivered	9.00 to 9.40
Foundry, by-product, Phila	9.00
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry by-prod., del'd St. Louis	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.25 to $1.75
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, ¾-in. f.o.b. Pa. mines	1.90 to 2.00
Mine run gas coal, f.o.b. Pa. mines	1.65 to 1.75
Steam slack, f.o.b. W. Pa. mines	80c. to 90c.
Gas slack, f.o.b. W. Pa. mines	1.00 to 1.10

Ferromanganese

	Per Gross Ton
Domestic, 80%, seaboard	$105.00
Foreign, 80%, Atlantic or Gulf port, duty paid	105.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$31.00 to $34.00
Domestic, 16 to 19%	29.00 to 32.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$83.50
75%	130.00

Per Gross Ton Furnace		Per Gross Ton Furnace	
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	45.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio Furnace

Per Gross Ton		Per Gross Ton	
10%	$31.00	12%	$35.00
11%	33.00		

Silvery Iron

F.o.b. Jackson County, Ohio Furnace

Per Gross Ton		Per Gross Ton	
6%	$24.00	10%	$29.00
7%	25.00	11%	31.00
8%	26.00	12%	33.00
9%	27.00		

Other Ferroalloys

Ferrotungsten, per lb., contained metal del'd	$1.40 to $1.50
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.15 to $3.65
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	$160.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton	$91.00
Ferrophosphorus, electric 24%, f.o.b. Anniston, Ala., per gross ton	$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride not over 5% silicon, gravel, f.o.b. Illinois and Kentucky mines	$18.00
No. 2 lump, Illinois and Kentucky mines	20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	$18.00 to $18.50
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines	32.50

Fire Clay Brick

	Per 1000 f.o.b. Works	
	High-Heat Duty Brick	Intermediate Heavy Duty Brick
Pennsylvania	$43.00 to $46.00	$35.00 to $38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	.....
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00
Standard size	45.00

Chrome Brick

	Per Net Ton
Standard size	$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts, blank or tapped, hexagons	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	7.00c. to 6.75c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled thread up to and including ⅛ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagons nuts	70
Semi-finished hexagons castellated nuts, S.A.E.	70
Stove bolts in packages, P'gh	75, 20, 10 and 5
Stove bolts in packages, Chicago	75, 20, 10 and 5
Stove bolts in packages, Cleveland	75, 20, 10 and 5
Stove bolts in bulk, P'gh	75, 20, 10, 5 and 2½
Stove bolts in bulk, Chicago	75, 20, 10, 5 and 2½
Stove bolts in bulk, Cleveland	75, 20, 10, 5 and 2½
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55, 60 per cent apply.

Large Rivets

(½-In. and Larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$3.10
F.o.b. Chicago	3.20

Small Rivets

(½-In. and Smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70 and 10
F.o.b. Cleveland	70 and 10
F.o.b. Chicago	70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10 and 5
Milled standard set screws, case hardened,	80 and 5
Milled headless set screws, cut thread	75 and 10
Upset hex. head cap screws, U.S.S. thread	85
Upset hex. cap screws, S.A.E. thread	85
Upset set screws	80, 10 and 5
Milled studs	70

Chicago

Automobile and Farm Implement Industries Taking Steel in Larger Quantities After Letdown

CHICAGO, July 16.—Among the noteworthy developments in this market are strong indications of greater consumption of steel by the automobile industry and by manufacturers of farm equipment. A week ago automobile parts makers started heavier production and now several large automobile builders have asked for heavier shipments to commence before Aug. 1. On the whole, the local steel market is firm.

Lessening in the strain on supplies of semi-finished steel is of distinct advantage to integrated mills, which now find rolling schedules easier to arrange and so are able to give better deliveries both as to time and variety of steel products.

New sales for the week were not large, but this is not surprising in view of the heavy purchases in the preceding 15 days. Specifications are steady at the average so far this year, and local steel mills continue to produce at capacity.

The Great Northern has placed 30,000 tons of rails, about 18,000 tons of which will be rolled by Chicago mills. Another Northwestern railroad will take 15,000 tons and a like tonnage is expected from the Pennsylvania. Western rail mills are well scheduled through August.

Several pipe line projects, including two lines from the Southwest to Chicago which will take nearly 440,000 tons of steel, and a 20-mile gas line in Kansas, are taking shape. Close to 40,000 tons of new building projects, not including steel mill additions, are in sight in the immediate Chicago district.

Pig Iron.—Northern iron is holding firm at $20 a ton, local furnace, and buying for the current quarter and last half is active. Prices for Southern iron, which is reaching Chicago and northern Illinois, are wavering. Nominally the market is at $14.50 a ton, Birmingham, but $14 is freely done and concessions are reported below this last figure. Some sellers are taking orders for later billings with prices to be adjusted at the time of shipments in accordance with the market at that time. One order of this kind was for 500 tons. A more or less common way of doing business in Southern iron is to put low offers up to furnaces. It is reported most of these are accepted. Sales in northern Indiana and western Michigan are heavy, the aggregate for the week being near 7000 tons. Two thousand tons of Southern basic, sold to replace scrap at St. Louis, has been taken at a low figure.

Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	$20.00
N'th'n No. 1 fdy., sil. 2.25 to 2.75	20.50
Malleable, not over 2.25 sil.	20.00
High phosphorus	20.00
Lake Super. charcoal, sil. 1.50	27.04
So'th'n No. 2 fdy. (all rail)	$19.51 to 20.51
Low phos., sil. 1 to 2, copper free	29.50
Silvery, sil. 8 per cent	29.79
Bess. ferrosilicon, 14-15 per cent	46.29

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Plates.—Demand for this commodity continues high from most consumers in the West. Manufacture of pipe is taking large tonnages, and tank makers in this and nearby territories are engaged at close to capacity. Car builders appear to be handicapped in their desire to increase output by the scarcity of skilled labor. Specifications from this source are heavy. New car orders are lacking, and there is further indication that the bulk of steel needed for old car business already has been ordered from mills. Several weeks ago a mill to the south of Chicago had received its last specification from car shops, and now one Chicago producer finds that releases for 4000 tons will complete its present obligations. Deliveries of plates are somewhat improved, being now in the range of six to eight weeks. This situation is tending to check the flow of new business from Western consumers to Eastern producers, but the total volume of plates placed to the east of Chicago was large and shipments coming to local consumers will be heavy for some time to come.

Structural Material. — Although there still is complaint that building permits in the Chicago area are low for this time of the year, it is quite apparent that the drop is less noticeable in the steel frame type of structure than it is in other kinds of building construction. Awards in the past week have been scattered and not of impressive size when considered individually. However, in gaging this situation it should be remembered that in recent months a number of extra large tonnages have been awarded and that much of that tonnage is still going through local shops. Steel mill expansion alone is engaging a fair part of local shop capacity, and the announcement by the Illinois Steel Co. that it will add materially to its South and Gary works forecasts the use of large tonnages for that purpose. A permit has been issued for the Cuneo Tower Building, noted a week ago, which will take close to 8000 tons. A theater and office building project for Wacker Drive, Chicago, will take 12,000 tons. All told, the pending list of steel structures is impressive. Shops at Milwaukee are busy, but in Indiana most fabricators are in need of additional work.

Mill prices on plain material, per lb.: 2.05c. base, Chicago.

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars	3.00c.
Reinforc'g bars, billet steel	2.10c. to 2.40c.
Reinforc'g bars, rail steel	1.90c. to 2.05c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Bands (⅝ in. in Nos. 10 and 12 gages)	3.20c.
Hoops (No. 14 gage and lighter)	3.75c.
Black sheets (No. 24)	4.05c.
Galv. sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.35c.
Spikes, ⅜ in. and larger	3.55c.
Track bolts	4.55c.
Rivets, structural	4.00c.
Rivets, boiler	4.00c.

	Per Cent Off List
Machine bolts	60
Carriage bolts	60
Coach or lag screws	60
Hot-pressed nuts, sq., tap. or blank	60
Hot-pressed nuts, hex., tap. or blank	60
No. 8 black ann'l'd wire, per 100 lb.	$3.45
Com. wire nails, base per keg	3.20
Cement c't'd nails, base per keg	3.20

Ferroalloys.—The market for spiegeleisen is quiet in new orders, but shipments are steady. Ferromanganese is quoted at $105 a ton, seaboard, but no sales are reported.

Prices delivered Chicago: 80 per cent ferromanganese, $112.56; 50 per cent ferrosilicon, $83.50 to $88.50; spiegeleisen, 19 to 21 per cent, $40.76.

Sheets.—Consumers of this commodity are for the most part busy and are entering liberal specifications. Releases are fully equal to shipments, which represent 85 per cent of hot mill capacity. New buying, though steady, is for the most part for nearby needs. Prices in the local market are firm, but light gage sheets, such as used by the roofing trade, are weak when for delivery in the Southeast and Southwest. Locker makers are busy and have substantial orders. Light tank manufacturers find their books growing, and they are releasing larger tonnages to the mills.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 3.10c.; No. 24 galv., 3.85c.; No. 10 blue ann'l'd, 2.35c. Deliv'd prices at other Western points are equal to the freight from Gary, plus the mill prices, which are 5c. per 100 lb. lower than Chicago delivered prices.

Cast Iron Pipe.—This market remains dull in both private and public buying. Car lot purchases, like large tonnages, are scarce, though prices remain steady at $37 to $38 a ton, Birmingham, for diameters 6 in. and larger. West Allis, Wis., is said to have ordered 32,000 ft. of 24-in. pipe from the United States Pipe & Foundry Co. Among new inquiries are 1668 tons of 3 to 12-in. Class B pipe for Chicago and 100 tons for a filtration plant at Popular Bluffs, Mo.

Prices per net ton, del'd Chicago: Water pipe, 6-in. and over, $45.20 to $46.20; 4-in., $49.20 to $50.20; Class A and gas pipe, $3 extra.

Bars.—This has been another good week from the viewpoint of specifications for mild steel bars. Releases are fully equal to shipments, which are at the capacity of local bar mills. Sales in the past seven days have been light, but this was not unexpected, since the bulk of third quarter contracts had been closed by the end of the second week in July. Of special interest is the fact that many users sought to cover for all of the last half, a move that seldom occurs at this time of the year. Automobile acces-

sory manufacturers are arranging schedules for the next two months. It is quite evident, as judged by their estimates of steel needs, that they are looking forward to the near future with optimism. Farm implement makers are encouraged as to the outlook both in the summer months and for the fall trade. This is reflected in their attitude toward the estimates of the steel they will need in the next three months. Shipments of alloy steel bars are steady at 85 per cent of local mill capacity. Deliveries range from three to four weeks. Specifications do not bulk as large as in either the first or second week of July. With the Moline mill again in operation, all rail steel bar units in this district are producing. Prices are firm at 1.95c. a lb., local mill, and deliveries range from three to four weeks. Specifications are fully equal to output. New buying, both for future and immediate needs, is quiet.

Bolts, Nuts and Rivets.—Demand for these commodities is easier from the railroads, but heavier from manufacturers of farm equipment. The net result is that shipments are about steady and output remains at 65 per cent of capacity. Stocks in the hands of producers are low.

Reinforcing Bars.—Pending projects, though in large volume, are moving slowly, and not an impressive amount of new business is coming before the trade. Stagnation of the market is adding to the weakness of prices, which, at 2.10c. to 2.40c. a lb., warehouse, for billet steel reinforcing bars and 1.90c. to 2.05c. for the rail steel commodity, have been wavering in recent weeks. Thorgesen & Erickson have been awarded the general contract for track elevation by the Chicago, Milwaukee, St. Paul & Pacific. This project will require 800 tons of bars. Bids will be opened July 15 on the 1200 tons needed by the Jewel Tea Co., Barrington, Ill.

Old Material.—This summer's scrap market is unusually steady because of heavy and uniform consumption by most users. Demand is holding prices at a higher relative level than in previous years. Week to week fluctuations are almost negligible. Supplies of the heavy tonnage grades are ample, but consumption is high and there appears to be little opportunity for yards to accumulate scrap in anticipation of heavier demand in the fall months. On this score, there is general accord among sellers that present quotations will hold moderately well in the coming weeks and that renewed buying, which is expected in September, will result in stronger prices. Sellers are working hard to cover their short positions in the market. One steel mill, which a week ago cut shipments of heavy melting steel, is again taking normal tonnages. A recent railroad offering of this grade brought $15.10 a gross ton, delivered, but odd cars are quickly being taken out of the market at as high as $15.30 a ton. Shipments of cast iron borings to blast furnaces are curtailed while one merchant stack is being relined. The supply of this grade is free, and brokers are paying $9.75 to $10.25 a gross ton, delivered, against old orders. Hydraulic bundles are being produced faster than consumers will take them. The best offer made by a mill in recent weeks is $13 a gross ton, delivered. The cast iron wheel market is quiet both in shipments and sales.

Prices deliv'd Chicago district consumers:

Per Gross Ton

Basic Open-Hearth Grades:	
Heavy melting steel	$14.75 to $15.25
Shoveling steel	14.75 to 15.25
Frogs, switches and guards, cut apart, and misc. rails	16.25 to 16.75
Hydraul. compressed sheets	13.00 to 13.50
Drop forge flashings	10.50 to 11.00
No. 1 busheling	13.00 to 13.50
Forg'd cast and r'l'd steel carwheels	18.25 to 18.75
Railroad tires, charg. box size	18.50 to 19.00
Railroad leaf springs cut apart	18.50 to 19.00
Acid Open-Hearth Grades:	
Steel couplers and knuckles	16.75 to 17.25
Coil springs	19.00 to 19.50
Electric Furnace Grades:	
Axle turnings	14.50 to 15.00
Low phos. punchings	16.50 to 17.00
Low phos. plates, 12 in. and under	16.50 to 17.00
Blast Furnace Grades:	
Axle turnings	10.75 to 11.25
Cast iron borings	9.75 to 10.25
Short shoveling turnings	9.75 to 10.25
Machine shop turnings	7.00 to 7.50
Rolling Mill Grades:	
Iron rails	16.00 to 16.50
Rerolling rails	17.50 to 18.00
Cupola Grades:	
Steel rails less than 3 ft.	17.75 to 18.25
Steel rails less than 2 ft.	18.25 to 18.75
Angle bars, steel	17.00 to 17.50
Cast iron carwheels	14.00 to 14.50
Malleable Grades:	
Railroad	16.75 to 17.25
Agricultural	15.50 to 16.00
Miscellaneous:	
*Relaying rails, 56 to 60 lb.	23.00 to 25.00
*Relaying rails, 65 lb. and heav.	26.00 to 31.00

Per Net Ton

Rolling Mill Grades:	
Iron angle and splice bars	15.00 to 15.50
Iron arch bars and transoms	21.00 to 21.50
Iron car axles	26.00 to 26.50
Steel car axles	16.50 to 17.00
No. 1 railroad wrought	13.50 to 14.00
No. 2 railroad wrought	13.00 to 13.50
No. 1 busheling	9.00 to 9.50
No. 2 busheling	7.00 to 7.50
Locomotive tires, smooth	14.50 to 15.00
Pipes and flues	10.00 to 10.50
Cupola Grades:	
No. 1 machinery cast	14.50 to 15.00
No. 1 railroad cast	13.75 to 14.25
No. 1 agricultural cast	13.25 to 13.75
Stove plates	12.25 to 12.75
Grate bars	11.75 to 12.25
Brake shoes	10.50 to 11.00

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Wire Products.—Demand for wire and wire products continues to taper, and mill output has been cut to 65 per cent of capacity. Jobbers are finding business rather spotty, but better than a year ago. The jobbing trade got under way late in the spring, with the result that the early summer demand has been better than usual. Use of nails is light, and competition, especially in the Southwest and Southeast, is unusually keen. The price situation in this commodity is unchanged. Quotations in and near Chicago are moderately steady, while in outlying districts price cutting is in evidence. Stocks in the hands of jobbers are of small size, but mill deliveries are prompt in wide assortments and the trade is not experiencing trouble in obtaining ample supplies on short notice. Specifications from the manufacturing trade show a slight decline.

Rails and Track Supplies.—The Great Northern has ordered 30,000 tons of standard-section rails. The Illinois Steel Co. was given an order for 13,000 tons, Inland Steel Co. 5000 tons, and Bethlehem will furnish 12,000 tons. About 30,000 tons of rails will soon come into the market, according to the estimates of local producers. The Northern Pacific is expected to take 15,000 tons, and it is probable that the Pennsylvania may order a like tonnage. Track orders aggregate 3000 tons. Pending tonnage is not less than 15,000 tons, of which 10,000 tons is for the Great Northern and the Northern Pacific and 5000 tons for the Pennsylvania. The light rail market is listless.

Prices f.o.b. mill, per gross ton: Standard section open-hearth and Bess. rails, $43; light rails, rolled from billets, $36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.15c.; angle bars, 2.75c.

Coke.—Prices for by-product foundry coke are steady at $8 a ton, local ovens. Spot buying is dull, but specifications against past obligations are heavy, and the shipping rate in July is close to the average in June.

More Steel Ties to Be Used on British Railroads

Further purchasing of railroad steel ties, following that of the Southern Railway (British) earlier in the year, is reported by Commercial Attaché William L. Cooper, London, to the Department of Commerce. The London, Midland & Scottish Railway has placed an order with the United Steel Companies, Ltd., for between 500 and 600 tons of pressed steel railway sleepers of the Sandberg heavy type. The London & North-Eastern Railway has placed a similar order of 500 tons.

To Merge Nipple Plants

Stockholders of the H. C. Atkins Mfg. Co., St. Louis, have voted to increase the capital stock of the company to $1,000,000 and have authorized the board of directors to negotiate for the purchase of several other pipe nipple manufacturing plants. The company's plan provides for merging of eight or ten such plants either by outright purchase or an exchange of stock.

American Institute of Steel Construction has awarded three cash prizes totaling $850 to university students who submitted the most authentic designs for a theoretical bridge in steel. The contest was held to stimulate interest in improved bridge designing.

New York

Heavy Tonnages of Pipe Pending for Gas Pipe Lines—Pig Iron Melt Sustained

NEW YORK, July 16.—The average melt of iron among the larger foundries is well sustained, but smaller consumers have been operating at a slightly reduced rate since the beginning of the quarter. Inquiry for third quarter iron, however, is active, with the present total for this district estimated at about 10,000 tons or more, and sales in the past week were in excess of 8000 tons. Among the sizable purchases of the week was 1000 tons of No. 1X foundry by the Draper Corporation, North Hopedale, Mass., which originally inquired for 2000 to 3000 tons. The Universal Winding Co., Providence, R. I., has closed on 700 tons of No. 1X and 600 tons of No. 2X foundry iron and the American Locomotive Co. has bought upward of 500 tons of foundry iron and a carload of malleable for its Schenectady, N. Y., plant. The New York Air Brake Co., Watertown, N. Y., has closed on a minimum carload of malleable of special analysis, reported to be for experimental purposes. About 3000 tons of foundry iron of a total inquiry for about 4000 tons, recently closed by the General Electric Co., Schenectady, N. Y., for various plants, is reported to have gone to the New England furnace, which has also booked about 10,000 tons of foundry iron for shipment to the pipe foundry at Burlington, N. J. Current inquiries for pig iron include some tonnage pending for a fortnight or more; about 4000 tons for plants of the American Radiator Co., 3500 tons for the Trenton, N. J., plant of the National Radiator Co., and about 2000 tons for the Chapman Valve & Mfg. Co., Indian Orchard, Mass. The Worthington Pump & Machinery Corporation, Harrison, N. J., is inquiring for 100 tons of foundry iron for Holyoke, Mass. Sales of Southern foundry iron in this district are rather limited, consumers apparently manifesting interest in it chiefly as a possible factor in bringing out lower prices from their usual sources of supply. Buffalo furnaces are quoting $18 a ton, base, on much of the small tonnage business in the market, but the larger and more desirable inquiries still bring out $17.50 a ton, with slightly lower prices on occasion.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	$22.41 to $22.91
*Buf. No. 2, del'd east. N. J.	20.78 to 21.28
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	21.39 to 22.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	21.89 to 23.02

Freight rates: $4.91 from Buffalo, $1.39 to $2.52 from eastern Pennsylvania.

*Price delivered to New Jersey cities having rate of $3.28 a ton from Buffalo.

Warehouse Business.—The number of orders for steel from warehouse stocks continues fair, but the tonnage per order has begun to increase in the past week. There is a moderate volume of structural steel buying, and demand for reinforcing bars is larger than early in the month. Recently some substantial business in plates has been reported by jobbers. Black and galvanized sheets are moderately active, but prices are still being shaded $1 to $2 a ton.

Cast Iron Pipe.—Buying by private companies has improved in the past week, but prices show no tendency to advance, ranging from about $30 to $32 a ton, base, f.o.b. Northern foundry. Current inquiries for pipe are in most cases for the larger diameters, which are cast by only a few makers. Syracuse, N. Y., has opened bids on about 2000 tons of 42-in. and 48-in. water pipe. Hartford, Conn., is accepting bids on a contract which will require 4000 to 5000 tons of pipe; 16,925 ft. of 42 or 48-in. and 2075 ft. of 36-in., Class B or Class C, with alternate bids on steel or reinforced concrete pipe. The Government of the Philippines is taking bids on about 1300 tons of 20-in., 36-in. and 54-in. water pipe for Manila.

Prices per net ton deliv'd New York: Water pipe, 6-in. and larger, $32.60 to $34.60; 4-in. and 5-in., $35.60 to $37.60; 3-in., $42.60 to $44.60. Class A and gas pipe, $3 extra.

Finished Steel.—Two large gas pipe line contracts are on the verge of being closed, one for 191,000 tons and the other for 250,000 tons. The contracts will cover the pipe for lines running from the Southwest into the Chicago district, but the orders will be placed in New York. The steel for one line, that of the Central States Natural Gas Co., mentioned a week ago as in prospect, is virtually closed, while the 250,000 tons to be bought is for a line to be built by Henry L. Doherty & Co., New York. Still another pipe line project is in the development stage and will be built by a group consisting of the Columbia Gas & Electric, Standard Gas & Electric, Utilities Power & Light and the American Gas & Electric companies. It is said that connecting links with existing gas lines will be built that will bring natural gas to Pennsylvania, New Jersey and New York utility companies. Main lines, with their connections, probably will require 1000 miles of pipe. About 600,000 tons of steel pipe has been ordered so far this year for gas lines alone; in addition, there has been considerable contracting for oil lines. Structural steel activity continues a prominent feature of steel buying in the New York district. The week's awards, totaling more than 14,000 tons in the district, included 5800 tons for a bridge over the Hackensack River in New Jersey, 2400 tons for the County Trust Co. building in New York and 1200 for a building for the Brooklyn *Daily Eagle*. Inquiries are headed by 4000 tons for a telephone building on Eighteenth Street, New York, and 2000 tons for a hotel at Atlantic City, N. J. In general, steel business shows a slight tapering off, but is

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.30c.
Soft steel bars, small shapes	3.25c.
Iron bars	3.24c.
Iron bars, Swed. charcoal	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Cold-roll. strip, soft and quarter hard	5.15c. to 5.40c.
Hoops	4.25c.
Bands	3.75c.
Blue ann'l'd sheets (No. 10)	3.85c. to 3.90c.
Long terne sheets (No. 24)	5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galv. annealed	5.15c.
Tire steel, 1½ x ½ in. and larger	3.30c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.65c.
Open-hearth spring steel, bases,	4.50c. to 7.00c.
	Per Cent Off List
Machine bolts, cut thread:	
¾ x 6 in. and smaller	60
1 x 30 in. and smaller	50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	60
¾ x 20 in. and smaller	50 to 50 and 10
Coach screws:	
½ x 6 in. and smaller	60
1 x 6 in. and smaller	50 to 50 and 10
	Per 100 Ft.
Boiler Tubes—	
Lap welded, 2-in.	$17.33
Seamless steel, 2-in.	20.24
Charcoal iron, 2-in.	25.00
Charcoal iron, 4-in.	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
½-in. butt	46	29
¾-in. butt	51	37
1-3-in. butt	53	39
2½-6-in. lap	48	35
7 and 8-in. lap	44	17
11 and 12-in. lap	37	12
Wrought Iron—		
½-in. butt	5	+19
¾-in. butt	11	+ 9
1-1½-in. butt	14	+ 6
2-in. lap	5	+14
3-6-in. lap	11	+ 6
7-12 in. lap	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box	$6.45	$6.20
Charcoal, per Box—	A	AAA
IC	$9.70	$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating	$10.00 to $11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets, Box Annealed—Black, C. R. One Pass

	Per Lb.
Nos. 18 to 20	3.80c.
No. 22	3.95c.
No. 24	4.00c.
No. 26	4.10c.
No. 28*	4.25c.
No. 30	4.50c.

Sheets, Galvanized

	Per Lb.
No. 14	4.40c.
No. 16	4.25c.
No. 18	4.40c.
No. 20	4.50c.
No. 22	4.60c.
No. 24	4.75c.
No. 26	5.00c.
No. 28*	5.25c.
No. 30	5.65c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

still unusually good for this time of the year. Except for continued weakness in wire nails and galvanized and black sheets, the price situation is steady. The top price, 3.70c., Pittsburgh, on galvanized sheets has virtually disappeared, current prices being 3.50c. to jobbers and 3.60c. to consumers.

Mill prices per lb., deliv'd New York: Soft steel bars, 2.29c.; plates, 2.22½c.; structural shapes, 2.19½c.; bar iron, 2.14c.

Old Material.—Except for No. 1 and No. 2 heavy melting steel, the scrap market is quiet and prices are only moderately firm. Brokers with contracts at $16 a ton, delivered Claymont, Del., and $16.50 per ton, Coatesville, Pa., are paying $16.25 a ton, Claymont, and up to $16.75 per ton, Coatesville, to obtain sufficient No. 1 steel. A similar situation exists in No. 2 heavy melting steel, with brokers paying $13, delivered to a Phoenixville, Pa., consumer, and $13.50 a ton, delivered to Harrisburg, Pa. While only a small tonnage of No. 2 heavy melting steel is moving to the Pittsburgh district, brokers filling contracts for No. 1 steel with western Pennsylvania mills are paying up to $18.75 per ton, delivered, on a $5.30 a ton freight rate, or $13.45 per ton, New York. Heavy breakable cast is quiet, with $14.50 a ton quoted for delivery to eastern Pennsylvania and $15 a ton, delivered to a Florence, N. J., foundry.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel	$12.75 to $13.35
Heavy melting steel (yard)	8.00 to 9.75
No. 1 hvy. breakable cast.	10.75 to 12.00
Stove plate (steel works)	7.75 to 8.25
Locomotive grate bars	8.25 to 8.75
Machine shop turnings	7.25 to 7.50
Short shoveling turnings	7.25 to 7.50
Cast borings (blast furn. or steel works)	7.00 to 7.25
Mixed borings and turnings	6.75 to 7.25
Steel car axles	19.25 to 19.75
Iron car axles	24.00 to 25.00
Iron and steel pipe (1 in. dia., not under 2 ft. long)	10.75
Forge fire	9.50 to 10.00
No. 1 railroad wrought	12.00 to 12.50
No. 1 yard wrought, long	11.00 to 11.50
Rails for rolling	13.00 to 13.50
Cast iron carwheels	12.25 to 12.50
Stove plate (foundry)	8.00 to 8.50
Malleable cast (railroad)	14.00 to 14.50
Cast borings (chemical)	10.00 to 10.50

Prices per gross ton, deliv'd local foundries:

No. 1 machry. cast	$17.00
No. 1 hvy. cast (columns, bldg. materials, etc.), cupola size	15.00
No. 2 cast (radiators, cast boilers, etc.)	14.50

Reinforcing Bars.—There has been a slight improvement in sales, although the market still is rather quiet. Awards and inquiries have consisted of lots ranging from 300 tons down to single carloads. Prices are unchanged.

Billet steel reinforcing bars in 40, 50 and 60-ft. lengths, 2.05c. per lb., Pittsburgh, and 2.30c. per lb., Pittsburgh warehouse, for cut lengths. Out of New York warehouse, 2.90c. per lb. for lots of 5 tons or more, 3.05c. for lots of 2 to 5 tons and 3.30c. for less than 2 tons, all delivered at job.

Coke.—Demand for foundry coke is fair, but the furnace grade is rather inactive. Some by-product coke for industrial use is being shipped from a local operation by barge and rail to nearby consumers. Prices are unchanged at $2.75 to $2.85 a net ton, Connellsville, for standard furnace coke, and $4.85 a net ton, ovens, for special brands of beehive foundry coke. Delivered prices of foundry grade are: To northern New Jersey, Jersey City and Newark, $8.56, and to New York and Brooklyn, $9.44 a net ton. By-product coke is quoted at $9 to $9.40 a net ton, Newark or Jersey City, and $10.06, New York or Brooklyn.

Cleveland

Consumers Continue to Take Steel in Large Volume — Easier Deliveries in Sheets and Strips

CLEVELAND, July 16.—Specifications for steel bars, plates and structural material showed quite a gain the past week over the first week in the month. While orders increased in number, they were mostly for small tonnages. Consumer plants in this territory continue in good operation with a satisfactory volume of business on their books.

Manufacturers of steam shovels and other road building equipment are very busy. The only slowing down is in plants making forgings and stampings for the automotive industry. While these continue in good operation, several have abandoned night shifts. While further curtailment by some of the automobile plants is looked for in the next few weeks, others will increase production with the bringing out of new models in August. However, a good total production is being sustained due to the continued heavy output by the Ford and Chevrolet companies, and the automotive industry predicts that the third-quarter production of cars will exceed any previous record for the period.

Plates are in fair demand in small lots from tank and boiler shops. Local fabricating shops are busy with small work. New inquiry in the building field continues light. Toledo will take bids Aug. 13 for a Maumee River bridge, requiring several thousand tons.

Some of the sheet mills are caught up on deliveries but others are fully committed for six weeks or longer and there has been little curtailment in operation. Weakness in sheets has increased and extended to blue annealed grades. Cold-rolled strip is dull and some of the mills need orders, this being the only product on which mills are up on deliveries.

While there is some irregularity on steel bars, the price is being fairly well maintained at 1.95c., Cleveland. No deviation is reported from the 1.95c., Pittsburgh, price on plates and structural material.

Pig Iron.—The market did not show much activity the past week, during which Cleveland interests sold 11,000 tons of foundry and malleable iron. Not much inquiry is pending. Most foundries that have not yet bought iron for the third quarter seem disposed to keep out of the market until their present stocks are used up. Prices appear to be holding firm at $18.50, Cleveland, for outside shipment, $19 for local delivery and $20, Lake furnace, for delivery in the Michigan territory. Some furnaces report a falling off in shipping orders this month as compared with June and others expect to move about as much iron as last month, during which their shipments fell 10 per cent below the tonnage shipped in May. There has been considerable slowing down among some of the large-production foundries that supply the automotive industry. A number of malleable foundries that are making castings for the Ford Motor Co. are keeping up to recent operations. With decreased shipments, most of the furnaces are adding to their stock piles. A small cargo of pig iron was shipped from Buffalo to the Chevrolet Motor Co., Saginaw, Mich. The river channel has been deepened so that water shipments can be made directly to this company's plant, and it is expected that regular shipments will be made by water from Buffalo to Saginaw.

Prices per gross ton at Cleveland:

N'th'n fdy., sil. 1.75 to 2.25	$19.50
S'th'n fdy., 1.75 to 2.25	20.50
Malleable	19.50
Ohio silvery, 8 per cent	28.00
Basic Valley furnace	18.50
Stand. low phos., Valley	$26.50 to 27.00

Prices except on basic and low phosphorus are delivered Cleveland. Freight rates: 50c. from local furnaces; $3 from Jackson, Ohio; $6 from Birmingham.

Semi-Finished Steel.—The leading local producer has its entire output for the third quarter sold. This mill has specifications to keep it operating at capacity for three weeks and specifications about equal production. While all third quarter contracts for sheet bars, billets and slabs were closed at

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and struc. shapes	3.00c.
Soft steel bars	3.00c.
Reinforc. steel bars	2.25c. to 2.50c.
Cold-fin. rounds and hex	3.65c.
Cold-fin. flats and sq.	4.15c.
Hoops and bands, No. 12 to ¼ in., inclusive	3.25c.
Hoops and bands, No. 13 and lighter	3.65c.
Cold-finished strip	*5.95c.
Black sheets (No. 24)	3.70c. to 3.90c.
Galvanized sheets (No. 24)	4.60c. to 4.75c.
Blue ann'l'd sheets (No. 10)	3.25c.
No. 9 ann'l'd wire, per 100 lb.	$2.95
No. 9 gal. wire, per 100 lb.	3.40
Com. wire nails, base per keg	2.95

*Net base, including boxing and cutting to length.

$35, Cleveland, Youngstown or Pittsburgh, shipments of billets and slabs are still being made against $34 second quarter contracts that have not been cleaned up. One consumer is inquiring for 2000 to 5000 tons of slabs for October and November shipment.

Sheets.—Most consumers are showing more interest in getting deliveries of sheets on order than in placing new business. The falling off in the demand for auto body sheets is offset in a measure by a good demand for full finished sheets from makers of building material and other users. Furniture sheets and enameling stock are also active. Weakness has developed on blue annealed material, particularly in the heavy gages. Concessions credited to continuous mills of $2 a ton on light sheets and more on the heavier material or light blue annealed plates are reported. On black sheets 2.85c., Pittsburgh, is quite commonly quoted, although some material carrying the higher finishes is being taken at the 2.95c. base. Galvanized sheets have weakened to 3.50c., Pittsburgh, and there are reports of even a lower price.

Wire Products.—Wire continues to move in a fair volume and the price is well maintained. Nails are quiet and subject to price irregularities in some districts.

Warehouse Business.—While sales are not as heavy as in June, the volume of business is satisfactory for a summer month. Orders are well diversified. Sheets are quieter. All prices are well maintained.

Strip Steel.—Specifications for both hot and cold-rolled strip steel are moderate and deliveries have further improved. Several mills can make shipments in two weeks on both grades. Third quarter contracts for both hot and cold-rolled strip were closed during the week, at regular prices, by one of the automotive interests. Hot-rolled strip is firm at 1.90c. to 2c., Pittsburgh. On cold-rolled strip the market generally has settled down to a flat 2.75c., Cleveland, price, efforts to get a 2.85c. price for small lots evidently having almost wholly disappeared.

Bolts, Nuts and Rivets.—The demand for bolts and nuts, while lighter than a few weeks ago, is better than in July, last year. Rivet orders show a slight gain over those of June, which was a quiet month for the rivet industry. Prices are firm at regular quotations.

Coke.—The demand for foundry coke is light, both in specifications against contracts and in new business. Better brands of Connellsville foundry coke are firm. Ohio by-product coke is quoted at $8.25, Painesville, for July shipment.

Old Material.—The local market is at a standstill owing to restrictions of shipments of steel-making grades by two mills, and dealers are showing considerable anxiety to secure shipping orders. A fair amount of scrap is moving to the Valley district and this activity is apparently supporting the Cleveland market, which appears firm, although there has been no recent test of prices on steel-making grades for local delivery. Dealers are paying $17.50 to $17.75 for No. 1 heavy melting steel, $17 for compressed steel and $16.75 for new No. 1 busheling for Youngstown shipment. Old No. 1 busheling has advanced 25c. a ton. Other grades are unchanged.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	$15.00 to $15.50
No. 2 heavy melting steel	14.50 to 15.00
Compressed sheet steel	14.50 to 15.00
Light bundled sheet stampings	12.00 to 12.50
Drop forge flashings	13.00 to 13.25
Machine shop turnings	9.25 to 9.50
No. 1 railroad wrought	13.50 to 14.00
No. 2 railroad wrought	16.00 to 16.50
No. 1 busheling	13.25 to 13.75
Pipes and flues	9.00 to 9.50
Steel axle turnings	12.50 to 13.00
Acid Open-Hearth Grades	
Low phos., forging crops	17.75 to 18.00
Low phos., billet, bloom and slab crops	18.50 to 18.75
Low phos., sheet bar crops	18.00 to 18.50
Low phos., plate scrap	18.00 to 18.50
Blast Furnace Grades	
Cast iron borings	10.75 to 11.00
Mixed borings and short turnings	10.75 to 11.00
No. 2 busheling	10.75 to 11.00
Cupola Grades	
No. 1 cast	16.75 to 17.25
Railroad grate bars	11.00 to 12.00
Stove plate	12.00 to 12.50
Rails under 3 ft	18.50 to 19.00
Miscellaneous	
Railroad malleable	18.00 to 18.50
Rails for rolling	16.25 to 16.50

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.70c.
Plates, ⅜-in.	2.90c.
Structural shapes	2.70c.
Soft steel bars, small shapes, iron bars (except bands)	2.80c.
Round-edge iron	3.50c.
Round-edge steel, iron finished 1½ x 1½ in.	3.50c.
Round-edge steel, planished	4.30c.
Reinforc. steel bars, sq. twisted and deform.	2.60c. to 2.80c.
Cold-fin. steel, rounds and hex.	3.60c.
Cold-fin. steel, sq. and flats	4.10c.
Steel hoops	3.55c.
Steel bands, No. 12 to ⅛-in. inclus.	3.30c.
Spring steel	5.00c.
*Black sheets (No. 24)	4.10c.
†Galvanized sheets (No. 24)	4.85c.
Light plates, blue annealed (No. 10)	3.25c.
Blue ann'l'd sheets (No. 13)	3.40c.
Diam. pat. floor plates—	
¼-in.	5.30c.
⅜-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

*For 50 bundles or more; 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.
†For 50 bundles or more; 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

Philadelphia

Steel Orders Numerous But for Small Tonnages—Galvanized Sheets Lack Firmness

PHILADELPHIA, July 16.—Specifications against third-quarter contracts are in good volume, but tonnages are smaller than in the second quarter. Buying is well distributed, however, and most steel mills are booking more business than is usual at this season. While operations are still maintained at a high rate, delays in delivery are generally shorter.

Prices are well maintained except on black and galvanized sheets, certain sheet mills which had considerable automobile business in the past quarter being in need of tonnage since buying by the automotive industry has slackened.

Eastern Pennsylvania pig iron prices are fairly well maintained despite competition from Birmingham producers, reported still to have stocks totaling in excess of 500,000 tons. The steel scrap market is stronger, especially prices of No. 1 and No. 2 heavy melting steel.

Bars.—Deliveries of most mills are shorter, ranging from one to three weeks. Operating rates are high and specifications, although for small tonnages, are unusually good for the season. Bars are quoted at 1.95c., Pittsburgh, or 2.27c., delivered Philadelphia.

Pig Iron.—It is estimated by pig iron sellers in this district that upward of 6000 tons of Southern iron has been sold to eastern Pennsylvania consumers since Birmingham furnaces began to quote on the present price level. Southern iron prices are $14.50 per ton, Birmingham, for foundry and $13.50 per ton for basic, or on a $6.01 per ton freight rate by rail and water, via Savannah, Ga., $20.51 for foundry and $19.51 for basic, on cars, Philadelphia. The movement of Southern iron via Norfolk, Va., has thus far been somewhat limited, as this routing necessitates shipping a minimum cargo of 700 tons. The petition of the Eastern railroads to the Interstate Commerce Commission to postpone reduction of the rate from Birmingham to Atlantic Coast ports, via Savannah, from $6.01 to $5.25, has been granted and a delay of about seven months is expected. About 1500 tons of cylinder iron for the Baldwin Locomotive Works is not yet reported placed, but with Birmingham iron available at about $20.37 per ton, delivered, all rail, purchase of Southern iron appears likely. It is also suggested that 3500 tons of foundry iron for the Trenton, N. J., plant of the National Radiator Co. may also go to a Southern furnace. On the usual purchases of small lots of foundry iron, eastern Pennsylvania furnaces have not found it necessary to offer concessions of more than about 50c. a ton from $21.50 per ton, furnace, but a desirable tonnage might bring out further concessions. The Virginia pig iron producer is preparing to go into blast early in October, with reduced production costs and, by taking advan-

tage of rail and water delivery to Atlantic Coast ports, via Newport News, Va., may make an effort to sell iron competitively in eastern Pennsylvania.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil.	$21.76 to $22.26
East. Pa. No. 2X, 2.25 to 2.75 sil.	22.26 to 22.76
East. Pa. No. 1X	22.76 to 23.26
Basic (del'd east. Pa.)	20.25 to 21.00
Gray forge	20.50 to 21.00
Malleable	21.25 to 21.75
Stand. low phos. (f.o.b. N. Y. State furnace)	22.00 to 23.00
Cop. b'r'g low phos. (f.o.b. furnace)	23.50 to 24.00
Va. No. 2 plain, 1.75 to 2.25 sil.	24.04
Va. No. 2X, 2.25 to 2.75 sil.	24.54

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces; $4.54 from Virginia furnaces.

Reinforcing Bars.—Inquiry is improving slightly, but competition is keen. About 200 tons for the Hartel Avenue sewer, Philadelphia, has been awarded, both rail and billet steel bars being bought. The hospital building for the Woman's Medical College, Philadelphia, calls for about 300 tons of bars. Rail steel bars are quoted at about 1.95c., Franklin, Pa., or Tonawanda, N. Y., or 2.27c., delivered Philadelphia, with no extra for cutting to length. Sellers of billet steel bars are showing an increasing tendency to quote prices with no extra for cutting to length and certain eastern Pennsylvania mills rolling billet steel bars have quoted 1.95c., Pittsburgh, or 2.27c., Philadelphia, without the extra, which is equivalent to the rail steel bar price. Pittsburgh mills have quoted 2c. to 2.05c., Pittsburgh, or 2.32c. to 2.37c., delivered Philadelphia, usually adding the $5 extra for cutting to length.

Plates.—Deliveries range from two to three weeks, with specifications on contracts small in size, but numerous. Buying by locomotive builders and the railroads is quiet at present, but there is a fair tonnage of plates moving to car builders and fabricating shops, especially tank builders. The low bidder on a barge for the Central Railroad of New Jersey, calling for about 600 tons of plates, was the Bethlehem Steel Co., with the New York Shipbuilding Co., next. It is reported that the low bidder quoted on longer delivery than was specified in the inquiry. Plates are quoted at 2.05c., Coatesville, Pa., or 2.15c., delivered Philadelphia.

Shapes.—Prices range from 1.95c. to 2.05c., f.o.b. nearest mill to consumer, or 2.01c. to 2.11c., delivered Philadelphia. Fabricating shops are well occupied, but new business has slackened considerably. Recent projects in this district include about 2000 tons for an Atlantic City Hotel and a small tonnage for a soldiers and sailors memorial bridge at Harrisburg, Pa.

Sheets.—Blue annealed sheet prices are being maintained at 2.35c. per lb., Pittsburgh, or 2.67c., Philadelphia, for No. 13 gage and light plates, blue annealed, No. 10 gage are quoted at 2.20c., Pittsburgh, or 2.52c., delivered Philadelphia. Black sheets are being shaded $1 to $2 a ton on most current business, mills quoting 2.85c. to 2.95c., Pittsburgh, or 3.17c. to 3.27c., Philadelphia. Galvanized sheets have settled a full $2 a ton on recent business to 3.60c., Pittsburgh, or 3.92c., Philadelphia, and further concessions of $1 a ton or more have been made on desirable business. Certain mills, which were heavily engaged on automobile tonnage in the second quarter are now seeking business, while others not rolling automobile sheets are still asking up to four and five weeks delay in delivery.

Imports.—In the week ended July 13, arrivals at this port consisted of 153 tons of structural shapes from France and 35 tons from Germany.

Old Material.—No. 1 heavy melting steel is strong and an eastern Pennsylvania consumer is understood to have closed on 5000 to 10,000 tons of No. 1 steel at $17 per ton, delivered. No. 2 heavy melting steel is firm and a Pencoyd, Pa., mill has bought a small tonnage of automobile steel at $14.25 per ton, delivered. Stove plate is quotable at $12 to $12.50 a ton delivered, on the basis of a recent sale to a Harrisburg consumer at $12.50, and machine shop turnings show an advance of 50c. a ton on a sale at $12, delivered. There is a strong undertone to prices and available supplies of No. 1 and No. 2 heavy melting steel are not large.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	$16.50 to $17.00
Scrap T rails	16.00
No. 2 heavy melting steel	12.50 to 14.25
No. 1 railroad wrought	16.00 to 16.50
Bundled sheets (for steel works)	11.50
Hydraulic compressed, new	14.50 to 15.00
Hydraulic compressed, old	12.00 to 12.50
Machine shop turnings (for steel works)	11.50 to 12.00
Heavy axle turnings (or equiv.)	14.00 to 14.50
Cast borings (for steel works and roll. mill)	11.00 to 13.50
Heavy breakable cast (for steel works)	15.00 to 15.25
Railroad grate bars	12.00 to 12.50
Stove plate (for steel works)	12.00 to 12.50
No. 1 low phos., hvy., 0.04% and under	22.00 to 23.00
Couplers and knuckles	20.00 to 21.00
Rolled steel wheels	20.00 to 21.00
No. 1 blast f'nace scrap	10.50 to 11.00
Wrot. iron and soft steel pipes and tubes (new specific.)	15.00
Shafting	19.00 to 19.50
Steel axles	23.00 to 23.50
No. 1 forge fire	14.00
Cast iron carwheels	16.50 to 16.75
No. 1 cast	16.50 to 17.00
Cast borings (for chem. plant)	14.50
Steel rails for rolling	16.50 to 17.00

Steel Corporation Retires Total Bonded Debt

The board of directors of the United States Steel Corporation, at a meeting July 16, passed the necessary resolutions calling for redemption on Nov. 1 the entire outstanding issue of the corporation's 10-60-yr. 5 per cent bonds of 1963 at 110 and accrued interest. The amount of bonds of this issue outstanding at this date is $133,372,000.

To date the corporation, in accordance with the plan announced in letter to stockholders of March 5, has redeemed all but $15,880,000 of the outstanding issue of its 50-yr. 5 per cent gold bonds of 1951. Of this total, $7,933,000 are of the callable series and have been formally called for redemption on Sept. 1. Also on this latter date cash funds will be deposited with the trustee, at rate of 115 and accrued interest, to provide for purchase and retirement on presentation of such of the non-callable series bonds of this issue, now totaling $7,947,000, which may not have been redeemed prior to that date. Upon the retirement, or provision for retirement, of the 50-yr. 5 per cent bonds and the 10-60-yr. bonds, there will be fully discharged all of the bonded debt of the corporation.

Subscriptions for New Stock

Under the recent offer to stockholders to subscribe for additional shares of common stock at $140 per share, subscriptions have been received and recorded to date for 1,009,485 shares, or 99.3 per cent of the total of 1,016,605 shares offered. Some few subscriptions awaiting perfection of assignment of warrants and other details will probably add slightly to the total of 1,009,485 shares. Of the number of shares subscribed for, about 91 per cent were paid for in full on June 21 and 9 per cent were payable in installments on June 21 and on Oct. 1.

Employees' Stock Subscriptions

Under the employees' stock subscription plan for 1929, stock was offered on May 28 for subscription at $165 per share. The subscription closed on July 6, subscriptions having been received from 48,956 employees for a total of 83,079 shares. This compares with 49,612 subscriptions received for 94,077 shares in 1928, when the price at which the stock was offered was $145 per share

Newton Steel Earnings

YOUNGSTOWN, July 16.—For the second quarter this year the Newton Steel Co. reports record net earnings of $799,928, after all charges except preferred dividends, and after allowance for Federal taxes of $109,081. It is expected the company will show net profits this year equivalent to $12 per share of outstanding common stock.

Net profits of the company in the first half, totalling $1,519,890, exceeded net earnings for all of 1928 by $162,957.

The company has a large volume of unfilled orders and is assured near-capacity operations over remainder of the year. It makes full-finished auto body sheets. At Monroe, Mich., it is building a new sheet mill plant, to be closer to the heavy automobile production area.

Pacific Coast

Two Pipe Lines Will Require 24,000 Tons of Steel—Another of 149 Miles in Prospect

SAN FRANCISCO, July 13 (*By Air Mail*).—Demand for iron and steel products on the Pacific Coast is well sustained. Awards of the past week compare favorably with the totals for the last few weeks. Structural steel was the most active, and several fair-sized lots were placed, outstanding among which were 950 tons for an apartment in San Francisco, booked by McClintic-Marshall Co., and 630 tons for a bridge over the Salinas River for the State Highway Department. Pipe mill representatives and plate fabricators are keenly interested in the call for preliminary bids for a pipe line at Phoenix, Ariz., requiring 14,000 tons of plates, and the call for bids, at Seattle, for 10,000 tons for the Cedar River pipe line project, bids on which were postponed from July 5 to July 19.

Pig Iron.—Movement of foundry pig iron is limited to unimportant lots. No change in quotations is noted.

Prices per gross ton at San Francisco:

*Utah basic	$25.00 to $26.00
*Utah fdy., sil. 2.75 to 3.25	25.00 to 26.00
**Indian fdy. sil. 2.75 to 3.25	25.00 to 26.00

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Bars.—While reinforcing steel bar awards this week fell below the previous week's total, upward of 1500 tons was booked. Among the larger lots were 416 tons for a bridge in California and 300 tons for highway work in Washington. Bids were opened this week on 168 tons for highway work at Phoenix, Ariz. Out-of-stock prices in the San Francisco district are unchanged at 2.20c., base, on carload lots and 2.60c., base, on smaller tonnages. Los Angeles out-of-stock quotations are $2 a ton higher. Demand for merchant bar steel is limited to unimportant tonnages, while the price remains firm at 2.35c., c.i.f. Coast ports.

Plates.—The largest plate award of the week called for 300 tons for a barge for the Santa Fe Railroad, placed with the Moore Dry Dock Co. Bids were opened this week on 100 tons for a 54-in. riveted steel pipe line for the East Bay Municipal Utility District, Oakland. Prices continue firm at 2.35c., c.i.f.

Shapes.—A fair amount of structural material was placed during the week, the total exceeding 3300 tons. The Isaacson Iron Works secured 160 tons for the City-County Building, Seattle, and 110 tons for a hangar for the Boeing Airplane Co., Seattle. Pending business is not of heavy proportions, but several fair-sized projects are scheduled to come out for figures in the near future. Plain material is firm at 2.35c., c.i.f. Coast ports.

Cast Iron Pipe.—Cast iron pipe awards of the week included 550 tons of 12-in. Class B pipe for a golf course at the Stanford University, which went to the United States Pipe & Foundry Co.; Palo Alto, Cal., 203 tons of 12-in. Class 150 pipe for the East Bay Municipal Utility District, Oakland, Cal., placed with the same interest, and 199 tons of 4 to 10-in. Class C pipe for San Diego, booked by Daley Corporation. The United States Pipe & Foundry Co. was low bidder on 2331 tons of 6 to 20-in. Class B pipe for the East Bay Municipal Utility District, Oakland. Bids were opened this week on 162 tons of 6 and 8-in. Class B pipe for Great Falls, Mont. New business calls for 1344 tons of 4 to 18-in. Classes C and D pipe for Vancouver, B. C., bids on which will be opened July 22 and for 1012 tons of 4 to 24-in. Class B pipe for Pasadena, Cal., bids on which will be opened July 18. Bert Noble was low bidder on 145 tons of 4 to 12-in. Class B pipe for San Diego.

Steel Pipe.—The Pacific Gas & Electric Co. has not yet taken any action on its inquiry for 2263 tons of 8⅝-in. O. D. gas pipe for installation at Gilroy, Monterey and Salinas, Cal. Eureka, Cal., placed a small tonnage of 2 and 3-in. galvanized standard pipe with the Lally Co. The Standard Oil Co. intends to build a pipe line in the San Joaquin Valley which will require 27 miles of 10-in. pipe, 50 miles of 8-in. and 72 miles of 6-in. pipe.

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and struc. shapes	3.15c.
Soft steel bars	3.15c.
Small angles, ⅞-in. and over	3.15c.
Small angles, under ⅞-in.	3.55c.
Small channels and tees, ¾-in. to 2¾-in.	3.75c.
Spring steel, ¼-in. and thicker	5.00c.
Black sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.80c.
Galv. sheets (No. 24)	5.30c.
Struct. rivets, ½-in. and larger	5.65c.
Com. wire nails, base per keg	$3.40
Cement c't'd nails, 100 lb. keg	3.40

Birmingham

Pig Iron Buyers Cautious and Sales Are for Nearby Requirements Only—Steel Business Holds Up

BIRMINGHAM, July 16.—Pig iron buyers continue to pursue a conservative policy in covering their third quarter requirements, despite the recent reduction in price, which established the base at $14.50 for No. 2 foundry. Most of the buying is for two to four weeks' requirements. The recent reductions in prices have undoubtedly made buyers cautious. The total tonnage placed last week was a little better than that of the preceding week because of the steady run of small orders and the resumption of activities after the holiday period. Prices below $14.50, Birmingham, have been made on recent sales for Northern shipment. The volume of shipments was better last week than the week before and a still larger movement is indicated. Furnace operations have been unchanged for several weeks. Of the 17 stacks in operation, nine are on foundry iron, seven on basic and one on recarburizing iron.

Prices per gross ton, f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil.	$14.50
No. 1 fdy., 2.25 to 2.75 sil.	15.00
Basic	14.50

Finished Steel.—New business in bars, plates and shapes is undiminished. Backlogs in these lines have changed very little in the past three or four weeks, the volume being approximately twice the amount it was at this time last year. Sheet buying is more pronounced than it has been at this season in the past. Several small orders for standard steel rails have been booked this month. Wire products' business continues to fall below the June rate. Mill operations remain at the peak reached early last month. All prices are the same. Structural steel fabricators report a fair volume of small orders, but no large orders. Two of the larger fabricators have heavy backlogs. Active open-hearths number 22 out of a total of 23.

Old Material.—New business continues slow and in small lots for early requirements. Demand for cast iron grades is almost nil. Prices are unchanged.

Prices per gross ton, deliv'd Birmingham dist. consumers' yards:

Heavy melting steel	$12.50
Scrap steel rails	12.50
Short shoveling turnings	9.00
Cast iron borings	9.00
Stove plate	$11.50 to 12.00
Steel axles	21.00
Iron axles	23.00
No. 1 railroad wrought	10.00 to 10.50
Rails for rolling	14.00 to 15.00
No. 1 cast	13.50
Tramcar wheels	13.00
Cast iron carwheels	12.50 to 13.00
Cast iron borings, chem.	13.50 to 14.00

Cast Iron Pipe.—New business of pressure pipe manufacturers was less last week than the average of the several weeks preceding owing to the absence of large orders. Awards are pending on the project at Oakland, Cal., requiring 2200 tons, and a project at Houston, Miss., requiring about 20,800 ft. of 6 to 8-in. pipe. A project at Griffin, Ga., requiring about nine miles of 16 to 20-in. pipe is still pending, as is the 700-ton job at Hollywood, Fla. The United States Pipe & Foundry Co. has booked an order for 6000 ft. of 8-in. and 17,000 ft. of 6-in. pipe for Alabama City, Ala. The demand as a whole is estimated to be 20 to 25 per cent under what it was at

this season last year. New business for several weeks has been made up almost entirely of municipal tonnages. The lowest operation of any plant is about 65 per cent and the highest about 95 per cent. Prices are firm at $37 to $38.

Coke.—Activity in the foundry coke market is confined to shipments on contracts, which are going forward at the steady rate of the past several weeks. Approximately 95 per cent of the ovens in the district are active. The base price remains at $5.

Boston

Pig Iron Prices Still Unsettled—Some Grade of Scrap Scarce and Price Trend is Upward

BOSTON, July 16.—New England pig iron prices are still very much unsettled. The Universal Winding Co., Providence, R. I., bought 1500 tons—800 tons No. 2X and 700 tons No. 1X—from the Mystic Iron Works and a Buffalo stack. The No. 1X is reported to have sold at $21.78 a ton, delivered, equivalent to $17.50 a ton on cars, Buffalo, while the No. 2X was sold on a delivered basis equal to $17.32 a ton, on cars, Buffalo, allowing for a $4.28 rail and water rate. Alabama iron is lower. Transactions in western Pennsylvania, New York State and Buffalo irons are reported largely in car lots. Competition for even these small tonnages is keen, and furnaces have been obliged to shade prices to secure orders. A textile machinery maker, previously reported as in the market for 1000 tons of iron, may buy 2000 to 3000 tons. A central Massachusetts foundry still is uncovered on a round tonnage.

Foundry iron prices per gross ton deliv'd to most New England points:

†Buffalo, sil. 1.75 to 2.25	..	$21.28 to $21.78
†Buffalo, sil. 2.25 to 2.75	..	21.78 to 22.28
*Buffalo, sil. 1.75 to 2.25	..	21.91 to 22.41
*Buffalo, sil. 2.25 to 2.75	..	22.41 to 22.91
East. Penn., sil. 1.75 to 2.25		24.65
East. Penn., sil. 2.25 to 2.75		25.15
Va., sil. 1.75 to 2.25		25.21
Va., sil. 2.25 to 2.75		25.71
Ala., sil. 1.75 to 2.25		21.41 to 23.27
Ala., sil. 2.25 to 2.75		21.91 to 23.77

Freight rates: $4.91 all rail from Buffalo, and $4.28 rail and water; $3.65 from eastern Pennsylvania; $5.21 all rail from Virginia; $6.91 to $8.77 from Alabama.

*All rail rate.
†Rail and water rate.

Reinforcing Bars.—Current business in billet steel bars is confined to small tonnages, yet the weekly aggregate was satisfactory. Prices hold well at 2.66½c. a lb., base, from stock. The largest individual prospect is 100 tons for a local institution addition, but it is expected that a new bankers' building will soon require 1000 tons or more. The market for rail steel bars has become rather listless, with prices nominal at 2.26½c., base, delivered common Boston freight rate points.

Shapes and Plates.—Fabricators of shapes and plates are now well covered on material for third quarter. Plate deliveries are still backward, while those of standard shapes are generally on schedule. Contracts placed with structural steel fabricators the past week were few. It is expected that about 1000 tons for various bridges will be closed this week. A Congress Street (Boston) bridge, involving 1000 tons or more, will soon come up for figures.

Cast Iron Pipe.—Hopkinton, Mass., has bought 1000 tons of pipe from the United States Pipe & Foundry Co., and it is reported that 300 tons of 6 and 8-in. stocks has been placed with a French foundry for a water line between Hyannis and Craigville, Mass. Weston, Mass., will close bids July 23 for 400 tons of 6 to 12-in. pipe. Some of the usually active foundries will not bid on the 4500 tons of 36 and 42-in. pipe wanted by West Hartford, Conn., as they are well sold ahead on these sizes. Prices quoted openly on domestic pipe are: 4 in., $46.10 to $47.10 a ton, delivered common Boston freight rate points; 6 to 12 in., $40.10 to $41.10; 16 to 20 in., $39.10. A $3 differential is asked on Class A and gas pipe.

Coke.—Specifications against last half by-product foundry coke contracts are increasing slowly. The price of such fuel remains at $11 a ton, delivered within a $3.10 freight rate zone.

Old Material.—Old material in general is scarce. Prices for available scrap wanted by Pennsylvania mills are higher. While $12 to $12.50 a ton on cars shipping point is the general price for No. 1 heavy melting steel, $12.75 was paid the past week. Steel turnings range from $6.60 to $7.10 a ton, as against $6.60 generally, a week ago, while dealers in most cases are paying slightly better prices for forge flashings, forge scrap and steel axles. The best most dealers will do on axles is $18 a ton, on cars, yet $18.50 and as high as $19 have been paid recently under special conditions. Railroad malleable is in demand, with $18.50 a ton, delivered, the common quotation. Specification pipe is the one material dealers cannot sell. Exporters are endeavoring to load the Norwegian steamer Karmoy with scrap for Danzig, but material is scarce. The Boston & Maine Railroad yesterday closed bids on approximately 65 cars of various kinds of scrap.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$12.00 to $12.75
Scrap T rails	11.50 to 12.00
Scrap girder rails	10.50 to 11.25
No. 1 railroad wrought	12.00 to 12.50
No. 1 yard wrought	9.50 to 10.00
Machine shop turnings	6.60 to 7.10
Cast iron borings (steel works and rolling mill)	6.50 to 6.60
Bundled skeleton, long	9.50 to 10.25
Forge flashings	10.25 to 10.50
Blast furnace borings and turnings	6.00 to 6.25
Forge scrap	9.00 to 9.25
Shafting	14.00 to 14.25
Steel car axles	17.50 to 18.00
Wrought pipe 1 in. in diameter (over 2 ft. long)	9.75 to 10.00
Rails for rolling	12.50 to 12.75
Cast iron borings, chemical	10.00 to 10.25

Prices per gross ton deliv'd consumers' yards:

Textile cast	$14.50 to $14.75
No. 1 machinery cast	15.00 to 15.25
No. 2 machinery cast	13.00 to 13.25
Stove plate	11.50 to 12.00
Railroad malleable	18.50 to 19.00

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars, small shapes	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway rounds	6.60c.
Norway squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tie steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold-rolled steel—	
Rounds and hex	*3.55c. to 5.55c.
Spares and flats	*4.05c. to 7.05c.
Toe calk steel	6.00c.
Rivets, structural or boiler	4.50c.

	Per Cent Off List
Machine bolts	50 and 5
Carriage bolts	50 and 5
Lag screws	50 and 5
Hot-pressed nuts	50 and 5
Cold-punched nuts	50 and 5
Stove bolts	70 and 10

*Including quantity differentials.

Canada

Canadian Pacific to Buy More Cars

TORONTO, ONT., July 16.—The Canadian Pacific is taking bids on 31 freight and passenger locomotives, 121 sleeping and passenger cars, 1411 stone, coal, ore and flat cars, 300 freight and express refrigerator cars and 200 steel-sheathed automobile cars.

Pig Iron.—The summer holiday season is taking toll of business in this market. Forward delivery buying has practically ceased, following the active buying movement which terminated about a week ago. Spot sales are fairly numerous, but in small lots. Shipments are going forward in large tonnage. Canadian pig iron prices are firm, but unchanged.

Prices per gross ton:

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75	$24.60
No. 2 fdy., sil. 1.75 to 2.25	24.10
Malleable	24.60
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75	$26.00
No. 2 fdy., sil. 1.75 to 2.25	25.50
Malleable	26.00
Basic	24.50
Imported Iron, Montreal Warehouse	
Summerlee	$33.50
Carron	33.00

Structural Steel.—While there is a strong prospective demand for structural steel in connection with new building undertakings, actual sales

for the week were much below the weekly average for this year. New business was made up chiefly of lots under 500 tons. Inquiries and specifications are out, however, for substantial tonnages on which early closing is expected. Fabricating plants in Canada are running at full time, with backlogs sufficient to maintain present activities for several months.

Old Material.—Consumers continue to withhold new business from the old material markets. Current sales are mostly confined to spot needs of the small consumers, with little or no forward delivery buying. Prices are firm, but unchanged.

Dealers' buying prices:

	Per Gross Ton	
	Toronto	Montreal
Heavy melting steel.	$10.00	$8.50
Rails, scrap	11.00	9.00
No. 1 wrought	10.00	12.00
Machine shop turnings	7.50	5.00
Boiler plate	7.50	6.00
Heavy axle turnings	8.00	7.50
Cast borings	7.50	5.00
Steel turnings	7.50	6.50
Wrought pipe	6.00	6.00
Steel axles	15.00	20.00
Axles, wrought iron	17.00	22.00
No. 1 machinery cast	....	17.00
Stove plate	....	13.00
Standard carwheels	....	16.00
Malleable	....	13.00
	Per Net Ton	
No. 1 mach'ry cast	$16.00	....
Stove plate	12.00	....
Standard carwheels	15.00	....
Malleable scrap	14.00	....

Buffalo

Pig Iron Inquiry Totals 10,000 Tons

BUFFALO, July 16.—While a great many pig iron consumers are inactive in the purchasing departments because of inventory taking, a buying movement appears to have begun for the third quarter. A Batavia melter wants 1500 tons of foundry, and in the East several sizable inquiries are pending. Three of these embrace about 7000 tons of foundry and are respectively 3500 tons, 2000 tons and 1500 tons. A few small lots are being sold in the district at $19.50 for No. 2 plain. Producers estimate the total inquiry for the week at about 10,000 tons. Prices in the district are firm.

Prices per gross ton, f.o.b. furnace:

No. 2 fdy., sil. 1.75 to 2.25	$19.50
No. 2X fdy., sil. 2.25 to 2.75	20.00
No. 1 fdy., sil. 2.75 to 3.25	21.00
Malleable, sil. up to 2.25	20.00
Basic	18.50
Lake Superior charcoal	27.28

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and struc. shapes	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.95c.
Cold-fin. flats, sq. and hex.	4.45c.
Rounds	3.95c.
Cold-rolled strip steel	5.85c.
Black sheets (No. 24)	4.20c.
Galv. sheets (No. 24)	4.85c.
Blue ann'l'd sheets (No. 10)	3.50c.
Com. wire nails, base per keg	$3.60
Black wire, base per 100 lb.	3.75

Finished Iron and Steel.—Most of the mills continue to operate at from 90 to 95 per cent of capacity. The fabricated structural market has been quite active and some very good business has been placed, including 1000 tons for a physical culture building at Rochester University; the Woodrow Wilson School at Binghamton, 200 tons; building for the Carborundum Co., Niagara Falls, 200 tons; bridges for the Youngstown-Olcott highway, 250 tons. Fabricators are awaiting action on the 8000-ton City Hall job. Bids go in July 19 for the 1600-ton Batchellerville viaduct north of Schenectady.

Old Material.—Strengthening of the market outside of Buffalo is reflecting itself here, though there has been no large buying movement. Some small tonnages of No. 1 heavy melting steel have been sold, and the market is strong at $17.25. There has been a little buying of No. 1 machinery cast scrap by some of the smaller consumers at $15.50 to $16. Railroad lists closed last week included No. 1 heavy melting steel, which brought $17.25, delivered Buffalo consuming plant. There is a shortage of knuckles and couplers and rolled steel wheels for this district. Prices offered are $21.00 to $21.50, Pittsburgh district points, against $19.00 to $19.50, Buffalo.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades	
No. 1 heavy melting steel.	$17.00 to $17.25
No. 2 heavy melting steel.	14.75 to 15.00
Scrap rails	16.50 to 17.00
Hydraul. comp. sheets	14.50 to 14.75
Hand bundled sheets	12.00 to 12.50
Drop forge flashings	14.75 to 15.00
No. 1 busheling	16.50 to 16.50
Hvy. steel axle turnings	14.00 to 14.50
Machine shop turnings	7.50 to 7.75
No. 1 railroad wrought	13.00 to 13.50
Acid Open-Hearth	
Knuckles and couplers	19.00
Coil and leaf springs	19.00
Rolled steel wheels	19.00
Low phos. billet and bloom ends	20.00 to 20.50
Electric Furnace Grades	
Short shov. steel turnings.	12.00 to 12.50
Blast Furnace Grades	
Short mixed borings and turnings	11.00 to 11.50
Cast iron borings	11.00 to 11.50
No. 2 busheling	10.00 to 10.50
Rolling Mill Grades	
Steel car axles	18.75 to 19.25
Iron axles	21.00 to 22.00
Cupola Grades	
No. 1 machinery cast	16.00 to 17.00
Stove plate	12.50 to 13.00
Locomotive grate bars	12.50 to 13.00
Steel rails, 3 ft. and under	19.00 to 19.50
Cast iron carwheels	14.00 to 14.50
Malleable Grades	
Industrial	18.50 to 19.00
Railroad	18.50 to 19.00
Agricultural	18.50 to 19.00
Special Grades	
Chemical borings	12.50 to 13.50

St. Louis

Pig Iron Sold for Last Quarter—Southern Price Situation Restricts Buying—Scrap Steady

ST. LOUIS, July 16.—The first sales of pig iron for fourth quarter shipment were reported this week by the St. Louis Gas & Coke Corporation—500 tons to a St. Louis jobbing foundry and 200 tons to a Kansas City melter. Current prices prevailed. Total sales of that maker for the week were 5000 tons, including 500 tons to a Belleville stove plant, 500 tons to each of two Iowa foundries, 300 tons to a Kansas City specialty maker and 200 tons to an Oklahoma melter, all for third quarter. Melters generally are buying only for immediate requirements, apparently being uncertain as to the future because of the recent reductions by Southern makers. The local maker's quotations are unchanged, although it is understood prices in competitive territory are being met in some instances.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill.	$20.00
Malleable, f.o.b. Granite City	20.50
N'th'n No. 2 fdy., deliv'd St. Louis	22.16
Southern No. 2 fdy., deliv'd	18.92
Northern malleable, deliv'd	22.16
Northern basic, deliv'd	22.16

Freight rates: 75c. (average) Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

Finished Iron and Steel.—The Granite City Steel Co. reports an improvement in the demand for galvanized sheets, while demand for plates and blue annealed sheets continues brisk. Prices in all lines are being generally well maintained. While no large structural projects are being undertaken, steel fabricators report that there has been a marked improvement in the number of small contracts, which have reached a fairly large volume.

Old Material.—An improvement in both inquiries and shipments during the last week is reported. The amount of old material reaching this market

Production and Shipment of Raw Materials and Finished Products in May

	May, 1929	April, 1929	May, 1928
Sheet-Metal Ware (a):			
Galvanized, produced, dozens	219,992	220,933	216,376
Galvanized, shipped, dozens	189,098	227,354	190,704
Galvanized, shipped, value	$748,831	$882,608	$758,953
Enameled, shipped, dozens	352,885	463,577	348,661
Enameled, shipped, value	$1,309,747	$1,420,535	$1,304,498

(a) United States Department of Commerce.

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-fin. rounds, shaftings, screw stock	3.75c.
Black sheets (No. 24)	4.25c.
Galv. sheets (No. 24)	5.10c.
Blue ann'l'd sheets (No. 10)	3.45c.
Black corrug. sheets (No. 24)	4.30c.
Galv. corrug. sheets	5.15c.
Structural rivets	3.95c.
Boiler rivets	3.95c.
	Per Cent Off List
Tank rivets, ⅞-in. and smaller, 100 lb. or more	65
Less than 100 lb	60
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-pressed nuts, sq., blank or tapped, 200 lb. or more	60
Less than 200 lb	50
Hot-pressed nuts, hex., blank or tapped, 200 lb. or more	60
Less than 200 lb	50

from the country dealers is still small because the heat has interfered with handling. Railroad shipments also are light for the same reason. Consumers are said to be willing to buy at present quotations, but dealers are cautious about taking such business. Prices are unchanged. Railroad lists: Santa Fe, 7250 tons; Rock Island, 6500 tons; Burlington, 6477 tons; Chesapeake & Ohio, 4951 tons; Louisville & Nashville, 2330 tons; Missouri-Kansas-Texas, 710 tons; Nickel Plate, 29 carloads; Frisco, 26 carloads; Pullman, six carloads.

Dealers' buying prices per gross ton, f.o.b. St. Louis district:

No. 1 heavy melting or shoveling steel	$13.50 to $14.00
No. 2 heavy melting or shoveling steel	12.75 to 13.25
No. 1 locomotive tires	15.00 to 15.50
Miscel. stand-sec. rails including frogs, switches and guards, cut apart	15.50 to 16.00
Railroad springs	17.00 to 17.50
Bundled sheets	9.50 to 10.00
No. 2 railroad wrought	13.50 to 14.00
No. 1 busheling	10.00 to 10.50
Cast iron borings and shoveling turnings	9.50 to 10.00
Iron rails	15.00 to 15.50
Rails for rolling	16.00 to 16.50
Machine shop turnings	8.00 to 8.50
Heavy turnings	9.75 to 10.00
Steel car axles	19.00 to 19.50
Iron car axles	26.50 to 27.00
Wrot. iron bars and trans.	22.00 to 22.50
No. 1 railroad wrought	13.00 to 13.50
Steel rails, less than 3 ft.	17.50 to 18.00
Steel angle bars	14.25 to 14.75
Cast iron carwheels	14.00 to 14.50
No. 1 machinery cast	15.50 to 16.00
Railroad malleable	15.50 to 16.00
No. 1 railroad cast	15.00 to 15.50
Stove plate	12.50 to 13.00
Agricult. malleable	15.00 to 15.50
Relay. rails, 60 lb. and under	20.50 to 23.50
Relay. rails, 70 lb. and over	26.50 to 29.00

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and struc. shapes	3.40c.
Bars, soft steel or iron	3.30c.
New billet reinforc. bars	3.15c.
Rail steel reinforc. bars	3.00c.
Hoops	4.05c.
Bands	3.50c.
Cold-fin. rounds and hex	3.85c.
Squares	4.35c.
Black sheets (No. 24)	4.05c.
Galvanized sheets (No. 24)	4.90c
Blue ann'l'd sheets (No. 10)	3.45c
Structural rivets	3.85c
Small rivets	65 per cent off list
No. 9 ann'l'd wire, per 100 lb.	$3.00
Com. wire nails, base per keg	2.85
Cement c't'd nails, base 100 lb. keg	2.85
Chain per 100 lb	8.75
	Net per 100 Ft.
Lap-weld steel boiler tubes, 2-in.	$16.00
4-in.	33.00
Seamless steel boiler tubes, 2-in.	17.00
4-in.	34.00

Cincinnati

Southern Pig Iron Weaker But Demand is Light—Cold Rolled Strip Sales Drop Sharply

CINCINNATI, July 16.—District consumers of Northern pig iron are continuing to go slowly in anticipating their needs and are buying only enough material to keep covered for 30 to 60 days. Consequently, new business, although in better volume than is usual in midsummer, is confined chiefly to purchases in small lots. Except for an inquiry from a Springfield, Ohio, melter for 400 to 500 tons, most of the quantities asked for range from 100 to 300 tons. In contrast with this fair activity in Northern iron, Southern iron continues dull and weak. The quoted price is $14.50, base Birmingham, but substantial concessions would undoubtedly be made on quantity orders. Silvery iron, which has been quiet for some time, has declined $1, bringing the new base price to $25.

Prices per gross ton, del'v'd Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25	$19.89 to $20.39
Ala. fdy., sil. 1.75 to 2.25	18.19
Ala. fdy., sil. 2.25 to 2.75	18.69
Tenn. fdy., sil. 1.75 to 2.25	18.19 to 18.69
S'th'n Ohio silvery, 8 per cent	26.89

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

Coke.—Except for an order from an Indiana consumer to cover his needs for the next nine months, new business in foundry coke has been light. On the other hand, specifications against current contracts during the first two weeks of July have advanced slightly over the corresponding period in June, and indications are that consumers will take more coke this month on contract.

Finished Material.—Although demand failed to keep pace with production last week, causing a reduction in backlogs, district sheet mills have sufficient unfilled orders to maintain capacity output into late summer. One exception to this, however, must be noted. Cold rolled strip has slumped sharply, following the withdrawal of automobile manufacturers from the market. The fabricated material market continues dull, although several large undisclosed projects are reported to be under consideration. Except for these reports, the market generally is very quiet and current business is at a hand-to-mouth rate.

Old Material.—Although the mills are using large amounts of scrap, trading in old material is confined to carload lots. Despite this dullness a continued scarcity of good scrap has given the market an undertone of firmness and consequently prices have been maintained.

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel	$13.25 to $13.75
Scrap rails for melting	13.75 to 14.25
Loose sheet clippings	9.25 to 9.75
Bundled sheets	10.50 to 11.00
Cast iron borings	9.00 to 9.25
Machine shop turnings	8.50 to 8.75
No. 1 busheling	10.50 to 11.00
No. 2 busheling	6.75 to 7.00
Rails for rolling	14.50 to 15.00
No. 1 locomotive tires	14.25 to 14.75
No. 2 railroad wrought	13.00 to 13.50
Short rails	18.50 to 19.00
Cast iron carwheels	12.75 to 13.25
No. 1 machinery cast	19.25 to 19.75
No. 1 railroad cast	15.25 to 15.75
Burnt cast	10.25 to 10.75
Stove plate	10.25 to 10.75
Brake shoes	10.25 to 10.75
Railroad malleable	15.25 to 15.75
Agricultural malleable	14.25 to 14.75

Detroit

Seasonal Decline in Automobile Production Will Be Less Than Usual This Year

DETROIT, July 16.—While the seasonal decline in automobile production is now apparent, it will be less than usual this year. Figures for June so far obtainable show that virtually all makers except Packard are affected. Packard in June built more cars than in May.

The low-priced cars are still holding the field for volume. Ford set a new daily record during June with a production averaging 9100 units.

It is believed in some quarters that the heavy sales of Ford cars have had a tendency to slow up sales of used cars generally, which of course is re-

ESTIMATED AUTOMOBILE PRODUCTION FOR JULY
(Actual Figures for May and June Shown)

	May	June	July (Estimated)
Auburn	3,032	3,144	2,500
Buick	12,000	14,665	31,408
Cadillac and LaSalle	4,200	1,842	1,500
Chevrolet	160,895	151,297	150,000
Chrysler	54,595	42,351	25,000
Ford	200,903	177,419	175,000
Franklin	1,707	1,405	1,200
Graham-Paige	11,677	5,987	4,500
Hudson and Essex	42,086	31,737	28,000
Hupmobile	5,329	2,030	1,800
Nash	12,117	9,070	8,000
Oldsmobile and Viking	16,000	7,361	6,000
Packard	4,561	4,753	4,600
Reo	4,453	3,042	2,800
Studebaker	14,000	.....	9,000
Willys Overland	35,000	30,000	25,000

flected in the disposal of new cars in the medium-priced field.

While June figures are below those of May, this year, they show a gain of approximately 26 per cent over the output in June, 1928, and it seems reasonable that production this month will be at a corresponding ratio over the total for July last year.

New car stocks held by dealers are ahead of retail demand, but the margin is said to be satisfactorily small.

Although the demand for structural steel shows a recession, the decrease is of small consequence. Proposed new work includes a theater at Battle Creek, Mich., an armory for the Naval Reserve in Detroit, an automobile sales and service building in Detroit and a store and office building in Detroit, which together will require 1000 tons or more of steel.

Old Material.—There have been no sales involving any tonnage during the past week and prices remain same as quoted last week.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Hvy. melting and shov. steel	$14.00 to $14.50
Borings and short turnings	9.00 to 9.50
Long turnings	8.00 to 8.50
No. 1 machinery cast	12.50 to 13.00
Automobile cast	13.00 to 13.50
Hydraul. comp. sheets	13.75 to 14.25
Stove plate	9.00 to 9.50
New No. 1 busheling	12.50 to 13.00
Old No. 1 busheling	11.00 to 11.50
Sheet clippings	8.75 to 9.25
Flashings	12.75 to 13.25

Fabricated Structural Steel

Fresh Inquiries Are Largest of Year—Chicago Work Will Take 25,000 Tons

OF the 26,000 tons of structural steel lettings in the past week, approximately 40 per cent was for non-industrial projects, 25 per cent for bridge work, 20 per cent for industrial purposes and the remainder for miscellaneous jobs. It is interesting to note that more than 15,000 tons represented building activities in New England, New York and New Jersey.

Fresh inquiries, totaling more than 74,000 tons, were the largest this year. Construction work in Chicago will take about 25,000 tons, or about 30 per cent of the tonnage which came out during the week. Plans for bridges are being pushed in various parts of the country, pending jobs include 20,000 tons for that purpose.

The outstanding award was 5800 tons for a bridge over the Hackensack River in New Jersey. Among the larger inquiries are 15,000 tons for an Ohio River bridge, 14,000 tons of plates for a pipe line at Phoenix, Ariz., and 12,000 tons for an office and theater building at Chicago. Awards follow:

CAMBRIDGE, MASS., 100 tons, garage, to New England Structural Co.

STAMFORD, CONN., 500 tons, department store, to A. E. Norton, Inc.

NEW YORK, 2000 tons, Goldman-Sachs Building on Pine Street, to American Bridge Co.

NEW YORK, 2200 tons, County Trust Co. building, to A. E. Norton, Inc.

NEW YORK, 500 tons, apartment building on Seventy-ninth Street, to Paterson Bridge Co.

NEW YORK, 500 tons, apartment building on Park Avenue, to Paterson Bridge Co.

NEW YORK, 900 tons, public school No. 141, to Harris Structural Steel Co.

NEW YORK, 150 tons, building for New York Central Railroad at 161st Street and Morris Avenue, to unnamed bidder.

BROOKLYN, 1200 tons, printing building for *Brooklyn Daily Eagle*, to George A. Just Co.

NORTH BEACH, N. Y., 425 tons, two airplane hangars, to McClintic-Marshall Co.

STATE OF NEW JERSEY, 5800 tons, bridge over Hackensack River, to Strobel Steel Construction Co.

ROCHESTER, N. Y., 1000 tons, physical education building for University of Rochester, to McClintic-Marshall Co.

BINGHAMTON, N. Y., 200 tons, Woodrow Wilson School, to McClintic-Marshall Co.

STATE OF NEW YORK, 250 tons, bridges over Youngstown-Olcott Highway, to McClintic-Marshall Co.

PHILADELPHIA, 200 tons, warehouse in Frankford, to R. E. Lederle, Philadelphia.

BELLE, W. VA., 225 tons, extension to generator plant for Du Pont Engineering Co., to Virginia Bridge & Iron Co.

STATE OF NEW YORK, 118 tons, State highway bridge at Dunkirk, N. Y., to McClintic-Marshall Co.

ST. JOSEPH, MICH., 920 tons, foundry for Auto Specialties Mfg. Co., to Flint Structural Steel Co.

TORONTO, ONT., 150 tons, warehouse on Fleet Street, to Reid & Brown Structural Steel & Iron Works.

PITTSBURGH, 300 tons, Melwood Avenue garage, to Jones & Laughlin Steel Corporation.

STATE OF WEST VIRGINIA, 200 tons, two State highway bridges, to Pittsburgh-Des Moines Steel Co.

DAYTON, OHIO, 600 tons, steam station for Dayton Power & Light Co., to Dayton Structural Steel Co.

ROCK ISLAND, ILL., 750 tons, addition to motor building for International Harvester Co., to Gage Structural Steel Co., Chicago.

ROCK ISLAND, 200 tons, addition to power house for International Harvester Co., to Rock Island Bridge Co.

CHICAGO, 770 tons, Trustee System Building at Lake and Wells Streets, to Duffin Iron Co., local.

CHICAGO, 600 tons, Dallas Brass & Copper Co., to Hansell Elcock Co., local.

CHICAGO & WESTERN INDIANA RAILROAD, 825 tons, subway at Chicago, to American Bridge Co.

STATE OF IOWA, 150 tons, highway bridges in Cass County, to St. Joseph Structural Steel Co., St. Joseph, Mo.

MESA, ARIZ., 250 tons, taintor gates, Stewart Mountain dam, to unnamed bidder.

ELLENSBURG, WASH., 257 tons, crossing, Yakima River, to unnamed bidder.

SEATTLE, 160 tons, City-County Building addition, to Isaacson Iron Works.

SEATTLE, 110 tons, Boeing Airplane Co. hangar, to Isaacson Iron Works.

PULLMAN, WASH., 300 tons, field house for Washington State University, to unnamed bidder.

BERKELEY, CAL., 325 tons, infirmary for University of California, to California Steel Co.

SACRAMENTO, 630 tons, bridge over Salinas River, to unnamed fabricator.

SAN FRANCISCO, 300 tons plates and shapes, barge for Santa Fe Railroad, to Moore Dry Dock Co.

SAN FRANCISCO, 950 tons, apartment, O'Farrel Street near Leavenworth Street, to McClintic-Marshall Co.

ST. ARDO, CAL., 650 tons, highway bridge, to American Bridge Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

BOSTON & ALBANY RAILROAD, 500 tons, roundhouse at Boston.

NEW YORK, 4000 tons, building on Eighteenth Street for New York Telephone Co.

NEW YORK, 8300 tons, subway, route 107; contract awarded.

ATLANTIC CITY, N. J., 2000 tons, hotel.

GERMANTOWN, PA., 200 tons, Germantown Trust Co. building.

HARRISBURG, PA., unstated tonnage, soldiers' and sailors' memorial bridge.

PHILADELPHIA & READING RAILROAD, 300 tons, bridge work.

SCHENECTADY, N. Y., 1600 tons, Batchellerville viaduct; bids July 19.

BUFFALO, 200 tons, Erie County bridge.

TOLEDO, tonnage unstated, Maumee River bridge for city of Toledo.

AKRON, OHIO, 100 tons, Northwest office building for Ohio Bell Telephone Co.

MCKEES ROCKS, PA., 15,000 tons, bridge across Ohio River; plans not yet completed.

PITTSBURGH, 300 tons, two tow boats for Inland Waterways Corporation.

PITTSBURGH, 1300 tons, recreation building for H. J. Heinz Co.

MIDDLETOWN, OHIO, 300 tons, new building for Middletown Bank & Deposit Co.

CINCINNATI, 500 tons, six scows for United States Engineer; bids close July 17.

LOUISVILLE & NASHVILLE RAILROAD, 900 tons, office building at Louisville.

BIG FOUR RAILROAD, 2000 tons, bridge at Terre Haute, Ind.

CHICAGO, 1000 tons, building for Edison Electric Appliance Co.; previously reported at 600 tons.

CHICAGO, 6000 tons, International Tower; previously called Machinery Mart.

CHICAGO, 12,000 tons, office and theater on Wacker Drive.

CHICAGO, 6000 tons, Garret Biblical Institute Building.

CHICAGO, 2300 tons, Parker High School; Hansell Elcock Co. reported low bidder.

PRINCETON, WIS., 250 tons, Fox River bridge; bids close July 25.

MILWAUKEE, 110 tons, Newburg bridge in Washington County; bids close July 24.

PHOENIX, ARIZ., 14,000 tons plates, pipe line, ¼-in. plate material; preliminary bids being taken.

NEWPORT BEACH, CAL., 150 tons, bridge for improvement of Lido Island; bids July 15.

SEATTLE, 10,000 tons plates, 48-in. riveted pipe, Cedar River Pipe Line; bids postponed from July 5 to July 19.

WEST VANCOUVER, B. C., 800 tons, bridge over Capilano River for British Columbia Department of Public Works.

Non-Ferrous Metal Markets

Tin Prices Advance, Copper Quiet, Lead Declines, Zinc Slow

THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY

	July 16	July 15	July 13	July 12	July 11	July 10
Lake copper, New York	18.12½	18.12½	18.12½	18.12½	18.12½	18.12½
Electrolytic copper, N. Y.*	17.75	17.75	17.75	17.75	17.75	17.75
Straits tin, spot, N. Y.	47.25	46.55	....	45.62½	45.75	45.50
Zinc, East St. Louis	6.70	6.70	6.70	6.70	6.70	6.70
Zinc, New York	7.05	7.05	7.05	7.05	7.05	7.05
Lead, St. Louis	6.55	6.55	6.55	6.55	6.55	6.55
Lead, New York	6.75	6.75	6.75	6.75	6.75	6.75

*Refinery quotation; price ¼c. higher delivered in the Connecticut Valley.

NEW YORK, July 16.

Tin.—The market has shown increasing strength during the past week. It is conservatively estimated that sales of Straits tin amounted to 1900 tons, the largest single week's business in the last month. The bulk of the buying has been done by consumers, and an unusual feature is the fact that some of the orders were for delivery as far ahead as February of 1930. The announcement of the formation of a British producers' association, looking toward the rationalization of the tin market, had a sentimental effect on business, but beyond that it had no special influence. Much discussion has arisen from the purchase by Patino Mines & Enterprises, Consolidated, of the interests of the National Lead Co. and of Simon I. Patino in the tin smelting plant of Williams, Harvey & Co., Ltd. Some observers believe that the deal will open the way for the Patino company to join the British producers' group in attempting to stabilize the market. Others argue, however, that no special significance should be attached to the transaction, since the National Lead Co. still owns a large block of stock in the Patino company, and therefore the sale is little more than a bookkeeping arrangement. Prices advanced steadily during the week from 45½c. to 47¼c. Spot metal, however, continues to sell at a discount of about 1c. a lb. The biggest day of the week was Monday, July 15, when 700 tons was sold. Spot Straits tin is quoted today at 47¼c., New York. The formal announcement of the organization of British producers resulted in a sharp increase in prices abroad, which are about £9 a ton higher than a week ago, with spot standard quoted at £213 15s., future standard at £217 7s. 6d. and spot Straits at £217 5s. Free selling in the East is noted, and the Singapore price today was £219 15s.

Copper.—While statistics for June show that stocks of refined copper increased about 12,700 tons, this was offset by a decline in blister output amounting to approximately 18,000 tons. The prevailing opinion in the trade is that these figures reveal an improvement in the market, and predictions are that the month of July will bring a reduction in refined stocks, thereby further strengthening the position of producers. Sellers find en-

Rolled Products

Prices on rolled non-ferrous products are unchanged from those prevailing one week ago.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—
- High brass ..... 23.25c.
- Copper, hot rolled ..... 26.75c.
- Zinc ..... 10.25c.
- Lead (full sheets) ... 11.00c. to 11.25c.

Seamless Tubes—
- High brass ..... 28.25c.
- Copper ..... 29.25c.

Rods—
- High brass ..... 21.25c.
- Naval brass ..... 24.00c.

Wire—
- Copper ..... 19.87½c.
- High brass ..... 23.75c.

Copper in Rolls ..... 26.75c.
Brazed Brass Tubing 30.87½c

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also to St. Louis on shipments to points west of that river.

- Sheets, 0 to 10 gage, 3 to 30 in. wide ..... 33.00c.
- Tubes, base ..... 42.00c.
- Machine rods ..... 34.00c.

Chicago Warehouse

(Prices Cover Trucking to Customers' Doors in City Limits)

	Base per Lb.
Sheets—	
High brass	23.25c.
Copper, hot rolled	27.75c.
Copper, cold rolled, 14 oz. and heavier	30.00c.
Zinc	10.00c.
Lead, wide	11.90c.
Seamless Tubes—	
Brass	28.25c.
Copper	29.25c.
Brass Rods	21.25c.
Brazed Brass Tubes	31.00c.

New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass	21.12½c. to 22.12½c.
Copper, hot rolled, base sizes	27.75c. to 28.75c.
Copper, cold rolled 14 oz. and heavier, base sizes	30.00c. to 31.00c.
Seamless Tubes—	
Brass	26.00c. to 27.00c.
Copper	29.12½c. to 30.12½c.
Brazed Brass Tubes	29.12½c. to 30.12½c.
Brass Rods	18.87½c. to 19.87½c.

New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets (No. 9), casks	10.50c. to 11.00c.
Zinc sheets, open	11.50c. to 12.00c.

Metals from New York Warehouse

Delivered Prices, Per Lb.

Tin, Straits pig	48.00c. to 49.00c.
Tin, bar	50.00c. to 51.00c.
Copper, Lake	19.50c.
Copper, electrolytic	19.25c.
Copper, casting	19.00c.
Zinc, slab	7.75c. to 8.25c.
Lead, American pig	7.50c. to 8.00c.
Lead, bar	9.50c. to 10.00c.
Antimony, Asiatic	10.50c. to 11.00c.
Aluminum No. 1 ingots for remelting (guaranteed over 99% pure)	25.00c. to 26.00c.
Alum. ingots, No. 12 alloy,	24.00c. to 25.00c.
Babbitt metal, commercial grade,	30.00c. to 40.00c.
Solder, ½ and ½	30.50c. to 31.50c.

Metals from Cleveland Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	50.75c.
Tin, bar	52.75c.
Copper, Lake	19.50c
Copper, electrolytic	19.25c.
Copper, casting	18.75c.
Zinc, slab	7.75c. to 8.00c.
Lead, American pig	7.50c. to 7.75c.
Lead, bar	9.75c.
Antimony, Asiatic	16.00c.
Babbitt metal, medium grade	18.75c.
Babbitt metal, high grade	54.75c.
Solder, ½ and ½	31.75c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged customers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	14.50c.	16.00c.
Copper, hvy. and wire	14.25c.	15.625c.
Copper, light and bottoms	12.50c.	13.50c.
Brass, heavy	8.50c.	9.50c.
Brass, light	7.50c.	8.50c.
Hvy. machine composition	11.50c.	12.75c.
No. 1 yel. brass turnings	9.50c.	10.25c.
No. 1 red brass or compos. turnings	11.25c.	12.25c.
Lead, heavy	5.50c.	5.75c.
Lead, tea	4.25c.	5.25c.
Zinc	3.50c.	4.25c.
Sheet aluminum	14.00c.	16.00c.
Cast aluminum	12.25c.	14.25c.

couragement in the fact that British importations of copper in June were 4 per cent greater than those of May. So far as buying is concerned, the past week was quiet, and sales averaged about 500 tons a day, against 1000 tons in the previous week. Most of the activity was confined to the export trade, domestic consumers having practically withdrawn from the market. Current reports are that the price of electrolytic copper is about to decline sharply. Producers declare emphatically, however, that these statements are propaganda of interests which are manipulating copper stocks on the New York Stock Exchange. They point out that quotations have held for several months in the face of an absence of buying and that nothing would be gained by concessions now. Therefore, quotations are unchanged at 18c., delivered in the Connecticut Valley, and at 18.30c., c.i.f. usual European ports. Lake copper is firm at 18c. to 18.12½c., delivered. Copper users apparently are letting stocks diminish to the vanishing point before placing further orders, and producers are confident that there must be a resumption of buying on at least a moderate scale in the near future.

Lead.—The American Smelting & Refining Co. reduced its price on Wednesday, July 10, to 6.75c., New York. This was followed immediately by a drop in quotations of the principal factor in the West to 6.60c., St. Louis, and later to 6.55c., St. Louis. Orders have been of fair volume.

Zinc.—Dullness persisted in prime Western zinc during the past week, but inquiries which appeared today indicate that there may be at least a slight pickup in business. Prices continue to range from 6.70c. to 6.80c., East St. Louis. There has not been sufficient business in the last few days, however, to make a real test of quotations. Companies which have been adhering to 6.80c. are holding to that figure and are getting a fair share of the orders.

Antimony.—The depression, noted a week ago, has continued with the result that holders of Chinese metal have been offering it at concessions. The present price is 8.25c. for spot and 8.50c. for futures, duty paid, New York.

Nickel.—Ingot nickel is quoted at 35c. a lb., with shot nickel at 36c. and cathodes of electrolytic nickel at 35c.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is selling at 23.90c. a lb., delivered.

Non-Ferrous Metals at Chicago

CHICAGO, July 16.—The tin market is active and prices have advanced sharply. Quotations for zinc and antimony are lower. Sales in the old metals are scattered and in small volume.

Prices per lb., in carload lots: Lake copper, 18.50c.; tin, 47.40c.; lead, 6.85c.; zinc, 6.65c.; in less-than-carload lots, antimony, 9.25c. On old metals we quote copper wire, crucible shapes and copper clips, 14c.; copper bottoms, 11.50c.; red brass, 11.50c.; yellow brass, 8c.; lead pipe, 4.50c.; zinc, 3.25c.; pewter, No. 1, 24.50c.; tin foil, 26c.; block tin, 36c.; aluminum, 12.87½c.; all being dealers' prices for less-than-carload lots.

Railroad Equipment

New York to Buy 300 Cars for Subway Service

DULLNESS continues in the railroad equipment market. Scarcity of orders and inquiries for locomotives and cars indicate a present lack of interest on the part of carriers. The Rio Grande do Sul, Brazil, is asking for bids on 80 steel underframe box cars, 50 steel ballast cars and 21 passenger cars, while the New York City Board of Transportation is expected to buy 300 steel passenger cars for subway service. The Burlington is in the market for 25 locomotives. Details of the week's business follow:

New York City Board of Transportation is asking for bids by Aug. 20 on 300 steel passenger cars for subway service.

Hercules Cement Co. has ordered 10 cement cars from Standard Steel Car Co.

Warren Tank Car Co. has ordered five tank cars from Standard Steel Car Co.

Rio Grande do Sul, Brazil, is asking for prices on 80 steel underframe box cars and 50 steel ballast cars, also 21 passenger cars.

New York Central has ordered 75 express refrigerator cars from Merchants Despatch Transportation Co.

Great Northern has ordered two dining cars from Pullman Car & Mfg. Corporation.

Minneapolis & St. Louis has ordered three gas-electric motor cars from St. Louis Car Co.

Illinois Central has ordered five 600-hp. oil-electric locomotives from Ingersoll-Rand Co. and General Electric Co.

Northern Pacific will buy 11 2-8-8-2 locomotives.

Great Northern is in the market for 12 4-8-4 locomotives.

Texas Pacific will purchase five Mountain-type engines.

International Harvester Co. has placed 13 side dump cars with Pressed Steel Car Co.

Chicago, Burlington & Quincy is contemplating purchase of 25 locomotives.

Detroit & Toledo Shore Line will buy six Mikado locomotives.

Pere Marquette is considering the purchase of 10 coaches.

Ten open all-steel trolley cars have been bought in the United States by Bogota, capital of Colombia, Commercial Attache Walter J. Donnelly, Bogota, reports to the Department of Commerce. The cars, which accommodate 60 passengers each, increased the number of street cars in Bogota to 100, all of United States manufacture. They are operated by the Compania Tranvia Municipal de Bogota.

Reinforcing Steel

New Projects of 5700 Tons Largest Since March—Awards Total 3200 Tons

THE total of new projects, about 5700 tons, was the largest of any week since March. Outstanding was 2100 tons for the Ohio River boulevard in Pittsburgh, 900 tons for approaches to the Ohio River bridge at McKees Rocks, Pa., and 800 tons for track elevation of the Chicago, Milwaukee & St. Paul Railroad in Chicago. Awards of the week totaled about 3200 tons, of which the largest was 600 tons for an apartment building in Chicago. Awards follow:

NEW YORK, 200 tons, barracks at Mitchel Field, to Igoe Brothers.

CHICAGO, 600 tons, apartment building at 1100 North Dearborn Street, to Calumet Steel Co.

CLEVELAND, 250 tons, Union Terminal work, to Pollak Steel Co.

CLEVELAND, 100 tons, East Fifty-fifth Street bridge for Nickel Plate Railroad, to Bourne-Fuller Co.

CHICAGO, 160 tons, International Ink Co., to Calumet Steel Co.

GRAND TRUNK RAILROAD, 400 tons, to an unnamed bidder.

WALLA WALLA, WASH., 100 tons, women's prison building, to Northwest Steel Rolling Mills.

OLYMPIA, WASH., 300 tons, highway work, to Northwest Steel Rolling Mills.

SEATTLE, 150 tons, apartment building and school in Olympia, to Northwest Steel Rolling Mills.

SACRAMENTO, 120 tons, bridge in Sacramento County, to unnamed bidder.

SACRAMENTO, 256 tons, bridge over Salinas River, to unnamed bidder.

SACRAMENTO, 416 tons, bridge over Cottonwood Creek, to unnamed bidder.

SACRAMENTO, 133 tons, paving in Madera County, to unnamed bidder.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

BOSTON, 100 tons, Perkins Institute for Blind Industrial House.

DELAWARE, LACKAWANNA & WESTERN RAILROAD, 300 tons.

NEWARK, N. J., 350 tons, garage.

PHILADELPHIA, 300 tons, hospital building for Woman's Medical College.

PITTSBURGH, 2100 tons, Ohio River Boulevard; Booth & Flinn, Ltd., general contractor.

MCKEES ROCKS, PA., 900 tons, approaches for Ohio River bridge; Dravo Contracting Co., general contractor.

CINCINNATI, 200 tons for Rubel Baking Co.; bids July 27.

CINCINNATI, 375 tons, new plant for Mosby Medicine Co.

CHICAGO, MILWAUKEE, ST. PAUL & PACIFIC, 800 tons, track elevation at Chicago; Thorgensen & Erickson, general contractors.

PHOENIX, ARIZ., 168 tons, paving and 14 bridges, Douglas-Rodeo Highway; bids opened.

ELLENSBURG, WASH., 143 tons, North Branch Canal project; division No. 2, bids Aug. 9.

PERSONAL

R. W. PROCTER, formerly of the Black & Decker Mfg. Co., Towson, Md., has been appointed general sales manager of the Van Dorn Electric Tool Co., Cleveland, which is a subsidiary of the Black & Decker company. He succeeds LYMAN H. BELLOWS, who recently resigned.

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HERBERT W. SMITH, formerly in charge of selling scrap for the Hudson Motor Car Co., has become vice-president of Samuel G. Keywell Co., Detroit, scrap dealer.

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WARREN C. WEBB has been appointed Pacific Coast sales manager, with offices at 443 East Third Street, Los Angeles, for the W. A. Jones Foundry & Machine Co., Chicago.

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R. C. BROWER, heretofore general manager of the Timken Roller Bearing Service & Sales Co., Canton, Ohio, has been appointed assistant secretary and assistant treasurer of the Timken Roller Bearing Co., and he is being succeeded by W. H. RICHARDSON, formerly manager of the New York office of the Service & Sales Company. E. H. AUSTIN, manager of the Kansas City branch, becomes manager of the New York office and L. J. HALDERMAN, manager of the office at Atlanta, Ga., has been made manager at Kansas City. PARKER T. ANCARROW, of the Richmond, Va., branch, succeeds Mr. Halderman at Atlanta, and STEWART B. ANCARROW becomes manager at Richmond.

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HUGH SCOTT has been placed in charge of the St. Louis office of the Union Chain & Mfg. Co., Sandusky, Ohio, and A. R. YOUNG heads the Indianapolis office of the company.

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R. N. JESSOP, formerly Chicago district sales manager, motor department, of the Ohio Electric & Controller Co., Cleveland, has been appointed sales engineer of the company with office at Cleveland.

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ARTHUR D. LITTLE, president, Arthur D. Little, Inc., Cambridge, Mass., delivered his presidential address on "Science and Labor" before the Society of Chemical Industry, London, at Manchester, England, July 9. He has been awarded the honorary degree of Doctor of Science from the University of Manchester and Honorary Associateship in the Manchester College of Technology.

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WILLIS L. KING, vice-president, Jones & Laughlin Steel Corporation, Pittsburgh, was honored by 80 executives and department heads of the company on July 12 by a dinner at the Pittsburgh Golf Club in observance of the completion of 60 years of service with the company. G. M. LAUGHLIN, JR., chairman of the board of the company, presided and Mr. King was presented with a platinum watch, suitably engraved.

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R. H. MADDOCKS, New York district sales manager of the Central Iron & Steel Co., Harrisburg, Pa., will sail July 19 on the Olympic for six weeks European trip. He will visit France, England and Scotland.

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J. G. BELDING, for the past 11 years general manager of the Lombard Iron Works & Supply Co., Augusta, Ga., at the annual meeting of the board of directors on July 3, was elected president of the corporation. He succeeds the late GEORGE R. LOMBARD, founder of the company. Mr. Belding is vice-president of the Southern Metal Trades Association and past president of the Southern Supply and Machinery Dealers' Association.

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W. H. WARREN, general superintendent of the plant of the Lukens Steel Co., Coatesville, Pa., has been elected vice-president in charge of operations. A vacancy in the office of vice-president occurred recently when HORACE B. SPACKMAN became chairman of the executive committee. HUGH KENWORTHY succeeded Mr. Spackman as manager of purchases.

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W. TRINKS, professor of mechanical engineering at the Carnegie Institute of Technology, Pittsburgh, has left for an extended trip of investigation in Europe this summer.

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WILLIAM C. DICKEY, New York sales agent for the Worth Steel Co., the Thomas Steel Co. and the New Haven Copper Co., will sail July 26 on the Ile de France for Europe. He will visit England, France, Switzerland and Italy, sailing from Naples on the Conte Grande on Aug. 31.

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J. R. POYSER plans to sever his connection with Doelger & Kirsten, Milwaukee, Sept. 1. From 1910 to July, 1922, he was connected with the Canton Foundry & Machine Co., Canton, Ohio, becoming secretary in charge of sales and advertising. He has been sales manager of Doelger & Kirsten since March 1, 1923.

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HENRY CLAY GRATON, one of the founders of Graton & Knight Co., Worcester, Mass., celebrated his 99th birthday on July 9.

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FRANK J. PHILLIPS, for many years associated with the Concrete Steel Co., Boston, and recently with the General Fireproofing Co., at Philadelphia, has again associated himself with the Boston concern.

W. R. CUNNICK has been appointed district sales manager at Detroit for the Weirton Steel Co., Weirton, W. Va., succeeding A. J. BOPP, who recently resigned to enter business for himself.

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H. H. RICE, of the General Motors Corporation and treasurer of the National Automobile Chamber of Commerce, and J. WALTER DRAKE, of the Hupp Automobile Co. and former Assistant Secretary of Commerce, have been appointed by President HERBERT HOOVER members of a delegation to represent the United States at the Pan American Highway Congress to be held in Rio de Janeiro in August. Mr. Drake will be chairman of the delegation.

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GEORGE A. V. RUSSELL, formerly manager of the engineering department of the Brightside Foundry & Engineering Co., Ltd., Sheffield, England, now engineer of the metal group companies of the Imperial Chemical Industries, Ltd., Birmingham, has sailed from Quebec on his return trip to England after an extended stay in the United States and Canada.

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E. J. BURNES, who since the first of the year has been assistant general sales agent of the Chateaugay Ore & Iron Co., has been appointed general sales agent of the company, with headquarters at 26 Liberty Street, New York, as successor to Ralph W. Clark, deceased. Mr. Burnes was for five years in the New York office of Pilling & Co. and for a year before his connection with the Chateaugay interests was with the Semet-Solvay Co.

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GEORGE A. PUGH has been elected a vice-president of the Aetna Standard Engineering Co., Youngstown, and will be in charge of machinery sales. H. E. MELIN has been appointed assistant manager of machinery sales. M. D. BAUGHMAN has been made manager of the operating department and will have charge of the plants and production at Ellwood City, Pa., and Warren, Ohio.

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MYRON C. TAYLOR, chairman of the finance committee of the United States Steel Corporation, attended on July 15 in Detroit the launching of an ore steamboat that was named for him. The vessel will be added to the corporation's ore-carrying fleet, operated by the Pittsburgh Steamship Co.

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W. S. PILLING of Pilling & Co., Philadelphia, leaves New York for San Francisco on July 20, with a party of friends to begin a round-the-world tour, expected to extend over nine months to a year. Hawaii, Japan, China, Indo-China, Siam and India, Arabia, Turkey and various European countries are included in the itinerary.

OBITUARY

CHARLES E. SCOFIELD, New York district sales manager of the Wheeling Steel Corporation since 1922 and for 35 years or more identified with distribution of sheet steel in the New York territory, died July 9 of heart failure as he was going to dinner in his summer home at Rowayton, Conn. He was 51 years of age. He started in the sheet business as a boy in the New York office of Merchant & Evans Co., of Philadelphia. He was with the Wheeling Corrugating Co. from 1907 to 1922. For three years he was in

C. E. SCOFIELD

charge of city sales for that company, and during the remainder of the period he was district sales manager. Mr. Scofield was in his office at 120 Broadway, New York, the day of his death. Not feeling well, he went home at noon and after a nap in the afternoon arose for dinner. He was a Mason, a member of the New York Athletic Club and the Shore Haven Country Club, Shore Haven, Conn.

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JOHN S. RUNNELLS, retired chairman of the board of the Pullman Co., died June 18 at Chocorua, N. H. He would have been 85 years old on July 30. He was graduated from Amherst College in 1865 and later was admitted to the bar in Iowa and practiced law at Des Moines, where he remained until 1887. That year he was appointed counsel for the Pullman Co. and later vice-president and general counsel, and from 1911 to 1922 was president of the company.

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E. S. GABRIAULT, erecting engineer with the Nordberg Mfg. Co., Milwaukee, and in their employ for 20 years, died, July 5, at Lima, Peru, where he had gone to supervise the installation of Nordberg power equipment for a large mining company. He left Milwaukee, May 28, on this trip.

P. J. LANDWER, assistant production engineer of the Wright Aeronautical Corporation, Paterson, N. J., died on July 10. He had been associated with the company for one year and previously had been connected with Mack Trucks, Inc.

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WILLIAM F. FAIR, blast furnace superintendent, Youngstown Sheet & Tube Co., Youngstown, died suddenly at his home in that city on July 10. He was 50 years of age and had been employed by the company for 21 years.

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WALTER F. HOOKER, manager of the Boston branch of Graton & Knight Co., Worcester, Mass., died at his home in Melrose, Mass., July 9. He was associated with the Worcester concern 30 years, starting in the workshops and working up to the Boston management. He was born in Lee, Mass., 53 years ago.

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H. O. CARY, at one time superintendent of the DeKalb plants of the American Steel & Wire Co., died June 19 at his home in Bangor, Mich. He was 79 years of age and had been in failing health for over a year.

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FREDERIC H. POOR, head of Frederic H. Poor, Inc., 50 Church Street, New York, manufacturer and distributer of tractor cranes and allied products, died at his home, 112 Park Avenue, Yonkers, N. Y., on July 9, at the age of 47. He had been ill for some time. Mr. Poor was a graduate of Harvard University in the class of 1903 and a year later received an engineer's degree at the same university. He went with the General Electric Co., remaining there five years at Schenectady, N. Y., and then moving to the New York office. In 1910 he became general manager of the S K F Ball Bearing Co., New York, and introduced that company's product in the United States. During the war he was president of the Triplex Safety Glass Corporation, New York. In 1919 he formed the firm of Wesselhoeft & Poor, which exported a wide variety of machinery to Colombia and Venezuela through four branch offices in those countries. This business was sold in 1926 to the International General Electric Co., and Mr. Poor afterward organized his own company.

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WILLIAM YATES, for 45 years an employee of the Heppenstall Forge & Knife Co., Pittsburgh, and most recently superintendent of the plant, died at a Pittsburgh hospital on July 14, aged 77 years.

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OTTO GOSSELL, for a number of years representative in Great Britain for the German steel producers Dortmunder Union and Aachener Hutte, with headquarters in London, died July 13. He was 80 years of age and had been a member of the Iron and Steel Institute (British) since 1880.

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JOSEPH HAMMELE, sales manager and a director of the Bausch & Lomb Optical Co., Rochester, died July 2. He had been associated with the company since 1882.

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GEORGE T. MOLYNEAUX, vice-president of the Price Iron & Steel Co., Chicago, broker in scrap iron and steel, died following a heart attack July 12 at the age of 35 years. He was born at Bristol, Tenn., where funeral services were held. After graduating from Yale University, he was for a number of years assistant professor of languages. At the time of his death he was an associate professor at the University of Ontario. He was well-known in educational circles as a linguist and a historian. He was a member of the Hamilton Club and the Chicago Yacht Club.

Second Quarter Earnings of Steel Companies

Net earnings of the Acme Steel Co. for the first six months of 1929 showed an increase of 16 per cent over the corresponding period of 1928. Net profit for the six months just ended, after all expenses, Federal and local taxes and depreciation, was $1,730,671, being at the rate of $6.31 a share. Net profits for the first six months of 1928 were $1,014,590. This company has recently erected three new buildings, one as an addition to the cold-rolled strip plant, another to house a new hot-rolled continuous strip mill and a third to be used as a warehouse. The two additional mill units will be ready to operate on or about Oct. 1.

A. M. Castle & Co. report record earnings for the second quarter and for the first six months of 1929. For the quarter ended June 30, net profits were $235,991, after all charges, including depreciation and Federal taxes, equal to $1.96 a share earned on 120,000 common shares. This compares with $1.61 a share in the previous quarter and $1.59 a share in the second quarter of last year. Net for the first six months was equal to $3.58 a common share, compared with $2.71 a share earned in the first half of 1928.

A 20 per cent common stock dividend on a basis of one new share for each five held has been voted by the directors of the Youngstown Sheet & Tube Co., Youngstown. They have also voted to increase the no par common stock from 1,000,000 no par shares to 2,000,000 shares. A special meeting of stockholders has been called for Aug. 15 to secure ratification of the directors' action.

European Steel Markets Less Active

British Holidays Ease Conditions—Germany Making Much Steel in Open-Hearth Furnaces—Spain Produces More Steel

(*By Cable*)

LONDON, ENGLAND, July 15.

CLEVELAND furnaces are now offering to accept last quarter pig iron contracts on a basis of £3 12s. 6d. ($17.58) per ton for No. 3 foundry, but buyers show no haste in contracting, as the Scottish holidays have begun and the English holidays will follow shortly. Meanwhile coke and ore prices are stronger and pig iron producers assert that production at present prices is unprofitable.

Hematite iron producers are active sellers, principally for export, and some good contracts for forward delivery have been negotiated.

Finished steel is generally quiet, but most Northeast Coast mills are well occupied with current contracts. Export inquiry is fair, but expansion of Far Eastern business is hindered by the unfavorable exchange rates.

British exports in June were 35,000 tons of pig iron, of which the United States received 1000 tons. Total exports of iron and steel were 307,000 tons.

Tin plate prices are irregular, as some mills are seeking orders, while others are well engaged. Higher tin prices are influencing consumers and inquiry has increased, but business is still only fair.

Galvanized sheets are quiet. Exports in June totaled 43,000 tons, the smallest since the coal strike period in 1926. India took only 8000 tons. Calcutta stocks are still large, so that little improvement in demand is expected for some time. Japan has bought further small lots of both heavy and light-gage black sheets.

Thomas W. Ward, Ltd., Sheffield, has purchased from the Frodingham Iron & Steel Co., Ltd., Scunthorpe, a large part of the properties of the Yorkshire Iron & Coal Co., Ltd., Leeds.

Continental markets are dull, but there is pressure from certain mills to secure orders. Semi-finished steel and merchant bars are especially easy, but shape and plate prices are being maintained.

Belgian works are reported to have secured about 30,000 tons of rails from Belgian railroads, which should aid in steadying the semi-finished market. The International Wire Rod Cartel has decided to maintain export prices, except those for the Far East, which have been modified as a result of reduced freight rates.

French production in May was 897,000 tons of pig iron and 819,000 tons of raw steel. Hanomag has secured an order for 52 locomotive boilers for India.

British Pig Iron Shortage Continues—Steel Active

LONDON, ENGLAND, July 5.—The principal feature of the iron and steel market is the continued increase in strength of pig iron prices. Demand from both domestic and export buyers is large and an even greater volume of business could be done if larger supplies were available. In the Cleveland district, especially, the shortage of iron is acute and consumers have been forced to supplement their supplies by purchases in other districts. The shortage is the result of insufficient coking coal and iron ore, which is preventing the blowing in of more furnaces.

At present there are 44 furnaces in blast in the Cleveland district, but by fall it is expected the total will have increased to 50. Producers of foundry, forge and basic iron are fully sold until October, and have not yet opened their books for last quarter tonnage. As a result, merchants with pig iron in stock are obtaining high prices for prompt shipment. Hematite iron is also stronger as a result of substantial buying by both domestic and foreign users.

Finished iron and steel production is steady, but curtailment is expected shortly with the arrival of the Glasgow annual holiday period. A number of plants in that district will suspend operation for only 10 days, while others will close for a full fortnight. New business has not been especially large, but specifications against contracts have been heavy, particularly for shipyard material. Export trade is still only moderately active.

British and Continental European Export prices per gross ton, f.o.b. United Kingdom Ports, Hamburg and Antwerp, with the £ at $4.85

British Prices, f.o.b. United Kingdom Ports

Cleveland No. 3 foundry	£3	12½s.	to	£3	13½s.	$17.58	to	$17.82
East Coast Hematite	3	14½	to	3	15	18.06	to	18.18
Ferromanganese, export	14	0				67.90		
Billets, open hearth	6	7½	to	6	10	30.92	to	31.52
Sheet bars, open hearth	6	5	to	6	10	30.31	to	31.52
Black sheets Japanese specifications	13	5				64.26		
Tin plate, per base box	0	18½	to	0	18½	4.40	to	4.48
Rails, 60-lb. and heavier	7	15	to	8	15	37.59	to	42.43
						Cents per Lb.		
Steel bars, open hearth	7	15	to	8	10	1.67	to	1.84
Beams, open hearth	7	2½	to	7	12½	1.55	to	1.65
Channels, open hearth	7	7½	to	7	17½	1.60	to	1.71
Angles, open hearth	8	2½	to	8	12½	1.76	to	1.86
Ship plates, open hearth	7	12½	to	8	2½	1.66	to	1.76
Black sheets, No. 24 gage	10	5	to	10	10	2.21	to	2.27
Galvanized sheets, No. 24 gage	13	7½	to	13	10	2.90	to	2.92

Continental Prices f.o.b. Antwerp or Hamburg

Foundry iron, 2.50 to 3.00 per cent sil., 0.50 to 0.90 per cent phos.	£3	10s.	to	£3	14½s.	$16.97	to	$18.06
Foundry iron, 2.50 to 3.00 per cent sil., 1.00 per cent and more phos.	3	12				17.45		
Billets, Thomas	5	2	to	5	5½	24.73	to	25.58
Sheet bars, Thomas	5	5	to	5	5½	25.46	to	25.58
Wire rods low C., No. 5 B.W.G.	6	5	to	6	6¼	30.31	to	30.61
Black sheets, No. 31 gage, Japanese	12	10				60.62		
Rails, 60 lb. and heavier	6	10*				31.52		
Rails, light	6	1½				29.46		
						Cents per Lb.		
Steel bars, merchant	5	15	to	5	16	1.27	to	1.28
Steel bars, deformed	5	15	to	5	16	1.27	to	1.28
Beams, Thomas, British standard	5	3	to	5	8	1.12	to	1.13
Channels, Thomas, American sections	6	0				1.32		
Angles, Thomas, 4-in. and larger, over ⅜-in. thick	5	6				1.14		
Angles, Thomas, 3-in.	5	17				1.29		
Ship plates, open-hearth inspected	7	10				1.62		
Hoop and strip steel, over 6-in. base	5	17				1.29		
Wire, plain, No. 8 gage	7	10				1.62		
Wire, galvanized, No. 8 gage	9	10	to	9	12½	2.06	to	2.12
Wire, barbed, 4-pt. No. 12 B.W.G.	12	0½				2.60		
Wire nails, base	8	0½				$1.74 per keg		
Wire nails, assortments, 1 to 6-in., keg	10	9				2.26		

*Open-hearth steel, 10s. ($2.42) per ton extra.

Germany Large Exporter of Open-Hearth Rods

HAMBURG, GERMANY, June 24.—German mills have become a dominant factor in the export of open-hearth wire rods and rivet stock. While there is no actual agreement in the Wire Rod Cartel, allocating open-hearth steel orders to Germany, both Belgian and French producers have gradually retired from this field and in most cases do not quote on such inquiries. German mills, in turn, are not offering much competition for Thomas steel business in wire and rivet rods.

The nominal quotation on open-hearth rods, No. 5 B.W.G., is £6 12s. 6d ($32.13) per ton, but almost no orders have been closed at less than £6 15s. ($32.73) per ton, and as most business in open-hearth steel is limited to orders for 50 to 250 tons, the price is about £6 17s. 6d. ($33.34) per ton.

Rivet manufacturers in Holland and Scandinavian countries, which import their supplies of open-hearth rods, have been unable to obtain lower prices from either Belgium or France on the sizes most used, 3/16-in., ¼-in. and 5/16-in. Rods for the drawing of fine music wire and wire rope are almost exclusively supplied by Germany.

Output of Open-Hearth Rails Increasing

HAMBURG, GERMANY, July 1.—Although the German Railroad Corporation recently informed the steel industry that there would be no restriction placed on the continued use of Thomas steel rails, output of this grade is constantly declining. Prior to 1913 the ratio of Thomas steel rails to open-hearth was 78 to 22, in 1924 the ratio had declined to 67 to 33 and by the end of last year it was 48 to 52. At present it is estimated that of every 100 tons of rails rolled in Germany, 55 tons are open-hearth and 45 tons Thomas steel. This increase of open-hearth rail production is expected to continue.

Steel Merchants to Restrict German Export Activity

HAMBURG, GERMANY, July 1.—The meeting here on June 28 of the Federation of German Industries and the Federation of German Exporters discussed at considerable length the relationship of the German steel and hardware industry and the exporters. Although no general agreement was established between the two associations, it appears certain that in the future the German hardware industry will, to a great extent, withdraw from direct export business, into which it entered following the war. The greater part of the heavy steel exports, however, will continue to be made through the selling organizations of the steel industry. This is expected to lead to an improvement in the profits of export trade in hardware and small steel products, which have been seriously restricted in the past because of keen competition between the hardware and steel merchants and the exporters.

*Exports of American Portable Pneumatic Metal-Working Tools**

Country of Destination	1928	1927
United Kingdom	$464,888	$505,073
Japan	257,801	121,735
Canada	168,290	165,140
France	166,804	131,885
Brazil	97,344	37,282
Spain	70,278	61,982
Australia	64,824	94,541
British India	53,893	66,582
Italy	44,206	49,170
Germany	38,832	34,526
Mexico	31,670	14,336
Argentina	31,590	21,342
South Africa	30,894	50,946
Total, including other countries	$1,704,146	$1,575,358

*Report made by L. J. Cochrane, Industrial Machinery Division, Department of Commerce.

Spanish Steel Output Increased in 1928

MADRID, SPAIN, July 20.—Production of steel in Spain was about 8 per cent more in 1928 than in 1927 and a further increase is expected for 1929. Total output of pig iron was 565,000 metric tons, of steel ingots 733,650 tons and of finished products 692,887 tons. A total of 4129 tons of ferromanganese and 149 tons of ferrosilicon was produced in 1928.

Germany Second in Steel Consumption

HAMBURG, GERMANY, June 24.—Efforts of the German steel industry through the publicity department of the Stahlwerks-Verband A. G. to extend the use of steel in Germany are meeting with success. In the per capita consumption of steel, Germany ranked fourth in 1926, with the United States first, Great Britain second and Sweden third. Last year Germany ranked second with 546 lb. per capita, compared with 526 lb. per capita in Great Britain and 438 lb. per capita in Sweden. France was fifth with 392 lb. per capita, Belgium sixth with 381 lb., Holland seventh with 356 lb., Switzerland eighth with 312 lb., Czechoslovakia ninth with 224 lb., and Denmark tenth with 222 lb. The lowest European consumption of steel was in Russia, with only 53 lb. per capita.

*Principal Foreign Markets for American Air Compressors**

Country of Destination	1928	1927
Canada	$941,631	$899,335
Spain	572,542	883,113
United Kingdom	443,526	488,566
Japan	420,373	348,511
Brazil	404,169	296,345
France	401,945	299,795
Russia	380,205	285,480
Belgium	289,776	134,564
Argentina	278,412	263,990
British India	267,638	170,891
Colombia	245,773	174,424
Mexico	232,890	247,276
Italy	221,398	191,457
Australia	195,244	317,109
Germany	168,502	157,523
Venezuela	157,642	57,417
Peru	100,033	87,209
Netherlands East Indies	83,464	47,021
Union South Africa	66,986	110,166
Cuba	60,350	122,233
Algeria and Tunisia	43,900	33,111
Total, including other countries	$6,737,534	$5,872,682

*From United States Department of Commerce.

Establishes Wire Publicity Bureau

HAMBURG, GERMANY, July 1.—German steel advertising through the Stahlberat Ungestelle at Düsseldorf is to be extended by the establishment of a second organization, the Drahtberatungsstelle, which will issue publicity and extend information on wire and its uses. Advertising of the new bureau advocates the wider use of wire and consumers will be freely advised on the kinds and qualities of wire they may require. Wire netting is now being widely used in Germany for road construction and the efforts of the new bureau will be directed to increasing this use both in Germany and in foreign markets.

New Company to Operate Famous Sheffield Works

LONDON, ENGLAND, July 2.—Andrews, Toledo, Ltd., has been formed to acquire the plant and assets, as of Nov. 3, 1928, of the old-established mill of Jno. Hy. Andrew & Co., Ltd., Sheffield. The new company has capital stock of £300,000 ($1,455,000), and the board of directors includes J. F. Parker, chairman, G. St. J. Strutt and Engineer Vice-Admiral Sir George Goodwin.

The plant, which manufactures all kinds of high-grade tool steels for the automobile and aircraft industries and wire rods, is to be modernized throughout.

Records Observations of Transcontinental Trip

S. A. Gabel, president Summerill Tubing Co., Bridgeport, Pa., was a member of the special party which made the inaugural trip of the Transcontinental Air Transport, Inc., just previous to the opening of the combination air and rail passenger route operated jointly by T. A. T. and the Pennsylvania Railroad. On the journey Mr. Gabel kept a log in which he recorded his observations. At Wichita, Kan., where the plane landed for a short time, he found that airplane manufacturers in that district are rushed with orders. When the trimotored plane was in New Mexico, he noted that the motors were using about 60 gal. of gasoline an hour and were making about 1600 r.p.m.

Machinery Markets and News of the Works

Machine Tool Sales Decline

Current Bookings, However, Are 20 Per Cent Better Than in Same Period Last Year

REPORTS from machine tool centers reveal that bookings this month have fallen below those of June. However, the New York district has been an exception, with sales equaling or slightly exceeding last month's volume.

Despite the seasonal recession in buying, it is estimated that current business shows a gain of approximately 20 per cent compared with the same period in 1928. The general run of orders has been for replacement purposes and has come from most consuming lines.

A Connecticut machine tool builder has closed for $200,000 worth of equipment, and the Packard Motor Car Co. has bought a few tools for the manufacture of Diesel engines and is expected to purchase a number of additional machines. The General Electric Co. is inquiring for about 30 tools for its electric refrigerator division at Schenectady, N. Y.

Machine tool deliveries are improving slightly, but still range in most cases from six weeks to three months or longer. An important lathe manufacturer cannot make deliveries sooner than the first quarter of 1930.

"June reflected the seasonal tendency toward a slackening in the volume of orders and the falling off has been sufficient to accelerate slightly the downturn of the three months' average index which was indicated in May for the first time since the summer of 1928," states the National Machine Tool Builders Association. "Even so, the rate of recession is not alarming, and so far as can be interpreted at the present time, it cannot be looked upon as a signal that the period of good demand that the industry has been enjoying for the past 12 months is over. The ratio of unfilled orders to shipments shows that the industry still has as good backlog of unfilled orders to work off during the summer months, even though shipments have been stepped up since February to a rate approximately 25 per cent above the rate of shipments last fall."

The association's index of gross orders stood at 291.6 for June, as against 334.3 for May. Shipments totaled 295.5, compared with 300.8 in May, the decline in shipments having been responsible for a slight upturn in the index of unfilled orders, which was 721.8 for June, compared with 721 for May.

New York

NEW YORK, July 16.—Machine tool buying in the first half of July was sustained at a high level, comparable with that in the corresponding period of June. In fact, some dealers declare that sales have been larger than those of last month. The substantial volume of business booked in the past two weeks, together with heavy pending inquiries before the trade, indicates that the usual summer let-down is not likely to materialize this year, and both dealers and manufacturers expect buying to be maintained at a satisfactory rate during the remainder of July and in August.

Several companies state that orders are running approximately 25 per cent ahead of those in the early part of the summer of 1928, despite the fact that deliveries now range from one to three months or longer on numerous tools. The general run of business is for replacement purposes and is distributed among most consuming lines. In some cases companies are in the market for the first time since 1920. The General Electric Co. is inquiring for about 30 tools for its electric refrigerator manufacturing division at Schenectady. Otherwise, purchases and inquiries are for from one to three machines each.

Officials of Fairchild Aviation Corporation, 270 West Thirty-eighth Street, New York, have organized Fairchild Aircraft, Ltd., with capital of $2,000,000 as Canadian subsidiary. Tract of about 265 acres has been acquired at Longueuil, near Montreal, as site for new plant, to include parts and assembling departments, to cost over $100,000 with equipment. Company will establish airport at same location, with hangars, repair shops and other units. Sherman H. Fairchild, head of parent company, will be president of subsidiary; Julian C. Smith is vice-president.

Kent Garage Investing Corporation, 350 Madison Avenue, New York, has awarded general contract to Fred T. Ley & Co., Inc., 578 Madison Avenue, for twenty-five-story automobile service, repair and garage building at Columbus Avenue and Sixty-first Street, to cost about $2,000,000 with equipment. Jardin, Hill & Murdock, 347 Madison Avenue, are architects.

Long Island State Park Commission, Babylon, L. I., will receive bids until July 26, for one 150-ft. steel standpipe, 300,000 gal. capacity, with skeleton steel frame support 175 ft. high. A. E. Howland is chief engineer.

Nichols Copper Co., 25 Broad Street, New York, is having plans drawn for three-story addition, 75 x 80 ft., to plant at Laurel Hill, Flushing, L. I., to cost over $75,000 with equipment. Leddy & Moore, 70 West Fortieth Street, New York, are architects.

Deppe-Merten Corporation, Long Island City, manufacturer of ventilating equipment, skylights, etc., has leased factory at 565 Boulevard for new plant.

Prudent Ice & Coal Co., Brooklyn, care of C. P. Cannella, 1162 Herkimer Street, architect, has asked bids on general contract for a one-story ice-manufacturing plant, to cost more than $100,000 with machinery.

Officials of International Projector Corporation, 90 Gold Street, New York, manufacturer of motion picture machines and parts, have organized General Theatres Equipment, Inc., to take over and expand that company together with a group of interests in kindred field, all specializing in production of projection lamps and other electric lighting equipment and devices. New organization will have combined assets of $67,000,000, and will arrange for early sale of block of stock, part of fund to be used for expansion of different units.

New York Steam Corporation, 280 Madison Avenue, New York, has awarded general contract to George A. Fuller Co., 949 Broadway, for three-story addition to power plant on Water Street 105 x 175 ft., and improvements in present station, to cost $250,000 with equipment.

Richardson Co., 2136 West Boulevard, Cleveland, manufacturer of battery boxes and equipment, is arranging for occupancy in August of plant of American Incubator Co., New Brunswick, N. J., recently acquired, and will carry out an expansion pogram to cost over $100,000. Initial works will total about 60,000 sq. ft. floor space. Cleveland works will be transferred to new site.

Metalkloth Co., Inc., Garibaldi Avenue, Lodi, N. J., manufacturer of filter cloth

products, has asked bids on general contract for one-story addition, to cost about $45,000 with equipment. Liebau & Breiby, 238 Main Street, Hackensack, N. J., are architects.

Allied Motor Industries, Inc., operating Great Lakes Aircraft Corporation, Cleveland, which recently took over plant in that city of Glenn L. Martin Co., has purchased controlling interest in American Cirrus Engines, Inc., 740 Washington Avenue, Belleville, N. J., manufacturer of aircraft motors under British patents, and will operate as unit. It is proposed to expand production of Cirrus engines and it is understood that plant may be removed to another location.

Delaware, Lackawanna & Western Coal Co., 120 Broadway, New York, has filed plans for new coal pockets and distributing plant at Jersey City, N. J., with conveying, loading and other equipment to cost $250,000.

Board of City Commissioners, 710 Bangs Avenue, Asbury Park, N. J., has awarded a general contract to DeRiso Brothers, Inc., 551 Fifth Avenue, New York, for a two-story power plant, for central heating service, to cost $397,000 with equipment. Warren & Wetmore, 16 East Forty-seventh Street, New York, are architects.

G. F. Machine Mfg. Corporation, 130 Bleecker Street, New York, recently organized to manufacture an iron lifter for ironing operations, is in market for gray iron castings, electric switches, wire, etc. Solomon Golub is president.

William H. Nicholls Co., Richmond Hill, N. Y., manufacturer of foundry equipment, has established two new offices, one at 341 West Sixteenth Street, Chicago Heights, Ill., in charge of S. H. Sutton, and another at 2842 West Grand Boulevard, Detroit, in charge of H. L. Ritz.

Michigan Seamless Tube Co., South Lyon, Mich., manufacturer of cold drawn seamless tubing, has appointed H. L. Wanderman, 1440 Broadway, New York, Eastern sales representative.

Herbert Kennedy Co., agent for Societe Anonyme des Hauts Fourneaux et Fonderies de Pont-a-Mousson, of Pont-a-Mousson, France, producer of cast iron bell and spigot pipe, has removed from 475 Fifth Avenue, New York, to Chanin Building, 122 East Forty-second Street. Offices of Intercontinental Pipe & Mining Co., which is building a plant at Chelsea, Mass., have also been moved to new address.

New England

BOSTON, July 15.—The closing on about $200,000 worth of tools by a Connecticut machine tool builder was the outstanding feature of the week. Another Connecticut tool builder has closed on a number of high-priced tools, and several other metal-working plants have placed orders for machines, deliveries extending into the last quarter of 1929. Local machine tool dealers did a fair business the past week, and received a sizable number of inquiries for one or more machines. Surface and internal grinders and lathes, ranging from bench type up to better than 36-in., are in demand in this territory. The city of Boston bought a shaper for a trade school and today closed bids on shapers, tool-room lathes and other equipment for the Mechanics Arts High School. About a dozen single-spindle drills were sold to eight plants.

The Crane Market

WITH both sales and inquiries light, quietness prevails in the crane market. Little important buying has been done this month, and companies which are considering the placing of orders are hesitant about closing. The dullness in the New York district reflects the usual seasonal decline, but this has been somewhat offset by a good volume of business reported from the Middle West. Crane builders continue very busy with no signs of a let-down in plant operations during the summer. A portion of the week's sales are listed below:

Pittsburgh Tube Co., Monaca, Pa., has bought one 5-ton, 100-ft. span electric overhead crane from Northern Engineering Works.

Cincinnati, New Orleans & Texas Pacific has purchased a maintenance-of-way crane from Orton Crane & Shovel Co.

George B. Limbert Co., East Chicago, Ind., has bought one 10-ton, 56-ft. span overhead electric crane from an unnamed bidder.

To speed up deliveries, some New England machine tool builders have temporarily discontinued production of certain types of equipment and are concentrating on the most active lines. The best delivery one Hartford tool builder can make on lathes is first quarter of 1930. Deliveries by New England grinding machine builders are gradually becoming more extended.

Used tool dealers are handicapped by a lack of machines. Business the past week was largely confined to foot presses, hack saws and other small tools.

Buying of small tools is more active and indications are that July sales may reach record proportions.

James Hunter Machine Co., 2 Main Street, North Adams, Mass., has awarded a contract for a machine shop addition.

Bullock Mfg. Associates, 46 Harrison Avenue, Springfield, Mass., manufacturers of tools, contemplate erection of a factory at West Springfield, to cost $30,000.

Liner-Atwill Co., 60 Bartholomew Avenue, Hartford, Conn., sheet metal, will close bids July 18 on one and two-story shop, 50 x 100 ft.

Columbia Airlines, Inc., Springfield, Mass., plans to start production of planes and motors about Sept. 1 at East Springfield. Outboard motors and motorcycles will be chief products. Charles A. Levine is president.

Marlboro Wire Goods Co., Marlboro, Mass., has started work on a plant addition.

Leonard Rooke Co., 486 Broad Street, Providence, manufacturer of valves, has awarded contract for a three-story addition, 60 x 100 ft.

Plantsville Foundry, Southington, Conn., capitalized for $50,000, has incorporated to do a general foundry and machine shop business. T. W. Thompson, Plantsville, Conn., is president.

Plans have been approved by Yale & Towne Mfg. Co., Canal and Market Streets, Stamford, Conn., for a one-story foundry addition, to cost $60,000 with equipment.

Warren Telechron Co., Ashland, Mass., manufacturer of bells, clocks and other electrical products, a subsidiary of General Electric Co., has plans for a two-story addition, to cost about $50,000 with equipment. Fay, Spofford & Thorndike, 44 School Street, Boston, are engineers.

American Brass Co., Waterbury, Conn., a subsidiary of Anaconda Copper Mining Co., 25 Broadway, New York, has purchased Randolph-Clowes Co., of same city, producer of kindred brass and copper specialties, and will consolidate.

Edison Electric Illuminating Co., 39 Boylston Street, Boston, has filed plans for a multi-story equipment storage and distributing plant, with repair facilities, to cost $120,000 with equipment.

Shell Eastern Petroleum Products Co., operated by Shell Union Oil Corporation, 65 Broadway, New York, has plans for a new storage and distributing plant at East Hartford, Conn., to cost about $100,000 with equipment.

Manning Mfg. Co., Rutland, Vt., manufacturer of creamery and dairy machinery, parts, etc., has awarded general contract to Mozzicato & Dipietro, 12 Hancock Street, Medford, Mass., for one-story and basement branch plant at Somerville, Mass., to cost about $45,000 with equipment.

Stamford Water Co., Summer Street, Stamford, Conn., has awarded general contract to Vuono Construction Co., 303 Main Street, for two-story mechanical shop, 55 x 90 ft., to cost about $35,000 with equipment.

Philadelphia

PHILADELPHIA, July 15.—Plans have been completed by I. Fischman & Sons, Tenth Street and Allegheny Avenue, Philadelphia, manufacturers of soda fountains and accessories, for one and two-story plant, to cost $1,500,000 with machinery. Clarence E. Wunder, 1520 Locust Street, is architect.

Proctor & Schwartz Electric Co., subsidiary of Proctor & Schwartz, Inc., Seventh Street and Tabor Road, manufacturer of drying machinery, air-conditioning equipment, etc., has awarded general contract to Wark Co., 1600 Walnut Street, for two-story plant on adjoining site, to cost $250,000 with equipment. Simon & Simon, Fidelity-Philadelphia Trust Building, are architects.

Philadelphia Steam Co., Forty-ninth Street and Grays Ferry Avenue, Philadelphia, recently formed by Edward H. Reuss, Jr., and associates, has applied for permission to take over under lease steam power plant of Pennsylvania Railroad Co., now in course of construction at Race and Thirtieth Streets, and to enlarge station about four times present size for central heating service to be furnished by company in area bounded by Broad, South and Fortieth Streets and Girard Avenue, for which franchise has been secured. Company will install pipe lines and system in district noted to cost $5,600,000, and is scheduling completion in November. Later, conduit system will be extended at cost of more than $10,000,000 additional. Mr. Reuss is president.

Daison Mfg. Co., Inc., 462 North Eighth Street, Philadelphia, manufacturer of lighting equipment, lamp shades, etc., has purchased four-story factory on site, 60 x 225 ft., at 2021-29 Naudain Street, for new plant. Increased output will be developed.

Hess-Bright Mfg. Co., Front Street and Erie Avenue, Philadelphia, manufacturer of ball bearings, has awarded general contract to F. V. Warren Co, 1913 Arch Street, for two additions, two stories, 60 x 122 ft., and one story, 60 x 140 ft., to cost about $100,000 with equipment.

Edward Board, Inc., 1641 North Twelfth Street, Philadelphia, has been organized

with capital of $30,000 to take over and expand plant and business at same address, heretofore operated under name of Edward Board, machinist. New company will design and manufacture special and standard machinery and parts. Mr. Board is president and treasurer.

Atlantic City Electric Co., Atlantic City, N. J., is planning construction of steel tower transmission line from new generating plant at Deep Water Point to Woodstown and Pleasantville, 57 miles, to cost more than $500,000.

Board of Education, Bridgeton, N. J., plans installation of manual training equipment in two-story junior high school to cost $425,000, for which bids will be asked on general contract in about 60 days. Edwards & Green, 548 Federal Street, Camden, N. J., are architects.

Hazle Brook Coal Co., Mount Carmel, Pa., has authorized immediate construction of electrically operated coal breaker at colliery near Mount Carmel, to cost about $1,000,000 with machinery.

Wire Fabrics Corporation, Mount Wolf, Pa., manufacturer of wire cloth and other wire goods, has awarded general contract to L. M. Klunk, 205 South George Street, York, Pa., for two-story addition, to cost about $40,000 with equipment.

Transmission Engineering Co., Provident Trust Building, Philadelphia, has been organized by L. H. Shingle and associates to specialize in power transmission problems. Mr. Shingle is treasurer of Power Transmission Association.

Specialty Metal Products Co., Inc., 539 Diamond Street, Philadelphia, is engaged in manufacture of sheet metal stampings and will also do machine work on contract.

South Atlantic

BALTIMORE, July 15.—Plans are under way by Levering Brothers, Inc., 200 Key Highway, Baltimore, manufacturer of sash weights and other iron castings, for one and two-story branch foundry at Hanover, Pa., to cost over $80,000 with equipment.

Maryland Airport Corporation, Cumberland, Md., recently formed with capital of $100,000 by John G. Wiebel, La Vale Street, and associates, will establish an airport at Pinto Road and McMullen Highway, where property has been secured. Project will include hangars, repair shops, oil storage and other buildings, to cost more than $65,000 with equipment. Mr. Wiebel will be secretary and treasurer.

American Radiator & Standard Sanitary Corporation, 40 West Fortieth Street, New York, is concluding negotiations for purchase of Campbell Metal Window Corporation, Baltimore, manufacturer of steel and metal windows and sash for office buildings, etc. It is proposed to increase output at Campbell plant, particularly in specially designed metal window with sill to accommodate new type of radiator to be hung directly from sill.

Sylvania Industrial Corporation, Fredericksburg, Va., recently organized with capital of $3,500,000, has acquired local property for new plant to manufacture industrial chemicals and kindred products, to cost over $250,000 with equipment.

Richfield Oil Corporation, Whitehall Building, New York, subsidiary of Richfield Oil Co., of California, Inc., Los Angeles, has acquired 40-acres in Curtis Bay district, Baltimore, and plans construction of new storage and distributing plant, with power house, pumping station and other units, to cost more than $150,000 with equipment. John B. Stein, Woolworth Building, New York, is engineer.

Board of District Commissioners, District Building, Washington, will soon take bids for one-story mechanical and repair shop at Bryant Street pumping station, to cost $50,000 with equipment. A. L. Harris, address noted, is municipal architect. Bids will also be asked about same time for one and two-story automobile service, repair and garage building for highway department on adjoining site, to cost about $170,000 with equipment.

City Council, High Point, N. C., is said to be planning construction of a municipal electric light and power plant, to cost about $50,000 with equipment.

Atlanta Gas Light Co., Atlanta, Ga., has awarded general contract to United Construction Co., Inc., Georgia Savings Bank Building, for one-story equipment storage and distributing plant, with repair department, 115 x 300 ft., to cost about $100,000 with equipment; also for one-story automobile service, repair and garage building, 60 x 120 ft., at same location for company motor trucks and cars. George Kollock is company engineer.

Champion Fibre Co., Canton, N. C., is reported considering construction of a new paper mill at Tuscaloosa, Ala., and has taken options on site. Project will cost over $200,000 including machinery.

Palmer & Lambdin, 513 North Charles Street, Baltimore, architects, are asking bids on general contract for five-story automobile service, repair and garage building, 60 x 185 ft., to cost more than $175,000 with equipment.

Board of Trustees, Western Carolina Teachers' College, Cullowhee, N. C., has engaged Charles E. Waddell, Jackson Building, Asheville, N. C., engineer, to prepare plans for a hydroelectric power plant on Tuckaseegee River, to cost more than $100,000 with equipment.

Buffalo

BUFFALO, July 15.—Work is under way by Sun Oil Co., Philadelphia, and 2246 Niagara Street, Buffalo, on storage and distributing plant near Kenmore, Tonawanda Township, to cost $240,000. Project will include automobile service and garage building for company motor trucks.

New York State Electric Corporation, 123 Cayuga Street, Ithaca, N. Y., is reported planning new steam-operated electric power plant at Carmel, N. Y., to cost more than $85,000.

Marcellus Casket Co., Van Rensselaer Street, Syracuse, N. Y., has plans for four-story addition, to cost more than $90,000 with equipment. M. L. King, Dennison Building, is architect.

Buffalo Foundry & Machine Co., 1543 Fillmore Avenue, Buffalo, will build a one-story addition, to cost about $25,000 with equipment.

Schroon River Pulp & Paper Co., Warrensburg, N. Y., will carry out an expansion program, including installation of new machinery in pulp wood and other departments and modernizing of present equipment, to cost over $40,000. Walter Carr is in charge.

National Magnetic Clock Corporation, Buffalo, recently organized by Edwin S. Burrows, 136 Lancaster Avenue, and associates, with capital of $25,000, plans operation of local factory to manufacture special magnetic clocks and clock mechanisms.

Aero Corporation of America, Inc., organized under Delaware laws, will take over and consolidate Covert Gear & Mfg. Co., Lockport, N. Y., and Simplex Aircraft Corporation, Defiance, Ohio. Expansion is planned. E. J. Allen and Alwin A. Gloetzner, presidents of Simplex and Covert companies, respectively, are identified with new organization.

Breuil & Bennett Fuel Oil Co., Ellicott Square, Buffalo, is planning new storage and distributing plant near Kenmore, to cost about $100,000 with equipment.

Pittsburgh

PITTSBURGH, July 15.—Following a few days of comparative quiet, occasioned by the Fourth of July holiday, the machinery trade has resumed the activity which prevailed during June and this month promises to be considerably above the average for this time of year. A number of tools have been placed and a favorable factor is fresh inquiries of sizable volume. One new list includes 10 tools and another six, while several call for single items. The Westinghouse Electric & Mfg. Co., has not yet begun to close against its third quarter list, but requirements indicate that heavy purchases against this list will continue throughout the quarter.

It is expected that the list for the new A. M. Byers Co. plant at Ambridge, Pa., will be out in about a month and the requirements of the Bethlehem Steel Co. for expansion at Johnstown will probably be announced at about the same time.

Although July and August are usually rather quiet months in the machinery business because of the vacation periods of executives, it is thought that the placing of tools will see little interruption this year.

Blair Strip Steel Co., New Castle, Pa., will build a one-story addition, 115 x 125 ft., to cost about $100,000 with equipment.

Pittsburgh Tube Co., Vandergrift Building, Pittsburgh, has plans for two additions, each one story, 60 x 420 ft. and 105 x 240 ft., to double present capacity. Installation will include two or more traveling cranes. Project is reported to cost more than $175,000 with equipment. C. O. Spillman is general superintendent.

Standard Steel Propeller Corporation, Homestead, Pa., has work under way on expansion at local mill to increase output from three to four times present rating of 350 propellers per month. Work will cost more than $100,000.

Lone Star Gas Corporation, Farmers' Bank Building, Pittsburgh, operating natural gas properties in Texas and other Southern States, has arranged for increase in capital from 2,000,000 to 7,000,000 shares of stock, no par value, part of fund to be used for expansion.

Lawrence Motor Co., Mercer Street, New Castle, Pa., has awarded general contract to Hoyland & Frasso, 411 Leasure Street, for four-story service, repair and garage building, to cost $140,000 with equipment. W. C. Eckles Co., Lawrence Savings & Loan Building, is architect.

West Virginia Coal & Coke Corporation, Huntington, W. Va., has been organized with capital of $2,400,000, to take over and expand West Virginia Coal & Coke Co., with properties in Elkins, Bower and Logan Counties, in receivership. New organization is arranging for bond issue of $2,000,000 and sale of 48,000 shares of stock, of which about $1,000,000 will be used for extensions and improve-

ments in mines, including installation of electrically-operated machinery, remodeling and improving of tipples, plants for coal sorting and preparation, conveying and hauling facilities, etc. John C. Cosgrove, one of receivers for former company, will be president of new corporation; A. H. Crane will continue as secretary and treasurer.

Kittanning Limestone Co., Kittanning, Pa., has changed name to Kittanning Cement & Limestone Co., and plans expansion, including construction of cement mill, building of dock 2500 ft. long, extensions in conveying, distributing and storage facilities, etc., to cost more than $600,000.

Detroit

DETROIT, July 15.—Contract has been let by Culver-Stearns Mfg. Co., 3513 Woodward Avenue, Detroit, manufacturer of automobile parts, lighting equipment, etc., to Beyster & Olmstead, General Motors Building, for two-story plant unit, to cost about $50,000 with equipment. J. Ivan Dise, McKerchey Building, is architect.

Board of Trustees, Detroit House of Correction, Detroit, is having plans drawn for power house for new group of buildings at Plymouth, Mich., entire project to cost more than $200,000. Albert Kahn, Inc., Marquette Building, is architect and engineer.

Excell-O Aircraft & Tool Corporation, 1469 East Grand Boulevard, Detroit, recently organized to take over and operate Excell-O Tool & Mfg. Co., same address, has plans under way for expansion, primarily to increase facilities for manufacture of aircraft parts and specialties. Company has arranged for stock issue to total $940,000, considerable part of fund to be used for purpose noted.

Kunkel Mfg. Co., Hart, Mich., manufacturer of automobile heaters, valve grinding tools, etc., is erecting one-story addition, to cost about $40,000 with equipment.

Streng-Chevrolet Co., 8510 Twelfth Street, Detroit, A. B. Streng, president, representative for Chevrolet automobile, has awarded general contract to Downey & Davis, Fisher Building, for three and four-story service, repair and garage building, to cost about $150,000, with equipment. Andrew Morrison, 2231 Park Avenue, is architect.

Crosby-Ross Window Equipment Corporation, Ann Arbor, Mich., recently organized with capital of $100,000 has taken over plants and properties of Crosby Mfg. Co., Ypsilanti, Mich., manufacturer of screens, window sash, etc., and Frederickson-Williamsen Co., Detroit, manufacturer of invertible window hardware, and will consolidate. Former plant at Ann Arbor of Orange Crush Co. has been purchased and will be remodeled to manufacture invertible window hardware, screens, storm sash, etc. I. E. D. Ross, Detroit, is president, and William M. Laird, Ann Arbor, treasurer.

Detroit Aircraft Corporation, Detroit, has arranged for purchase of controlling interest in Lockheed Aircraft Corporation, Los Angeles, and will be active in management. It is proposed to carry out an expansion program at last noted plant, to cost over $75,000 with equipment.

Schermack Corporation, 1164 West Baltimore Avenue, Detroit, manufacturer of vending machines and parts, is planning new units to cost over $250,000 with equipment. Albert Wood, 2111 Woodward Avenue, is architect.

Sherrill Ambler, Northville, Mich., has purchased local plant and property of American Bell & Foundry Co., consisting of about 4½ acres improved with one-story buildings totaling about an acre of floor space. New owner will continue production as heretofore, and plans development of Bell furnace division of business with increase in foundry output.

Chicago

CHICAGO, July 15.—Reports of activity in the local machine tool market vary, some dealers finding July sales equal to those in June, while others report sales less than in the previous month. New purchases in the last week were in moderate volume and from widely scattered sources. Large buyers, though having in mind needs for the future, are slow in making their wants known.

Progress is being made on lists for several farm machinery manufacturers, but there is a growing impression that definite action will not be taken until early fall. Dealers' unfilled orders are large and deliveries are improving slowly. Complaint is frequently heard that railroad cars, suitable for loading some types of machinery, are at times difficult to obtain. The used tool market remains active.

Chicago Screw Co., 1026 South Homan Avenue, Chicago, will build a four-story addition to machine shop, 70 x 124 ft. J. B. Fisher, 140 South Dearborn Street, is architect.

Comandor Furnace Co., Vandalia, Ill., is erecting a new building, 56 x 240 ft., which will provide about 14,000 sq. ft. of additional manufacturing space.

Contract has been let by W. H. Salisbury Co., 401-21 Morgan Street, Chicago, manufacturer of rubber products, to Rune & Son, 6753 Stony Island Avenue, for one and two-story additions, 116 x 125 ft., to cost about $120,000 with equipment. Albert P. Dippold, 3948 Cottage Grove Avenue, is architect.

B. Mercil & Sons Plating Co., 1921 Fulton Street, Chicago, has awarded general contract to Chicago Industrial Construction Co., 53 West Jackson Boulevard, for one-story addition, 100 x 121 ft. A 30-ft. span traveling crane will be installed. Expansion will cost more than $70,000 with equipment.

Minnesota Mining & Mfg. Co., Forest and Fauquier Streets, St. Paul, Minn., manufacturer of abrasive materials, mining specialties, etc., is asking bids on general contract for a two-story and basement addition, to cost about $150,000 with equipment. Toltz, King & Day, Inc., Builders' Exchange Building, is architect and engineer.

American Beet Sugar Co., Steel Building, Denver, has plans for a one-story addition to mill at Rocky Ford, Colo., 40 x 145 ft., to cost about $85,000 with equipment.

Rath Packing Co., Elm and Sycamore Streets, Waterloo, Iowa, meat packer, has plans for six-story addition, to cost about $250,000 with conveying, refrigerating and other equipment. Henschien & McLaren, 1637 Prairie Avenue, Chicago, are architects and engineers.

Burst-Harig Mfg. Co., 1735 Carroll Avenue, Chicago, recently organized to manufacture tools, dies, etc., is completing a one-story machine shop, to cost about $30,000 with equipment.

R. H. Buhrke Co., 4540 Fullerton Avenue, Chicago, manufacturer of golf sticks, irons, etc., has awarded general contract to C. S. Miller, 5338 North Spaulding Avenue, for two-story plant, 100 x 125 ft., to cost about $65,000 with equipment. A. V. Teisen Co., 4804 North Kedzie Avenue, is architect.

Englander Spring Bed Co., 3943 Lowe Street, Chicago, is planning to rebuild part of plant recently destroyed by fire. Headquarters are at Johnson and Stewart Avenues, Brooklyn, N. Y.

Electric Household Utilities Corporation, West Twenty-second Street and South Fifty-fourth Avenue, Cicero, Ill., has begun construction of one-story foundry, to cost more than $50,000 with equipment. Present foundry at Waukegan, Ill., will be removed to new building early in September, with installation of additional equipment.

Half interest in Chamberlain Machine Works, Waterloo, Iowa, manufacturer of clothes wringers, has been sold to Studebaker Securities Co. Company has been reorganized as Chamberlain Corporation and plans are under way for a new factory, 100 x 200 ft., with another unit, 150 x 300 ft., contemplated for next spring. F. L. Chamberlain, who has been head, remains as president; Col. George M. Studebaker is treasurer, and C. M. Sherrill, secretary.

International Harvester Co., Chicago, has plans for a new plant, 230 x 620 ft., and a two-story addition to its recently completed motor manufacturing unit at its Farmall tractor plant at Rock Island, Ill., entire project to cost about $1,000,000.

Milwaukee

MILWAUKEE, July 15.—Machine tool manufacturers still are far behind on deliveries, but there is a general feeling that the peak has been passed. Inquiries from railroads are increasing. Orders from automotive manufacturers have not receded and demand from other sources continues good, although there are signs of relaxation in some quarters.

Giddings & Lewis Machine Tool Co., Fond du Lac, Wis., maker of drilling and milling machines, horizontal boring machines, etc., has contracted with Immel Construction Co., Fond du Lac, for one-story addition to machine shop, 90 x 250 ft., to cost $100,000 including equipment. Austin Co., Cleveland, is engineer.

University of Wisconsin, Madison, will close bids Aug. 6 for the construction of the mechanical engineering building for which $577,000 has been appropriated. Building will be irregular in shape, 230 x 250 ft., three stories. Bids are to be sent to J. D. Phillips, business manager of university. Plans are by Arthur Peabody, State architect.

Central Brass Foundry Co., Neenah, Wis., recently organized by A. M. Schnetzer, superintendent of Neenah Brass Works for fifteen years, and John W. Hewitt, one of owners of Hewitt Machine Co., Neenah, will open a new foundry at Menasha, Wis., specializing largely in jobbing work on paper and sulphite mill machinery. Mr. Schnetzer has disposed of his interest in the Neenah Brass Works, and will be in active charge of the new company.

Rock County Clerk, Janesville, Wis., will take bids until July 20 for construction of a machine shop, garage and warehouse, 50 x 200 ft., for servicing and

storing road-making and maintenance equipment. Charles E. Moore is County highway commissioner.

Milwaukee Electric Railway & Light Co., 217 Michigan Street, Milwaukee, has started excavation for addition to Cold Spring Avenue car repair and service shop, 164 x 292 ft., to cost $100,000. R. H. Pinkley is in charge.

Acme Metal & Scrap Iron Co., 497 Virginia Street, Milwaukee, will build a plant and refinery addition, 45 x 110 ft.

Cincinnati

CINCINNATI, July 15.—Fresh bookings for machine tools declined the past week, but manufacturers report sufficient unfilled orders to maintain production at a good rate throughout the summer. Demand is chiefly for standard tools and is coming from a wide source, which tends to offset the decrease caused by the withdrawal of automobile manufacturers from the market pending development of new models. The Chicago, Burlington & Quincy Railroad has placed an order with a local manufacturer for four motor-driven lathes.

Foreign business has declined sharply, although interest was revived last week when several machine tool makers received requests from a Russian commission, which had been in this market for several months, for additional information.

Plans are under way by Emery Industries, Inc., June and Long Streets, Ivorydale, Cincinnati, for one-story power plant, to use pulverized fuel, to cost over $75,000 with equipment. Kinney & Ehlers, Inc., Dixie Terminal Building, is consulting engineer.

C. O. Sherrill, City Hall, Cincinnati, city manager, has awarded general contract to William Miller & Son, 1952 Central Parkway, for hangar at municipal Lunken Airport, with shop and repair facilities, to cost $61,000. Kruckemeyer & Strong, St. Paul Building, are architects.

Board of Education, Sidney, Ohio, is said to be planning installation of manual training equipment in two-story high school addition to cost $250,000, for which plans will be drawn by H. L. Loudenback & Son, Kah Building, architects.

City Council, Murfreesboro, Tenn., plans installation of elevated steel tank and tower, with capacity of about 500,000 gal., in connection with extensions and improvements in municipal waterworks to cost $300,000, for which bonds have been approved. J. B. Farmer is superintendent in charge.

Absopure Refrigerator Corporation, Louisville, recently formed by David A. Brown, Louisville, and associates, has taken over Vogt Refrigerator Co., with local plant, manufacturer of metal refrigerators and equipment, and Absopure Refrigerator Co., Detroit, manufacturer of electric refrigerating units and accessories, and will consolidate. Output will be increased. Both companies were formerly operated as divisions of General Necessities Corporation, 2011 Park Avenue, Detroit. Mr. Brown will be president of consolidated company.

Formica Insulation Co., 4614 Spring Grove Avenue, Cincinnati, manufacturer of laminated insulating products, has taken out a permit for multi-story addition, to cost $100,000 with equipment, for which general contract recently was let to Ferro Concrete Construction Co., Third and Elm Streets.

Board of Education, Delaware, Ohio, is said to be planning installation of manual training equipment in two-story high school to cost about $500,000, for which bids are being asked on general contract until July 25. Glass-Ramsey, Inc., 186 East Broad Street, Columbus, Ohio, is architect.

Girdler Corporation, Goss Avenue and Shelby Street, Louisville, recently organized to take over and consolidate local group of companies manufacturing ice cream freezers, freezing machinery, etc., will make extensions and improvements in four-story factory at location noted. Plans are also under way for a new unit, to cost more than $50,000 with equipment. Walter H. Girdler is president.

Indiana

INDIANAPOLIS, July 15.—Contract has been let by Board of Trustees, Purdue University, Lafayette, to Glenn W. North Construction Co., Terre Haute, for first unit of mechanical engineering building at West Lafayette, to cost $150,000 with equipment. Walter Scholer, Painters' and Decorators' Building, Lafayette, is architect.

Grapho-Metal Packing Co., 2232 Alvord Street, Indianapolis, manufacturer of metallic packing, has purchased plant and business of Detroit Replacement Service Inc., 2559 Bellevue Street, Detroit, manufacturer of water pumps, starting cranks and kindred products, and will consolidate. Detroit plant will be removed to Indianapolis where expansion will be carried out. Albert D. Smith is president.

George B. Limbert & Co., 570 Fulton Street, Chicago, manufacturers of iron pipe, steamfitters' supplies and kindred products, have awarded general contract to H. B. Olney, 1200 East Chicago Avenue, East Chicago, Ind., for extensions and improvements in branch plant at East Chicago, to cost about $35,000. Briggs & Almy, 608 South Dearborn Street, Chicago, are engineers.

Automatic Screw Products Corporation, Indianapolis, recently organized by A. J. Vondersaar, 2021 Hoyt Avenue, and associates, has leased 10,000 sq. ft. in building at Nineteenth Street and Martindale Avenue, and will establish plant for second operation work on screw machine products.

Citizens' Gas Co., 47 South Penn Avenue, Indianapolis, is planning extensions and improvements in artificial gas plant, including installation of gas compressor units and auxiliaries, ovens and by-products equipment, and other machinery, to cost about $800,000.

Cleveland

CLEVELAND, July 15.—Machine tool sales by dealers were rather light the past week and not much new inquiry developed. The Packard Motor Car Co., Detroit, purchased a few tools to manufacture Diesel engines for airplanes and has a number of additional machines on its list of requirements. Another Michigan automobile manufacturer is figuring on some additional equipment. Sales by a local manufacturer of lathes continue good, its business so far this month equaling that during the same period in June. This company reports a good foreign demand from England and France. While machine tool deliveries are easier, the improvement on most lines is only slight.

Contract has been let by Cleveland Institute of Aviation, Society for Savings Building, Cleveland, to Gilchrist Construction Co., Western Reserve Building, for hangar, 120 x 145 ft., with repair facilities, and building, 40 x 120 ft., at proposed airport and training field, to cost $80,000 with equipment.

William R. Hopkins, City Hall, Cleveland, city manager, has plans for one-story municipal automobile service, repair and garage building, to cost about $100,000 with equipment. Herman Kregelius, City Hall, is city architect in charge.

Standard Oil Co., Toledo, Ohio, plans rebuilding part of oil storage and distributing plant destroyed by fire July 4.

Ohio Piston Co., 5337 St. Clair Avenue, Cleveland, has plans for one-story addition, to cost about $50,000 with equipment. Kalsch & Hoefler, 4500 Euclid Avenue, are architects.

Rainbow Luminous Products, Inc., operating Rainbow Light, Inc., 21-43 Forty-fourth Road, Long Island City, manufacturer of electric tube lighting equipment, has purchased Central Outdoor Advertising Co., 1124 Carnegie Avenue, Cleveland, recently formed by merger of General Outdoor Advertising Co., address noted, and Harry H. Packer Co., 2420 West Superior Street, same city, manufacturer of electric signs, displays, etc. Purchasing company will consolidate into single operating unit, and plans expansion. George L. Johnson is chairman of board of Rainbow organization.

Cleveland Chain & Mfg. Co., Pennsylvania Railroad and Henry Street, Cleveland, manufacturer of steel chains, chain hooks, etc., has plans for one-story addition, 45 x 100 ft., to cost about $50,000 with equipment.

Piqua Electric Mfg. Co., Piqua, Ohio, has been incorporated, and has engaged in manufacture of electric fans, especially for exhaust and ventilating purposes. Company is contemplating building a new plant within the next year.

Gulf States

BIRMINGHAM, July 15.—Expansion will be carried out at Dallas, Tex., by Fairchild Aviation Corporation, 270 West Thirty-eighth Street, New York. A new hangar with shop and repair facilities will be constructed at Love Field, and other units established, to cost $75,000 with equipment. Stanley Moir is local manager.

Southern Sugar Co., Clewiston, Fla., has work under way on expansion program, to include installation of conveying, grinding and other equipment, to cost more than $600,000. Work is scheduled for completion in December. W. G. Ames is company construction engineer in charge. Headquarters are at 645 North Michigan Avenue, Chicago. B. G. Dahlberg is president.

Bent Concrete Pipe Co., Forth Worth, Tex., manufacturer of large diameter steel-reinforced concrete pipe, with headquarters in Grosse Building, Los Angeles, has acquired 10-acre tract at West Dallas, Tex., as site for new plant, to cost over $700,000 with machinery.

Uniheart Universal Tool Co., Muscle Shoals City, near Sheffield, Ala., recently organized, has established a local plant to manufacture a patented tool holder, with drop forging, finishing and other departments.

John Deere & Co., Moline, Ill., manufacturer of plows and other agricultural machinery, has asked bids on general contract for a three-story and basement factory branch and distributing plant, 116 x 120 ft., at San Antonio, Tex., to cost over $75,000 with equipment. O. E. Eckerman, Moline, is architect. Clark E. Inglish, 311 South Flores Street, San Antonio, is local manager.

R. W. Alfred, 120 West Craig Street, San Antonio, Tex., and associates are planning new ice-manufacturing plant at Mercedes, Tex., to cost about $85,000 with equipment.

Tobian Garage, Inc., Dallas, Tex., has purchased four-story building and will remodel for new service, repair and garage building, to cost $150,000, exclusive of puchase price. Company is operated by William Tobian.

Board of Education, Birmingham, has authorized installation of manual training shops in first unit of new West End high school, to cost more than $400,000 with equipment. Plans have also been approved for two-story unit at industrial high school for negroes. Warren, Knight & Davis, Protective Life Building, are architects.

St. Louis

ST. LOUIS, July 15.—Plans are being considered by Prest-o-Lite Co., 30 East Forty-second Street, New York, manufacturer of acetylene equipment, welding apparatus, etc., for branch plant at Oklahoma City, Okla., consisting of two one-story units, 60 x 131 ft., and 50 x 60 ft., to cost about $100,000 with equipment.

Terminal Railroad Association, 1800 Market Street, St. Louis, has filed plans for one-story shop and equipment storage building, 45 x 175 ft., to cost about $55,000 with equipment.

Schmidt, Boucher & Overend, Brown Building, Wichita, Kan., architects, have awarded general contract to Blaser-Vollmer, Inc., 430 North Rock Island Avenue, for three-story and basement automobile service, repair and garage building, 74 x 145 ft., to cost about $100,000 with equipment.

Pierce Petroleum Corporation, 1329 Gratiot Street, St. Louis, has awarded general contract to Fruin-Colnon Contracting Co., Merchants Laclede Building, for one-story storage and distributing plant, 70 x 119 ft., to cost about $45,000 with equipment. H. L. Denning is company architect, address noted.

National Supply Co., 9 South Main Street, Tulsa, Okla., oil and gas well equipment and supplies, has awarded general contract to W. H. Horster, Exchange National Bank Building, for three-story storage and distributing plant, with pipe and fitting departments, etc., 75 x 125 ft., to cost about $75,000 with equipment. A. M. Atkinson, Mid-Continent Building, is architect.

New Era Motors, Inc., care of J. E. Roberts, 17 East Forty-fifth Street, New York, recently organized to manufacture an eight-cylinder front drive automobile, to be known as Ruxton automobile, has leased property at St. Louis for temporary plant pending construction of a new plant at Detroit. Both parts production and assembling departments will be provided. A. M. Andrews is president; and Fred D. Peabody, formerly assistant sales manager of Hupp Motor Car Corporation, Detroit, sales manager.

Sparton Aircraft Co., Tulsa, Okla., has work under way on an expansion program for production of cabin aircraft, airmail transport and training airplanes. Company is a subsidiary of Skelly Oil Co., Tulsa.

Pacific Coast

SAN FRANCISCO, July 11.—American Foundry Co., Bay Point (Contra Costa County), Cal., has purchased plant property of Dow Pump & Diesel Engine Co., Alameda, Cal., and will remove to that location, with installation of additional equipment. A. Searle is general manager.

Bates Valve Bag Co., 2001 East Fifty-seventh Street, Los Angeles, has plans for one-story plant, 170 x 360 ft., to cost over $100,000 with machinery. Austin Co. of California, Inc., is engineer. Headquarters are at 35 East Wacker Drive, Chicago.

Cudahy Packing Co., 803 Macy Street, Los Angeles, has awarded general contract to Pozzo Construction Co., 421 Macy Street, for three additions to meat-packing plant, to cost more than $100,000 with equipment; a three-story unit will be built for lard refining. Company engineering department, Omaha, Neb., is in charge.

Oil Well Mfg. Co., 6040 Alameda Street, Huntington Park, Cal., manufacturer of oil well equipment and supplies, has plans for a one-story addition, 70 x 140 ft., including improvements in present plant, to cost over $40,000 with equipment. A. Godfrey Bailey, Hillcrest Building, is architect.

Utah Power & Light Co., Kearns Building, Salt Lake City, has plans for a two-story addition to steam-operated electric power plant, to cost $250,000 with equipment. Company is operated under direction of Electric Bond & Share Co., 2 Rector Street, New York.

Jessie J. Ward, city clerk, Centralia, Wash., will receive bids until Aug. 13 for equipment for a municipal electric light and power plant, including two 2900-hp. hydraulic turbines; two 2500-kva. electric generators; eight 1667-kva. transformers, and auxiliary equipment.

Aircraft Plywood Corporation, Seattle, recently organized, has acquired former local plant of Gould Lumber Co. for new works. Expansion will be carried out to provide for production of 200,000 ft. plywood per day for aircraft industry. Company is said to be arranging sale of stock issue under direction of First Securities Co., Seattle, part of fund to be used for purpose noted.

Pacific Mill & Mine Supply Co., 1122 Santa Fe Avenue, Los Angeles, has awarded general contract to John M. Cooper Co., Inc., Rives-Strong Building, for one-story storage and distributing plant, 40 x 160 ft., to cost about $30,000 with equipment.

Canada

TORONTO, July 15.—While there has been a falling off in machine tool sales in this market, local builders and dealers look upon the decline as seasonal, rather than as an indication of a recession in business. Current demand, while below that of a couple of months ago, is on a more substantial basis than for the corresponding period last year. Inquiries for single tools are in fairly good volume. Small tools are moving freely.

R. S. Hart, manager of National Steel Car Co., Hamilton, Ont., has acquired plant formerly occupied by Carbon & Alloy Steels, Ltd., Welland, Ont., and has awarded contract to Gardner Construction Co., for remodeling. A new company, to be known as National Steels, Ltd., will operate works.

Lionite Abrasive Co., subsidiary of General Abrasive Co., Niagara Falls, N. Y., will start work at once on erection of a plant in Stamford township, near Niagara Falls, Ont., to cost $150,000.

An agreement between Simcoe, Ont., Board of Education and American Can Co., has been approved by Town Council, whereby former Central school property passes to can company for $35,000. This is understood to be initial step in establishing a can manufacturing plant to ultimately cost $1,000,000.

Bids are being received by W. A. Pearse, business administrator of Board of Education, 155 College Street, Toronto, for lathes and other machinery for installation in Western Branch, Technical High School.

Guelph Stove Co., Guelph, Ont., has taken out a permit for an addition, to cost $115,000.

Auto Strop Safety Razor Co., 83 Duke Street, Toronto, will build an addition to cost $50,000.

City of Hull, Que., will spend $100,000 on construction of waterworks plant, including purchase of pumping units, etc. Leo Lancetot, City Hall, is engineer.

Canadian Oil Companies, Ltd., 2 Strachan Avenue, Toronto, contemplates building an addition and erection of new storage tanks at Petrolia, Ont.

Toronto, Hamilton & Buffalo Railway Co., has awarded several contracts for roundhouse repair shops at Hamilton, Ont., to cost $850,000.

Robert Mitchell Co., 750 Belaire Street, St. Laurent, Que., has awarded contract to Anglin-Norcross, Ltd., 2063 Victoria Avenue, Montreal, for a foundry to cost $500,000. T. Pringle & Sons, Ltd., 410 St. Nicholas Street, Montreal, is architect.

Jeffrey Mfg. Co., 1111 Beaver Hall Hill, Montreal, has awarded general contract to A. F. Byers & Co., Ltd., for a factory at Ville La Salle, Que.

Foreign

OFFICIALS of Petroleum Heat & Power Co., 511 Fifth Avenue, New York, manufacturer of oil burners and oil-burning equipment, are planning organization of subsidiary to operate in France. It is proposed to establish a plant in that country for complete distributing and servicing facilities. Project is reported to cost over $1,000,000. William C. McTarnahan, president, has gone abroad to complete details.

Government of Russia, through Amtorg Trading Corporation, 261 Fifth Avenue, New York, official buying agency for Soviet Russian Government, has arranged with Lockwood Greene Engineers, Inc., 1 Pershing Square, New York, and Boston, architect and engineer, to reorganize and reconstruct textile mills in Soviet Union, including design and construction of new plants covering all branches of production. A five-year program has been ratified, providing a capital investment of about $700,000,000 for textile industry during that period, and which is estimated will more than double present output. Announcement has been made by both interests noted that a large part of machinery and equipment requirements will be purchased in United States.

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Universal Apprenticeship Essential

Shortage of Skilled Mechanics Cannot Be Overcome So Long as Common Duty of Training Younger Generation Is Shirked

BY HAROLD S. FALK*

THE man who works is the most important factor in the industrial world. An abandoned factory, with crumbling walls, sagging roof, windows broken and doors off the hinges, is excellent evidence that industry without men is worse than useless. Up-to-date equipment, efficient accounting systems, strong financial foundation, advantageous location, loyal and satisfied customers—all these are futile without a strong organization of men who know their work.

Manufacturers and business people have gradually come to realize this important fact and are devoting more and more thought to matters of personnel. Business men who are confronted with more problems than they can take care of have asked themselves why they should not train assistants to help them with these problems. This thought naturally enough suggested another—that if an organization is efficient, it will not present so many problems in the first place, and in the second place will include a great number of men, even in subordinate positions, who can solve their own problems long before they reach the head of the business.

General Lack of Interest in Apprenticeship

Accordingly, there has grown up in the last few years a very considerable development of personnel work in industry. Employment departments have been set up for careful and sometimes scientific selection of workers; the work and habits of men are analyzed and recorded to find for each one the task for which he is best fitted; shop committees have been appointed for safety, for the adjustment of disputes, for improvement in processes and for other purposes; insurance and pension features have been provided; hospitals have been established; working conditions have been improved; training courses for young engineers, for salesmen, for foremen and for office workers, as well as other educational advantages, are available in many industries.

It is a curious fact that in spite of all this there is a general lack of interest in apprentice training among American business men. Of course, there are exceptions. Here and there may be found organizations, especially among the railroads, in the machinery building industry

PATTERN Apprenticeship Is the Oldest Branch of Apprentice Training in the Falk Shop and None Is Better Organized

*Vice-president and works manager, Falk Corporation, Milwaukee.

and in the building trades, in which thorough programs of apprentice training have been arranged. However, the great majority of our employers seem to think that all necessary men can be hired when needed, or they do not think about the matter at all.

Prevalent Opinion that Modern Mechanical Industry Requires No Skill

Some time ago I spoke before a group of foundrymen on the subject of apprentice training. During the informal discussion that followed the talk, one of the foundry operators stated that his plant was on a production basis and that all his castings were made on molding machines which were automatic and practically fool-proof. He stated that modern machinery dispenses with skilled mechanics, that he had no need for them in his plant and did not want any. This is merely an example of the far

FOUNDRY Apprentices and Certain Machine Shop Apprentices Are Given Several Months' Training in a Heat-Treating Shop, Not with the Idea of Making Them Skilled in Heat Treating Steel, but to Teach Them to Appreciate What May Be Done in Changing the Properties and Characteristics of Steel

too prevalent opinion that trained men are not required in modern mechanical manufacturing.

The following answer to the argument is from an article which recently appeared in a well-known trade publication:

"Managers of automobile plants have been known to say that they want nothing except men who can be taught a mechanical operation and are willing to stay at it indefinitely. But where do such managers obtain their superintendents, their foremen and inspectors? Who is there to show the mechanical operators what to do and how they are to do it? Mechanics are necessary in production industries to take care of the maintenance of machinery and to set it up in the first place. Skilled men of the highest class are required to plan and to make the tools and fixtures that make production work possible. Only highly trained men can plan the routing of work, the placing of machines and the proper arrangement and correlation of various departments."

It may be true that the proportion of skilled mechanics required in mass production is smaller than in the old-fashioned manufacturing methods, but the production industries have expanded so much that the actual number of mechanics required is probably greater than ever before.

Moreover, it must not be forgotten that there are important and extensive industries that do not readily lend themselves to mass production methods. For instance, we do not expect to find any considerable number of unskilled men on line assembly and machine operations in the manufacture of locomotives, passenger cars, boilers and turbines for public service corporations, furnaces, cars and rolls for the steel industry, printing presses, machinery for vessels, equipment for food and chemical industries and water turbines. Such products will continue for years to be built as individual units rather than by thousands along an assembly line and, hence, in those industries, the all around mechanic will continue to hold his own.

Shortage of Apprentices in the United States

Magnus W. Alexander, president of the National Industrial Conference Board, explained the situation excellently in a paper before the American Society of Mechanical Engineers in December, 1924. That is some years past, but conditions have not changed materially since then. According to investigations made by his organization, about 5 per cent of the industrial workers in the United States must be replaced every year. Since the ordinary apprentice training course extends over a period of several years, 15 to 20 per cent of the total number of skilled mechanics should be constantly in training as apprentices in order to supply the required 5 per cent every year. He placed the number of skilled mechanics in the United States at 4,500,000. Fifteen to 20 per cent of this number would be from 675,000 to 900,000 apprentices. As a matter of fact, only 144,000 apprentices were reported in the United States at the time his paper was presented. Accordingly, there was at that time a shortage of over half a million apprentices in the country, indicating a pronounced shirking of the duty of training mechanics on the part of American business people in general.

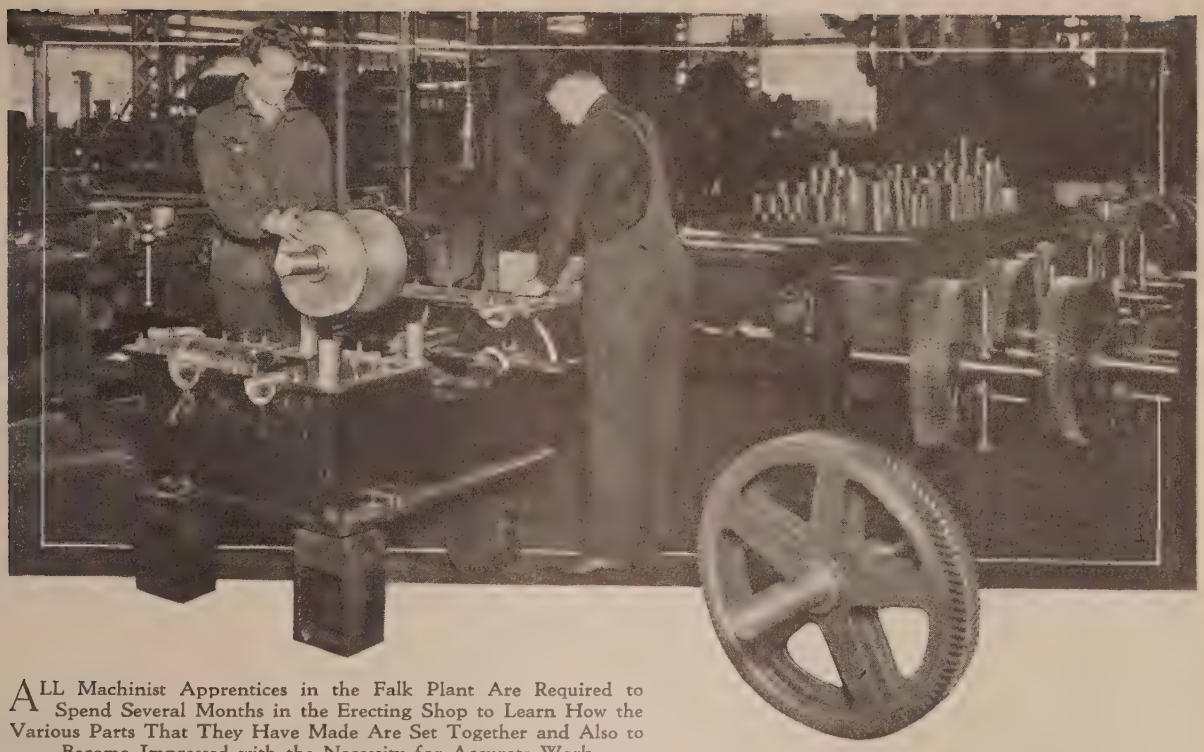
Apprentice Training Not a Financial Burden

Apprentice training will not be an added financial burden upon the manufacturer, if carefully established and if the quota of apprentices is correct. It has been shown by experience that the work of apprentices is done well enough to carry not only the labor cost but all indirect charges caused by apprenticeship administration and supervision as well. However, apprenticeship is no longer a paying enterprise if the quota of apprentices is too high.

For this reason the present conditions are unfair to those few manufacturers who train apprentices. They find that a very considerable portion of the apprentice graduates leave as soon as their course is completed. This proportion is sometimes as high as 50 per cent. Accordingly these companies are forced to maintain up to double the correct quota of apprentices in order to supply their own requirements in skilled men.

Industry Needs Universal Apprenticeship

There are reasons other than the unfairness of the present methods why apprenticeship should be extended to every industrial district and to practically every manufacturer. Industry's need for trained men will not be satisfied until this is done. Although certain manufacturers now train many more apprentices than they themselves need, it is utterly impossible for them to train all that are required, even if they were willing to do so. The shortage of half a million apprentices in the country which was pointed out by Mr. Alexander cannot be made up until apprenticeship becomes universal. Apprenticeship should be made a community responsibility in every manufacturing district. Employers in each district should



ALL Machinist Apprentices in the Falk Plant Are Required to Spend Several Months in the Erecting Shop to Learn How the Various Parts That They Have Made Are Set Together and Also to Become Impressed with the Necessity for Accurate Work

associate themselves for the purpose of supplying together the number of skilled mechanics required in the district.

How universal apprenticeship is to be achieved is another matter. Apprenticeship will not grow of itself. It is comparatively easy to point out the need for it and extremely difficult to devise a way of bringing it about. However, intensification of efforts already begun will go a long way.

Promotion by Interested Employers

Employers who are training apprentices can accomplish much. Economists, engineers, employment experts, Federal and State agencies, educational authorities—all these can preach the need of apprenticeship to a manufacturer and he will pay little attention to them. But when another manufacturer, one of his own class, one who is confronted by the same problems and difficulties, tells him that apprenticeship is necessary and that he has made a success of it, the skeptical manufacturer becomes interested.

Therefore, manufacturers who employ apprentices will do well to call the attention of their associates constantly to the advantages of apprentice training: The strong corps of young mechanics who will be effective for years to come; a stable organization, sympathetic with the policies of the employer; a group of young men from whom

FALK Corporation Apprentices Have an Association That Sponsors Entertainments and Athletic Events. The meeting depicted shows part of the association organizing for an annual picnic

executives and officials may be selected, and the desirability of a force of mechanics who are not only skilled in their trades but thoroughly acquainted with products in addition.

In the Milwaukee branch of the National Metal Trades Association much has been accomplished in this direction by a number of well-organized committees on apprenticeship. By standardized supervision and procedure and a program of promotion they have doubled the number of apprentices in the district in the last 10 years. Trade skill contests, banquets for apprentices and for foremen and superintendents, and contact with the schools have played an important part in this work.

Wide Publicity Essential

In addition, the development of apprentice training can be greatly assisted by general and constant publicity. This should be directed not only toward business men, but also toward the general public, associations of various kinds, civic bodies and, especially, school teachers and school authorities. It has frequently been pointed out that no program of apprentice training will be successful that is not built upon the approval of the community.

In this matter of publicity, the trade and business magazines and papers have performed an excellent service and no doubt will continue to do so.

Helpful Activity of Trade and Manufacturing Associations

Much can be expected from the manufacturing and trade associations, which have also contributed a great deal to the development of apprenticeship. The officers and professional managers of these associations have, as a rule, shown more foresight and appreciation of the advantages of apprenticeship than have the members themselves. This was to be expected. The individual member of an association is more or less absorbed by the activities of his own plant and business. He is seldom in a position to appreciate difficulties of a general nature unless they concern him directly.

On the other hand, officers and managers of associations can survey the entire industry that they serve, and their investigations frequently disclose the existence of problems that must be solved by the industry as a whole, even though they may not oppress any individual member to any appreciable extent. For instance, every employer who is a member of an association may hire salesmen and foremen as he needs them and think nothing of it. However, the manager of the association understands that members are merely taking these salesmen and foremen from each other, creating a high turnover and increasing the cost of doing business for all.

A number of associations have appointed training directors and have made considerable appropriations for their work. The directors visit the members, help them in organizing apprentice training programs and make efforts to interest those who have not begun the work. Associations have also made discussion of apprenticeship problems a part of their regular meetings, have issued booklets and circular letters on the subject and have given to the movement the support of their boards of directors.

In addition, certain associations have made a careful study of the problems of apprenticeship and have prepared solutions for their membership when possible. Thus, they have arranged and published courses of work for various trades, standard forms for contracts, certificates and records, have established bureaus of information, have made calculations of the needs of their membership for mechanics and have worked out theoretical minimum quotas of apprentices. Unfortunately, such work has seldom been fully appreciated and sometimes has not even had the full approval of all members.

Worthy Activity for a Wealthy Foundation

The suggestion has been made that apprenticeship would be an excellent field of activity for one of the wealthy foundations. The mere fact that such an institution took up the study of apprenticeship would give a great impetus to the movement.

The development of apprentice training so far has been due almost exclusively to the efforts of the various agencies that have been described and, undoubtedly, they will achieve still greater results. If more people can be attracted to these activities and can be made to take an interest in them, a much greater extension of the movement during the next few years may be expected. Other and better plans may easily come to the minds of those who apply themselves to the study of universal apprenticeship, a problem that must be solved.

Germans Study Energy Losses in Heroult Furnaces

TWO articles have appeared in the German technical paper, *Archiv für das Eisenhüttenwesen*, discussing energy losses in Heroult electric furnaces.

The first article discussed losses in a 7-ton furnace with particular reference to heat accumulation processes. N. Wark was the author. With the intention of determining the distribution of the energy losses between the transformer, the current leads, the cooling water, the furnace body and the furnace gases, it was found that time of charging, the quality of the scrap and the condition of the furnace refractory walls in particular, have an influence on the heat losses of the furnace. The flow of heat through the furnace walls was investigated; and it was ascertained that the amount of the accumulated heat decreased during the melting period, as the heat supplied to the walls was insufficient to make up for that which was radiated externally

In the other article, written by H. Klinar, O. Reinhold and N. Wark, losses in a 15-ton furnace with particular reference to the wear of the roof were discussed. Energy balance sheets were prepared for the life of one roof from the data obtained during four melts, using cold charges. These showed clearly the dependence of the heat losses on the wear of the roof.

As regards the ability of the roof material to absorb heat, the results which were obtained confirmed those recorded with the 7-ton furnace, referred to above. The thermal balance sheets of melts made with liquid charges showed that the energy supplied was almost entirely used up in the formation of the slag and in making up the radiation losses.

These abstracts were made by the Iron and Steel Institute and the National Federation of Iron and Steel Manufacturers of London, England.

"The Thermal Expansion of Tantalum" is the title of research paper No. 62 of the United States Bureau of Standards. It is a reprint from the bureau's *Journal of Research* and the author is Peter Hidnert. It contains 10 pages and is illustrated with charts.

Foundry Uses Hot-Blast Cupolas

Marked Savings in Fuel and Time—Borings Made into Briquettes for Charge—Mixing Ladle to Be Used

BY FRED L. PRENTISS*

BY adopting improved production, materials-handling and other methods, and by providing better arranged foundries and more efficient equipment, the automotive industry has played an important part in the last few years in the development of the foundry industry. These changes have resulted in the reduction of hand labor to a minimum, better working conditions for the men, lower production costs and improvement in the quality of the product.

When a new foundry is built to make motor car castings, the builder attempts to improve on the last one and thus to assure a further increase in efficiency and reduction in the cost of making castings. The latest foundry to be built for the manufacture of motor car castings is the gray iron unit of the Oakland Motor Car Co., Pontiac, Mich. Its numerous interesting features in layout, arrangement, handling and other equipment, foundry practice, elimination of hand and hard labor make it an outstanding plant in the foundry field. Well lighted and well ventilated buildings make working conditions excellent.

Preheated Blast Used for Two Cupolas

From a production standpoint one of the most interesting features is the use of hot-blast cupolas, the blast of two of the four cupolas being preheated by the combustion gases from the cupola, resulting in a greater output and a saving in fuel. This is the first automobile foundry to use the hot-blast method with its cupolas, although the Griffin Wheel Co. has been using hot-blast cupolas for some time.

A new method of handling the cupola charging material and making up the charges is designed as an improvement over methods employed in other modern production foundries which have largely eliminated hand labor in the charging of cupolas. One of the interesting features of this part of the foundry is that cast iron borings are made into briquettes for the cupolas. The equipment for handling the borings and the briquettes themselves is all a part of the cupola materials-handling system, working in conjunction with the equipment for handling pig iron and scrap.

Methods provided for delivering castings and sand from the shake-out to the basement, removing them immediately from the foundry floor and keeping the foundry largely free from the heat, smoke and gases that come from the molds and castings, are recent developments which tend to improve working conditions in the foundry.

Built for making practically all castings for the Oakland and Pontiac cars, the foundry has a rated melting capacity of 450 tons a day. The buildings are arranged for convenience in handling material and castings, the whole plant being laid out to avoid counterflow of work.

*Resident editor, THE IRON AGE, Cleveland.

Cupola Charging Floor. Charges are brought up by the cupola charger from the ground floor through the shafts shown

Four tracks coming in from one side feed the plant. Two of these are for sand and two for fuel and metal. A fifth track serves a conveniently located service building, running along a dock at the side of that building for delivering flasks, wire, machinery and miscellaneous supplies to the maintenance department, stock room and wire room.

Finished castings, on leaving the cleaning department, move to the adjoining shipping department and from the loading dock at the side of that department are carried by truck to the adjoining motor building. Service yards of ample size are provided between the foundry buildings.

All four cupolas have 90-in. shells, lined down to about 60 in. Gases of combustion are drawn from the hot-blast cupola into a gas chamber through 16 openings 5 ft. below the charging door, by a suction fan using ½-oz. suction. The gas, mainly carbon monoxide, is delivered to the combustion chamber of one blast heater that serves the two cupolas. Cold air for the cupola blast is delivered by the cupola blowers into the blast heater and, after preheating by the burning of the cupola gases, enters the cupola at a pressure of 8 oz. at a temperature of 400 deg. Fahr. That temperature is closely maintained at all times. The volume of preheated air entering each cupola is controlled by a Bacharach indicator and recorder.

Blast for the four cupolas is supplied through one feed line by three Root blowers, two driven by a constant-speed and one by a variable-speed motor. As low pressure is used on the hot-blast cupolas, the full capacity of the three blowers is not required. For this reason the volume of air is regulated by the use of one variable-speed motor.

A Measure of the Improvement in Performance

Melting capacity of the cupolas has been materially increased by the use of the hot blast. The output of each hot-blast cupola is 19 to 20 tons an hour, compared with 15 to 16 tons an hour on the cold-blast cupolas with the same linings. Coke consumption has been reduced to one ton for 10 tons of iron melted, compared with a ratio of 1 to 7 in the cold-blast cupola. The sulphur content of iron melted in the hot-blast cupola is considerably lower than that made in the cold-blast cupola. Another advantage claimed for the hot-blast method is that it preserves the furnace linings.

For making iron for all kinds of castings the cupola charge is 4000 lb., of which approximately 46 per cent is malleable pig iron, 5 per cent nickel-chrome iron, 35 per cent cast scrap and the remainder steel scrap. Cylinder blocks and heads are made of hard iron. Iron for flywheels and clutch plates at present is softened by the addition of ferrosilicon in the ladle. With the completion of all the molding units, both hard and soft iron will be made, the latter to be used for the smaller parts. These will include transmission housings, intake and exhaust manifolds, clutch plate housings and miscellaneous small castings.

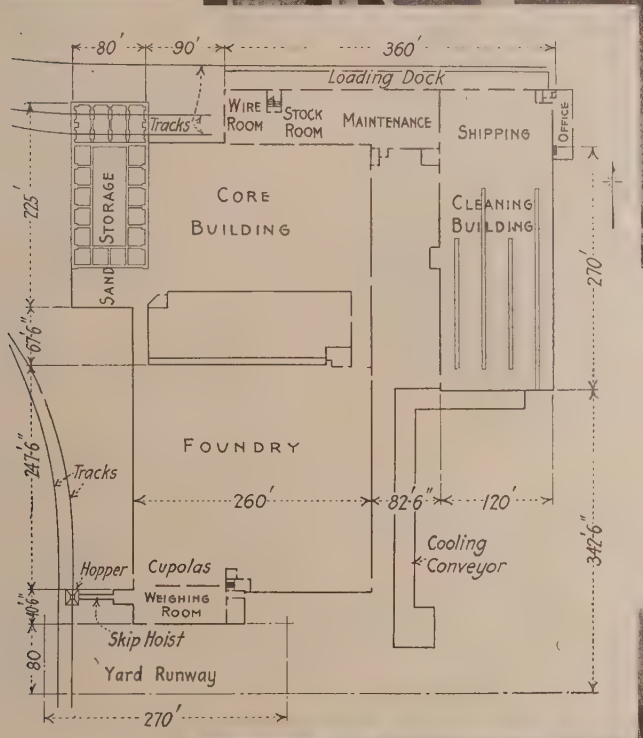
HANDLING Equipment in Weighing Room, the Stockyard Being at the Left, Outside the Building. Weighed material drops into the charging buckets as they are pushed along the rollers at rear. The briquette hopper is shown at top

LIFT Truck Picks Up Charging Bucket by Cone Head on a Shaft Extending Through Center of Bucket, and Carries It by a Slot in the Truck Frame

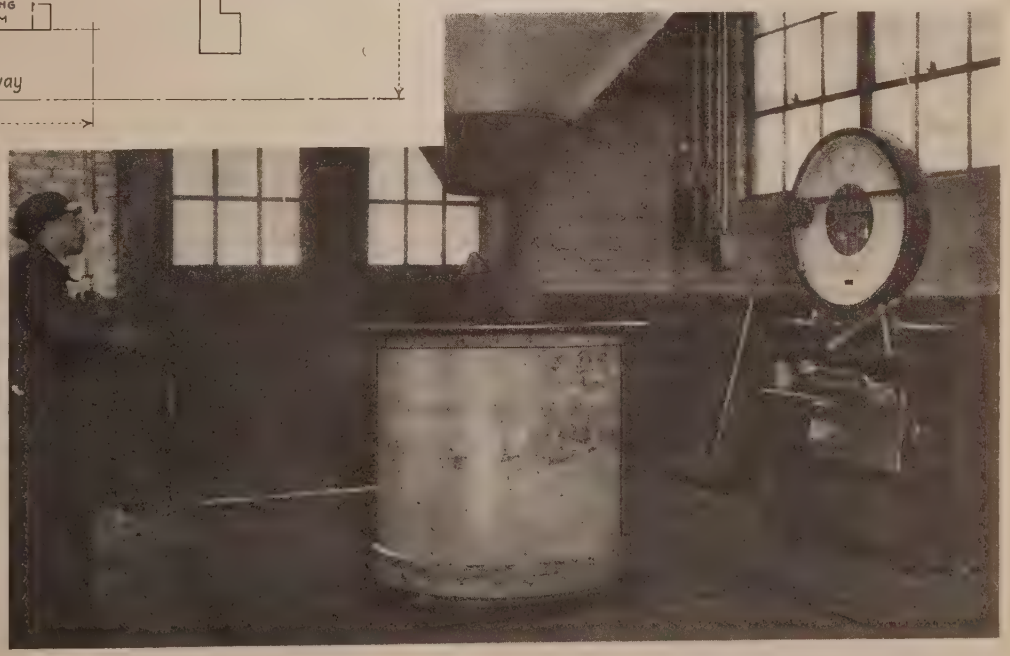
Metal from the four cupola spouts will flow into a 4-ton mixing ladle, to be installed shortly, to secure a more uniform metal. This ladle, of the tilting type mounted on an electric truck, will deliver the iron to the Sprague hot-metal carrier now in use. This has a 2000-lb. ladle in which metal is taken to the pouring bays, where it is delivered to the pouring ladles.

Four short, horizontal conveyors carry metal from the stockyard through openings in the side wall to the weighing room, at the side of the cupola building, in which the charges are made up. One conveyor handles

ONE of the Conveyors for Delivering Scrap from the Stockyard to a Bin in the Weighing Room (Right)



LAYOUT of the Foundry Departments, Showing How Iron and Cores Move from Either Side to the Molding and Pouring Floors. Thence the castings proceed toward the right, to the outside cooling conveyor, which, in turn, deposits them in the cleaning room



CHARGING Bucket Setting on a Scale to Receive Its Charge of Coke and Limestone from the Hopper Above (Right)

steel scrap, one cast scrap and two pig iron. Pig iron and scrap are placed on the conveyors by the traveling stockyard crane, equipped with a lifting magnet, and from each conveyor the metal drops into a weighing hopper of about 1-ton capacity.

There is a weighing hopper for each conveyor and a fifth for briquettes. The metal is dropped from the weighing hopper to a charging bucket of 4000-lb. capacity set on a roller conveyor located at floor level. This conveyor extends along the side wall of the weighing room, directly beneath the hoppers. The empty charging bucket is spotted by a specially designed electric lift truck under the first hopper and, after the charge is received from this hopper, the bucket is pushed forward on the roller conveyor by an air-operated mechanism that moves the bucket a fixed distance—to a point beneath the second hopper—to receive the second portion of its charge, and so on until the charge is made up. Charges are placed in the bucket in this order: Steel scrap, waste scrap, briquettes, two kinds of pig iron.

The charging truck picks up the loaded bucket at the end of the roller conveyor and sets it beneath a hoisting shaft that connects with the cupola charging floor above.

Borings are brought in open-top cars from the motor plant to the stockyard and unloaded with the stockyard crane, which places the scrap into two storage bins, each of 50-ton capacity. A single belt conveyor carries the scrap from these bins to a Southwark briquetting machine in which they are made into cylindrical briquettes 4 in. in diameter and 4 in. long, weighing about 8 lb. each. The briquettes are discharged into an elevator which carries them to a horizontal conveyor above the weighing room. From this they fall into two 50-ton storage bins located above the roller track on which the charges are made up. From these bins the briquettes are discharged into a weigh hopper located in a line with the other hoppers used in making up the charges.

Coke and limestone are dumped from hopper-bottom cars into the hopper of an automatic skip hoist, which delivers the fuel and limestone into a storage bin at the end of the weighing room. This bin, having a capacity for four carloads of coke and one of limestone, is divided into five sections, the center section being for limestone and the others for coke. Coke and limestone are discharged from the bin through a hopper into a charging bucket—800 to 1000 lb. capacity—set on a scale. The discharge gate of each bin section can be operated independently. The bucket with its charge of coke and limestone, 60 lb. of the latter per ton of metal, is taken by the charging truck to the hoisting shaft. Coke breeze and fine coke pass through a screen that leads to a storage tank.

An interesting feature of the coke-charging equipment is the design of the charging buckets. These have a steel shaft through the center, on the upper end of which, extending slightly above the top of the bucket, is a cone-type button which is used for handling the bucket. The charging truck designed to operate the bucket picks up the bucket by the button. The cupola charging machine which elevates the bucket to the charging floor also lifts the bucket by gripping the button end of the shaft. The buckets are 48 in. high and 54 in. in diameter, and have dump bottoms.

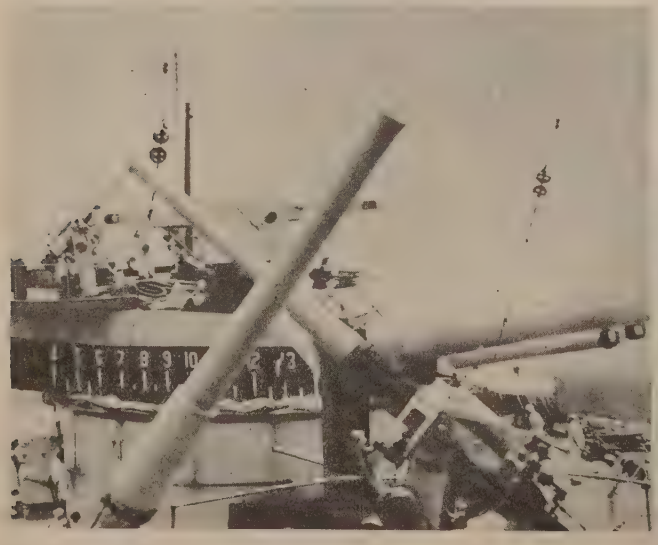
As the elevating shaft is oval in form, providing room for two buckets, a loaded bucket can pass up and an empty bucket down at the same time. The cupola charging machine sets the bucket into the cupola, flanges on the bucket sides resting on a wishbone in the cupola. Then the bucket is dumped from the bottom.

This charging machine differs from those used in some foundries in that it is not provided with an operating cab. Instead, it is operated by a control switch at the side of the cupola, and only one man is required to charge two cupolas. He controls the movements of the bucket and charging by simply stepping from one switch to the other.

[*A second article will follow, describing the molding, pouring and cleaning facilities.*]

Gears and Wireless Antennae of Phosphor Bronze

TWO bureaus of the United States Navy make large use of gears: the Bureau of Ordnance, in charge of guns and torpedo tubes, and the Bureau of Engineering, of the power supply and all auxiliaries, such as deck and hoisting engines. Both bureaus are wide users of phosphor bronze gears, the former in gun mountings, the latter in auxiliary engines and equipment. And both specify gears which show best possibilities in civilian practice; they desire that such products be standardized. In the two pictures, which were furnished by the Phosphor Bronze Smelting Co., Philadelphia, gears of that metal, hidden in the winch and the gun mountings, do not appear. But the wireless antennae shown are of the same metal.



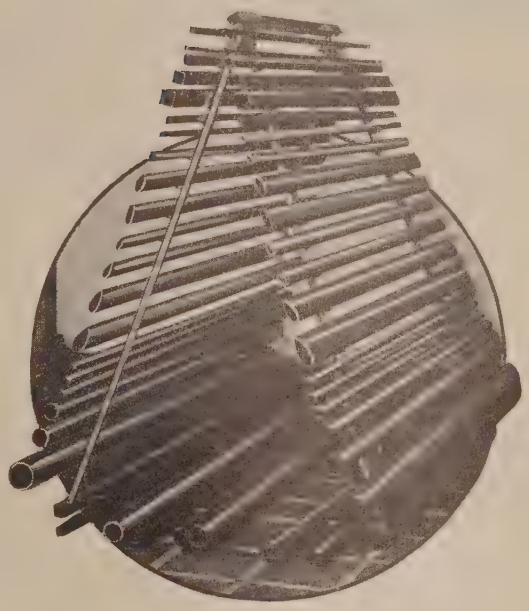
Metals Used in Airplane Making

Increasing Volumes of Chrome-Molybdenum, Nickel and High-Carbon Steels and Aluminum Alloys

BY GEORGE S. HERRICK

SINCE the memorable flight in a heavier-than-air machine by Orville Wright at Kitty Hawk, N. C., Dec. 17, 1903, not only the materials but the designs of aircraft construction have been changed radically. The box-like craft of bamboo, ash or balsa wood and cloth, with ordinary steel wires for the flying and landing braces of the wings, has rapidly developed into the modern craft of rakish lines and metal construction. Each step in the progress has found metal coming into increasing importance, until the airplane has become the incentive to the rather intensive development of both steel and non-ferrous alloys, all competing for a permanent and efficient place in aircraft manufacture.

Almost over night the American end of the airplane industry became a real factor among our manufacturing enterprises, and while Europe, as in the development of the motor car, continues, of course, to be a builder of airplanes, America is in the throes of an activity which is approaching the mass production basis that is characteristic of modern industries in this country.



THESE Tubes, Round, Square and Streamline in Various Sizes, Are All Used in the Construction of Aircraft. The display is of tubes made by the Summerill Tubing Co., Bridgeport, Pa.

It is estimated that about 60 companies are constructing almost 95 per cent of all the airplanes produced in this country at the present time. Of these, about eight are leaders in building the large, all-metal, passenger carrying types.

Of the total output, probably about 90 per cent of the planes are fabric covered over alloy steel frames, with a few of alloy aluminum frames, leaving about 10 per cent covered with aluminum alloy sheets. Magnesium still is preferred by some makers for certain parts. Aluminum foil still finds use to cover the wood frame, or metal parts, to protect them against rotting or corrosion from contact with the textile covering, which has been treated with an acetate "dope."

Chrome-Molybdenum Steel Most Used

Except for certain builders who are using fuselage frames of 17-ST aluminum alloy in the form of structural shapes or tubing, chrome-molybdenum steel tubing is preferred. Those who have European experience cling to a medium-carbon seamless steel tube. It was the ordinary seamless tube which succeeded the fuselage of wood and is still used by many British and Continental builders. This tubing, listed in Army and Navy specifications as No. 57-180-1A, has an analysis of C, 0.20 to 0.30 per cent, Mn, 0.50 to 0.80 per cent, P, 0.045 per cent maximum and S, 0.050 per cent maximum. Its physical properties are a minimum strength of 55,000 lb. per sq. in. and yield point of 36,000 lb.

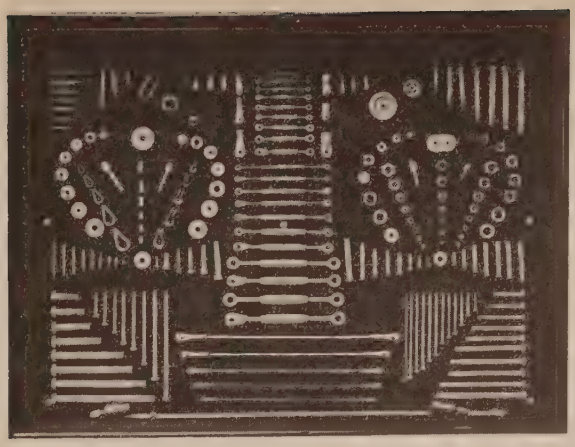
By far the greater number of American builders today are using chrome-molybdenum steel tubing classified in the Army and Navy specifications as No. 57-180-2A and with a standard analysis of C, 0.25 to 0.35; Mn, 0.40 to 0.60; P, 0.04 max., S, 0.045 max., Cr, 0.80 to 1.10 and Mo, 0.15 to 0.25. This is the same analysis as S. A. E. No. 4130 X. Most of it is of the seamless manufacture, streamlined (ovate section) in exterior positions, where air resistance must be at a minimum.

The round chrome-molybdenum tubing used ranges in size from ¼-in. outside diameter and 0.028 in. in wall thickness and 7/16-in. O. D. with 1/32-in. wall to 2½-in. with ¼-in. wall. In certain of the large passenger carrying ships, tubing as large as 3½-in. O. D. with ½-in. wall is used, usually only for a small section for an axle or for part of the frame of the landing gear.

The smallest diameters of tubing are used in high-speed planes for forming the frame of the tail and after section of the fuselage, the larger diameters going into the main section and the undercarriage. Certain makers use a limited amount of square tubing for the frame around the cockpit, as they claim that the square tube offers greater resistance to squeezing, tending to afford great protection to the occupant of the cockpit in the event of a serious accident.

Streamline tubing goes into such parts as the undercarriage and struts of the wings, where motion through the air will be attended with a minimum of eddies. These streamlined tubes are drawn in all the required sizes and vary somewhat in shape, as may be seen in the accompanying illustration of a sample stand at the Summerill Tubing Co., Bridgeport, Pa.

The quantity of tubing used in an individual plane ranges from 350 ft. in a small open cockpit, single place plane to possibly 1000 ft. in an open cockpit two place plane, about 1400 ft. in an inclosed cockpit design, 1600 ft. or more in a large passenger carrying plane, such as the "Patrician" recently built by the Keystone Aircraft



THESE Products for Aircraft, Consisting of Bolts, Tie Rod Terminals, Turnbuckles, Shackles, Washers, Grommets, Thimbles, Pulleys, Ferrules, Clevis Pins, Nuts. Are Produced by the Aero Supply Mfg. Co., College Point, L. I., or Its Subsidiary Companies, the Standard Automatic Products Corporation, Corry, Pa., and the National Steel Products Co., Dayton, Ohio

Corporation, Bristol, Pa., and as much as 3000 ft. in a large, 30-passenger ship, recently constructed by the Fokker Aircraft Corporation of America, Hasbrouck Heights, N. J.

Makers of tubing for aircraft, as do manufacturers of other materials entering into airplane construction, apply rigid standards of inspection. In the plant of the Aero Supply Mfg. Co., College Point, N. Y., is prominently displayed the advice to workmen, "Make It Safe for the Flyers," and in the inspection department of the Summerill Tubing Co., Bridgeport, Pa., is a large sign with the advice to inspectors, "Above All Be Careful. You'll Fly Yourself Some Day."

In this latter mill, tubes travel through in lots, usually consisting of a single order. When the swaged end, used for drawing the tubes through the dies, is sawed off, each tube is permanently numbered on the end and after passing through the straightening machine goes to an inspector, who tests for hardness. He marks the result on a sheet, which is kept as a record together with the order of the customer; and in the event of a complaint the hardness indication as well as the analysis of the steel used are available for each tube.

When material is intended for the Army or Navy, the tubes are turned over for final inspection to a Government inspector, who marks each tube passed by him with his own die, which, in the case of the Navy is an anchor, the initials U.S.N. and the inspector's own initials or sign.

Covering the Fuselage

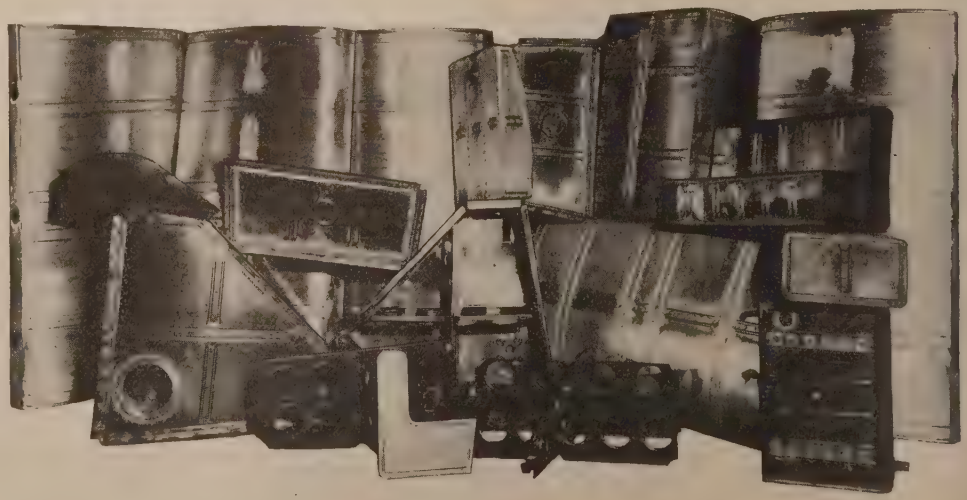
Aluminum and its alloys are being increasingly used in aircraft construction. While sizes and gages of sheets are far from being standard they are usually of Nos. 12 to 30 gage, but mostly of Nos. 16 to 18 gage, corrugated. The corrugating varies with the builder. In general, sheets are used in wing construction, gas tanks, ship cabins, bottom lining, cowling, instrument boards, fuselage covering and incidental fittings such as battery boxes. On seaplanes, hull frames and sheathing, decking and pontoons are often made of strong alloy sheets. It is difficult to estimate the average amount of aluminum entering into an airplane, but it is noteworthy that in 1928 the aluminum used in aircraft increased about 250 per cent over the quantity consumed in the preceding year. As airplane production increased only about 150 per cent during that period, it appears that the use of aluminum has grown faster than the industry.

In the all-metal airplane, aluminum alloy sheets, usually duralumin, 17-ST, or Alclad sheets, are used almost exclusively. A Kansas City, Mo., builder recently experimented with welding thin-gage black steel sheets, for covering the fuselage, but the results are understood to have been less satisfactory than expected.

Pure aluminum sheets are used almost entirely for fuel tanks, which sometimes occupy most of the available space in the fuselage and in some cases are in the wings. The welded tank is preferred. Occasionally a riveted duralumin or Alclad tank will be specified and in a few instances tanks have been made of dairy tin plate. Some years ago copper tanks were rather widely used.

Aluminum, or alloy of aluminum, sheets for tanks are usually of Nos. 14, 16, 18 and 20 gages, depending upon the capacity of the tanks, which range from a few gallons in those designed for the wings or tail to as much as 550 gal. in a single tank on the larger air transports.

As with many other products entering into aircraft, tanks are far from standardized, each builder specifying the size and shape suitable to the plane being constructed. In certain of the larger craft, intended for long-distance flights, practically the entire interior, except the cockpit, will sometimes be composed of closely fitted tanks. So much space do they occupy that they are not only formed to the shape of the fuselage, but when necessary, as to pass controls and other wiring through, a



A FEW of the Shapes of Welded Aluminum Tanks for Aircraft Fabricated by the Paramount Welded Aluminum Products Corporation, Brooklyn, N. Y. In the foreground are sections of honeycombing for the interior

LARGE Capacity Aluminum Tanks with the Baffle Plates Riveted in Place and the Rivets Welded. This interior construction permits free flow of fuel to the motors, but prevents sudden shifting of the contents

section of pure aluminum tubing is welded into the tank from side to side, or across a corner. When the space through the tank for controls is large the tank is practically built around a hole.

For oil tanks, a number of builders specify tubes welded across the tank, usually at the ends, to permit circulation of air as an aid in maintaining a cool oil supply. Such tubing is almost entirely of pure aluminum, although the fittings on tanks are sometimes of aluminum alloy, which holds a thread more satisfactorily than the pure metal.

The accompanying illustrations show tanks of various designs for aircraft fabricated by the Paramount Welded Aluminum Products Co., 195 Morgan Avenue, Brooklyn, N. Y. The cross section baffles in all the larger tanks and most of the small designs are stamped from aluminum sheets and riveted into the tank interior to prevent sudden shifting of gasoline to one side, which might cause a heavily loaded plane to overturn. The baffle sections are constructed to permit free flow of fuel to the motor in any position.

Black Sheet Stampings

The industry uses a small tonnage of black steel sheets in the manufacture of miscellaneous fastenings and accessories. When stamped, or otherwise fabricated for use in exposed places, the usual requirement is Army and Navy specification No. 57-136-8, the analysis of which is C, 0.25 to 0.35 per cent; Mn, 0.40 to 0.60; P, 0.04 max.; S, 0.045 max., Cr, 0.80 to 1.10 and Mo, 0.15 to 0.25. Stampings in places where strength and resistance to corrosion are not so important are usually of Army and Navy specification No. 57-136-3 and have an analysis of C, 0.20 to 0.30, Mn, 0.50 to 0.80, P, 0.045 max. and S. 0.045 max. The finished stamping of either quality of sheets is always coated, usually with cadmium, to prevent corrosion.

Steel Cord and Tie Rods for Bracing

Wire and cord, or the number of tie rods used in a plane vary with size and design. A biplane with two wings to be braced with the landing and flying braces requires considerably more wire cord or tie rods externally than a monoplane. Until a few years ago, builders in most cases used wooden longerons, or main longitudinal members for the fuselage, and these were braced with wire, which could be adjusted to the proper tension by turnbuckles. This type of construction is still used, but chrome-molybdenum, high-carbon or aluminum alloy tubing, or rolled alloy aluminum shapes take the place of the wooden longerons. Tinned No. 10 or No. 20 gage steel wire, or tie rods of the exact length of the section to be braced are used.

Two active makers of tie rods are the Stewart Hartshorn Co., New York, and the MacWhyte Co., Kenosha, Wis. The rods range from 0.138 in., 6-40 thread to 0.625 in. in diameter, ⅝-18 thread and have a total ultimate strength of 1000 to 24,700 lb. in the streamline section, depending upon the size and from 1080 to 35,800 lb. in the thread section. They are made to A.S.M.E. specifications in the smaller sizes and to S.A.E. specifications in the larger sizes. The Army and Navy specification for tie rods compares with the S.A.E. and requires C, 0.40 to 0.50 per cent, Mn, 0.50 to 0.80, P, 0.045 max. and S, 0.050 max.

When used externally for flying or landing braces these tie rods are streamlined. For tying in the frame of the fuselage a square rod is usually specified. All such rods are plated, usually with cadmium. Sizes used depend upon the capacity of the plane, an ordinary light commercial plane requiring about 5/16-in. and smaller rods, the larger sizes entering into the heavy transports and bombing planes for the Army and Navy. All such rods are subject to careful inspection as with other products for aircraft, and in the case of the Stewart Hartshorn Co., all rods are subjected to a proof test load equivalent to 60 per cent of the specified breaking load.

While many manufacturers use tie rods throughout their planes, others specify steel aircraft cord. Of this, three principal types are used, the so-called hard, 19-wire strand, composed of 19 galvanized, or tinned wires stranded together, the so-called flexible 7 x 7 cord, composed of strands of seven galvanized or tinned wires, six strands around one, and the extra flexible, 7 x 19 cord, composed of strands of 19 tinned wires, in six strands around one. The illustration of cross sections is of cord manufactured by the John A. Roebling's Sons Co., Trenton, N. J.

For the wing bracing on biplanes, the usual practice, when cord is used is to specify 19 strand, galvanized or tinned, which is classified by the Army specifications as No. 48-21. In some instances, makers use 6 x 7, cotton center galvanized or tinned cord, Army specification No. 48-14A and occasionally 7 x 7, wire center, galvanized or tinned cord, Army specification No. 48-22. No special flexibility is required in the wire for this exterior bracing of the wings.

A substantial footage is required as the flying wires are generally double while the landing braces are either single strands of cord, or two small-diameter pieces are used, so that they may be streamlined by binding together with balsa wood between. When steel cord is used, turnbuckles are required. These range from 4½-in. to 9½-in.

Fig. 1. 19-wire Aircraft Strand

Fig. 2. 7 x 7 (Wire Center) Aircraft Cord

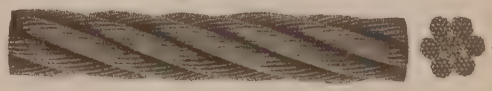


Fig. 3. 7 x 19 Aircraft Cord

from pin-eye to pin-eye, with strength of 800 lb. in the small sizes to 17,500 lb. on the larger sizes. The ends of the turnbuckles are of steel to S.A.E. specification No. 2330, while the barrels are of special bronze, Army and Navy specification No. 57-162.

A considerable length of the heavier cord is used in the interior for controls on the rudder, elevators and ailerons. The usual steel cord for this purpose is the 7 x 19, tinned, which is extra flexible. The sizes used vary from ⅛ to ¼ in. in diameter. While it is difficult to estimate the amount of wire used in an airplane, the total footage of the various solid wires and cords will range from 250 to 300 ft. in a small design using steel cord for exterior bracing and 500 to 700 ft. and more in a large passenger carrying plane. Some builders of monoplanes in the exterior bracing of the wings use a section of chrome-molybdenum tubing from the fuselage to the underside of the wings and this is streamlined by covering with aluminum sheet. By making these braces wide, one builder claims increased lifting power for the plane.

While galvanized wire is still used, the tendency is decidedly toward increased use of tinned wire, and wire with cadmium plating. As in the case of other materials, the wire and cord used are subject to numerous tests and are all manufactured to either Army or Navy specifications. In the case of wire and cord the two Government branches still retain specifications which vary slightly in some instances.

In addition to the wire and cord required for interior bracing of the fuselage, and wings, exterior bracing of wings, nose and tail and the controls, there is a moderate amount of insulated wire used in the wiring for lights, ignition, grounding and antennae, and welding rods are used for chrome-molybdenum steel tubing or rolled shapes.

Resistance to Corrosion a Factor

Second only to strength in aircraft construction is the factor of corrosion. When aluminum is used, further protection is not necessary, but aluminum alloy of the 17-ST type is subject to corrosive action, which has been overcome to a certain extent in the Alclad sheet. In the case of alloy steel, which is exposed, a protective coating must be applied to meet the Army and Navy test of 100 hr. in an atmosphere of salt spray. Galvanizing is sometimes used, but is being succeeded in many plants by cadmium plating, tin coating and other processes. Recently chromium plating for exposed parts made of aluminum alloy is being considered by manufacturers.

All bolts, nuts, rivets and wing reinforcement materials are either of heat-treated aluminum alloy or of alloy steel. While nuts are of ordinary steel, all bolts are made from nickel steel, according to S.A.E. specification No. 2330, or Army and Navy specification No. 1004-C, with an analysis of C, 0.25 to 0.35 per cent, Mn, 0.50 to 0.80 P, 0.040 max., S, 0.050 max. and Ni, 3.25 to 3.75. All bolts are heat treated to give a minimum strength of 125,000 lb. per sq. in.

Products Bear Makers' Marks

Whenever the product permits, there is a growing use among manufacturers of individual marking of materials. While not general, a number have adopted a system of marking bolts and similar small finished products with an X, the official designation of Army and Navy specifications and certain manufacturers add their own sign or letter. The Aero Supply Mfg. Co., College Point, N. Y., a manufacturer of bolts and other small products, whose entire production goes to aircraft builders, marks each bolt on the head with the Army and Navy X and a letter, changed each year, so that at any time the bolt may be identified as made by this producer in a certain year.

As the Army and Navy specifications have been revised considerably and are still subject to minor revisions from year to year, this identification enables the maker to determine at any time whether or not the bolt in question was made to the standard effective in the year designated by the mark.

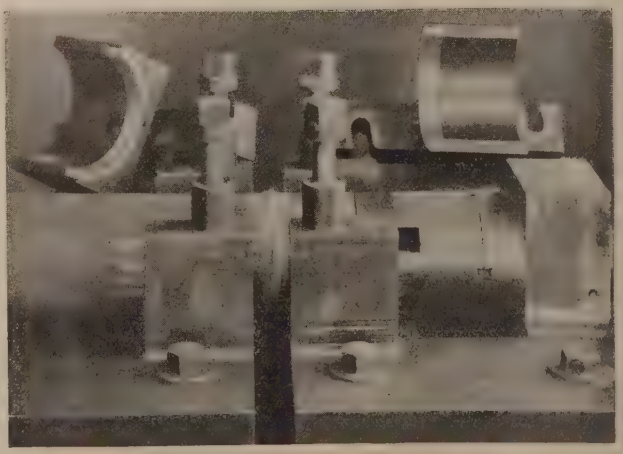
From this it becomes evident that, despite the requirements of lightness, strength and resistance to corrosion for material entering into aircraft production, this new and growing industry offers a source of increasing consumption of alloy steels. Non-ferrous metals, especially aluminum and its alloys, are being used extensively and will undoubtedly continue to be, and as the aircraft industry tends to reach a basis of quantity production, comparable to other great industries of the country, the factor of cost of materials as well as quality will be increasingly important, which should bring alloys of steel into still greater use by the builders of aircraft.

Flash Welds on Aircraft Tubing

JOINTS in the tubing forming the skeleton of aircraft are commonly welded with the oxy-acetylene flame as being well fitted for the thin gages of metal used, and the intersections are at such varying angles that hand work is the most economical method.

In some instances, however, a plain butt joint must be made between straight tubing, or an end fitting attached. Then a resistance flash weld is a logical solution. Cases in point are on the struts supporting the landing gear and on the motor fitting of the Ford tri-motored planes. The former is illustrated, lying in the lower jaws of the welding machine.

These welding jaws or dies are lined with Elkonite, a proprietary series of alloys of copper and tungsten. The copper gives the electrical conductivity required to pass the welding currents of large amperage, and the tungsten hardens and raises the melting point to resist wear and overheating. It is said that the dies shown are in perfect shape after 600 welds had been made, whereas the materials formerly used required redressing after 50 operations.



Terminal Strut Immediately After Welding (upper dies removed)

Obsolete and Inactive Patterns

Determining How Long They Should Be Kept— Practices of 80 Leading Companies Reviewed —Storage Charges Sometimes Levied

WHEN to dispose of the little used or obsolete pattern constitutes one of the difficult problems of industry, and affects the small firm as well as the large one. The purpose here is to present methods in current use by different companies in various fields of industry, in the hope that the information may be helpful.

The money expended for storing patterns is evident from the amount of storage space used. One firm has no less than 12 large warehouses filled with patterns; another has nine; others from one to seven or eight. Ingersoll-Rand Co. has, among eight large warehouses devoted solely to pattern storage, one which is 600 ft. long, 50 ft. wide and three stories tall. Sessions Foundry Co. has three good-sized warehouses for storing patterns, one being a large five-story building of modern construction.

B. F. Sturtevant Co., which has manufactured fans, blowers, and allied products for nearly 70 years, has accumulated a tremendous number of patterns. Its line is so varied that it may be called upon to furnish no less than 1,000,000 different repair parts, many of which are castings. At present the company is obliged to carry nearly 100,000 different patterns.

Several factors are to be considered before formulating a definite policy pertaining to the retention of patterns which are seldom used. One is the value of the pattern, measured in terms of its replacement cost, and the other is the obligation of the company to the customer to furnish repair parts or castings which require that particular pattern.

The value of a pattern ordinarily should be balanced against its cost of storage. An obsolete pattern might easily absorb, in storage cost over a given period of time, more than its worth. Often it is more economical to replace occasionally a pattern which has been destroyed than to invest thousands of dollars in storage facilities for patterns that are not being utilized.

No standard practice appears to be in use in the amortization of the pattern account. From replies received from companies all over the country, in different fields of manufacture, the rate varies from 10 per cent to 33⅓ per cent a year.

A wide difference of opinion exists concerning the obligation of a company to its customers in the matter of furnishing repair parts. It is interesting to note that the B. F. Sturtevant Co. recently had returned to it, for repair, a fan that was sold in 1865. The customer did not want a new one. The Krementz Co., Newark, N. J., several years ago received for replacement a 25-cent collar button of its manufacture which had been in continual use for more than 30 years.

"Obsolete" ordinarily means having gone out of use. However, when applied to patterns, the word takes on a different aspect. A pattern which may be classified as obsolete in one industry may not be in another. The type of industry and the nature of the product should be the determining factors in the interpretation of the word "obsolete."

Manufacturers of heaters, boilers and stoves frequently are called upon to furnish new grate bars and analogous parts for units of their manufacture which have been in service for many years. The sides of a stove rarely require replacement. Therefore patterns for old grate bars would not be classified as obsolete, whereas those for the sides of the same stove may be so considered. The nature of the product itself would govern the definition in this instance.

A large stationary steam engine of standard manufacture may have a life of 35 or 40 years in service. Its initial cost runs into a sizable figure. So long as the engine is in operation, parts for the engine which, because of wear or otherwise, may ordinarily require replacement should be available to the owner. The maker of the engine cannot therefore consider the patterns for those parts as obsolete, even though they may remain unused for a long period of time.

In the foundry, a different situation exists. The average jobbing foundry usually has on hand many patterns that belong to its customers, and which it is obliged to store as an accommodation. The foundry has little control over these, other than the knowledge from its own records as to their activity. The foundry is not in a position to judge the obsolescence of the patterns in question, but must be guided entirely by the owners' wishes.

Singer Mfg. Co. provides many metal patterns of each part for mounting on its molding machines. When a class or style of machine is superseded by a new model, all the obsolete metal patterns are destroyed, with the exception of one set, which is kept to fill orders for spare parts over a period of years. In this case, the pattern becomes obsolete when a new model is brought out to supersede the machine using a casting which required that particular pattern.

Organizations Setting Standards

Some effort has been made to set a definite method of procedure as standard in several fields of industry. To this end a number of trade associations have set standard practice recommendations for the guidance of their membership. The Ohio Foundries Association and the Newark Foundrymen's Association have adopted a "Uniform Trades Custom," that patterns not in use for six months shall be subject to storage charges.

The Steel Founders Society has issued a circular covering recommended trade customs, Section II of which reads as follows:

> The foundry shall not be expected to provide storage for patterns for which no orders have been received during a period of two years.

The "Standard Trade Customs" adopted by the Malleable Iron Research Institute incorporates the same ruling under Item 15.

The Machinery Builders Society, upon the recom-

NOTE.—From a report prepared by the Policyholders' Service Bureau, Service on Manufactures, Metropolitan Life Insurance Co., New York. The practices of about 80 machine builders and founders, in 15 States, from Massachusetts to Missouri and from Michigan and Wisconsin to Tennessee and Virginia, were drawn upon.

mendations made by its Committee on Obsolete and Inactive Patterns, recently adopted the following as standards for its membership:

1. All patterns, jigs and fixtures which are special for a job, and not likely to be used again, should be scrapped at the end of the guarantee period.
2. All other patterns, jigs and fixtures that have not been used for a period of five years shall be scrapped.
3. The customer shall be charged with the cost of replacing any of the above that have been destroyed after the stated period, the customer being advised of this fact on receipt of his order for repair parts.

The National Machine Tool Builders' Association states that, with the progress in machine tool design, the average life of the design of standard machines seems to be about seven years. Therefore, if economic life in the users' hands be counted as ten years, the user of the last machine produced on the design would be getting reasonable service if he could get a repair part from the original pattern ten years after the last machine of that design was made. This would give the user of the first machine of this design 17 years, in which he could obtain a repair part from the original pattern. This association therefore advocates that machine tool manufacturers should not under ordinary conditions carry patterns longer than ten years after delivery of the last machine of a type.

Utilizing Inactive and Obsolete Patterns

Many companies have found it not only economical from a cost standpoint, but also an aid in reducing the number of patterns to be stored, to make over the old pattern wherever possible into the new one. This of course necessitates cooperation on the part of the engineering department in so designing the new part that the old pattern can, at least in part, be utilized. It is well so to redesign the part that the new one can also serve as a replacement part for the old model.

Swartwout Co. finds that, as a rule, a pattern becomes obsolete when the company is building a revised model, but quite often it is possible to work the old pattern over to make a new one.

Terry Steam Turbine Co. endeavors in every case to redesign parts for the machines so that they will readily fit into the place of the old one, should replacement be necessary. In this case the obsolete pattern is destroyed immediately.

(In the second and concluding installment will be discussed the time element in connection with retention of patterns and methods of determining obsolesence.)

Action of Coal Dust When Applied to Molding Sand

IN a paper presented at the Third International Foundrymen's Congress in London, June 11 to 14, by Ben Hird on "Coal Dust as Applied to Molding Sand," the author attempts to prove, by practical experiments, the action of coal dust during the pouring of molds which have been faced with sand containing a percentage of this material, and the changed condition of the sand and coal dust after use. There appear to be no data of sustained investigations of the action of coal dust in sand molds.

Practically every foundryman has formed his own ideas as to what actually takes place, the most prevalent idea being that a slight film of gas, or smoke, on the face of the mold, prevents the molten metal from fusing the silica grains giving the casting a clean blue skin, instead of the rough gray appearance when no coal dust is used.

Mold Has Mica Window

A desire to observe what actually happens inside a closed mold during casting led to the adoption of a special mold with a mica window. The pattern, with strip of mica, was rammed up in the usual way in a three-parted box, with the mica in position and opposite the opening in the middle part. Before the pattern was withdrawn the intervening sand between the mica and the slot in the box was cut away, care being taken not to expose the extreme edges of the mica. The in-gate was cut in at the bottom joint. The mold was cast on a low stool to facilitate observation.

When molten iron was poured into the molds made with coal dust facing sand, smoke immediately began to rise up the sides of the mold. The thickness of this smoke varies with the amount of coal dust in the sand, and its volatile content. The top of the rising metal has the form of a meniscus, the convex face uppermost. The metal rises with a rolling action against the sides of the mold, due to the friction of the sand face. There appears to be a clear space, about ⅛ in. to ¼ in. (which follows the shape of the meniscus) between the top of the rising metal and the smoke. This is due to the intense heat of the molten iron.

It required very close observation to see the rising metal trap any of the coal gas. It is certain that this action takes place because the coal specks are giving off their volatile gases and continue for some time after the metal has covered them. Tests on anthracite coal seem to prove that the carbon deposit on the skin of the mold, created by the smoke from the coal dust, has only a preliminary and slight influence on the color and quality of the casting skin.

As the previous mica-window tests were all made on the vertical faces of the molds, further experiments were carried out to find the action of coal dust on the bottom horizontal faces. The advancing metal forms a very pronounced meniscus, which gives a rolling motion to the flow. Between the advancing metal and slight coal smoke there appeared to be a clear space, similar to that in the vertical experiments.

Superfine coal dust is the most efficient for heavy as well as light work. Coarse-graded coal dust, unless used in large proportions, when they cause other blemishes (such as pock-marks and ratching), are too widely distributed among the sand grains to function properly, and leave much of the sand on the mold faces unprotected, or so slightly covered that the coating is burned off by the heat of the metal.

Dust Must Be Superfine Quality and of at Least 30 Per cent Volatile Matter

Therefore, coal dust, as its name implies, must be the dust of coal, and for all classes of work should be of a "superfine" quality. Also, the volatile content should not be less than 30 per cent, in other words, a bituminous coal.

This action of the volatile matter in the coal during the casting of the mold explains the reason why used foundry sand is black, when coal dust is mixed with the facing sand. This can easily be proved by burning the black "used sand" in air. The carbon film will burn off, leaving a brown or gray silica grain, such as is left on the top of an open sand plate when a thin layer of black sand has been thrown after casting.

Southern Rod Mill Electrification

Synchronous Motor Drives and Unusual Motor Combination Used by Gulf States Steel Co. for Rolling Rods from 4-In. Billets

BY GORDON FOX*

A CONSIDERABLE part of the steel tonnage produced by the Gulf States Steel Co. is marketed in the form of wire products. Open-hearth ingots, 18 in. x 20 in., weighing 5400 lb., are reduced in a 36-in. blooming mill, engine driven, to 4 in. x 4 in. billets (nominal size; their section is 14.6 sq. in.). These billets supply the rod mill, which, in turn, delivers to the wire mills. About 80 per cent of the output of the rod mills is No. 5 rod.

The rod mill is of the Garrett type. Six 16-in. tandem roughing passes, of which the last four are continuous, are followed by twelve 12-in. strand and finishing passes arranged in a staggered train as shown in the diagram. This requires rather heavy drafts, especially in the earlier passes, the sectional area of the rod after the ninth pass being less than 0.25 sq. in.

This mill was previously driven by three steam engines. One engine was directly connected to the lay shaft of the continuous roughing stands, another engine drove stands Nos. *7* to *16* inclusive, through a series of rope drives, while a third engine drove finishing stands Nos. *17* and *18*. The steam for these engines was supplied at 150 lb. pressure by coal-fired boilers. The engines exhausted at about atmospheric pressure into a low-pressure line common to this mill and to the steam-driven blooming mill. Much of the low-pressure steam from these mill drives was utilized in low-pressure turbines located in the same building with the rod mill engines.

A study of the power, fuel and water supply for this plant indicated that substantial economies could be derived through electrification of the steam-driven mills, coupled with centralized generation of electric power in a new power plant located near the blast furnace plant. The connection with the Alabama Power Co. was maintained for the purchase of power required in addition to that generated in the new power house.

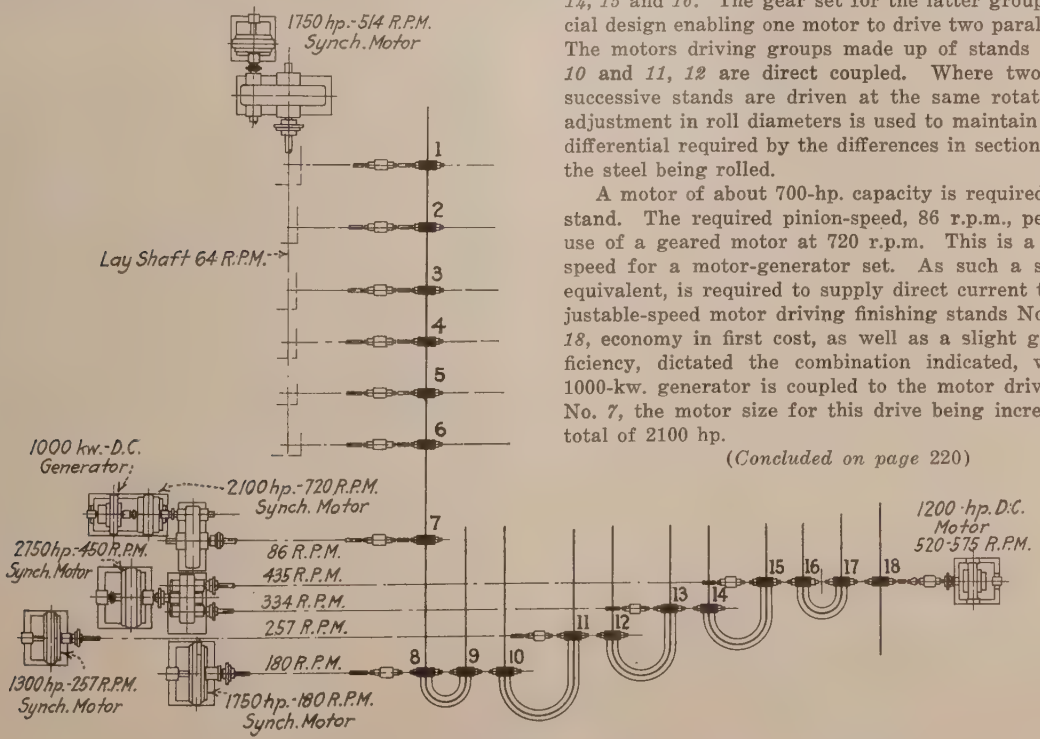
Electrification of the rod mill is of interest, first, because it involves the use of five synchronous motors in a system of subdivided or group drives. It is a pioneer application of this type. It is of interest, secondarily, because of the combination of one of the driving motors with a direct-current generator to make up a motor-generator set which, in turn, supplies the direct-current motor driving the finishing stands.

Arrangement and sizes of the driving motors are shown in the diagram. Rather high-speed motors with gear drives are employed for the continuous group, for stand No. *7* and for the group comprising stands Nos. *13*, *14*, *15* and *16*. The gear set for the latter group is a special design enabling one motor to drive two parallel shafts. The motors driving groups made up of stands Nos. *8*, *9*, *10* and *11*, *12* are direct coupled. Where two or three successive stands are driven at the same rotative speed, adjustment in roll diameters is used to maintain the speed differential required by the differences in sectional area in the steel being rolled.

A motor of about 700-hp. capacity is required at No. *7* stand. The required pinion-speed, 86 r.p.m., permits the use of a geared motor at 720 r.p.m. This is a favorable speed for a motor-generator set. As such a set, or its equivalent, is required to supply direct current to the adjustable-speed motor driving finishing stands Nos. *17* and *18*, economy in first cost, as well as a slight gain in efficiency, dictated the combination indicated, wherein a 1000-kw. generator is coupled to the motor driving stand No. *7*, the motor size for this drive being increased to a total of 2100 hp.

(*Concluded on page* 220)

*Electrical Engineer, Freyn Engineering Co., Chicago. From an article published in "Freyn Design."



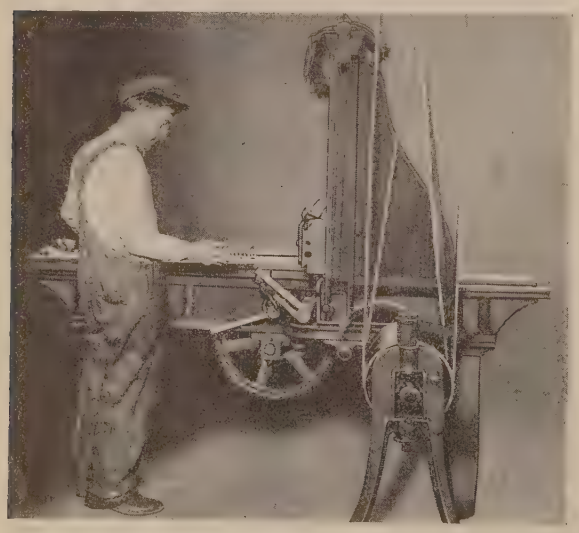
Layout of Rod Mill, Showing Shafting Speeds for Various Roll Stands

Heat Treating in Making Springs

Control of Physical Characteristics Necessary in Handling Steel Wire for Compression and Tension Springs

BY F. W. MANKER*

MOST of the raw material in the manufacture of coiled steel springs is wire. Most of this wire is heat treated at the wire mill in accordance with well established methods, before being shipped to the spring factory. But the spring maker is increasingly meeting consumer specifications which make it imperative for him to select unusual steels and alloys and to develop special heat treatments of his own.



Testing Springs for Solid Compression Under 3000-Lb. Pressure, to Remove Permanent Set

Among the springs which the Kokomo Spring Co., Kokomo, Ind., manufactures are those for counter-balances on garage and factory doors, and also for suspending the blades on road graders. These latter have a carrying capacity of 2800 lb. and weigh from 90 to 150 lb. each. This concern also puts out springs for about 100 different makes of trucks and tractors. Other items include automobile valve springs, agricultural implement springs, pump valve springs, phosphor bronze springs for steam pump valves, etc., and monel metal springs, sulphur dioxide resisting, for refrigerating machinery.

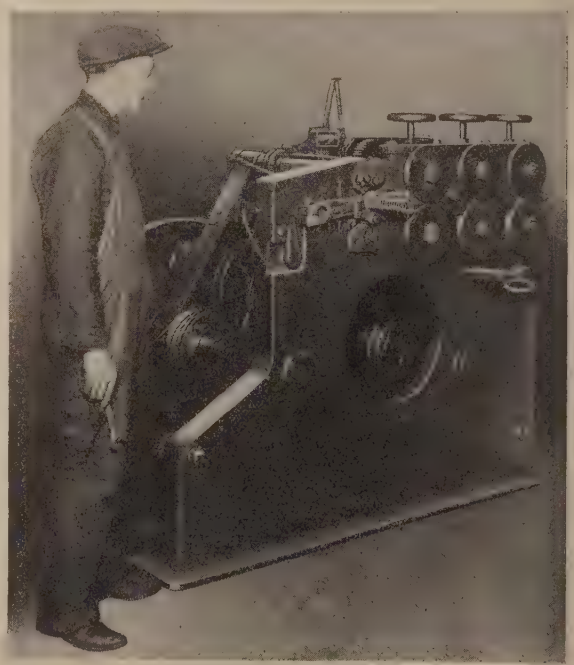
In designing springs the primary object is to secure continuous and intermittent deflection or movement of coils, without permanent set or stretching. Known supporting loads and definite deflections, the two variable factors encountered, bear a definite relation to each other. We might call them cause and effect, the load applied being the cause and the deflection the effect.

These are expressed in mathematical formulas, which include diameter of coil in relation to diameter of material used and number of coils, all governed by the fiber stress exerted and the tensile strength of the material used. These formulas show that the amount of angle or twist which a round bar is capable of producing under torsional movement is directly dependent upon the length of the bar or wire used in the spring, which in turn is controlled by the diameter and number of coils. Increasing either augments the factor of safety.

Increasing the size of material decreases the maximum fiber stress allowable, as all spring action is based upon the torsional or twisting action of wire. In other words, the greater the distance from the circumference of the bar to its center, the less twisting action will the bar safely stand. This is due to the greater movement of the outside fibers, which are in tension, as compared with that of the inside fibers which are, at the same time, in compression. The result is unequal strains and often failure of material.

Modulus of Elasticity Under Torsion

Carefully conducted tests show the modulus of elasticity of high or low-carbon Bessemer, open-hearth or crucible steel to vary from 25,000,000 to 30,000,000 lb. to the square inch under tension; but under torsion it amounts to only about 10,500,000 lb. This latter figure, together with a fiber stress of from 60,000 to 90,000 lb.



Automatic Spring Coiling Machine Used in Producing Springs at High Speed

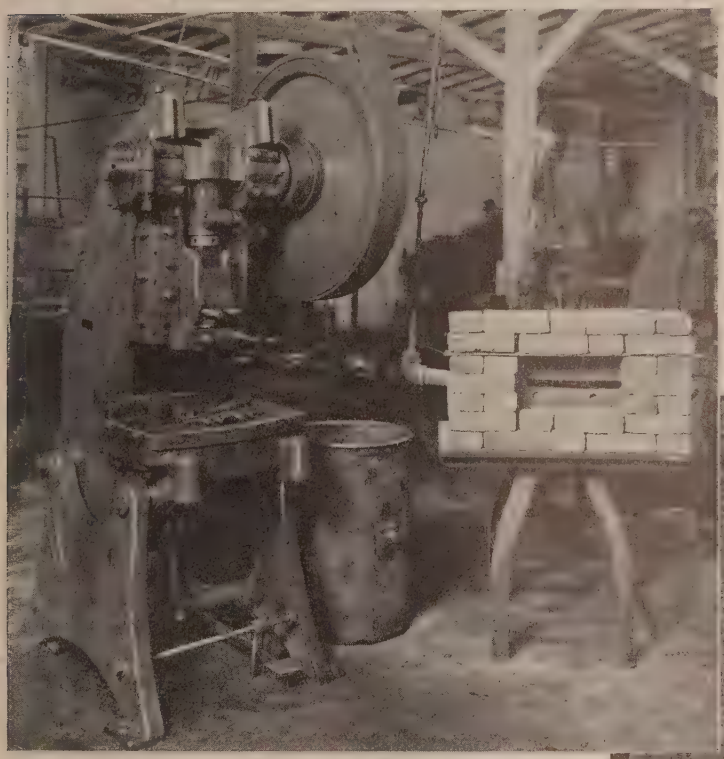
*Assistant to president, Great Lakes Steel Corporation.

to the square inch, is used in the formulas of this concern.

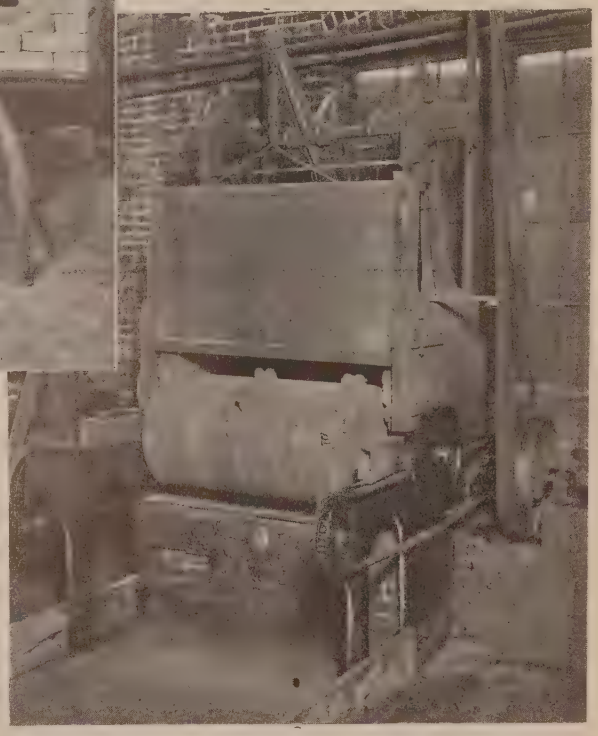
In extension springs of the overhead door type is another factor, initial tension, which is due to mechanical crowding of one coil against another, and varies from a quarter to a fifth of the total load carried by the spring.

Owing to the variation in the modulus of elasticity as shown, it is almost impossible for all springs to be absolutely uniform; hence a commercial variation of plus or minus 10 per cent is usually allowed. When closer tolerances are required it becomes necessary to test each spring as it is produced, rejecting those which do not meet the specifications. This is expensive.

The greater the fiber stress developed under working conditions, the shorter is the life of the spring. The theoretical fiber stress for an ideal spring is 70,000 to 80,000 lb. and with it a spring should withstand 2,000,000 workings without failure. However, for moderate use this company has made springs, from its own special-process material, which have a tensile strength of 190,000 lb., working under 125,000 to 140,000 lb. fiber stress, with satisfactory results.



USE Is Made of Several Portable Gas-Fired Forge Furnaces, as at Left, Placed Alongside the Presses. With this equipment one operator can make 2000 small steel forgings in 9 hr. Below is a gas-fired drawing furnace of the rotary drum type, in which the drum may be run out for discharging



Furnaces for Hardening and Drawing

The heat-treating department of this plant is equipped with modern furnaces and other equipment, using gas as fuel. There is a row of gas furnaces, used interchangeably for hardening and drawing, which are 7½ ft. long, 5½ ft. wide and 9 ft. high. They are fired with 14 gas burners located in each end, each battery of burners being manifolded to an inspirator. These units are of brick, suitably insulated and stayed, and were built and installed by the Surface Combustion Co., Toledo, Ohio. Automatic temperature controls and indicating pyrometers are used.

One drawing furnace is of the drum type, the drum setting in a brick, combustion chamber, heated with 11 gas burners, manifolded to an inspirator. The drum revolves in pillow blocks, the shaft being driven by a motor through a gear train. The pillow blocks run on steel tracks placed in the side walls and extending 4 ft. beyond the combustion chamber, to aid in discharging.

Two furnaces, back to back, serve the dual purpose of tempering or blueing and japan baking. An overhead monorail system serves both, running out of one, making a complete turn and traveling the length of both on the outside, and making another turn to run into the other. The tempering oven is carried at 650 deg. Fahr. After being tempered the work is removed on the monorail, cooled, dipped in japan and run into the japanning oven, where the japan is baked on at 400 deg. Fahr. Each furnace is heated with 14 gas burners and an inspirator.

Quench tanks serve the various furnaces, oil being the principal quenching medium. Water coils, immersed in these tanks serve to cool them and the tanks have water jackets also. In the summer ice water is used.

All springs manufactured from material up to 9/16 in. in diameter are coiled cold, but anything larger must be heated first. For this purpose forging furnaces fired with gas are used. One of these is 50 ft. long, 3 ft. wide and 5 ft. high and has 16 gas burners and an inspirator on each side. This unit is heated to 1500 deg. Fahr., and will hold 25 1-in. bars at a time.

There are also two portable forging furnaces which may be shifted from one punch press to another. One

operator can forge 2000 ⅜-in. steel forgings from one of these furnaces in a 9-hr. day. All the furnaces in this plant are equipped with inspirators of the venturi type, made by the Surface Combustion Co. These economize in fuel, afford a close temperature control and make possible any furnace atmosphere required, oxidizing, neutral or reducing.

Oil was used prior to the conversion to gas and the fuel cost for heat treating with oil was 29.4c. for each 100 lb. With gas this cost now runs between 19c. and 23c. for 100 lb. Furthermore, rejections of spoiled stock, which formerly averaged 5 per cent, now amount to less than 0.1 per cent.

Chrome-vanadium steel, S.A.E. 6150, as used in this plant, is of the following analysis:

Carbon	0.45 to 0.55 per cent
Manganese	0.50 to 0.80
Phosphorus	0.04 maximum
Sulphur	0.04 maximum
Chromium	0.80 to 1.10
Vanadium	0.15 minimum, with 0.18 desired

In heat treating this the stock is brought up to a temperature of 1500 to 1525 deg. Fahr. and soaked for 10 to 20 min. Quenched in oil, it is then drawn at 800 to 1100 deg. for from 20 min. to 2 hr., according to the cross section, qualities desired, etc. To relieve any remaining strains, this stock is reheated to 650 deg. Fahr. for 1 hr.

Automobile valve springs are coiled from hard-drawn, silico-manganese wire, S.A.E. 9250. The analysis of this steel is similar to the one given, except that silicon (1.80 to 2.20 per cent) takes the place of chromium and vanadium, and the manganese content is 10 points higher. The only heat treatment required for springs of this steel is tempering, after all cold-working operations have been completed.

About 75 per cent of the springs made in this plant are coiled from wire already heat treated. These springs are of the extension type, as contrasted with the compression type, and must have an initial tension of approximately one-fifth of the total carrying load. It has been found in practice that oil-tempered wire affords from 25 to 30 per cent more stretch or elongation after coiling than regular spring wire. In the construction of extension springs it is necessary to crowd the wire, to produce the desired initial tension; and were they to be heated to 1500 deg. Fahr. after coiling, this initial tension would be lost.

In making compression springs the factor of initial tension does not enter. Hence this type of spring can be either made from heat-treated stock or coiled from regular wire and heat treated afterward. Here the deciding factor is cost. Thus, for some of these springs 1020 S.A.E. steel is used, of the following analysis:

Carbon	0.15 to 0.25 per cent
Manganese	0.30 to 0.60 per cent
Phosphorus	0.045 maximum
Sulphur	0.05 maximum

After coiling, the springs are heated to 1425 to 1500 deg. Fahr. for a half hour, quenched in oil and drawn at 900 to 1100 deg. The time of the draw ranges from 20 min. to 2 hr., depending upon the cross section of the material, physical requirements, etc.

Special Manufacturing Equipment

A novel machine in this plant is an emery wheel grinder for grinding both ends of a spring at the same time, and at the rate of 25 a minute. It is automatic and hopper fed and will take springs from ¾ in. to 15 in. long. This machine is being rebuilt to increase its speed by at least 25 per cent, using rubber-bond disks instead of emery wheels.

In some instances the ends of springs must be annealed, to offset stresses set up by severe forming (sharp bends, etc.), and in others the ends must first be heated before being formed. For this purpose a cast iron box with small holes is used. The springs are inserted in the holes in such a way that only the ends protrude into the box, where they are heated with a gas torch.

There are machines which can be adapted to make closed or open coils, and special speed lathes for turning out long springs, operating at 1500 r.p.m. and producing springs 150 ft. long, if necessary. Long lines of automatic coiling machines are used, which form any kind of spring, with or without tapered ends, closed or open ends and of any length, from stock ranging from 0.006 to 9/32 in. in diameter. One of these will turn out 180 springs a minute from 0.006 to 0.032-in. material.

A long line of punch presses is used for cutting springs to any length, or for forming special ends, and other machines for looped ends and for special-shaped flat springs. All compression springs are pressed to remove permanent set and all are tested to the full load specified.

All of the above machines are designed and made by the company, except the automatic coilers. This concern maintains a testing laboratory, and research and engineering departments, for designing new kinds of springs and the machines with which to make them.

Southern Rod Mill Electrification

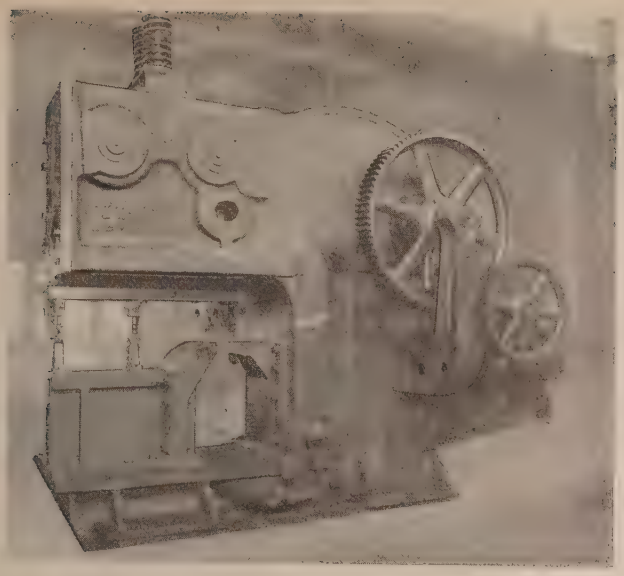
(*Concluded from page* 217)

Arrangements for starting and switching the synchronous motors are of interest. All of these motors, with the exception of the 2750-hp. unit, are arranged to start on full voltage, developing approximately full-load torque with three to four times full-load kva. The pull-in torque developed by these motors is about half of full-load value. The 2750-hp. motor is arranged to start normally with a reactor in series, to minimize the usual starting inrush. However, if the starting torque, under reduced voltage, should be deficient, as on a Monday morning, full voltage can be applied with no ill effects other than the high starting inrush.

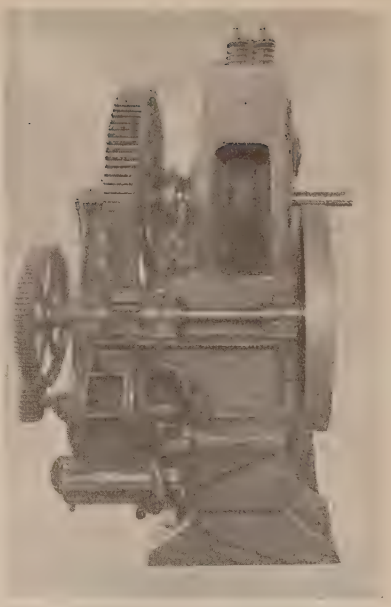
As these motors run almost entirely in one direction, the ability to back off being seldom required, it was not thought necessary to supply individual forward and reverse oil circuit breakers for them. Each motor is provided with a single breaker. A set of reversing disconnects is provided ahead of the bus supplying the entire group of synchronous motors.

This rod mill is provided with seven reels. Finishing at about 1600 ft. a minute, six strands are closely maintained, resulting in an average output of about 350 tons on a 12-hr. turn. The power consumption of the main roll drives, electrically driven, is about 200 kwhr. for a gross ton of product. This compares with a consumption of about 13,000 lb. of steam an hour used by the engines which formerly drove the mill. The reduction in operating and maintenance labor represents a marked economy in costs.

Pearlitic cast iron is being used to an increasing extent to replace cast steel and cast iron by British engine builders, if exhibits at the recent North-East Coast Exhibition may be taken as a criterion. So-called Lanz-Perlit fire bars were shown to be sound and unchanged in shape after 16 months of service in a boiler, whereas the life of ordinary gray iron castings would be only three months. Impact strength of the improved iron measured by blows to fracture is eight times that of the ordinary. Hardness is uniform, varying from the normal of 190 Brinell but slightly even in castings ranging from ¾ to 2½ in. thick.



USE of Two Toggles Permits Application of Pressure at Two Points on the Ram and Is Claimed to Reduce Power Requirements. The motor and all driving mechanism are mounted on the frame as shown in view at right



Beam Punch with Toggle-Operated Ram

BEAM punches for structural shapes and plates, differing from usual design in that a pair of toggles transmit pressure to the ram, are being built by the Beatty Machine & Mfg. Co., Hammond, Ind. Special features are that the ram is designed without overhang and it is guided throughout its full length. Use of two toggles affords application of pressure at two points on the ram, reduces the size of driving gears and is claimed to reduce power requirements. These machines will be built for ram pressures ranging from 150 to 600 tons.

To add strength to the head of the punch, the main body extending up in the housing has been made the same length as the face or space for tooling. The toggles are operated by a connecting rod which leads to the main shaft. This shaft extends through the frame at right angles to the face of the head and is fitted with an automatic stop clutch. The driving gears are assembled on the housing, thereby making for economy of floor space. The punch is of steel construction throughout, with slide bearings bronze lined and all shaft bearings bronze bushed and fitted with a single-shot force-feed lubricating system.

The machine illustrated has a stroke of 3 in. and exerts 400 tons' pressure. It will punch four 1⅞-in. holes through 1-in. material in cluster at any point at front or back of head. The length of head, front to back, is 60 in., and right to left, 12 to 40 in. as required. The die space, or distance from the face of the head to the table, stroke down, is 48¾ in.

Wheels and Casters for Industrial Trucks

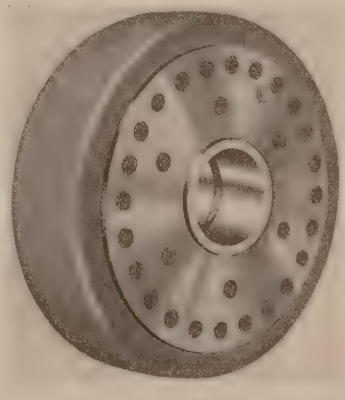
THE Metzgar Co., Grand Rapids, Mich., has added to its line of end-grain wood truck wheels for warehouse, hand and trailer trucks, a "super-strength" type for use on hand-lift and other trucks subjected to unusually heavy service.

In all types—standard, heavy-duty and "super-strength"—the wheels are made up of a number of hardwood wedges of equal size securely bound together with circular steel bands. These bands, with the hub flanges, are laid deep enough in the wood to provide the necessary radial strength, and are fastened by rivets which extend through each wedge. The butt ends of the wedges are surfaced, forming an end wood tread that is said to have wearing qualities comparable to a butcher's block. Various hub arrangements can be furnished.

Heavy-Duty End-Grain Wood Truck Wheel with Hyatt Roller Bearings

The wheels can be equipped with either oil-less end-wood plain bearings, or Hyatt roller bearings. The entire wheel is impregnated with a suitable lubricant, and this, in addition to the end wood presented to the axle, is said to provide a plain bearing that will last indefinitely in ordinary trucking operations. Micrometer measurements taken after several months' service are said to show no appreciable wear of either the end-wood bearings or the axles with which they are used. If desired, however, Alemite-Zerk lubrication can be furnished for the plain bearing wheels. Roller bearing wheels are recommended when higher speeds and easier rolling than usually obtainable with plain bearings are required. These bearings are regularly equipped for Alemite lubrication.

The standard type end-grain wood truck wheel is made in a range of sizes from 2½ to 20 in. diameter, inclusive. The rivets in the side plates are countersunk to make both sides of the wheel perfectly flush, so that less space is required in the horns when the wheels are used in swivel or rigid casters. Compression tests of 10-in. diameter, 3-in. face wheels of standard



"Super-Strength" Wheel for Hand-Lift and Other Unusually Heavy Service Trucks

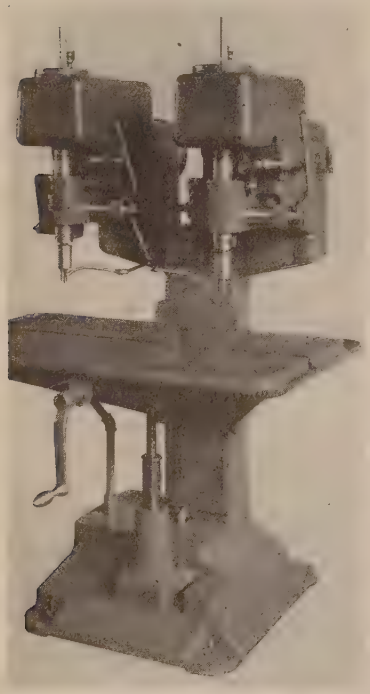
type are said to have withstood a load of 21 tons.

For heavier service than usually required of two-wheel warehouse trucks and four-wheel platform trucks, the heavy-duty type wheel having double the number of wedges and rivets is recommended. Sizes range from 6 to 20 in. in diameter, and up to 6 in. in face width, the 6 to 9 in. wheels being of plate type and larger sizes of band type. They are made in a wide range of hub lengths and to fit any size of axle.

End-grain wood wheel casters are manufactured by the company in both rigid and swivel types for a variety of industrial applications.

New Semi-Automatic Tapping Machine

TO eliminate tap breakage, a multiple-disk friction clutch is incorporated in the spindle drive of the semi-automatic tapping machine illustrated, single and multiple-spindle types of which are being built by the Rickert-Shafer Co., Erie, Pa.



Work May Be Tapped to a Predetermined Depth and Means Are Provided to Eliminate Tap Breakage

For production on an automatic basis, a block on a serrated cam located on the left-hand side of the spindle housing may be set to permit tapping to a predetermined depth. Pulling the handle downward engages the clutch and causes the tap to advance into the work. When the required depth is reached the block on the serrated cam trips the mechanism so that the clutch is released in one direction, setting in operation a train of gears which reverses the spindle and backs the tap out of the work. A slight upward thrust on the handle then reverses the mechanism for tapping the next piece. On work of ordinary type one operator can keep two spindles going full time.

The machines can be furnished for either belt or motor drive. Pump and other equipment for supplying coolant or oil to the taps is provided and the arrangement is such that the overflow is returned to the reservoir in the base of the machine. It is stated that the machine has been tested in tapping up to 1-in.—8 U.S.S. threads without signs of being overloaded.

Cut-Off Saw for Brass and Bronze Bars and Shapes

BRASS and copper bars 3-in. in diameter are cut-off in from 3 to 4 sec. by the machine illustrated, which has been developed by the Hunter Saw & Machine Co., Pittsburgh, for cutting off brass, bronze and copper shapes, solid and tubing. Angular as well as straight cuts can be made on the machine, the capacity of which is for material up to 3 in. in diameter.

The 10-in. diameter saw blade is mounted on a balanced tilting frame and is fed through the material by means of an offset hand-lever, the work being held in a quick-acting eccentric vise. The saw blade is driven by a 3-hp. motor through roller and chain and sprockets, and runs at a peripheral speed of 1300 ft. per minute.

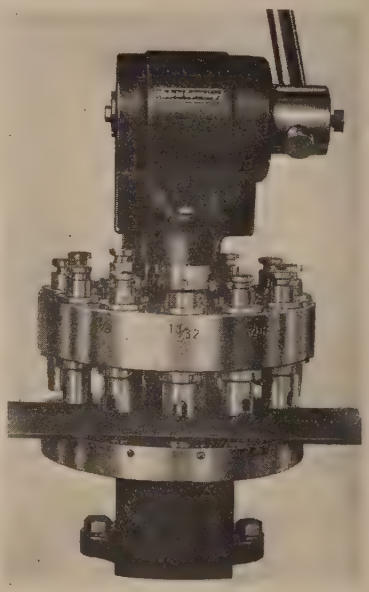
The Saw Blade Is Driven by a 3-Hp. Motor Through Silent Chain and Operates at 1300 F.P.M.

Means are provided for keeping the chain at proper working tension. The motor and starter are inclosed in the base of the machine. The saw guard is arranged to tilt out of the way to facilitate removal of the saw blade.

Floor space of 24 x 48 in. is occupied and the height of the machine is 45 in. overall. The height to the table is 31 in. The net weight of the machine, which is designated as the Model No. 4, with standard motor and starter, is 950 lb.

Will Punch 12 Different Size Holes

TO meet a demand for a portable machine ready at a moment's notice for punching holes of a range of common sizes, the Eda multiple punch here shown has been built. It covers any one of 12 sizes ranging from ⅛ to ½ in. and is designed rigid enough to pierce steel of machinery grade up to 3/16 in. in thickness. The punches and dies, which are simple, are mounted on a freely revolving turret, an automatic ball stop catching the turret at the moment that a desired size punch and die are central under the ram. Angle and tee sections up to 1¾ in. are included within the scope of the punch.



Holes from ⅛ to ½ In. May Be Punched in 3/16-In. Steel. The weight is 100 lb.

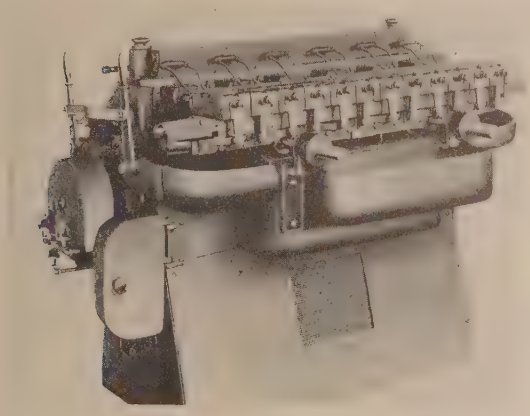
The machine, which weighs under 100 lb., is marketed by the Wiedemann Machine Co., 1815 Sedgley Avenue, Philadelphia.

Electric Furnace for Heat Treating Aluminum Sheets

The Fairmont Mfg. Co., Fairmont, W. Va., producer of aluminum sheet and castings, is installing a large electric heat-treating furnace. The equipment will be used chiefly in heat-treating aluminum-alloy sheet. Dr. Robert J. Anderson, vice-president of the company, states that the new furnace will be in operation by about Sept. 1.

Multiple-Spindle Driller Uses Cluster Drill Heads

FOR either single or cluster head work the Kent Machine Co., Cuyahoga Falls, Ohio, is bringing out a new horizontal drilling machine which is similar to its No. 1 six-spindle unit, but is larger and heavier and incorporates new features, including the cluster drilling mechanism. It is built with six single spindles on 7½ in. centers or with six special cluster drill heads on 7½ in. centers.



THE Single and Cluster Drill Heads Are on 7½-In. Centers. Twelve fixtures are required, two for each drill head, and six of them are loaded while six others are being drilled

Fixtures may be designed to accommodate a wide variety of work. Either belt or motor drive is furnished, the motor for the latter being mounted on a movable angle plate in the base of the machine to facilitate adjusting the tension of the driving chain and the changing of sprockets to vary the speed of the machine.

The rate of production is governed by the r.p.m. of the camshaft, which is controlled through a series of change gears and adjustable dogs. With this combination it is possible to synchronize the speed of machine with the ability of the operator to load and unload the fixtures. Feed of the drill is controlled by a feed cam and may be varied to suit requirements by changing the gears which control the camshaft speed.

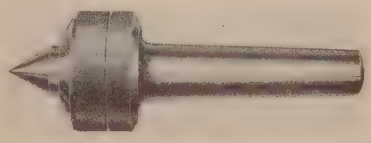
Twelve fixtures are required, two for each drill head. These fixtures alternately occupy positions in front of and between the drill heads. When in line with the drill heads, they are automatically locked, and when in the alternate position they are opened to permit unloading and loading. Thus, while the drill table moves forward for the drilling, six fixtures are filled by operator while six other fixtures securely hold the parts being drilled.

Live Center for Use with Tungsten Carbide Tools

A HEAVY-DUTY live center, said to be suitable for use in connection with lathes and other machine tools using tungsten carbide cutting tools, is pictured herewith.

This device, manufactured by Nielsen, Inc., Lawton, Mich., consists of an outer tapered sleeve, an alloy-steel heat-treated center mounted in double-row ball bearings at the front and in a roller bearing at the rear, and a knurled front cap containing at its forward end a felt seal. The center and its bearings run in oil that is supplied through oil holes at the front and rear of the tapered sleeve. The knurled front cap permits convenient removal of the alloy steel center, while the felt seal is intended to prevent entrance of dust or grit into the front bearings.

The tool, designated as the D.R., is regularly made in a Morse taper series, embracing eight sizes from No. 3 to No. 7, and a Jarno taper series of 15 sizes, from No. 6 to No. 20. The overall width and length of the Morse taper series ranges from 2¼ in. x 6 5/16 in. to 9 in. x 20 in. and of the Jarno taper centers from 2¼ in. x 5 13/16 in. to 5 5/16 in. x 16 in. The radial and thrust load sustained by the Morse taper series ranges from 600 to 29,000 lb. per sq. in. per 100 r.p.m. The standard included angle of the center point is 60 deg. Special tapers and points can be furnished to order.



Anti-Friction Bearings Are Used Front and Rear. The knurled front cap contains a felt seal at its forward end

In a recent test of one of the No. 6 centers at the Case School of Applied Science, Cleveland, in connection with a lathe using a tungsten carbide tool, cast iron was cut at 500 ft. per min., the depth of cut being ⅝ in. and the feed 0.037 in. Steel containing 0.50 per cent carbon, 0.75 per cent chrome and 1.5 per cent nickel was cut at 200 ft. per min., the depth of cut being ¼ in. and the feed 0.037 in. It is claimed that in both cases the center withstood the load without chatter.

Completes Investigation of Machinists' Vises

AN investigation of the efficiency of various weights of machinists' vises has been completed by the Bureau of Standards. The relationship between size of vise and its efficiency was determined by performing typical shop operations on steel specimens held in the vise. These operations consisted of sawing, bending and riveting, and were carried out under carefully standardized conditions, using 12 vises of the stationary bottom type having different lengths of jaw from 2 in., 9 lb., to 9 in., 282 lb.

Static tests, such as sawing, in which the movement of the tool was large compared with the movement of the vise, showed no appreciable difference in the efficiency with which the work was performed. In the dynamic tests, however, such as riveting and some of the bending tests on large specimens, the weight, or inertia, of the vise had an appreciable effect on the efficiency with which the work was performed. The efficiency of the 5½-in., 102 lb., vise was greater than for any of the lighter vises, but was about the same for larger vises. Complete results of this investigation will be published by the Department of Commerce in the near future.

Dual Buffer with Independent Spindle Control

TWO separate and distinct spindles, each operated by its own motor, feature a dual-motored Tex-drive buffer made by the Hisey-Wolf Machine Co., Cincinnati. Either spindle may be operated independently of the other. This arrangement makes it possible to have the two spindles operating at different speeds at the same time.

This new buffer is of gooseneck design, which gives the operator great freedom of movement and permits easy handling of large and bulky pieces. Accessibility of all parts and rigidity of construction are incorporated. The base consists of a substantial casting inside of which are motor, starter and starting switch.

Spindle and bearing housing are assembled as a unit. The entire unit may be quickly removed from the base by loosening four bolts on each side. This arrangement simplifies the problem of removing a worn or broken belt and replacing it with a new one.

Spindle bearing boxes are cast iron and are keyed to the column. A key along the entire base of bearing housing fits into a keyway in top of the column. Thus, no matter how often the bearing housing is taken off, the keyway arrangement insures perfect realinement of spindle and motor pulleys. Automatic lubrication is obtained by a simplified oiling system.

General Mileage Scale for Cast Iron Pipe

WASHINGTON, July 22.—The Interstate Commerce Commission, in what is known as the Krupp Foundry cast iron pipe scale, has ordered the railroads to use the mileage scale prescribed in the so-called Hoch-Smith iron and steel case, for the removal of undue prejudice against founders at Lansdale and Quakertown, Pa., and Florence, N. J., and undue preference for founders in the Birmingham, Chattanooga and Knoxville districts.

In the original decision in the Krupp case the regulating body designed a scale, but did not prescribe it by definite order, to be used by the railroads in measuring the difference between the rates from shipping points of the Eastern founders and the shipping points of the Southern founders to the same destinations east of the Mississippi River and north of the Ohio.

Commissioner Porter, who wrote the report in which the revision of the original Krupp report was made, said there was no reason why the scale prescribed in the general iron and steel case, applicable throughout the territory north of the Ohio and Potomac rivers and east of the Mississippi, should not be used. But the scale in that case was not long enough. Therefore it was lengthened from 1200 to 1500 miles. The added distance of 300 miles is divided into alternate 35 and 30-mile blocks. One cent per 100 lb. is added for each block so that at 1500 miles the lengthened scale, to be used in calculating the differences in rates, is 65c. per 100 lb.

The result of the use of this scale is that the differences at the competitive points will be somewhat less than they would have been had the scale suggested but not ordered in the original Krupp report been put into use.

Swedish Bearing Industry Expanding

Production of ball and roller bearings in Sweden has expanded rapidly during recent years, according to E. J. Cochrane, industrial machinery division, United States Department of Commerce, the 1928 production being estimated to have reached between 33,000,000 and 35,000,000 Swedish kroner ($8,844,000 to $9,380,000), compared with 24,167,000 ($6,476,756) in 1926 and 26,524,000 ($7,111,432) in 1927.

As only a small part of this production can be used in Sweden, outlet for the balance must be found abroad. In this Swedish manufacturers have succeeded in increasing their foreign sales from some 23,409,000 kroner ($6,271,200) in 1925 to nearly 33,000,000 kroner ($8,844,000) in 1928. In Europe, Germany, Russia, the United Kingdom, France, Belgium and Czechoslovakia constitute the best customers. On the North American continent, both Canada and the United States are excellent markets, and in South America and Asia, Argentina and Japan, respectively, are the heaviest buyers.

Manufacture of ball and roller bearings in Sweden is practically confined to four companies, namely the A/B Svenska Kullagerfabriken (S. K. F.), Goteborg; the A/B Nafveqvarns Bruk, Navekvarn; the A/B Abjorn Anderson, Svedala; and the Skogsfors Bruks A/B Reftele. Of these the A/B Svenska-Kullagerfabriken (S. K. F.), Goteborg, is the largest. This company was established in 1907 and owns 12 factories, four of which are located abroad, in the United States, England, France and Germany respectively. In addition, it has 187 sales branches scattered throughout the world.

Central Alloy Reduces Prices on Nirosta Steel

The Central Alloy Steel Corporation has announced substantial price reductions on Enduro Nirosta steel, covering all forms in which the material is produced. Central Alloy is working toward greatly increased output of stainless steel in response to rapidly growing buying interest in many lines, including the automobile and building industries. The present price reduction, it is stated, is the first step in the company's policy to stimulate consumption by lower quotations as the volume of output expands.

Gearing Advertising to Selling

"Gearing Advertising to Selling" will be the theme of the eighth annual convention of the National Industrial Advertisers Association to be held in Cincinnati, Sept. 30, Oct. 1 and 2, it has been announced by Jesse R. Harlan, chairman of the convention committee of the Cincinnati Association of Industrial Advertisers. Sherman Perry, American Rolling Mill Co., Middletown, is chairman of the program committee.

Officers of the national organization are: Nelson S. Greenfelder, Hercules Powder Co., Wilmington, Del., president; George H. Corey, Cleveland Twist Drill Co., Cleveland, first vice-president; Allan Brown, Bakelite Corporation, New York, second vice-president; H. von P. Thomas, Bussman Mfg. Co., St. Louis, third vice-president, and Benjamin H. Miller, Permutit Co., New York, secretary and treasurer.

American Pulley Co. Buys Sprucolite Line

The American Pulley Co., Philadelphia, manufacturer of pulleys, steel hangers and hand trucks, has taken over all products of the Sprucolite Corporation, Bloomfield, N. J., embracing various types of pulleys. The new line, to be called American Sprucolite pulleys, will be marketed through mill supply houses.

Engineering Meeting at Akron in October

A meeting of the American Society of Mechanical Engineers will be held in Akron, Ohio, Oct. 21 to 23, at the Portage Hotel. Eight sessions are being planned under the auspices of the professional divisions and standing committees on the following subjects: Applied mechanics, materials handling, education and training for the industries, aeronautics, steam power, iron and steel, and management.

A dinner, followed by a smoker with entertainment, is being arranged at the Firestone Club House for Monday evening, Oct. 21, and a banquet at the Portage Hotel for Tuesday evening. Inspection trips planned cover the plants of the Firestone Tire & Rubber Co., the Goodyear Tire & Rubber Co. and the B. F. Goodrich Co.

Steel Frame House to Be Built in 100 Days

Moving into a house 100 days after the digging for the foundation was started is an achievement which will be demonstrated this month at Indianapolis, where a steel frame house will be erected by the Steel Frame House Co., a subsidiary of the McClintic-Marshall Co., Pittsburgh. The house, consisting of eight rooms, two baths and garage, will measure about 40,000 cu. ft. The contractor will be an assembler, for the materials will be fabricated in plants at some distance from the house while the foundation is being built and will be shipped to the site ready for erection.

The house will demonstrate the durability and economy through speed of erection that is possible with steel framing. The Steel Frame House Co. has built or is building similar houses in Philadelphia, Lancaster, Pa., Rochester, N. Y., Toledo, Ohio, and Columbus, Ohio. The plans for the Indianapolis structure were made by Frederick Wallick, Indianapolis architect.

Will Make Bartlett-Snow Equipment in England

Pneulec, Ltd., Mafeking Road, Smethwick, near Birmingham, has been given exclusive selling and manufacturing rights in the British market for Bartlett-Snow special machinery for handling sand, molds, cores and castings. Among these products are conveyors and elevators of many types, screens, magnetic separators, sand conditioners, pug mills, blenders, sand hoppers, gates, feeders, core crushers and cupola charging units.

S. G. Taylor Chain Co., Hammond, Ind., is preparing for distribution a catalog which has eliminated many items in conformity with the company's simplification program. It will give information relative to sling chains, especially as to diameter and dimension of joiner and end links.

Plans Outlined for Distribution Census

Business Men's Group Appoints F. M. Feiker of Associated Business Papers, Inc., as Chairman

A GROUP of business men which will aid the Government in the census of distribution to be taken next year by the Department of Commerce met in Washington on July 17 to draw up preliminary plans for the collection of what was described as "vitally essential statistics."

F. M. Feiker, managing director of the Associated Business Papers, Inc., was named chairman of the group. In discussing the work before the committee, Mr. Feiker said there seemed to be six important objectives in the minds of business men and economists who have given the distribution census consideration. He described these as follows:

1. To provide a statistical picture or count of the number of distributers classified as to class, as to size, as to number of employees, as to the volume of business. Such a count or census of distributers forms the simplest picture of the outlets for distribution between the consumer and the producer. There is at the present time no such picture and the contemplated census of distribution should include the first simple objective.

2. A count and classification by establishments of the volume of sales in various commodities to be classified by commodities, by geographical units, by volume of sales as related to size of establishments, etc. It is obvious that a discussion and clarification of this objective is essential before consideration can be given to the detailed contents of schedules.

3. The use of the statistics briefly summarized above from the point of view of those who produce commodities, i. e., from the point of view of their use for establishing market possibilities and sales quotas both by groups of producers and by individual producers. Much of the demand for a census of distribution comes from producing groups such as manufacturers, sales and advertising organizations which seek to use the distribution statistics to advance the economical distribution of their particular commodities, both raw materials and manufactured products. This objective also includes a consideration of the distribution of goods from manufacturer to manufacturer and a consideration of the problems of a census of distribution of manufactured commodities.

4. The consideration of the use of distribution statistics by trade association groups representing wholesale, retail and service outlets which seek to analyze the relation between their volume and the volume of other commodities or between the sectional demands existing within the distribution of one class of commodities. There have grown in increasing volume broad problems of competition between industries, one commodity competing with another for the consumer's dollar. There is basic need for considering therefore relative present sales in lines of commodities on the part of the distributer of those commodities as well as on the part of the producer. If practicable, a distribution census should be projected which would allow totals to be classified in a way to produce comparative figures of this sort.

5. The use of the statistics by the individual distributer or producer who seeks to make comparison between his own volume of business and the volume of business of his group either considered nationally or, in the case of the retailer, locally. It is obvious that the average business man would like to see a census of distribution established this year which would enable him to make such comparisons.

6. There remains the public value of the assembly of such statistics as are proposed whereby social or economic groups having as their objective studies in living costs or housing costs, living standards, etc., would seek to find in these statistics totals for comparison which they could put to broad public use.

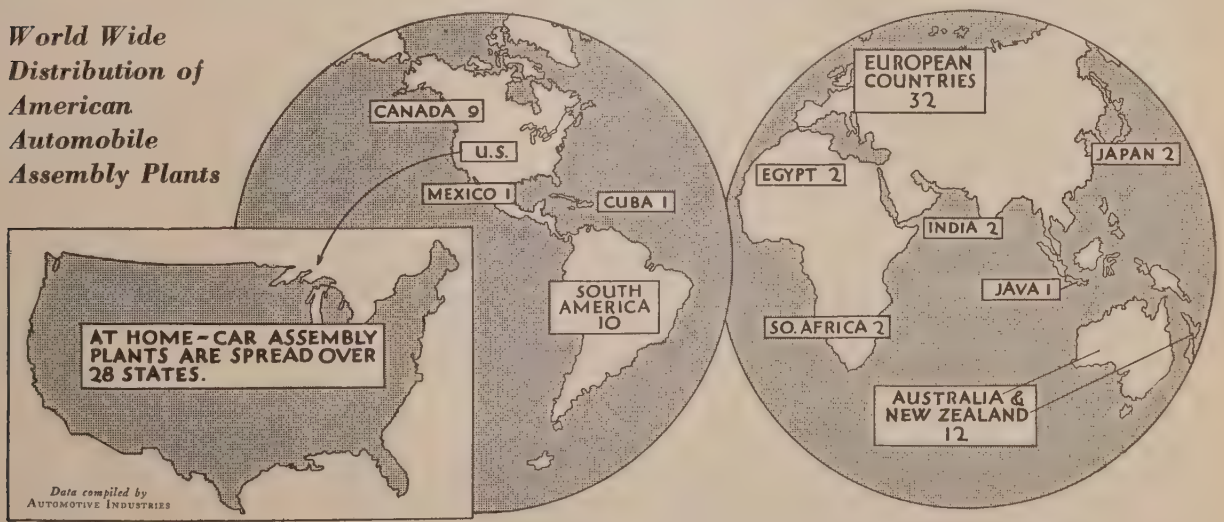
An Appreciation of The Iron Age

An appreciation of this journal appeared in the Chicago *Daily News* of July 12 in connection with a brief article devoted to Alvin I. Findley, editor-in-chief. What that newspaper had to say of THE IRON AGE is in part as follows:

"Its weekly market service is well known and has been one of the most trustworthy indexes of business. This service is not intended as a forecast; it aims primarily to picture current conditions in the iron and steel markets as they are each week.

"THE IRON AGE market service is the fruition of many years of cultivation. Technique of reporting had to be developed and an antagonistic psychology had to be overcome. The importance of publishing facts, instead of optimistic exaggerations, was not appreciated when business men believed that sentiment was a controlling factor in influencing trade conditions. No one has done more than Mr. Findley in breaking down these obstacles and in unswerving devotion to unbiased, uncolored news."

World Wide Distribution of American Automobile Assembly Plants



THERE are 72 plants in countries outside the United States, scattered through Canada, South America, Europe, Africa, India, Japan, Australia and New Zealand in which native labor is employed to assemble American motor cars. These plants turn out more than one-third of all of the cars made throughout the world outside the United States. According to a survey by A. B. Crofoot in *Automotive Industries*, there are 155 assembly plants for American cars, 87 of them within the United States.

Heavy Orders for Fabricated Structural Steel

Orders for fabricated structural steel in June are reported by the Department of Commerce at 92 per cent of monthly capacity, the computed tonnage having been 354,200. This is an increase of 2 per cent over the May total of 346,500 tons, and has been exceeded only once—by the 358,500 tons of March last. An equal tonnage, however, was reported for August, 1928. The current figure compares with 296,450 tons for June, 1928.

Shipments fell off markedly in June, having been only 273,350 tons computed, compared with 311,850 tons in May. While the June total was the smallest since February, it showed a gain over the 261,800 tons of June, 1928.

For the first half-year new orders are computed at 1,936,500 tons, compared with 1,570,800 tons last year. The gain represents 23 per cent. Similarly, shipments in the half-year were 1,686,300 tons, compared with 1,424,500 tons last year. This shows a gain of 18½ per cent.

Iron and Steel Traffic on Rivers Gaining

River traffic in iron and steel products on the Ohio River amounted to 116,679 tons during June, compared with 102,162 tons in the preceding month and 96,156 tons in June, 1928, according to the figures of the United States Engineer Office, Pittsburgh. On the Monongahela River, June commerce in steel products totaled 116,157 tons, compared with 88,340 tons in May and 75,422 tons in June, 1928. June steel movement on the Allegheny River was 722 tons, against 525 tons in the preceding month and 2350 tons in June, 1928.

Production of Malleable Castings Falls Off

Production of malleable castings in June is reported by the Department of Commerce at 71,055 net tons, a decline of more than 12 per cent from the 80,901 tons of May and the smallest tonnage for any month so far this year. It compares, however, with 67,090 tons in June, 1928, showing an increase of 6 per cent from last year.

Shipments in June were 71,311 tons—smaller than that for any previous month this year, except February. This compares with 79,885 tons in May and with 66,737 tons in June, 1928.

Orders booked in June, at 64,581 tons, made the smallest total for any month this year. This compares with 76,673 tons in May and with 61,071 tons in June, 1928. Capacity was operated in June to the extent of 73.8 per cent, compared with 83 per cent in May.

For the first half-year, production was 466,396 tons, which represents an increase of 18 per cent over the 394,876 tons last year. Shipments were 461,839 tons, showing a gain of almost 20 per cent over the 385,228 tons of last year. Orders booked totaled 463,700 tons, an increase of 21 per cent over the 384,009 tons of last year.

Consumption of Lake Superior Ores

Ore from Lake Superior consumed in June is reported by the Lake Superior Iron Ore Association at 5,676,652 gross tons. This is a reduction of more than 5 per cent from the 5,980,248 tons consumed in May. It shows an increase, however, of about 21½ per cent over the 4,667,493 tons consumed in June, 1928.

Ore on hand July 1 amounted to 23,701,011 tons. This is an increase of more than 3 per cent compared with the 22,980,603 tons of July 1, 1928. The current figure includes 19,618,611 tons on hand at furnaces and 4,082,400 tons on Lake Erie docks. This ore serves a total of 264 furnaces, of which 196 were in blast on May 31 and 197 on June 30.

Canadian Automobile Production in 1928

Eleven companies operating 14 factories were engaged in making automobiles in Canada in 1928, according to a bulletin of the Dominion Bureau of Statistics. Production made a new high record at 242,054 cars, valued at $149,177,000 wholesale. The output was 18 per cent greater than in 1926—the previous best year—and the value was 22 per cent higher.

Complete passenger cars made in 1928 numbered 176,096, of which 77 per cent were closed. In addition, chassis for passenger cars numbered 21,752. Complete trucks made numbered 17,527, showing a sharp decline from the 29,603 of 1927. Truck chassis to the number of 26,679 were produced.

Production and Shipment of Raw Materials and Finished Products

	June, 1929	May, 1929	June, 1928
By-product coke (a), net tons	4,509,564	4,664,242 (b)	3,961,268
Beehive coke (a), net tons	721,500	597,400	301,600
Total coke (a), net tons	5,231,064	5,261,642	4,262,868
Total coke (a), daily average	179,179	172,585	143,642

(a) United States Bureau of Mines.
(b) Highest total for any month.

Foundry Equipment Orders Up Slightly in June

Foundry equipment orders in June were slightly in excess of shipments, according to reports received by the Foundry Equipment Manufacturers' Association from 19 of its members. June net orders stood at 177.3, the base of 100 representing the average for 1922, 1923 and 1924. Unfilled orders were 300.8 at the end of June, or nearly double the June shipments, which were on the basis of 172.7.

Increase in Commodity Prices

Wholesale prices of commodities are reported by the United States Bureau of Labor Statistics at 96.4 in June, compared with 95.8 in May and with 97.6 in June, 1928. All figures are based on 100 as the average of 1926. Five of the 10 major groups showed increases in June, compared with May, and five showed decreases.

Increases were registered by farm products, foods, hides and leather, fuel and lighting and the miscellaneous group; decreases by textiles, metals, building materials, chemicals and drugs and house furnishings. In no case did the decrease of any group exceed one unit, but some of the increases were considerably more than that.

Metals and metal products dropped from 105.2 to 105.1, through declines in the iron and steel figure from 98.4 to 98.2, and in non-ferrous metals from 104.9 to 104.8. There were no changes in the figures for agricultural implements, automobiles or the other metal products. Building materials showed a slight decline, caused mainly by drops in prices of lumber and bricks. The structural steel element for building materials remained at 99.6, as for the preceding month.

Canada's Pig Iron Output 518,557 Tons in Half Year

Production of coke pig iron in Canada during June amounted to 89,873 gross tons, according to a statement issued by the Dominion Bureau of Statistics at Ottawa. This tonnage, while slightly under the 97,379 tons produced in June of a year ago, was the second highest reported for the current year to date, being 9 per cent over the total of 81,464 tons in May and only exceeded by the 93,939 tons of February.

For the six months ended June 30, 1929, the cumulative production of pig iron in Canada was 518,557 tons. This tonnage replaced the figures for the corresponding period of 1918 at 501,000 tons as the second highest on record and was only 1 per cent under the high level of 524,000 tons, which was established in the first half of 1917. During the first six months in 1928, production amounted to 468,013 tons. Output for the half year under review included 401,758 tons of basic iron, 87,052 tons of foundry iron and 29,747 tons of malleable iron.

This Issue in Brief

Skilled labor shortage is inevitable unless apprentice-training is more extensively adopted. United States has 4½ million skilled mechanics. To maintain this number at least 675,000 apprentices should be in training. Actually, less than 200,000 are being trained.—Page 203.

* * *

Economic weather signals. Average commodity price advanced in June to 96.4, compared with 95.8 in May and 97.6 in June, 1928. Orders for fabricated structural steel were heavy for June, being 92 per cent of capacity, a gain of 2 per cent over May.—Page 226.

* * *

Cadmium - plating, tin - coating and other processes are succeeding galvanizing in many plants manufacturing aircraft parts. Now chromium-plating for exposed parts made of aluminum alloy is being considered by manufacturers.—Page 214.

* * *

Are you wasting valuable storage space on patterns you will never use again? Value of pattern should be balanced against storage cost. Often it is more economical to replace an occasional pattern than to invest thousands of dollars in storage facilities for patterns not being utilized.—Page 215.

* * *

Electrification of rod mill involves use of five synchronous motors in a system of subdivided or group drives. One motor is combined with a d.c. generator to supply current for the motor driving the finishing stands.—Page 217.

Heat-treating fuel costs cut 22 per cent in spring plant. Gas fuel also reduces rejections from 5 per cent to less than 0.1 per cent.—Page 220.

* * *

Tungsten-carbide tool cuts cast iron at rate of 500 ft. a minute. Depth of cut was ⅝ in., and feed 0.037 in. Lathe was equipped with heavy-duty live center, made especially for use with tungsten-carbide tools.—Page 223.

* * *

Big market for fuel tanks in aircraft industry. Welded aluminum sheets are used almost entirely. Tanks are built to conform to shape of the fuselage, and are honeycombed with baffle plates to prevent sudden shifting of contents.—Page 213.

* * *

Pearlitic cast iron is replacing cast steel and cast iron in British engine building, if recent exhibit may be taken as criterion. Fire bars of the improved iron are still sound after 16 months service. Ordinary gray iron castings last only 3 months.—Page 220.

* * *

Apprentice - training not an added expense if quota of apprentices is correct. Work of apprentices is usually done well enough to carry labor cost and all indirect charges.—Page 204.

* * *

Lifting button permits convenient handling of cupola coke-charging buckets. A cone-type button is fixed at upper end of a steel shaft through the center of bucket, which has a dump bottom.—Page 210.

Predicts closer attention to material costs in aircraft industry, as quantity-production methods are adopted. Investigator believes this will encourage even greater use of alloy steels for aircraft parts.—Page 214.

* * *

Charge storage space for patterns not in use for six months. Two gray iron foundry associations have adopted this rule. Steel foundries destroy patterns for which no orders have been received within two years.—Page 215.

* * *

Coal dust for sand mold facing should be "superfine" quality, of not less than 30 per cent volatile content. Coarse-graded coal dust functions improperly, because of uneven distribution among the sand grains.—Page 216.

* * *

Makers of small parts used in aircraft construction are showing a growing tendency to "trademark" the part and also to add a symbol denoting year of manufacture.—Page 214.

* * *

Increases cupola output 25 per cent by using hot blast. Automobile foundry cuts coke consumption 30 per cent and gives cupola linings longer life by abandoning cold blast.—Page 208.

* * *

Flash-welding dies lined with copper-tungsten alloy are in good condition after 600 welds. With die materials formerly used, dies are said to have required redressing after 50 welds.—Page 214.

A. I. FINDLEY
Editor

THE IRON AGE

W. W. MACON
Managing Editor

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Tariff Dust Clouds

ONE grows weary of reading the vehement exaggerations, published voluminously in recent weeks, telling what foreign Governments will do to the hurt of American trade if the present Congress raises existing duties. We are told with increasing insistence that our European debtors cannot pay us what they owe if we build up tariff walls so high that they cannot send us their products. The statement is so self-demonstrating—and so many Americans have been saying practically the same thing for so many years—that the reader wonders why so much strength is expended in reiterating it. Of about the same caliber would be the rejoinder that if American duties are made so low that foreign goods flood our markets industry here would be so depressed that Europe could no longer get loans from us wherewith to pay its debts.

No one really expects that the new tariff rates will be made so high that Europe cannot send us goods; and it is equally unlikely that they will be made so low that any domestic industry will have to put workers in idleness while low-priced products of its European competitors come in freely. In spite of all the thundering in the index, Europe, Canada, Argentina and the rest will do a great deal of buying from the United States after the new tariff bill is enacted, and the shipments of foreign products into this country will not be in materially smaller volume than in the years last past.

Whatever may have been said for partisan reasons in recent discussions at Washington, no one will seriously contend that the good will of foreign buyers—and sellers—is not to have weight in the making of our tariff schedules. President Hoover did well to remind Congress in his message last March that "in determining changes in our tariff we must not fail to take into account the broad interests of the country as a whole, such interests including our trade relations with other countries." At the same time he gave the right answer to foreign critics when he said that no discrimination against any foreign industry is involved in equalizing the difference in costs of production at home and abroad, "thus taking from foreign producers the advantages they derive from paying lower wages to labor."

We scarcely need say that it is the conversion of these generalizations into definite terms of ad valorem and specific duties that makes the trouble. But men who have sat on the Ways and Means Committee or the Senate Finance Committee learned long ago that predictions of domestic producers and those of importers as to the effect of a proposed rate on the volume of domestic or import business were far different from what actually happened when the identical rate took its place in the law. This, too, even when the rate in question had all the sanctions of so-called expert comparison of wage rates and other elements of foreign and domestic costs, for costs have far less to do with determining the destination of an order than tariff theory has ever taken into account.

Those whose tariff platform makes the welfare of the greatest number the criterion of all rate making will be glad to see the Senate bill drafted on the basis of recognizing any economic changes, since the present tariff was enacted, that have put domestic producers at a disadvantage. What is in order is not such a wide range of rate increases as the House bill provides, but, in accordance with promises made in the campaign of 1928, such reasonable amendment of the act of 1922 as is called for in the light of seven years' experience under it.

Paying for What One Gets

A CARDINAL principle of buying, as exemplified by the practice of Uncle Sam, is to accept the lowest bid that will meet the specifications. Other things being equal, this is a very good rule, and many people outside governmental circles practice the same method. Unfortunately, "other things" usually are not equal. This has been brought out forcibly in an article by Morton C. Tuttle, Boston builder, in the Boston *Evening Transcript*. While his comments related to building construction, their application is far wider.

Mr. Tuttle spoke particularly of low bids based on a series of cut-throat prices obtainable from certain sub-contractors. He pointed out that most often, when such bids are accepted, the orderly and timely progress of building is interrupted by delays caused by "sub-contractors of all degrees of ineptitude, * * * hard at work making confusion, delay and waste." And as "the progress schedule for a modern construction job is a complicated time-table fixing the arrival and departure of the different trades," a loss of time in one element throws the whole schedule out of gear, and no one profits.

Particularly troublesome are the results of such delay when the high costs of modern city building are involved, with heavy interest accruals. Or when the structure is urgently needed at a particular time, and prospective business is lost if it be not ready.

If modern automobile works were subjected to such conditions the cars would cost the public far more than they do. A plant building cars without a

stockroom, depending upon regular, prompt, uninterrupted supply of the parts, including sub-assemblies; another one running on a basis of a 5-hour storage of the necessary parts, and more goods constantly in transit to take the place of what is used from hour to hour—these schedules could not exist without the utmost reliability of their suppliers, all along the line.

A low price may be an adequate price for what one gets in exchange for it. But if what one wants or needs is beyond the scope of the low bidder, the price is low in seeming only, and a higher one might better be paid.

Automobile Exports Not So Large

WHEN very heavy automobile production was predicted for the present year it was explained that, while the domestic market might have difficulty in absorbing a large increase, there was room for a very considerable expansion in exports. Observing the remarkably heavy production reported month by month this year one might assume that the prediction was being fulfilled. As a matter of fact, however, exports have increased less than the domestic trade. Comparing the first five months of last year and this, there was an increase of 48 per cent in the number of cars and trucks produced, while the number exported increased only 33 per cent. The remainder, left for the domestic trade, represents an increase of 51 per cent.

The matter is somewhat complicated because in common thought we have two different conceptions of automobile activity, one derived from the monthly statistics of car and truck production, the other from the purchases of materials by the industry. These purchases provide for the manufacture of exported parts. For the domestic trade parts need hardly be considered, for we have the statistics of production, and there are only replacement parts in addition. For the export trade we have in addition to exported units the exports of parts for foreign assembly, and there may be an important increase there when none is shown in the complete units exported. Therefore we compile a brief statement to cover substantially the whole ground, considering cars and trucks first and then exported parts.

Cars and Trucks

	Produced in U. S.	Exported	Export Per Cent
1925	4,265,830	303,059	7.1
1926	4,300,934	305,528	7.1
1927	3,401,326	384,309	11.3
1928	4,358,759	507,253	11.6
1929*	2,677,781	273,499	10.2

*Five months only.

The jump in percentage from 1926 to 1927 is to be noted; but in 1928 there was only a negligible increase, while thus far this year exports have not increased as much as production. Since it might be suggested that there is a difference in domestic and export seasons it may be mentioned that in the first five months of last year the export proportion was 11.4 per cent, substantially typical of the whole year.

Next we have exported parts, which are reported separately as engines, parts for foreign assembly, and parts for replacement. The table below gives the total of the three, and to convey an idea of the importance of the parts the value of cars and trucks exported is given:

Automobile Exports, Value

	Cars and Trucks	Parts
1925	$222,784,738	$86,990,232
1926	223,763,952	87,135,601
1927	278,297,096	102,357,758
1928	355,112,806	135,780,267
1929*	179,759,581	103,466,688

*Five months.

For four years parts held just even with complete units exported, at 37 to 39 per cent, while this year the proportion jumped to 58 per cent.

Admittedly the export trade of the automobile industry, in units and parts, is very important, but it is far from large enough to take the edge off a large decline in the domestic demand should one occur, and the domestic demand of the last 12 months has been phenomenal by comparison with its slow growth in immediately preceding years.

Protecting Inventions Abroad

JAMES L. BROWN, chief of the patent and trademark section of the Bureau of Foreign and Domestic Commerce, writing in *Commerce Reports*, urges upon American exporters a greater interest in protecting their inventions by patents in foreign countries. Mr. Brown sees that too little attention has been paid to the subject and as a consequence there has been loss of trade to foreign competitors. He would have the machinery manufacturer take out patents in Great Britain, Germany, France, Canada and every other country where the particular type of machinery is built, and also in every country where it is used or where there is indication of a future demand. American manufacturers agree to this in principle, but they know that much money has been wasted on useless patents abroad and are more discriminating than they used to be.

The attitude of inventors and makers of patentable articles in the period since the war has been a changing one. In the stress of war production European manufacturers overcame much of their prejudice against American industrial methods and equipment. After the Armistice there was a feeling in the United States that this change of mind marked the beginning of a new era in European industry, which should mean a huge demand for much of our equipment that had come to be indispensable here. Consequently there was something of a rush to secure patent protection abroad on the many inventions of war time. But in the great unsettlement of reaction the anticipated quick market failed to materialize. Capital was not at hand to assist; enthusiasm waned here, and some apathy developed regarding foreign patents.

There has been, of course, no neglect to patent abroad the important inventions in the newer fields, as the radio, airplane, electrical, motion picture and automobile. In addition, in the last year or two, according to patent attorneys, there has been a general renewal of patent activities, due to the growing importance of foreign markets for American manu-

factured products. But those interested are proceeding with discrimination. To cover by patent large geographical areas is costly, not only in the initial stages, but in the annual or biennial fees which must be paid in nearly all countries, under penalty of automatic cancellation.

The situation in Germany is probably the most difficult. To secure protection there an invention must be more than an improvement or refinement. It must approach closely to the basic, for it must involve, to quote the law, a new "technological effect." Therefore, many inventions, patentable here and in most other countries, cannot get by in Germany. It often happens that, as Germany is coming to be our most formidable competitor in fields where new inventions play a large part, the American manufacturer feels that if a German patent is not procurable it is not worth while to seek protection in other countries.

There is abundant evidence, according to patent authorities, of the wisdom of careful study before deciding to seek patent protection abroad. The fact is that a large percentage of such patents on American inventions have been permitted to lapse after a year or two for non-payment of fees. Yet foreigners seem not to have taken advantage of such removal of protection. Nor has failure to work American inventions abroad, under the compulsory working clauses existing in all countries except the United States, developed many instances of competitors making use of the inventions. If an invention is not worth protecting by payment of fees or by working, either by the owner or under royalty, it is fair to presume in most cases that it was never worth the trouble and cost of patenting.

Coke By-Products Do Well

COKE by-product values have increased slightly in the last three years, belying fears entertained long ago that the general saving of by-products would so flood the market as to bring about unremunerative prices. The by-products are many and prices have moved variously, but the general trend has been as stated. The Bureau of Mines has put out a compilation showing for various years the total value of coke by-products, whether sold or consumed by the producer, per ton of coke made. The figures are given below, and as commodity prices generally have fluctuated we add the Bureau of Labor's index number of all commodity prices at wholesale, with a computation dividing the by-products value by the index number. This in essence is reducing the value to terms of the 1926 dollar, 1926 being the base year of the commodity index:

Value of Coke By-Products Per Ton of Coke Made

	Actual Value	Commodity Index	Converted Value
1915	$2.19	69.5	$3.15
1917	3.01	117.5	2.56
1922	3.32	96.7	3.44
1923	3.48	100.6	3.46
1924	3.51	98.1	3.58
1925	3.58	103.5	3.45
1926	3.52	100.0	3.52
1927	3.66	95.4	3.84
1928	3.66	96.7	3.78

Apart from the upward trend of values, both absolute and relative to commodity prices in general, the coke producers have had the advantage of lower coal prices in the last few years. Coal as charged into ovens last year had an average value of $3.57, against $3.87 for 1927 and $3.88 for 1926. As these values include widely varying freights paid they are no indication of the f.o.b. mine price.

The realization involved in the table of values includes breeze. Excluding breeze, the sales of by-products, to affiliated departments and to outsiders, totaled $151,309,528, and that was three-fifths of the delivered value of the coal used. Half the total was realized on gas, $76,498,857; the next largest item was ammonia, in sulphate and liquor form, $27,340,056; then followed in order tar, $17,544,797, and motor benzol, $16,832,646.

Since 1919 there has been rather a slow growth in the number of by-product ovens—from 10,379 on Jan. 1, 1920, to 12,544 at the beginning of this year. But more ovens than thus indicated have been built, as not a few have been dismantled. There has been a sharp increase in the production from 30,833,951 net tons in 1920 to 48,313,025 net tons in 1928, chiefly by reason of beehive coke being displaced. At the present time, however, by-product construction is quite active.

CORRESPONDENCE

Appeals for Invaluable Apparatus for Museum

To the Editor: The Rosenwald Industrial Museum of Chicago is the result of an endowment of $3,000,000 made by Julius Rosenwald, for the equipment and maintenance of the institution, and a $5,000,000 bond issue voted by the people of the city to the South Park Commissioners for the restoration of the old Fine Arts Building in Jackson Park, which will permanently house the technical collections.

In this museum the history of science, engineering and industry will be interpreted, not only by three-dimensional working models, but (and this is something that has not been attempted anywhere) also so presented that the social and economic causes and results, the little known background of all of the epoch-making inventions and discoveries, will be clarified.

We have recently learned that a Newcomen engine stood for many years on the shores of Newark Bay and was finally junked because no institution would give it a permanent home. The big Corliss beam engine that ran the Pullman Works met a similar fate. It is quite conceivable that there are still in existence many of these technical relics, in some inconspicuous corner.

We should like to appeal to your readers who may know of the location of some invaluable pieces of apparatus which might well find a home in the first industrial museum in America. If so, their communications, addressed to the director of the Rosenwald Industrial Museum, 300 West Adams Street, Chicago, will be most welcome.

JOHN A. MALONEY,
Assistant to the director,
Rosenwald Industrial Museum.

Chicago.

New Card of Extras Issued

Manufacturers of Cold-Finished Steel Bars and Shafting Announce Price Revisions

MANUFACTURERS of cold-finished steel bars and shafting issued a card of extras on July 15 which supersedes the previous card, dated Oct. 17, 1927. Hereafter this will be known as the "card of extras" instead of the "standard classification of extras" and it will be included in the "Manufacturers' Standard Practices."

Features of the new card of extras are briefly summarized in the following paragraphs:

There are no changes in the size extras on rounds, squares, hexagons and flats.

Extras for odd and intermediate sizes.—There are no changes except that the "odd size" extra applies on specifications for less than 20,000 lb. of one size and grade for shipment at one time.

Extras for turned and polished steels.—These have been increased and in some instances, especially on smaller sizes, advances are substantial. Extras shown under date of Oct. 17, 1927, and preceding cards were entirely too low and manufacturers have been handling this character of business at a loss. The new extras will permit the manufacture of this character of material at a reasonable profit.

Extras for chamfering.—No changes.

Boxing and burlapping.—The only change is the omission of the "burlapping extra of 15c. per 100 lb." While railroads require shippers to burlap (both ends and middle), all less-than-carload shipments weighing less than 24,000 lb., manufacturers recognize the increased tonnage handled by electric traction lines, steamship companies and motor truck haulage, and on these movements burlapping, required by railroads, is not necessary.

Extras for special composition.—It will be observed that this is set up in a different way. Extras A, B, C, D, G, H, I, J and K are the same as in the previous card, though some of these—B, C, D, I, J and K—were not published. The principal changes, in E and F, represent a reduction.

Extras for special finish.—This displaces the extras in the Oct. 17, 1927, card applying on "piston rod steel." The new extras are the same as the old on sizes 1⅛ in. and larger, while on the smaller sizes they are higher. This is because most of the product is now made by the cold drawing, grinding and polishing process, the cost of which is represented by the new extras. Heretofore manufacturers have used a special list (unpublished) to cover cold drawn, ground and highly polished bars and the new extras on sizes smaller than 1⅛ in. are substantially the same as the unpublished list.

Extras for long and short lengths.—It will be noted that the extras for lengths shorter than 84 in. have been increased slightly and that some new brackets have been added. Extras for lengths 84 in. to 119⅛ in. are unchanged, as are the extras for lengths longer than 24 ft. Two new paragraphs have been added. These are explanatory.

Quantity differentials.—The extra for lots (one size and grade for shipment at one time) less than 500 lb. has been increased from $1 to $1.50, while the extra for lots—500 lb. to 999 lb. has been increased from 75c. to 90c. per 100 lb. The new extras represent the actual cost of handling these small quantities. Prior to this, manufacturers have not been fairly compensated for the heavy cost of getting out these small lots, which the jobber is so much better equipped to handle. No changes have been made on lots 1000 lb. to 1999 lb., or on lots 2000 lb. to 3999 lb.

Extras for accuracy.—These have been revised completely. In most instances, the new extras are lower than those shown in the previous card, and it will be observed that the headings are different. In other words, the extras for oversize accuracy have been omitted, as it is the manufacturer's practice to work from a given size to a specified tolerance undersize. The revision of these extras clarifies a condition which in previous cards was sometimes misunderstood.

Standard manufacturing tolerances.—These are unchanged.

The new card of extras is to become effective at once. However, as most buyers are under contract for the third quarter, it will not become effective in such cases until Oct. 1, the beginning of the next contract period. Buyers under contract for the third quarter will be given the benefit of the new "extras for chemical composition," as all changes here represent a reduction.

Committee Will Advise On Census of Manufactures

WASHINGTON, July 23.—George G. Crawford, president, Tennessee Coal, Iron & Railroad Co., Birmingham, Walter S. Tower, Bethlehem Steel Co., Bethlehem, L. S. Horner, president, Niles-Bement-Pond Co., New York, and Clarence M. Wooley, president, American Radiator Co., New York, are among a list of 18 members of an advisory committee on census of manufactures invited by Secretary of Commerce R. P. Lamont to assist in planning for the 1930 census of manutures, which is intimately associated with the coming fifteenth decennial census. The committee will meet at the Department of Commerce here on Thursday of the present week for the primary purpose of discussing coordination of statistics covering the nation's manufacturing output with the census of distribution data to be collected next year for the first time.

The advisory committee is made up of manufacturers, economists, statisticians and others. This is the third census advisory committee which has been formed, the other two, the advisory committee for the census of unemployment and the advisory committee for the census of distribution, having held sessions in the department last week. It is planned to organize a fourth advisory committee in connection with the census of population.

In a general sense, according to Secretary Lamont, discussion at Thursday's conference will include the scope of the manufactures census schedules, the establishment of a line of demarcation between the manufactures census and the census of distribution, and determination of additional inquiries, if any, which it might be desirable to include to throw more light upon the distribution enumeration, which represents a new government undertaking.

According to officials of the Census Bureau manufacturing activities are classified, for census purposes, into 340 separate industries, of which 114 are canvassed by means of a general schedule and 226 by special schedules. The combined number of inquiries on all the manufactures schedules used at the census of 1927 amounted to nearly 15,000. It is believed to be highly essential to consider special schedules, industry by industry, and that recommendations regarding a particular schedule should be solicited only from the industry or industries concerned.

The suggestion has been advanced that the question whether the rather detailed inquiry with regard to the numbers and horsepower of the several classes of prime movers (steam engines, steam turbines, hydro-turbines, etc.) in use in manufacturing establishments shall be carried on the schedules at every biennial census of manufactures or shall be carried only at alternate censuses. This subject and that regarding quantities of coal consumed are among the many topics which the committee probably will discuss.

Secretary Lamont Appoints Unemployment Committee

WASHINGTON, July 23.—Complying with a resolution adopted at the recent meeting of the advisory committee for the unemployment census that a small executive committee be named to cooperate with the Department of Commerce in drawing up an appropriate questionnaire and in making plans for the unemployment enumeration, Secretary of Commerce R. P. Lamont has extended invitations to the following persons to become members of the committee:

Dr. Joseph H. Willetts, University of Pennsylvania, Philadelphia; William Green, president, American Federation of Labor, Washington; J. Chester Brown, chief statistician, Bureau of Labor Statistics, Department of Labor, Washington; William A. Berridge, Metropolitan Life Insurance Co., New York; George E. Roberts, vice-president, National City Bank, New York; L. W. Wallace, American Federated Engineering Societies, Washington; Dr. E. Dana Durand, chief, statistical research division, Bureau of Foreign and Domestic Commerce, Washington.

The Rudel-Ryder Machinery Co., Ltd., 159 Bay Street, Toronto, Ont., has been appointed exclusive selling agent for the products of the Geometric Tool Co., New Haven, Conn.

Iron and Steel Markets

No Marked Recession in Sight

Steel Production Well Maintained Although Operations Are Tapering at Pittsburgh—Southern Pig Iron Sellers More Aggressive

SIGNS of a letup in the activity of the iron and steel industry are not lacking, but there is no indication of a recession of customary summer proportions. A further decline has occurred in the consumption of automobile steels, which is now 25 to 35 per cent below the peak rate of May, and the aggressive selling of Alabama pig iron is being felt in a wider area, but steel ingot output as a whole shows little change and foundry melt in the North and East is well maintained.

While steel production in the Pittsburgh district is reported as tapering, operations are holding up in other centers and nothing resembling an appreciable reduction is in sight. Steel Corporation subsidiaries continue to produce at a capacity rate.

The buoyancy of the scrap market, particularly in open-hearth grades, is also an earnest of sustained steel output. Heavy melting grade at Pittsburgh has advanced 25c. a ton to $18.75.

In the pig iron market the broadening scope of Southern competition reflects a decline in Birmingham consumption and a corresponding need for business from other markets. The Alabama subsidiary of the Steel Corporation is shipping against orders for 50,000 tons each from a New Jersey cast iron pipe plant and a Pacific Coast steel works, and has booked 12,000 tons for delivery in Japan.

In eastern Pennsylvania a large consumer has bought a trial tonnage of Southern basic at $19.50, delivered, or 50c. a ton below the price at furnace in that district. In Chicago, Alabama foundry iron is freely offered at $14, Birmingham, and in some instances at $13.50.

The decline in steel specifications from the automobile industry is regarded as temporary, being attributed chiefly to the changing models, and a recovery in releases is expected in about 30 days.

Demand from other consuming lines is active. Pipe lines, which have become a major outlet for steel, have added large tonnages to mill books during the week. The Milwaukee maker of electrically welded pipe will supply 191,000 tons for the longest gas line ever laid, to be built for the Central States Natural Gas Co. from Amarillo, Tex., to Chicago, a distance of 950 miles. The Republic Iron & Steel Co., which recently undertook the making of electric-welded pipe, has taken an order for 200 miles of 6-in. (8000 tons) for the Southwestern Gas Co. A pipe line for Vancouver, B. C., calling for 5000 tons of plates, has been placed with a local fabricator.

Structural steel demand continues at high tide. Computed orders for June, as reported by the Department of Commerce, were 354,200 tons, a total exceeded only once—in March, this year, when returns showed bookings of 358,000 tons. Orders for the first half, at 1,936,500 tons, showed a gain of 23 per cent over the corresponding period in 1928. Awards for the week, at 38,000 tons, were of average proportions, while new inquiries, totaling 34,000 tons, included 13,200 tons for a New York subway section.

Canadian structural work in early prospect is estimated at 100,000 tons, one-half of the total being for the provinces of Ontario and Quebec.

Railroad buying is featured by rail orders of 15,000 tons each, placed by the Pennsylvania and the Northern Pacific. The Nova Scotia mill has been awarded 11,000 tons by the Newfoundland Government. The Wabash has bought 25 large freight locomotives and the Texas & Pacific is in the market for 15. Several large car inquiries are expected from Western roads, among them the Santa Fe, the Union Pacific and the Illinois Central.

Plates, influenced to a large extent by requirements for pipe, are in heavy demand at Chicago, where they accounted for 20 per cent of the mill bookings of the week. This product is also active in other districts. Eastern mills welcome the delay in Governmental approval of contracts for merchant ships and cruisers, preferring to receive the steel specifications when the present pressure for plates has been relieved.

Steels used by the automotive industry are growing easier in price. In sheets the need for new business is becoming more of a factor in the common finishes and the heavier gages. On black sheets 2.85c., Pittsburgh, has become general, 2.95c. having virtually disappeared even as an asking price. Galvanized sheets are being sold rather commonly at 3.60c., Pittsburgh, to consumers and at 3.50c. to jobbers. Sales of heavy gage blue annealed have been made at 2.10c., for No. 10 gage, and in special instances at 2c. Tin mill black plate has been sold at 2.90c., Pittsburgh, a decline of $2 a ton from the recent ruling level.

Sales of steel sheets in the first half of the year, as reported by the independent manufacturers, averaged 380,000 tons a month, or 25 per cent above the average of the corresponding period in 1928. Shipments amounted to 362,000 tons a month, 14½ per cent better than last year. Production kept pace with shipments, averaging 365,000 tons a month.

Both of THE IRON AGE composite prices are unchanged, pig iron at $18.42 a gross ton and steel at 2.412c. a lb.

A Comparison of Prices

Market Prices at Date, and One Week, One Month and One Year Previous, Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron, Per Gross Ton:	July 23, 1929	July 16, 1929	June 25, 1929	July 24, 1928
No. 2 fdy., Philadelphia	$21.76	$21.76	$21.76	$20.26
No. 2, Valley furnace	18.50	18.50	18.50	16.50
No. 2 Southern, Cin'ti	17.69	17.69	18.69	19.19
No. 2, Birmingham	14.50	14.50	15.00	15.50
No. 2 foundry, Chicago*	20.00	20.00	20.00	17.50
Basic, del'd eastern Pa.	20.25	20.25	20.25	19.00
Basic, Valley furnace	18.50	18.50	18.50	16.00
Valley Bessemer, del'd P'gh	20.76	20.76	20.76	18.76
Malleable, Chicago*	20.00	20.00	20.00	17.50
Malleable, Valley	19.00	19.00	19.00	17.00
Gray forge, Pittsburgh	19.76	19.76	19.76	18.01
L. S. charcoal, Chicago	27.04	27.04	27.04	27.04
Ferromanganese, furnace	105.00	105.00	105.00	105.00
Rails, Billets, etc., Per Gross Ton:				
Rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Light rails at mill	36.00	36.00	36.00	36.00
Rerolling billets, Pittsburgh	35.00	35.00	34.00	32.00
Sheet bars, Pittsburgh	35.00	35.00	35.00	32.00
Slabs, Pittsburgh	35.00	35.00	35.00	32.00
Forging billets, Pittsburgh	40.00	40.00	39.00	38.00
Wire rods, Pittsburgh	42.00	42.00	42.00	42.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.85	1.85	1.85	1.85
Finished Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Bars, Pittsburgh	1.95	1.95	1.95	1.85
Bars, Chicago	2.05	2.05	2.05	2.00
Bars, Cleveland	1.95	1.95	1.95	1.85
Bars, New York	2.29	2.29	2.29	2.19
Tank plates, Pittsburgh	1.95	1.95	1.95	1.85
Tank plates, Chicago	2.05	2.05	2.05	2.00
Tank plates, New York	2.22½	2.22½	2.22½	2.17½
Structural shapes, Pittsburgh	1.95	1.95	1.95	1.85
Structural shapes, Chicago	2.05	2.05	2.05	2.00
Structural shapes, New York	2.19½	2.19½	2.19½	2.14½
Cold-finished bars, Pittsburgh	2.30	2.30	2.30	2.10
Hot-rolled strips, Pittsburgh	1.90	1.90	1.90	1.75
Cold-rolled strips, Pittsburgh	2.75	2.75	2.75	2.90

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

Finished Steel,	July 23, 1929	July 16, 1929	June 25, 1929	July 24, 1928
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 24, P'gh	2.85	2.85	2.85	2.60
Sheets, black, No. 24, Chicago dist. mill	3.05	3.05	3.05	2.75
Sheets, galv., No. 24, P'gh	3.60	3.60	3.60	3.40
Sheets, galv., No. 24, Chicago dist. mill	3.80	3.80	3.80	3.60
Sheets, blue, No. 13, P'gh	2.35	2.35	2.35	2.10
Sheets, blue, No. 13, Chicago dist. mill	2.45	2.45	2.45	2.20
Wire nails, Pittsburgh	2.65	2.65	2.65	2.55
Wire nails, Chicago dist mill	2.70	2.70	2.70	2.60
Plain wire, Pittsburgh	2.50	2.50	2.50	2.40
Plain wire, Chicago dist. mill	2.55	2.55	2.55	2.45
Barbed wire, galv., P'gh	3.30	3.30	3.30	3.20
Barbed wire, galv., Chicago dist. mill	3.35	3.35	3.35	3.25
Tin plate, 100 lb. box, P'gh	$5.35	$5.35	$5.35	$5.25
Old Material, Per Gross Ton:				
Heavy melting steel, P'gh	$18.75	$18.50	$18.25	$14.25
Heavy melting steel, Phila	16.50	16.50	16.00	13.00
Heavy melting steel, Ch'go	14.75	14.75	14.75	12.25
Carwheels, Chicago	14.00	14.00	14.00	12.75
Carwheels, Philadelphia	16.50	16.50	16.00	15.50
No. 1 cast, Pittsburgh	15.50	15.50	15.50	14.25
No. 1 cast, Philadelphia	16.50	16.50	16.50	15.50
No. 1 cast, Ch'go (net ton)	14.50	14.50	14.50	13.50
No. 1 RR. wrot., Phila	16.00	16.00	16.00	13.50
No. 1 RR. wrot., Ch'go (net)	13.50	13.50	13.50	10.75
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$2.75	$2.75	$2.75	$2.60
Foundry coke, prompt	3.75	3.75	3.75	3.75
Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	18.12½	18.12½	18.12½	14.75
Electrolytic copper, refinery	17.75	17.75	17.75	14.50
Tin (Straits), New York	47.25	47.25	44.25	48.00
Zinc, East St. Louis	6.80	6.70	6.70	6.20
Zinc, New York	7.15	7.05	7.05	6.55
Lead, St. Louis	6.55	6.55	6.80	6.00
Lead, New York	6.75	6.75	7.00	6.20
Antimony (Asiatic), N. Y.	8.75	8.25	8.75	9.37½

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Pittsburgh

Less Tension in Production—Sheet Still Behind in Deliveries but Prices Are Weak

PITTSBURGH, July 23.—Two or three companies in this district have taken out open-hearth furnaces in the last week. Although the need for repairs is held responsible for this curtailment in one of the cases, steel production in the Pittsburgh district is beginning to taper. The larger companies, in the face of declining specifications in many products, are no longer pushing their steel capacity to the limit. The condition is reflected in slightly lighter shipments of ferroalloys and furnace coke, as well as in a generally easier condition in the semi-finished steel market, the supply of this commodity now being fully equal to the requirements of all the large companies.

The present month is expected to show a slight decline in shipments of nearly all products, probable exceptions being wire and plates. Had it not been for the hot weather early in the month, sheet production would likely have been equal to June, as sheet mills are still behind in deliveries and have enough business on their books for four to six weeks operations.

Backlogs on bars and shapes have declined materially and strip steel and cold-finished steel bars are now being moved in the two or three weeks usually required for rolling.

Makers of lapweld pipe in the larger sizes are preparing to quote on several large projects, and with present operations at a fairly high rate, the second half of the year is expected to prove more profitable than the first.

Sheet prices have shown additional weakness and the maximum quotations of 2.85c. and 3.70c., Pittsburgh, on black and galvanized sheets, respectively, are no longer applying on any important tonnage. The general market has settled to prices $2 under the above figures with galvanized sheets now being commonly sold to jobbers at 3.50c. On blue annealed light plates, the product of continuous strip mills are being sold at 2.10c and even less, although makers of blue annealed sheets operating jobbing mills are holding to 2.20c. Tin mill black plate has been sold by several producers for 2.90c., Pittsburgh, a concession of $2 a ton from recent levels. The higher asking price on cold-rolled strip steel is no longer effective and one or two cases of shading the 2.75c. quotation are reported.

The pig iron and coke markets are quiet. A steel company in this district is reported to have bought a substantial tonnage of basic iron in the last week, but the price was not disclosed. Other sales are of small tonnage, but the aggregate is fairly satisfactory. The scrap market is stronger and No. 1 heavy melting steel is now quotable at $18.50 to $19.

Pig Iron.—Activity is still confined largely to small fill-in orders, although one large sale of basic pig iron to a non-integrated steel company in this district is reported. The Westinghouse Electric & Mfg. Co. has placed the second-half requirements of its Trafford City plant with at least three

producers. The price on the foundry grade was $20.01 delivered. This figures back to $19, Pittsburgh local furnace, and represents a slight concession made by the Valley makers who shared in the business. However, the Valley prices of $18.50 for foundry and basic iron, and $19 for malleable and Bessemer are being strictly adhered to in small sales in the immediate Valley district and other points at which the Pittsburgh furnace does not have a freight rate advantage. Shipments against contracts are steady but not of large proportions. A number of consumers are said to have placed small tonnages recently to tide them over the summer months, as they have sufficient iron on previous contracts to keep them from going into the market at this time for any considerable tonnage. The Standard Sanitary Mfg. Co. has issued one or two small inquiries for supplementary tonnages at its Pittsburgh district plants, and may not enter the market for any substantial tonnage at this time. This method of buying in small lots has probably added strength to the market, as furnaces are not inclined to accept lower prices except to build up substantial backlogs. Furnace stocks are not accumulating and many makers are not now prepared to quote on large tonnages for delivery in the immediate future. The Claire furnace of the Davison Coke & Iron Co. was blown out on July 23 for relining and the same company's Cherry Valley stack is expected to go in during the first week of August.

Prices per gross ton, f.o.b. Valley furnace:

Basic	$18.50
Bessemer	19.00
Gray forge	18.00
No. 2 foundry	18.50
No. 3 foundry	18.00
Malleable	19.00
Low phos., copper free	27.00

Freight rate to Pittsburgh or Cleveland district, $1.76.

Prices per gross ton, f.o.b. Pittsburgh district furnace:

Basic	$19.00
No. 2 foundry	19.00
No. 3 foundry	18.50
Malleable	19.50

Freight rates to points in Pittsburgh district range from 63c. to $1.13.

Semi-Finished Steel.—The supply of crude steel in this and nearby districts is now of about normal proportions, although open-hearth production must be maintained at a very high rate to maintain this situation. Two or three companies in the district have put out furnaces in the last week, but not because stocks are accumulating. Integrated steel makers who normally have a small surplus of semi-finished steel for sale in the open market have nothing to offer at this time. Several large buyers of billets and slabs have not yet contracted for their third quarter requirements and the price situation is unchanged, with producers holding to $35, Pittsburgh or Youngstown, and buyers refusing to pay more than $34. On sheet bars the price is well established at $35, with a few companies asking $36 on spot tonnage. Very little business has been taken at the latter figure. Wire rods are steady at $42, Pittsburgh or Cleveland, and shipments against contracts are high for this time of the year.

Bars, Shapes and Plates.—Tonnage releases are still ahead of expectations, but some makers report a slight decline as compared with the previous month. Mills are having considerable difficulty satisfying customers on plate shipments, although the situation has eased off slightly in the last month. It is still difficult to get deliveries in less than six weeks and one large maker has enough business booked to assure capacity operation for at least two months. Demand from barge builders and railroad equipment makers is responsible to a large extent for this situation, but there is a satisfactory movement into other consuming channels. Bars are moving well, with delivery promises averaging from three to four weeks. Reinforcing steel is accounting for a large tonnage and there is a steady demand from screw machine product makers and cold-finishing mills. Agricultural implement makers served by Pittsburgh companies have not curtailed their steel requirements. Shapes are the least active of the heavy hot-rolled products. However, the larger fabricating shops in the district are well occupied and the volume of pending business is satisfactory for this time of the year. Plates are holding firmly at 1.95c., Pittsburgh, while there are occasional concessions of $1 a ton on shapes and bars.

Wire Products.—Demand for manufacturers' wire is fully equal to that of June, but shipments of fencing, barbed wire and other products going to the farms have fallen off slightly. In the aggregate the wire business is considerably ahead of last year and prospects are encouraging. The nail market is characteristically quiet, and continued price weakness is reported in outlying territory, where quoting on a mill base is more common than naming a Pittsburgh base. Pittsburgh mills are meeting this competition in some instances, but have not had to go below 2.65c. per lb., Pittsburgh, in territory east of here. The 2.75c. price also applies on a limited amount of business. On wire no deviations from 2.50c. to 2.60c., Pittsburgh or Cleveland, are reported.

Tubular Goods.—Mills in the Pittsburgh and Youngstown districts are very optimistic over the prospective line pipe business and are prepared to quote on several of the large projects now being considered. Lap-weld and seamless mills are operating at about 60 per cent on an average, although this figure is based on considerable capacity that will probably not be utilized again in the manufacture of pipe. Demand for standard pipe is steady, but not active, while shipments of mechanical and boiler tubing are holding up well.

Sheets.—Shipments of sheets during July will probably show a slight decline as compared with June, but they may be close to record proportions for this month. Some curtailment in production in July has been occasioned by the hot weather, but this was not a factor during the last week and the leading interest operated its mills at about 98 per cent of capacity. The greater part of the falling off in demand may be traced to curtailment in the operations of makers of medium-priced automobiles, as demand from other consuming industries has not declined appreciably. Makers of electrical refrigerators are still requiring large tonnages of sheets and the radio industry is growing in importance as a user. Prices are not

The Iron Age Composite Prices

Finished Steel

July 23, 1929, 2.412c. a Lb.

One week ago	2.412c.
One month ago	2.412c.
One year ago	2.319c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products make 87 per cent of the United States output of finished steel.

	High		Low	
1929	2.412c.,	April 2;	2.391c.,	Jan. 8
1928	2.391c.,	Dec. 11;	2.314c.,	Jan. 3
1927	2.453c.,	Jan. 4;	2.293c.,	Oct. 25
1926	2.453c.,	Jan. 5;	2.403c.,	May 18
1925	2.560c.,	Jan. 6;	2.396c.,	Aug. 18

Pig Iron

July 23, 1929, $18.42 a Gross Ton

One week ago	$18.42
One month ago	18.63
One year ago	17.04
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low	
1929	$18.71,	May 14;	$18.29,	March 19
1928	18.59,	Nov. 27;	17.04,	July 24
1927	19.71,	Jan. 4;	17.54,	Nov. 1
1926	21.54,	Jan. 5;	19.46,	July 13
1925	22.50,	Jan. 13;	18.96,	July 7

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base per Lb.
F.o.b. Pittsburgh mill	1.95c.
F.o.b. Chicago	2.05c.
Del'd Philadelphia	2.27c.
Del'd New York	2.29c.
Del'd Cleveland	1.92½c. to 1.95c.
F.o.b. Cleveland	1.90c. to 1.95c.
F.o.b. Lackawanna	2.05c.
F.o.b. Birmingham	2.15c.
C.i.f. Pacific ports	2.35c.
F.o.b. San Francisco mills	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills, 40, 50, 60-ft.	2.05c.
F.o.b. Pittsburgh mills, cut lengths	2.30c.
F.o.b. Birmingham, mill lengths	2.15c.

Rail Steel

F.o.b. mills, east of Chicago dist.	1.85c. to 1.90c.
F.o.b. Chicago Heights mill	1.95c.
Del'd Philadelphia	2.27c.

Iron

Common iron, f.o.b. Chicago	2.05c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	2.12c.
Common iron, del'd New York	2.14c.

Tank Plates

	Base per Lb.
F.o.b. Pittsburgh mill	1.95c.
F.o.b. Chicago	2.05c.
F.o.b. Birmingham	2.15c.
Del'd Cleveland	2.14c.
Del'd Philadelphia	2.15c.
F.o.b. Coatesville	2.05c.
F.o.b. Sparrow Point	2.05c.
F.o.b. Lackawanna	2.05c.
Del'd New York	2.22½c.
C.i.f. Pacific ports	2.35c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh mill	1.95c.
F.o.b. Chicago	2.05c.
F.o.b. Birmingham	2.15c.
F.o.b. Lackawanna	2.05c.
F.o.b. Bethlehem	2.05c.
Del'd Cleveland	2.14c.
Del'd Philadelphia	2.01c. to 2.06c.
Del'd New York	2.14½c.
C.i.f. Pacific ports	2.35c.

Hot-Rolled Hoops, Bands and Strips

	Base per Lb.
6 in. and narrower, P'gh	2.00c.
Wider than 6 in., P'gh	1.90c.
6 in. and narrower, Chicago	2.20c.
Wider than 6 in., Chicago	2.10c.
Cooperage stock, P'gh	2.20c.
Cooperage stock, Chicago	2.30c.

Cold-Finished Steel

	Base per Lb.
Bars, f.o.b. Pittsburgh mill	2.30c.
Bars, f.o.b. Chicago	2.30c.
Bars, Cleveland	2.35c.
Shafting, ground, f.o.b. mill	*2.65c. to 3.60c.
Strips, P'gh	2.75c.
Strips, Cleveland	2.75c.
Strips, del'd Chicago	3.05c. to 3.15c.
Strips, Worcester	2.90c. to 3.00c.
Fender stock, No. 20 gage, Pittsburgh or Cleveland	4.25c.

*According to size.

Wire Products

(Carload lots, f.o.b. Pittsburgh and Cleveland, to jobbers and retailers.)

	Base per Keg
Wire nails	$2.65 to $2.75
Galvanized nails	4.65 to 4.75
Galvanized staples	3.35 to 3.45
Polished staples	3.10 to 3.20
Cement coated nails	2.65 to 2.75
	Base per 100 Lb.
Bright plain wire, No. 6 to No. 9 gage	$2.50 to $2.60
Annealed fence wire	2.65 to 2.75
Spring wire	3.50 to 3.60
Galv'd wire, No. 9	3.10 to 3.20
Barbed wire, galv'd	3.30 to 3.40
Barbed wire, painted	3.05 to 3.15
Woven wire fence (per net ton to retailers)	65.00

Chicago district mill and delivered Chicago prices are $1 per ton above the foregoing. Birmingham mill prices $3 a ton higher; Worcester, Mass. (wire), mill $8 a ton higher on production of that plant; Duluth, Minn., mill $2 a ton higher; Anderson, Ind., $1 higher.

Cut Nails

	Per 100 Lb.
Carloads, Wheeling, Reading or Northumberland, Pa.	$2.70
Less carloads, Wheeling or Reading	2.80

Light Plates

No. 10, blue annealed, f.o.b. P'gh.	2.10c. to 2.20c.
No. 10, blue annealed, f.o.b. Chicago dist.	2.30c.
No. 10, blue annealed, del'd Phila.	2.42c. to 2.52c.
No. 10, blue annealed, B'ham	2.35c.

Sheets

Blue Annealed

	Base per Lb.
No. 13, f.o.b. P'gh	2.25c. to 2.35c.
No. 13, f.o.b. Chicago dist.	2.45c.
No. 13, del'd Philadelphia	2.67c.
No. 13, blue annealed, B'ham	2.50c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh	2.85c.
No. 24, f.o.b. Chicago dist. mill	3.05c.
No. 24, del'd Philadelphia	3.17c. to 3.27c.
No. 24, f.o.b. Birmingham	3.00c. to 3.10c.

Metal Furniture Sheets

No. 24, f.o.b. P'gh	4.10c. to 4.20c.

Galvanized

No. 24, f.o.b. Pittsburgh	3.50c. to 3.60c.
No. 24, f.o.b. Chicago dist. mill	3.80c.
No. 24, del'd Cleveland	3.69c. to 3.79c.
No. 24, del'd Philadelphia	3.92c. to 4.02c.
No. 24, f.o.b. Birmingham	3.75c. to 3.85c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.90c. to 3.00c.
No. 28, f.o.b. Chicago dist. mill	3.10c.

Automobile Body Sheets

No. 28, f.o.b. Pittsburgh	4.10c.

Long Ternes

No. 24, 8-lb. coating, f.o.b. mill	4.00c.

Vitreous Enameling Stock

No. 24, f.o.b. Pittsburgh	3.90c.

Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills	$5.35
Standard cokes, f.o.b. Gary	5.45

Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)
(Per Package, 20 x 28 in.)

8-lb. coating I.C.	$11.20
15-lb. coating I.C.	14.00
20-lb. coating I.C.	15.30
25-lb. coating I.C.	$16.70
30-lb. coating I.C.	17.75
40-lb. coating I.C.	19.85

Alloy Steel Bars

(F.o.b. makers' mill)

Alloy Quality Bar Base, 2.65c. to 2.75c. per Lb.

S.A.E. Series Numbers		Alloy Differential
2000	(½% Nickel)	0.25
2100	(1½% Nickel)	0.55
2300	(3½% Nickel)	1.50
2500	(5% Nickel)	2.25
3100	Nickel Chromium	0.55
3200	Nickel Chromium	1.35
3300	Nickel Chromium	3.80
3400	Nickel Chromium	3.20
4100	Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50
4100	Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600	Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel)	1.05
5100	Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100	Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100	Chromium Spring Steel	0.20
6100	Chromium Vanadium Bars	1.20
6100	Chromium Vanadium Spring Steel	0.95
9250	Silicon Manganese Spring Steel (flats)	0.25
	Rounds and squares	0.50
	Chromium Nickel Vanadium	1.50
	Carbon Vanadium	0.95

Above prices are for hot rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is ¾c. per lb. higher. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis.

Billets under 4 x 4 in. carry the steel bar base. Slabs with a sectional area of 16 in. or over carry the billet price. Slabs with sectional area of less than 16 in. or less than 2½ in. thick, regardless of sectional area, take the bar price.

Rails

	Per Gross Ton
Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	36.00
Light (from rail steel), f.o.b. mill	34.00
Light (from billets), f.o.b. Ch'go mill	36.00

Track Equipment

	Base per 100 Lb.
Spikes, ⅜ in. and larger	$2.80
Spikes, ½ in. and smaller	2.80
Spikes, boat and barge	3.00
Tie plate, steel	2.15
Angle bars	$2.75
Track bolts, to steam railroads	$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel Inches	Black	Galv.	*Iron* Inches	Black	Galv.
⅛	45	19½	¼ and ⅜	+11	+36
¼ to ¾	51	25½	½	23	5
½	56	42½	¾	28	11
¾	60	48½	1 and 1¼	31	15
1 to 3	62	50½	1½ and 2	35	18

Lap Weld

2	55	43½	2	23	9
2½ to 6	59	47½	2½ to 3½	28	13
7 and 8	56	43½	4 to 6	30	17
9 and 10	54	42½	7 and 8	29	16
11 and 12	53	40½	9 to 12	26	11

Butt Weld, extra strong, plain ends

⅛	41	24½	¼ and ⅜	+13	+48
¼ to ¾	47	30½	½	23	7
½	53	42½	¾	28	12
¾	58	47½	1 to 2	34	18
1 to 1½	60	49½			
2 to 3	61	50½			

Lap Weld, extra strong, plain ends

2	53	42½	½	29	13
2½ to 4	57	46½	2½ to 4	34	20
4½ to 6	56	45½	4½ to 6	33	19
7 to 8	52	39½	7 and 8	31	17
9 and 10	45	32½	9 to 12	21	8
11 and 12	44	31½			

On carloads the above discounts on steel pipe are increased on block by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Steel		*Charcoal Iron*	
2 in. and 2¼ in.	40	1½ in.	1
2½ in.—2¾ in.	48	1¾ in.	8
3 in.	54	2 in.—2¼ in.	13
3¼ in.—3¾ in.	56	2½ in.—2¾ in.	16
4 in.	59	3 in.	17
4½ in. to 6 in.	48	3¼ in. to 3½ in.	18
		4 in.	20
		4½ in.	21

On lots of a carload or more, the above base discounts are subject to a preferential of two fives on steel and of 10 per cent on charcoal iron tubes. Smaller quantities are subject to the following modifications from the base discounts:

Lap Welded Steel—Under 10,000 lb., 6 points under base and one five; 10,000 lb. to carload, 4 points under base and two fives. Charcoal Iron—Under 10,000 lb., 2 points under base; 10,000 lb. to carload, base and one five.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	63	3 in.	48
1¼ to 1½ in.	55	3¼ to 3½ in.	50
1¾ in.	39	4 in.	53
2 to 2¼ in.	34	4½, 5 and 6 in.	42
2½ to 2¾ in.	42		

Hot Rolled

2 and 2¼ in.	40	3¼ to 3½ in.	56
2½ and 2¾ in.	48	4 in.	59
3 in.	54	4½, 5 and 6 in.	48

Beyond the above base discounts a preferential discount of 5 per cent is allowed on carload lots. On less than carloads to 10,000 lb. base discounts are reduced 4 points with 5 per cent preferential; on less than 10,000 lb., base discounts are reduced 6 points, with no preferential. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage take mechanical tube list and discounts. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30%, base (carloads)	55
Carbon, 0.30% to 0.40%, base	50

Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

what they should be, considering the heavy backlogs of most of the large producers. The 3.70c. and 2.95c., Pittsburgh, quotations on galvanized and black sheets respectively are now applying on scarcely any business and, although these figures are still quoted, the market has settled to 2.85c. on black sheets and 3.60c. on galvanized. Jobbers are having little difficulty in placing business at the $2 concession usually offered them on galvanized sheets. Automobile companies are said to be able to buy black sheets at 2.75c., base, but, as this business cannot be classified as one-pass material on which the price is usually based, it is not representative of the market. High differentials for pickling and other treatment enable manufacturers to secure an adequate profit on this business which they would not be able to get on the ordinary one-pass product. Large makers in this territory are holding firmly to the 2.20c. and 2.35c., Pittsburgh, quotations on light plates and blue annealed sheets and are making no effort to compete with wide strips, which are sold at lower prices. Weakness has developed on tin mill black plate, which is now quotable at 2.90c. to 3c., Pittsburgh.

Tin Plate. — Demand continues rather steady and specifications for September tonnages from the container manufacturers have been satisfactory. In some cases mills will begin rolling this tonnage some time next week, as present backlogs are not sufficient to maintain the present rate of operations for any length of time. Mills in the district are well over a 90 per cent rate in operations and will continue these schedules for several weeks unless current demand declines suddenly.

Strip Steel.—Some makers of strip steel report heavier tonnage releases thus far in July than were received during the corresponding June period, but demand is rather spotty for both the hot and cold-rolled material. Makers who depend for the bulk of their tonnage on the manufacturers of medium-priced automobiles have been forced to curtail operations somewhat since the first of the month, but a fairly well diversified demand continues from other miscellaneous users of strips. Deliveries are no longer extended for more than two or three weeks except in isolated cases where mill facilities are largely responsible. On hot-rolled strip, prices are well established at 2c., Pittsburgh, for 6-in. and narrower, and 1.90c. for the wider sizes. Concessions of $1 to $2 a ton from the 2.75c., Pittsburgh, price on cold-rolled strip have been reported, but, so far as can be determined, this shading has always occurred under conditions that could not be said to govern the market. Makers generally have refused to meet quotations below 2.75c., although the 2.85c. price, formerly quoted on small-lot business, is gradually disappearing.

Cold-Finished Steel Bars.—Revision of extras on cold-finished steel bars, the details of which will be found elsewhere in this issue, results in slight price reductions when applied to the list as a whole. The new prices will not apply on third quarter tonnage, which is largely covered by contract. July business is holding up to June levels, but operations are largely on a week-to-week basis. Improvement in demand from the automobile industry is expected in a short time, but present specifications do not reflect this tendency. The price of 2.30c., Pittsburgh, is being well maintained.

Bolts, Nuts and Rivets.—Operations have declined slightly from the high rate of the spring months, but the industry as a whole is still running at 60 to 65 per cent of theoretical capacity, an unusually high level for this time of the year. Demand is well diversified, with railroad car builders taking a large tonnage and jobbers steadily requiring shipments. Price conditions are encouraging, with bolts and nuts unchanged at 70 per cent off list and large rivets holding at $3.10 per 100 lb., Pittsburgh or Cleveland.

Coal and Coke.—The furnace coke market shows little change from the previous week, with demand rather quiet and production somewhat higher than the present requirements of the consuming industry. Prices are unchanged at $2.75 to $2.85 a net ton, Connellsville, although producers are asking slightly higher figures on future tonnage in expectation of a stronger demand. On the foundry grade, both shipments and new business are at a low point and the situation is reflected in price uncertainty on all except the premium brands of coke, which are firm at $4.85, ovens. Coal production is holding up fairly well for this time of the year, but no price recovery is expected before fall.

Old Material.—The scrap market has developed further strength in the last week, and No. 1 heavy melting steel is now quotable at $18.50 to $19, the average being an advance of 25c. Although heavy melting steel is offered at some points at $18.75, mills would have difficulty in purchasing any quantity of first quality steel at that figure. One mill in the district which accepts car sides as No. 1 steel paid $18 for a considerable tonnage, and as other consumers will not take car sides at less than $1 a ton under the No. 1 grade, this purchase also bears out the strength of the market. Hydraulic compressed sheets are theoretically stronger but no sales at higher than $18.50, which might justify an advance of 25c. a ton, have been reported. Blast furnace borings and turnings have been sold at $12.75 and $13, and grades of steel which ordinarily reflect the strength of the No. 1 heavy melting grade have gained strength along with it. Rejections are frequent at all points in the district, and the scarcity of high grade No. 1 steel is probably responsible for the general strength of the market. However, with the large consumers nearly all taking scrap in undiminished quantities, and at a rate considerably higher than is usual at this time of the year, a strong market situation is not unexpected. It is freely believed that any marked recession in steel operations would be reflected immediately in the scrap market. And uncertainty on this point has resulted in a cautious attitude on the part of both buyers and sellers of scrap.

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.25c.
Hoops	4.25c.
Black sheets (No. 24), 25 or more bundles	3.80c.
Galv. sheets (No. 24), 25 or more bundles	4.55c.
Blue ann'l'd sheets (No. 10), 1 to 10 sheets	3.45c.
Galv. corrug. sheets (No. 28), per square	$4.43
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count,	60 per cent off list
Machine bolts, 100 count,	60 per cent off list
Carriage bolts, 100 count,	60 per cent off list
Nuts, all styles, 100 count,	60 per cent off list
Large rivets, base per 100 lb.	$3.50
Wire, black soft ann'l'd, base per 100 lb.	$3.00 to 3.10
Wire, galv. soft, base per 100 lb.	3.00 to 3.10
Common wire nails, per keg	3.00
Cement coated nails, per keg	3.05

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$18.50 to $19.00
No. 2 heavy melting steel	16.50 to 17.00
Scrap rails	18.00 to 18.50
Compressed sheet steel	18.00 to 18.50
Bundled sheets, sides and ends	17.00 to 17.50
Cast iron carwheels	16.50 to 17.00
Sheet bar crops, ordinary	19.50 to 20.00
Heavy breakable cast	13.00 to 13.50
No. 2 railroad wrought	18.50 to 19.00
Hvy. steel axle turnings	16.25 to 16.75
Machine shop turnings	12.00 to 12.50
Acid Open-Hearth Grades:	
Railr. knuckles and couplers	21.50 to 22.00
Railr. coil and leaf springs	21.50 to 22.00
Rolled steel wheels	21.50 to 22.00
Low phos. billet and bloom ends	22.50 to 23.00
Low phos., mill plates	22.50 to 23.00
Low phos., light grades	20.50 to 21.50
Low phos., sheet bar crops	20.50 to 21.50
Heavy steel axle turnings	16.25 to 16.75
Electric Furnace Grades:	
Low phos., punchings	20.00 to 21.00
Hvy. steel axle turnings	16.25 to 16.75
Blast Furnace Grades:	
Short shoveling steel turnings	12.50 to 13.00
Short mixed borings and turnings	12.50 to 13.00
Cast iron borings	12.50 to 13.00
Rolling Mill Grades:	
Steel car axles	21.50 to 22.00
Cupola Grades:	
No. 1 cast	15.00 to 16.00
Rails 3 ft. and under	20.00 to 21.00

Industrial Plants Corporation, 25 Church Street, New York, has been appointed auctioneer to sell at public auction all of the physical assets of the Wildman Tire & Rubber Co., Port Clinton, Ohio, consisting of land, buildings, machinery, etc.

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

Billets and Blooms

	Per Gross Ton
Rerolling, 4 in. and under 10 in., Pittsburgh	$35.00
Rerolling, 4 in. and under 10 in., Youngstown	35.00
Rerolling, 4 in. and under 10 in., Cleveland	35.00
Rerolling, 4 in. and under 10 in., Chicago	37.00
Forging quality, Pittsburgh	$40.00 to 41.00

Sheet Bars

(Open Hearth or Bessemer)

	Per Gross Ton
Pittsburgh	$35.00
Youngstown	35.00
Cleveland	35.00

Slabs

(8 in. x 2 in. and under 10 in. x 10 in.)

	Per Gross Ton
Pittsburgh	$35.00
Youngstown	35.00
Cleveland	35.00

Skelp

(F.o.b. Pittsburgh or Youngstown)

	Per Lb.
Grooved	1.85c. to 1.90c.
Universal	1.85c. to 1.90c.
Sheared	1.85c. to 1.90c.

Wire Rods

(Common soft, base)

	Per Gross Ton
Pittsburgh	$42.00
Cleveland	42.00
Chicago	43.00

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.80
Old range non-Bessemer, 51.50% iron	4.65
Mesabi Bessemer, 51.50% iron	4.65
Mesabi non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.40

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algerian	10.00c.
Iron ore, low phos., Swedish, average 68% iron	10.00c.
Iron ore, basis Swedish, average 65% iron	9.00c.
Manganese ore, washed, 52% manganese, from the Caucasus	33.00c. to 35.00c.
Manganese ore, Brazilian, African or Indian, basic 50%	33.00c. to 35.00c.
Tungsten ore, high grade, per unit, in 60% concentrates	$15.00 to $15.50

	Per Gross Ton
Chrome ore, 45 to 50% Cr_2O_3, crude, c.i.f. Atlantic seaboard	$22.00 to $24.00

	Per Lb.
Molybdenum ore, 85% concentrates of MoS_2, delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$2.75 to $2.85
Foundry, f.o.b. Connellsville prompt	3.75 to 4.85
Foundry, by-product, Ch'go ovens	8.00
Foundry, by-product, New England, del'd	11.00
Foundry, by-product, Newark or Jersey City, del'vered	9.00 to 9.40
Foundry, by-product, Phila.	9.00
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry by-prod., del'd St. Louis	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.25 to $1.75
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, ¾-in. f.o.b. Pa. mines	1.90 to 2.00
Mine run gas coal, f.o.b. Pa. mines	1.65 to 1.75
Steam slack, f.o.b. W. Pa. mines	80c. to 90c.
Gas slack, f.o.b. W. Pa. mines	1.00 to 1.10

Ferromanganese

	Per Gross Ton
Domestic, 80%, seaboard	$105.00
Foreign, 80%, Atlantic or Gulf port, duty paid	105.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$31.00 to $34.00
Domestic, 16 to 19%	29.00 to 32.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$83.50
75%	130.00

	Per Gross Ton Furnace		*Per Gross Ton Furnace*
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	45.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		*Per Gross Ton*
10%	$30.00	12%	$34.00
11%	32.00		

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		*Per Gross Ton*
6%	$23.00	10%	$27.00 to $28.00
7%	24.00	11%	29.00 to 30.00
8%	25.00	12%	31.00 to 32.00
9%	26.00		

Other Ferroalloys

Ferrotungsten, per lb., contained metal del'd	$1.40 to $1.50
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.15 to $3.65
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	$160.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton	$91.00
Ferrophosphorus, electric 24%, f.o.b. Anniston, Ala., per gross ton	$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silicon, gravel, f.o.b. Illinois and Kentucky mines	$18.00
No. 2 lump, Illinois and Kentucky mines	20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	$18.00 to $18.50
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines	32.50

Fire Clay Brick

	Per 1000 f.o.b. Works	
	High-Heat Duty Brick	Intermediate Heavy Duty Brick
Pennsylvania	$43.00 to $46.00	$35.00 to $38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	.....
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00
Standard size	45.00

Chrome Brick

	Per Net Ton
Standard size	$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts, blank or tapped, hexagons	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	7.00c. to 6.75c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled thread up to and including ⅛ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagons nuts	70
Semi-finished hexagons castellated nuts, S.A.E.	70
Stove bolts in packages, P'gh	75, 20, 10 and 5
Stove bolts in packages, Chicago	75, 20, 10 and 5
Stove bolts in packages, Cleveland	75, 20, 10 and 5
Stove bolts in bulk, P'gh	75, 20, 10, 5 and 2½
Stove bolts in bulk, Chicago	75, 20, 10, 5 and 2½
Stove bolts in bulk, Cleveland	75, 20, 10, 5 and 2½
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55, 60 per cent apply.

Large Rivets

(½-In. and Larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$3.10
F.o.b. Chicago	3.20

Small Rivets

(⅞-In. and Smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70 and 10
F.o.b. Cleveland	70 and 10
F.o.b. Chicago	70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10 and 5
Milled standard set screws, case hardened	80 and 5
Milled headless set screws, cut thread	75 and 10
Upset hex. head cap screws, U.S.S. thread	85
Upset hex. cap screws, S.A.E. thread	85
Upset set screws	80, 10 and 5
Milled studs	70

Chicago

Renewed Demand for Plates Beyond District's Capacity —Look for Revival of Railroad Buying

CHICAGO, July 23.—New demands for plates and semi-finished steel have helped to place sales at the average of the year or about double the volume of the previous seven days. Fully 20 per cent of new purchases were plates for the manufacture of pipe and a liberal tonnage is accounted for by raw steel needs.

Mild steel bars also figured prominently in the week's business, in which rail purchases were of little moment. Deliveries on plates, which had improved in recent weeks to a range of seven to eight weeks, now promise to extend again. Local plate mills find themselves in a position wherein they cannot, if they intend to take care of expected normal business from regular customers, assume added obligations for this commodity and as a result plate orders are once more flowing to the East.

Specifications for plates, shapes and bars average well with recent weeks and match shipments, which are at local mill capacity.

Inquiry from a wide circle of consumers is more active. Interest is growing in the prospect of a revival of equipment purchases by Western railroads. The trade has hopes that the Illinois Central will buy 500 cars for the Central of Georgia and also complete for itself the buying program which was left uncompleted last spring. The Sante Fe and the Union Pacific are mentioned as two other possibilities and then there is the inquiry of long standing by the Chicago & Northwestern.

It is definitely known now that the expansion program of the Illinois Steel Co. will include a structural mill for rolling the Carnegie beam section.

Pig Iron.—Silvery iron is off $1 a ton on the lower grades and as much as $2 a ton on some of the higher grades. The new quotations are not firm and offerings are not attracting wide attention among buyers. The Southern iron market remains mixed as to prices, though $14 a ton, Birmingham, remains an average. Some sales figure back to $13.50 a ton when differentials are included at 25c. instead of the usual 50c. Sales are in moderate volume including 250 tons, which is a duplication of an order placed last week by a melter in western Illinois. A cargo of Lake Erie iron has docked at Milwaukee. Although the bulk of this iron was sold prior to shipment, still odd tonnages are offered that are said to figure as low as $18.50 a ton at Milwaukee. The Northern iron market remains steady at $20 a ton. With five merchant stacks in blast shipments are in excess of production. In fact deliveries so far in July are running only a trifle behind the June rate. Releases by the automobile industry and manufacturers of farm equipment are heavier. The general feeling here is that such lessening as there is in the rate of melting is due more to the vacation period and hot weather than to a definite falling off of business.

Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	$20.00
N'th'n No. 1 fdy., sil. 2.25 to 2.75	20.50
Malleable, not over 2.25 sil.	20.00
High phosphorus	20.00
Lake Super. charcoal, sil. 1.50	27.04
So'th'n No. 2 fdy. (all rail)	$19.51 to 20.51
Low phos., sil. 1 to 2, copper free	29.50
Silvery, sil. 8 per cent	29.79
Bess. ferrosilicon, 14-15 per cent	46.29

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Plates.—New sales of plates account for close to 20 per cent of total finished steel purchases for the week. Moreover, new orders for plates are fully equal to shipments, following several weeks of a quiet market after the completion of the bulk of third quarter contracting. While a part of the plate tonnage placed during the week is for building purposes, the bulk of it will go into the manufacture of steel pipe. Since the first of July there has been steady improvement in deliveries, but new business has checked this trend and promises now are not better than seven to eight weeks. Local mills were not willing to obligate themselves for the full tonnage sought, and again sizable orders for plates for delivery in this district have gone to mills east of Indiana. Interest in oil storage tanks centers in specifications against old orders and in inquiries which are enlarged this week by 3000 tons. Tank fabricating shops are busy and their outlook, as gaged by pending tank programs, is unusually favorable. Reports are persistent that Western railroads are planning new car building programs that will take definite shape early in the fall. The Santa Fe is mentioned as one possible purchaser and the trade expects the Chicago & North Western to revive its inquiry for 1000 to 2500 box cars. Western car shops are well engaged, with schedules now arranged into September. Specifications for car material, though smaller than a week ago, are still of fair size.

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars	3.00c.
Reinforc'g bars, billet steel	2.10c. to 2.40c.
Reinforc'g bars, rail steel	1.90c. to 2.05c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Bands ($\frac{3}{16}$ in. in Nos. 10 and 12 gages)	3.20c.
Hoops (No. 14 gage and lighter)	3.75c.
Black sheets (No. 24)	4.05c.
Galv. sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.35c.
Spikes, $\frac{9}{16}$ in. and larger	3.55c.
Track bolts	4.55c.
Rivets, structural	4.00c.
Rivets, boiler	4.00c.
	Per Cent Off List
Machine bolts	60
Carriage bolts	60
Coach or lag screws	60
Hot-pressed nuts, sq., tap. or blank	60
Hot-pressed nuts, hex., tap. or blank	60
No. 8 black ann'l'd wire, per 100 lb.	$3.45
Com. wire nails, base per keg	3.20
Cement c't'd nails, base per keg	3.20

Ferroalloys. — Shipments are in good volume. New buying is quiet, with prices generally steady. Spiegeleisen is quoted $31 to $34 a ton, furnace, with few takers.

Prices delivered Chicago: 80 per cent ferromanganese, $112.56; 50 per cent ferrosilicon, $83.50 to $88.50; spiegeleisen, 19 to 21 per cent, $40.76.

Structural Material.—This market is more impressive from the viewpoint of the pending list than of current awards. Bids have been opened on the Parker School, Chicago, which will require 2300 tons, and also on the 1800 tons for the Fine Arts Building, but the low tenders have not yet been definitely accepted. Contracts ranging up to 1000 tons each have been more numerous in recent weeks and small and medium-sized shops are no longer hard pressed for immediate work. Large shops, while comfortably booked for the present, would feel more secure if a few of the large pending jobs would move faster. Sales of structural material are in good volume against recent lettings. Specifications, at 6000 tons, are close to the weekly average so far this year. Deliveries show improvement, with promises now ranging from five to six weeks. Awards for the week total close to 3000 tons, of which 1100 tons is for the Burnham Avenue bridge and 850 tons for the West Town Bank Building, both in Chicago.

Mill prices on plain material, per lb.: 2.05c. base, Chicago.

Sheets. — Chicago district sheet mills, operating at about 85 per cent of capacity, are still held in check by supplies of raw steel, inasmuch as orders at hand would warrant a higher rate of output. New buying is steady, but for current needs, and prices, as a week ago, are steady locally on all grades with the exception of light-gage galvanized sheets. Deliveries on blue annealed sheets have been advanced to 12 weeks, while the galvanized and black finishes may be had in three to four weeks. Distribution by jobbers is large and their specifications against contracts are liberal.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 3.10c.; No. 24 galv., 3.85c.; No. 10 blue ann'l'd, 2.35c. Deliv'd prices at other Western points are equal to the freight from Gary, plus the mill prices, which are 5c. per 100 lb. lower than Chicago delivered prices.

Cast Iron Pipe.—This market is quiet, with few tonnages before the trade, and new developments do not indicate an early turn for the better. Carload orders are more numerous than a week ago, but the change is not significant as a market factor. The

Lynchburg Foundry Co. has been awarded 9600 ft. of 6-in. and 7800 ft. of 8-in. pipe by Royal Oak, Mich., and the McWane Cast Iron Pipe Co. has taken 9000 ft. of 4-in. and 3000 ft. of 6-in. pipe for Naponee, Neb. Aberdeen, S. D., will take bids on 9800 ft. of 12-in., 9700 ft. of 10-in. and 8700 ft. of 8-in. pipe. This municipality also has a supplementary list for about 8500 ft. of 8 to 12-in. pipe and fittings, on which bids may be taken at a later date.

Prices per net ton, del'd Chicago: Water pipe, 6-in. and over, $45.20 to $46.20; 4-in., $49.20 to $50.20; Class A and gas pipe, $3 extra.

Bars.—Sales of mild steel bars have expanded in recent weeks, as widely diversified users have sought additional tonnages. The average rate at which tonnages are being sent to mills in July is above that of June and well above July, 1928. Specifications are fully equal to shipments, which promise to expand around Aug. 1, when some users will need larger quantities. Prices are steady at 2.05c. a lb., Chicago. Slightly smaller specifications for alloy steel bars are leading producers to cut output two to three points this week. Deliveries are improving, but the change is not marked and promises range from three to four weeks. Spot buying is moderately active at current quotations. Small orders for iron bars at 2.05c. a lb., Chicago, are numerous from railroads and other users. The bulk of the immediate needs of car builders has been supplied, and backlogs are light. Local rail steel bar mills are fully engaged and incoming business is ample to support current output. Barn equipment manufacturers have well arranged schedules for several months to come and the bed industry, in contrast with a year ago at this time, is well engaged. Orders for fence posts are seasonably dull.

Bolts, Nuts and Rivets.—This market is quiet and prices are steady. Current specifications are on a level with the average in recent weeks.

Rails and Track Supplies.—Western mills have booked 3000 tons of standard-section rails. About 2000 tons was for the Pennsylvania, which is reported to have placed 13,000 tons with Eastern mills. The Northern Pacific, which the trade expects will take 15,000 tons, may make its needs known about Aug. 1. Orders for track fastenings total 2500 tons, of which 1500 tons was for iron tie plates for use by railroads in and near Chicago. Rail rolling schedules have been revised downward, the average now being close to 75 per cent of capacity.

Prices f.o.b. mill, per gross ton: Standard section open-hearth and Bess. rails, $43; light rails, rolled from billets, $36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.15c.; angle bars, 2.75c.

Old Material.—Heavy-tonnage buyers of scrap iron and steel, evidently influenced by price fluctuations in previous summers, are holding out of this market except for small lots for immediate needs. Dealers, confident of the underlying strength of the market, are bending every effort to cover short positions. However, in at least one grade, namely, heavy melting steel, indications do not bear out ideas of strength. Shipments against orders from the Gary mills have now been completed and new orders have not been forthcoming from that source. In all probability this will mean that the tonnage formerly diverted to Gary will have to be prepared for other mills, which for some time past have been amply supplied. Hydraulic bundles are moving more freely to mills, though one buyer is still taking this grade in limited tonnages. Prices for short rails are stronger as supplies run short and brokers actively bid against offerings by the railroads. The St. Paul is offering a supplementary list of 1000 tons and the Nickel Plate has advertised 3000 tons.

Prices deliv'd Chicago district consumers:

Per Gross Ton

Basic Open-Hearth Grades:	
Heavy melting steel	$14.75 to $15.25
Shoveling steel	14.75 to 15.25
Frogs, switches and guards, cut apart, and misc. rails	16.50 to 17.00
Hydraul. compressed sheets	13.00 to 13.50
Drop forge flashings	10.50 to 11.00
No. 1 busheling	13.00 to 13.50
Forg'd cast and r'l'd steel carwheels	18.25 to 18.75
Railroad tires, charg. box size	18.50 to 19.00
Railroad leaf springs cut apart	18.50 to 19.00
Acid Open-Hearth Grades:	
Steel couplers and knuckles	16.75 to 17.25
Coil springs	19.00 to 19.50
Electric Furnace Grades:	
Axle turnings	14.50 to 15.00
Low phos. punchings	16.50 to 17.00
Low phos. plates, 12 in. and under	16.50 to 17.00
Blast Furnace Grades:	
Axle turnings	10.75 to 11.25
Cast iron borings	9.75 to 10.25
Short shoveling turnings	9.75 to 10.25
Machine shop turnings	7.00 to 7.50
Rolling Mill Grades:	
Iron rails	16.00 to 16.50
Rerolling rails	17.50 to 18.00
Cupola Grades:	
Steel rails less than 3 ft.	17.75 to 18.25
Steel rails less than 2 ft.	18.25 to 18.75
Angle bars, steel	17.00 to 17.50
Cast iron carwheels	14.00 to 14.50
Malleable Grades:	
Railroad	16.75 to 17.25
Agricultural	15.50 to 16.00
Miscellaneous:	
*Relaying rails, 56 to 60 lb.	23.00 to 25.00
*Relaying rails, 65 lb. and heav.	26.00 to 31.00

Per Net Ton

Rolling Mill Grades:	
Iron angle and splice bars	15.00 to 15.50
Iron arch bars and transoms	21.00 to 21.50
Iron car axles	26.00 to 26.50
Steel car axles	16.50 to 17.00
No. 1 railroad wrought	13.50 to 14.00
No. 2 railroad wrought	13.00 to 13.50
No. 1 busheling	9.00 to 9.50
No. 2 busheling	7.00 to 7.50
Locomotive tires, smooth	14.50 to 15.00
Pipes and flues	10.00 to 10.50
Cupola Grades:	
No. 1 machinery cast	14.50 to 15.00
No. 1 railroad cast	13.75 to 14.25
No. 1 agricultural cast	13.25 to 13.75
Stove plates	12.25 to 12.75
Grate bars	11.75 to 12.25
Brake shoes	10.50 to 11.00

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Reinforcing Bars.—Awards are at the low point of the year and, though the pending list is of good size, only a few projects appear to be near the closing stage. Fresh inquiry also is light. Demand will improve, however, if large building construction expands as it now promises to do. The Chicago, Milwaukee, St. Paul & Pacific is placing small orders—25 to 50 tons each—against an inquiry for 800 tons for track elevation. There is promise that reinforcing bars will be purchased for Illinois road work, funds for which will soon be available from the new gasoline tax. Recent awards and fresh inquiries are given on page 250.

Wire Products.—Price cutting in common wire nails is spreading and common quotations now are $2.60 to $2.75, base, per keg, Pittsburgh or Cleveland, and $1 a ton above these figures in the Chicago district. Prices for other wire products are, on the whole, little disturbed. The demand for nails, which has been below the expectations of the trade all spring and so far this summer, gives no indications of improvement in the near future. Salesmen returning from vacations have made a good showing, orders for wire having shown some improvement this week. However, neither new orders nor specifications equal production at 65 per cent of capacity and stocks in the hands of producers are slowly increasing. The jobbing trade is quiet. Distributers are cautious in placing orders, which usually are small and which are placed at frequent intervals. Crop reports, on the whole, are favorable. The past two weeks has been favorable to corn, cotton and potatoes. Some of the Northeastern States are in need of rain, as is also true in some of the extreme Northwestern States. Much of the country has had plenty of rain, while in some localities there has been an excess. Mill prices for wire and wire products are given on page 235.

Cold-Rolled Strip.—Specifications are lagging behind output, which so far has held to an 85 per cent rate. Producers look for lower output and shipments at an early date unless the market as a whole makes a turn for the better.

Coke.—July shipments are well up to the average in June and all ovens in this district are lighted. Scattered spot sales are going at $8 a net ton at the ovens.

Republic Gets First Order for Electric-Welded Pipe

YOUNGSTOWN, July 23.—Republic Iron & Steel Co. has received its first sizable order for steel pipe produced by the electrical welding method from the Southwestern Gas Co. The order calls for 200 miles of 6-in. tubing, requiring 8000 tons. The Republic Company has one mill in operation under Johnson patents manufacturing pipe up to 7 in. in diameter, and plans to install two additional mills.

International Steel & Iron Co., Evansville, Ind., recently forwarded the first bargeload of structural steel ever billed from that river port. The cargo aggregated 500 tons and was part of a 1500-ton order for a bridge to be constructed at Terryville, Tenn.

New York

Heavier Inquiry for Pig Iron—July Steel Bookings Ahead of Volume Last Year

NEW YORK, July 23.—Pig iron sales are heavier, having totaled 12,000 tons in the past week, and demand is expanding. Including 10,000 tons wanted for various plants of the American Radiator Co., pending inquiry aggregates 20,000 tons. Melt is generally holding its own and in some cases is improving. The operations of foundries making heating equipment are pointing upward as they approach fall and the heavier seasonal demands that will be felt at that time. The Chapman Valve Mfg. Co., Indian Orchard, Mass., has closed for 2000 tons, and the Worthington Pump & Machinery Corporation has bought 200 tons for its Holyoke, Mass., plant. The A. P. Smith Mfg. Co., East Orange, N. J., has placed 600 tons of No. 2 plain and No. 2X for the fourth quarter requirements of its Bloomfield foundry. The Eastern Malleable Iron Co., Naugatuck, Conn., is in the market for 1000 to 2000 tons. The competition of Alabama iron is still more of a threat than an actuality. The only large recent sale reported in this section was 50,000 tons now being shipped by the Tennessee Coal, Iron & Railroad Co. to the Burlington, N. J., pipe plant. This iron is moving by rail to Norfolk, Va., and from there by barge to destination. The proposed reduced rail and water rates from Birmingham via Savannah, Ga., and coastwise ocean vessels to North Atlantic ports have been protested, but not suspended as reported last week. The Interstate Commerce Commission has until Aug. 1 to act on the protests of Northern furnaces. Going prices on Northern pig iron show little change. On No. 2 plain, quotations lower than $17.50, Buffalo, or equivalent, are rarely reported, but silicon differentials on higher grades are frequently waived. The barge movement from Buffalo has increased, although still below the volume of a year ago. A seasonal decline in water shipments of other commodities has caused a downward revision of rates on pig iron, $2 a ton now being readily available on the haul from Buffalo to New York harbor.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	$22.41 to $22.91
*Buf. No. 2, del'd east. N. J.	20.78 to 21.28
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	21.39 to 22.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	21.89 to 23.02

Freight rates: $4.91 from Buffalo, $1.39 to $2.52 from eastern Pennsylvania.

*Price delivered to New Jersey cities having rate of $3.28 a ton from Buffalo.

Warehouse Business.—Buying since July 1 has been smaller than in June, demand for structural shapes and black and galvanized sheets having declined considerably. Prices are unchanged, but concessions on sheets of $1 to $2 a ton continue. On a recent sizable purchase of blue annealed sheets, subject to the quantity reduction of 40c. per 100 lb. from 3.90c., base, for more than 15,000 lb., the price is reported to have been 3.30c. per lb.

Cast Iron Pipe.—Inquiry from private users has been increasing recently, and there is a small tonnage of municipal business. Most producers of pressure pipe, however, are apparently in need of orders and with competition keen, prices continue from about $31 to $34 per net ton, f.o.b. Northern foundry. The Eastman Kodak Co., Rochester, N. Y., is inquiring for 6240 net tons of 30-in. pipe for delivery to Rochester about Aug. 15. The Water Supply district of Bolton Township, Bolton Landing, N. Y., opened bids July 23 on 193 tons of 6-in., 159 tons of 8-in. and 250 tons of 10-in. water pipe, a total of 612 tons. The Fox Reynolds Co., Inc., general contractor, 81 East 125th Street, New York, is asking for bids on about 14,300 ft. of 3 to 30-in. pipe for Orangeburg, N. Y., and about 4000 ft. of 4 to 30-in. pipe for Wassaic, N. Y.

Prices per net ton deliv'd New York: Water pipe, 6-in. and larger, $32.60 to $34.60; 4-in. and 5-in., $35.60 to $37.60; 3-in., $42.60 to $44.60. Class A and gas pipe, $3 extra.

Reinforcing Bars.—There has been a fair number of small jobs closed, but inquiries are light. The Chevrolet Motor Co. is taking bids on 700 tons of bars for a plant at Tarrytown, N. Y. Prices are reported firm and unchanged.

Billet steel reinforcing bars in 40, 50 and 60-ft. lengths, 2.05c. per lb., Pittsburgh, and 2.30c. per lb., Pittsburgh warehouse, for cut lengths. Out of New York warehouse, 2.90c. per lb. for lots of 5 tons or more, 3.05c. for lots of 2 to 5 tons and 3.30c. for less than 2 tons, all delivered at job.

Finished Steel.—Despite a tapering off in specifications and orders, producers of steel bars and plates declare that July bookings will show a large gain over those in the corresponding month of last year. The tonnage of plates going into the oil industry is causing favorable comment. Two large pipe line contracts, reported last week as pending, have not yet been closed. The revival of interest in shipbuilding also is expected to bring with it a demand for substantial plate tonnages. Structural steel has continued active, both from the standpoint of bookings and of fresh inquiries. The latter included 13,200 tons for section 5, route 108, of the New York subway in Queens, 3800 tons for an office building in Newark, N. J., and 3000 tons for a factory at East Hartford, Conn., for the Pratt & Whitney Aircraft Corporation. Despite a well sustained demand from consumers, the sheet market has developed further weakness. Galvanized sheets have been sold as low as 3.50c., Pittsburgh, a concession of $2 a ton from the previous week's price and a drop of $4 a ton from the level which prevailed two weeks ago. Although considerable business is still being booked at 3.60c., consumers look

Warehouse Prices, f.o.b New York

	Base per Lb.
Plates and structural shapes	3.30c.
Soft steel bars, small shapes	3.25c.
Iron bars	3.24c.
Iron bars, Swed. charcoal	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Cold-roll. strip, soft and quarter hard	5.15c. to 5.40c.
Hoops	4.25c.
Bands	3.75c.
Blue ann'l'd sheets (No. 10)	3.85c. to 3.90c.
Long terne sheets (No. 24)	5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galv. annealed	5.15c.
Tire steel, 1½ x ½ in. and larger	3.30c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.65c.
Open-hearth spring steel, bases	4.50c. to 7.00c.

	Per Cent Off List
Machine bolts, cut thread:	
¾ x 6 in. and smaller	60
1 x 30 in. and smaller	50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	60
¾ x 20 in. and smaller	50 to 50 and 10
Coach screws:	
½ x 6 in. and smaller	60
1 x 6 in. and smaller	50 to 50 and 10

Boiler Tubes—	Per 100 Ft.
Lap welded, 2-in.	$17.33
Seamless steel, 2-in.	20.24
Charcoal iron, 2-in.	25.00
Charcoal iron, 4-in.	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
½-in. butt	46	29
¾-in. butt	51	37
1-3-in. butt	53	39
2½-6-in. lap	48	35
7 and 8-in. lap	44	17
11 and 12-in. lap	37	12
Wrought Iron—		
½-in. butt	5	+19
¾-in. butt	11	+ 9
1-1½-in. butt	14	+ 6
2-in. lap	5	+14
3-6-in. lap	11	+ 6
7-12-in. lap	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box	$6.45	$6.20
Charcoal, per Box—	A	AAA
IC	$9.70	$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating	$10.00 to $11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets, Box Annealed—Black, C. R. One Pass

	Per Lb.
Nos. 18 to 20	3.80c.
No. 22	3.95c.
No. 24	4.00c.
No. 26	4.10c.
No. 28*	4.25c.
No. 30	4.50c.

Sheets, Galvanized

	Per Lb.
No. 14	4.40c.
No. 16	4.25c.
No. 18	4.40c.
No. 20	4.50c.
No. 22	4.60c.
No. 24	4.75c.
No. 26	5.00c.
No. 28*	5.25c.
No. 30	5.65c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

for 3.50c. as an early ruling quotation. Shading has been done in black and blue annealed sheets, but the tendency to grant lower prices has not been common.

Mill prices per lb., deliv'd New York: Soft steel bars, 2.29c.; plates, 2.22½c.; structural shapes, 2.19½c.; bar iron, 2.14c.

Coke.—Although production in the Connellsville district shows no recession despite the season, prices are well maintained. Standard furnace coke is still quoted at $2.75 to $2.85 per net ton, ovens. Special brands of beehive foundry coke are $4.85 per net ton, ovens, or $8.56 per net ton, delivered to northern New Jersey, Jersey City, and Newark, and $9.44 to New York or Brooklyn. By-product coke is quoted at $9 to $9.40 a net ton, Newark or Jersey City, and $10.06, New York or Brooklyn.

Old Material.—About 10,000 tons of No. 1 heavy melting steel has been brought by a cosumer at Coatesville, Pa., at $17 per ton, delivered. Brokers have been quoting $16.50 per ton, delivered Coatesville, on old contracts and have paid up to $16.75 per ton to obtain sufficient material. Machine shop turnings are slightly stronger, with dealers paying $11.25 per ton, delivered to Phoenixville, Pa., and up to $11.50 per ton, delivered to Conshohocken, Pa. Forge fire also shows a slight advance, with $13.75 per ton quoted on deliveries to a Coatesville, Pa., consumer. Cast scrap is rather inactive and brokers are offering about $14.50 per ton, delivered, for heavy breakable cast and $11.50 to $12, delivered, for stove plate.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel	$12.75 to $13.35
Heavy melting steel (yard)	8.00 to 9.75
No. 1 hvy. breakable cast.	10.75 to 11.75
Stove plate (steel works).	8.00 to 8.25
Locomotive grate bars....	8.25 to 8.75
Machine shop turnings....	7.25 to 7.75
Short shoveling turnings..	7.25 to 7.75
Cast borings (blast furn. or steel works).....	7.00 to 7.25
Mixed borings and turnings	6.75 to 7.25
Steel car axles.....	19.25 to 19.75
Iron car axles.....	24.00 to 25.00
Iron and steel pipe (1 in. dia., not under 2 ft. long)	10.75
Forge fire	9.75 to 10.25
No. 1 railroad wrought...	12.00 to 12.50
No. 1 yard wrought, long..	11.00 to 11.50
Rails for rolling.....	13.00 to 13.50
Cast iron carwheels.....	12.25 to 12.50
Stove plate (foundry)....	8.00 to 8.50
Malleable cast (railroad).	14.00 to 14.50
Cast borings (chemical)..	10.00 to 10.50

Prices per gross ton, deliv'd local foundries:

No. 1 machry. cast.....	$17.00
No. 1 hvy. cast (columns, bldg. materials, etc.), cupola size.....	15.00
No. 2 cast (radiators, cast boilers, etc.)	14.50

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and struc. shapes.....	3.00c.
Soft steel bars.....	3.00c.
Reinforc. steel bars.....	2.25c. to 2.50c.
Cold-fin. rounds and hex.....	3.65c.
Cold-fin. flats and sq.....	4.15c.
Hoops and bands, No. 12 to ⅛ in., inclusive	3.25c.
Hoops and bands, No. 13 and lighter	3.65c.
Cold-finished strip	*5.95c.
Black sheets (No. 24).....	3.70c. to 3.90c.
Galvanized sheets (No. 24).	4.60c. to 4.75c.
Blue ann'l'd sheets (No. 10).....	3.25c.
No. 9 ann'l'd wire, per 100 lb.....	$2.95
No. 9 gal. wire, per 100 lb.....	3.40
Com. wire nails, base per keg.....	2.95

*Net base, including boxing and cutting to length.

Cleveland

High Operations Assured Through August—Automobile Demand One-Third Off From Spring Peak

CLEVELAND, July 23.—The changing over by some of the automobile companies to the manufacture of new models has brought about a further slowing up in shipping orders for the grades of steel the automobile companies use. Sheets and strip steel have been affected to the largest extent. In sheet steel, takings by the automobile industry have declined probably 25 to 35 per cent from the peak rate of the spring, according to some estimates.

New models are being brought out by Buick, Chrysler, Reo and Hudson, and it is expected in the steel trade that orders from these companies will again show an upward trend in August.

Many of the sheet mills still have large backlogs in some finishes, but the need for new business, particularly in the common finishes, is bringing out some price concessions on heavy gage blue annealed material, while on black sheets 2.85c., Pittsburgh, now appears to be the maximum obtainable except in a few special instances where the black sheet base is used for sheets of higher finishes. In products other than those used by the automobile industry, the July demand is holding at a high rate.

In plates, shapes and bars, orders and specifications are keeping pace with the June volume. A leading producer has, in fact, booked more tonnage in these products this month than in the corresponding period in June.

Mill operations are being held at virtually a maximum rate. Orders now on the books, with those which can be counted upon, assure steady output through August, although it may be at a slightly reduced pace. Shipments are greater than incoming business, with resultant reduction in backlogs.

Iron Ore.—Consumption of Lake Superior iron ore declined 303,596 tons in June, as compared with May, according to figures compiled by the Lake Superior Iron Ore Association. The June total was 5,676,652 and that for May was 5,980,248 gross tons. The June consumption was more than 1,000,000 tons greater than that of the same month last year, the figure for June, 1928, having been 4,667,493. Ore on hand as of July 1 at furnaces and on docks was 23,701,011 tons, of which 19,618,611 tons was at furnaces and 4,082,400 tons was on Lake Erie docks. The number of furnaces using Lake ore which were in blast on the last day of June was 197, one more than on the last day of May.

Pig Iron.—Sales of pig iron in the past week, at about 20,000 tons, were almost double those of the preceding week. Shipments as well as sales have gained, although not so much iron is going to consumers as was shipped last month. However, the leading producers are moving as much as they are making. Inquiry is not very heavy, nor is it expected to be within the next 30 days or so, as melters generally are well covered for the quarter and furnaces have substantial backlogs. There was a good-sized carryover tonnage from the second quarter. Not much interest is being shown by melters in the fourth quarter. However, an inquiry for 5000 tons from an Indiana company, which probably will be closed this week, is for shipment over the remainder of the third quarter and all of the fourth quarter. Prices are holding firm at $18.50, Cleveland, for outside shipment, at $19 for local delivery, and $20, Lake furnace, for Michigan territory. While the break in prices of Alabama pig iron may have made buyers cautious, it has had no other effect on the pig iron situation in the Cleveland district. Northern consumers have become educated to the use of pig iron that runs lower in phosphorus and higher in manganese than does the Southern iron, and offers of Southern iron hereabouts have not resulted in much business. Demand for low phosphorus iron is very quiet, but prices are unchanged at $26.50 to $27, furnace.

Prices per gross ton at Cleveland:

N'th'n fdy., sil. 1.75 to 2.25	$19.50
S'th'n fdy., 1.75 to 2.25....$20.00 to	20.50
Malleable	19.50
Ohio silvery, 8 per cent...	28.00
Basic Valley furnace.....	18.50
Stand. low phos., Valley.. 26.50 to	27.00

Prices except on basic and low phosphorus are delivered Cleveland. Freight rates: 50c. from local furnaces; $3 from Jackson, Ohio; $6 from Birmingham.

Semi-Finished Steel.—The leading local producer of semi-finished steel has its entire third-quarter output under contract and has actual specifications on hand for three weeks' rollings. The price situation seems to have become stabilized at $35, Cleveland, Youngstown or Pittsburgh, for billets, slabs and sheet bars.

Reinforcing Steel.—Demand loeally has struck a midsummer lull. A clothing factory for Richman Brothers in Cleveland, on which the general contract has been let, will take 300 tons.

Warehouse Business.—Local warehouses report that business is continuing at a good rate, although it is somewhat less than that done in June. Prices are steady.

Bolts, Nuts and Rivets.—Business in bolts and nuts so far in July is larger than during the same number of days in June. The tonnage in rivets, however, is light, but is running about the same as in June, which showed a falling off from the preceding months. Prices are unchanged.

Plates, Shapes and Bars.—Demand for the heavy hot-rolled products is much better this month than was expected. Consumption of plates by car builders, boiler manufacturers and other leading consumers has shown no marked decline. In fact, a leading seller of these lines has booked more business in July so far than in the same number of days in June. The structural market is quiet in new lettings, but a fair amount of work is in prospect. The jail courts building in Cleveland, on which bids will soon be requested, will take 1500 to 2000 tons and the Akronia Hotel, at Akron, plans for which will be out shortly, will require a thousand tons or more. An inquiry of interest to plate manufacturers is for a small tonnage of 2 to 3 per cent nickel steel plates for the boiler shells for 12 locomotives for the Great Northern Railway. Nickel steel plates for this purpose have been extensively used by the Canadian railroads. Prices of plates, shapes and bars are steady.

Sheets. — Orders from automobile manufacturers and body builders have shown a further decline. Some sellers estimate that current shipping orders represent a drop of 25 to 35 per cent from the peak rate of May and early June. While many sheet mills still have comfortable backlogs, especially in full finished sheets, the need for new tonnage is becoming more of a factor in the common finishes and heavier gages. The weakness in blue annealed sheets, referred to a week ago, affects chiefly the heavy gages now classified as light plates. Although many of the jobbing mills are adhering to 2.20c., Pittsburgh base, for No. 10 gage, sales have been made at 2.10c. and in special instances at 2c. Light blue annealed sheets, which take a 2.35c., Pittsburgh base, are firm. On black sheets, 2.85c., Pittsburgh, is general to nearly all buyers, 2.95c. having virtually disappeared even as an asking price. Galvanized sheets are being quite generally sold at 3.60c., Pittsburgh, to consumers and at 3.50c. to jobbers.

Strip Steel.—Demand for hot-rolled and cold-rolled strip steel has slumped. Mills still have a fair amount of business in hot-rolled on their books, but some cold rollers need orders. The result is that the recent minimum price of 2.75c., Pittsburgh or Cleveland, on cold rolled is now available on lots which had been commanding a premium of $2 a ton.

Wire Products.—Specifications for wire from the automobile industry are considerably lighter. Wire nails are dull and there are some irregularities in prices.

Old Material.—In the absence of new buying by local steel mills the scrap trade is marking time. Continued high operations of the steel mills and the strength in the Pittsburgh and Youngstown markets have given the local market an undertone of strength notwithstanding the slack demand here. Two local consumers of heavy melting steel are still restricting shipments from dealers, partly because of the deliveries they are getting from Detroit by boat. Prices are unchanged.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	$15.00 to $15.50
No. 2 heavy melting steel	14.50 to 15.00
Compressed sheet steel	14.50 to 15.00
Light bundled sheet stampings	12.00 to 12.50
Drop forge flashings	13.00 to 13.25
Machine shop turnings	9.25 to 9.50
No. 1 railroad wrought	13.50 to 14.00
No. 2 railroad wrought	16.00 to 16.50
No. 1 busheling	13.25 to 13.75
Pipes and flues	9.00 to 9.50
Steel axle turnings	12.50 to 13.00
Acid Open-Hearth Grades	
Low phos., forging crops	17.75 to 18.00
Low phos., billet, bloom and slab crops	18.50 to 18.75
Low phos., sheet bar crops	18.00 to 18.50
Low phos., plate scrap	18.00 to 18.50
Blast Furnace Grades	
Cast iron borings	10.75 to 11.00
Mixed borings and short turnings	10.75 to 11.00
No. 2 busheling	10.75 to 11.00
Cupola Grades	
No. 1 cast	16.75 to 17.25
Railroad grate bars	11.00 to 12.00
Stove plate	12.00 to 12.50
Rails under 3 ft.	18.50 to 19.00
Miscellaneous	
Railroad malleable	18.00 to 18.50
Rails for rolling	16.25 to 16.50

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.70c.
Plates, ⅜-in.	2.90c.
Structural shapes	2.70c.
Soft steel bars, small shapes, iron bars (except bands)	2.80c.
Round-edge iron	3.50c.
Round-edge steel, iron finished 1½ x 1½ in.	3.50c.
Round-edge steel, planished	4.30c.
Reinforc. steel bars, sq. twisted and deform.	2.60c. to 2.80c.
Cold-fin. steel, rounds and hex.	3.60c.
Cold-fin. steel, sq. and flats	4.10c.
Steel hoops	3.55c.
Steel bands, No. 12 to ⅛-in. inclus.	3.30c.
Spring steel	5.00c.
*Black sheets (No. 24)	4.10c.
†Galvanized sheets (No. 24)	4.85c.
Light plates, blue annealed (No. 10)	3.25c.
Blue ann'l'd sheets (No. 13)	3.40c.
Diam. pat. floor plates—	
¼-in.	5.30c.
⅜-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

*For 50 bundles or more; 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.
†For 50 bundles or more; 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

Philadelphia

Steel Buying Smaller But Mill Operations High—Southern Basic Sold In Small Tonnages

PHILADELPHIA, July 23.—Despite the slackening of specifications, usual at this season, steel mill operations are maintained at a high rate. Deliveries range from two to four weeks on bars and plates, but are fairly prompt on shapes and sheets. Prices are firm except on black and galvanized sheets, which have settled about $2 a ton in recent weeks.

Although Southern pig iron continues to offer low-priced competition in this district, eastern Pennsylvania furnaces are maintaining prices at their former level. Strength in the iron and steel scrap market is largely in heavy melting steel.

Pig Iron.—Southern pig iron is freely offered at $13.50 per ton, furnace, for basic and $14.50, furnace for foundry iron, but buying continues rather limited. For barge shipment, via Norfolk, Va., sellers of Birmingham iron have quoted a rail and water rate, loaded on cars Philadelphia of $5 a ton, plus the rail rate to consumer's plant. On basic iron, quotations have been made of $19.63 and $20.13 per ton, delivered, which compares with an eastern Pennsylvania basic price of $20 per ton, furnace. A large user in this district is reported to have closed on a trial tonnage of Southern basic at about $19.50 a ton, delivered. A Pencoyd, Pa., user of basic is reported to be receiving shipment of about 5000 tons of basic iron from Birmingham. In the past week, eastern Pennsylvania pig iron producers have followed the action of eastern railroads in protesting to the Interstate Commerce Commission, reductions of rail and water rates on Southern pig iron to Atlantic Coast ports. Foundry iron demand is small with prospective buyers showing no haste in placing orders in view of the low prices quoted by Birmingham sellers. Thus far eastern Pennsylvania producers have, as a rule, maintained a minimum of $21, furnace, on foundry.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil.	$21.76 to $22.26
East. Pa. No. 2X, 2.25 to 2.75 sil.	22.26 to 22.76
East. Pa. No. 1X	22.76 to 23.26
Basic (del'd east. Pa.)	20.25 to 21.00
Gray forge	20.50 to 21.00
Malleable	21.25 to 21.75
Stand. low phos. (f.o.b. N. Y. State furnace)	22.00 to 23.00
Cop. b'r'g low phos. (f.o.b. furnace)	23.50 to 24.00
Va. No. 2 plain, 1.75 to 2.25 sil.	24.04
Va. No. 2X, 2.25 to 2.75 sil.	24.54

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces; $4.54 from Virginia furnaces.

Bars.—Deliveries range from two to four weeks and the price is firm at 1.95c. per lb., Pittsburgh, or 2.27c., delivered Philadelphia. Mills are maintaining a high rate of operation, although since the beginning of the present quarter buying has been smaller.

Reinforcing Bars. — Low bidder for the general contract on the Ridge Avenue subway, which requires 1000 tons of bars, was the Keystone State Construction Co. About 475 tons of reinforcing bars in the Coatesville General Hospital at Coatesville, Pa., have

been awarded to the Truscon Steel Co. Rail steel bars are quoted at about 1.95c., Franklin, Pa., or Tonawanda, N. Y., or 2.27c., delivered Philadelphia, with no extra for cutting to length. Billet steel reinforcing bars are quoted at 1.95c., to 2.05c., Pittsburgh, or 2.27c. to 2.37c., delivered Philadelphia, with $5 extra for cutting to length. Occasionally the extra for cutting is omitted to meet the competition of rail steel bars.

Shapes.—Mills are well engaged, especially on the smaller sizes and deliveries range from a week to three weeks in some instances. Quotations are unchanged at 1.95c. to 2c. and occasionally 2.05c., f.o.b. nearest mill to consumer, or 2.01c. to 2.06c. and occasionally 2.11c., delivered Philadelphia.

Plates.—Buying is well distributed with the railroads and car builders particularly active. The contracts for building merchant ships and the cruisers for the Navy have not yet been formally approved, but mills are so well provided with tonnage at present that the delay is considered desirable, as the tonnage may be needed more later in the quarter than at present. A new avenue of plate consumption appears to be opening in their use for floor construction in buildings. The four-story addition to the Congressional Library in Washington requires about 200 tons of ¼-in. narrow plates. Prices are firm at 2.05c., Coatesville, or 2.15c., delivered Philadelphia.

Sheets.—Automobile body builders in this district are buying a fair tonnage of sheets and radio manufacturers have bought a substantial tonnage of deep drawing and electrical sheets and have not yet satisfied their requirements for this year. Blue annealed sheets, No. 13 gage are 2.35c. per lb., Pittsburgh, or 2.67c., delivered Philadelphia, and light plates, blue annealed, No. 10 gage are 2.20c. per lb., Pittsburgh, or 2.52c., delivered Philadelphia. Black and galvanized sheets are quoted at 2.85c., Pittsburgh, or 3.17c., Philadelphia, for black and 3.60c., Pittsburgh, or 3.92c., delivered Philadelphia, for galvanized. Concessions of about $1 a ton are sometimes obtainable on desirable orders.

Warehouse Business. — Prices are well maintained, but the volume of business this month is appreciably smaller than in June.

Imports.—In the week ended July 20, a total of 4474 tons of chrome ore arrived at this port from Portuguese Africa. Steel imports consisted of 72 tons of steel bars, 78 tons of structural shapes and 29 tons of steel bands from Belgium, 261 tons of structural shapes, 14 tons of steel bands and 13 tons of bars from France and 24 tons of billets and 27 tons of steel rods from Sweden. Scrap arrivals totaled 29 tons from the United Kingdom and 6 tons from Germany.

Old Material. — A large eastern Pennsylvania consumer has closed on upward of 10,000 tons of No. 1 heavy melting steel at $17 a ton, delivered. Supplies of No. 2 steel are not large and brokers with contracts for delivery to Conshohocken and Pencoyd, Pa., are paying up to $14.25 and $14.50 per ton, delivered, to fill their orders. Low phosphorus scrap is lacking in strength, and prices of heavy breakable cast are less firm than the market on other grades of scrap.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	$16.50 to $17.00
Scrap T rails	16.00
No. 2 heavy melting steel	12.50 to 14.25
No. 1 railroad wrought	16.00 to 16.50
Bundled sheets (for steel works)	11.50
Hydraulic compressed, new	14.50 to 15.00
Hydraulic compressed, old	12.00 to 12.50
Machine shop turnings (for steel works)	11.50 to 12.00
Heavy axle turnings (or equiv.)	14.00 to 14.50
Cast borings (for steel works and roll. mill)	11.00 to 11.50
Heavy breakable cast (for steel works)	15.00 to 15.25
Railroad grate bars	12.00 to 12.50
Stove plate (for steel works)	12.00 to 12.50
No. 1 low phos., hvy., 0.04% and under	22.00 to 23.00
Couplers and knuckles	19.50 to 20.50
Rolled steel wheels	19.50 to 20.50
No. 1 blast f'nace scrap	10.50 to 11.00
Wrot. iron and soft steel pipes and tubes (new specific.)	15.00
Shafting	19.00 to 19.50
Steel axles	23.00 to 23.50
No. 1 forge fire	14.00
Cast iron carwheels	16.50 to 17.00
No. 1 cast	16.50 to 17.00
Cast borings (for chem. plant)	14.50
Steel rails for rolling	16.50 to 17.00

The Wean Engineering Co., Inc., Warren, Ohio, has become the selling company in the United States and Canada for the McKay Machine Co., Youngstown, Ohio, maker of roller leveling equipment. Flinn & Dreffein Co., Chicago, is associated with the Wean company as furnace contractors and combustion engineers on continuous pack heating furnaces for sheet and tin mills.

The American Railway Tool Foremen's convention, which will be held this year at the Hotel Sherman, Chicago, Sept. 11, 12 and 13, will be featured by an exhibit in charge of the supply organization subsidiary to the association, of which supply association, C. C. Ziegler, Greenfield Tap & Die Corporation, 611 West Washington Boulevard, Chicago, is secretary.

Methods of investigating individual industrial accidents are presented in a pamphlet issued by the National Safety Council. An appendix sets forth the system used by E. I. du Pont de Nemours & Co., and a description of the court of inquiry conducted by the American Steel & Wire Co.

The first of four new sheet mills of the Continental Steel Corporation plant at Kokomo, Ind., has been started and the remainder will be put in operation shortly.

Railroad Equipment

Wabash Purchases 25 Large Freight Locomotives

PURCHASE of 25 large freight locomotives by the Wabash was the feature of the past week in the railroad equipment market. The Texas & Pacific is inquiring for 15 locomotives. The Great Northern Equipment Co. is taking bids on 300 flat cars and 300 flat car underframes. Details of the week's business follow:

Wabash has ordered 25 large freight locomotives from Baldwin Locomotive Works.

Cearense Railroad of Brazil has ordered three locomotives from Baldwin Locomotive Works.

Campbell River Timber Co. has ordered one locomotive from Baldwin Locomotive Works.

Great Northern Equipment Co. is inquiring for 300 flat cars and 300 flat car underframes.

New York, New Haven & Hartford is asking for bids on 75 coke car bodies of 40 tons capacity each.

Texas & Pacific will buy 15 Texas type locomotives.

Extra Dividend on Jones & Laughlin Stock

Jones & Laughlin Steel Corporation reports net income of $6,051,508 after deductions for Federal taxes, depreciation, depletion and bond interest, for the quarter ended June 30. Net income for the six months ended June 30 is $11,305,687, after preferred and common dividends. The balance carried to surplus in the last quarter was $3,727,273 and $7,233,538 in first half.

Regular quarterly dividends of 1¾ per cent on preferred and 1½ per cent on common stock were declared, and also an extra dividend of 1 per cent on common stock.

Cleveland engineers are planning on an engineers' day during the Cleveland Air Races and Airplane Show which is to be held the latter part of August. The program is under the joint auspices of the Cleveland Engineering Society and the aeronautic division and Cleveland section of the American Society of Mechanical Engineers. One session will be devoted to seaplane and flying-boat development.

A net loss of $61,011.56 for the second quarter was reported for the Virginia Iron, Coal & Coke Co., Roanoke, Va. The first quarter showed a profit of $33,048.15, so that the results of operations for six months ended June 30 is a net loss of $27,963.41.

Radio talks are being given by the Clipper Belt Lacer Co., over the Madison Square Garden Station, W.M.S.G., New York. These talks started on May 25 and will be put on four times a week for a period of six months.

Pacific Coast

Pipe Line Calling for 5000 Tons Placed—Structural Awards Total 7000 Tons—Rivets Active

SAN FRANCISCO, July 20 (*By Air Mail*). — Movement of steel products on the Pacific Coast shows few signs of diminishing, and bookings this week were in fair volume. An award of 5000 tons of plates for a pipe line in Vancouver, B. C., was placed, and bids have been opened on a 3700-ton riveted steel pipe line for Seattle. A number of important reinforcing steel bar projects were placed, including 675 tons for a school in San Francisco and 500 tons for a college building in Berkeley, Cal.

Considerable interest has been aroused in recent reports regarding the acquisition of the Columbia Steel Corporation by the United States Steel Corporation and the contemplated purchase by the latter company of a large industrial site near the Columbia Steel Corporation's present property in Pittsburg, Cal. Verification, however, could not be obtained.

Pig Iron.—Foundry operations are of such a character that demand for foundry iron remains more or less spotty, the majority of sales and inquiries being small. Pig iron quotations are unchanged.

Prices per gross ton at San Francisco:

*Utah basic	$25.00 to $26.00
*Utah fdy., sil. 2.75 to 3.25	25.00 to 26.00
**Indian fdy., sil. 2.75 to 3.25	25.00 to 26.00

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Bars.—Awards of reinforcing bars were the largest of any week of the year to date and brought the total for 1929, for the first time since the early part of April, above the aggregate for the corresponding total of last year. Important bookings included 800 tons for two buildings in Berkeley, placed with the Soule Steel Co.; 370 tons for an apartment in San Francisco, secured by W. C. Hauck & Co., and close to 600 tons for two factories in San Francisco, taken by the Pacific Coast Steel Co. Although most pending inquiries are for less than 100 tons, the West Garfield Street bridge in Seattle calls for 1150 tons. Out-of-stock prices in San Francisco continue at 2.20c. a lb., base, on carload lots, with 2.60c. a lb. applying on smaller tonnages. Los Angeles out-of-stock prices are $2 a ton higher. Merchant bars continue to move in small lots only, and 2.35c. a lb., c.i.f. Coast ports, appears to be general on this class of material.

Plates.—The Vancouver Engineering Works was awarded 5000 tons of plates for a pipe line for Vancouver, B. C. Other lettings of the week included seven steel tanks, ranging in size from 65,000 to 200,000 gal., for the Southern Pacific Co., San Francisco, to be installed at various points in California and Nevada. The Western Pipe & Steel Co. took 125 tons for a siphon for a reclamation project at Vale, Ore., while the Seattle Boiler Works secured 150 tons for a burner at Klamath Falls, Ore., for the Weyerhaeuser Timber Co. Bids were opened this week on 3700 tons for a riveted steel pipe line at Seattle. Prices remain firm at 2.35c. a lb., c.i.f. Coast ports.

Shapes. — Demand for structural shapes is being well maintained, and awards this week exceeded 7000 tons. Most of these projects, however, called for lots of from 100 to 200 tons. The Virginia Bridge & Iron Co. took two bridges for the Pacific Electric Co., Los Angeles, requiring 252 tons. An apartment in San Francisco calls for 200 tons, and a sorting rack for a timber company in Oregon for 250 tons. Plain material is firm at 2.35c. a lb., c.i.f. Coast ports.

Rivets.—Activity among the plate fabricating plants on the Pacific Coast has resulted in a stream of orders for rivets, and business booked so far this year is estimated to be in excess of that entered for the entire year 1928. Prices on large rivets appear to be firm at $3.10 a 100 lb., Pittsburgh.

Cast Iron Pipe.—Only three awards were reported placed this week. The American Cast Iron Pipe Co. took 225 tons for the improvement of West Dravus Street, Seattle. Bert Noble secured 145 tons of 4 to 12-in. Class B pipe for the improvement of Fifty-fifth Street, San Diego, Cal. Newport Beach, Cal., placed 724 tons of 4 to 12-in. Class B pipe for the improvement of Lido Island with the Underground Construction Co. On 1012 tons of 4 to 12-in. Class B pipe for Pasadena, Cal., the United States Pipe & Foundry Co. and the Pacific States Cast Iron Pipe Co. were low bidders, the latter company on the 4-in. pipe. The East Bay Municipal Utility District, Oakland, Cal., has made no award, as yet, on its project calling for 2331 tons of 6 to 20-in. Class B or centrifugal pipe. Bids were opened this week on 185 tons of 4 to 12-in. Class B pipe for the improvement of Broadway, Santa Monica, Cal. Bids were also opened by Alhambra, Cal., for 360 tons of Class B pipe. San Diego will open bids on Aug. 5 for 145 tons of 4 and 6-in. Class B pipe for the improvement of Redwood Street.

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and struc. shapes	3.15c.
Soft steel bars	3.15c.
Small angles, ¾-in. and over	3.15c.
Small angles, under ¾-in.	3.55c.
Small channels and tees, ¾-in. to 2¾-in.	3.75c.
Spring steel, ¼-in. and thicker	5.00c.
Black sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.80c.
Galv. sheets (No. 24)	5.30c.
Struct. rivets, ½-in. and larger	5.65c.
Com. wire nails, base per keg	$3.40
Cement c't'd nails, 100 lb. keg	3.40

Birmingham

Pig Iron Sold in East—Steel Buying Tapers But Mill Output Is Undiminished

BIRMINGHAM, July 23.—Buyers are apparently satisfied that the present base price will continue, as actual requirements are the main factor in current purchases. Buying has been in much smaller volume than was expected by furnace interests when prices were reduced for the second time, early this month. Last week's sales to district consumers were at about the same rate as in the previous week. A good portion of current business consists of spot orders from the smaller foundries. Several sales are reported made to East Coast points pending the establishment of the new combination rail and barge rates to Baltimore, Philadelphia, New York and Boston, which are scheduled to become effective Aug. 12, and it is expected that the movement of iron to those points will be important. The sale of Birmingham iron to the East so far has been of an introductory character. The Tennessee company has been shipping iron for some time to two large foundries in the East, one of which is a subsidiary company. It is reported that 15,000 tons of Birmingham iron will be shipped to the Louisville, Ky., plant of the Standard Sanitary Mfg. Co. The total number of active blast furnaces in this district remains at 17. Nine are on foundry iron, seven on basic and one on recarburizing iron.

Prices per gross ton, f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil.	$14.50
No. 1 fdy., 2.25 to 2.75 sil.	15.00
Basic	14.50

Finished Steel.—A further tapering off in the volume of new business has reduced it to a point where it is not quite equal to present shipments. Operations remain at the highest rate of the year, which is only a little under capacity for most of the mills. Order books are sufficient to support production at the present gait for from three to four weeks without the addition of further tonnage. Inquiries for bars, plates and shapes, though not so brisk as two weeks ago, are still much heavier than is usual for this season. Prices are unchanged. Structural steel fabricators report several important projects in prospect for the next few weeks. New orders of the Nashville Bridge Co. include over 4000 tons for towers for a transmission line near Memphis, Tenn., 200 tons for Alabama highway bridges and 125 tons for a bridge at Aberdeen, Miss. Reinforcing bar orders are in small lots, with

a fairly satisfactory aggregate. Only one open-hearth furnace is idle out of a total of 23, as has been the case for three weeks.

Cast Iron Pipe.—A few inquiries from the Middle West were the main developments in the pressure pipe market during the past week. Included was a project at Chicago, requiring about 1600 tons, to be awarded July 23. The United States Pipe & Foundry Co. is low bidder on 2331 tons of 6 to 20-in. pipe for Oakland, Cal. This company has been awarded 20,800 ft. of 6 and 8-in. pipe for Houston, Miss. The American Cast Iron Pipe Co. has booked 200 tons for Mountain City, Tenn. The placing of about four miles of 8 to 12-in. pipe for Hollywood, Fla., has been postponed until Aug. 15. West Greenville, S. C., will open bids July 30 for 20,000 ft. of 6 and 8-in. pipe. The project at Griffin, Ga., requiring nine miles of 16 to 20-in. pipe will be awarded about Sept. 1. Shipments this month have exceeded those of the comparable period of last month, being a little better than production. Prices are steady at $37 to $38 a net ton, Birmingham.

Coke.—Foundry coke under contract is moving in fairly satisfactory volume for this season. Prices are unchanged at $5 a net ton, Birmingham.

Old Material.—Several of the larger consumers are continuing to specify much less than their usual tonnages and the market remains slow. Smaller consumers are buying small lots as needed for current requirements. Practically no cast iron scrap is being sold. Prices are unchanged but weak.

Prices per gross ton, deliv'd Birmingham dist. consumers' yards:

Heavy melting steel	$12.50
Scrap steel rails	12.50
Short shoveling turnings	9.00
Cast iron borings	9.00
Stove plate	$11.50 to 12.00
Steel axles	21.00
Iron axles	23.00
No. 1 railroad wrought	10.00 to 10.50
Rails for rolling	14.00 to 15.00
No. 1 cast	13.50
Tramcar wheels	13.00
Cast iron carwheels	12.50 to 13.00
Cast iron borings, chem.	13.50 to 14.00

St. Louis

Advances in Scrap—New Business in Finished Steel Light —Demand for Pig Iron Lags

ST. LOUIS, July 23.—Melters seem wary of the pig iron market, in view of recent reductions by the Southern makers, and most purchases are being made only for immediate needs. The St. Louis Gas & Coke Corporation sold only 1850 tons, all for third quarter shipment, including 500 tons to an Iowa jobbing foundry, 300 tons to an Illinois equipment maker and 200 tons to an Illinois melter, all foundry, and 350 tons of malleable to an Illinois concern. The local maker has made no change in its prices despite two recent reductions of 50c. a ton by Southern interests. Shipments continue heavy.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill.	$20.00
Malleable, f.o.b. Granite City	20.50
N'th'n No. 2 fdy., deliv'd St. Louis	22.16
Southern No. 2 fdy., deliv'd	18.92
Northern malleable, deliv'd	22.16
Northern basic, deliv'd	22.16

Freight rates: 75c. (average) Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

Old Material.—For some time shipments to this market have been light, and dealers have increased prices to stimulate the movement. There is said to be a considerable short interest in No. 1 heavy melting steel, and in several other items. Consumers are showing more interest in the market, but dealers are reluctant to book business at present prices. Railroad lists, which are unusually light, follow: Chicago & Alton, 950 tons; International-Great Northern, 6926 tons; St. Louis & San Francisco, 42 carloads; Cotton Belt, 16 carloads; Nashville, Chattanooga & St. Louis, 10 carloads, and Chicago & Eastern Illinois, six carloads.

Dealers' buying prices per gross ton, f.o.b. St. Louis district:

No. 1 heavy melting or shoveling steel	$13.75 to $14.25
No. 2 heavy melting or shoveling steel	12.75 to 13.25
No. 1 locomotive tires	15.00 to 15.50
Miscel. stand.-sec. rails including frogs, switches and guards, cut apart	15.75 to 16.25
Railroad springs	18.00 to 18.50
Bundled sheets	9.50 to 10.00
No. 2 railroad wrought	13.75 to 14.25
No. 1 busheling	10.00 to 10.50
Cast iron borings and shoveling turnings	9.50 to 10.00
Iron rails	15.00 to 15.50
Rails for rolling	16.25 to 16.75
Machine shop turnings	8.00 to 8.50
Heavy turnings	9.75 to 10.00
Steel car axles	19.00 to 19.50
Iron car axles	26.50 to 27.00
Wrot. iron bars and trans.	22.00 to 22.50
No. 1 railroad wrought	13.00 to 13.50
Steel rails, less than 3 ft.	17.50 to 18.00
Steel angle bars	14.25 to 14.75
Cast iron carwheels	14.50 to 15.00
No. 1 machinery cast	15.50 to 16.00
Railroad malleable	15.50 to 16.00
No. 1 railroad cast	15.00 to 15.50
Stove plate	12.50 to 13.00
Agricult. malleable	15.00 to 15.50
Relay. rails, 60 lb. and under	20.50 to 23.50
Relay. rails, 70 lb. and over	26.50 to 29.00

Coke.—A shortage of foundry coke is reported, there being an especially good demand from melters in this area. Shipments of furnace coke to district smelters continue heavy. The usual seasonal dullness prevails in the domestic coke trade.

Finished Steel.—Specifications for plates, shapes and bars are reaching the mills as contracts require, but no new business of consequence is being placed. The demand for tank plates and blue annealed sheets continues good. The American Bridge Co. got the first sizable structural order for some time, 450 tons for a Woolworth building. A number of large projects are being discussed by financial interests, but the largest definitely before the trade is a Mack Truck service station, 350 tons.

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-fin. rounds, shaftings, screw stock	3.75c.
Black sheets (No. 24)	4.25c.
Galv. sheets (No. 24)	5.10c.
Blue ann'l'd sheets (No. 10)	3.45c.
Black corrug. sheets (No. 24)	4.30c.
Galv. corrug. sheets	5.15c.
Structural rivets	3.95c.
Boiler rivets	3.95c.

	Per Cent Off List
Tank rivets, 7/8-in. and smaller, 100 lb. or more	65
Less than 100 lb	60
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-pressed nuts, sq., blank or tapped, 200 lb. or more	60
Less than 200 lb	50
Hot-pressed nuts, hex., blank or tapped, 200 lb. or more	60
Less than 200 lb	50

Cincinnati

Scrap Stronger—Interest in Pig Iron Lacking

CINCINNATI, July 23.—Sales of pig iron have declined noticeably, and the market generally is dull as buyers feel their way before entering the market. Such iron as has been purchased has been bought quietly in small quantities, chiefly in carload lots. Despite this lull in activity, Northern pig iron continues firm at about $18.50 base, furnace. On the other hand, Southern iron is still weak at $14.50 base, Birmingham, with strong indications that concessions on quantity orders would be granted. The Marmon Motor Car Co., Indianapolis, is inquiring for a quantity of Northern foundry iron, ranging from 2500 to 5000 tons, depending on whether the company takes material only for third quarter or for the entire second half. A Muncie, Ind., consumer is asking for 600 tons of the same grade.

Prices per gross ton, deliv'd Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25	$19.89 to $20.39
Ala. fdy., sil. 1.75 to 2.75	17.69 to 18.19
Ala. fdy., sil. 2.25 to 2.75	18.19 to 18.69
Tenn. fdy., sil. 1.75 to 2.25	17.69 to 18.19
S'th'n Ohio silvery, 8 per cent	26.89

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

Finished Material.—The usual seasonal recession of buying activity is being felt by district sheet mills and, consequently, backlogs are being slowly reduced. Interest in galvanized

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and struc. shapes	3.40c.
Bars, soft steel or iron	3.30c.
New billet reinforc. bars	3.15c.
Rail steel reinforc. bars	3.00c.
Hoops	4.05c.
Bands	3.50c.
Cold-fin. rounds and hex.	3.85c.
Squares	4.35c.
Black sheets (No. 24)	4.05c.
Galvanized sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.45c.
Structural rivets	3.85c.
Small rivets	65 per cent off list
No. 9 ann'l'd wire, per 100 lb.	$3.00
Com. wire nails, base per keg	2.85
Cement c't'd nails, base 100 lb. keg	2.85
Chain per 100 lb	8.75

	Net per 100 Ft.
Lap-weld steel boiler tubes, 2-in.	$16.00
4-in.	33.00
Seamless steel boiler tubes, 2-in.	17.00
4-in.	34.00

sheets for roofing is increasing and is tending to offset to a small degree the sagging demand for other lines. Specialty sheets continue to command attention, as manufacturers of electrical devices, steel furniture and partitions are maintaining production at a good rate. On the other hand, demand for blue annealed sheets is off.

Coke.—Except for the sale of 5000 tons of New River foundry coke to an Illinois consumer, new business has been confined to spot shipments for immediate use. However, specifications on current contracts continue at a good rate and in better quantity than last month. Prices on by-product foundry coke, delivered in Cincinnati, will continue at $10.05 during August.

Old Material.—Although no sales of large tonnages have been reported, consumers are taking old material on commitments at a fair rate and dealers are finding it difficult to obtain good scrap to apply on contracts. Dealers are paying 25c. more a ton for heavy melting steel and No. 2 railroad wrought than a week ago. The price on bundled sheets has increased 50c. a ton, while sheet clippings are down 25c.

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel	$13.50 to $14.00
Scrap rails for melting	13.75 to 14.25
Loose sheet clippings	9.00 to 9.50
Bundled sheets	11.00 to 11.50
Cast iron borings	9.00 to 9.25
Machine shop turnings	8.50 to 8.75
No. 1 busheling	10.50 to 11.00
No. 2 busheling	6.75 to 7.00
Rails for rolling	14.50 to 15.00
No. 1 locomotive tires	14.25 to 14.75
No. 2 railroad wrought	13.25 to 13.75
Short rails	18.50 to 19.00
Cast iron carwheels	12.75 to 13.25
No. 1 machinery cast	19.25 to 19.75
No. 1 railroad cast	15.25 to 15.75
Burnt cast	10.25 to 10.75
Stove plate	10.25 to 10.75
Brake shoes	10.25 to 10.75
Railroad malleable	15.25 to 15.75
Agricultural malleable	14.25 to 14.75

Youngstown

Specifications Declining in Sheets, Strips and Bars, But Production Remains High

YOUNGSTOWN, July 23. — Although new business has been falling off steadily in the last two or three weeks, Valley district steel makers are still being pressed for deliveries on many products and operations have declined very little from the high rate of April and May. Curtailment in the sheet mills and, to a lesser extent, in open-hearth production has been necessitated by hot weather. Repairs to furnaces are also required from time to time, but not more than two or three of the available open-hearth furnaces in the district are usually allowed to be idle at one time and steel output is at record proportions for the summer season.

The principal declines in specifications have been in sheets and strips and more recently in bars. On sheets, however, mill backlogs are so large, even on the common finishes, that declining tonnage releases will have no effect on output for several weeks and revived automobile specifications are expected to appear before that time. Shipments to the automobile and parts makers serving the Ford and Chevrolet companies have not lessened, the decline in production by Michigan companies being confined largely to the makers of cars in the medium-priced class. On hot and cold-rolled strips backlogs have been generally reduced and business is on the hand-to-mouth basis that usually prevails at this time of the year. On bars deliveries range from two to four weeks, but better shipments are rapidly becoming possible.

The pipe business has been steadily growing more encouraging, and Youngstown companies will have an opportunity of quoting on several hundred thousand tons of line pipe in the next few weeks. Line pipe business now on company books is fairly satisfactory, but standard pipe is below expectations. The Republic Iron & Steel Co. is making shipments from the first unit of its electric-welded pipe plant in sizes up to 6⅝ in. and work is progressing rapidly on the mills that will make larger sizes. The Youngstown Sheet & Tube Co. is also experimenting on electrically-welded pipe and is reported to be making rapid progress in the development of a marketable product.

Tin mills are operating at close to physical capacity and business coming in promises to hold these schedules for several weeks.

Price weakness in sheets and strip is not generally recognized by the larger mills in the district because of their large backlogs on most products. However, business is being taken at 3.60c. and 2.85c., Pittsburgh, respectively on black and galvanized sheets and these figures are more representative of the market than higher quotations. Although prices $1 and $2 a ton under the above figures are growing more common, they are not being met by Youngstown mills, which are also holding firmly to the 2.20c. and 2.35c., Pittsburgh, quotations on light plates and blue annealed sheets. In other districts concessions of $2 a ton have appeared on these products, as well as on the 3c. price on tin mill black plate. Hot-rolled strip is steady at 1.90c. and 2c., Pittsburgh or Cleveland, and the market on cold-rolled strip is now well represented by 2.75c.

On sheet bars, billets and slabs $35 is the ruling quotation, and non-integrated mills have generally contracted for third quarter at that figure. Semi-finished steel is still rather hard to buy in the open market, although contract business is being taken care of satisfactorily.

The pig iron market is firm at $18.50, Valley, for the foundry and basic grades and $19 for malleable and Bessemer. There is little buying except in small lots, but shipments against old contracts are holding up well and furnace stocks are at the lowest point in years. The Cherry Valley stack of the Davison Coke & Iron Co. is expected to be blown in during August, and the Claire furnace of the same company will go out for relining in the near future.

The scrap market reflects the strength of the Pittsburgh district, and sales of heavy melting steel have been made during the last week at $18.50, delivered to Valley mills. Hydraulic compressed sheets are quotable at $17.50 to $18, or about 50c. a ton under No. 1 heavy melting.

Canada

Newfoundland Government Buys 11,000 Tons of Rails—100,000 Tons of Structural Work in Prospect

TORONTO, ONT., July 23.—While the Canadian pig iron markets are still affected by the summer holiday lull, more interest was manifest during the past week. No forward buying was reported, but spot demand was more active. The daily melt continues high, with many foundries operating at 100 per cent of capacity. Prices are strong in most districts, although they have been shaded in some instances on especially desirable business.

Prices per gross ton:

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75	$24.60
No. 2 fdy., sil. 1.75 to 2.25	24.10
Malleable	24.60
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75	$26.00
No. 2 fdy., sil. 1.75 to 2.25	25.50
Malleable	26.00
Basic	24.50
Imported Iron, Montreal Warehouse	
Summerlee	$33.50
Carron	33.00

Structural Steel. — Demand shows general improvement. Several large bridge contracts are expected to be placed soon. A number of new building projects have been announced for which from 100 to 8000 tons of steel will be required. It is estimated that prospective structural steel work in Ontario and Quebec totals 50,000 and 60,000 tons, while for other parts of the Dominion upward of 50,000 tons is in prospect.

Cast Iron Pipe.—Sewage and waterworks developments are resulting in a growing demand for pipe. At the same time there are large prospective requirements in both steel and cast pipe in connection with oil and gas operations in this country. The Greater Vancouver Water Board, Vancouver, B. C., has awarded a contract to the Vancouver Engineering Works,

519 West Sixth Avenue, to supply seven miles of steel pipe ranging in size from 26 to 36 in. in diameter, at a cost of $292,963. The City Council, Winnipeg, Man., has placed an order with the Canada Iron Foundries, Fort William, Ont., for 3600 ft. of 6-in. pipe, 3600 ft. of 10-in. pipe and 3600 ft. of 12-in. pipe.

Rails.—In addition to the substantial rail orders recently received by the Algoma Steel Corporation, Sault Ste. Marie, Ont., and the Dominion Iron & Steel Co., Sydney, N. S., the latter company has just received an order for 11,000 tons of rails from the New Foundland Government. Other large orders are said to be in consideration by both the Canadian National Railways and the Canadian Pacific Railway.

Old Material.—Business in this market has shown some improvement, in sympathy with the betterment in the general outlook of the iron and steel industry as a whole. A few good tonnage sales were reported in heavy melting steel and turnings in the Toronto district and inquiry is more active than for several weeks. Montreal interests continue to order steel scrap in small lots, but at frequent intervals. Prices are firm but unchanged.

Dealers' buying prices:

	Toronto	Montreal
	Per Gross Ton	
Heavy melting steel.	$10.00	$8.50
Rails, scrap	11.00	9.00
No. 1 wrought	10.00	12.00
Machine shop turnings	7.50	5.00
Boiler plate	7.50	6.00
Heavy axle turnings	8.00	7.50
Cast borings	7.50	5.00
Steel turnings	7.50	6.50
Wrought pipe	6.00	6.00
Steel axles	15.00	20.00
Axles, wrought iron	17.00	22.00
No. 1 machinery cast	....	17.00
Stove plate	....	13.00
Standard carwheels	....	16.00
Malleable	....	13.00
	Per Net Ton	
No. 1 mach'ry cast	$16.00	....
Stove plate	12.00	....
Standard carwheels	15.00	....
Malleable scrap	14.00	....

Coke.—Consumption of by-product foundry coke is running a little ahead of July, 1928, records, and just about on a par with June, this year. The price on New England made fuel remains unchanged at $11 a ton, delivered within a $3.10 freight rate zone. Last week 4000 tons of coke from the Ruhr district of Germany, loaded at Rotterdam, arrived at Providence, R. I., for the Providence Gas Co.

Old Material.—With mills specifying against contracts more freely, with competition among shippers growing, and with most kinds of scrap in limited supply, old material prices continue to have an upward trend. The market for No. 1 heavy melting steel, scrap rails, forge flashings and skeleton is stronger than that for other kinds of scrap. Bethlehem Steel Co.'s representatives are active in the unprepared scrap market. Material bought by them is being shipped direct to consuming point instead of from the company's Quincy, Mass., shipbuilding plant, as heretofore. Owing to the fact that 75 per cent of loading crane equipment is out of commission, making it possible to load not more than 100 tons per day, indications are local scrap exporters will withdraw from the market after this week until loading facilities have been replaced in commission. One steamer is expected to finish loading 3500 tons for Danzig this week. Another 1500 ton contract will probably be held up temporarily.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$12.50 to $13.00
Scrap T rails	11.75 to 12.50
Scrap girder rails	10.50 to 11.50
No. 1 railroad wrought	12.00 to 12.50
No. 1 yard wrought	9.50 to 10.00
Machine shop turnings	6.60 to 7.10
Cast iron borings (steel works and rolling mill)	6.50 to 6.60
Bundled skeleton, long	9.50 to 10.50
Forge flashings	†0.25 to 10.75
Blast furnace borings and turnings	6.00 to 6.25
Forge scrap	9.00 to 9.25
Shafting	14.00 to 14.25
Steel car axles	18.00 to 19.00
Wrought pipe 1 in. in diameter (over 2 ft. long)	9.75 to 10.00
Rails for rolling	12.50 to 13.00
Cast iron borings, chemical	10.00 to 10.25

Prices per gross ton deliv'd consumers' yards:

Textile cast	$14.50 to $15.00
No. 1 machinery cast	15.00 to 15.25
No. 2 machinery cast	13.00 to 13.25
Stove plate	11.00 to 11.50
Railroad malleable	18.50 to 19.00

Boston

Pig Iron Sales Larger With Prices Showing No Strength—Scrap Values Advancing

BOSTON, July 23.—The purchase of 2000 tons by a Massachusetts valve manufacturer, 1500 tons by a Massachusetts textile machinery maker, 1000 tons by a Connecticut foundry and numerous small lots brought local pig iron sales the past week up to approximately 9000 tons, the largest total for some weeks. The valve manufacturer business was split three ways. The textile machinery business went largely to a furnace east of Buffalo, as did the 1000-ton Connecticut order. It is understood the textile manufacturer will purchase more iron this week, and there is a possibility of heater makers coming into the market shortly for several thousand tons, although they have not sent out inquiries. Irons sold the past week included Mystic, Buffalo, New York State, western Pennsylvania and Alabama. Prices are still soft, although no business at less than the equivalent of $17 a ton, base Buffalo, is reported. No. 1X iron, however, sold at the equivalent of $17.50 a ton, Buffalo, and a shade higher. Thus furnaces are not holding to 50c. differentials.

Foundry iron prices per gross ton deliv'd to most New England points:

†Buffalo, sil. 1.75 to 2.25	$21.28 to $21.78
†Buffalo, sil. 2.25 to 2.75	21.78 to 22.28
*Buffalo, sil. 1.75 to 2.25	21.91 to 22.41
*Buffalo, sil. 2.25 to 2.75	22.41 to 22.91
East. Penn., sil. 1.75 to 2.25	24.65
East. Penn., sil. 2.25 to 2.75	25.15
Va., sil. 1.75 to 2.25	25.21
Va., sil. 2.25 to 2.75	25.71
Ala., sil. 1.75 to 2.25	21.41 to 23.27
Ala., sil. 2.25 to 2.75	21.91 to 23.77

Freight rates: $4.91 all rail from Buffalo, and $4.28 rail and water; $3.65 from eastern Pennsylvania; $5.21 all rail from Virginia; $6.91 to $8.77 from Alabama.

*All rail rate.

†Rail and water rate.

Reinforcing Steel.—The market for reinforcing steel remains quiet. Sales of billet steel bars the past week aggregated just under 300 tons. Prices are firm at 2.66½c. a lb., base, from stock. Rail steel bars are 2.26½c., base, delivered common Boston freight rate points.

Cast Iron Pipe.—The Boston Consolidated Gas Co. will shortly close on its last quarter 6 to 24-in. pipe requirements, about 2000 tons in all. For estimating purposes, Holyoke, Mass., is asking bids on 1000 tons of 6 to 12-in. pipe. Massachusetts has purchased 350 tons of pipe for various State institutions, and Bedford, Mass., 100 tons of 6-in. stock. Prices quoted openly on domestic pipe are: 4 in., $46.10 to $47.10 a ton, delivered common Boston freight rate points; 6 to 12 in., $40.10 to $41.10; 16 to 20 in., $39.10. A $3 differential is asked on Class A and gas pipe.

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars, small shapes	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway rounds	6.60c.
Norway squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tie steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold-rolled steel—	
Rounds and hex	*3.55c. to 5.55c.
Spares and flats	*4.05c. to 7.05c.
Toe calk steel	6.00c.
Rivets, structural or boiler	4.50c.

	Per Cent Off List
Machine bolts	50 and 5
Carriage bolts	50 and 5
Lag screws	50 and 5
Hot-pressed nuts	50 and 5
Cold-punched nuts	50 and 5
Stove bolts	70 and 10

*Including quantity differentials.

Detroit Scrap Firmer

DETROIT, July 23.—There have been no changes in prices on waste material in the district during the past week and there is a decidedly firmer tendency on blast furnace grades, with prices near the high of the range. This is probably due to the fact that the production of scrap has decreased during the present month.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Hvy. melting and shov. steel	$14.00 to $14.50
Borings and short turnings	9.00 to 9.50
Long turnings	8.00 to 8.50
No. 1 machinery cast	12.50 to 13.00
Automobile cast	13.00 to 13.50
Hydraul. comp. sheets	13.75 to 14.25
Stove plate	9.00 to 9.50
New No. 1 busheling	12.50 to 13.00
Old No. 1 busheling	11.00 to 11.50
Sheet clippings	8.75 to 9.25
Flashings	12.75 to 13.25

Buffalo

Pig Iron Inquiries Total 20,000 Tons—One Is for Fourth Quarter—Scrap Scarce

BUFFALO, July 23.—Inquiries totaling 20,000 tons of pig iron have been received. This volume is partially accounted for by the fact that melters who have been operating steadily through the second quarter and thus far into the third quarter on iron purchased early in the year are now running short and must come into the market. Two inquiries from the East are for 3000 tons apiece and one is for 4000. There are several for 1000 tons and similar tonnages. An order placed in Buffalo from the East was for 1600 tons of malleable and foundry. The first fourth-quarter inquiry for 250 tons of foundry has been received. The movement over the canal has been very good. Production of iron in this district is at top notch and one maker reports the heaviest first-half shipments in the history of the company. Buffalo producers believe that furnaces east of here are pretty well sold up and are hopeful of a firm price being maintained along the seaboard.

Prices per gross ton, f.o.b. furnace:

No. 2 fdy., sil. 1.75 to 2.25	$19.50
No. 2X fdy., sil. 2.25 to 2.75	20.00
No. 1 fdy., sil. 2.75 to 3.25	21.00
Malleable, sil. up to 2.25	20.00
Basic	18.50
Lake Superior charcoal	27.28

Finished Iron and Steel.—Manufacturers of reinforcing bars and fabricated structural steel report a steady demand and plenty of inquiries for small size lots, but not many for sizeable tonnages. Bids will be received soon for a post office in connection with the New York Central Terminal in East Buffalo. This building will require 400 tons of structural steel. A water reservoir at Gowanda will require 150 tons of reinforcing bars. Operation of mills is being maintained and the demand shows no sign of tapering.

Old Material.—No. 1 heavy melting steel is unusually scarce and the market is stronger. There has been some purchasing at $17.25, but no large tonnages. There have been a few purchases of No. 1 machinery cast at $15.75 to $16, and an inquiry is out for 2000 tons of stove plate. This consumer wants to buy at about $12.50, but dealers believe the material cannot be had under $13. Railroad lists went to Pittsburgh at a price of $19, Buffalo. There is a strong demand from Weirton for No. 2 heavy melting steel, and dealers are offering $14.25 to $14.50 on old orders here. In one instance $14.75 was paid. Dealers are paying $10 for machine shop turnings on one order, but as the material is taken only on an analysis basis shipments are not being freely made. One small purchase of stove plate is reported at $13. Demand for specialties has picked up, but quite a number of unfilled orders are out and dealers are reluctant to take on new. There has been a decided drop in the production of scrap and demand has been maintained. A few sales of cast iron borings at $11.50 are reported. One of the largest consumers in the district continues to bring in hydraulic sheets from Detroit at the rate of two boatloads a week.

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and struc. shapes	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.95c.
Cold-fin. flats, sq. and hex.	4.45c.
Rounds	3.95c.
Cold-rolled strip steel	5.85c.
Black sheets (No. 24)	4.20c.
Galv. sheets (No. 24)	4.85c.
Blue ann'l'd sheets (No. 10)	3.50c.
Com. wire nails, base per keg	$3.60
Black wire, base per 100 lb.	3.75

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades:		
No. 1 heavy melting steel	$17.00 to	$17.25
No. 2 heavy melting steel	14.75 to	15.00
Scrap rails	16.50 to	17.00
Hydraul. comp. sheets	14.50 to	14.75
Hand bundled sheets	12.00 to	12.50
Drop forge flashings	14.25 to	14.50
No. 1 busheling	15.50 to	16.50
Hvy. steel axle turnings	14.00 to	14.50
Machine shop turnings	7.50 to	7.75
No. 1 railroad wrought	13.00 to	13.50
Acid Open-Hearth Grades:		
Knuckles and couplers		19.00
Coil and leaf springs		19.00
Rolled steel wheels		19.00
Low phos. billet and bloom ends	20.00 to	20.50
Electric Furnace Grades:		
Short shov. steel turnings	12.00 to	12.50
Blast Furnace Grades:		
Short mixed borings and turnings	11.00 to	11.50
Cast iron borings	11.00 to	11.50
No. 2 busheling	10.00 to	10.50
Rolling Mill Grades:		
Steel car axles	18.75 to	19.25
Iron axles	21.00 to	22.00
Cupola Grades:		
No. 1 machinery cast	16.00 to	17.00
Stove plate	12.50 to	13.00
Locomotive grate bars	12.50 to	13.00
Steel rails, 3 ft. and under	19.00 to	19.50
Cast iron carwheels	14.00 to	14.50
Malleable Grades:		
Industrial	18.50 to	19.00
Railroad	18.50 to	19.00
Agricultural	18.50 to	19.00
Special Grades:		
Chemical borings	12.50 to	13.50

Sustained Industrial Output Forecast by Statisticians

"The past half year established a new high record in industrial production and trade in the United States, and the current rate should continue without serious let-up for some time to come," according to the July report of the Conference of Statisticians in Industry, operating under the auspices of the National Industrial Conference Board, New York. "This achievement is all the more remarkable because it was brought about in the face of extremely unfavorable money conditions, an unsettled agricultural situation, a decline in building construction and a depressed condition in the hide and leather industries."

The report emphasizes especially the favorable balance between production and consumption. "So far this year a very large industrial output has been absorbed by what seems to be an insatiable consumer demand. Commodity stocks on the whole have actually been on the decrease. In spite of the high tempo of production, costs have apparently remained stationary or declined, for net earnings have increased faster than gross income. No important signs of overproduction have as yet appeared."

Although the decline in building construction continues, it appears to be centered, according to the report, chiefly in the larger cities and has affected mainly residential building. The recovery of agricultural prices is pointed to by the report as likely to convert a hitherto unfavorable factor into a stabilizing influence for continued industrial prosperity.

More Steel Castings Made in Half-Year

WASHINGTON, July 23.—Orders for commercial steel castings in June totaled 94,559 tons, representing 65 per cent of the monthly capacity of 145,700 tons of the 127 concerns reporting to the Department of Commerce. This compares with 113,329 tons, or 78 per cent of capacity, for May. Production was 115,411 tons, or 79 per cent of capacity, against 127,189 tons or 87 per cent of capacity in May.

Of the June orders, 35,425 tons was for railroad specialties, being 52 per cent of that class of capacity and 59,134 tons was for miscellaneous castings, representing 76 per cent of such capacity. For the six months ended June, orders totaled 723,292 tons, or 83 per cent of capacity compared with 509,268 tons, or 58 per cent of capacity, for the corresponding period of last year.

June production was made up of 55,493 tons of railroad specialties, or 82 per cent of such capacity, and 59,918 tons of miscellaneous castings, or 77 per cent of such capacity. Production for the first six months of 1929 aggregated 670,685 tons, against 527,265 tons for the corresponding period of 1928. The gain in railroad specialties was much heavier than in the miscellaneous group. It was 43 per cent—from 204,841 tons to 293,120 tons—compared with 17 per cent—from 322,424 tons to 377,565 tons—for miscellaneous castings.

Exhibits of metal products will be shown at the Leipzig Trade Fair at Leipzig, Germany, Aug 25 to 31 inclusive. America's expanding world trade has been responsible for increased participation in the fairs during the past few years. Information concerning the fair can be obtained from American headquarters at 11 West Forty-Second Street, New York.

Non-Ferrous Metal Markets

Tin Sales Heavy, Copper More Active, Zinc Prices Advance

NEW YORK, July 23.

Tin.—The past week was marked by increased buying of Straits tin, total sales having amounted to about 2800 tons. This tonnage put the week among the highest of the year. Demand was about equally divided among dealers and consumers, and deliveries over the remainder of 1929 were specified by most customers. The market was quiet early in the week until a consumer bought 500 tons. This transaction gave impetus to further active trading, which has prevailed the last few days. While business has been of substantial volume, there have been no developments of outstanding interest. The demand for Straits tin is reflected in prices. Quotations have remained fairly steady all week and spot Straits tin was firm today at 47.25c., New York. The London market has been moderately active and prices have not changed much in the past week. Spot standard is quoted at £212 10s., future standard at £216 5s. and spot Straits at £216 5s. An interesting feature is that full prices were paid in the primary market at Singapore, which was quoted today at £220 10s.

Copper.—An upward turn in demand was discernible the past week and indications are that buying on a more liberal scale will continue during the remainder of July. Sales this morning totaled about 1200 tons and average daily bookings in the last seven days have been more than 1100 tons, or twice those of the preceding week. Practically all of the gain has been confined to foreign users, for domestic consumers still are refraining from buying, except in extremely meager lots. Producers, however, are confident that the time is rapidly drawing near when domestic companies will be forced into the market from the sheer necessity of meeting immediate needs. Although the increased sales have bolstered the market, it must be remembered that demand still is far below normal. Producers must book about 2000 tons daily in order to find an outlet for normal accumulation of stocks. It is evident, therefore, that business during July has been far from satisfactory, even though the month is ending more satisfactorily than it began. Prices are firm and unchanged, with

THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY

	July 23	July 22	July 20	July 19	July 18	July 17
Lake copper, New York	18.12½	18.12½	18.12½	18.12½	18.12½	18.12½
Electrolytic copper, N. Y.*	17.75	17.75	17.75	17.75	17.75	17.75
Straits tin, spot, N. Y.	47.25	47.25	....	47.37½	46.42½	47.00
Zinc, East St. Louis	6.80	6.80	6.80	6.80	6.80	6.80
Zinc, New York	7.15	7.15	7.15	7.15	7.15	7.15
Lead, St. Louis	6.55	6.55	6.55	6.55	6.55	6.55
Lead, New York	6.75	6.75	6.75	6.75	6.75	6.75

*Refinery quotation; price ¼c. higher delivered in the Connecticut Valley.

Prices on rolled non-ferrous products are unchanged from those prevailing one week ago.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—
- High brass ..... 23.25c.
- Copper, hot rolled ..... 26.75c.
- Zinc ..... 10.25c.
- Lead (full sheets) ... 11.00c. to 11.25c.

Seamless Tubes—
- High brass ..... 28.25c.
- Copper ..... 29.25c.

Rods—
- High brass ..... 21.25c.
- Naval brass ..... 24.00c.

Wire—
- Copper ..... 19.87½c.
- High brass ..... 23.75c.

Copper in Rolls ..... 26.75c.
Brazed Brass Tubing ..... 30.87½c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also to St. Louis on shipments to points west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide ..... 33.00c.
Tubes, base ..... 42.00c.
Machine rods ..... 34.00c.

Chicago Warehouse

(Prices Cover Trucking to Customers' Doors in City Limits)

Sheets—	Base per Lb.
High brass	23.25c.
Copper, hot rolled	27.75c.
Copper, cold rolled, 14 oz. and heavier	30.00c.
Zinc	10.00c.
Lead, wide	11.90c.
Seamless Tubes—	
Brass	28.25c.
Copper	29.25c.
Brass Rods	21.25c.
Brazed Brass Tubes	31.00c.

New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—		
High brass	21.12½c.	to 22.12½c.
Copper, hot rolled, Base sizes	27.75c.	to 28.75c.
Copper, cold rolled 14 oz. and heavier, base sizes	30.00c.	to 31.00c.
Seamless Tubes—		
Brass	26.00c.	to 27.00c.
Copper	29.12½c.	to 30.12½c.
Brazed Brass Tubes	29.12½c.	to 30.12½c.
Brass Rods	18.87½c.	to 19.87½c.

New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets (No. 9), casks	10.50c.	to 11.00c.
Zinc sheets, open	11.50c.	to 12.00c.

Metals from New York Warehouse

Delivered Prices, Per Lb.

Tin, Straits pig	48.50c. to 49.50c.
Tin, bar	50.50c. to 51.50c.
Copper, Lake	19.50c.
Copper, electrolytic	19.25c.
Copper, casting	19.00c.
Zinc, slab	7.75c. to 8.25c.
Lead, American pig	7.50c. to 8.00c.
Lead, bar	9.50c. to 10.00c.
Antimony, Asiatic	10.50c. to 11.00c.
Aluminum No. 1 ingots for remelting (guaranteed over 99% pure)	25.00c. to 26.00c.
Alum. ingots, No. 12 alloy,	24.00c. to 25.00c.
Babbitt metal, commercial grade,	30.00c. to 40.00c.
Solder, ½ and ⅓	31.00c. to 32.00c.

Metals from Cleveland Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	52.00c
Tin, bar	54.00c.
Copper, Lake	19.50c.
Copper, electrolytic	19.25c.
Copper, casting	18.75c.
Zinc, slab	7.75c. to 8.00c.
Lead, American pig	7.50c. to 7.75c.
Lead, bar	9.75c.
Antimony, Asiatic	16.00c.
Babbitt metal, medium grade	18.75c.
Babbitt metal, high grade	56.50c.
Solder, ½ and ½	31.75c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged customers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	14.50c.	16.00c.
Copper, hvy. and wire	14.25c.	15.75c.
Copper, light and bottoms	12.50c.	13.50c.
Brass, heavy	8.50c.	9.50c.
Brass, light	7.50c.	8.50c.
Hvy. machine composition	11.50c.	12.75c.
No. 1 yel. brass turnings	9.50c.	10.25c.
No. 1 red brass or compos. turnings	11.25c.	12.25c.
Lead, heavy	5.25c.	5.75c
Lead, tea	4.25c.	5.25c.
Zinc	3.50c.	4.25c.
Sheet aluminum	14.00c.	16.00c.
Cast aluminum	12.25c.	14.25c.

electrolytic copper quoted at 18c., delivered in the Connecticut Valley, and at 18.30c., c.i.f. usual European ports. Lake copper is steady at 18c. to 18.12½c., delivered.

Zinc.—At the beginning of the week producers sold considerable tonnages of prime Western zinc at 6.70c., East St. Louis, and then raised the price to 6.80c. All sellers are now quoting on the latter basis. The bulk of the week's business, of course, was done prior to the advance, and therefore sales the past few days have been somewhat light.

Lead.—Considerable buying was reported the past week, with total sales in the United States approximating 12,000 tons. During the middle of the week there was a slight drop in quotations to 6.52½c., St. Louis, but later the market recovered its strength and producers are now holding to 6.55c. The American Smelting & Refining Co. is asking 6.75c., New York.

Antimony.—The crisis in Chino-Russian relations which developed the past week precipitated a rush of consumer buying of Chinese metal. The result has been a general firming up of prices, with spot selling at 8.75c. and futures at 8.62½c., duty paid, New York.

Nickel.—Ingot nickel is selling at 35c. a lb., shot nickel at 36c. and cathodes of electrolytic nickel at 35c.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is priced at 23.90c. a lb., delivered.

Non-Ferrous Metals at Chicago

CHICAGO, July 23.—Prices have advanced on all metals except copper and lead. Sales are in fair volume and releases against old orders are liberal. The old metal market is steady and moderately active.

Prices per lb., in carload lots: Lake copper, 18.50c.; tin, 48c.; lead, 6.65c.; zinc, 6.90c.; in less-than-carload lots, antimony, 9.62½c. On old metals we quote copper wire, crucible shapes and copper clips, 14c.; copper bottoms, 11.50c.; red brass, 11.50c.; yellow brass, 8c.; lead pipe, 4.50c.; zinc, 3.25c.; pewter, No. 1, 24.50c.; tin foil, 26c.; block tin, 36c.; aluminum, 12.87½c.; all being dealers' prices for less-than-carload lots.

New Trade Publications

Wrought Iron—Mesker Brothers Iron Co., St. Louis. Treatise on wrought iron, describing metal sash of this material and the reasons why it is immune to progressive corrosion. Wrought iron sash made by this company may be had in center-pivoted or projected types. The sections are exceptionally heavy, being 1½ in. deep and weighing more than 1 lb. a foot.

Valves.—Homestead Valve Mfg. Co., Coraopolis, Pa. Catalog of 52 pages, identified as catalog No. 35, contains information and illustrations of various types of valves manufactured by the company. Features shown for the first time are 8-in. and 10-in. straight-way valves, 12-in. three-way valves and a special two-way protected seat hydraulic operating valve, which may be used as a spray valve or as a tube tester relief valve. To illustrate the company's ability to handle special engineering and industrial requirements, a complicated type of cast steel valve designed to meet unusual pressure and temperature requirements is shown.

Unit Heater.—Young Radiator Co., Racine, Wis. The Young unit heater in a recirculating box is described in a four-page circular. This is a particularly interesting development for automobile factories, garages, warehouses and machine shops.

Furnace Construction.—Standard Arch Co., Frostburg, Md. Booklet of 20 pages illustrating and describing an arch suspended roof, flat suspended roof and sectional supported sidewall construction for furnaces of either the industrial or the boiler type, and for a wide variety of fuels. Methods of installation and repair are detailed.

Refractories.—Charles Taylor Sons Co., Cincinnati. Booklet of four pages describing Tayco X refractories for special furnace requirements. Strength at high temperatures is stressed.

Ball Bearings.—New Departure Mfg. Co., Bristol, Conn. Loose-leaf pages of engineering reference book, general industrial edition. These cover 26 pages with an index and introduction. They are illustrated. A considerable amount of tabular matter is included.

Piling Case Goods.—Revolvator Co., 352 Garfield Avenue, Jersey City. Bulletin 85A, illustrated, shows the use of portable stacking elevators for putting boxes of goods into storage and taking them out again.

Locomotive Cranes.—Link-Belt Co., 910 South Michigan Avenue, Chicago. Booklet of 48 pages describing cranes, shovels and drag lines operated by electric motor or by steam, gasoline or Diesel engines. Capacities are from ¾ yd. to 2 yd. Crawler cranes and shovels are featured.

Water-Level Indicator.—Combustion Engineering Co., 200 Madison Avenue, New York. Folder of four pages illustrating and describing a water-level indicator for boilers, which is easily readable from the floor, regardless of the height of the boiler.

Floodlight.—Crouse-Hinds Co., Syracuse, N. Y. Bulletin 2134 of four pages illustrates and describes a floodlight for universal service, either industrial or otherwise.

Silent Chain Drives.—Ramsey Chain Co., Albany, N. Y. Catalog of 88 pages, profusely illustrated, describing a line of chain drives for application to all types of machinery. The illustrations are largely drawn from widespread installations. Tabular matter gives dimensions and list prices for a considerable variety of equipment.

Mechanical Stokers.—American Engineering Co., Philadelphia. Pamphlet of 16 pages illustrating and describing Taylor stokers, with particular reference to units going into the Delray No. 3 station of the Detroit Edison Co.

Motor-Generator Set.—General Electric Co., Schenectady, N. Y. Bulletin GEA-394A covers in two pages a small induction motor-generator set obtainable in sizes from ⅞ kw. to 35 kw. and giving 125 or 250-volt direct current.

Reinforcing Steel

Lettings Total 5500 Tons And Inquiries Are Light

REINFORCING steel lettings the past week totaled only 5500 tons, consisting mostly of miscellaneous jobs ranging from 100 to 300 tons. Inquiries for about 1800 tons were among the smallest of the year. They included 700 tons for a plant at Tarrytown, N. Y., for the Chevrolet Motor Co.

SAYREVILLE, N. J., 200 tons, Eastern New Jersey Power Co., to Truscon Steel Co.

COATESVILLE, PA., 475 tons, Coatesville General Hospital, to Truscon Steel Co.

CINCINNATI, 200 tons, sewer construction, to West Virginia Rail Co.

GRAND RAPIDS, MICH., 800 tons, sewage treating plant, to an unnamed bidder.

GRAND TRUNK RAILROAD, 500 tons, grade separation work at Pontiac, Mich., to Jones & Laughlin Steel Corporation.

DES MOINES, IOWA, 300 tons, Montgomery Ward Co., to Sheffield Steel Corporation.

PHOENIX, ARIZ., 168 tons, paving Douglas-Rodeo Highway, to unnamed bidder.

SAN FRANCISCO, 277 tons, factory, Howard and Montgomery Streets, to Pacific Coast Steel Co.

SAN FRANCISCO, 287 tons, factory, Yosemite and Lane Streets, to Pacific Coast Steel Co.

SAN FRANCISCO, 370 tons, apartment building, O'Farrell and Leavenworth Streets, to W. C. Hauck & Co.

SAN FRANCISCO, 675 tons, school, Twenty-ninth and Geary Streets, to Pacific Coast Steel Co.

HAYWARD, CAL., 150 tons, warehouse for California Conserving Co., to Pacific Coast Steel Co.

BERKELEY, CAL., 500 tons, Giannini Hall, University of California, to Soule Steel Co.

BERKELEY, 300 tons, dormitory, Bancroft and Piedmont Avenue, to Soule Steel Co.

SANDPOINT, WASH., 150 tons, barracks, to Northwest Steel Rolling Mills.

OLYMPIA, WASH., 250 tons, highway work, to Northwest Steel Rolling Mills.

OLYMPIA, 200 tons, highway work, to Pacific Coast Steel Co.

PORTLAND, ORE., 100 tons, highway work, to Northwest Steel Rolling Mills.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

TARRYTOWN, N. Y., 700 tons, plant addition for Chevrolet Motor Co.

GOWANDA, N. Y., 150 tons, water reservoir for village.

PHILADELPHIA, 1000 tons, Ridge Avenue subway; Keystone State Construction Co., low bidder for general contract.

CLEVELAND, 300 tons, clothing factory for Richman Brothers.

CHICAGO, tonnage not stated, Gateway theater; Rapp & Rapp, architects.

TACOMA, WASH., 290 tons, cold storage plant; bids being taken.

SAN FRANCISCO, 300 tons, Shell Oil Building; bids being taken.

American Hoist & Derrick Co., St. Paul, Minn., manufacturer of hoisting machinery, has removed its San Francisco office to 5515 Doyle Ave., Emeryville, Oakland, Cal. Boyd Nixon continues in charge.

PERSONAL

HAROLD W. SCHROEDER has been appointed district sales manager at New York for the Wheeling Steel Corporation, succeeding C. E. Scofield, who died July 9. Mr. Schroeder was born in Montclair, N. J., in 1894 and was graduated from Harvard University in 1915 with the bachelor of science

H. W. SCHROEDER

degree. He worked for several years in the Steubenville, Ohio, mill of the LaBelle Iron Works, and in July, 1919, became associated with the New York sales office of that company. When the LaBelle company merged with the Wheeling Steel Corporation in 1921, Mr. Schroeder continued in the New York office of the consolidated companies, in 1925 being appointed manager of the export department. In 1927 he added to his work the duties of assistant manager of sales for the New York district. In conjunction with his activities as district sales manager he will continue as manager of the export department, in which capacity he has charge of all of the company's foreign sales.

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HARRY A. BLACK, president, Black Hardware Co., Galveston, Tex.; HAROLD C. SMITH, president, Illinois Tool Works, Chicago; FREDERICK M. FEIKER, managing director, Associated Business Papers, Inc., New York, and ALFRED REEVES, general manager, National Automobile Chamber of Commerce, New York, are members of a committee of the Chamber of Commerce of the United States to assist trade groups in relation to trade association activities.

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F. A. WEYMOUTH, for a number of years engineer of tests of the former Maryland Steel Co., Sparrows Point, Md., and later sales metallurgist, Bethlehem Steel Co., has been appointed chief metallurgist of the Colorado Fuel & Iron Co., Pueblo, Colo.

HAROLD S. FALK, vice-president and works manager of the Falk Corporation, Milwaukee, has been appointed chairman of the committee on industrial education of the National Metal Trades Association. During the last seven years he has been chairman of the apprenticeship committee of the Milwaukee branch of the National Metal Trades Association and under his direction the number of apprentices in the Milwaukee district has grown from 460 to well over 1000. Mr. Falk is also a member of the committee on education and training for industries of the American Society of Mechanical Engineers.

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ADOLFO PRIETO, president, Monterey Iron & Steel Co., Monterey, Mexico, sailed from New York July 19 on the Alfonso XIII for Spain. He spent several days in New York as the guest of WILLIAM G. MOLER, New York representative of the Monterey company. Mr. Prieto was also entertained by the Mexican Chamber of Commerce of the United States in New York. He is president of La Victoria, one of the largest cotton and woolen mills in Mexico, and is director of industrial, financial and commercial institutions, including the Bank of Mexico.

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J. C. WILLIAMS, vice-president and general manager, Weirton Steel Co., Weirton, W. Va., sailed on July 15 for a six-weeks vacation in Europe.

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W. K. STAMETS, Pittsburgh machinery dealer, is returning this week from a three-months tour of Europe.

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J. S. ELVERSON, who for more than 25 years has specialized in chilled iron casting work, has been honored by the Fuller Lehigh Co., Fullerton, Pa., which has adopted the trade name Elverite as a designation for its chilled iron products. Mr. Elverson is the Fuller Lehigh Co.'s metallurgist. After his graduation from the University of Pennsylvania in 1887, he worked for a number of years in ore surveys, was ore agent for the Crane Iron Works, and later president of the Catasauqua Mfg. Co., manager of the Oxford mines and furnaces of Empire Steel & Iron Co. and president of the Lehigh Foundry Co.

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E. A. WEAVER, heretofore district manager of the Boston office of the Surface Combustion Co., has been transferred to the home office at Toledo. He will be succeeded by JOHN R. WALTMAN.

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E. P. DILLON, since 1918 general manager of the Research Corporation of New York, has been appointed vice-president and associate engineer of the E. Y. Sayer Engineering Corporation, New York. He has been engaged in power plant design and construction work since his graduation from the University of Colorado in 1899.

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WALTER M. SUTTON, formerly in charge of the St. Louis office of the W. A. Jones Foundry & Machine Co., Chicago, has been appointed manager of the Pittsburgh office of the company.

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BENJAMIN DIXON, who has been sales manager of the Industrial Works of Bay City, Mich., has become district sales manager of the Detroit and Chicago offices of the Ohio Locomotive Crane Co., Bucyrus, Ohio. He will make his headquarters in Detroit.

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E. G. CRAIG has been placed in charge of the New York office, 342 Madison Avenue, of the Hevi Duty Electric Co., Milwaukee.

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THOMAS L. THOMAS, formerly vice-president of the McKay Machine Co., Youngstown, Ohio, will take an executive position with the Wean Engineering Co., Inc., Warren, Ohio, which recently arranged to handle sales exclusively for the iron and steel industry for the McKay Machine Co.'s roller leveling equipment.

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H. S. RAWDON has taken up his duties as chief of the division of metallurgy, Bureau of Standards, Washington, succeeding Dr. H. W. GILLETT, who resigned to become director of the Battelle Memorial Institute, Columbus, Ohio. Mr. Rawdon has been in charge of the section of optical metallurgy at the Bureau of Standards.

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C. W. NIXON, formerly assistant to the general manager of the Central Foundry Co., Holt, Ala., has been named manager of operations of the southern plants of the company, with headquarters at Bessemer.

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E. K. MILLER has resigned as superintendent of the Fairfield blast furnaces of the Tennessee Coal, Iron & Railroad Co. He has been succeeded by G. M. HARRIS, formerly assistant superintendent.

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WILMER C. HANSON, who was formerly vice-president of W. Tyrie Stevens, Inc., New York, has opened his own office at 30 Church Street, New York, as export manager, specializing in engineering and construction machinery and equipment.

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JESSE GURNEY VINCENT, vice-president of engineering, Packard Motor Car Co., received the honorary degree of master of engineering from the University of Michigan at the commencement exercises on June 17.

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RAY C. CROUCH, mechanical engineer, Riter-Conley Mfg. Co., Pitts-

burgh, has become works manager of Reeves Brothers Co., Birmingham.

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JOHN A. ROSS, JR., professor of mechanical engineering, Clarkson College of Technology, Potsdam, N. Y., has been appointed to the newly created position of dean of administration.

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E. J. SCHWANHAUSSER, assistant manager of the Harrison works, Worthington Pump & Machinery Corporation, is taking a combined business and pleasure trip through Europe.

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ROBERT K. PLUMMER, who has been in charge of the Indianapolis office of Gears & Forgings, Inc., Cleveland, has been made assistant sales manager of the company. GEORGE W. DAVIS, formerly of the Chicago office, has been transferred to Indianapolis as district manager.

Ohio Foundrymen To Take Boat Trip

If a sufficient number of advance reservations are received, the Ohio Foundries Association, Penton Building, Cleveland, will hold its 1929 convention on an Ohio River boat. The plan is to leave from Cincinnati shortly after Sept. 15 for a trip to Ashland Ky., and return. The cost of the trip will be $30 a person. Arrangements will be made to visit a plant during the stop at Ashland.

Obituary

JOHN S. TURNER, since 1904 a member of the sales organization of the Pressed Steel Car Co., died on July 15 at his home in Brooklyn, aged 70 years. He spent about 25 years in the employ of various railroads. In 1901 he entered the sales department of the Standard Coupler Co., and a few years later joined the New York sales organization of the Pressed Steel Car Co.

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HARRIS BOTWINIK, president, Botwinik Brothers, Inc., New Haven, Conn., died July 12.

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THOMAS E. MURRAY, for years a vice-president of the New York Edison Co. and head of an engineering firm of his own name, an inventor of note largely in the electrical field and a man identified particularly with the engineering of central station power plants, died of heart disease at his home at Wickapogue, L. I., July 21, aged 68 years.

Examinations are to be held by the Civil Service Commission for associate and assistant metallurgists. The entering salaries are, respectively, $3,200 and $2,600 a year. Applications will close Aug. 28. Full information may be obtained from the commission, at Washington, or at the post office or custom house in any city.

Non-ferrous Meetings for Metal Congress Week

The Institute of Metals Division of the American Institute of Mining and Metallurgical Engineers has announced papers to be presented during its annual fall meeting at Cleveland in the week of Sept. 9 during the National Metal Congress. Simultaneously with this meeting of the Institute of Metals will be presented programs by four other national technical societies, including the American Society for Steel Treating, the American Welding Society and the iron and steel divisions of the American Institute of Mining and Metallurgical Engineering and the American Society of Mechanical Engineers.

The papers to be presented include:

Metallography of Commercial Thorium, by E. S. Davenport, Westinghouse Lamp Works, Bloomfield, N. J.

The System Cadmium-Mercury, by Robert F. Mehl and Charles S. Barrett, Naval Research Laboratory, Anacostia, D. C.

Crystal Structure of the Alpha Copper-Tin Alloys, by Robert F. Mehl and Charles S. Barrett.

Cold Working of Metals, by R. L. Templin, Aluminum Co. of America, New Kensington, Pa.

Eutectic Composition of Copper and Tin, by G. O. Hiers and G. P. deForest, National Lead Co., Research Laboratory, Brooklyn, N. Y.

Effect of Alloying on the Permissible Fiber Stress in Corrugated Zinc Roofing, by E. A. Anderson, New Jersey Zinc Co., Palmerton, Pa.

Determining the Orientation of the Crystal in Rolled Metal from X-Ray Patterns Taken by the Monochromatic Pinhole Method, by Wheeler P. Davey, C. C. Nitchie and M. L. Fuller, New Jersey Zinc Co., Palmerton, Pa.

Metal Recoveries in Secondary Aluminum Practice, by Dr. R. J. Anderson, Fairmont Mfg. Co., Fairmont, W. Va.

Reclaiming Non-Ferrous Scrap Metals at Metal Manufacturing Industries, by Francis N. Flynn, Milwaukee.

Manufacture of Wire Bars from Secondary Copper, by W. A. Scheuch and J. Walter Scott, Western Electric Co., Hawthorne Station, Chicago.

Secondary Bronze, by H. M. St. John, Detroit Lubricator Co., Detroit.

Battery Lead, by F. F. Colcord, U. S. S. Lead Refinery, New York.

Reclaiming White Metal Waste, by Mr. Potter, Federal Mogul Corporation.

Cuppy Wire, by Mr. Remmers, Western Electric Co., Hawthorne Station, Chicago.

Scrapped 1700 Machines in Rebuilding Business

"When we put our house in order, business came back," says Col. F. H. Payne, President Greenfield Tap & Die Corporation, Greenfield, Mass., in an article in the July issue of the Executives Service Bulletin, published by the Metropolitan Life Insurance Co., New York. Colonel Payne says in this article that when the break in business came in the fall of 1920 the Greenfield Tap & Die Corporation decided to revamp its entire plant. Since that time more than 1700 machines of various types have been scrapped and about $2,000,000 has been spent on new buildings and equipment.

"We were facing a period of lean business some years ago," says Colonel Payne. "That spurred us on —made us go in for a costly program of reconstruction. The results have shown that we were right. It pays to go at a job of house cleaning as thoroughly as possible and there is never an end to it because American initiative never stands still. We did not miss the 1700 machines that we threw away when we saw that our real job was ahead of us."

June Sheet Production Far Below May

Production and shipments of steel sheets by independent makers in June dropped sharply from the high record of May, according to the monthly report of the National Association of Flat Rolled Steel Manufacturers. Production amounted to 337,841 net tons, compared with 393,430 tons during May. Shipments were 347,989 tons, compared with 392,336 tons in the previous month.

Sales, which amounted to 307,911 tons, showed a good gain over the 279,783 tons of May, which was more than 100,000 tons below April. With smaller shipments and heavier sales, the unfilled tonnage declined much less sharply, as sales were within about 40,000 tons of shipments. The mills still had a large tonnage of unfilled orders on their books July 1. The June report and comparisons, in net tons, follow:

	June	May	April
Total number of mills	722	722	722
Capacity per month	451,125	502,600	482,000
Percentage reporting	67.8	67.6	67.6
Sales	307,911	279,783	398,206
Production	337,841	393,430	375,256
Shipments	347,989	392,336	377,274
Unfilled orders	676,568	713,568	835,801
Unshipped orders	111,333	119,535	121,164
Unsold stocks	52,274	48,334	54,142
Percentages of Capacity			
Sales	100.6	82.4	122.3
Production	110.4	115.8	115.2
Shipments	113.7	115.5	115.9
Unfilled orders	221.1	210.1	256.8
Unshipped orders	36.4	35.2	37.2
Unsold stocks	17.1	14.2	16.6

Manganese Producers Meet in September

The annual convention of the American Manganese Producers Association will be held at the Mayflower Hotel, Washington, Sept. 9 and 10. A review of the industry will be presented. All persons interested in the development of domestic manganese are expected to be present. Harold A. Pumpelly, Metropolitan Bank Building, Washington, is secretary of the association. Richard H. Brown is chairman of the board of directors, J. Carson Adkerson, is president and John H. Cole, first vice-president.

Quiet Prevails in European Markets

Hot Weather and Holiday Season Exert Retarding Influence—Swedish Ore More Active—May Establish Thin-Sheet Cartel

(*By Cable*)

LONDON, ENGLAND, July 22.

INCREASING costs of iron ore and fuel are stiffening Cleveland pig iron prices and consumers are hastening to place their last quarter requirements. Deliveries earlier than September are obtainable only in small lots from merchants at more than market prices. Pig iron activity is consequently greater than is usual in the summer months.

Hematite iron is moving freely and prices are tending upward. Steel business is quiet as Scottish plants have closed for the holidays and English plants are preparing for vacations. Most Northeast Coast works are well occupied and plate mills are in a better position.

Japan is purchasing moderately, but Chinese demand has been hindered by the political situation in Manchuria.

Tin plate inquiry is good, but business is still restricted and mills are closing down at intervals under the restriction of output plan. Production is further curtailed by the hot weather. It is expected that the July production quota will be further reduced, which will entail more mills stopping. Consequently prices are considered more likely to be advanced in the near future.

Galvanized sheets are quiet but Indian reports are more optimistic and buying is expected to develop before long. Japan is buying a few small tonnages of light-gage black sheets.

Redpath, Brown & Co., Ltd., Edinburgh, have secured a £250,000 ($1,212,500) contract for the steelwork in the new Ford Motor Co. plant at Dagenham.

Continental markets are weak as a result of the general absence of large orders and increasing activity of mills seeking to replace contracts which are expiring. Prices of semi-finished material and merchant bars are especially easy, but plates and shapes are steady.

Collapse of the International Hoop Cartel has caused disorganization of prices, which are now about £6 to £6 2s. 6d. per ton, base (1.30c. to 1.32c. per lb.).

Swedish Company Mining Chrome Ore in Turkey

HAMBURG, GERMANY, July 3.—Seeking a source of chrome ore supply other than from the South Rhodesian Chrome Ore Mining Co., Swedish steel companies, including the Forsbacka Jernverks A. B. at Forsbacka, Avesta Jernverks A. B. at Avesta and the Fagersta Bruks A. B. at Fagersta, have formed a company with headquarters at Stockholm, Sweden, which has obtained a concession from the Turkish Government for mining chrome ore. The deposits, which are near Angora, are reported to be rich and a small tonnage has been shipped to Sweden. It is believed in some quarters that by 1931 the new mines will be able to supply an important tonnage to European consumers and some ore may be available for shipment to the United States.

May Form Continental Thin-Sheet Cartel

HAMBURG, GERMANY, July 8.—Establishment of the French Black Sheet Comptoir has not yet affected the market, but French prices are higher than formerly, and there has been a general slackening of demand. The German sheet market showed no upward tendency of prices after formation of the French comptoir or the German Feinblechkontor. The German association controls only about 50 per cent of the German sheet production.

Since formation of the Feinblechkontor, it is reported that Continental mills rolling thin-gage sheets, No. 28 and 30 gage, such as are bought by the Japanese market, are considering establishment of a separate syndicate and have approached British and American sellers with a view to formation of an international cartel or loose agreement covering these thin gages. Most of these mills in Germany are in the present Feinblech-

British and Continental European Export prices per gross ton, f.o.b. United Kingdom Ports, Hamburg and Antwerp, with the £ at $4.85

British Prices, f.o.b. United Kingdom Ports

Cleveland No. 3 foundry	£3	12½s.	to	£3	13½s.	$17.58	to	$17.82
East Coast Hematite	3	15	to	3	15½	18.18	to	18.30
Ferromanganese, export	14	0				67.90		
Billets, open hearth	6	7½	to	6	10	30.92	to	31.52
Sheet bars, open hearth	6	5	to	6	10	30.31	to	31.52
Black sheets, Japanese specifications	13	0	to	13	5	63.05	to	64.26
Tin plate, per base box	0	18⅛	to	0	18½	4.40	to	4.48
Rails, 60-lb. and heavier	7	15	to	8	15	37.59	to	42.43
						Cents per Lb.		
Steel bars, open hearth	7	15	to	8	10	1.67	to	1.84
Beams, open hearth	7	2½	to	7	12½	1.55	to	1.65
Channels, open hearth	7	7½	to	7	17½	1.60	to	1.71
Angles, open hearth	8	2½	to	8	12½	1.76	to	1.86
Ship plates, open hearth	7	12½	to	8	2½	1.66	to	1.76
Black sheets, No. 24 gage	10	5	to	10	10	2.21	to	2.27
Galvanized sheets, No. 24 gage	13	7½				2.90		

Continental Prices f.o.b. Antwerp or Hamburg

Foundry iron, 2.50 to 3.00 per cent sil., 0.50 to 0.90 per cent phos.	£3	10s.	to	£3	14½s.	$16.97	to	$18.06
Foundry iron, 2.50 to 3.00 per cent sil., 1.00 per cent and more phos.	3	12				17.45		
Billets, Thomas	5	1	to	5	5	24.49	to	25.46
Sheet bars, Thomas	5	4	to	5	5	25.22	to	25.46
Wire rods low C., No. 5 B.W.G.	6	5	to	6	6¼	30.31	to	30.61
Black sheets, No. 31 gage, Japanese	12	10				60.62		
Rails, 60 lb. and heavier	6	10*				31.52		
Rails, light	6	1½				29.46		
						Cents per Lb.		
Steel bars, merchant	5	14	to	5	15	1.26	to	1.27
Steel bars, deformed	5	13½	to	5	14	1.25	to	1.26
Beams, Thomas, British standard	5	4	to	5	8	1.12	to	1.15
Channels, Thomas, American sections	6	0				1.32		
Angles, Thomas, 4-in. and larger, over ⅝-in. thick	5	6				1.14		
Angles, Thomas, 3-in.	5	16				1.28		
Ship plates, open-hearth inspected	7	10				1.62		
Hoop and strip steel, over 6-in. base	6	0	to	6	2½	1.32	to	1.33
Wire, plain, No. 8 gage	7	10				1.62		
Wire, galvanized, No. 8 gage	9	10	to	9	12½	2.06	to	2.12
Wire, barbed, 4-pt. No. 12 B.W.G.	11	18				2.57		
Wire nails, base	8	0½				$1.74	per keg	
Wire nails, assortments, 1 to 6-in., keg	10	6½				2.23		

*Open-hearth steel, 10s. ($2.42) per ton extra.

kontor, but that association states that it has no intention at present of participating in an international sheet agreement.

Columeta in Luxemburg and the Paris sales offices of the Luxemburg mills have advanced their prices on black sheets and are now quoting on a level with British mills, which are leading at present in sheet exports to Japan. The present price is £12 10s. ($60.62) per ton, f.o.b. Antwerp, with the possibility of a concession of 1s. 6d. (36c.) per ton on large orders. This is also the price quoted in Germany, so that, although there is no cartel or agreement in force at present, prices are uniform, an unusual situation for any commodity in the Continental steel market.

Sweden Increasing Iron Ore Exports

STOCKHOLM, SWEDEN, July 6.—Producers of iron ore, including the Grangesberg Corporation, have informed Continental consumers that exports of iron ore in the first half of this year totaled 4,153,000 tons, and it is planned to export 9,000,000 tons in 1930 and about 9,500,000 tons in 1931. The schedule of next year's exports of iron ore includes estimated shipments of 6,000,000 tons by the Kiruna-Narvik mines, 200,000 tons by the Kiruna-Luleo mines, 2,250,000 tons by the Malmberget-Luleo mines and 500,000 tons by others. Of the total shipments of ore in the first half of this year about 90 per cent went to German consumers.

Germany Replacing Copper Wire with Aluminum

HAMBURG, GERMANY, July 8.—Aluminum wire is now being used extensively by the German telephone and telegraph department and in other Continental countries for overland lines. In Great Britain, especially, there is an increasing use of aluminum wire for transmission purposes. Copper products manufacturers in Germany claim that they have lost more customers in the past year than at any previous time, and that their business has declined to such a degree that their requirements are being covered by the present small orders and it will be unnecessary to buy more heavily in the future unless consumers using other metals return to the use of copper.

German Non-Ferrous Exports Up

HAMBURG, GERMANY, July 8.—German exports of semi-finished nonferrous products for the first five months of this year were 39,108 tons, compared with 31,983 tons in the same period of 1928. This is the largest total of exports that has been reached. Brass and copper semi-finished products constituted 89.7 per cent of the total.

German Scrap Quiet After Heavy Buying Movement

HAMBURG, GERMANY, July 8.—Iron and steel scrap is quieter following the recent heavy demand and upward movement of prices, which began in May. The Vereinigte Stahlwerk A. G., Düsseldorf, has succeeded in covering its heavy melting steel requirements for the rest of this year on contracts at about 67 m. ($15.96) per metric ton, delivered to the works, but other consumers paid higher prices. Buying has declined since the middle of June and prices are easier, but stocks of scrap in Germany are small and exports have been reduced to a few small tonnages.

Joint Sales Company Formed by German Motor Builders

HAMBURG, GERMANY, July 8.—The Junkerswerke, Dessau, and the Berlin-Tegel locomotive and motor works have formed a sales company under the name Vereinigte Deutsche Industriewerke Junkers-Borsig-Hall, with headquarters in Berlin. The company will establish sales agencies in the Near East, the first offices opened probably being in Egypt, Palestine, the Sudan and Cyprus. It will handle the sales of complete pumping stations and Diesel engines. Eventually the company will also operate agencies in the Far Eastern markets.

Japan Inquires for Rails—Buys Welsh Tin Plate

NEW YORK, July 22.—Export to the Far East is still rather small. The Nippon Oil Co. in Japan recently closed on about 25,000 base boxes of tin plate with Welsh mills, the second successive order from this company to go to British makers. Tokio municipality is opening bids on about 3000 tons of grooved rails. Japanese consumers of billets and sheet bars have not inquired for some months, following an active period of buying last fall and early this spring. Chinese merchants are inquiring for wire shorts, tin plate waste waste, bar crop ends and plate cuttings, but in most instances are unwilling to pay the prices quoted by American sellers of such material.

Russian Machinery Buying Has Increased

The Soviet Union purchased industrial machinery valued at $18,000,000 from American manufacturers in the first nine months of the current Soviet fiscal year, beginning Oct. 1, 1928, states the Amtorg Trading Co. Adding the value of tractors ordered recently, the total for slightly more than nine months is about $40,000,000. Purchases for the entire fiscal year 1927-1928 amounted to $33,000,000. In addition to transactions for immediate delivery, the Amtorg company has contracted for industrial and agricultural machinery aggregating $75,000,000 to be delivered in the next few years.

Not Many Locomotives Need Repairs

Fewer locomotives were in need of repair on the Class I railroads of the United States on July 1 than at any time since the railroads began the compilation of these reports in 1920. They totaled 7453, or 13 per cent of the number on line, according to the American Railway Association. This was a reduction of 350 locomotives or 4.5 per cent compared with the best previous record, established on June 1, 1929, at which time there were 7803 locomotives, or 13.6 per cent, awaiting repairs.

Class I railroads on July 8 had 204,308 surplus freight cars in good repair and immediately available for service. This was a reduction of 13,349 cars compared with June 30, at which time there were 217,657 cars.

Engineers to Discuss Industrial Trend

"Trends in Industry" will be the major theme of the sixteenth national convention of the Society of Industrial Engineers, to be held at the Hotel Statler, Cleveland, Oct. 23, 24 and 25.

Sessions will be held each morning and evening and plant inspection trips are planned for each afternoon. George C. Dent, 205 West Wacker Drive, Chicago, is executive secretary of the society.

Canadian Steel Output for Half Year Shows Gain

Canadian production of steel ingots and direct steel castings during June dropped to 119,505 gross tons from 126,372 tons in the previous month, but was slightly higher than the 116,530 tons reported for June last year. Compared with figures for May, the output in June showed a decline in steel ingots to 113,341 tons from 120,015 tons in May, while the output of steel castings showed little change at 6164 tons from 6357 tons in the previous month.

For the six months ended with June 30 the production of steel ingots and direct steel castings amounted to 738,842 gross tons, or an increase of 14 per cent over the 648,338 tons made during the corresponding six months of last year, and was 52 per cent greater than the 487,310 tons produced in the first half of 1927. This year's output to the end of June included 703,600 tons of ingots and 35,242 tons of direct steel castings.

Service Steel Co., Detroit, has opened a warehouse in Buffalo, where a stock of seamless steel tubing will be carried.

Steel Companies' Profits Rise Sharply

Youngstown Sheet & Tube Co.'s Gain About 38 Per Cent in Second Quarter Over First—Republic Iron & Steel Co. Also Makes Substantial Gain

STEEL companies' profits rose sharply in the second quarter of the year. Only a few companies have so far announced their figures for the quarter and first half, but the profits statements that have been published point unmistakably to the fact that the first six months of 1929 have broken all records for earnings in peace times.

The Youngstown Sheet & Tube Co. reported a net income for the June quarter of $6,107,057, allowing for interest, depreciation, Federal taxes, etc., equivalent after dividend requirements on the preferred stock to $5.90 a share on the 1,000,000 shares of the common stock. This compares with $4,430,316, or $4.22 a share on common shares in the first quarter and $2,490,891 or $2.24 a share of common in the June quarter of 1928.

Net income for six months ended June 30, this year, totaled $10,537,373, after above charges, equal to $10.12 a share on common stock, comparing with $4,154,407 or $3.65 a share in the first half of 1928.

The gain in Youngstown's profits in the second quarter over those of the first quarter was $1,676,741, or almost 38 per cent, a surprising record in view of the fact that a considerable portion of the company's capacity is in pipe, which has not been in as great demand during the past quarter as some of the other rolled products.

Donner Had Good First Half

The Donner Steel Co. made only a slight gain in the second quarter over the first, but its net income for the entire first half was more than three times that of the corresponding period last year. Donner's second quarter net income was $644,320 against $634,625 in the first quarter. After charges for depreciation, interest, Federal taxes, etc., this amount, after allowance for dividends on prior preference stock, was equal to $1.29 a share on the common stock, compared with $1.27 in the first quarter.

Net income for the six months of this year totaled $1,278,945 after above charges, equal to $2.56 on the common, against $391,218, or 61c. a share, on the common in the first half of 1928.

Republic's Gain Substantial

The Republic Iron & Steel Co., with a net gain of $386,182 in its second quarter profits over those of the first quarter, or about 13 per cent, did not do quite so well as its next-door neighbor, Youngstown Sheet & Tube Co. Republic's net profit for the second quarter was $3,263,309, after charges for interest, depreciation, Federal taxes, etc., equivalent after dividends on the preferred stock to $3.44 a share on the 819,865 shares of common stock outstanding.

In the first quarter Republic's net profits were $2,877,127, or $3.03 a share on 804,568 shares of common. In the June quarter of 1928 Republic made $1,053,855, or $1.03 a share on the 596,030 shares of common then outstanding. Republic profits for the first half of the year totaled $6,140,435, equal to $6.42 a share on 819,865 shares against $1,541,187 or $1.11 a share on the 596,030 shares in the first half of 1928. Profits for the first half of 1928 included earnings of the Trumbull Steel Co. only for the June quarter.

Reflects Good Situation in Sheets

The Michigan Steel Co.'s profits illustrate the good situation during the first half in the manufacture of sheet steel, which is this company's only product. The net profit for the first half is estimated at $1,185,000 after the usual charges, equal to $5.38 a share on 220,000 shares of common stock. This record is better than the profits of any previous full year. Net profits in 1928 were $1,049,902, or $4.77 a share.

Net Income of Steel and Pig Iron Companies in First Half Much Higher Than in First Half of Last Year

	1929 First Half	1928 First Half	Per Cent of Gain
Youngstown Sheet & Tube Co.	$10,537,373	$4,154,407	153.6
Republic Iron & Steel Co.	6,140,435	1,541,187	298.4
Newton Steel Co.	1,519,889	1,356,933*	...*
Michigan Steel Co.	1,185,000 (estimated)	1,049,902*	...*
Colorado Fuel & Iron Co.	1,384,164†	720,529†	92.1
Donner Steel Co.	1,278,945	391,218	226.9
Acme Steel Co.	1,730,671	1,014,590	70.6
Gulf States Steel Co.	759,885	541,802	40.2
McKeesport Tin Plate Co.	1,084,562	852,974	27.2
M. A. Hanna Co.	1,733,454	446,659	288.1
Columbia Steel Corporation	1,066,737	679,761	56.9
Otis Steel Co.	2,798,398	1,743,066	60.6
Central Alloy	3,324,277	2,240,359	48.4
Superior Steel Corporation	181,377	—32,357	...

*Newton Steel Co. and Michigan Steel Co. did not report earnings for the first half of 1928, so the figures for all of 1928 are used. Both companies made materially more in the first half of this year than in all of last year.

†Colorado Fuel & Iron Co.'s figures are before allowance for Federal taxes.

The Colorado Fuel & Iron Co. did not do as well in the second quarter as in the first quarter. In the first quarter the company earned $918,677 and in the second quarter $465,487.

Ore and Pig Iron More Profitable

Improved conditions this year in the ore and pig iron trades are reflected in the report of the M. A. Hanna Co., which in the June quarter earned $1,351,714, after charges for depreciation, interest, Federal taxes, etc. This compares with $381,739 in the first quarter and $558,425 in the June quarter of last year. The Hanna company's second quarter profits were equal to $12.07 a share on 111,994 shares of 7 per cent preferred stock, on which there are accumulated back dividends. For the first half Hanna's profits were $1,733,454 after above charges, equal to $15.47 a share on preferred.

Otis Steel Earnings

Net earnings of The Otis Steel Co. after all charges, including estimated Federal taxes, were $1,630,218 for the second quarter of 1929, compared with $907,536 for the second quarter of 1928, an increase of 79 per cent.

For the first six months of 1929, after similar charges, the company reported $2,798,398, compared with $1,743,066 for the first six months of 1928, an increase of 60 per cent. Earnings for the first half of 1929 were equivalent to $2.94 a share on the common stock, compared with $1.64 for the first six months of 1928.

President E. J. Kulas reports that the company's output continues practically at capacity, with large bookings indicating considerably less than the usual seasonal slackening.

Central Alloy Steel Corporation

Earnings of the Central Alloy Steel Corporation for the second quarter of 1929 were $1,892,934 after all charges including depreciation and estimated federal taxes. This was equivalent to $1.32 a share on the 1,296,371 shares of common stock outstanding. In the second quarter of 1928, the company reported $1,265,230, after similar charges, or 84 cents a share on the common stock.

For the first half, earnings for the company were $3,324,277, equal to $2.29 a share on common compared with $2,240,359, or $1.46 a share, in the first half of 1928.

The Consolidated Steel Corporation, a combination of the Baker Iron Works, Union Iron Works and Llewellyn Iron Works, reports for six months ended June 30, 1929, net profit

of $366,468 after charges and Federal taxes, equivalent to 85 cents a share on 240,000 no-par shares of common stock after dividends on $1.75 no-par preferred stock. The consolidation of the three Los Angeles companies was effected December, 1928.

Net profit of the Superior Steel Corporation for six months ended June 30 was $181,377, after taxes and charges, against net loss of $32,357 the first half of 1928. Net profit for the June quarter was $73,025, after taxes and charges, against $30,760 in June quarter of the previous year, also after taxes and charges.

Fabricated Structural Steel

One-Half of Past Week's Awards Were for Industrial Projects and Railroad Work

ALMOST one-half of the structural steel awards of the past week totaling 38,000 tons, were for industrial projects and railroad work and a substantial portion of fresh inquiries is for similar classes of jobs. New work which appeared for bids was far below that of the previous week, amounting to less than 34,000 tons.

Outstanding among lettings were 4200 tons for a telephone building in New York, 4000 tons for transmission line towers at Memphis, Tenn., and 3000 tons each for an office building at Boston and for a structure in Baltimore, Md., for the Western Electric Co. The largest inquiry was for 13,200 tons for a subway section in New York, 3800 tons for an office building in Newark, N. J., and 3000 tons for a plant for the Pratt & Whitney Aircraft Corporation at East Hartford, Conn. Awards follow:

MONTREAL, 1500 tons for Legault bridge, to Dominion Bridge Co.

MILLINOCKET, ME., 630 tons, paper mill, to Megquier & Jones Co.

BOSTON, 3000 tons, office building, Franklin and Federal Streets, to McClintic-Marshall Co.

CAMBRIDGE, MASS., 275 tons, Radcliffe College building, to New England Structural Co.

JAMAICA-WARREN, VT., 190 tons, two State bridges, to unnamed fabricator.

MEDFORD, MASS., 160 tons, school, to New England Structural Co.

BROOKLINE, MASS., 120 tons, school, to New England Structural Co.

SOUTH BRAINTREE, MASS., 100 tons, gasoline still supports, to New England Structural Co.

BOSTON & MAINE RAILROAD, 100 tons, west wing of North Station in Boston, to New England Structural Co.

BOSTON & MAINE RAILROAD, 115 tons, bridge at Andover, Mass., to Boston Bridge Works.

NEW YORK, 600 tons, theater on West Fifty-first Street, to Harris Structural Steel Co.

NEW YORK, 4200 tons, building on West Eighteenth Street for New York Telephone Co., to McClintic-Marshall Co.

NEW YORK, 300 tons, Seaboard Bank Building on West Thirty-fourth Street, to Levering & Garrigues Co.

EDWARDS, N. Y., 500 tons, building for St. Joseph Lead Co., to Kellogg Structural Steel Co.

BUCKHILL FALLS, PA., 450 tons, addition to Inn, to McClintic-Marshall Co.

WILKES-BARRE, PA., 280 tons, Kirby Memorial Hospital, to Bethlehem Fabricators.

PENNSYLVANIA RAILROAD, 700 tons, bridges, to Bethlehem Steel Co. and American Bridge Co.

PHILADELPHIA, 360 tons, repairs to Spring Garden Street bridge for Department of Public Works, to Shoemaker Bridge Co.

NORFOLK & WESTERN RAILROAD, 1200 tons, bridges, to Virginia Bridge & Iron Co.

NORFOLK & WESTERN RAILROAD, 875 tons, bridges, to Mount Vernon Bridge Co.

BALTIMORE, 3000 tons, insulated wire building for Western Electric Co., to unnamed fabricator.

BALTIMORE & OHIO RAILROAD, 350 tons, signal bridges, to McClintic-Marshall Co.

BALTIMORE & OHIO RAILROAD, 400 tons, bridges in Ohio, to American Bridge Co.

LOUISVILLE & NASHVILLE RAILROAD, 800 tons, addition to office building at Louisville, Ky., to Louisville Bridge & Iron Co.

MEMPHIS, TENN., 4000 tons, transmission line towers, to Nashville Bridge Co.

MONTGOMERY, ALA., 200 tons, State highway bridges, to Nashville Bridge Co.

GADSDEN, ALA., 325 tons, dirigible hangar for Goodyear Tire & Rubber Co., to Decatur Iron & Steel Co.

ABERDEEN, MISS., 125 tons, bridge over Tombigbee River, to Nashville Bridge Co.

PITTSBURGH, 1300 tons, recreation building for H. J. Heinz Co., to McClintic-Marshall Co.

ERIE, PA., 450 tons, grain elevator for Pennsylvania Railroad, to Pittsburgh Bridge & Iron Works.

MONACA, PA., 350 tons, Pittsburgh Tube Co., to Pittsburgh Bridge & Iron Works.

MICHIGAN CENTRAL RAILROAD, 300 tons, bridges, to American Bridge Co.

MIDDLETOWN, OHIO, 300 tons, Middletown Bank & Deposit Co. building, to Dayton Structural Steel Co.

CLEVELAND, 1000 tons, City Hospital, to unnamed fabricator.

STATE OF INDIANA, 700 tons, miscellaneous work, to Indiana Bridge Co.

WAUKESHA, WIS., 250 tons, additions for Glancy Malleable Iron Corporation, to Worden-Allen Co.

KENOSHA, WIS., 100 tons, shipping platform for Nash Motors Co., to Worden-Allen Co.

STEVENS POINT, WIS., 132 tons, insurance building, to Duffin Iron Co., Chicago.

CHICAGO, 850 tons, West Town Bank building, to Midland Structural Steel Co.

CHICAGO, 190 tons, Goodman Mfg. Co., to Duffin Iron Co.

CHICAGO, 250 tons, manufacturing building, to Duffin Iron Co.

CHICAGO, 1100 tons, Burnham Avenue bridge, to an unnamed bidder.

UNION PACIFIC, 200 tons, foot-bridge, to McClintic-Marshall Co.

CHICAGO & ALTON, 240 tons, bridge work, to American Bridge Co.

ST. LOUIS, 450 tons, Woolworth Building, to American Bridge Co.

GALENA, KAN., 600 tons, building for Eagle-Picher Co., to Illinois Steel Bridge Co., Jacksonville, Ill.

SAN ANTONIO, TEX., 1800 tons, Nix Building, to Orange Car & Steel Co.

LOS ANGELES, 250 tons, bridges for Pacific Electric Co., to Virginia Bridge & Iron Co.

LOS ANGELES, 150 tons, packing plant, 803 Macy Street, to Consolidated Steel Corporation.

LOS ANGELES, 150 tons, hangar for Goodyear Zeppelin Co., to McClintic-Marshall Co.

SAN FRANCISCO, 200 tons, apartment building, Haight and Buchanan Streets, to Golden Gate Iron Works.

SAN FRANCISCO, 140 tons, apartment building, Vallejo and Laguna Streets, to Western Iron Works.

SAN FRANCISCO, 100 tons, alteration to Orpheum Theater, to Western Iron Works.

SAN FRANCISCO, 250 tons plates, seven tanks for Southern Pacific Co., to Chicago Bridge & Iron Works.

BERKELEY, CAL., 125 tons, factory for California Corrugated Culvert Co., to Pacific Coast Engineering Co.

PORTLAND, ORE., 250 tons, sorting racks for Hines Lumber Co., to Poole & McGonigle.

VALE, ORE., 125 tons plates, siphon, to Western Pipe & Steel Co.

KLAMATH FALLS, ORE., 150 tons plates, burner for Weyerhaeuser Timber Co., to Seattle Boiler Works.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

MIDDLETON, MASS., 100 tons, hospital addition.

EAST HARTFORD, CONN., 3000 tons, building for Pratt & Whitney Aircraft Corporation.

NEW YORK CENTRAL RAILROAD, 2400 tons, work at Harmon, N. Y.

STATE OF NEW YORK, 1600 tons, highway bridge at Batchelorville, N. Y.; Pittsburgh-Des Moines Steel Co., low bidder.

NEW YORK, 13,200 tons, section 5, route 108 of subway in Queens.

NEWARK, N. J., 3800 tons, building for American Insurance Co.

ATLANTIC CITY, N. J., 175 tons, addition and alterations to Hotel Flanders, 127 St. James Place.

PENNSYLVANIA RAILROAD, 1000 tons, six bridges.

QUEBEC, Department of Public Works, 2000 tons, bridge between Lachine and Coughnawaga.

QUEBEC, Department of Roads, 200 tons, bridge over St. Jacques River.

HAMILTON, ONT., 1250 tons, four school buildings.

TORONTO, 150 tons, bridge over ship channel at Cherry Street for Harbor Commission.

BUFFALO, 400 tons, post office for New York Central terminal.

BUFFALO, 1000 tons, New York State office building.

CLEVELAND, 450 tons, Christian Science Church.

NILES, OHIO, 200 tons, building for Niles Trust Co.

CHICAGO, 1800 tons, Rosenwald Industrial Museum; R. C. Wieboldt Co., general contractor.

ST. LOUIS, 350 tons, service station for Mack Truck Co.

KANSAS CITY, MO., tonnage not stated, university building.

DALLAS, TEX., 1500 tons, Southwestern Bell Telephone Co. building.

BOISE, IDAHO, 257 tons, reclamation work; bids opened.

Machinery Markets and News of the Works

Tool Buying Well Sustained

Sales Have Been Above Normal and Inquiries Are of Substantial Volume

MACHINE tool buying has been sustained at a rate higher than normal for this time of the year. Sales have run considerably ahead of those in the corresponding period of last year, though not up to the June volume.

The absence of transactions on a large scale has been offset by the steady flow of orders for one or two tools each. Almost all consuming industries have contributed to recent business, which has been well distributed throughout the country. The New York district has been especially active in this respect.

Sales of brakes and presses for manufacture of sheet metal products have attracted attention because of the liberal volume.

Inquiries are sufficiently impressive to indicate that there will be no marked diminution in business during the remainder of the summer. Meanwhile, machine tool plants are operating at capacity to reduce unfilled orders and secure easier deliveries.

United Dry Docks, Inc., New York, is in the market for equipment for a tank shop. A French commission is expected to buy automatic lathes for boring cylinders of airplane motors.

An advance of from 5 to 10 per cent in the prices of some planer builders is noted. One line of engine lathes and a line of milling machines have been increased about 10 per cent.

New York

NEW YORK, July 23.—Although machine tool buying has slowed up a bit, as compared with the peak activity of the past few months, it is still at an unusually high rate for July. No large buying is reported, but there is a steady flow of orders for one or two machines, and local offices are quoting on a good deal of prospective business. This has been an exceptional season for the sale of brakes for sheet metal work. United Dry Docks, Inc., New York, is in the market for complete equipment for a tank shop. Some manufacturers of planers have announced advances in prices ranging from 5 to 10 per cent.

Plans are under way by Third Avenue Railway Co., 2396 Third Avenue, New York, for a two-story addition to mechanical and motor bus repair shop, to cost about $40,000 with equipment. E. H. Faile & Co., 441 Lexington Avenue, are architects.

Mutual Sunset Lamp Mfg. Co., 21 East Houston Street, New York, has leased space in Trade Facilities Building, Brooklyn, totaling 60,000 sq. ft. floor area, and will establish new plant. It is understood that New York factory will be removed to new site.

Brooklyn Borough Gas Co., Mermaid Avenue and West Seventeenth Street, Brooklyn, is said to be planning call for bids on general contract early in August for new shop, automobile service and garage building, 157 x 200 ft., for company cars, to cost more than $200,000 with equipment. Block & Hess, 18 East Forty-first Street, New York, are architects.

Continental Can Co., 1 Pershing Square, New York, is planning an expenditure of about $2,000,000 during next six months for extensions and improvements in plants, including additions to can-manufacturing plant at San Jose., Cal., and enlargement of works at Seattle.

Lehigh Valley Railroad Co., 143 Liberty Street, New York, is planning electrification of lines between Mauch Chunk and Wilkes-Barre, Pa., to cost about $8,500,000 with equipment.

Delaware, Lackawanna & Western Railroad Co., 90 West Street, New York, has awarded general contract to Turner Construction Co., Graybar Building, for new coal pocket and distributing plant, 40 x 308 ft., at South Brooklyn, with conveying, loading and other mechanical equipment, to cost more than $100,000.

Rubel Coal & Ice Corporation, 937 Fulton Street, Brooklyn, is planning expansion in ice-manufacturing division, and will build a group of new plants in Brooklyn, to cost over $5,000,000 with machinery. Company has disposed of coal business and will concentrate activities in future largely in ice production.

United Aircraft & Transport Corporation, operating Chance-Vought Corporation, Long Island City, manufacturer of aircraft equipment, and other interests, has purchased Sikorsky Aviation Corporation, specializing in production of military and other aircraft, with plant at College Point, L. I., and new factory nearing completion at Bridgeport, Conn., and will consolidate. First noted plant will be continued at present location and later will be consolidated with works at Bridgeport. A. C. Dickinson is president.

Atlantic Basin Iron Works, Inc., Van Brunt, Summit and Bowne Streets, Brooklyn, manufacturer of marine engines, valves, forgings, etc., plans rebuilding part of plant destroyed by fire July 17, with loss more than $75,000, including equipment.

Western Electric Co., 195 Broadway, New York, with plant at Kearny, N. J., manufacturer of radio equipment, telephone apparatus, etc., has leased one and three-story plant, 175 x 210 ft., totaling about 45,000 sq. ft. floor space at 132-52 Tichenor Street, Newark, for a tool-making division.

Essex County Vocational Schools, 960 Broad Street, Newark, N. J., will take bids at once for three-story boys' vocational school at Bloomfield, N. J., to cost over $400,000 with equipment. Guilbert & Betelle, 24 Branford Place, Newark, are architects.

V. J. Burnelli, Keyport, N. J., has leased part of local plant of Aeromarine-Klemm Corporation manufacturer of aircraft, for the production of special transport airplanes, including parts manufacture and assembling.

Flintkote Co., East Rutherford, N. J., manufacturer of roofing products, is said to have plans for a two-story addition, to cost more than $40,000 with equipment. Headquarters are in Park Square Building, Boston.

C. M. Gray Mfg. Co., 358 Central Avenue, East Orange, N. J., manufacturer of die-castings, is considering plans for a three-story addition, to cost about $70,000 with equipment.

Board of Education, Cranford, N. J., is considering installation of manual training equipment in new two-story senior high school to cost $700,000, for which plans are being drawn by H. B. Brady, Inc., 333 North Broad Street, Elizabeth, N. J., architect.

New Standard Aircraft Corporation, 230 East Sixteenth Street, Paterson, N. J., is disposing of an additional stock issue, part of funds to be used for expansion. Company is arranging for early production of a new training plane on maximum basis, including parts manufacture and assembling.

United Dry Docks, Inc., 11 Broadway, New York, recently organized to merge several shipbuilding and dry dock plants in New York district, is contemplating erection of new tank shop to cover about 2¼ acres. Company is in market for plate bending rolls, angle bending rolls, a flanging press, electric welding machines and overhead electric cranes. Harry Lindemann, of tank and fabricated steel department, Staten Island, is in charge of prospective work.

Plastic Die & Molding Co., 249 Verona Avenue, Newark, N. J., has been organ-

ized to make stamping and forming dies and permanent molds by a new process. A. B. Strickler is secretary.

Great Neck Manufacturers, Inc., Great Neck, N. Y., has begun manufacture of tungsten hack saw blades under brand name of Monarch. Sales offices are at 162 Chambers Street, New York.

Philadelphia

PHILADELPHIA, July 22.—Bids have been asked on general contract by Schuch Machine Co., 235 New Street, Philadelphia, for one-story plant to cost more than $30,000 with equipment. Charles E. Oelschager, 1615 Walnut Street, is architect.

Kensington Shipyard & Drydock Corporation, Philadelphia, recently organized by Francis J. McDonald, president of Baltimore & Philadelphia Steamboat Co., Pier 3, South Delaware Avenue, and associates, has acquired shipbuilding plants and repair yards of Philadelphia Ship Repair Co., Kensington Shipyard & Drydock Co., Camden Shipbuilding Corporation, Camden, and Noecker & Ake Shipbuilding Co., Camden. New owner will consolidate and operate different properties, and plans expansion. Another plant, also, is projected on waterfront property at Philadelphia, to consist of two graving docks, each with capacity for vessels up to 16,000 tons, 700 ft. and longer, with machine and other shops for repair work, to cost more than $1,000,000.

Bendix Brake Service Co., 3914 North Broad Street, Philadelphia, automobile brakes and equipment, a subsidiary of Bendix Brake Co., South Bend, Ind., will take bids on revised plans for two-story and basement factory branch, service and repair plant, 75 x 175 ft., to cost $150,000 with equipment. H. G. Christman Co., 306 South Notre Dame Avenue, South Bend, is architect.

Fayette R. Plumb Co., Inc., 4837 James Street, Philadelphia, manufacturer of edged tools, plans rebuilding part of plant destroyed by fire July 13.

Board of Trustees, National Farm School, Doylestown, Pa., is taking bids until July 31 for a new farm machanics' building, to cost more than $30,000 with equipment. Edwin H. Silverman and Abraham Levy, Thirteenth and Chestnut Streets, Philadelphia, are architects.

American Radiator & Standard Sanitary Corporation, 40 West Fortieth Street, New York, has purchased plant and business of Thomas Maddock's Sons Co., Trenton, N. J., manufacturer of sanitary ware, and will operate as unit of organization. It is proposed to build addition to Maddock plant at Hutchinson's Mills, to cost more than $300,000. Present officials of Maddock company will continue with purchasing organization.

S. Arthur Fisher and Paul M. Cheesman, 844 High Street, Williamsport, Pa., have organized S. Arthur Fisher Body Co., capitalized at $60,000, to establish plant to manufacture automobile bodies, including truck bodies, a repair division will be provided. Balser Weber, Howard, Pa., is also interested in new organization.

Anthracite Combustion & Engineering Co., Inc., 5120 Wakefield Street, Philadelphia, has been incorporated to manufacture full line of blower equipment for use in homes, schools, churches and institutions. Company has provided manufacturing facilities. It will buy motors, blower castings, fans and temperature controls. F. E. Whitney is president.

Empire Steel Castings, Inc., Reading, Pa., has been incorporated to take over Empire Steel Casting Co. and will carry on business developed by its predecessor in electric alloy and carbon steel castings. Officers of new organization are: President, Frank Hodson; directors, Charles Shipman Payson, Wallace E. Belcher, D. W. Phillips; secretary-treasurer, J. E. Horton. Company has recently completed extensions to its foundry and further additions will be made in near future.

The Crane Market

INQUIRY for overhead traveling cranes is still rather limited and prospective buyers are slow to act on outstanding business. Some locomotive crane buying is reported, contractors beginning to close on some small capacity equipment. The Mallory Machinery Corporation, 522 Light Street, Baltimore, is inquiring for a used 5 to 10-ton, 80-ft. span, 3-motor, overhead crane. The Laclede Steel Co., St. Louis, is inquiring for three 5-ton, 105-ft. span, 3-motor, overhead cranes for its Alton, Ill., plant. The cranes for the new plant of the Great Lakes Steel Corporation at Ecorse, Mich., are reported to have been awarded to the Morgan Engineering Co.

Among recent purchases are:

New York Central Railroad, New York, two 25-ton locomotive cranes from Industrial-Brownhoist Corporation.

B. Levitt, Rome, N. Y., 7½-ton crawl-tread crane from Browning Crane Co.

James Stewart & Co., 230 Park Avenue, New York, two small crawl-tread cranes from Moore Speedcrane Co., 30 Church Street, New York.

Arthur A. Johnson Corporation, Long Island City, New York, small crawl-tread crane for subway work from Koehring Co., New York.

Gulf States Steel Co., Alabama City, Ala., one 40-ton, 73-ft. 3-in. span, blooming mill crane, one 40-ton, 92-ft. span and one 15-ton, 92-ft, span plate mill cranes and one 15-ton, 100-ft. span billet yard crane, from Alliance Machine Co.

South Atlantic

BALTIMORE, July 22.—Plans are under way by Flynn & Emrich Co., 301 North Holliday Street, Baltimore, manufacturer of mechanical stokers, parts, etc., for one-story foundry unit, to cost about $75,000 with equipment. W. S. Austin, Maryland Trust Building, is architect and engineer. James F. Turner is general manager.

Public Improvement Commission, City Hall, Baltimore, is said to be planning installation of manual training equipment in three-story junior high school to cost about $425,000, for which plans will be drawn by Taylor & Fisher, Union Trust Building, architects.

General Electric Co., Schenectady, N. Y., has awarded general contract to Flagler Co., Red Rock Building, Atlanta, Ga., for one-story and basement addition to motor and motor equipment factory branch and service works at Atlanta, 55 x 200 ft., to cost about $50,000 with equipment.

Southern Aviation Enterprises, Inc., Atlanta, Ga., recently formed by R. E. L. Cone, Palmer Building, and associates, is reported planning establishment of aircraft manufacturing plant near Birmingham, including parts and assembling departments for production of five-passenger type airplanes, initial unit to cost more than $65,000 with equipment.

Board of District Commissioners, District Building, Washington, has awarded general contract to English Construction Co., 1311 H. Street, N. W., for extensions and improvements in power plant at district training school at Laurel, Md., to cost about $35,000. Additional equipment will be installed.

Manufacturers' Light & Heat Co., Columbia Bank Building, Pittsburgh, has secured franchise for natural gas supply from properties in western Pennsylvania to Berlin, Grantsville, Meyerdale, Md., and vicinity, and plans installation of pipe lines and systems. It is also proposed to furnish service at Salisbury and adjoining communities.

Aluminum Co. of America, Inc., Oliver Building, Pittsburgh, is making ready to begin work on hydroelectric power project on Little Tennessee River, near Bryson City, N. C., where engineering office has been established. Project will include construction of three power dams, generating stations, switching plants and transmission lines, and is reported to cost more than $12,000,000 with machinery.

Kil Mfg. Co., incorporated for $50,000, has erected a plant at Kilmarnock, Va., to manufacture septic tanks, gutter and spouting, metal cornice, etc. Plant is 50 x 100 ft., two stories. A. W. Wagenseller is president.

New England

BOSTON, July 22.—Sales of machine tools were smaller than those of the previous week, although the majority of dealers did a fair business in single machines. New England sales for the first half of July ran ahead of those for the first half of June, owing primarily to activity in Connecticut. An encouraging feature is that additional inquiries are in hand with a sizable backlog of prospects to work on for the remainder of the year. It is believed that many metal-working plants will place requirements in August to obtain 1929 deliveries on certain types of tools. New England machine tool builders in general are operating at capacity on day shifts, with some maintaining night shifts in certain departments.

Maxium Fire Engine Co., Middleboro, Mass., has started work on a plant to cost $25,000.

John Alden Coal Co., Inc., Gloucester, Mass., will build coal pockets. Handling equipment is required.

Lever Brothers Co., 164 Broadway, Cambridge, Mass., has closed bids on a coal hopper. Conveyor equipment will be needed.

Stone & Webster, Inc., Boston, has preliminary plans for a power house for Everett, Mass., to be built by Edison Electric Illuminating Co. of Boston.

Maine Coal & Dock Co. will build a coaling plant at Bucksport, Me. A hoisting engine of 500 tons per hr. capacity and conveyor belts will be purchased.

City of Bloomfield, Conn., closes bids Aug. 1 for a high school to cost $140,000 with equipment. A manual training department is included.

City of Pittsfield, Mass., has plans for a high school to cost $2,200,000 with equipment. Manual training departments are contemplated.

CARNEGIE LIBRARY OF ATLANTA

Worcester Wire Works, 379 Main Street, Worcester, Mass., has started work on a one and two-story manufacturing unit, 20 x 68 ft.

United Aircraft & Transportation Co., Inc., Hartford, has started work on a plant to cost $2,000,000 with equipment.

Contract has been let by Scovill Mfg. Co., Waterbury, Conn., manufacturer of brass pipe, condenser tubing and kindred products, to Tracy Brothers Co., local, for four-story addition, 21 x 165 ft. to cost more than $65,000 with equipment. H. L. Thompson, Waterbury, is architect.

Plantsville Foundry, Inc., Plantsville, Conn., recently formed with capital of $50,000, will take over and operate former local foundry of Stewart-Walker Co., which recently filed petition in bankruptcy. Victor E. Walker, Meriden, Conn., formerly president of Stewart-Walker Co., will be identified with new organization.

Fairhaven Iron Foundry Co., Fairhaven, Mass., has awarded general contract to Macomber Street Co., 1925 Tenth Street, N. E., Canton, Ohio, for rebuilding one and two-story foundry, 50 x 100 ft., recently destroyed by fire, to cost about $45,000 with equipment.

Board of Education Providence, R. I., plans installation of manual training equipment in new three-story and basement junior high school to cost $1,200,000, for which bids have been asked on general contract. Commissioner of Public Buildings, City Hall, in charge.

Pratt & Whitney Aircraft Co., Hartford, Conn., manufacturer of Wasp aircraft engines, will break ground at once for new plant at East Hartford, with main unit one-story, 400 x 1000 ft.; two-story engineering building, and other one and two-story structures, entire group to cost about $2,000,000 with machinery. Albert Kahn, Inc., Marquette Building, Detroit, is architect and engineer.

Cadillac-LaSalle Co., 563 State Street, Springfield, Mass., representative for Cadillac and LaSalle automobiles, is having revised plans drawn for one and two-story and basement service, repair and sales building, to cost about $115,000 with equipment.

C. H. Dexter & Sons, Inc., Windsor Locks, Conn., manufacturer of paper goods, has purchased, for expansion, local mill of American Writing Paper Co., closed for several months. Some new equipment will be purchased.

Sinclair Refining Co., 205 East Forty-second Street, New York, will begin construction of oil storage and distributing plant at Hartford, to cost over $75,000 with equipment.

Buffalo

BUFFALO, July 22.—Plans have been filed by Trico Products Corporation, 817 Washington Street, Buffalo, manufacturer of automobile equipment and accessories, for one-story addition, to cost about $60,000 with equipment.

Charles Cory & Son, Inc., 183 Varick Street, New York, manufacturer of marine equipment, bells, etc., has acquired plant and business of Tucker Foundry Co., Medina, N. Y., manufacturer of cast iron pipe and fittings, and will take possession Aug. 1. New owner will operate plant as branch and plans expansion.

Buffalo General Electric Co., Electric Building, Buffalo, has plans for new steam-operated electric generating plant adjoining present Huntley station. Initial installation will provide for capacity of 80,000 kw., to be increased later. Project is reported to cost more than $2,000,000 with transmission lines.

Spriesch Tool & Mfg. Co., Buffalo, has been organized by James Spriesch, 179 Keystone Street, and associates, with capital of $40,000, to manufacture tools, dies and kindred products. New company will be affiliated with business heretofore operated under name of Joseph Spriesch, 183 South Elmwood Avenue, manufacturer of similar specialties, and it is understood will succeed to that organization. Thomas F. Morrissey, 135 Winspear Avenue, is also interested in new company.

Board of Education, Little Falls, N. Y., is considering installation of manual training equipment in new two-story junior high school to cost $300,000, for which bids will soon be asked on general contract. C. W. Clark, Savings Bank Building, Cortland, N. Y., is architect; A. R. Acheson, Eckel Building, Syracuse, N. Y., is mechanical engineer.

Airport Advisory Board of City Council, Buffalo, has plans for new marine airport, including two hangars, 125 x 150 ft., with repair facilities, to cost about $135,000 with equipment and other buildings. Nat E. Duffy, director of Genesee Street municipal airport, is in charge.

Fladd-Luig Co., Inc., 213 Central Avenue, Rochester, N. Y., is a jobber of plumbing and heating supplies and is not going into manufacture of machinery, as erroneously stated recently in these columns.

Syracuse Ornamental Co., 581 South Clinton Street, manufacturer of metal specialties, has awarded general contract to Dawson Brothers, Union Building, for extensions to cost about $30,000 with equipment.

Pittsburgh

PITTSBURGH, July 22.—Business in this district continues moderately active. A number of small orders have been placed the past week and new inquiries are appearing regularly. Railroad business, which has not been active since the recent placing of large lists by the Chesapeake & Ohio, has been revived slightly by small inquiries from the Baltimore & Ohio and the Pennsylvania. The Westinghouse Electric & Mfg. Co. has begun to make awards against its third quarter list, but buying by the United States Aluminum Co. for its plant extensions at New Kensington, Pa., is not expected for at least two weeks.

Deliveries have had little opportunity for improvement since the heavy buying movement of the spring and many dealers in this territory are still unable to quote on much business in which they would normally be interested. Local offices are busy preparing estimates on some of the larger prospects pending in the district and there is little prospect of any marked falling off in orders during the remainder of summer and early fall.

Standard Underground Cable Co., Seventeenth and Pike Streets, Pittsburgh, has plans for one-story addition to works at Perth Amboy, N. J., to cost about $200,000 with equipment. Part of Pittsburgh plant will be removed to that location when new unit is completed.

Standard Oil Co. of Pennsylvania, Ledger Building, Philadelphia, is planning an expansion at plant of Pennsylvania Lubricating Co., Lawrenceville, near Pittsburgh, including storage and distributing facilities, to cost more than $500,000 with equipment.

Aluminum Co. of America, Inc., Oliver Building, Pittsburgh, has acquired plant and business of Modern Foundry & Pattern Works, Inc., Oakland, Cal., manufacturer of aluminum castings, etc., and will operate as unit of organization. J. F. Russell and Peter Caird, president and vice-president of Modern Foundry company, will continue in present positions.

Romeson Mfg. Co., Titusville, Pa., recently organized by Gray I. Morriss, Beaver Falls, Pa., and associates, with capital of $150,000, to manufacture iron and steel products, has taken over Titusville plant of American Radiator Co., closed for about two years, and will remodel for early occupancy.

Continental Refining Co., Oil City, Pa., is planning to rebuild part of oil refinery destroyed by fire July 18.

City Council, Wheeling, W. Va., is planning establishment of municipal airport, including hangars, repair shops, oil storage and other buildings, to cost about $650,000. A bond issue will soon be voted.

Detroit

DETROIT, July 22.—Plans are under way by Hancock Iron Works, Pontiac, Mich., for one-story addition, to cost about $35,000 with equipment. R. O. Derrick, Pontiac Savings Bank Building, is architect.

Detroit Steel Products Co., 2250 East Grand Boulevard, Detroit, manufacturer of steel sash and kindred products, has plans for first unit of new plant, totaling 125,000 sq. ft. floor space, to cost more than $300,000 with equipment. Smith, Hinchman & Grylls, Marquette Building, are architects.

In connection with expansion program following acquisition of controlling interest in Lockheed Aircraft Corporation, Los Angeles, mentioned last week, Detroit Aircraft Corporation, Detroit, has leased part of former local plant of Studebaker Corporation, and will equip for manufacture of airplanes, including parts manufacture and assembling.

Old Dutch Refining Co., Muskegon, Mich., has broken ground for a new oil refinery near city, to cost more than $100,000 with machinery.

A. J. Bopp, General Motors Building, Detroit, formerly local district sales manager for Weirton Steel Co., is organizing Bopp Steel Corporation, to construct local plant to manufacture cold rolled steel products. Site has been purchased, and plans for initial unit will be drawn soon, to cost over $100,000 with equipment.

Board of Education, Flint, Mich., plans installation of manual training equipment in new two-story junior high school to cost $550,000, for which bids will soon be asked on general contract. Malcolmson & Higginbotham, 1219 Griswold Street, Detroit, are architects; McColl, Snyder & McLean, Penobscot Building, Detroit, are mechanical engineers.

Following recent purchase of controlling interest in American Cirrus Engines, Inc., 740 Washington Avenue, Belleville, N. J., manufacturer of aircraft engines, by Allied Motor Industries, Inc., Chicago, plans are being arranged for establishment of new plant in part of former works of Wills Motor Car Co., Marysville, Mich., lately taken over by Allied organization. Work will include establishment of two divisions, one for development of new aircraft engine for use by United States Navy, and other for expansion in assembling operations of present engines, now being conducted at Belleville plant, to cost more than $90,000.

Leonard Refrigerator Co., Clyde Park, S. W., Grand Rapids, Mich., has plans for an addition and improvements in present plant, to cost more than $40,000 with equipment.

Michigan Bell Telephone Co., 1365 Cass Avenue, Detroit, has plans for a six-story equipment storage and distributing plant, 340 x 505 ft., with mechanical and electrical repair and service divisions, to cost $1,400,000 with machinery. Smith, Hinchman & Grylls, Marquette Building, are architects.

Chicago

CHICAGO, July 22.—The machine tool market is becoming more active as the end of July approaches. Orders are scattered and usually for small numbers of tools, but many purchases are for large machines so that in point of value, many sellers' current business is more impressive than at the beginning of the month. The used tool market is less active, although the supply is still short of demand.

The Santa Fe has ordered a 600-ton hydraulic wheel press. Other than this purchases by the railroads are quiet. Farm implement manufacturers are showing less interest, although it is not unlikely that a sizable list will be issued early in August. Demand for presses, after having lagged for a time, during which deliveries improved, is brisk and comes from a wide diversity of users.

Prices have been advanced about 10 per cent on one line of lathes and a line of milling machines.

Blackhawk Foundry & Machine Co., Davenport, Iowa, is planning erection of a molding department, 122 x 164 ft.

Oil Products Appliance Co., Maywood, Ill., is erecting a second story to its plant which will provide 19,500 sq. ft. of additional floor space.

American Brake Shoe & Foundry Co., Maywood, Ill., is building an addition to its local machine shop.

Contract has been let by Chicago, Rock Island & Pacific Railroad Co., 139 West Van Buren Street, Chicago, to T. S. Leake Construction Co., 608 South Dearborn Street, for extensions and improvements in engine house and repair shops on Forty-seventh Street, to cost $350,000 with equipment. C. A. Morse is chief engineer.

Electrical Research Laboratories, Inc., 2500 Cottage Grove Avenue, Chicago, manufacturer of radio equipment and devices, has acquired plant of Cable Piano Co., for expansion.

J. E. Decker & Sons, 320 Fifteenth Street, N. W., Mason City, Iowa, have plans for new six-story addition to meat-packing plant and lard refinery, to cost $300,000 with equipment. H. Peter Henschien, 1637 Prairie Avenue, Chicago, is architect and engineer.

W. F. & John Barnes Co., Rockford, Ill., manufacturer of drills, drilling machinery and other machine tools, has plans for new two or three-story unit, to cost more than $70,000 with equipment. A. Eliel, Stewart Building, is architect.

Western Screw Mfg. Co., 4413 West Kinzie Street, Chicago, has awarded general contract to Anderson & Winblad, 6235 Michigan Avenue, for two-story plant, 170 x 322 ft., to cost $100,000 with equipment. A. Epstein, 2001 West Pershing Road, is architect and engineer.

Colorado Fuel & Iron Co., Pueblo, Colo., plans early rebuilding of portion of coal mining plant at Segunda, Colo., recently destroyed by fire, including tipples and equipment.

Onsrud Machine Co., 3910 Palmer Street, Chicago, has awarded general contract to Austin Co., for one-story addition, 80 x 100 ft., to cost about $35,000 with equipment.

Thomas Kelly & Brothers, 3424 West Lake Street, Chicago, manufacturers of plumbing equipment, brass goods, etc., have leased space in building at 4442 West Roosevelt Road, 75 x 125 ft., for expansion.

Midwest Carbide Corporation has recently been organized by National Lead Co. and Shawinigan Products Corporation, New York, a subsidiary of the Shawinigan Water & Power Co. of Canada, to carry on manufacture of calcium carbide at Keokuk, Iowa, heretofore conducted by United Lead Co., subsidiary of National Lead Co. Officers of new company will be supplied from staffs of owning interests, E. J. Cornish, president, National Lead Co., becoming president; L. F. Loutrel, vice-president of Shawinigan Products Corporation, vice-president and general manager of new company, and T. F. Wettstein, formerly of United Lead Co., vice-president, and continuing in charge of manufacture.

Biflex Products Corporation, Decatur, Ill., is erecting an addition, 150 x 160 ft., and is moving machinery and business of its bumper plant at Waukegan to local works. About $100,000 will be spent on new equipment.

Fisher Governor Co., Marshalltown, Iowa, has purchased Apex Regulator Co., Decatur, Ill. Apex products are closely allied with those of purchasing company, which manufactures automatic pressure control specialties for steam, water, air and oil and gas industries. Equipment of Apex company will be removed to Marshalltown, where Fisher Governor Co. will operate Apex company as a separate unit.

Indiana

INDIANAPOLIS, July 22.—E. L. Cord, president of Auburn Automobile Co., Auburn, and associates have organized Corman Aircraft Corporation, with capital of $50,000 and headquarters at Connersville. New company is said to be planning establishment of local factory, including departments for parts production and assembling. Mr. Cord and associates are now operating an experimental aircraft plant at Dayton, and it is understood that this will be consolidated with new company later. L. E. Manning and Raymond S. Pruditt are interested in new concern.

Board of Education, 150 North Meridian Street, Indianapolis, is said to be planning installation of manual training school in new three-story and basement junior high school to cost $600,000, for which bids are being asked on general contract until Aug. 1. McGuire & Shook, 941 North Meridian Street, are architects.

United States Corrugated Fibre Box Co., 1315 Martindale Avenue, Indianapolis, has asked bids on general contract for one and two-story and basement plant, to cost about $200,000 with machinery. Charles E. Bacon, Odd Fellows Building, is architect.

Glascock Brothers Mfg. Co., 1515 West Fifteenth Street, Muncie, manufacturer of bottle coolers, dispensers and similar equipment, has awarded general contract to G. W. Ewing & Son., 1919 West Eighth Street, for three one-story additions, to cost about $45,000 with equipment.

Kunkle Valve Co., Fort Wayne, has awarded general contract to Bueshing & Hagerman Co., 402 East Superior Street, for two-story service building, 60 x 150 ft., to cost about $40,000 with equipment.

L. S. Guetti Tool Co., 113 North New Jersey Street, Indianapolis, has been organized to manufacture special tools and gages. Company is in operation.

Cincinnati

CINCINNATI, July 22.—New machine tool business in this district is in good volume for this season of the year, and plants are maintaining capacity production to clean up unfilled orders. Inquiry, although for only one or two machines at a time, is sufficiently brisk to give promise of a steady volume of fresh bookings. Among new orders the past week were two from automobile manufacturers and one from a tool maker for medium sized planers. A French Commission, which has established headquarters at Cleveland, has requested information on automatic lathes for boring airplane engine cylinders.

Bids will soon be asked by Dayton Rubber Mfg. Co., West Riverview Avenue, Dayton, Ohio, for a two-story addition, to cost about $150,000 with equipment. Schenck & Williams, Third National Bank Building, are architects. J. A. McMillan is president.

Ovens, power equipment, conveying and other machinery will be installed by General Baking Corporation, 420 Lexington Avenue, New York, in extensions to plants at Columbus, Ohio, Louisville and Indianapolis, including improvements in present units. Expansion at Columbus plant will cost about $600,000, and at other two bakeries $350,000 each, for completion by close of year.

City Council, Nashville, Tenn., is arranging fund of $250,000 for extensions and improvements at McConnell airport, to be used as a municipal field, including new hangar units, repair and reconditioning shops, and other buildings.

City Council, Tippecanoe, Ohio, is said to be planning early call for bids for extensions and improvements in municipal electric light and power plant, including installation of additional equipment, to cost $100,000. Collins H. Wight, Dayton Savings & Trust Building, Dayton, Ohio, is engineer.

Knoxville Structural Steel Co., Knoxville, Tenn., recently organized by H. R. Adams, Knoxville, and associates, with capital of $100,000 has acquired property on Central Avenue as site for new steel fabricating plant, with main unit, 60 x 100 ft., to cost about $75,000 with equipment.

City Council, Kingsport, Tenn., is considering establishment of municipal airport on Reedy Creek, where site has been selected, to include hangar, repair shop, oil storage and other units, to cost more than $50,000.

Board of Education, Springfield, Ohio, is planning installation of manual training equipment in new junior high school to cost $250,000, for which bids are being asked on general contract until Aug. 2. Eastman & Budke, First National Bank Building, are architects.

City Council, Jackson, Tenn., is arranging bond issue of $750,000, for a municipal electric light and power plant,

to include either purchase of existing local central station with expansion program, or construction of new plant.

Wyatt C. Hedrick, Inc., First National Bank Building, Forth Worth, Tex., plans construction of six-story automobile service, repair and garage building at Memphis, Tenn., 148 x 150 ft., to cost more than $400,000 with equipment.

Milwaukee

MILWAUKEE, July 22.—Although inquiries are in large volume, there are signs of easier tendencies in the equipment markets, with relief in tension especially noticeable in machine tools. Prosperity among the machine manufacturers is inducing many to undertake expansions which indicate good fall and winter demand for equipment.

Glancy Malleable Iron Corporation, 840 Wisconsin Central Street, Waukesha, Wis., has begun work on a foundry addition, 118 x 208 ft., to be followed by another unit for shipping department. Plans are by A. A. Wickland & Co., consulting engineers, 205 West Wacker Drive, Chicago. Worden-Allen Co., Milwaukee, is general contractor.

Giddings & Lewis Machine Tool Co., Fond du Lac, Wis., is building an addition for assembling and erecting to cost $100,000, and will install 20-ton electric crane, Austin Co., Cleveland, Ohio, designers; Immel Construction Co., Fond du Lac, has general contract.

Wisconsin Valley Electric Co., Wausau, Wis., has started reconstruction of its hydroelectric power plant on Wisconsin River, near Tomahawk, Wis., at cost of $140,000.

City of West Allis, Wis., is taking bids until July 30 for furnishing and installing a 1,000,000-gal. elevated steel tank for water supply extension. William Darby is city engineer.

St. Louis

ST. LOUIS, July 22.—Contract has been let by Marquette Cement Mfg. Co., 401 Louderman Building, St. Louis, to Gamble Construction Co., 620 Chestnut Street, for storage and distributing plant to cost about $90,000 with equipment. L. E. Ritter, 140 South Dearborn Street, Chicago, is architect.

Mack International Motor Truck Corporation, 2804 Pine Street, St. Louis, manufacturer of motor trucks, with headquarters at 25 Broadway, New York, will soon take bids for a one-story service, repair and sales building, to cost $230,000 with equipment. H. E. Foster, 400 West Madison Street, Chicago, is architect.

City Council, Kansas City, Mo., is arranging fund of $500,000 for establishment of new municipal airport, consisting of hangars, repair shops and other units. Main structures will have total floor space of 160,000 sq. ft. City engineering department, City Hall, will be in charge.

Missouri Power & Light Co., Board of Trade Building, Kansas City, Mo., is planning extensions in power plant at Jefferson City, Mo., and installation of additional equipment. Work will be carried out in connection with new transmission line between Jefferson City and Mexico, Mo., with power switching stations and other structures, entire project to cost more than $300,000.

Seven-in-One Brake Co., 1430 Baltimore Avenue, Kansas City, Mo., automobile brakes and equipment, has leased one-story and basement building to be erected at 3222 Gillham Plaza, for new service and repair works, to cost about $40,000 with equipment. Hoit, Price & Barnes, Telephone Building, are architects.

International Agricultural Corporation, 61 Broadway, New York, has purchased 20-acre tract in College Hill section, Texarkana, Ark., as site for new one-story plant 140 x 300 ft., to manufacture commercial fertilizers to cost about $140,000 with machinery.

American Eagle Aircraft Corporation, Kansas City, Mo., manufacturer of airplanes and parts, has purchased Wallace Aircraft Co., Chicago, manufacturer of a special three-piece folding wing monoplane, and will consolidate. Chicago plant, which has capacity for about one complete plane unit per week, will be removed to Kansas City, where increased production will be developed. With this acquisition, purchasing company will produce seven different types of aircraft. E. E. Porterfield, Jr., is president.

Charles F. Haller, Parsons, Kan., is at head of project to construct a new plant to manufacture aluminum products. Negotiations are under way with Chamber of Commerce, Fulton, Mo., for suitable site.

Midwest Stove & Enameling Co., 1100 South Charles Street, Belleville, Ill., has leased 5,000 sq. ft. of floor space from C. Heinz Stove Co., Second and Chestnut Streets, St. Louis, for manufacture of sheet iron heaters.

Cleveland

CLEVELAND, July 22.—Contract has been let by Reliance Electric & Engineering Co., 1088 Ivanhoe Road, Cleveland, manufacturer of electric motors, generators, etc., to J. L. Hunting Co., Guarantee Title Building, for one-story addition, 150 x 175 ft., to cost about $115,000 with equipment.

Patterson Foundry & Machine Co., East Liverpool, Ohio, manufacturer of pottery machinery, etc., has awarded a general contract to Potters' Lumber Co., East Liverpool, and Hiner Structural Steel Co., Canton, Ohio, for one-story machine shop, to cost $135,000 with equipment.

Electric Auto-Lite Co., Toledo, Ohio, manufacturer of automobile starting and lighting equipment, etc., has purchased John W. Brown Mfg. Co., Martin Road, Columbus, Ohio, manufacturer of automobile lamps, headlights and kindred products, and will consolidate. Expansion in output is planned.

White Motor Co., East Seventieth Street and St. Clair Avenue, Cleveland, manufacturer of motor trucks, has plans for one-story service, repair and sales building, to cost $200,000 including equipment. Hadlow, Hughes, Hick & Conrad, 819 Euclid Avenue, are architects.

Ford Motor Co., Detroit, has awarded general contract to Krebay Construction Co., New City Trust Building, Indianapolis, for extensions and improvements in branch assembling plant at Cleveland, to cost $200,000 with equipment.

Mohawk Rubber Co., Akron, Ohio, has asked bids on general contract for a three-story and basement addition, 75 x 100 ft., to cost about $135,000 with equipment. Henry & Murphy, Second National Bank Building, are architects.

Logan Gear Co., Toledo, Ohio, and Bingham Stamping Co., with local plant for manufacture of sheet metal stampings, have arranged for a consolidation. New company will have a capital of 190,000 shares of stock, no par value, with assets totaling $2,000,000. Expansion in output is planned.

Gulf States

BIRMINGHAM, July 22.—Plans are in progress by Brown Paper Mill Co., Monroe, La., for additions to mill at West Monroe to double present capacity, and to cost more than $4,000,000. George F. Hardy, 309 Broadway, New York, is consulting engineer.

Phillips Petroleum Co., Bartlesville, Okla., has authorized enlargements in oil refinery at Borger, Tex., to cost more than $100,000 with machinery.

Dallas Power & Light Co., Dallas Tex., has work under way on addition to steam-operated electric generating plant, making a total output of 100,000 hp., for station. Extensions will be made in transmission lines and power switching facilities. Entire project will cost about $3,000,000 and is scheduled for completion by end of year.

City Council, Beaumont, Tex., has plans for establishment of municipal airport, including steel hangars, oil storage and distributing building, repair and reconditioning shops, to cost more than $65,000 wth equipment. R. C. Black, city engineer, in charge.

Linde Air Products Co., 30 East Forty-second Street, New York, manufacturer of commercial oxygen, welding apparatus, etc., has awarded contract to J. M. Brown, Shreveport, La., for one-story and basement plant at Agurs, to cost $50,000 with equipment.

International Lubricant Corporation, Canal Bank Building, New Orleans, has plans for new two-story plan, 60 x 100 ft., to manufacture lubricating specialties, to cost about $30,000 with equipment.

T. A. T. Flying Service, Inc., Fort Worth, Tex., a subsidiary of Southern Air Transport, Inc., same address, has purchased 380-acre tract near Wichita Highway, about six miles from city, for establishment of commercial airport, including steel hangars, repair shops, and other mechanical units, to cost about $200,000 with field development. T. A. T. Flying School, Inc., will establish buildings and headquarters at new location, while another subsidiary, Southern Aeromotive Service, Inc., will construct main repair and service works there for concentration of operations.

Board of Education, Greenville, Miss., is considering installation of manual training equipment in two and one-half story junior high school to cost $220,000, for which bids will soon be asked on general contract. N. W. Overstreet, Mississippi Fire Insurance Building, Jackson, is architect.

East Bank Water District No. 1, Jefferson Park, Kenner, La., plans early call for bids for steel water tank and elevated steel tower, pumping machinery, and auxiliary equipment for waterworks project to cost $1,250,000. Bond issue in amount noted has been voted. Henry A. Mentz & Co., Hammond, La., are engineers.

Texas Air Transport Flying Service, Inc., Fort Worth National Bank Building, Fort Worth, Tex., is planning hangar, with machine and repair shop at municipal airport at El Paso, Tex., to cost about $50,000 with equipment.

Pacific Coast

SAN FRANCISCO, July 18.—Miller-Schofield, Inc., Los Angeles, recently organized with capital of $5,000,000 by officials of Harry Miller Mfg. Co., and Schofield, Inc., both of same city, to manufacture engines for motor boats, airplanes and automobiles, is said to be completing plans for establishment of local plant, to cost more than $200,000 with equipment.

Boeing Air Transport Co., Inc., Balboa Building, San Francisco, with headquarters at Seattle, has awarded general contract to Austin Co. of California, San Francisco, for aircraft manufacturing plant on 10-acre tract near municipal airport at Oakland, Cal., to cost more than $300,000 with equipment. Company also has another plant in progress at Los Angeles, to cost about $400,000 with machinery.

Angelus Oil Tool Corporation, Los Angeles, has plans for one-story plant, 35 x 115 ft., to manufacture oil well drilling tools and equipment, to cost about $25,000 with equipment. Lawrence Nowell, 4814 Loma Vista Street, is architect.

Mine & Smelter Supply Co., Salt Lake City, Utah, has purchased local property as site for new three-story storage and distributing plant, with heavy hardware and machinery departments, to cost $130,000 with equipment. Main plant is at Denver.

Marchant Calculating Machine Co., Emeryville, Cal., manufacturer of computing machines and parts, has plans for a one and two-story addition, to cost $60,000 with equipment. Miller & Warnecke, 1404 Franklin Street, Oakland, Cal., are architects.

Phoenix Aircraft Corporation, Phoenix, Ariz., Floyd Stahl, secretary, in charge, has plans for airplane manufacturing plant, one story, with departments for parts production and assembling, to cost about $65,000 with equipment.

Southern Pacific Co., 500 South Central Avenue, Los Angeles, has plans for new locomotive and car repair shops on San Fernando Road, consisting of engine house, $140,000; one-story machine shop, 74 x 225 ft., $100,000; power house, 50 x 55 ft., and other buildings, to cost $275,000 with equipment.

Pacific Coast Pulp & Paper Co., Richvale, Cal., has awarded general contract to Charles S. Mabrey Co., Inc., Fourth and J Streets, Sacramento, Cal., for new units, comprising machine room, 60 x 225 ft.; two-story beater room, 75 x 120 ft.; boiler plant, 50 x 90 ft., and other structures, to cost $400,000 with machinery.

Axelson Airplane Engine Co., recently formed as a subsidiary by Axelson Machine Co., 6160 South Boyle Avenue, Los Angeles, has awarded general contract to Consolidated Steel Corporation, Los Angeles, for new one-story plant, 120 x 220 ft., at Huntington Park, for parts production and assembling, to cost $90,000 with equipment.

Archer Blower & Pipe Co., 641 East Sixty-first Street, Los Angeles, Cal., has been incorporated to succeed Archer Blower & Pipe Co. Company will manufacture blowers, piping systems and inhibitors, chiefly for industrial plants. Jules F. Archer is president.

Claggett Overhead Irrigation & Lawn Sprinkler Co. has been organized as subsidiary of Claggett Pipe & Supply Co., 2834 Sunset Boulevard, Los Angeles, Cal. Former company will manufacture general sprinkler equipment, pipe and irrigation supplies. Walter Meek is manager.

Southern California Gas Co., Los Angeles, has applied for permission to construct and operate a natural gas pipe line from Kettleman Hills section to points in San Joaquin Valley, totaling about 150 miles, with booster stations, etc., to cost $1,400,000. It is also proposed to build a line for similar service from Huntington Beach to La Jolla, to cost more than $250,000.

City Council, Mount Pleasant, Utah, is planning construction of municipal electric light and power plant, to cost $40,000 with equipment. A bond issue will be voted.

Foreign

OFFICIALS of Torrington Co., Torrington, Conn., manufacturer of metal specialties, swaging machinery, bicycle parts, etc., have organized a subsidiary to operate in Great Britain, under name of Torrington Co., Ltd., capitalized at £5000 (about $25,000), and is said to be planning establishment of plant facilities.

General Electric Co., Schenectady, N. Y., is said to be planning construction of new plant at Monterrey, State of Neuvo Leon, Mexico, for manufacture of electric lamps, to cost more than $500,000 with equipment.

Berlin Electric Co., Berlin, Germany, has arranged for loan of $3,000,000 in United States, considerable part of proceeds to be used for expansion.

Chinese Nationalist Government, Peking, through National Council of Reconstruction in China, has authorized construction of two radio broadcasting stations, and equipment will be purchased in United States, including steel towers, power station apparatus and broadcasting equipment for short-wave operation.

Municipalities and Local Commissions Section, Ministry of the Interior, Cairo, Egypt, is asking bids until Aug. 13 for an electric power plant, including equipment, with underground and overhead transmission and distributing lines for town of Maghagha in Minieh Province.

American Smelting & Refining Co., 120 Broadway, New York, has expansion program under way at plant in northern Peru, to include installation of sintering machines and auxiliary equipment to cost over $750,000. Work is scheduled for completion late in fall.

N. I. Stamatiu, Bulevardul Basarab 17, Bucharest, Roumania, desires to receive drawings and descriptions, together with prices in lei, of snow plows of American type for use on Roumanian railroads. Price is to be named c.i.f. Port Roumain, Braila, Galatzi or Constanta. Tenders are to be addressed to N. I. Stamatiu for transmission to "Administration Generale des Chemins de Fer de Roumanie."

Aeronautics Bureau, Government of Japan, Tokyo, is arranging an appropriation of 3,845,292 yen ($1,768,834) to be expended for new civil airports at Tokyo, Fukuoka and Tsushima, along line of new international airway from Tokyo to Seoul in Korea, during 1929, '30 and '31, including hangars, repair and reconditioning shops and other mechanical buildings.

Fabrica Nacional de Automoviles, S. A., Barcelona, Spain, recently organized with capital of 16,000,000 pesetas to manufacture automobiles, is planning construction of plant near city noted, where headquarters will be maintained, including parts manufacture and assembling. Branch plants and service branches will also be established in different parts of country.

Canada

TORONTO, July 22.—The machine tool market in this territory is beginning to show more life. Inquiries, while mostly for single tools, are improving and a few lists are appearing for a half dozen tools. Some good purchases have been made the past week for plants under construction. Mining development work has stimulated demand for equipment in Ontario, Quebec, Manitoba and Saskatchewan, and some good-sized orders are expected within the next few weeks. Small tools are moving freely.

City of Edmundston, N. B., will start work soon on construction of a power house and dam which, with equipment, will represent an expenditure of $200,000. Thomas Gwerette is clerk. H. G. Acres & Co., Ltd., Ferry Street, Niagara Falls, Ont., is consulting engineer.

Several contracts have been awarded for a $500,000 foundry at St. Laurent, Que., for Robert Mitchell Co., Ltd., 750 Belair Street. Anglin-Norcross, Ltd., is general contractor.

Hull Iron & Steel Foundries, Ltd., Montcalm Street, Hull, Que., has awarded general contract to Gordon Black, Leaside Avenue, for an addition to cost $200,000.

Hamilton Boiler Works, 925 King Street West, Hamilton, Ont., will build a one-story factory to cost $20,000.

Ontario Refinery Co., in which Consolidated Mining & Smelting Co., and International Nickel Co. are interested, has awarded the general contract to Fraser Brace, Ltd., 107 Craig Street, Montreal, for a copper refinery at Copper Cliff, Ont., to include an electrolytic tank house, 300 x 400 ft., and two casting buildings, each 200 x 300 ft.

Southern Canada Power Co., will start work immediately on a 2000-hp. electric development plant at Burroughs Falls, near Drummondville, Que.

Fairchild Aircraft, Ltd., recently incorporated with a capital stock of $2,000,000, has purchased 265 acres near Montreal, and will establish an airport, build hangars and erect a plant to manufacture airplanes.

Skinner Co., Ltd., Oshawa, Ont., has plans for an automobile bumper manufacturing plant.

New Trade Publications

Refractories for Power Plants.—Charles Taylor Sons Co., Cincinnati. An eight-page booklet, contains information of a technical and practical nature in regard to fireclay brick for boiler settings. After discussing refractoriness, shrinkage, slag erosion, spalling, joints and chemical analysis, the booklet describes Taylor-made fire brick.

Manganese Steel.—American Manganese Steel Co., Chicago Heights, Ill. An eight-page pamphlet illustrating and describing new applications and unusual uses for manganese steel, for Fahralloy, and Amsco products.

Heat Treatment of Gray Iron.—Whiting Corporation, Harvey, Ill. An eight-page pamphlet entitled, "Heat Treatment of Gray Cast Iron" is a reprint of an article by Dr. Edward E. Marbaker, director of foundry research department of the Whiting Corporation, published in the interest of the foundry industry by that company. It is a reprint of an article in THE IRON AGE of Aug. 2, 1928.

THE IRON AGE

New York, August 1, 1929

ESTABLISHED 1855

VOL. 124, No. 5

Two Weeks War Against Waste

Whirlwind Campaign Among Employees of Pontiac Plant Brought 3558 Suggestions, a Third of Them of Value and Pointing to Annual Savings of $542,000

A WAR against waste in a whirlwind campaign lasting two weeks was made recently by the Oakland Motor Car Co., Pontiac, Mich. Ammunition employed included forceful speaking by plant executives, posters and display boards galore, a special daily newspaper as well as machine guns, martial music and other means of arousing a waste prevention spirit among the workers and of bringing out suggestions of ways to cut production costs and eliminating waste.

As an incentive, $1,247 in prizes were offered. The intensive campaign brought out 3558 suggestions for stopping waste and improving production methods. When a start was made in checking over the suggestions, it was felt that if 3 per cent of the suggestions proved of tangible value the campaign would have proved successful. However, about 35 per cent of the suggestions were found to be valuable, and these, it is claimed, will result in an annual saving of $542,000.

Numerous other suggestions have not yet been definitely passed on, having been referred to the engineering department to determine whether they are practical. The company spent approximately $16,000 in conducting its war against waste and regards this as a very profitable investment.

The prize money was divided into about 100 individual prizes. A grand prize of $100 was offered the employee who sent in the best suggestion. In addition, the plant was divided into five sectors and 19 prizes aggregating $220 were offered in each sector, ranging from a $50 first prize down to ten sixth prizes of $5 each.

To increase interest in eliminating waste and in the contest, numerous display boards, for which prizes were offered, were placed throughout the plant, illustrating graphically loss due to waste. At the top of the display boards were effective slogans. Posters in color were placed in all departments and for these prizes were given as well as a prize for the best 500-word article on waste elimination.

The campaign against waste was led by Gordon Lefebvre, vice-president in charge of operations and chairman of the Permanent Waste Committee of the Oakland company. Mr. Lefebvre sounded the call to arms in a declaration of war here reproduced.

Extensive preparations were made for the campaign by various committees. A member of the general committee made a trip to Washington to confer with the Department of Commerce officials and to secure suggestions as to the best method of conducting the campaign. Assistance was rendered by the Committee on Elimination of Waste in Industry of the Federated American Engineering Societies, and companies that had conducted similar campaigns were asked to give their experiences and make recommendations.

The intensive campaign continued for two weeks. Noonday meetings were held in the plant cafeteria, during which short talks were made by various executives. Alfred P. Sloan,

Declaration of War

WHEREAS:—There have grown up with this industry, and entrenched themselves firmly within its lawful domains, certain lawless and disturbing elements; and

WHEREAS:—Said elements are in continual and persistent conflict with our march of progress, and

WHEREAS:—Said elements having flourished undisturbed have grown to the point where they now threaten the peace and security of our business, the successful and orderly pursuit of our labors, and have constituted themselves a menace to our future prosperity, and

WHEREAS:—They have established themselves in defiance of all regular and authorized laws governing the conduct of the business of which we are a part

WHEREFORE, Be It Resolved:—That we, the officers and employees of the Oakland Motor Car Company, this sixth day of May, nineteen hundred twenty-nine, through our regularly constituted representatives in convention duly assembled, do hereby declare war upon the aforesaid offenders—Namely, Extravagance, Inefficiency and Waste; and do pledge all our physical, and such financial resources as may be necessary to wage to successful conclusion this war against them, to the end that we may again be free and undisturbed in the happy pursuit of our labors, and the permanent possession of the benefits which must acrue from a successful prosecution of this war.

Signed:

G. LEFEBVRE,
General Chairman

Jr., president of the General Motors Corporation, in a letter commending the Oakland company for its campaign, said: "I know that the major items of expense in our corporation are well controlled, but I also feel that there remains a wonderful opportunity in scientifically regulating the minor items. The cumulative total waste of small material items reaches an enormous sum."

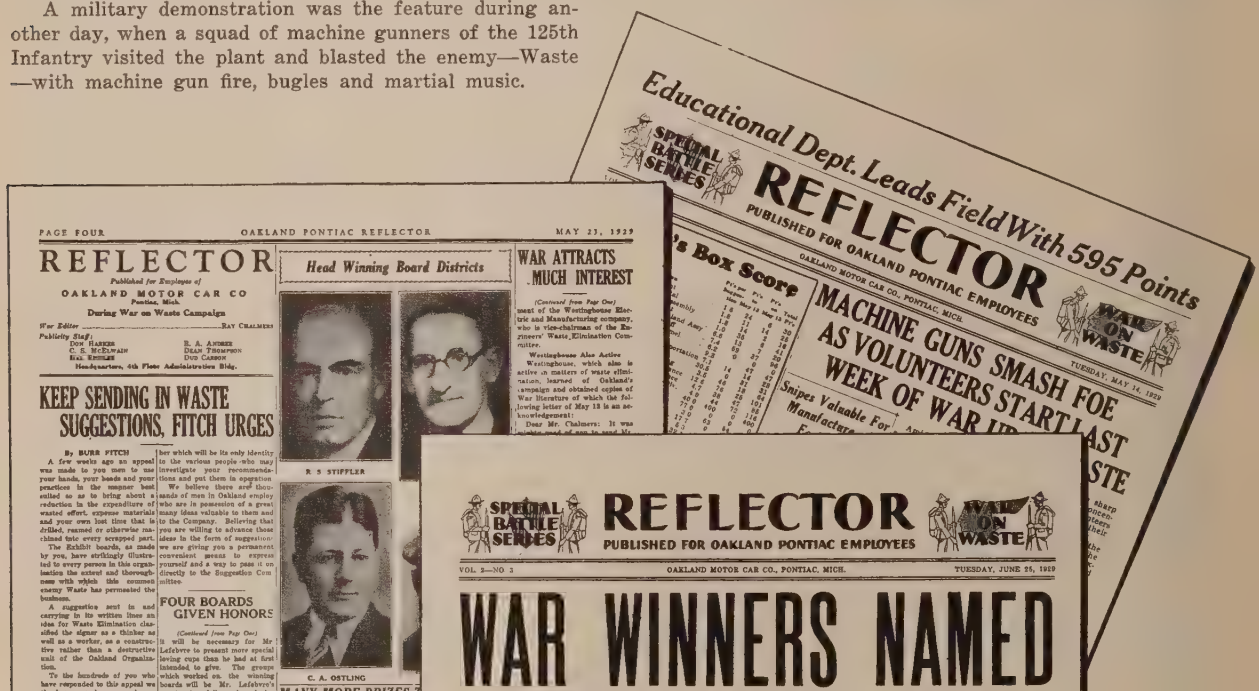
At the start of the campaign suggestion blanks were distributed to the workmen. Mr. Lefebvre issued a bulletin in which he listed subjects for consideration in preparing suggestions.

The campaign aroused considerable interest among executives of other General Motors units and a party of the higher executives, including President Sloan and various officers of different units, spent a day visiting the plant and seeing how the campaign was being conducted. These visitors were greatly impressed.

A military demonstration was the feature during another day, when a squad of machine gunners of the 125th Infantry visited the plant and blasted the enemy—Waste—with machine gun fire, bugles and martial music.

The publication of a newspaper, the "Reflector," was one of the effective features of the campaign. This was issued daily for the two weeks, and a few additional issues were published later to announce the results. This four-page paper covered from day to day the various activities in connection with the campaign and contained articles on waste prevention by executives and department heads. It also carried numerous illustrations, including reproductions of photographs taken in the plant showing waste in different departments, photographs of posters and of many of the leaders in the campaign, as well as numerous cartoons.

The suggestion that won the first prize was a plan to use Philfuel for the block test of motors in place of gasoline or city gas. This suggestion contained full details as to the cost of installing the equipment necessary for



Educational Dept. Leads Field With 595 Points

SPECIAL BATTLE SERIES

REFLECTOR

PUBLISHED FOR OAKLAND PONTIAC EMPLOYEES

OAKLAND MOTOR CAR CO., PONTIAC, MICH.

WAR ON WASTE

TUESDAY, MAY 14, 1929

's Box Score

MACHINE GUNS SMASH FOE AS VOLUNTEERS START LAST WEEK OF WAR

Snipes Valuable For Manufacture

PAGE FOUR — OAKLAND PONTIAC REFLECTOR — MAY 23, 1929

REFLECTOR

Published for Employees of OAKLAND MOTOR CAR CO

Pontiac, Mich.

During War on Waste Campaign

War Editor ..... RAY CHALMERS

Publicity Staff: DON HARPER, C. S. McELWAIN, HAL EDDIES, R. A. AMBER, DEAN THOMPSON, DUD CARSON

Headquarters, 4th Floor Administration Bldg.

KEEP SENDING IN WASTE SUGGESTIONS, FITCH URGES

By BURR FITCH

A few weeks ago an appeal was made to you men to use your heads, your heads and your practices in the manner best suited so as to bring about a reduction in the expenditure of wasted effort, expense materials and your own lost time that is drilled, reamed or otherwise machined into every scrapped part.

The Exhibit boards, as made by you, have strikingly illustrated to every person in this organization the extent and thoroughness with which this common enemy Waste has permeated the business.

A suggestion sent in and carrying in its written ideas an idea for Waste Elimination classified the signer as a thinker as well as a worker, as a constructive rather than a destructive unit of the Oakland Organization.

To the hundreds of you who have responded to this appeal we thank you, and we are sincere in the hope that you will be glad in the thought that you are one of the family—proud of the suggestion you have sent in and of the opportunity to serve.

Oakland has many hard tasks she wants to get done this year, next year, and years to come. Knowing that so many men seek, naturally, the easiest way, she attaches great importance to the suggestion method of discovering those men in the ranks who do care and are thinking of three tasks.

The man who throws his better self into his job seems to draw new strength and energy that sustain him in the difficult climb to advancement.

Take it from me, the fellow who persists in doing his job better may be trampled on by others who don't care, but to endure with patience and self control is no bad element in the preparation of a man for the great number of things, in the Oakland Family, that must somehow someway be done better.

You are now provided with the permanent form of Suggestion Blank and through the Reflector acquainted with details of the permanent plan.

We want one or more suggestions from every employe. We want you to feel free to express yourself without fear that you will incur the displeasure of someone of greater authority.

Your suggestions will be treated strictly confidential by the Suggestion Committee. Each suggestion will be given a number which will be its only identity to the various people who may investigate your recommendations and put them in operation.

We believe there are thousands of men in Oakland employ who are in possession of a great many ideas valuable to them and to the Company. Believing that you are willing to advance those ideas in the form of suggestions we are giving you a permanent, convenient means to express yourself and a way to pass it on directly to the Suggestion Committee.

Head Winning Board Districts

R. S. STIFFLER

C. A. OSTLING

FOUR BOARDS GIVEN HONORS

(Continued from Page One)

will be necessary for Mr. Lefebvre to present more special loving cups than he had at first intended to give. The groups which worked on the winning boards will be Mr. Lefebvre's guests at a jolly and exclusive picnic expedition into the wild woods. The date of the outdoor party will be announced as soon as Mr. Lefebvre completes arrangements to obtain the loving cups.

The boards are so good that it is intended to retain them permanently. Detailed information regarding their future disposition will be printed in an early issue of the Reflector.

A repair job TODAY Keeps the junk man AWAY

MANY MORE PRIZES T NEW WASTE ELIMI

Until the winners in the War campaign are chosen and announced, don't mark time or let up in your efforts toward eliminating Waste.

Regular awards will vary in amount from $2.50 and upwards, depending upon the value of the suggestions to the company. An award of $5.00 in addition to the regular awards will be paid, upon

Poor Way to Be 'Taken fo

WAR ATTRACTS MUCH INTEREST

(Continued from Page One)

ment of the Westinghouse Electric and Manufacturing company, who is vice-chairman of the Engineers' Waste Elimination Committee.

Westinghouse Also Active

Westinghouse, which also is active in matters of waste elimination, learned of Oakland's campaign and obtained copies of War literature of which the following letter of May 13 is an acknowledgment:

Dear Mr. Chalmers: It was

SPECIAL BATTLE SERIES

REFLECTOR

PUBLISHED FOR OAKLAND PONTIAC EMPLOYEES

WAR ON WASTE

VOL. 2—NO 3 — OAKLAND MOTOR CAR CO., PONTIAC, MICH. — TUESDAY, JUNE 25, 1929

WAR WINNERS NAMED

Campaign Nets Half Million

C. J. Flynn of Standards Dept. Wins High Award

Given Grand Prize For Recommending Substitution Of G-4 Philfuels For Gasoline On Block Test

SAVING EACH YEAR TO RUN TO HUGE SUM

35% of Suggestions Point Ways to Gain $542,000 Annually

3658 PLANS RECEIVED

Oakland's War on Waste cost approximately $16,000. From concrete evidence of the waste prevention spirit demonstrated by the volunteers, this will be only a small proportion of the intangible returns which will accrue from the War.

According to Gordon Lefebvre, about 35 per cent of the suggestions received will effect a projected saving of $542,000, while a like amount may be expected from the balance of the suggestions which were set aside for further investigation by the Permanent Committee.

Everybody Happy

Add to this the intangible values accruing from the extra care and pains taken throughout the plant during the campaign to fling the Demon Waste, and you get into important money—so important in fact that the Management is tickled pink with the way the volunteers came through.

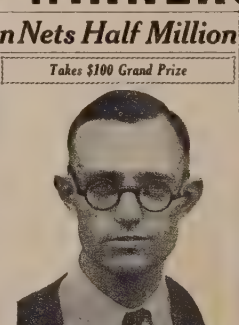
"In launching the Waste War," said Mr Lefebvre "we felt that if three per cent of the suggestions received were of tangible value the War would be a success.

"Yet, when we began checking over the heaps of suggestions received, we found that instead of three per cent being good, the average was nearer 35 per cent.

"This fact demonstrates the high type of constructive thinking our men are capable of doing and shows me in a very forcible manner the unusual standard of the men whom we are glad to have connected with Oakland.

"In all 3358 suggestions came in up to the deadline set at the end of the two weeks' campaign. However, 300 additional ones arrived the first of the following week and were counted in with

Takes $100 Grand Prize



Chester J. Flynn

ANTI-WASTE IDEAS NEED BE ONLY SIMPLE AND PRACTICAL

A reading of Mr. Flynn's numbered among those in the prize money were comparatively simple—just sound constructive ideas plainly presented on the suggestion blank.

Don't get the idea, after reading the best plan, that you have to be as detailed as Mr. Flynn was in order to qualify for a prize from the Permanent Suggestion committee. Remember the men who first thought of putting creases on the ends of pencils, and the wiggle in a hairpin, the hump in a hook and eye, and the fortunes they accumulated.

Often the simplest things are best. If you feel you have a hot idea, get it down on paper as quickly and as clearly as you know how, and shoot it in. The competitive War is over. Every practical plan now wins a prize

What Ho! Lads, Listen To This

Attention, all you prize winners! Wednesday night June 26 is the big night.

That night promptly at 7:00 P. M. you are to report at the Old Mill Tavern at Waterford for such a feast and entertainment as would repay you for all the effort put into winning the prizes. In addition the Big Shots will be on hand to present you with your cash money.

Every one of the 96 men listed in the tables as a winner is to be on deck. The general Committee and subcommittees also will be there, as well as the Superintendents.

It's your hour in the spotlight, so be on hand tomorrow at 7 p. m. sharp.

THANKS FOR YOUR HELP

As this issue winds up the special battle series of the War Reflector, the staff takes this opportunity to thank the entire Oakland organization for the fine cooperative spirit shown in contributing solicited and unsolicited articles. The staff regrets that many of you contributed worthy articles and poems which space did not permit to be used.

Judges Have Tough Job

Choosing the best plans from the 3,558 suggestions received proved by far the hardest task yet encountered in connection with the campaign. To assure a fair distribution of prizes the judges: Gordon Lefebvre, L. A. Blackburn, Walter Rea, Burr Fitch and Wayne Eddy—had to read and re-read the entire group of plans and then check back to determine the accuracy of claims made by the suggestors.

So outstanding was Mr Flynn's grand prize suggestion that the Judges issued the following statement:

Committee Pleased

"It is with great pleasure that the General Committee for the "War on Waste" Campaign, after many days and nights of studying the many suggestions submitted by employes of the Oakland Motor Car Company, announces Chester J Flynn for the Grand Prize, on the suggestion of using Philfuel for Block Test, as compared with Gasoline or City Gas.

"The selection of Mr. Flynn's suggestion for the Grand Prize was unanimous. In addition Mr. Flynn has made numerous other suggestions, which project almost as much as the returns on the Philfuel suggestion.

"Mr. Flynn, in making this study, left nothing for the General Committee to investigate. He developed all of the costs.

(Continued on Page Two)

A SPECIAL Four-Page Newspaper Was Published Daily for the Two Weeks of the Waste Eliminating Campaign

CARNEGIE LIBRARY OF ATLANTA

Waste Eliminating Suggestions Offered at Outset of Campaign

ELECTRIC lights and gas fires burning needlessly (gas fires could in many cases be equipped with pilot lights).

* * *

Motors and tools running idly.

* * *

Leaky air hose, water and steam pipes.

* * *

Acetylene torches burning needlessly (could in some cases be equipped with automatic shut-off).

* * *

Scrapping of good material (work with inspection).

* * *

Excessive amounts of tools in workmen's drawers.

* * *

Use of high-priced expense materials for low-priced.

* * *

Wrong use of mallets, files, high-speed steel, carbon steel, etc.

* * *

Excessive consumption of waste and other expense materials.

* * *

Accumulation of unnecessary or excessive amounts of materials, which should be credited back to stores.

* * *

Defective workmanship.

* * *

Removal of unused equipment of all kinds.

* * *

Repair of cracks and crevices in benches, floors, etc., which form receptacles for holding small items such as screws, nuts, washers, etc.

the use of this gaseous fuel. The estimate showed a saving of 6½ cents per motor tested or $2,597 per month based on a production of 1600 motors per day. The cost of the equipment required was placed at $32,943, which would be amortized in about 12½ months.

In the display board contest there were 115 entries. The winning board on one side bore the slogan, "Not a part of the car, but a part of the cost," below which were displayed various small parts that had been scrapped because of defects. On the other side was the slogan, "Use it right—stop the waste." Below this were listed various supplies, such as tools, emery cloth, lamps, belting, grease, fittings, babbitt, etc.

Some of the saving that has been accomplished by the General Motors Corporation by standardization and simplification was referred to in one of the articles in the war campaign publication. This stated that in 1925 the executives of the corporation, realizing that 70 per cent of an automobile is composed of minor parts, instituted a study of the additional savings that might be accomplished through further reduction in the variety of these parts. At that time the average automobile built by General Motors contained 13,000 different parts. One type of bolt was used for one purpose and a slightly different type for another. Different threads were used on different screws. As a result of this investigation the General Motors Corporation in one year reduced the average number of parts in a car from 13,000 to 2110.

Bearing Bronzes Best Suited to Lack of Lubricant

RESEARCH paper No. 68 of the United States Bureau of Standards deals with bearing bronzes made with and without zinc. It was written by H. J. French and E. M. Staples of the bureau. It includes a study of the wearing properties, hardness, structure, toughness and resistance to deformation at temperatures up to 600 deg. Fahr. Based on this study, the bronzes in the copper corner of the copper-tin-lead system have been classified according to the character of service for which they seem best adapted.

Bronzes with less than 4 per cent tin were considered unsuitable for general bearing service. They have low resistance to deformation and wear rapidly in the absence of lubrication. Bronzes with less than about 5 per cent lead seem to be suited only for such service as has the lubrication maintained. Bronzes containing more than 5 per cent lead were found best able, of any of the groups, to operate for short periods without lubricant. With increasing lead percentages, up to 15, the bronzes showed bettering characteristics in this respect, but no appreciable advantages appear in raising lead above 15 per cent.

Addition of 4 per cent of zinc to the copper-tin-lead alloys had, in general, a good influence upon the properties of the bronze. The changes observed included a tendency toward higher hardness and resistance to deformation under repeated blows, to lower friction and lower wear in the absence of oil. However, the effects of zinc additions up to 4 per cent are small and may be insignificant in comparison with changes in properties readily produced from variations in foundry practice.

"Don'ts" for Chain Users

A folder on welded chain recently issued by American Chain Co., Inc., Bridgeport, Conn., contains the following advice on things to avoid:

Don't load a chain above its rated capacity.
Don't subject a chain to jerky loads.
Don't use a chain that appears defective.
Don't fasten chain over sharp corners.
Don't save money by making "home made" slings.
Don't use slings at acute angles if avoidable.
Don't think annealing is a "cure all" for chain ills.
Don't buy chain of doubtful quality.
Don't tie knots in chains or allow them to become twisted.

High-Speed Strip

ROLLS on Continuous Principle Up to 2400 Ft. a Minute and In Coils Up to 2000 Lb. in Weight

ROLLING of long lengths of hot strip at high delivery speeds and in a range of sizes and gages not ordinarily produced on a single mill has been achieved in a unit recently placed in operation at the Sharon, Pa., plant of the Sharon Steel Hoop Co. It rolls strip 2½ x 0.028 in.; 6 x 0.035 in.; 8 x 0.049 in., and 10 x 0.065 in. at speeds up to 2400 ft. per min. and in coils from 150 lb. to 2000 lb. All strip sizes are produced from 30-ft. billets.

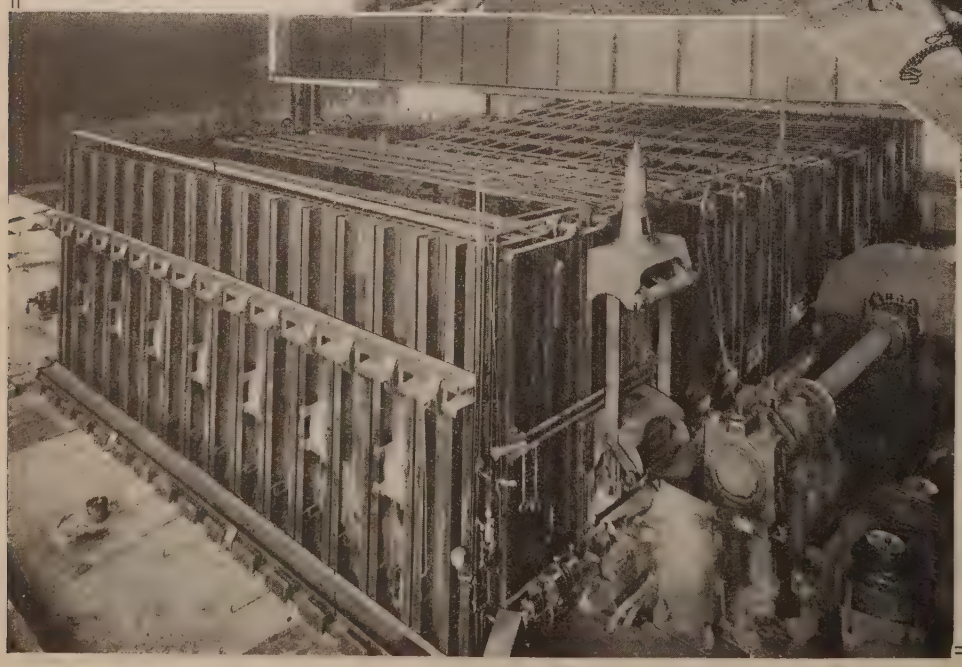
The mill and handling equipment are located in two parallel buildings about 500 ft. in length, which extend from the billet storage transcept to the hot warehouse loading transcept buildings. The billets are delivered to the furnace from a mechanical billet platform by a motor-driven roller table through a pinch roller located in the corner of the furnace.

The furnace is 32 ft. wide by 47 ft. long on the hearth, and is completely inclosed on the sides and ends with rolled steel plates. Between the brick walls and the steel plates insulating material has been placed to conserve the heat. The furnace is equipped with a Morgan special metal pipe recuperator stove. A double pusher, electrically driven, is installed for pushing billets through the furnace, and a Morgan-Hawthorne pushout for discharging the billets. A flat roof furnished by the American Arch Co. is used on this furnace. The furnace is fired with producer gas from a Morgan new type producer located near the furnace. The producer, it has been proved, may be depended on to gasify 6000 lb. of coal per hr. The furnace has a capacity of 60 tons of 2-in. thick billets or slabs per hr.

A Morgan up-and-down cut shear is placed between the furnace and the roughing mill. This shear is fed by a set of motor-driven pinch rolls when it is necessary to cut the billets into short lengths; otherwise, the billets are pushed from the furnace directly into the roughing mill.

The roughing mill consists of five trains of 18-in.

THERE Are Six Trains of 14-in. Rolls in the Finishing Mill. The strip is delivered on edge. In the background are the roughing mill and the furnace



PINCH Rolls and An Up-and-Down Shear May Be Seen (view at left) At the Discharge End of the Furnace Which is Enclosed on Sides and Ends with Rolled Steel Plates

Mill at Sharon, Pa.

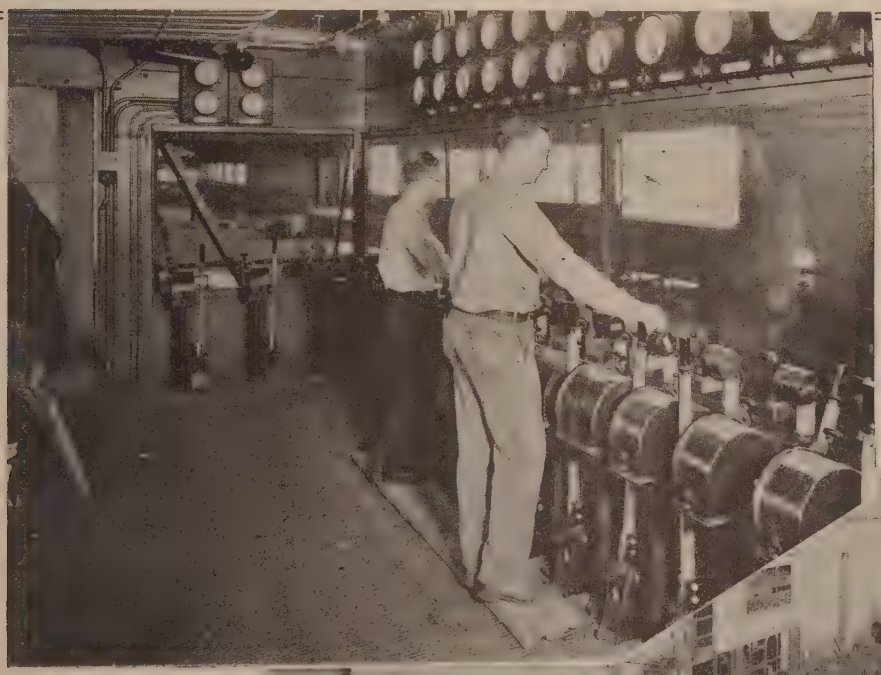
REGULATION of Driving Motors and Means to Prevent Scratching the Product Among the Features

rolls, which are driven by a variable-speed direct-current motor through reducing and helical bevel gears. The bevel gears are inclosed in oil-tight welded steel bases and covers. In the roughing group, four Morgan edging mills with 16-in. and 12-in. rolls are installed. All edging mills are driven by separate motors. Hydraulic water sprays of 1000 lb. pressure are employed in the roughing mill for the removal of all furnace scale and to insure a good surface. After the roughing mill a Morgan steam flying shear is installed for cropping the front ends of the strip.

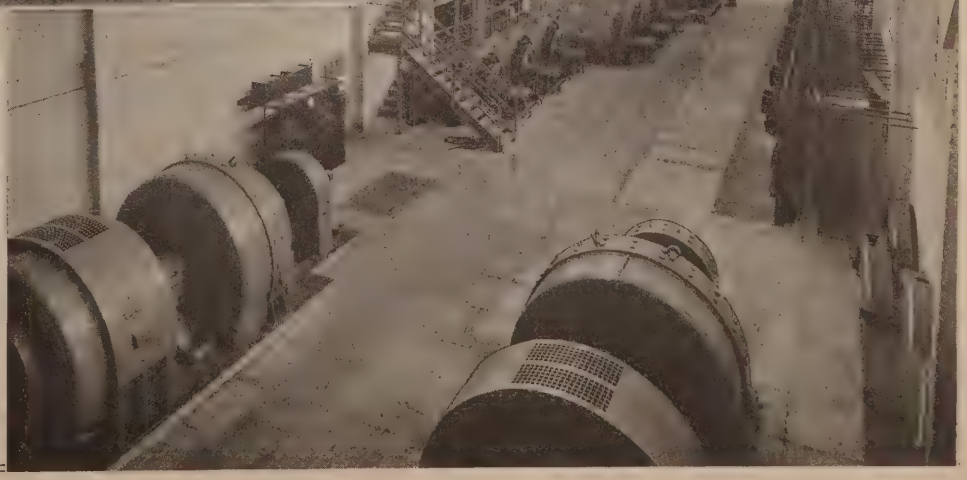
The finishing mill consists of six trains of 14-in. rolls. Each of these is driven by an individual variable-speed direct-current motor. Double armature motors are used on the first three trains. The six motors are mounted on one large bed plate. Novel features are employed in handling the strip, and in the guides and looping devices, to prevent scratching the product during the rolling operations and afterward when being delivered to the loading and pickling departments.

The strip is delivered from the last finishing mill through a twisted trough to either of two vibrators, which in turn deliver the strip on edge in serpentine form upon slowly moving conveyors. The front end of the piece is then placed in motor-driven pinch rolls that feed it into a shear for cropping, and then into the reel for coiling. The cropping shear may also be used for dividing the strip so that light weight coils may be made without reshearing. When the coil is completed, a motor-driven pulloff places the coil on a conveyor which carries the coils into the loading building where they are assembled on trucks. There are two complete sets of vibrators, conveyors, shears, coilers and delivery conveyors.

The power for this mill is received at 2300 volts, 60 cycles, 3-phase, and is converted to direct current of 600 volts in two 4500-kw. motor-generator sets with a 250-kw. 250-volt direct-connected exciter on each set. One exciter is used for excitation and control purposes, and the



ON the Control Platform Are the Motor Controllers, Meters and Speed Indicators. The roller on mill floor gives orders through a microphone and loud speaker



MOTOR-GENERATOR Set Is in Foreground, Finishing Mill Motors in Left Center and Roughing Mill Motor and Gear Drive in Background

other exciter is used for the auxiliary motors required for the mill. There is also a 250-volt plant service line available for emergency. The roughing mill motor, being of wider spread range than customary, a Ward-Leonard control is employed, using one of the direct-current generators for this service. This arrangement is separately controlled so that it does not interfere with the operation of the other motors. The finishing and edging mill motors are equipped with magnetic control, dynamic braking and emergency reversing.

Operator Gets Instructions through Loud Speaker

In the operating pulpit the following devices are mounted so that the operator has complete control of the motors at this point:—Master switch for starting, stopping and reversing each drive; spring return master switch for the motor-operated coarse adjustment field rheostat for each drive; lever-operated field rheostat for fine speed adjustment for each drive; speed indicators for each drive, and ammeters for each drive. The operators in the pulpit receive instructions regarding operations and speed changes from a loud speaker mounted in the pulpit, the roller talking into a microphone located on the operating floor.

All the mill motors are equipped with speed regulating equipment that holds the speeds of the different motors constant regardless of the load being carried by the different motors. The speed regulators for the edging mill motors are regulated in conjunction with the roughing mill motor, so that as the speed of the roughing mill is changed the speed of the edging mill motor is automatically changed. This avoids separate adjustment of the edging mill motors every time there is a change of speed required for the roughing mill. The speed of each edging mill can, however, be adjusted separately when required. The vibrator motors are also equipped with speed regulators.

The mill was designed and built by the Morgan Construction Co., Worcester, Mass. The electrical equipment was furnished by the General Electric Co., Schenectady, N. Y. The Sharon company's construction force took care of the erection of buildings, the installation of foundations for the machinery, and the mounting of the machinery in place.

German Views on Use of Open-Hearth Decarburizers

TWO articles have recently appeared in issues of *Stahl und Eisen* discussing the use of different decarburizing agents in the open-hearth process, one by S. Schleicher, in the issue of April 4, 1929, pages 458 to 462, and the other by E. Killing, in the issue of April 18, 1929, pages 527 to 531.

In the first article on the general subject of "Comparative Economy of Various Decarburizers," Mr. Schleicher says:

> Trials were made in an open-hearth furnace with various decarburizers with the object of discovering the effect of these on the cost of the process. Rolling mill scale proves to be the most economical, the value of the iron gained being slightly in excess of the cost of the scale and lime added. With pure Swedish ore, after balancing gains and losses, the cost works out at 2.46 shillings per 100 kg. of carbon requiring to be burned. Using siliceous hematite (with Fe_2O_3 57.71, and SiO_2 40.8 per cent.), the cost becomes 10.84 shillings per 100 kg. of carbon burned, the reason for the much higher cost being the increased quantity of lime added and the higher loss of iron by burning.
>
> The quantity of oxygen in the decarburizer does not in the least affect the speed of decarburization, but it does determine the amount of decarburizer required. The decarburizer should be added in a quantity corresponding to the rate of combustion of the carbon in the bath. If added in excess of that rate, the excess iron of the ore used is slagged, instead of going into the bath.

In the second article under the general heading "Conditions on Which the Effects of Decarburizing Agents Depend," E. Killing says in substance:

> The chief factors to consider in choosing a decarburizer are the iron content, the quantity and form of combination of the oxygen, the degree of acidity or basicity, the amount of injurious constituents, the mechanical condition and the moisture, free or combined. The effect of the decarburizer is mainly influenced by the time at which it is added, the bath temperature, the composition of the charge and of the slag, the composition of the gas and quantity of air for combustion, and the hearth area.
>
> The kind of ore chosen may have quite an appreciable effect on the cost of production. The theoretical calculations concerning the advantage of ferric oxide as compared with ferrous have proved true in practice. A high silica content in a decarburizer greatly reduces its efficiency.

Temperature Measurement by Means of Color Transition

WHAT appears to be a new principle in optical pyrometry is incorporated in an instrument recently described by Dr. G. Naeser.*

As is well known, the radiation from a "black body" is composed of the various primary colors, the relative amounts of each depending on the temperature of the radiator. This is the basis for the conventional scheme of "color temperatures."

The new pyrometer contains first a filter which transmits only two wavelengths—such as red and green. The light is then passed through a wedge-shaped filter in which one wavelength—the green—is absorbed more completely with increasing thickness than the other. As a result part of the wedge appears green and part red. At the division between the two colors a line of white appears, due to the equal absorption of red and green. A change in temperature produces a change in the relative amounts of red and green in the radiation, with consequent lateral shift of the white line along the wedge.

It is claimed that an accuracy of plus or minus 13 deg. C. is obtained between 900 and 2000 deg. This could doubtless be increased considerably. One possible difficulty is that of partial color-blindness of the operator—if the eye is more sensitive to red than to green, the white will apparently be displaced toward the green end of the wedge. This may be taken care of, says Dr. Naeser, by sighting first with one eye and then with the other.

Stahl und Eisen, April 4, 1929.

Edgar Allen Steel Co., Inc., 741 Washington Street, New York, exclusive representative in the United States of Edgar Allen & Co., Ltd., Sheffield, England, has opened an office at 704 Fisher Building, Detroit, and will carry complete stocks of Allen tool steels in that city.

Conveyors Reduce Assembly Costs

Studebaker Corporation Cuts Labor Expense 15 Per Cent and Doubles Output by Using Conveyors for Sub-Assembly and Final Assembly Operations

IN doubling its capacity for producing automobiles, the Studebaker Corporation has rearranged its plant at South Bend, Ind., so that the major part of the sub-assembly and final assembly work is done on conveyors. While mechanical handling of materials has become the rule rather than the exception in the automobile industry, chief interest lies in the new uses and the increasing flexibility of the systems which are installed to meet the special needs of each manufacturer.

At the Studebaker plant there are innovations in handling parts which should attract more than passing attention. Motors, for example, are carried on an overhead conveyor 2810 ft. from the motor building to the final assembly lines, where they are lowered into the chassis. This conveyor is capable of handling 177,000 lb. of work at one time and of delivering 100 motors an hour to four final assembly lines, motors being distributed along the conveyor at 10-ft. intervals.

Another unusual installation is an overhead chain conveyor for transporting all chassis sheet metal parts from the enameling and lacquer departments through three floors of three buildings to the final assembly lines. This conveyor is 2200 ft. long.

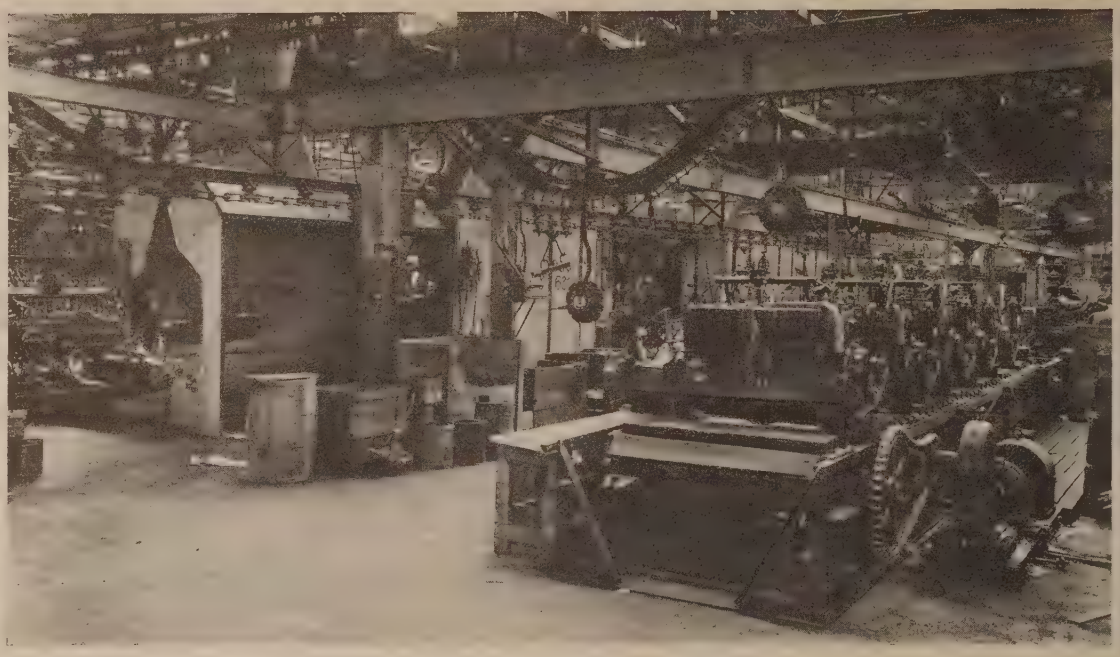
There are many other features indicating increased skill and efficiency with which mechanical conveyors are being used. Where space is needed for manufacturing operations, overhead conveyors are raised to a point which does not interfere with the operation of machine tools or other equipment. At other points, where material carried by the conveyor must be within reach of workmen or where conveyors cross one another, the monorail carrier dips conveniently.

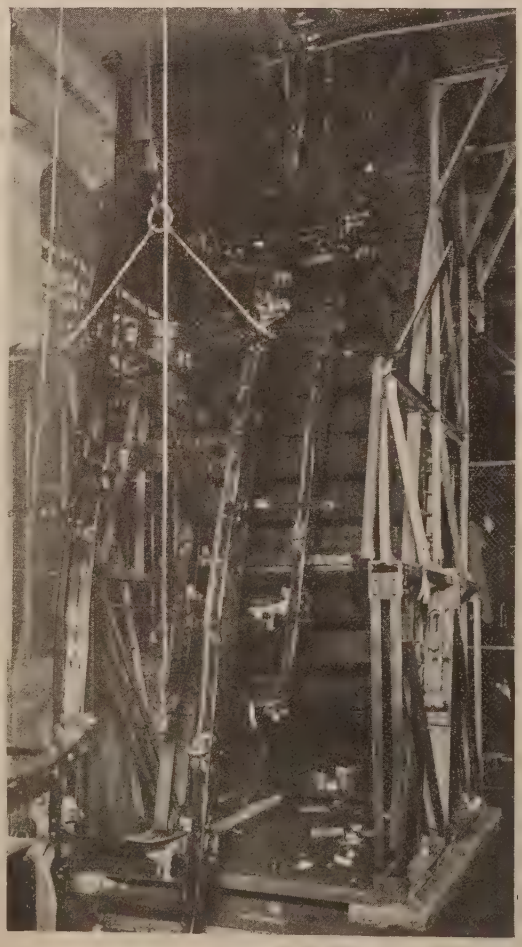
Versatility Shown in Design of Hooks

Aside from the flexibility of the conveyors, great versatility has been shown in the design of special hooks and carriers on which parts are placed for movement along the conveyor line. These hooks have been made so that parts can be attached to them with a minimum of time and effort and can be transported without damage.

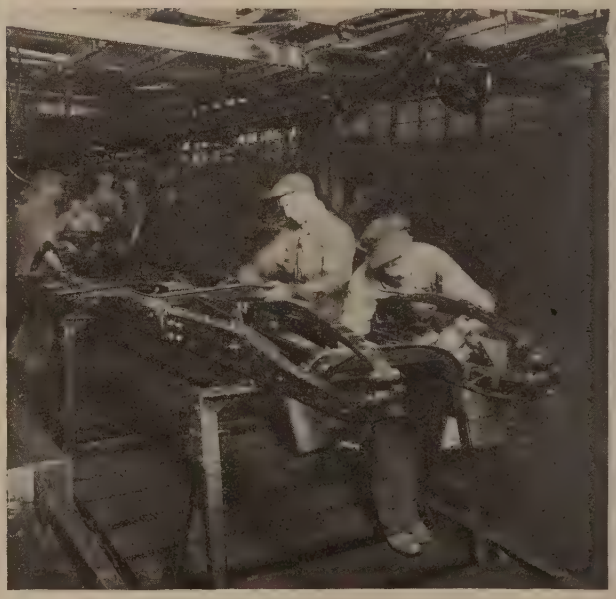
The conveying system is by no means confined to overhead conveyors, for the roller type also has been installed in connection with certain operations. Cylinder blocks, for example, are machined on tools adjoining four parallel roller conveyors 800 ft. long. Differing from the practice in some other automobile plants, Studebaker

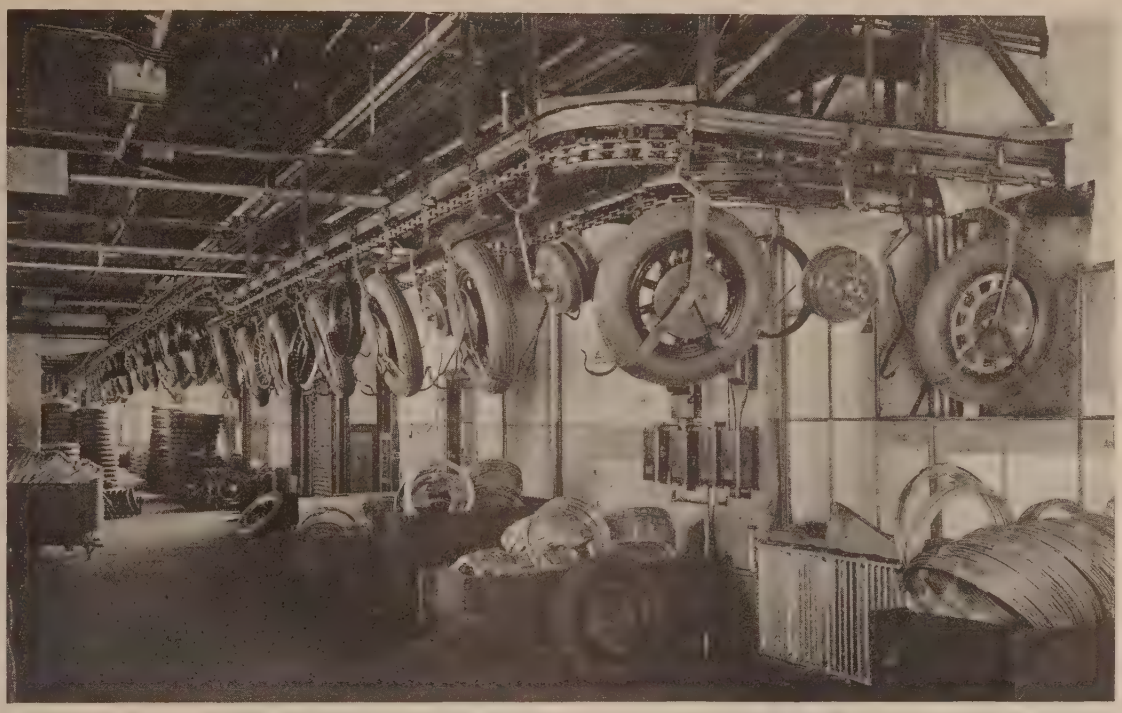
TO Avoid Interfering with Manufacturing Operations, Motors Being Carried by Overhead Chain Conveyor to Main Car Assembly Lines Move From One Floor to Another Along Wall Just Outside Building. Protection against accidental fall is afforded by metal screen running beneath conveyor





MOTORS Are Set Crosswise on Short Slat Conveyor with Flywheel End Overhanging So That Transmission Can Be Assembled (Above). Frames are carried at 15-deg. angle from first to second floor of assembly building on double-chain slat type conveyor (left). Springs and axles are added (below) while frame is in upside down position on slat conveyor with structural uprights 30-in. high





WHEELS Are Carried on Special Racks on Overhead Chain Conveyor to Assembly Line (above). Garnish moldings and instrument boards (below) are delivered to body assembly line by overhead conveyor

engineers have not routed conveyors under machine tools in order to have machining done without removing the cylinder blocks from the conveyors; instead a rope hoist is employed to lift cylinder blocks from conveyors on to machine tools, and in this way delays are avoided when tools are being repaired.

Running at right angles to the cylinder machining lines and connected to them are four roller conveyors on which motors are assembled. It is here that connecting rods, valves, camshafts, pistons and crankshafts are added to the cylinder block. During their progress along the line, motors are upside down for part of the journey, but are righted in a "barrel turnover." For boring the face of the flywheel housing, motors are taken off the conveyor by crane and are set in a specially-designed boring stand.

At the end of the assembly line, motors are placed by crane on a chain conveyor equipped with steel plate carriers, which carry motors at a 30-deg. angle. The framework of this conveyor is narrow so that operators can get at the motors easily. The use of the conveyor has eliminated the necessity of constructing rotating stands for the motors and has proved economical. It is here that the flywheel, clutch, cylinder head, timing gear, timing gear cover, starter, generator, water pump, ignition system, manifolding and carburetor are assembled.

Motors Transferred to Run-In Stands

Motors are transferred from the chain conveyor to run-in stands by crane, where they are cleaned and driven with kerosene, and from there to dynamometer stands for a dynamometer test. From the dynamometer stands motors are picked up by crane and set crosswise on a short slat conveyor with the flywheel end overhanging so that the transmission can be assembled. Transmissions come to the assembly line on an overhead chain conveyor, which crosses all four main motor assembly lines. The slat conveyor runs to the edge of the crane bay, where motors are removed by crane and hung on the motor delivery conveyor, which carries them to the main assembly lines. The transfer work is done while the motor delivery conveyor is in motion.

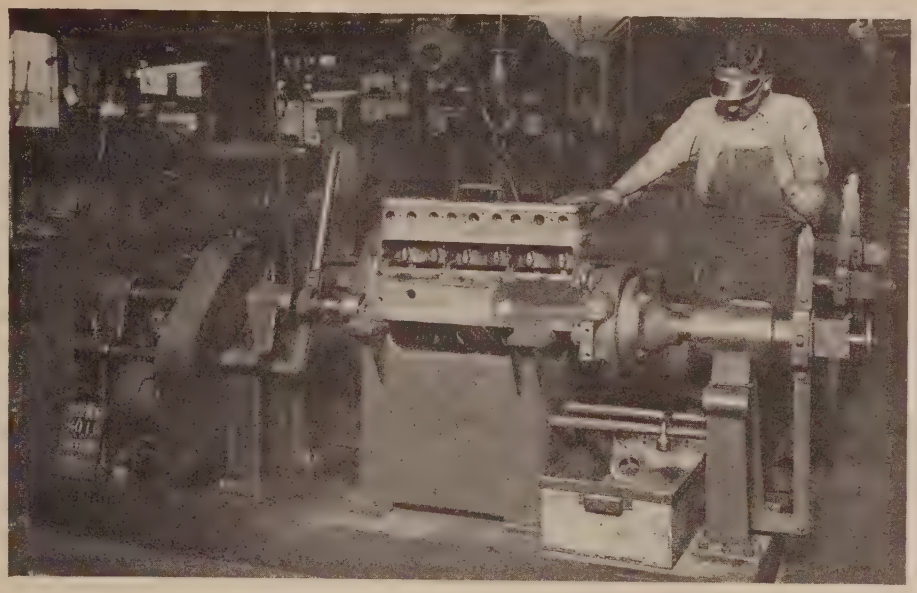
Motors on the delivery conveyor go through a paint spray booth, where they receive a coat of paint, and then begin the journey to the main car assembly lines. During this trip they are routed so as to avoid interfering with manufacturing operations. At some points they move from one floor to another on the overhead conveyor along the wall just outside the building. In such cases protection against accidental fall is afforded by means of a metal screen running beneath the conveyor. This conveyor carries eight-cylinder motors weighing 1200 lb. including transmission, at a speed ranging from 4.16 ft. to 16.6 ft. a min. It is operated by a 5-hp. motor and has a dual mechanical drive.

TO Save Floor Space in Assembly Building, Bodies Are "Nosed" by a Specially Designed Mechanical Device and Are Stored in That Position to Await Movement to Main Assembly Lines

In the piston department, pistons are handled on a roller conveyor which in every respect, except size, resembles a standard roller conveyor. It is just wide enough to accommodate a piston, and its rollers are made of ¾-in. standard pipe. It was designed and built by the company. Crankshafts are delivered from the machining department to the motor assembly lines on an overhead chain conveyor on which they are hung endwise.

All Conveyors Lead to Main Assembly Lines

The main car assembly lines are the central point to which all parts are delivered, and consequently all conveyors used for carrying these parts have the assembly lines as their destination. Front axles are machined on the fourth floor of the machine department building, the work flowing from the west to the east end, while rear axles are machined on the third floor. At the east end



FOR Boring Face of Flywheel Housing, Motors Are Taken Off Conveyor by Crane and Are Set in Special Boring Stand

of the fourth floor, front axles are hung on an overhead conveyor which passes down to the third floor, where rear axles are added. The conveyor then goes through a spray booth and axles receive a prime coat of paint. From the spray booth the conveyor travels down a bridge to the second floor, where it serves the axle storage department, and thence moves to the four final assembly lines.

Tire rims, tires and wheels are handled by overhead chain conveyor from storage through assembly, and finished wheels are carried to the final car assembly lines on another overhead conveyor 840 ft. long moving at a rate of 24 ft. a min. At the end of the lacquer department, finished hoods are hung endwise from the inside of the louver on an overhead chain conveyor and thence are delivered to the proper point along the final car assembly lines.

The conveyor for chassis sheet metal parts, already referred to, transports front and rear fenders, side splash guards, radiator dust pans, gas tank covers and trunk racks from the enameling department or the lacquer department through the storage department on the third floor to the final car assembly lines on the second floor. In the course of its journey it travels in three floors of three buildings. Passage through the storage department makes possible the removal there of rejected parts and the substitution in the blank spaces of new parts taken from storage. If the conveyor is delivering material to the assembly lines too rapidly, parts are taken off in the storage department to await demand.

Frames Assembled on Slat Type Conveyor

On the first floor of the final car assembly building, automobile frames, which are purchased from an outside source, move by hand along a metal table where running board brackets are fastened to the frames. At the end of the table the frames are lifted by an electric hoist on to a conveyor, which carries them at an angle of

PISTONS Are Handled on Roller Conveyor Just Wide Enough to Accommodate a Piston. Rollers are made of ¾-in. standard pipe

15 deg. to the second floor. Here springs and axles are added while the frames are upside down and the conveyor passes through a spray booth where the frames are given a coat of paint. At the end of the conveyor, frames are turned over into an upright position by means of a mechanically-operated hook. The frame conveyor is of the double-chain slat type with structural uprights 30 in. high to carry the frames.

There are four parallel final assembly lines, which are served by conveyors somewhat similar in construction to the frame conveyor. These conveyors have chassis stations between which are steel flights where operators can work. They are designed to accommodate any length chassis having a wheel base ranging from 109 in. to 135 in. It is along these two final assembly lines that the body, wheels, sheet metal parts, bumpers, and other small parts are added. Cars move down the first two lines and back along the third and fourth, actually being carried backward in the latter case. During the last 50 ft. along the third and fourth lines, the motor of the car is started and it is backed under its own power off the conveyor and on to an automatic elevator, which lowers it to the first floor. At the point where cars move under their own power, an overhead exhaust system has been provided to remove fumes.

Cars Move Down "Doll-Up Line"

On the first floor the cars are towed on a "doll-up" conveyor by drag chain, where they are rigidly inspected and polished and where any minor blemishes are removed.

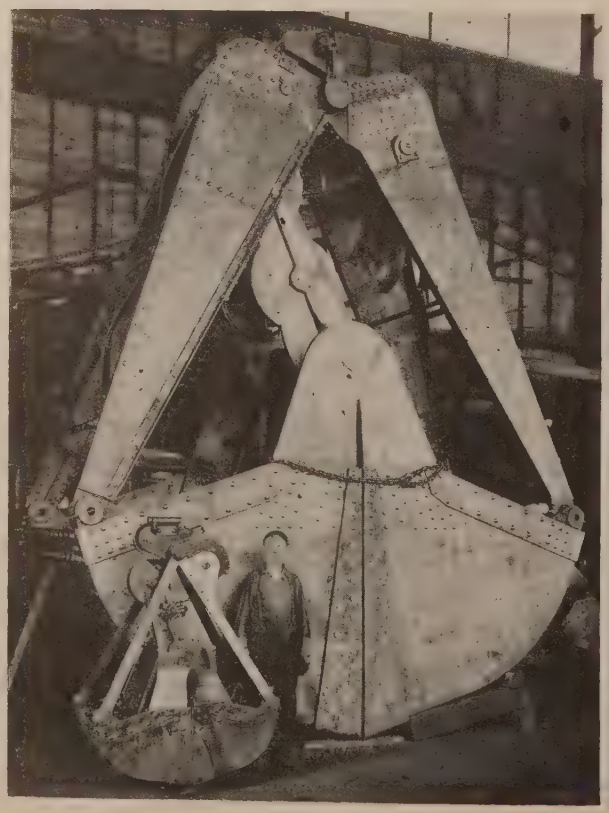
Installation of conveyors has resulted in expanding the use of old buildings and in concentrating manufacturing operations in a floor space in which heretofore it was impossible to produce more than 400 instead of the present 900 cars a day. Moreover, labor costs have been cut down about 15 per cent.

The conveyors on which motors are assembled and then are transported to the final assembly lines were designed and installed by the Jervis B. Webb Co., Detroit. The frame conveyor and the conveyors for the final assembly lines are the products of Mechanical Handling Systems, Inc., Detroit, while the conveyor delivering sheet metal parts from the enameling and lacquer departments to the final assembly lines was built by the Anchor Steel & Engineering Co., Detroit.

Action of Inhibitors in Pickling Solutions

CERTAIN inhibitors reduce the rate of solution of metals in acid solutions. F. N. Speller, metallurgical engineer, National Tube Co., in an address Dec. 28, 1928, before the American Association for the Advancement of Science said that this is due to an increase in the hydrogen overpotential, which is generally assumed to be due to formation of a film of discharged inhibitor substances adsorbed on the cathodic areas. The theory of inhibitor action has been well stated as follows:

When immersed in acid, iron goes into solution at the anode areas, forming ions and discharging hydrogen ions at the cathode areas. These cathode areas may be said to occur principally in the narrow spaces of the grain boundaries in steel, or between the metal and slag in wrought iron. Most inhibitors are either bases, such as quinoline, or positively charged colloids, and when these are present they travel to the cathode areas with the hydrogen. When the positively charged heavy particles are discharged, they cannot escape by gaseous evolution and accordingly are adsorbed on the surface, building up a protective layer.



Clamshell Bucket Takes 10 Tons of Coal at a Time

A CLAMSHELL bucket of 16½-yd. capacity has been shipped by the G. H. Williams Co., Erie, Pa., to the Donner Steel Co., Buffalo. At one grab it picks up 10 gross tons of coal. Alongside it, in the picture, is shown a Williams ⅜-yd. clamshell.

From the bottom of the scoop to the top of the head, the big coal bucket measures 18 ft. 9 in. in height. When it is lowered, open, upon a pile of coal, its scoops have a spread of 19 ft. The area covered by the spreading scoops is 133 sq. ft.

It was designed especially to increase the capacity of a crane already in use on the docks of the Donner Steel Co. The designers are proud of the fact that it weighs only 28,000 lb.

The bucket is of the four-rope type, which gives the operator positive control, even on a high bridge crane, where the bucket must be lowered a considerable distance. The twin-power-arm design serves to prevent cable twisting, and also eliminates "side leads" of closing cable. The closing line sheaves on each of the twin-power arms work always in the one plane, giving a straight-line pull. This is calculated to save wear on sheaves, flanges and bearings, as well as cable.

Assessing Obsolescence of Patterns

Methods of Determining When They Are No Longer Likely to Be Required —Periodic Survey Suggested

PERHAPS the most common procedure has been to cull out obsolete patterns whenever the storage space has become cramped. This method does not provide an efficient solution to the problem. A review of the more effective methods reported by some of the companies cooperating in this survey may be helpful.

Drives to Eliminate Patterns

Falk Corporation has on occasions made periodic drives to eliminate some of its patterns. It found that invariably after this procedure it ran into difficulties, as its customers shortly afterward ordered castings from the patterns which were discarded.

De Laval Steam Turbine Co., on its last drive to eliminate some of its obsolete patterns, destroyed a large pattern. Six months later this pattern was called for and had to be replaced at a cost of $1,500.

National Cash Register Co. disposes of its obsolete patterns, because the company finds that the cost of remaking the few patterns which may be called for later is less than the storage costs would be if all were retained.

One of the plants of Ingersoll-Rand Co. has found it better business occasionally to replace a pattern which has been destroyed than to invest thousands of dollars in storage facilities for patterns that are not moving. The greatest care is exercised before any pattern is destroyed, and it has been found necessary to replace only a few.

Definite Time Interval

Some companies have adopted a definite time interval of inactivity of the pattern before it is to be destroyed. This procedure is rather precarious, although it has proved a satisfactory solution to the problem in individual instances.

E. W. Bliss Co. destroys all patterns which have not been used in five years. The company also gives consideration to the advisability of destroying some which there is reason to believe will not be used again, even though they may not be five years old.

R. D. Nuttall Co. disposes of all patterns not used by it for ten years. Before destroying a pattern, however, the company makes a careful study to ascertain if there is not a possibility of revising it to meet later requirements.

I. P. Morris Corporation recently established the ruling that patterns not used for five years are to be destroyed. On some of the largest of its turbines, on which the pattern cost is relatively small as compared with the ultimate cost of the product, and for which there is not likely to be any demand for duplication or replacement for at least two years, the patterns are destroyed as soon as all castings made therefrom are machined and tested. The firm has found, after a period of six months in which this ruling has been in effect, that there has resulted a reduction in pattern storage area of 75 to 80 per cent.

This is the concluding installment of the article "Obsolete and Inactive Patterns," the first portion of which appeared in THE IRON AGE of July 25, page 215.

Another method is to have the engineering department or the sales department make the final decision as to the disposition of the patterns. Every ten years the Brown & Sharpe Mfg. Co. reviews all of its patterns which have been inactive during that period, and destroys those decided upon after proper consideration by its engineering department.

Builders Iron Foundry examines its patterns at least once a year, at which time it discards all those which are obsolete. In this process, the salesmen are consulted on those patterns in which they may be most interested. The effort is on the side of having too few rather than two many patterns, but in practice the firm has found a good many that do not pay by their use for the space occupied.

Sometimes there are in an organization one or two members fully qualified to take action on the patterns; where such is the case, their decision is final. An example of this may be found in the practice of a large mid-western company which goes over its patterns annually; all obsolete patterns are immediately scrapped. The responsibility for the decision is left to the man in charge of patterns and the assistant to the president, who is thoroughly conversant with the sales and service needs.

Retaining All Patterns

There are instances where, because of the nature of a product or the policy of a company, all patterns are retained, even though they would ordinarily be classed as obsolete. Skinner Engine Co. has found it has to supply repair parts for engines which it built 25 to 30 years ago. It feels, therefore, obliged to keep all its patterns, and no obsolete classification is attempted.

Busch-Sulzer Brothers Diesel Engine Co. maintains patterns for its commercial product as long as the engines are in service. This necessitates extensive pattern storage. But since the longer a machine is in service the more likely replacement parts will become necessary, the company does not believe it is advisable for it to destroy patterns even 25 years old.

Riley Stoker Corporation has been engaged in the stoker business for almost 50 years, and has in that time accumulated a great many patterns. As long as a stoker of the firm's manufacture is in service, it feels duty bound to supply renewal parts whenever required.

Waterbury Tool Co. keeps the patterns of its regular product indefinitely, as do both Murray Iron Works Co. and De La Vergne Machine Co., since they believe it is to their advantage to be able to supply repair parts for their respective machines whenever called upon to do so.

Some firms retain certain classes of patterns, but destroy others, the procedure depending, as before suggested, upon the nature of the product. There are many instances where only specific parts of a unit would under ordinary circumstances need replacement within the life of the unit. In these cases, it would obviously be of no particular advantage to retain and store all the patterns for the complete unit.

United States Radiator Corporation, for instance,

finds it necessary to keep only the patterns of parts of its various products which are subject to wear. Years after a heating boiler is installed in a residence, an owner would resent being put to a heavy expense to replace his entire boiler simply because the manufacturer was unable to furnish a grate bar which had burned out. A grate bar of obsolete pattern, even at what appears to be an exorbitant price per pound, is an economical repair.

Buckwalter Stove Co. has found it good practice to destroy, after a reasonable period of time, all patterns for its stoves with the exception of the fireboxes and the firebox parts. B. F. Sturtevant Company destroys all patterns of any special designs which have not worked out to be salable in any volume. This aids in keeping the pattern storage space free of unproductive patterns.

When a large part of a piece of equipment fails after a number of years of service, the cost of the repair usually approaches closely the cost of a new unit. With a little calculation of obsolescence, a new sale often can be made, and the manufacturer is money ahead to encourage this transaction by making a scrap value allowance for the old unit.

Several Jobbing Foundry Methods

Several methods are pursued by jobbing foundries. One is to keep all customers' patterns until called for. This may work a hardship on the foundry, and often necessitates the foundry's requesting the customer to give permission for the return of certain patterns, which permission may or may not be given. In one such case a foundry, after the first request was unanswered, asked its customer again, this time stating that if the patterns in question were not removed by a specified date, they would be put outside. This method obviously is poor practice. It not only causes the foundry to stand a large share of the burden of storage but also presents possibilities of unpleasantness with customers.

Another method adopted by some foundries is to have an understanding with the customer that all patterns not active will be retained without charge for a definite period of time only. After the expiration of this time, and upon notification by the foundry, storage charges are made to the customer for retaining his pattern. This system is found more equitable for both the foundry and the customer, and precludes the possibility of difficulties which may arise when no time limit is placed upon the storage of customers' patterns.

Reclassification

The practice of the Barber-Colman Co. gives an interesting example of the reclassification system for the handling of obsolete patterns. In its pattern storage the company has reserved certain shelves for obsolete patterns. At intervals of three years these patterns are checked by the engineers interested, who decide which patterns are entirely useless and those that may be needed at some future date for making castings for repairs.

Patterns which are found to be entirely useless are destroyed, and patterns which there may be occasion to use are packed in large boxes and the boxes stored in a space in the warehouse assigned for this purpose. Each box of patterns is given a number and a complete record of its contents is made and kept for reference, so that whenever need for one of these patterns develops, it can readily be located and used, after which it is returned to its box.

George D. Roper Corporation classifies its patterns as (1) Active; (2) Inactive; and (3) Obsolete. The inactive patterns are stored with the active patterns and occupy about twice as much space. They are considered inactive because they are used only for furnishing repairs, and some of them are almost 20 years old. The obsolete patterns are stocked in a separate space and kept for their salvage value. This space occupies about one-fifth the space required for the active patterns.

Fairbanks, Morse & Co. remove their patterns to their service department pattern storage as soon as a product is discontinued. The warehouse is checked two or three times a year, and as many patterns are disposed of as possible.

Card System

A system which has many valuable features is a card index of all patterns. When properly applied, this is reported to be of inestimable value in solving the obsolete pattern problem. Allis-Chalmers Mfg. Co. maintains in its pattern shop a card index of all patterns. On each card it posts the date the pattern is taken out of storage and used in the foundry, as well as the date it is returned to storage. The cards act as a guide to the activity of the patterns, and lists are prepared several times during the year, showing patterns which have not been used during a period of approximately five years. These lists are then forwarded to the various engineering departments for their recommendations as to whether the patterns are to be retained in storage or destroyed.

It does not necessarily follow that any pattern which has not been used during a period of five years is to be destroyed, as the engineers who make the decision may consider the pattern to have sufficient prospective value to justify the expense of continued storage. The period of inactivity, therefore, is not the sole consideration, as the engineers, familiar with all the factors involved, must weigh the going value of the pattern against the cost of storage, as well as the company's obligation to its customers in furnishing repair parts.

Link-Belt Co. also has inaugurated a card system for use in its pattern vaults. The form of card which this company uses is shown in Fig 1. It will be noted that this card carries a full description of the pattern, covers the question as to whether it is wood or metal, and lists all core boxes and loose parts. It also gives data as to the location of the pattern, so that anyone wishing to use the pattern can readily find it by referring to this card. At the bottom of the card is a record which indicates not only the location of the pattern at all times, but also how often the pattern has been used over a given period of time. Thus at the end of any interval, the cards can be reviewed and decisions made as to which patterns to retain, and which ones can be scrapped.

Isbell-Porter Co. maintains a somewhat similar system, using the information contained on the cards in much the same manner as above. The card used by Isbell-Porter Co. is illustrated in Fig. 2.

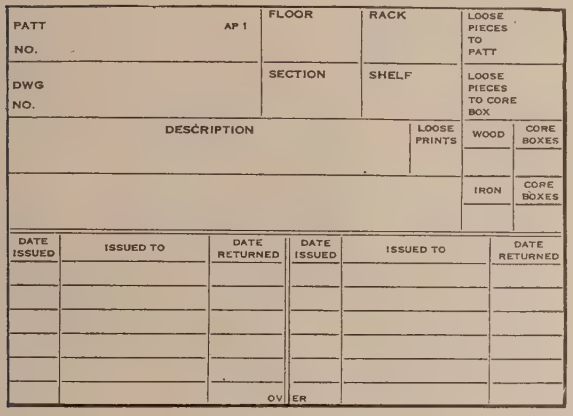
Periodic Survey

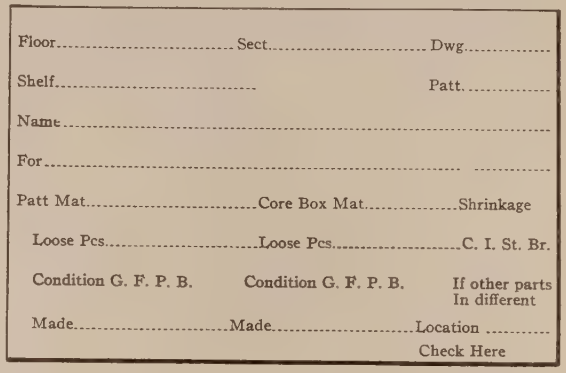
Numerous companies make periodic surveys of their patterns in storage, to determine which are obsolete and can be destroyed. Several methods are in use. One is to review the records of the various patterns to ascertain their activity. This is usually done either by a special representative who is familiar with the patterns, sales and production, or jointly by members of the sales and engineering departments who are fully acquainted with all the factors involved.

National Cash Register Co. makes semi-annual inspections of all its patterns not in actual use, and which have not been used during the previous six months. These are then laid aside, and all patterns for which there has been no call during the year are passed upon by the Inspection Committee. This committee consists of the men in charge of the pattern, foundry, general machine, tool room and tool supply departments. They are familiar with the requirements and are in a position to determine whether the patterns will be used in the future. The pattern is scrapped when the committee so decides.

The procedure followed by Morgan Construction Co. presents an interesting example of the application of this method, used in conjunction with a card system. The company places full responsibility for its pattern policy in its Pattern Committee, which is composed of the general superintendent, chief draftsman, a designer, pattern shop foreman, pattern records and storage man, and the treasurer of the company. The committee meets at least once a month. It takes into consideration three factors in determining the obsolescence of the patterns:

1. Notification by the engineering department of a change in design.
2. Inactivity of a pattern for five years. This is determined by reference to the pattern record cards.





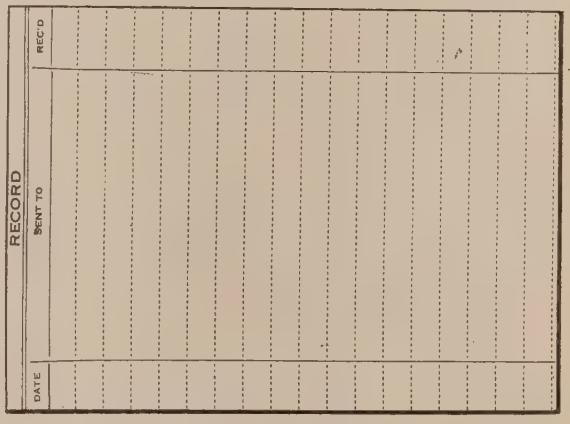


FIG. 1—Link-Belt Co. Card (Above) for Patterns in Storage. The back of the card duplicates the lower half of the front (here shown), thus providing space for recording many instances of use

FIG. 2—Isbell-Porter Co. Uses This Card (at right) to Keep Records of Stored Patterns

3. Notification from pattern storage department of irreparably poor condition of a pattern.

Pattern record cards covering about 200 patterns are reviewed by the Pattern Committee. Notations are made on the cards through the use of two rubber stamps, one reading "Scrapped" and the other "Reviewed." The latter stamp indicates the decision of the committee to withhold scrapping the pattern until a later date. In every case where a pattern comes before the committee for consideration, dating stamp bearing the meeting date is imprinted next to the stamp showing the committee's decision.

Following the meeting, the record cards of patterns which have been declared obsolete by the Pattern Committee are turned over to a secretary, who prepares notices to be sent to all customers who have previously had castings made from the patterns in question. These are sent out with a statement that the patterns have been declared obsolete, and giving the customers an opportunity to purchase spares or castings from the patterns within 30 days after the date of notice. This procedure avoids in large measure the possibility of scrapping a pattern one day, and receiving an order on the following day for a casting from the pattern. Records of the Pattern Committee from 1924 to May 18, 1928, indicate a total of 8959 patterns scrapped during that period.

Rare Metal Columbium Now Available

At the recent Exposition of Chemical Industries in New York, the first metallic columbium made in the United States was exhibited by Dr. C. W. Balke, chemical director of Fansteel Products Co., North Chicago, Ill. Columbium, it will be remembered, is a rare metal similar in many ways to tantalum, which also was first produced in America by Dr. Balke.

Like tantalum, columbium is inert to practically all chemical action, and is soluble only in a mixture of nitric and hydrofluoric acids. In electrolytes the metal is unidirectional. It readily absorbs gases by occlusion, and has been patented as a "getter" in vacuum tubes. Columbium is very ductile and is easily worked cold. It may be rolled, drawn, hammered, formed or cut with ordinary metal-working tools. It welds readily to itself and other metals by the spot welding process. However, the metal must not be subjected to any great amount of heat in atmosphere, or it will become brittle.

Except for about a half-ounce made by Siemens in 1906, the Fansteel exhibit represented, it is asserted, all the metallic columbium in the world. The exhibit consisted of several pounds of the metal in sheets, bars, rods and wire.

There are workable deposits of columbite in the black hills of South Dakota, and the ore is also found in several other places on the North American Continent. In value, the metal is about one-seventh the price of platinum, and about half the price of gold.

Building Machines of Welded Steel

Has Advantages for Equipment Infrequently Ordered, and as Step in Developing New Lines—Cast Construction Economical for Machines Produced in Quantity

BY D. M. LUEHRS*

A GREAT deal has been published in the technical press relating to the substitution of welded-steel for cast-iron and cast-steel construction. Much of the work described, such as shears, concrete mixers, cranes and crane runways, has been of comparatively simple design and has involved very little attempt, even by the designer in cast metals, to produce really pleasing looking as well as highly efficient equipment. The majority of machine designers are perhaps unaware that welded steel can be embodied in the construction of machine tools and still produce a machine of pleasing appearance, eliminating square corners and brackets upon which workmen may accumulate waste, oil cans, etc.

*President, Luehrs Co., designer and builder of automatic machinery, Fostoria, Ohio.

Attempts have been made by some promoters of welding to substitute welded-steel construction wherever cast metal is used. That is an impractical proposition. The company with which the writer is connected has been building machine tools and other machinery of welded steel since 1914 and has had numerous opportunities to determine where welded steel leaves off and cast construction begins.

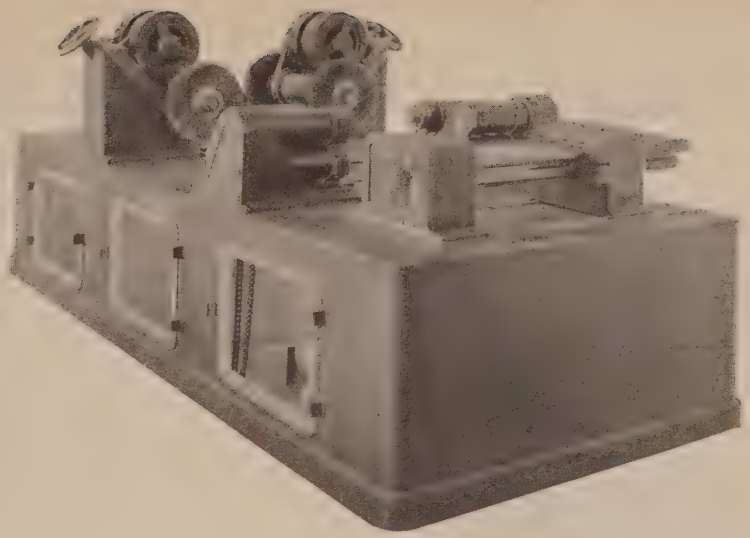
Welded steel construction is ideal for special machines, only one or two of which are to be built. It is also of advantage in building the first standard machine of a new design, or for building standard equipment, especially of large size, for which orders are received only once or twice a year.

In the case of the special machine there is always more or less development work during the entire construction period. Machine designers are not infallible and numerous alterations usually have to be made in the design. It costs practically as much to build a set of

FIG. 1.—Welded Steel Was Used in Building This 8-Ft. Diameter Indexing Table Designed to Carry Jigs for Work Done at Three Different Stations. Production of six pieces a minute is required and so the table must be indexed 18 times a minute. To get the necessary stiffness and sufficient wall thickness, this table, if of cast construction, would be too heavy to index at the speed required without the use of accessory equipment to accelerate and decelerate. Built of welded steel, thoroughly braced and ribbed, and carried by a Timken precision roller bearing, the table can be turned readily with one finger

FIG. 2.—This Special Milling Machine Combines Welded and Cast Construction. The base, hydraulic platen or table, hydraulic vises, hold-downs and milling arbors are of welded steel, but because the same set of patterns could be used for both the right and left-hand head and tailstocks, steel castings were used for those parts. The tailstock castings are electrically welded to the tubular overarms that tie the head and tailstock together

FIG. 3.—(Below) Welded Steel Was Used Economically in This Machine, Especially for the Overarm Supporting the Wire Straightener, the Rack Frame Guides and Gear Boxes. The machine was designed for feeding wire, straightening and cutting it to length and welding it to form the rectangular oven rack for gas ranges. The door frames and doors and the two handwheels shown on the machine are castings



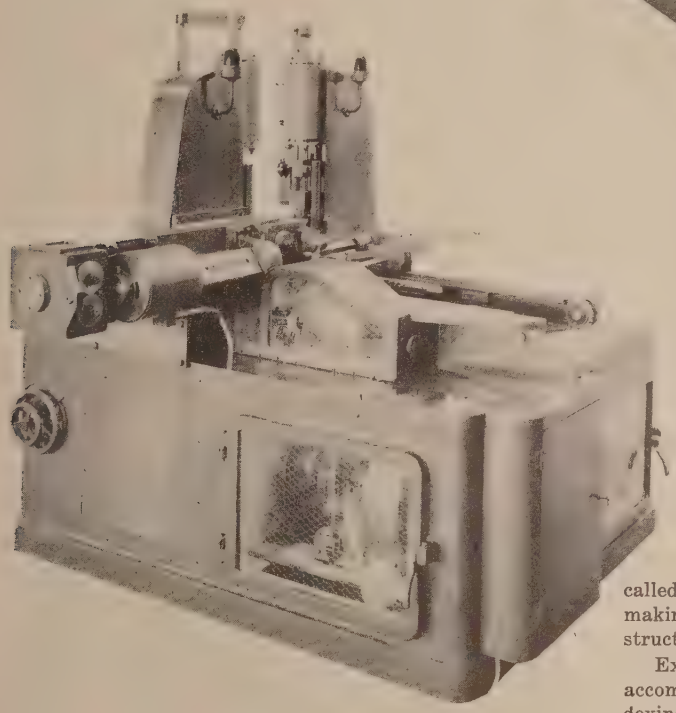


FIG. 4.—(Above) The Welded Steel Base of This Machine, for Finishing Operations on the Gas Range Oven Racks, is 5-Ft. Wide and 12-Ft. Long. Of welded steel also are the gear boxes that support the roll straightener, the housings and parts, and the rotary shear. The two triangular base supports for the wire brushes are identical in design and were therefore made of castings. The door frames being of standard size are of cast steel, welded into holes burned into the steel plates

patterns and core boxes as it does to perform the welding operations on the machine itself. Patterns deteriorate rapidly, require fire-proof storage, and unless another machine is going to be built from the same pattern within six or eight months, patterns can be eliminated with considerable speeding up in production and a reduction in the weight and cost of the material. Other advantages include increased stiffness and strength, smoother finish, requiring less paint, and the elimination of the necessity for "aging" the material.

In developing a standard machine of new design, welded-steel construction offers the same advantages. In addition, it permits the welding on of brackets and pads and the making of changes without scrapping and remaking the patterns and castings. Having completed the development work and having determined just how the proposed machine will function, it is, of course, more economical to put the machine into patterns and get the castings in the regular way. Modern heat-treating largely takes care of the aging problem.

When a large machine tool is to be built only two or three times a year, deterioration and repairs to patterns become quite costly. Large castings are relatively hard to handle and of necessity must be thicker, hence heavier and more costly, in order to obtain the same strength as with the steel construction. With very large equipment of this class, changes in design are frequently called for to fit the machine to particular requirements making it necessary to add considerable pattern construction to the job.

Examples of welded-steel construction are shown in the accompanying illustrations. Fig. 1 is an 8-ft. diameter indexing table; Fig. 2, a special milling machine representing a combination of cast and welded-construction; and Fig. 3 is a machine for feeding wire, straightening and cutting it to length and finally welding it into a rectangular gas range oven rack. Fig 4 is a machine for finishing operations on the gas stove oven-racks. The captions for these illustrations give further data on each machine.

In building these machine bases, the plates are planed and scarfed on a plate planer. The molding around the base is also planed and one edge rounded, on the plate planer. All welds are caulked immediately after welding to remove any strains that may be set up by the welding heat. We find no difficulty in obtaining welds free from porosity, and have never had a weld fail.

Proper equipment, proper welding wire and a high-grade experienced welder are the prime essentials to success in obtaining good welded steel construction.

A directory of mine operators and statistical data pertaining to shipments of iron ore are contained in a booklet published by the Lake Superior Iron Ore Association, Cleveland. Included in the data are annual shipments from each mine in the period 1909-1928 inclusive, annual receipts at lake ports, ore on dock at Lake Erie ports, annual shipments from other than Lake Superior mines and annual imports by countries.

New Low-Sulphur Iron for Ingot Molds

Effort to Avoid Cracking of Molds from Sudden Expansion and Slower Contraction—Oxides Blamed for Permanent Growth

DEVELOPMENT of an ingot mold iron to resist, as much as possible, the failure of molds through heat checking and cracking has been the purpose of the Vulcan Mold & Iron Co., Latrobe, Pa., in bringing out a new metal which is designated as Vulc-Iron. Specializing particularly in the ingot mold requirements of tool, alloy and other high-grade steel producers, the company has used cupola-melted, rather than direct-metal, iron in casting its molds, to obtain a smooth surface and also to minimize cracking from the wide temperature fluctuations during the early life of the mold.

Development of Vulc-Iron is the culmination of several years of experimenting to determine the cause of heat-checking in ingot molds, and the entire output of the company is now being made of this metal.

Causes of Heat-Checking

Cast iron, as is now generally known, is made up of steel matrices interspersed with graphite flakes. During the heating and cooling that an ingot mold undergoes in service, the cast iron expands and contracts according to the heat laws. As the coefficient of expansion of the steel matrix is higher than that of the graphite, the steel expands more rapidly, leaving a cavity around each graphite flake. Near the surface of the mold these cavities will permit oxygen and other gases to penetrate and oxidation takes place at or near the surface of the mold.

Photomicrographs clearly show evidence of oxides surrounding the graphite flakes. These oxides, being of greater volume than the elements oxidized, partially fill the cavity formed during the expansion that takes place when the hot metal is poured into the mold; when the mold cools and contraction occurs, the metal cannot shrink back to the original volume. A permanent growth of the iron is recorded, this apparently being the cause of a large percentage of the failures in molds.

Controls Size and Distribution of Graphite

Checking of this growth of the ingot mold metal during cooling has been attempted in Vulc-Iron by reducing the number of graphite flakes in the iron and by making them smaller and more rounded in form. This would also bring about a lessening of the distance between the graphite flakes and reduce the penetration of oxygen by stopping the open paths used by the gases.

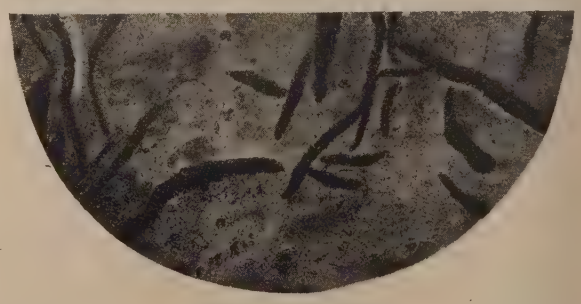
Accompanying photomicrographs show the difference in structure between Vulc-Iron and ordinary cupola cast iron. Tests of molds in service have shown the growth-resisting qualities of the former and the consequent reduced fire cracking.

High percentages of sulphur in cast iron tend to increase its brittleness and lead to cracking at both high and low temperatures. Hence, Vulc-Iron is treated to reduce its sulphur content. It averages 0.035 per cent sulphur, and is guaranteed under 0.05 per cent sulphur. Only Bessemer iron is used in the cupola, with a percentage of low-phosphorous steel scrap and of cast iron scrap, the latter entirely of the company's old molds, returned for this purpose. Washed coke is burned in the cupola and desulphurizer is used freely.

Improved Service Demonstrated

Tests of the molds in plants show an average improvement in service of about 25 per cent over regular or direct metal ingot mold iron. In a number of cases it has been found practical to reduce the wall thicknesses of molds by the use of this metal, without allowing them to fail by breaking or cracking. As a good many molds in use today have a greater wall thickness than is necessary to produce the required amount of chill on the ingots, the excess thickness being required to prevent cracking or breaking, efforts are being made to develop the po-

DIFFERENCE in Structure of Vulc-Iron (upper) and Ordinary Cupola Cast Iron (lower) Is Shown in the Photomicrographs, Magnified 100 Times. In the Vulc-Iron, the graphite flakes are greatly reduced in size, providing a much finer granular structure



tentialities of Vulc-Iron to the fullest extent in this direction.

It is believed also that this metal may provide sufficient strength in the mold wall to resist cracking without a redesigning of molds in cases when molds are not strong enough to withstand the sudden expansion occasioned by the pouring of the steel.

New All-Metal Construction Principle

Portable Buildings Put Together With Special Key Device—Some Electric Welding Done

BY R. A. DADISMAN*

IN the wake of the all-metal house movement comes a new development in portable all-metal building construction, conceived and designed for the White Castle System, Inc., Wichita, Kan., by Lloyd W. Ray of their construction department. This suggests the possible application of the idea to other types of commercial and industrial buildings.

No rivets are used in the construction of the supporting structure or the inside or outside surface joints, and yet the building can be knocked down and reassembled in a few days, with no tools except a pair of pliers, a wrench and a screw driver. The entire structure with interior fixtures in place weighs about 8000 lb.

The White Castles are fireproof, are protected inside and out from deteriorating weather conditions, and can be initially built for about one-fourth less cost than the glazed brick buildings formerly used by this company. So versatile is this new type of construction that the building will fit a variety of corner sites. This is because the doorways and doors are interchangeable, so that the door may be placed at the end or the side, and it can swing open to the right or left, without any change in specifications.

For several years the White Castle System had been searching for a movable, attractive and sturdy type of all-metal construction which would replace the brick structures in use for the company's chain of stands. The only thing to be had was constructed in the traditional manner, riveted together, so that it was practically impossible to move it economically. And there were exposed rivet and bolt heads, and it could not take the attractive finish so much desired. The key to the problem was really a mechanical key—a locking device which eliminated the use of rivets or bolts, and was completely hidden from view. And yet it bound together the proposed all-metal building as solidly as the best hammered rivet might have done.

Since there were no dies in existence for making the steel studding to meet the specifications, the entire job had to be done from the ground up. In Fig. 1, showing the assembled superstructure, the eight sections composing this framework are indicated by vertical lines on both the lower and the upper track. Each corner is a section, with an intermediate section in the front, at the rear, and at each end. Each section is built up by welding the studding into the upper and lower track. Only two sizes of steel studding are used.

Frames for windows, doors and transoms are bolted in and easily removable, so as to fit the specific needs of the ultimate location of the building. The only wood used is a "breaker" of wood strips on the inside of the studding. This serves as an insulator between the two sheetings, eliminating actual metal contact between exterior and interior of the building, further insulating against the weather and preventing the possibility of "sweating."

How the interior and exterior porcelain-enameled Armco ingot iron sheets are secured without the use of

*American Rolling Mill Co., Middletown, Ohio.

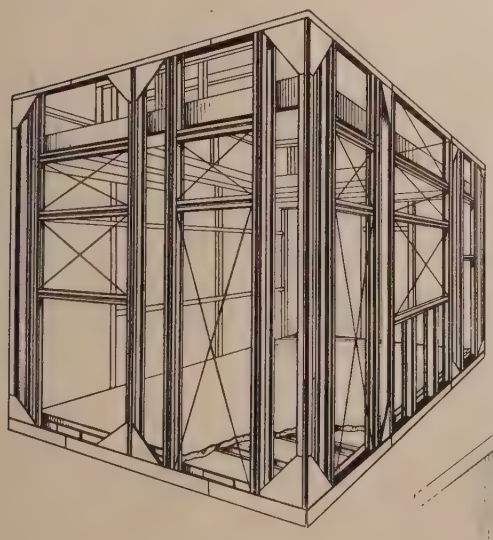


FIG. 1

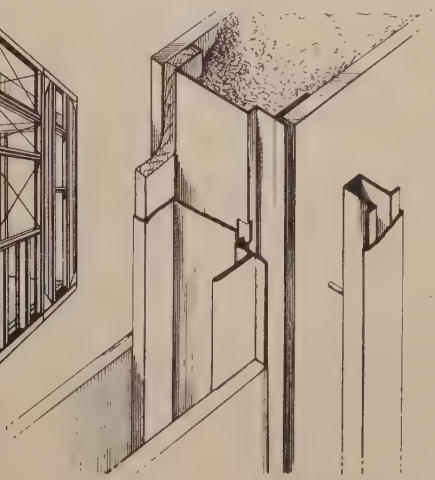


FIG. 2

FIG. 3

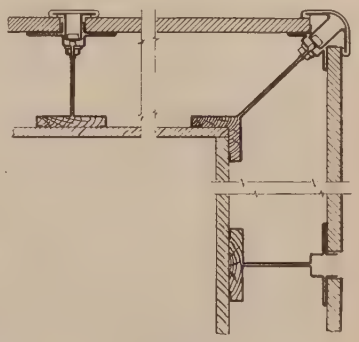


FIG. 4

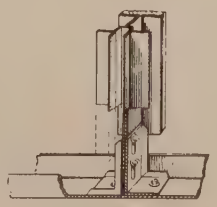


FIG. 5

rivets, bolts or other methods commonly used in metal construction is shown in the cross-section view of studding, Fig. 2. Exterior sheets are secured to the studding by a locking key as shown at right in Fig. 2. The key cover, built to fit snugly over the flanges of the key, is also porcelain enameled, leaving the exterior of the building without any evidence of the manner of fastening the sheets to the framework.

Interior sheets are cut so that they meet at the wood strips inserted in the studding, and are secured by screws directly into the wood. Joints between sheets are then covered with a nickel molding strip, also screwed into the wood. Insulation in the 4-in. space between exterior and interior walls, shown in Fig. 2, is asbestos rock wool.

Final assembly of all these units of construction is shown in the cross section view, Fig. 3. How the key appears when set in place is shown in the upper left and at the corner section in this drawing. Fig. 4 shows the method of securing the movable and interchangeable framework for doors, windows and transoms.

Ascendency of Alloy Iron Castings

Automobile Companies the Largest Users—Great Deal Made from Mayari Pig Iron—Output in 1928 Over 700,000 Tons

BY EDWIN F. CONE

IN a survey of the alloy iron casting industry of the United States, entitled "Ascendency of Alloy Iron Castings," published in THE IRON AGE, March 28, pages 861 to 863 and 924, it was promised that a brief supplementary article would be published later because further returns from the questionnaire were expected. In the following paragraphs some pertinent facts, not ascertained up to the time the earlier data were analyzed, have been furnished by a few other producers of alloy gray iron castings.

The original questionnaire had been sent to 3813 foundries. At the time that article was written, replies had been received from about 1900 producers, or nearly one-half of all of them. Since then the number has expanded to 1988. It is assumed that practically none of the 1825 silent foundries make alloy gray iron.

Large Tonnage Used by Automobiles

An interesting feature of the use of alloy gray iron castings is their application to automobiles. Nearly 30 leading automobile makers were canvassed and of these 22 were heard from directly. Fifteen manufacturers do not make their own iron castings. One automobile maker who uses nickel-chromium cylinder heads and other castings on a large scale did not reply. Estimating that company's production and adding it to the output of the companies which gave their production, there was produced in 1928, by automobile companies having their own foundries, approximately 200,000 tons of alloy gray iron castings, containing either nickel alone or nickel and chromium. The large part of this total was made by the use of Mayari pig iron. It is of interest to note that one maker of a leading high-priced automobile made over 14,000 tons of semi-steel castings, principally cylinder blocks and cylinder heads.

Another large outlet for alloy iron castings is in the form of rolls for various types of rolling mills. Replies from seven companies producing such rolls containing nickel, chromium or molybdenum, or combinations of these, indicate that about 15,000 tons was made in 1928 by these companies.

Wide Use of Mayari Pig Iron

Due to some misunderstanding of the original questionnaire, a large number of makers of nickel-chromium castings did not report the sources of the nickel and chromium. It develops that a larger proportion of this grade of iron castings is made by the use of Mayari pig iron than was at first suspected. According to data furnished by the Bethlehem Steel Corporation, approximately 600,000 tons of gray iron castings were made from Mayari pig iron sold by that company in 1928, the castings containing widely varying percentages of nickel and chromium and the uses to which they are put being also very much diversified.

In this connection attention is called to the fact that the use of nickel in cast iron was suggested as early as 1858 by Sir William Fairbairn. Its essential benefits to gray iron were described by Guillet in 1907. No industrial development, however, took place based upon the experiments of these two pioneers, on account of the high cost.

Early in 1912 the Pennsylvania Steel Co. experimented with a Cuban ore and made a number of tests of iron containing varying amounts of nickel and chromium. In the same year the Reading Iron Co., Reading, Pa., purchased some Mayari pig iron for pipe balls. Attention was attracted to the wear-resisting properties of these balls. Other tests were made by S. Jarvis Adams, and in 1913 J. Ramsay Spear was granted a patent covering the use of these alloys. Mayari pig iron was coming into use in the making of rolls for steel mills at that time.

Purchase of the Pennsylvania Steel Co. by the Bethlehem Steel Co., in July, 1916, placed the Mayari properties in the latter's possession. The Bethlehem company began actively to develop this special grade of pig iron into a commercial product. Up to that time only six or seven firms were using it and only in the low-silicon grades for wear-resisting uses; it was during the post-war depression, or from 1919 to 1921, before the commercial application of nickel was advised for use in gray iron castings. Mayari pig iron, by this time, it is stated, had been used by many foundries interested in improving their product, but development was slow until the motor car makers began to use it in quantities in an effort to produce better cylinder blocks. Today, as the above survey indicates, this iron is used by a large number of American automobile manufacturers, and also by European car makers.

Opinions of Foundrymen

Supplementing some of the views of various foundries, given in the original article, the following are important:

One company in the East states that in 1928 it made a large tonnage of vanadium iron castings, for "use in machinery in places where superior tensile strength is required and where a casting has to withstand friction, such

as cams, etc., and for extrusion, tool and die purposes, where it is essential that the metal will not run nor score. Castings are heat treated in such cases where they must be a little softer than in the natural condition."

A large railroad, which has its own foundry, says that its output of over 1150 tons last year was made with a mixture of two grades of pig iron, two grades of scrap iron, four grades of scrap steel, ferromanganese and No. 44 nickel alloy. "Fifty per cent of this tonnage was a high-grade alloyed iron for locomotive cylinders, cylinder bushings, cylinder packings, valve bushings, valve packings, piston heads, valve rings, piston bull rings, and other locomotive parts."

A large foundry and machine company reports that last year it made about 200 tons per month of molybdenum and other alloy iron rolls.

Significant information comes from a producer, on a large scale, of corrosion-resisting cast iron pipe and sections made from nickel-chromium alloy iron, meaning evidently Mayari pig iron. The metal was produced in two cupolas, one of the conventional design and the other fired by powdered coal, the iron being superheated in both units.

A maker of one of the leading high-grade automobiles estimates that he produced, last year, about 5000 tons of cylinder block castings containing from 1.25 to 1.50 per cent nickel, about 1000 tons of pistons containing 1 per cent nickel, and one or two smaller jobs of about 500 tons, in which 1 per cent nickel was used.

A Western company, which produces agricultural implements, offers the following testimony: "We have just recently been experimenting with the use of nickel and chromium in our iron castings. We have not progressed far enough to give any definite information, other than that we receive fairly good results with the use of these two alloys in castings for cylinder heads and gears."

From a company located in the Eastern States, the following experience in making and testing alloy gray iron castings is reported:

From two test pieces that were made in our foundry, using alloys, the piece tested was cast as a riser on a casting. The first castings weighed approximately 500 lb. and were rather chunky. They were cast from a mixture consisting of 20 per cent foundry pig iron (silicon 2.01 per cent), 40 per cent cast scrap and sprues and 40 per cent steel scrap. The analysis was:

Total carbon	3.45	per cent
Phosphorus	0.396	per cent
Manganese	0.58	per cent
Sulphur	0.116	per cent
Silicon	1.43	per cent
Nickel	0.81	per cent
Chromium	0.14	per cent

Nickel and chromium used in ladle.
Tensile strength 36,500 lb. per sq. in.

The second castings weighed approximately 1500 lb. each and were complicated with a lot of cores and sections from ½ in. up to 1¾ in. thick. They were cast from a mixture consisting of 37 per cent foundry pig iron, 3 per cent Mayari pig iron, 50 per cent cast scrap and sprues, and 10 per cent steel scrap; 1 per cent nickel was added in ladle. The analysis was:

Total carbon	2.80	per cent
Phosphorus	0.176	per cent
Manganese	0.62	per cent
Sulphur	0.14	per cent
Silicon	1.40	per cent
Nickel	1.36	per cent
Chromium	0.09	per cent

Tensile strength, 33,800 lb. per sq. in.
Brinell hardness, 90.

This last casting was a lathe bed. The report from the machine shop was that it machined a little hard but always showed up fine.

A revision of the table of output of alloy iron castings, by States, published in the original article, accompanies this article. It shows that reports from 39 States indicated an output in 1928 of about 299,500 gross tons. Added to this an estimated tonnage of 400,000 tons from companies not heard from, and based mainly on the known uses of Mayari pig iron by a diversified number of companies, the total alloy iron output in 1928 was approximately 700,000 tons.

Output of Alloy Gray Iron Castings by States in Tons in 1928

Alabama	1,919	Nebraska	300
California	590	New Jersey	5,171
Colorado	22	New York	5,275
Connecticut	3,410	Ohio	9,283
Delaware	7,500	Oklahoma	150
Florida	2	Oregon	249
Georgia	788	Pennsylvania	36,305
Illinois	7,848	Rhode Island	300
Indiana	19,673	South Carolina	35
Iowa	3,840	South Dakota	5
Kansas	2,500	Tennessee	100
Kentucky	85	Texas	295
Louisiana	20	Utah	70
Maine	78	Vermont	1,200
Maryland	50	Virginia	5
Massachusetts	10,266	West Virginia	1,927
Michigan	158,120	Washington	706
Minnesota	6,575	Wisconsin	9,196
Missouri	1,250		
Montana	4,401	Total	299,509

Total Alloy Iron Output in 1928, 700,000

Large Assortments of Bolts and Nuts Make Warehousing a Difficult Problem

BECAUSE of the multiplicity of sizes and types which must be carried in stock, the warehousing of bolts and nuts is one of the most difficult problems for the manufacturer of these products. At the Lebanon, Pa., plant of the Bethlehem Steel Co., for example, about 12,000 tons of these products and 3000 different items are nearly always carried in stock. These bolts and nuts are stored in bins of varying sizes, some holding as much as 80,000 lb. each. Kegs of bolts and nuts are packed through openings in the bottoms of these bins. Skilled workers assemble as many as 1100 kegs a day, based on standard size No. 12½ keg, which means the handling of more than 15,000 pieces a day. The orderly and convenient arrangement of the Bethlehem bolt and nut warehouse is shown by the illustration of one bay of a building 200 x 675 ft. used for bolts and nuts only.

Hot-Metal Ladle of Spherical Shape

Many Advantages Claimed for New Type of Container—Greater Capacity Without Excessive Weight

REDUCTION to a minimum of radiating surface in a hot-metal ladle is accomplished in a 70-ton spherical-shaped ladle which has been developed by F. F. Kling, chief engineer, Youngstown works, Carnegie Steel Co. It is now being successfully used at that plant in transferring hot metal from the blast furnaces to the mixers. A number of these ladles are being introduced at the Mingo, Ohio, works of the Carnegie company also and others are being built by William B. Pollock Co., Youngstown, for a Canadian steel company.

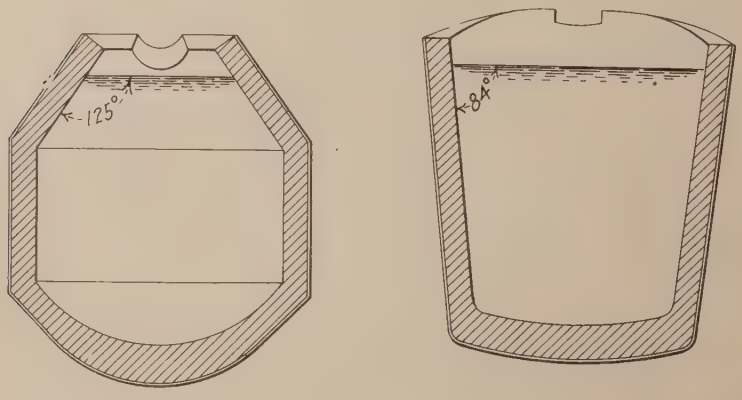
As shown in the illustration, the shape of the ladle represents a decided departure from the usual type, and the center of gravity of the metal is low. Splashing in transit is practically eliminated. The ladle is of strong construction and comparatively light in weight. It can be lifted from the car in pouring, or can be poured directly from the car, and a transfer ladle is unnecessary in pouring the hot metal into the mixer.

Ladle trunnion bushings rotate on the self-lubricating brass sleeves, thus preventing wear on the trunnions, as well as on the crane hooks. Self-lubricating bushings have been provided also on the pin which the auxiliary hook of the crane, or the hook of the pig casting machine hoist, engages when turning the ladle over.

The ladle car is of substantial construction and, because of its shortness in proportion to capacity, requires little track space. The car frames which tie the trucks together are made of 6-in. x 15-in. rolled steel slabs of high tensile strength. Self-lubricating brass washers are used on top of the centerplates of the truck bolsters, reducing wear at this point and enabling the trucks to turn easily when going around curves. The cars are equipped with draft gears and, as a safety measure, heavy safety chains backed up by springs are provided.

The Kling ladle and car may be used satisfactorily on 85-lb. rails, and trestles of usual design are strong enough to support it. Removing kish is accomplished by dumping into a box or cinder pot immediately after the iron has been poured into the mixer; it does not have to be scraped out of ladle. New lining may be put in without the use of arch supports.

In comparison with the old 20-ton ladle, the Kling type keeps the metal hot longer, and runner scrap and used ingot molds can be melted in the ladle. With hotter iron the mixers do not skull, and considerably more scrap can be used in the converters. Skull in the ladle is practically eliminated, with the exception of a small growth of kish in the spout, which is removed twice a week. Fewer men are required in the cast houses and ladle house with the larger ladle, and men are saved in cleaning ladles.



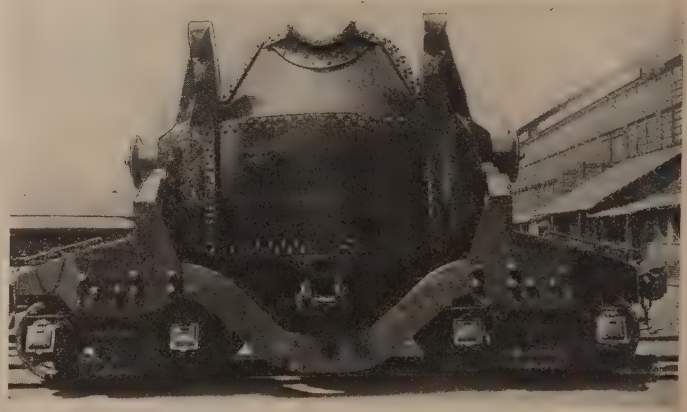
SECTION of the Kling Ladle, Compared with a Ladle of Conventional Design and Same Capacity, Shows Reduction in Exposed Surface of Metal

Range Boilers and Expansion Tanks

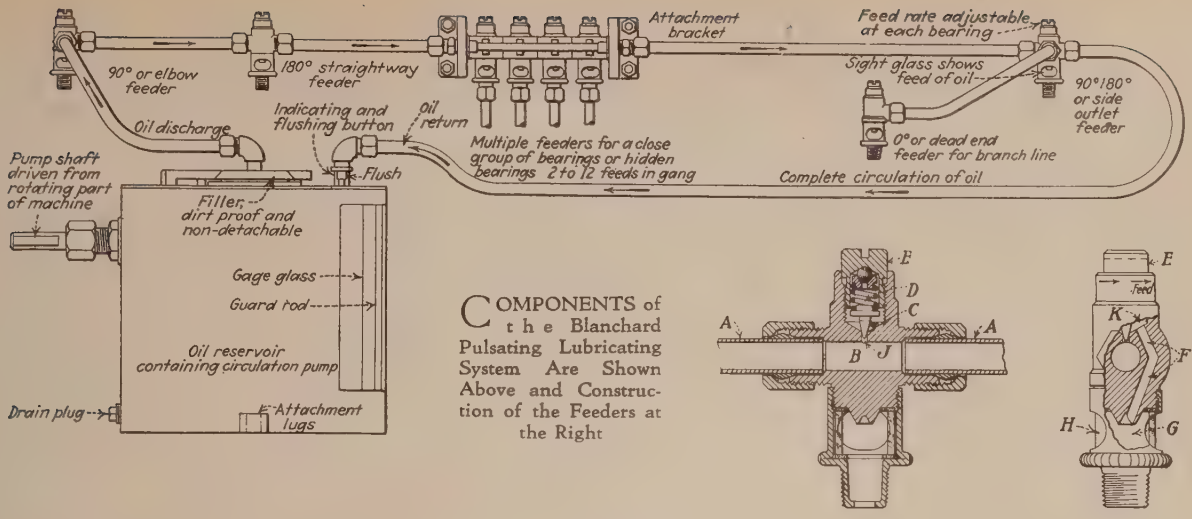
Simplified Practice Recommendation R8-29 relates to range boilers and expansion tanks. This has been put out by the United States Bureau of Standards. It covers 13 sizes of range boilers and six sizes of expansion tanks. The pamphlet describing it gives some details as to both together with illustrations. Copies may be obtained for 10c. from the Government Printing Office, Washington.

Wrought Iron Pipe Nipples

Commercial Standard CS 6-29, covering wrought iron pipe nipples, has been promulgated by the United States Bureau of Standards. It gives tables of the standards adopted for different sizes of pipe, and different weights, including stock lengths and taper thread dimensions. The pamphlet, which may be obtained for 10c. from the Superintendent of Documents, Government Printing Office, Washington, gives details also as to the membership of the conference at which the standards were tentatively adopted.



SHORTNESS for Its Capacity Features This Ladle Car. The tilted ladle (unlined) well shows its shape and other characteristics


Attachment bracket
Feed rate adjustable at each bearing
90° or elbow feeder
180° straightway feeder
Sight glass shows feed of oil
90°180° or side outlet feeder
Oil discharge
Indicating and flushing button
Oil return
Multiple feeders for a close group of bearings or hidden bearings 2 to 12 feeds in gang
0° or dead end feeder for branch line
Pump shaft driven from rotating part of machine
Flush
Complete circulation of oil
Filler, dirt proof and non-detachable
Gage glass
Guard rod
Oil reservoir containing circulation pump
Drain plug
Attachment lugs

COMPONENTS of the Blanchard Pulsating Lubricating System Are Shown Above and Construction of the Feeders at the Right

Lubricating System Provides Wide Range of Feed Rates

FROM five to 100 feeders may be supplied automatically with clean oil in individually predetermined amounts by means of the Blanchard pulsating lubricating system illustrated, which is manufactured by the Rivett Lathe & Grinder Corporation, Boston. In addition to flexibility, simplicity and economy are claimed for this centralized oiling system.

An oil reservoir, pump, pressure control valve, single circuit pipe line and feeders, single or in gang, at each bearing comprise the system. Oil is pumped constantly through the circuit at a pressure of about 10 lb. for 95 per cent of the cycle and at 50 to 60 lb. during the remainder of the cycle. This intermittent stepping-up of pressure, through the pressure control valve, serves to lift the needle of each feeder from its seat and admit oil to the bearings. The feeders are spring loaded and may be adjusted over a wide range to permit a feed as low as two or three drops an hour and as high as a small stream at each pulsation. Visible indication of the working of the entire system is provided through the pulsating action of a flush plunger located on the reservoir and a sight glass on each feeder. Oil supply in the reservoir is indicated by a gage glass.

Pumping of oil begins and stops with the machine and the rate of delivery is proportional to the speed of the machine. When unusually cold starting conditions are encountered, the system may be flushed by pressing down the flush plunger on the reservoir. Light or heavy oil of suitable grades may be used. After the initial adjustments of the feeders, the system requires no further attention other than replenishing the reservoir, which holds 3 qt.

The oil reservoir contains the pump and pressure control valve, and may be mounted on the machine or near it, with the pump shaft belted or geared to any rotating member. It is equipped with a permanently attached filler cap, a screened filler opening and a drain plug at the bottom. The pump is a double-plunger unit with piston valves and can be driven in either direction, or reversing. Neither ball nor check valves are employed. The oil intake to the pump is equipped with an accessible fine-mesh screen, providing double filtering of the oil. The pressure control valve is of rotating-plate type and is driven by worm and gear from the pump shaft. Connected with the moving part of this valve and located above the cover of the reservoir is the flush button, which, in making a jump at each pressure pulsation, gives visible indication of the working of the system.

The individual feeders provided at each lubricating point are made in a variety of external forms to facilitate application and piping arrangements. From the line sketch it will be seen that the passage *B* through the feeder is part of the oil circulation line *A A*. The oil flows through *B* under low pressure except when pulsation occurs, when the momentary kick, acting through the passage *J*, lifts the needle *C* from its seat against the adjustable loading of spring *D*, and admits a particle of oil. When the pulsation ceases the needle instantly reseats.

Oil thus taken from the circulation line collects in the chamber *K*, flows down through the passage *F* and drips off the nozzle *G*, the flow being visible through the glass at *H*. Adjustment of the oil supply to the bearing is made through screw *E*, which when turned to the left increases the rate of feed, and when turned to the right, decreases it.

The jump of the needle overcomes any tendency of the oil to film over the feed opening. This opening is located above the circulation line to obviate entrance of foreign matter; the grit or dirt falls back into the line and is carried by the oil stream to the reservoir to be filtered out.

High-Speed Rotor Grinder for Die and Pattern Work

A DIE grinder that is claimed to develop more than ½ hp. at 13,000 r.p.m., which power and speed adapt the machine for smooth clean work with small wheels and points, is being placed on the market by the Rotor Air Tool Co., Cleveland.

The tool is designed to use 1½-in. vitrified wheels, 2½-in. high-speed wheels and ½-in. pencils. It was developed for grinding dies, metal patterns and for use in brass, bronze and aluminum foundries for finish grinding of castings and for scroll work on ornamental pieces. The machine is of simple design and light in weight. A wheel arbor for wheels having a ⅝-in. hole, ⅝ in. wide, is regularly furnished, but arbors for ¼ and ½-in. holes are available as extras. Accessory equipment includes a collet for holding a ¼-in. shank for mounting small wheels and for holding pencil sticks. The same collet may be used for holding a variety of points for special work.

More Than ½ Hp. Is Developed at 13,000 R.P.M.

Trade Rules for Scrap Industry Approved

Federal Commission Accepts Code With Minor Changes —Scrap Institute Sets Up Bureau to Aid in Enforcing Rules

WASHINGTON, July 30. — Rules of conduct for the scrap iron and steel industry were officially promulgated by the Federal Trade Commission last Friday. They are the outgrowth of rules adopted at a conference held at Pittsburgh on May 23 under the direction of Commissioner Garland S. Ferguson, Jr., assisted by M. Markham Flannery, director of trade practice conferences. Except for the omission of the resolution governing compliance with the rules, one minor amendment and rearrangement of the rules into Groups I and II, those announced by the commission appear in the same form as those adopted by the industry and published in THE IRON AGE of May 30, pages 1497-98. The eliminated resolution provided that all violations of the rules be referred "in the first instance to the Institute of Scrap Iron and Steel, Inc., for investigation and adjustment." The amendment directed by the commission substituted the word "misleading" for the word "indefinite" preceding the word "language" in the rule relating to price quotations.

Group I rules are those affirmatively approved by the commission, while Group II rules are accepted by the commission as expressions of the trade. In Group I the commission has included six rules, covering "top dressing" of cars, defamation of competitors, price quotations, interference with contracts, commercial bribery and fictitious bills of lading. Group II also includes six rules, which concern overbilling of cars, arbitration, cost accounting, overweights, failure to fulfill orders and continuance of conference.

A Trade Relations Bureau has been set up in the Institute of Scrap Iron and Steel, Inc., to investigate complaints and assist in the enforcement of the code of business practices, Benjamin Schwartz, director general of the institute, announced following the action of the Federal Trade Commission. It is planned to have special chapter committees appointed to investigate complaints, in the first instance, in the territories covered by the 12 chapters of the institute. The Trade Relations Bureau will receive reports, will conduct supplementary investigations, if necessary, and will make recommendations as to the disposition of each case. The following statement was issued by the Trade Relations Bureau, with the approval of Mr. Schwartz:

The date on which these resolutions become effective is July 26, on which the commission published its official report. The grouping of the resolutions in two groups is a technical proceeding, and does not affect the merits or the effectiveness of the resolutions. The resolutions that are approved by the commission are binding on the entire industry, whether members sign them or not. It is, however, understood that the Federal Trade Commission requests the business men of an industry to sign the resolutions, as a means of ascertaining who will cooperate with the commission.

The single resolution that was disapproved by the commission does not concern a trade practice, but deals with the matter of enforcement. In view of the policy of the Federal Trade Commission to look to an industry for the enforcement of its own code, a resolution to that effect does not require approval by the commission. In line with this policy, a Trade Relations Bureau has been established by the institute.

The following resolution was adopted by the executive committee of the institute at its last meeting:

Whereas, compliance with these rules is essentially a matter for the industry, itself, and whereas, it is desirable that outside agencies of enforcement should be used as a last resort and that violations be adjusted expeditiously and without notoriety within the industry, therefore be it resolved: that it is the sense of this conference that all violations of these rules be referred in the first instance to the Institute of Scrap Iron and Steel, Inc., for investigation and adjustment.

The Trade Relations Committee is composed of the following: Charles Dreifus, Pittsburgh, chairman; Charles Bock, Buffalo, co-chairman; Joel Claster, Reading, Pa.; Harry Ehrlich, Springfield, Mass.; Joseph G. Hitner, Philadelphia; Herman D. Moskowitz, New York; John R. Briggs, Philadelphia; George B. Doane, Boston; Ben Cohen, Wilkes-Barre, Pa.; Joseph Maher, Buffalo; Carl R. Briggs, Blue Island, Ill.; Samuel N. Summer, Columbus, Ohio, and Morris Speer, Cleveland. Joseph Colvin will be secretary of the Trade Relations Bureau.

Recoveries of Non-Ferrous Metals Larger

WASHINGTON, July 30.—Showing an increase of $21,271,500 over 1927, the value of certain non-ferrous metals recovered from secondary sources in 1928 has been reported to the Bureau of Mines as $277,623,500. According to J. P. Dunlop, who compiled the figures, the increase in total value was due mainly to larger recoveries of copper, brass, lead and nickel and to the higher average price of copper in 1928, for the average prices of lead, zinc, and tin were considerably less in 1928 than in 1927. There were large gains in the quantity of secondary copper, lead and nickel in 1928, small increases in secondary zinc and aluminum and small decreases in tin and antimony. The quantity of copper, including that in brass, increased more than 46,000 tons.

There was a continuation of large shipments of scrap copper and brass to Europe. In 1927 the combined exports were 68,706, net tons and last year they were 70,146 tons. The combined imports of copper scrap and brass scrap in 1928 were about 11,400 tons, mainly from Canada and Latin America. The main increase in lead was in the output of secondary pig lead by smelters which treat mainly ore. The increase at these plants was about 17,500 tons, while at regular secondary plants it was only about 1500 tons. Secondary lead recovered in alloys increased 13,600 tons. Zinc recovered by redistillation increased nearly 6000 tons, while that recovered by sweating and remelting was about the same in 1928 as in 1927. Exports of zinc dross decreased 1300 tons, but the quantity used in zinc dust, lithopone, and zinc chloride increased about 9000 tons.

Detinning plants treated a larger quantity of clean tin plate clippings in 1928 than in 1927, but the recovery from such clippings was less. It is reasonable to assume, according to Mr. Dunlop, that the efficiency of detinning plants has not decreased in the last 10 years, yet the yield of tin per gross ton of tin plate clippings, according to reports filed with the Bureau of Mines, has declined from 36.27 lb. in 1918 to 30.3 lb. in 1928. Only a few old tin coated containers were treated last year, for the much lower prices of tin made the handling of them unprofitable. About two-thirds of the recoveries at detinning plants were as tin content in tin tetrachloride and tin oxide.

The report stated that profits in most lines of secondary metal recovery were larger in 1928 than for several years, and operations were on a sounder and less speculative basis. The range in metal prices was not large and secondary metal dealers and smelters relied more on ordinary profits of buying and selling. Mr. Dunlop said that there seems to be need of improved business methods, since profit in handling certain scrap metals and drosses is said to be very small.

More Coke Ovens in Boston Region

The New England Coal & Coke Co., Everett, Mass., a subsidiary of the Massachusetts Gas Co., has contracted with the Koppers Co. for a battery of 82 Becker type coke ovens to be ready for operation July 1, 1930. With the completion of this battery, the company will have 437 ovens; the new battery will increase the annual production by 500,000 tons of coke. The company is selling coke to the Boston Consolidated Gas Co., for gas making purposes, and has been using high test gas to fire its ovens. With the completion of the new ovens high test gas instead of coke will be sold to the gas company.

"PITTSBURGH" BY NORDFELDT

Reproduced in The Iron Age by courtesy of Nils Anderson, President, Debevoise-Anderson Co., 117 Liberty Street, New York

Steel Treaters to Discuss Nitriding

A number of papers on the new process of hardening steel at low temperatures by ammonia (the so-called nitriding process) will feature the annual meeting of the American Society for Steel Treating, to be held in Cleveland, Sept. 9 to 13. Ad. Fry, the German inventor of the process, has signified his intention of being present. Papers so far secured for the symposium are:

"A Study of the Nitriding Process," by V. O. Homerberg and J. P. Walsted, Massachusetts Institute of Technology, Cambridge, Mass.

"A Few Fundamentals of the Nitriding Process," by H. W. McQuaid and W. J. Ketcham, Timken Detroit Axle Co., Detroit.

"Researches of Nitriding Steels," by Dr. O. E. Harder, J. T. Gow and L. A. Willey, University of Minnesota, Minneapolis.

"Short Time Nitriding of Steels in Molten Cyanides," by A. B. Kinzel and J. J. Egan, Union Carbide & Carbon Research Laboratories, Long Island City, N. Y.

"Observations upon the Iron-Nitrogen System," by Samuel Epstein, Illinois Steel Co., South Chicago, Ill.

"Investigations in Nitriding," by Robert Sergeson, Central Alloy Steel Corporation, Canton, Ohio.

"The White Layer in Gun Tubes," by H. H. Lester, Watertown Arsenal, Watertown, Mass.

Headquarters for the Steel Treaters will be at the Hotel Cleveland. Other organizations cooperating in the National Metal Congress are the Iron and Steel Division and the Institute of Metals Division of the American Institute of Mining and Metallurgical Engineers (headquarters at Hotel Cleveland), the Iron and Steel Division of the American Society of Mechanical Engineers (headquarters at Hollenden Hotel), and the American Welding Society (headquarters at Statler Hotel).

Gear Manufacturers to Meet in Philadelphia

The fall meeting of the American Gear Manufacturers Association will be held at the Benjamin Franklin Hotel, Philadelphia, Oct. 24, 25 and 26, instead of at Briarcliff, N. Y., as first reported.

In addition to papers and addresses on technical developments and on subjects of general interest, recommended practices will be submitted by the association's technical standardization committees. T. W. Owen, 3608 Euclid Avenue, Cleveland, is secretary of the association.

Announce Aeronautic Meeting Papers

The joint meeting of the Society of Automotive Engineers and the Aeronautical Chamber of Commerce of America, to be held at the Hotel Hollenden, Cleveland, Aug. 26, 27 and 28, will feature papers on a variety of topics, including materials and welding. E. H. Dix, Jr., Aluminum Co. of America, Pittsburgh, will present a paper on the "Characteristics and Prevention of Corrosion of Strong Light Alloys," and H. S. Cooper, Beryllium Corporation of America, will speak on "Beryllium Alloys." A paper on "Welding Aircraft Parts" will be read by R. M. Mock, Bellanca Aircraft Corporation, Wilmington, Del.

Other topics include design of wings, gaging engine performance, high-temperature liquid-cooled engines, geared engines, load factors for aircraft structures, variable pitch propellers, load ratings of commercial airplanes and the selling of airplanes to business houses.

Produces Ball Bearings for Aircraft

Fafnir Bearing Co., New Britain, Conn., to meet the requirements of the aircraft industry, has produced a series of ball bearings of narrow width and dimensioned in inches and major fractions. This so-called "S Series" ranges from ¼ to 1 in. bore by seven steps, and has been designed by its recently organized aeronautical division to fill the needs for more rigid, frictionless and wear-resistant control mechanisms on aircraft.

Strategic Metals and Minerals

The United States Department of Commerce has issued Trade Promotion Series, No. 76, entitled "Mineral Raw Materials" (Price 45c.), a comprehensive survey of the production and consumption of metals and minerals.

This study is divided into two parts. In Part I each country is treated separately to indicate the magnitude of its requirements for each of the minerals and its ability to supply these from within its own borders, followed by a statistical analysis of production, imports, and exports covering the 5-year period 1923-1927.

In Part II each mineral is considered separately in its relation to the general world position of the various minerals and the relative positions occupied by each of the countries under review. Major sources of minerals are indicated.

Decrease in Imports of Pig Iron in June

WASHINGTON, July 26.—Imports of pig iron in June dropped to 11,396 gross tons from 14,393 tons in May. Last year the June total was only slightly heavier than in 1929.

For the six months, imports at 73,461 tons have been slightly less than the 75,295 tons of last year. There has not been much change in the line-up of countries of origin, although a heavy decline in incoming shipments from Great Britain, coupled with a moderate rise in those from India, brought the two close together at the end of June.

UNITED STATES IMPORTS OF PIG IRON BY COUNTRIES OF SHIPMENT

(In Gross Tons)

	June		Six Months Ended June	
	1929	1928	1929	1928
United Kingdom	3,040	6,726	26,872	34,727
British India	3,903	3,792	25,439	23,780
Germany	.....	55	103	95
Netherlands	3,600	894	17,474	13,515
Canada	49	.....	471	378
France	101	.....	101	.....
Belgium	.....	.....	184	202
Norway	464	50	1,340	91
Sweden	200	238	1,003	1,041
All others	39	44	474	1,466
Total	11,396	11,799	73,461	75,295

Completing Development of Haystellite Cutting Tools

It is expected that new tungsten carbide cutting tools bearing the name of Haystellite will be placed on the market before the end of the year by the Haynes Stellite Co., Kokomo, Ind.

The material is a modification of the alloy introduced by the company a short time ago for use as a diamond substitute on oil well bits and for drawing dies. It is not to be confused with Stellite, being radically different in composition, and is to be distinguished from most of the tungsten-carbide tools at present on the market in that it is a cast rather than a sintered alloy. Uniformity of product is a feature claimed.

Tests have been under way for several months in large production shops, and the alloy, so far as cutting tools are concerned, is in the final development stage. The company expects to be able to furnish sample tools in the near future.

Farrell-Cheek Expansion

The Farrell-Cheek Steel Foundry Co., Sandusky, Ohio, has found it necessary to make further additions to its foundry building. Construction is now in progress of a new addition that will be 60 x 100 ft. and will be used to house special steel operations. The building, it is expected, will be ready for occupancy by Sept. 1.

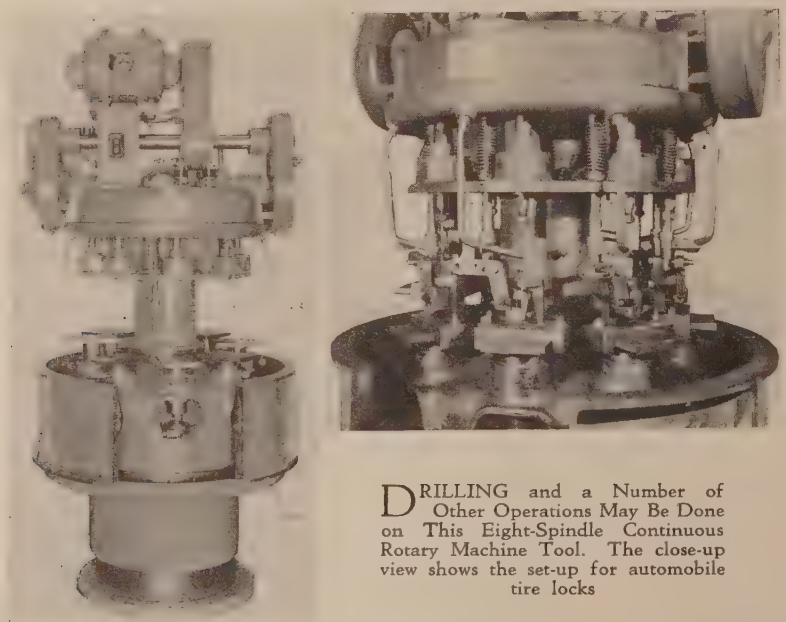
The building runs east and west and is part of the present structure. The core room of the foundry is now three times its former size and the addition now being built was necessary despite the fact that the capacity was doubled only last November.

Plans for other additions are under consideration and may be settled in the near future.

Continuous Type Rotary Machine Has Wide Range

IN drilling, tapping, threading, hollow milling, countersinking, facing and other operations, the eight-spindle continuous rotary machine illustrated is claimed to give high production, with savings in labor and floor space.

When only one operation is performed on the machine, eight pieces are finished at each complete revolution of the carrier, which rotates continuously about the column. A battery of the machines may be synchronized for successive operations, or a single machine may be tooled for drilling, reaming, facing, etc., the same piece. In the latter case the tools are mounted in sequence in the spindles, and the operator advances the piece one spindle each time it comes around to him until the piece is finished, putting a fresh piece under the spindle that performs the first operation. The machine is built by the Enterprise Mfg. Co., Third and Dauphin Streets, Philadelphia.



DRILLING and a Number of Other Operations May Be Done on This Eight-Spindle Continuous Rotary Machine Tool. The close-up view shows the set-up for automobile tire locks

The rotating carrier mounts on its upper part the driving mechanism and the spindles, and on its lower part, the work-tables. There is a table for each spindle, and both move with their centers always in line. The work is fed to the tools, the spindles having no vertical motion. During each revolution of the carrier each table drops clear of the tool and is again raised and fed to the tool, the feed being obtained by a fixed ring cam and a roller at the bottom of each table plunger.

When the machine is on single operation work, the sole duty of the attendant is to unload and reload and clamp the work as it comes to the loading station. When automatic clamping jigs are used his task is reduced to merely moving the work in and out of the jig. Knock-outs, indexing jigs and other devices that can be actuated by a supplementary cam may be employed on the machine.

The machine is of simple design and has no small or delicate parts. It is equipped with motor drive, all-geared head and ball bearings. The spindle drive is through spur and bevel gearing at the right-hand end of the pulley or drive shaft, and variations in spindle speed are obtainable through change gears. The carrier is driven through change gears, planetary and bevel gearing at the left-hand end of the pulley shaft. The smallest member of the planetary gearing is 5 in. in diameter. The carrier drive, as well as each work-table, is protected by a shear key. All gears and other rotating parts are inclosed. Coolant is supplied only while the tools are cutting and chips are disposed of at every revolution of the table.

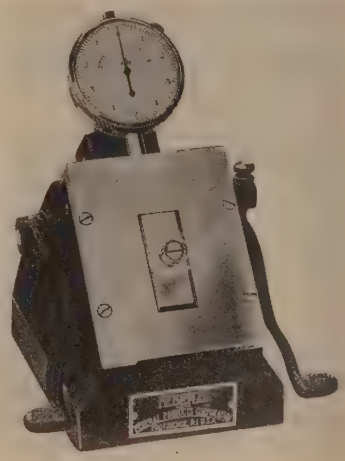
Individual adjustment is provided for each work-table by means of a right and left-stem that extends entirely through both parts of the table plunger. Simultaneous adjustment of all tables is made by rotating the large nut on the column by means of the crank and worm geared to it.

Equipped with the standard cam, the machine has capacity for drilling a ¾-in. hole in cast iron, a ⅝-in. hole in medium carbon steel to a depth of 1¼ in. Facing cuts up to 1/16 in. deep and 1½ in. in diameter may be taken in cast iron and up to 1/16 in. by 1¼ in. in steel. The total movement of the standard cam is 2 in. and of the special cam 3 in. The distance from the spindle to top of the table at highest point of the cam is 16¾ in. maximum and 10 in., minimum. The distance from center to center of spindles in a circle is 9 in. The maximum height of the table from the floor at the loading station is 42 in. The driving motor ranges from 5 to 15 hp. according to character of work. Floor space occupied by the machine is 4 x 4 ft., and the weight is approximately 5000 lb.

# Indicates 0.0001 In. Variations in Size of Small Holes

SIZE variations and amount of out-of-roundness of holes ranging from ⅜ to 1½ in. are determined rapidly by means of the gage illustrated, size variations down to 0.0001 in. being read directly from the dial and roundness checked merely by revolving the work. Long life is also a feature, it being claimed by the maker, the Federal Products Corporation, Providence, R. I., that the instrument has been known to measure more than 1,000,000 holes.

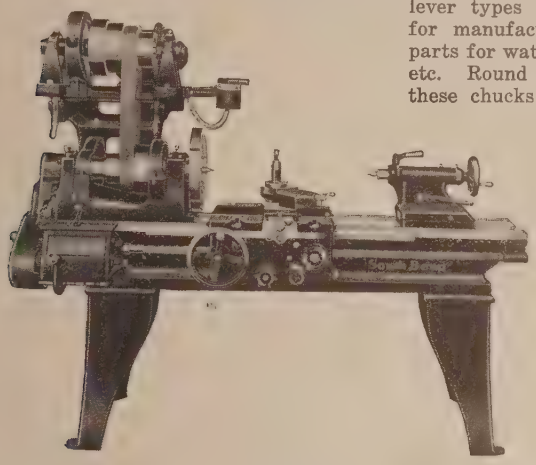
The indicating dial is 2¾ in. in diameter and is graduated in 0.001 and 0.0001 in., the 0.001 in. graduations being ¾ in. apart. The gage may be operated from either side and the parts gaged as rapidly as the operator can place them on the jaws. Setting the gage to measure different sizes of holes is accomplished conveniently by removing the top plate and loosening the screws that clamp the lower jaw in the dovetail, putting a master on the jaws or using a micrometer, as preferred, then setting the jaws so that the indicator registers about 0.001 in. on the minus side of zero. The jaws are then tightened and the gage is ready for use. The small knurled screw on the upper right-hand lever is a stop to adjust the range of the indicator.



Jaws are made in four different sizes: ⅜ to ½ in.; ½ to ¾ in.; ¾ to 1⅛ in.; and 1⅛ to 1½ in. One jaw is regularly furnished with the gage, which is designated as the model 36, other sizes being supplied as extras.

New Line of Motor-Driven Engine Lathes

A NEW model silent-chain motor-driven lathe is being built by the South Bend Lathe Works, South Bend, Ind., in sizes from 9 to 18 in., and in several different types, including bench, tool-room, manufacturing the gap bed, equipped with either standard or quick change gears.



BELT Shifting Is Facilitated by the Tilting Motor Table. The drum type control switch is within easy reach of the operator

The machine is self-contained and requires no more floor space than the countershaft driven lathe. It is equipped with a reversing motor mounted with the driving cone on a table above the machine. This table is supported by a bracket securely fastened to the lathe bed and is arranged so that it may be tilted forward by means of a convenient lever to relieve belt tension and facilitate belt shifting. Independent adjustment is provided for taking up belt slack. From the motor, the drive to the upper cone is by silent chain, which is provided with a felt wick oiler and is entirely inclosed by a guard of improved design. A special guard that covers the driving cone, the belting and the spindle can be furnished if desired. The size of motor varies from ¾ to 3-hp., according to the size of lathe.

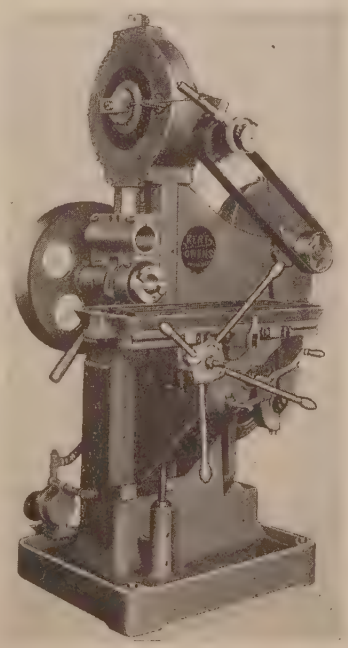
Drum-type reversing control switch is employed, it being considered the most practical for a motor-driven screw-cutting lathe because of the continual starting, stopping and reversing the lathe spindle. Wiring from the motor to the switch is inclosed in flexible metal conduit.

The bronze spindle bearings are lubricated from an oil cup with hinged lid, the oil flowing down around the upper half of the bearing to wicks located in small squares milled out of the lower half of the bearing at the point where it meets the upper half. This system is intended not only to assure adequate supply of oil, but to keep dust and dirt from the bearings. Felt shear wipers are provided for the V-ways of the bed. The machine is equipped with an automatic interlock to prevent simultaneous engagement of the automatic feeds and the half nuts for thread cutting. The tailstock has a set-over for taper turning and a binding lever that locks the spindle without disturbing the alinement. The spindle is graduated in 1/16 in.

Attachments include handwheel and lever types of draw-in collet chuck for manufacture of small precision parts for watches, typewriters, radios, etc. Round split collets for use in these chucks are made in a number of sizes, and square and hexagon types can be furnished. They are hardened and tempered and ground both inside and outside. A spindle nose collet chuck, for large collets, is also made.

Milling Machine With Cam Feed to Head

CAM feed to the head, permitting use of a feed or rate of travel to suit any change in cross section of the cut, thus assuring maximum output, is a feature of a new production milling machine put out by the Kent-Owens Machine Co., Toledo, Ohio. This feed may be operated continuously or disengaged automatically upon completion of the cycle. With continuous operation, the operator simply loads and unloads the work and if an indexing fixture can be used, production may be further increased, one side of the fixture being loaded while the work in the other side is being milled.



Cam-Actuated Head Permits Use of Feeds to Suit Changes in Cross-section of Cut

The machine may be arranged for either countershaft or motor drive. From the motor, which is mounted on the back of the column, the drive is by silent chain to the backshaft, from which the power is transmitted by belts to the vertical feeding mechanism and the spindles. Both the backshaft and the spindle are mounted on Timken roller bearings, and a heavy flywheel is provided on the spindle to prevent chatter and vibration. The spindle is of standardized type. The cam drive is through a hardened steel worm and bronze worm wheel, wear between which is taken up by means of an eccentric bushing. Both the cam and follower are of hardened steel. Cams to suit particular requirements can be furnished.

Conditions In Germany May Widen Machine Tool Market

Changed conditions in Germany that improve the outlook for sales of American machine tools in that and other European countries are pointed out by E. F. Du Brul, general manager of the National Machine Tool Builders Association, in a recent bulletin to member companies.

It seems probable, the bulletin states, that the reparations settlement will do much toward clarifying conditions in Europe and will encourage industrialists to proceed at a more rapid rate than in the immediate past.

"Until recently the German situation, in particular, has been quite discouraging. As recently as the first of March there were in Germany 2,460,000 receiving unemployment dole, but by April 30 this had been reduced to 1,100,000, or to more than one half in less than two months. Part of the unemployment of course was largely influenced by the building trades and other industries which depended on weather conditions. Nevertheless, the change has been quite remarkable.

"It also seems probable that reparations in kind will have a tendency to decrease, and that this will tend to relieve the United States from this type of competition in France."

The Edward G. Budd Mfg. Co., Philadelphia, reports a production of 1,233,323 steel automobile doors for the first six months of 1929. This compares with the production of 1,317,507 doors during the entire year 1928.

Where Steel Exports Went in First Half-Year

Canada Took 393,731 Tons of Nine Leading Items—Japan Retains Second Position with 81,004 Tons, Followed by Argentina, 30,807 Tons; Philippines, 25,019 Tons; Mexico, 20,382 Tons

Exports from United States, by Countries of Destination

(In Gross Tons)

	Steel Plates				Galvanized Sheets				Black Steel Sheets			
	June		Six Months Ended June		June		Six Months Ended June		June		Six Months Ended June	
	1929	1928	1929	1928	1929	1928	1929	1928	1929	1928	1929	1928
Total	*17,640*	*14,529*	*107,296*	*71,726*	*12,604*	*10,490*	*86,420*	*75,125*	*15,718*	*19,223*	*92,763*	*90,311*
Canada	14,791	12,202	90,516	60,584	3,534	3,185	18,900	17,132	9,231	9,767	52,879	40,500
Japan	271	380	1,692	878	312	110	1,365	1,096	3,067	7,207	13,107	37,430
Cuba	104	64	829	356	617	549	2,907	2,721	78	272	761	1,101
Philippine Islands	77	368	882	1,748	1,182	168	13,865	11,446	5	306	2,419	1,399
Mexico	54	132	343	373	1,355	730	6,719	4,085	331	275	1,815	1,169
Argentina	....	....	....	....	785	1,000	3,435	4,149	629	195	3,208	923
Chile	....	....	....	....	....	....	....	....	....	45	1,447	151
Colombia	....	....	....	....	19	768	3,238	3,607	26	25	148	281

	Steel Rails				Barbed Wire				Plain and Galvanized Wire			
	June		Six Months Ended June		June		Six Months Ended June		June		Six Months Ended June	
	1929	1928	1929	1928	1929	1928	1929	1928	1929	1928	1929	1928
Total	*7,389*	*10,499*	*85,566*	*109,124*	*6,395*	*7,000*	*55,688*	*58,426*	*3,789*	*4,657*	*26,137*	*23,673*
Canada	1,681	2,061	13,981	10,557	528	757	1,532	2,493	732	1,277	8,292	7,969
Japan	....	3,585	5,470	9,718	....	....	....	....	139	421	882	651
Cuba	150	180	5,429	1,461	620	661	1,443	2,555	143	415	605	614
Philippine Islands	151	30	4,206	3,925	486	184	3,296	799	74	95	351	145
Mexico	119	673	1,643	3,284	618	493	3,192	3,541	209	283	1,078	1,151
Argentina	489	883	1,755	2,776	620	1,981	3,955	8,869	909	1,633	4,844	4,699
Chile	265	....	12,196	20,514	....	....	....	....	....	....	....	....
Colombia	223	2,093	3,106	9,200	209	556	4,564	2,079	....	....	....	....
Brazil	795	12	4,440	13,581	1,267	546	....	8,656	280	135	909	535
China	373	....	4,151	21,028	....	....	....	....	....	....	....	....

	Tin Plate				Steel Bars				Heavy Plain Structural Material			
	June		Six Months Ended June		June		Six Months Ended June		June		Six Months Ended June	
	1929	1928	1929	1928	1929	1928	1929	1928	1929	1928	1929	1928
Total	*18,041*	*22,276*	*136,121*	*125,099*	*12,249*	*13,816*	*112,620*	*70,768*	*31,268*	*19,356*	*145,866*	*89,873*
Canada	3,892	5,558	23,765	23,387	7,460	9,139	58,553	46,547	26,966	17,377	125,313	75,492
Japan	4,345	3,195	34,960	26,683	281	166	18,602	480	2,359	5	4,926	1,184
Cuba	303	327	3,207	2,384	234	229	2,053	2,525	387	421	1,479	2,299
Mexico	668	1,179	4,583	6,786	194	56	710	374	50	130	299	603
Argentina	2,003	2,456	11,749	10,255	....	....	....	....	....	17	1,861	195
Chile	561	308	2,885	1,740	....	....	....	....	522	236	2,905	1,895
Brazil	224	90	9,963	1,721	....	....	....	....	....	....	....	....
China	2,211	2,945	11,446	9,151	....	....	....	....	....	....	....	....
British India	123	17	3,714	3,491	....	....	....	....	....	....	....	....
United Kingdom	....	....	844	169	2,058	1,336	10,386	7,934	....	....	....	....
Italy	534	651	3,884	6,694	....	....	....	....	....	....	....	....

Destination of Iron and Steel Exports from the United States

(In Gross Tons)

Country of Destination	June, 1929	January Through June 1929	1928
North and Central America and West Indies	*139,449*	*814,751*	*651,279*
Canada and Newfoundland	117,056	675,614	535,834
Cuba	4,624	36,352	31,246
Guatemala	335	3,827	5,835
Honduras	736	6,727	3,951
Mexico	10,876	46,085	39,797
Panama	1,040	10,221	8,508
Salvador	234	4,213	1,911
British West Indies	1,662	12,385	4,367
Other West Indies	2,127	14,384	15,035
Other Central America	759	4,943	4,795
South America	*27,026*	*215,321*	*217,350*
Argentina	8,420	53,787	51,202
Brazil	4,681	33,516	41,308
Chile	2,879	31,841	36,125
Colombia	2,723	24,730	35,206
Peru	2,365	17,672	13,390
Uruguay	374	5,441	5,084
Venezuela	5,189	45,313	31,900
Other South America	395	3,021	3,135
Europe	*31,599*	*192,652*	*149,673*
Belgium	165	1,800	7,297
France	1,564	9,854	2,499
Germany	766	12,724	20,415

Country of Destination	June, 1929	January Through June 1929	1928
Italy	10,495	64,432	44,101
Netherlands	168	1,514	1,333
Poland and Danzig	7,406	47,762	32,040
Rumania	182	1,805	2,396
Soviet Russia	159	2,112	1,569
United Kingdom	5,455	31,311	26,454
Other Europe	5,239	19,338	11,569
Far East	*46,982*	*357,518*	*331,157*
British Malaya	85	4,408	3,414
China	4,587	41,351	57,535
Netherlands East Indies	3,269	36,821	14,051
India and Ceylon	1,440	11,246	13,562
Japan	27,558	186,742	181,572
Kwantung	609	7,871	2,981
Philippine Islands	5,078	47,051	44,133
Australia	2,593	11,447	7,585
New Zealand	226	2,795	1,047
Other Asia and Far East	1,537	7,786	5,277
Africa	*2,755*	*11,597*	*7,903*
Union of South Africa	1,029	4,193	3,480
Egypt	1,100	5,195	3,088
Mozambique	288	1,104	479
Other Africa	338	1,114	856
Total	247,811	1,591,839	1,357,362

Strong Steel Earnings Statements

Quarterly Reports of United States and Bethlehem Steel Corporations and Others

TOTAL earnings of the United States Steel Corporation for the three months ended June 30 amounted to nearly $72,000,000. This compares with $60,105,381 for the first quarter and with $46,932,986 for the corresponding quarter last year. The earnings of the second quarter of 1917, a war year, were $90,579,204.

Income available for common stock dividends and surplus amounted to $47,520,924. The regular common stock dividend of 1¾ per cent was declared on 8,030,304 shares, being 7,116,235 shares previously outstanding plus 914,069 fully paid for under the subscription offer of April 16. Thus there are 102,536 shares under the subscription offer that have not yet been taken or fully paid for. On the basis of the 8,030,304 shares, the net income in this last quarter was at the rate of $5.92 per share, but on the basis of the earlier number of 7,116,235 shares, the income was $6.68 per share and compares with $5.04 for the first quarter.

Total earnings of the first half of this year were $132,100,842 and those for the first half of 1928 were $87,-867,018. The accompanying table gives the principal figures.

May Acquire Columbia Steel Corporation

No official statements have been made with regard to reports that the United States Steel Corporation is negotiating to secure the property of the Columbia Steel Corporation. What it would acquire includes a modern blast furnace near Provo, Utah, with a by-product coke oven plant of 850 tons daily capacity; rolling mills at Pittsburg, Cal., and at Torrance, Los Angeles, making steel bars, sheets, wire and nails; steel casting plants at Pittsburg and Portland, Ore., and raw material properties.

The steel foundry at Pittsburg was described in THE IRON AGE of Jan. 23, 1919, and the rolling mill at Pittsburg, the open-hearth furnaces and 18-in. and 12-in. bar mills, were illustrated in the issue of June 24, 1920. The Torrance plant was originally owned by the Llewellyn Iron Works but has been enlarged in both the steel making and rolling departments. Columbia's entering in the sheet business was the result of the purchase of the plant of the Pacific Sheet Steel Co. in South San Francisco.

Bethlehem Earns $5.33 a Share

THE Bethlehem Steel Corporation reported net income for the second quarter of $11,766,473 after interest, depreciation and depletion charges, which was equal, following the deduction of 7 per cent cumulative preferred dividends, to $5.33 a share on the common stock outstanding. This compares with $9,045,590 in the preceding quarter, or $4.05 a share on a smaller number of shares, an additional 600,000 having been issued as of June 19, 1929. Net income in the second quarter of 1928 was $4,529,328, or $1.57 a share on the common stock then outstanding.

The directors declared a dividend of $1.50 a share on the common stock, placing the common shares on a $6 per year basis, compared with $4 previously. They also declared the regular quarterly dividend on the preferred stock.

In commenting on the report, E. G. Grace, president, stated that billed prices showed an encouraging gain over those of the preceding quarter, as well as the corresponding quarter, last year. Current operations are at approximately 99 per cent of capacity and will remain at about that rate through August. In September, fall demands should make themselves felt, and business throughout the rest of the year, judging from present indications, should be in sustained volume, he declared. Recessions in the consumption of steel in some lines, notably the automobile industry, have been offset in large part by increased requirements in other directions. The outlook in structural steel, he said, is unusually promising, and he expects railroad buying to keep up at a good rate. Exports are the largest the company has made since the war, and the reparations settlement is favorable to a continued high volume of foreign trade.

The company has no outstanding improvement program to announce at this time, Mr. Grace said, but the issuance of 600,000 additional common shares in June was for the purpose of furthering general improvements, which are being made continually. Although it was not many months ago that surplus capacity in steel was regarded as one of the main problems confronting the industry, there is no doubt, he stated, that the country would have suffered great harm in recent months if capacity had not measured up to demand.

The Bethlehem corporation's operations during the second quarter averaged 100.6 per cent of rated capacity, compared with 91.9 per cent in the first quarter and 82.5 per cent during the second quarter of 1928.

The value of orders on hand June 30 was $56,829,800, compared with $62,702,683 at the end of the previous quarter and $51,761,908 on June 30, 1928.

Earnings of Other Steel Companies

The Sharon Steel Hoop Co. reports earnings from operations in the first six months of 1929 of $1,761,-208.23, after full charges for maintenance and repairs to plants. After deducting depreciation charges of $507,791.58, bond interest of $177,-864.54 and government profits tax of $131,001.77, net earnings amounted to $944,550.34, as against $971,853.53 for the entire year 1928. This is equal to $2.63 a share on 359,240 shares of stock. During the past six months the company put into operation its new continuous hot-strip mill and cold-rolled strip mill. It is stated that the new departments should add materially to the company's future earnings.

Net income of the Eastern Rolling Mill Corporation in the second quarter was $252,373, after all charges, compared with $203,396 in the corresponding period of 1928.

The Follansbee Brothers Co. earned a net profit of $999,660 in the six months ended June 30. This is after depreciation, interest and federal taxes, equivalent after preferred dividends to $5.05 a share on 180,000 shares of common stock. For the first quarter of 1929 the company reported a net profit of $402,572, equivalent to $1.98 a share.

In the first six months of the year the Sloss-Sheffield Steel & Iron Co. had a net income of $655,878, after depreciation and depletion, but before interest and federal taxes.

Net profits of the Truscon Steel Co. in the second quarter totaled $1,-

Earnings of Steel Corporation

Earnings for Second Quarter

	Total Earnings
April, 1929	$22,361,428
May, 1929	25,604,641
June, 1929	24,029,392
Total earnings after deducting expenses, taxes and interest	$71,995,461
Less charges and allowances for depletion, depreciation and obsolescence	15,919,386
Net income	$56,076,075
Deduct: Interest corporation bonds	2,250,232
Balance	$53,825,843
Dividends: Preferred, 1¾ per cent $6,304,919	
Common, 1¾ per cent 14,053,032	20,357,951
Surplus for the quarter	$33,467,892

Comparison of Quarterly Earnings of Bethlehem Corporation

	Second Quarter, 1929	First Quarter, 1929	Second Quarter, 1928
Total income of corporation and subsidiaries	$18,069,082	$15,245,471	$10,767,959
Less interest charges	2,773,642	2,780,575	2,841,636
Balance	$15,295,440	$12,464,896	$7,926,323
Less provision for depletion, depreciation and obsolescence	3,528,967	3,419,306	3,396,995
Net income for period	$11,766,473	$9,045,590	$4,529,328
Less dividends: Pref. stock	$1,750,000	$1,750,000	$1,697,500
Com. stock.	3,600,000	2,400,000	.....
Total	$5,350,000	$4,150,000*	$1,697,500
Surplus for period	$6,416,473	$4,895,590*	$2,831,828

*Adjusted to reflect dividend payable Aug. 15, 1929, on additional 600,000 shares issued June 18, 1929.

003,494, after depreciation, federal taxes and other charges equivalent to $1.59 a share on 589,036 shares of $10 par value common stock. This compares with $785,143, or $1.22 a share, in the same period of 1928.

Campbell, Wyant & Cannon Co. and its subsidiary, National Motor Castings Co., report net profit in the first quarter of 1929 of $531,379, equal to $1.53 a share on 348,000 shares of stock.

Fabricated Structural Steel

About 60 Per Cent of Awards Were in Canada and Northeastern Part of United States

STRUCTURAL steel awards of 34,000 tons in the past week were about equally divided between railroad and industrial work and non-industrial projects. About 60 per cent of the lettings were in Canada and the northeastern section of the United States. Fresh inquiries, totaling 36,000 tons, were slightly larger than those of the previous week.

Among the larger contracts placed were 6000 tons for an office building at Montreal, Que., 3800 tons for an office building at Newark, N. J., 3000 tons for a Chevrolet assembly plant at Tarrytown, N. Y., and 2200 tons for an aircraft manufacturing plant at East Hartford, Conn. New work on which bids are being asked include 8000 tons for approaches to the McKinley bridge at St. Louis, 6000 tons for a State agricultural building at Harrisburg, Pa., and 2200 tons each for a Chicago school and for a mill building for a copper company in Arizona. Awards follow:

BOSTON & ALBANY RAILROAD, 650 tons, roundhouse in Brighton district, Boston, to unnamed fabricator.

BOSTON & MAINE RAILROAD, 250 tons, roundhouse at Somerville, Mass., to Boston Bridge Works, Inc.

BOSTON & MAINE RAILROAD, 350 tons, three bridges at Lansingburg, N. Y., to Boston Bridge Works, Inc.

MONTREAL, QUE., 6000 tons, office building, to Dominion Bridge Co.

JAMAICA, VT., 125 tons, highway bridge, to American Bridge Co.

HYDE PARK, MASS., 130 tons, garage and stock building for Edison Electric Illuminating Co., to McClintic-Marshall Co.

EAST HARTFORD, CONN., 2200 tons, Pratt & Whitney Aircraft Corporation plant, to Levering & Garrigues Co.

MONTICELLO, N. Y., 190 tons, telephone building, to unnamed bidder.

DOBBS FERRY, N. Y., 200 tons, telephone building, to Elby Structural Steel Co.

TARRYTOWN, N. Y., 3000 tons, assembly plant for Chevrolet Motor Co., to Mahon Structural Steel Co.

VESTA, N. Y., 175 tons, two highway bridges, to American Bridge Co.

NEWARK, N. J., 3800 tons, American Insurance Co. building, to Hedden Iron Construction Co.

RIVERTON, N. J., 150 tons, Delaware River bridge between Riverton and Belvidere, to Bethlehem Fabricators, Inc.

TRENTON, N. J., 1050 tons, Trenton Senior High School, to American Bridge Co.

FLORENCE, N. J., 200 tons, machine shop, to Belmont Iron Works.

MINERSVILLE, PA., 500 tons, factory for H. D. Bob & Co., reported to Bethlehem Construction Co.

NETRONA, PA., 120 tons, tank foundations, to Pittsburgh Bridge & Iron Co.

SEABOARD AIR LINE, 250 tons, bridge at Hopewell, Va., to Virginia Bridge & Iron Co.

DETROIT, 2800 tons, municipal airport, to Whitehead & Kales Co.

DETROIT, 800 tons, warehouse for Michigan Telephone Co., to Russell Steel Construction Co.

DETROIT, 1200 tons, plant addition for Detroit Steel Products Co., to Russell Steel Construction Co.

DETROIT, 100 tons, store, to Palmer Bee Co.

GRAND RAPIDS, MICH., 400 tons, Michigan Telephone Co., warehouse, to R. C. Mahon Co., Detroit.

MUSKEGON, MICH., 600 tons, building, to Massillon Bridge & Structural Co.

MICHIGAN CENTRAL RAILROAD, 800 tons, grade separation work in Detroit and vicinity, to McClintic-Marshall Co.

CLEVELAND, 130 tons, Lincoln Electric Co., all-welded warehouse, to Austin Co.

CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS RAILROAD, 2000 tons, two bridges in Indiana, to American Bridge Co.

NEWBURG, WIS., 110 tons, State highway bridge, to Wisconsin Bridge & Iron Co.

CHICAGO, 700 tons, Henrici restaurant, to unnamed bidder.

CHICAGO, 250 tons, Continental Can Co. building, to Mid City Iron Works.

ST. LOUIS, 350 tons, service building for Mack Truck Co., to Mississippi Valley Structural Steel Co.

ST. LOUIS, 150 tons, Procter & Gamble Co. building, to St. Louis Structural Steel Co.

COLUMBIA, MO., 375 tons, field house for University of Missouri, to Stupp Brothers Bridge & Iron Co.

POMONA, CAL., 100 tons, telephone building, to McClintic-Marshall Co.

HUNTINGTON PARK, CAL., 200 tons, factory for Axelson Machine Co., to Consolidated Steel Corporation.

SAN FRANCISCO, 500 tons, hotel, Post Street, to McClintic-Marshall Co.

OAKLAND, 100 tons, plates 54-in. riveted steel pipe for East Bay Municipal Utility District, to unnamed fabricator.

PORTLAND, ORE., 900 tons, office building, Tenth and Washington Streets, to Poole & McGonigle.

SEATTLE, 150 tons plates, digester for Rainier Paper & Pulp Co., to Willamette Iron & Steel Co.

LOS ANGELES, 100 tons, warehouse, 3275 East Slauson Avenue, to an unnamed bidder.

NEWPORT BEACH, CAL., 150 tons, bridge on Lido Island, to an unnamed bidder.

OLYMPIA, WASH., 100 tons, bridge over Solduc River, to an unnamed fabricator.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

BOSTON, 1050 tons, Congress Street bridge.

BOSTON, 300 tons, fire department building in Bowdoin Square.

PROVIDENCE, R. I., 100 tons, Roger Williams Avenue bridge.

STAMFORD, CONN., 650 tons, First National Bank building.

BRISTOL, CONN., 200 tons, building for New Departure Mfg. Co.

NEW YORK, 2550 tons, pier 3, North River; Lane & Ogle, Inc., low bidder on general contract.

ELIZABETH, N. J., 600 tons, New York & New Jersey Telephone Co. building.

ALBANY, N. Y., 500 tons, printing building for J. B. Lyon Co.

PENNSYLVANIA RAILROAD, 14,000 tons, bridge over Hackensack River; Phoenix Bridge Co., low bidder.

PHILADELPHIA, 2000 tons, plant addition for Atwater Kent Co.

PHILADELPHIA, 5000 tons, convention hall and auditorium; call for bids about Aug. 15.

HARRISBURG, PA., 6000 tons, Agricultural Building.

CHICAGO, MILWAUKEE, ST. PAUL & PACIFIC, 800 tons, track elevation at Evanston, Ill.

CHICAGO, MILWAUKEE, ST. PAUL & PACIFIC, 650 tons, subway at Milwaukee.

CHICAGO, 2200 tons, public school.

CHICAGO, 400 tons, building for Crane Co.; Graham, Anderson, Probst & White, architects.

PRINCETON, WIS., 250 tons, State highway bridge; C. R. Meyer & Sons Co., Oshkosh, Wis., general contractor, steel to be sublet.

MILWAUKEE, 500 tons, emergency hospital.

ST. LOUIS, 8000 tons, approaches to McKinley bridge.

STATE OF ARIZONA, 2200 tons, mill buildings for a copper company.

SEATTLE, 3700 tons, plates, Cedar River pipe line; Western Pipe & Steel Co., low bidder.

PORTLAND, ORE., 105 tons, bridge over Nehalem River; bids opened.

LOS ANGELES, 1500 tons, Los Angeles Stock Exchange Building; bids about Sept. 1.

Automobile Outlook Bright

PHILADELPHIA, July 30.—It is generally believed that production for July in automobiles will prove greater than in July, 1928. Production during August is expected to exceed that of July, according to *Automotive Industries*, because of increased production schedules contemplated by several companies that are preparing to introduce new models.

Improvement in the agricultural outlook throughout the country, it is considered, will be a highly favorable influence on the automobile market during the next several months. It appears doubtful that output for any of the remaining months of this year will fall below that for the corresponding months of last year.

The Pennsylvania Railroad recently placed an order for 1000 all-metal box cars to be manufactured of pure iron sheets. The Armco ingot iron sheets for these cars will be rolled on the new continuous mills of the American Rolling Mill Co.

This Issue in Brief

Savings of more than one-half million dollars per year are expected to result from two-weeks war against waste. Over 3500 suggestions were received in automobile company's anti-waste campaign, conducted at a cost of $16,000.—Page 263.

* * *

Cuts labor expense 15 per cent and doubles plant output by installing conveyors for assembly operations. New material-handling system in Studebaker plant contains many unusal innovations.—Page 269.

* * *

Electric welding of merchant ships expected to save 8 to 10 per cent deadweight. Welding is being used increasingly in German yards for ship fabrication.—Page 323.

* * *

Erects small metal buildings without rivets, bolts, or welding. Pliers, wrench and screw-driver are all the tools to erect buildings with new locking device.—Page 281.

* * *

Alloy iron castings find their greatest use in automobile industry. Mayari pig iron is used to a considerable extent, principally for cylinder blocks and cylinder heads.—Page 282.

* * *

Conserves heat, reduces labor cost, and eliminates splashing by using new spherical hot-metal ladle. Keeps the metal hot longer than the old, straight-side ladle. Skull is practically eliminated.—Page 284.

* * *

Gain of 27 per cent in American machinery exports in first half of 1929 over same period of last year. Shipments were valued at more than 300 million dollars. June total was close to 50 millions, a gain over both May, 1929, and June, 1928.—Page 326.

Bearing bronzes should have not less than 4 per cent tin, and need not have more than 15 per cent lead. Bureau of Standards finds little advantage in greater lead content. Addition of 4 per cent zinc had a good influence on the properties of the bronze.—Page 265.

* * *

Reduce waste of storing obsolete patterns by making a periodic survey. Rule of thumb method of destroying patterns unused for a definite period may prove expensive. A better way is to have them looked over at intervals by an individual or committee acquainted with probable requirements.—Page 275.

* * *

Perfects chrome-plating process for aluminum. Can be applied to stampings, sheets and castings, enabling them to resist acids which affect aluminum. Will increase the durability of aluminum parts in service subject to wear. May also solve the problem of atmospheric corrosion in aircraft parts.—Page 325.

* * *

Avoids conveyor tie-ups when machine tools are under repair by *not* routing conveyors under machine tools. Instead, cylinder blocks are lifted from conveyors to machine tools by rope hoists.—Page 269.

* * *

Floor space saved by upending auto bodies awaiting movement to main assembly lines. A specially designed mechanical device "noses" bodies, reducing considerably the amount of storage space needed.—Page 272.

* * *

"Mike" carries instructions from operators on rolling mill floor to loud speaker in operating pulpit. Motors for new hot strip mill are controlled completely from pulpit.—Page 268.

Finished steel exports up 20 per cent for half year, imports down 28 per cent, compared with same period of 1928. More than one million tons of rolled and finished steel shipped out of United States during first six months.—Page 324.

* * *

Iron and steel scrap complaints should be registered with newly organized Trade Relations Bureau of Scrap Institute. Federal Trade Commission approves scrap code.—Page 286.

* * *

Charge for pattern storage should be made by jobbing foundries after patterns have been stored for a certain time. It is good practice to notify the customer at expiration of the free storage period.—Page 276.

* * *

Narrow conveyors obviate need for rotating stands for use in assembling motors. Chain conveyor is equipped with steel plate carriers which convey motors at a 30-deg. angle. Conveyor framework is so narrow that operators can get at motors easily.—Page 272.

* * *

Twenty-five per cent longer service claimed for ingot molds made of new low-sulphur iron. Cracking of ordinary cast iron molds is said to be due to differing coefficients of expansion of the steel matrix and the graphite in the cast iron.—Page 280.

* * *

Impractical to substitute welded-steel construction wherever cast metal is used, says machinery builder. Welded steel construction is ideal for special machines, only one or two of which are built per year, or for building the first standard machine of a new design.—Page 278.

A. I. FINDLEY
Editor

THE IRON AGE

W. W. MACON
Managing Editor

ESTABLISHED 1855

Mechanization Aids Summer Work

STEEL has not had its usual summer dip in production, and an explanation is sought. In the common reckoning two general seasons of activity in buying and in production have been recognized—one a preparation for summer, the other a preparation for winter; whereupon summer would fall between these two periods. Another factor to which some observers have given attention is buying habits; executives desiring to take summer vacations and arranging their affairs in advance. That would explain seasonal periods in buying better than seasonal periods in delivery, for the executive could arrange simply a schedule of deliveries to be made during his absence.

A further thought on this subject is that in the past it was difficult to get workmen to perform well in summer, the work being arduous. Now, with increased mechanization all along the line, work is not so arduous, it being more a matter of controlling machinery. Notably that is the case at blast furnaces and in steel mills, where there are fewer men per unit of output, the men do not have as much physical exertion, and there are various appliances to make things more comfortable. In sheet and tin mill work in particular a veritable revolution has been wrought, working conditions for the hot mill crews being vastly improved.

On June 1 of this year steel mills had a large volume of shipping orders on books, and on July 1 the volume was simply diminished, still making a substantial total. It does not follow that consumption of steel was materially delayed; that if there had been much heavier deliveries in May the actual consumption would have been correspondingly greater; and the same may be said of June.

So far as the passage of time has thus far permitted, the sustained activity in steel production in the summer has quite fallen in with Mr. Farrell's wish expressed at the May meeting of the American Iron and Steel Institute: "Let us spread out this business. Do no let us try to do all the business that we can possibly do in three or four months of the year and have nothing left."

Improvement in equipment, appurtenances and methods has made work in summer easier and thus stimulates it. Here is one reason among several why we have more activity at the mills this summer than in the old-time summer. Along much the same line we see improvement in operation in winter. The railroads are the most notable example, functioning well in spite of the natural impediments of winter. It used to be considered necessary, for instance, for consumers to lay in large stocks of coal for winter. Nowadays they are quite indisposed to stock up to any extent. We have been getting down to steadier work all around.

We are quite aware that what is said above of the greater ease with which high production can now be attained in the summer season does not cover the larger question of the relation between current steel consumption and production. Leaders in the industry, who only two months ago, at the meeting of the American Iron and Steel Institute, were cautioning that "new building be kept within reasonable control" have since been led to ask whether the increasing uses of their products have not been stealing up on our capacity more rapidly than our forecasting formulas have led us to think. The answer to that question may show that the influences immediately shaping the course of the industry are not seasonal but stronger and more permanent.

Pots and Pans

RECENTLY a group of technical editors was privileged to inspect an extensive display of aluminum cooking utensils. Whatever the extent of his limitations as an art critic, one of those present could not escape the impression that the specimens exhibited a wide range in esthetic value. Among them were stew pans, egg cups and double boilers exactly like the ones sold nearly 20 years ago, by door-to-door canvassers, college boys at once earning money for schooling and providing an outlet for the new metal products. These pans conformed to shapes which were arrived at with the least effort and the simplest tools. Economy of production and simple utility were unquestionably the prime considerations in the mind of the manufacturer. Beauty—well, whoever thought of art in pots and pans in 1910?

More recently we have rediscovered the fact that simply because a thing is to be used every day it need not hence be ugly. Rediscovered, because artisans in bygone days successfully blended beauty with utility, even in metal in Damascened sword blades, forged wrought iron grills, hammered vessels, or embossed silverware. The combination of comeliness and grace is possible even in an aluminum stew kettle, for one notable specimen in the exhibit had eye-satisfying proportions of height to diameter; the handle was shapely and set at exactly the right angle; the sides bulged just enough for the height, and the thickness of the plate and roll on

the lip were correct for the other dimensions. A hundred years from now our great-great-grandchildren will give this stew kettle a place of honor in their home, alongside the silver teapot made by Paul Revere; not because the two pieces are antiques, but because they are specimens of metal work in which utility, form and mass have been harmoniously blended by artists who knew the capabilities of the metal they worked and the limitations of their manufacturing methods.

Mending a War Rent

DURING the week of Sept. 9 when our own Institute of Metals will be meeting with sundry steel men in Cleveland, the British Institute of Metals will journey to Düsseldorf and hold joint discussions with the Verein Deutscher Ingenieure and the Deutsche Gesellschaft für Metallkunde. The announcement tells us that the latter gathering is notable because it is the first formal meeting of British engineers with their German associates since 1914. Thus it is apparent, in form at least, that the directors of the British and German societies believe that the war is over.

Whether eleven years is sufficient to heal the deep wounds of the great cataclysm is doubtful; but intellectual intercourse must be resumed sooner or later. Many will absent themselves from the meetings, not a few who do attend will be nervous and somewhat constrained in behavior. Utter frankness, of course, will be impossible. The program recognizes this when it "requests business competitors not to apply for tickets to the various plant visitations." Such plainness of speech is to be preferred to the custom, more honored in the observance than the breach, at some American plants, of detaining the visitor with inconsequential matters until 11:30, then reaching the interesting operations just as the whistle blows for the lunch hour.

The New Natural Gas Boom

SQUARE the diameter in inches of a natural gas pipe line and multiply by 3000. The product is approximately the number of tons of coal per annum represented on a heat unit basis. A 20-inch pipe line represents about 1,200,000 net tons of coal per annum, one-fifth of 1 per cent of our total coal production of late. The lines will not all operate at capacity, but on the other hand the gas will be burned more efficiently than coal, so the comparison is a fair one to furnish a conception of what these pipe lines mean. The steel trade has been much interested in line pipe orders. Thus far the record in size is the 950-mile line from Texas to Chicago, involving 191,000 net tons; but still larger lines are being planned.

The reason natural gas discoveries in the last few years have been bringing such interesting news, and orders, to the steel trade is that the gas was discovered out West, where the distances are great and much of the gas must go several hundred miles to find enough people to consume it. At the same time the financing of these projects has become relatively easy.

The particular activity in this laying of natural gas lines covers thus far a period of less than two years. Lacking an exact count, we estimate that the lines completed in this period and those now being laid will transport about one-third as much natural gas as was produced in 1927. The production of that year was about 1,370,000,000, in thousands of cubic feet. The estimate of increase is only a rough one, but it gives an idea of the importance of the work. Additional projects come up at intervals, but in some quarters it is doubted that there will be enough gas to take care of them all.

In 1927 the three fuels produced, coal, petroleum and gas, represented about 22,624 trillion B.t.u., computed by standards adopted some time ago by the Bureau of Mines, 13,100 B.t.u. per pound of bituminous coal, 13,600 for anthracite, 6,000,000 per barrel of petroleum and 1075 per cubic foot of natural gas. The relative proportions were: Bituminous coal, 60.0 per cent; anthracite, 9.6 per cent; petroleum, 23.9 per cent; natural gas, 6.5 per cent. An addition of one-third to the natural gas would displace more than 3 per cent of the coal, assuming only equal efficiency in realizing the heat units, but the gas should do considerably better than that.

When the gas is piped long distances for domestic use it will frequently if not generally be mixed with gas manufactured from coal or coke. To the old time user of natural gas that is adulteration of the natural gas. To the gas maker it is enriching the manufactured gas, which may not run much over 500 B.t.u. per cubic foot.

The boom in the laying of natural gas lines has played a part worth taking into account in the heavy production of steel during the last 12 months. A 20-inch line 1000 miles long will require from 170,000 to 200,000 net tons of pipe, according to wall thickness, and any long line involves a considerable tonnage of feeder and branch line pipe. A description of the A. O. Smith plant, making electrically welded pipe at Milwaukee, was given in THE IRON AGE of July 11, 1929, pp. 92-4, it being stated that about 100,000 tons of steel a month was being delivered for the manufacture of 26 miles of this pipe daily.

Designing for Low Cost

WHEN a thing can be done in several ways and the least expensive of the acceptable ways is not chosen, there is waste. When, with a free choice of satisfactory materials, one of the more costly is selected, unnecessary expense results. These points are made in a recent article by Morton C. Tuttle, Boston builder, in discussing his industry. Considerations of durability, pleasing appearance, convenience in use and other desirable qualities are assumed to be evaluated in his equation.

"I have observed the building of factories for manufacturing similar metal products," Mr. Tuttle writes, "where some were of brick and timber, some of steel with timber floors, some of steel frame with concrete floors, and others all concrete. Here were four types of structure serving practically like pur-

poses but varying probably 20 per cent in cost. If the less expensive was adequate for its purpose, then, however efficiently the other buildings were erected, they were extravagant."

This same condition is met in manufacturing. It is by cutting corners, where analysis shows they may be cut to advantage, that many dollars are put on the right side of the ledger. But this presupposes competent engineering. The machine must be adequate for its purpose. It must have enough excess strength to allow for the inevitable increase in the loads that will be put upon it—going in many cases far beyond those which it was constructed to bear. The new use of tungsten-carbide tools is a parallel example to the old one of high-speed steel tools, of adding greatly to the stresses imposed on machines which were built before those tools were developed.

Nevertheless, the lesson the Boston builder would impress upon industry will bear repeating. It represents a policy that has become almost axiomatic in the most up-to-date of our industrial establishments. Only by lowering costs of production have the steel companies, in the past five years, been able to earn such dividends as they have paid. Dollars were taken from the cost of making each ton, not only by the Steel Corporation but by its competitors, and at times a good part of this saving was passed along to the buyers in lower prices for the product. The least expensive methods were chosen because they had to be chosen.

Mr. Hoover and the Laws

THE President has put great emphasis upon the necessity for obedience to the laws that have been made, and has pointed out that if we disregard our own laws we are consigning ourselves to destruction, adding that if we do not like the laws we should rescind them. In a way his ideas are reminiscent of what President Grant said to the effect that the best way to abolish a bad law is to enforce it. All of this is quite contrary to our custom of abolishing bad laws by forgetting about them—that is, disregarding them.

This complicated subject probably involves the very roots of our popular form of government. We enact laws in great volume and very many of them reflect no popular will. In the case of laws involving intricate economic and technical questions there is no popular will, inasmuch as 99 per cent or more of the people are entirely ignorant of the subject.

Our laws are largely enacted by trading, or, in the vernacular, by log rolling, and it is far easier to enact them in such a way than it is to undo them. So we continue to have on our statute books the sumptuary laws of the New England States, archaic automobile speed laws, statutes prohibiting the possession of firearms, and many others that are popularly disregarded, but are occasionally invoked when someone has an axe to grind and can make a temporary use of them. The disregard of the 14th and 15th amendments to the Federal Constitution, which began 50 years ago during the administration of President Hayes, is perhaps the most important national example.

But to make a more pointed comment, Mr. Hoover as a mining engineer is thoroughly familiar with the mining laws of the United States and knows how some of their fundamental provisions have been abolished by common consent in the mining districts. No one better than himself knows that if they were strictly observed we should not have a mining industry of the magnitude of the present. He knows, moreover, that the efforts to reform those laws, that have been made during a quarter of a century under the leadership of his own profession, have been a failure. This is, of course, an example of a technical subject about which the public knows little and is incompetent to have any opinion. It is in fact an example of a subject on which Congress ought not to be expected to legislate except in broadest principle.

CORRESPONDENCE

Foreigners Should Pay for Access to the American Market

To the Editor: Let it be noted that the "steel people" who appear at Washington and ask for high duties on what they sell and none on what they buy, as manganese, who find the American a capital fellow to sell to and a reprehensible person to buy from, are not the only people who seem to have this short-sighted idea. Even the down-trodden farmers want duties on farm products, and fertilizer on the free list!

It is time for the country to get rid of these narrow and suicidal ideas. The way to have protection is for everybody to work together and get it, as a national system; not just a series of special favors granted to those who can marshal the most convincing (to the committees) arguments, no matter how specious they themselves may know them to be.

Is it realized how much of a free trade country the United States is? What other country opens its doors so widely to free importations and admits an equal volume of goods duty free? And in that connection it is worth remembering that admission of goods duty free to the largest and highest market in the world is a good deal more than free entry into a small, low market such as most countries offer.

High prices in America are due to high taxes and high taxes are one and the same thing as high civilization and activity. They are inseparable. The American pays taxes far higher than he realizes and is entitled to recover his tax costs when he sells his goods, to leave him enough profit to enable him to do business.

Will somebody please explain in a reasonable way why a foreigner should be given a present of the right to sell goods here free of taxation by National and State Governments, when an American pays dearly for the privilege?

Let it be noted that the iron blast furnaces of the Eastern States, built to supply the domestic market with foundry irons, have been mostly put out of business since the war by increased freight rates and other increases, and that these higher freight rates were necessitated by higher absolute (not apparent only) taxation. The tax items hidden in the cost of a ton of foundry iron, made in America, delivered in Philadelphia, probably equal a good many dollars a ton, which the American producer must pay to make and deliver that iron. Why permit a furnace in India to sell iron in Philadelphia at a tax cost of $1.12½? What is there about the foreign producer that makes him so balky about sharing in the tax costs of this high-level market and entitles him to so much consideration, with none for the American?

ANSON G. BETTS.

West Cummington, Mass., July 25.

Again Block River and Rail Route to Youngstown

The Pittsburgh Coal Co. and its subsidiary, the Montour Railroad Co., both of Pittsburgh, have again been denied by the Interstate Commerce Commission the right to open a new combination river and rail route to connect the Monongahela Valley with the Youngstown district. Some months ago the commission refused to allow the Pittsburgh, Lisbon & Western Railroad, in which the coal company has a controlling interest, to construct two extension that would provide direct rail-and-water connection between Monongahela Valley coal lands and Youngstown. Later the coal company acquired control of the Youngstown Suburban Railroad, which obviated the necessity of building most of the northern extension of the Pittsburgh, Lisbon & Western and sought to have the case reopened.

An entirely new application now probably will be made to the commission, according to H. J. German, president of the Montour Railroad. Although the case is being conducted largely by the coal company and the Montour Railroad, Youngstown district steel companies are greatly interested, as the rail extension would provide Youngstown with direct rail service to the Ohio River and thus allow it to compete with Pittsburgh and Wheeling district companies in the down-river trade.

The Pittsburgh & Lake Erie and Pennsylvania railroads have filed proposed tariff schedules providing for a rate of $1.02 a ton on coal for the haul from Youngstown to the river. The river haul would cost 30c. a ton and, with the cost of transfer from barge to car, the cost of the rail-and-river haul would be higher than the present all-rail rate of $1.34 a ton.

Blaw-Knox Absorbing Steel Casting Co.

Directors of the Blaw-Knox Co., Blawnox, Pa., have ratified a contract with the Union Steel Casting Co., Pittsburgh, providing for exchange of stock whereby control of the Union company will pass to the Blaw-Knox Co. The contract is subject to the depositing by stockholders of the Union company of a sufficient number of shares to constitute control in an amount satisfactory to the Blaw-Knox Co. Similar contracts with the Lewis Foundry & Machine Co., Groveton, Pa., and the National Alloy Steel Co., Blawnox, Pa., have also been ratified by the Blaw-Knox directors.

The Blaw-Knox Co. manufactures transmission towers, concrete road forms, hammer welded steel products, steel floor grating, airplane hangars and a number of other fabricated steel products. The Union Steel Casting Co., a manufacturer of steel castings, also owns the entire capital stock of the Pittsburgh Rolls Corporation, Pittsburgh, which manufactures iron and steel rolls. The Lewis Foundry & Machine Co. is a maker of iron rolls and the National Alloy Steel Co. produces special alloy steel castings. The corporate identity of each of the above companies will be maintained.

Completes Metal Tariff Revision

WASHINGTON, July 30.—Republican members of the Senate Committee on Finance have completed work of revising the metal schedule of the House tariff bill, and while there are numerous reports as to changes, none can be verified. Members of the committee would not discuss the published report that the committee had voted not only to retain a duty on manganese ore but to apply it on concentrates of 10 per cent and more as against the present duty of 1c. a lb. on contained manganese of 30 per cent or more. Whether or not the committee actually has taken this action, the report has created surprise since it had been rather definitely stated that a majority of the Republican members were in favor of either reducing the present duty or removing it altogether and likewise lowering the compensatory duty on ferromanganese.

Cultivation of Structural Steel Mart Bears Fruit

Greater assistance to the fabricators of structural steel in Canada was pledged by Charles F. Abbott, executive director of the American Institute of Steel Construction, New York, in an address before the executives of leading Canadian firms at the Royal York Hotel, Toronto, July 30.

He said, in part: "Trade associations, such as ours, are not limited by the boundaries of a single country. In the development of markets for structural steel the problem in the United States is no different from what it is in Canada. This is especially true, inasmuch as we are primarily concerned with the sale of services—fabrication and erection. Members in Canada are just now very active, but not much more so than the fabricators of structural steel in the United States. Since the institute was organized in 1922 the annual tonnage of our members has more than doubled.

"This great increase in business has been due largely to the efforts we have made to standardize practices and to eliminate industrial waste. The results have been tangible savings to the builder and owner of a steel structure. Practically all the important cities in Canada and the United States have revised their building codes to conform to the recommendations our institute has proposed. Our present research activities promise to increase the use of structural steel to a much greater extent. The steel plate floor for bridges and buildings, making possible taller skyscrapers; steel hangars, which are increasing rapidly as the demands of aviation begin to be felt, and steel dams, of which the greatest developments are in the future, promise to multiply our tonnage several times over again.

"In this work the Canadian fabricators of structural steel have wholeheartedly cooperated in making possible research and market development that is proving highly beneficial to the industry in both countries. Firms that have shown the foresight to support the work of this association are those which the banker, the architect and the owner are beginning to classify as dependable. Our daily mail at our New York and Cleveland offices, and at the district offices established at strategic points throughout Canada and the United States, bears witness of this fact, for the institute is being called upon more and more to advise with buyers of steel structures."

Prest-O-Lite Starts Two New Plants

The Prest-O-Lite Co. has recently added two new acteylene gas plants located at 540 East Seventeenth Street, Wichita, Kan., and at Jones Street and Pennsylvania Railroad, Youngstown, Ohio. These plants will supply local industry with dissolved acetylene for oxy-acetylene welding and cutting. These two increase the number operated by the Prest-O-Lite Co. to 45 gas producing plants, situated in as many industrial centers.

New Detroit Company to Make Cold-Rolled Strip

A. J. Bopp, who has been Detroit district sales agent for the Weirton Steel Co. since 1917, has resigned to form the A. J. Bopp Steel Corporation, which will engage in the manufacture of cold-rolled strip steel, specializing in narrow light-gage material.

A plant site has been purchased in Detroit and contracts for building and equipment will be closed soon.

Fittings for Tubular Booms

American Marine Standards H30-1928 and H31-1929 relate to steel fittings for tubular steel cargo booms, The standards cover both the hinge fitting at the heel of the boom and the sheave fitting, or cap, at the outer end of the boom. Detailed dimensions, adopted as standard, are given in the pamphlet for booms for capacities of 5, 10, 15, 20 and 30 tons. Copies may be obtained for 5c. each from the Government Printing Office, Washington.

Iron and Steel Markets

August Outlook Promising

No Important Recession in Steel Output Indicated—Chicago Mill Bookings Gain—Automobile Industry to Take More Steel in Next Two Months

THE end of July has disclosed no marked recession from the high rate of steel output that has prevailed since early in the year. It is taken for granted that production statistics for the past month will indicate a new July record in steel ingots and an average operating rate approaching that of June. Present interest is not in past performance, but rather in the prospects for coming months.

At Pittsburgh there are evidences of gradual curtailment of steel works activities, although thus far reductions in open-hearth operations have been confined to smaller companies specializing in a few rolled products. Reports from other steel centers, although reflecting slower specifications for certain finished materials, indicate no current or imminent slackening in ingot output.

The Bethlehem Steel Corporation, according to a statement by President Grace, will continue to run at close to capacity throughout August. Chicago mills are not only holding their own, but are increasing their backlogs. Their sales of plates, shapes and bars were 50 per cent heavier than in the previous week, when bookings were fully abreast of the average to date this year. At Cleveland, sheet orders of some mills were larger than the total tonnage for the three preceding weeks of the month.

A particularly good augury, in view of the recent decline in demand for automobile steels, is the fact that motor car makers have arranged shipping schedules for August and September that, for the most part, call for more steel than was delivered to them during the past month. While the Chevrolet Motor Car Co. has reduced its production, the trend among other companies is upward.

The encouraging outlook in steel is commanding special attention in view of the importance of a high rate of operations in terms of steel company profits, as revealed by the quarterly report of the United States Steel Corporation. With prices over the first half of this year (measured by THE IRON AGE composite price for finished steel) averaging only 2¼ per cent higher than those of the first half of 1928, but with production 17 per cent higher this year than last, total earnings went up over 50 per cent, the showing of the first two quarters of the Steel Corporation this year being $132,101,000 and for the same quarters last year $87,867,000.

Competition by Alabama producers for pig iron business in Northern and Eastern markets has accentuated, rather than diminished. Southern basic iron has been quoted at $13 a ton, Birmingham, and less in recent bids for eastern Pennsylvania tonnage. Under this pressure, prices of furnaces in the Philadelphia district are giving ground, as evidenced by concessions of 50c. to $1 a ton from recent quotations on foundry grade. Buffalo producers, on the other hand, having accumulated substantial backlogs, are taking a stronger price position, and the situation with other furnaces on the Great Lakes is satisfactory.

The large demand for pipe for gas lines accounts, in large measure, for the unusual pressure on Chicago plate mills and the overflow of considerable plate tonnage to producers farther east. The placing of 250,000 tons of pipe by Henry L. Doherty & Co., New York, for a gas line from Texas to Chicago is in early prospect. The National Tube Co. has booked 8000 tons of 10 and 12-in. pipe for a line of the Southwestern Gas Co.

Of seasonal significance is an increase in bar specifications from the farm equipment industry, following the completion of inventories.

The construction outlook is promising. The award of 14,000 tons by the Pennsylvania Railroad for a Hackensack River bridge is imminent, and bids on a New York subway section, taking 13,200 tons, will be opened Aug. 2. Structural steel requirements for the Illinois Steel Co.'s expansion program at Gary are estimated at 40,000 to 50,000 tons. Fabricated steel lettings for the week were of average proportions, totaling 33,000 tons. Fresh inquiries called for 36,000 tons.

Rail mill operations continue to taper, now averaging 72 per cent of capacity at Chicago. Demand for track supplies is excellent, however, with new bookings of 7000 tons reported in that district and an inquiry for 6000 tons of tie plates from the New York, New Haven & Hartford pending. The New Haven will also buy rails.

With mill backlogs declining in some products, more is heard of price shading, although market levels as a whole are being maintained. In the Central West weakness in wire nails has become more general, with sales at $2.60 a keg, Cleveland or Pittsburgh, a drop of $1 a ton from the recent minimum. A few mills are competing more aggressively for galvanized sheets, on which 3.50c., Pittsburgh, the price to jobbers, has been extended in certain cases to consumers.

Scrap is buoyant at Pittsburgh, Chicago and other centers, with prices pointing upward.

Exports of rolled and finished steel in the first half, at 1,149,000 tons, showed a gain of 21 per cent over the total for the corresponding period last year.

THE IRON AGE pig iron composite has fallen to $18.38 a ton from the $18.42 of the last two weeks. The finished steel composite remains at 2.412c. a lb.

A Comparison of Prices

Market Prices at Date, and One Week, One Month and One Year Previous, Advances Over Past Week in Heavy Type, Declines in Italics

	July 30, 1929	July 23, 1929	July 2, 1929	July 31, 1928
Pig Iron, Per Gross Ton:				
No. 2 foundry, Philadelphia	*$21.26*	$21.76	$21.76	$20.26
No. 2, Valley furnace	18.50	18.50	18.50	16.50
No. 2 Southern, Cin'ti	17.69	17.69	18.69	19.19
No. 2, Birmingham	14.50	14.50	15.00	15.50
No. 2 foundry, Chicago*	20.00	20.00	20.00	17.50
Basic, del'd eastern Pa.	*20.00*	20.25	20.25	19.00
Basic, Valley furnace	18.50	18.50	18.50	16.00
Valley Bessemer, del'd P'gh	20.76	20.76	20.76	18.76
Malleable, Chicago*	20.00	20.00	20.00	17.50
Malleable, Valley	19.00	19.00	19.00	17.00
Gray forge, Pittsburgh	19.76	19.76	19.76	18.01
L. S. charcoal, Chicago	27.04	27.04	27.04	27.04
Ferromanganese, furnace	105.00	105.00	105.00	105.00
Rails, Billets, etc., Per Gross Ton:				
Rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Light rails at mill	36.00	36.00	36.00	36.00
Rerolling billets, Pittsburgh	35.00	35.00	35.00	32.00
Sheet bars, Pittsburgh	35.00	35.00	35.00	32.00
Slabs, Pittsburgh	35.00	35.00	35.00	32.00
Forging billets, Pittsburgh	40.00	40.00	40.00	38.00
Wire rods, Pittsburgh	42.00	42.00	42.00	42.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.85	1.85	1.85	1.85
Finished Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Bars, Pittsburgh	1.95	1.95	1.95	1.85
Bars, Chicago	2.05	2.05	2.05	2.00
Bars, Cleveland	1.95	1.95	1.95	1.85
Bars, New York	2.29	2.29	2.29	2.19
Tank plates, Pittsburgh	1.95	1.95	1.95	1.85
Tank plates, Chicago	2.05	2.05	2.05	2.00
Tank plates, New York	2.22½	2.22½	2.22½	2.17½
Structural shapes, Pittsburgh	1.95	1.95	1.95	1.85
Structural shapes, Chicago	2.05	2.05	2.05	2.00
Structural shapes, New York	2.19½	2.19½	2.19½	2.14½
Cold-finished bars, Pittsburgh	2.30	2.30	2.30	2.10
Hot-rolled strips, Pittsburgh	1.90	1.90	1.90	1.75
Cold-rolled strips, Pittsburgh	2.75	2.75	2.75	2.90

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

	July 30, 1929	July 23, 1929	July 2, 1929	July 31, 1928
Finished Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 24, P'gh	2.85	2.85	2.85	2.60
Sheets, black, No. 24, Chicago dist. mill	3.05	3.05	3.05	2.75
Sheets, galv., No. 24, P'gh	3.60	3.60	3.60	3.40
Sheets, galv., No. 24, Chicago dist. mill	3.80	3.80	3.80	3.60
Sheets, blue, No. 13, P'gh	2.35	2.35	2.35	2.10
Sheets, blue, No. 13, Chicago dist. mill	2.45	2.45	2.45	2.20
Wire nails, Pittsburgh	*2.60*	2.65	2.65	2.55
Wire nails, Chicago dist. mill	*2.65*	2.70	2.70	2.60
Plain wire, Pittsburgh	2.50	2.50	2.50	2.40
Plain wire, Chicago dist. mill	2.55	2.55	2.55	2.45
Barbed wire, galv., Pittsburgh	3.30	3.30	3.30	3.20
Barbed wire, galv., Chicago dist. mill	3.35	3.35	3.35	3.25
Tin plate, 100 lb. box, P'gh	$5.35	$5.35	$5.35	$5.25
Old Material, Per Gross Ton:				
Heavy melting steel, P'gh	$18.75	$18.75	$18.25	$14.25
Heavy melting steel, Phila	16.50	16.50	16.50	13.00
Heavy melting steel, Ch'go	14.75	14.75	14.75	12.50
Carwheels, Chicago	14.00	14.00	14.00	12.75
Carwheels, Philadelphia	16.50	16.50	16.00	15.50
No. 1 cast, Pittsburgh	15.50	15.50	15.50	14.25
No. 1 cast, Philadelphia	16.50	16.50	16.50	15.50
No. 1 cast, Ch'go (net ton)	14.50	14.50	14.50	13.50
No. 1 RR. wrot., Phila	16.00	16.00	16.00	13.50
No. 1 RR. wrot., Ch'go (net)	13.50	13.50	13.50	10.75
Coke, Connellsville,				
Per Net Ton at Oven:				
Furnace coke, prompt	$2.75	$2.75	$2.75	$2.75
Foundry coke, prompt	3.75	3.75	3.75	3.75
Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	18.12½	18.12½	18.12½	14.75
Electrolytic copper, refinery	17.75	17.75	17.75	14.50
Tin (Straits), New York	47.25	47.25	44.62½	47.75
Zinc, East St. Louis	6.80	6.80	6.70	6.20
Zinc, New York	7.15	7.15	7.05	6.55
Lead, St. Louis	6.55	6.55	6.80	6.00
Lead, New York	6.75	6.75	7.00	6.20
Antimony (Asiatic), N. Y.	8.62½	8.75	8.75	10.00

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Pittsburgh

Expect Curtailed Operations By Mid-August With Better Business in September

PITTSBURGH, July 30.—July has been an exceptionally busy month for Pittsburgh district steel companies, but they will enter August with the declining tendency in specifications unchecked and an almost certain curtailment in operations before the middle of the new month. As it looks now such a curtailment will not be pronounced and will be followed by improved business during September.

Local steel makers, who have expected a falling off in steel demand for several weeks, are well pleased with the rate of business in July and are inclined to view with some favor the prospect of a slight slowing down during August. Operating facilities are feeling the strain of protracted capacity production more than ever now that hot weather has become a factor in output, and a longer breathing spell than is expected next month would be required to prepare the mills for a resumption of activity in the fall comparable to the record of the last four months.

Hot weather interfered with production during the last week, notably in the sheet and tin mill departments. As tonnage releases on sheets have shown very little decline, mills had no opportunity to improve their shipments, and deliveries on the common finishes of sheets are little better than they were a month ago. The same is true of plates, but on other products operations are on about a two-weeks basis, with high production justified only by an exceptionally heavy summer demand.

Wire specifications last week maintained the month's lead over the corresponding period in June, particularly in manufacturers' wire. Weekly tin plate specifications are sufficient to justify a 90 per cent of capacity operation by all leading makers.

Current demand for reinforcing bars is strong, but the requirements of cold-finishing mills are lighter and alloy steel bar shipments have declined sharply. Structural awards in this district are negligible, but large fabricators are well supplied with business and there are a number of large projects in prospect. An order for 20 barges requiring about 3000 tons of steel is said to have been placed recently with a local fabricator.

Prices show no additional weakness. Mills are taking a firmer stand in view of an expected improvement in demand by the end of August and are refusing to meet lower prices than 2.85c., Pittsburgh, on black sheets and 3.60c. on galvanized except to large jobbers. On wire nails large Pittsburgh jobbers have not been able to buy at less than 2.65c.

There is little activity in pig iron and sales are confined almost entirely to fill-in tonnage sufficient to carry melters through August. Prices are holding exceptionally well. The scrap market has also maintained its recent strength in the face of practically no mill buying.

Pig Iron.—Sales continue at about the level of recent weeks with business confined almost entirely to small lots for shipment during August. It

now seems certain that large buyers in the district are not going into the market for third-quarter tonnage of any size, but rather are buying in small lots which, together with iron due them on old contracts, will be sufficient for August requirements. In some quarters it is thought that a buying movement of considerable proportions will develop during September. The Standard Sanitary Mfg. Co. has made small purchases for its Pittsburgh and New Brighton, Pa., plants, but the total in neither case ran more than 1500 tons; at least three furnaces shared in this business and full market prices were obtained. Shipments are keeping up fairly well for this time of the year and there is little opportunity for furnace stocks to accumulate. In many cases aggregate sales of local agents for the week are entirely sufficient to take the output of the furnace which they represent. Prices are well established at $18.50, Valley, for foundry and basic iron, and $19 for malleable and Bessemer. A Pittsburgh district furnace is quoting prices 50c. over these figures.

Prices per gross ton, f.o.b. Valley furnace:

Basic	$18.50
Bessemer	19.00
Gray forge	18.00
No. 2 foundry	18.50
No. 3 foundry	18.00
Malleable	19.00
Low phos., copper free	27.00

Freight rate to Pittsburgh or Cleveland district, $1.76.

Prices per gross ton, f.o.b. Pittsburgh district furnace:

Basic	$19.00
No. 2 foundry	19.00
No. 3 foundry	18.50
Malleable	19.50

Freight rates to points in Pittsburgh district range from 63c. to $1.13.

Semi-Finished Steel.—Hot weather has affected steel production adversely in the last week, but correspondingly reduced demand from finishing mills has prevented any shortage. However, the supply of unfinished steel in this and nearby districts is still sufficient only to meet current demand and producers have not yet had the opportunity to accumulate stocks which they would normally maintain. Some of the smaller mills in the district whose open-hearth output goes into only one or two products have recently taken out furnaces, but the larger interests are still holding production at as near physical capacity as possible. Semi-finished steel is not being freely offered in the open market, but it is now nearly always possible to purchase spot tonnage in case of urgent demand. Large users of sheet bars have their requirements for this quarter under contract, but consumers of billets and slabs are reported to be delaying their commitments until the price is definitely settled. At present sheet bars, billets and slabs are generally quoted at $35, Pittsburgh or Youngstown, although a few makers with limited quantities for sale are asking a dollar more on spot tonnage. Wire rods are unchanged at $42, Pittsburgh or Cleveland, and the movement is very satisfactory for this time of the year.

Rails and Track Supplies.—The New York, New Haven & Hartford Railroad is expected to close this week on an unstated rail tonnage and is also inquiring for 5000 to 6000 tons of tie plates. Otherwise this market is rather quiet and little activity is expected before September. Specifications on contract business are coming in well for the summer period, but shipments have been tapering off gradually for several weeks. Prices are being regularly adhered to, except in the case of light rails, on which concessions are being made to meet the price of the rerolled product.

Bars, Shapes and Plates.—Tonnage releases on bars and shapes continue to taper, but local producers find demand for plates almost as strong as it was earlier in the spring, allowing little opportunity for improved deliveries. Mills are booked for six to eight weeks, and reports are current that the tight situation in Chicago is again forcing large consumers in that district to seek tonnage in this territory. Car builders in this district are still specifying plates freely, and an order for 20 barges reported to have been placed during the week will further extend the backlogs of local barge builders. Demand for bars has felt the summer lull this month, and backlogs of all mills have been substantially reduced. The cold-finishing mills are requiring considerably less steel than they were in June, and shipments of alloy steel bars have declined materially. Reinforcing bars are holding up well, and, although large tonnage awards have been lacking in the last two weeks, the volume of small business has been gratifying. Prospective structural business bulks large. An addition to the Bell Telephone Building in Pittsburgh will require about 3000 tons and another office building under consideration will take a greater tonnage. A local fabricator has been awarded 2000 tons of structural steel for two railroad bridges in Indiana. Prices on the heavy hot-rolled products show little if any weakness, with 1.95c., Pittsburgh, the ruling quotation.

Wire Products.—Shipments of manufacturers' wire during July will be fully equal to those of June, and one maker reports a gain this month of at least 10 per cent. Specifications are coming in at a high rate for this season. Other wire products are quiet, with demand for barbed wire and other agricultural products considerably reduced. Wire prices are well maintained at 2.50c. to 2.60c., Pittsburgh or Cleveland. Wire nails show little improvement and reports persist that prices are being sharply reduced at points down the Ohio River. However, large Pittsburgh jobbers have not been able to buy nails at less than 2.65c., Pittsburgh, and a $2 premium is occasionally required on small tonnages.

Tubular Goods.—The pipe market is alive with reports of large prospective gas lines, and, although local mills are not inclined to give credence to many of the current stories, it seems definitely assured that the development of electrically welded pipe has opened up unusual possibilities for the piping of natural gas to large centers of population. A second line into Chicago from the Texas fields, which would require at least 200,000 tons of pipe, is considered quite active, and in view of the heavy tonnage booked last week by the Milwaukee fabricator, makers of lap-welded tubing in the Pittsburgh and Youngstown districts expect to share in this business if it is placed. A gas line into New York and

The Iron Age Composite Prices

Finished Steel

July 30, 1929, 2.412c. a Lb.

One week ago	2.412c.
One month ago	2.412c.
One year ago	2.319c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products make 87 per cent of the United States output of finished steel.

	High		Low	
1929	2.412c.,	April 2;	2.391c.,	Jan. 8
1928	2.391c.,	Dec. 11;	2.314c.,	Jan. 3
1927	2.453c.,	Jan. 4;	2.293c.,	Oct. 25
1926	2.453c.,	Jan. 5;	2.403c.,	May 18
1925	2.560c.,	Jan. 6;	2.396c.,	Aug. 18

Pig Iron

July 30, 1929, $18.38 a Gross Ton

One week ago	$18.42
One month ago	18.63
One year ago	17.04
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low	
1929	$18.71,	May 14;	$18.29,	March 19
1928	18.59,	Nov. 27;	17.04,	July 24
1927	19.71,	Jan. 4;	17.54,	Nov. 1
1926	21.54,	Jan. 5;	19.46,	July 13
1925	22.50,	Jan. 13;	18.96,	July 7

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base per Lb.
F.o.b. Pittsburgh mill	1.95c.
F.o.b. Chicago	2.05c.
Del'd Philadelphia	2.27c.
Del'd New York	2.29c.
Del'd Cleveland	1.92½c. to 1.95c.
F.o.b. Cleveland	1.90c. to 1.95c.
F.o.b. Lackawanna	2.05c.
F.o.b. Birmingham	2.15c.
C.i.f. Pacific ports	2.35c.
F.o.b. San Francisco mills	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills, 40, 50, 60-ft.	2.05c.
F.o.b. Pittsburgh mills, cut lengths	2.30c.
F.o.b. Birmingham, mill lengths	2.15c.

Rail Steel

F.o.b. mills, east of Chicago dist.	1.85c. to 1.90c.
F.o.b. Chicago Heights mill	1.95c.
Del'd Philadelphia	2.27c.

Iron

Common iron, f.o.b. Chicago	2.05c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	2.12c.
Common iron, del'd New York	2.14c.

Tank Plates

	Base per Lb.
F.o.b. Pittsburgh mill	1.95c.
F.o.b. Chicago	2.05c.
F.o.b. Birmingham	2.15c.
Del'd Cleveland	2.14c.
Del'd Philadelphia	2.15c.
F.o.b. Coatesville	2.05c.
F.o.b. Sparrow Point	2.05c.
F.o.b. Lackawanna	2.05c.
Del'd New York	2.22½c.
C.i.f. Pacific ports	2.35c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh mill	1.95c.
F.o.b. Chicago	2.05c.
F.o.b. Birmingham	2.15c.
F.o.b. Lackawanna	2.05c.
F.o.b. Bethlehem	2.05c.
Del'd Cleveland	2.14c.
Del'd Philadelphia	2.01c. to 2.06c.
Del'd New York	2.14½c.
C.i.f. Pacific ports	2.35c.

Hot-Rolled Hoops, Bands and Strips

	Base per Lb.
6 in. and narrower, P'gh	2.00c.
Wider than 6 in., P'gh	1.90c.
6 in. and narrower, Chicago	2.20c.
Wider than 6 in., Chicago	2.10c.
Cooperage stock, P'gh	2.20c.
Cooperage stock, Chicago	2.30c.

Cold-Finished Steel

	Base per Lb.
Bars, f.o.b. Pittsburgh mill	2.30c.
Bars, f.o.b. Chicago	2.30c.
Bars, Cleveland	2.35c.
Shafting, ground, f.o.b. mill	*2.65c. to 3.60c.
Strips, P'gh	2.75c.
Strips, Cleveland	2.75c.
Strips, del'd Chicago	3.05c. to 3.15c.
Strips, Worcester	2.90c. to 3.00c.
Fender stock, No. 20 gage, Pittsburgh or Cleveland	4.25c.

*According to size.

Wire Products

(Carload lots, f.o.b. Pittsburgh and Cleveland, to jobbers and retailers.)

	Base per Keg
Wire nails	$2.60 to $2.75
Galvanized nails	4.65 to 4.75
Galvanized staples	3.35 to 3.45
Polished staples	3.10 to 3.20
Cement coated nails	2.65 to 2.75

	Base per 100 Lb.
Bright plain wire, No. 6 to No. 9 gage	$2.50 to $2.60
Annealed fence wire	2.65 to 2.75
Spring wire	3.50 to 3.60
Galv'd wire, No. 9	3.10 to 3.20
Barbed wire, galv'd	3.30 to 3.40
Barbed wire, painted	3.05 to 3.15
Woven wire fence (per net ton to retailers)	65.00

Chicago district mill and delivered Chicago prices are $1 per ton above the foregoing. Birmingham mill prices $3 a ton higher; Worcester, Mass. (wire), mill $3 a ton higher on production of that plant; Duluth, Minn., mill $2 a ton higher; Anderson, Ind., $1 higher.

Cut Nails

	Per 100 Lb.
Carloads, Wheeling, Reading or Northumberland, Pa.	$2.70
Less carloads, Wheeling or Reading	2.80

Light Plates

No. 10, blue annealed, f.o.b. P'gh.	2.10c. to 2.20c.
No. 10, blue annealed, f.o.b. Chicago dist.	2.30c.
No. 10, blue annealed, del'd Phila.	2.42c. to 2.52c.
No. 10, blue annealed, B'ham	2.35c.

Sheets

Blue Annealed

	Base per Lb.
No. 18, f.o.b. P'gh	2.25c. to 2.35c.
No. 18, f.o.b. Chicago dist.	2.45c.
No. 18, del'd Philadelphia	2.67c.
No. 18, blue annealed, B'ham	2.50c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh	2.85c.
No. 24, f.o.b. Chicago dist. mill	3.05c.
No. 24, del'd Philadelphia	3.17c. to 3.27c.
No. 24, f.o.b. Birmingham	3.00c. to 3.10c.

Metal Furniture Sheets

No. 24, f.o.b. P'gh	4.10c. to 4.20c.

Galvanized

No. 24, f.o.b. Pittsburgh	3.50c. to 3.60c.
No. 24, f.o.b. Chicago dist. mill	3.80c.
No. 24, del'd Cleveland	3.69c. to 3.79c.
No. 24, del'd Philadelphia	3.92c. to 4.02c.
No. 24, f.o.b. Birmingham	3.75c. to 3.85c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.90c. to 3.00c.
No. 28, f.o.b. Chicago dist. mill	3.10c.

Automobile Body Sheets

No. 28, f.o.b. Pittsburgh	4.10c.

Long Ternes

No. 24, 8-lb. coating, f.o.b. mill	4.00c.

Vitreous Enameling Stock

No. 24, f.o.b. Pittsburgh	3.90c.

Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills	$5.35
Standard cokes, f.o.b. Gary	5.45

Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)
(Per Package, 20 x 28 in.)

8-lb. coating I.C.	$11.20
15-lb. coating I.C.	14.00
20-lb. coating I.C.	15.30
25-lb. coating I.C.	$16.70
30-lb. coating I.C.	17.75
40-lb. coating I.C.	19.85

Alloy Steel Bars

(F.o.b. makers' mill)

Alloy Quality Bar Base, 2.65c. to 2.75c. per Lb.

S.A.E. Series Numbers		Alloy Differential
2000	(½% Nickel)	0.25
2100	(1½% Nickel)	0.55
2300	(3½% Nickel)	1.50
2500	(5% Nickel)	2.25
3100	Nickel Chromium	0.55
3200	Nickel Chromium	1.35
3300	Nickel Chromium	3.80
3400	Nickel Chromium	3.20
4100	Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50
4100	Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600	Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel)	1.05
5100	Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100	Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100	Chromium Spring Steel	0.20
6100	Chromium Vanadium Bars	1.20
6100	Chromium Vanadium Spring Steel	0.95
9250	Silicon Manganese Spring Steel (flats)	0.25
	Rounds and squares	0.50
Chromium Nickel Vanadium		1.50
Carbon Vanadium		0.95

Above prices are for hot rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is ¾c. per lb. higher. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis.

Billets under 4 x 4 in. carry the steel bar base. Slabs with a sectional area of 16 in. or over carry the billet price. Slabs with sectional area of less than 16 in. or less than 2½ in. thick, regardless of sectional area, take the bar price.

Rails

	Per Gross Ton
Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	36.00
Light (from rail steel), f.o.b. mill	34.00
Light (from billets), f.o.b. Ch'go mill	36.00

Track Equipment

	Base per 100 Lb.
Spikes, ⅝ in. and larger	$2.80
Spikes, ½ in. and smaller	2.80
Spikes, boat and barge	3.00
Tie plate, steel	2.15
Angle bars	$2.75
Track bolts, to steam railroads	$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel Inches	Black	Galv.	Iron Inches	Black	Galv.
⅛	45	19½	¼ and ⅜	+11	+36
¼ to ⅜	51	25½	½	23	5
½	56	42½	¾	28	11
¾	60	48½	1 and 1¼	31	15
1 to 3	62	50½	1½ and 2	35	18

Lap Weld

2	55	43½	2	23	9
2½ to 6	59	47½	2½ to 3½	28	13
7 and 8	56	43½	4 to 6	30	17
9 and 10	54	42½	7 and 8	29	16
11 and 12	53	40½	9 to 12	26	11

Butt Weld, extra strong, plain ends

⅛	41	24½	¼ and ⅜	+13	+48
¼ to ⅜	47	30½	½	23	7
½	53	42½	¾	28	12
¾	58	47⅞	1 to 2	34	18
1 to 1½	60	49½			
2 to 3	61	50½			

Lap Weld, extra strong, plain ends

2	53	42½	½	29	13
2½ to 4	57	46½	2½ to 4	34	20
4½ to 6	56	45½	4½ to 6	33	19
7 to 8	52	39½	7 and 8	31	17
9 and 10	45	32½	9 to 12	21	8
11 and 12	44	31½			

On carloads the above discounts on steel pipe are increased on block by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Steel		Charcoal Iron	
2 in. and 2¼ in.	40	1½ in.	1
2½ in.—2¾ in.	48	1¾ in.	8
3 in.	54	2 in.—2¼ in.	13
3¼ in.—3¾ in.	56	2½ in.—2¾ in.	16
4 in.	59	3 in.	17
4½ in. to 6 in.	48	3¼ in. to 3½ in.	18
		4 in.	20
		4½ in.	21

On lots of a carload or more, the above base discounts are subject to a preferential of two fives on steel and of 10 per cent on charcoal iron tubes. Smaller quantities are subject to the following modifications from the base discounts:

Lap Welded Steel—Under 10,000 lb., 6 points under base and one five; 10,000 lb. to carload, 4 points under base and two fives. Charcoal Iron—Under 10,000 lb., 2 points under base; 10,000 lb. to carload, base and one five.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	63	3 in.	48
1¼ to 1½ in.	55	3¼ to 3½ in.	50
1¾ in.	39	4 in.	53
2 to 2¼ in.	34	4½, 5 and 6 in.	42
2½ to 2¾ in.	42		

Hot Rolled

2 and 2¼ in.	40	3¼ to 3½ in.	56
2½ and 2¾ in.	48	4 in.	59
3 in.	54	4½, 5 and 6 in.	48

Beyond the above base discounts a preferential discount of 5 per cent is allowed on carload lots. On less than carloads to 10,000 lb. base discounts are reduced 4 points with 5 per cent preferential; on less than 10,000 lb., base discounts are reduced 6 points, with no preferential. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage take mechanical tube list and discounts. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30%, base (carloads)	55
Carbon, 0.30% to 0.40%, base	50

Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

other Eastern cities is under consideration, and although such a line would likely originate in West Virginia, a much more distant field is being considered. As mentioned in THE IRON AGE last week, a part of the feeder pipe required for the Southwestern Gas Co. line running from Monroe, La., to Birmingham, Ala., and Atlanta, Ga., was placed with the Republic Iron & Steel Co., to be made by the electrical welding process. The 10-in. and 12-in. pipe required for this line has been placed with the National Tube Co., the requirements being about 8000 tons. Seamless pipe is fairly active, with mills in the district operating at around 75 per cent of rated capacity. Mechanical and boiler tubing are also moving steadily.

Sheets.—Hot weather interfered with sheet production during the last week, but operations held at close to 95 per cent of capacity. Tonnage releases on all finishes of sheets continue large, and capacity output during August would not completely dispose of mill commitments. The price situation is unchanged, with galvanized sheets quotable at 3.50c. to 3.60c., Pittsburgh, and black at 2.85c. Companies producing blue annealed sheets on jobbing mills refuse to take business on the No. 10 base at less than 2.20c., Pittsburgh, but makers of wide strips are freely making concessions of $2 or more a ton. On the No. 13 gage base, concessions from the 2.35c., Pittsburgh, price are not common.

Tin Plate.—Weekly specifications justify 90 per cent operations, with most makers and mills holding at about that rate. This is considered very satisfactory for the summer months, and crop reports from most parts of the country justify the belief that current demand will not taper off very much during August.

Strip Steel.—Demand for strip steel is spotty and few makers are able to maintain well-rounded production. Companies serving the two large makers of low-priced automobiles have heavy commitments on certain sizes and widths, but are able to make deliveries in a week or two on other sizes. In some cases specifications this month are running ahead of June, but these are exceptional and most mills would consider a July tonnage as high as June more than satisfactory. No further price weakness is reported, hot-rolled material holding at 1.90c. and 2c., Pittsburgh, and cold-rolled at 2.75c.

Coal and Coke.—Demand for furnace coke is seasonably dull, and the leading interest in the Connellsville region has taken out a number of ovens. Independent producers have also curtailed slightly. Prices on the furnace grade are unchanged at $2.75 to $2.85, Connellsville, with slightly higher quotations ruling on future requirements. Shipments of foundry coke are probably at the low point of the year, with prices generally weak on all except the premium grades. The coal market is without feature, unless the continued chaotic price situation might be considered as such.

Warehouse Business.—Movement of steel out of warehouse stocks is fairly satisfactory for this time of the year, with activity well distributed throughout the various lines. Galvanized corrugated sheets are moderately active and demand for reinforcing bars is good. New extras on cold-finished steel bars, which were recently announced by mills, will have no effect on warehouse prices before the third quarter. Jobbers are now selling blue annealed sheets on the two bases established some time ago by the mills, with the No. 10 gage quoted at 3.45c. per lb. in lots of 1 to 10 sheets, and the No. 13 gage at 3.60c. per lb. Warehouse prices on wire nails have developed weakness, and nails are now quotable at $2.90 to $3, base, per keg.

Old Material.—Despite a week of exceptionally light activity, the scrap market has retained its strength, and although quotations cannot be changed on the basis of actual sales, the tendency seems to be toward higher prices. High quotations on the heavy grades of steel have forced up prices on the light materials and developed a scarcity in such products as short shoveling steel turnings and machine shop turnings. Compressed sheets are very tight as buying prices in Detroit have advanced, and heavy water movement from that point is diverting tonnage which might ordinarily come to Pittsburgh into other territories. No sales of compressed sheets at higher than $18.50 have been reported in this district, but dealers are forced to pay a price at Detroit which figures to $18.50, delivered Pittsburgh, without the ordinary brokers' commission. Specialties continue scarce and heavy steel axle turnings have advanced 25c. on a recent sale. There are hold-ups at two consuming points in this district but other large plants are requiring scrap at an undiminished rate, and if steel operations continue at the present schedules through the early part of August, an even stronger scrap market is expected. Bids will be taken on Aug. 7 on the July Pennsylvania Railroad list, which contains 55,000 tons. The Baltimore & Ohio list, which closes Aug. 5,. contains 18,400 tons.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$18.50 to $19.00
No. 2 heavy melting steel	16.50 to 17.00
Scrap rails	18.00 to 18.50
Compressed sheet steel	18.00 to 18.50
Bundled sheets, sides and ends	17.00 to 17.50
Cast iron carwheels	16.50 to 17.00
Sheet bar crops, ordinary	19.50 to 20.00
Heavy breakable cast	13.00 to 13.50
No. 2 railroad wrought	18.50 to 19.00
Hvy. steel axle turnings	16.50 to 17.00
Machine shop turnings	12.00 to 12.50
Acid Open-Hearth Grades:	
Railr. knuckles and couplers	21.50 to 22.00
Railr. coil and leaf springs	21.50 to 22.00
Rolled steel wheels	21.50 to 22.00
Low phos. billet and bloom ends	22.50 to 23.00
Low phos., mill plates	22.50 to 23.00
Low phos., light grades	20.50 to 21.50
Low phos., sheet bar crops	20.50 to 21.50
Heavy steel axle turnings	16.50 to 17.00
Electric Furnace Grades:	
Low phos., punchings	20.00 to 21.00
Hvy. steel axle turnings	16.50 to 17.00
Blast Furnace Grades:	
Short shoveling steel turnings	12.50 to 13.00
Short mixed borings and turnings	12.50 to 13.00
Cast iron borings	12.50 to 13.00
Rolling Mill Grades:	
Steel car axles	21.50 to 22.00
Cupola Grades:	
No. 1 cast	15.00 to 16.00
Rails 3 ft. and under	20.00 to 21.00

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.25c.
Hoops	4.25c.
Black sheets (No. 24), 25 or more bundles	3.80c.
Galv. sheets (No. 24), 25 or more bundles	4.55c.
Light plates, blue ann'l'd, (No. 10), 1 to 10 plates	3.45c.
Blue annealed sheets (No. 13), 1 to 10 sheets	3.60c.
Galv. corrug. sheets (No. 28), per square	$4.43
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count,	60 per cent off list
Machine bolts, 100 count,	60 per cent off list
Carriage bolts, 100 count,	60 per cent off list
Nuts, all styles, 100 count,	60 per cent off list
Large rivets, base per 100 lb.	$3.50
Wire, black soft ann'l'd, base per 100 lb.	$3.00 to 3.10
Wire, galv. soft, base per 100 lb.	3.00 to 3.10
Common wire nails, per keg	2.90 to 3.00
Cement coated nails, per keg	3.05

To Make High-Strength Iron Castings

Davies & Thomas Co., Catasauqua, Pa., and William Sargent, Newark, N. J., have taken licenses from a group of German firms to manufacture high-strength iron castings under the so-called "Perlit" process. The first-named firm is now adapting its foundry for production, which will start in the near future.

The Third National Fuels Meeting, to be held in Philadelphia, Oct. 7-10, will have a series of papers on the domestic heating plant. The domestic use of gas, oil, electricity, anthracite and bituminous coal and coke will be covered.

"Oil Heat" is the title of a booklet issued by the Oil Heating Institute, 342 Madison Avenue, New York, and devoted to the use of oil-burning equipment for domestic purposes. It is illustrated with both line cuts and half-tones, the former using color.

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

Billets and Blooms

	Per Gross Ton
Rerolling, 4 in. and under 10 in., Pittsburgh	$35.00
Rerolling, 4 in. and under 10 in., Youngstown	35.00
Rerolling, 4 in. and under 10 in., Cleveland	35.00
Rerolling, 4 in. and under 10 in., Chicago	37.00
Forging quality, Pittsburgh	$40.00 to 41.00

Sheet Bars

(Open Hearth or Bessemer)

	Per Gross Ton
Pittsburgh	$35.00
Youngstown	35.00
Cleveland	35.00

Slabs

(8 in. x 2 in. and under 10 in. x 10 in.)

	Per Gross Ton
Pittsburgh	$35.00
Youngstown	35.00
Cleveland	35.00

Skelp

(F.o.b. Pittsburgh or Youngstown)

	Per Lb.
Grooved	1.85c. to 1.90c.
Universal	1.85c. to 1.90c.
Sheared	1.85c. to 1.90c.

Wire Rods

(Common soft, base)

	Per Gross Ton
Pittsburgh	$42.00
Cleveland	42.00
Chicago	43.00

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.80
Old range non-Bessemer, 51.50% iron	4.65
Mesabi Bessemer, 51.50% iron	4.65
Mesabi non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.40

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algerian	10.00c.
Iron ore, low phos., Swedish, average 68% iron	10.00c.
Iron ore, basis Swedish, average 65% iron	9.00c.
Manganese ore, washed, 52% manganese, from the Caucasus	33.00c. to 35.00c.
Manganese ore, Brazilian, African or Indian, basic 50%	33.00c. to 35.00c.
Tungsten ore, high grade, per unit, in 60% concentrates	$15.00 to $15.50

	Per Gross Ton
Chrome ore, 45 to 50% Cr_2O_3, crude, c.i.f. Atlantic seaboard	$22.00 to $24.00

	Per Lb.
Molybdenum ore, 85% concentrates of MoS_2, delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$2.75 to $2.85
Foundry, f.o.b. Connellsville prompt	3.75 to 4.85
Foundry, by-product, Ch'go ovens	8.00
Foundry, by-product, New England, del'd	11.00
Foundry, by-product, Newark or Jersey City, delivered	9.00 to 9.40
Foundry, by-product, Phila.	9.00
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry by-prod., del'd St. Louis	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.25 to $1.75
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, ¾-in. f.o.b. Pa. mines	1.90 to 2.00
Mine run gas coal, f.o.b. Pa. mines	1.65 to 1.75
Steam slack, f.o.b. W. Pa. mines	80c. to 90c.
Gas slack, f.o.b. W. Pa. mines	1.00 to 1.10

Ferromanganese

	Per Gross Ton
Domestic, 80%, seaboard	$105.00
Foreign, 80%, Atlantic or Gulf port, duty paid	105.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$31.00 to $34.00
Domestic, 16 to 19%	29.00 to 32.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$83.50
75%	130.00

Per Gross Ton Furnace		*Per Gross Ton Furnace*	
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	45.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

Per Gross Ton		*Per Gross Ton*	
10%	$30.00	12%	$34.00
11%	32.00		

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

Per Gross Ton		*Per Gross Ton*	
6%	$23.00	10%	$27.00 to $28.00
7%	24.00	11%	29.00 to 30.00
8%	25.00	12%	31.00 to 32.00
9%	26.00		

Other Ferroalloys

Ferrotungsten, per lb., contained metal del'd	$1.40 to $1.50
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.15 to $3.65
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	$160.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton	$91.00
Ferrophosphorus, electric 24%, f.o.b. Anniston, Ala., per gross ton	$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silicon, gravel, f.o.b. Illinois and Kentucky mines	$18.00
No. 2 lump, Illinois and Kentucky mines	20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	$18.00 to $18.50
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines	32.50

Fire Clay Brick

	Per 1000 f.o.b. Works	
	High-Heat Duty Brick	Intermediate Heavy Duty Brick
Pennsylvania	$43.00 to $46.00	$35.00 to $38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	.....
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00
Standard size	45.00

Chrome Brick

	Per Net Ton
Standard size	$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts, blank or tapped, hexagons	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	7.00c. to 6.75c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled thread up to and including ⅛ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagons nuts	70
Semi-finished hexagons castellated nuts, S.A.E.	70
Stove bolts in packages, P'gh	75, 20, 10 and 5
Stove bolts in packages, Chicago	75, 20, 10 and 5
Stove bolts in packages, Cleveland	75, 20, 10 and 5
Stove bolts in bulk, P'gh	75, 20, 10, 5 and 2½
Stove bolts in bulk, Chicago	75, 20, 10, 5 and 2½
Stove bolts in bulk, Cleveland	75, 20, 10, 5 and 2½
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55, 60 per cent apply.

Large Rivets

(½-In. and Larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$3.10
F.o.b. Chicago	3.20

Small Rivets

(7/16-In. and Smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70 and 10
F.o.b. Cleveland	70 and 10
F.o.b. Chicago	70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10 and 5
Milled standard set screws, case hardened	80 and 5
Milled headless set screws, cut thread	75 and 10
Upset hex. head cap screws, U.S.S. thread	85
Upset hex. cap screws, S.A.E. thread	85
Upset set screws	80, 10 and 5
Milled studs	70

Chicago

Bookings of Steel Mills Growing—No Pre-Autumn Recession Looked For—Wire Nails Weak

CHICAGO, July 30.—Sales of plates, shapes and bars are fully 50 per cent heavier than in the previous week, when new purchases were abreast of the average for the year. Lower rolling schedules in rail mills and reduced demands for automobile steels have simplified the problem of distributing steel among finishing departments. No longer handicapped by the allocation of semi-finished steel, Western mills have set out to increase their plate mill bookings and thereby to check, in some measure, the flow of orders to Eastern mills.

It is worthy of note that sales of rails and semi-finished steel were almost wholly lacking in the past week, while for the third consecutive seven-day period plate bookings have overshadowed new commitments in other steel products.

Producers' books are growing, while specifications hold steady at the current shipping rate, which is virtually equal to local mill capacity. The general market, while satisfactory throughout the summer, now seems to be growing even more active and thoughts of a possible slowing down before fall have passed from the minds of buyers and sellers.

Preliminary estimates indicate that steel ingot production for July has established a record for that month. Each of the seven months in 1929 has been a record for that particular month.

The local scrap market is in the hands of brokers, who are gaining confidence in the near future, as indicated by their willingness to take long positions. Railroad lists are being bid at higher prices and miscellaneous lots of the heavy-tonnage grades are quickly taken out of the market at steadily advancing prices.

Pig Iron.—Shipments of Northern iron will not establish a record for July, but the tonnage added to the total for the previous six months sets a record for any seven months' period. With one merchant stack out for relining, heavy drafts are being made against stocks in the hands of producers. In fact, it is thought by some that, had full pig iron producing capacity been available in July, shipments would have set a record. Six merchant furnaces are in blast, and it is probable that the Iroquois stack will be relined in time to be lighted by the middle of August. Stocks at furnaces are low, a situation which is unusual at the approach of the final quarter. New purchases are in moderate volume. A number of melters who are now buying third quarter iron are extending their contracts to cover the remainder of the year. Silvery releases are larger from users in western Michigan. Recently reduced prices, which lack strength, have failed to stimulate widespread buying. Stocks at charcoal iron furnaces, though smaller than in the late spring, are still of ample size to insure prompt delivery of most grades. The Southern iron market is quiet except for odd carlots placed in many cases as trial orders.

Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	$20.00
N'th'n No. 1 fdy., sil. 2.25 to 2.75	20.50
Malleable, not over 2.25 sil.	20.00
High phosphorus	20.00
Lake Super. charcoal, sil. 1.50	27.04
So'th'n No. 2 fdy. (all rail)	$19.51 to 20.51
Low phos., sil. 1 to 2, copper free	29.50
Silvery, sil. 8 per cent	29.79
Bess. ferrosilicon, 14-15 per cent	46.29

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Ferroalloys.—New sales of spiegeleisen are light, and shipments against past obligations are smaller. Consumers of ferromanganese are ordering freely against old contracts.

Prices delivered Chicago: 80 per cent ferromanganese, $112.56; 50 per cent ferrosilicon, $83.50 to $88.50; spiegeleisen, 19 to 21 per cent, $40.76.

Plates.—For the second week, plate sales account for a large part of current orders to local mills, in fact, a larger share than last week, in view of a lack of rail and semi-finished purchases recently. Chicago plate mills are operating at capacity and new specifications, which are fully equal to shipments, assure heavy output for some time to come. Backlogs are unusually heavy, not only in proportion to local capacity, but also with respect to the season. Tank building programs continue to make headway, though no awards are reported. Fabricating shops are taking steel plates as fast as mills can make deliveries, which now range from six to eight weeks. New business in railroad equipment is light. The Great Northern is asking for prices on 300 underframes. In some quarters this is looked upon as a feeler, which may lead to the purchase of cars rather than underframes. Specifications from car shops are of moderate size, and shipments against past releases are large, while shops are pressing for quicker deliveries. Recent heavy sales of plates, largely for the manufacture of pipe, are interpreted by some as indicating a desire to hold more of this business for local mills. The drop in demand for automobile steels and a lessened rate of rail output is easing the problem of allotting steel to finishing departments. This permits greater production by plate mills.

Hot-Rolled Strip.—Specifications are fully equal to production, which is at local mill capacity. Prices are steady.

Structural Material.—Fabricators are looking to the future with greater confidence as the pending list grows and a more liberal number of small-tonnage contracts are placed. Although shop backlogs are not materially changed in size, enough work has been placed to keep unfilled business practically stationary, which is more than fabricators had expected in the midsummer weeks. Although official figures are not available, it is variously estimated that the Illinois Steel Co.'s expansion program will call for 40,000 to 50,000 tons of structural material. A Detroit fabricator is said to have taken 2000 tons for a branch plant of the Chevrolet Motor Car Co., and the Big Four railroad has ordered 2000 tons for a bridge at Terre Haute, Ind. Plans are being prepared for the Garrett Biblical Institute building at Chicago. Bids will be taken on the 6000 tons needed some time in the early fall. It is reported that legal obstacles are delaying the award of 3600 tons for the Thompson Building, Chicago.

Mill prices on plain material, per lb.: 2.05c. base, Chicago.

Bars.—Sales of bars are practically double those in the previous week, which were fully abreast of the average for the year. Specifications are equal to shipments, which are going forward at local mill capacity. Demand for mild steel bars is well diversified both as to character of specifications and as to consumers. Agricultural implement manufacturers are taking larger quantities now that inventories are out of the way. Forgers are taking heavier tonnages and cold-drawn steel producers, as well as bolt and nut makers, are taking liberal quantities. Prices for mild steel bars are steady at 2.05c. a lb., Chicago. Demand for alloy steel bars is steady from the majority of users, but consumption by automobile manufacturers is at low ebb, judged by releases to Chicago mills. In some cases, schedules that called for larger releases about Aug. 1 have been postponed to Aug. 15. This, however, is not taken as a reflection of the state of automobile

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars	3.00c.
Reinforc'g bars, billet steel	2.15c. to 2.35c.
Reinforc'g bars, rail steel	1.85c. to 1.95c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Bands (1/8 in. in Nos. 10 and 12 gages)	3.20c.
Hoops (No. 14 gage and lighter)	3.75c.
Black sheets (No. 24)	4.05c.
Galv. sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.35c.
Spikes, 5/8 in. and larger	3.55c.
Track bolts	4.55c.
Rivets, structural	4.00c.
Rivets, boiler	4.00c.
	Per Cent Off List
Machine bolts	60
Carriage bolts	60
Coach or lag screws	60
Hot-pressed nuts, sq., tap. or blank	60
Hot-pressed nuts, hex., tap. or blank	60
No. 8 black ann'l'd wire, per 100 lb.	$3.45
Com. wire nails, base per keg	3.20
Cement c't'd nails, base per keg	3.20

business, but rather as an indication that motor car manufacturers have not been able in all cases to get new models under way as rapidly as they had expected. Output of alloy steel bars in this district stands between 70 and 75 per cent of capacity. Spot buying is in moderate volume. Iron bar shipments and specifications are steady. Backlogs are light. The general situation in the rail steel bar market is unchanged from a week ago.

Wire Products.—Prices for nails throughout practically the whole of the Middle West show more weakness than a week ago. Demand from all classes of buyers is light. One disturbing factor, also affecting woven wire fencing, is the recent announcement by mail order houses that freight will be paid on all orders. Local sellers, already confronted with a weak and slow market, are intently watching this development without comment. Shipments of wire and wire products, as a whole, have gained in volume in the last few days and July now promises to be the best seventh month since 1922. Demand for concrete mesh is in good volume but below that of 12 months ago. Wire rope sales are large and shipments are heavy. Buyers are pressing for deliveries of electrical cable, which is sold up to November. General demand for electrical wire is active. Mill prices for wire and wire products are given on page 303.

Rails and Track Supplies.—New orders for standard-section rails total 1500 tons. Of unusual occurence in the light rail market are three orders that total 500 tons, the bulk of which will be shipped to Western copper producers. Rail output in this district is slowly tapering, the average now being about 72 per cent of capacity. New business in track fastenings is brisk, with 7000 tons in new orders. Inquiry is of little moment at present.

Prices f.o.b. mill, per gross ton: Standard section open-hearth and Bess. rails, $43; light rails, rolled from billets, $36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.15c.; angle bars, 2.75c.

Bolts, Nuts and Rivets.—Specifications are in good volume except on small rivets, the demand for which is measurably lighter. Spot sales are in moderate volume and prices are steady.

Reinforcing Bars.—Contracts for reinforcing bars are more numerous, but they are scattered over a wide territory. Competition remains keen and current prices are weak. Rail steel reinforcing bars ordinarily bring 1.85c. to 1.95c. a lb. and the billet steel commodity is commonly quoted at 2.15c. to 2.35c. a lb. out of Chicago warehouses. From some viewpoints the future looks bright. The pending list is large and during the week several general contracts have been placed, pointing to early awards for reinforcing bars. Small-tonnage awards are more numerous and odd lots of small size are frequently coming out for figures. New contracts and fresh inquiries are shown on page 318.

Cast Iron Pipe.—Glamorgan Pipe & Foundry Co. has been awarded 1670 tons of 3 to 12-in. Class B pipe by Chicago at $46.05 a ton, delivered, or $37.85 a ton, Birmingham. Aberdeen, S. D., is said to have placed 12,000 ft. of 8-in., 14,000 ft. of 10-in. and 10,000 ft. of 12-in. pipe with the United States Pipe & Foundry Co. The McWane Cast Iron Pipe Co. has been awarded 18,000 ft. of 6 and 8-in. pipe by Clio, Mich. Hamilton County, Ohio, will take bids Aug. 2 on 43,000 ft. each of 6 and 8-in. pipe, 3800 ft. of 12-in. and 34 tons of fittings. Public utilities are buying occasional carloads and railroads are finding use for small quantities of cast pipe. Deliveries are prompt on practically all sizes.

Prices per net ton, del'd Chicago: Water pipe, 6-in. and over, $45.20 to $46.20; 4-in., $49.20 to $50.20; Class A and gas pipe, $3 extra.

Sheets.—Specifications are in larger volume than shipments, which have been cut to 80 per cent of hot mill capacity. Curtailment of production is due to hot weather during the last five or six days. New buying is steady and in good volume, and prices for sheets are firm except when delivery is made to the Southwest. Jobbers continue to order freely and light tank makers are busier, as indicated by larger specifications to hot mills.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 3.10c.; No. 24 galv., 3.85c.; No. 10 blue ann'l'd, 2.35c. Deliv'd prices at other Western points are equal to the freight from Gary, plus the mill prices, which are 5c. per 100 lb. lower than Chicago delivered prices.

Cold-Rolled Strip. — Operations have been cut to a range of 70 to 75 per cent of capacity, following a decline in specifications. New buying is light, with prices steady.

Coke. — Shipments of by-product foundry coke are at local oven capacity. New buying is confined to small lots. Prices are steady at $8 a ton, local ovens.

Old Material.—Dealers are bidding up railroad lists in an attempt to take a long position in the market. Expiration of several large commitments in the local market, steadiness of demand from large consumers and an upward movement in the Pittsburgh market all tend to confirm brokers' belief that there is strength underlying the local market and that prices will go up rather than down. In the meantime quotations remain at a dead level, with undercurrents of strength shown in some grades that were notably weak at the middle of the month. Steel mills discount the argument of sellers of scrap that the pressure placed on blast furnaces will soon necessitate heavy repairs, with resultant increase in the use of cold metal and larger quantities of scrap. Shipments of borings barely meet the needs of local consumers, as increasing tonnages are being moved from Michigan to Eastern markets. Brokers are bidding as high as $15.75 a gross ton, delivered, for odd carloads of heavy melting steel. The Chicago & North Western has offered 1500 tons, and the Baltimore & Ohio will sell 15,000 tons on Aug. 5.

Prices deliv'd Chicago district consumers:

Per Gross Ton

Basic Open-Hearth Grades:	
Heavy melting steel	$14.75 to $15.25
Shoveling steel	14.75 to 15.25
Frogs, switches and guards, cut apart, and misc. rails	16.50 to 17.00
Hydraul. compressed sheets	13.00 to 13.50
Drop forge flashings	10.50 to 11.00
No. 1 busheling	13.00 to 13.50
Forg'd cast and r'l'd steel carwheels	18.50 to 19.00
Railroad tires, charg. box size	18.50 to 19.00
Railroad leaf springs cut apart	18.50 to 19.00
Acid Open-Hearth Grades:	
Steel couplers and knuckles	16.75 to 17.25
Coil springs	19.00 to 19.50
Electric Furnace Grades:	
Axle turnings	14.50 to 15.00
Low phos. punchings	16.50 to 17.00
Low phos. plates, 12 in. and under	16.50 to 17.00
Blast Furnace Grades:	
Axle turnings	10.75 to 11.25
Cast iron borings	9.75 to 10.25
Short shoveling turnings	9.75 to 10.25
Machine shop turnings	7.00 to 7.50
Rolling Mill Grades:	
Iron rails	16.00 to 16.50
Rerolling rails	17.50 to 18.00
Cupola Grades:	
Steel rails less than 3 ft.	17.75 to 18.25
Steel rails less than 2 ft.	18.25 to 18.75
Angle bars, steel	17.00 to 17.50
Cast iron carwheels	14.00 to 14.50
Malleable Grades:	
Railroad	16.75 to 17.25
Agricultural	15.50 to 16.00
Miscellaneous:	
*Relaying rails, 56 to 60 lb.	23.00 to 25.00
*Relaying rails, 65 lb. and heav.	26.00 to 31.00

Per Net Ton

Rolling Mill Grades:	
Iron angle and splice bars	15.00 to 15.50
Iron arch bars and transoms	21.00 to 21.50
Iron car axles	26.00 to 26.50
Steel car axles	16.50 to 17.00
No. 1 railroad wrought	13.50 to 14.00
No. 2 railroad wrought	13.00 to 13.50
No. 1 busheling	9.00 to 9.50
No. 2 busheling	7.00 to 7.50
Locomotive tires, smooth	14.50 to 15.00
Pipes and flues	10.00 to 10.50
Cupola Grades:	
No. 1 machinery cast	14.50 to 15.00
No. 1 railroad cast	13.75 to 14.25
No. 1 agricultural cast	13.25 to 13.75
Stove plates	12.25 to 12.75
Grate bars	11.75 to 12.25
Brake shoes	10.50 to 11.00

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

U. S. Aluminum Expansion

United States Aluminum Co., New Kensington, Pa., will erect a new machine shop, rehabilitate old New Kensington Brewing Co. property and build an addition to Arnold tube mill at total cost of $1,000,000. Machine shop will be of brick and steel construction, 130 x 482 ft., with 50-ton cranes on working floor and with light tool equipment on mezzanine floor. The brewing company brick buildings will be improved for storage of patterns and materials for adjoining machine shop. Tube mill addition will be 155 x 425 ft., and will house tube drawing and heat treating equipment with inspection and packing facilities.

New York

Pig Iron Sales of 10,000 Tons—Structural Steel Activity Sustained—Weakness in Sheets

NEW YORK, July 30.—Pig iron sales during the week totaled 10,000 tons, and pending business aggregates 20,000 tons. The largest inquiry, 10,000 tons for American Radiator Co. plants in the West, is still open. A Connecticut melter is in the market for 5000 tons and a New England textile manufacturer wants 1000 tons. The Thatcher Co., Newark, N. J., is inquiring for 500 tons of foundry iron for the current quarter. The Eastern Malleable Iron Co., Naugatuck, Conn., recently closed against an inquiry for 1000 to 2000 tons, and is in the market for additional tonnage. Foundry melt is spotty in some areas, but on the whole, if one is to judge from pig iron shipments, is well sustained. Hot weather, of course, has tended to slow up operations to some extent. Outside of a sale of 1000 tons of Alabama iron to a New England consumer, orders for Southern iron have been confined to scattered small lots. Representatives of Southern producers, however, are active in covering this market and in developing ways of delivering iron on the most economical basis. The water-and-rail rate from Birmingham to Savannah, Ga., and via steamship to New York, amounting to $5.50 a ton, with free lighterage at this end, is being ignored for the time being because of the possibility of its suspension. The rate of $3.50 a ton to Norfolk, Va., on iron for transshipment by barge northward has not been protested. The handling charge at Norfolk is 35c. a ton and barge rates to New York range from $1.10 to $1.20 a ton (1000 tons or more). If loaded from barge on Pennsylvania Railroad cars for further shipment, handling costs of 15c. a ton or less are waived. Effective Aug. 1 a railroad rate of $1.01 a ton to local New Jersey points will be available from Jersey City. As a consequence the total transportation charges from Birmingham to these New Jersey points will be $5.96 a ton, or a delivered price on foundry grade at $14.50, Birmingham, of $20.46. The main difficulty is arranging for barge shipments of 1000 tons or more from Norfolk. New York State furnaces are well booked and have no excessive stocks. No sales at less than $17.50, Buffalo, have been reported, and a considerable tonnage, made up largely of smaller lots, has been sold at $18, base.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	$22.41 to $22.91
*Buf. No. 2, del'd east. N. J.	20.78 to 21.28
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	20.89 to 22.02
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	21.39 to 22.52

Freight rates: $4.91 from Buffalo, $1.39 to $2.52 from eastern Pennsylvania.

*Price delivered to New Jersey cities having rate of $3.28 a ton from Buffalo.

Warehouse Business.—Buying from stock is restricted to small lots, but there is still a fair tonnage of structural material moving and a moderate volume of business in sheets is reported. Black and galvanized sheet prices are subject to shading of $1 to $2 a ton and even greater concessions are occasionally made on substantial orders for blue annealed. Softness of blue annealed sheet prices is attributed to the wide spread between present warehouse and mill quotations, which, on the basis of 2.20c., base Pittsburgh, or 2.54c., delivered New York, from the mill, is about $27 a ton.

Cast Iron Pipe.—The usual season of quiet in pressure pipe buying has set in and not much activity is expected until inquiry begins to appear for fall delivery of pipe. A substantial number of orders are being placed for carload lots, but about the largest recent award in this district was 625 tons of 8-in. Class C pipe for Yonkers, N. Y., on which the low bid was $35.70 per net ton, delivered, quoted by the United States Pipe & Foundry Co. The freight rate from Burlington to Yonkers is $3.80 per ton. On 27 tons of 6-in. Class B pipe for Newburgh, N. Y., R. D. Wood & Co. were the low bidders with a price of $34.64 per ton and a $2.90 per ton freight rate from Florence, N. J.

Prices per net ton deliv'd New York: Water pipe, 6-in. and larger, $33.60 to $34.60; 4-in. and 5-in., $36.60 to $37.60; 3-in., $43.60 to $44.60. Class A and gas pipe, $3 extra.

Reinforcing Bars.—Numerous small orders, which have totaled a fairly good volume in the aggregate, have been placed. Prices have not changed.

Billet steel reinforcing bars in 40, 50 and 60-ft. lengths, 2.05c. per lb., Pittsburgh, and 2.30c. per lb., Pittsburgh warehouse, for cut lengths. Out of New York warehouse, 2.90c. per lb. for lots of 5 tons or more, 3.05c. for lots of 2 to 5 tons and 3.30c. for less than 2 tons, all delivered at job.

Finished Steel.—Despite a slight slackening in demand for bars and plates, business continues unusually good for midsummer. An important producer says that bookings in July were about 25 per cent ahead of those in the same month of 1928. Orders and specifications have come from a wide range of consumers. Prices are firm and show no change. Pronounced activity in structural steel is still a feature. Lettings in the past week have included 3000 tons for a Chevrolet assembly plant at Tarrytown, N. Y., 2200 tons for the new building of the Pratt & Whitney Aircraft Corporation at East Hartford, Conn., and 3800 tons for an office building in Newark, N. J. Two thousand tons for a plant addition to the Atwater Kent factory in Philadelphia was the largest of the fresh inquiries. Pending business is heavy and awards in the next month are expected to insure fairly good operations for district fabricating shops. The placing of 14,000 tons for a bridge across the Hackensack River by the Pennsylvania Railroad is expected in a few days. The Phœnix Bridge Co. is low bidder. The

Warehouse Prices, f.o.b New York

	Base per Lb.
Plates and structural shapes	3.30c.
Soft steel bars, small shapes	3.25c.
Iron bars	3.24c.
Iron bars, Swed. charcoal	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Cold-roll. strip, soft and quarter hard	5.15c. to 5.40c.
Hoops	4.25c.
Bands	3.75c.
Blue ann'l'd sheets (No. 10)	3.85c. to 3.90c.
Long terne sheets (No. 24)	5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galv. annealed	5.15c.
Tire steel, 1½ x ½ in. and larger	3.30c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.65c.
Open-hearth spring steel, bases,	4.50c. to 7.00c.

	Per Cent Off List
Machine bolts, cut thread:	
¾ x 6 in. and smaller	60
1 x 30 in. and smaller	50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	60
¾ x 20 in. and smaller	50 to 50 and 10
Coach screws:	
½ x 6 in. and smaller	60
1 x 6 in. and smaller	50 to 50 and 10

	Per 100 Ft.
Boiler Tubes—	
Lap welded, 2-in.	$17.33
Seamless steel, 2-in.	20.24
Charcoal iron, 2-in.	25.00
Charcoal iron, 4-in.	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
½-in. butt	46	29
¾-in. butt	51	37
1-3-in. butt	53	39
2½-6-in. lap	48	35
7 and 8-in. lap	44	17
11 and 12-in. lap	37	12
Wrought Iron—		
½-in. butt	5	+19
¾-in. butt	11	+ 9
1-1½-in. butt	14	+ 6
2-in. lap	5	+14
3-6-in. lap	11	+ 6
7-12-in. lap	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box	$6.45	$6.20
Charcoal, per Box—	A	AAA
IC	$9.70	$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating	$10.00 to $11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets, Box Annealed—Black, C. R. One Pass

	Per Lb.
Nos. 18 to 20	3.80c.
No. 22	3.95c.
No. 24	4.00c.
No. 26	4.10c.
No. 28*	4.25c.
No. 30	4.50c.

Sheets, Galvanized

	Per Lb.
No. 14	4.40c.
No. 16	4.25c.
No. 18	4.40c.
No. 20	4.50c.
No. 22	4.60c.
No. 24	4.75c.
No. 26	5.00c.
No. 28*	5.25c.
No. 30	5.65c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

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contract for 2550 tons for pier 3, North River, should be awarded this week. Aug. 2 is the date set for opening bids for 13,200 tons for a section of the New York subway in Queens. Sheet steel manufacturers comment on the rather incongruous situation in the sheet market. Although sales have been exceptionally good and most mills are unable to make deliveries in less than four to six weeks—factors which should give strength to the market—prices have sagged somewhat, especially in galvanized and black sheets. The former grade is selling at 3.60c., Pittsburgh, to consumers and 3.50c. to jobbers, with an occasional dip to the latter figure on an order for a consumer. Even lower quotations are said to rule in the South on roofing and siding material.

Mill prices per lb., deliv'd New York: Soft steel bars, 2.29c.; plates, 2.22½c.; structural shapes, 2.19½c.; bar iron, 2.14c.

Coke.—Demand for foundry coke is fair. Standard furnace coke is moderately active and quotations are unchanged at $2.75 to $2.85 per net ton, Connellsville. Special brands of beehive foundry coke are $4.85 per net ton, ovens, or $8.56 per net ton, delivered to northern New Jersey, Jersey City and Newark and $9.44 to New York or Brooklyn. By-product coke is quoted at $9 to $9.40 a net ton, Newark or Jersey City, and $10.06, New York or Brooklyn.

Old Material.—Heavy melting steel prices paid by brokers for delivery to eastern Pennsylvania and occasionally for shipment to the Pittsburgh district continue firm, with a slight tendency to advance. Other grades of scrap are inactive and prices are unchanged. No. 1 heavy melting steel is quoted by brokers at $16.25 to $16.50 per ton, delivered eastern Pennsylvania, and brokers buying for shipment to western Pennsylvania are offering $18.25 per ton, delivered, or $12.95 per ton, New York. Rerolling rails are being bought at $17.50 per ton, delivered to eastern Pennsylvania, and cast iron carwheels are stronger by about 50c. a ton. Cast scrap is quiet.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel	$12.75 to $13.35
Heavy melting steel (yard)	8.00 to 9.75
No. 1 hvy. breakable cast.	10.75 to 11.75
Stove plate (steel works).	8.00 to 8.25
Locomotive grate bars....	8.25 to 8.75
Machine shop turnings....	7.50 to 7.75
Short shoveling turnings..	7.50 to 7.75
Cast borings (blast furn. or steel works).....	7.00 to 7.25
Mixed borings and turnings	6.75 to 7.25
Steel car axles.....	19.50 to 20.00
Iron car axles.....	24.00 to 25.00
Iron and steel pipe (1 in. dia., not under 2 ft. long)	10.75
Forge fire	9.75 to 10.25
No. 1 railroad wrought...	12.00 to 12.50
No. 1 yard wrought, long..	11.00 to 11.50
Rails for rolling.....	13.25 to 13.75
Cast iron carwheels.....	12.50 to 13.00
Stove plate (foundry)....	8.00 to 8.50
Malleable cast (railroad).	14.00 to 14.50
Cast borings (chemical)..	10.00 to 10.50

Prices per gross ton, deliv'd local foundries:

No. 1 machry. cast.....	$17.00
No. 1 hvy. cast (columns, bldg. materials, etc.), cupola size.....	15.00
No. 2 cast (radiators, cast boilers, etc.)	14.50

Cleveland

August Outlook Is for July Rate, a Midsummer Record—Upturn in Sheet Orders

CLEVELAND, July 30.—Steel production in this district shows no decline, except such as had been occasioned by extreme heat. Measured by output, the month has established a new record for midsummer, not excepting the war years and the unusual summer activity of 1920.

Incoming business, as compared with June, has shown some falling off, but the decline has been less than was expected. The effect of the reduced scale of new buying and shipping releases has been to lower the tonnage of unfilled orders on mill books, but mill operations have been held at a high rate. On the basis of orders now definitely scheduled, it appears certain that mill output in August will be continued at about the current rate.

Except in some widths and gages of sheet and strip steel, mills are not in need of orders, and even in these products the need is not urgent. A few mills are competing more aggressively for business in galvanized sheets, and the continuous sheet mills have given concessions on the gages and widths they roll. Generally, however, the price situation is fairly steady.

The only marked change in the past week was an upturn in sheet orders. Whether buyers had been holding off in the expectation of lower prices or for some other reason, the fact is many of them were forced to come into the market. Last week's sheet orders with some mill offices were larger than the total tonnage for the preceding three weeks of the month.

Automobile demand is somewhat spotty, but on the whole is still good. A few plants which were shut down or had curtailed output because of vacations or changes in models are again in production, although at a moderated pace. The Chevrolet Motor Car Co. has cut its schedules, but the general trend among other companies is upward as compared with the early part of July. Shipping schedules for steel that have been arranged for August and September by automobile manufacturers and body builders generally call for more steel than has been shipped to these companies during July.

Pig Iron.—Pig iron business showed further improvement, with sales totaling about 25,000 tons, which was 5000 tons more than was sold in the previous week. Inquiry, however, is very light, but Lake furnaces are well sold up through this quarter. Melters are not yet taking much interest in their fourth quarter requirements. Shipments are running only slightly less than in June. A steel company that sells merchant iron is using nearly all of its product in its own open-hearth furnaces and is virtually out of the market for the remainder of this quarter. An Indiana company that was in the market for 5000 tons of foundry iron is understood to have closed. Prices are steady at $18.50, Cleveland, for outside shipment, at $19 for local delivery and at $20, Lake furnace, for Michigan delivery.

Prices per gross ton at Cleveland:

N'th'n fdy., sil. 1.75 to 2.25	$19.50
S'th'n fdy., 1.75 to 2.25....$20.00 to	20.50
Malleable	19.50
Ohio silvery, 8 per cent...	28.00
Basic Valley furnace.....	18.50
Stand. low phos., Valley.. 26.50 to	27.00

Prices except on basic and low phosphorus are delivered Cleveland. Freight rates: 50c. from local furnaces; $3 from Jackson, Ohio; $6 from Birmingham.

Warehouse Business. — Although July is usually a dull month in jobbers' sales, this month has been an exception. Business has been in smaller volume than in June, but has outstripped all sales records for July. The decline from June has not been severe. Prices are well maintained.

Reinforcing Bars.—Inquiry is light. The largest contract was 500 tons for the Cleveland Electric Illuminating Co. at Ashtabula, Ohio, taken by the Bourne-Fuller Co.

Semi-Finished Steel.—While the production of semi-finished steel now seems to be ample for all requirements, there is no surplus, and the furnaces and mills of the local producer are being operated at full capacity to take care of contract business. The price remains at $35, Cleveland, Youngstown or Pittsburgh, for billets, slabs and sheet bars.

Bolts, Nuts and Rivets.—Orders for bolts and nuts have increased during the past few days. Total bookings for July will be larger than those of June. Demand for rivets has not improved and falls considerably short of makers' capacity.

Plates, Shapes and Bars. — New business and contract specifications for plates, shapes and bars during July have reached a volume closely approximating that of June. While the structural steel market is quiet at the moment, considerable new

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and struc. shapes.....	3.00c.
Soft steel bars.....	3.00c.
Reinforc. steel bars.....2.25c. to	2.50c.
Cold-fin. rounds and hex.....	3.65c.
Cold-fin. flats and sq.....	4.15c.
Hoops and bands, No. 12 to ¼ in., inclusive	3.25c.
Hoops and bands, No. 13 and lighter	3.65c.
Cold-finished strip .....*5.95c.	
Black sheets (No. 24).....3.70c. to	3.90c.
Galvanized sheets (No. 24).4.60c. to	4.75c.
Blue ann'l'd sheets (No. 10).....	3.25c.
No. 9 ann'l'd wire, per 100 lb.....	$2.95
No. 9 gal. wire, per 100 lb.....	3.40
Com. wire nails, base per keg.....	2.95

*Net base, including boxing and cutting to length.

work is in prospect. Meanwhile, fabricating shops are busy on contracts and are calling for steady shipments of plain material. Plate demand in this district is sustained by the continued activity of boiler and tank fabricating shops. The Cleveland producers of steel bars are taking a good deal of the local tonnage. Outside mills are not competing strongly for this business, especially on the larger tonnages, which occasionally bring out price concessions when considered on a delivered basis.

Old Material.—Despite the strength at Pittsburgh and Youngstown, the local scrap market continues quiet, with prices unchanged. Local mills are not buying and, in fact, have not yet taken in all of the material due them on contracts. At Youngstown, $18.50 is being paid for heavy melting steel and $18 for hydraulic compressed bundles. Production of scrap by Detroit automobile plants has declined this month.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$15.00 to $15.50
No. 2 heavy melting steel	14.50 to 15.00
Compressed sheet steel	14.50 to 15.00
Light bundled sheet stampings	12.00 to 12.50
Drop forge flashings	13.00 to 13.25
Machine shop turnings	9.25 to 9.50
No. 1 railroad wrought	13.50 to 14.00
No. 2 railroad wrought	16.00 to 16.50
No. 1 busheling	13.25 to 13.75
Pipes and flues	9.00 to 9.50
Steel axle turnings	12.50 to 13.00
Acid Open-Hearth Grades:	
Low phos., forging crops	17.75 to 18.00
Low phos., billet, bloom and slab crops	18.50 to 18.75
Low phos., sheet bar crops	18.00 to 18.50
Low phos., plate scrap	18.00 to 18.50
Blast Furnace Grades:	
Cast iron borings	10.75 to 11.00
Mixed borings and short turnings	10.75 to 11.00
No. 2 busheling	10.75 to 11.00
Cupola Grades:	
No. 1 cast	16.75 to 17.25
Railroad grate bars	11.00 to 12.00
Stove plate	12.00 to 12.50
Rails under 3 ft	18.50 to 19.00
Miscellaneous:	
Railroad malleable	18.00 to 18.50
Rails for rolling	16.25 to 16.50

Sheets.—Demand took a spurt in the past week. Some local sales offices received a larger tonnage of orders last week than in all of the rest of July. In some instances, automobile companies and body builders have arranged steel shipping schedules for August and September that call for larger tonnages than were shipped in July. The price situation reflects continued weakness in galvanized sheets, on which 3.50c., Pittsburgh, which has been the price to jobbers, has been extended in certain cases to consumers. Black sheets remain at 2.85c., Pittsburgh. Light gage blue annealed material, especially in the wider sizes, continues fairly firm in price, but the heavy gage narrow material, such as is rolled by the continuous mills, is being sold at concessions. Some sheet mills still have substantial backlogs. Deliveries of nearly all grades have shortened, but rollings sufficient for three or four weeks are in hand in many grades. On some grades, orders extend into September.

Strip Steel.—While there has been a let-down in the call for strip steel, the mill situation is still fairly good. No marked curtailment of production is reported in hot-rolled strip. Some makers of cold-rolled strip are in need of orders, while others have a fair volume ahead of them. The easing has occurred chiefly in wide strips, which can be had in one to two weeks.

Wire Products. — Manufacturers' wire is being shipped in good volume. While the automobile industry is not taking as much as it was a month or two ago, the shipments to that industry are regarded by the mills as highly satisfactory for this time of year. Plain wire prices are steady, but irregularities persist in wire nail prices.

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.70c.
Plates, ⅜-in.	2.90c.
Structural shapes	2.70c.
Soft steel bars, small shapes, iron bars (except bands)	2.80c.
Round-edge iron	3.50c.
Round-edge steel, iron finished 1½ x 1½ in.	3.50c.
Round-edge steel, planished	4.30c.
Reinforc. steel bars, sq. twisted and deform.	2.60c. to 2.80c.
Cold-fin. steel, rounds and hex.	3.60c.
Cold-fin. steel, sq. and flats	4.10c.
Steel hoops	3.55c.
Steel bands, No. 12 to ⅜-in. inclus.	3.30c.
Spring steel	5.00c.
*Black sheets (No. 24)	4.10c.
†Galvanized sheets (No. 24)	4.85c.
Light plates, blue annealed (No. 10)	3.25c.
Blue ann'l'd sheets (No. 13)	3.40c.
Diam. pat. floor plates— ¼-in.	5.30c.
⅜-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

*For 50 bundles or more; 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.
†For 50 bundles or more; 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

Philadelphia

Steel Specifications Smaller — Pig Iron Prices Begin to Be Affected By Southern Competition

PHILADELPHIA, July 30.—Operating rates of steel mills are being maintained, but specifications against current contracts are smaller and backlogs on mill books have declined from the total a month ago. Prices are firm on plates, shapes and bars and a firmer tone is evident on black and galvanized sheets, since the recent recession of about $2 a ton in quotations.

Pig iron is lacking in strength in the face of competition from Southern sellers, but concessions have not been large. With the exception of heavy melting steel, iron and steel scrap is quiet and prices show no tendency to advance.

Reinforcing Bars.—Projects calling for small tonnages of bars are numerous, but competition is keen among distributers, so that 1.95c. per lb., Pittsburgh, or 2.27c., delivered Philadelphia, with no extra for cutting to length is still obtainable on billet steel bars. An outstanding inquiry is for 700 tons of reinforcing bars in a build- for the Atwater Kent Mfg. Co., Philadelphia. Billet steel bars are quoted at 1.95c. to 2.05c., Pittsburgh, or 2.27c. to 2.37c., delivered Philadelphia, with the $5 extra for cutting to length sometimes disregarded by sellers. Rail steel reinforcing bars are quoted at 1.95c., Franklin, Pa., or Tonawanda, N. Y., or 2.27c., delivered Philadelphia, with no extra for cutting to length.

Pig Iron.—Southern basic iron is being quoted openly at $13.50 per ton, furnace, but recent bids for eastern Pennsylvania business have been at $13 a ton and less. Consequently, with consumers in this district considering the purchase of Birmingham basic iron, the eastern Pennsylvania market is lacking in strength and $20 to $20.50 per ton, delivered, is representative of the current trend. Foundry iron prices have been shaded by sellers of Southern iron from $14.50 per ton, Birmingham furnace, and in the past week a consumer in this district has closed on 1000 tons of Southern iron. While eastern Pennsylvania furnaces are not inclined to meet the delivered prices of Southern iron, they recognize that the saving to the buyer must be reduced to a minimum, which has resulted in shading $21.50, furnace, by 50c. to $1 a ton. Except for an inquiry from the Sun Shipbuilding Co., Chester, Pa., for about 500 tons of No. 2 and No. 2X foundry iron, current inquiry is for small lots.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil.	$21.26 to $22.26
East. Pa. No. 2X, 2.25 to 2.75 sil.	21.76 to 22.76
East. Pa. No. 1X	22.26 to 23.26
Basic (del'd east. Pa.)	20.00 to 20.50
Gray forge	20.50 to 21.00
Malleable	21.25 to 21.75
Stand. low phos. (f.o.b. N. Y. State furnace)	22.00 to 23.00
Cop. b'r'g low phos. (f.o.b. furnace)	23.50 to 24.00
Va. No. 2 plain, 1.75 to 2.25 sil.	24.04
Va. No. 2X, 2.25 to 2.75 sil.	24.54

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces; $4.54 from Virginia furnaces.

Bars.—Deliveries are shorter, ranging from two to three weeks, but operating rates of mills are well maintained with sufficient tonnage on the books to carry producers over the period of mid-summer quiet. Prices are firm at 1.95c. per lb., Pittsburgh, or 2.27c., delivered Philadelphia.

Shapes.—Fabricators are well engaged with contracts and not inclined to quote so low for new business as has been the case in the past. Shape mills are maintaining a good rate of operation, but prices although firmer, show no tendency to advance from

1.95c. to 2.05c., f.o.b. nearest mill to consumer, or 2.01c. to 2.11c., delivered Philadelphia.

Plates.—The volume of specifications against contracts is smaller, but this is generally considered as a temporary condition of business, attributable to the summer. Deliveries still range from two to three weeks and prices are firm at 2.05c., per lb., Coatesville, or 2.15c., delivered Philadelphia.

Sheets.—Black and galvanized sheets have settled to 2.85c., Pittsburgh, or 3.17c., delivered Philadelphia for black and 3.60c., Pittsburgh, or 3.92c., Philadelphia, for galvanized. Occasionally concessions of $1 a ton are made from these prices on sizable tonnages. Blue annealed sheets are being maintained at 2.35c. per lb., Pittsburgh, or 2.67c., delivered Philadelphia for No. 13 gage, and light plates blue annealed are quoted at 2.20c., Pittsburgh, or 2.52c., delivered Philadelphia for No. 10 gage.

Imports.—In the week ended July 27, a total of 970 tons of chrome ore arrived at this port from Greece and 1060 tons of pig iron was received, of which 979 tons was from British India and 81 tons from Sweden. Steel imports consisted of 52 tons of steel bands from Belgium and 20 tons from the United Kingdom and 92 tons of steel billets from Sweden.

Old Material.—A Pencoyd, Pa., mill has closed on a small tonnage of No. 2 automobile scrap at $14.50 per ton, delivered, an advance of 25c. from its previous buying price. No. 1 heavy melting steel is firm at $16.50 to $17 per ton, delivered, but other grades are inactive and prices lacking in strength, especially cast scrap.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	$16.50 to $17.00
Scrap T rails	16.00
No. 2 heavy melting steel	12.50 to 14.50
No. 1 railroad wrought	16.00 to 16.50
Bundled sheets (for steel works)	11.50
Hydraulic compressed, new	14.50 to 15.00
Hydraulic compressed, old	12.00 to 12.50
Machine shop turnings (for steel works)	11.50 to 12.00
Heavy axle turnings (or equiv.)	14.00 to 14.50
Cast borings (for steel works and roll. mill)	11.00 to 11.50
Heavy breakable cast (for steel works)	15.00 to 15.25
Railroad grate bars	12.00 to 12.50
Stove plate (for steel works)	12.00 to 12.50
No. 1 low phos., hvy., 0.04% and under	22.00 to 23.00
Couplers and knuckles	19.50 to 20.50
Rolled steel wheels	19.50 to 20.50
No. 1 blast f'nace scrap	10.50 to 11.00
Wrot. iron and soft steel pipes and tubes (new specific.)	15.00
Shafting	19.00 to 19.50
Steel axles	23.00 to 23.50
No. 1 forge fire	14.00
Cast iron carwheels	16.50 to 17.00
No. 1 cast	16.50 to 17.00
Cast borings (for chem. plant)	14.50
Steel rails for rolling	16.50 to 17.00

To Assist on Census of Manufactures

WASHINGTON, July 30.—Revision of inquiries on the general schedule of the manufactures' census will be prime purpose of an executive committee named at a meeting last Friday at the Department of Commerce of the Advisory Committee for the Census of Manufactures. There also was appointed a publicity committee, which will institute a campaign to acquaint business men with the scope and importance of the statistics with the hope of obtaining complete cooperation in getting necessary data.

The executive committee, approved by Secretary of Commerce Lamont, includes the following: Col. L. S. Horner, president, Niles-Bement-Pond Co., New York, chairman, and Walter S. Tower, Bethlehem Steel Co..

National Machine Tool Show in Cleveland

The most complete range of machine tools, equipment and accessories ever assembled, it is stated by its management staff, will be on display in the 1929 National Machine Tool Builders' Exposition, which will occupy the West Annex, Arena and Arcade of the Public Auditorium in Cleveland, from Sept. 30 to Oct 4 inclusive.

The exposition will be visited, according to official forecast, by some 15,000 executives, engineers, production specialists, buyers, superintendents, shop foremen and operating men from among the diversified machine tool using industries in this country and abroad.

In direct charge of the 1929 exposition is the following committee: Chairman: J. Wallace Carrel, Lodge & Shipley Machine Tool Co.; P. E. Bliss, Warner & Swasey Co.; Ralph E. Flanders, Jones & Lamson Machine Co.; Robert M. Gaylord, Ingersoll Milling Machine Co.; James E. Gleason, Gleason Works; and ex-officio Henry Buker, Brown & Sharpe Mfg. Co., president of the association.

What the Railroads Did in 1928

"Statistics of Common Carriers," issued by the Interstate Commerce Commission in pamphlet form, shows that the railroads in 1928 transported 2,361,622,636 net tons of revenue freight an average distance of 183.31 miles. During the same year 790,327,447 passengers were carried an average of 39.99 miles each. The freight earned a revenue averaging 1.081c. for each ton-mile. The passengers produced a revenue of 2.85c. average for each passenger-mile.

Investment of the railroads in lines, plant and equipment is given as $24,873,474,285, an increase of 1.7 per cent over the preceding year. Use of this property produced total revenues aggregating $6,111,735,511. Against this the operating expenses amounted to $4,427,995,036, giving an operating ratio of 72½ per cent. Taxes amounted to $389,432,415 and dividends to $431,030,910. The dividends were at the rate of 7.09 per cent on the stocks on which they were declared, and of 5.03 per cent on the total stocks outstanding.

Steel Furniture Makers Adopt Trade Rules

WASHINGTON, July 30.—The Federal Trade Commission has issued new trade practice rules covering the steel office furniture industry. Manufacturers held a conference with the commission in Washington on April 13 and voted to adopt rules governing the conduct of the industry. The conference represented more than 80 per cent of the volume of business and 65 per cent of the number of companies in the industry.

Expands Capacity for Stainless Iron

The Duraloy Co. of Pittsburgh has recently installed a 1½-ton Moore Lectromelt Furnace at its plant at New Cumberland, W. Va. Extensive additions have also been made to the machine shop, thus facilitating the output of machined chromium alloy castings in greater quantities.

Steel Traffic to Hold Up

Iron and steel freight traffic in the third quarter will approximately equal that of the second and will show a gain of 8 per cent over the third quarter of 1928, according to an estimate by the iron and steel committee of the Atlantic States Shippers Advisory Board.

Passing upon a complaint by the Vulcan Mold & Iron Co., Latrobe, Pa., Examiner Lewis L. Prout in a report to the Interstate Commerce Commission, made public yesterday, held that the rate of $2.02 per ton of pig iron from Hubbard, Ohio, and certain other points in the Mahoning and Shenango valleys to Latrobe is not unreasonable. It was recommended that the complaint be dismissed.

A 44-page booklet has been issued by the New Jersey Zinc Co., 160 Front Street, New York, entitled "Rolled Zinc." It is fully illustrated and contains tables and other information concerning the various rolled zinc products made by that company.

Tractors are coming more and more into use in India, according to a report received by the Department of Commerce from Assistant Trade Commissioner R. C. Cockburn, Calcutta.

Pacific Coast

Bids Received on Seattle Pipe Line—Large Amount of Reinforcing Work Pending—Structural Awards Decline

SAN FRANCISCO, July 27 (*By Air Mail*).—Demand for steel products, especially structural shapes, has eased off and few large tonnages are up for figures or pending. The outstanding development of the week was the tabulation of bids on the 3700-ton riveted Cedar River pipe line at Seattle, Wash., which showed the Western Pipe & Steel Co. to be the low bidder. Cast iron pipe bookings were also heavy, Oakland and Pasadena, Cal., placing 2173 tons and 852 tons respectively. Prices are being well maintained and little shading is being indulged in.

Pig Iron.—Both sales and inquiries for foundry iron are limited to unimportant lots. Specialty plants, such as stove and sanitary ware manufacturers, are operating on fairly heavy schedules, but jobbing plants remain on restricted schedules. Quotations are unchanged.

Prices per gross ton at San Francisco:

*Utah basic	$25.00 to $26.00
*Utah fdy., sil. 2.75 to 3.25	25.00 to 26.00
**Indian fdy., sil. 2.75 to 3.25	25.00 to 26.00

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Bars.—Important reinforcing bar lettings of the week included 550 tons for the Vance Building, Seattle, placed with the Northwest Steel Rolling Mills; 300 tons for an office building in Santa Monica, Cal., and 208 tons for highway work in Alameda County, Cal., the latter two projects being placed with unnamed interests. At the present time pending business exceeds 3000 tons, the largest project calling for 1150 tons for the West Garfield Street bridge, Seattle, bids on which open next week. Los Angeles out-of-stock prices are firm at 2.30c. a lb. base, on lots of 250 tons and up, 2.40c. a lb., on carload quantities and 2.70 c., on smaller lots. San Francisco prices are $2 a ton lower. Movement of merchant bar material has not improved of late, sales and inquiries being confined to small tonnages composed of a wide range of sizes. Prices on this class of steel remain firm at $2.35c. a lb., c.i.f. Coast ports.

Plates.—The East Bay Municipal Utility District has placed 100 tons of 54-in. riveted pipe with an unnamed interest. The only other important letting of the week, which went to the Willamette Iron & Steel Co. called for 150 tons for a digester for the Rainier Pulp & Paper Co., Seattle. Bids opened last week on the Cedar River pipe line, Seattle, show the Western Pipe & Steel Co. as being low. An award is expected within the next few days. Prices appear firm at 2.35c. c.i.f. Pacific ports.

Shapes.—Structural lettings have fallen off. Only four awards of over 100 tons were reported. Poole & McGonigle secured 900 tons for an office building in Portland, Ore., the McClintic-Marshall Co. took 500 tons for a hotel in San Francisco and the Consolidated Steel Corporation booked 200 tons for a factory addition in Huntington Park, Cal. Pending business is the lightest in several months. New inquiries include 1500 tons for the Los Angeles Stock Exchange Building, bids on which will be called for in September. Bids were opened this week on 105 tons for a bridge over the Nehalem River in Oregon. No change has occurred in prices, 2.35c., c.i.f., being firm.

Cast Iron Pipe.—Important cast iron pipe awards include 2173 tons of 6 to 20-in. Class 150 and Class B pipe for the East Bay Municipal Utility District, Oakland, booked by the United States Pipe & Foundry Co. The Pacific States Cast Iron Pipe Co. took 75 tons of 4-in. Class 150 pipe and the United States Pipe & Foundry Co. booked 777 tons of 6 to 12-in. Class 150 and 24-in. Class B pipe for Pasadena, Cal. Griffith Co. secured 185 tons of 4 to 12-in. Class B pipe for the improvement of Broadway, Santa Monica, Cal. Pending business calls for less than 2500 tons, no new inquiries of importance having come up for figures.

Steel Pipe.—Movement of standard steel pipe is holding up well, but most orders call for relatively small lots, as distributers have well balanced stocks. No action has yet been taken by the Pacific Gas & Electric Co., San Francisco, on its inquiry for 2263 tons of 8⅝-in. O. D. gas pipe for installation in Monterey, Salinas and Gilroy, Cal. This company also contemplates the laying of a 16-in. line across the Carquinez Straits bridge to serve lower valley points.

Coke.—Sales and inquiries cover small lots for prompt shipment. English beehive coke is quoted at $16 to $17 a net ton, delivered incoming dock, while by-product coke is quoted at $12.50 to $13.50 a ton.

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and struc. shapes	3.15c.
Soft steel bars	3.15c.
Small angles, ⅞-in. and over	3.15c.
Small angles, under ⅞-in.	3.55c.
Small channels and tees, ¾-in. to 2¾-in.	3.75c.
Spring steel, ¼-in. and thicker	5.00c.
Black sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.80c.
Galv. sheets (No. 24)	5.30c.
Struct. rivets, ½-in. and larger	5.65c.
Com. wire nails, base per keg	$3.40
Cement c't'd nails, 100 lb. keg	3.40

Birmingham

More Pig Iron Inquiry from the East—Steel Bookings 10 Per Cent Smaller than a Month Ago

BIRMINGHAM, July 30.—Merchant producers of pig iron anticipate a heavy movement to Eastern points on the new rail and steamer rates which are scheduled to go into effect the last of this week. While these rates have been protested, so far they have not been suspended. Several round tonnages already have been booked for East Coast points and inquiries from that section in the last few days indicate considerable interest in Birmingham iron. A few trial orders have already been shipped. Sales in the district were a little better last week. Several orders for 3000 to 4000 tons were booked. Some of the larger users have covered their third-quarter requirements, while others are buying for immediate requirements only. The smaller consumers prefer to buy iron as it is needed. The base price of $14.50, Birmingham, for No. 2 foundry continues. Shipments are at about the same rate as throughout July. Seventeen blast furnaces remain active. Of this number nine are on foundry iron, seven on basic and one on recarburizing iron.

Prices per gross ton, f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil.	$14.50
No. 1 fdy., 2.25 to 2.75 sil.	15.00
Basic	14.50

Finished Steel.—New business is estimated to be around 10 per cent less than at this time last month, but it is considerably larger than 12 months ago. There has been a gradual decline in orders during the latter part of July, due to the usual summer lull, which in past years has arrived several weeks earlier. In view of their substantial backlogs the mills have not been forced to curtail operations and except in rails they are practically at capacity. Business in wire products has declined from the June rate, but the aggregate is considerably ahead of last year. Deliveries of finished steel, as a whole, are in about the same volume as in the past several weeks. Prices are steady and unchanged. None of the pending structural projects has been placed. The Gulf States Steel Co. is expected to award an important tonnage for new buildings at Alabama City this week. Lettings and fresh inquiries for reinforcing bars are not up to the average. Twenty-two open-hearth furnaces out of a total of 23 have been active throughout July.

Cast Iron Pipe.—Awards in the pressure pipe market are few and in small to medium tonnages. Several important municipal projects, financed

by recent bond issues, are being held up due to the unsatisfactory market for the securities. Inquiries indicate a fair tonnage in prospect, considering conditions. Private buying has been of little consequence for several weeks. Pending projects include about 20,000 ft. of 6 and 8-in. pipe for West Greenville, S. C., to be awarded July 30; about 4 miles of 8 to 12-in. for Hollywood, Fla., to be awarded Aug. 15; about 9 miles of 16 to 20-in. pipe for Griffin, Ga., to be awarded about Sept. 1, and a fair-sized project at Kenner, La. Shipments continue in good volume and some plants have made reductions in stocks during July. Quotations remain at $37 to $38 a net ton, Birmingham, for 6-in. and larger diameters.

Coke.—A steady movement of material on contracts is about the only activity in the foundry coke market. The number of active ovens in the district is unchanged, but output is reported to be less than in June. The base price remains $5 a net ton, Birmingham.

Old Material.—Light buying in steel grades continues, but outside of this the market is at a standstill. Prices are without change.

Prices per gross ton, deliv'd Birmingham dist. consumers' yards:

Heavy melting steel	$12.50
Scrap steel rails	12.50
Short shoveling turnings	9.00
Cast iron borings	9.00
Stove plate	$11.50 to 12.00
Steel axles	21.00
Iron axles	23.00
No. 1 railroad wrought	10.00 to 10.50
Rails for rolling	14.00 to 15.00
No. 1 cast	13.50
Tramcar wheels	13.00
Cast iron carwheels	12.50 to 13.00
Cast iron borings, chem.	13.50 to 14.00

Boston

Pig Iron Producers Advance Quotations—Marked Scarcity Gives Scrap Market Stronger Tone

BOSTON, July 30.—Buffalo furnaces with comfortable backlogs for third quarter delivery have advanced prices $1 a ton to $18.50, base furnace, while others are asking $18. Furnaces east of Buffalo have not changed prices, but intimate they will do so within the near future. Business in the past week was less active, but sales included 1000 tons of Buffalo and 500 tons of Southern iron to a Massachusetts machinery manufacturer, 1000 tons of malleable to a Connecticut foundry and smaller tonnages, the aggregate being about 5000 tons. A small tonnage of Indian iron was sold at $22.50 a ton on dock here, duty paid. A Worcester, Mass., foundry is in the market for 1000 tons of No. 2X and No. 1X, and a Massachusetts machinery builder for 1000 tons of low phosphorus iron.

Foundry iron prices per gross ton deliv'd to most New England points:

†Buffalo, sil. 1.75 to 2.25	$21.78 to	$22.78
†Buffalo, sil. 2.25 to 2.75	22.28 to	23.28
*Buffalo, sil. 1.75 to 2.25	22.41 to	23.41
*Buffalo, sil. 2.25 to 2.75	22.91 to	23.91
East. Penn., sil. 1.75 to 2.25		23.65
East. Penn., sil. 2.25 to 2.75		24.15
Va., sil. 1.75 to 2.25		25.21
Va., sil. 2.25 to 2.75		25.71
Ala., sil. 1.75 to 2.25	21.41 to	23.27
Ala., sil. 2.25 to 2.75	21.91 to	23.77

Freight rates: $4.91 all rail from Buffalo, and $4.28 rail and water; $3.65 from eastern Pennsylvania; $5.21 all rail from Virginia; $6.91 to $8.77 from Alabama.

*All rail rate.

†Rail and water rate.

Coke.—The outstanding development of the week was the placing of an order for 82 ovens with the Koppers Co. by the New England Coal & Coke Co. The demand for foundry coke holds up well despite a slight letup in the melt of iron due to the excessive heat. Prices are still $11 a ton, delivered within a $3.10 freight rate zone.

Reinforcing Steel.—Aggregate sales of billet steel bars for the week were 600 tons, including 200 tons for a Harvard University dormitory to be supplied by J. C. Coleman & Sons Co. Sellers are holding firmly to 2.66½c. a lb., base, from stock. The market for rail steel bars is quiet at 2.26½c., base, delivered common Boston freight rate points.

Warehouse Business.—The usual summer letdown in the movement of iron and steel out of warehouses is noted, but business is running ahead of a year ago and prices are being maintained. Dealers in domestic wire nails are experiencing competition from German nails.

Cast Iron Pipe.—The Boston Consolidated Gas Co. has split 2000 tons of 6 to 24-in. pipe with two Northern foundries, and Westfield, Mass., has purchased 100 tons of 6 and 8-in. from the Warren Pipe & Foundry Co. West Hartford, Conn., has rejected bids for 3600 tons of 36 and 42-in. cast iron pipe and has purchased cement pipe from the Lock Joint Pipe Co. at $369,-204.25. Hamden, Conn., will close bids Aug. 2 on 3000 ft. of 10-in. pipe.

Imports.—Imports of pig iron at this port so far this month amount to 548 tons, all from India. The Mystic Iron Works, Everett, Mass., so far this month, has unloaded 10,560 tons of Newfoundland and 5950 tons of Bona ores.

Old Material.—Quotations on forge flashings are a shade easier owing to a marked slowing up in demand, but prices for other kinds of scrap tend upward. Higher prices on steel scrap have failed to bring out much material. Dealers say that never before was steel scrap as scarce as it is today. No. 1 heavy melting steel is generally $12.50 to $12.75 a ton, on cars shipping point, with specially selected stock $13. Scrap T-rails are bringing practically as much as No. 1 steel, and dealers are scouring New England for abandoned trolley lines. The export market is inactive. It is expected, however, that a steamer will load 1500 tons here in the latter part of August for Danzig delivery.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$12.50 to $13.00
Scrap T rails	12.00 to 12.50
Scrap girder rails	11.00 to 11.50
No. 1 railroad wrought	11.00 to 11.50
No. 1 yard wrought	9.00 to 9.50
Machine shop turnings	6.60 to 7.10
Cast iron borings (steel works and rolling mill)	6.50 to 6.60
Bundled skeleton, long	9.50 to 10.50
Forge flashings	10.00 to 10.25
Blast furnace borings and turnings	6.00 to 6.25
Forge scrap	9.00 to 9.25
Shafting	14.00 to 14.25
Steel car axles	18.00 to 19.00
Wrought pipe 1 in. in diameter (over 2 ft. long)	9.75 to 10.00
Rails for rolling	12.50 to 13.00
Cast iron borings, chemical	10.00 to 10.25

Prices per gross ton deliv'd consumers' yards:

Textile cast	$14.50 to $15.00
No. 1 machinery cast	15.00 to 15.25
No. 2 machinery cast	13.00 to 13.25
Stove plate	11.00 to 11.50
Railroad malleable	18.50 to 19.00

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars, small shapes	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway rounds	6.60c.
Norway squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tie steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold-rolled steel—	
Rounds and hex	*3.55c. to 5.55c.
Spares and flats	*4.05c. to 7.05c.
Toe calk steel	6.00c.
Rivets, structural or boiler	4.50c.

	Per Cent Off List
Machine bolts	50 and 5
Carriage bolts	50 and 5
Lag screws	50 and 5
Hot-pressed nuts	50 and 5
Cold-punched nuts	50 and 5
Stove bolts	70 and 10

*Including quantity differentials.

Special attention has been paid to the drinking water problem of steel mills, foundries and similar institutions by the Frigidaire Corporation, Dayton, Ohio, in the development of five new series of electric water coolers. Realizing that workers in places where temperatures are high and much physical labor is done do not dare drink water that is too cold, Frigidaire engineers have brought out factory-type coolers that produce water at any temperature desired.

The Reliance Machinery Sales Co., 1407 Brighton Road, Pittsburgh, has been appointed distributer in the Pittsburgh district of back-geared, screw cutting lathes manufactured by South Bend Lathe Works, South Bend, Ind.

Canada

Short Wheat Crop May Affect Imports of Pig Iron from United States—Structural Demand Active

TORONTO, ONT., July 30.—Although there is little future buying of pig iron, a number of melters are showing interest in the market and spot demand is being maintained at a satisfactory level. Deliveries on contract and spot shipments are in good volume, with the current movement 15 to 20 per cent above that of a year ago. Some melters are complaining that prices are high, and action on a few large orders has been postponed. Shading is reported in some districts where desirable tonnages are in prospect, but the greater part of current business is being taken at quoted prices. Any adverse effect that the short wheat crop in the Canadian West may have on the iron and steel industry will be chiefly in imports, due to the fact that agricultural implement makers get practically their entire raw material requirements from United States producers.

Prices per gross ton:

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75	$24.60
No. 2 fdy., sil. 1.75 to 2.25	24.10
Malleable	24.60
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75	$26.00
No. 2 fdy., sil. 1.75 to 2.25	25.50
Malleable	26.00
Basic	24.50
Imported Iron, Montreal Warehouse	
Summerlee	$33.50
Carron	33.00

Structural Steel.—A more pronounced buying movement has developed in structural steel. The Dominion Bridge Co., Lachine, Que., has been awarded 6000 tons of steel for the new Aldred Building at Montreal. Orders for 100 to 500 tons have improved of late and at the present time a number of substantial tonnage contracts are pending.

Old Material.—Demand is holding at a good level in spite of the holiday listlessness of the market. While new business is spotty, total sales for the week were in good volume. Mills have again dropped out of the market, with the result that there is very little demand for heavy melting steel and turnings. Foundries, taking small individual tonnages, are buying at frequent intervals with the consequence that new business is making good headway as compared with a year ago. Prices are firm, but without change.

Dealers' buying prices:

	Per Gross Ton	
	Toronto	Montreal
Heavy melting steel	$10.00	$8.50
Rails, scrap	11.00	9.00
No. 1 wrought	10.00	12.00
Machine shop turnings	7.50	5.00
Boiler plate	7.50	6.00
Heavy axle turnings	8.00	7.50
Cast borings	7.50	5.00
Steel turnings	7.50	6.50
Wrought pipe	6.00	6.00
Steel axles	15.00	20.00
Axles, wrought iron	17.00	22.00
No. 1 machinery cast	....	17.00
Stove plate	....	13.00
Standard carwheels	....	16.00
Malleable	....	13.00
	Per Net Ton	
No. 1 mach'ry cast	$16.00	....
Stove plate	12.00	....
Standard carwheels	15.00	....
Malleable scrap	14.00	....

St. Louis

Scrap Prices Continue to Rise—Pig Iron Buying Light—Steel Specifications Improve

ST. LOUIS, July 30.—Sales of pig iron during the last week were very small, the St. Louis Gas & Coke Corporation disposing of 250 tons of malleable to one East Side melter and 50 tons of high silicon iron to a local jobbing foundry. The small volume of sales is ascribed to the uncertainty caused by recent recessions in the price of Southern iron, melters being fearful of placing orders except for immediate requirements lest there be further reductions. The local maker has made no change in its published quotations, although it is understood to be meeting the market in competitive territory. The melt in the district continues heavy, activities during the last 30 days having been at a considerably higher rate than the average for the same period in the last several years, according to the Federal Reserve Bank of St. Louis. The bank statement also says that jobbing foundries, particularly those specializing in railroad castings, report orders substantially larger than a year ago, and that sales of farm implements and stoves during the first half of the year were considerably larger than during the same period in 1928.

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-fin. rounds, shaftings, screw stock	3.75c.
Black sheets (No. 24)	4.25c.
Galv. sheets (No. 24)	5.10c.
Blue ann'l'd sheets (No. 10)	3.45c.
Black corrug. sheets (No. 24)	4.30c.
Galv. corrug. sheets	5.15c.
Structural rivets	3.95c.
Boiler rivets	3.95c.
	Per Cent Off List
Tank rivets, 7/8-in. and smaller, 100 lb. or more	65
Less than 100 lb	60
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-pressed nuts, sq., blank or tapped, 200 lb. or more	60
Less than 200 lb	50
Hot-pressed nuts, hex., blank or tapped, 200 lb. or more	60
Less than 200 lb	50

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill.	$20.00
Malleable, f.o.b. Granite City	20.50
N'th'n No. 2 fdy., deliv'd St. Louis	22.16
Southern No. 2 fdy., deliv'd	18.92
Northern malleable, deliv'd	22.16
Northern basic, deliv'd	22.16

Freight rates: 75c. (average) Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

Finished Steel.—An improvement in specifications against contracts for plates, shapes, bars and sheets is reported by mills. The price situation on sheets of all kinds is said to be firm. Railroads have completed allocations of their third-quarter requirements in plates, shapes and bars and sheets. A total of 875 tons of structural steel business in three projects was reported by fabricators in the district. Generally the structural trade is quiet.

Old Material — Consumers have been pressing dealers for deliveries on contracts, with the result that dealers' prices have been increased in the hope of stimulating shipments from the country. Receipts in this market have been light, and there is said to be a heavy short interest on the part of dealers. Advances range from 25c. to $1 a ton. Railroad lists: New York Central, 14,500 tons of 80, 85 and 100-lb. relaying rails; Union Pacific, 2565 tons; Chicago, Milwaukee, St. Paul and Pacific, 118 carloads and 2000 tons steel rails; Big Four, 1900 tons; Missouri-Kansas-Texas, 500 tons; Missouri Pacific, 116 carloads; St. Louis-San Francisco, six carloads.

Dealers' buying prices per gross ton, f.o.b. St. Louis district:

No. 1 heavy melting or shoveling steel	$14.00 to $14.50
No. 2 heavy melting or shoveling steel	13.25 to 13.75
No. 1 locomotive tires	15.50 to 16.00
Miscel. stand.-sec. rails including frogs, switches and guards, cut apart	16.25 to 16.75
Railroad springs	18.50 to 19.00
Bundled sheets	9.50 to 10.00
No. 2 railroad wrought	14.00 to 14.50
No. 1 busheling	10.00 to 10.50
Cast iron borings and shoveling turnings	9.50 to 10.00
Iron rails	15.00 to 15.50
Rails for rolling	16.75 to 17.25
Machine shop turnings	8.50 to 9.00
Heavy turnings	10.00 to 10.50
Steel car axles	19.00 to 19.50
Iron car axles	27.50 to 28.00
Wrot. iron bars and trans.	22.00 to 22.50
No. 1 railroad wrought	13.00 to 13.50
Steel rails, less than 3 ft.	18.00 to 18.50
Steel angle bars	14.50 to 14.75
Cast iron carwheels	14.50 to 15.00
No. 1 machinery cast	15.00 to 15.50
Railroad malleable	15.50 to 16.00
No. 1 railroad cast	15.00 to 15.50
Stove plate	12.50 to 13.00
Agricult. malleable	15.00 to 15.50
Relay. rails, 60 lb. and under	20.50 to 23.50
Relay. rails, 70 lb. and over	26.50 to 29.00

Union Twist Drill Co., Athol, Mass., has appointed the Pacific Mill & Mine Supply Co., Los Angeles, Cal., as its dealer in the Los Angeles district. The latter will carry a comprehensive stock of milling and gear cutters, hobs, drills, reamers, taps and dies.

Cincinnati

Sheet Backlogs Continue to Taper—Scrap Gains in Strength, Pig Iron Dull

CINCINNATI, July 30.—The continual sagging of the Southern pig iron market has contributed an undertone of uncertainty to the market and, although the quotations of Northern furnaces have not been affected, consumers of Northern iron are buying only in small quantities, in the expectation that price revisions will become more general. The prevailing Southern quotation is $14.50, base Birmingham, and a few small sales have been made at this price, but there have been no large inquiries to bring out concessions, and it is the opinion in the trade that $14 would be the lowest figure at which business could be done. A Muncie, Ind., melter is asking for 100 to 300 tons of Northern foundry iron, and a Cambridge, Ind., consumer wants 500 tons of the same grade. A third Indiana consumer is inquiring for 300 tons of malleable for third quarter.

Prices per gross ton, deliv'd Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25	$19.89 to $20.39
Ala. fdy., sil. 1.75 to 2.75	17.69 to 18.19
Ala. fdy., sil. 2.25 to 2.75	18.19 to 18.69
Tenn. fdy., sil. 1.75 to 2.25	17.69 to 18.19
S'th'n Ohio silvery, 8 per cent	26.89

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

Finished Material.—Backlogs of district sheet mills were reduced slightly during the past week, as production exceeded demand. The volume of new business, however, was about equal to that of the preceding week and was better than usual for July. Although deliveries are a shade easier than a month ago, the situation is still far from satisfactory from the consumers' point of view and, consequently, some of them are specifying in excess of their needs to insure sufficient material to sustain production at a good rate. While most of the automobile manufacturers have withdrawn from the market until the annual inventory period during the latter part of August is passed, several companies are specifying sheets for new models. Despite the present recession of automotive requirements, district mill operators look for a brisk market in the early fall. Galvanized sheets for roofing materials are in increasing demand and, although reports of price discontent in the Southeast are being heard, manufacturers say that no sagging of the market is likely.

Coke.—Specifications for by-product foundry coke during July were better than in the preceding month, thus reflecting the continued activity of the foundries in this district. Oven operations are abreast of the demand and, consequently, shipments are about up to date. New business, however, is very light and consists chiefly of spot orders for immediate use.

Old Material.—Firmness in other markets is being reflected here, causing a slight scarcity in first class scrap. Dealers are paying good prices for heavy melting steel and specialty grades of scrap and, although there is very little buying, consumers are taking material on contract at a good rate. Scrap rails and cast iron borings are up 25c. a ton, while No. 2 busheling has broadened its spread 25c., making the new quotation $7 to $7.50, an increase of 25c. on the bottom and 50c. on the top.

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel	$13.50 to $14.00
Scrap rails for melting	14.00 to 14.50
Loose sheet clippings	9.00 to 9.50
Bundled sheets	11.00 to 11.50
Cast iron borings	9.25 to 9.50
Machine shop turnings	8.50 to 8.75
No. 1 busheling	10.50 to 11.00
No. 2 busheling	7.00 to 7.50
Rails for rolling	14.50 to 15.00
No. 1 locomotive tires	14.25 to 14.75
No. 2 railroad wrought	13.25 to 13.75
Short rails	18.50 to 19.00
Cast iron carwheels	12.75 to 13.25
No. 1 machinery cast	19.25 to 19.75
No. 1 railroad cast	15.25 to 15.75
Burnt cast	10.25 to 10.75
Stove plate	10.25 to 10.75
Brake shoes	10.25 to 10.75
Agricultural malleable	14.25 to 14.75
Railroad malleable	15.25 to 15.75

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and struc. shapes	3.40c.
Bars, soft steel or iron	3.30c.
New billet reinforc. bars	3.15c.
Rail steel reinforc. bars	3.00c.
Hoops	4.05c.
Bands	3.50c.
Cold-fin. rounds and hex	3.85c.
Squares	4.35c.
Black sheets (No. 24)	4.05c.
Galvanized sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.45c.
Structural rivets	3.85c.
Small rivets	65 per cent off list
No. 9 ann'l'd wire, per 100 lb.	$3.00
Com. wire nails, base per keg	2.85
Cement c't'd nails, base 100 lb. keg	2.85
Chain per 100 lb.	8.75
	Net per 100 Ft.
Lap-weld steel boiler tubes, 2-in.	$16.00
4-in.	33.00
Seamless steel boiler tubes, 2-in.	17.00
4-in.	34.00

Youngstown

Best July Steel Output on Record—Pipe Demand Large

YOUNGSTOWN, July 30.—Another month of record-breaking steel production ends this week. Schedules in the district have averaged above 85 per cent, making this the best July on record. From present indications, August production and shipments will be equally as satisfactory. Makers of steel pipe have a larger volume of inquiries now than at any time this year, and much of this tonnage will be transferred to order books in August, it is expected. The Republic Iron & Steel Co., for example, is booked ahead for six weeks in its pipe mills, well into September. Most of the new pipe tonnage is for pipe line projects. The Republic company is producing substantial tonnages of 4-in. and 6-in. tubing on its new electric welding tube mill. Foundations have been laid for two additional mills to roll larger pipe by this method under the Johnson patents, but it will be well into next year before they are completed. The new capacity will provide an additional outlet for the company's plate mill at Lansingville.

Reports that the Republic company received an order for 100,000 tons of steel tubing from a Southern interest are incorrect, officials advise. The bulk of the order referred to was placed some time ago with the A. O. Smith Corporation, and the remainder was divided among a number of other producers.

Schedules this week in the Mahoning Valley show 46 of 51 independent open-hearth furnaces active, 113 of 120 sheet mills under power, tin mills close to capacity, independent bar mills at 80 per cent and strip mills at above 90 per cent.

Valley steel companies are devoting considerable attention to water transportation, both of finished steel and inbound raw materials. The Sheet & Tube company has made arrangements for warehouse facilities at Memphis, Tenn., and expects to ship as much of the stock as possible by way of the Ohio and Mississippi rivers. Some Sheet & Tube company coal is being shipped from Pennsylvania to Ohio partly by barge. Valley pipe makers are making substantial shipments, especially of seamless tubing, to southern California via Baltimore and the Panama Canal.

Iron Castings Business Reported Good

The Gray Iron Institute, Terminal Tower Building, Cleveland, reports that production in June of 119 member foundries was 28,114 tons, which was at the ratio of 113.2 per cent, considering the average monthly production during the last three calendar years as 100. Forty foundries report business prospects as good, 56 fair and 7 poor.

New Members

The following new members have been elected: Barnett Foundry & Machine Co., Irvington, N. J.; Kelly Foundry Co., Pittsburgh; James McKinney & Son, Albany, N. Y.; Brooklyn Foundry Co., Astoria, N. Y.; Old Colony Foundry Co., East Bridgewater, Mass.; Gibby Foundry Co., East Boston, Mass.; L. W. Pond Machine & Foundry Co., Worcester, Mass., and Central Foundry Co., Joplin, Mo.

Buffalo

With Heavy Furnace Backlogs, Pig Iron Prices are Firm —Steel Operations at Capacity

BUFFALO, July 30.—With all the Buffalo furnaces having heavy backlogs, the situation in this district on pig iron is firmer, and this has been made apparent by a tightening of prices on eastern delivery. One interest has instructed its Eastern agents to accept no more iron of any tonnage without referring it to the home office. Under no circumstances will this furnace accept any business in the East more than $1 under the Buffalo base. This particular interest sold 25,000 tons during June and has already booked 24,000 tons for the fourth quarter. The Eastern Malleable Co. is understood to have withdrawn its inquiry for 3000 tons of malleable. A Massachusetts inquiry for 4000 tons mentioned last week has been partially placed and it is understood that part of the tonnage came to Buffalo. A Franklin, Pa., melter bought 800 tons. The Massey-Harris inquiry from Batavia has not yet been placed and the tonnage has been expanded to include the requirements of the Toronto plant.

Prices per gross ton, f.o.b. furnace:

No. 2 fdy., sil. 1.75 to 2.25	$19.50
No. 2X fdy., sil. 2.25 to 2.75	20.00
No. 1 fdy., sil. 2.75 to 3.25	21.00
Malleable, sil. up to 2.25	20.00
Basic	18.50
Lake Superior charcoal	27.28

Finished Iron and Steel.—The market for all grades manufactured in this district continues very good and operations of the local mills show no evidence of any seasonal falling off. Open-hearth operation is as high now as it has been at any period of this year and mill operation is close to 100 per cent. One interest is maintaining its mills at double turn except when it is unable to get the steel. There has been a steady booking of small lots of reinforcing bars and fabricated structural, but no large tonnage has been placed during the week.

Old Material. — The outstanding transaction of the week was the purchase of 2000 tons of stove plate at $13.50. There have been a few small sales of heavy melting steel, and the market remains unchanged. Dealers continue to pay $17 on an old order of No. 1 at $17.25 to $17.50 and $14.25 to $14.50 on an old order of No. 2 heavy melting steel. Dealers are also paying as high as $11 on old cast iron borings orders. Strength of specialties in the outside markets is having a firming effect on the Buffalo market for knuckles and couplers, rolled steel wheels and coil and leaf springs. With Pittsburgh and Youngstown points paying $22, volume of receipts in the Buffalo territory has been curtailed.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades:		
No. 1 heavy melting steel	$17.00 to	$17.25
No. 2 heavy melting steel	14.75 to	15.00
Scrap rails	16.50 to	17.00
Hydraul. comp. sheets	14.50 to	14.75
Hand bundled sheets	12.00 to	12.50
Drop forge flashings	14.25 to	14.50
No. 1 busheling	15.50 to	16.50
Hvy. steel axle turnings	14.00 to	14.50
Machine shop turnings	7.50 to	7.75
No. 1 railroad wrought	13.00 to	13.50
Acid Open-Hearth Grades:		
Knuckles and couplers		19.00
Coil and leaf springs		19.00
Rolled steel wheels		19.00
Low phos. billet and bloom ends	20.00 to	20.50
Electric Furnace Grades:		
Short shov. steel turnings	12.00 to	12.50
Blast Furnace Grades:		
Short mixed borings and turnings	11.00 to	11.50
Cast iron borings	10.50 to	11.00
No. 2 busheling	10.00 to	10.50
Rolling Mill Grades:		
Steel car axles	18.75 to	19.25
Iron axles	21.00 to	22.00
Cupola Grades:		
No. 1 machinery cast	16.00 to	17.00
Stove plate	13.00 to	13.50
Locomotive grate bars	12.50 to	13.00
Steel rails, 3 ft. and under	19.00 to	19.50
Cast iron carwheels	14.00 to	14.50
Malleable Grades:		
Industrial	18.00 to	18.50
Railroad	18.00 to	18.50
Agricultural	18.00 to	18.50
Special Grades:		
Chemical borings	12.50 to	13.50

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and struc. shapes	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.95c.
Cold-fin. flats, sq. and hex.	4.45c.
Rounds	3.95c.
Cold-rolled strip steel	5.85c.
Black sheets (No. 24)	4.20c.
Galv. sheets (No. 24)	4.85c.
Blue ann'l'd sheets (No. 10)	3.50c.
Com. wire nails, base per keg	$3.60
Black wire, base per 100 lb.	3.75

Detroit

Dealers' Stocks Still Small in Low-Priced Cars

DETROIT, July 30.—The most encouraging aspect of the present situation in automotive production lies in the fact that the demand for automobiles continues to exceed the volume usually expected during midsummer. Consequently, the decline in production at this season has been smaller and more gradual than in former years. In fact, dealers' stocks in the low-price car field are still exceedingly small in some sections of the country, buyers being forced to wait for delivery. And this demand is not controlled by any one manufacturer, as indicated by production volume in the Ford, the Chevrolet and the Willys-Overland plants. The Ford Motor Co. turned out its two millionth car on July 24 and it is reported that the minimum wage scale of Ford employees is soon to be increased.

The Durant Motor Co., Inc., announces a new model, the 6-63, a six-cylinder car priced midway between the 6-60 and the 6-66 models.

By Aug. 1, demand for automotive steel should begin to show an improvement and specifications for September and October deliveries should begin to come in.

Orders for hot and cold-rolled strip so far this month show an increase of about 25 per cent over those received during the same period of 1928. Full-finish automobile sheets show a fairly satisfactory demand, with prices firm. However, there no longer exists any difficulty in getting semi-finished material at second quarter prices.

Automobile body sheets remain at 4.10c., Pittsburgh, with cold-finished bars at 2.30c. Hot-rolled strips, 6-in. and narrower, stand at 2c., Pittsburgh, with wider than 6-in. at 1.90c., Pittsburgh.

The market is experiencing the usual slowing up in the structural field. Small-lot orders for steel have declined considerably during the past month, and at the present time there are not enough small alteration or addition jobs to keep the small fabricators busy.

Plans are being completed for the Capital Savings Bank at Lansing, Mich., which will be a 22-story building. No estimate of the steel requirements is yet available.

The Electric Autolite Co. announces plans for a $275,000 office building in Toledo, and the Detroit Aircraft Corporation has authorized the erection of a seaplane hangar in Grosse Isle, near Detroit.

With some further reductions in automobile production, scrap dealers are finding some difficulty in buying additional tonnage. The market is firm, with top prices of the range frequently being paid on blast furnace grades.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Hvy. melting and shov. steel	$14.00 to $14.50
Borings and short turnings	9.00 to 9.50
Long turnings	8.00 to 8.50
No. 1 machinery cast	12.50 to 13.00
Automobile cast	13.00 to 13.50
Hydraul. comp. sheets	13.75 to 14.25
Stove plate	9.00 to 9.50
New No. 1 busheling	12.50 to 13.00
Old No. 1 busheling	11.00 to 11.50
Sheet clippings	8.75 to 9.25
Flashings	12.75 to 13.25

Cut Tacks and Cut Nails

Simplified Practice Recommendation R47-28, promulgated by the United States Bureau of Standards, relates to cut tacks and small cut nails for a great variety of industrial purposes. Standard sizes for each such use are given in the pamphlet mentioned, which may be obtained for 10c. from the Government Printing Office, Washington. Standards include sizes of packages for the various kinds of tacks and nails.

Non-Ferrous Metal Markets

Copper Sales Larger, Tin Quiet, Lead Weak, Zinc Dull

NEW YORK, July 30.

Copper.—Impressive gains in foreign sales were made during the past week. Bookings averaged about 1400 tons daily with sales yesterday and today totaling approximately 3000 tons each. More liberal buying is attributed to the fact that consumers have let stocks dwindle to such a low point that they are forced into the market to fill immediate requirements. Domestic users, on the other hand, have purchased only small lots, but are inquiring for fair-sized tonnages. Producers declare that the pressure which has been exerted by customers to obtain lower prices is proving of no avail. They assert that the shading of quotations at the present time, after they have withstood the effects of an extended period of comparative inactivity, would be a needless concession. They expect their position to be strengthened by July production figures, which admittedly will show the results of the curtailment of output. The outlook is favorable for an improvement in domestic sales during August, while producers are confident that foreign users must continue buying at a steady rate to cover current needs. Electrolytic copper is quoted at 18c., delivered in the Connecticut Valley, and at 18.30c., c.i.f. usual European ports. Lake copper is unchanged at 18c. to 18.12½c., delivered.

Tin.—Following two weeks of exceptionally heavy buying, sales of Straits tin receded sharply the past week and were well under 1000 tons. Although some business has been booked for the last quarter of the year, the bulk of the tonnage was for spot delivery. The quietness of the market, however, did not adversely affect prices, which have fluctuated little. This is shown by the fact that spot Straits tin sold on July 24 at 47.25c., New York, and today was quoted at the same figure. Sellers are not pressing for orders at the moment and buyers have indicated a lack of interest. The London group did not take an active part in trading until late today, when they bought 200 tons, thereby imparting an underlying tone of firmness to the London market. Prices have trended slightly upward with spot standard quoted at £213 12s. 6d., future standard at £217 7s. 6d. and spot Straits at £217

THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY

	July 30	July 29	July 27	July 26	July 25	July 24
Lake copper, New York	18.12½	18.12½	18.12½	18.12½	18.12½	18.12½
Electrolytic copper, N. Y.*	17.75	17.75	17.75	17.75	17.75	17.75
Straits tin, spot, N. Y.	47.25	47.00	....	47.125	46.875	47.25
Zinc, East St. Louis	6.80	6.80	6.80	6.80	6.80	6.80
Zinc, New York	7.15	7.15	7.15	7.15	7.15	7.15
Lead, St. Louis	6.55	6.55	6.55	6.55	6.55	6.55
Lead, New York	6.75	6.75	6.75	6.75	6.75	6.75

*Refinery quotation; price ¼c. higher delivered in the Connecticut Valley.

Prices on rolled non-ferrous products are unchanged from those prevailing one week ago.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—
- High brass ..... 23.25c.
- Copper, hot rolled ..... 26.75c.
- Zinc ..... 10.25c.
- Lead (full sheets) ... 11.00c. to 11.25c.

Seamless Tubes—
- High brass ..... 28.25c.
- Copper ..... 29.25c.

Rods—
- High brass ..... 21.25c.
- Naval brass ..... 24.00c.

Wire—
- Copper ..... 19.87½c.
- High brass ..... 23.75c.

Copper in Rolls ..... 26.75c.
Brazed Brass Tubing ..... 30.87½c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also to St. Louis on shipments to points west of that river.

- Sheets, 0 to 10 gage, 3 to 30 in. wide ..... 33.00c.
- Tubes, base ..... 42.00c.
- Machine rods ..... 34.00c.

Chicago Warehouse

(Prices Cover Trucking to Customers' Doors in City Limits)

Sheets—	Base per Lb.
High brass	23.25c.
Copper, hot rolled	27.75c.
Copper, cold rolled, 14 oz. and heavier	30.00c.
Zinc	10.75c.
Lead, wide	11.35c.
Seamless Tubes—	
Brass	28.25c.
Copper	29.25c.
Brass Rods	21.25c.
Brazed Brass Tubes	31.00c.

New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—		
High brass	21.12½c.	to 22.12½c.
Copper, hot rolled, Base sizes	27.75c.	to 28.75c.
Copper, cold rolled 14 oz. and heavier, base sizes	30.00c.	to 31.00c.
Seamless Tubes—		
Brass	26.00c.	to 27.00c.
Copper	29.12½c.	to 30.12½c.
Brazed Brass Tubes	29.12½c.	to 30.12½c.
Brass Rods	18.87½c.	to 19.87½c.

New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets (No. 9), casks	10.50c.	to 11.00c.
Zinc sheets, open	11.50c.	to 12.00c.

Metals from New York Warehouse

Delivered Prices, Per Lb.

Tin, Straits pig	48.50c. to 49.50c.
Tin, bar	50.50c. to 51.50c.
Copper, Lake	19.50c.
Copper, electrolytic	19.25c.
Copper, casting	19.00c.
Zinc, slab	7.75c. to 8.25c.
Lead, American pig	7.50c. to 8.00c.
Lead, bar	9.50c. to 10.00c.
Antimony, Asiatic	10.50c. to 11.00c.
Aluminum No. 1 ingots for remelting (guaranteed over 99% pure)	25.00c. to 26.00c.
Alum. ingots, No. 12 alloy,	24.00c. to 25.00c.
Babbitt metal, commercial grade,	30.00c. to 40.00c.
Solder, ½ and ½	31.00c. to 32.00c.

Metals from Cleveland Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	52.25c.
Tin, bar	54.25c.
Copper, Lake	19.50c.
Copper, electrolytic	19.25c.
Copper, casting	18.75c.
Zinc, slab	7.75c. to 8.00c.
Lead, American pig	7.25c. to 7.50c.
Lead, bar	9.75c.
Antimony, Asiatic	16.00c.
Babbitt metal, medium grade	18.75c.
Babbitt metal, high grade	56.50c.
Solder, ½ and ½	31.75c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged customers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	14.50c.	16.00c.
Copper, hvy. and wire	14.25c.	15.75c.
Copper, light and bottoms	12.50c.	13.75c.
Brass, heavy	8.50c.	9.50c.
Brass, light	7.50c.	8.50c.
Hvy. machine composition	11.50c.	12.75c.
No. 1 yel. brass turnings	9.75c.	10.50c.
No. 1 red brass or compos. turnings	11.25c.	12.25c.
Lead, heavy	5.25c.	5.75c.
Lead, tea	4.25c.	5.25c.
Zinc	3.50c.	4.25c.
Sheet aluminum	14.00c.	16.00c.
Cast aluminum	12.25c.	14.25c.

2s. 6d. The primary market at Singapore has been steady at £221.

Zinc.—With producers adhering strictly to 6.80c., East St. Louis, for prime Western zinc, sales have been of negligible volume. Consumers are only interested in covering immediate requirements and consequently orders have been confined to small lots.

Lead.—Weakness in the price of lead was revealed the past week when sales were made at 6.50c., St. Louis, but quotations rapidly were reestablished at 6.55c. after a few orders had been taken at the lower figure. Bookings yesterday were about 1000 tons, but today buying fell off somewhat. Most consumers are specifying August deliveries.

Antimony.—The apparently pacific settlement of the Chino-Russian dispute has resulted in an easier market in Chinese metal, with spot selling at from 8.62½c. to 8.75c. and futures at 8.50c., duty paid, New York. The flurry of buying a week ago probably will still be reflected in continued light buying during the coming week.

Nickel.—The price of ingot nickel is 35c. a lb., of shot nickel 36c. and of cathodes of electrolytic nickel 35c.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is selling at 23.90c. a lb., delivered.

Non-Ferrous Metals at Chicago

CHICAGO, July 30.—The volume of sales is heavier and prices are unchanged. The old metal market is steady both in quotations and purchases by consumers.

Prices per lb., in carload lots: Lake copper, 18.50c.; tin, 48c.; lead, 6.65c.; zinc, 6.90c.; in less-than-carload lots, antimony, 9.62½c. On old metals we quote copper wire, crucible shapes and copper clips, 14c.; copper bottoms, 11.50c.; red brass, 11.50c.; yellow brass, 8c.; lead pipe, 4.50c.; zinc, 3.25c.; pewter, No. 1, 24.50c.; tin foil, 26c.; block tin, 36c.; aluminum, 12.87½c.; all being dealers' prices for less-than-carload lots.

Reinforcing Steel

Awards Drop to Low Point and Inquiries Are Small

LETTINGS dropped to a low point the past week, totaling only 4300 tons. The largest job was 1000 tons for a power house at Powerton, Ill. An office building at Seattle, Wash., will take 550 tons. Fresh inquiries of 3100 tons included 800 tons for a building at Barrington, Ill. Awards follow:

CAMBRIDGE, MASS., 200 tons, Harvard University dormitory, to J. C. Coleman & Sons.

DELAWARE, LACKAWANNA & WESTERN RAILROAD, 150 tons, coal pockets in Brooklyn, to McClintic-Marshall Co.

NEW YORK CENTRAL RAILROAD, 175 tons, shops at Harmon, N. Y., to McClintic-Marshall Co.

POWERTON, ILL., 1000 tons, power house, to American System of Reinforcing.

ASHTABULA, OHIO, 500 tons, Cleveland Electric Illuminating Co. building, to Bourne-Fuller Co.

KALAMAZOO, MICH., 100 tons, Park Hotel, to Concrete Engineering Co.

STEVENS POINT, WIS., 250 tons, Hardware Mutual Life Insurance Co. building, to Concrete Engineering Co.

CEDAR RAPIDS, IOWA, 500 tons, filtration plant, to Laclede Steel Co.

SANTA MONICA, CAL., 300 tons, office building, Third and Santa Monica Streets, to unnamed bidder.

SACRAMENTO, CAL., 208 tons, highway work in Alameda County, to unnamed bidder.

ELLENSBURG, WASH., 200 tons, normal school, to Northwest Steel Rolling Mills.

OLYMPIA, WASH., 125 tons, highway work, to Northwest Steel Rolling Mills.

SEATTLE, 550 tons, Vance Building, to Northwest Steel Rolling Mills.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

BOSTON, 300 tons, Boston & Maine Railroad hotel.

PHILADELPHIA, 700 tons, building for Atwater Kent Mfg. Co.

CHICAGO, 300 tons, Naval Hospital building.

CHICAGO, 250 tons, Fine Arts Building; R. C. Wieboldt & Co., general contractors.

CHICAGO, 130 tons, Irvale apartment building.

CHICAGO, 450 tons, Wilbur Wright School; W. E. O'Neil, general contractor.

CHICAGO, 125 tons, Parker School; Hanson Brothers, general contractors.

CHICAGO, 100 tons, Swift & Co., fertilizer plant.

CHICAGO, 275 tons, Henrici Restaurant; R. C. Wieboldt & Co., general contractors.

CHICAGO, tonnage not stated, apartment building on North Clark Street; Rosenthal & Cornell, general contractors.

BARRINGTON, ILL., 800 tons, Jewel Tea Co. building; Lundoff Bicknell Co., general contractor.

SAN FRANCISCO, 300 tons, opera house and war memorial buildings; bids postponed indefinitely.

New Chicago Maker of Rolled Products

A new company now in process of being incorporated for the purpose of manufacturing rolled steel products has acquired the former Whitman & Barnes Company plant, 120th and Morgan Streets, Chicago. The Sessions Engineering Co., Chicago, is engineer.

Boiler Makers Adopt Rules

WASHINGTON, July 30.—Trade practice rules governing the range boiler industry were issued yesterday by the Federal Trade Commission. On the basis of volume of business, it was estimated by the commission that 60 per cent of the industry was represented at the conference at which the rules were adopted.

Railroad Equipment

Orders and Inquiries for Locomotives Better

THE placing of two fair-sized orders and the appearance of inquiries from a number of carriers indicate a revival of interest in locomotive buying. The Northern Pacific and the Chilean State Railways have each contracted for 11 locomotives, while the New York Central is in the market for 35 oil-electric battery locomotives. The Burlington is considering the purchase of 25 locomotives. The Canadian Pacific has ordered 100 80-ton ore cars. Details of the week's business follow:

Canadian Pacific has ordered 100 80-ton ore cars from Canadian Car & Foundry Co.

Cudahy Packing Co. has ordered 50 steel underframes from Pullman Car & Mfg. Corporation.

Chicago, Milwaukee, St. Paul & Pacific has bought 15 steel caboose underframes from Bettendorf Corporation.

Chicago & Great Western has ordered two baggage mail cars from Pullman Car & Mfg. Corporation.

Northern Pacific has purchased 11 Yellowstone-type locomotives from Baldwin Locomotive Works.

Chilean State Railways has ordered 11 locomotives from Baldwin Locomotive Works.

Burlington is considering purchase of 25 locomotives.

St. Louis Southwestern is expected to buy 10 locomotives.

New York Central is in market for 35 oil-electric battery locomotives.

Nashville, Chattanooga & St. Louis will buy five freight locomotives.

Kentucky & Indiana Terminal is in market for 8 switching locomotives.

Louisville & Nashville is said to be contemplating purchase of passenger locomotives.

Minneapolis, St. Paul & Sault Ste. Marie is considering purchase of passenger engines.

Ford Scrap Sales in 1928

The Ford Motor Co., Detroit, has announced that the sale of scrap material of all kinds netted the company $3,573,877.60 during 1928. This figure represents only the scrap that was sold in the open market. Considerable quantities were used in the Ford company's own blast furnaces and open-hearth furnaces. The Ford company ships about 900 tons of scrap a day, of which about 500 tons is in the form of borings and turnings from machine shops; 300 tons of sheet steel scrap from the stamping shops and about 125 tons in the form of drop forge flashings obtained from the manufacture of such parts as the camshaft.

Brass Ingots Reduced

CHICAGO, July 30.—Brass ingot prices at Chicago were reduced July 29. Brass ingots of 85-5-5-5 composition were reduced from 16¼c. a pound to 15¾c.; 80-10-10 brass from 17½c. to 16¾c., and yellow brass ingots from 13c to 12¾c.

PERSONAL

The late LEWIS MILLER, who was for nearly 40 years the head of Aultman, Miller & Co., Akron, Ohio, manufacturers of Buckeye harvesting machinery, which he invented, was cofounder in 1873 with the late BISHOP JOHN H. VINCENT, of the famous Chautauqua Institution, at Chautauqua Lake, N. Y. On July 24 the centenary of Mr. Miller's birth was celebrated at Chautauqua. At the evening exercise in the amphitheater, before an audience of 10,000, THOMAS A. EDISON and HENRY FORD, guests of honor, made brief responses. Addresses were made by ADOLPH S. OCHS, publisher of the New York *Times*; DR. ELMER A. SPERRY, president of the American Society of Mechanical Engineers, who brought greetings from the national engineering societies; ALVIN I. FINDLEY, editor *The Iron Age*, and JUDGE WILLIAM L. RANSOM, New York, president of the board of trustees of the Chautauqua Institution.

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W. E. WORTH has been appointed Pacific Coast representative, with offices at 216 Pine Street, San Francisco, for the American Gas Furnace Co., Elizabeth, N. J.

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GEORGE W. DAVIS, formerly of the Chicago office of Gears & Forgings, Inc., Cleveland, has been made district manager of the Minneapolis office of the company.

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ARTHUR W. KLINGMAN, for 25 years associated with the Bourne-Fuller Co., Cleveland, has been made vice-president of the Foster Bolt & Nut Mfg. Co., Cleveland.

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I. EDMUND WAECHTER has resigned as superintendent of the Illinois Foundry Co., Springfield, Ill., to become general superintendent of the L. N. N. Foundry Co., Cleveland.

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GEORGE H. BANCROFT, for the past four years assistant purchasing agent for the Willys-Overland Co., Toledo, Ohio, has been appointed purchasing agent, succeeding the late WILLARD H. CALKINS. He was graduated from the University of Michigan in 1912 and taught engineering there for two years. Later he engaged in the general practice of engineering until after the war and in 1919 entered the automobile industry with the Oakland Motor Car Co.

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J. T. BENCHOFF has been made district manager of the newly-opened office in the Marshall Building, Cleveland, of the Landis Machine Co., Waynesboro, Pa.

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CHARLES E. EVELETH, who since 1927 has been a vice-president of the General Electric Co., in charge of the manufacturing department with C. C. CHESNEY and W. R. BURROWS, has been transferred to the engineering department of the company, and will be associated with E. W. ALLEN. Mr. Eveleth will give special attention to the problems of the designing departments and works laboratories, and Mr. Allen will have charge of the commercial engineering, the contract service and district engineering departments.

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HENRY S. RAWDON, who, as announced in THE IRON AGE of July 25, has been appointed chief of the Division of Metallurgy, Bureau of

HENRY S. RAWDON

Standards, Washington, was born in England. He was educated in the public schools in Michigan and was graduated from Michigan Normal College. He was a high school principal and superintendent for six years. In 1912 he received the degree of metallurgical engineer from the University of Michigan. As assistant physicist in charge of metallography in the division of metallurgy of the Bureau of Standards, he was sent to England and France to study the question of phosphorus and sulphur in steel. He has been active in committee work of the American Society for Testing Materials and other technical societies.

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JAMES F. EDNIE, foreman of the tool-treating shop of the armor plate department, Carnegie Steel Co., Homestead, Pa., has become assistant metallurgist of the Union Switch & Signal Co., Swissvale, Pa.

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ARTHUR T. KATHNER, inventor of the Kathner normalizing furnace, has sailed for Europe to further the sale and servicing of his furnace.

S. F. SIDES has been appointed direct sales representative in Los Angeles for the Union Twist Drill Co., Athol, Mass. He has been associated for the past eight years with the Goddard & Goddard Co., Detroit, in the Pacific Coast territory.

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R. M. BRUSHINGHAM has been made district manager of the Edgar Allen Steel Co., Inc., New York, in charge of its Detroit office, which will be opened at 704 Fisher Building, Aug. 3. He was associated for 12 years with the Colonial Steel Co., for the past four years as representative in Detroit.

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THOMAS O'BRIEN, formerly manager of the Farrell, Pa., works, American Sheet & Tin Plate Co., has been appointed manager of the Gary, Ill., tin mill of that company, succeeding W. C. LOYD, who has resigned. Mr. O'Brien has been succeeded at Farrell by JOHN A. BUTLER, recently manager of the company's New Castle, Pa., works. E. R. THOMPSON has been named manager at the New Castle works. JOHN N. CROMBIE, recently assistant manager of the company's Laughlin works, Martins Ferry, Ohio, has been made assistant manager of the Shenango works at New Castle. HAROLD S. PYLE has been named assistant manager of the Laughlin works, succeeding Mr. Crombie. R. B. SAYLOR has been appointed assistant manager of the Wellsville, Ohio, works, and A. G. RINDERKNECHT has been named to a similar position at the Dover, Ohio, works. These appointments are effective Aug. 1.

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GROVER C. BROWN, chief civil engineer at the Cambria plant of the Bethlehem Steel Co., Johnstown, Pa., has been appointed management representative at that plant. He succeeds C. L. BAKER, who has been transferred to the company's Lackawanna, N. Y., works.

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JOHN ECKERLE, president, Aluminum Industries, Inc., Cincinnati, sailed on the Bremen, July 29, for a tour of Germany and of several other European countries.

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JAMES A. FARRELL, president and chief executive officer of the United States Steel Corporation, sailed for Europe on the Leviathan July 27. He was accompanied by Mrs. Farrell, James A. Farrell, Jr., and Miss Rosamond Farrell. After visiting Paris the party will go to San Sebastian, Spain, on the coast of the Bay of Biscay.

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CHARLES E. SATLER has resigned as secretary of the United Engineering & Foundry Co., Pittsburgh, after 44 years of service with the company. GEORGE H. FRIESEL, treasurer, has been elected secretary in addition to his regular duties. J. H. HILLMAN, JR., chairman Hillman Coal & Coke

Co., and prominently identified with numerous Pittsburgh industrial enterprises, has been elected a director of the United company.

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JEAN ROCHE, senior engineer at Wilbur Wright Field, Dayton, Ohio, will become president of the Aeronautical Corporation of America, Cincinnati, Aug. 15. He is the inventor of a flivver plane. He formerly worked for the Standard Airplane Co., at Elizabeth, N. J.

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J. BLAIR SUTTON, president, Sutton Engineering Co., Pittsburgh, has returned from a three months' business trip in Europe.

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E. C. FAUSTMANN, formerly vice-president of the Royal Typewriter Co., Hartford, Conn., has been made president to succeed G. E. SMITH, who resigned.

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J. H. COLLIER, general manager of the Crane Co., Bridgeport, Conn., plant, has been made general supervisor of the company's European valve business. A. E. MACDONALD, Bridgeport plant superintendent, succeeds Mr. Collier as general manager.

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KENNETH M. LANE, designer of the airplane which last May broke the world's altitude record, has been appointed chief of the aeronautical engineering section of the Department of Commerce.

Obituary

WILLIAM PIGOTT, vice-president, Pacific Coast Steel Co., Seattle, Wash., died in Vancouver, B. C., July 19, following a stroke of apoplexy suffered on July 4.

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JOHN FELTES, vice-president, Standard Electric Tool Co., Cincinnati, died of pneumonia at his home in Cincinnati, July 24.

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LOUIS WAKEMAN PENFIELD, president, Hadfield Penfield Steel Co., Cleveland, died Monday night, July 29, at his home in that city, following a long illness. He was 72 years of age.

Sharp Drop in Canadian Motor Car Output

Automobile production in Canada in June totaled only 21,492 cars, compared with 31,559 in May. The latter figure represented the first recession following the rapid rise in output from January through April. Compared with May, output in June showed declines in closed passenger models, trucks and chassis and increases in open passenger cars, taxicabs and buses.

New Trade Publications

Steel Castings.—Nugent Steel Casting Co., Chicago. A two-page illustrated leaflet describes steel castings which are used in the production of the Buda 619 heavy-duty motor car which is a small gasoline-driven engine. All castings used in the chassis of this engine are made of steel.

Steel Castings.—Lebanon Steel Foundry, Lebanon, Pa. A four-page leaflet, illustrated, describes the application of special electric steel castings which are used by the Worthington Mower Co. in the production of its special motor-driven and other lawn mower equipment where light-section steel castings are essential.

Cupola Blowers.—General Electric Co., Schenectady, N. Y. A four-page illustrated leaflet describes the single-stage centrifugal air compressors for cupola blowing produced by that company. Charts are given showing the results of the use of these blowers as well as tables, giving air volume requirements and size of sets recommended for various iron to coke ratios.

Roof Slabs.—Federal Cement Tile Co., Chicago.—A 36-page catalog describes featherweight concrete insulating roof slabs manufactured by this company. The catalog contains the story and detail drawings of these slabs, specifications and data in regard to weights and dimensions, detail drawings and essential data about featherweight nailing concrete roof slabs and a partial list of users of the products. The catalog is profusely illustrated.

Controllers and Switchboards.—Electric Controller & Mfg. Co., Cleveland. Three bulletins have been issued by this company. No. 970, describing a.c. manual controllers, includes the V-4 dinkey controller for use with duplex drives having two motors mechanically connected to the same drive. No. 1021, covering d.c. type S crane switchboards, includes 115-volt and 550-volt ratings. Dimensions have been revised to apply to newly designed shunt contactor. No. 1037-D, covering a.c. and d.c. type B limit stops, has been revised to show dimensions of the new style contactor.

Electric Meters.—Sangamo Electric Co., Springfield, Ill. Bulletin No. 78, consisting of 16 pages, tells of the uses of Sangamo type N ampere-hour meter. Illustrations of parts and wiring diagrams are shown in this booklet.

Twist Drills.—New Process Twist Drill Co., Taunton, Mass. A new edition of a catalog covering complete line of high speed and carbon twist drills has been issued. Catalog includes photographs showing methods of manufacturing forged twist drills.

Power Pumps. — Goulds Pumps, Seneca Falls, N. Y. Catalog "S" and handbook, bound together in limp covers, includes 72 pages in the catalog and 32 pages in the handbook. The catalog is thoroughly illustrated and includes a wide variety of types of pumps operated by steam or from belts or by electric motors. The handbook is full of data, including installation diagrams, illustrative examples intended to assist in selecting the proper pump and figuring the suction lift, head, horsepower, pulley sizes, etc. This is in the nature of a treatise on the subject.

Flexible Couplings. — Westinghouse Electric & Mfg. Co., East Pittsburgh. Circular 1838, devoted to flexible couplings made at Nuttall works. Particulars relating to construction, application and maintenance of couplings designed for use with speed reducers are included.

Marine Oil Engines.—Ingersoll-Rand Co., 11 Broadway, New York. Bulletin of 24 pages, illustrating and describing Diesel engines for marine use in driving a wide variety of vessels.

Diesel Engines.—Busch-Sulzer Brothers-Diesel Engine Co., St. Louis. Four pamphlets devoted to Diesel engines used in developing electric power. Information regarding operation and maintenance expenses is given in some detail.

Rail Steel Bars.—Rail Steel Bar Association, 228 North La Salle Street, Chicago. Booklet of 16 pages, devoted to the use of rail steel bars for concrete reinforcement. Illustrations show methods of preparation of the bars, methods of bending and installation. Standard specifications of the American Society for Testing Materials are given.

Blow Guns and Forge Blowers.—Schutte & Koerting Co., Philadelphia. Bulletin 4-T, of four pages, illustrates and describes blow guns for the use of compressed air and forge blowers. The illustrations, which are in color, show the action of the compressed air and its entrainment of air from the main suction lines.

Bonding Cement for High Temperature.—Chicago Fire Brick Co., 1439 Elston Avenue, Chicago. Folder of four pages devoted to a high-temperature bonding cement recommended for bonding fire brick in a wide variety of metallurgical and other furnace uses. It is shipped in two forms—hotset, to be mixed with water, and coldset—a concentrated, hydrated mixture.

Flexible Shafts. — Stow Mfg. Co., Binghamton, N. Y. Bulletins 100 and 150 of four pages each illustrate and describe a line of flexible shafting for use in a wide variety of services, of which that of the dentists' equipment is perhaps most familiar. Considerable data will be found in the pamphlets covering this flexible shafting and its uses.

Electrically Welded Pipe.—A. O. Smith Corporation, Milwaukee. Bulletin 505 of 52 pages, illustrated, tells of the Smith method of welding steel plate into pipe by electrical means and gives many illustrations of the use of this pipe. Data of an engineering character cover sizes, weights and strength, and even such items as the freight cost entering into the use of this pipe.

Air Compressor and Vacuum Pumps.—Pennsylvania Pump & Compressor Co., Easton, Pa. Bulletin No. 147, consisting of 24 pages, contains an interesting cross-sectional view of the company's compressor, together with description and illustrations of Pennsylvania methods of compressor regulation.

European Mills Lack Export Business

Unsettled Condition in Far East Is Factor—Government Committee to Survey British Steel Industry—English Pig Iron Strong

(*By Cable*)

LONDON, ENGLAND, July 29.

PIG iron demand is now affected by the holiday periods and but little improvement is expected before early fall. Cleveland makers, however, are well booked for two months and further advances in prices are regarded as possible, although with raw material output increasing and an expected decrease of costs, Cleveland makers are at present willing to book forward business at current prices.

Hematite iron is stiffening, as low priced ore and fuel contracts are expiring. Based on current raw material prices, hematite iron costs more than £4 ($19.40) a ton to produce, so that the tendency is upward. Meanwhile, consumers' demands have eased with the holiday season.

Finished steel is generally quiet for export, but domestic consumers have bought moderately and Northeast Coast makers are hastening to execute orders before their vacation periods begin. Prices are strong with an upward tendency.

Continental sales here are at a minimum and mills are actively seeking to increase sales, so that prices are declining.

Tin plate inquiry is fair, but business is slow. An important Welsh group is well sold up to the end of the year at full prices. Consequently, makers are generally inclined to take a firmer view and more mills are suspending rather than to sell tin plate at 18s. 3½d. ($4.43) per base box, f.o.b. works port. The market is therefore expected to develop a firmer tone.

Galvanized and black sheets are inactive.

The Government committee appointed to inquire into conditions in the iron and steel industry comprises Lord Sankey, A. U. Alexander, Sir Cecil L. Budd, T. C. Cramp and Sir William Plender. The committee will consider and report upon the present condition and prospects and make recommendations as to any action which may appear desirable and practicable to improve the position of the iron and steel industries in world markets.

Dorman, Long & Co. have secured a contract for £262,000 ($1,270,700) for a memorial road and bridge at Bangkok, Siam.

German raw steel output in June was 1,430,000 metric tons. Belgian production in June was 342,000 tons of pig iron and 339,000 tons of raw steel. On July 1, 57 Belgian furnaces were in blast. Belgian mills have booked 75,000 tons of rails and other contracts through the International Rail Makers' Association are pending.

Luxemburg production in June totaled 242,000 metric tons of pig iron and 218,000 tons of raw steel. On June 30, there were 38 furnaces in blast. Saar output in June was 187,000 metric tons of pig iron and 190,000 tons of raw steel. On June 30 there were 28 furnaces in blast.

Summer Quiet in Great Britain

Holidays Curtail Business—Last Quarter Pig Iron Sold —Steel Export Committee Going to South America

LONDON, ENGLAND, July 19.—Midsummer quiet has set in and, with Scottish plants closed for a week to 10 days and holiday periods coming in other sections, little improvement in business is expected until fall. It is noteworthy, however, that the number of blast furnaces in operation has steadily increased throughout the year. Since last December the number in blast has been augmented by 15 furnaces and more are operating now than at any time since August, 1927. Pig iron production in the past six months has been about 5 per cent greater than in the first half of 1928, and the increase would have been even greater had not the output in February been unusually small.

The improvement in the pig iron market has been largely due to the curtailment of imports because of in-

British and Continental European Export prices per gross ton, f.o.b. United Kingdom Ports, Hamburg and Antwerp, with the £ at $4.85

British Prices, f.o.b. United Kingdom Ports

Cleveland No. 3 foundry	£3	12½s.	to	£3	13½s.	$17.58	to	$17.82
East Coast Hematite	3	15	to	3	15½	18.18	to	18.30
Ferromanganese, export	13	10	to	14	0	65.47	to	67.90
Billets, open hearth	6	7½	to	6	10	30.92	to	31.52
Sheet bars, open hearth	6	5	to	6	10	30.31	to	31.52
Black sheets, Japanese specifications	13	0	to	13	5	63.05	to	64.26
Tin plate, per base box	0	18⅛	to	0	18½	4.40	to	4.48
Rails, 60-lb. and heavier	7	15	to	8	15	37.59	to	42.43
						Cents per Lb.		
Steel bars, open hearth	7	15	to	8	10	1.67	to	1.84
Beams, open hearth	7	2½	to	7	12½	1.55	to	1.65
Channels, open hearth	7	7½	to	7	17½	1.60	to	1.71
Angles, open hearth	8	2½	to	8	12½	1.76	to	1.86
Ship plates, open hearth	7	12½	to	8	2½	1.66	to	1.76
Black sheets, No. 24 gage	10	5	to	10	10	2.21	to	2.27
Galvanized sheets, No. 24 gage	13	5	to	13	7½	2.91	to	2.94

Continental Prices f.o.b. Antwerp or Hamburg

Foundry iron, 2.50 to 3.00 per cent sil., 0.50 to 0.90 per cent phos.	£3	9s.	to	£3	13½s.	$16.73	to	$17.82
Foundry iron, 2.50 to 3.00 per cent sil., 1.00 per cent and more phos.	3	11				17.21		
Billets, Thomas	4	19	to	5	2	24.00	to	24.73
Sheet bars, Thomas	5	2½	to	5	3	24.86	to	24.98
Wire rods low C., No. 5 B.W.G.	6	4	to	6	6¼	30.06	to	30.61
Black sheets, No. 31 gage, Japanese	12	15				61.83		
Rails, 60 lb. and heavier	6	10*				31.52		
Rails, light	6	1½				29.46		
						Cents per Lb.		
Steel bars, merchant	5	13	to	5	14	1.25	to	1.27
Steel bars, deformed	5	12	to	5	12½	1.21	to	1.22
Beams, Thomas, British standard	5	4	to	5	8	1.12	to	1.15
Channels, Thomas, American sections	6	0				1.32		
Angles, Thomas, 4-in. and larger, over ⅜-in. thick	5	6				1.14		
Angles, Thomas, 3-in.	5	16				1.28		
Ship plates, open-hearth inspected	7	10				1.62		
Hoop and strip steel, over 6-in. base	6	0	to	6	2½	1.32	to	1.33
Wire, plain, No. 8 gage	7	7½				1.62		
Wire, galvanized, No. 8 gage	9	7½				2.02		
Wire, barbed, 4-pt. No. 12 B.W.G.	11	17½				2.56		
Wire nails, base	0	7¾				$1.87	per keg	
Wire nails, assortments, 1 to 6-in., keg	10	6½				2.23		

*Open-hearth steel, 10s. ($2.42) per ton extra.

creased costs at Continental furnaces. This has not only aided British furnaces in their own domestic market, but has enabled them to regain certain foreign markets. Cleveland furnaces, which are in a particularly prosperous position, have opened their books for last quarter contracts following withdrawal from the market for several weeks. Hematite iron lacks the strength exhibited by Cleveland prices, as there is no control among hematite producers of prices and production. However, makers have little iron to sell for delivery before August and are able to sell without shading ruling market quotations. Export demand for hematite is improving, with both Belgian and Italian consumers actively inquiring for tonnage.

Steel mills have not had a comparable improvement in business, as their market is still partly influenced by Continental competition. At present, however, European mills report a lack of substantial tonnage for export. The unsettled situation in the Far East and depreciated exchange are obstacles to betterment in demand, but the steel makers' export committee has negotiated some good business in ship material for Japan. Following their recent Canadian visit, members of export committee are sailing in August for a tour of South America.

Under the Labor Party administration the question of safeguarding iron and steel has become less prominent, although certain members of the opposition are still urging its adoption. The new government, however, is opposed to protection, although it announced that a comprehensive inquiry will be made into the position of the iron and steel industry.

According to Lloyd's Register of Shipbuilding, vessels under construction in the United Kingdom in the quarter ended June 30 totaled 1,453,906 tons, an increase of 96,531 tons from the previous quarter. Tonnage under construction abroad decreased 96,118 tons to 1,384,319 tons at the end of the second quarter.

Germany Buys Russian and Indian Manganese Ore

HAMBURG, GERMANY, July 16.—The largest manganese ore contract this year has just been placed. A German consumer has bought 100,000 tons of Caucasian manganese ore from Poti, Georgia, at 1s. to 1s. 1d. (24c. to 26c.) per unit, delivered, the price varying with the quality of the ore. A contract for 26,000 tons of Indian manganese ore has been closed at 1s. ½d. to 1s. 1½d. (25c. to 27c.) per unit, depending upon the quality.

Construction of an all-welded 8000-bbl. oil barge has been begun by Truss-Weld Barge Co., Elizabeth, N. J. It will be 134 ft. long, 33 ft. beam and 12.5 ft. deep, and is especially planned for service on the New York State Barge Canal.

German Steel Business Improving

Unemployment Declining As Domestic Buying Increases —Export Trade Good But Prices Are Irregular

BERLIN, GERMANY, July 16.—Business has begun to improve and the number of unemployed has declined to less than one-third of the February total. While foreign trade has receded, seasonal improvement is expected in the fall. In the domestic market, building is more active and manufacturers are again expanding output. Demand from machinery builders is heavier and there is an active market in small finished products, cutlery and hardware.

Producers of semi-finished material have sufficient tonnage on their books to carry them into October in many instances, although in large measure this is the result of the increased activity of their own finishing mills rather than a larger demand from rolling mills that buy in the open market. Business in bars, bands, heavy and light-gage sheets has improved, but medium-gage sheets are inactive and show a downward tendency.

Export business in the past fortnight has been irregular and rather restricted. The German syndicates have endeavored to maintain their export prices, although affected by weaker quotations in France and Belgium. Business in steel bars in South America, the Dutch East Indies and the Far East is quite active, but consumers of bars in other markets have not been buying recently. An effort by German sellers to maintain bar prices at £6 per ton (1.30c. per lb.), which is 8s. ($1.94) per ton less than the high point reached this year, has been unsuccessful, and this month the Stahlwerksverband has reduced its quotations to a range of £5 17s. 6d. to £5 18s. per ton (1.27c. to 1.28c. per lb.).

Exports of Solingen cutlery are increasing and sales to France, Great Britain and Italy are reported satisfactory, with unusually large sales to British India, although at low prices.

Imports of heavy iron and steel, including scrap, in the first quarter of this year, totaled 738,017 tons, while exports were 2,313,737 tons. An interesting feature of the scrap trade was the virtual balance between exports of 123,401 metric tons and imports of 120,061 tons. In other products there was a considerable difference between imports and exports. Imports of pig iron totaled 69,008 tons and exports 139,685 tons; imports of shapes, including bars and bands, totaled 275,668 tons, while exports were 536,537 tons; imports of wire were 42,764 tons and exports 221,849 tons; sheet imports were 29,511 tons and exports 214,801 tons, and rail and steel tie imports were 48,969 tons and exports 155,175 tons.

Labor Scarcity in France Attracts Foreigners

BORDEAUX, FRANCE, July 15.—Labor shortage continues in a majority of French industries. The total number of unemployed listed in the Paris area during one week in May was 335. In the metallurgical and engineering industries at this time there were 2451 offers of employment and only 208 applicants. From mines and quarries there were 1772 offers of employment and only 13 applicants. In the same week 1694 foreign workers were added to French industrial payrolls.

German Machinery Exports Gaining

BERLIN, GERMANY, July 16.—The Machinery Manufacturers' Association reports a further gain in orders booked in June. Domestic orders for machinery have been increasing since March and foreign business has been active since last fall. In the first half of this year 44 per cent of all machinery sales by members of the association was for export, compared with 36 per cent in the first half of last year. The greatest demand was for power equipment and machine tools. Builders of printing machinery and mechanical mining equipment report that they are increasingly dependent on foreign business. On the basis of orders now on the books of association members, output for the year will exceed the 1928 total by 200,000,000 m. ($47,600,000).

Germany Sells More Wire and Cable to United States

HAMBURG, GERMANY, July 16.—In May the United States advanced to first place as a buyer of German wire rope, taking 115 tons. The United Kingdom was second with 105 tons, Holland was third with 102 tons and Brazil fourth with 101 tons. In wire nails the United States has advanced as a buyer of the German product from seventh place in 1928 to third place this year. In May the United Kingdom received 1500 tons of wire nails, China 860 tons and the United States 730 tons. The United States also ranked third as a buyer of barbed wire, Brazil leading with 1600 tons, India second with 900 tons and the United States third with 700 tons. Germany's total exports of wire and wire products were 62,000 tons in May.

German Use of Welding on Ships Increasing Rapidly

HAMBURG, GERMANY, July 16.—Electric welding is being increasingly used for the fabrication of ships in Germany, having been adopted by Messrs. Blohm & Voss, Hamburg; by Deschimag, a merger of five German yards; by the Deutsche Werft at Kiel, which is building German battleships and by the Government yard at Wilhelmshafen. The latest use of electric welding is in the construction of merchant ships up to 10,000 to 12,000 tons. The next ships to be built by Deschimag at Bremen and Hamburg for the North German Lloyd line will be electrically welded.

In addition to the larger vessels, all river craft and steel barges on the Oder, Elbe and Rhine rivers are being electrically welded, and such craft exceeds the German tonnage on the seas.

While the weight saved on merchant vessels through electrical welding will be less than on warships with their heavy armor plate, it is expected to amount to 8 to 10 per cent (deadweight). The German Lloyd and British Lloyd have put electrically welded ships in the highest registered class, and the insurance companies accept them at 100 per cent value.

Swedish Exports Improve While Imports Decline

STOCKHOLM, SWEDEN, July 16.—Business in iron and steel has improved and orders on mill books for rolled products are larger than a year ago. Prices have advanced recently as a result of the increase in scrap quotations, but export prices are unchanged. In the first five months of this year exports of iron and steel totaled 109,164 metric tons, while imports, not including pig iron and scrap, totaled 104,508 tons. Imports, however, showed a decline from the total of 120,031 tons for the first five months of 1928, while exports increased from the 102,379 tons for that period.

Iron Ore Imports Continue Heavy in June

WASHINGTON, July 26.—June imports of iron ore, while less than those for May, continued the heavy movement of the past few months. The total was 243,913 gross tons, compared with 275,762 tons in May and with 284,134 tons in April. The imports were 188,892 tons in June, 1928. For the six months the imports reached 1,467,736 tons, which is 18 per cent higher than the total for the like period of last year.

Chile furnished a little more than half of the total imported in June. For the six months of the year, Chile's contribution was almost 53 per cent, with Cuba second and Sweden back in third place.

Gain in Italian Output of Machinery

The increased production of machinery in Italy since the war is revealed in a study of the Italian machinery industry by A. A. Osborne, assistant American commercial attaché, Rome. A characteristic of the industry is the small scale on which most establishments operate. Less than 5000 out of a total of 700,000 companies employed more than 100 workers each, according to a census made in 1927. Production, however, is so far advanced that in certain lines it is equal to domestic demand. Plants are equipped for the manufacture of most heavy electrical machinery and hydraulic equipment.

There is comparatively little output of machinery for special purposes, which in most cases must be obtained abroad. Moreover, most companies produce items of a widely diverse character, because the demand for any one class of machines is so restricted and competition is so keen that few establishments confine themselves to the production of specialized lines.

Thomas W. Ward, Ltd. Buys Yorkshire Blast Furnaces

LONDON, ENGLAND, July 19.—The properties of the Yorkshire Iron & Coal Co., Ltd., Leeds, recently acquired by the Frodingham Iron & Steel Co., Ltd., Scunthorpe, Lincolnshire, have been, for the most part, sold by the Frodingham Company to Thomas W. Ward, Ltd., Sheffield. The purchase includes the four blast furnaces and plant near Ardsley, the collieries near Morley and a large acreage of land. The new owner is expected to modernize part of the plant and to dismantle the rest.

SOURCES OF AMERICAN IMPORTS OF IRON ORE
(In Gross Tons)

	June		Six Months Ended June	
	1929	1928	1929	1928
Canada	298	303	505	10,326
Cuba	50,000	25,500	319,900	190,286
Chile	126,590	90,800	772,675	715,500
Spain	6,797	6,653	38,213	11,903
Sweden	27,331	.....	123,032	19,614
French Africa	12,930	47,350	97,910	241,371
Other countries	19,967	18,286	115,451	45,513
Total	243,913	188,892	1,467,736	1,234,513

United Steel Works Exports 40 Per Cent of Output

HAMBURG, GERMANY, July 16.—The United Steel Works, Düsseldorf, has issued the report for the third quarter of its business year—from April 1 to June 30. Production in all departments of the corporation showed an increase from the previous quarter, Jan. 1 to March 31. Coke output was 2,608,471 metric tons, compared with 2,431,578 tons in the preceding quarter, pig iron production 1,710,172 tons, compared with 1,660,403 tons, and steel ingot output 1,882,182 tons compared with 1,824,733 tons.

The number of employees on June 30 was 176,207, compared with 171,876 on March 31. The total, however, was 9700 less than at the end of the company's third quarter last year. The value of all sales during the quarter was 407,500,000 m. ($96,585,000) of which 159,200,000 m. ($37,889,600), or about 40 per cent, represented export business

Less Plate Work Placed in June—Half Shows Gain

WASHINGTON, July 30.—Orders for fabricated steel plate totaled 45,893 tons in June, against 47,763 tons in May, according to reports made to the Department of Commerce by 48 firms. The production ratios for the two months were 57.4 per cent and 59.8 per cent respectively. Of the June orders, 6890 tons was for oil storage tanks, compared with 10,087 tons in May; 4433 tons for refinery materials and equipment, against 4053 tons; 1998 tons for tank cars, compared with 960 tons; 5444 tons for gas holders, against 5300 tons; 1003 tons for blast furnaces, against 1245 tons, and 26,125 tons for stacks and miscellaneous requirements, compared with 26,118 tons in May.

For the first six months of the year, orders totaled 283,589 tons, representing 59.2 per cent of capacity, compared with 260,483 tons, or 54.4 per cent of capacity, for the corresponding period of last year. Comparative distribution of the tonnage during the first half of 1929 and during the corresponding period of last year, respectively, was as follows: Oil storage tanks, 76,154 tons and 111,010 tons; refinery materials and equipment, 28,867 tons and 16,032 tons; tank cars, 24,831 tons and 12,163 tons; gas holders, 27,257 tons and 20,261 tons; blast furnaces, 5761 tons and 3666 tons; and stacks and miscellaneous 20,719 tons and 97,351 tons.

Despatch Oven Co., Minneapolis, Minn., has appointed the Industrial Engineering & Equipment Co., 1341 Syndicate Trust Building, St. Louis, as its district sales representative for the State of Missouri and the southern portion of Illinois.

Less Steel Exported in June

Half-Year Increase Over Last Year Was 17½ Per Cent—Meanwhile Imports Fell 10 Per Cent

WASHINGTON, July 26.—Declining 13,705 gross tons, exports of iron and steel products from the United States in June totaled 247,811 tons, against 261,516 tons in May. For the six months ended with June, however, exports increased to 1,591,839 tons, a gain of 234,476 tons over the 1,357,363 tons exported during the corresponding period of last year. Exports in June, 1928, were 260,767 tons, or 12,956 tons in excess of the movement for June of the current year. The daily average shipment abroad in June, this year, was 8260 tons, against 8436 tons in May.

Imports in June also showed a slump, dropping to 63,635 tons from 74,272 tons in May, a decrease of 10,637 tons. For the first half of the present year imports declined 36,243 tons from those of the corresponding period of last year, the totals being 394,088 tons in 1928 and 357,845 tons in 1929. Imports in June of last year amounted to 66,602 tons, or 2967 tons above those for last month. The daily average import movement in June was 2121 tons, compared with 2396 tons in May.

Declines in exports in June as compared with May were reflected in 23, and gains were made in 14, of the 37 products listed in THE IRON AGE table. The sharpest drop was made in the outgoing shipments of scrap, with a total of 42,816 tons in June, against 55,916 tons in May. Steel bar exports decreased to 12,249 tons from 14,720 tons; plates to 17,640 tons from 20,185 tons and pig iron to 3101 tons from 8088 tons.

On the other hand, exports of galvanized sheets rose to 12,604 tons from 11,342 tons; tin plate to 18,041 tons from 14,537 tons; plain structural material to 31,268 tons from 30,331 tons, and fabricated material to 7363 tons from 6652 tons.

Among important gains in exports for the first six months over outgoing shipments for the like period of last year were those made in steel bars, which increased to 112,620 tons from 70,768 tons; plates increased to 107,296 tons from 71,726 tons; hoops, bands and strip steel, increased to 42,858 tons from 27,697 tons, and plain structural material, increased to 145,866 tons from 89,873 tons. The greatest decline was in exports of steel rails, which decreased to 85,566 tons from 109,124 tons.

Imports of Iron and Steel into the United States

(In Gross Tons)

	June		Six Months Ended June	
	1929	1928	1929	1928
Pig iron	11,396	11,799	73,461	75,295
Ferromanganese*	5,534	5,870	32,584	24,405
Ferrosilicon†	561	366	4,137	1,711
Ferrochrome‡	20	76	240	338
Scrap	6,658	7,715	43,273	22,844
Pig iron, ferroalloys and scrap	*24,169*	*25,826*	*153,695*	*124,593*
Steel ingots, blooms, billets and slabs	1,671	2,054	12,383	11,870
Wire rods	1,336	1,119	8,596	9,417
Semi-finished steel	*3,007*	*3,173*	*20,979*	*21,287*
Rails and splice bars	1,332	3,282	3,060	9,646
Structural shapes	12,274	14,438	69,107	88,842
Boiler and other plates	72	2,215	2,422	3,157
Sheets and saw plates	2,266	2,110	10,430	14,839
Steel bars	3,170	5,770	18,272	50,346
Bar iron	672	418	1,983	1,351
Hoops, bands and cotton ties	3,245	2,329	14,678	14,865
Tubular products (wrot.)	4,032	2,773	22,056	21,055
Nails, tacks, staples	1,079	688	4,540	3,843
Tin plate	27	42	142	592
Bolts, nuts, rivets and washers	32	17	136	143
Round iron and steel wire	295	344	3,266	2,032
Barbed wire	612	183	2,965	1,749
Flat wire; strip steel	162	134	1,103	1,207
Steel telegraph and telephone wire	....	25	....	143
Wire rope and strand	256	184	1,264	803
Other wire	85	1	349	278
Rolled and finished steel	*29,611*	*34,953*	*155,773*	*214,891*
Cast iron pipe	6,679	2,525	26,274	31,517
Castings and forgings	169	125	1,124	1,800
Total	63,635	66,602	357,845	394,088
Manganese ore*	51,290	12,650	165,602	33,917
Iron ore	243,913	188,892	1,467,736	1,268,413
Magnesite	3,511	7,825	12,111	27,474

*Manganese content only.
†Silicon content only.
‡Chromium content only.

Exports of Iron and Steel from the United States

(In Gross Tons)

	June		Six Months Ended June	
	1929	1928	1929	1928
Pig iron	3,101	5,674	30,790	25,329
Ferromanganese	104	338	1,013	4,861
Scrap	42,816	64,918	249,720	251,131
Pig iron, ferroalloys and scrap	*46,021*	*70,930*	*281,523*	*281,321*
Ingots, blooms, billets, sheet bar	4,199	755	25,051	10,299
Skelp	13,674	4,471	53,795	46,557
Wire rods	2,774	4,818	23,060	18,529
Semi-finished steel	*20,647*	*10,044*	*101,906*	*75,385*
Steel bars	12,249	13,816	112,620	70,768
Alloy steel bars	931	1,276	11,400	7,492
Iron bars	171	183	2,754	1,843
Plates, iron and steel	17,640	14,529	107,296	71,726
Sheets, galvanized	12,604	10,490	86,420	75,125
Sheets, black steel	15,718	19,223	92,763	90,311
Sheets, black iron	1,373	1,612	7,545	7,488
Hoops, bands, strip steel	6,275	4,820	42,858	27,697
Tin plate; terne plate	18,041	22,276	136,121	125,099
Structural shapes, plain material	31,268	19,356	145,866	89,873
Structural material, fabricated	7,363	9,406	54,671	40,226
Steel rails	7,389	12,483	85,566	109,124
Rail fastenings, switches, frogs, etc.	3,223	1,998	17,047	27,574
Boiler tubes	1,286	1,401	9,560	8,358
Casing and oil-line pipe	8,509	10,144	72,974	54,443
Black and galvanized welded pipe	12,572	10,424	68,784	53,901
Malleable iron screwed pipe fittings	1,143	917	6,291	4,411
Plain wire	3,789	4,657	26,137	23,673
Barbed wire and woven wire fencing	6,395	7,000	35,688	38,426
Wire cloth and screening	150	169	912	849
Wire rope	738	430	3,922	2,578
Wire nails	952	1,300	7,958	8,607
Other nails and tacks	928	1,091	5,349	5,258
Horseshoes	45	26	183	205
Bolts, nuts, rivets and washers, except track	1,206	1,281	8,127	6,500
Rolled and finished steel	*171,958*	*170,308*	*1,148,812*	*951,555*
Cast iron pipe and fittings	3,417	3,099	17,095	17,360
Car wheels and axles	1,448	1,702	12,467	7,624
Iron castings	815	1,307	7,079	6,937
Steel castings	1,239	812	6,299	5,240
Forgings	663	1,295	7,213	4,972
Castings and forgings	*7,582*	*8,215*	*50,153*	*42,133*
All other	1,603	1,270	9,445	6,969
Total	247,811	260,767	1,591,839	1,357,363

Decreases were reflected in June in imports of 17 of the 26 products listed while gains were made in eight when compared with May, with no incoming shipments either month of steel telegraph and telephone wire. The most important changes were in pig iron and structural shape imports, the former declining to 11,396 tons in June from 14,393 tons in May while structural shapes dropped to 12,274 tons from 14,744 tons. The gains were of minor character.

Of the 5534 tons of ferromanganese imported in June, 2620 tons came from Canada, 1261 tons from the United Kingdom, 1164 tons from Norway, 237 tons from Italy, 116 tons from France and 100 tons from Germany. Sweden supplied 1358 tons of the 3170 tons of steel bars imported, while 769 tons came from Belgium and 490 tons from France. Of the 3245 tons of hoops and bands imported, 1280 tons came from Germany, 1114 tons from Belgium and 453 tons from France.

Of the 12,274 tons of shapes imported in June, Belgium furnished 6400 tons; Germany, 4065 tons; and France, 1455 tons. France supplied 6437 tons of the 6679 tons of cast iron pipe imported during the month. Russia supplied 22,547 tons of the 51,290 tons of manganese ore concentrates imported in June, while 21,253 tons came from Brazil, 4880 tons from India and 2325 tons from Canada, according to the records of the Department of Commerce.

Exports of iron and steel in June were valued at $8,605,494, against $8,350,746 in June of last year, despite the larger quantity shipped during the earlier month. For the six months of the current year the value was $55,560,889, compared with $45,806,173 for the corresponding period of last year. Imports of iron and steel in June were valued at $787,728, against $663,458, also despite the larger shipments of last year. For the six months of 1929 the value was $4,303,909, against $3,956,450, an increase of $347,459 in value, in the face of a decline in tonnage.

Steel Furniture Orders Decline in June

WASHINGTON, July 30.—Orders for steel furniture in the "business group" in June were valued at $2,530,723, as against $2,814,423 in May, according to reports received by the Department of Commerce from 34 manufacturers. Shipments totaled $2,584,539 and $2,783,992 respectively, while unfilled orders at the end of June amounted to $2,320,642, compared with $2,400,734 at the end of May. Orders and shipments for the first six months of the current year were valued at $18,062,198 and $17,994,374 respectively, against $18,592,422 and $18,078,708 respectively for the corresponding period of last year.

Orders for $949,553 worth of shelving furniture were placed in June, according to reports from 16 producers, compared with $1,120,990 in May. Shipments were valued at $910,534 and $989,120 respectively, while unfilled orders at the end of June were valued at $934,834, against $897,361 at the end of May. Orders and shipments for the first six months of the year were valued at $6,330,636 and $6,017,167 respectively.

UNITED STATES IMPORTS OF IRON AND STEEL PRODUCTS

(In Gross Tons)

	June	May
Austria	34	60
Belgium	9,888	13,577
Czechoslovakia	660	55
France	9,965	12,281
Germany	12,580	15,579
Italy	387	256
Netherlands	....	3,066
Norway	3,677	291
Sweden	3,835	3,927
Poland and Danzig	1,629	....
Switzerland	3	59
United Kingdom	5,790	9,517
Europe	*48,448*	*58,668*
Canada	10,042	10,982
Mexico	39	32
Cuba	1,200	....
British India	3,903	4,314
British Malaya	....	275
China, Japan, etc.	3	1
Total	63,635	74,272

Employment for Seventh District Little Changed

Industrial employment in the seventh federal reserve district remained practically stationary during the period May 15 to June 15, according to a statement issued by the Federal Reserve Bank of Chicago. Plants with an approximate total of 350,000 workers showed a decline of 0.1 per cent. Pay-rolls increased 0.6 per cent, a partial recovery from the decrease of 1.4 per cent reported for the previous period. In comparison with a year ago, employment was approximately 7 per cent heavier, both in the number of workers and in volume of pay-roll.

Steel Boiler Orders Smaller

WASHINGTON, July 30.—Orders for 1685 steel boilers, with a total of 1,822,799 sq. ft., were placed in June, against 1751 with 2,144,607 sq. ft. in May, according to reports to the Department of Commerce by 80 manufacturers. For the first six months of the year, orders totaled 8725 boilers, with 9,743,852 sq. ft., compared with 9167 boilers, with 8,534,985 sq. ft. for the corresponding period of last year.

Net earnings in the first half of 1929 for the Foote-Burt Co., manufacturer of drilling and boring machinery, Cleveland, amounted to $241,711 after all charges. This was equal to $2.48 a common share. Earnings in the first half of 1928 were $320,632.

Hamilton Bridge Co. to Build Toronto Plant

TORONTO, ONT.—The Hamilton Bridge Co., Hamilton, Ont., has acquired a site on the waterfront from the Toronto Harbor Commissioners and will erect there a structural steel plant at a cost of about $350,000.

At the proposed plant the company can receive steel shipments by water. It is reported to be the company's plan to bring steel by boat from Chicago through the Welland Canal.

Chrome-Plated Aluminum On Market

Chromium plating of aluminum, by a process discovered by Harry F. Gardner, formerly of the United States Bureau of Standards, is now being done commercially by the Perma-Chrome Process Corporation in Cleveland. It is reported that all varieties of aluminum objects, such as castings, stampings and flat sheets, have been successfully plated in quantity.

A bare aluminum sheet which had scleroscope hardness of 7, tested 16 points hard after plating. The new surface is said to remain bright after long exposure to boiling water, fruit juices, and the various organic liquids formed during cooking, and which rapidly tarnish pure aluminum. It is also anticipated that the added hardness will be useful to improve gas engine pistons and other parts which must resist wear; it may also solve the problem of atmospheric corrosion of aircraft parts.

The officers of the Perma-Chrome Process Corporation are J. V. Whitbeck, president, Clyde Morgan, vice-president, William Chandler, general manager and J. I. Krall, secretary and treasurer.

Shippers to Be Consulted in Designing Cars

A plan to allow shippers a voice in specifying the design of freight cars to be purchased by railroads has been proposed by the Allegheny Regional Advisory Board, a group made up of representatives of carriers in the Pittsburgh and nearby districts. The plan proposes that, in the interests of maximum efficiency, economy and safety, designs for all kinds of new car equipment be submitted to expected users for suggestions and approval.

Metal Bases for Plaster

Expanded metal lath, woven wire and other forms of metallic backing, for use as a support for plaster or stucco in construction work, form the subject of United States Government Master Specification No. 553, issued by the Bureau of Standards. The seven-page pamphlet gives details of the standard sizes adopted for these purposes.

Nearly 50 Millions in Machinery

Exports in June Gain Over May—Half-Year Was 27½ Per Cent Ahead of 1928—Imports Higher

WASHINGTON, July 26.—Reflecting an increase of $1,646,667, exports of machinery of all kinds from the United States in June were valued at $49,732,282, compared with $48,085,615 in May. Meanwhile a gain of $6,649,355 was made over exports for June of last year, when the value was $43,082,927.

For the six months of 1929, exports of machinery were valued at $305,209,299, an increase of $65,459,783 over exports for the corresponding period of last year, valued at $239,749,516. Exports of machinery and all vehicles in June were valued at $104,994,973, against $89,925,919 in June of last year; for the six months they were valued at $671,818,336, compared with $508,139,793 for the corresponding period of 1928.

Exports of industrial machinery, as classified by the Division of Statistics, Department of Commerce, were valued at $22,392,023 in June, against $22,158,220 in May, an increase of $233,803. In June of last year they were valued at $19,877,543. For the six months ended with June they were valued at $138,446,882, compared with $108,356,700 for the corresponding period of last year.

Exports of power-driven metal-working machinery, as listed in THE IRON AGE table, totaled 886 units, valued at $1,537,399, against 812, valued at $1,173,198, in May. Exports of agricultural machinery and implements in June were valued at $12,041,000, against $10,295,000 in June of last year. For the six months they were valued at $72,068,000, compared with $54,012,000 for the corresponding period of last year.

Imports of machinery and vehicles in June were valued at $3,714,910, against $4,059,694 in May and $2,530,218 in June of last year. For the six months of 1929 they were valued at $21,860,050, an increase of $7,927,897 over imports for the first six months of 1928, valued at $13,932,153.

Imports of machinery as listed in THE IRON AGE table were valued at $2,609,261 in June, against $3,191,787 in May and $1,904,697 in June of last year. For the first six months of the present year they were valued at $16,414,371 as compared with $10,290,973 for the corresponding period of last year, an increase of $6,123,398.

Imports of industrial, office and printing machinery in June were valued at $2,111,168, against $2,213,314 in May and $1,745,976 in June of last year. For the first six months of 1929 they were valued at $12,487,534, an increase of $4,056,754 over incoming shipments for the corresponding period of last year, valued at $8,430,780.

Approximately 135 large business corporations now own airplanes for the use of their salesmen, executives and for the transportation of parts, supplies, and other services, the Ryan Aircraft Corporation, St. Louis, has found after making a survey of the rapidly increasing use of the airplane by business interests. Four, six and eight-place cabin planes, powered with a single motor, are the common types.

Machinery Exports from the United States

(By Value, in Thousands of Dollars)

	June		Six Months Ended June	
	1929	1928	1929	1928
Locomotives	$159	$142	$934	$1,025
Other steam engines	66	97	471	549
Boilers	152	129	918	582
Accessories and parts	169	34	503	335
Automobile engines	849	1,117	7,747	7,993
Other internal combustion engines	549	1,071	5,034	4,311
Accessories and parts	303	378	2,363	1,950
Electric locomotives	28	85	342	1,034
Other electric machinery and apparatus	894	626	6,680	3,801
Excavating machinery	567	485	4,143	4,009
Concrete mixers	95	66	710	511
Road-making machinery	393	313	1,821	1,502
Elevators and elevator machinery	461	372	2,578	2,147
Mining and quarrying mach'ry	1,384	1,358	8,363	6,913
Oil well machinery	1,950	1,174	12,881	6,809
Pumps	940	688	6,125	3,873
Bending and power presses	441	283	1,839	917
Forging machines	198	97	773	407
Machine tools*	1,517	1,478	9,343	7,372
Other metal-working machinery and parts	724	512	3,904	2,970
Textile machinery	1,024	1,165	6,988	6,830
Sewing machines	843	771	5,186	4,472
Shoe machinery	124	173	1,060	947
Flour-mill and gristmill machinery	38	25	303	231
Sugar-mill machinery	343	280	1,471	2,160
Paper and pulp mill mach'ry	370	199	1,608	1,704
Sawmill machinery	74	73	468	458
Other woodworking mach'ry	187	152	1,158	916
Refrigerating and ice-making machinery	1,310	980	7,339	4,650
Air compressors	590	770	3,840	3,474
Typewriters	2,032	1,885	12,209	11,682
Power laundry machinery	146	103	993	585
Typesetting machines	417	375	3,082	2,268
Printing presses	669	410	3,866	3,051
Agricultural machinery and implements	12,041	10,295	72,068	54,012
All other machinery and parts	17,685	14,922	106,098	83,300
Total	$49,732	$43,083	$305,209	$239,750

*Principal details in another table.

Exports of Power-Driven Metal-Working Machinery

	June, 1929		May, 1928	
	No.	Value	No.	Value
Engine lathes	65	$182,174	54	$115,415
Turret lathes	34	112,281	25	84,163
Other lathes	82	155,430	105	180,531
Vertical boring mills and chucking machines	7	25,035	34	38,920
Thread-cutting and automatic screw machines	82	139,858	73	115,911
Knee and column type milling machines	32	79,526	24	64,001
Other milling machines	76	148,434	32	63,715
Gear-cutting machines	41	117,640	42	141,879
Vertical drilling machines	36	51,231	27	23,482
Radial drilling machines	9	25,024	14	48,296
Other drilling machines	81	78,314	160	36,397
Planers and shapers	79	100,262	33	50,461
External cylindrical grinding machines	44	134,868	47	95,343
Internal grinding machines	41	121,314	47	66,007
Metal-working tool-sharpening machines	177	66,008	95	48,177
Total	886	$1,537,399	812	$1,173,198

Imports of Machinery Into the United States

(By Value)

	June		Six Months Ended June	
	1929	1928	1929	1928
Metal-working machine tools	$130,271	$47,447	$619,960	$316,938
Agricultural machinery and implements	794,779	333,455	5,442,860	2,913,216
Electrical machinery and apparatus	163,077	97,611	683,363	737,540
Other power-generating machinery	164,367	12,276	653,332	84,828
Other industrial machinery	888,678	1,163,176	6,366,592	4,810,835
Vehicles, except agricultural	468,089	250,732	2,638,264	1,427,616
Total	$2,609,261	$1,904,697	$16,414,371	$10,290,973

Machinery Markets and News of the Works

Sales and Inquiries Large

Machine Tool Builders Report No Improvement in Deliveries —Outlook for August Favorable

THERE was increasing evidence the past week that machine tool buying is not likely to feel the usual unfavorable effect of hot weather and of the vacation season.

Sales were well sustained and inquiries were on a sufficiently large scale to suggest that August may bring even better bookings than July, which have been surprisingly good.

It is not strange, under the circumstances, that machine tool builders report no improvement in deliveries, which in some cases run into November, December and the early months of next year. Recognizing the serious delays in deliveries at present, the Pratt & Whitney Co. has placed orders for about $200,000 worth of tools, including 10 universal turret lathes, for the new plant of the Pratt & Whitney Aircraft Corporation, although this plant is not expected to be ready to operate until next January or February.

The General Electric Co. has closed for two turret lathes, seven engine lathes and a number of presses for its electric refrigerator department at Schenectady, N. Y., and will buy additional equipment soon. Kearney & Trecker Corporation, Milwaukee, has recently expended about $150,000 for tools for a plant addition.

In the Chicago district, dealers are quoting against a list for the International Harvester Co. which ultimately will call for $1,500,000 worth of machine tools. The list already put out totals about $150,000.

An inquiry for 30 lathes for delivery to Russia has appeared, but otherwise the foreign market is without feature.

New York

NEW YORK, July 30.—Following a slight recession in machine tool buying, business is again at the former high level. It is suggested by some sellers that there may be postponements of buying until after the machine tool exhibit in Cleveland the week of Sept. 30, but it is also pointed out that with the possible exception of lathes, deliveries are at present rather extended, in some cases being well into November, and buyers may not be inclined to delay.

The General Electric Co., Schenectady, continues an active buyer for its electric refrigerator department. It has closed on part of its list of 30 tools for that division, including two of a total of five turret lathes, seven engine lathes and a number of presses. In the past week it has inquired for additional engine and turret lathes and bench milling machines.

A recent outstanding purchase was made by the Pratt & Whitney Co., Hartford, Conn., for the Pratt & Whitney Aircraft Corporation, which is building a new plant. The list, including 10 universal turrent lathes, reached a total of about $200,000 and is expected to be followed by further sizable orders. In addition to large lot buying, there is a considerable volume of single tool business to replace obsolete equipment. In the past week, the Erie Railroad has inquired for a 36-in. shaper and the New York Central for a 54-in. boring mill.

Plans have been filed by Keller Mechanical Engineering Co., 70 Washington Street, Brooklyn, manufacturer of die-cutting machinery, etc., for one-story plant, 180 x 300 ft., at Belleville, N. J., with one-story office adjoining, 50 x 120 ft., to cost about $100,000 with equipment. It is understood that present works will be removed to new location and capacity increased. Fletcher-Thompson, Inc., 738 Broad Street, Newark, N. J., is architect and engineer.

Hugo E. Magnuson, 420 Lexington Avenue, New York, architect, has plans for a two-story automobile service, repair and garage building at Brooklyn, to cost about $100,000 with equipment.

Cerro de Pasco Copper Corporation, 44 Wall Street, New York, has plans for expansion and improvements at properties near Kingman, Ariz., including two new concentrating mills, electrolytic zinc plant, tramway system, power plant and other units, to cost more than $10,000,000 with equipment.

Nassau & Suffolk Lighting Co., Island Park, N. Y., has arranged for increase in capital from $6,500,000 to $10,000,000, part of fund to be used for expansion in electric light and power properties.

Anaconda Wire & Cable Co., subsidiary of Anaconda Copper Mining Co., 25 Broadway, New York, has work under way on expansion at wire mill at Hastings, N. Y., to include installation of considerable additional equipment to cost over $1,500,000. Company will also carry out similar development at Sycamore, Ill., Anderson, Ind., and Muskegon, Wis., to cost over $750,000 with equipment.

Aero Supply Mfg. Co., College Point, L. I., manufacturer of aircraft apparatus, parts, etc., has plans for one-story unit, 50 x 140 ft., to cost about $35,000 with equipment. Peter M. Coco, 433 Steinway Avenue, Long Island City, is architect.

Cutler-Hammer Mfg. Co., Milwaukee, manufacturer of electric control devices, switches, etc., is reported planning Eastern branch plant near New York, initial unit to cost over $500,000 with equipment.

Irving Kudroff, 15 West Thirty-eighth Street, New York, architect, has plans for a six-story automobile service, repair and garage building, to cost about $130,000 with equipment.

Leonard K. Madden, 9 First Street, Troy, N. Y., and associates have organized Electric Master Machine Co., with capital of $200,000, and will operate local plant for production of special machinery and parts. William C. Ratz, 916 Jacob Street, is interested in new organization.

Westinghouse Lamp Works, Inc., Bloomfield, N. J., a subsidiary of Westinghouse Electric & Mfg. Co., 150 Broadway, New York, has awarded general contract to White Construction Co., 95 Madison Avenue, New York, for two additions, five and four stories, 50 x 100 ft., and 50 x 200 ft., to cost over $650,000 with equipment.

Tung-Sol Lamp Works, Inc., 95 Eighth Avenue, Newark, manufacturer of radio tubes and equipment, will soon break ground for an addition, totaling about 82,000 sq. ft. floor space, to cost more than $200,000 with equipment.

Board of Chosen Freeholders, Court House, Hackensack, N. J., will take bids at once for one-story power plant at Bergen Pines, Oradell, to cost $125,000 with equipment. Henry R. Kent & Co., 5 Erie Avenue, Rutherford, N. J., are engineers.

Sonoco Products Co., 95 Boyd Avenue, Jersey City, N. J., manufacturer of cardboard tubing, fiber spools and kindred products, has taken over former plant of American Motor Co., Grant Avenue, Plainfield, N. J., where it will concentrate production. Factory at Jersey City is being removed to new location and capacity will be increased.

Guilbert & Betelle, 24 Branford Place, Newark, architects, have plans for a power plant at Hillside, N. J., for company whose name is temporarily withheld, to cost more than $45,000 with equipment.

Officials of Sonatron Tube Co., 57-59 State Street, Newark, manufacturer of radio tubes and equipment, are organizing new company, to take over present organization, as well as Televocal Corpo-

ration, 588 Twelfth Street, West New York, N. J., and Magnatron Corporation, 406 Jefferson Street, Hoboken, N. J., both manufacturers of similar apparatus. Companies will be consolidated and expansion carried out. Sonatron company has plans for a six-story addition, 67 x 120 ft., to cost about $125,000 with equipment, for which Siegler & Greenberg, 164 Market Street, are architects.

North Jersey District Water Supply Commission, 24 Commerce Street, Newark, will soon take bids for electric motors, switchboards and other electric power equipment, to cost about $100,000, and for pumping machinery to cost about $50,000, for Wanaque aqueduct project.

Reliance Steel Products Co., 43-49 Ralph Street, Bellville, N. J., has been recently incorporated with capital of $125,000 to manufacture screw products.

Macval Pump & Engineering Co., Inc., New York, will manufacture on contract 50 to 1500 gal. per min. bronze rotary pumps for fire and industrial purposes.

American Machinery Supply Corporation, 24-26 Mechanic Street, Newark, N. J., has been formed to deal in new and used tools. Charles J. McPhillips is president and Paul Kifner secretary-treasurer.

South Atlantic

BALTIMORE, July 26.—Contract has been let by Black & Decker Mfg. Co., Pennsylvania Avenue, Towson, Baltimore, manufacturer of portable electric tools, etc., to William H. Sands, Towson, for two-story addition to cost about $140,000 with equipment. George N. Mackenzie, 3d., 5 North Guilford Avenue, Baltimore, is architect.

Wyatt & Nolting, Keyser Building, Baltimore, architects, have plans for two and six-story automobile service repair and garage building, to cost about $900,000 with equipment.

Tennessee Mineral Products Co., Spruce Pine, N. C., a unit of United Feldspar Corporation, 10 East Fortieth Street, New York, is said to be planning extensions in local properties and will install machinery for feldspar production in two mines, including hoisting, conveying and other handling equipment.

Duke Power Co., Charlotte, N. C., operating electric light and power properties in North and South Carolina, has arranged for an increase in capital from $100,000,000 to $150,000,000, part of fund to be used for extensions and improvements.

Reid-Avery Co., Cleveland and Chesapeake Avenues, St. Helena, Baltimore, manufacturer of oxy-acetylene and electric welding rods, electrodes, etc., has approved plans for a one-story addition, 50 x 210 ft., to cost about $30,000 with equipment.

Standard Wholesale Phosphate Co., Continental Building, Baltimore, has plans for a new one-story unit, 120 x 300 ft., at Williamston, N. C., to cost over $90,000 with machinery. C. G. Crockett is plant manager in charge.

Cunliffe-Cadillac Co., Baltimore, local representative for Cadillac automobile, has leased multi-story building to be erected at Charles and Twenty-fourth Streets, for which general contract has been let to North Eastern Construction Co., 6 West Madison Street, for a new service, repair and sales building, to cost $150,000 with equipment. Howard Baldwin, 339 St. Paul Street, is architect.

Claude Neon Virginia Corporation, Richmond, Va., has been formed by Baltimore interests, headed by Norman A. Hill, 12 Clay Street, Baltimore, with capital of $75,000 and 2500 shares of stock, and plans establishment of plant at Richmond to manufacture electric lighting equipment, displays, etc., under Claude Neon patents. New company is represented by William H. Hudgins, 213 St. Paul Street, Baltimore.

City Council, High Point, N. C., has plans for a municipal electric light and power house, to cost over $75,000 with equipment. William C. Olsen, Exchange Place, Raleigh, N. C., is consulting engineer.

The Crane Market

INQUIRY for electric overhead cranes has slackened considerably and award of pending business is somewhat delayed by the vacation season. An outstanding list of overhead cranes recently issued, calls for six 30-ton electric cranes for substations of the Board of Transportation, New York. The inquiry is from the General Electric Co., Schenectady, N. Y., and the Westinghouse Electric & Mfg. Co., Pittsburgh. There are two more lists of overhead equipment pending, which have been in the market for some weeks. Builders are well booked with business, following one of the best six-month periods since the armistice, and it is noteworthy that dealers in used overhead cranes are actively seeking equipment to supply an increased demand. Locomotive crane business is light, but there is a fair volume of pending business, especially from contractors.

Among recent purchases are:

Goldsmith Brothers Smelting & Refining Co., Chicago, 3-ton, 40-ft. span, electric traveling crane from Northern Engineering Works.

Philadelphia

PHILADELPHIA, July 29,—Bids are being asked on general contract by Atwater Kent Mfg. Co., Philadelphia, until Aug. 6 for one-story, sawtooth roof addition, totaling 450,000 sq. ft., to cost $1,200,000 with equipment. Company has broken ground for four-story power plant, to cost $200,000 with machinery. Ballinger Co., Twelfth and Chestnut Streets, is architect and engineer for both structures.

Girard Smelting & Refining Co., Tioga and Richmond Streets, Philadelphia, will soon ask bids on general contract for one-story addition, to cost about $140,000 with equipment. H. B. Tobias, Otis Building, is architect.

Philadelphia & Reading Coal & Iron Co., Reading Terminal, Philadelphia, has plans for new steam-operated electric generating plant on Susquehanna River at Herndon, Pa., to utilize pulverized coal as fuel, to cost about $6,000,000 with transmission system. Application has been made for charters for 33 electric transmission companies to operate in townships in eastern part of State. Transmission lines will be constructed through different townships. A. J. Maloney is president.

W. F. Potts Son & Co., Inc., 1224 Cherry Street, Philadelphia, iron and steel products, has awarded a general contract to Fred A. Havens Co., 845 North Nineteenth Street, for one-story storage and distributing plant, to cost about $30,000. M. A. Webster, 1600 Arch Street, is architect.

Kay Steel Wheel Co., Los Angeles, manufacturer of automobile wheels, etc., has leased part of building at Delaware Avenue and South Street, Philadelphia, for Eastern factory branch and distributing plant. Company has been occupying property in this vicinity heretofore.

Grinnell Automatic Sprinkler Co., Commercial Trust Building, Philadelphia, manufacturer of fire extinguishers and equipment, has purchased property at Erie Avenue and D Street, 200 x 337 ft., for new two-story factory branch and distributing plant. It will cost over $100,000 with equipment, and will replace present plant at Seventeenth Street and Sedgley Avenue, which will be removed to new location. Main plant is at Providence, R. I.

Mechanicsburg Borough School Board, Locust and Arch Streets, Mechanicsburg, Pa., is said to be planning installation of manual training equipment in new two-story high school addition to cost about $185,000, for which bids will be asked on general contract early in August. C. J. Lappley, Front and Harris Streets, Harrisburg, Pa., is architect.

Louis Sylvester, president, and other officials of Scranton Button Co., Scranton, Pa., are organizing American Record Co., to take over and consolidate company noted with Cameo Record Corporation, 114 East Thirty-second Street, and Regal Record Co., 10 West Twentieth Street, New York. New company will have assets estimated at $8,000,000 and will specialize in production of talking machine records; plant of Scranton company will be developed as primary manufacturing works and increased facilities will be provided. Mr. Sylvester will head consolidated organization.

Bro-Dun Metal Products Co., North West End Avenue and McKinley Street, Lancaster, Pa., has been organized by Jerome S. Dunie and Edgar P. Brock, 1045 Woods Avenue, with capital of $25,000, to operate local foundry for production of brass, bronze, aluminum and other castings.

Sylvania Products Co., Emporium, Pa., manufacturer of radio tubes and equipment, is establishing branch factory at Lock Haven, Pa., for production of new screen grid-type tube and affiliated specialties.

New England

BOSTON, July 29.—Some local machine tool dealers did a good business the past week, planers, shapers, radial drills and lathes being in most active demand. Fully 90 per cent of tools sold were for 1930 delivery. Sales of some types of equipment undoubtedly are restricted because of deferred deliveries. Business in used tools is confined to small and unimportant equipment.

Machine tool prices tend upward; press brakes are higher, as well as planers and shapers.

July sales of small tools probably will exceed those of the corresponding month last year, and June this year.

Harry Katz, 525 Park Street, Hartford, Conn., has plans for an automobile body and radiator repair shop. Welding equipment is under consideration.

L. W. Bills, 73 Hancock Street, Lexington, Mass., has started work on a two-story, 24 x 42 ft., machine shop, to cost $15,000 without equipment.

Reed & Prince Mfg. Co., Duncan Avenue,

Worcester, Mass., is erecting a two-story addition, 106 x 209 ft.

Yale & Towne Mfg. Co., Stamford, Conn., has awarded a contract for a one-story foundry addition, 100 x 150 ft. A new furnace will be installed.

New Britain-Gridley Machine Co., 140 Chestnut Street, New Britain, Conn., is making alterations to its plant. Conveying equipment will probably be required.

New Britain Machine Co., South Street, New Britain, Conn., machine tools, has started work on a one-story addition, 24 x 260 ft.

Westinghouse Electric & Mfg. Co., East Springfied, Mass., is building a one-story foundry addition, 30 x 80 ft.

American Coal & Charcoal Co., 55 Derby St., Salem, Mass., has plans for coal pocket, 45 x 80 ft., for which conveying equipment is needed.

Morgan Brass Foundry, Lincoln Avenue, Providence, R. I., destroyed by fire last week, has plans for a new plant. Hoisting equipment, furnaces and general brass foundry equipment will be needed.

Thomas Smith & Co., 288 Grove Street, Worcester, Mass., metal punches and bolts, have started work on a one-story addition, 56 x 58 ft.

Contract has been let by Vanadium Metals Co., Boston Post Road, Groton, Conn., to H. R. Douglas & Son, Barrows Building, New London, Conn., for one-story foundry, 50 x 124 ft., to cost about $40,000 with equipment.

Bassick Co., Austin Street, Bridgeport, Conn., manufacturer of casters, metal furniture trimmings, etc., is said to be planning one-story addition, to cost about $45,000 with equipment.

Wright & Corson Co., Bridgeport, Conn., manufacturer of rivets, machine screws and kindred products, has work under way on removal of equipment from local plant to new factory at Milford, Conn., recently completed, and will concentrate production at latter place in future. New plant will represent investment of about $500,000.

New Departure Mfg. Co., Bristol, Conn., manufacturer of ball bearings, has awarded general contract to Aberthaw Co., Boston, for one-story forge shop extension, 50 x 82 ft., to cost over $40,000 with equipment.

Agawam Airport, Inc., Agawam, Mass., operated by H. L. Bowles, Springfield, Mass., and associates, has authorized construction of hangar with repair and reconditioning shop, to cost about $90,000 with equipment.

C. J. Cox Engineering Co., 625 Putnam Avenue, Cambridge, Mass., manufacturer of mechanical specialties, has awarded general contract to C. J. Pitcher, 46 Cornhill Street, Boston, for one-story shop addition and improvements in present works, to cost about $35,000.

Homer D. Bronson Co., Beacon Falls, Conn., manufacturer of sheet metal stampings, hinges and butts for automobiles, cabinets, etc., has awarded general contract to Oscar Lacroix Construction Co., Waterbury, Conn., for one-story addition, 35 x 100 ft., to cost about $40,000 with equipment. W. E. Hunt, Torrington, Conn., is architect.

Dewey & Almy Chemical Co., 235 Harvard Street, Cambridge, Mass., has taken out permit for one-story machine shop, to cost about $30,000 with equipment.

Chase Brass & Copper Co., Waterbury, Conn., a subsidiary of Kennecott Copper Corporation, 120 Broadway, New York, has purchased Irvine Brass & Copper Co., Minneapolis, Minn., manufacturer of kindred brass and copper products, which will be operated as branch works.

Boston & Maine Railroad Co., North Station, Boston, is razing passenger car repair shop at freight yards between Somerville and Cambridge, and will soon begin work for new engine house with repair facilities, to cost more than $1,000,000 with equipment, for which plans have been completed.

Detroit

DETROIT, July 29.—Grand Trunk Railway Co., 400 East Jefferson Street, Detroit, has plans for one-story car repair shop at Ferndale, Mich., to cost more than $45,000 with equipment. Engineering department is in charge.

Board of Trustees, University of Michigan, Ann Arbor, has plans for extension and improvements in power house, including underground system, and will proceed with work at once, to cost over $400,000.

Bohn Aluminum & Brass Co., Joseph Campau Avenue, Detroit, has awarded general contract to Krieghoff Co., 6661 French Road, for three-story addition, primarily for manufacture of aluminum parts for aircraft, to cost $125,000 with machinery.

Evans Auto Loading Co., Inc., Dime Bank Building, Detroit, manufacturer of automobile loading devices and equipment, is arranging for a bond issue to total about $1,200,000, part of fund to be used for expansion. Company is establishing a factory branch on Pacific Coast to manufacture battery boxes and kindred specialties.

Huntington Regulator Co., Flint, Mich., manufacturer of gas regulators and other regulating devices, is said to be planning a new factory at Lansing, Mich., to cost over $45,000 with equipment. Present factory will be removed to new location and capacity increased.

Detroit Butcher Supply Co., 1455 Gratiot Avenue, Detroit, manufacturer of knives, fixtures, etc., has plans for two-story unit, to cost about $55,000 with equipment. Pollmar & Ropes, Hoffman Building, are architects.

Whitmar & Leonard, Inc., Grand Rapids, care of W. C. Whitmar, city, recently organized to manufacture gliders and other aviation equipment, is planning early operation of a local plant. Charles S. Leonard, Grand Rapids, will be an official of new company.

Clark Equipment Co., Buchanan, Mich., manufacturer of axles, wheels, transmissions and other automotive equipment, has arranged for a stock issue of $2,280,000, part of fund to be used for expansion. Negotiations are being completed for purchase of controlling interest in Frost Gear & Machine Co., Jackson, Mich., manufacturer of kindred equipment, which will be operated as a subsidiary. Company will also develop business of Clark Tructractor Co., manufacturer of gasoline-propelled industrial trucks, etc., another subsidiary. Eugene B. Clark is president.

Pontiac Redi-Mixed Corporation, Pontiac, Mich., recently formed with capital of $75,000, by W. R. Ransom and T. S. McGaughan, Pontiac, and associates, is planning construction of new concrete-mixing plant, with bins, loading equipment, etc., to cost $35,000 with machinery.

Officials of Moreland Brothers Co., Adrian, Mich., oil products, have arranged for change of name to Moreland Oil Co., and plan expansion. Company is arranging for sale of bond issue to total about $100,000, part of fund to be used for extensions.

Ford Motor Co., Detroit, has filed plans for one-story addition to aircraft manufacturing plant at Dearborn, Mich, to cost more than $100,000 with equipment.

Allied Motor Industries, Inc., has bought Wills St. Clair plant at Marysville, including 144 acres, on St. Clair River, for manufacture of airplane engines.

Ramisch Tool & Die Co., Kalamazoo, Mich., has been organized to manufacture metal dies, stampings and patterns. Purchase of equipment is contemplated.

Michigan Aero-Engine Corporation, Lansing, Mich., has been organized to manufacture Rover aviation engines. H. B. Lundberg is president and general manager.

Marine Aircraft Corporation, Detroit, has been organized as subsidiary of Detroit Aircraft Corporation, and will manufacture amphibians and flying boats. C. B. Fritsche is vice-president of the latter company.

Buffalo

BUFFALO, July 29.—National Lime, Cement & By-Products Corporation, Stock Exchange Building, Buffalo, is arranging for construction of new lime plant on site recently acquired near Tuscumbia, Ala., to cost more than $350,000 with equipment. It is expected to make machinery purchases early in fall. Autery Engineering Co., Sheffield, Ala., is in charge of surveys for plant.

Kee-Lox Mfg. Co., 10 Keelox Place, Rochester, N. Y., manufacturer of carbon and other processed papers, has awarded general contract to Werner Spitz, 11 Comfort Street, for two additions, two and three stories, to cost about $60,000 with machinery. Leander McCord, Taylor Building, is architect.

Fire, July 24, destroyed a part of storage and distributing plant of Irving Engineering Co., 74-80 Jewett Avenue, Buffalo, automobile fronts and kindred products. Plans are being considered for rebuilding.

Carborundum Co., Buffalo Avenue, Niagara Falls, N. Y., manufacturer of grinding wheels and other abrasive materials, has awarded a general contract to Laur & Mack Contracting Co., College Street and Highland Avenue, for four-story addition, to cost about $100,000 with equipment.

Acoustic Products Co., 50 West Fifty-seventh Street, New York, manufacturer of radios and equipment, has purchased Federal Telephone Mfg. Corporation, 1738 Elmwood Avenue, Buffalo, and its subsidiaries, Federal Radio Corporation and Federal Orthosonic, Ltd., and will consolidate. Purchasing company will develop Buffalo plant to maximum capacity for manufacture of radio apparatus, including cases and frames, supplementing production now being carried out at Saginaw, Mich., and will also increase manufacturing facilities at last-noted works.

Walker Lee, Jr., Powers Building, Rochester, architect, will take bids at once for automobile service, repair and garage building, to cost $100,000 with equipment.

Consolidated Packaging Machinery Corporation, 1400 West Avenue, Buffalo, has been incorporated to continue manufacture of a general line of automatic packaging machinery.

Chicago

CHICAGO, July 29.—Chicago machine tool dealers have begun to quote against the International Harvester Co.'s list which, it is said, will ultimately call for about $1,500,000 worth of machine tools. Inquiries before the trade total $150,000 for tools on which satisfactory deliveries are difficult to obtain. Kearney & Trecker Corporation, Milwaukee, has recently closed for $150,000 worth of machine tools for an addition. On the whole, business in July has been in good volume, such in fact that improvement in deliveries is of small moment.

It is reported that the Nash Motors Co. is planning for extensive replacements at its Kenosha plant. Crane Co., Chicago, which has ordered a 72-in. boring mill, will buy several radial drills and is interested in milling machines and turret lathes. Both inquiries and purchases by the railroads are of small size. Chicago Board of Education will buy a two-wheel dry grinder, an 11-in. x 4-ft. engine lathe, an 18-in. band saw and three motor-in-head lathes.

Valley Forge Steel & Tool Co., has purchased property at corner of Monroe and Jefferson Streets, Chicago, improved with six-story loft structure. It will occupy about one-third of building and will carry on a general business in tool steels and metal cutting tools.

Goodman Mfg. Co., 4834 South Halsted Street, Chicago, manufacturer of mining machinery, will build a three-story brick factory, 58 x 73-ft. L. E. Ritter, Marquette Building, is architect.

Victor X-Ray Corporation, 223 South Seeley Avenue, Chicago, will build a five-story plant addition, 104 x 126-ft. to cost $150,000. S. N. Crowen, Willoughby Tower, is architect.

Standard Perforating Co., Forty-ninth Place, Chicago, will build a factory containing 13,000 sq. ft. of floor space.

Superstructure has been begun by Monarch Aircraft Co., Rockford, Ill., for one-story plant, 120 x 140 ft., for parts production and assembling, to cost more than $85,000 with equipment.

Englewood Desk Co., Inc., 5820 Lowe Avenue, Chicago, has awarded general contract to Charles Magnuson, 7431 Merrill Avenue, for rebuilding part of two-story plant recently destroyed by fire, to cost about $40,000 with equipment.

Economy Machine Products Co., 5206-14 Lawrence Avenue, Chicago, has awarded a general contract to Chicago Industrial Construction Co., 53 West Jackson Boulevard, for one-story addition, 60 x 90 ft., to cost about $30,000 with equipment. J. M. Brandstetter, 2001 West Pershing Road, is architect and engineer.

Rockford Drop Forge Co., Rockford, Ill., will soon begin work on one-story addition, 85 x 275 ft., with extension 60 x 72 ft., to cost about $150,000 with equipment. Lockwood Greene Engineers, Inc., 400 North Michigan Avenue, Chicago, is architect and engineer.

Minnesota Mining & Mfg. Co., Forest and Fauquier Streets, St. Paul, Minn., manufacturer of abrasive materials, mining specialties, etc., has awarded a general contract to William M. Murphy & Son, Pioneer Building, for two-story and basement addition, to cost about $150,000 with equipment. Toltz, King & Day, Inc., Builders' Exchange Building, is architect and engineer.

Scully Steel & Iron Co., 203 South La Salle Street, Chicago, has asked bids on general contract for one-story storage and distributing plant, to cost about $40,000 with equipment.

K-B Auto-Radio Laboratories, Inc., Chicago, has leased factory at 2925 Calumet Avenue, totaling about 15,000 sq. ft. floor space, for manufacture of radio equipment and devices.

Board of Education, Pueblo, Colo., is said to be planning installation of manual training equipment in central junior high school addition at Broadway and Orman Streets, to cost $130,000, for which superstructure will soon begin. Walter DeMordaunt, First National Bank Building, is architect.

Continental Grain Co., Chamber of Commerce, Minneapolis, Minn., has filed plans for new grain elevator on Twenty-fifth Avenue, S. E., to include elevating, conveying, screening and other equipment, to cost about $100,000. A. B. Marcy is secretary.

Pittsburgh

PITTSBURGH, July 29.—The machinery trade has not shown marked activity the past week, but July sales with most dealers in this district appear close to the June level, and unusually high for a mid-summer month. A large part of the business of local agents is for replacement parts and repairs, as equipment in plants has been taxed to the utmost in recent months, and in some cases companies have postponed placing new tools until production capacity is not being utilized so highly. For this reason many dealers expect the machine tool business to remain active for some time.

Westinghouse Electric & Mfg. Co. has not begun to place the bulk of tools on its third quarter list and no action has been taken on equipment for the new plant of the Aluminum Co. of America at New Kensington, Pa. Otherwise prospective inquiry of outstanding size is light, but requirements of the large steel mill expansion projects in this district are furnishing local dealers with plenty of figuring.

Plans are being drawn by Reliance Steel Castings Co., Twenty-eighth and Smallman Streets, Pittsburgh, for one-story foundry addition, to cost about $55,000 with equipment. Lake & Davidson, 6200 Penn Avenue, are architects.

Iron City Tool Works, Inc., Pittsburgh, has been formed with capital of $50,000, to take over and expand company of same name with plant at 3201 Smallman Street, specializing in manufacture of tools and implements, steel shapes, etc.

Penn Airplane Co., Sharon, Pa., is considering rebuilding part of assembling plant destroyed by fire June 20.

E. I. duPont deNemours & Co., Wilmington, Del., has approved plans for addition to electric generating plant at branch nitrogen works at Belle, W. Va., to cost more than $100,000 with equipment.

Hancock Mfg. Co., New Cumberland, W. Va., recently organized, has work in progress on new mill for production of steel stampings, and will increase size, as originally planned, from 30 x 208 ft. to 70 x 208 ft., to cost about $80,000 with equipment.

Pennsylvania Power Co., Sharon, Pa., has plans for two-story equipment storage and distributing plant, with repair shop, to cost $100,000 with equipment. Stevens & Wood, Inc., 20 Pine Street, New York, is engineer. Company is a subsidiary of Pennsylvania-Ohio Edison Co., Youngstown.

Indiana

INDIANAPOLIS, July 29.—Contract has been let by Edwards Iron Works, Inc., South Bend, to C. A. Jordan Co., 725 Wilbur Street, for one-story storage and distributing plant, to cost about $45,000 with equipment.

Board of School Trustees, Monroe City, has authorized installation of manual training department in new two-story and basement high and grade school, to cost about $115,000, for which bids will soon be asked on general contract by John Bayard, 231 Main Street, Vincennes, architect.

Mal-Gra Castings Co., Cambridge City, manufacturer of malleable castings, is planning to rebuild part of foundry destroyed by fire July 18.

Arthur Church, 231 East River Street, Peru, architect, has plans for a one and three-story automobile service, repair and garage building, 135 x 145 ft., to cost about $100,000 with equipment.

General Outdoor Advertising Co., 120 West Maryland Street, Indianapolis, manufacturer of displays, signs, etc., is planning erection of new plant on property recently secured under lease, to cost more than $70,000 with equipment. Present works will be removed to new location on completion of building, scheduled in October.

J. D. Adams Mfg. Co., 217 South Belmont Avenue, Indianapolis, manufacturer of road-building machinery and equipment, has plans for new factory branch and distributing plant at Dallas, Tex., to cost close to $40,000 with equipment. Erection will be in charge of H. P. Inge, Republic Bank Building, Dallas.

Cleveland

CLEVELAND, July 29.—Plans are under way by Willard Storage Battery Co., East 131st Street and St. Clair Avenue, Cleveland, for new plant at Los Angeles for initial output of 2000 electric storage battery units daily, to cost about $1,000,000 with machinery.

Spaulding Fibre Co., 124 St. Clair Avenue, Cleveland, manufacturer of sheets, rods, tubes, etc., has plans for a one-story plant unit, 100 x 100 ft., to cost over $60,000 with equipment. McGarry & McGarry, 241 Euclid Avenue, are architects. Headquarters of company are at Tonawanda, N. Y.

Plibrico Jointless Firebrick Co., 1840 Kingsbury Avenue, Chicago, has acquired plants and properties of Portsmouth Refractories Co., Portsmouth, Ohio, including refractory plant at Firebrick, Ohio, and about 1200 acres of raw material lands in Lawrence and Scioto Counties. Extensions and improvements will be made, including installation of mechanical drying and weathering system; part of works will be developed for calcining flint clay for refractory furnace linings.

Hercules Motors Corporation, Canton, Ohio, manufacturer of gasoline engines for motor buses, trucks, etc., has disposed of stock issue to total $4,500,000, part of proceeds to be used for expansion.

General Fireproofing Co., Youngstown, Ohio, has awarded general contract to Rust Engineering Co., Koppers Building, Pittsburgh, for four-story addition totaling 90,000 sq. ft. floor space, for production of aluminum chairs, to cost $250,000 with machinery.

Automobile Service Corporation of America, Inc., care of Shattuck & Layer, 134 North La Salle Street, Chicago, archi-

tects, has plans for an automobile service, repair and garage at Cleveland, consisting of three units, each one story, 30 x 256 ft., 30 x 120 ft., and 110 x 115 ft., to cost over $100,000 with equipment.

Middle States Air Service, Inc., care of C. W. Frank, Akron Savings & Loan Building, Akron, Ohio, architect, has plans for a hangar with shop and repair facilities at local airport, to cost about $150,000 with equipment. It is expected to ask bids on general contract in August.

Cleveland Chain & Mfg. Co., Cleveland, is erecting an addition to care for increased business. L. D. Round is president.

Lincoln Electric Co., Cleveland, has awarded contract to Austin Co. for an all-welded warehouse, 68 x 200 ft., to cost $65,000.

Cincinnati

CINCINNATI, July 29. — Although a slight letup in the volume of fresh booking is noticed by machine tool builders in this district, new business on the whole is good for this season of the year and better than during the same period, last year. Production is being sustained at an unusually high level for midsummer. Although there is a recession in the call for specialty tools, this is offset by the constant inquiry for one or two standard machines and a widening source of demand.

While action is being awaited on two previous inquiries from Russian commissions, which passed some time inspecting plants in this district, a third request for quotations has been received. This is for 30 lathes of all sizes and types.

Board of Education, Cincinnati, plans installation of manual training department in new school on Victory Boulevard, to cost $1,000,000, for which bids will be asked on general contract in August. Garber & Woodward, 4 West Seventh Street, are architects.

Texas Corporation, 524 Walnut Street, Cincinnati, headquarters at Houston, Tex., has plans for an oil storage and distributing plant, to cost about $50,000 with equipment.

Hobart Mfg. Co., **Troy, Ohio, manufacturer** of meat choppers and kindred products, has plans for a one-story addition, to cost about $20,000 with equipment.

E. R. McKenzie, 2432 Parkway Place, Memphis, Tenn., and associates have organized Machine Mfg. & Supply Co., with capital of $100,000, and plans early operation of local plant for production of mechanical specialities.

Hart Mfg. Co., 1600 North Western Parkway, Louisville, manufacturer of furnaces, castings, etc., plans rebuilding part plant destroyed by fire July 20.

Knoxville Iron Co., Knoxville, Tenn., has work under way on expansion program, including installation of additional machinery, to cost more than $150,000.

Commerce Garage Co., 321 Race Street, Cincinnati, will take bids in August for seven-story service, repair and garage building, 60 x 200 ft., to cost $450,000 with equipment. Hillsmith & Co., Chamber of Commerce Building, are architects and engineers.

Reynolds Metal Co., Louisville, is said to be planning call for bids on general contract about middle of August for initial unit of plant on Bell's Lane, three-stories, to cost $150,000 with equipment. Arthur G. Tafel, 142 South Third Street, is architect. Company is affiliated with United States Foil Co., Louisville.

Milwaukee

MILWAUKEE, July 26. — Practically no recession has taken place in the machine tool trade, manufacturers reporting good flow of orders and inquiries. Automobile plants have reduced production, and wood-working factories are experiencing a depression in almost all lines except that of radio cabinet manufacture. Deliveries have improved on some items, but not on special equipment or milling machines. Inquiries forecast a brisk fall season.

Preferred stock of National Gauge & Equipment Co., LaCrosse, Wis., has been acquired by Moto-Meter Gauge & Equipment Co., division of Moto-Meter Corporation, Long Island City, N. Y., following purchase last fall of all common stock by Moto-Meter interests. LaCrosse plant will be remodeled and an adjoining building will also be occupied for manufacturing. Equipment for vitreous enameling is being added.

Milwaukee Circulating Pump & Mfg. Co., 331 Ninth Street, Milwaukee, maker of forced water equipment for internal combustion engines, has changed its name to Hein-Werner Motor Parts Corporation, following a reorganization in which S. A. Perkins, secretary-treasurer of Waukesha Motor Co. acquired large holdings. Plant and offices of Hein-Werner corporation will be moved to Waukesha, where a two-story plant, 175 x 300 ft. will be erected at a cost of about $200,000. Machinery in Milwaukee plant will be moved to Waukesha.

Unit Corporation of America, 5301 Burnham Street, Milwaukee, specializing in manufacture of gears, transmissions and other automotive specialties, have started work on new building, 100 x 225 ft., for Universal Power Shovel division of company. It will cost $125,000 with equipment.

Liberty Foundry Co., 368 State Street, Wauwautosa, Milwaukee County, Wis., is about to contract for an addition, 26-ft. high with floor area of 27,350 sq. ft.

Wisconsin-Timken Axle Co., High Street, Oshkosh, Wis., is erecting two additions, 40 x 40 ft., and 24 x 30 ft.

Bell Machine Co., Oshkosh, Wis., maker of woodworking machinery, has begun construction of 2-story addition, 50 x 85 ft., to cost about $35,000 with machinery.

City of Kiel, Wis., has retained W. G. Kirchhiffer, Madison, Wis., consulting engineer, to design additions for water supply system, including one 750-gal. and one 300-gal. pumps, air lift pump, air compressor and an extra reservoir. Theodore Brill is city clerk.

St. Louis

ST. LOUIS, July 29.—Contract has been let by Beacon Airways of America, Inc., Board of Trade Building, Kansas City, Mo., to J. F. Gier, 410 East Fifty-fourth Street, for one-story plant, 60 x 155 ft., to manufacture aircraft, to cost about $100,000 with equipment. Clarence E. Shepard, Huntzinger Building, is architect.

Mallinckrodt Chemical Works, Inc., 3600 North Second Street, St. Louis, has awarded general contract to Woerman Construction Co., Syndicate Trust Building, for a power house, to cost about $80,000 with equipment.

City Council, Oklahoma City, Okla., is arranging fund of $435,000 for extensions in municipal airport, including hangars, repair and reconditioning shops, and other buildings.

Board of Education, Coffeyville, Kan., is planning installation of manual training equipment in new high school, to cost $500,000, for which bids will soon be asked on general contract. Glenn H. Thomas, W. K. H. Building, Wichita, Kan., is architect.

Johnson-Norton Buick Agency, Oklahoma City, Okla., local representative for Buick automobiles, is considering three-story and basement service, repair and sales building, 125 x 165 ft., to cost about $120,000 with equipment.

Mid-Southern Air Terminal, Inc., Little Rock, Ark., care of William J. Blythe, Boyle Building, has taken options on property near city for airport, and plans construction of hangars, repair shops, oil storage and other buildings, to cost more than $85,000 with equipment.

Inland Waterways Corporation, Helena, Ark., E. C. Horner, head, has plans for grain elevator and transfer terminal, with elevating, conveying, screening and other equipment, to cost $130,000. W. F. Schulz, Memphis, Tenn., is engineer.

New Era Motors, Inc., care of J. E. Roberts, 17 East Forty-fifth Street, New York, organized to manufacture Ruxton automobile, an eight-cylinder, front drive car, has arranged with Gardner Motor Co., Inc., Main and Rutgers Streets, St. Louis, for initial manufacture of new automobile, and will not operate temporary plant in that city as previously announced. Both parts manufacture and assembling will be handled by Gardner company. New Era company plans erection of permanent plant at Detroit later.

Board of Education, St. Joseph, Mo., is planning installation of manual training equipment in new Garfield-Jackson high school, to cost $260,000, for which plans will be drawn by Walter B. Tootle, Lacey Bank Building, architect. William B. Ittner, 911 Locust Street, St. Louis, is associate architect.

Sunnen Products Co., manufacturer of valve grinders, valve lifters and compressors, has purchased 3½-acre site at Maplewood, Mo., a suburb of St. Louis, for erection of a plant containing about 25,000 sq. ft. of floor space, to cost $25,000.

Gulf States

BIRMINGHAM, July 29.—Plans are being completed by Standard Oil Co. of Louisiana, Baton Rouge, for extensions in local refinery, including installation of equipment for gasoline production, to cost over $5,000,000 with machinery.

Ha-Boy Metal Products Co., 1443 West Forsyth Street, Jacksonville, Fla., manufacturer of metal goods for automobiles, including all-metal ventilating shades, etc., is planning an expansion to more than double present capacity, to cost over $40,000 with equipment. William E. Boyett is head.

Southern Steel Works, Inc., 908 Lucien Avenue, Birmingham, has begun an expansion program at steel fabricating plant, to include new punch shop, cutting shop and other units, with one-story extension to beam shop, to cost over $90,000 with machinery.

Model Brass Foundry Co., 2309 Hickory Street, Dallas, Tex., has plans for exten-

sions and improvements in foundry, to cost over $25,000.

Humble Oil & Refining Co., Houston, Tex., is planning extensions in refinery at Baytown, Tex., including installation of equipment for gasoline production, to cost over $2,000,000.

Airport Committee of City Council, Brady, Tex., has authorized purchase of property on Mason Highway, about four miles from city, as site for municipal airport, and plans early construction of hangar, repair shop, oil storage and other buildings, to cost more than $65,000 with equipment.

Southern Cotton Oil Co., Sheffield, Ala., will erect a one-story addition, to cost about $45,000 with equipment.

Cranfill-Reynolds Co., Dallas, Tex., has been formed with capital of 1,000,000 shares of stock, no par value, to take over a group of oil companies, including Cranfill & Reynolds, Inc., Cisco, Tex.; Moody-Seagraves Co., Fort Worth, Tex.; Petroleum Pipe Line Co. and Central Texas Refining Co., Corsicana, Tex., as well as Cody Petroleum Co., Cody, Wis. Headquarters of consolidated organization will be at Dallas. Plans are under way for expansion in different refineries and pipe line construction. O. R. Seagraves is chairman of board of new organization.

Seaman Foundry Co., 2307 Grand Avenue, Dallas, Tex., is planning an expansion program, including installation of additional equipment for production of iron and other castings, to cost about $25,000.

American Gas & Power Co., Birmingham, operating Birmingham Electric Co., Birmingham Gas Co. and other light and power utilities, has purchased Industrial Gas Corporation, Birmingham, and will consolidate. Purchased company was formerly a subsidiary of Alabama By-Products Co. Plans are under way for expansion, including pipe line construction.

Alamo Airplane Co., Milam Building, San Antonio, Tex., has plans for one-story aircraft plant, including parts and assembling departments, to cost about $30,000 with equipment. Company will manufacture three models of airplanes to retail at popular price. Boyd Hammond is company engineer, in charge.

Pacific Coast

SAN FRANCISCO, July 25.—Contract has been let by California Corrugated Culvert Co., Fifth and Parker Streets, Berkeley, Cal., to Pacific Coast Engineering Co., Oakland, for one-story addition to cost about $25,000 with equipment. F. C. Williams, 74 New Montgomery Street, San Francisco, is architect.

Standard Auto Body Co., Fifteenth Street and Central Avenue, Los Angeles, will take bids at once for one-story addition, 100 x 150 ft., to cost about $65,000 with equipment. Richard D. King, Van Nuys Building, is architect.

Board of County Supervisors, Fresno, Cal., has plans for one-story repair shop at Fresno district fair grounds for County road equipment, to cost $25,000.

Southern California Gas Co., Los Angeles, has applied for permission to build a pipe line from Huntington Beach to San Diego, Cal., about 250 miles, with daily capacity of 50,000,000 cu. ft., to cost more than $2,500,000 with booster stations, etc.

Board of School Trustees, Rivera, Cal., has rejected bids for a one-story manual arts building at local high school, and will ask new bids later, following voting of additional appropriation. Robert H. Orr, Corporation Building, Los Angeles, is architect.

Edward Hines Western Pine Co., Burns, Ore., operated by Edward Hines Lumber Co., 2431 South Lincoln Street, Chicago, has work under way on initial units of new lumber mill at Burns, to cost more than $2,000,000 with machine shops, power house and other units. Completion is scheduled in about six months.

Oregon-Washington Railroad & Navigation Co., Portland, will soon begin an addition to engine house with repair facilities at Huntington, Ore., to cost $30,000 with equipment.

M. J. Grewe, 1800 East Forty-sixth Street, Denver, and associates, are planning early erection of plant near Phoenix, Ariz., for manufacture of sand-lime brick, initial units to cost about $100,000 with power house, machine shop and other structures.

Western Oil Co., Los Angeles, has begun construction of new gasoline refinery in Wilmington district, to cost $2,500,000 with machinery.

General Water Heater Co., Front Street, Burbank, Cal., has awarded general contract to Union Engineering Co., Huntington Park, for two one-story additions, 60 x 175 ft., and 46 x 82 ft., to cost about $40,000 with equipment.

Canada

TORONTO, July 29.—While small individual orders are responsible for the greater part of current demand for machine tools, business as a whole is in satisfactory volume. Inquiries continue good and new business appearing is sufficient to indicate that the season will show a new record in sales compared with that of other years. Demand is not confined to any one district, but appears to be general throughout Canada.

H. G. Acres & Co., Ltd., consulting engineer, Niagara Falls, Ont., has been commissioned to rebuild the municipal hydroelectric plant at Edmundston, N. B., at a cost of $300,000. Bids for construction and equipment will be called soon.

Progress Spring Bed Co., Ltd., 988 Debullion Street, Montreal, will soon call for tenders for a five-story factory. M. E. Coshof, 1237 Phillips Square, is architect.

Bakelite Corporation of Canada, Ltd., 163 Dufferin Street, Toronto, has purchased site at St. Catharines, Ont., and will erect a plant.

Building Repairs & Alterations, Ltd., Royal Bank Building, Toronto, will build a two-story factory, 50 x 80 ft.

Several building contracts have been awarded for construction of a roundhouse and repair shops, for Toronto, Hamilton & Buffalo Railway Co., James and Hunter Streets, Hamilton, Ont., to cost $500,000.

Chrysler Corporation of Canada, Ltd., Walkerville, Ont., which recently completed erection of its main building and first of a series of three units of its plant at a cost of $1,750,000, will now erect an administration building and other units.

Canadian Industries, Ltd., will erect a sulphuric acid plant near International Nickel Co.'s refinery at Copper Cliff, Ont. Sulphur fumes from nickel plant will be used in manufacture of sulphuric acid, nitre cake, and other chemicals. It is proposed to start work next fall.

Western Canada

Westminster Paper Co.'s plant at New Westminster, B. C., was destroyed by fire, with a loss estimated at $1,000,000.

Canadian Brown Steel Tank Co., is contemplating erection of a plant at 20th Street and Pacific Avenue, Brandon, Man.

Carter-Halls-Aldinger, Ltd., Royal Bank Building, Winnipeg, has general contract for an addition to paper plant at LaVerandrye and St. Jeane Streets, Winnipeg.

Foreign

PLANS have been aproved by Otis Elevator Co., Eleventh Avenue and Twenty-sixth Street, New York, for branch plant at Sydney, Australia, including facilities for parts production and assembling, to cost more than $500,000 with equipment.

Intercontinents Power Co., operated under management of Gannett, Seelye & Fleming, Inc., 602 North Second Street, Harrisburg, Pa., engineer, with electric light and power utilities in Argentina, Brazil and Chile, known as S.A. Cia Sud Americana de Servicios Publicos, and S. A. Luz Electrica de Tres Arroyos, is disposing of a bond issue of $3,000,000, part of fund to be used for acquisition of additional properties, and extensions in power plants and system.

H. S. Denny, president, Mentor Exploration & Development Co., Ltd., Toronto, and other officials of that company are organizing Canadian Salvador Mines, Ltd., a subsidiary, to take over and operate gold and silver mining properties of Central American Mines, Ltd., in Republic of Salvador. New organization will carry out expansion program, including installation of mining and surface equipment.

Kolster Radio Corporation, 200 Mount Pleasant Avenue, Newark, N. J., operating Kolster-Brandes, Ltd., London, England, manufacturer of radio sets and equipment, has completed an agreement between last-noted organization and Telephon-fabrik Berliner Aktiengesellschaft, Berlin, Germany, for a consolidation of interests in that country. Latter company will manufacture Kolster-Brandes radios and equipment at Berlin and Hanover plants.

Goodyear Tire & Rubber Co., Akron, Ohio, is reported planning new plant in Argentina, for manufacture of automobile tires and tubes, to cost over $1,000,000 with machinery. Charles A. Stillman, vice-president, recently visited country noted to make survey and complete arrangements.

Royal Dutch Co., London, England, operating oil properties and refineries in different parts of world, is planning construction of new refinery near Budapest, Austria, to cost over $1,000,000 with equipment. It will be operated by Batavian Petroleum Co., a subsidiary.

It was doubtless apparent to all readers of the article entitled "Trouble Shooting With Microscopes," by Messrs. Smith and Riggan, THE IRON AGE, July 18, page 146, that Figs. 1 and 2 were transposed. The text makes it clear that the coarse grained structure shown in Fig. 2 is characteristic of steel castings as cast, while the fine grain of Fig. 1 represents the same after a proper anneal.

THE IRON AGE

New York, August 8, 1929

ESTABLISHED 1855 VOL. 124, No. 6

Apprentices Trained Four Years

Worthington Company Program Includes Both Practical Training and Class Room Work—Junior Student Engineers' Course Also Conducted

BY JOHN F. BIEHL*

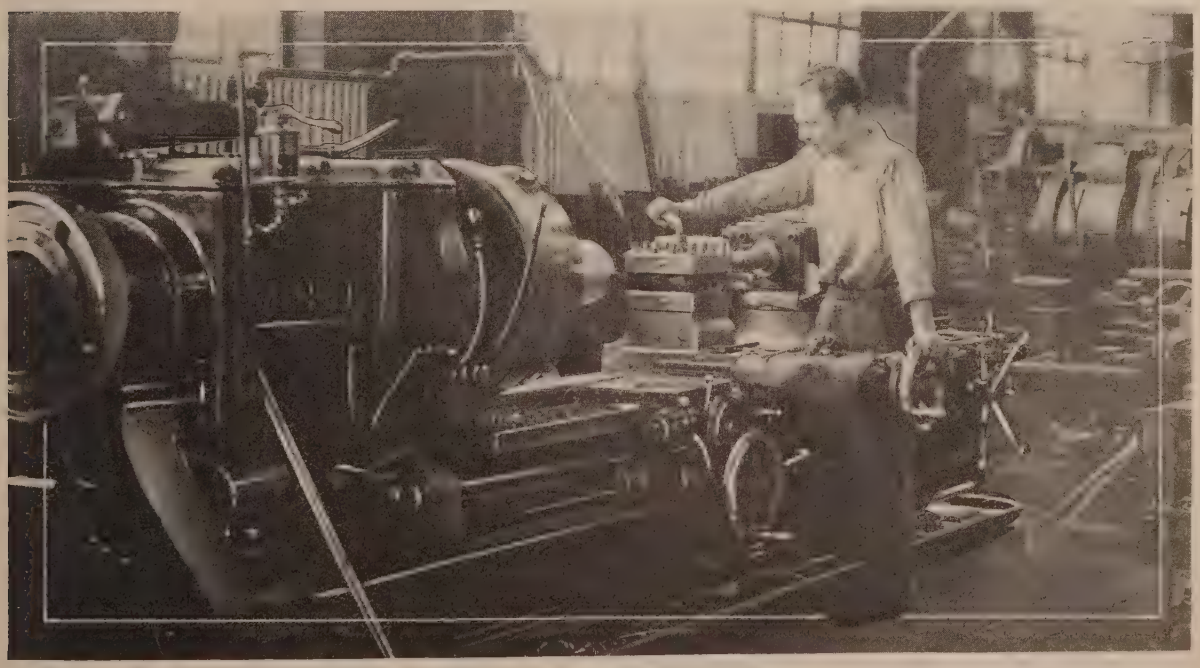
IN September, 1920, our plant put into operation a training program for pattern and machinist apprentices which had been approved by a committee consisting of the works manager, department superintendent, production superintendent and several interested foremen. Since that time the committee has held periodic meetings to revise the program to provide for expansion of training activities along lines not originally contemplated.

All machinist apprentices are under the direct supervision of an instructor whose duties are to teach them how to operate machine tools, to submit weekly apprentice reports to the educational director, and to cooperate with department foremen in obtaining the most satisfactory results. Incidentally, foremen are not expected to spend their time with beginners.

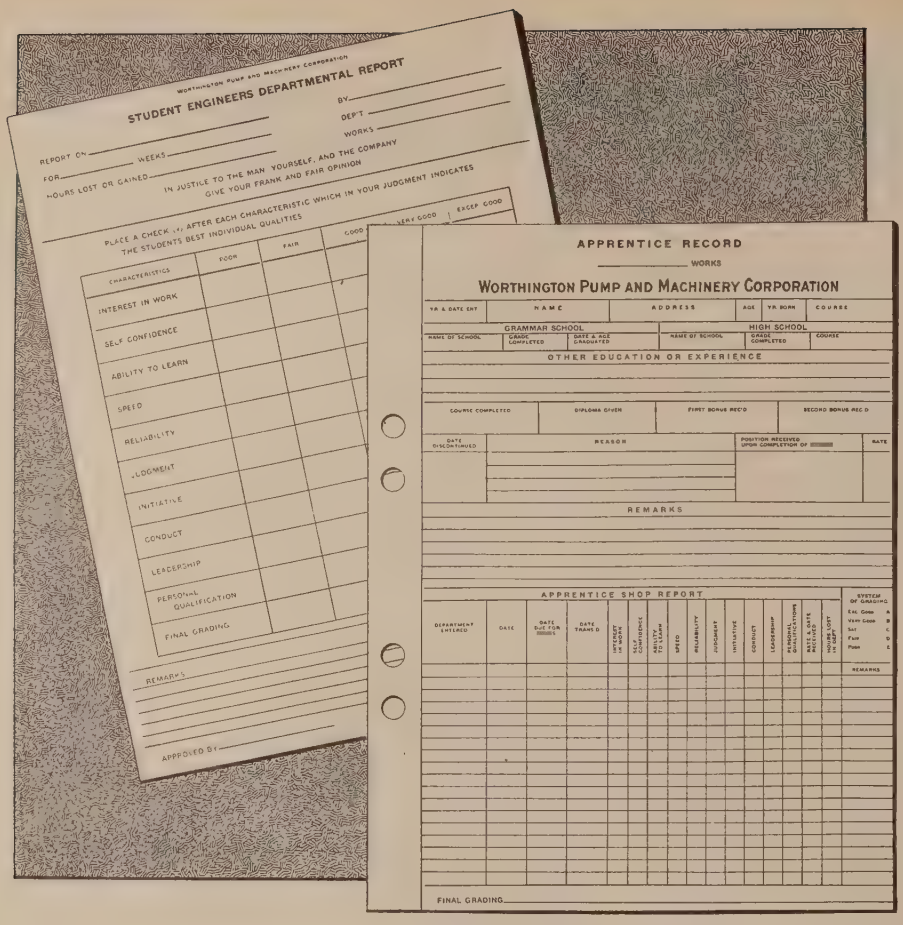
The present training program for machinist apprentices covers four years, or a total of 9984 working hours. Details of the program are given on another page and divided as shown.

Jig and tool apprentices are selected from boys who have had experience up to the tool grinding period, although occasionally one who has progressed further is chosen. Rates are the same as those for machine apprentices. Pattern shop apprentices are given foundry training during the first six months and during the next three and one-half years work in the pattern shop under the direct supervision of the department superintendent, who, from time to time, calls upon the educational director for

*Laidlaw Works, Worthington Pump & Machinery Corporation, Elmwood Place, Ohio.



Machinist Apprentices Receive Practical Training in Operating Machine Tools During Four-Year Course



Records of Apprentices and of Junior Student Engineers Are Kept on Forms Shown Above

assistance. There is only a slight difference in rates as compared with those for machinist apprentices.

In addition to the practical training already outlined, machine apprentices receive "related training," which is based on a program formulated by the Ohio State Department of Vocational Education and by the company. It consists of:

First Year.—Review of general school arithmetic presented in the form of shop mathematics, pertaining to decimal equivalents, etc.; blue print reading and study of machine tools; practical application of calipers, micrometers, etc. Classes are conducted twice each week from September to June.

Second Year.—Mechanical drawing 2 hr. a night once a week. Algebra first half of term and geometry the latter half, with practical applications; instruction 1 hr. twice a week from September to June.

Third Year.—Study of steam engines and compressors 1½ hr. once a week. Trigonometry first half of term and strength of materials latter half; 1 hr. twice a week from September to October.

Fourth Year.— Practical applications of mechanism first half of term and mechanics second half, 1 hr. twice a week; jig and tool design (drafting, etc.) 1½ hr. once a week; short course in business English and industrial economics given at most convenient time during year.

Pattern shop apprentices receive instruction in all of the above subjects except jig and tool design.

On account of the location of the plant outside the corporate limits of Cincinnati and the inability of the Elmwood Place, Ohio, public schools to pay nonresident tuition in the Cincinnati schools, the company has been compelled to operate its own related training department. The results have proved satisfactory, the outstanding advantage to the company having been the possibility of determining at close range the apprentice's ability to fill future positions, as well as judging his immediate work.

Related training is carried on after regular work hours. All instructors are employees occupying responsible positions with the company, but are certified by the State Department of Education. They receive compensation for their services as instructors, one-half of their salary being paid by the company and one-half by the State. They meet monthly with the educational director to discuss the work the apprentices are doing.

The program outlined in 1920 called for 16 machinist apprentices, four to graduate each year. However, the results have been so successful that the number has been increased from 16 to 24, or six graduates each year. The present allotment of apprentices is as follows:

Seven helpers and errand boys (beginners)
One tool counter assistant
Two tool grinders (over 18 years of age)
Two drill operators
One small lathe operator
One large lathe operator
Two vertical boring mill operators
One horizontal boring mill operator
One cylindrical grinder operator (generally not included in course)
One shaper, milling machine and planer operator (usually one on milling machine and one on planer)
One assembler
One tool apprentice
One jig apprentice
One special draftsman
One turret lathe operator

The quota of machinist apprentices was arrived at by (a) making a survey of the machines that apprentices could operate within the child labor laws; (b) by considering the number of department employees and of machine shop mechanics; (c) by studying the possibility of utilizing services of apprentices in slack periods to insure carrying out the company's policy of continuous employment throughout the four years of apprenticeship. These factors also were considered in establishing the quota of pat-

Training Program for Machinist Apprentices

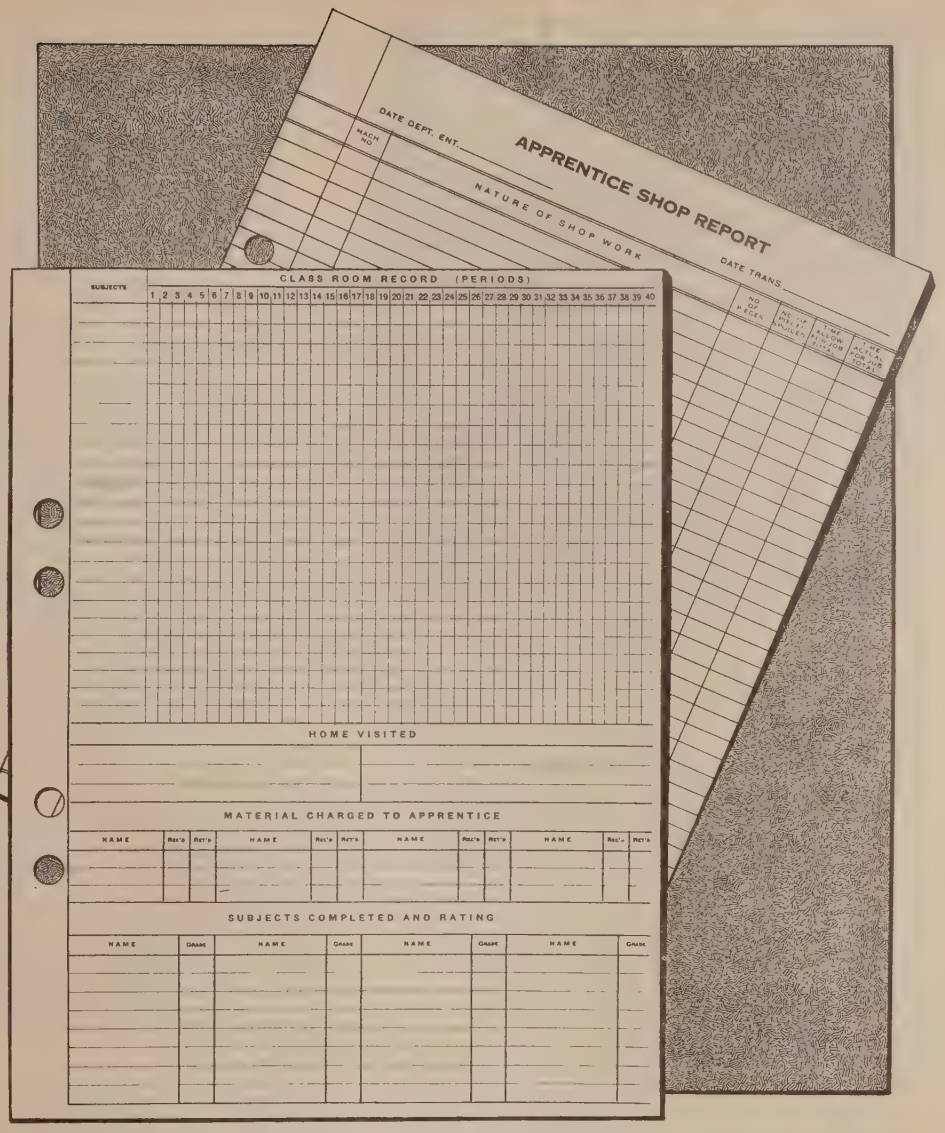
Type of Work	Length of Time	Period of Training	Rate per Hour
Errand and helper	Probationary	1	25c.
Tool or jig counter	3 months	2	27c.
Drill operation	3 months	..	...
Tool grinding	3 months	3	29c.
Shaper and miller	6 months	4	31c.
Small lathe	6 months	5	33c.
Large lathe	6 months	6	35c.
Horizontal or vertical boring mill	6 months	7	37c.
Unit assembly	3 months	..	...
Layoff work	6 months	8	39½c.
Erection	6 months	9	42c.
Total	4 years		

tern apprentices.

The present ratio of machinists to apprentices is approximately 10 to 1. In the pattern shop four apprentices constitute a full quota, one apprentice completing his training period each year. The ratio of pattern makers to apprentices is about 5 to 1.

Forms used in connection with apprenticeship training have been confined to a school and shop record, related training record, foreman's conclusion regarding the apprentice at the close of the training period and a personal weekly apprentice report. While the first three are important, the most valuable is the personal weekly apprentice report, which sets forth the work done by the apprentice during the week—amount of repetitional work, number of pieces spoiled, time allowed on job and time in which job was actually completed. For apprentices not working on machine tools, the report acts as a safeguard against incomplete training.

Inasmuch as the report is used primarily to judge the apprentice's work and ability, it also affords a check of the shop instructor's efforts. His efficiency is reflected in the data pertaining to spoiled work and in the time in which the jobs were actually completed.



The Shop and Class Room Standing of Each Apprentice Is Rated on Cards (Above), Which Are Kept on File

Each week the accounting department supplies the educational director all work tickets of machinist apprentices. These are checked and the total hours lost or gained by each apprentice are noted. A summary of the total loss or gain of all machinist apprentices is prepared, and a copy is forwarded to the instructor to inform him of apprentices in need of further instruction.

Subsequent History of Machinist Apprentices

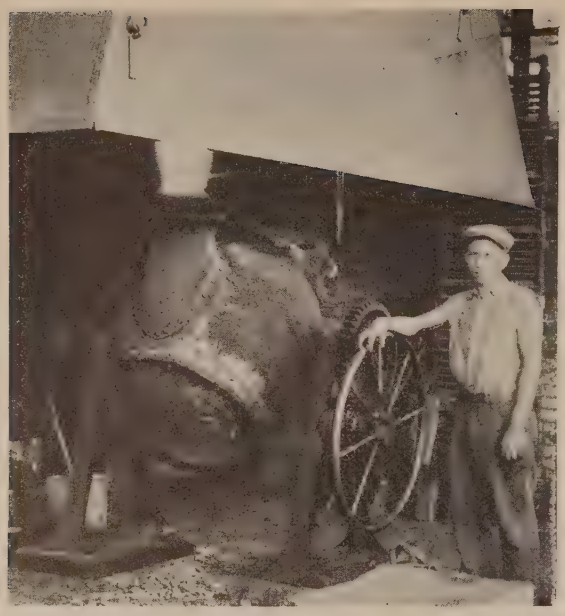
The record of machinist apprenticeship training since 1920 is shown in a table. The 18 graduates of the course still in the company's employ are as follows: one milling machine operator, one lay-off worker, one machine repairer, one vertical boring mill and general utility operator, two lathe operators, two vise hands, one lathe department inspector, one road man, one radial drill department inspector, one vertical drill department inspector, one jig and tool designer, one erector, one horizontal boring machine operator, two jig makers and one tool maker.

Expressed in percentages, graduates of the machinist apprenticeship course have filled positions as given in the following classification:

	Per Cent
Machine tool operators	27.80
Inspectors	16.66
Draftsmen	5.55
Vise hands	33.33
Jig makers	11.11
Tool makers	5.55

In 1924 the apprenticeship training program was supplemented by a junior student engineers' course, which is confined to high school graduates technically inclined and to young men who have been compelled, on account of conditions beyond their control, to discontinue their technical training at college. The object of the course is to develop men for positions beyond the ability of the apprentice, such as sales, engineering and road work.

Practical training provided in this course consists of foundry practice; operation of drill presses, lathes, boring mills and milling machines; lay off; unit assembly; hydraulic testing; erection of medium and small compressors; and experimental engineering. The period for each of these tasks ranges from two to six months. To round out his experience the student selects the type of work he desires, such as sales, erection or engineering, for an in-



Foundry Practice Is Stressed in Course for Foundry Apprentices

tensive training period of nine months. His rate of pay graduates from 32c. an hour during the first six months' period to 50c. during the eighth and final period.

Junior students are put through a related training course in the following subjects:

Analytical geometry
Strength of materials
Mechanical drawing
Use of slide rule
Calculus
Business English
Elements of steam engineering
Mechanics
Thermodynamics
Industrial economics
Advanced engineering drawing
Study of compressors
Departmental student conferences
Principles of factory management
Applied electricity (at local technical school)

Foundry apprenticeship training was put into operation in June, 1927. The practical and related training is of such nature as to attract men whose services can be utilized in other work besides molding and core making, if necessary. During the first three years of this program the apprentice is instructed in making small and large cores, core finishing, bench molding, side floor molding, main floor molding and cupola practice. The last year he is permitted to select either molding or core making. He starts his training period at 37c. an hour and at the end of the fourth year is receiving 60c. Related training embodies blue print reading and sketching, monthly meetings with department heads, algebra, geometry, physics, chemistry, strength of materials, metallography, industrial economics, foremanship and factory management. Foundry practice is emphasized throughout the entire course.

When all training programs of the company are operating according to their respective quotas in 1930, there will be 60 young men in training, divided as follows: machinist apprentices, 40 per cent; pattern apprentices, 7 per cent; junior students, 27 per cent; foundry apprentices, 26 per cent.

No Difficulty in Getting Recruits for Courses

Previous to 1923 difficulty was experienced in getting applications for apprenticeship courses, largely because both parents and boys were primarily interested in wages instead of training for future employment. However, the favorable publicity given the program by the employees and by the apprentices themselves regarding its benefits and the opportunities at the expiration of the apprenticeship period resulted in employees getting their own sons and close friends to take advantage of the training courses. While some applicants are secured through efforts of outside organizations, the greatest source of supply has been the vocational department of the Cincinnati public schools.

All changes of rates and transfers are made by the educational director and are forwarded to the department superintendent for approval. In accordance with the agreement entered into by the apprentice and the company in regard to the training program, prompt transfers and changes of rates are made, unless some unusual condition arises which makes desirable the temporary postponement of changes. There are times, for instance, when rush orders or lack of sufficient help make it advisable to retain an apprentice beyond the allotted period. This is never done without explaining to him the reasons and without setting, if possible, a definite date when he will be transferred. To avoid impairment of production, foremen are notified by the instructor at least one week in advance of changes and of the new boys they will receive.

The use of nickel as such does not eliminate internal shrinkage in castings, according to the experience of R. F. Harrington, metallurgist, Hunt-Spiller Mfg. Corporation, Boston. He was incorrectly reported in this particular in THE IRON AGE of July 4 in the report of the International Foundry Congress in London. The latter part of the report of Mr. Harrington's discussion is correct, namely, that he has a high regard for nickel in respect to its ability to permit of a more uniform structure in the various sections of castings having light and heavy sections.

Machinist Apprentices, 1920-1929

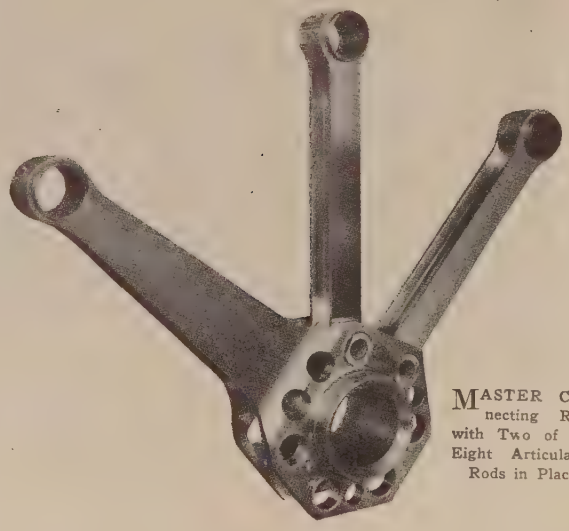
Year	Total Employed	Number Departed Before Agreement Signed	Number Departed After Agreement Signed	Total Finished or Still Training	Per Cent Completed Course or Still Training	Graduates Still in Employ	Who Left Employ
1920	4	..	..	4	100.00	4	..
1921	10	6	1	3	30.00	3	..
1922	11	9	..	2	18.00	2	..
1923	13	7	3	3	23.10	2	1
1924	12	5	2	5	41.66	5	..
1925	10	4	4	2	20.00	2	..
1926	14	8	1	5	35.71	(In training)	..
1927	9	3	1	5	55.55	(In training)	..
1928	11	5	1	5	45.45	(In training)	..
1929	10	1	..	9	90.00	(In training)	..
Total	104	48	13	43		18	

Note: Three graduates left the company's employ after graduation, but two have returned.

Machining Two Connecting Rods

Forgings for Master and Articulated Rods Pass Through Boring, Reaming, Milling, Drilling, Facing and Grinding Operations

BY FAY LEONE FAUROTE*



MASTER Connecting Rod, with Two of the Eight Articulated Rods in Place

UPON receipt of the forgings for the master connecting rod, they are inspected and corresponding numbers are stamped on the rod and test piece, which is cut off close to the hub. These test pieces are held by the inspection department until the heat-treating department notifies the inspectors that the rods are to be heat treated. The forgings are then annealed if necessary.

Next they are put in a three-jaw chuck. After facing, a 1½-in. drill is put through, followed by a 2⅜-in. drill, then a 2 15/32-in. boring bar, which is followed by a 2½-in. reamer. The flange is then rough faced to 1¼ in. from center of rod and turned to 3.156-in. diameter hub. The hub is rough faced to 3/16 in. from finished face, after which the rod is put in a 24-in. Bullard, where two operations are performed: First, the flange is rough faced to 2½ in. and turned to 3.156 ± 0.005 in. diameter. The hub is also rough faced from finished face to 19/32 in. or 3 9/32 ± 0.005 in. overall.

A 1 7/32 in. hole is then drilled through the wrist pin hub. It is then reamed to 1.250 ± 0.001 in. diameter.

For the rough milling operation the part is then put in a Cincinnati Hydromatic miller, two rods at a time clamped in a fixture. This operation rough mills the side of the channel, making 13/16 in. dimension at wrist pin boss to ⅞ in., holding 3 5/32 in. dimension at large end to 3 7/32 in. The rods are then reversed and the operation is repeated.

Then the five sides of the cheeks are rough milled on a Sundstrand Rigidmil, making 2.700 in. dimension to 2 49/64 in. The rough milling of the edges of the channel and the side of the cheek, making 2.700 in. dimension to 2 49/64 in. and allowing 1/16 in. for finish on the edges of the channel, are performed on two rods at a time on a Hydromatic miller; as is also the operation of rough milling to 1¼ in. wide, holding depth ⅛ in. from center. Parts are reversed and the operation repeated, making a web thickness of ¼ in.

A vertical miller is used to rough mill the wrist pin boss, making 0.828 in. radius to 57/64 in. radius. After the edges are smoothed with a file, the master connecting rod is heat treated so that it will register a Brinell hardness of 302 to 320, after which it is sand-blasted, pickled, neutralized in a lime solution and blown off with live steam.

After inspection for cracks, seams and other defects, it is placed in a fixture and the crankpin hole is finish-bored to 2.700 in. diameter. The side of the cheek is then finish-faced 2 7/16 in. from the other face or 1 3/16 in. from the center. It is then finish-turned to 3 1/32 in. diameter, finish-faced 3 1/32 in. diameter boss to 3/16 ± 0.005 in. from face of cheek. Finally, it is finish-turned to 2 13/16 in. diameter, starting 11/16 in. from end X and making the cut 1⅜ in. wide. The inside is finish reamed to 2.726 ± 0.002 in. diameter.

Held on an expansion arbor, the cheek is finish-faced to 2⅜ in. overall. The rod is finish-turned to 3 1/32 in. diameter and the hub finish-faced to 3.172 ± 0.002 in. overall. The rod is then put on a drill press and the wrist pin hole is rough bored to 1.366 in. diameter, after which it is finish reamed to 1.381 ± 0.001 in. diameter.

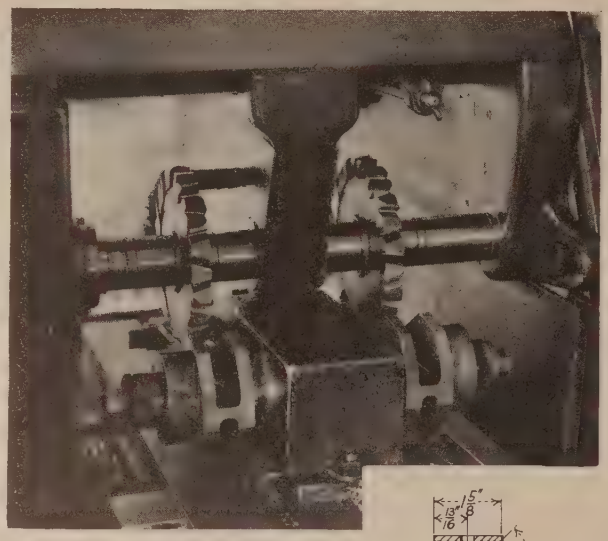
Both edges of the channel are then finish milled on a Hydromatic miller, two rods at a time, after which the channel itself is finish milled 1⅜ in. wide, depth 1/16 in. from center. The parts are then reversed and the operation repeated, making the web thickness ⅛ in. A vertical miller is employed to finish mill the wrist pin boss 1 21/32 ± 0.010 in. Two rods are loaded in a fixture on a Cincinnati Hydromatic miller and the side of the channel is finish milled to 13/16 in. from center. The rods are reversed and the operation repeated, making 1⅝ in. dimension at end of wrist-pin hub.

A Sundstrand Rigidmil finish mills the five sides of the cheeks to 2.700 ± 0.010 in. On a horizontal miller the master connecting rod is milled to 1⅝ in. radius at pin boss—depth 1/16 in. to center. The rod is then reversed and the operation repeated, holding the web at ⅛ in. thickness. A No. 3 standard Milwaukee vertical miller finish mills the center web 1⅜ in. wide to ⅝ in. dimension.

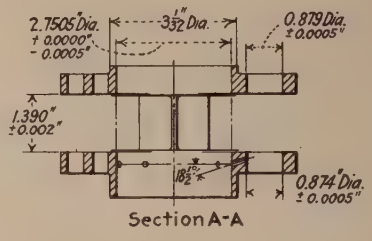
After disk grinding the five sides to remove tool marks, the corners of the cheeks are ground to a 3/16 in. radius. The part is then pickled for 5 min. in an alcohol solution containing 5 per cent nitric acid, neutralized and then inspected for cracks and flaws.

On a Bryant grinder the crankpin hole is rough ground to 2.745 ± 0.001 in. diameter, and the right face of the hub cleaned up to 0.187 ± 0.002 in. to cheek. The rod is then placed in a fixture and rough ground on an Abrasive

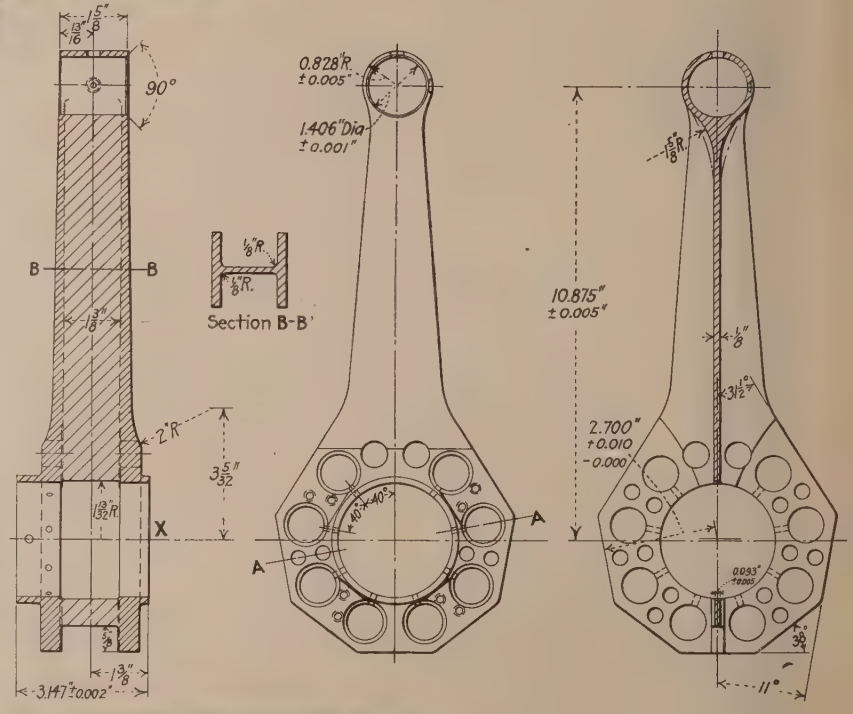
*Mechanical engineer, New York. This is one of a series of articles describing the machining of the chief parts of the new Wright Whirlwind aeronautical engine. The first article appeared in THE IRON AGE of July 18, page 148.

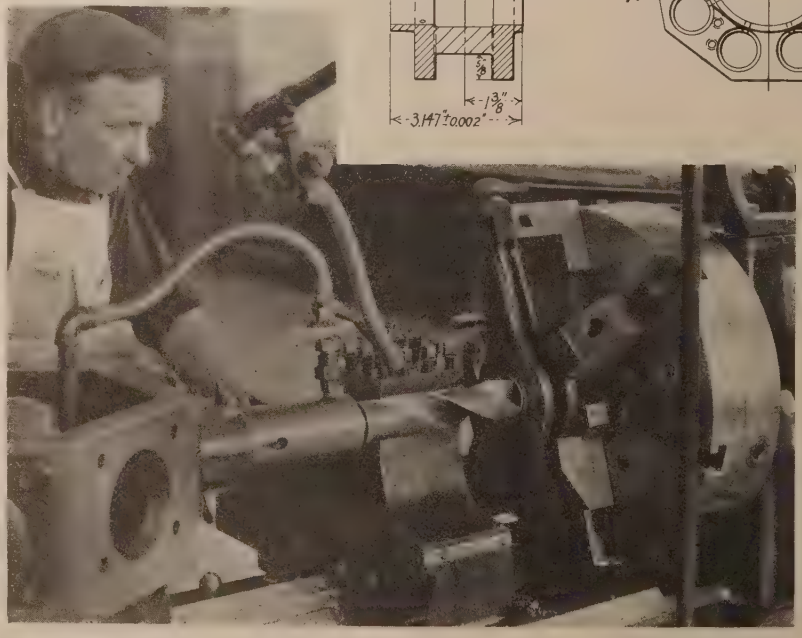


ROUGH Milling Channel on Two Master Rods on High-Powered Hydromatic Milling Machine (at Left)



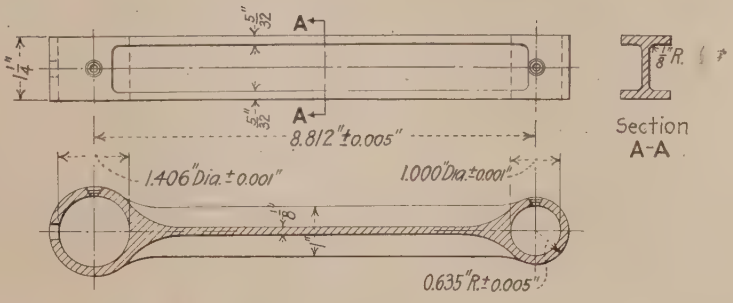
THE Accompanying Drawings Cover the Master Connecting Rod with Which Are Articulated Eight Auxiliary Rods, of Which the Size and Design Are Shown on the Facing Page





DRILLING and Rough Boring of Crankpin Hole and Facing Flange on Master Rod (at Left)

ABOVE: Checking Master Rod for Crankpin Alinement and Square with Wristpin Hole on Nine Cylinder Whirlwind. On the right are three Cyclone master rods



BELOW: Inspection of I-Beam Section Articulated Rod and Checking Knuckle Pin and Piston Pin Holes for Alinement

grinder to 1⅜ in. dimension (centerline to right face of hub). A bench operation forms a 3/32-in. radius and removes shoulder in channel on both sides. The rod is then polished all over.

A Blanchard surface grinder is used for grinding the face of the long hub to 3.147 ± 0.002 in. dimension. A four-spindle drill drills two 39/64 in. holes and reams them to ⅝ in. diameter. The jig is then turned over and the operation is repeated.

Drilling of the eight knuckle-pin holes is accomplished on a 16-spindle head Foote-Burt drill, boring 0.874 in. holes to 0.869 ± 0.001 in. diameter and 0.879 in. holes to 0.874 ± 0.001 in. diameter. A Leland-Gifford drill is used for counterboring eight 17/32-in. radius holes one side only (0.875 in. diameter holes) to 0.005 in. maximum depth (on short-hub side). The eight knuckle-pin holes are then rough reamed to 0.873 in. and 0.878 in. diameter, and finish reamed to 0.874 ± 0.0005 in. diameter and 0.879 ± 0.0005 in. diameter, being sure that the 0.879 in. diameter holes are on the counterbored side.

Using a Milwaukee No. 2 vertical miller, the flats are milled, blending out with face of cheek to 1.540 and 1.518 in. dimension. This is repeated four times by indexing. With a Leland-Gifford four-spindle drill twelve ⅜-in. holes are drilled through one side. Then the jig is turned over and four ⅜-in. holes are drilled through and eight No. 3 (0.213-in. diameter) holes are drilled through one side (¼-in. 28 P. tapped holes). Using a four-spindle Leland-Gifford drill press, eight ¼-in.—28 U. S. standard thread holes are tapped and eight ¼-in. tapped holes 1/32 in. x 45 deg. are countersunk.

Then a 1.406-in. hole 1/64 in. x 45 deg. is countersunk for the wristpin; the part is reversed and the operation repeated. With a sensitive drill eight 5/32-in. diameter holes at 18½ deg. angle are drilled into the eight 0.874-in. diameter holes. The Leland-Gifford four-spindle sensitive drill is used to drill one No. 13 (0.185-in. diameter) hole through one side of the long hub.

With an Abrasive surface grinder the master connecting rod is rough ground to 1.390 in. dimension, after which the web at bottom of rod is ground to 3/64 in. from centerline x 1⅜ in. wide, holding 1/32 in. radii in corners. The rod is reversed and the operation repeated, making web 0.093 ± 0.005 in. thick. The next operation, with a Bryant chucking grinder, is to chuck short hub out and finish grind the 2.7505 — 0.0005 in. diameter crankpin hole to size. Also with a Bryant chucking grinder the wrist-pin hole is ground to 1.406 ± 0.001 in. diameter.

The rod is finish ground 1.390 ± 0.002 in. dimension between the cheeks, with an Abrasive grinder, holding cheeks equal thickness. The rod is reversed and the operation repeated. A 5/16-in. diameter hole is then drilled with a four-spindle Leland-Gifford sensitive drill in the wrist-pin hub and a No. 19 drill (0.166 in.) in side of hub. The latter is then counterbored 0.250 ± 0.002 in. diameter to 0.046 ± 0.003 in. dimension and 5/16 in. diameter to 1/32 in. deep.

The burrs at holes are now removed and sharp edges, 1/64 in., are broken to 1/32 in. The holes are inspected, as is the alinement of crank-pin and wristpin hole. Next the wristpin bushing is pressed into place with an air arbor press (the 5/16 in. and ¼ in. holes lining up). A No. 19 (0.166 in. diameter) hole is drilled through the wall of the bronze bushing with a Leland-Gifford sensitive drill.

Then the rod is taken to the bench, where dowel is driven in place, a hardened plug is inserted in the bush and the metal at bottom of 5/16-in. counterbore is staked in to hold dowel. Next the wrist-pin hole is finish bored and reamed with a drill press to 1.250 ± 0.001 in. diamter, the sharp edges are removed at the bench, the hole is inspected and its alinement with the crankpin hole is checked.

After the master connecting rod has been given a fine polish all over on a polishing jack, the connecting rod bearing is pressed into place with an arbor press (⅛-in. holes in rod and bearing should be approximately in line). A No. 14 (0.182-in. diameter hole is drilled with a Leland-Gifford sensitive drill ⅛ in. deep to point of drill in bearing. It is drilled through with a ⅛-in. diameter drill and redrilled with a No. 14 flat-end drill to square up bottom of hole x ⅛ in. deep. Finally, a dowel is driven into place, the rod is washed thoroughly in the gasoline tank, inspected and delivered to finished stores.

How Articulated Rod Is Machined

THIRTY-FIVE operations are necessary for the machining of the articulated rod. The forgings are purchased from outside vendors and upon delivery to rough stores are inspected, heat treated if necessary, and then put through the Brinell test for hardness.

Both sides are then rough-milled and one side surface ground. The pin holes are drilled and reamed, and after the channels are rough-milled the rods are pickled, limed and washed, after which they are inspected for seams, laps, cracks and other defects.

They are then ground on both sides, the edges and radius are milled, after which the channel is finished milled. They are then given a stamp and serial numbers.

The end radii are milled, the pin holes drilled and reamed, the three small holes drilled, and after burrs are removed they are pickled, neutralized, washed and inspected. They are then rough-polished, the holes are ground, the sides disk ground, and the rods then inspected for alinement.

After taking off the rough edges, the bushings are pressed in, holes are drilled for pins, pins put in, after which the two bushings are finish-bored and inspected. If necessary the bushings are again finish-bored, after which the articulated rods are buffed and polished all over, washed in kerosene, inspected and delivered to the finished stock room.

Modern Ship is One-Tenth Copper, Says Association

A modern 30,000-ton ship is about one-tenth copper, according to the Copper and Brass Research Association, 25 Broadway, New York, which has completed a survey of shipbuilding. The bronze propellers of such a ship may contain 53,500 lb. of copper, shaft sleeves 53,000 lb., main propelling machinery 200,000 lb., electrical gear and wiring, 3,000,000 lb., and even such inconspicuous installations as voice tubes, it is stated, may require 100,000 lb. of copper.

The Copper and Brass Research Association says that prospective building programs of the world's merchant marine and navies indicate the construction of 3,000,000 gross tons of shipping a year. The yearly increase in world tonnage should amount to 1,000,000 or more tons. An average of 1,000,000 tons or more is lost or broken up each year.

"The United States now finds itself possessed of about 10,000,000 tons of shipping, nearly 500 per cent more than in 1914," the survey says. "A great deal of this is war heritage and almost 3,000,000 tons is now idle. Eventually, it is believed, this idle tonnage will be scrapped as there is little possibility that it could be operated at a profit in competition with ocean bound trade. Of the remaining 7,000,000 tons much of it is obsolete and is losing money. For this reason it may be retired from service as time and circumstances may warrant."

Byers New Process for Wrought Iron*

Inventor Describes Fundamentals of Method Whereby Pilot Plant Produces 200 Tons of Wrought Iron Daily— Puddler Eliminated by Steel Plant Equipment

BY JAMES ASTON

WROUGHT iron manufacture of today is usually associated with hand puddling. The essential steps in the process are:

1. Melting down the charge of pig iron in a cupola.
2. Refining the metal to a low content of the several metalloids.
3. Disintegration of or "graining" the mass in the slag bath resulting from refining.
4. Balling up the metallic mass and thereby incorporating with it a portion of the slag.
5. Compacting the composite mass with ejection of surplus slag.

The operation requires skill and severe manual effort, with an accompaniment of small outputs and high costs of manufacture.

It is to be expected that human ingenuity has been requisitioned to increase output and minimize manual labor. Numerous so-called "mechanical puddling" processes have been devised, with a dominance of failures, but with a few attaining a commendable degree of success. In general, the methods have employed furnaces of a rotary or oscillatory type, with the focus of attention upon obtaining agitation of the charge in simulation of the manual effort of the puddler.

Any successful method to displace hand puddling in the production of wrought iron must maintain or improve upon the characteristics of product obtained in hand puddling; it must do this with increased unit masses and aggregate output; and it must decrease manufacturing costs to an extent proportional to the expected expansion of the market for the product. Failures have been in part due to inconsistencies in quality of material produced, in part to difficulties of maintenance of equipment, and in part to manufacturing costs which, in comparison with those of hand puddling, were not attractive to capital. Metallurgically, disintegration of the refined base metal to secure minute and uniform intermingling with the slag is the crux of the problem, and was the focus of attention in the development of the Byers new process.

JAMES ASTON, inventor of the Byers new process for making wrought iron, started his researches on the subject in 1915. Eleven years later, when the principal operations had been verified on a tonnage basis, he resigned from the staff of A. M. Byers Co. to become head of the Department of Mining and Metallurgical Engineering at the Carnegie Institute of Technology

Plant and Operation at Warren

Operation at the plant of A. M. Byers Co. began at Warren, Ohio, in July, 1927. After a few months on a moderate scale, in which there was an ironing out of some of the mechanical difficulties, production was put upon a regular and steadily increasing basis. Today, with some extensions of the original equipment, output is in excess of 200 gross tons per day, with operations on two-turn, six-day week program.

The process is divisible into several steps, which correspond to the above mentioned major subdivisions of the hand puddling method. The plant consists of several units, each of which is adapted to carry out its special phase of the operation.

Bessemer grade pig iron is melted in a 12-ft. cupola, similar to those used in supplying metal to Bessemer plants when direct blast-furnace metal is not available. It has a melting capacity of about 15 tons per hour, and operates continuously for a week, after which patching of the lining in the tuyere zone is necessary. The cupola is mechanically charged. There is a pickup of 4 to 5 points of sulphur; however, it is adequately eliminated by the use of about 20 lb. per ton of soda ash, added to the ladle on tapping. The full requirement for each heat is tapped at one time, then taken in a ladle to the converter house by an overhead crane.

Refining is done in two 2-ton side-blown acid-lined converters, operating on a cycle of about 25 min. for each vessel. The metal is blown "full" with an analysis when teemed averaging C, 0.06; Mn, 0.03; P, 0.10; Si, 0.02; S, 0.05. In contrast with Bessemer steel practice, no additions are made to the ladle metal, and it is important also to bear in mind in such comparison that the ladle metal in the new process operation is merely a semi-finished material which subsequently undergoes completion of metalloid removal, and the important functions of degasification and deoxidation during the reactions involved in processing. The Bessemer converter is admirably adapted to the refining stage of the operation, producing metal in batches of moderate size on a relatively brief, steady cycle.

The slag incorporated in wrought iron is essentially a ferrous silicate, high in iron oxide. In hand puddling practice it is a combination of oxides resulting from the reactions of refining, with such additional ingredients as may result from a fluxing of materials on the furnace hearth. It will vary somewhat, for good or evil in results, with the nature of the charge material, individualism in practice, and character of furnace materials. A typical composition is FeO, 70 to 75 per cent; Fe_2O_3, 5 to

*This paper was prepared for presentation at the Cleveland meeting of the American Institute of Mining and Metallurgical Engineers to be held in September, 1929. Copyright, 1929, by the institute.

FIRST a "Thimble" Is Partly Filled with Iron Silicate Slag, Melted in a Tilting Open-Hearth Furnace, and Then a Weighed Amount of Blown Bessemer Steel Gradually Poured Into the Thimble. Rapid cooling of the steel liberates gases so rapidly that the metal disintegrates into a sponge

10; SiO_2, 10 to 12; MnO, 2; Al_2O_3, 2; P_2O_5, 2; and occasional or small amounts of CaO, MgO, or other oxides. The iron silicate is the important or dominant ingredient, with the others secondary or merely incidental.

In the new process, preparation of the slag consists of independent melting of the constituent ingredients in the proportions for the desired composition. Puddling-furnace tap cinder (where available), heating-furnace cinder, roll scale, iron ore, and sand represent available sources of supply. The composition is maintained in close conformity to the slag found in good wrought iron, with adjustments in line with experience which has shown that improved characteristics of product may be obtained.

The melting is done in a tilting regenerative open-hearth furnace, oil-fired, of 20-ton steel rating. It is of standard type, magnesite lined, but with additional water cooling to protect the hearth from the heavy scouring action of the molten slag. Make-up slag is transferred in a ladle to the processing floor as required.

Disintegration of the metallic mass is the dominant feature in the manufacture of wrought iron, in order that a sponge shall be formed to serve as a carrier of the slag. This phase of the new process probably represents the first recognition of the dominance of this feature and a consequent concentration of effort in devising effective means of comminution; it is the keystone of the new process.

The operation is carried out in a set of unlined, stationary cups or thimbles, resting upon standards along the pouring platform. The average heat of blown metal is about 5000 lb., and this formed into two balls, for which two cups are employed. The cups are rectangular, roughly 3 by 4 ft. in bottom dimensions, and 5 ft. deep; with considerable taper to the top. One of the cups carries about 2½ to 3 ft. of slag, brought on as needed from the melting furnace. Into this slag, about 2500 lb. of blown metal is poured in a steady stream over the lip, as shown in the illustration. The weight and rate of pouring are under observation on the crane scale from which the ladle is suspended. The average pouring time is about 3 min., being equivalent to a 1 to 1½-in. nozzle stream.

During pouring, there is marked churning and agitation of the slag, with a boiling action causing it to rise to the top of the cup; but there is no violence in the observable reactions. From time to time moderate amounts of cold granulated slag are shoveled into the cups during pouring, largely for the purpose of quieting a too vigorous boil, which might cause the rising slag to flow over the rim of the vessel.

Immediately upon completion of the pour, the boil subsides and the slag level goes down markedly. The cup is picked up with the crane, and the excess slag is poured into the adjoining empty cup, which is then ready to receive the remaining half of the ladle metal. The decanted cup now contains the solidified, spongy mass of metal, intermingled with liquid slag, conforming in all respects to the product of the best hand puddling practice. The ball is dumped upon a carriage, and transferred to a hydraulic press to be compacted into a bloom. Naturally, the slag take-up of the ball necessitates a make-up supply to the cups from time to time, as indicated by the level of slag in the vessels; the general requirement with present practice approximating 600 lb. per ton of wrought iron produced. It must be realized, however, that the slag incorporated in the wrought iron is very much less than the melting make-up, since the greater part is recovered after squeezing.

The ball, which is at a welding heat, is compacted to a solid, rectangular bloom about 12 by 14 in. by 5 ft., in a manipulator type hydraulic press, and is immediately sent to a 29-in. three-high blooming mill, where it is

roughed down to appropriate sizes. On the same heat, additional rolling in a 24-in. three-high mill produces the shipping product, either billets suitable for a direct rolling to skelp, or standard muck-bar sections used for piling. A steadily increasing proportion of the output is in billet form.

Fundamental Principle of New Process

The simplicity, positiveness, and smoothness of the operation is a matter of general comment. While operations are simple, they are built upon physico-chemical principles.

Refining of the base metal and the preparation and melting of the slag need no explanation. The mechanical admixture of base metal and slag is the crux of the situation. The execution is most effective if one is solid and the other liquid; preferably a solidification of the iron, because of its higher fusion point and preponderant volume in the product. The metal is poured at a temperature in excess of its fusion point of 2750 deg. Fahr., while the slag, liquid at all stages of the operation, has a general working temperature of about 2300 to 2400 deg. Fahr. Under present operating conditions, the slag volume relative to metal poured into the cup is six or eight to one. This is considerably in excess of the quantity needed to absorb the heat of solidification of the metal, without becoming superheated to a temperature above or dangerously near the fusion point of the iron. With these conditions, therefore, the slag is an active quenching medium which solidifies the metal promptly and continuously as it enters the bath.

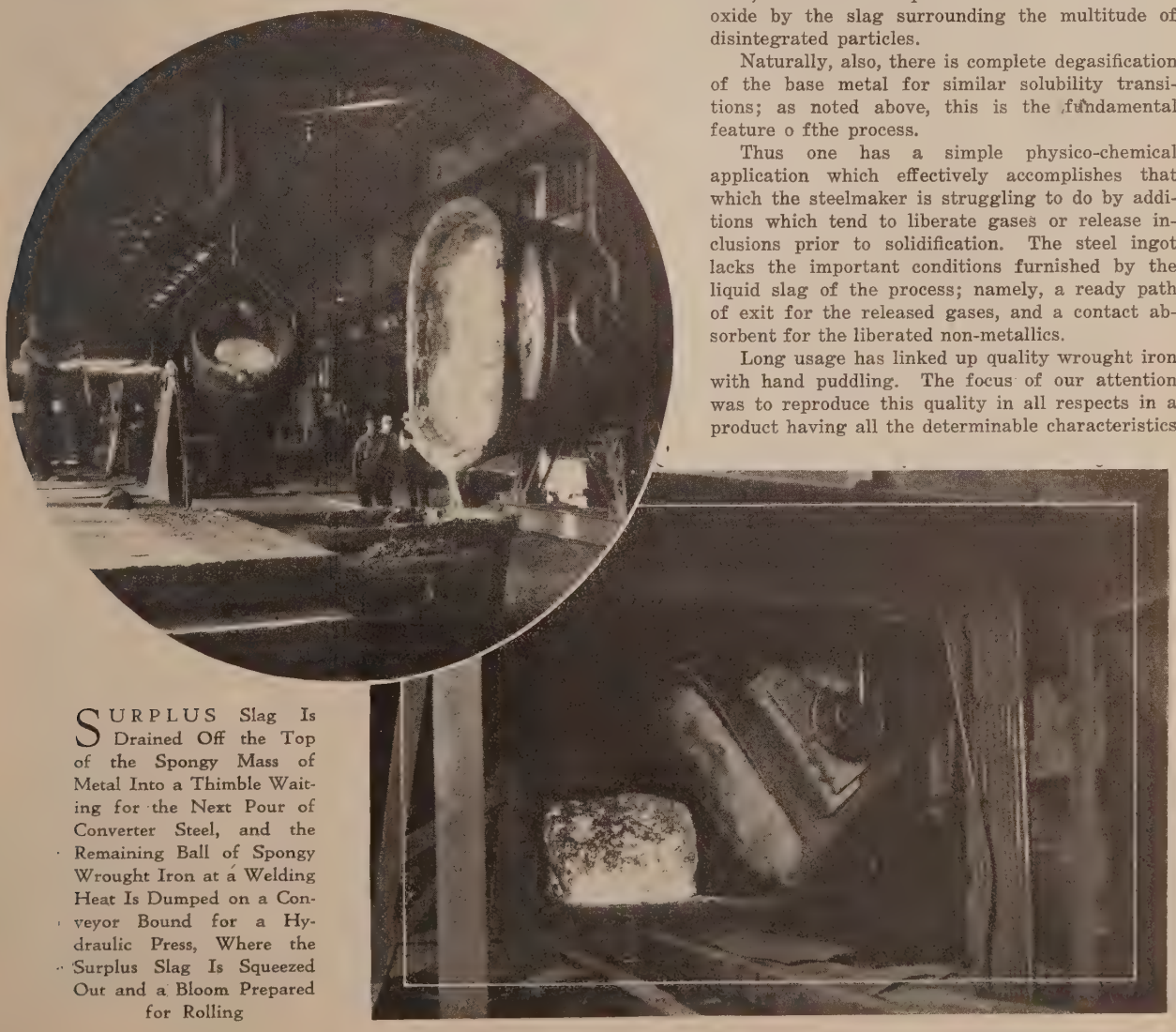
Accompanying this is the all-important principle upon which the process is founded. It is a well-established fact that molten iron or steel carries large volumes of gas in solution; and that the solubility relationship becomes nil upon change from liquid to solid. The rate of gas evolution is proportional to the speed of solidification. The operating conditions of the process as described are such that the metal is shattered by the gas evolution as it solidifies. Being heavier than the slag, it settles to the bottom of the cup as a spongy mass, which coheres as a result of a welding temperature automatically maintained in the heat exchange.

There are some interesting and important accompaniments of this operation. In view of the oxidizing and basic nature of the slag, the metalloid content of the blown metal is appreciably reduced during pouring, particularly with respect to carbon, manganese, and sulphur. In fact, with increasingly higher carbon metal, the additional gas created by reaction of carbon with the iron oxide of the slag may bring about a violent reaction resulting in a heavy boil and overflow of a slag from the cup. And yet the seemingly paradoxical result is reached of effective deoxidation of the base metal by reason of the change of solubility of iron oxide in iron from a considerable degree to nil on change of state from liquid to solid, and the absorption of the liberated iron oxide by the slag surrounding the multitude of disintegrated particles.

Naturally, also, there is complete degasification of the base metal for similar solubility transitions; as noted above, this is the fundamental feature o fthe process.

Thus one has a simple physico-chemical application which effectively accomplishes that which the steelmaker is struggling to do by additions which tend to liberate gases or release inclusions prior to solidification. The steel ingot lacks the important conditions furnished by the liquid slag of the process; namely, a ready path of exit for the released gases, and a contact absorbent for the liberated non-metallics.

Long usage has linked up quality wrought iron with hand puddling. The focus of our attention was to reproduce this quality in all respects in a product having all the determinable characteristics



SURPLUS Slag Is Drained Off the Top of the Spongy Mass of Metal Into a Thimble Waiting for the Next Pour of Converter Steel, and the Remaining Ball of Spongy Wrought Iron at a Welding Heat Is Dumped on a Conveyor Bound for a Hydraulic Press, Where the Surplus Slag Is Squeezed Out and a Bloom Prepared for Rolling

of wrought iron. The results have measured up to the objective. The material conforms to all standards set for wrought iron—chemical, metallographic, and physical; a conclusion subscribed to by many investigators, including railroad and government representatives, after careful examination and test. This is confirmatory of our own studies in laboratory, mill and field.

In many respects, the new process product has superiority of quality. Greater uniformity results from the controllability of operations and the elimination of individualism. There is benefit in the added work put upon the larger mass in squeezing and rolling. Uniformly low content of carbon in the blown metal has resulted in virtual elimination of blisters, the bane of wrought iron manufacture. Low metalloid content, and particularly the controllability and adjustability of metal and slag character independently, has benefited the welding and other physical properties of the product. In addition, this operating advantage points the way to the manufacture of wrought iron of special characteristics and adaptability, including the possibility of entry into the alloy field.

It is almost needless to point out the advantages accruing from the general parallelism to steelworks' practice in equipment, personnel, and operating procedure. Tonnages of individual blooms and in the aggregate are a matter largely of engineering expediency. The all important item of lowered costs of manufacture is an accompaniment. In comparison with steel manufacture, the new process has certain special features which add to the cost, but they may be largely offset by such items as ferro-alloys, molds, soaking pit charges, and cropping, which enter into the cost of steel production.

While the concentration of effort in the development was upon the production of quality wrought iron without thought of process involved, it is interesting to note the exact parallelism of the new process to the reactions and accomplishments of hand puddling. Melting, refining, and slag formation involve identical fundamental principles and reactions and need no elaboration. The "opening" or "graining" of the iron as it "comes to nature" has been generally conceded as the special art of the puddler and a stumbling block in the development of mechanical puddlers. It is a misconception that disintegration is the direct result of physical effort of the man or machine; disintegration is the result of degasification on solidification of the iron as its fusion point passes the operating temperature of the furnace when the metal nears the end point in carbon elimination. Effort is necessary primarily in an attempt to bring all portions of the refining mass into the favorable zones of reaction, as contrasted with the unfavorable conditions of relatively cold interiors or furnace bottoms. The physico-chemical forces of reaction are identical; except that in the new process they are more effective and more uniformly executed due to the more favorable operating condition of approaching the reaction or solidification from above with a fully and uniformly refined iron, rather than rising into the solidification range with an irregularly refined metal. The new process may be classed as puddling in the logical interpretation of reactions and accomplishments.

The Future

The Warren operation is serving a useful purpose as a proving ground. Construction is well under way on a new plant being erected by the A. M. Byers Co. at Economy, Pa., in the Pittsburgh district. The Bessemer converters, bottom blown, will be of 10 tons capacity, and the balls produced will be about 2 tons in weight. A more rapid operation will be obtained by a cup-car system of handling, with progressive movement of the cars to the several zones. Initial production will be 600 gross tons per day, with only minor extensions to double or treble this output. Immediate mill equipment will be blooming, plate, bar, and skelp mills; with projected extensions to include blast furnace and coke oven plant and finishing mills. This project should put wrought iron into its proper place in the field of ferrous products, through an expanding market made possible by lowered costs, greater tonnages, and diversification of output.

Metal and Machinery Makers Pay Highest Wages

Employment and wages in the manufacturing industries during 1928, as measured by the National Industrial Conference Board, contained remarkably few fluctuations. The periods of low output in one industry were apparently balanced in large measure by higher activities in others. The general business situation was stable, and wage rates (as expressed in average hourly earnings) are fairly well standardized. Changes affect more the number of hours worked weekly and the number of workers employed than they have the rates paid for labor.

Average hourly earnings of all wage-earners in 25 manufacturing industries reporting was 57c. per hour, with a deviation of ½c. up or down during the year. This is about 230 per cent of the average hourly rate for 1914 (24.5c.). The average weekly earnings also varied but slightly, between $27.09 and $27.76. This shows the average week to be 48 hr., three and a half hours shorter than in 1914. Thus the working week has grown shorter, and computations by means of cost-of-living indexes show that the pay will buy about 1/3 more than the somewhat longer week in July 1914.

Subdividing these average figures, it is found that earnings of skilled male workers tend toward a rate of 65c. per hour. Unskilled men earn 50c. as a maximum, and women's rates approach 40c. per hour. Whereas such women as were employed worked nearly as long as the men in 1914, last year the average week for women was 42½ hr., and for men 48½ hr. Skilled workers have a shorter week than unskilled (1 hr. difference).

Segregating the weekly earnings by industries, it is found that the metal working and producing industries are near the top, having four out of the top six, the other two being in the printing trades.

Industry	Average for All Wage-earners — Hours per Week	Hourly Rate	Weekly Earnings
Iron and steel	54.3	$0.646	$35.13
Automobiles	47.9	0.683	32.67
Heavy machinery	47.7	0.657	31.34
Agricultural implements	49.9	0.625	31.16
Machines and machine tools	49.3	0.608	29.99
Electrical manufacturing	45.9	0.615	28.25
Hardware and small parts	47.5	0.542	25.72

British Develop an Improved Electric Resistor Furnace

An electric resistance furnace developed in England is claimed to have certain marked improvements. It was described by Dr. W. Rosenhain and W. E. Prytherch in a paper before the last meeting of the British Institute of Metals. Higher available working temperatures are claimed for the furnace, up to 1400 deg. C., also durability and freedom from oxidation of the carbon resistor. The heating element of this type of furnace consists of carbon, or graphite, pellets, or short rods placed end to end in a refractory sheathing tube which fits easily over them. Heating occurs by contact resistance. The sheathing tube prevents the access of air sufficiently to avoid any appreciable burning of the carbon.

Leaching Manganese Ore With Ammonia

Bradley Process, Successful in 4-Ton Pilot Plant, Produces High Grade Oxide from Silicious Cuyuna Ore

IN view of the oft-repeated statements that American manganese producers are about to market a concentrated ore, suitable for the production of ferromanganese, the description of the so-called Bradley process appearing in *Engineering and Mining Journal*, June 29 and July 6 is interesting. According to the author, Carl Zapffe, manager of iron ore properties, Northern Pacific Railway Co., the process is the result of more than five years' intensive research by Wilson Bradley, an engineer of Deerwood, Minn., assisted by such well-known men and firms as Dr. Charles A. Doremus, E. P. Mathewson, and H. A. Brassert & Co. Much of the preliminary work was done in the laboratories of John C. Wiarda & Co., Brooklyn, N. Y., and the Dorr Co., Westport, Conn., although the whole process has been verified in a pilot plant with 4 tons daily capacity.

The work was done primarily to find a way to treat the low-grade silicious ores of the Cuyuna district, occurring in great tonnages at the surface. A typical analysis (natural) is

Manganese	13.5 per cent	as MnO_2
Iron	24.8 per cent	as Fe_2O_3
Silica (SiO_2)	22.1 per cent	
Alumina (Al_2O_3)	2.2 per cent	
Lime (CaO)	0.9 per cent	
Combined water	8.0 per cent	
Moisture	10.0 per cent	

Going on the assumption that some chemical method would be necessary to separate the metallic oxides, a number of solvents were tried. It was finally found that ammonium sulphate would take MnO and FeO into solution rapidly. It was also found that roasting the ore in a reducing atmosphere at low temperature will reduce 90 per cent of the MnO_2 to MnO, and very little of the Fe_2O_3 to FeO. The manganese sulphate in the filtered solution is then precipitated by ammonia gas, which action simultaneously regenerates the solvent, ammonium sulphate. The precipitated manganese oxide is dried and sintered, ready for smelting.

Mr. Zapffe estimates the operating figures for a plant (already designed) to produce 50 tons of manganese sinter per day. Ore would be crushed wet in ball mills to 65 mesh, the pulp thickened and filtered, and the filter cake dried. This fine ore would then be roasted in a rotary furnace at 750 deg. Fahr. The furnace atmosphere would contain CO_2 and CO in the relationship of 16 and 20 per cent. Extra time or higher temperature increases the proportion of iron oxide reduced to FeO; most of the iron after roasting is in the form of the magnetic oxide Fe_3O_4, insoluble in this process.

The roasted ore is then leached in counterflow digestors containing 16 times its weight of 10 per cent ammonium sulphate solution (temperature is not stated). Free ammonia is produced here, according to the following equation:

$$MnO + (NH_4)_2SO_4 = MnSO_4 + 2NH_3 + H_2O$$

A correct amount of the pulp is withdrawn continuously, filtered and the liquor sent to a precipitating tower, where it meets the ammonia gas piped over from the digestor. This gas precipitates the manganese and regenerates the ammonium sulphate solution, thus:

$$Mn\ SO_4 + 2NH_3 + 2H_2O = (NH_4)_2\ SO_4 + Mn\ (OH)_2$$

The manganese hydrate is deflocculated by an air jet, settled, washed free of sulphur, and filtered. After drying the granular product is mixed with a little fine coke and sintered.

It is possible that the tailings, which contain magnetic iron oxide, can be passed through a magnetic concentrator, and the concentrate sintered into a useful iron ore.

Mr. Zapffe says that 5.2 tons of Cuyuna ore will be required to make one ton of manganese sinter of the following composition:

Manganese	67.3 per cent
Iron	4.8 per cent
SiO_2	2.7 per cent
Phosphorus	0.01 per cent
Alumina	0.35 per cent
Magnesia	0.16 per cent
Carbon	0.25 per cent
Sulphur	0.01 per cent

1.5 tons of iron ore sinter and 1.3 tons of waste will also be produced. About 150,000 cu. ft. of blast furnace gas (or its equivalent) will be required to reduce 5 tons of ore, and 80,000 cu. ft. more for drying, evaporation, and miscellaneous purposes. For each ton of sinter, 20 lb. of fresh ammonium sulphate and 7000 gal. of water will be needed to replace losses; also 20 kw-hr. of electric current for grinding, pumping and lights. A plant making 50 tons of sinter daily can be operated by 10 men per shift, plus a foreman and a chemist. Estimated cost per ton of the product is not published.

A letter from A. J. Boynton, vice-president, H. A. Brassert & Co., states "Our study of the technology involved has extended over a period of a year or more. We believe the process to be technically correct and practically controllable. The apparatus required is standard in the metallurgy of the higher metals, and is obtainable from firms of high commercial and engineering standing. We regard the process as experimental only with respect to adjustment of detail of construction and operation."

High-Elastic Steel Popular with British Shipbuilders

Experience with high-strength structural steel for ships' hulls has been so gratifying, according to F. G. Martin, metallurgist for the Liverpool shipping concern, Alfred Holt & Co., that it is now wholly a matter of balancing initial cost of the vessel with its increased earning capacity. A reduction of 10 per cent of the dead weight has been effected in more than one instance, said Mr. Martin, speaking before the West of Scotland Iron and Steel Institute. Several vessels are under order in which about half of the total weight of the steel will be a high-elastic limit mild steel. Another steel, known as the "33-38-ton material," had been used in small amount, but experience with it has necessarily been short and limited.

Using Ram-Up-Cores for Castings

Method of Making Automotive Pistons and Large Bracketed Pieces—Ram-Up Chaplet Cores

BY PAUL R. RAMP*

MOLDING automotive pistons is often done in the same manner as for pulleys. In such cases the pattern consists of a plain ring or pot, the proper diameter inside and outside. Before the core is rammed up the ram-up-core is dropped into the ring in the same manner as the core was dropped into the pattern in Fig. 6. [First section of article.] This ram-up-core forms the connecting rod bosses, brackets and ribs that are part of a piston.

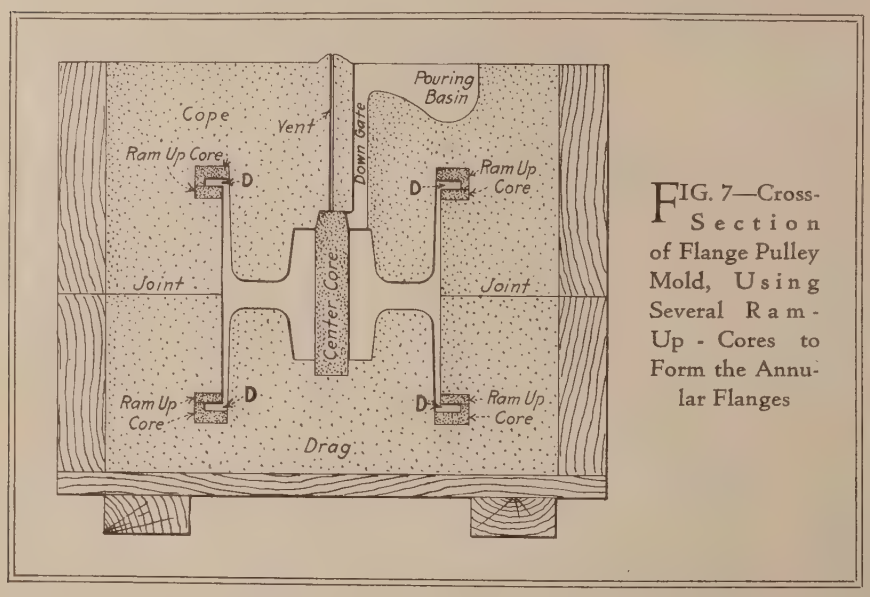


FIG. 7—Cross-Section of Flange Pulley Mold, Using Several Ram-Up-Cores to Form the Annular Flanges

Another illustration of the use of ram-up-cores in the molding of a flange pulley is in Fig. 7, a cross-section of a flange pulley mold. To make a casting of this kind without ram-up-cores, it would be necessary to make the mold in a three-part flask. Or the part of the mold between the flanges might be formed with two ring cores; one to be hung in the cope part of the mold and the other to be placed in the drag part. Another method would be to have the flange section of the pattern loose, and to draw the loose section out and cover the flange part of the mold with a covering core.

An objection to the three-part flask for making this mold is the additional labor required to ram up one more section of flask. The objection to using ring cores between the two flanges is the danger there is of misplaced cores. There is additional cost in making these cores, as they must be large enough to have sufficient bearing on a print that is wide enough to support them and hold them in their proper place. In addition to this, there is always danger of these ring cores being misplaced, and reducing the thickness of metal on the face of the pulley or similar casting.

The use of loose-flange patterns and covering cores to form these flanges is an unsatisfactory plan, as there is always danger of the covering core getting broken while the sand is being rammed over it. Although this may not occur, it is decidedly hard to be sure there is no loose sand in the flanges. Considerable trouble is experienced also in ramming the loose-flange patterns out of line with the main pattern.

Fig. 7 is a plan of using ram-up-cores to form the flanges, which are indicated by *DDDD*. These ram-up-cores consist of two light ring cores, which usually are pasted together before they are used. One part of these two cores fits snugly around the outside diameter of the pulley rim pattern, and the upper section of the ring core rests on the upper edge of the pulley rim pattern. This plan holds the core in its proper place, and also prevents loose sand from working into the part of the ram-up-core that forms the flanges, while the mold is being rammed.

In making molds of this kind, often the part of the mold which forms the highest point in the cope side is rammed too hard or is not properly vented. As a result a blowhole occurs on the edge of the rim pulley wheel. When ram-up-cores are used they form the outer edge of the rim as well as the flange, and there is no danger of hard ramming causing a blowhole at this point. So the ram-up-cores in this case not only simplify the molding method but protect the high points against hard ramming.

In Fig. 8 is a cross-section of a loam mold for a 10-ft. generator support casting, in which are several brackets. Instead of using brick and loam to form these brackets, ram-up-cores were placed in their proper position and the wall was built around them. There is nothing unusual about this, but it is another illustration of the varied use to which ram-up-cores may be put. If these brackets had been formed of brick and loam, it would have required more labor to make the mold and greater care to finish it, and would have increased the danger of the casting cracking when cooling.

Ram-up-cores are used extensively in loam molding in places where nozzles and projection flanges and other

*Superintendent of foundry and pattern shop, Newport News Shipbuilding & Dry Dock Co., Newport News, Va. The first section on this article appeared in our issue of June 6, page 1549.

irregularities occur which are difficult to make with loam and brick. These ram-up-cores are generally underdried, as they receive a second drying when the mold is placed in the oven.

In many cases the arms and hub of large pulleys are formed by the use of ram-up-cores and the arms and hubs of large flywheels are made in this manner. Brackets, bearings and bosses on automobile crankcases are generally formed with ram-up-cores. They have a prominent place in all production work. The advantage of a ram-up-core over a core placed in a core print is the space is necessary also on account of the button which is to be formed around the stem of the chaplet. The operation is to place the stem chaplet in the core box, place the loose blocks in their place so that they hold the stem chaplet in position, ram the core box full of sand, rap and draw the core box off the core, draw out the loose blocks *BB* and the core is made.

At upper right of Fig. 9 is a cross-section of such a small ram-up chaplet core. The chaplet is shown in position extending through the center of the button. The large view in Fig. 9 is a cross-section of a pipe pattern

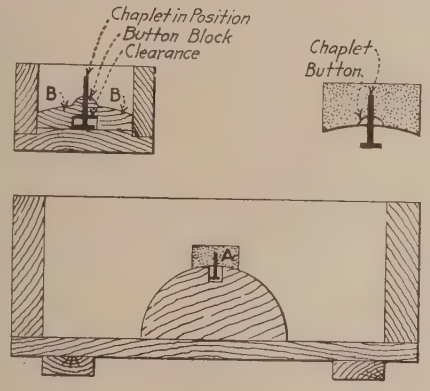
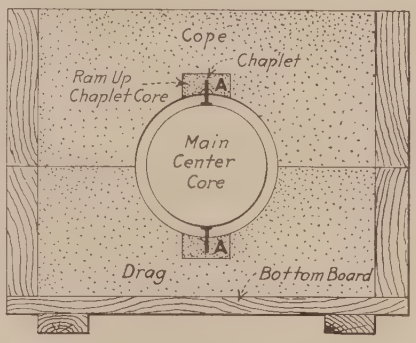


FIG. 9 — Drag Flask (Above) Ready to Ram, with Ram-Up Chaplet Core in Position on Pattern. Detail at left is cross-section of ram-up chaplet core box; at right, cross section of ram-up chaplet core

FIG. 10—Cross-Section of Pipe Mold in Which Ram-Up Chaplet Cores Are Used (at Right)



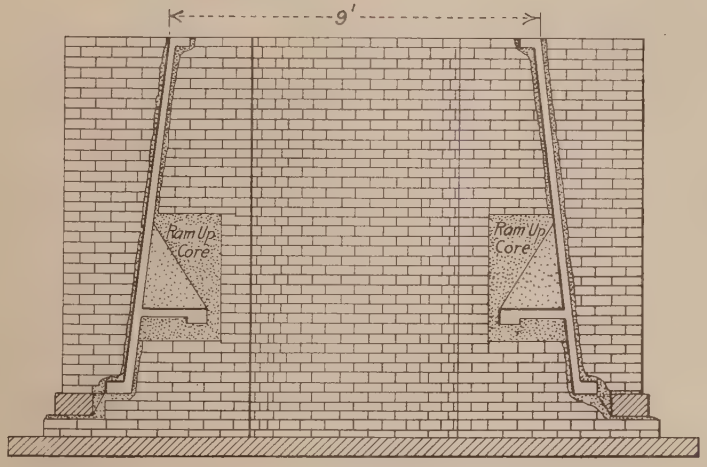


FIG. 8—Cross-Section of Mold Made in Loam to Produce a Generator Support Casting 10 Ft. in Diameter at Bottom and 9 Ft. at Top (at Left)

absence of fins, of variation of metal, and of misplaced cores. They also avoid deformed cores, because seldom can a deformed core be used if it is a ram-up-core, as it will not fit properly into or against the pattern, whereas a core that is placed in a print can be used and the deformity is not discovered until after the casting is cleaned.

Ram-up Chaplet Cores

Another type of ram-up-core is the ram-up chaplet core, which has considerable use. In Fig. 9 (upper left) is a cross-section of a core box used to make a ram-up chaplet core for a small pipe. The small stem chaplet, which in many cases can be an ordinary wire nail with a large head, is shown in position. This chaplet is held in place by the loose blocks in the bottom of the core box, indicated by *BB*.

The clearance space in these two blocks is necessary, to make it possible to draw the loose pieces out of the core without disturbing the stem chaplet. This clearance lying on the molding board, with the drag in place and the ram-up chaplet core *A* in proper position.

It will be noted that a slot is provided in the pipe pattern to allow the stem chaplet to extend into the pattern to the proper depth. This depth represents the thickness of metal we will have between the core and the outside of the mold. The molding operation is to place the pipe pattern in the flask, ram-up chaplet core on the pattern with the chaplet extending into the slot cut out for it, then fill the flask with sand and ram it.

Fig. 10 is a cross-section of a pipe mold complete ready for pouring, with the main core being held in position by the use of ram-up chaplet cores. This is a case where the chaplets are placed in the mold before it is rammed up. This is an effective method in cases where it is too expensive to place the chaplets after the mold is made, or it is not desirable to use double-headed chaplets. Of course, such cases exist only where the work is very small and light.

Steels at Elevated Temperatures

Their Response to Stress—Development of the "Time-Yield" Factor as Aid to Engineer in Designing Structures

BY DR. W. H. HATFIELD*

IT is proved that steels may be plastically deformed by stresses, imposed over long periods, which would be without measurable effect when imposed over short periods. Clearly, if the designer is to devise plant and machinery which can be safely operated at higher temperatures under diverse influences, the first problem is to determine the value of stress which can be borne indefinitely without plastic deformation.

Steels must have an elastic range, i.e., a range of stress within which they behave as practically elastic bodies. This follows from the fact that they are crystalline aggregates, and it holds good for the crystalline phase irrespective of temperature, or, how would the atoms orientate themselves to the space lattice? It is clear that a stress of a certain magnitude must be applied to destroy the lattice, otherwise it will persist. At low temperatures the order of stress required is relatively high; at high temperatures it is only nominal. When cohesion is overcome plastic deformation results.

Limited by Need for Minute Measurement

Our difficulty today lies in the severe limitation as regards sensitivity of measurement. In our own researches we work to a direct observation of 1/40,000 in. Others claim to be working to a direct observation of 1/1,000,000 in. But it will be quite clear that deformation may, under certain conditions, be proceeding at a rate which is so slow as not to be observed, even with the most delicate measurement, except over the longest periods of time.

This fact gives an opening for the expression of the abstract idea that any metal will be deformed under any stress, given a long enough period of time. It is one of those propositions difficult to establish, and equally difficult to disprove. Nevertheless, on general grounds, the author holds the contrary view, that steels have elastic ranges over the range of temperature in which the engineering world is interested, and, further, that it is our business to know what those ranges are. The point at issue is whether we can, or cannot, give the engineer a factor of safety as regards the time effect in the expectation of life of the part concerned. The answer is in the affirmative.

Helping the Engineer to Design

I have heard the view expressed by turbine engineers that they would be in position to design adequately, with resultant suitable factors of safety, if they had data concerning the stresses below which the rate of creep would not exceed 0.000001 in. per in. per hr.

An extremely valuable summing up of the present position as regards the properties of steels for use in connection with superheated steam has been given by R. G. C. Batson, typical data concerning the limiting creep stress being disclosed in the tables.

These data relate to mild-carbon steels, and Mr. Batson states that, even by increasing the strength of the

*Brown-Firth Research Laboratories, Sheffield, England. This is abstract of a paper read before the West of Scotland Iron and Steel Institute.

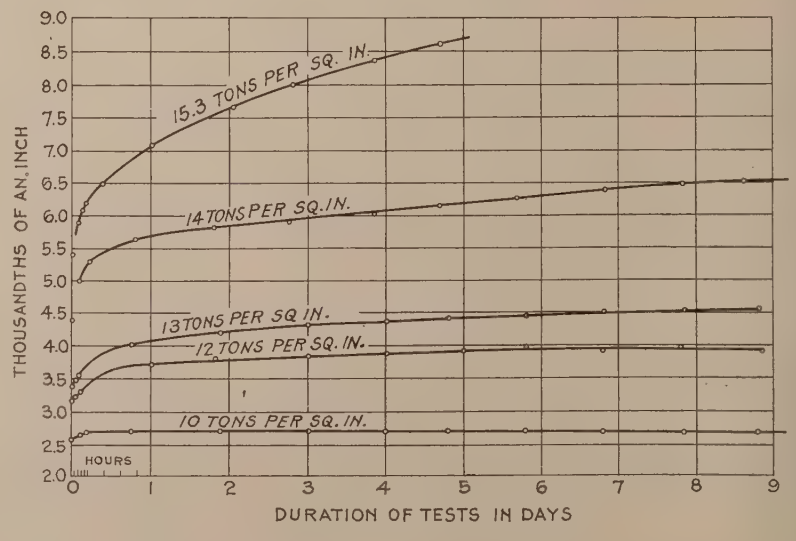


FIG. 1—Tests of 0.42 per cent Carbon Steel at 400 Deg. C. (752 Deg. Fahr.). This steel, of which the limit of proportionality was 7.8 tons per sq. in., had been normalized at 860 deg. C. (1580 deg. Fahr.)

steel by increasing the carbon content, a limiting creep stress exceeding 5 tons per sq. in. cannot be obtained, even with a carbon content of 0.51 per cent, at 500 deg C. The limiting creep stresses stated are the result of work at the National Physical Laboratory.

Limiting creep stress as determined at that laboratory is the stress above which there is a steady, continuous creep of a measurable rate within the accuracy of their measurements. Testpieces are loaded for several months at different values of stress, and the rate of creep to which the pieces settle down is determined. From these rates of creep a curve is drawn from which a close estimate is made of the limiting creep stresses.

Accumulation of Data Is Disappointingly Slow

Four to five months are required to obtain a satisfactory value of limiting creep stress at one temperature. Clearly, therefore, researches having as their object the improvement of steel as regards an increase in the limiting creep stress are severely handicapped, owing to the great time required for discriminating examination of steels of varying composition and diverse heat treatments.

This unsatisfactory position has been dealt with in the Brown-Firth laboratories by arbitrarily deciding the conditions of the standarized test likely to be helpful in this direction. The method adopted consists in discovering, by static loading, the stress within which, at the temperature, stability of dimensions is attained within a period of 24 hr. for a further period of 48 hr., with an extension not exceeding the elastic deformation of 0.5 per cent on the gage length, with limitation as regards measurement for permanence of dimensions of 0.000001 in. per in. per hr.

What the Time-Yield Is

This value I have named the Time-Yield. A single test for a given temperature in search of this value is obtained by this method in three days, and the matter is therefore brought, in point of time, within limits which permit a large number of tests being made in a reasonable period.

Fig. 1 indicates the effect of various loads on the manner of deformation at a given temperature. It gives the resultant curves due to loading 0.42 per cent carbon steel at 400 deg. C. (752 deg. Fahr.) under 15.3, 14, 13, 12 and 10 tons per sq. in. respectively. This graph clearly and definitely demonstrates that the Time-Yield, as herein suggested and determined, is a value which can undoubtedly form a safe basis for design; particularly having in mind that the period over which observation is made, taken in conjunction with the degree of accuracy of measurement, discloses movements of a less order than 0.000001 in. per in. per hr.

Steel for Boiler and Superheater Tubes

Temp., Deg. C.	Temp., Deg. Fahr.	0.10 Per Cent Carbon Steel: Limit of Proportionality (Tons per Sq. In.)	0.10 Per Cent Carbon Steel: Ultimate Tensile Stress (Tons per Sq. In.)	0.10 Per Cent Carbon Steel: Limiting Creep Stress (Tons per Sq. In.)	0.17 Per Cent Carbon Steel: Limit of Proportionality (Tons per Sq. In.)	0.17 Per Cent Carbon Steel: Ultimate Tensile Stress (Tons per Sq. In.)	0.17 Per Cent Carbon Steel: Limiting Creep Stress (Tons per Sq. In.)
400	752	...	...	...	6.5	29.0	13.4
450	842	...	...	...	5.5	24.5	8.5
480	896	4.0	17.0	5.5	5.0	21.5	6.0
500	932	3.3	14.9	3.5	4.8	19.4	4.8
525	977	2.9	13.7	2.0	4.4	17.0	3.5
550	1022	2.5	12.1	1.3	4.0	15.0	2.4
570	1058	2.2	10.5	1.0	3.5	13.0	2.0
600	1112	1.9	8.4	0.6	2.8	11.0	1.2

0.23 Per Cent Carbon Steel for Superheater and Steam Drums

Temp., Deg. C.	Temp., Deg. Fahr.	Limit of Proportionality (Tons per Sq. In.)	Ultimate Tensile Stress (Tons per Sq. In.)	Limiting Creep Stress (Tons per Sq. In.)
400	752	6.3	26.0	13.5
470	878	5.3	18.5	7.0
530	986	4.0 (approx.)	16.4	4.0

It will be seen that, as the stress falls, the speed of deformation lessens, and that of 10 tons per sq. in., after a very small initial deformation, there is no further extension of the testpiece over a period of 9 days. This statement is, of course, governed by the sensitivity of measurement mentioned. But it will be clear to anyone accustomed to such experimental work that, if the stress is dropped to two-thirds of that required to fulfill the definition of the Time-Yield, i.e., no movement exceeding say, 0.000001 in. per in. per hr., we have indeed reached a stress which obviously will not produce measurable deformation within the reasonable life of machines or parts in which we are interested.

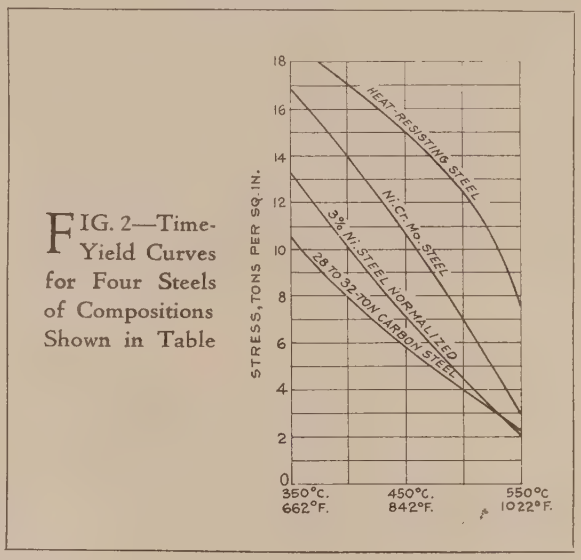


FIG. 2—Time-Yield Curves for Four Steels of Compositions Shown in Table

Data Applying to Specific Cases Vary

It will, of course, be appreciated that figures given apply to a specific analysis of material in a particular condition, and that the values will vary with modifications in analysis and condition. Also it is obvious that stability of dimensions will not be obtained until stability of structure for a given temperature is attained, since modifications in structure may lead to small volume changes which may be confused with changes in dimensions such as we are considering. Again, although it may be held to be a fundamental condition, yet the temperature stated should be attained and maintained; an experimental condition difficult to achieve except when the utmost precautions are taken.

In Fig. 2 will be found the Time-Yield curves for mild steel, nickel steel, nickel-chromium-molybdenum steel, and for a special heat-resisting nickel-chromium-tungsten steel. The details for these steels are given in the table on page 350.

Information at Hand for the Engineer

Fig. 2 contains information of immediate service to the designing engineer. The first curve to note is that of the mild steel, the material at present in use for the production of high-pressure boiler drums. With the increase in temperatures and pressures it has become of the utmost importance to know with certainty the maximum stress which can be imposed *without change of dimensions.*

So important are these drums that welded construction has rightly been displaced in the best practice by single hollow forgings. In spite of protestations to the contrary, welded joints are always more or less unreliable, since the least lapse in technique will result in oxide of iron being

left in the weld and unsoundness not infrequently results from unskillful filling in. Given, however, a single-forging drum and given a knowledge of the Time-Yield of the material for a given temperature, the engineer has his feet on solid ground.

May Stress to Two-Thirds the Limits Shown

As regards this mild steel the Time-Yield value is 7.7 tons per sq. in. at 400 deg. C., 5.7 tons at 450 deg. C., and about 4 tons at 500 deg. C. The deduction is that this steel may be stressed in service with safety to two-thirds the value of the loads stated. It has been the practice of the speaker to apply this over a long period of time as regards the products of the companies with which he is associated, and the whole thing pans out satisfactorily.

Over the range of temperature under discussion the 3 per cent nickel steel gives definitely superior results to the mild steel. Much more improved values are, however, obtained from the nickel-chromium-molybdenum steel, and this material is proving of great utility in several applications at such temperatures. The upper curve is typical of the values to be obtained from the nickel-chromium-tungsten heat-resisting steels.

Composition of Steels in Fig. 2

	C.	Mn.	Si.	Ni.	Cr.	Mo.	W.	Treatment
Mild steel	0.25	0.58	0.11	0.13	....	....	....	Normalized at 900 deg. C.
Nickel steel	0.24	0.55	0.20	3.3	....	....	....	Normalized at 850 deg. C.
Ni. Cr. Mo. steel	0.30	0.57	0.24	2.38	0.61	0.59	....	Oil hardened at 850 deg.; tempered at 620 to 630 deg. C.
Heat-resisting steel	0.50	0.60	0.50	9.4	12.68	....	3.75	Air cooled from 1000 deg. C.

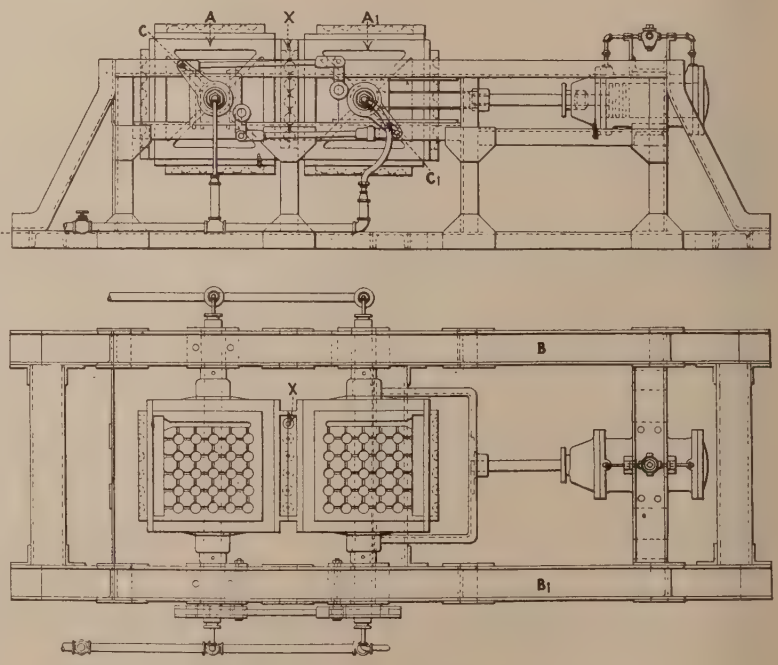
Creep tests and time-yield determinations can be made only over considerable periods and, therefore, the results of ordinary tensile tests at gradually ascending temperatures will be of interest. It must, however, be borne in mind that such figures have a relation, as yet, only incompletely determined as regards the response of the steel to stresses imposed over long periods of time.

Chill Mold for Making Steel Balls

A CASTING machine for chilled steel balls, to be used at mines or fine-grinding plants in isolated places where freight on a manufactured article is excessive, is described in detail by John B. Huttl of Honduras, Central America, in the *Engineering and Mining Journal* for May 18.

As shown by the drawing, it comprises two water-cooled cubical boxes, to four faces of which are bolted square die plates. When a pair of these dies are forced together by the air piston, 25 balls can be cast at one pouring through X. After the metal is chilled the two molds are pulled apart, each mold box turned 90 deg., the group of balls falls to the floor, a new pair of molds is closed, and operations continue.

Mr. Huttl recommends that the molds be milled from gray cast iron; a 21-in. square slab will make a half mold for 25 2-in. balls. Before the first cast is made, the molds should be preheated with a gasoline torch. Rock-drill parts, broken crusher jaws, in fact any steel scrap, is said to make satisfactory raw material, and produce a ball which will stand two or three blows from a steam hammer before breaking.



Permanent Mold for Chilled Steel Balls for Grinding Mills

No mention is made of the furnaces used for melting this steel scrap. A production of 1400 balls per hour has been made with three men—one caster, one cylinder operator, and a third for greasing the molds with spent crank case oil.

A study of the use of the gravity concentration process in the beneficiation of Alabama oolitic iron ores has been made by the United States Bureau of Mines in cooperation with the University of Alabama and the University of Missouri. The self-fluxing iron ores of Alabama are the foundation of the iron and steel industry of that State, says the bureau in a recently issued report. In addition to these deposits of self-fluxing ores, there are seams containing practically the same percentages of iron but too much silica. These ores at present are valueless, but if they could be concentrated by reducing the silica content, the ore reserves of the Birmingham district would be greatly augmented. The low cost of gravity concentration gives this process first rank in the beneficiation of iron ores. For this reason many experimenters have tried to concentrate the Alabama iron ores on tables. In the face of the early failure a new trial has been made and the results have justified the effort.

Michigan as a Steel-Producing State

Importance of Detroit as a Consuming Center Accounts for Construction of Nearby Steel Plants

BY C. E. WRIGHT

DETROIT, Aug. 6.—Steel companies in the Central District, particularly those making sheets and strips, are watching with keen interest the development of Michigan as a steel-producing State.

Ranking fourth in steel consumption among all the States, Michigan is now in seventeenth place in steel production. This will be changed somewhat next year when two new steel plants get into operation.

The new Great Lakes Steel Corporation, which is building a plant at Ecorse, a suburb of Detroit, will start making steel about one year hence. The new sheet plant of the Newton Steel Co. at Monroe, Mich., 30 miles below Detroit, may get started rolling steel sooner.

The Great Lakes plant will have open-hearth capacity and rolling mills sufficient for the annual production of about 400,000 tons of semi-finished and finished steel. Its finished products will be hot-rolled and cold-rolled strip steel, and it will supply the Michigan Steel Corporation, with which it is closely affiliated, with sheet bars. These the Michigan Steel Corporation now obtains from outside sources.

The Newton Steel Co., in its new plant at Monroe, will produce about 125,000 tons of sheets a year, which is approximately the present capacity of its mills at Newton Falls, Ohio.

As the Michigan Steel Corporation is now producing a like amount of sheets at its plant in Detroit, the automobile industry of lower Michigan will soon have a sheet production of a quarter of a million tons right at its front door.

Add to this an annual strip steel output of about 250,000 tons, which the Great Lakes Steel Corporation will be able to turn out, and Michigan will assume a fairly important position as a steel-producing State, not to mention the tonnage produced by the Ford Motor Co. for its own use.

The Detroit Steel Corporation is a contender for a portion of the cold-rolled strip business of the Detroit area, and another new cold-rolled strip producer just organized is the A. J. Bopp Steel Corporation.

These steel-making developments in Michigan raise the question as to whether the trend of new steel capacity will be toward producing steel nearer to its largest consuming centers. The early trend in the development of steel manufacture was to get close to sources of supply. Thus Pittsburgh became a steel center because of cheap coal, while plentiful supplies of ore and coal in Alabama brought about the upbuilding of steel manufacture in that section.

But today freight plays so large a part in steel distribution that low costs on raw materials do not always offset the expense of comparatively long hauls of finished steel.

The present freight rate on finished steel from Pittsburgh to Detroit, for example, is 29c. per 100 lb. This may be reduced to 26.5c. under the new mileage scale ordered by the Interstate Commerce Commission, but even so, it is about $4 a ton above the switching charge which Detroit plants will have to pay in getting steel to automobile manufacturers and other large consumers in Detroit.

Virtually every steel company in the country has a sales office in Detroit. For many companies the district supplies a greater amount of business than any consuming section in the country. What the effect on the competitive situation will be when the new capacity comes into play remains to be seen, but some companies whose plants are in other States are not viewing the outlook with equanimity. The tonnage to be supplied by the new Michigan mills must come out of other companies' tonnage unless there is a sufficient increase in steel consumption in the Detroit district to make up the difference.

A sidelight on the present race for business in Detroit is the considerable increase this year in the tonnage of steel that is being moved here by boat. The savings in freight, as compared with rail hauls, are generally obtained by the buyer, in whole or in part. Small consumers pay about the same for their steel as such buyers do in other districts, but large users are able to draw on Buffalo, Cleveland and Chicago mills for water shipments at lower delivered prices than are possible in many other sections of the country.

Locomotives Under Order Still Large in Number

WASHINGTON, Aug. 6.—Railroad locomotives to the number of 69 were shipped in July as against 78 in June, according to reports received by the Department of Commerce from the principal manufacturing plants. Of the July shipments 42 locomotives were for domestic use, 39 being steam and three being electric units. The 27 locomotives exported were of the steam type.

For the first seven months of the current year 388 locomotives were shipped as against 360 for the corresponding period of last year. Unfilled orders at the end of July of the present year totaled 539 locomotives as against 552 at the end of June. Both these figures were higher than unfilled orders for all of 1928 and the first five months of 1929. Of the locomotives on order at the end of July 490 steam and 18 electric units were for domestic account and 31 were steam locomotives for exportation.

Melting Practice and Other Papers at Metal Congress

Alexander L. Feild, chairman, program committee of the Iron and Steel Division of the American Institute of Mining and Metallurgical Engineers has released the papers to be presented as the division's portion of the program for the National Metal Congress to be held in Cleveland the week of Sept. 9. Sessions will be held on Tuesday, Wednesday and Thursday, the Wednesday morning session being devoted entirely to the subject of ores, while the other sessions will be devoted to melting practice.

The Iron and Steel Division will join with the Institute of Metals Division of the A. I. M. & M. E., which is also presenting a program during National Metal Week, in a dinner to be held at Hotel Cleveland on Tuesday evening, Sept. 10.

Other societies presenting programs during the week besides those mentioned, are the Iron and Steel Division of the American Society of Mechanical Engineers; the American Welding Society and the American Society for Steel Treating.

The papers for the Iron and Steel Division meeting of the mining engineers are as follows:

"Change in Microstructure of iron at the A_3 Transformation Points," by B. A. Rogers, Western Electric Co., Chicago.

"New Development in Wrought Iron Manufacture," by James Aston, Carnegie Institute of Technology, Pittsburgh.

"Viscosity of Blast Furnace Slags," by R. S. McCaffery, University of Wisconsin, Madison, Wis.

"Fluorspar and Its Uses," by Earl Brokenshire, Oglebay, Norton & Co., Cleveland.

"Foreign Iron Ores," by Charles Hart, Delaware River Steel Co., Chester, Pa.

"Iron Ore Sinter," by G. M. Schwartz, University of Minnesota, Minneapolis, Minn.

"Bradley Process for the Beneficiation of Manganiferous Ores," by Carl Zapffe, Northern Pacific Railroad, Brainerd, Minn.

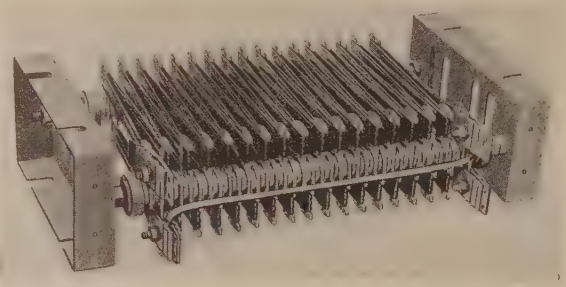
"Diffusion of Iron Oxide from Slag to Metal in the Open-Hearth Process," by C. H. Herty, Jr., United States Bureau of Mines, Pittsburgh.

"Experimental Determination of Equilibrium in the System Carbon-FeO in Molten Iron," by A. B. Kinzel and J. J. Egan, Union Carbide & Carbon Research Laboratories, Long Island City, N. Y.

"Rate of Carbon Drop and Degree of Oxidation of the Metal Bath in Basic Open-Hearth Practice, II," by A. L. Feild, Union Carbide & Carbon Co., New York.

New Resistor Described As Unbreakable

DUR-ristor, a new resistor described as unbreakable, with a continuous resistance element, is announced by Cutler-Hammer, Inc., Milwaukee. Advantages emphasized include vibration-proof and unbreakable, non-corrodible, light of weight and compact.



The Resistance Element Is Continuous and Is Arranged to Permit Expansion and Contraction

The main body of DUR-ristor, the resistance element, consists of two strips of a rust-proof, non-corrodible alloy. They are proportionally ribbed on the sides as well as on the turning edges. A new method of supporting the strips, combined with the ribbing, serves to allow the strips to expand and contract freely during temperature changes. Mica is used for all insulation.

The DUR-ristors, regardless of ampere rating, are of equal size. The thickness of the resistance strip is the only part that varies according to ampere rating.

Improved Wood-Working Machine

INCREASE in power by some 50 per cent, and more convenient arrangement of the dial plate for making angle settings are features of the improved model D "Wonder Worker" wood-working machine built by De Walt Products Corporation, Leola, Pa.

A 5-hp. Motor of New Design Provides More Power with Less Temperature Rise

By means of various attachments, ripping, cross-cutting, dadoing, mitering, beveling and many other operations can be done on the one machine. Fir 4-in. thick is said to be ripped at the rate of 50 lineal ft. per min. Cross cutting of 6-in. material is within the capacity of the machine and the change from cross cutting to ripping may be made instantly without turning off the power.

A two or three phase 5-hp. motor of new design is employed, providing more power at full load, with less temperature rise. The dial plate with degree markings and pitch scale is now directly located in front of the operator and is notched at each 45 deg., which facilitates making adjustments for angle or bevel cutting. A locking device actuated by a convenient hand-lever has been provided for locking the motor quickly and positively in any cutting position, and provision has been made for quick changing of tool attachments. The cutting tool is completely guarded in all positions.

The machine weighs 340 lb. and is portable. It is fitted on a 29 x 59-in. table that can be handled by two men.

Scarfing Tip for Deseaming Billets

TO speed up the scarfing of billets and keep down the cost, the Weldit Acetylene Co., Detroit, offers a scarfing tip for its model S torch. The tip makes a cut such as is indicated in the accompanying reproduction of a photograph, which shows a torch cutting of a seam or surface defect in the steel. The billet so treated is then re-rolled immediately with little or no loss of time or heat.

Another field offered for the scarfing tip is the preparation of plates for electric welding. The plates are placed together in proper position and the scarfing tip passed over the contact edges giving a groove with fresh surfaces ready for the electrically melted bead.

Lincoln "New Kathode" Welding Electrode

A welding electrode, known as the "New Kathode," has been developed by the Lincoln Electric Co., Cleveland, for the arc welding of mild steel and for cast iron repair work. It is manufactured in stock lengths of 14 in. and 24 in. To provide best possible protection, during shipment, the rod is packed in metal containers holding 50 lb. each.

Tapping Set-Up for Radiator Loop Machine

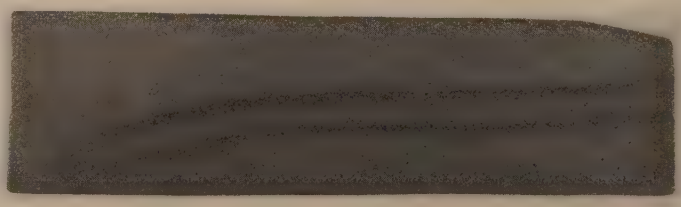
IN THE IRON AGE of June 27, page 1772, a new machine built by the Moline Tool Co., Moline, Ill., was described and illustrated. It is a single-purpose machine for boring, facing and tapping radiator loops. There are four spindles. The machine can be arranged to have all spindles boring and facing, or all facing and tapping, or half boring and half tapping. The illustration previously shown was of the machine as set up for boring and facing.

This same machine, adapted to facing and tapping, bores, taps and faces rough castings in one operation, the cycle being almost identical to that described before.

However, in this instance, the tapping is done by mechanical feed through a screw and nut having the same lead as the tap used for the work. The facing is done hydraulically and the cutters are mounted on the main spindles, while the taps are inserted in small spindles, operating through the center of large spindles, and are adjustable endwise, the same as the facing spindles.

In this latter case, one common drive motor is used, being mounted on the base, driving a common drive shaft through open and closed belts, so as to keep the timing correct.

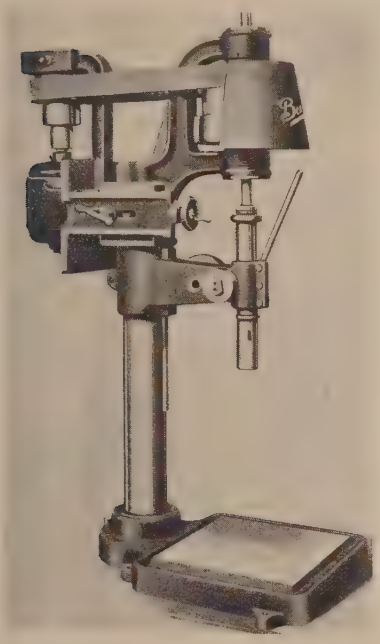
Average production on this operation is 90 loops an hour. The machine can be adjusted to take any loop from 5 in. to 13 in. wide and from 8 in. to 38 in. between centers of holes. The approximate weight of the facing and tapping machine is 18,000 lb.



Scarfing Tip Is Used to Remove Surface Defects of Billets So That Rerolling May be Pursued With Little or No Loss of Heat or Time

New 16-in. Sensitive Drill for Production Work

EQUIPPED with a ½-hp. motor the Buffalo Forge Co.'s, Buffalo, new 16-in. sensitive drilling machine here illustrated has capacity for drilling ⅞-in. holes in cast iron and 9/16-in. holes in steel. With a ⅓-hp. driving motor the capacity is ⅝ in. and 7/16 in. respectively. The drive is through three-step cone pulleys, providing three spindle speeds, 418, 835 and 1725 r.p.m.



Both Bench and Floor-Type Machines Are Made. With a 1725-r.p.m. motor, spindle speeds are 418, 835 and 1725 r.p.m.

In both the bench and floor type machines ball bearings are employed throughout. The head has a travel of 8½ in. and the spindle a travel of 7 in. The pulley and motor support is an iron casting and the column, which is 4 in. in diameter, is made of steel. The outer part of the spindle is guided by a sleeve running in bronze bearings and provided with a ball thrust bearing. Belt adjustment is made by loosening a hand-operated nut on the shifter bracket and turning the handwheel at the left-hand side of the machine. Hand-lever feed is provided on the bench machine and both hand-lever and foot-treadle feeds on the floor type drill. A knurled nut directly back of the feed pinion permits disconnecting the foot treadle at any time; or the foot treadle attachment can be omitted if desired.

The floor type drill has a 12-in. square tilting table and a floor base 21 in. in diameter. The maximum distance from base to spindle is 46 in. and from table to spindle 38 in. The overall height of the machine is 76 in. The bench machine has a 15¾ x 22½-in. base, with a working surface 12¾ in. square. The greatest distance from table to spindle is 28 in. and the overall height of the machine is 48 in. The net weight of the bench drill is 350 lb. and of the floor type machine, 400 lb.

Annealing Furnace with Accelerated Cooling

THE General Electric Co. announces a new electric furnace for annealing alloy steel to obtain variable heating and cooling cycles.

The furnace is lined with lightweight refractories of low thermal capacity. By the use of this type of refractory it is possible for the furnace walls to heat or cool very quickly, serving to give flexibility to the heating and cooling cycles and to increase the furnace economy.

To obtain variation of the cooling period, cooling coils and a ventilating system that can be sealed tight by insulated doors during the heating period are used. The coils may be installed in the sides, bottom or both of the furnace. None of the cooling air enters the furnace chamber. The rate of cooling is varied by varying the amount of air blown through the ventilating system. The ventilation holes are fitted with sand-sealed, insulated covers to prevent heat leakage during the heating cycle. After the work is cooled by the cooling coils below the critical temperature, the covers may be opened and the cooling further accelerated by a flow of air into the bottom vents, through the furnace and out through the top vents. The covers may be opened to any extent by the use of a single control.

Uniform Heating, at Variable Speeds, and Control of Cooling Rate Are Features of This Electric Annealing Furnace

Small Scrap Bundling Press Has Motor Drive

PRODUCTION is markedly increased and denser bundles are made by an improved model small hydraulic scrap bundling machine which has been placed on the market by Samuel H. Garrett, 224 North Thirteenth Street, Philadelphia. The machine is designated as the Tempus No. 5 and is similar to the hand-operated press of the same name described in THE IRON AGE of Feb. 21, except that hand operation is now by means of sprocket and chain instead of by lever, and the hydraulic pump is motor driven instead of hand operated. An automatic starter stops the machine when the power limit is reached, and push button control is provided. The motor has Timken roller bearings packed with grease; other bearings are oiled automatically through hollow steel shafts that are filled from the outside and are protected by dust-proof spring valves.

Motor-Driven Pump Speeds Operation and Makes Possible Denser Bundles

Portable mounting is provided, as before, so that the machine may be moved conveniently to the scrap pile. Bundles 12 in. wide, 20 in. long and from 12 to 18 in. high, may be made, the height, as well as the weight of the bundle, being dependent upon the material. The height to top of the hopper is 40 in., the width 24 in. and the depth, front to back, 16 in. The weight of the new machine is 600 lb.

Metals Section of Safety Council Plans Meeting

The Metals Section of the National Safety Council will hold a meeting in connection with the eighteenth annual congress of the council at the Stevens Hotel, Chicago, Sept. 30 to Oct. 4. The program includes addresses by Dr. Harry Myers, superintendent of personnel, Frigidaire Corporation, Dayton, Ohio; George Seyler, works manager Lunkenheimer Co., Cincinnati; Phillip Stremmel, general superintendent Granite City Steel Co., Granite City, Ill.; H. S. Smith, Union Carbide Co., New York; and J. E. Culliney, safety engineer Bethlehem Steel Corporation, Bethlehem, Pa. F. G. Bennett, safety director Buckeye Steel Castings Co., Columbus, Ohio, and J. M. Woltz, safety director Youngstown Sheet & Tube Co., Youngstown, Ohio, will make reports of the foundry research committee and the safe practices committee, respectively.

At the final session a safety playlet will be presented and the iron and steel safety contest trophy will be awarded. John A. Oartel, chief of saftey bureau Carnegie Steel Co., will show a film illustrating safety kinks in the metals industry.

Pittsburgh Steel Foundry Acquires Sharon Company

The Pittsburgh Steel Foundry Corporation, Pittsburgh, has bought the Sharon Foundry Co., Sharon, Pa., and the Pittsburgh company is expected to issue 30,000 additional shares of common stock to finance the purchase.

The Pittsburgh Steel Foundry Corporation operates a plant at Glassport, Pa., and its products include steel castings, alloy steel castings, finished castings for rolling mill machinery, charging boxes and ingot cars, railroad bolsters and side frames, annealing boxes, and miscellaneous car and machinery castings. The Sharon company, with works at Wheatland, Pa., manufactures castings for steel works and blast furnaces and general machinery castings.

Exports of $1,000,000 a Day in Industrial Machinery

WASHINGTON, Aug. 6.—The upward trend of exports of industrial machinery, under way for the past six years, continues, and for the first half of 1929 their total value was nearly $130,000,000, as compared with $102,000,000 for the corresponding period of 1928, according to L. J. Cochrane, Industrial Machinery Division, Department of Commerce. The movement for the first six months of the present year approximately equaled the volume for the entire year of 1924 and considerably exceeded the volume for either 1922 or 1923.

Mr. Cochrane pointed out that industrial machinery exports are approaching a level of almost $1,000,000 each working day, "obviously a trade of very substantial importance when measured simply in terms of its monetary value, but of even greater importance if we remember the economic significance of machinery and the forces that the employment of this equipment will release in the countries of destination, whether this be highly specialized machinery for advanced industries of Europe or construction and other machinery that may be employed in some of the more backward territories."

New Pricing Basis for Steel Windows

Manufacturers of solid section steel windows have formulated a code of approved practices to be submitted to the Federal Trade Commission through their attorney, Abram F. Myers, formerly of the commission. The code is designed to eliminate unfair methods of competition, and uneconomic trade practices and to cooperate with the United States Department of Commerce in bringing about standardization and elimination of waste.

One of the principles most interesting to contractors is concerned with the elimination of discriminatory prices through publication by each company of its discounts from a standardized list price.

In accordance with this principle, the Detroit Steel Products Co., maker of Fenestra products, has authorized the following discounts as of Aug. 1:

On Engineering Products

Orders listing	*Discount per cent*
$0 to $400	45
$400 to $1,000	50
1,000 to 2,000	50 and 5
2,000 to 3,000	50 and 10
3,000 to 6,000	50 and 15
6,000 to 10,000	50 and 20
10,000 to 20,000	50 and 25
20,000 & Over	50 and 30

On Commodity Products

0 to 300	List
300 to 500	10
500 to 1,000	15
1,000 to 2,000	20
2,000 & Over	25

Imports of Pig Iron Into the United States by Ports of Entry

(In Gross Tons)

	12 Months Ended June	
	1929	1928
Massachusetts	15,297	14,478
Connecticut	8,255	3,100
Buffalo	40	.....
New York	8,594	7,118
Sabine	1,690	.....
Philadelphia	63,439	83,370
Chicago	2,000	2,150
Maryland	12,970	10,842
New Orleans	200	.....
Virginia	1,003	2,041
Galveston	1,441	2,370
San Antonio	395	245
Los Angeles	7,649	8,091
San Francisco	12,435	8,714
Oregon	547	1,212
Washington	1,139	2,313
Michigan	1,068	414
St. Louis	45	135
Hawaii	603	1,001
Total	138,810	147,594

Leetonia Furnace to Resume Under Belgian Process

The blast furnace formerly operated by the McKeefrey Iron Co., at Leetonia, Ohio, has been purchased by Morris B. Abrams, Cleveland, who is forming a company to operate the stack. Mr. Abrams says that associated with him will be a Belgian steel maker and a new process will be employed to allow the use of a much larger percentage of scrap than the maximum ordinarily used in blast furnace operation. It is the intention to use 75 per cent scrap and 25 per cent ore.

The McKeefrey furnace, first built in 1866, has been idle for a number of years. Several years ago plans were made for the erection of a steel plant in connection with the furnace, but were abandoned after steel for four 70-ton open-hearth furnaces had been delivered to the site. Mr. Abrams' plans include the building of these furnaces. The company that operates the furnace will be a subsidiary of the Atlas Steel & Supply Co., Cleveland, dealer in scrap, of which company Mr. Abrams is president.

Steel Fabricators to Meet at Biloxi

The next annual convention of the American Institute of Steel Construction, Inc., will be held in Biloxi, Miss., at the Edgewater Gulf Hotel, Nov. 13 to 16 inclusive. The institute has been invited by the German Steel Syndicate (Stahlwerks-Verband) to participate in an international conference on steel construction, to be held at Düsseldorf in August, 1930.

German Rebate on Pig Iron Expected to Be Continued

WASHINGTON, Aug. 6.—The Roheisen Verband, the German pig iron association, is expected to continue granting rebates to German consumers of pig iron for the second half of the present year, according to a report received by the Department of Commerce from Berlin. Under the association's contract with German consumers, the rebates on pig iron used in gray iron and malleable iron castings for export is equal to the difference between the domestic and world market prices. The rebate, which at the present time is fixed at about $1.43 per ton, is given only to those who buy 100 per cent of their requirements through the association.

Civil service examinations for engineers to fill vacancies in the Bureau of Standards, Department of Commerce, have been announced. Applications to the United States Civil Service Commission, Washington, must be made before Sept. 11. The positions to be filled include materials testing engineer and assistant testing engineers.

Europe Looks for September Upturn

Large Autumn Requirements Are Expected, but Steel Prices at Moment Are Weak—American Tin Plate Exports Active

(*By Cable*)

LONDON, ENGLAND, Aug. 6.

IRON and steel markets are under the influence of the holidays and little important change is expected before September. The Cleveland pig iron outlook is bright, as furnace output is well sold and preparations are on foot to relight more furnaces. Autumn requirements are expected to develop on a large scale.

Coke and ore shortage, and high prices are still the crux of the whole position.

Steel is quiet, especially in plates and sheets and rail sections. Mills are moderately active, but new business is slow, though shipbuilding specifications are issued more regularly.

Tin plate is quiet, with a steadier tone on small output. Works are closed for stopweek, which in several cases may be prolonged for two weeks. The quota percentage is expected to be further reduced.

Galvanized sheets are dull, but steadier, as production is restricted. Japan is inquiring for thin black sheets.

Clyde shipbuilding in July amounted to 13 vessels, or 38,000 tons.

Continental iron and steel are practically idle here. Prices generally are easy, but opinion is inclined that values have now touched their lowest.

French output for June was 865,000 metric tons of pig iron and 797,000 tons of steel.

German rolled steel output in June was 986,000 tons.

Polish production in June was: Pig iron, 58,000 metric tons; raw steel, 107,000 tons; rolled steel, 78,000 tons.

Continental Improvement Expected Soon

(*By Radio*)

BERLIN, GERMANY, AUG. 5.

MANY steel mills are beginning to show a decided unwillingness to accept export orders at present prices. The recent weakness in Continental prices is generally believed to be the result of the holiday season and recovery of the market is expected by the end of August.

All syndicate domestic prices are unchanged for this month. The home market is more active and there is an increasing demand for pig iron from foundries, machinery manufacturers and other consumers. Demand for gas and boiler tubes is improving. Except for pig iron, export prices are weaker and the Stahlwerksverband has made a further reduction in prices of bars, beams and bands.

Export Inquiry for Tin Plate Active

NEW YORK, Aug. 6.—Export inquiry for tin plate is active with the Nippon Oil Co. in Japan inquiring for quarterly requirements expected to total about 45,000 base boxes of oil sizes, and the Amtorg Trading Corporation, New York, asking for 60,000 to 75,000 base boxes of tin plate for export to Russia, shipment to begin in September. The Imperial Japanese Army is in the market for its annual requirement of canning tin plate, asking for about 10,000 base boxes, instead of the usual tonnage of 5000 to 7000 base boxes.

German Barbed Wire Sales Steadily Declining

HAMBURG, GERMANY, July 22.—Producers of barbed wire report a decline in consumption of this type of wire for fencing, a trend that has been particularly noticeable this year. Investigation by the mills shows that users apparently prefer galvanized fencing wire, wherever the substitution is possible. A similar trend in demand has been noticed in export business. As producers of barbed wire doubt that much increase would develop from advertising its use in Germany and abroad, it is believed probable that the barbed wire divisions of certain makers in the Ruhr will soon suspend operations. Mills here do not believe that so sharp a recession in barbed wire business will be experienced by American producers, as it is pointed out that the difference in price between barbed wire and galvanized fencing wire is much smaller in the American market than in Europe.

British and Continental European Export prices per gross ton, f.o.b. United Kingdom Ports, Hamburg and Antwerp, with the £ at $4.85

British Prices, f.o.b. United Kingdom Ports

Cleveland No. 3 foundry	£3	12½s.	to	£3	13½s.	$17.58	to	$17.82
East Coast Hematite	3	15	to	3	15½	18.18	to	18.30
Ferromanganese, export	13	10	to	14	0	65.47	to	67.90
Billets, open hearth	6	7½	to	6	10	30.92	to	31.52
Sheet bars, open hearth	6	5	to	6	10	30.31	to	31.52
Black sheets, Japanese specifications	13	0	to	13	5	63.05	to	64.26
Tin plate, per base box	0	18¼	to	0	18½	4.42	to	4.48
Rails, 60 lb. and heavier	7	15	to	8	15	37.59	to	42.43
						Cents per Lb.		
Steel bars, open hearth	7	15	to	8	10	1.67	to	1.84
Beams, open hearth	7	2½	to	7	12½	1.55	to	1.65
Channels, open hearth	7	7½	to	7	17½	1.60	to	1.71
Angles, open hearth	8	2½	to	8	12½	1.76	to	1.86
Ship plates, open hearth	7	12½	to	8	2½	1.66	to	1.76
Black sheets, No. 24 gage	10	5	to	10	10	2.21	to	2.27
Galvanized sheets, No. 24 gage				13	7½			2.94

Continental Prices f.o.b. Antwerp or Hamburg

Foundry iron, 2.50 to 3.00 per cent sil., 0.50 to 0.90 per cent phos.	£3	9s.	to	£3	13½s.	$16.73	to	$17.82
Foundry iron, 2.50 to 3.00 per cent sil., 1.00 per cent and more phos.	3	11				17.21		
Billets, Thomas	4	18	to	5		23.76	to	24.25
Sheet bars, Thomas	5	1	to	5	2	24.50	to	24.74
Wire rods low C., No. 5 B.W.G.	6	4	to	6	6¼	30.06	to	30.61
Black sheets, No. 31 gage, Japanese	12	10				60.62		
Rails, 60 lb. and heavier	6	10*				31.52		
Rails, light	6	1½				29.46		
						Cents per Lb.		
Steel bars, merchant	5	13	to	5	14	1.25	to	1.27
Steel bars, deformed	5	12	to	5	12½	1.21	to	1.22
Beams, Thomas, British standard	5	4	to	5	6	1.12	to	1.14
Channels, Thomas, American sections	5	15	to	6	0	1.27	to	1 32
Angles, Thomas, 4-in. and larger, over ⅜-in thick	5	5				1.14		
Angles, Thomas, 3-in.	5	15				1.25		
Ship plates, open-hearth inspected	7	10				1.62		
Hoop and strip steel, over 6-in. base	5	15	to	5	17½	1.25	to	1.27
Wire, plain, No. 8 gage	7	7½				1.62		
Wire, galvanized, No. 8 gage	9	7½				2.02		
Wire, barbed, 4-pt. No. 12 B.W.G.	11	17½				2.56		
Wire nails, base	0	7¾				$1.87 per keg		
Wire nails, assortments, 1 to 6-in. keg	10	6½				2.23		

*Open-hearth steel, 10s. ($2.42) per ton extra.

Germany Exports Larger Part of Its Steel Output

HAMBURG, GERMANY, July 22.—The percentage of German steel production exported is increasing. Semi-finished steel exports represented 41.33 per cent of output in 1927, 57.37 per cent in 1928 and 51 per cent in the first half of this year. Structural steel exports were 17.6 per cent of production in 1927, 27.02 per cent in 1928 and 41.6 per cent in the first half of 1929. Foreign shipments of steel bars and rods were 19.7 per cent in 1927, 25.19 per cent in 1928 and 39.6 per cent in the first half of this year. Plate exports represented 25.8 per cent of output in 1927, 24.19 per cent in 1928 and 39 per cent in the first half of 1929. Shipments of steel hoops advanced from 19.7 per cent of output in 1927 to 25.02 per cent in 1928 and to 42.8 per cent in the first half of this year.

The proportion of production shipped for export is expected by some mills to show a decline during the second half.

Association of British Tin Producers in Prospect

WASHINGTON, Aug. 6.—Efforts are still being made by a British group to effect more active and centralized control of tin production and prices through the formation of a tin producers' association, according to a report received by the Department of Commerce from London. Actual progress in the organization of a comprehensive association is probably less than would appear to be indicated by some published reports, as there is understood to be considerable opposition. Strong financial interests are reported behind the proposals, however, and the ultimate formation of an association is expected.

It is apparently the opinion of a large section of the trade that, even if the plan should be successful, strict control would be difficult and in any case considerable time would elapse before its effects would be felt to any extent. This opinion, the report says, tends to be confirmed by the existing belief that production still exceeds consumption to a greater degree than is apparent from the available statistics of the industry.

Magnesium Alloy Cheaper Than Aluminum Alloy

HAMBURG, GERMANY, July 22.—Price reductions on Electron (magnesium alloy) have brought it to a lower price level per square meter than aluminum alloy. By way of comparison, the alumium alloy known as Lautal weighs 2.8 kg. per square meter in a No. 20 gage sheet and costs 12.75 m. ($3.03). Electron weighs 1.82 kg. per square meter for a No. 20 gage sheet and costs 11.83 m. ($2.83). These prices compare with 23.75 m. ($5.65) for a square meter of No. 20 gage copper sheet weighing 8.9 kg.

A recent publication of the German aluminum industry in commenting on the increasing use of aluminum and its alloys states that German consumption of copper in the first half of this year was about 20,000 tons less than in the first half of 1928, while consumption of aluminum and its alloys and other non-ferrous metals increased 29,000 tons.

German Koppers Company Has Large Contracts

HAMBURG, GERMANY, July 22.—Recent large foreign contracts for coke oven installations have been booked by the Heinrich Koppers A. G., Essen, which is affiliated with the Koppers Coke Oven Co., Sheffield, England, and the Koppers Co., in the United States. Among these contracts is an order from the Kabushiki Kaisha Asano Zosensho of Kanagawa for an installation of ovens that will be the largest in Japan. The company also has contracts for coke ovens in Czechoslovakia, Austria, Poland, India and Switzerland and, in addition, will modernize the entire coke production of the city of Stockholm, Sweden.

Earnings of Steel Companies Are Large

The Wheeling Steel Corporation reports net profit for the second quarter of $2,342,294, after all charges, equivalent to $4.25 a share on 394,837 shares of common stock. This compares with $1,795,243, or $2.86 a share, in the preceding quarter, and $1,530,125, or $2.19 a share in the second quarter of 1928.

For the second quarter the Pittsburgh Steel Co. had a net profit of $1,422,548, equivalent, after all charges, to $4.89 a share on 253,500 shares of common stock. Its first quarter earnings were $1,333,661, or $4.54 a share.

The American Rolling Mill Co. in the first six months of 1929 reports a surplus of $4,410,177, after interest, Federal taxes and preferred dividend requirements, equal to $3.26 a share on 1,351,379 shares of common stock (par value $25). This compares with surplus, excluding $2,785,918 income from sale of gas rights, of $1,767,001, or $1.55 a share on 1,140,022 shares in the first half of 1928.

Net profits of American Steel Foundries in the first half were $2,802,224, equivalent, after all charges, to $2.59 a share on 993,020 no-par value shares of common stock. In the same period last year net profits were $1,854,741, or $1.71 a share, on 902,745 shares.

In the second quarter the Inland Steel Co. earned a net profit of $3,126,908, after deducting all charges. The company's net profits in the entire year 1928 were $9,334,297.

Net income of Transue & Williams Steel Forging Corporation for the quarter ended June 30 was $137,603, before Federal taxes, equal to $1.37 a share on 100,000 no-par value shares outstanding. This compares with $132,534, or $1.32 a share, in the corresponding quarter of 1928.

In the first half of the year, net earnings of the Columbia Steel Corporation were $716,758, as against $329,938 in the same period last year. This is equivalent to 48c. a share on 1,497,171 shares of common stock, as against 23c. a share in the first six months of 1928 and about 57c. a share on 1,330,623 shares for the full year of 1928.

Imports of Pig Iron Into the United States by Countries of Origin

(In Gross Tons)

	12 Months Ended June	
	1929	1928
Belgium	204	651
France	131	3,000
Germany	703	1,495
Netherlands	30,948	26,874
Sweden	2,693	1,996
Norway	2,435	91
United Kingdom	41,839	45,213
Canada	1,108	414
Mexico	395	245
India	58,079	67,615
British Malaya	275	.....
Total	138,810	147,594

Iowa College Aids Graduates

To assist in solving the problem of securing business positions for engineering graduates, the personnel office of the division of engineering of Iowa State College, Ames, Iowa, published for the senior students a "personnel service leaflet," 3¾ x 6¾ in., punched to fit a standard loose-leaf cover. The leaflet shows a half-tone print of the student and gives his name, course, date of graduation and information regarding his qualifications. These leaflets are being sent to business firms throughout the country.

For use with drum switches mounted in crane cabs and similar places, the General Electric Co. announces a new type of operating mechanism. This mechanism, superseding the rack-and-pinion under-lever type, eliminates the trouble experienced in keeping a perfect line-up between the shaft of the operating mechanism and the drum switch shaft, and makes it possible to inclose the mechanism to keep dirt from the gear lubricant.

Jenison Machinery Co., 58 Fremont Street, San Francisco, has been appointed exclusive representative for northern California and parts of Nevada and Oregon for J. A. Fay & Egan Co., Cincinnati, manufacturer of woodworking machinery.

This Issue in Brief

Apprentice-training class work is carried on after regular work hours. Instructors are employees occupying responsible positions with the company, but certified to by the State Department of Education. One-half their salary as instructors is paid by the company, and one-half by the State. —Page 334.

* * *

Wrought iron made by Aston process discussed by inventor, who says the product is more uniform in quality through controllability of operations and elimination of individualism.—Page 344.

* * *

Defective castings resulting from use of deformed cores are virtually eliminated when ram-up cores are used, as the ram-up core, if deformed, will not fit properly into or against the pattern.—Page 347.

* * *

Creep stress investigation at high temperatures is handicapped by difficulty of getting exact measurement of minute deformations. Deformation may be proceeding at a rate so slow as not to be observed even with the most delicate measurement, except over the longest period of time.—Page 348.

* * *

Almost one million dollars worth of industrial machinery is exported per working day. Although of substantial monetary importance, the economic significance is even greater, considering the forces of employment the equipment will release in the countries to which the machinery is shipped.—Page 354.

* * *

Many machining operations required on master connecting rod for aircraft engine. Forgings are bored, reamed, drilled, milled and ground. Pickling in an alcohol solution containing 5 per cent nitric acid reveals cracks and surface flaws.—Page 337.

New puddleless wrought iron process is performed by pouring Bessemer steel gradually into a "cup" partly filled with iron silicate slag. The boiling action causes the steel to intermingle with the slag, producing a spongy mass of metal. The ball is compacted into a bloom under a hydraulic press.—Page 342.

* * *

Skilled labor problem is solved, partly at least, by apprentice-training course. Ohio machinery builder finds that he has an opportunity to determine at close range the apprentices' ability to fill future positions.—Page 334.

* * *

New process produces manganese sinter from low-grade silicious ore. Ammonia sulphate proves to be an effective solvent. One ton of manganese sinter of 67.3 per cent manganese can be made from 5.2 tons of ore.—Page 345.

* * *

High-strength structural steel reduces deadweight of ships' hulls 10 per cent. High elastic steel is gaining in use in British shipyards. In several vessels on order one-half the total weight of the steel will be high-elastic limit mild steel.—Page 345.

* * *

Ram-up cores cut foundry costs where castings have nozzles, projecting flanges and other irregularities. Advantages over a core placed in a core print are absence of fins, variation of metal and of misplaced cores.—Page 346.

* * *

Is the trend of new steel-producing capacity toward greatest consumption centers rather than toward sources of supply, as formerly? Growing importance of Michigan as a steel-producing State indicates that producers are getting close to customers. Freight today plays a large part in the expense of comparatively long hauls of finished steel.—Page 351.

Valuable information for engineers and designers of machinery and other steel structures is furnished by time-yield method of determining creep stress under high temperatures. Method developed in a British laboratory completes a test in three days.—Page 349.

* * *

Machinery builder now has no difficulty in securing applicants for his apprentice-training course. Several years ago applicants were scarce due to desire for immediate higher wages. Favorable publicity has helped. Vocational departments of local public schools produce the largest proportion of apprentices.—Page 336.

* * *

Lowered production costs of wrought iron, brought about by new process which eliminates hand-puddling, is expected to create expanded market for this metal. New plant will produce at the outset 600 gross tons per day. —Page 344.

* * *

Mergers as a whole do not operate more economically than independent companies. Recent study made by the National Industrial Conference Board revealed that the combined record of mergers over a term of years does not differ much from that of independents.—Page 358.

* * *

Mild steel used for high-pressure boiler drums may be stressed with safety to two-thirds the value of limits developed in British laboratory test. Time-yield value determines the maximum stress which can be imposed without change of dimensions.—Page 349.

* * *

Pig iron average daily output rate for July was 1.5 per cent under June. Average daily production was 122,100 tons, a new high record for July. On Aug. 11 there were 216 furnaces in blast, a loss of 2 for the month.—Page 362.

A. I. FINDLEY
Editor

THE IRON AGE

W. W. MACON
Managing Editor

ESTABLISHED 1855

Still an Uneven Prosperity

EVERY one recognizes that there are varying rates of trade activity at the present time, some lines doing extremely well, others less well, and some rather poorly. It is worth while to inquire what general principles if any are involved. Then there is the particular point that some lines should not be expected to grow as fast as others, and their slower growth should not be held against them.

Turning to the conveniently arranged statistics compiled by the Federal Reserve Board, one finds that petroleum refining and automobile and tire production have been running this year far above the general activity, tobacco and iron and steel somewhat above, and leather and shoes and lumber far below.

There is a lack of perspective in much of the current comment. One of the commonest remarks in business conversations is that building activity is off this year. So it is, from last year; but this longer range and more impressive comparison, taking 1923-4-5 as the base period (which is used in all these Federal Reserve statistics), show that building contracts in the first five months of this year made a greater gain than industrial production, building contracts standing at 123 against 120 for industrial production. We therefore may dismiss building from present consideration, since by a reasonably long range comparison it is doing quite well enough, and study the details of industrial production.

In the first five months of this year industrial production (adjusted for seasonal variation) showed 20 per cent gain over the base period 1923-4-5. Manufacturing did better than mineral production, which is included in the general result, but with a relatively low weighting.

Taking the first five months of the year and comparing individual lines with the general industrial pace, we find the following divergences above and below, which for convenience are arranged in sequence:

Manufacturing

	Per Cent Variation		Per Cent Variation
Petroleum refining	+36	Cement, brick, and glass	+ 7
Automobiles	+30	Paper and printing	+ 5
Rubber tires	+29	Textiles	— 2
Tobacco and manufactures	+12	Food products	—17
Iron and steel	+10	Leather and shoes	—18
Non-ferrous metals	+ 9	Lumber	—30

Mineral Production

Copper	+14	Bituminous coal	—16
Crude petroleum	+13	Anthracite	—20
Lead	— 4	Silver	—20
Zinc	— 7		

Some questions are suggested by the table. Should one expect the output of food products to increase when production of automobiles increases? Food is 17 per cent below the general level of activity; the actual production was precisely the same as in the base period, but there was a trifle less food per capita, as population increased 6 per cent. Substantially the same thing can be said of coal, actual production showing no change. The difference is that one would not expect people to eat more when there is more manufacturing, but would expect the manufacturers to use more coal. This they avoid by utilizing coal more efficiently.

It is an interesting point that, while the increases from the base period in industrial production and in building are substantially the same, cement, brick and glass are 7 per cent above the general industrial average, while lumber is 30 per cent below. We may accept this, at least tentatively, as indicating a permanent swing in the character of materials used in building work, particularly when we observe iron and steel also to be in excess. It is not necessarily a change in choice of material for the same class of building, for there may be, and indeed there is, a change in the choice of building. Year by year, of the total family housing provided, apartments increase in proportion and single dwellings decrease.

Size and Business Success

"EVERYTHING you have is the biggest in the world." This gibe at the American point of view, made in the writer's hearing by a Brazilian student at one of our universities, was telling as well as ironical. There may be need for these reminders that our penchant for big things has its weakness, even though we see it as inseparable from the imagination that created our great business organizations and our justly famed mass production methods.

Faith in size *per se* has real dangers. Many look on the outstanding success of the United States Steel Corporation as final proof of the benefits of broad industrial consolidation, ignoring factors that have made its career exceptional. The popular mind more and more turns to mergers as the short cut to profits. There is an increasing tendency to attribute unusual achievement to large-scale organization and to overlook the human equation.

Industrial organizations, no matter how excellent in scheme, demand more than ever a high quality of directing personnel. Mergers do not guarantee competent management. A recent study of consolidations by the National Industrial Conference Board shows that their combined record over a term of

years does not differ much from that of independent companies. While many merged organizations made high profits and grew in size, many failed and the majority fell short of conspicuous success. Then there is the mammoth Ford company, with ramifications covering the globe, to confute continuously the idea that large-scale industry and consolidation are synonymous.

We are in a time when the public needs more than ever to discriminate in evaluating big things, since popular participation in the securities markets is greater than ever before. To ignore the present ratio of earnings to stock values and to trust in consolidation for future returns is to support the most unsound speculation. Unless this attitude gives way to greater sanity, the swollen volume of stock market transactions, with its attendant strain on credit, may become a real threat to prosperity.

The Supply of Steel Salesmen

TAKING stock of the physical and financial resources of a corporation is a routine matter. It behooves a corporation to take stock also of its personnel resources. The steel industry as a whole needs to take stock of its supply of salesmen, with regard not so much to the quantity or number as to the quality.

Since 1923 the tonnage of steel produced has increased approximately one-third. But for its welfare the industry requires much more than one-third increase in these six years in sales ability or quality, for three principal reasons: 1. The number of orders relative to total tonnage has increased greatly. 2. The variety of products made has increased greatly. 3. Competition has increased greatly.

Is not the requirement in total sales ability practically measured by the continued product of the increase in tonnage and the three other factors? Having one-third increase in tonnage and assuming only one-third increase for each of the other three factors, the continued product is more than a tripling. Has the steel industry tripled the effectiveness or sum total of quality of its selling force in the last six years?

By no means is it a matter of mere number of salesmen. Doubtless many cases would be found of a company increasing the number of salesmen by more than one-third, but increasing the number carries with it the temptation to lower the average quality. It requires more men to cover the ground and the orders are smaller, hence the executive may feel the individual rating need not be so high.

Steel companies have done a great deal in training their salesmen as to both the methods of manufacture and the character of uses of their products. We raise no question here as to whether or not they have done enough. Granting for argument that they have, there remains the final and crucial test of all salesmanship, and that is getting the price. Getting the order is only one part of the transaction, a useless or even injurious part if the price is not right. Have the steel companies that have trained their salesmen in the technique of character and quality of steel given corresponding attention to training them in the technique of getting the price?

It is a well known fact that spells of price cutting do occur in some of the finished steel products, usually leading to lower prices all around. Frequently the executive asserts that the salesman is to blame. He was too eager to get the order; he believed too much of what the buyer said; or he acted without instructions. Who is to blame for that? It is inconceivable that such a blunder should be so frequently made, of the salesman doing something to displease his chief when trying to please him. In the matter of believing what buyers say, it would seem that training in respect to that factor should be considered highly desirable. As to the salesman acting without instructions, nobody will take that seriously.

Accordingly the matter of the sales resources of the steel industry divides itself into two parts—the number and quality of the salesmen and the number and quality of the executives who direct the salesmen. We raise no question as to the ability of individual executives or heads of sales departments, the question being whether there are enough men in authority to manage properly the sales activities of the aggregated producers of steel. It can be said today, as it was said by Mr. Schwab in his first presidential address before the American Iron and Steel Institute, that "the next great move of the steel industry must be the proper and economic distribution and selling of its product."

Synthetic Manganese Ore

ON page 345 is printed a description of the so-called Bradley process for beneficiating the manganese-bearing iron ores of the Cuyuna range, summarized from a much more detailed account recently appearing in *Engineering and Mining Journal*. The first public reference to this process was made at the Cleveland meeting (April, 1927) under the auspices of the American Institute of Mining and Metallurgical Engineers to consider the whole question of manganese supply for the American steel industry. Briefly, the ore must be ground in ball mills and roasted in a reducing atmosphere to make the manganese soluble. The manganese is then leached out with ammonium sulphate solution, the iron and silica filtered off, the manganese precipitated with ammonia gas (thus regenerating the leaching solution) and the manganese hydrate washed, dried and sintered into a high-grade oxide for the furnace.

At first glance the process seems hopelessly complex and expensive. Treatment of ore in a closed system of chemical digesters and precipitators, closed so tightly that ammonia gas will not escape, would seem to have many drawbacks. But it should be remembered that the Calumet & Hecla company in the Lake Superior district has been engaged for many years in the profitable leaching of old tailings with ammonia gas. Thousands of tons a day of this waste material is dredged out of a lake, where it has lain these many years, is ground in ball mills, concentrated in a preliminary way by conventional methods, then leached with ammonia solutions, and a high-grade copper reclaimed. The over-all cost of this cannot be very great, for only about 12 pounds of copper is recovered from each ton of tailing treated. This plant operated when copper was selling for 15 cents a pound, so the total cost must have been below $1.80 per ton.

Similarly it might be noted that the Kennecott

Copper Corporation leaches a mill tailing with ammonia. Approximately 25 pounds of copper is recovered from a ton of tailing and it must cost less than $3.75 per ton to do it.

It might be objected that these costs do not include mining, that the chemical processes have a crushed material delivered to them free of charge. Surface mining and crushing of Cuyuna ores would probably cost about as much as the same operation at Ajo, Ariz. At that place, the New Cornelia Copper Co. steam-shovels an oxidized copper ore, crushes it, leaches it with sulphuric acid, reduces the solution, makes an electrolytic cathode, sells the copper and pays the freight to Eastern seaboard for less than $3.80 per ton. (The company gets only 25 pounds of copper out of a ton of ore.)

Consequently it must be admitted that a well designed plant operating on an economical chemical cycle, where the solvent is regenerated, can handle the raw material for costs on the order of $4 a ton. Assuming that the Bradley process is such a one, and that it takes 5 tons of ore to make one ton of sinter (65 per cent manganese), the operation might cost approximately $20 when done on a large scale. This is close to the price during 1923 to 1927 of 50 per cent foreign ore at our ports, before the payment of the duty of 1 cent per pound of manganese.

Since 65 per cent sinter should command a sizable premium over 50 per cent ore, the financial chances for the proposed process, on the basis of these rough figures, seem bright. Unless, indeed, the miners of Russian and Indian high grade ores reduce their selling prices sharply.

Whether the Bradley process is as simple to operate as the ammonia or acid leaching of copper may be doubted. In the first place it requires a preliminary roast, closely controlled as to time, temperature and gas analysis, so that most of the manganese may be made soluble, without getting too much of the iron simultaneously into solution. In the second place, the final precipitate, manganese hydrate, is a dense flocculate, which settles slowly, and like iron and aluminum hydrates, is very hard to wash clean. Mr. Bradley says that aeration will deflocculate the material. This is to be hoped; otherwise the precipitate will carry off valuable ammonium sulphate solvent and the sinter will run too high in sulphur. If, on the other hand, too much water is used to wash the sulphate out, it must later be evaporated (with costly heat) to recover the chemical solvent.

Another latent source of trouble, which might easily loom bigger than either of the above, is the use of the same reaction to put the manganese into solution that is used later to precipitate it. In other words, it is one of those reversible reactions which works from right to left in one stage and from left to right in the second. Sometimes, however, with fiendish persistence, these work the wrong way, precipitating when they really should be leaching, and vice versa. Practical success with such chemical reactions requires continuously precise control of solution temperatures, concentrations and pressures—a thing not always possible when one of the raw materials varies as much in chemical composition and physical constitution as ore.

Summing up, it may be said that equally intricate hydro-metallurgical operations have long been carried out on a grand scale, using the same sort of equipment which the Bradley process requires, and at a cost which ought to be competitive. However, there seem to be chemical pitfalls which a commercial plant may not be able to avoid—although they appear to have been in the 4-ton pilot plant already operated.

THE IRON AGE desires to congratulate most heartily Wilson Bradley, his assistants and his backers, on the persistence, skill and faith which have brought them thus far toward their goal. If the chemical processes are not too delicate, if the stable ranges in the reversible reactions are sufficiently wide to lend themselves to commercial operations on hundreds of tons a day, the chances of success seem to be bright.

CORRESPONDENCE

British Requirements for Aircraft Tubing Are Exacting

To the Editor: In your July 25 issue the article entitled, "Metals Used in Airplane Making" has been read with a great deal of interest, but I feel that an important oversight was made in the statement: "Those who have European experience cling to a medium carbon seamless steel tube. It was the ordinary seamless tube which succeeded the fuselage of wood and is still used by many British and Continental makers."

The historical portion of the above quotation is probably correct, but present British practice does not use "ordinary seamless tube" in any vital parts of the fuselage. The specification used in places where United States practice employs S.A.E. No. 4130X (chrome molybdenum) is covered by Provisional Air Ministry Aircraft Specifications Number D.T.D. 89A and Number D.T.D. 113, the former covering all round tubes down to and including ½-inch diameter, and the latter all round tubes below ½-inch diameter, and all sizes of non-circular tubes.

The steel covered by these specifications is of the following approximate analysis, being directly quoted from copies of the specifications:

Carbon	not more than 0.30 per cent
Silicon	not more than 0.30 per cent
Sulphur	not more than 0.050 per cent
Phosphorus	not more than 0.050 per cent
Manganese	not more than 1.50 per cent

Specification No. D.T.D. 89A calls for the following physical properties:

Tensile strength before welding, min.	100,800 lb. per sq. in.
Yield stress before welding, min....	89,600 lb. per sq. in.
Tensile strength after welding, min..	67,200 lb. per sq. in.
Yield stress after welding, min.....	56,000 lb. per sq. in.

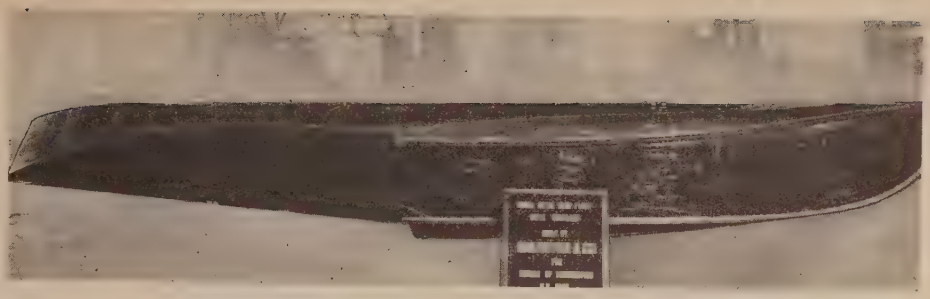
Specification No. D.T.D. 113 calls for the following physical properties:

Tensile strength before welding, min.	78,400 lb. per sq. in.
Yield stress before welding, min.....	67,200 lb. per sq. in.
Tensile strength after welding, min..	67,200 lb. per sq. in.
Yield stress after welding, min.....	56,000 lb. per sq. in.

This contrasts with the S.A.E. 4130X minimum ultimate strength of 55,000 lb. and yield point of 36,000 lb., as mentioned in your publication.

British aircraft engineers and metallurgists with whom I have talked pointed out the much higher yield point required by the British Air Ministry specifications, and also the much higher yield point obtainable by the use

AIRPLANE Float of Monel Metal and Monel Rivets



of this 1.50 per cent manganese tubing. They also claim that with the high manganese tubing there is no tendency to air harden at the weld as is the case with the chrome molybdenum specification, thereby causing brittleness in the joints.

It would seem that in the matter of aircraft tubing the British are more exacting than are our own people; and if these British specifications are of interest to any aircraft engineers we should be glad to supply them.

HENRY SEARS HOYT
A. Milne & Co.
745 Washington Street
New York

Metals Used in Airplane Construction

To the Editor: I read with considerable interest the very excellent article "Metals Used in Airplane Making" appearing in THE IRON AGE for July 25. I believe it would be of interest to add to the comprehensive list of metals discussed therein, the following additional metals and general observations:

Stainless steels, particularly of the non-magnetic type, are finding an ever increasing application in aircraft. These are highly desirable not only because of their corrosion resisting properties, but because where earth inductor compasses are installed the non-magnetic feature is highly desirable. They are applicable to all uses to which steel is applied in aircraft, and most recently they have been used for manufacturing airplane ribs by special brazing and welding processes. They are, of course, extensively used in British airship R 101.

Monel metal, 69 per cent nickel, 28 per cent copper, 2 per cent iron and 1 per cent manganese, silicon and carbon, though a heavy metal, combines strength with inherent resistance to corrosion—an important feature. Monel metal floats recently built do not exceed the weight of analogous duralumin floats by 10 per cent. It has been used for many other parts, and while still highly experimental in aeronautical applications, its use is being watched with keen interest.

Copper is used in sheet form for gas and oil tanks, radio bonding, radiator shells, shims and washers, and flashing on wooden hulls and floats. In tube form it is used for gas, oil and water lines, radiator cores and heater coils. For fuel systems it is rapidly regaining favor over the lighter aluminum and duralumin tubing. As wire, it is used for ignition, radio and lighting wires, for bonding and for safety wire. Of the many alloys, brass, bronze, etc., it will perhaps suffice to say that their employment in aircraft is analogous to their use in other products.

In considering the relative merits of materials of construction for aircraft use, the most important factor is the strength-weight ratio. The accompanying table gives the strength-weight ratio of some of the aircraft materials:

STRENGTH-WEIGHT RATIO OF AIRCRAFT MATERIALS

Material	Ultimate Tensile Strength, Lb. per Sq. In.	Specific Gravity	Index T. S. / S. G. x 1000
Music wire (0.01 in. dia.)	400,000	7.85	51.2
Alloy steel (extra high strength)	200,000	7.85	25.6
Magnesium alloy	34,000	1.75	19.4
Duralumin	55,000	2.85	19.3
Balsa wood	(Comp.) 2,200	.12	18.3
Alloy steel (heat treated—generally used)	125,000	7.85	15.9
Monel metal (hard)	127,000	8.8	14.4
Spruce	(Comp.) 4,300	.46	9.8
Monel metal (annealed)	82,000	8.8	9.3
Mild carbon steel (normalized)	55,000	7.85	7.0
Aluminum	18,000	2.7	6.7

JOHN F. HARDECKER
Chief Draftsman, Aircraft Factory,
United States Navy Yard.
Philadelphia.

Concrete Reinforcing Bars Tested

TO find a method of making the cold-bend test of uniform severity for concrete reinforcing bars of all sizes and degrees of hardness, and to find an impact test suitable for detecting brittleness in such bars, a series of tests have been made at the Bureau of Standards.

A standard test for quality of concrete reinforcing bars consists in bending the bars, without heating, through 90 to 180 deg. with a radius of bend equal to one, two or three diameters of the bar. The angle and radius of the bend depend generally upon the size and hardness of the bar. The differences in the angle and radius of the bend required for different types of bars cause differences in the severity of the tests applied to them. Thus the tendency is to suit the specification to what the bars of different grade will meet successfully, rather than to the service demanded of them in bending for use as reinforcement.

In the tests made by the Bureau of Standards, on bars purchased in the open market, it was desired to find out also whether the application of the cold-bend test might impair the tensile strength, although the bar did not fail in the bend test. Cold-bend tension and impact tests were made. The cold-bend tests were made by the standard methods and by means of an improved machine designed and built at the bureau.

Bars that did not break in the cold-bend test were not seriously affected as to strength by the bending. With the special bending machine used, all bars, regardless of their size, appeared to undergo about the same strain when bent through the same angle. The apparent yield point in the bending test was made higher than the yield point determined in direct tension test.

While the impact test used gave an approximate measure of the yield point of the bar, none of the bars broke in the impact test except a few which had been quenched in water from a high temperature.

New July Record in Iron Output

Daily Rate Less Than June by 1808 Tons or 1.5 Per Cent—New Seven Months' Record —Net Loss of Two Furnaces

A NEW record for pig iron production in July was made this year. Complete returns from every furnace show that the output was 122,100 tons per day. The next largest July was 118,656 tons daily in 1923. Compared with June, the July production fell off nearly 1.5 per cent. It was about 2.9 per cent under the record month in May.

Total output in July was 3,785,120 gross tons or 122,100 tons per day for the 31 days, compared with 3,717,225 tons or 123,908 tons per day for the 30 days in June. The June data are revised because telegraphic reports on July 2 were not in all cases complete. The July output shows a loss of 1808 tons per day from June or 1.46 per cent.

A New Seven Months' Record

For the seven months to Aug. 1, the production was 25,426,080 tons, which is a record. The best previous similar period was to Aug. 1, 1923, when the total was 24,519,868 tons. The war record for the first seven months was 21,423,660 tons in the year 1918.

Rate of Operation on Aug. 1

On Aug. 1 there were 216 furnaces blowing with an estimated operating rate of 121,965 tons per day. On July 1, according to revised data, there were 218 furnaces operating with an estimated operating rate of 122,590 tons each day. Only three

Daily Average Production of Coke Pig Iron in the United States by Months Since Jan. 1, 1925—Gross Tons

	1925	1926	1927	1928	1929
Jan.	108,720	106,974	100,123	92,573	111,044
Feb.	114,791	104,408	105,024	100,004	114,507
Mar.	114,975	111,032	112,366	103,215	119,822
Apr.	108,632	115,004	114,074	106,183	122,087
May	94,542	112,304	109,385	105,931	125,745
June	89,115	107,844	102,988	102,733	123,908
½ year	105,039	109,660	107,351	101,763	119,564
July	85,936	103,978	95,199	99,091	122,100
Aug.	87,241	103,241	95,073	101,180	.....
Sept.	90,873	104,543	92,498	102,077	.....
Oct.	97,528	107,553	89,810	108,832	.....
Nov.	100,767	107,890	88,279	110,084	.....
Dec.	104,853	99,712	86,960	108,705	.....
Year	99,735	107,043	99,266	103,382	.....

Pig Iron Production by Districts, Gross Tons

	July (31 days)	June (30 days)	May (31 days)	April (30 days)
New York and Mass.	256,697	246,124	265,512	257,299
Lehigh Valley	95,571	102,302	108,803	93,506
Schuylkill Valley	71,350	70,265	74,312	69,684
Lower Susq. and Lebanon Valleys	37,775	44,651	33,392	31,150
Pittsburgh district	815,045	787,313	814,944	780,896
Shenango Valley	144,455	148,675	157,952	143,260
Western Pennsylvania	146,886	143,474	159,960	152,942
Maryland, Va. and Ky.	123,447	117,250	135,073	118,785
Wheeling district	127,136	133,450	147,933	142,470
Mahoning Valley	373,181	372,030	380,129	364,373
Central and North'n Ohio	387,383	374,138	388,958	318,678
Southern Ohio	52,232	46,345	47,635	44,139
Illinois and Indiana	772,276	771,070	795,902	768,307
Mich., Minn., Mo., Wis., Colo. and Utah	146,304	131,514	145,840	135,191
Alabama	225,513	219,235	235,117	235,787
Tennessee	9,869	9,389	6,620	6,158
Total	3,785,120	3,717,225	3,898,082	3,662,625

Daily Rate of Pig Iron Production by Months—Gross Tons

	Steel Works Iron	Merchant Iron*	Total
July, 1928	79,513	19,578	99,091
August	82,642	18,538	101,180
September	82,590	19,487	102,077
October	88,051	20,781	108,832
November	88,474	21,610	110,084
December	85,415	23,290	108,705
January, 1929	85,530	25,514	111,044
February	89,246	25,261	114,507
March	95,461	24,361	119,822
April	95,680	26,407	122,087
May	100,174	25,571	125,745
June	99,993	23,915	123,908
July, 1929	98,044	24,056	122,100

*Includes pig iron made for the market by steel companies.

Coke Furnaces in Blast

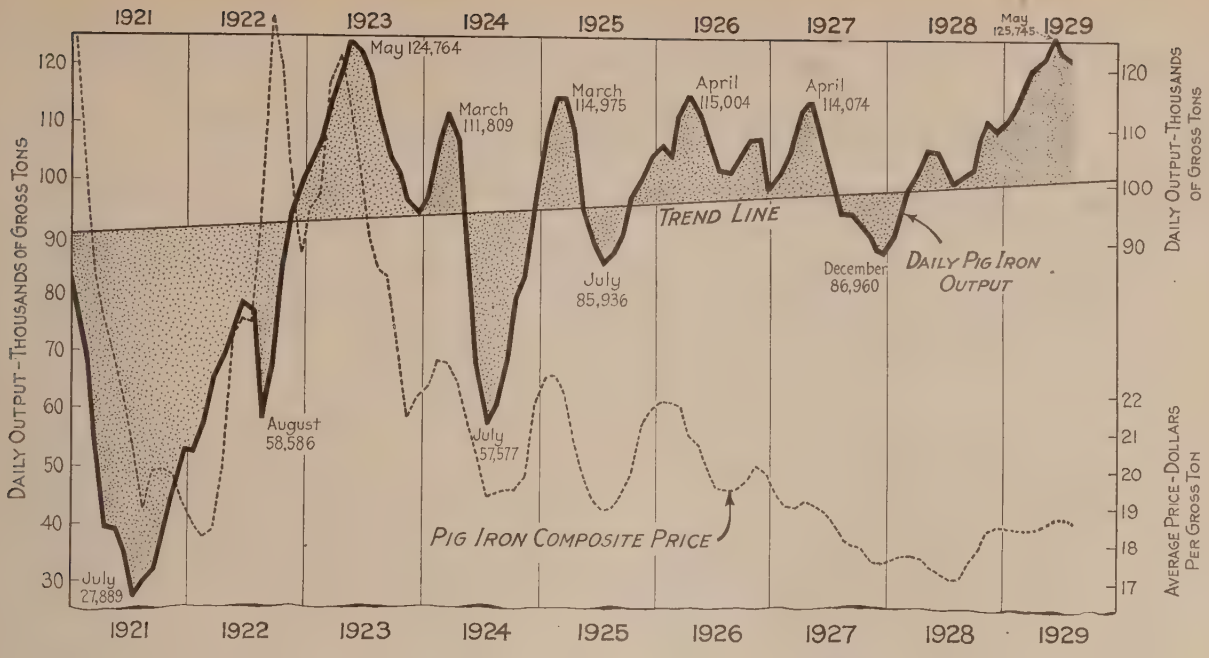
Furnaces	Aug. 1 Number in Blast	Aug. 1 Gross Tons per Day	July 1 Number in Blast	July 1 Gross Tons per Day
New York:				
Buffalo	14	7,295	14	7,275
Other N. Y. and Mass.	3	980	3	930
New Jersey	0	....	0	....
Pennsylvania:				
Lehigh Valley	8	3,085*	8	3,410*
Schuylkill Valley	5	2,300	5	2,340
Susquehanna Valley	2	1,170	3	1,495
Ferromanganese	0	....	0	....
Lebanon Valley	0	....	0	....
Ferromanganese	0	....	0	....
Pittsburgh District	41	26,225	40	25,575
Ferromanganese	3	485	3	470
Shenango Valley	8	4,370	9	4,955
Western Pennsylvania	7	4,185	8	4,230
Ferromanganese	3	425	3	550
Maryland	6	3,345	6	3,075
Wheeling District	7	4,135	7	4,290
Ohio:				
Mahoning Valley	19	12,040	19	12,030
Central and Northern	20	12,495	20	12,470
Southern	4	1,700	3	1,545
Illinois and Indiana	35	24,915	35	25,105
Mich., Wis and Minn.	7	3,405	7	3,160
Colo., Mo. and Utah	3	1,315	3	1,225
The South:				
Virginia	0	....	0	....
Ferromanganese	1	90	1	90
Kentucky	1	420	2	745
Alabama	17	7,270	17	7,310
Ferromanganese	0	....	0	....
Tennessee	2	315	2	315
Total	216	121,965	218	122,590

*Includes spiegeleisen.

Production of Coke Pig Iron in United States by Months Beginning Jan. 1, 1927—Gross Tons

	1927	1928	1929
Jan.	3,103,820	2,869,761	3,442,370
Feb.	2,940,679	2,900,126	3,206,185
Mar.	3,483,362	3,199,674	3,714,473
Apr.	3,422,226	3,185,504	3,662,625
May	3,390,940	3,283,856	3,898,082
June	3,089,651	3,082,000	3,717,225
½ year	19,430,678	18,520,921	21,640,960
July	2,951,160	3,071,824	3,785,120
7 mos.	22,381,838	21,592,745	25,426,080
Aug.	2,947,276	3,136,570	.....
Sept.	2,774,949	3,062,314	.....
Oct.	2,784,112	3,373,806	.....
Nov.	2,648,376	3,302,523	.....
Dec.	2,695,755	3,369,846	.....
Year*	36,232,306	37,837,804	.....

*These totals do not include charcoal pig iron. The 1928 production of this iron was 142,960 gross tons.



Production of Pig Iron in July Represented an Average Output per Furnace Close to 565 Tons

Inclined line represents the gradually increasing theoretical needs of the country, ascertained by a balancing of the ups and downs in production. It shows an average yearly increase in consumption of about 423,000 tons

furnaces were blown in during July while five were shut down.

No furnaces were blown in or blown out by the Steel Corporation last month, but independent steel companies blew in two and shut down three. There was one merchant stack blown in and two were blown out or banked. Thus the month's net loss was one steel-making and one merchant furnace.

Loss in Steel-Making Iron

There was a loss in the production of steel-making iron last month and a slight gain in merchant iron. The loss in steel-making iron was 1959 tons per day from June while the gain in merchant was 141 tons in the daily rate.

Second Largest Ferromanganese Output This Year

Production of ferromanganese at 31,040 tons was smaller than the 33,363 tons made in June, which was a record for many months. The July output was the second largest this year. The spiegeleisen output was normal.

Furnaces Blown In and Out

Only three furnaces were blown in during July: No. 2 Monessen furnace of the Pittsburgh Steel Co. in the Pittsburgh district, the Martins Ferry furnace of the Wheeling Steel Corporation in the Wheeling district, and the Globe furnace in southern Ohio.

Five furnaces were blown out or banked during July: One furnace at the Steelton plant of the Bethlehem Steel Corporation in the Susquehanna Valley, the Colonial furnace in western Pennsylvania, one Ashland furnace of the American Rolling Mill Co. in Kentucky, the Claire furnace in the Shenango Valley, and No. 1 LaBelle furnace of the Wheeling Steel Corporation in the Wheeling district.

Production of Steel Companies for Own Use—Gross Tons

	Total Pig Iron Spiegel and Ferromanganese			Ferromanganese*		
	1927	1928	1929	1927	1928	1929
Jan.	2,343,881	2,155,133	2,651,416	31,844	22,298	28,208
Feb.	2,256,651	2,274,880	2,498,901	24,560	19,320	25,978
Mar.	2,675,417	2,588,158	2,959,295	27,834	27,912	24,978
Apr.	2,637,919	2,555,500	2,826,028	24,735	18,405	22,413
May	2,619,078	2,652,872	3,105,404	28,734	29,940	25,896
June	2,343,409	2,448,905	2,999,798	29,232	32,088	33,363
½ year	14,876,355	14,675,448	17,040,842	166,939	149,963	160,836
July	2,163,101	2,464,896	3,039,370	26,394	32,909	31,040
7 mos	17,039,456	17,140,344	20,080,212	193,333	183,872	191,876
Aug.	2,213,815	2,561,904	.....	21,279	24,583	.....
Sept.	2,090,200	2,477,695	.....	20,675	22,278	.....
Oct.	2,076,722	2,729,589	.....	17,710	23,939	.....
Nov.	1,938,043	2,654,211	.....	17,851	29,773	.....
Dec.	1,987,652	2,647,863	.....	20,992	28,618	.....
Year	27,345,888	30,211,606	.....	291,840	312,061	.....

*Includes output of merchant furnaces.

Sale of Commonwealth Steel Co. Formally Closed

The sale of the Commonwealth Steel Co., Granite City, Ill., to the General Steel Castings Co., Philadelphia, has been formally closed. Deeds convey the Commonwealth properties to the Philadelphia corporation through an intermediary, John J. Dooher, a Commonwealth employee.

Sales department of Page Steel & Wire Co., Bridgeport, Conn., has been moved from Bridgeport to American Bank Building, Pittsburgh. Sales of chain link fence will be handled by R. T. Teeple, and field fence and general wire products by S. B. Cairns. Welding wire and specialties will be under direction of J. J. Flaherty. W. T. Kyle, general manager of sales, will be located in New York Central Building, 230 Park Avenue, New York.

Iron and Steel Markets

Rate of Pig Iron Production Dips

July Total Shows Gain, But Daily Average Declines 1.46 Per Cent From That of June—Smaller Steel Producers Curtail Operations

PIG iron production in July, at 3,785,120 tons, exceeded that of June by 67,895 tons, and was the third largest monthly total on record, being surpassed only by the figures for May, 1929, and May, 1923. However, the July daily rate of output, 122,100 tons, ranks fifth, having been exceeded by the months mentioned and by June, 1923, and June, 1929. The decline from the previous month, this year, was 1808 tons, or 1.46 per cent. The loss was entirely in steel making pig iron, the rate for merchant iron having shown a slight gain.

Pig iron production thus far this year, at 25,426,080 tons, has established a new seven months' record, surpassing the previous high mark, for the corresponding period in 1923, by nearly 4 per cent.

Continued high output this month is indicated by the rate at which the 216 furnaces in blast were operating on Aug. 1, namely 121,965 tons a day, or only 135 tons below the actual average production through July.

August production of steel seems to be pointed toward a decline of possibly 5 or 10 per cent from the recent high rate. Thus far makers of a wide range of products have been able to allocate tonnage among their various finishing departments in such a manner as to utilize their full ingot capacity, and there are indications that replenishment of reserve stocks of semi-finished steel will be a factor in sustaining their output through the remainder of the month. Such a move would place them in a position to take advantage of improved business in September and, at the same time, would permit them to continue to reap the economies accruing from peak operations.

Actual reductions in steel output to date have been confined to smaller companies specializing in a few finished products. Shifts in demand are less serious for producers making a diversity of finished materials, since a decline in business in one direction is frequently offset by a gain in another. The Steel Corporation, for example, continues to operate at virtually 100 per cent of capacity and its total backlog is still large.

Unquestionably buyers are ordering at closer range than earlier in the year. In fact, Pittsburgh reports that business in hot-rolled strip, tin plate, and cold-finished and alloy steel bars is again on a hand-to-mouth basis. This change in buying practice does not necessarily presage any marked change in operations or in the volume of consumption. Moreover, extended deliveries are still the rule on some of the heavier products, notably on plates, and in the Chicago district, favored by steel pipe and railroad car business, mill commitments seem headed for another period of expansion. The week's steel specifications at Chicago were the largest since late in April.

Railroad buying is featured by the placing of 30,000 tons of rails by the New York, New Haven & Hartford. The Chicago, Milwaukee, St. Paul & Pacific has entered the market for 1000 gondola cars, and the Pacific Fruit Express, for 500 refrigerator cars, raising the total of pending inquiries to 5000 cars, of which 4500 are freight and 500 passenger cars. The Pennsylvania Railroad will open bids Aug. 16 on 29,000 tons of plates, shapes and bars. Two Lake boats, placed by the Steel Corporation, call for 10,000 tons of plates and shapes.

Automobile production this month, judging by the announced schedules of motor car plants, will be larger than in July, but it is not expected to get back into full swing before October.

Fabricated steel awards, totaling 34,000 tons, are on a par with those of the previous week, and fresh inquiries aggregate 35,000 tons. The amount of pending work in the East is estimated as the largest on record.

Prices on wire nails have generally declined to $2.55 a keg, Pittsburgh or Cleveland, a recession of $3 a ton from the recent quotation of $2.70. Barbed wire has gone down in sympathy with nails, and in the New York district, plain wire has been sold at $2.40 a 100 lb., Pittsburgh, a concession of $2 a ton. On galvanized sheets 3.50c. a lb., Pittsburgh, is now the recognized market, a reduction of $2 a ton, and irregularities are reported on blue annealed and black sheets. On the other hand, several makers of cold-rolled strip have announced advances of $2 a ton to 2.85c. a lb., Cleveland or Pittsburgh.

Pig iron buying is not particularly active, but furnace shipments to foundries are keeping up at a good rate, with increased demand from makers of heating equipment tending to offset, in part, the reduced requirements of the automotive industry. Southern producers have sold 35,000 tons in the St. Louis district in the past month, but an eastern Pennsylvania steel plant which recently bought a barge load of Alabama iron, has divided an order for 18,000 tons of basic among nearby furnaces.

Domestic sales of copper, amounting to 30,000 tons for the week, were the largest since mid-March. Foreign orders for 12,000 tons were the best in several months. Consumers have been forced to come into the market after failing to break the price, which has remained at 18c., delivered Connecticut Valley.

THE IRON AGE pig iron composite price is again where it was two weeks ago, having advanced 4c. to $18.42 a gross ton. The finished steel composite remains at 2.412c. a lb.

A Comparison of Prices

Market Prices at Date, and One Week, One Month and One Year Previous, Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron, Per Gross Ton:	Aug. 6, 1929	July 30, 1929	July 9, 1929	Aug. 7, 1928
No. 2 fdy., Philadelphia	$21.26	$21.26	$21.76	$20.26
No. 2, Valley furnace	18.50	18.50	18.50	16.50
No. 2 Southern, Cin'ti	17.69	17.69	18.19	19.19
No. 2, Birmingham	14.50	14.50	14.50	15.50
No. 2 foundry, Chicago*	20.00	20.00	20.00	17.50
Basic, del'd eastern Pa.	*19.75*	20.00	20.25	19.00
Basic, Valley furnace	18.50	18.50	18.50	16.00
Valley Bessemer, del'd P'gh	20.76	20.76	20.76	18.76
Malleable, Chicago*	20.00	20.00	20.00	17.50
Malleable, Valley	19.00	19.00	19.00	17.00
Gray forge, Pittsburgh	19.76	19.76	19.76	18.01
L. S. charcoal, Chicago	27.04	27.04	27.04	27.04
Ferromanganese, furnace	105.00	105.00	105.00	105.00
Rails, Billets, etc., Per Gross Ton:				
Rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Light rails at mill	36.00	36.00	36.00	36.00
Rerolling billets, Pittsburgh	35.00	35.00	35.00	32.00
Sheet bars, Pittsburgh	35.00	35.00	35.00	32.00
Slabs, Pittsburgh	35.00	35.00	35.00	32.00
Forging billets, Pittsburgh	40.00	40.00	40.00	38.00
Wire rods, Pittsburgh	42.00	42.00	42.00	42.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.85	1.85	1.85	1.90
Finished Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Bars, Pittsburgh	1.95	1.95	1.95	1.90
Bars, Chicago	2.05	2.05	2.05	2.00
Bars, Cleveland	1.95	1.95	1.95	1.85
Bars, New York	2.29	2.29	2.29	2.24
Tank plates, Pittsburgh	1.95	1.95	1.95	1.90
Tank plates, Chicago	2.05	2.05	2.05	2.00
Tank plates, New York	2.22½	2.22½	2.22½	2.17½
Structural shapes, Pittsburgh	1.95	1.95	1.95	1.90
Structural shapes, Chicago	2.05	2.05	2.05	2.00
Structural shapes, New York	2.19½	2.19½	2.19½	2.14½
Cold-finished bars, Pittsburgh	2.30	2.30	2.30	2.10
Hot-rolled strips, Pittsburgh	1.90	1.90	1.90	1.75
Cold-rolled strips, Pittsburgh	2.75	2.75	2.75	2.90

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

Finished Steel,	Aug. 6, 1929	July 30, 1929	July 9, 1929	Aug. 7, 1928
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 24, P'gh	2.85	2.85	2.85	2.65
Sheets, black, No. 24, Chicago dist. mill	3.05	3.05	3.05	2.75
Sheets, galv., No. 24, P'gh	*3.50*	3.60	3.60	3.40
Sheets, galv., No. 24, Chicago dist. mill	3.80	3.80	3.80	3.60
Sheets, blue, No. 13, P'gh	2.35	2.35	2.35	2.10
Sheets, blue, No. 13, Chicago dist. mill	2.45	2.45	2.45	2.20
Wire nails, Pittsburgh	*2.55*	2.60	2.65	2.55
Wire nails, Chicago dist. mill	2.65	2.65	2.70	2.60
Plain wire, Pittsburgh	2.50	2.50	2.50	2.40
Plain wire, Chicago dist. mill	2.55	2.55	2.55	2.45
Barbed wire, galv., Pittsburgh	*3.20*	3.30	3.30	3.20
Barbed wire, galv., Chicago dist. mill	3.35	3.35	3.35	3.25
Tin plate, 100 lb. box, P'gh	$5.35	$5.35	$5.35	$5.25
Old Material, Per Gross Ton:				
Heavy melting steel, P'gh	$18.75	$18.75	$18.50	$15.00
Heavy melting steel, Phila	16.50	16.50	16.50	13.00
Heavy melting steel, Ch'go	14.75	14.75	14.75	12.75
Carwheels, Chicago	14.00	14.00	14.00	12.75
Carwheels, Philadelphia	16.50	16.50	16.50	15.50
No. 1 cast, Pittsburgh	15.50	15.50	15.50	14.25
No. 1 cast, Philadelphia	16.50	16.50	16.50	15.50
No. 1 cast, Ch'go (net ton)	14.50	14.50	14.50	13.50
No. 1 RR. wrot., Phila.	16.00	16.00	16.00	13.50
No. 1 RR. wrot., Ch'go (net)	13.50	13.50	13.50	10.75
Coke Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$2.75	$2.75	$2.75	$2.75
Foundry coke, prompt	3.75	3.75	3.75	3.75
Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	18.12½	18.12½	18.12½	14.75
Electrolytic copper, refinery	17.75	17.75	17.75	14.50
Tin (Straits), New York	47.25	47.25	45.12½	47.87½
Zinc, East St. Louis	6.80	6.80	6.70	6.25
Zinc, New York	7.15	7.15	7.05	6.60
Lead, St. Louis	6.55	6.55	6.70	6.00
Lead, New York	6.75	6.75	6.90	6.20
Antimony (Asiatic), N. Y.	**8.75**	8.62½	8.50	10.00

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Pittsburgh

Demand on Most Products Declining Gradually and Smaller Companies Curtailing Operations—Some Price Weakness

PITTSBURGH, Aug. 6.—As the steel industry enters August, it becomes more and more evident that if operations are maintained at the recent high rate throughout this month it will be principally because the larger integrated companies wish to replenish reserve stocks of steel, which have been reduced to a minimum during the last two or three months.

Smaller companies in this and nearby districts have taken out open-hearths in the last week and further intrenchment is indicated by the slowing down of finishing mills. In spite of this the largest interests in the district are maintaining recent high operating rates and at present plan no curtailment during August. This may be partially explained by the fact that the makers of a wide range of products are able to utilize their full output by a careful allocation of tonnage. On the other hand, it is much more likely that a part of the August output of semi-finished steel will be used in building up reserve stocks of this material. This plan would allow steel makers to continue to profit by high and consequently economic operations during a short period of slightly reduced demand and would also place them in an advantageous position in the case of improved business during September.

Specifications on most products are still declining gradually. Notable exceptions are sheets and plates, while a better demand for cold-rolled strip has recently developed. Backlogs are dwindling and tonnage currently released is not sufficient to sustain present rolling schedules in some departments. In hot-rolled strip, tin plate, and cold-finished and alloy steel bars business has already been reduced to a hand-to-mouth basis, and operating schedules have been tapering slightly for some time. As this tapering began from a capacity rate, the total loss in production has had only a negligible effect on the district's total steel output.

Slightly lower schedules in the heavier products, such as bars and shapes, would have a much greater influence and the completion of rail rollings in the next few weeks will release additional steel tonnage for use elsewhere. Pipe operations show improvement and consistent pushing of plate capacity has not resulted in much better deliveries.

Price weakness persists in some lines despite a firmer stand on the part of leading makers. A price of 3.50c., Pittsburgh, on galvanized sheets, which was formerly made only to jobbers, is now becoming more common on other business. Other grades of sheets show a somewhat firmer tendency and concessions on cold-rolled strip are no longer reported. Following several weeks of continued weakness, wire nails are now quotable at $2 under recent levels. Barbed wire is similarly lower, but manufacturers' wire is holding at recent levels with the help of a rather strong demand.

Pig Iron.—Buyers in this district are still placing occasional small orders for iron to carry them through

August, and no additional activity is expected before September. The last month of the quarter, however, will find consumers with little if any iron on contract, and substantial tonnages are expected to be placed at that time for consumption during the closing months of the year. The fact that foundry operations during the last quarter are still a matter of considerable conjecture has prompted buyers to take a rather cautious stand, and there is nothing in the present situation which indicates any advance in price. It is also unlikely that there will be any shortage of iron at that time. Furnace stocks are now at probably the low point of the year, but present shipments are no longer keeping pace with production at a number of furnaces. Malleable foundries in this district are more active than others and some sellers are picking up a fair tonnage of this grade in small orders. Foundry iron shipments are probably not so heavy as they were a month ago, but there has been no check in the movement of basic iron to steel plants and steel foundries. Prices are unchanged, with foundry and basic at $18.50, Valley, and malleable and Bessemer at $19. The local furnace is quoting prices 50c. higher on all these grades. The Cherry Valley furnace of the Davison Coke & Iron Co. was blown in on Aug. 5.

Prices per gross ton, f.o.b. Valley furnace:

Basic	$18.50
Bessemer	19.00
Gray forge	18.00
No. 2 foundry	18.50
No. 3 foundry	18.00
Malleable	19.00
Low phos., copper free	27.00

Freight rate to Pittsburgh or Cleveland district, $1.76.

Prices per gross ton, f.o.b. Pittsburgh district furnace:

Basic	$19.00
No. 2 foundry	19.00
No. 3 foundry	18.50
Malleable	19.50

Freight rates to points in Pittsburgh district range from 63c. to $1.13.

Semi-Finished Steel.—Billet and blooming mills in this territory are still being operated at close to capacity and raw steel is not being accumulated at any point in the district. However, the supply is now well adjusted to the demands of finishing mills, and consuming departments are no longer having the difficulties which they experienced earlier in the year of having sufficient steel from a tonnage standpoint, but not of the proper specifications. Increasing pipe operations are keeping up the demand for Bessemer steel and although production is not so high as it was two months ago, when substitutions for open-hearth steel were frequent, the output is entirely in line with the correspondingly high open-hearth production. Sales of small tonnages of billets, slabs and sheet bars are being made at $35, Pittsburgh or Youngstown, and although a few large buyers of billets and slabs are reported to have been able to extend their second quarter contracts into this quarter without an advance in price, no recent transactions have been made at less than the quoted market. Wire rods are not quite so active as they were a month ago, but are going to makers of manufacturers' wire at an undiminished rate. The price is well established at $42, Pittsburgh or Cleveland. Skelp is unchanged at 1.85c. to 1.90c. per lb., Pittsburgh, and occasional spot sales are being made.

Bars, Shapes and Plates.—Current demand for plates shows no recession from the high rate which has prevailed for several months and ability to make shipments continues to be the deciding factor in the placing of business. None of the mills in this district is able to make shipment on any sizable tonnage in less than six weeks. Demand from nearby consumers is all that could be expected and regular customers of local mills are generally being taken care of. It is likely that much of the prospective business for which delivery is so urgent comes from other districts and is quite likely offered to several mills in an effort to get prompt shipments. This might give the market a misleading aspect, but it cannot be denied that the bulk of the business in this district is based upon the immediate needs of consumers and is going directly into consumption. Bars and shapes are moving fairly well, but August business is expected to show a slight decline from July. This will be true in spite of the fact that current specifications have changed little in the last few weeks, but backlogs as of July 31 were not so large as they were on the first of the month. No large structural projects have come out in the last week, but there is still a comfortable volume of work in prospect and large fabricating shops have considerable backlogs. Prices are holding at 1.95c., Pittsburgh, on bars, shapes and plates.

Wire Products.—Shipments of manufacturers' wire during July were ahead of June with some makers, and generally showed an increase over July of last year. The first days of the new month brought little change in the volume of specifications, although there are indications that the automobile industry will take less material in August than in preceding months. Agricultural wire products are quiet and weakness in barbed wire is recognized in lower prices. Galvanized barbed wire is now quotable at 3.20c. to 3.30c. per lb., Pittsburgh, with mills holding to the higher figure on small orders. Shading of wire nail prices, long prevalent in the Ohio River territory, has also become more common in the immediate Pittsburgh district, and although mills still quote a base price of $2.65 per keg, the actual market is better represented by a range of $2.55 to $2.65. Galvanized and cement coated nails and staples are also correspondingly weaker.

Tubular Goods.—No large lettings have been reported last week, but prospective projects are being watched carefully by local mills, with early action anticipated on at least one large pipe line. Oil country demand is holding at recent levels and the recent agreement to hold up drilling operations in the Kettleman Hills field of California until 1931 is expected to have a favorable influence on the oil industry. Demand from the automobile industry for mechanical tubing has declined, but a resumption is expected in a few weeks. Other users of mechanical tubing have not reduced their specifications and boiler tubes are moderately active.

Sheets.—The sheet market shows no further weakness except on galvanized

The Iron Age Composite Prices

Finished Steel

Aug. 6, 1929, 2.412c. a Lb.

One week ago	2.412c.
One month ago	2.412c.
One year ago	2.348c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products make 87 per cent of the United States output of finished steel.

	High		Low	
1929	2.412c.,	April 2;	2.391c.,	Jan. 8
1928	2.391c.,	Dec. 11;	2.314c.,	Jan. 3
1927	2.453c.,	Jan. 4;	2.293c.,	Oct. 25
1926	2.453c.,	Jan. 5;	2.403c.,	May 18
1925	2.560c.,	Jan. 6;	2.396c.,	Aug. 18

Pig Iron

Aug. 6, 1929, $18.42 a Gross Ton

One week ago	$18.38
One month ago	18.63
One year ago	17.04
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low	
1929	$18.71,	May 14;	$18.29,	March 19
1928	18.59,	Nov. 27;	17.04,	July 24
1927	19.71,	Jan. 4;	17.54,	Nov. 1
1926	21.54,	Jan. 5;	19.46,	July 13
1925	22.50,	Jan. 13;	18.96,	July 7

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base per Lb.
F.o.b. Pittsburgh mill	1.95c.
F.o.b. Chicago	2.05c.
Del'd Philadelphia	2.27c.
Del'd New York	2.29c.
Del'd Cleveland	1.92½c. to 1.95c.
F.o.b. Cleveland	1.90c. to 1.95c.
F.o.b. Lackawanna	2.05c.
F.o.b. Birmingham	2.15c.
C.i.f. Pacific ports	2.35c.
F.o.b. San Francisco mills	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills, 40, 50, 60-ft.	2.05c.
F.o.b. Pittsburgh mills, cut lengths	2.30c.
F.o.b. Birmingham, mill lengths	2.15c.

Rail Steel

F.o.b. mills, east of Chicago dist.	1.85c. to 1.90c.
F.o.b. Chicago Heights mill	1.95c.
Del'd Philadelphia	2.27c.

Iron

Common iron, f.o.b. Chicago	2.05c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	2.12c.
Common iron, del'd New York	2.14c.

Tank Plates

	Base per Lb.
F.o.b. Pittsburgh mill	1.95c.
F.o.b. Chicago	2.05c.
F.o.b. Birmingham	2.15c.
Del'd Cleveland	2.14c.
Del'd Philadelphia	2.15c.
F.o.b. Coatesville	2.05c.
F.o.b. Sparrow Point	2.05c.
F.o.b. Lackawanna	2.05c.
Del'd New York	2.22½c.
C.i.f. Pacific ports	2.35c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh mill	1.95c.
F.o.b. Chicago	2.05c.
F.o.b. Birmingham	2.15c.
F.o.b. Lackawanna	2.05c.
F.o.b. Bethlehem	2.05c.
Del'd Cleveland	2.14c.
Del'd Philadelphia	2.01c. to 2.06c.
Del'd New York	2.14½c.
C.i.f. Pacific ports	2.35c.

Hot-Rolled Hoops, Bands and Strips

	Base per Lb.
6 in. and narrower, P'gh	2.00c.
Wider than 6 in., P'gh	1.90c.
6 in. and narrower, Chicago	2.20c.
Wider than 6 in., Chicago	2.10c.
Cooperage stock, P'gh	2.20c.
Cooperage stock, Chicago	2.30c.

Cold-Finished Steel

	Base per Lb.
Bars, f.o.b. Pittsburgh mill	2.30c.
Bars, f.o.b. Chicago	2.30c.
Bars, Cleveland	2.35c.
Shafting, ground, f.o.b. mill	*2.65c. to 3.60c.
Strips, P'gh	2.75c.
Strips, Cleveland	2.75c. to 2.85c.
Strips, del'd Chicago	3.05c. to 3.15c.
Strips, Worcester	2.90c. to 3.00c.
Fender stock, No. 20 gage, Pittsburgh or Cleveland	4.25c.

*According to size.

Wire Products

(Carload lots, f.o.b. Pittsburgh and Cleveland, to jobbers and retailers.)

	Base per Keg
Wire nails	$2.55 to $2.65
Galvanized nails	4.55 to 4.65
Galvanized staples	3.25 to 3.35
Polished staples	3c. to 3.10c.
Cement coated nails	2.55 to 2.65

	Base per 100 Lb.
Bright plain wire, No. 6 to No. 9 gage	$2.50 to $2.60
Annealed fence wire	2.65 to 2.75
Spring wire	3.50 to 3.60
Galv'd wire, No. 9	3.10 to 3.20
Barbed wire, galv'd	3.20 to 3.30
Barbed wire, painted	2.95 to 3.05
Woven wire fence (per net ton to retailers)	65.00

Chicago district mill and delivered Chicago prices are $1 per ton above the foregoing. Birmingham mill prices $3 a ton higher; Worcester, Mass. (wire), mill $3 a ton higher on production of that plant; Duluth, Minn., mill $2 a ton higher; Anderson, Ind., $1 higher.

Cut Nails

	Per 100 Lb.
Carloads, Wheeling, Reading or Northumberland, Pa.	$2.70
Less carloads, Wheeling or Reading	2.80

Light Plates

No. 10, blue annealed, f.o.b. P'gh.	2.10c. to 2.20c.
No. 10, blue annealed, f.o.b. Chicago dist.	2.30c.
No. 10, blue annealed, del'd Phila.	2.42c. to 2.52c.
No. 10, blue annealed, B'ham	2.35c.

Sheets

Blue Annealed

	Base per Lb.
No. 13, f.o.b. P'gh	2.25c. to 2.35c.
No. 13, f.o.b. Chicago dist.	2.45c.
No. 13, del'd Philadelphia	2.67c.
No. 13, blue annealed, B'ham	2.50c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh	2.85c.
No. 24, f.o.b. Chicago dist. mill	2.95c. to 3.05c.
No. 24, del'd Philadelphia	3.17c. to 3.27c.
No. 24, f.o.b. Birmingham	3.00c. to 3.10c.

Metal Furniture Sheets

No. 24, f.o.b. P'gh	4.10c. to 4.20c.

Galvanized

No. 24, f.o.b. Pittsburgh	3.50c. to 3.60c.
No. 24, f.o.b. Chicago dist. mill	3.70c. to 3.80c.
No. 24, del'd Cleveland	3.59c. to 3.79c.
No. 24, del'd Philadelphia	3.92c. to 4.02c.
No. 24, f.o.b. Birmingham	3.75c. to 3.85c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.90c. to 3.00c.
No. 28, f.o.b. Chicago dist. mill	3.00c. to 3.10c.

Automobile Body Sheets

No. 28, f.o.b. Pittsburgh	4.10c.

Long Ternes

No. 24, 8-lb. coating, f.o.b. mill	4.00c.

Vitreous Enameling Stock

No. 24, f.o.b. Pittsburgh	3.90c.

Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills	$5.35
Standard cokes, f.o.b. Gary	5.45

Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)
(Per Package, 20 x 28 in.)

8-lb. coating I.C.	$11.20
15-lb. coating I.C.	14.00
20-lb. coating I.C.	15.30
25-lb. coating I.C.	$16.70
30-lb. coating I.C.	17.75
40-lb. coating I.C.	19.85

Alloy Steel Bars

(F.o.b. makers' mill)

Alloy Quality Bar Base, 2.65c. to 2.75c. per Lb.

S.A.E. Series Numbers		Alloy Differential
2000	(½% Nickel)	0.25
2100	(1½% Nickel)	0.55
2300	(3½% Nickel)	1.50
2500	(5% Nickel)	2.25
3100	Nickel Chromium	0.55
3200	Nickel Chromium	1.35
3300	Nickel Chromium	3.80
3400	Nickel Chromium	3.20
4100	Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50
4100	Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600	Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel)	1.05
5100	Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100	Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100	Chromium Spring Steel	0.20
6100	Chromium Vanadium Bars	1.20
6100	Chromium Vanadium Spring Steel	0.95
9250	Silicon Manganese Spring Steel (flats)	0.25
	Rounds and squares	0.50
	Chromium Nickel Vanadium	1.50
	Carbon Vanadium	0.95

Above prices are for hot rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is ¾c. per lb. higher. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis.

Billets under 4 x 4 in. carry the steel bar base. Slabs with a sectional area of 16 in. or over carry the billet price. Slabs with sectional area of less than 16 in. or less than 2½ in. thick, regardless of sectional area, take the bar price.

Rails

	Per Gross Ton
Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	36.00
Light (from rail steel), f.o.b. mill	34.00
Light (from billets), f.o.b. Ch'go mill	36.00

Track Equipment

	Base per 100 Lb.
Spikes, ⅜ in. and larger	$2.80
Spikes, ½ in. and smaller	2.80
Spikes, boat and barge	3.00
Tie plate, steel	2.15
Angle bars	$2.75
Track bolts, to steam railroads	$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel Inches	Black	Galv.	Iron Inches	Black	Galv.
⅛	45	19½	¼ and ⅜	+11	+36
¼ to ⅜	51	25½	½	23	5
½	56	42½	¾	28	11
¾	60	48½	1 and 1¼	31	15
1 to 3	62	50½	1½ and 2	35	18

Lap Weld

2	55	43½	2	23	9
2½ to 6	59	47½	2½ to 3½	28	13
7 and 8	56	43½	4 to 6	30	17
9 and 10	54	42½	7 and 8	29	16
11 and 12	53	40½	9 to 12	26	11

Butt Weld, extra strong, plain ends

⅛	41	24½	¼ and ⅜	+13	+48
¼ to ⅜	47	30½	½	23	7
½	53	42½	¾	28	12
¾	58	47½	1 to 2	34	18
1 to 1½	60	49½			
2 to 3	61	50½			

Lap Weld, extra strong, plain ends

2	53	42½	½	29	13
2½ to 4	57	46½	2½ to 4	34	20
4½ to 6	56	45½	4½ to 6	33	19
7 to 8	52	39½	7 and 8	31	17
9 and 10	45	32½	9 to 12	21	8
11 and 12	44	31½			

On carloads the above discounts on steel pipe are increased on block by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Steel		Charcoal Iron	
2 in. and 2¼ in.	40	1½ in.	1
2½ in.—2¾ in.	48	1¾ in.	8
3 in.	54	2 in.—2¼ in.	13
3¼ in.—3¾ in.	56	2½ in.—2¾ in.	16
4 in.	59	3 in.	17
4½ in. to 6 in.	48	3¼ in. to 3½ in.	18
		4 in.	20
		4½ in.	21

On lots of a carload or more, the above base discounts are subject to a preferential of two fives on steel and of 10 per cent on charcoal iron tubes. Smaller quantities are subject to the following modifications from the base discounts:

Lap Welded Steel—Under 10,000 lb., 6 points under base and one five; 10,000 lb. to carload, 4 points under base and two fives. Charcoal Iron—Under 10,000 lb., 2 points under base; 10,000 lb. to carload, base and one five.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	63	3 in.	48
1¼ to 1½ in.	55	3¼ to 3½ in.	50
1¾ in.	39	4 in.	53
2 to 2¼ in.	34	4½, 5 and 6 in.	42
2½ to 2¾ in.	42		

Hot Rolled

2 and 2¼ in.	40	3¼ to 3½ in.	56
2½ and 2¾ in.	48	4 in.	59
3 in.	54	4½, 5 and 6 in.	48

Beyond the above base discounts a preferential discount of 5 per cent is allowed on carload lots. On less than carloads to 10,000 lb. base discounts are reduced 4 points with 5 per cent preferential; on less than 10,000 lb., base discounts are reduced 6 points, with no preferential. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage take mechanical tube list and discounts. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30%, base (carloads)	55
Carbon, 0.30% to 0.40%, base	50

Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

material. Now, however, the 3.50c., Pittsburgh, price to jobbers has been extended to other consumers in many cases. Some mills will not take business at less than 3.60c., and this figure is still representative of the general market. Sales to jobbers at less than 3.50c. are confined to the South, where chaotic price conditions have existed for some time. On black sheets the market seems to have achieved a degree of stability at 2.85c., Pittsburgh, and an advance on fourth-quarter business seems likely. Blue annealed light plates are weak in competition with wide strip, although jobbing mills are so well supplied with business that they are regularly refusing orders at less than 2.20c., Pittsburgh. Shading of the 2.35c., Pittsburgh, price on blue annealed, No. 13 gage, is not reported in this district. Sheet mills in the Pittsburgh, Ohio River and Youngstown districts are generally scheduled at capacity through August and well into September on some finishes. The leading interest has scheduled its mills at 97 per cent of theoretical capacity this week, as against 98 per cent last week, with a scarcely perceptible reduction in backlogs. A strong demand for metal furniture sheets is reported with a price of 4.20c., Pittsburgh, ruling on new business. Shipments of automobile body sheets have declined in the last two weeks and a still greater decrease is expected preparatory to the introduction of new models.

Tin Plate.—The tin plate market shows little change, with current specifications against September tonnage sufficient to maintain mill operations at about 90 per cent of capacity. One or two of the independent companies are at a higher figure. Any change in this situation is expected to be on the side of a decrease, as the tin plate industry operates far enough ahead of consumption to have taken care of the larger requirements of the container manufacturers before the end of the summer.

Strip Steel.—Specifications for cold-rolled strip have been somewhat heavier in the last week and the market has also developed a better tone with regard to price. Mills of several producers are scheduled at close to capacity throughout August and if demand continues to improve larger backlogs will begin to accumulate before the end of the month. No recent concessions from the 2.75c., Pittsburgh or Cleveland, price have been reported and mills are again attempting to get 2.85c. on small tonnages. The hot-rolled strip business continues quiet. Operations are on a hand-to-mouth basis and demand is spotty. Quoted prices are holding, with material 6 in. and narrower at 2c., Pittsburgh, and the wider sizes at 1.90c.

Cold-Finished Steel Bars.—July business was about equal to June with most makers and some of them report a slight improvement in specifications in the last week. Shipments to the automotive industry have declined, but Detroit offices of local companies bear out the impression of the trade that a heavier demand from this source may be expected before the end of the month. Makers of agricultural implements served by Pittsburgh mills have maintained high summer schedules and heavier demand from the automobile industry will offset a seasonal decline from the former channel. Prices are holding satisfactorily at 2.30c., Pittsburgh.

Coal and Coke.—The coke market is still very quiet, with business confined entirely to small lot purchases, which add little to the schedules of ovens. In the Connellsville district beehive production is being maintained at a high rate for this time of the year, but demand is hardly equal to operations, particularly in the case of independent companies. Anticipation of heavy fall business is maintaining the price of furnace coke at $2.75 to $2.85 per net ton, Connellsville. Foundry coke is also quiet and prices are weak. Only the premium brands are bringing the full quoted price. The coal market has not yet felt the beginning of fall demand and shows little improvement.

Old Material.—The scrap market has passed through a week of extreme lethargy, but the situation has developed no justification for lower prices. In fact, short shoveling steel turnings have been sold at $13.50, an advance of 50c. over previous transactions, and machine shop turnings are correspondingly higher. This is a further reflection of the strength in low-priced materials brought about by the high prices of the heavier grades of steel. The Pittsburgh situation is an unusual one, in view of the fact that both heavy melting steel and compressed sheets are equally strong, if not stronger, in the Youngstown district than they are in Pittsburgh. Dealers in Detroit have been paying as high as $15 for compressed sheets for shipment by water to eastern Lake ports. With freight rates to Youngstown and Pittsburgh of approximately $3.50 and $4 a ton, this steel could not be moved here at the price local mills paid for their last tonnages of compressed. Nevertheless, $18.50 remains the top of the market on the basis of actual sales and local consumers show no disposition to pay more. The closing tomorrow of the Pennsylvania Railroad list will probably give the scrap market a more definite position. The week preceding this letting is nearly always a quiet one, and in view of the difference of opinion as to what the current list will bring, there is no justification for changing the present quotation of $18.50 to $19 on heavy melting steel. Some dealers report that heavy melting can be bought at $18 and $18.25 for consumption in this district, but the more common prices seem to range from $18.50 to $18.75. Specialties continue strong with the supply very limited. The monthly list of the Norfolk & Western, which will close on Aug. 9, contains 4400 tons.

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.25c.
Hoops	4.25c.
Black sheets (No. 24), 25 or more bundles	3.80c.
Galv. sheets (No. 24), 25 or more bundles	4.55c.
Light plates, blue ann'l'd (No. 10), 1 to 10 plates	3.45c.
Blue annealed sheets (No. 13), 1 to 10 sheets	3.60c.
Galv. corrug. sheets (No. 28), per square	$4.43
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count,	60 per cent off list
Machine bolts, 100 count,	60 per cent off list
Carriage bolts, 100 count,	60 per cent off list
Nuts, all styles, 100 count,	60 per cent off list
Large rivets, base per 100 lb.	$3.50
Wire, black soft ann'l'd, base per 100 lb.	$3.00 to 3.10
Wire, galv. soft, base per 100 lb.	3.00 to 3.10
Common wire nails, per keg.	2.90 to 3.00
Cement coated nails, per keg	3.05

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$18.50 to $19.00
No. 2 heavy melting steel	16.50 to 17.00
Scrap rails	18.00 to 18.50
Compressed sheet steel	18.00 to 18.50
Bundled sheets, sides and ends	17.00 to 17.50
Cast iron carwheels	16.50 to 17.00
Sheet bar crops, ordinary	19.50 to 20.00
Heavy breakable cast	13.00 to 13.50
No. 2 railroad wrought	18.50 to 19.00
Hvy. steel axle turnings	16.50 to 17.00
Machine shop turnings	12.50 to 13.00
Acid Open-Hearth Grades:	
Railr. knuckles and couplers	21.50 to 22.00
Railr. coil and leaf springs	21.50 to 22.00
Rolled steel wheels	21.50 to 22.00
Low phos. billet and bloom ends	22.50 to 23.00
Low phos., mill plates	22.50 to 23.00
Low phos., light grades	20.50 to 21.50
Low phos., sheet bar crops	20.50 to 21.50
Heavy steel axle turnings	16.50 to 17.00
Electric Furnace Grades:	
Low phos., punchings	20.00 to 21.00
Hvy. steel axle turnings	16.50 to 17.00
Blast Furnace Grades:	
Short shoveling steel turnings	13.00 to 13.50
Short mixed borings and turnings	12.50 to 13.00
Cast iron borings	12.50 to 13.00
Rolling Mill Grades:	
Steel car axles	21.50 to 22.00
Cupola Grades:	
No. 1 cast	15.00 to 16.00
Rails 3 ft. and under	20.00 to 21.00

Aetna-Standard Company Plans Expansion

YOUNGSTOWN, Aug. 6.—The Aetna-Standard Engineering Co., manufacturer of rolling mill equipment, plans to double its common stock, increasing authorized shares to 200,000 from 100,000. Part of the proceeds of this issue will be used to pay a stock dividend and the rest to provide funds for an expansion program. The company controls important patents in the manufacture of continuous mill equipment for producing sheets, strips and tin plate, and operates plants at Warren, Ohio, and Ellwood City, Pa.

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

Billets and Blooms

	Per Gross Ton
Rerolling, 4 in. and under 10 in., Pittsburgh	$35.00
Rerolling, 4 in. and under 10 in., Youngstown	35.00
Rerolling, 4 in. and under 10 in., Cleveland	35.00
Rerolling, 4 in. and under 10 in., Chicago	37.00
Forging quality, Pittsburgh	$40.00 to 41.00

Sheet Bars

(Open Hearth or Bessemer)

	Per Gross Ton
Pittsburgh	$35.00
Youngstown	35.00
Cleveland	35.00

Slabs

(8 in. x 2 in. and under 10 in. x 10 in.)

	Per Gross Ton
Pittsburgh	$35.00
Youngstown	35.00
Cleveland	35.00

Skelp

(F.o.b. Pittsburgh or Youngstown)

	Per Lb.
Grooved	1.85c. to 1.90c.
Universal	1.85c. to 1.90c.
Sheared	1.85c. to 1.90c.

Wire Rods

(Common soft, base)

	Per Gross Ton
Pittsburgh	$42.00
Cleveland	42.00
Chicago	43.00

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.80
Old range non-Bessemer, 51.50% iron	4.65
Mesabi Bessemer, 51.50% iron	4.65
Mesabi non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.40

Foreign Ore, c.i.f. Philadelphia or Baltimore	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algerian	10.00c.
Iron ore, low phos., Swedish, average 68% iron	10.00c.
Iron ore, basis Swedish, average 65% iron	9.00c.
Manganese ore, washed, 52% manganese, from the Caucasus	33.00c. to 35.00c.
Manganese ore, Brazilian, African or Indian, basic 50%	33.00c. to 35.00c.
Tungsten ore, high grade, per unit, in 60% concentrates	$15.00 to $15.50

	Per Gross Ton
Chrome ore, 45 to 50% Cr_2O_3, crude, c.i.f. Atlantic seaboard	$22.00 to $24.00

	Per Lb.
Molybdenum ore, 85% concentrates of MoS_2, delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$2.75 to $2.85
Foundry, f.o.b. Connellsville prompt	3.75 to 4.85
Foundry, by-product, Ch'go ovens	8.00
Foundry, by-product, New England, del'd	11.00
Foundry, by-product, Newark or Jersey City, delivered	9.00 to 9.40
Foundry, by-product, Phila.	9.00
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry by-prod., del'd St. Louis	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.25 to $1.75
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, ¾-in. f.o.b. Pa. mines	1.90 to 2.00
Mine run gas coal, f.o.b. Pa. mines	1.65 to 1.75
Steam slack, f.o.b. W. Pa. mines	80c. to 90c.
Gas slack, f.o.b. W. Pa. mines	1.00 to 1.10

Ferromanganese

	Per Gross Ton
Domestic, 80%, seaboard	$105.00
Foreign, 80%, Atlantic or Gulf port, duty paid	105.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$31.00 to $34.00
Domestic, 16 to 19%	29.00 to 32.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$83.50
75%	130.00

Per Gross Ton Furnace		Per Gross Ton Furnace	
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	45.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

Per Gross Ton		Per Gross Ton	
10%	$30.00	12%	$34.00
11%	32.00		

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

Per Gross Ton		Per Gross Ton	
6%	$23.00	10%	$27.00 to $28.00
7%	24.00	11%	29.00 to 30.00
8%	25.00	12%	31.00 to 32.00
9%	26.00		

Other Ferroalloys

Ferrotungsten, per lb., contained metal del'd	$1.40 to $1.50
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.15 to $3.65
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	$160.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton	$91.00
Ferrophosphorus, electric 24%, f.o.b. Anniston, Ala., per gross ton	$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silicon, gravel, f.o.b. Illinois and Kentucky mines	$18.00
No. 2 lump, Illinois and Kentucky mines	20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	$18.00 to $18.50
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines	32.50

Fire Clay Brick

	Per 1000 f.o.b. Works	
	High-Heat Duty Brick	Intermediate Heavy Duty Brick
Pennsylvania	$43.00 to $46.00	$35.00 to $38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	.....
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00
Standard size	45.00

Chrome Brick

	Per Net Ton
Standard size	$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts, blank or tapped, hexagons	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	7.00c. to 6.75c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled thread up to and including ⅛ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagons nuts	70
Semi-finished hexagons castellated nuts, S.A.E.	70
Stove bolts in packages, P'gh	75, 20, 10 and 5
Stove bolts in packages, Chicago	75, 20, 10 and 5
Stove bolts in packages, Cleveland	75, 20, 10 and 5
Stove bolts in bulk, P'gh	75, 20, 10, 5 and 2½
Stove bolts in bulk, Chicago	75, 20, 10, 5 and 2½
Stove bolts in bulk, Cleveland	75, 20, 10, 5 and 2½
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55, 60 per cent apply.

Large Rivets

(½-In. and Larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$3.10
F.o.b. Chicago	3.20

Small Rivets

(⅞-In. and Smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70 and 10
F.o.b. Cleveland	70 and 10
F.o.b. Chicago	70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10 and 5
Milled standard set screws, case hardened,	80 and 5
Milled headless set screws, cut thread	75 and 10
Upset hex. head cap screws, U.S.S. thread	85
Upset hex. cap screws, S.A.E. thread	85
Upset set screws	80, 10 and 5
Milled studs	70

Chicago

Sales Equal to Shipments, Which Are at Full Capacity—Prices on the Whole Steady

CHICAGO, Aug. 6.—Deliveries from Chicago steel mills promise to step forward as specifications for the week now closing total the largest since April 26. New sales are equal to shipments, which continue at full ingot capacity.

There are no outstanding sources of orders this week, both new purchases and releases coming from widely diversified industries and from a broad territory. Computations are complete on steel shipments in July and it has been found that that tonnage exceeded July, 1928, by 35 per cent. Corresponding increases were recorded in sales and specifications. This is significant, inasmuch as the end of April usually reflects a downward trend in the demand for steel, whereas this year ingot capacity has been fully engaged through the late spring and so far this summer.

One of the foremost light automobile manufacturers has reduced production schedules. This is reflected in lighter specifications for alloy steel bars. On the other hand, several makers are increasing the assembly of new models and larger quantities of steel are being used.

The railroad equipment market is on the mend as to fresh inquiries. The Chicago, Milwaukee, St. Paul & Pacific came into the market today for 1000 70-ton gondola cars, and 500 refrigerator cars will be bought by the Pacific Fruit Express.

Prices on the whole are steady. Plates, shapes and bars readily bring 2.05c. a lb., Chicago, and sellers are holding to current quotations on semi-finished steel, the supply of which is not freer than in recent weeks. Weakness continues in nails and jobbers in the local market are getting concessions on wire as well as on galvanized sheets.

Northern foundry iron quotations are steady at $20 a ton. Scrap quotations are unchanged, though sentiment among sellers is that higher prices are near at hand.

Pig Iron.—August shipments of Northern iron are running fully 5 per cent ahead of the rate in July. New sales are more active as many melters are covering for the remainder of the year. Several inquiries ranging from 500 tons to 2000 tons have come from Indiana buyers. It is estimated here that about 35,000 to 40,000 tons of boat iron has reached Chicago this year. This is said to be about equal to the total tonnage received in the entire season of navigation in 1928. Prices for Southern iron remain weak as sellers press to expand its use in this district. An order for Southern basic iron is said to have been duplicated in the St. Louis territory, where it is also reported that not less than 35,000 tons of Southern iron has been sold in the last month.

Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	$20.00
N'th'n No. 1 fdy., sil. 2.25 to 2.75	20.50
Malleable, not over 2.25 sil.	20.00
High phosphorus	20.00
Lake Super. charcoal, sil. 1.50	27.04
So'th'n No. 2 fdy. (all rail)	$19.51 to 20.51
Low phos., sil. 1 to 2, copper free	29.50
Silvery, sil. 8 per cent	29.79
Bess. ferrosilicon, 14-15 per cent	46.29

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Ferroalloys.—A small resale lot of spiegeleisen has been sold in this district at $33 a ton, Hazard, Pa. On the whole this market is quiet, with shipments moving forward in satisfactory volume.

Prices delivered Chicago: 80 per cent ferromanganese, $112.56; 50 per cent ferrosilicon, $83.50 to $88.50; spiegeleisen, 19 to 21 per cent, $40.76.

Structural Material.—Fresh awards total 3500 tons, and new inquiries call for 6000 tons. Two new jobs are in prospect in Chicago, one being for 2500 tons for a chain of garages and the other an unstated tonnage for the 35-story Otis Estate office building. Little is known regarding the extension to the outer drive and the new bridge that is to span the mouth of the Chicago River except that designs are being prepared. The Cuneo Tower project has hit a snag because of opposition to the height of the outer walls up to the first setback. Competition remains keen for going tonnages and price levels are unchanged.

Mill prices on plain material, per lb.: 2.05c. base, Chicago.

Wire Products.—Specifications were heavier than in the previous week, largely because many jobbers are filling in stocks, which had been allowed to dwindle. Quotations on wire to the manufacturing trade, which is taking tonnages at a uniform rate, are steady, but jobbers in Chicago and to the south, notably St. Louis, are getting concessions on both wire and nails. Wire mill operations are holding at 65 per cent of capacity and at that rate stocks are expanding. For the country as a whole crops are reported to be in a better than average condition. Mill prices on wire and wire products are given on page 367.

Cold-Rolled Strips.—Prices are unchanged in a quiet market. Specifications on the whole are lighter, and operations are tending downward from the current rate of 70 per cent of capacity. In the absence of buying, except in small and scattered lots, producers' backlogs are shrinking.

Hot-Rolled Strips.—Operations in this district are near capacity and specifications are fully equal to shipments. Deliveries are at reasonably close range.

Rails and Track Supplies.—Rail mill operations remain steady, with schedules well set for August. Both new orders and fresh inquiries are limited to miscellaneous small lots. Definite word has not yet come from the Northern Pacific, which is expected to inquire for 15,000 tons. New business in track accessories totals 2500 tons. The end of the summer demand for these commodities is in sight and mills look for lighter production schedules at an early date. The light rail market is dull.

Prices f.o.b. mill, per gross ton: Standard section open-hearth and Bess. rails, $43; light rails, rolled from billets, $36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.15c.; angle bars, 2.75c.

Cast Iron Pipe.—The market is more active, although little new business is developing in and near Chicago. The Great Northern is said to have placed 32,000 ft. of 10-in. pipe with an unnamed bidder, and James B. Clow & Sons have been awarded 125 tons of 4 to 24-in. pipe by Grand Rapids, Mich. The American Cast Iron Pipe Co. was successful bidder on a tonnage for Minneapolis. Peoria, Ill., is in the market for 500 tons of pipe and fittings for a sewage disposal plant, and Adrian, Mich., will buy 100 tons of 10 to 16-in. pipe. Several Western railroads have made purchases of small tonnages. Deliveries are prompt and prices are steady at $45.20 to $46.20 a ton, delivered Chicago, for 6-in. and larger diameter.

Prices per net ton, del'd Chicago: Water pipe, 6-in. and over, $45.20 to $46.20; 4-in., $49.20 to $50.20; Class A and gas pipe, $3 extra.

Sheets.—Buying for close-by needs continues brisk, and producers' books are growing at a rapid pace. Hot weather is having a telling effect on output, which for the week did not average above 80 per cent. This condition, plus the tight situation in sheets bars, is resulting in deliveries falling back, especially in the blue annealed product. Promises of shipments of light plates and blue annealed sheets are now beyond 12 weeks, while deliveries of galvanized and black sheets have advanced to a range of four to five weeks. Prices are less stable, with concessions being granted on galvanized sheets to be delivered in the South and Southwest and with local jobbers being able to get better than quoted prices on carloads of the galvanized and black grades. Distribution by the jobbing trade is heavy and this is reflected to the mills in large specifications.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 3.10c.; No. 24 galv., 3.85c.; No. 10 blue ann'l'd, 2.35c. Deliv'd prices at other Western points are equal to the freight from Gary, plus the mill prices, which are 5c. per 100 lb. lower than Chicago delivered prices.

Bars.—Both specifications and sales of mild steel bars are well above the weekly average to date this year and deliveries are slowly creeping forward. Forgers in the Chicago district are taking liberal quantities of bars, with their operations continuing near capacity. Pressure for steel by the agri-

cultural implement trade is not so severe as earlier in the year, though shipments from mills are somewhat larger as August gets under way. Specifications for alloy steel bars are lighter, following curtailment of output by one of the foremost makers of light motor cars. Demand from other users remains steady, and spot purchases are active at current quotations. Output averages a trifle above 70 per cent of capacity. Demand for iron bars from the railroads thus far this year has shown marked improvement over that of the first seven months of 1928. Specifications for rail steel bars are equal to production, with local mills on a double turn basis. Mill prices remain firm at 1.95c. a lb., Chicago Heights, and deliveries range from three to four weeks.

Reinforcing Bars.—Contracts for reinforcing bars have been fairly numerous in the last 10 days and, if releases come as expected by the trade, shop operations soon will be lifted above the current range of 60 to 70 per cent. Dealers expect prices to strengthen. This week gives no reflection of such a change, and it could not be made quickly because of outstanding quotations on a long pending list. Close to 450 tons has been ordered for a warehouse in Chicago. A commercial building will take 400 tons and a garage 250 tons. Sub-contractors are taking bids on reinforcing steel for a Jewel Tea Co. building at Barrington, Ill. There is still doubt whether this tonnage will be purchased by the general contractor or by a sub-contractor. Recent awards and new inquiries are given on page 386.

Plates.—Over 7000 tons of tank plates will be required in two orders for oil storage tanks which will be fabricated near Chicago for shipment to the South and to the Southwest. Tank builders in the Chicago district and in the Southwest are busy, with well balanced books, and specifications forwarded by them to local mills are in good volume. Pending tank jobs are in good number and well scattered over a wide territory. Shipments of plates to the Milwaukee pipe manufacturers are heavy. A local fabricator has ordered 1000 tons of plates for pipe and plate work in connection with a new blast furnace which was announced in the spring by the Wisconsin Steel Works. Deliveries on plates are again moving ahead under the influence of heavier specifications. The best promises that are now being made range from seven to eight weeks. The railroad car market is less active from the viewpoint of specifications against old orders, but there is greater promise that fresh purchases are not far in the future. The Pacific Fruit Express is inquiring for 500 refrigerator cars, and it is reported that a Western railroad will soon ask for prices on 1000 freight cars. It is computed here that replacements by private buyers and railroads have barely kept pace with the retirement of cars in the last three years. Many believe that greater efficiency in the use of equipment has not kept up with increases in the volume of freight. The movement of wheat from Kansas is unusually heavy and complaints concerning car service are reported. It is stated that the Santa Fe, Burlington, Chicago & North Western and the Illinois Central are among the Western railroads that may enter the market in the early fall.

Bolts, Nuts and Rivets.—Shipments of these commodities so far in August are running parallel with the rate in July. Specifications in recent days have been heavier, giving encouragement to the trade that demand will gain headway. Farm implement manufacturers are ordering cautiously but at a rate which indicates they are not far from capacity operations.

Coke.—The Chicago by-product foundry coke market is quiet except in the matter of shipments, which show no change from recent weeks.

Old Material.—Brokers are losing none of their bullish attitude, in spite of stiff resistance encountered from buyers. Sellers discount the statement of some large users that stock piles are ample, preferring to believe that many melters are leaning heavily on current shipments. At the moment incoming scrap is ample to meet the needs of buyers. However, there are persistent reports of round tonnages of manufacturers' scrap moving east from Michigan and of railroad scrap that is being diverted from Chicago to other producing centers. A reflection of the brokers' attitude is shown in their willingness to pay railroads as high as $16 a gross ton, delivered, for heavy melting steel, which, as gaged by the last prices paid by consumers, would go against orders at $15.25 a ton. This week a dealer has paid a railroad the equivalent of $19.70 a gross ton, delivered, for a tonnage of rerolling rails. This is $1.20 a ton above the price last paid by a consumer. On the whole, it may be said that brokers' bids for railroad items are 50c. to 75c. a ton above quotations on the last consumer sales.

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars	3.00c.
Reinforc'g bars, billet steel	2.15c. to 2.35c.
Reinforc'g bars, rail steel	1.85c. to 1.95c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Bands (1/16 in. in Nos. 10 and 12 gages)	3.20c.
Hoops (No. 14 gage and lighter)	3.75c.
Black sheets (No. 24)	4.05c.
Galv. sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.35c.
Spikes, 1/2 in. and larger	3.55c.
Track bolts	4.55c.
Rivets, structural	4.00c.
Rivets, boiler	4.00c.
	Per Cent Off List
Machine bolts	60
Carriage bolts	60
Coach or lag screws	60
Hot-pressed nuts, sq., tap. or blank	60
Hot-pressed nuts, hex., tap. or blank	60
No. 8 black ann'l'd wire, per 100 lb.	$3.45
Com. wire nails, base per keg	3.20
Cement c't'd nails, base per keg	3.20

Prices deliv'd Chicago district consumers:

	Per Gross Ton
Basic Open-Hearth Grades:	
Heavy melting steel	$14.75 to $15.25
Shoveling steel	14.75 to 15.25
Frogs, switches and guards, cut apart, and misc. rails	16.50 to 17.00
Hydraul. compressed sheets	13.00 to 13.50
Drop forge flashings	10.50 to 11.00
No. 1 busheling	13.00 to 13.50
Forg'd cast and r'l'd steel carwheels	18.50 to 19.00
Railroad tires, charg. box size	18.50 to 19.00
Railroad leaf springs cut apart	18.50 to 19.00
Acid Open-Hearth Grades:	
Steel couplers and knuckles	16.75 to 17.25
Coil springs	19.00 to 19.50
Electric Furnace Grades:	
Axle turnings	14.50 to 15.00
Low phos. punchings	16.50 to 17.00
Low phos. plates, 12 in. and under	16.50 to 17.00
Blast Furnace Grades:	
Axle turnings	10.75 to 11.25
Cast iron borings	9.75 to 10.25
Short shoveling turnings	9.75 to 10.25
Machine shop turnings	7.00 to 7.50
Rolling Mill Grades:	
Iron rails	16.00 to 16.50
Rerolling rails	17.50 to 18.00
Cupola Grades:	
Steel rails less than 3 ft.	17.75 to 18.25
Steel rails less than 2 ft.	18.25 to 18.75
Angle bars, steel	17.00 to 17.50
Cast iron carwheels	14.00 to 14.50
Malleable Grades:	
Railroad	16.75 to 17.25
Agricultural	15.50 to 16.00
Miscellaneous:	
*Relaying rails, 56 to 60 lb.	23.00 to 25.00
*Relaying rails, 65 lb. and heav.	26.00 to 31.00
	Per Net Ton
Rolling Mill Grades:	
Iron angle and splice bars	15.00 to 15.50
Iron arch bars and transoms	21.00 to 21.50
Iron car axles	26.00 to 26.50
Steel car axles	16.50 to 17.00
No. 1 railroad wrought	13.50 to 14.00
No. 2 railroad wrought	13.00 to 13.50
No. 1 busheling	9.00 to 9.50
No. 2 busheling	7.00 to 7.50
Locomotive tires, smooth	14.50 to 15.00
Pipes and flues	10.00 to 10.50
Cupola Grades:	
No. 1 machinery cast	14.50 to 15.00
No. 1 railroad cast	13.75 to 14.25
No. 1 agricultural cast	13.25 to 13.75
Stove plates	12.25 to 12.75
Grate bars	11.75 to 12.25
Brake shoes	10.50 to 11.00

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Advances in Detroit Scrap

DETROIT, Aug. 6.—Curtailed automobile production is reflected in the market on waste material, in that heavy melting and shoveling steel advanced 25c. a ton, long turnings 50c., and hydraulic compressed and flashings, 25c. There have been some sales to mills and furnaces, with the result that the market is strong.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Hvy. melting and shov. steel	$14.25 to $14.75
Borings and short turnings	9.00 to 9.50
Long turnings	8.50 to 9.00
No. 1 machinery cast	12.50 to 13.00
Automobile cast	13.00 to 13.50
Hydraul. comp. sheets	14.00 to 14.50
Stove plate	9.00 to 9.50
New No. 1 busheling	12.50 to 13.00
Old No. 1 busheling	11.00 to 11.50
Sheet clippings	8.75 to 9.25
Flashings	13.00 to 13.50

New York

Record Amount of Structural Steel Work Pending— Pig Iron Prices Are Steadier

NEW YORK, Aug. 6.—Pig iron sales continue in fair volume, totaling 11,000 tons for the week. While buyers are still rather apathetic, sellers are succeeding in booking considerable business by thoroughly canvassing the trade. Prices are tending toward greater strength, with $18, base Buffalo, or the equivalent, more frequently the minimum quotation available on foundry grades. Relatively little Alabama iron is reported sold, but the fact that lower rail-and-steamer rates from Birmingham went into effect Aug. 1 may facilitate sales, particularly of smaller lots. These new rates, which are $5 a ton to Baltimore, $5.25 to Philadelphia, $5.50 to New York and $5.75 to Boston, are distinct from the rail-and-barge rates quoted on shipments via Norfolk, Va. The Eastern Malleable Iron Co., Naugatuck, Conn., is reported to have closed against its inquiry for 5000 tons of malleable. The American Tube & Stamping Co., Bridgeport, Conn., has been feeling out the market on basic and may inquire for as much as 5000 tons.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	$22.41 to $22.91
*Buf. No. 2, del'd east. N. J.	20.78 to 21.28
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	20.89 to 22.02
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	21.39 to 22.52

Freight rates: $4.91 from Buffalo, $1.39 to $2.52 from eastern Pennsylvania.

*Price delivered to New Jersey cities having rate of $3.28 a ton from Buffalo.

Warehouse Business.—Total business in July was less than in June, but considerably better than is usual at this season. There is a fair demand for structural material and sheets, but sheet prices, especially galvanized, are still subject to concessions of $1 to $2 a ton, and shading of prices on blue annealed sheets is general, concessions sometimes amounting to $4 and more a ton.

Cast Iron Pipe.—Prices continue irregular, with Northern makers of pressure pipe usually quoting from $32 to $33 per ton, f.o.b. foundry, although $31 a ton has not entirely disappeared. An exporter in New York is about to close on 300 tons of 18-in. water pipe for export to Hayti. The Texas Co., New York, is in the market for about 500 tons of large size pipe for shipment to Texas.

Prices per net ton deliv'd New York: Water pipe, 6-in. and larger, $33.60 to $34.60; 4-in. and 5-in., $36.60 to $37.60; 3-in., $43.60 to $44.60. Class A and gas pipe, $3 extra.

Reinforcing Bars.—Aside from 400 tons of bars for sewer work in the Bronx, awarded to the Kalman Steel Co., orders have consisted of small lots of less than 100 tons each. Seven hundred tons of bars for the Chevrolet assembly plant at Tarrytown, N. Y., are still pending. Prices are firm and unchanged.

Billet steel reinforcing bars in 40, 50 and 60-ft. lengths, 2.05c. per lb., Pittsburgh, and 2.30c. per lb., Pittsburgh warehouse, for cut lengths. Out of New York warehouse, 2.90c. per lb. for lots of 5 tons or more, 3.05c. for lots of 2 to 5 tons and 3.30c. for less than 2 tons, all delivered at job.

Finished Steel.—The contract for 250,000 tons of pipe for a gas pipe line to be built by Henry L. Doherty & Co., New York, has not yet been let, but early action is expected. The pipe line, which is to extend from the Texas Panhandle to communities in the Chicago district, may take as high as 275,000 tons. Structural steel awards in New York and vicinity have been unusually heavy, mostly for apartment houses and office buildings. The largest job, 6000 tons, was for the London Terrace apartments on West Twenty-third Street. Other outstanding bookings included 5000 tons for a telephone building on West Eighteenth Street, 3800 tons for an addition to Hell Gate power house and 2500 tons for New York Central car shops at Harmon, N. Y. The volume of pending work indicates that steel fabricators will be well engaged through the latter part of the year. In fact, fabricators agree that never before has there been so large an amount of inquiries as at present. Sheet steel makers say that buying has held up well, and deliveries range from four to six weeks, depending upon the grade of material. However, prices continue somewhat soft, especially in galvanized sheets, which have been sold to consumers in some cases at 3.50c., Pittsburgh. Large tonnages of galvanized are going into the South for roofing purposes and there concessions of $2 to $4 a ton have been made to obtain business. Black sheets are quoted at 2.85c. to 2.95c., and blue annealed appears firm at 2.25c. for No. 13 gage. Wire goods are weak, with plain wire selling as low as $2.40 per 100 lb., Pittsburgh. Wire nails also are being shaded and can be secured for $2.55 per keg, Pittsburgh, or less. Inquiries for well over 100,000 base boxes of tin plate are a feature of the foreign market. About 75,000 boxes is for delivery to Russia.

Mill prices per lb., deliv'd New York: Soft steel bars, 2.29c.; plates, 2.22½c.; structural shapes, 2.19½c.; bar iron, 2.14c.

Coke.—The market on both furnace and foundry coke continues steady and unchanged, with furnace grade quoted at $2.75 to $2.85 per net ton, Connellsville, and special brands of beehive foundry coke at $4.85 per net ton, ovens. Delivered prices of foundry coke are $8.56 per net ton, delivered to northern New Jersey, Jersey City and Newark and $9.44 to New York or Brooklyn. By-product coke is quoted at $9 to $9.40 a net ton, Newark or Jersey City, and $10.06, New York or Brooklyn.

Old Material.—No. 1 heavy melting steel is being bought at $16.25 per ton, delivered Claymont, Del., and $16.50

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.30c.
Soft steel bars, small shapes	3.25c.
Iron bars	3.24c.
Iron bars, Swed. charcoal	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Cold-roll. strip, soft and quarter hard	5.15c. to 5.40c.
Hoops	4.25c.
Bands	3.75c.
Blue ann'l'd sheets (No. 10)	3.85c. to 3.90c.
Long terne sheets (No. 24)	5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galv. annealed	5.15c.
Tire steel, 1½ x ½ in. and larger	3.30c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.65c.
Open-hearth spring steel, bases	4.50c. to 7.00c.

	Per Cent Off List
Machine bolts, cut thread:	
¾ x 6 in. and smaller	60
1 x 30 in. and smaller	50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	60
¾ x 20 in. and smaller	50 to 50 and 10
Coach screws:	
½ x 6 in. and smaller	60
1 x 6 in. and smaller	50 to 50 and 10

	Per 100 Ft.
Boiler Tubes—	
Lap welded, 2-in.	$17.33
Seamless steel, 2-in.	20.24
Charcoal iron, 2-in.	25.00
Charcoal iron, 4-in.	67.00

Discounts on Welded Pipe

	Black	Galv.
Standard Steel—		
⅛-in. butt	46	29
¾-in. butt	51	37
1-3-in. butt	53	39
2½-6-in. lap	48	35
7 and 8-in. lap	44	17
11 and 12-in. lap	37	12
Wrought Iron—		
⅛-in. butt	5	+19
¾-in. butt	11	+ 9
1-1½-in. butt	14	+ 6
2-in. lap	5	+14
3-6-in. lap	11	+ 6
7-12-in. lap	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box	$6.45	$6.20
Charcoal, per Box—	A	AAA
IC	$9.70	$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating	$10.00 to $11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets, Box Annealed—Black, C. R.

One Pass

	Per Lb.
Nos. 18 to 20	3.80c.
No. 22	3.95c.
No. 24	4.00c.
No. 26	4.10c.
No. 28*	4.25c.
No. 30	4.50c.

Sheets, Galvanized

	Per Lb.
No. 14	4.40c.
No. 16	4.25c.
No. 18	4.40c.
No. 20	4.50c.
No. 22	4.60c.
No. 24	4.75c.
No. 26	5.00c.
No. 28*	5.25c.
No. 30	5.65c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

per ton, delivered Conshohocken, Pa. No. 2 steel is quoted by brokers at $12 per ton, delivered Phoenixville; $13.50 per ton, delivered Harrisburg, and $14 per ton, delivered Conshohocken, Pa. Machine shop turnings are slightly stronger, with brokers paying $11.50 a ton, delivered either to Phoenixville or Conshohocken, Pa. Other grades of scrap are quiet, but prices are firm. Export, particularly to Japan, continues active, and another ship for Japan will begin to load next week.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel	$12.75 to	$13.35
Heavy melting steel (yard)	8.00 to	9.75
No. 1 hvy. breakable cast.	10.75 to	11.75
Stove plate (steel works).	8.00 to	8.25
Locomotive grate bars....	8.25 to	8.75
Machine shop turnings....	7.75 to	8.00
Short shoveling turnings..	7.75 to	8.00
Cast borings (blast furn. or steel works).....	7.00 to	7.25
Mixed borings and turnings	6.75 to	7.25
Steel car axles.....	19.50 to	20.00
Iron car axles.....	24.00 to	25.00
Iron and steel pipe (1 in. dia., not under 2 ft. long)		10.75
Forge fire	9.75 to	10.25
No. 1 railroad wrought...	12.00 to	12.50
No. 1 yard wrought, long..	11.00 to	11.50
Rails for rolling.....	13.25 to	13.75
Cast iron carwheels.....	12.50 to	13.00
Stove plate (foundry)....	8.00 to	8.50
Malleable cast (railroad).	14.00 to	14.50
Cast borings (chemical)..	10.00 to	10.50

Prices per gross ton, deliv'd local foundries:

No. 1 machry. cast.....	$17.00
No. 1 hvy. cast (columns, bldg. materials, etc.), cupola size.....	15.00
No. 2 cast (radiators, cast boilers, etc.)	14.50

Automobile Outlook

The automobile industry, according to *Automotive Industries*, has entered the second week in August with production at a rate which promises to show a total for the month well above that of August last year, when the factories in the United States and Canada turned out 492,543 cars and trucks. Several companies, which either have announced new models or are about to make such announcements, are resuming or contemplating comparatively high production schedules.

New car registrations in Detroit during the last few days in July spurted suddenly forward with the result that the total for the month was brought to a figure well above that of July last year despite less favorable outlook earlier in the month.

Although still quite heavy, new and used car stocks are declining, dealers report. Car stocks reached their peak in April, and have been showing a continued sharp decline since.

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and struc. shapes.....	3.00c.
Soft steel bars.....	3.00c.
Reinforc. steel bars.....2.25c. to	2.50c.
Cold-fin. rounds and hex.....	3.65c.
Cold-fin. flats and sq.....	4.15c.
Hoops and bands, No. 12 to ¼ in., inclusive	3.25c.
Hoops and bands, No. 13 and lighter	3.65c.
Cold-finished strip .....*5.95c.	
Black sheets (No. 24).....3.70c. to	3.90c.
Galvanized sheets (No. 24) .4.60c. to	4.75c.
Blue ann'l'd sheets (No. 10).....	3.25c.
No. 9 ann'l'd wire, per 100 lb.....	$2.90
No. 9 gal. wire, per 100 lb.....	3.35
Com. wire nails, base per keg.....	2.90

*Net base, including boxing and cutting to length.

Cleveland

Steel Demand Drops Below July Rate, But Mills Have Heavy August Commitments

CLEVELAND, Aug. 6.—Demand for finished steel fell off in the past week, specifications for most products being light. However, July business with most mills was better than in June of this as well as in June of last year. While deliveries have further improved, mills are comfortably filled for August on nearly all products. Steel bars are considerably easier and buyers can now secure fairly prompt shipments. Deliveries on plates are still quite extended. Most of the sheet mills still have good backlogs, although some have nearly caught up on auto-body sheets. Mills are committed for several weeks on hot-rolled strip but some need cold-rolled strip tonnage.

Announced schedules by the automobile manufacturers indicate that the production of motor cars will be somewhat larger this month than in July, owing to the increasing production by two or three makers that have brought out new models. However, this industry is not expected to get back into full swing much before October. The Ford Motor Co. is continuing this month at the same production schedule it maintained in July.

Orders for two lake boats, each requiring 5000 tons of plates and shapes, have been placed by the Pittsburgh Steamship Co., subsidiary of the United States Steel Corporation. One will be built by the Toledo Shipbuilding Co. and the other by the Great Lakes Engineering Works.

Weakness in sheet prices has become more pronounced. On the other hand, some of the cold-rolled strip mills have advanced their price $2 a ton.

Pig Iron.—Sales gained somewhat in the past week, Cleveland interests disposing of 20,000 tons of foundry and malleable iron. Little interest is being taken in the fourth quarter, although a few of the sales were made for delivery extending over the remainder of the year. While shipments during July were slightly better than in June, they were not up to the May record. There has been some increase in the demand by stove and furnace manufacturers, which fact, to some extent, has offset the decrease in the melt by automobile foundries. With the expectation of increased activity by the automotive industry next month some predict that August foundry activities will be at the low point for the year. New inquiry is rather light. Among inquiries is one from a central Indiana melter for 1000 tons of foundry iron. The low price on Southern foundry iron has diverted to Southern furnaces a few lots of iron in southern Ohio. Prices are firm and unchanged at $18.50, Cleveland, for outside delivery, $19 for local delivery and $20, Lake furnace, for Michigan shipment. The market in Buffalo has a firmer tone, and it is claimed that $18 is now the minimum price Buffalo furnaces will quote on foundry iron for Eastern shipment. Pickands, Mather & Co. will blow out its B stack in Toledo Aug. 7 for relining.

Prices per gross ton at Cleveland:

N'th'n fdy., sil. 1.75 to 2.25		$19.50
S'th'n fdy., 1.75 to 2.25....	$20.00 to	20.50
Malleable		19.50
Ohio silvery, 8 per cent...		28.00
Basic Valley furnace.....		18.50
Stand. low phos., Valley..	26.50 to	27.00

Prices except on basic and low phosphorus are delivered Cleveland. Freight rates: 50c. from local furnaces; $3 from Jackson, Ohio; $6 from Birmingham.

Iron Ore.—Another record was broken in shipments of Lake Superior ore during July, when the water movement was 10,670,882 tons, an increase of 1,691,183 tons over the corresponding month last year. The previous high mark for July was in 1918, when shipments were 10,659,203 tons. The record for monthly shipments was made in August, 1926, when the movement was 10,709,260 tons. All records for corresponding months were also broken in April, May and June. The movement by water up to Aug. 1 was 32,910,820 tons, an increase of 9,635,996 tons over last year. This breaks all previous records, the largest movement to Aug. 1 in previous years being made in 1918, when the mines shipped 29,608,933 tons. With the record breaking movement during the first half of the season, shipments this year will probably be considerably heavier than was expected early in the year. Some estimates place the movement for the season at 65,000,000 tons, breaking the record of 1916, when the water movement amounted to 64,734,198 tons.

Semi-Finished Steel.—The leading local producer has caught up on deliveries to an extent that it can now make prompt shipment if desired, although it still has a two weeks' backlog. Specifications on contracts continue to come out in good volume. There is an absence of new inquiry.

Coke.—Foundry coke shipments show some falling off. New demand is very light. Some activity is developing in by-product foundry coke as dealers are starting to purchase for stocks. The price is unchanged at $4.50 per net ton, Ohio ovens, for egg coke. Ohio by-product foundry coke is quoted at $8.25, Painesville, for August shipment.

Strip Steel.—Several makers have advanced the price $2 a ton on cold rolled strip steel to 2.85c., Cleveland and Pittsburgh, and some announce that they will quote this price only to large buyers, asking 2.95c. for small lots. The advance cannot apply to much business during the present quarter, as most consumers are under 2.75c. contracts. Makers claim that

that price leaves too low a margin of profit. Fender stock remains unchanged at 4.25c. for No. 20 gage. Mills are getting a fair volume of specifications, but do not have much backlog. Most producers still have a good tonnage of hot rolled strip on their books and prices are firm at 1.90c., Pittsburgh, for wide strip and 2c. for narrow.

Steel Bars, Plates and Shapes.—Demand for steel bars has decreased considerably, owing largely to the slowing down of the automotive industry. Plates continue to move in good volume to manufacturing plants and tank fabricators. A local mill as well as some other mills is fully committed on plates for four weeks. Specifications for plain structural material from manufacturing plants are fair. The building field is quiet. Prices are steady at 1.90c. to 1.95c., Cleveland, for steel bars and 1.95c., Pittsburgh, for plates and shapes.

Sheets.—Specifications are rather light and most mills have made further reductions in their backlogs. While some mills have only enough orders for auto body sheets to keep them fully engaged for about two weeks most producers are committed through August or a little longer on all grades. An increase in demand is expected next month, as some consumers have already issued September releases. Prices show more of an irregular tendency. Galvanized sheets have been quoted to jobbers at 3.50c., Valley, or equivalent to 3.40c., Pittsburgh. There are reports of shading of common black sheets to 2.75c., Pittsburgh, to barrel manufacturers and concessions to 2.25c. are being made on blue annealed sheets carrying fair extras. Shading to 2.10c. on blue annealed light plates continues.

Wire Products.—Nail prices have become more irregular in some sections with reports of prices of $2.50 per keg or lower and some jobbers are reported to have become a disturbing factor by selling at prices lower than the regular mill prices. Plain wire and galvanized wire for manufacturing purposes are moving in full volume. Wire appears to be holding to regular quotations in this market.

Reinforcing Bars.—Inquiry is not active. The only award of any size during the week was 250 tons for an addition to the plant of the Richman Brothers Co., Cleveland. Prices are somewhat irregular.

Cold Finished Steel Bars.—Demand has slowed down sharply as some consumers have curtailed operations, owing to reduced business from the automotive industry, and others are cutting down their inventories.

Warehouse Business.—While business has been rather light so far this month, demand is about normal for this season. Jobbers are getting a fair volume of diversified orders from machine tool and equipment manufacturers. Business from the building field is rather light. Prices are firm.

Old Material.—Selected heavy melting steel scrap has advanced 50c. a ton, to $16 to $16.25, but the grade used by one Cleveland consumer has not changed. Compressed sheet steel and machine shop turnings have also advanced 50c. a ton. Blast furnace grades are slightly weaker, dealers paying $10.50 to $10.75 for this material. The local market continues very dull, as mills have large stocks and are still restricting shipments. The Valley market is firm. Dealers are paying $18.25 to $18.50 for No. 1 heavy melting steel and $17.50 to $18 for compressed sheet steel for Youngstown delivery.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$15.00 to $15.50
No. 2 heavy melting steel	14.50 to 15.00
Compressed sheet steel	15.00 to 15.50
Light bundled sheet stampings	12.00 to 12.50
Drop forge flashings	13.00 to 13.25
Machine shop turnings	9.50 to 10.00
No. 1 railroad wrought	13.50 to 14.00
No. 2 railroad wrought	16.00 to 16.50
No. 1 busheling	13.25 to 13.75
Pipes and flues	9.00 to 9.50
Steel axle turnings	12.50 to 13.00
Acid Open-Hearth Grades:	
Low phos., forging crops	17.75 to 18.00
Low phos., billet, bloom and slab crops	18.50 to 18.75
Low phos., sheet bar crops	18.00 to 18.50
Low phos., plate scrap	18.00 to 18.50
Blast Furnace Grades:	
Cast iron borings	10.50 to 10.75
Mixed borings and short turnings	10.50 to 10.75
No. 2 busheling	10.50 to 10.75
Cupola Grades:	
No. 1 cast	16.75 to 17.25
Railroad grate bars	11.00 to 12.00
Stove plate	12.00 to 12.50
Rails under 3 ft	18.50 to 19.00
Miscellaneous	
Railroad malleable	18.00 to 18.50
Rails for rolling	16.25 to 16.50

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.70c.
Plates, ⅜-in.	2.90c.
Structural shapes	2.70c.
Soft steel bars, small shapes, iron bars (except bands)	2.80c.
Round-edge iron	3.50c.
Round-edge steel, iron finished 1½ x 1½ in.	3.50c.
Round-edge steel, planished	4.30c.
Reinforc. steel bars, sq. twisted and deform.	2.60c. to 2.80c.
Cold-fin. steel, rounds and hex	3.60c.
Cold-fin. steel, sq. and flats	4.10c.
Steel hoops	3.55c.
Steel bands, No. 12 to ⅜-in. inclus.	3.30c.
Spring steel	5.00c.
*Black sheets (No. 24)	4.10c.
†Galvanized sheets (No. 24)	4.85c.
Light plates, blue annealed (No. 10)	3.25c.
Blue ann'l'd sheets (No. 13)	3.40c.
Diam. pat. floor plates—	
¼-in.	5.30c.
⅜-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

*For 50 bundles or more; 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.
†For 50 bundles or more: 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

Philadelphia

Steel Buying Shows Increase—Basic User Contracts With Eastern Pennsylvania Furnaces

PHILADELPHIA, Aug. 6.—The lull in steel buying which appeared toward the end of June shows evidence of having terminated with July and most mills have received an increased volume of specifications on current contracts during the past week. This increase in buying had not been generally expected for another fortnight or more, so that mills are generally beginning to look forward to the remainder of the year with optimism.

The Pennsylvania Railroad will open bids Aug. 16 on 20,000 tons of plates, 6500 tons of bars and 2255 tons of shapes.

A feature of the pig iron market is the purchase of a sizable tonnage of basic by a consumer in this district, all from eastern Pennsylvania furnaces in competition with sellers of Southern iron.

Pig Iron.—Eastern Pennsylvania furnaces are quoting foundry iron at $21 a ton, base, and occasionally shading this by 50c. a ton, when competition is encountered from Birmingham iron. The Lobdell Car Wheel Co., Wilmington, Del., has closed on about 200 tons of foundry iron with an eastern Pennsylvania furnace, although Birmingham sellers competed for the business. The American Brake Shoe & Foundry Co. is inquiring for a carload of foundry iron for its Baltimore plant, and the New York Air Brake Co., Watertown, N. Y., is in the market for a carload of foundry grade. In the past week a Coatesville, Pa., consumer of basic has closed on about 18,000 tons with three eastern Pennsylvania furnaces for delivery in August, September and October. Although the buyer had previously bought a barge cargo of Birmingham basic at a price said to have been $19.13 per ton, delivered, no further contract for Southern iron is reported to have been made by this buyer. The eastern Pennsylvania price is understood, however, to have been less than $20 a ton, delivered.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil.	$21.26 to $21.76
East. Pa. No. 2X, 2.25 to 2.75 sil.	21.76 to 22.26
East. Pa. No. 1X	22.26 to 22.76
Basic (del'd east. Pa.)	19.75 to 20.25
Gray forge	20.00 to 20.50
Malleable	21.25 to 21.75
Stand. low phos. (f.o.b. N. Y. State furnace)	22.00 to 23.00
Cop. br'g low phos. (f.o.b. furnace)	23.50 to 24.00
Va. No. 2 plain, 1.75 to 2.25 sil.	24.04
Va. No. 2X, 2.25 to 2.75 sil.	24.54

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces: $4.54 from Virginia furnaces.

Bars.—Mills are maintaining high operating rates and the price is firm at 1.95c., Pittsburgh, or 2.27c. per lb., delivered Philadelphia. The Pennsylvania Railroad will open bids Aug. 16 on 6500 tons of bars.

Reinforcing Bars.—The greater

part of the tonnage of reinforcing bars pending award consists of small lots of considerably less than 100 tons. Competition continues keen and billet steel bars are still quoted at 1.95c. to 2.05c. per lb., Pittsburgh, or 2.27c. to 2.37c., delivered Philadelphia, with the $5 extra for cutting to length sometimes disregarded by the distributer. Rail steel bars are quoted at 1.95c. per lb., Franklin, Pa., or Tonawanda, N. Y., or 2.27c., delivered Philadelphia, with no extra for cutting to length.

Shapes.—Business has begun to increase and mills are in some instances offering two to three weeks' delay in delivery for certain specifications. Fabricators are well engaged and some substantial contracts are pending, including 2200 tons in a building for the Atwater Kent Mfg. Co. and a total of 14,500 tons in two bridges over the Hackensack River for the Pennsylvania Railroad. Prices are unchanged at 1.95c. to 2.05c. per lb., f.o.b. nearest mill to consumer, or 2.01c. to 2.11c., delivered Philadelphia.

Plates.—The past week has brought an increase in the volume of specifications against contracts. The Pennsylvania Railroad opens bids Aug. 16 on 20,000 tons of plates, part of its usual requirements. The price is unchanged at 2.05c. per lb., Coatesville, Pa., or 2.15c. per lb., delivered Philadelphia.

Old Material.—Consumers are receiving deliveries on contracts and, as a rule, show but little interest in making new purchases of scrap. No. 2 heavy melting steel is active with purchasing by brokers to fill contracts. There is also a fair tonnage of No. 1 heavy melting steel moving to consumers at Claymont, Del., and Coatesville, Pa. Cast grades of scrap continue inactive.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	$16.50 to $17.00
Scrap T rails	16.00 to 16.50
No. 2 heavy melting steel	12.50 to 14.50
No. 1 railroad wrought	16.00 to 16.50
Bundled sheets (for steel works)	11.50
Hydraulic compressed, new	14.50 to 15.50
Hydraulic compressed, old	12.00 to 12.50
Machine shop turnings (for steel works)	11.50 to 12.00
Heavy axle turnings (or equiv.)	14.00 to 14.50
Cast borings (for steel works and roll. mill)	11.00 to 11.50
Heavy breakable cast (for steel works)	15.00 to 15.25
Railroad grate bars	12.00 to 12.50
Stove plate (for steel works)	12.00 to 12.50
No. 1 low phos., hvy., 0.04% and under	22.00 to 23.00
Couplers and knuckles	19.50 to 20.50
Rolled steel wheels	19.50 to 20.50
No. 1 blast f'nace scrap	10.50 to 11.00
Wrot. iron and soft steel pipes and tubes (new specific.)	15.00
Shafting	19.00 to 19.50
Steel axles	23.00 to 23.50
No. 1 forge fire	14.00
Cast iron carwheels	16.50 to 17.00
No. 1 cast	16.50 to 17.00
Cast borings (for chem. plant)	14.50
Steel rails for rolling	16.50 to 17.00

Sheets.—Blue annealed sheet prices are firm at 2.35c. per lb., Pittsburgh, or 2.67c., Philadelphia, for No. 13 gage, with light plates, blue annealed, No. 10 gage, at 2.20c., Pittsburgh, or 2.52c., delivered Philadelphia. Automobile manufacturers are showing less activity than a few weeks ago, but are still accepting shipments on contracts. Black and galvanized sheets have settled to 2.85c., Pittsburgh, or 3.17c., delivered Philadelphia, for black, and 3.55c. to 3.60c., Pittsburgh, or 3.87c. to 3.92c., delivered Philadelphia, for galvanized. Some galvanized sheet business was recently closed at 3.50c., Pittsburgh, or 3.82c., delivered Philadelphia, but sellers are beginning to show more firmness and it is doubted that less than 3.55c., Pittsburgh, could be done today. Radio manufacturers are less active in buying sheets, having covered their requirements for the present.

Imports.—In the week ended Aug. 3, ore arrivals at this port consisted of 2500 tons of chrome ore from Portuguese Africa and 36 tons of ferrochrome from Switzerland. The only steel imports were 89 tons of structural shapes from Germany and 6 tons of steel scrap from the United Kingdom.

Welding Society Program Stresses Research

Six technical sessions will be necessary to present the material available at the fall meeting of American Welding Society, held in Cleveland, Sept. 9 to 13, simultaneously with other metallurgical societies. Sessions and headquarters will be at Hotel Statler.

Nine research papers will be presented, three of them dealing with newly discovered non-destructive tests of welds. One of these tests, based on electrical conductivity, is the discovery of Elmer Sperry, well known inventor and president of American Society of Mechanical Engineers. The second involves the use of the stethoscope. The third is an X-ray method.

In addition, three special sessions will be devoted largely to research. A meeting of the Bureau of Welding will deal with a variety of research projects. The meeting of the structural steel welding committee will record advances in that fast-developing field. A special conference of college professors and other research workers will discuss further activities along this line.

Two papers will deal with the welding of boiler tubes and drums, the tubes of mercury boilers, and containers for high pressure. Other subjects covered by technical papers include gas welding of steel buildings, automatic welding of thin sheets, welding of pipe lines, replacement of castings by welding in machine construction, and the welding of copper alloys and high-strength aluminum alloys.

To Increase Capital Stock

YOUNGSTOWN, Aug. 6.—On Aug. 15 a special stockholders' meeting of the Youngstown Sheet & Tube Co. will be held to approve the proposed increase in common capital from 1,000,000 to 2,000,000 shares and a 20 per cent stock dividend, which will require 200,000 shares of the new stock.

Railroad Equipment

Inquiries Pending for More Than 5000 Cars

DESPITE the fact that buying of railroad equipment has been light, manufacturers look for considerable business to be placed in the near future. There are inquiries now pending for about 4500 freight cars and between 500 and 600 passenger cars, most of which is likely to be awarded this month. The Chicago, Milwaukee, St. Paul & Pacific is in the market for 1000 70-ton gondola cars and the Boston & Maine is considering the purchase of a like number of box cars. Details of the week's business follow:

General Chemical Co. has placed an order for 15 75-ton sulphuric acid tank cars and 21 50-ton sulphuric acid tank car tanks with American Car & Foundry Co.

Ann Arbor is inquiring for 100 hopper car bodies.

Chicago, Milwaukee, St. Paul & Pacific is in market for 1000 70-ton gondola cars.

Boston & Maine is considering purchase of 1000 box cars.

Wabash is inquiring for 100 50-ton steel hopper car bodies.

Bessemer & Lake Erie is asking bids on 25 70-ton steel gondola cars.

To Build Steel Plant at Pretoria, South Africa

Pretoria, South Africa, is to have a steel plant of 200,000 tons annual capacity, laid out according to the best American and European practice. It is expected to be complete from coke ovens, blast furnaces and open-hearth furnaces through to the rolling mills. The International Construction Co., Ltd., 56 Kingsway, London, W.C.2, it is understood, has been appointed engineer, working with a committee of four experts representing the steel company, the South African Iron & Steel Industrial Corporation, Ltd.

Tariff Bill Progress

WASHINGTON, Aug. 6.—The past week has developed no definite information as to the revision of the metal schedule of the House tariff bill by the Republican members of the Senate Committee on Finance. Members of the committee will not discuss what was done in connection with their work on the metal schedule, which was completed early last week. Rumors are conflicting and are not considered to be reliable.

Beginning yesterday the majority members are holding night sessions in an effort to have the bill ready to report to the Senate on Aug. 19, the date on which it was proposed that the Senate reconvene, but there is doubt that the bill will be ready by that time, in which event it is likely that reconvening of the Senate will be postponed.

Pacific Coast

Current Bookings Light, But Pipe Lines Will Require 13,000 Tons of Plates—Structural Awards Double Last Year's

SAN FRANCISCO, Aug. 3., (*By Air Mail*).—Awards of iron and steel products on the Pacific Coast this week were the lightest in many weeks, both in the aggregate tonnage and in the number of projects placed. The two outstanding lettings of the week were 3700 tons of plates for the Cedar River Pipe Line, Seattle, placed with the Western Pipe & Steel Co. and 1000 tons of reinforcing bars and wire mesh for a project at Hawthorne, Nev., secured by the Truscon Steel Co. Several pipe line projects in the Northwest, which are up for, or about to come out for, figures, will require close to 13,000 tons of plates.

The trade is exceptionally interested in the report that the United States Steel Corporation has taken a 90-day option on the properties of the Columbia Steel Corporation.

Building construction in July compared favorably with the previous month's aggregate, but fell below that of July, 1928. Permits issued in Los Angeles amounted to $7,942,133. Seattle, Oakland and Portland turned in totals of $1,382,220, $1,273,959 and $1,113,656 respectively.

Pig Iron.—Movement of foundry pig iron is limited to relatively small tonnages. One importer recently unloaded about 500 tons in various Pacific Coast ports. Importations of foreign iron during April, figures for which have just been released, show the smallest tonnage of the year, being less than 500 tons. Prices remain unchanged.

Prices per gross ton at San Francisco:

*Utah basic	$25.00 to $26.00
*Utah fdy., sil. 2.75 to 3.25	25.00 to 26.00
**Indian fdy., sil. 2.75 to 3.25	25.00 to 26.00

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Bars.—Awards of reinforcing steel bars were the lightest in over six weeks. While a fair number of small lettings were noted, calling for lots of from 20 to 40 tons, larger contracts were limited to four projects. In addition to the tonnage mentioned above, the Truscon Steel Co. took 130 tons for a Science Hall in Reno, Nev. Bids were opened this week on 1150 tons for the West Garfield Street bridge. Prices on out-of-stock material in the San Francisco district continue unchanged at 2.30c. a lb., base, on carload lots and up to 2.60c. on smaller tonnages. Los Angeles prices are $2 a ton higher. Merchant bar steel is quoted at 2.35c. a lb., c.i.f.

Plates.—Of special interest to plate mill representatives and fabricators was the announcement that bids would be called for next week on a pipe line at Everett, Wash., calling for close to 10,000 tons. Bids open Aug. 7 on 200 tons of riveted steel pipe for Bremerton, Wash., and on Aug. 8 for 2000 tons for a surge tank and penstock for Tacoma, Wash. The General Petroleum Corporation plans to erect two odd-size 60,000-bbl. tanks in San Pedro, Cal., and these tanks will take a total of 460 tons. Prices appear firm at 2.35c., c.i.f.

Shapes.—Awards of structural steel shapes and plates so far this year are just short of the 200,000-ton mark, while for the same period a year ago less than 100,000 tons had been booked. The only award of importance went to Dyer Brothers and called for 100 tons for a factory addition in San Jose, Cal. Bids were opened this week on 950 tons for the West Garfield Street bridge, Seattle. Other new projects include 2400 tons for a viaduct over the Chicago, Milwaukee, St. Paul & Pacific tracks on Eleventh Street, Tacoma, and 300 tons for the Sommer-Kaufmann store on Market Street, San Francisco. During April consumers in the Los Angeles district imported over 2600 tons of shapes, the largest tonnage in over a year. Plain domestic material remains firm at 2.35c., c.i.f.

Cast Iron Pipe.—For the first time this year cast iron pipe awards were confined to lots of less than 100 tons. Demand is never particularly strong at this time of the year. Pending business does not exceed 3000 tons. Bids open on Aug. 7 for 875 tons of 10 to 24-in. Class B or riveted steel pipe for Bremerton, Wash. Alturas, Cal., will open bids Aug. 15 for 199 tons of 4 to 8-in. Class B pipe. Imports of foreign cast iron pipe during April totaled 1148 tons, compared with 2518 tons for the previous month and 1935 tons for April, 1928. Of this total over 1100 tons came from French makers and was divided between Seattle and Los Angeles users.

Steel Pipe.—Movement of standard steel pipe is holding up well, though confined to unimportant tonnages. The Southern Counties Gas Co., Los Angeles, is asking for bids on the construction of a pipe line from Laguna through San Clemente to San Diego County, and plans to furnish the contractors with 65,000 ft. of 12¾-in. O. D. gas pipe. Tubular imports during April were the lightest in over two years and aggregated 606 tons, compared with 3280 tons for March and 4907 tons for April a year ago.

Coke.—The coke market reflects the same quiet condition noted in the pig iron market, with sales and inquiries, for the most part, involving unimportant tonnages. One large importer of foreign coke has just unloaded 4000 tons of English beehive and by-product coke on the Coast, which was distributed among consumers in Los Angeles, San Francisco, Seattle and Vancouver. English beehive coke is quoted at $16 to $17 a net ton, delivered incoming dock, while by-product material ranges from $12.50 to $13.50 a net ton. During April coke imports totaled 3436 tons, compared with 2624 tons for the preceding month and 3818 tons for April, 1928. Of the total, 2000 tons came from the United Kingdom and 1300 tons from the Netherlands.

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and struc. shapes	3.15c.
Soft steel bars	3.15c.
Small angles, ¼-in. and over	3.15c.
Small angles, under ¼-in.	3.55c.
Small channels and tees, ¾-in. to 2¾-in.	3.75c.
Spring steel, ¼-in. and thicker	5.00c.
Black sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.80c.
Galv. sheets (No. 24)	5.30c.
Struct. rivets, ½-in. and larger	5.65c.
Com. wire nails, base per keg	$3.40
Cement c't'd nails, 100 lb. keg	3.40

Birmingham

Rail-and-Steamer Rates on Pig Iron Go Into Effect—Steel Demand Above Usual Summer Level

BIRMINGHAM, Aug. 6.—Pig iron producers are more optimistic over the market outlook than they have been in several weeks. There has been steady buying for third quarter, and more of the larger melters have covered their requirements. The probable make is estimated to be over 80 per cent sold. Shipments to district consumers have been averaging close to production. One company reports that July shipments exceeded output by a small margin. Present indications are that August shipments will show a gain over those of July. The new combination rail-and-steamer rates to Eastern ports became effective Aug. 1. They are $5 a ton to Baltimore, $5.25 to Philadelphia, $5.50 to New York and $5.75 to Boston, representing reductions ranging from 76c. for the Baltimore rate to $1.16 for the Boston rate. Several important tonnages are under option to these points, but actual shipping orders so far have been few and have involved small tonnages. Southern basic iron is said to have been quoted, under the new transportation rates, at a delivered price that figures back as low as $13, Birmingham. No. 2 foundry continues to be sold at $14.50, Birmingham, though concessions of 50c. a ton are reported in competitive territories. Of the 17 district furnaces active, nine are on foundry, seven on basic and one on recarburizing iron. The Republic Iron & Steel Co. will blow out its No. 1 furnace this month for repairs.

Prices per gross ton, f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil.	$14.50
No. 1 fdy., 2.25 to 2.75 sil.	15.00
Basic	14.50

Finished Steel.—The margin between bookings and shipments continues to diminish slightly, but is still larger than it has been at this season in a number of years past. Despite the decline in inquiries in the past two or three weeks, the volume is sufficient to indicate that the midsummer slump, which usually reaches its lowest point in August, will be much less noticeable than it has been in any previous postwar year. The sheet buying movement that began about the middle of July is still under way. Plates and structural shapes are next in activity. New business in wire product is at the low point of the year, but is better than at this time last year. Shipments of wire products are slower. New bookings of structural steel fabricators during the past week were light. Prospective work, however, includes steel for a 14-story office building addition at Atlanta, an 18-story office building at Birmingham and for the new mills of the Gulf States Steel Co. at Alabama City. New business in reinforcing bars is off slightly. Three open-hearth furnaces were taken off for repairs last week, leaving 19 active out of a total of 23 in the district.

Cast Iron Pipe.—New business in pressure pipe during the past two weeks has been considerably below the average of the few weeks preceding, and unfilled tonnage is being worked off. The project at West Greenville, S. C., requiring about 300 tons, has been awarded to the American Cast Iron Pipe Co. About 12,000 ft. of 10-in. pipe was divided between the American Cast Iron Pipe Co. and the National Cast Iron Pipe Co. Bids will be opened this week for about 15,000 ft. of 6 and 8-in. pipe for Nashville, Tenn. Newton, N. C., will open bids Aug. 13 for 6000 ft. of 8-in. pipe. A project at Gadsden, Ala., to be let Aug. 15, will require about 3000 ft. of 12 to 18-in. pipe. Shipments approximate production, which is estimated to be over 80 per cent of capacity. Prices remain at $37 to $38 a net ton, Birmingham, for 6-in. and larger sizes.

Coke.—The movement of foundry coke under contract compares favorably with that of this time last year. Shipments are steady and operations stable. Prices are unchanged at $5 a net ton, Birmingham.

Old Material.—Inquiries and sales in the steel grades have improved. Specifying on contracts has increased and present shipments are above the July average. Prices for the steel grades are firmer, but unchanged.

Prices per gross ton, deliv'd Birmingham dist. consumers' yards:

Heavy melting steel	$12.50
Scrap steel rails	12.50
Short shoveling turnings	9.00
Cast iron borings	9.00
Stove plate	$11.50 to 12.00
Steel axles	21.00
Iron axles	23.00
No. 1 railroad wrought	10.00 to 10.50
Rails for rolling	14.00 to 15.00
No. 1 cast	13.50
Tramcar wheels	13.00
Cast iron carwheels	12.50 to 13.00
Cast iron borings, chem	13.50 to 14.00

price is becoming established and mills are considering another attempt to get the market back to 2.95c. Youngstown makers confirm the report that galvanized sheets are now being sold to consumers as well as to jobbers at 3.50c., Pittsburgh, although they are holding to 3.60c. in most instances. Wide strip mills in the district are not well occupied, and less favorable market conditions have brought out concessions of $2 and even $4 a ton on heavy-gage blue annealed sheets, which are still quoted at 2.20c., Pittsburgh, for No. 10. On hot-rolled strip, prices are holding well at 1.90c. and 2c., Pittsburgh. The cold-rolled strip market has gained strength and the minimum of 2.75c., Pittsburgh or Cleveland, which wavered recently as the result of sales to Detroit tubing manufacturers at 2.65c., is now better established. In fact, one maker is again quoting 2.85c. on all small orders and has booked some business at that figure. Other prices are holding and, with a marked summer decline in business now definitely averted, mills are disposed to maintain a firm attitude.

The pig iron market is very quiet and, although shipments are keeping up, business being booked from week to week is of small proportions. Five merchant stacks are being operated in the Mahoning and Shenango Valleys, the Cherry Valley furnace of the Davison Coke & Iron Co. having been scheduled to go into blast early this week, offsetting the blowing out of that company's Claire furnace on July 22. It is also reported that the McKeefrey furnace at Leetonia, Ohio, recently bought by the Atlas Steel & Supply Co., Cleveland, may soon be put in operation.

The scrap market shows unusual strength and, with sales of heavy melting steel having been made at $19 and compressed sheets at $18.50, it is quotable on a par with the Pittsburgh market. This is due to the fact that steel companies in the district are taking large tonnages and to a scarcity of the better grades.

Youngstown

August Steel Shipments May Show 5 to 10 Per Cent Decline —September Prospects Bright

YOUNGSTOWN, Aug. 6. — Mahoning Valley steel mills are beginning their sixth month of practically capacity operations, and many departments have had sufficient specifications to schedule the mills fully through August. A slight decrease in the number of open-hearth furnaces in operation has not curtailed the production of crude steel to any great extent, but it is apparent that the capacity of the district is no longer being severely taxed to supply finishing mills, and the present month will probably see a decline of from 5 to 10 per cent in total steel shipments.

In forecasting the future, opinion is practically unanimous in the belief that September will bring an upturn. Large consuming industries in and near the Valley district plan very heavy fall operations, and increasing specifications for sheets, strip and other products used by the automobile industry make an improvement in demand from this channel almost certain. Pipe business has also improved materially in the last two months, and large tonnages now in prospect lead to the belief that the best months of the year are still ahead of that department. One large Valley interest has its lap-weld mill entirely scheduled during August, and although the demand for standard butt-weld pipe has failed to become very active this year, the pipe industry as a whole seems to be entering a period of marked prosperity.

Sheet mills in the district are fully scheduled throughout the present month. On some sizes and finishes of sheets, rollings cannot be accommodated until the middle of September. Strip backlogs are not nearly so heavy and, although one large maker of cold-rolled strip is booked up for at least a month, deliveries on the hot-rolled material can be made in about two weeks. On tin plate, specifications for as long as two weeks' rollings are the exception, the majority of the mills operating on a week-to-week basis. Plate business is exceptionally good, but bars are quiet.

Prices seem to have shown some improvement in the last two weeks. On black sheets the 2.85c., Pittsburgh,

Canada

Pig Iron and Scrap Quiet— Structural Steel Active

TORONTO, ONT., Aug. 6.—While the demand for foundry and malleable pig iron was without special feature during the week, total sales continued in good volume. Some decline in sales was reported by local blast furnace representatives, due chiefly to the civic holiday on Aug. 5, but this is believed to be only a temporary slump. July pig iron sales dropped somewhat below those of June, but were in much larger volume than those of July a year ago. Forward contracting is at a standstill. Melt is holding at its high level, with prospects of being maintained until the end of the year. Production of pig iron remains large,

with seven stacks in blast. Pig iron prices are firm but unchanged.

Prices per gross ton:

Delivered Toronto

No. 1 fdy., sil. 2.25 to 2.75	$24.60
No. 2 fdy., sil. 1.75 to 2.25	24.10
Malleable	24.60

Delivered Montreal

No. 1 fdy., sil. 2.25 to 2.75	$26.00
No. 2 fdy., sil. 1.75 to 2.25	25.50
Malleable	26.00
Basic	24.50

Imported Iron, Montreal Warehouse

Summerlee	$33.50
Carron	33.00

Structural Steel.—Bridge and building construction is increasingly active. Demand is not confined to any one locality, but is general throughout Canada. Several substantial structural steel tonnages were awarded during the week; others will be placed soon.

Old Material.—While there was some improvement in sales during the week, business continues to be affected by the summer holiday season. Current demand is almost entirely of a spot nature, with no forward delivery contracts reported by local dealers. Prices are unchanged.

Dealers' buying prices:

	Per Gross Ton	
	Toronto	Montreal
Heavy melting steel	$10.00	$8.50
Rails, scrap	11.00	9.00
No. 1 wrought	10.00	12.00
Machine shop turnings	7.50	5.00
Boiler plate	7.50	6.00
Heavy axle turnings	8.00	7.50
Cast borings	7.50	5.00
Steel turnings	7.50	6.50
Wrought pipe	6.00	6.00
Steel axles	15.00	20.00
Axles, wrought iron	17.00	22.00
No. 1 machinery cast	....	17.00
Stove plate	....	13.00
Standard carwheels	....	16.00
Malleable	....	13.00
	Per Net Ton	
No. 1 mach'ry cast	$16.00	....
Stove plate	12.00	....
Standard carwheels	15.00	....
Malleable scrap	14.00	....

Buffalo

Pig Iron Producers in Stronger Position—Steel Output Undiminished—Advances in Scrap

BUFFALO, Aug. 6.—One Buffalo furnace has announced that it is practically out of the market on pig iron for Eastern delivery for the next 60 days. On the business it is considering, nothing less than $18.50, base, is being quoted, with full differentials. Considerable iron is being booked privately without the sending out of general inquiries. In the last few days a local producer has booked 3000 to 4000 tons in scattered lots of 100 to 300 tons. Eastern inquiries for 500 tons of foundry and malleable and for 1000 tons of foundry and malleable have been closed here. The Eastern Malleable Iron Co. is in the market for 5000 tons of malleable, following the withdrawal of a previous inquiry. The American Radiator Co. has bought a tonnage of iron for Southern and Middle Western plants and is understood to be no longer in the market. One Buffalo furnace reports being entirely out of stock iron, and another reports that its stock sheet is lower by 4000 tons than it has been any time this year.

Prices per gross ton, f.o.b. furnace:

No. 2 fdy., sil. 1.75 to 2.25	$19.50
No. 2X fdy., sil. 2.25 to 2.75	20.00
No. 1 fdy., sil. 2.75 to 3.25	21.00
Malleable, sil. up to 2.25	20.00
Basic	18.50
Lake Superior charcoal	27.28

Finished Steel.—Operations of steel mills thus far in the third quarter have been at the same pace as during the previous part of the year, and producers see no signs of let-up in the immediate future. The Lackawanna plant of the Bethlehem Steel Co. is operating 22 out of 24 open-hearth furnaces, with the roughing mills on three 8-hr. shifts and the finishing mills on two 10-hr. shifts. The Donner Steel Co. is operating seven out of 10 open-hearth furnaces, and recent alterations make these seven equivalent to eight previously. Most of the mills are on double turn. A considerable volume of reinforcing bars has been booked in small lots. One seller has accumulated about 2000 tons of this type of business during the past week, with most of the orders running under 25 tons. The general contract for the new State office building to be built in Buffalo, has not been awarded, but the low bidder has been announced. This probably will require about 860 tons of fabricated structural steel.

Old Material.—Sales of No. 1 heavy melting steel at $17.50 are reported. Pittsburgh and Youngstown points are understood to be paying $18.50 for No. 1 grade, and outside demand for No. 1, No. 2 heavy melting steel and hydraulic compressed sheets is generally strong, so that very little of this material is coming into this market. Dealers report a marked shortage of No. 1 heavy melting steel. They are offering at high as $14.75 for No. 2 steel on a $15 order placed some time ago. Strong demand exists at Weirton, W. Va., for No. 2 heavy melting steel and dealers are offering $17, delivered Weirton, for this material. No. 1 machinery cast is more active, a number of small sales at $16 being reported. The 2000-ton order for stove plate placed here last week was filled without difficulty, as supplies were heavier than usual. Two other sales of stove plate at $13.50 were reported. One buyer was able to obtain a certain amount of distress stove plate at $13. Sales of knuckles and couplers, coil and leaf springs and rolled steel wheels have been made at $19.50. Sales of cast iron borings at $11.50 are reported, and this commodity seems to be scarce. General production of scrap dropped off in this territory during July.

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and struc. shapes	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.95c.
Cold-fin. flats, sq. and hex	4.45c.
Rounds	3.95c.
Cold-rolled strip steel	5.85c.
Black sheets (No. 24)	4.20c.
Galv. sheets (No. 24)	4.85c.
Blue ann'l'd sheets (No. 10)	3.50c.
Com. wire nails, base per keg	$3.60
Black wire, base per 100 lb	3.75

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$17.25 to $17.50
No. 2 heavy melting steel	14.75 to 15.00
Scrap rails	16.50 to 17.00
Hydraul. comp. sheets	14.50 to 14.75
Hand bundled sheets	12.00 to 12.50
Drop forge flashings	14.25 to 14.50
No. 1 busheling	15.50 to 16.50
Hvy. steel axle turnings	14.00 to 14.50
Machine shop turnings	7.50 to 7.75
No. 1 railroad wrought	13.00 to 13.50
Acid Open-Hearth Grades:	
Knuckles and couplers	19.00 to 19.50
Coil and leaf springs	19.00 to 19.50
Rolled steel wheels	19.00 to 19.50
Low phos. billet and bloom ends	20.00 to 20.50
Electric Furnace Grades:	
Short shov. steel turnings	12.00 to 12.50
Blast Furnace Grades:	
Short mixed borings and turnings	11.00 to 11.50
Cast iron borings	10.50 to 11.00
No. 2 busheling	10.00 to 10.50
Rolling Mill Grades:	
Steel car axles	18.75 to 19.25
Iron axles	21.00 to 22.00
Cupola Grades:	
No. 1 machinery cast	16.00 to 17.00
Stove plate	13.00 to 13.50
Locomotive grate bars	12.50 to 13.00
Steel rails, 3 ft. and under	19.00 to 19.50
Cast iron carwheels	14.00 to 14.50
Malleable Grades:	
Industrial	18.00 to 18.50
Railroad	18.00 to 18.50
Agricultural	18.00 to 18.50
Special Grades:	
Chemical borings	12.50 to 13.50

American Puddled Iron Co. to Take Over Warren Plant

YOUNGSTOWN, Aug. 6.—Effective Jan. 1, 1930, the American Puddled Iron Co. will take possession of its plant at Warren, Ohio, which has been under lease for three years to the A. M. Byers Co., Pittsburgh. At this plant, the Byers company has successfully developed the Aston process of producing puddled iron. The American Puddled Iron Co. will continue operations at this property and plans eventually to install sheet mills.

Under the terms of its arrangement with the A. M. Byers Co., the American Puddled Iron Co. is licensed to manufacture iron by the Aston process, and to convert it into any finished product except pipe. The American Puddled Iron Co. also comes into possession of all equipment at the Warren plant that has been used by the Byers company in its operations.

At the start the company will produce wrought iron in such semi-finished forms as sheet bars, muck bars, billets and blooms. Finishing capacity in the form of sheet mills will be installed in due course. The Warren plant has a present capacity of 5000 to 6000 tons of wrought iron per month. It includes a site of 470 acres, served by the Baltimore & Ohio Rail-

road, with connections with the Erie and Pennsylvania; several factory buildings, a 350-ton cupola, a three-high blooming mill and a three-high finishing mill. All of the equipment is electrically operated.

The capital structure of the American Puddled Iron Co. consists of 35,000 shares of $100 par stock, of which 29,154 shares have been issued. No new financing is contemplated for the beginning of operations.

At the end of this year the Byers company will transfer its manufacturing operations from Warren to its new plant at Ambridge, Pa.

The American Puddled Iron Co. is an outgrowth of the Youngstown Steel Co., originally formed by the late E. L. Ford and associates to develop the Ford process of manufacturing puddled iron. Mr. Ford died before his process was perfected for commercial purposes and the Warren plant was subsequently leased to the Byers company.

St. Louis

Pig Iron Sales Improve—Scrap Dealers Continue to Bid Up Prices—Steel Output Sustained

ST. LOUIS, Aug. 6.—Sales of pig iron increased during the week, the volume booked by the St. Louis Gas & Coke Corporation being 5000 tons. Of this, 3800 tons for an Indiana equipment builder, 500 tons for a Quincy, Ill., melter and 400 tons for an Illinois equipment builder, were for shipment over the remainder of 1929, while three orders for 100 tons each were for prompt delivery. There is believed to be a heavy tonnage of iron to be placed for the rest of this quarter, but melters are still postponing action on account of the uncertainty of the price situation. The melt in the district is said to be off on account of hot weather. The local producer has made no change in quoted prices, but is said to be making concessions on high phosphorus iron in competition with the Southern makers.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill.	$20.00
Malleable, f.o.b. Granite City	20.50
N'th'n No. 2 fdy., deliv'd St. Louis	22.16
Southern No. 2 fdy., deliv'd	18.92
Northern malleable, deliv'd	22.16
Northern basic, deljv'd	22.16

Freight rates: 75c. (average) Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

Finished Steel.—Demand for black and galvanized sheets during July was up to that of June, while specifications for blue annealed, tin plate and plates were not as great as in the preceding month, it is reported by the Granite City Steel Co. The company is operating all units as near to capacity as the weather permits. The structural steel trade is quiet. The only new reinforcing bar project pending is McMillan Hospital of the Washington University group, which will require approximately 500 tons.

Coke.—Buying of domestic coke is satisfactory for the season. Foundry grades are said to be a bit easier, because of the lighter melt in the district. Furnace coke is being taken by smelters in the district according to specifications.

Old Material.—Dealers continue to bid up prices, and some items are from 50c. to $1 a ton higher. Buying by the mills is not heavy, but sellers believe that higher prices will prevail. There has been an improvement in the movement of old material into this market, but it was slight. Railroad lists: Pennnsylvania, 55,000 tons; Baltimore & Ohio, 14,000 tons; St. Louis-San Francisco, 20 carloads, and Chicago & Eastern Illinois, nine carloads.

Dealers' buying prices per gross ton, f.o.b. St. Louis district:

No. 1 heavy melting or shoveling steel	$14.00 to $14.50
No. 2 heavy melting or shoveling steel	13.25 to 13.75
No. 1 locomotive tires	15.50 to 16.00
Miscel. stand.-sec. rails including frogs, switches and guards, cut apart	16.75 to 17.25
Railroad springs	18.50 to 19.00
Bundled sheets	10.00 to 10.50
No. 2 railroad wrought	14.00 to 14.50
No. 1 busheling	10.00 to 10.50
Cast iron borings and shoveling turnings	9.50 to 10.00
Iron rails	15.00 to 15.50
Rails for rolling	17.25 to 17.75
Machine shop turnings	9.00 to 9.50
Heavy turnings	10.00 to 10.50
Steel car axles	19.00 to 19.50
Iron car axles	27.50 to 28.00
Wrot. iron bars and trans.	22.00 to 22.50
No. 1 railroad wrought	13.50 to 14.00
Steel rails, less than 3 ft.	19.00 to 19.50
Steel angle bars	14.50 to 14.75
Cast iron carwheels	14.50 to 15.00
No. 1 machinery cast	15.00 to 15.50
Railroad malleable	15.50 to 16.00
No. 1 railroad cast	15.00 to 15.50
Stove plate	12.50 to 13.00
Agricult. malleable	15.00 to 15.50
Relay. rails, 60 lb. and under	20.50 to 23.50
Relay. rails, 70 lb. and over	26.50 to 29.00

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-fin. rounds, shaftings, screw stock	3.75c.
Black sheets (No. 24)	4.25c.
Galv. sheets (No. 24)	5.10c.
Blue ann'l'd sheets (No. 10)	3.45c.
Black corrug. sheets (No. 24)	4.30c.
Galv. corrug. sheets	5.15c.
Structural rivets	3.95c.
Boiler rivets	3.95c.
	Per Cent Off List
Tank rivets, ⅞-in. and smaller, 100 lb. or more	65
Less than 100 lb	60
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-pressed nuts, sq., blank or tapped, 200 lb. or more	60
Less than 200 lb	50
Hot-pressed nuts, hex., blank or tapped, 200 lb. or more	60
Less than 200 lb	50

Cincinnati

Mill Operations Sustained—Scrap Strong, Pig Iron Dull

CINCINNATI, Aug. 6.—Consumers of pig iron are wary about entering the market for large quantities and are purchasing only enough material to maintain production, thus causing the volume of new business of district furnaces to decline noticeably. Of course, a recession in buying activity is always looked for at this time of the year, but the situation is further complicated by the unsettled condition of the Southern market, which in a few instances has caused Northern furnaces to figure closely to take business. Another factor is the withdrawal of automobile manufacturers from the market, pending the bringing out of new models, but this is expected to disappear in about 30 days. There is no inquiry of note before the trade.

Prices per gross ton, deliv'd Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25	$19.89 to $20.39
Ala. fdy., sil. 1.75 to 2.75	17.69 to 18.19
Ala. fdy., sil. 2.25 to 2.75	18.19 to 18.69
Tenn. fdy., sil. 1.75 to 2.25	17.69 to 18.19
S'th'n Ohio silvery, 8 per cent	26.89

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

Finished Material.—Although the general sheet demand during the past week has been maintained at a high level for midsummer, new business was not abreast of production and district sheet mills reduced backlogs further. Deliveries, however, are still extended and, with the highway and roofing demand increasing, mill operators do not look for much additional improvement in the situation. The leading interest in this district reports that two of its units are booked approximately three months in advance and all other units, except the cold-rolled strip mill, are maintaining capacity production to keep pace with

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and struc. shapes	3.40c.
Bars, soft steel or iron	3.30c.
New billet reinforc. bars	3.15c.
Rail steel reinforc. bars	3.00c.
Hoops	4.05c.
Bands	3.50c.
Cold-fin. rounds and hex. Squares	3.85c. 4.35c.
Black sheets (No. 24)	4.05c.
Galvanized heets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.45c.
Structural rivets	3.85c.
Small rivets	65 per cent off list
No. 9 ann'l'd wire, per 100 lb.	$3.00
Com. wire nails, base per keg	2.85
Cement c't'd nails, base 100 lb. keg	2.85
Chain per 100 lb	8.75
	Net per 100 Ft.
Lap-weld steel boiler tubes, 2-in.	$16.00
4-in.	33.00
Seamless steel boiler tubes, 2-in.	17.00
4-in.	34.00

demand. With a reawakening of the automotive demand the latter part of this month, it is expected that interest in cold-rolled strip again will increase. Improvement in the price situation on galvanized sheets is indicated in reports that concessions heretofore granted by certain mills to Southern roofing manufacturers are being refused.

Coke.—District sellers of by-product foundry coke report that specifications during July were greater than in any month since March, when an acute situation in southern Michigan caused a very heavy demand. Indications for this month, however, are that foundries will ease up on specifications, primarily because of the decrease in automotive demand. New business is still very quiet and, except for a few carloads, no new bookings have been announced.

Old Material.—While the market is still firm, as indicated by the continued steadiness of prices and a further advance of 25c. in heavy melting steel, consumers are not buying old material in large quantities. Mills are taking shipments on old contracts, but as these terminate, new purchases are made only to cover requirements for short periods and in some instances for immediate use. The Norfolk & Western Railway is offering 4300 tons and the Pennsylvania has announced a list of 50,000 tons.

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel	$13.75 to $14.25
Scrap rails for melting	14.00 to 14.50
Loose sheet clippings	9.00 to 9.50
Bundled sheets	11.00 to 11.50
Cast iron borings	9.25 to 9.50
Machine shop turnings	8.50 to 8.75
No. 1 busheling	10.50 to 11.00
No. 2 busheling	7.00 to 7.50
Rails for rolling	14.50 to 15.00
No. 1 locomotive tires	14.25 to 14.75
No. 2 railroad wrought	13.75 to 14.25
Short rails	18.50 to 19.00
Cast iron carwheels	12.75 to 13.25
No. 1 machinery cast	19.25 to 19.75
No. 1 railroad cast	15.25 to 15.75
Burnt cast	10.25 to 10.75
Stove plate	10.25 to 10.75
Brake shoes	10.25 to 10.75
Agricultural malleable	14.25 to 14.75
Railroad malleable	15.25 to 15.75

Boston

Reduced Sales of Pig Iron—Buffalo Quotations Advance—Scrap Easier on Increasing Supply

BOSTON, Aug. 6.—Pig iron sales the past week dropped off, amounting to less than 5000 tons, contrasted with slightly more than that amount the previous week. They included 1000 tons of low phosphorus to a Massachusetts machinery manufacturer by a furnace east of Buffalo, and the remainder was in small tonnages. Another Massachusetts machinery manufacturer has yet to cover on 1000 tons of No. 2X and No. 1X. No other sizable inquiry is in the market. Buffalo furnace prices unquestionably are firmer than they were a fortnight ago. Numerous small lots of No. 2X iron sold the past week at $18.50 a ton, furnace, and the lowest price offered so far on the 1000-ton open inquiry has been $18. The furnace making that price is on an $18-a-ton base, but in this instance waived the differential on the No. 2X. Iron made east of Buffalo the past week sold at an advance of 25c. to 50c. a ton, in some cases.

Foundry iron prices per gross ton deliv'd to most New England Points:

†Buffalo, sil. 1.75 to 2.25	$22.28 to $22.78
†Buffalo, sil. 2.25 to 2.75	22.78 to 23.28
*Buffalo, sil. 1.75 to 2.25	22.91 to 23.41
*Buffalo, sil. 2.25 to 2.75	22.91 to 23.91
East. Penn., sil. 1.75 to 2.25	23.65
East. Penn., sil. 2.25 to 2.75	24.15
Va., sil. 1.75 to 2.25	25.21
Va., sil. 2.25 to 2.75	25.71
Ala., sil. 1.75 to 2.25	21.41 to 23.27
Ala., sil. 2.25 to 2.75	21.91 to 23.77

Freight rates: $4.91 all rail from Buffalo, and $4.28 rail and water; $3.65 from eastern Pennsylvania; $5.21 all rail from Virginia; $6.91 to $8.77 from Alabama.

*All rail rate.
†Rail and water rate.

Shapes and Plates.—Mills are holding firmly at 1.90c. to 2c. a lb., base, Pittsburgh, on plates and standard shapes and are well booked ahead. Plate deliveries are still uncertain, but specifications on shapes are coming forward on schedule. The New England Structural Co. is the low bidder on 300 tons of steel for the fire station, Bowdoin Square, Boston, but the cost exceeds the appropriation. The aggregate tonnage placed the past week in small fabricating jobs in Boston ran about 800 tons. Competition among fabricators is keen and New York State firms have invaded the New England field, taking jobs of as small as 25 tons.

Reinforcing Steel.—Billet steel bars continue to sell in small tonnages. While competition among sellers is keener than at any previous time this year, they are holding firmly to 2.66½c., base, from stock. The 250 to 300 tons required for the North Station hotel will probably close this week, as well as better than 700 tons for a downtown office building. Rail steel bars are moving in limited amounts at concessions from the general 2.26½c., base, delivered common Boston freight rate points price.

Coke.—Little change is noted in the by-product foundry coke situation. Specifications against last half contracts are holding up well and the price remains at $11 a ton, delivered within a $3.10 freight rate zone.

Old Material.—Old material is coming out more freely and mills are specifying against contracts more liberally. Consequently the general scrap price structure does not appear so strong as heretofore. Sales of No. 1 heavy melting steel at $13 a ton have practically disappeared and $12.75, on cars shipping point is now the recognized top price. Quotations on T rails have dropped noticeably due to increased supplies. One dealer is paying $15 a ton, on cars shipping point for shafting, but the average going price is $14. Steel turnings are off about 10c. a ton. In contrast with the general trend of values, bundled skeleton, forge flashings and blast furnace borings and turnings are doing a little better. A steamer has just finished loading 3300 tons of scrap here for Danzig. Another steamer is due here Aug. 7 to take 1200 to 1400 tons for the same port. The four cranes on the local loading dock heretofore out of commission are working and the next steamer will load quickly.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$12.50 to $12.75
Scrap T rails	11.50 to 12.00
Scrap girder rails	11.00 to 11.50
No. 1 railroad wrought	11.00 to 11.50
No. 1 yard wrought	9.00 to 9.50
Machine shop turnings	6.50 to 7.00
Cast iron borings (steel works and rolling mill)	6.50 to 6.60
Bundled skeleton, long	10.00 to 10.50
Forge flashings	10.00 to 10.50
Blast furnace borings and turnings	6.10 to 6.50
Forge scrap	9.00 to 9.25
Shafting	14.00 to 15.00
Steel car axles	18.00 to 19.00
Wrought pipe 1 in. in diameter (over 2 ft. long)	9.75 to 10.00
Rails for rolling	12.50 to 13.00
Cast iron borings, chemical	10.00 to 10.25
Prices per gross ton deliv'd consumers' yards:	
Textile cast	$14.50 to $15.00
No. 1 machinery cast	15.00 to 15.25
No. 2 machinery cast	13.00 to 13.25
Stove plate	11.00 to 11.50
Railroad malleable	18.50 to 19.00

An evening course in Diesel and oil engines has been announced by the Polytechnic Institute, Brooklyn, N. Y. Lectures will be held every Tuesday evening, beginning with the last Tuesday of September. Detailed information may be obtained by addressing the institute, 99 Livingston Street, Brooklyn.

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars, small shapes	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway rounds	6.60c.
Norway squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tie steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold-rolled steel—	
Rounds and hex	*3.55c. to 5.55c.
Squares and flats	*4.05c. to 7.05c.
Toe calk steel	6.00c.
Rivets, structural or boiler	4.50c.

	Per Cent Off List
Machine bolts	50 and 5
Carriage bolts	50 and 5
Lag screws	50 and 5
Hot-pressed nuts	50 and 5
Cold-punched nuts	50 and 5
Stove bolts	70 and 10

*Including quantity differentials.

Non-Ferrous Metal Markets

Largest Domestic Copper Sales Since Middle of March

NEW YORK, Aug 6.

Copper.—After an extended period of dullness, copper sales turned sharply upward the past week. Domestic consumers resumed buying on a liberal scale, placing orders for more than 30,000 tons. This constituted the largest week's business since the middle of March. Concurrent with the renewal of activity in the domestic market were substantial bookings abroad, which totaled over 2000 tons daily. Practically all purchases, both domestic and foreign, were for delivery in the next 30 days. The spurt of buying is attributed to the fact that consumers allowed stocks to diminish to the point where immediate requirements demanded the ordering of fresh material. This action on the part of users has broken a deadlock during which attempts were made by them to reduce prices by refraining from buying and thereby forcing producers, hungry for business, to offer inducements in the form of lower quotations. The latest developments are regarded as a victory for producers in their efforts to maintain the market at the present level. Outstanding during the week was the resumption of the solicitation of orders by the primary producers, who lately have been leaving the market to custom smelters. Sellers are convinced that the substantial bookings of the past week do not represent a flurry of buying, but are a forerunner of a steady flow of business from both domestic and foreign consumers during the month of August. Electrolytic copper is firm at 18c., delivered in the Connecticut Valley, and at 18.30c., c.i.f. usual European ports. Lake copper remains at 18c. to 18.12½c., delivered.

Copper Averages.—The average price of Lake copper for July, based on daily quotations in THE IRON AGE, is 18.12½c., delivered New York. The average price of electrolytic copper is 17.75c., refinery, or 18c., delivered in the Connecticut Valley.

Tin.—Despite the scarcity of orders, which totaled only 500 tons in the past week, the Straits tin market has shown surprising steadiness. In addition to the lack of demand on the part of buyers, the week was made even more dull by the fact that Mon-

THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY

	Aug. 6	Aug. 5	Aug. 3	Aug. 2	Aug. 1	July 31
Lake copper, New York	18.12½	18.12½	18.12½	18.12½	18.12½	18.12½
Electrolytic copper, N. Y.*	17.75	17.75	17.75	17.75	17.75	17.75
Straits tin, spot, N. Y.	47.25	47.25	....	47.125	47.125	47.25
Zinc, East St. Louis	6.80	6.80	6.80	6.80	6.80	6.80
Zinc, New York	7.15	7.15	7.15	7.15	7.15	7.15
Lead, St. Louis	6.55	6.55	6.55	6.55	6.55	6.55
Lead, New York	6.75	6.75	6.75	6.75	6.75	6.75

*Refinery quotation; price ¼c. higher delivered in the Connecticut Valley.

Rolled Products

Prices on rolled non-ferrous products are unchanged from those prevailing one week ago.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—
- High brass ..... 23.25c.
- Copper, hot rolled ..... 26.75c.
- Zinc ..... 10.25c.
- Lead (full sheets) ... 11.00c. to 11.25c.

Seamless Tubes—
- High brass ..... 28.25c.
- Copper ..... 29.25c.

Rods—
- High brass ..... 21.25c.
- Naval brass ..... 24.00c.

Wire—
- Copper ..... 19.87½c.
- High brass ..... 23.75c.

Copper in Rolls ..... 26.75c.
Brazed Brass Tubing ..... 30.87½c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also to St. Louis on shipments to points west of that river.

- Sheets, 0 to 10 gage, 3 to 30 in. wide ..... 33.00c.
- Tubes, base ..... 42.00c.
- Machine rods ..... 34.00c.

Chicago Warehouse

(Prices Cover Trucking to Customers' Doors in City Limits)

Sheets—	Base per Lb.
High brass	23.25c.
Copper, hot rolled	27.75c.
Copper, cold rolled, 14 oz. and heavier	30.00c.
Zinc	10.75c.
Lead, wide	11.35c.
Seamless Tubes—	
Brass	28.25c.
Copper	29.25c.
Brass Rods	21.25c.
Brazed Brass Tubes	31.00c.

New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—		
High brass	21.12½c.	to 22.12½c.
Copper, hot rolled, base sizes	27.75c.	to 28.75c.
Copper, cold rolled, 14 oz. and heavier, base sizes	30.00c.	to 31.00c.
Seamless Tubes—		
Brass	26.00c.	to 27.00c.
Copper	29.12½c.	to 30.12½c.
Brazed Brass Tubes	29.12½c.	to 30.12½c.
Brass Rods	18.87½c.	to 19.87½c.

New York Warehouse

Delivered Prices, Base Per Lb.

- *Zinc sheets (No. 9), casks* ..... 10.50c. to 11.00c.
- *Zinc sheets, open* ..... 11.50c. to 12.00c.

Metals from New York Warehouse

Delivered Prices, Per Lb.

- Tin, Straits pig ..... 48.50c. to 49.50c.
- Tin, bar ..... 50.50c. to 51.50c.
- Copper, Lake ..... 19.50c.
- Copper, electrolytic ..... 19.25c.
- Copper, casting ..... 19.00c.
- Zinc, slab ..... 7.75c. to 8.25c.
- Lead, American pig ..... 7.50c. to 8.00c.
- Lead, bar ..... 9.50c. to 10.00c.
- Antimony, Asiatic ..... 10.50c. to 11.00c.
- Aluminum No. 1 ingots for remelting (guaranteed over 99% pure) ..... 25.00c. to 26.00c.
- Alum. ingots, No. 12 alloy, 24.00c. to 25.00c.
- Babbitt metal, commercial grade, 25.00c. to 35.00c.
- Solder, ½ and ½ ..... 31.00c. to 32.00c.

Metals from Cleveland Warehouse

Delivered Prices, Per Lb.

- Tin, Straits pig ..... 52.25c.
- Tin, bar ..... 54.25c.
- Copper, Lake ..... 19.50c.
- Copper, electrolytic ..... 19.25c.
- Copper, casting ..... 18.75c.
- Zinc, slab ..... 7.75c. to 8.00c.
- Lead, American pig ..... 7.25c. to 7.50c.
- Lead, bar ..... 9.75c.
- Antimony, Asiatic ..... 16.00c.
- Babbitt metal, medium grade ..... 18.75c.
- Babbitt metal, high grade ..... 56.50c.
- Solder, ½ and ½ ..... 31.75c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged customers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	14.75c.	16.00c.
Copper, hvy. and wire	14.50c.	15.75c.
Copper, light and bottoms	12.50c.	13.75c.
Brass, heavy	8.50c.	9.50c.
Brass, light	7.50c.	8.50c.
Hvy. machine composition	12.00c.	13.00c.
No. 1 yel. brass turnings	9.75c.	10.50c.
No. 1 red brass or compos. turnings	11.25c.	12.25c.
Lead, heavy	5.25c.	5.75c.
Lead, tea	4.25c.	5.25c.
Zinc	3.50c.	4.25c.
Sheet aluminum	14.00c.	16.00c.
Cast aluminum	12.25c.	14.25c.

day was a bank holiday in London so that trading activities were suspended there. Practically all buying has been for August and September delivery. Spot Straits tin has fluctuated but little during the week and was quoted today at 47.25c., New York. The London market is firm, but prices have fallen off slightly. Spot standard is quoted at £212 17s. 6d., future standard at £216 17s. 6d. and spot Straits at £216 7s. 6d. The price at Singapore is steady at £220 5s.

Zinc.—Prime Western zinc is firm at 6.80c., East St. Louis, but orders have been confined to from one to two carloads each. Figures published by the American Zinc Institute reveal that zinc stocks increased about 7200 tons during July, a development which has tended somewhat to weaken the market. However, producers declare that several large consumers have allowed stocks to run down materially and that they will have to make sizable purchases the moment that demand for their product picks up.

Lead.—There is a stronger undertone to the market. Consumers have been buying in larger quantities and thereby have added strength to prices. Orders for August delivery have been taken at 6.55c., St. Louis, but producers, at least in some cases, are asking 6.60c. for September delivery. The leading interest continues to quote 6.75c., New York.

Antimony.—Consumers have been purchasing steadily in small lots and spot metal has advanced to 8.75c. with futures selling at 8.62½c., duty paid, New York. Imports of Chinese metal during August are estimated at about 500 tons. Since demand is normally about 800 tons monthly and since only small stocks are in warehouses, there is a strong possibility that prices may advance. In several cases dealers now are trying to get 6.00c. for spot metal.

Nickel.—Ingot nickel is quoted at 35c. a lb., shot nickel at 36c. and cathodes of electrolytic nickel at 35c.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is priced at 23.90c. a lb., delivered.

Non-Ferrous Metals at Chicago

CHICAGO, Aug. 6.—Spot sales are in good volume. Prices are steady except for a small reduction in quotations on zinc. Purchasers of old metals are more numerous than a week ago.

Prices per lb., in carload lots: Lake copper, 18.50c.; tin, 48c.; lead, 6.65c.; zinc, 6.87½c.; in less-than-carload lots, antimony, 9.62½c. On old metals we quote copper wire, crucible shapes and copper clips, 14c.; copper bottoms, 11.50c.; red brass, 11.50c.; yellow brass, 8c.; lead pipe, 4.50c.; zinc, 3.25c.; pewter, No. 1, 24.50c; tin foil, 26c.; block tin, 36c.; aluminum, 12.87½c.; all being dealers' prices for less-than-carload lots.

Bethlehem's Report to Employees

President Grace Attributes Bright Outlook to Worker Relations—Has Made Plans for Revamping Properties

NEVER was the future success of the Bethlehem Steel Corporation better assured than it is today, according to Eugene G. Grace, president, in a statement to the company's employees. Mr. Grace's statement was included in a report to the employees—similar to the company's yearly reports to stockholders—covering the annual conferences which have just been concluded between the management and representatives of the employees.

"I do not hesitate to say," Mr. Grace states, "that this happy outlook is due largely to our persistent adherence to the principle of good management, which recognizes above everything else that a cooperative relationship between employer and employee is essential to the success of any large industrial undertaking.

"The steel industry as a whole is experiencing the greatest demand in its history. Bethlehem has been operating for many months under a demand in excess of its rated capacity. New records are being established in all branches of the business. And because the company more than five years ago undertook a comprehensive program of rebuilding and rounding out its plants, Bethlehem was ready to meet this anticipated demand, not only more economically but also in larger quantities with a complete line of commercial steel products for every one of steel's expanding uses.

"Rising almost from obscurity 25 years ago, Bethlehem today occupies a new position of financial security and commercial leadership. The company's progress has enabled us not only to provide steadier work for our employees than at any time in recent years, but also to resume payment of dividends to our common stockholders after five years' interruption, and to share with them in other ways the company's prosperity. The results which have been accomplished should be especially gratifying to the employees—so many of whom are also stockholders—for the evidence is plain that this achievement means work well done all along the line."

The report points out that the results achieved may be attributed to those activities which are jointly operated by employees and management, namely, employee representation, savings and stock ownership, pensions, relief, accident prevention, home ownership aid, etc. The report adds that weekly earnings of Bethlehem employees are today over 20 per cent higher than the average weekly earnings in 24 major industries.

Plans have been made, it is stated, for further revamping of Bethlehem's properties to enable the company to keep pace with the growing demand for its products.

Obituary

WILLIAM PIGOTT, whose death at Vancouver, July 19, was mentioned in this column last week, was born 69 years ago in New York, but received his school education in Ohio. He went to Seattle in 1895 and had long been a conspicuous figure in steel manufacture, developing the Seattle properties of the Pacific Coast Steel Co., of which he was for years vice-president. He was president of the Pacific Foreign Trade Council in 1925 and 1926 and was a director of the Dexter Horton National Bank of Seattle and a member of India House, New York.

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JOSEPH E. HUBINGER, president, Eastern Machine Screw Corporation, New Haven, Conn., died at his home in that city July 30, aged 71 years. He was born in Madison, Ind., and went to New Haven in 1882, where he started in business with his brothers.

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WILLIAM M. C. FOSTER, vice-president and general manager of the Mead Cycle Co., Chicago, died July 31, at his home in Lake Bluff, Ill., aged 53 years.

EDWARD NEWBEGIN, president, Multnomah Iron Works, Portland, Ore., died suddenly July 25, in that city.

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CHARLES H. SCHRODER, secretary of the Murray Iron Works Co., Burlington, Iowa, for 27 years, died July 29, aged 62 years. He had been connected with the company for 47 years.

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JOSEPH D. MARKS, Cleveland dealer in iron and steel scrap, died at Battle Creek, Mich., Aug. 1, following an operation, aged 48 years. Several years ago, he, with H. R. Fishel, organized the Fishel & Marks Co. About four years ago, Mr. Marks took over the business and later the company was discontinued. Since that time he had been engaged in business under his own name.

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N. L. KENREIGH, for 20 years associated with Strong, Carlisle & Hammond Co., Cleveland, in a sales capacity in the northern Ohio territory, died at his home in Ravenna, Ohio, Aug. 1.

PERSONAL

DR. GEORGE B. WATERHOUSE, professor of metallurgy, Massachusetts Institute of Technology, Cambridge, Mass., is spending the greater part of the summer at Sydney, Nova Scotia, and at Montreal, Quebec, at the plants of the Dominion Iron & Steel Co., a subsidiary of the British Empire Steel Corporation, Ltd.

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E. D. SPICER, superintendent of the refrigeration department of the General Electric Co., has been made assistant manager of the Schenectady works, effective Aug. 1, according to an announcement made by C. C. Chesney, vice-president of manufacturing. Mr. Spicer was graduated from Cornell University in 1912 with the degree of mechanical engineer. He has been with the General Electric Co. since 1924.

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ALAN KISSOCK, who invented the process for alloying molybdenum with steel by the use of calcium molybdate, has been elected vice-president in charge of production of the Climax-Molybdenum Co., 61 Broadway, New York. He was graduated from the Colorado School of Mines as a mining engineer in 1912, and for three years was engaged in the examination and management of various mines. From 1915 to 1918 he was manager of the Molybdenum Products Co., Tucson, Ariz., and then became president of the Steel Alloys Co., Los Angeles, Cal. During 1922 and 1923 he devoted his time to the examination and management of mines and then associated himself with the Climax Molybdenum Co. in 1924. Since 1924 he devoted himself to the mining and milling of molybdenum ores and to the construction and operation of plants for the production of calcium molybdate. He has also been active in promotional work in connection with the use of molybdenum steels.

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MATTHEW M. KENNEDY has resigned as chief metallurgist and materials engineer at the United States Navy Yard, Philadelphia, to become associated with Horace C. Knerr, consulting metallurgical engineer, Philadelphia.

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ROBERT B. MARSHALL has joined the New York sales staff of the Chain Belt Co., Milwaukee.

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J. C. BINGHAM, heretofore assistant purchasing agent for the Sharples Separator Co., West Chester, Pa., has been appointed purchasing agent, and L. F. ARCHER has been appointed works manager, succeeding S. E. DYKE, resigned.

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W. H. ARNOLD, formerly assistant sales manager of the Pittsburgh Valve, Foundry & Construction Co., Pittsburgh, has been made general sales manager, succeeding C. A. ANDERSON, JR., who became president of the company on March 1. Mr. Arnold has been identified with the company since 1905.

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W. J. BECK, for nineteen years director of research of the American Rolling Mill Co., has been appointed assistant to Charles R. Hook, general

W. J. BECK

DR. ANSON HAYES

manager. Mr. Beck will have direct charge of the development in electrical steel sheets for magnetic purposes. He is widely known in this branch of the industry, having joined Armco in 1903. Graduating from Purdue University in 1896, he was for several years an electrical engineer with the Westinghouse Electric & Mfg. Co. He came to the American Rolling Mill Co. as superintendent of the electrical department and in 1910 was appointed director of research.

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DR. ANSON HAYES has been appointed director of research of the American Rolling Mill Co., Middletown, Ohio. For the past year and a half he has been chief of the chemical division of the Armco research division. He held the chair of physical chemistry at Iowa State College for twelve years and headed that division of the large chemical department of that institution. He also taught graduate courses in thermodynamics and directed research work in the study of factors that influence the stability of iron carbide, particularly in white iron composition suitable for the manufacture of malleable iron. He is a graduate of Drake University, class 1908. His master's degree was taken at Iowa State College, and he received his Ph.D. from the University of Chicago.

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GEORGE L. GORDON, who has been assistant general manager of sales of the Lukens Steel Co., Coatesville, Pa., has been promoted to general manager of sales, succeeding FRANK H. GORDON, now a vice-president. J. H. MCELHINNEY, assistant general superintendent of the company, has become general superintendent to succeed W. H. WARREN, recently elected vice-president and G. DONALD SPACKMAN, who has been superintendent of the flanging department, has become assistant general superintendent.

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LEON F. PAYNE, manager of the credit department, Carnegie Steel Co., Pittsburgh, has been elected treasurer of the Oil Well Supply Co., Pittsburgh, succeeding H. H. JAMES, who was recently elected vice-president in charge of manufacturing for the Supply company.

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R. J. TEEPLE will have charge of chain link fence sales for the Page Steel & Wire Co., following the transfer of the company's general sales department from Bridgeport, Conn., to the American Bank Building, Pittsburgh. S. B. CAIRNS will handle sales of field fence and general wire products, and welding wire and specialties will be handled by J. J. FLAHERTY. W. T. KYLE, general manager of sales for the company will maintain his headquarters at the company's general offices at 230 Park Avenue, New York.

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CHARLES E. HAUCH has been appointed purchasing agent of the North American Refractories Co., National City Bank Building, Cleveland.

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E. P. SEDGWICK has been re-elected president of the Chicago Hardware Foundry Co., North Chicago, Ill. Other officers elected were E. B. SHERWIN, secretary; J. W. ELLIS, treasurer; F. J. SHERWIN, vice-president and G. L. BREWSTER, assistant secretary.

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CHARLES R. BARTON, for the past several years vice-president in charge of the seamless tube mill of Spang, Chalfant & Co., Inc., at Ambridge, Pa., has been made vice-president in charge of all operations of that company.

BOOK REVIEWS

Smelting All Metals

Principles of Metallurgy, by John L. Bray. 568 pages. Ginn & Co., Boston. Price $5.80.

This solid book by the professor of metallurgy at Purdue University has apparently been written to fill the needs of the courses given at that institution. Whether it will be adopted by other colleges will depend upon the time available for such matters. In the opinion of the reviewer, Professor Bray's book is comprehensive enough for a principal text for students in metallurgical engineering; he doubts whether mechanical, civil, electrical and chemical engineers can afford enough time on the matter of winning metals from ores to be able to read 568 pages about it. While undoubtedly all engineers should know much about metals, the available time is more efficiently spent in studying their properties as materials of engineering construction—that is, treating metallurgy and strength of materials as coordinate subjects—and introducing only enough smelting, working and heat treatment to show how the properties of the metals and alloys can be made to vary within useful limits.

The present book follows what may be termed the classical outline, beginning with ores, refractories and fuels, discusses sampling and ore concentration, smelting and refining. A careful reading of the 80-page chapter on copper shows it to be accurate and comprehensive, so concise that many of the implications of the text will escape the student or uninitiated. The most modern practice is discussed, giving space to obsolete and obsolescent methods only where this is necessary to illustrate some phase of present-day operations in America. The chapter ends with a detailed description of two western plants—matter somewhat out of place in a book supposed to be devoted to "principles."

Paging through the rest of the book, the other metals are found to be treated in similar satisfactory manner. The least adequate seems to be a 10-page brief on alloy steels (a section of the chapter on metallography.) Notes on the metallurgy and uses of manganese (page 404) and chromium (page 407) should be amplified and corrected in the next printing.—E. E. T.

German Treatise on Foundry Work

Die metallurgischen und metallographischen Grundlagen des Gusseisens. By K. von Kerpeley. 116 pages, 6½ x 9¾ in. 135 illustrations and 34 tables. Published by Wilhelm Knapp, Halle, (Saale), Germany.

This valuable contribution to the literature of cast iron, is Part VII of a series of books on iron, steel, and nonferrous foundry practice. It has been prepared recently with reference to new metallographic and metallurgical investigations and much of the material is based on test and microscopic examinations of defective castings. Particular attention is paid to the effect of overheating, especially in electric furnaces. There is reference to many hypotheses advanced to account for facts, which have not been definitely accounted for by tests or experience.

While the material is a trifle too technical to be used as a text book or a reference book for the average foundryman, and furthermore is written in a foreign language, that is in one sense the fault of our method of education.

The author discusses the grain of cast iron and the origin of each variety; he treats of the influences of each of the four usual alloying or adulterating elements, singly and in combination; gives a whole chapter to the influence of graphite on the grain; takes up silicon especially in reference to its influence on the graphite, and also shows what nickel, chromium and other elements do to the carbon content and character of the grain. The dependence of the mechanical properties of cast iron on the grain and treatment are also very clearly and exhaustively handled.

The diagrammatic illustrations, especially those in three dimensions, are excellent and instructive; and would be more so if the lettering of some of them were more distinct. (In this particular, American publishers have made us very exacting.)—R. G.

Industrial Economics

Industrials, Their Securities and Organization. By Sterling H. Bunnell. 334 pages. Published by A. W. Shaw Co., Chicago. Price $5.

This book is of interest to two classes of readers, those who are looking for new ideas on industrial management and those who are concerned with the market value of industrial shares. The active administrative officers of manufacturing enterprises, and the more careful investors who take time to study their problems before solving them, will be attracted by the author's presentation. Mr. Bunnell has several messages to deliver on a very broad subject, and his discussions are clear and well supplemented by numerous illustrations gathered from personal observation and experience. The work has much of the comprehensiveness of a text book, but without the usual dryness and formality.

At least four of the twelve chapters are of special interest to the investor as well as the market operator. The author reviews the development, present position and significance of the modern industrial organization. He calls attention to the wide distribution of ownership of industrial shares throughout our ever-increasing army of investors, including both capitalists and wage earners, employers and employees. He traces the important steps in the development of mechanical principles and appliances, and reviews the more recent strides in the efficiency of their application. The subjects of financing, administration, production, marketing, distribution, consumption accounting, development of personnel, plant location, working conditions, and the analysis of balance sheets and earning statements are also reviewed in considerable detail.—H. J. Wolf.

Manufacturing. Edited by Prof. Malcolm Keir. 611 pages, 6 x 9 in. Published by the Ronald Press Co., New York. Price $5.

In view of the three stages in American economics—production as a specialty, then distribution, and now the attempt to equalize these—this book has been prepared by a number of specialists to cover a report upon the principal industries of our country. Chapters follow on American labor, and Labor's industrial problems.

From the very fact that so many authors have had a finger in the literary pie, it is unsatisfactory as a proper study of the problem of manufacturing in general. There is too much historical material—or rather too little concerning the living present, and the future possibilities and

probabilities—after all, these things concern us more than what is called the dead past.

The editor commits the usual error of referring to "labor" when he means "organized labor." The latter constitutes, and always has constituted, but a very small proportion of the labor of this or any other country—in America never more than one fifth of the numbers engaged in work for pay. Another statement, that women's wages have been lower than men's for the same work primarily because the reserve supply has been greater, is not entirely true. Women receive less pay for the added reasons that as a rule they are physically less fitted, they are liable to fluctuations of physical ability, and may not be considered as permanent because they are liable to stop working for pay and take up their more proper occupation as housewives and mothers. They have also, as a rule, from their more mercurial temperament and because less apt to have dependents, a greater percentage of turnover.—R. G.

New Editions of Standard Works

Steel and Its Heat Treatment, by D. K. Bullens. Third edition, rewritten and reset. 564 pages. John Wiley & Sons, Inc., New York. Price $5.

Principles of Metallography, by R. S. Williams and V. O. Homerberg. Second edition. 260 pages. McGraw-Hill Book Co., Inc., New York. Price $3.

It is a good sign when a technical book goes into the second or third edition. Usually the author (and publisher) is glad to have the first edition bought before the book becomes a record of history. When, after a lapse of 10 or 12 years, the demand for the work is sufficient to warrant extensive revision, the subject it treats must be of live interest, and the book appraised favorably by the public.

"Bullens" certainly is well-known to heat treaters. It is the only comprehensive treatise known to the reviewer which talks heat treatment in words the heat treater understands best. Consequently many explanations of practical facts could easily be criticized by the scientist as not conforming exactly to metallurgical theory, but the truth would doubtless be less understandable to the ordinary reader if expressed more precisely.

While hardening, tempering and annealing may all be referred to critical points and heating and cooling rates, not every heat treater has a critical point apparatus. For that reason many specific examples of proper heat treatment programs to give definite properties to steels of certain analyses are undoubtedly consulted frequently by the man at the fire.

New and valuable matter has been added on the proper selection of furnaces and other equipment. It is surprising to find no mention of the McQuaid-Ehn test for normal carburizing steel in the two otherwise comprehensive chapters on case hardening.

Williams and Homerberg's book in metallography is a brief introduction to the science. Much attention is given to the chemical composition and physical constitution of useful alloys, both ferrous and non-ferrous and a table in the appendix lists the composition of many commercial alloys. Emphasis on such phases of the subject, while it undoubtedly widens the audience for the book, makes certain parts of it read more like excursions into metallurgy or engineering materials than metallography. On such excursions lapses in accuracy may be noted, probably because the authors are speaking from hearsay rather than experience.

An idea of the speed at which metallurgy is progressing may be drawn from the fact that in these late editions, the metallography book says on page 161 that "Steels containing one per cent manganese or more cannot be water quenched without danger of cracking," a statement directly contradicted by the recent extensive adoption of medium manganese steels. In Bullen's book there is no mention of nitrogen hardening, nor the ductile stainless irons or high chromium-nickel steels.

Furnace Information for Users

Practical Industrial Furnace Design, by Matthew H. Mawhinney. 318 pages. John Wiley & Sons, Inc. Price $4.

The title of this book is rather misleading, as it contains general information of practical use to engineers and managers who are contemplating the purchase of a new heating furnace, or who are studying the operation of those already installed, rather than detailed information and data to be used by furnace designers in drafting plans for new construction. Consequently the circulation of the book should be far greater than though it were restricted to furnace builders. Any user who desires to get the most for the money he spends on heat treating or baking could peruse this book with profit. It avoids the use of intricate calculations of heat production and transfer; in place of this it endeavors to give diagrams, graphs, or general relationships conveying the same information in more readily understandable manner.

One fact, emphasized at various places in the book, is that much money is often spent to save labor at the furnace, whereas a smaller outlay would save more money in fuel economy. Stated in another way, the author believes that the first place to establish economies is in fuel consumption. A small device to close a door tightly may cost less than $50 to make and install, but save that amount of money every month by keeping heat inside the furnace where it belongs. On the other hand, most equipment for handling hot metal inside a furnace is expensive to install, hard to maintain, and frequently absorbs useful heat in circulating water. Large sums must be saved in labor before it counterbalances the aggregate of these expenses.

New Books Received

Practical Steelmaking. By Walter Lister. Pages 413, 6 x 9 in., illustrated. Published by Instruments Publishing Co., 1117 Wolfendale Street, Pittsburgh.

Foundry Practice. Fourth edition. By R. H. Palmer. Pages 450, 5½ x 8¼ in., illustrated. Published by John Wiley & Sons, Inc., 440 Fourth Avenue, New York. Price, $3.50.

Engineering Drawing. Fourth edition. By Thomas E. French. Pages 466, 6 x 9¼ in., illustrated. Published by McGraw-Hill Book Co., 370 Seventh Avenue, New York. Price, $3.00.

Social Aspects of Industry. By S. Howard Patterson. Pages 539, 6 x 9¼ in., illustrated. Published by McGraw-Hill Book Co. Price $3.00.

Human Nature and Management. By Ordway Tead. Pages 312, 5½ x 8½ in. Published by McGraw-Hill Book Co. Price, $3.50.

Industrial Economics. By Dexter S. Kimball. Pages 312, 6 x 9¼ in., illustrated. Published by McGraw-Hill Book Co. Price $3.00.

Mergers in Industry. Pages 205, 6 x 9¼ in., illustrated. Published by National Industrial Conference Board, Inc., 247 Park Avenue, New York. Price, $3.00.

The American Merchant Marine Problem. Pages 167, 6 x 9¼ in., illustrated. Published by National Industrial Conference Board, Inc. Price, $2.50.

The International Financial Position of the United States. Pages 276, 6 x 9¼ in., illustrated. Published by National Industrial Conference Board, Inc. Price, $5.00.

Fabricated Structural Steel

More Than One-Half of Lettings, Totaling 34,000 Tons, Was for Work in New York

MORE than one-half of the structural steel lettings in the past week, totaling 34,000 tons, was for work in the New York metropolitan area. Included in the New York projects were 6000 tons for an apartment building, 3800 tons for a power house addition and 2550 tons for pier 3 in the North River. Inquiries amounting to 35,000 tons were slightly less than those of the previous week and included 10,000 tons of plates for a pipe line at Everett, Wash., 2500 tons for garages at Chicago and 2500 tons for airports at various locations for the Curtiss Airport Corporation. Awards follow:

BOSTON, 400 tons, Boston Insurance Co. building, to New England Structural Co.

SLATERSVILLE, MASS., 200 tons, power house, to H. B. Smith Co.

DEER LAKE, NEWFOUNDLAND, 135 tons, addition to power house of International Paper Co., to Jones & Laughlin Steel Corporation.

BOSTON & ALBANY RAILROAD, 600 tons, roundhouse at Beacon Park, Mass., to McClintic-Marshall Co.

NEW YORK, NEW HAVEN & HARTFORD RAILROAD, 100 tons, bridge at Canton, Mass., to Boston Bridge Works, Inc.

NEW YORK, NEW HAVEN & HARTFORD RAILROAD, 196 tons, bridge at Port Chester, N. Y., to unnamed bidder.

NEW YORK CENTRAL RAILROAD, 2500 tons, car shops at Harmon, N. Y., to American Bridge Co.

NEW YORK, 2550 tons, Pier 3, North River, to American Bridge Co.

NEW YORK, 3800 tons, addition to Hell Gate power house, to American Bridge Co.

NEW YORK, 200 tons, St. Margaret's School, to McClintic-Marshall Co.

NEW YORK, 1600 tons, apartment building at 1222 Park Avenue, to Paterson Bridge Co.

NEW YORK, 6000 tons, London Terrace apartments on Twenty-Third Street, to Levering & Garrigues Co.

NEW YORK, 1400 tons, apartment building at 104th Street and Central Park West, to Easton Structural Steel Co.

NEW YORK, 815 tons, public schools Nos. 71, 154 and 135, to Easton Structural Steel Co.

NEW YORK, 214 tons, apartment building at 21 East Seventy-Fourth Street, to Easton Structural Steel Co.

NEW YORK, 133 tons, Broadway Exchange Building at 61 Broadway, to Post & McCord, Inc.

JERSEY CITY, N. J., 350 tons, church and rectory, to Mullaney Iron Works.

LOCUST SUMMIT, PA., 260 tons, cleaning plant for Reading Coal Co., to Shoemaker Bridge Co.

OAKMONT, PA., 200 tons, Edgewater Steel Co., to Guibert Steel Co.

PITTSBURGH, 200 tons, Duquesne Slag Products Co., to Pittsburgh Bridge & Iron Works.

STATE OF TENNESSEE, 300 tons, highway bridges, to Virginia Bridge & Iron Co.

IRMO, S. C., 750 tons, hydroelectric power station for Lexington Water Power Co., awarded by W. S. Barstow Co., Reading, Pa., to Belmont Iron Works.

PITTSBURGH, 3000 tons, 20 barges for Basic Barge Line, Inc., to Dravo Contracting Co.

MOUNT VERNON, OHIO, 180 tons, Pittsburgh Plate Glass Co., to Pittsburgh Bridge & Iron Works.

HAMMOND, IND., 800 tons, factory for Lever Brothers Co., to Duffin Iron Co., Chicago.

ROGERS CITY, MICH., 1000 tons, Michigan Lime Stone & Chemical Co., to American Bridge Co.

NORTHERN PACIFIC, 350 tons, viaduct at Superior, Wis., to an unnamed bidder.

CHICAGO, 1000 tons, Edison Electric Appliance Co., to McClintic-Marshall Co.

CHICAGO, 1000 tons, pipe and plate work for Wisconsin Steel Co., to John Mohr & Sons, local.

KANSAS CITY, MO., 700 tons, Hall Building, to Kansas City Structural Steel Co.

SAN JOSE, CAL., 100 tons, factory, to Dyer Brothers.

SEATTLE, 3700 tons plates, Cedar River pipe line, to Western Pipe & Steel Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

GOULDS MILL, VT., 200 tons, bridge for Springfield Terminal Railway.

CENTRAL VERMONT RAILROAD, 200 tons, bridge at White River Junction, Vt.

BEVERLY, MASS., 200 tons, bridge.

NASHUA, N. H., 100 tons, office building.

NEW YORK CENTRAL RAILROAD, 300 tons, grade crossing elimination at Forks, N. Y.

NEW YORK, 13,200 tons, section 5, route 108 of subway in Queens, general contract to George H. Flynn, Inc.

NEW YORK, 1675 tons, Lenox Hill hospital.

NEW YORK, 2500 tons, airports at various locations for Curtiss Airport Corporation.

ELIZABETH, N. J., 1725 tons, highway bridge for State Highway Commission.

PENNSYLVANIA RAILROAD, 800 tons, five bridges.

PHILADELPHIA, 650 tons, Germantown Trust Co. building.

PENNSYLVANIA RAILROAD, 14,500 tons, bridges over Hackensack River: for passengers, 10,000 tons; for freight, 4500 tons; Phoenix Bridge Co., low bidder.

STATE OF PENNSYLVANIA, 780 tons, bridge at Connaught Creek, Erie County, 160 tons; viaduct in Northumberland County, 620 tons.

STATE OF NEW JERSEY, 2000 tons, two bridges on route 25; bids open Aug. 12.

ATLANTIC COUNTY, N. J., 500 tons, Dorset Boulevard bascule bridge; bids open Aug. 14.

PHILADELPHIA, 800 tons, bridge for city at Henry Avenue over Reading Railroad.

BUFFALO, 860 tons, State office building; McClintic-Marshall Co. low bidder.

CLEVELAND, 300 tons, Kinsman Road grade elimination bridge for Cleveland Union Terminals Co.

CHICAGO, MILWAUKEE, ST. PAUL & PACIFIC, 2000 tons, car shops at Milwaukee.

MADISON, WIS., 1400 tons: 800 tons for field house and 600 tons for mechanical engineering building.

CHICAGO, 250 tons, Gateway Theater.

CHICAGO, tonnage not stated, 35-story building for Otis Estate, Holabird & Roche, architects.

CHICAGO, 2500 tons, chain of garages.

EAST ST. LOUIS, ILL., 700 tons, mill building for Laclede Steel Co.

BREMERTON, WASH., 200 tons, plates, 10 to 24-in. riveted or cast iron pipe; bids Aug. 7.

EVERETT, WASH., 10,000 tons, plates, pipe line, 44 to 56-in.; bids to be called next week.

TACOMA, WASH., 2000 tons, plates, penstock and surge tank; bids Aug. 8.

TACOMA, 2400 tons, Eleventh Street viaduct over Milwaukee tracks; bids soon.

SAN FRANCISCO, 300 tons, Sommer-Kaufman store; bids being taken.

Reinforcing Steel

Lettings Total Only 2400 Tons and Inquiries Lag

DULLNESS in reinforcing steel is indicated by the fact that awards in the past week totaled only 2400 tons. Fresh inquiries amounted to about 3600 tons, the largest being 1000 tons for a filtration plant at Peoria, Ill. Awards follow:

NEW YORK, 400 tons, sewer work in Bronx, to Kalman Steel Co.

CLEVELAND, 250 tons, factory addition for Richman Brothers Co., to Bourne-Fuller Co.

CHICAGO, 425 tons, warehouse at Orleans and Huron Streets, to Concrete Steel Co.

CHICAGO, 220 tons, building for Cushman Sons, to Concrete Engineering Co.

HAWTHORNE, NEV., 600 tons bars and 400 tons wire mesh, ammunition depot, to Truscon Steel Co.

RENO, NEV., 130 tons, Mackay Science Hall, University of Nevada, to Truscon Steel Co.

BEVERLY HILLS, CAL., 205 tons, bank, Santa Monica Boulevard, to Soule Steel Co.

MONTEREY, CAL., 119 tons, garage, to unnamed bidder.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

BOSTON, 700 tons, office building.

CINCINNATI, 300 tons, bridge piers and Union Station approach, for Cincinnati Union Depot Co.

CINCINNATI, 200 tons, new Christ Hospital.

CINCINNATI, 100 to 200 tons, Hamilton County Tuberculosis Hospital.

ARLINGTON HEIGHTS, ILL., 500 tons, filtration plant.

CHICAGO, 250 tons, garage on Clark Street, Fox & Fox, architects.

CHICAGO, 400 tons, commercial building for Zimmerman, Saxe & Zimmerman Co.

PEORIA, ILL., 1000 tons, filtration plant.

ST. LOUIS, 500 tons, McMillan Hospital for Washington University medical group.

The American Rolling Mill Co. will construct a four-hole regenerative soaking pit at its Columbia plant, Butler, Pa. The contract, including stack and additional producer gas flues, has been let to the Rust Engineering Co., Pittsburgh. The National Tube Co., Pittsburgh, will build five continuous Rust recuperative tube reheating furnaces at its Lorain, Ohio, and McKeesport, Pa., works. The furnaces will have a heating capacity in excess of 250 tons of tubes an hour.

Machinery Markets and News of the Works

Tool Buying Well Sustained

August Sales Expected to Be Better Than Normal—General Electric Co. Is Large Purchaser

USUALLY a light month for machine tool sales, August has opened with buying sustained at a fairly high level, although a slight decline in demand is reported from some manufacturing centers.

A slackening in the volume of orders in the Chicago and New England districts has been offset by gains at Cincinnati and by continued liberal bookings at New York and Cleveland.

Machine tool builders are of the opinion that business during August will be better than normal for a midsummer month, although a let-down from the July volume is not unexpected. Shop operations are being carried along at capacity and in most cases unfilled orders are sufficiently large to insure the maintenance of present production schedules well into the fall.

Final reports of July sales reveal that they were only a little if any less than those of June. A Cleveland turret lathe builder states that bookings last month showed an increase of 20 per cent over those of the previous month and were on a parity with those of May, which was a peak month.

General Electric Co. has been a heavy buyer, having purchased tools for its Lynn and Pittsfield plants and for its electric refrigerator manufacturing department. American Locomotive Co. is inquiring for 10 large tools for its Dunkirk, N. Y., plant and the International Harvester Co. probably will begin closing for special machines on its list the coming week.

The Cleveland Union Terminal Co. has contracted for several machines included in its list of 25 tools for which inquiries were made a few weeks ago. The Amtorg Trading Corporation has purchased some tools, including gear-cutting machines, for a tractor plant in Russia and an American builder has sold eight electric drop hammers for Russian delivery.

New York

NEW YORK, Aug. 6.—Machine tool buying continues active with business well distributed. Outstanding among the large buyers is the General Electric Co., Schenectady, which has closed on two milling machines for its turbine department, several tools for its Lynn and Pittsfield, Mass., plants and additional equipment for its refrigerator manufacturing department, including eight presses, a press brake, shaper, cutter grinder, radial drill and engine lathes. Tools are still pending for this division of the company, which is reported producing about 3500 refrigerators a month, while recent sales have been at the rate of about 5500 a month. Westinghouse Electric & Mfg. Co. is also an active buyer for its refrigerator manufacturing plant.

Western Electric Co. still has a number of inquiries out for tools for its Kearny, N. J., plant and American Locomotive Co. is inquiring for more than 10 machines for its Dunkirk plant. Wood Newspaper Machine Corporation, Plainfield, N. J., has closed on several tools, and International Motor Co., Plainfield, has been a small buyer the past week. Among aircraft manufacturers, Sikorsky Aviation Corporation, College Point, N. Y., and Bridgeport, Conn., has closed on three precision bench lathes and Fairchild Aviation Corporation, Farmingdale, N. Y., and Fokker Aircraft Corporation of America, Hasbrouck Heights, N. J., have also been recent buyers.

Plans are being completed by Curtiss Airports Corporation, 27-29 West Fifty-seventh Street, New York, for new airport on 325-acre tract recently acquired at Valley Stream, L. I., replacing former airport at Mineola, L. I., to consist of six hangars, motor repair and equipment shops, airplane repair base, oil storage buildings and other units, to cost over $350,000 with equipment. Complete flying school will be established. Kenneth Franzheim, 345 Madison Avenue, New York, is architect.

United American Metals Corporation, foot of Clay Street, Brooklyn, has plans for a new one and two-story plant, to cost $45,000 with equipment. Gustave Erda, 788 Manhattan Avenue, is architect.

Motor Replacement Parts Corporation, 29 Grove Avenue, Port Richmond, S. I., has leased new building, 30 x 75 ft., now in course of erection on New Street, and will occupy as new mechanical shop. G. C. Marino and Elbert Stewart, Jr., are heads.

Rockland Light & Power Co., Nyack, N. Y., has work under way on a new hydroelectric power plant, to cost over $200,000 including transmission lines, to connect with present system.

Margon & Holder, 29 West Fifty-seventh Street, New York, architects, have filed plans for two-story automobile service, repair and garage building on White Plains Road, to cost about $160,000 with equipment.

Westinghouse Electric & Mfg. Co., 150 Broadway, New York, with main plant at East Pittsburgh, has purchased 22-acre tract in meadow district, Newark, N. J., as site for new Eastern plant. Initial structures will be used primarily for storage and distributing service and are reported to cost more than $500,000. Later it is proposed to erect group of multi-story manufacturing units to cost over $5,000,000 with equipment. It is said that a number of smaller plants will be removed to new location, including factories now at New York and Brooklyn, South Bend, Ind., and Springfield, Ohio.

Royal Show Case Co., 648 Wythe Avenue, Brooklyn, has revised plans for new plant unit, to cost about $50,000 with equipment, for which bids will be asked on general contract early in fall. Murray Klein, 65 Court Street, is architect.

Knickerbocker Ice Co., 41 East Forty-second Street, New York, will soon take bids on general contract for a four-story ice-manufacturing plant, to cost about $100,000 with machinery. C. Leslie Wier is company architect and engineer.

Ford Motor Co., Detroit, has taken title to 35-acre tract at Edgewater, N. J., for new assembling and distributing plant, with power house, to cost over $5,000,000 with equipment. New works will be used primarily for export account and will replace present plant at Kearny, N. J., recently sold to Western Electric Co. Albert Kahn, Inc., Marquette Building, Detroit, is architect and engineer for Ford plant and bids will be asked on general contract from that office about middle of month.

Standard Oil Co. of New Jersey, Inc., 26 Broadway, New York, will erect new storage and distributing plant at Atlantic Highlands, N. J., to cost about $225,000 with equipment.

North Jersey District Water Supply Commission, 24 Commerce Street, Newark, will receive bids until Aug. 20 for motor-generator exciter sets, oil circuit breakers, switchgear and other equipment for electric station at headworks at Wanaque dam, Wanaque, to cost about $100,000; also for electrically-operated centrifugal pumping units of 23 million and 11 million gal. per day capacity, and smaller pumping machinery, with accessories, to cost about $50,000. Morris R. Sherrerd is consulting engineer.

Turner Tanning Machinery Co., 51-53 Commercial Street, Newark, manufacturer of machinery and parts for leather tanneries, has leased building at 27 Haynes Street, totaling about 10,000 sq. ft. floor space, for expansion and will remove to new location. Headquarters are at Peabody, Mass. John Fitzgerald is general manager.

Crew Levick Co., 219 North Broad Street, Philadelphia, refined oils, gasoline, etc., subsidiary of Cities Service Co., 60 Wall Street, New York, has plans for storage and distributing plant at Perth Amboy, N. J., to cost more than $100,000 with equipment.

Groov-Pin Corporation, formerly located 45-22 Thirty-eighth Street, Long Island City, has moved to a larger plant at 47-18 Thirty-seventh Street.

Dur-O-Bilt Metal Corporation, 402-404 West Twenty-fifth Street, New York, has been organized with capital of $20,000 to manufacture metal equipment for restaurants, cafeterias and kitchens.

Hobson, Houghton & Co., Ltd., Sheffield, England, steel manufacturer, has organized Hobson, Houghton & Co., Inc., and has established an agency at 790-794 Greenwich Street, New York, where all transactions in United States will be taken care of. Arthur R. Purdy is president of new company, and Rowland Bramall, secretary-treasurer and manager.

South Atlantic

BALTIMORE, Aug. 5.—Contract has been let by Williamsport Wire Rope Co., Williamsport, Pa., to Jacob Gehron Co., Inc., same city, for one-story branch plant, 100 x 180 ft., in Sparrows Point section, Baltimore, to cost more than $90,000 with equipment. Works will replace temporary plant at same place leased from Bethlehem Steel Co. Facilities will be provided for doubling capacity. G. R. Shepherd is plant manager.

Celanese Corporation of America, Inc., Amcelle, near Cumberland, Md., has plans for three-story solvents recovery unit, to cost $150,000 with machinery. F. T. Small is company engineer.

Republic Service Corporation, 424 Land Title Building, Philadelphia, W. C. Devin, engineer, is concluding purchase of municipal electric light and power plant and system at Radford, Va., for a price of $400,500, and plans extensions, including transmission lines.

Chesapeake & Ohio Railroad Co., Richmond, Va., has awarded general contract to John W. Cowper Co., State Planters' Bank Building, city, for extensions and improvements in engine house and shops at Hinton, W. Va., including coaling station facilities, coal conveying equipment, engine supply building and electric shop, etc., to cost $265,000. Company is also planning expansion in engine house and terminal shops at Elk, W. Va., to cost about $50,000 with equipment. C. W. Johns is chief engineer.

Board of Trustees, University of Maryland, Baltimore, is said to be planning call for bids for three-story addition to engineering building to cost about $100,000 with equipment. Smith & May, Calvert Building, are architects.

R. J. Reynolds Tobacco Co., Winston-Salem, N. C., has plans for a one-story addition to tin foil manufacturing plant, to cost about $40,000 with equipment.

Charlotte Electric Supply Co., Charlotte, N. C., manufacturer of electrical specialties, has plans for new one-story plant, to cost about $24,000 with equipment.

McCleskey Cotton Oil & Peanut Mills, Inc., Americus, Ga., recently organized by L. L. McCleskey, Americus, and associates, has purchased local mill of Farmers' Oil Co., for new plant. Extensions and improvements are planned.

City Council, Atlanta, Ga., has authorized construction of new hangar with shop facilities at Candler Field, to cost about $50,000 with equipment.

Charlottesville Oil Corporation, Charlottesville, Va., has plans for a new oil storage and distributing plant for motor oils, including elevated steel tanks, pumping equipment, etc., to cost about $45,000.

Washington County School Board, Hagerstown, Md., B. J. Grimes, superintendent, is said to be planning installation of manual training department in new two-story high school at Clear Spring, Md., to cost $115,000, for which plans are being drawn by A. J. Klinkhart, Kohler Building, Hagerstown, architect.

Consumers Utility Co., Staunton, Va., has secured gas franchise at Harrisonburg, Va., and is said to be planning new artificial gas plant, to cost about $100,000 with equipment and pipe lines.

Hardwood Dimension Co., Florence, S. C., has awarded general contract to W. A. Cravy & Sons, 1226 Sumter Street, Columbia, S. C., for one-story plant, 120 x 500 ft., to cost about $90,000 of which about one-half will be used for machinery. Majority of equipment will be electrically operated.

Philadelphia

PHILADELPHIA, Aug. 5.—Bids have been asked on general contract by Reading Co., Reading Terminal, Philadelphia, for one-story electric car repair and construction shop, 137 x 325 ft., with lean-to extension, 25 x 119 ft., at Nineteenth Street and Wagner Avenue, Wayne Junction, to cost more than $100,000 with equipment. Clark Dillenback is company architect.

Riter Brothers & Co., Inc., 1022 Race Street, Philadelphia, metals, has leased former two-story storage and distributing plant of General Electric Co., at Frankford Avenue and Palmer Street, for expansion.

Curtis-Martin Newspapers, Inc., Independence Square, Philadelphia, has awarded general contract to Doyle & Co., 1519 Sansom Street, for two-story addition to automobile service, repair and garage building for company trucks and cars, to cost $150,000 with equipment.

Department of Public Works, City Hall, Philadelphia, is arranging bond issue of $1,000,000 for new municipal airport at South Philadelphia, including hangars, repair and reconditioning shops, oil storage building and other units. Project will require about $7,000,000 for completion, and an additional fund of $6,000,000 will be secured later. Alexander Murdoch is director of department.

Elevating, conveying and other mechanical-handling equipment will be installed in new storage and distributing plant to be erected by Frankford Grocery Co., Penn Avenue and Unity Street, Philadelphia, to cost $175,000. W. E. S. Dyer, Land Title Building, is architect and engineer.

General Cold Storage Co., 328 Market Street, Camden, N. J., recently organized with capital of $1,000,000 by J. P. Murray, 4813 Springfield Avenue, Philadelphia, and associates, is said to be planning establishment of ice-manufacturing and cold storage plant, to cost more than $350,000 with machinery. Harry C. Polk, Glenside, Pa., is interested in new company.

Berks Airways, Inc., Reading, Pa., care of E. Hickman, 148 South Fifth Street, architect, has plans for airport near Jacksonwald, including hangars, repair shops and other units, to cost over $300,000 with equipment.

Officials of Capital City Iron & Steel Co., Harrisburg, Pa., affiliated with Harrisburg Pipe & Pipe Bending Works, Inc., have organized Harrisburg Steel Co., to take over and expand present organization. Connection with Harrisburg Pipe & Pipe Bending Works, Inc., will continue as heretofore. New company will be represented by R. Frank Shaffner, Jr.

Thomas B. Lippincott, 11 South Sixteenth Street, Philadelphia, architect, has plans for a three-story automobile service, repair and garage building, to cost about $100,000 with equipment.

Lycoming Mfg. Co., Williamsport, Pa., manufacturer of automobile engines, a subsidiary of Auburn Automobile Co., Auburn, Ind., is completing an addition for production of airplane motors and expects to have unit ready for service early in fall.

Detroit

DETROIT, Aug. 5.—Wolverine Carburetor Co., Jackson, Mich., recently organized by T. G. Atkins, Jackson, and associates, has taken over former local factory of C. J. Mfg. Co., for manufacture of carburetors and kindred equipment.

Standard Tube & Mfg. Co., 2435 Scotten Avenue, Detroit, manufacturer of metal tubular products, is reported planning new factory at Ferndale, Mich., to cost more than $60,000 with equipment.

Michigan Brass & Iron Works, Lansing, Mich., is planning to rebuild part of foundry destroyed by fire July 28.

American Wire Cloth Co., 1432 North Pitcher Street, Kalamazoo, Mich., manufacturer of wire, screens, etc., will erect one-story plant, 40 x 120 ft. in Parchment district, to cost about $35,000 with equipment. Present works will be removed to new location and capacity increased. American Signs Corporation, manufacturer of signs, displays and kindred specialties, will occupy factory to be vacated by American Wire company for expansion; present sign manufacturing plant will be continued as heretofore.

The Crane Market

NEW business in overhead and locomotive cranes is small, but a substantial number of inquiries is in the market, including six overhead cranes for the Board of Transportation, New York, for installation in sub-stations. In the Chicago district, the Rockford Iron Works, Rockford, Ill., is in the market for a 5-ton, 20-ft. span electric traveling crane.

Among recent purchases are:

Walworth Co., Kewanee, Ill., 5-ton, 34-ft. span overhead crane from Shepard Niles Crane & Hoist Corporation.

Auto Specialities Co., St. Joseph, Mich., two 5-ton, overhead cranes from Western builder.

Union Steam Pump Co., Battle Creek, Mich., 40-ton, 60-ft. span overhead crane from unnamed builder.

Chevrolet Motor Co., Flint, Mich., has begun construction of one-story unit, 250 x 375 ft., for metal stamping plant, to cost about $500,000 with equipment.

Michigan Steel Tube Products Co., Hamtramck, Mich., has approved an expansion program to cost $300,000, including new units to develop capacity of about 5,000,000 ft. of electrically welded steel tubing per month, covering primarily tubular products for automobiles.

Baker-Perkins Co., Williamson Street, Saginaw, Mich., manufacturer of special machinery and parts for chemical, food products and other industries, has awarded general contract to Trier Construction Co., 2113 Court Street, for one-story addition, to cost about $55,000 with equipment. Carl Pletscher is president.

Packard Motor Car Co., East Grand Boulevard, Detroit, has plans for a four-story addition, to cost more than $200,000 with equipment. Albert Kahn, Inc., Marquette Building, is architect and engineer. Packard company is completing erection of unit for production of Diesel engines and parts for airplanes to be ready for service by end of month. It will represent an investment of about $500,000.

Stark Pump Co., 17128 Mount Elliott Avenue, Detroit, has been incorporated and will continue manufacture of automatic electric basement drainers, fountain, brine and booster pumps.

New England

BOSTON, Aug. 5.—Bookings by machine tool dealers have declined. Manufacturers, however, have received some good orders from outside points, but report a falling off in demand. A Hartford maker of electric drop hammers has done a substantial business for both foreign and domestic account. It has sold eight hammers, costing about $7,500 each, to the Soviet Government, and is negotiating for additional business. The Spicer Mfg. Co., Toledo, has bought three hammers. It is the general opinion that business will remain comparatively quiet until after the National Machine Tool exhibition next month.

Business in small tools continues in large volume. July sales were the best for any month this year.

Bay State Abrasive Products Co., Westboro, Mass., is taking bids on a one-story plant, 80 x 100 ft.

City of Westfield, Mass., will have plans ready next month for a two-story and basement trade school addition which will require metal working equipment.

Pratt & Whitney Aircraft Co., Hartford, Conn., a unit of United Aircraft Transportation Co., New York, has awarded a contract to Levering & Garrigues, New York, for new plant at East Hartford to manufacture Wasp aircraft engines and parts. Main unit will be one-story, 400 x 1000 ft., with two-story engineering building, entire project to cost about $2,000,000 with equipment. Albert Kahn, Inc., Marquette Building, Detroit, is architect and engineer. Chance Vought Aircraft Corporation, Long Island City, N. Y., another affiliation of parent company, has plans by same architect for new plant near site of Wasp engine works, with one-story main unit, 320 x 672 ft., and several smaller buildings, for production of passenger and commercial aircraft. Project will include an airport with hangars, mechanical shops, etc., and is reported to cost more than $1,500,000 with machinery. Bids will be asked at once on general contract. Boeing Aircraft & Transportation Co., Seattle, another unit of United Aircraft organization, has plans for an Eastern plant at same location in East Hartford, for production of transcontinental airplanes and parts, to cost over $1,000,000 with equipment. It is understood that same architect will prepare plans for this plant.

Board of Education, Central Falls, R. I., is remodeling former city hall for trade school, and will install machine and automobile repair shop, woodworking shop and other departments. It is planned to have school ready for occupancy in fall. Holbert T. Smales is director of vocational education.

Fletcher-Thompson, Inc., 542 Fairfield Avenue, Bridgeport, Conn., architect and engineer, has plans for a two-story automobile service, repair and garage building, 100 x 300 ft., to cost about $185,000 with equipment.

Nash Engineering Co., Wilson Avenue, Norwalk, Conn., manufacturer of air compressors, etc., has filed plans for one-story addition, 30 x 180 ft., to cost about $38,000 with equipment.

Worcester Pressed Steel Co., Barber Avenue, Worcester, Mass., has awarded general contract to Harty & Brown, 25 Hunt Avenue, Boston, for one-story addition, to cost about $40,000 with equipment.

Texas Corporation, 31 St. James Avenue, Boston, has awarded general contract to Simpson Brothers Corporation, 77 Summer Street, for one-story repair shop at oil storage and distributing plant, 100 x 135 ft., to cost about $45,000 with equipment.

Continental Airports, Inc., New Haven, Conn., has acquired 110-acre tract at Milford, Conn., for new airport and has plans for hangars, repair shop, oil storage and other units, entire project to cost more than $175,000 with equipment. Port will be known as Hiram Bingham Field.

Buffalo

BUFFALO, Aug. 5.—Consolidated Aircraft Co., 2050 Elmwood Avenue, Buffalo, has acquired property near Fort Erie, Ont., as site for new plant including parts manufacture and assembling departments, and is said to have plans under way for initial units to cost more than $250,000 with equipment. R. P. Whitman is general manager.

Marcellus Casket Co., Van Rensselaer Street, Syracuse, N. Y., will take bids at once for four-story addition, to cost about $90,000 with equipment. M. L. King, Dennison Building, is architect.

Associated Gas & Electric Co., operating light and power utilities in northern New York, Pennsylvania and New England, is arranging for expansion in different properties, with steel tower transmission lines. A fund of $40,000,000 is being scheduled for work. Executive offices are at 61 Broadway, New York.

William B. Lausterer, 535 Lake View Avenue, Jamestown, N. Y., and associates have organized American Hydraulic Appliance Corporation with capital of $30,000, and plan establishment of new plant at Buffalo for production of hydraulic and other mechanical equipment.

Dahlstrom Metallic Door Co., Buffalo and Second Streets, Jamestown, manufacturer of fireproof doors, sash, etc., has plans for an addition, to cost about $40,000 with equipment. Oliver Johnson, Fenton Building, is architect.

Department of Public Works, City Hall, Rochester, N. Y., Harold W. Baker, commissioner, has plans for hangar with shop and repair facilities at municipal airport, to cost about $35,000 with equipment.

Syracuse Gauge Mfg. Co., Syracuse, N. Y., care of Frank O. Scherr, 102 Stroud Place, recently organized by Mr. Scherr and associates, is said to be planning operation of local factory for manufacture of gages, valves and kindred specialties. Henry Scherr, 1406 Butternut Street, is also interested in organization.

Falk Mill Supply Co., 477 St. Paul Street, Rochester, N. Y., machinery dealer, has purchased plant and equipment of Climax Locomotive Works, builder of locomotives used in lumber camps, mines, mills, etc. This purchase marks opening of new branch of business for Falk company.

Cincinnati

CINCINNATI, Aug. 5.—New business booked by machine tool manufacturers in this territory the last few days in July brought the month's total to a higher level than that of July, 1928, and about on a parity with June of this year. General activity has sustained operations at an unusually high level for this season of the year and the number of unfilled orders is still large. Manufacturers report sufficient bookings to continue capacity production well into the fall. A constant flow of small inquiries also augurs well for a continued steady demand.

Kansas City Southern Railroad has placed an order with a local manufacturer for two large engine lathes.

Contract has been let by Master Electric Co., Dayton, Ohio, manufacturer of electrical equipment, to Huffman Realty Co., Dayton, for one-story addition, to cost $30,000 with equipment.

Board of Education, Portsmouth, Ohio, plans installation of manual training equipment in new two-story and basement junior high school to cost $230,000, for which bids are being asked on general contract. R. Wile, Portsmouth, is architect; William B. Ittner, 911 Locust Street, St. Louis, is consulting architect and engineer.

Harnischfeger Sales Corporation, 269 Union Avenue, Memphis, Tenn., an interest of Harnischfeger Corporation, Milwaukee, has awarded general contract to Memphis Construction Co., 160 Union Avenue, for one-story factory branch, storage and distributing plant, with service division, 40 x 175 ft., to cost about $50,000 with equipment. Hanker & Cairns, 123 South Court Street, Memphis, are architects.

Stumb Motor Co., 1408 Broad Street, Nashville, Tenn., has plans for three-story service, repair and garage building, 102 x 170 ft., to cost about $100,000 with equipment. Warfield & Keeble, Nashville Trust Building, are architects.

Mead Pulp & Paper Co., Chillicothe, Ohio, has plans for an addition for pulp and paperboard manufacture, to cost about $400,000 with machinery. Company engineering department is in charge.

Nashville Warehouse & Elevator Co., Nashville, Tenn., is planning to rebuild part of grain elevator and plant destroyed by fire July 27, with loss reported close to $400,000, including elevating, conveying and other equipment.

City Council, Chattanooga, Tenn., has awarded general contract to Rogers & Leventhal, 826 East Eleventh Street, for

hangar, repair shop and terminal buildings at municipal airport, to cost about $55,000 with equipment. William Crutchfield, First National Bank Building, and Maxwell James, Provident Life Building, are architects.

Milwaukee

MILWAUKEE, Aug. 5.—Production in all metal working plants continues at the high rate of preceding months, and no signs of a summer lull are as yet discernible. Demand from the smaller shops is especially strong. Agricultural implement makers look for a better fall business than that of early summer or spring. Automobile manufacturers, while curtailing current production, are the source of an unusual amount of inquiries. Deliveries show no improvement.

Milwaukee County Park Commission is taking bids for a hangar, 80 x 100 ft., for experimental department of Hamilton Metalplane Co. at Milwaukee County Airport. Charles F. Barndt, 530 Park Street, is general manager of Hamilton company.

Little Wolf Co., New London, Wis., will build dam and hydro electric power plant on Little Wolf River three miles from New London. Dr. W. H. Finney, Clintonville, Wis., is president of company and Frank L. Zaug, New London, secretary.

Janesville Foundry & Machine Co., Janesville, Wis., recently organized by A. W. Schlueter, owner of Schlueter Boiler Works, and Walter Reynolds, Beloit, Wis., has taken over idle foundry of New Doty Mfg. Co., 301 North Main Street and will specialize in gray iron castings.

Marathon Rubber Products Co., Inc., Wausau, Wis., will take bids soon on a one-story addition, 86 x 121 ft.

Sliding Clutch Mfg. Co., 1830 Vliet Street, Milwaukee, has been incorporated to manufacture a sliding clutch, either in its own plant or on a contract basis. Jacob Weisling is president and treasurer.

Moe Brothers Mfg. Co., 113-121 East Clybourn Street, Milwaukee, has been organized to manufacture lighting equipment and kindred products and is now in production.

Pittsburgh

PITTSBURGH, Aug. 5.—Machinery business in this district during July was about equal to June and considerably ahead of July last year. August indicates little decline from the July figure, as local offices are busy preparing estimates on new inquiries, and the Westinghouse Electric & Mfg. Co. and the United States Aluminum Co. are expected to close on a good portion of their extensive lists this month.

Machine tool deliveries are quite extended and many dealers have been unable to quote on considerable business in which they normally would have been interested. For this reason quotations are very firm and manufacturers' representatives are satisfied with the margin of profit now being obtained.

Tidewater Pipe Co., Ltd., Franklin, Pa., a subsidiary of Tidewater Oil Co., 11 Broadway, New York, has purchased plant and property of Emery Mfg. Co., consisting of oil refinery at Franklin, pipe lines, oil storage and distributing plants, and other units. New owner plans expansion. George J. Hanks is president.

Wightman Glass Bottle Co., Parker, Pa., will double former output of plant recently destroyed by fire, and has plans for main one-story unit, 125 x 270 ft. New bottle-making machinery will be installed, all equipment to be electrically operated. It will cost more than $350,000 with equipment. Knox Glass Co., is interested in project.

Presto Electric Roaster Co., Pittsburgh, recently formed with capital of $100,000, is said to be arranging establishment of plant for production of electric heating appliances and kindred equipment. Company is represented by Ivan Bielek, 440 Tenth Avenue, Munhall, Pa., treasurer. S. M. Bielek, 1001 Butler Pike, Etna, Pa., is also interested in new organization.

Board of Education, Borough of Overbrook, Pa., is said to be planning installation of manual training equipment in two-story addition to junior high school, to cost over $175,000. Louis Stevens, Century Building, Pittsburgh, is architect.

Hazel-Atlas Glass Co., Wheeling, W. Va., will make extensions and improvements in power department at plant at Grafton, W. Va., including installation of fuel-saving and handling equipment, to cost about $70,000. G. Wesley Evans is superintendent.

Erie Bolt & Nut Co., Erie, Pa., will erect a one-story building, 50 x 140 ft., for machine shop and additional storage purposes. All materials and machinery have been purchased.

Cleveland

CLEVELAND, Aug. 5.—Machine tool sales held up well during July although dealers' orders declined slightly as compared with June. A local manufacturer of turret lathes reports a 20 per cent gain in business in July over the previous month, its sales lats month equaling the large volume attained in May. Business is well diversified and buying is in small lots, few orders being for more than two or three machines.

The Cleveland Union Terminals Co. has purchased a few of the machines covered by its recent list of 25 tools. The Amtorg Trading Corporation has purchased some equipment, including gear cutting machines for a tractor plant in Russia. It is at present figuring on 30 turret lathes for 1929 delivery. While deliveries of some lines of tools have improved considerbly, other makers are as far behind on shipments as a few weeks ago.

Gogan Machine & Foundry Co., 1440 East Fifty-fifth Street, Cleveland, has awarded contract to J. L. Hunting Co. for an addition, 40 x 72 ft., to cost about $70,000. Company makes heat treating machines used in manufacture of springs and spring forming machinery. Joseph Gogan is president.

Medusa Portland Cement Co., Engineers' Building, Cleveland, is concluding arrangements for controlling interest in Newaygo Portland Cement Co., Newaygo, Mich., and its subsidiary, Manitowoc Portland Cement Co., Manitowoc, Wis. Consolidated interests will operate a group of eight mills with gross annual output of 8,000,000 bbl. Medusa company has plans for another mill at Charlevoi, Mich., with initial capacity of 1,500,000 bbl. annually to cost about $2,500,000 with machinery. J. B. John is president.

McKay Machine Co., Youngstown, manufacturer of metal-working and automotive machinery and parts, has awarded general contract to Emil P. Linberger, 830 Market Street, for one-story addition, to cost about $45,000 with equipment.

Suburban Light & Power Co., Alliance, Ohio, has work under way on an expansion program to cost about $500,000, of which about $350,000 will be used for an addition to local steam-operated electric generating station.

Toledo Grain & Milling Co., Toledo, Ohio, is considering rebuilding part of flour mill destroyed by fire July 28, with loss reported more than $300,000 including machinery.

E. F. Hauserman Co., 6800 Grant Avenue, Cleveland, manufacturer of steel partitions for offices, factories, etc., has plans for a one and two-story addition, to cost more than $50,000 with equipment. George S. Rider Co., Century Building, is architect and engineer.

Akron Air Services, Inc., 975 East Market Street, Akron, Ohio, has awarded general contract to Clemmer & Noah, Inc., 470 East Market Street, for hangar with shop and repair facilities at Fulton Field, to cost about $80,000 with equipment.

Lindsay Wire Weaving Co., 14025 Aspinwall Avenue, Cleveland, has plans for a two-story addition, 50 x 120 ft., to cost about $65,000 with equipment. Bohnard & Parson, Euclid Building, are architects. H. L. Lindsay is president.

Chicago

CHICAGO, Aug. 5.—Lighter demand for machine tools is noted in this district. New orders are widely scattered and individually small. Fresh inquiry, although not large, continues at a steady rate, giving some indication that August sales will be in satisfactory volume. Deliveries remain practically stationary on standard tools and buyers of special equipment are also having difficulty in obtaining deliveries promised.

Steady progress is reported on the special machinery in the International Harvester Co.'s list. It is thought that some orders will be placed next week.

Western Electric Co., Hawthorne Station, Chicago, will build a one-story addition, 95 x 204 ft. to cost $95,000. C. B. Barnes, Hawthorne Station, is architect.

Heating Systems Corporation, Joliet, Ill., has broken ground for first unit of its plant, to cost over $100,000 including equipment.

Martin-Parry Corporation, 2201 South Union Avenue, Chicago, manufacturer of commercial automobile bodies, has leased part of one-story building at 2848 Quinn Street, and will remodel for new assembling works. Present plant will be removed to new location. Headquarters and main plant are at York, Pa.

Iowa Railway & Light Co., Cedar Rapids, Iowa, has awarded a general contract to J. W. Hopp Construction Co., Granby Building, for two-story equipment storage and distributing plant with repair facilities, to cost about $35,000.

City Council, Moline, Ill., is planning establishment of municipal airport to cost about $150,000, with hangars, repair and reconditioning shops and other units. A special aviation commission has been formed to carry out project. R. M.

Benell, City Hall, is city engineer in charge.

Standard Stamping & Perforating Co., 4718 Fifth Avenue, Chicago, manufacturer of metal products, has leased site and building to be erected in Kenwood manufacturing district by Holton, Seelye & Co., 140 South Dearborn Street, to be one story, totaling about 13,000 sq. ft. floor space, to cost about $40,000. Present works will be removed to new location and additional equipment installed.

Taylor Forge & Pipe Co., West Fourteenth Street and Cicero Avenue, Cicero, Ill., has plans for one-story unit, to cost about $45,000 with equipment. Weiss & Niestedt, 53 West Jackson Boulevard, Chicago, are architects.

Traveling ovens, power equipment, conveying and other machinery will be installed in three-story plant to be erected by Cushman Sons, Inc., 1138 Bryn Mawr Avenue, Chicago, to cost $260,000. Michaelson & Rognstad, 3256 Franklin Avenue, are architects.

Faries Mfg. Co., Decatur, Ill., manufacturer of electric fixtures, is erecting a one-story addition, 80 x 240 ft.

Indiana

INDIANAPOLIS, Aug. 5.—City Council, Terre Haute, has authorized a bond issue of $125,000 for establishment of municipal airport, to include hangars, repair shops and other units. It is proposed to purchase present air terminal of Terre Haute Airways, Inc., and expand.

Anaconda Wire & Cable Co., operated by Anaconda Copper Mining Co., 25 Broadway, New York, has purchased three plants and other properties of Marion Insulated Wire & Rubber Co., Marion, manufacturer of rubber-covered wire, cables, etc., and will consolidate. Plants will be continued at present location and production increased.

Bendix Aviation Corporation, South Bend, Ind., operating Bendix Brake Co., and other properties, will take over General Instrument Co., recently organized, and operate as unit of organization. Last noted company has secured Pioneer Instrument Co., Brooklyn, N. Y.; J. P. Marsh Co., Detroit; Paulin System, Inc., Los Angeles, and Tiffany Mfg. Co., Newark, N. J., all manufacturers of aircraft and automotive instruments. Expansion is planned, including addition to plant of Pioneer company to cost about $60,000. Vincent Bendix is chairman of General Instrument Co.; Orvill W. Thompson is president.

Western Oil Co., 310 North Meridian Street, Indianapolis, has filed plans for new oil storage and distributing plant, including machine shop, at Kokomo, reported to cost about $50,000 with equipment.

Bailey Products Corporation, Union City, has been organized to take over business of Bailey Mfg. Co., local, manufacturer of screw and metal products and of couplings for magnetos, generators and water pumps. O. G. Gist is president and G. A. Thomas, manager.

Edwards Iron Works, South Bend, has work under way on an expansion program to cost $300,000. New buildings include main shop, 186 x 325 ft., in which all fabricating will be done, two warehouses, 80 x 562 ft. and 40 x 360 ft., respectively, and a power house.

Lamb Machine Co., Indianapolis, has moved to 1128 West Street, and is in operation.

Gulf States

BIRMINGHAM, Aug. 5.—Plans have been approved by Prest-O-Lite Co., 30 East Forty-second Street, New York, manufacturer of acetylene equipment, welding apparatus, etc., for branch plant at Tampa, Fla., to cost over $90,000 with machinery.

Hurricane Motor Co., Inc., 2103 Walker Street, Houston, Tex., manufacturer of aircraft motors and parts, will soon begin construction of new one-story plant, to cost more than $175,000 with machinery.

Brown Paper Mill Co., Inc., Monroe, La., is disposing of bond issue of $3,000,000, fund to be used for construction of addition to mill for production of kraft papers and kraft paperboard. Work is scheduled for completion in 12 months and will cost about $1,500,000 more than bond issue. George F. Hardy, 309 Broadway, New York, is consulting engineer.

Central Power & Light Co., Frost National Bank Building, San Antonio, Tex., has acquired site at Mercedes, Tex., for a new ice-manufacturing plant, to cost about $175,000 with machinery. Company also plans erection of similar plant at Elsa, Tex., to cost about $85,000.

Gulf Refining Co., Gulf Building, Houston, Tex., has begun construction of oil storage and distributing plant, to consist of five main buildings, pumping station, tanks, 300-ft. dock and other structures, to cost more than $350,000 with equipment. Headquarters are in Frick Annex, Pittsburgh.

Galveston Wharf Co., Galveston, Tex., will issue bonds for $2,245,000, fund to be used for addition to grain elevator, to include elevating, conveying, screening and other equipment for capacity of 5,846,000 bu.

City Council, Abilene, Tex., has plans for hangar, 100 x 100 ft., with shop and mechanical facilities at municipal airport, to cost about $55,000 including equipment. B. Russell Shaw, Arcade Building, St. Louis, is architect.

Charles A. Seward Machine Co., Birmingham, manufacturer of elevating, conveying and kindred machinery, is carrying out an expansion program in transmission equipment division.

Southern Natural Gas Corporation, Monroe, La., has work under way on new pipe line from Monroe and Richland, La., gas fields to Atlanta, Ga., total distance of 421 miles, to furnish natural gas for industries at different points in Georgia. It is scheduled for completion in January, and will cost $20,000,000 with compressor stations and other facilities.

Texas-Louisiana Power Co., Fort Worth, Tex., will build new steam-operated electric power plant at Perryton, Tex., to cost about $80,000 with equipment.

Dallas Airports Utilities Corporation, Dallas, Tex., recently organized, has plans for hangar, 150 x 330 ft., with repair and reconditioning shops, at Love Field, to cost about $75,000 with equipment. Edgar L. Flippen is president.

Board of Education, Lubbock, Tex., is considering installation of manual training department in new three-story high school to cost $600,000, for which plans are being completed by Peters, Strange & Bradshaw, Lubbock, architects.

Yellow Cab Co., Dolorosa Avenue, San Antonio, Tex., has awarded general contract to Allen & Allen, Fredericksburg Road, for one-story service, repair and garage building, 145 x 160 ft., to cost about $100,000 with equipment.

St. Louis

ST. LOUIS, Aug. 5.—Bids are being asked on general contract by Mack International Motor Truck Corporation, 2804 Pine Street, St. Louis, for one-story factory branch, with assembling department, to cost $230,000 with equipment. H. E. Foster, 400 West Madison Street, Chicago, is architect and engineer. Headquarters of company are at 25 Broadway, New York.

City Council, Lees Summit, Mo., has plans for municipal electric light and power house, to cost about $100,000 with machinery. Rollins Engineering Co., Railway Exchange Building, Kansas City, Mo., is engineer.

Board of Education, Topeka, Kan., will install a manual training department in addition to Roosevelt Junior High School, for which plans have been completed by Thomas W. Williamson & Co., Farmers' National Bank Building, architects.

City Council, Little Rock, Ark., has called special election on Aug. 19 to approve bond issue of $200,000 for establishment of municipal airport, including hangars, repair shops, oil storage and other units, for which plans will be drawn at once.

Greenlease-Moore Chevrolet Co., 901 North Broadway, Oklahoma City, Okla., representative for Chevrolet automobile, has awarded general contract to William Lambert Construction Co., 1812 West Sixteenth Street, for service, repair and sales building, to cost about $100,000 with equipment. N. B. Fleming, Commercial Building, is architect.

Air Terminal Corporation, Kansas City, Mo., care of Buckley & Van Brunt, Gloyd Building, architects, has plans for airport terminal at municipal field, including one, two and three-story hangar of circular type, 450 ft. diameter, with repair shops and other divisions, to cost $500,000 with equipment.

Board of Education, Concordia, Kan., is considering installation of manual training equipment in new junior and senior high school to cost about $300,000, for which bids are being asked on general contract until Aug. 20. Proudfoot, Rawson, Souer & Thomas, Hubbell Building, are architects.

Oklahoma Pipe Line Co., Oklahoma City, Okla., a subsidiary of Standard Oil Co. of New Jersey, Inc., 26 Broadway, New York, is planning construction of pipe line from Cushing, Okla., to point near Oklahoma City, about 53 miles, to cost more than $300,000 with booster stations, etc.

Capitol City Steel & Iron Co., Oklahoma City, Okla., has work in progress on a new structural steel fabricating mill, to cost more than $100,000.

Western Automobile Co., Washington Boulevard and Euclid Avenue, St. Louis, has awarded general contract to Shasserre Construction Co., Fullerton Building, for three-story service, repair and sales building, to cost about $100,000 with equipment.

Pacific Coast

SAN FRANCISCO, Aug. 1.—Contract has been let by Paramount Famous-Lasky Corporation, Hollywood, Cal., to Union Engineering Co., Huntington Park, Cal., for a one-story machine shop to cost about $40,000 with equipment.

Standard Rock Co., Builders' Building, Stockton, Cal., is planning installation of rock-crushing plant with conveying, load-

ing and other equipment, to cost over $100,000. A stock issue of about $200,000 will be sold, part of fund to be used for new plant.

Department of Works, San Francisco, has plans for a hydroelectric power plant in connection with Hetch Hetchy water project, at Red Mountain bar, Don Pedro dam of Modesto Valley Water District. Station will be equipped for initial capacity of 25,000 kw., and is reported to cost about $1,000,000 with transmission lines and switching stations. City engineering department, Nelson Eckert, assistant city engineer, in charge.

Calumet & Arizona Mining Co., Douglas, Ariz., has authorized an expansion program at local smelting plant and at mining properties in Bisbee district. At last noted place all mining and surface equipment will be electrified, and new hoists and other machinery installed Project will cost $2,100,000. Headquarters of company are at Calumet, Mich.

Clinton Campbell, Phoenix, Ariz., operating two local brick manufacturing plants, has plans for a third plant to cost about $125,000 with machinery.

Willard Storage Battery Co., East 131st. Street and St. Clair Avenue, Cleveland, manufacturer of electric storage batteries, has purchased property in the Union Pacific industrial district, Los Angeles, 300 x 600 ft., for new plant for Western coast trade. Plans are under way for two initial units, each one story, to cost about $350,000 and $250,000 with equipment, respectively. Other structures will be built later. Entire project will cost about $1,000,000.

Breese Aircraft Corporation, Portland, Ore., recently organized, will take over company of same name with local plant, specializing in production of monoplanes. Plans are under way for general expansion, including establishment of new parts manufacturing and assembling plant near municipal airport on Swan Island where production will be concentrated. New company has arranged for stock issue to total $620,000, large part of proceeds to be used for development noted.

Mountain States Power Co., Tacoma, Wash., has plans for extensions in steam-operated electric power plant on Coos Bay, Marshfield, Ore., to include installation of additional equipment. Extensions will be made in transmission lines in district noted. Entire project will cost over $1,000,000.

Crown-Willamette Paper Co., 248 Battery Street, San Francisco, is beginning work on extensions at mill at Camas, Wash., to include installation of machinery in pulp department and paper-making division, to cost over $3,500,000.

Kreager Heater Corporation, 1821 East Olive Way, Seattle, Wash., is in market for motors, thermostats, transformers and blowers. H. W. Leavitt is vice-president and secretary.

Jacobs & Gile, Portland, Ore., steel jobbers, have let contract to Austin Co., for a warehouse to cost $30,000.

Washing Machine Service Co., 918 West Seventh Place, Los Angeles, manufacturer of parts and accessories for washing machines, has recently been incorporated. William Vogel is president and general manager.

Canada

TORONTO, Aug. 5.—Machine tool sales in July tapered somewhat, compared with previous months this year, but business, as a whole, was better than that of the corresponding month last year. The total volume for the first seven months of this year was well above that of other years since the war. Current demand, while not strong, is holding at a satisfactory summer level. Inquiries are good, and there are indications of some fair sized lists to be issued soon.

Toronto Hydroelectric Commission, Yonge Street, has approved purchase of equipment to cost $1,000,000.

Bell Furniture Co., Southampton, Ont., has started work on the foundations for a $25,000 factory addition, three stories, 60 x 80 ft.

A. G. Spalding & Brothers, of Canada, Ltd., 5 Edward Street, Brantford, Ont., manufacturer of sporting goods, etc., has awarded contract to Schultz Construction Co., 45 Albion Street, for a one-story factory addition, to cost $40,000.

Steel Co. of Canada, Ltd., 525 Dominion Street, Montreal, head office, Hamilton, Ont., has awarded a number of contracts for erection of an addition. Mander & Lucas, 2072 Aulmer Street, have the general contract.

Several contracts have been awarded for plant at Niagara Falls, Ont., for Lionite Abrasive, Ltd., Niagara Falls, N. Y., to cost $150,000.

Canadian Office & School Furniture Co., 1195 King Street, Preston, Ont., has started work on one-story addition, 70 x 93 ft., to cost $40,000.

Foreign

OFFICIALS of Grigsby-Grunow Co., 2038 North Kolmar Avenue, Chicago, manufacturer of radio sets and equipment, have organized Grigsby-Grunow Co., Ltd., to operate in England. Plans are being arranged for construction of a plant near London, to cost more than $350,000 with machinery. B. J. Grigsby is president of parent company.

Russo-Asiatic Consolidated Co., Sydney, Australia, has acquired a controlling interest in Mount Isa Mines Co., in North Queensland section, and is arranging for development of lead and zinc properties. New owner will continue construction program now under way, to include erection of mill and smelter, power plant, mines equipment buildings and other units, to cost over $6,000,000 with machinery.

Spencer Kellogg & Sons, Inc., Niagara Square, Buffalo, manufacturer of linseed and other refined oils, has purchased plant and properties of L. C. Gillespie & Sons, Hankow, China, producers and refiners of chinawood oil. New owner will take over property at once and plans expansion.

American & Foreign Power Co., operated by Electric Bond & Share Co., 2 Rector Street, New York, has purchased property at Mezquital, near Durango, Mexico, and is reported planning a new hydroelectric generating plant, with transmission lines to connect with Durango system and within radius of about 150 miles of that city for power supply to mining properties in district. Entire project will cost about $3,500,000.

Government of Panama, Panama, is arranging fund of about $70,000 under direction of Government Road Board, for extensions and improvements in municipal airport, known as Paitilla Field, to include hangars, repair shops, oil storage and other field units.

Ford Motor Co., Detroit, is said to be planning construction of new assembling plant at Antivaria, Jugoslavia, to cost more than $750,000 with equipment. This will be one of number of plants to be established in Europe including works in Russia and in Germany, each to represent investments of more than $5,000,000.

New Trade Publications

Oxwelding Aluminum and Its Alloys.—Linde Air Products Co., 30 East Forty-second Street, New York. Eight-page pamphlet describing required technique, illustrating many desirable fixtures, and equipment welded of commercial aluminum.

Acid Proof Mastic.—Nukem Products Corporation, Buffalo, N. Y. Folder describing "Basolit," an acid proof material for flowing between joints in brick-lined pickling tanks, and methods of constructing leak-proof tanks.

Arc Welders and Supplies.—General Electric Co., Schenectady, N. Y. Pamphlets GEA-876C, GEA-1009A, and GEA-571C, describing respectively 400-ampere welder driven by alternating current motor, 300-ampere portable welder driven by gas engine, and equipment such as shields, electrode and holders, resistors and reactors.

Welding Wire.—Page Steel & Wire Co., Bridgeport, Conn. Folder entitled "Materials Are Important," but argues proposition that special processing of materials going into wire is necessary to make good wire for welding.

Welding and Cutting Outfits.—International Oxygen Co., Newark, N. J. Folder illustrating outfits designed especially for general automobile work in repair garages.

Nickel in Cast Iron.—International Nickel Co., Inc., 67 Wall Street, New York. Bulletins 201-A and 207 describing methods of making alloy cast iron, and the properties of nickel and nickel-chromium cast irons fitting them for gas and steam engine cylinders, parts to resist pressure, machine tool beds and tables, and intricate castings generally.

Mine and Industrial Locomotives.—Baldwin Locomotive Works, Philadelphia, and Westinghouse Electric & Mfg. Co., East Pittsburgh. Special publication No. 1841, devoted to electric locomotives manufactured in conjunction by the two companies. Illustrations, plans and complete data on locomotives recently placed in service by companies are included with special reference to the transportation problems of small companies.

Pipe Fittings.—Westinghouse Electric & Mfg. Co., East Pittsburgh. Circular 1676-B dealing with fittings for pipe structures with many illustrations. Many new applications for pipe fittings are included, such as racks in industrial establishments, railings, display racks and pipes of all kinds.

Sprayers.—Binks Mfg. Co., Chicago. Bulletin No. 12 describes the use of hand and power sprayers for cold water paints, whitewash, calsomines and insecticides.

Water Wheels.—James Leffel & Co., Springfield, Ohio. A detailed description of a Leffel water wheel, featuring the Leffel outside or exposed type gate operating mechanism, is contained in Bulletin W205.

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THE IRON AGE

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No Alarm for Industry in Federal Reserve Bank Action

BY VIRGIL JORDAN

THE action of the New York Federal Reserve Bank Aug. 8 is probably far simpler and more consistent in its purpose and effects than are the rather far-fetched and abstruse attempts to explain it. I do not think the large and sudden raise in the discount rate and the equally large cut in the rate on bankers' bills should be regarded as another attempt to scare, break or control the stock market, or to discriminate against it. If the market chose to regard it as such, that tells more about the market's state of mind than it does about the Federal Reserve's.

Reserve System Is Not Specially Interested in Stock Market

As I read the record of Reserve policy and practice in recent years, I do not find that it is specially interested in the stock market at all, or much less that it has been engaged in any sinister strategy to curb it. The Reserve System today is not controlling the money market in any such narrow sense; it is merely responding and adjusting itself to conditions that have arisen through great and far-reaching changes in industry and trade, domestic and international, and the methods of financing them. That, I believe, has been its position and policy ever since 1923.

The changes last Thursday are merely a recognition or symptom of an important fact, which has made many business men uneasy, but which the stock market is determined to ignore. This fact is that money is abnormally high, which means merely that credit is scarce in comparison with the demand for it. This is true the world over. It has been increasingly true in the past two years, and will remain true as far ahead as one can see, unless there should be a radical change in banking policy and business philosophy.

Rediscount Rate Does Not Fully Reflect Money Tightness

The central banks of all important countries (except France) have raised their rates and will raise them further if the present situation persists. Here even a 6 per cent rediscount rate does not fully reflect the tightness of money, for the collateral loan and even the commercial paper rate in the open market are higher than that and will probably remain so.

It is useless to blame the stock market and its enormous demand for credit for this tightness of money, or to hurl epithets like "speculation" or "inflation" at the new methods of financing industry and trade which have given rise to this demand. They have come to stay, and their demands are probably going to be met. The banking system will ultimately have to adjust itself to them. The "inflationists" and "new era" philosophy are in the saddle or trying to get in, in almost all countries as well as here.

¶ On Aug. 8, 1929, the directors of the Federal Reserve Bank of New York unexpectedly advanced the rediscount rate from 5 per cent to 6 per cent and reduced the rate on acceptances from 5¼ to 5⅛ per cent. The securities' market response was first one of alarm. Then bankers appeared to greet the action as a constructive step. As an important item in the whole matter of the relation of high money rates to business activity, THE IRON AGE asked Virgil Jordan to discuss the question for industry.

¶ Responding under a title, "The Federal Reserve Hews to the Line," he supplements in the accompanying article his contribution in THE IRON AGE of May 30, emphasizing that the new methods of financing industry have come to stay and that the central banks, if left alone, will probably adjust themselves to the existing pressure with safety, on the score that credit resources are adequate for considerable industrial expansion. Mr. Jordan, who has been chief economist of the National Industrial Conference Board for upward of nine years, reiterates that the Federal Reserve Bank is not trying to control the money market in any narrow sense.

The central banks, if left alone and free of political influence, will probably be able in time to adjust themselves to this pressure with safety, for the credit resources, especially in this country, are adequate for considerable expansion. But until they do the depressing atmosphere of tension and strain and tightness in the money markets of the world will continue.

Importance of Open Market Credit on General Business Steadily Diminishing

A six per cent rate is not likely permanently to discourage the stock market, nor is the lower bill rate of any special significance as a promise of easier money. Experience has already shown that the discount rate, even when graduated to penalize heavy bank borrowing, affects the rate charged by member banks very little, because the added cost is slight. Its immediate effect on general business depends upon the importance of open market credit in the financing of industry and trade, and this is steadily diminishing, for all types of business except those which are backward in organization or highly seasonal, like agriculture and the scattered, small-scale manufacturing and retail trades.

For this reason the lower rate on bankers' acceptances must be regarded only as a natural concession or adjustment to the special seasonal needs of agriculture, whose production and marketing facilities are as yet relatively poorly organized and which is more and more getting the short end of the credit rope. The development of large, well capitalized marketing organizations or "stabilization corporations," such as has been begun under the stimulus of the Federal Farm Board, may change this materially. In any case, the credit made available through the lower bill rate for this season will quickly liquidate itself as the crops are finally marketed. It will not float about in the money market for speculators to use for very long, and when it is paid off money will continue as tight as ever.

Only Continued High Money Rates Will Force Business Curtailment

We have seen in the past two years that tight money does not necessarily affect business quickly, for reasons which I have pointed out elsewhere. In the long run, however, continued high money rates will force either business expansion or credit policy to give way. The pressure will show itself first in increased costs of government financing, higher taxes and retarded borrowing by agencies compelled to depend upon the bond market. Later, price deflation sets in, slow and chronic. This is already evident in some countries abroad, and even to some extent here, in the persistent refusal of the price level to respond normally to the sustained vigorous business expansion.

British Survey of Present Status of Chromium Plating

CHROMIC acid and chromic sulphate were originally thought to form the essential basis of a chromium depositing solution, but now practice is in favor of sulphuric acid as a substitute for the chromic sulphate, owing to the high purity obtainable in that acid, said G. E. Gardan in a paper entitled "A Survey of the Published Information on Chromium Plating," delivered recently before the Electroplaters' and Depositors' Technical Society at Birmingham, England. Some selections from his address follow:

The concentration of sulphuric acid in the solution has to bear a fixed relationship to the chromic acid content. For average working conditions one part by weight of sulphuric acid is added to every hundred parts of chromic acid. Variation in that proportion causes a reduction of the cathode efficiency, a low concentration of sulphuric acid being particularly detrimental to the deposit, which is covered with a brown film.

Describes a Typical Bath

A typical bath solution contains 40 oz. per imperial gallon of chromic acid, and 0.4 oz. of sulphuric acid. No other added substance is essential for satisfactory working, but it is obvious that chemical changes take place during electrolysis. The most important of these is the reduction of a portion of the hexavalent chromium to the trivalent state. Some workers, therefore, favor deliberate initial production of part of the hexavalent chromium to the trivalent state by chemical or electrochemical means. It is, however, important to limit the concentration of trivalent chromium, for that element reduces the range of current densities for satisfactory deposition.

Chromium plating differs from most other metal deposition processes because of the high current density necessary, the low current efficiency obtained, and the pronounced differences in character of the deposit that results from variations of current density, temperature and composition of the solution. In general, with increasing current density or decreasing temperature, the efficiency increases and the deposit changes from a bluish color, with bright matte surface, to one with a bright lustrous appearance and finally to a dark iridescent deposit, often described as "burnt." The blue matte is too thin to be of commercial value. The bright lustrous deposit is extremely hard and decorative, and needs little or no subsequent polishing. The dark matte, though extremely hard, can be polished by the normal methods. The current density should be kept moderately high (100-300 amps. per sq. ft.)

Some Difficulties of the Process

The nature of the cathode material, and in particular its hydrogen over-voltage, is an important factor in determining not only the initial deposit of chromium but also the ease with which the cathode may be covered with the deposit. In metals of low hydrogen over-voltage, such as iron and steel, the minimum current density at which chromium can be deposited is higher, and the range of current densities in which bright deposits may be produced is both different and more restricted than in the case of metals of high hydrogen over-voltage, such as copper. As nickel has a lower over-voltage than copper, it is not so satisfactory in this respect, but as an undercoat nickel has much to recommend it from a corrosion standpoint and it is now common practice to deposit a layer of this on steel articles prior to chromium plating. Lead anodes of high purity are very satisfactory and the gradually formed insoluble lead chromate has no detrimental action on the bath.

Electro-deposited chromium is distinguished from other metals by its resistance to corrosion, resistance to oxidation at elevated temperature and its extreme hardness and low co-efficient of friction. As deposited, the reflectivity is only 65 per cent, but in contrast with other metals, that figure is permanently maintained. Chromium is unattacked by salt water, ammonia, nitric acid and hydrogen sulphide. Dilute sulphuric and hydrochloric acids only vigorously attack the metal after it has been rendered "active" by cathodic polarization, namely, by contact with zinc in the acid.

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Conveyors for Molding Operations

Large Use of Mechanical Equipment for Handling Materials in Automotive Plant—Feeder Lines for Sand and Other Materials Reduce Labor Costs

CHARGING methods for cupolas in the Oakland foundry at Pontiac, Mich., were covered in THE IRON AGE issue of July 25, page 207. This had to do primarily with the matter of preparing the charge for the cupolas, getting it weighed and transporting it to the place where it was to be used. In the following pages the molding and core-making operations are described, and handling of the castings on cooling conveyors and thence into the cleaning department.

There are seven conveyors for continuous molding and pouring, with room for one additional molding unit. One unit is for cylinder blocks, one for cylinder heads, one for manifolds, one for flywheels, one for gear covers and some other parts, one for transmission cases and one for miscellaneous castings.

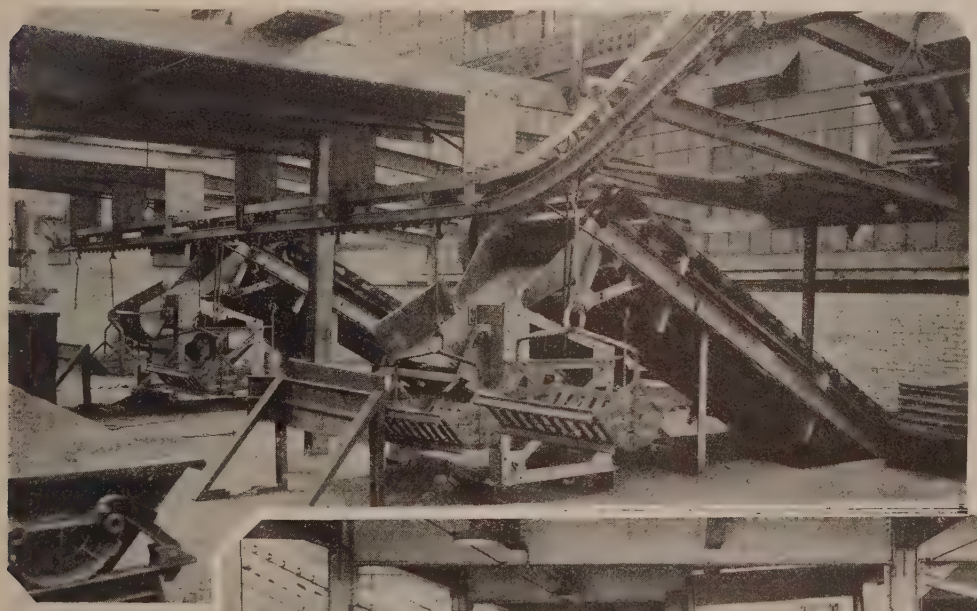
All but the cylinder block mold conveyor, which is 200 ft. long, are 180 ft. in length. The cylinder block conveyor is of the ordinary drag chain type. Cylinder block molds are made on five drag and five cope machines. The drags are handled from the molding machines to the conveyor with jib cranes. The copes and cores are handled with Cleveland Electric tramrails and the pouring done with them. Molds are carried around to a secondary cooling line, which conveys them to the shake-out.

Unusual Construction of Conveyors

Five of the conveyors are of a new roller type. In these the general practice of using conveyor trucks operating on rails is reversed by having rollers on a stationary frame and the mold trays equipped with inverted rails fastened to their bottoms. Thus the rails move on the rollers. The trays are 24 x 54 in. These cover the rollers and driving chain, the latter on the inner side of the frame. It is claimed for this type of conveyor that a smoother action is secured and an accumulation of sand on the rails is prevented. The conveyor for miscellaneous castings is of the sliding type and has smaller trays.

The conveyors are on the usual oval plan, except that that for the cylinder blocks makes a complete circuit. The cooling or return line of each is hooded and provided with an exhaust system for carrying away the smoke and gases.

Copes of cylinder molds are shaken out half-way down



CASTINGS and Sand Are Dropped from the Shake-out Into Tumbling Mills in the Basement. Thence the castings pass on to the conveyors at the left, which carry them out of the foundry and deliver them to the cooling conveyor (Below)

DISCHARGE End of Two of the Conveyors Which Carry the Castings from the Basement. Castings are dumped into baskets hanging from the cooling conveyor (Above)

the return line with a Stoney shake-out bail located at an opening in the cooling hood. Empty flasks are placed on a gravity conveyor and returned to the cope machines. The drag mold and casting move to the end of the conveyor, where a hoist picks the casting from the drag flask and hangs it on to a casting conveyor. As this loading point is at the side of the foundry, the casting is carried a few feet to reach the outside of the building, so that little of the heat and fumes escape from the castings into the foundry. The drag flasks are shoved by a pneumatic pusher on to a shake-out and, after the sand is shaken out, are returned to the molding machines.

Drag molds of all castings except cylinder blocks are dumped over a shake-out and the castings dropped with the sand through an opening in the shake-out to the basement. Here they pass into a tumbling barrel 54 in. in diameter by 10 ft. long, the outer circumference of which is a perforated plate. The sand passes through the perforations and the castings on to an inclined apron conveyor which conveys them outside the foundry, the discharge ends of the six conveyors being in a straight line near the side of the building.

Castings Cooled in Open Air

These conveyors discharge the castings into a hopper which is dumped by an air hoist into a basket that is hooked on to a cooling conveyor located above the discharge end and at right angles to the flight conveyors.

There are four cooling conveyors, from 900 to 1500 ft. long, including the one for cylinder blocks previously referred to. One is for cylinder heads and flywheels, one for manifolds and housings and the third for transmission cases and miscellaneous castings. The baskets of castings are hung on hooks on 4-ft. centers. Cylinder blocks, not carried in baskets, are hung on the hooks. Cylinder blocks are carried on the cooling conveyor approximately 2 hr. and other castings 90 min. for cooling, before they reach the cleaning room, on the same conveyor line.

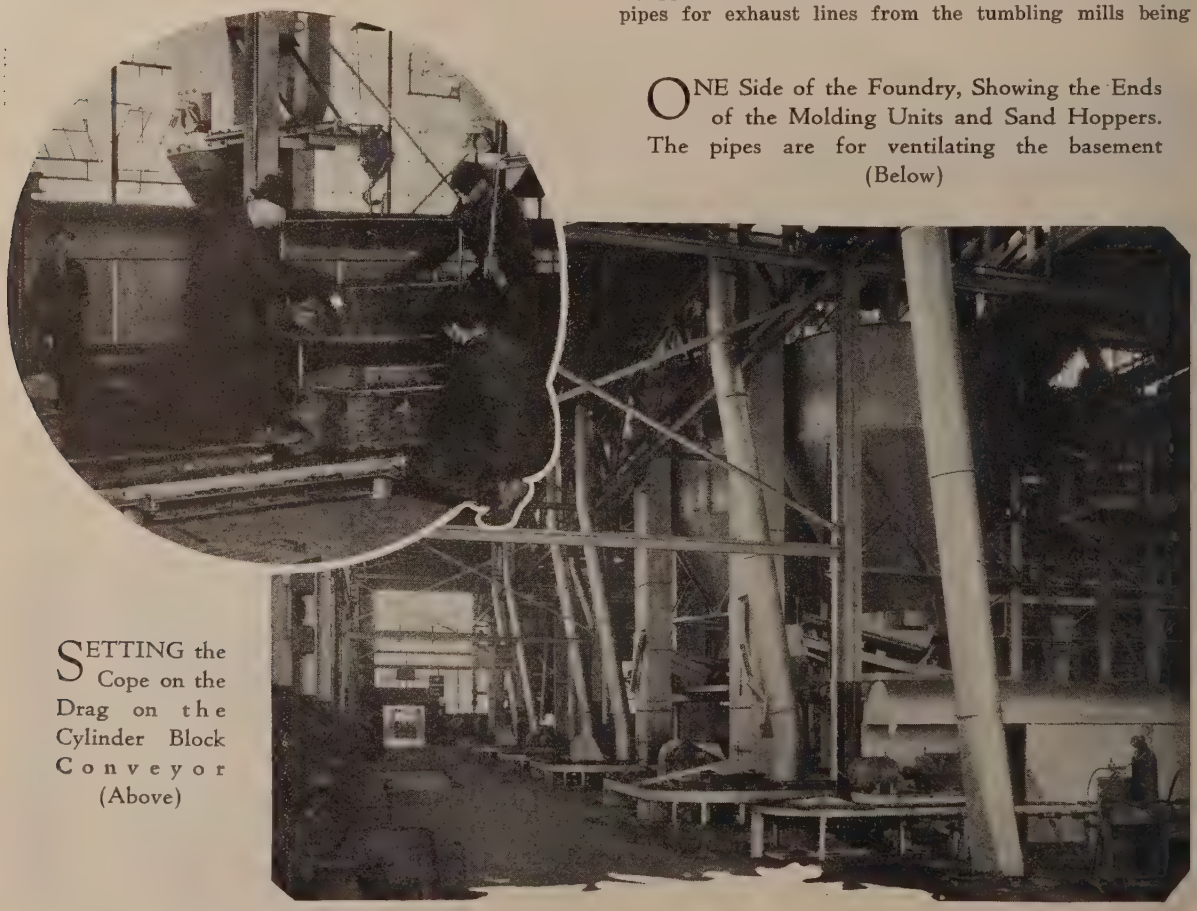
Cylinder blocks move on the conveyor through a detached knock-out building, where they are cleared of sand on a Stoney knock-out machine and are then returned to the conveyor. The molding sand passes through a riddle and the core through a crusher; all the sand goes over a magnetic pulley to take out the metal.

Then the sand is discharged into a pit, where it is made fluid by being mixed with water. The sand and water are kept thoroughly mixed by being agitated by a spray of water. The sand is carried away by a hydraulic pump, being delivered to a dump through a 5-in. line. Dust collected in the cleaning department is handled in the same way, being delivered from the dust arrestor on the roof to the same pit that receives the knock-out sand.

Cylinder blocks, on reaching the cleaning department on the cooling conveyor, pass on the same conveyor through a Pangborn double sand-blast machine. Then they are ground with a swing grinder, tumbled and given a water test. For testing they are placed in a revolving fixture placed on a roller conveyor so that the blocks can be turned over, permitting the testers to see inside the barrels.

The bottoms of the baskets that carry the smaller castings on the cooling conveyors, instead of being flat, turn up at an angle of 90 deg. on each side, making it easy to dump the contents. The castings are dumped into skids, which are handled by electric trucks for the tumbling, chipping and grinding operations. The tumbling equipment consists of 40 Whiting tumbling mills with 36 x 80-in. barrels, motor driven in batteries of six.

The cleaning department is well arranged and equipped. It is entirely free of belts and piping, all pipes for exhaust lines from the tumbling mills being



ONE Side of the Foundry, Showing the Ends of the Molding Units and Sand Hoppers. The pipes are for ventilating the basement (Below)

SETTING the Cope on the Drag on the Cylinder Block Conveyor (Above)

FIXTURE in Which Cylinder Blocks Are Rotated While Being Water-Tested After Final Operations in the Cleaning Department

POURING Flywheels on One of the Mold Conveyors

under the floor. Air drawn through the dust arrestors, after cleaning, is returned to the building during the cold weather. Otherwise, with a large amount of cold air being brought in to replace the heated air removed, it would be difficult to heat the building. Gravity conveyors and electric hoists are provided wherever needed to facilitate the handling of work through the cleaning operations. The tumbling mills are served with electric hoists.

Core Ovens of Vertical Type

Efficiency and saving of space are effected by the arrangement and equipment of the core-making department. This is provided with 16 vertical core ovens 8 ft. 6 in. square and 45 ft. high. These are oil fired and have automatic control, which maintains the temperature at approximately 450 deg. Fahr. On their downward course the cores pass through a cooling chamber and, when they reach the floor level, they are ready for inspection and assembly.

Cores for each oven are supplied by a group of 4 to 12 core-makers, who work around the oven. The core-maker sets his own cores in the oven and takes an empty tray back to his bench to be loaded. This eliminates the use of racks and the provision of aisles. Owing to the use of vertical ovens, it is stated that the core department takes only about one-fourth as much space as otherwise would be required.

A new design of hydraulically operated vertical oven is provided for drying cores after pasting. These are carried on 26 x 42-in. trays which are raised by a cylinder operated by a motor-driven pump. One pump and one motor serve the three ovens of this type. The cylinder located beneath the oven raises the loaded trays 15 in., at the same time pushing up the stack of trays above. When the cylinder descends, a catch holds the trays in position. As each tray reaches the top of the oven it moves automatically over to the opposite or return side of the conveyor. The cores remain in the oven about 25 min. An advantage claimed for this type of oven is that, as the trays do not turn on sprockets at the top or bottom, they can be spaced closer together.

The core sand is delivered to overhead hoppers and distributed on monorails to hoppers above the core-makers' benches. Core sand is prepared in three batch mixers supplied by the Standard Sand & Machine Co. The foundry makes its own sea coal, using a Grindle multi-stage pulverizer for pulverizing the coal. The sand preparation equipment includes two Simpson mills.

Three sand-handling systems serve the molding units: One for the units making cylinder blocks and heads; one for the flywheel and manifold molding units; a third for the transmission cases and miscellaneous castings. Room is provided for a fourth sand-handling system.

Preparing Sand for Various Uses

Sand from the tumbling mills in the basement, which separate the sand and castings, is conveyed on a belt conveyor over a magnetic separator to a bucket elevator that delivers it to a revolving screen above the foundry floor. The screened refuse sand is discharged to boxes on the floor. The good sand from the screen goes to a primary tempering belt and thence to a paddle mixer, which delivers it to a circular storage bin of 100-ton capacity.

A revolving table feeder takes it from this bin to a

second elevator, which delivers it to a final tempering belt. In the first tempering moisture is added to the sand and it is given time to season in the storage bins. After the last tempering the sand is aerated in a squirrel cage type of aerator and then delivered to two flight distributing lines, from which it is automatically delivered to hoppers over the molding machines. Strike-off and spill sand passes from the foundry floor to reciprocating conveyors beneath, which deliver it back into the system. New sand is introduced automatically and uniformly through floor hoppers with revolving plate feeders.

Facing sand for the cylinder block and cylinder head lines is brought from the sand preparation room in trucks, delivered to floor hoppers, elevated and distributed by flight conveyors over the molding units to hoppers over the molding machines, the overhead sand-handling equipment having double flights and compartments, to hold both molding and facing sand.

Sand is stored in concrete bins in the sand storage building, which has a capacity of 450 cars and is served by an overhead crane.

Dimensions of the principal buildings are: Foundry, 247 x 260 ft.; core department, 160 x 247 ft.; cleaning room, 120 x 350 ft.; service building, 60 x 360 ft.; sand storage building, 80 x 225 ft. Adjoining the cupola department is a chemical laboratory in which the heats and raw material are checked. On the second floor of the service building are a pattern shop, pattern storage room, men's lockers and women's rest room.

The foundry was laid out and built under the direction of J. E. Linabury, the foundry manager, being designed and built by the Austin Co. The mold conveyors and those for handling pig iron, scrap and briquettes to the weighing scales were supplied by the Link Belt Co., the cooling conveyors by the Palmer-Bee Co. and the core ovens by the Detroit Sheet Metal Works.

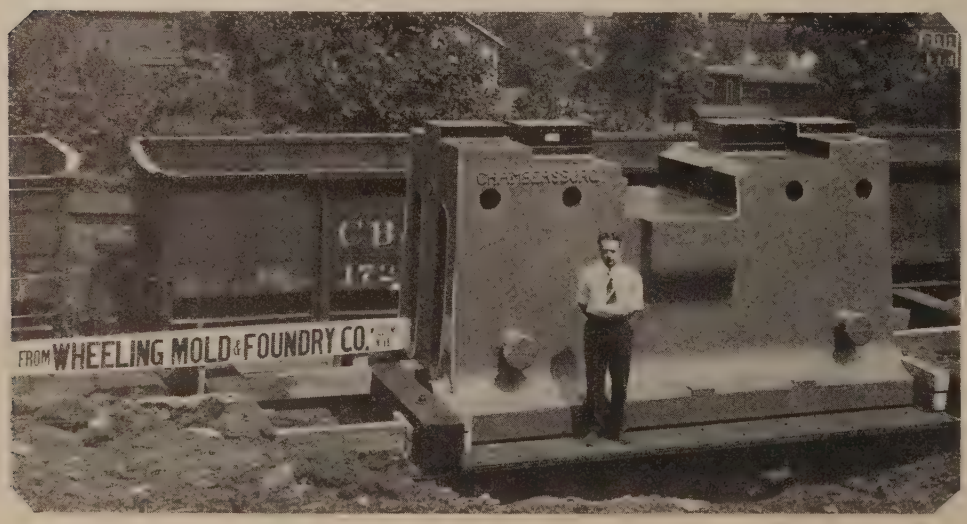
Makes Steel Casting Requiring 360,000 Lb. in the Rough

INCREASES in the forging activities of automobile manufacturers in recent years have led to unusual problems in the making of steam hammer castings and culminated in the casting of an anvil block, pictured in the accompanying illustration, the machined weight of which is 240,000 lb. This casting, which was made by the Wheeling Mold & Foundry Co., Wheeling, W. Va., for a 25,000-lb. drop hammer now being built by the Chambersburg Engineering Co., Chambersburg, Pa., for shipment to an automobile manufacturer in Italy, required unusual care in production because of its size and specifications.

It is of mild steel of the following analysis: Carbon, 0.23 per cent; silicon, 0.30; sulphur, 0.029; phosphorus, 0.034, and manganese, 0.90. The heats from three open-hearth furnaces were required to pour the casting, a total weight of 160 tons. A second heat of 20 tons was required 16 hr. later to take care of shrinkage. In the meantime a furnace was built around the sink head, which was lined with Sil-o-Cel brick and properly fired to delay freezing of the casting proper until all of the steel was available and also to maintain a liquid situation while the steel was cooling in the main body of the casting.

The block was cast with the working face down in a dry sand mold set in the floor, the bottom of the block being level with the floor. Small cores were not considered, owing to the huge volume of metal, but two lightening cores were used successfully in each end. The block was too large to remove from the pit in its entirety and the riser was cut off by means of an oxy-acetylene jet. This cut was 28-in. deep all around the riser, leaving a final core 4-in. in diameter, which was knocked off.

As the crane capacity of the foundry was not large enough to handle a casting of this size, unusual problems of moving had to be met. Temporary trunnions were cast on the ends to facilitate handling in addition to the permanent ones on the sides. The end ones were later removed. In order to move the casting from the pit, ways were built and the block was turned around and skidded on a truck bed on greased skids. It was then moved about the foundry on a 150-ton truck on a turntable. The problem of transferring the casting to the customer also involves difficulties as only one or two railroad cars are large enough to carry it. When the block is prepared for the ocean voyage to Italy, special bulkheads will probably have to be built in the ship's hold to prevent shifting.



THIS Anvil Block, on Car Ready for Shipment, Has the Record - Breaking Weight of 240,000 Lb. It is 156 in. long, 95½ in. high, 84 in. wide at bottom and 55½ in. wide at top

Steel Which Is Sound in Blooming

Precautions Necessary for Best Results—Preferential Range of Temperatures—High Manganese Content

BY JOSEPH R. MILLER*

EVERY mill rolling the regular grades of common carbon steel has made some study of the causes of seams and slivers. It is safe to say that nowhere have these causes been so well and so definitely located that control can be applied with fully successful results. Widely divergent ideas regarding particularly the proper procedure in teeming, handling, charging and heating the ingots have resulted from studies and observations made. The difficulty lies in interpretation of the facts observed and is due to the complexity of the conditions surrounding the entire sequence of operations.

It is not uncommon, therefore, to find that the full burden of the elimination of seams and cracks has been shifted to the steel maker. In such cases it is assumed that if a good quality steel is teemed properly into proper molds other features may be neglected. This applies in a general way; that is, good steel making will lessen the problems of the blooming process.

It applies, however, to such grades of steel as have no peculiar characteristics that involve hot-short qualities at one or another temperature. These latter grades tend, in rolling, to break up into seams and slivers, and steel-making skill does not operate to change the condition. Also, in general, if the sulphur content cannot be kept down the general tendency of the output will be toward greater trouble in that direction and here, too, the steel maker is handicapped.

Assuming a careful practice in steel making and a good soaking pit operation with proper pass design in the blooming mill, there still remains the question of steel compositions and their appropriate rolling temperatures.

Preferential Range of Rolling Temperatures

Everyone is familiar with the fact that ingot iron has a decided preferential range of rolling temperatures. It is a fact, not so well recognized, that the common grades of steel have such preferential temperatures, although to a much less marked degree. However, mostly, the range of unsatisfactory rolling is extended, pushing the most satisfactory range up toward the burning point of the steel. The writer had, at one time, arranged a series of tests to compare different compositions and to bring out the suitable temperature for each.

An electric heating element was placed in refractory in such a manner that special test specimens could be heated while held in the grips of the tensile-testing machine. A thermo-couple gave the temperature. With this apparatus it was possible to break specimens at the various temperatures at which steel might be rolled in the blooming mill. It was found that, when specimens broke off short in the test, poor rolling was observed on that steel at the temperatures so represented; but when specimens necked down to a sharp point, or nearly so, good rolling was observed on that steel at those temperatures. That would be, of course, on the earlier passes in blooming, for, once reduced, the grain refinement begins to strengthen the material.

With this method he also started in 1918 to test samples prepared from such ingots as were found to contain an accidental high manganese content. These usually were observed to roll well. Thus it was determined that open-hearth free cutting steel (added sulphur) would roll much better if the manganese specification, formerly around 0.60 to 0.80 per cent, were raised to about 1¼ per cent.

Rejections Ran High

Rejections on the old grade ran very high on blooms for bars for cold-drawing purposes, or for machining—somewhere around 20 per cent average. And often half the blooms would have to be diverted. With manganese specified at about 1¼ per cent these rejections dropped to 2 to 5 per cent. Earlier production was sold under a trade name, and was found suitable for free cutting and case hardening purposes.

Thus a grade of steel which formerly was a source of great annoyance and loss in rejections was changed to one that was easily prepared and without serious losses. The idea that raising the manganese content would induce a brittleness and hardness was shown by test to be erroneous, for such brittleness was not encountered to any extent until the composition was well up around 2 per cent manganese. Steel made with 1¼ to 1½ per cent manganese was found to be free cutting and tough; also it case hardened satisfactorily. The first of open-hearth screw steel with this higher manganese was made in 1925, and was used with success.

It would be difficult to favor, in blooming, a preferential temperature. However, by careful heating an approach can be made to the best temperature conditions, and particularly where it is best to start rolling at very high temperatures. It is possible, however, to make composition changes, like that mentioned, improving the rolling qualities without changing the utility of the product.

Steel Clean of Oxides Rolls Better

Of course, if the sulphur is low, and the steel comes through clean of oxides without excessive deoxidation, it will roll better. Some claim for certain chemical mixtures that through their use unusually tough metal is produced; and it is sure that, if the materials used in a heat of steel bring it out clean without the excessive use of aluminum and silicon, the metal will roll better, even in spite of the sulphur.

The problem of making steel which is free from seams and slivers lies between excessive care in handling and rolling the ingots after teeming, and the production of a tough metal that will roll without great care. In tonnage operations the latter is preferred, because it allows greater production from the blooming mill. In making special grades which do not in their nature roll well,

*Pittsburgh.

then special attention must be given the ingots after teeming, as there is no other way out of it.

There are special shapes of ingots intended to favor a certain amount of hot work before any strain is put on the ingot skin. These do some good, and they simulate the fluted forging ingot. However, no precautions will produce a result as successful as that attained when a tough composition of well made steel can be used.

Forging Seamless Steel Drums

Difficulties Encountered in Expanding a Thin-Walled Tube—Ends of Various Shapes Closed by Different Methods—Limitations in Accuracy

BY CAPT. RONALD BENSON*

PRODUCTION of large drums is similar to the production of gun tubes. The first requirement is a hollow billet. This is prepared by trepanning the core from the center of an ingot, which may or may not have had a preliminary cogging, and cutting off the scrap ends. The hole is usually smaller than the interior of the drum for reasons of economy.

The hole is next opened out by expanding, or "becking," to the size needed. The length of forging which can be becked varies with the plant, and the diameter of the becking bar, and is usually between 10 and 16 ft. The next process therefore will be forging on a mandrel of the required diameter, so as to increase the length while reducing the wall thickness.

Producing the Hollow Tube

The two chief difficulties are the rapid loss of heat and the action known to forgemen as "bellying."

The length of time during which forging can be carried on after each reheating varies inversely with the diameter of the mandrel, and directly with the wall thickness—e.g., with a 36-in. mandrel, working from a billet roughed down to 60-in. diameter, the forging of a tube with a 4-in. wall could be carried on for only something between 60 and 70 min. If a tube with a 6-in. wall were being made, forging could go on for 90 or 100 min.

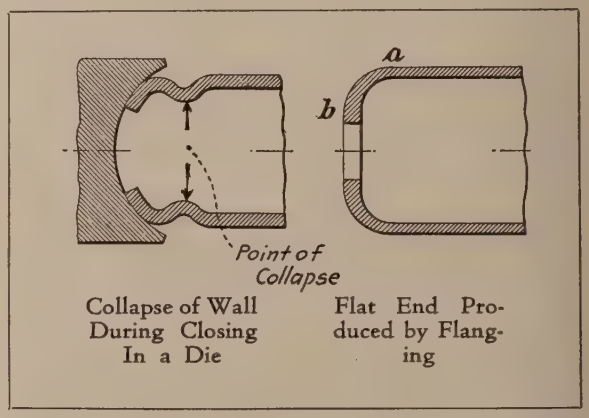
Such rapid cooling may be reduced by heating the mandrel. A good working rule is that if the mandrel does not change color it is safe to proceed. The most economical method of keeping the mandrel temperature as high as this is to forge two tubes concurrently on the same mandrel, one being forged while the other is being re-heated. Or a hollow mandrel may be used. If a central hole one-half the radius is removed, the volume of mandrel tending to chill the forging is reduced 25 per cent.

The other chief difficulty, known as bellying, is the flow of squeezed metal in a circumferential, as opposed to a longitudinal direction. It is greatly intensified in thin tubes, and is almost absent in thick-walled tubes, forged on small mandrels. The ideal tools would have narrow circumferential faces in contact with the forging, so that all the flow would be at right angles to these faces, i.e., in a longitudinal direction. If the face of the tools is too narrow, however, a very large number of squeezes is needed to produce a true cylindrical surface. As a compromise, curved tools with narrow faces and beveled sides are used. With such tools the tubes produced are so close to the mandrel that "fast mandrels" are occasionally encountered. A few squeezes with flat tools always loosen the mandrel.

Machining the Inner Bore

The machining allowance varies with the furnace and time of heating, but a rough rule is to allow 1 in. on all surfaces in addition to mandrel taper allowance.

There seems to be no reason why boiler drums should not be accepted with a black forged finish outside—in fact, tubes of this nature have been supplied—but it is necessary to specify a tolerance of approximately ½ in. in the thickness of wall. The interior cannot readily be produced sufficiently free from scale to obviate machining.



Collapse of Wall During Closing In a Die

Flat End Produced by Flanging

It is usually expedient to bore a straight hole through from end to end, and subsequently to close both ends. Or one end can be closed before machining, leaving one end open for machining purposes, to be closed subsequently. Designs usually call for a thicker wall on the closed end than on the shell—allowance must be made for this.

Closing the Ends

There are three possible ways of closing the ends of the drums:

(1) By pressing the end of the forging into a die, as in shell bottling.
(2) By flanging or bending over.
(3) By swaging, the process being similar to the work of the toggle presses sometimes used for closing shells and gas cylinders.

The first method is quick and simple for closing ends where the proportionate reduction in diameter is small, but tubes of the kind described would be closed to approximately one-third the original diameter. It is therefore

*Vickers-Armstrong, Ltd., Abstracted from *Engineer*, April 19, 1929.

quite impossible to carry out such a closing in a single-operation die, because the pressure required is greater than the walls of the parallel portion can support. Even if only the length of tube exactly sufficient to form the closed end were heated, collapse would take place in the parallel portion where it just enters the die, as shown by the sketch. Yet this portion at least must be heated to enable closing in a single operation.

In practice, a large number of dies of varying angles have to be used, the work done in each die being small, and the expense is too great. The closed ends so made are, however, very well formed and evenly stressed in closing.

Closing the End by Flanging Method

The second method of closing is by bending over, or flanging. The open ended tube is bored, and rough machined outside. The portion which it is intended to bend over is rough machined for concentricity only, and extra thickness is left on it to suit the design required. The end to be produced is approximately as shown in the sketch. The length of parallel tube required to make the end from *a* to *b* can be determined only by experiment.

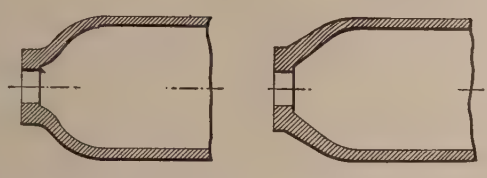
The usual process is to support the drum from below, prevent it from kicking back, and bend a small portion of the periphery downward at the top by pressing on it with a suitable tool. The tube is then rotated slightly, and another portion of the end bent over, so that by the time the tube has been completely rotated the end has been flanged over somewhat, and the opening in the end reduced. Successive applications of pressure must be small and uniform, or an irregular and crinkled surface of the flat end may be produced. It is not possible to close the end completely by this method.

Swaging the End

The third method of closing is by swaging. The process is essentially a series of small compressions of the walls of the tube in two places.

The effect of one squeeze, with the tube in the position shown, is to thicken the wall at *a* and *b* and to reduce the portion of the tube which is being worked upon to an ellipse, the major axis of which is the original diameter, the minor axis being reduced by the amount which the press has traveled. If now the tube be rotated, and a series of squeezes be applied, the ultimate result is that the wall is thickened and the diameter decreased.

There is a tendency for the portion of the tube which is being worked upon to increase in length. The ratio of circumferential flow to longitudinal flow depends upon the design of the tools and the method of manipulation; with



Swaged Ends, Spherical or Conical, with Spigot

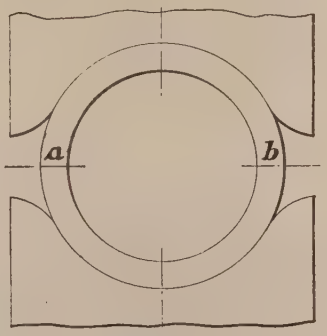
unsuitable tools the wall thickness may even be less after the diameter has been reduced than it was before.

This ratio, however, must be known. Also, the longitudinal extension of the dome portion must be allowed for, so that the drum shall be of the correct length when closing is completed. It is usual to allow a tolerance of 1 in. on the overall length, and it has been found possible to work within this tolerance for a drum 45 ft. long.

Special tools are needed to shape the domed end of the drum unless a considerable amount of machining is to be done on the exterior after closing.

It is not practicable to produce a drum with a flat or slightly dished end by this method. The easiest shapes are either hemispherical or conical, with a protruding spigot which is machined inside to form a seat for the manhole cover, the length of spigot desirable being 3 in. to 4 in. with a 4-ft. drum.

The wall thickness of the domed end can be increased to any desired amount. In fact, the thicker domes are



Swaging Tools

slightly easier to produce, so the designer can call for an end which he is sure is much stronger than any other part of the boiler.

Seamless vessels intended for oil cracking, with a 2-ft. bore, have been produced with one end swaged down till the only trace of the original bore was a small line which did not extend beyond a circle 2-in. diameter, and the ends were closed, after boring, by a screwed plug only 3-in. diameter.

Sheffield University Opens Cold-Working Steel Laboratory

A NEW laboratory for research on cold-working of steel was opened on July 6 at Sheffield University, Sheffield, England, as the consequence of a gift from the Worshipful Co. of Ironmongers of London. This company has made a grant of £800 a year for seven years to endow a fellowship and two scholarships in the cold-working of steel. Through the Cutlers' Co. of Hallamshire, firms connected with the cold-working industry have presented the university with the necessary plant.

The laboratory will be attached to the metallurgical and engineering departments of the university and will be controlled by the professors of those subjects, assisted by a committee on which the Ironmongers' Co., Cutlers' Co. and the industry will be represented, as well as the university. Drawing, rolling and pressing are among the processes on which research work will be done.

The mechanical equipment of the laboratory includes a wire and bar drawing plant constructed by George Crossley, Ltd., Cleckheaton. Having a two-speed gear and variable-speed motor, wire drawing speeds of from 28 to 360 ft. a min. may be obtained, and wires can be drawn of all sizes up to ⅝ in. in diameter and rods up to 1 in. diameter.

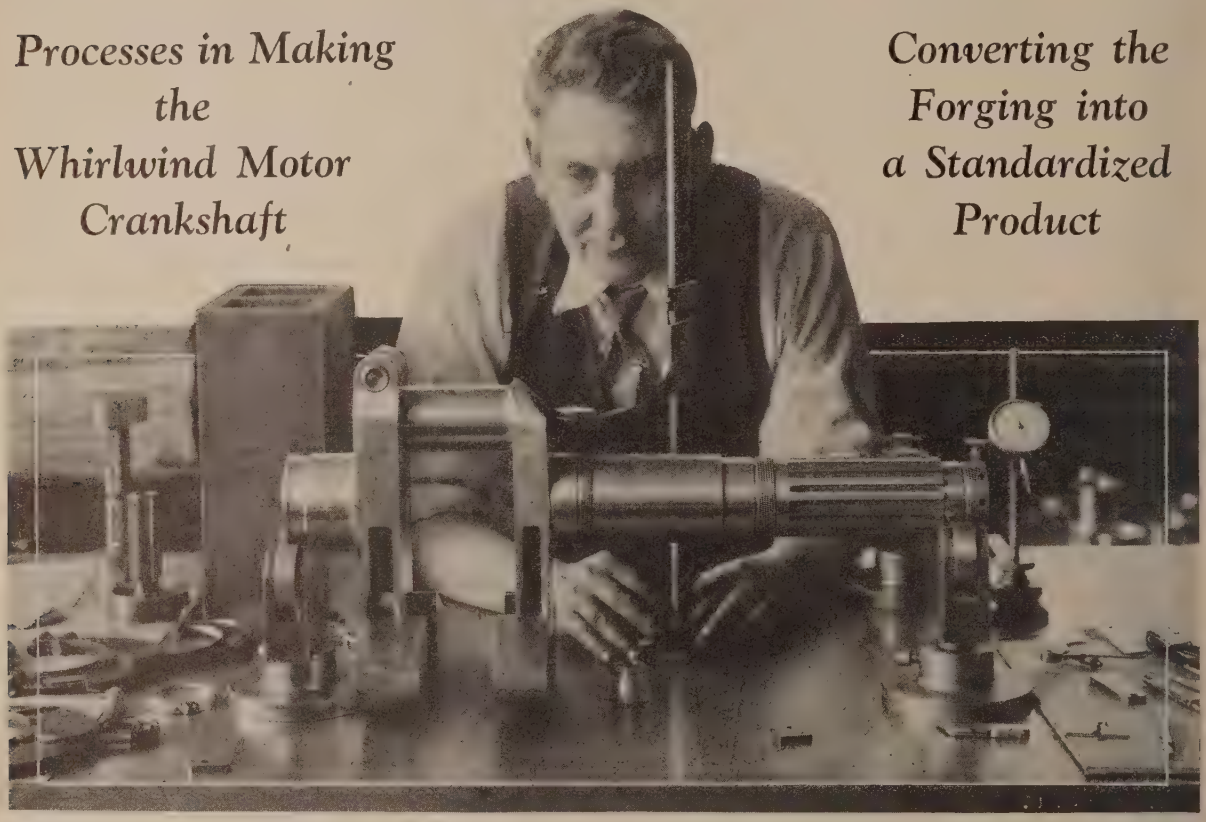
The rolling mill plant has been constructed by W. H. A. Robertson & Co., Ltd., Bedford. It has hardened steel rolls, 10 in. diameter and 10 in. face, and is fitted with two-speed gear box and variable-speed motor, giving a range of rolling speeds from 60 to 300 ft. a min. The motor is capable of developing from 50 hp. at 570 r.p.m. to 120 hp. at 1260 r.p.m.

Machining the Wright Crankshaft

BY FAY LEONE FAUROTE*

Processes in Making the Whirlwind Motor Crankshaft

Converting the Forging into a Standardized Product



FOR the Wright Whirlwind crankshaft, steel forgings are purchased from an outside vendor. These are first heat treated, then inspected for flaws or defects and stamped with a serial number. Spots are ground for the hardness test. The forgings are then inspected for hardness and delivered to rough stores.

Preparatory to machining the crankshaft forging, the shaft end and pin end are cut off and both ends centered. The shaft side of the cheek is then faced, chamfered and turned to outside diameters. The cheek faces are next rough milled, and the outside diameter and cheek are rough ground. The crankpin is then centered, turned and faced. The cheek faces are rough milled on the pin side, after which the pin is finish turned and faced, and the chamfers and groove are formed. The next operation is to rough grind the pin and form the radius. The cheek edges are rough milled, and the serial number is then re-stamped.

Next the crankpin is drilled, rough and finish counterbored, chamfered, rough and finish reamed and tapped. The radius on cheeks is milled, also the radius on long end of cheeks and the angle on cheek. A 1⅜-in hole 1¼-in. deep is then drilled and gun-drilled through. The end is next counterbored, bored, reamed and faced, the taper is rough and finish reamed, and the whole is chamfered.

INDICATING Trueness and Checking for Alinement on Crankshaft of J-6 Series "Whirlwind" Engine

The slot on side of cheek is then milled, and the operation is repeated for the opposite slot, bringing the two slots into alinement. A ⅛-in. x 45-deg. chamfer is milled on each side of both slots. The web in slot is rough milled, and the sides of slots are then finish milled.

The next operation is to drill four holes through both sides of cheeks. The alinement hole is then drilled through the center of cheek. Burrs are removed and the slots are filed to gage.

Next the crankpin side of cheek is faced and the shoulder and radius are formed. After this the crankpin side of cheek is milled, the cheek is faced, the outside diameters finish turned, and the undercuts chamfered and formed. A hole for screw is then drilled, counterbored and tapped. A ¼-in. hole is drilled through the crankpin wall at a 30-deg. angle, reamed and chamfered; and another ¼-in. hole is drilled through the bottom wall of the crankpin at a 40-deg. angle.

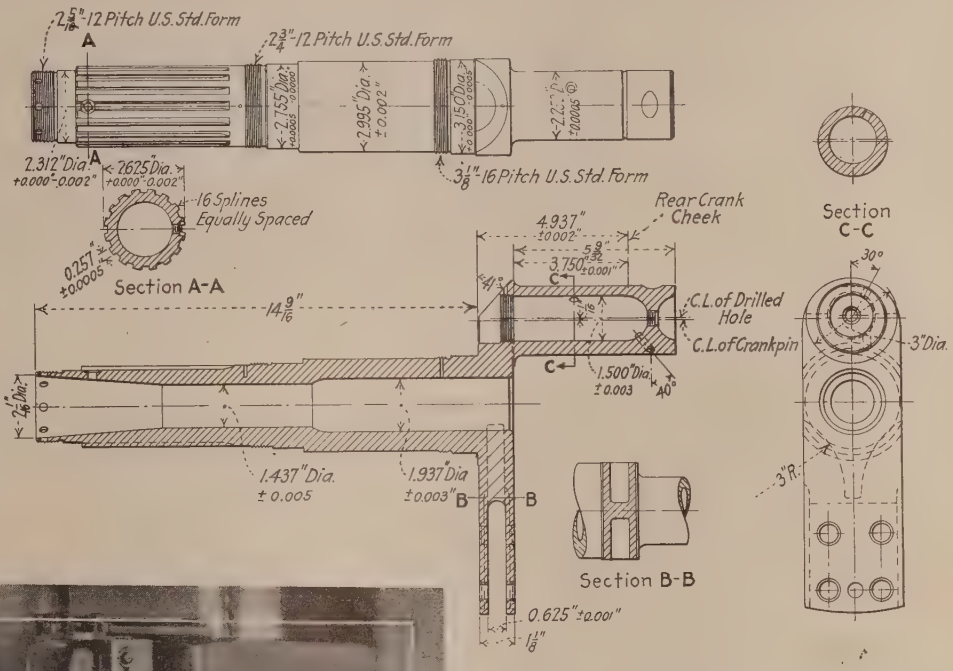
The crankshaft next goes to a plain grinder, where the shaft side of cheek is finish ground and the radius formed. The outside diameters are also finish ground.

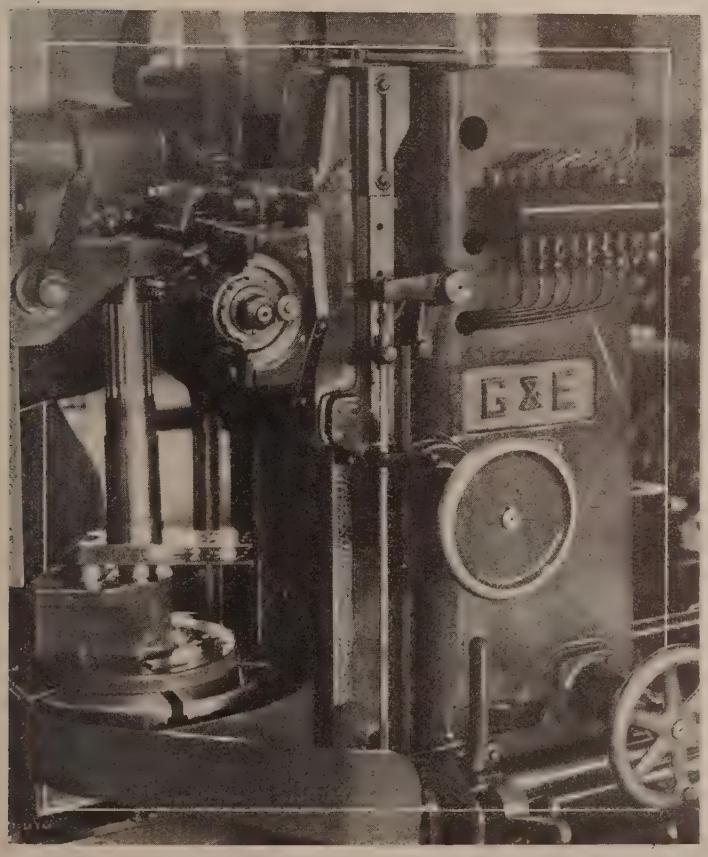
* Mechanical engineer, New York. This is one of a series of articles describing the machining of the chief parts of the new Wright Whirlwind aeronautical engine. The first article appeared in THE IRON AGE of July 18, page 148.

The next operation is to mill a 3⅛-in.—16P thread on the shaft, near the cheek; then a 2¾-in.—12P thread, about halfway to the end; then a 2-5/16-in.—12P thread at the outer end.

After the cheeks have been ground on both sides, the splines are finish hobbed and burred to gage. The crankpin side of cheek is ground and the radius formed; after which the crankpin is finish ground and the collar ground. Radii are then drilled and formed and the crankpin end is chamfered. A radius is then bored in the crankpin, these two "radii" forming the spherical or cup-shaped surfaces inside the crankpin.

THESE Drawings of the Crankshaft Give Some Idea of the Dimensional Exactions of Manufacture





MILLING Crankshaft for Propeller Hub on Gould & Eberhardt Hobbing Machine

Eight holes, equally spaced and 17/64-in. diameter, are drilled through the thread end of the shaft. Burrs are removed, sharp edges broken, and the holes tapped. The end of the crankshaft is then faced to remove center mark.

Finally, the radii are polished and the crankpin lapped. The crankshaft is washed in gasoline, inspected and delivered to finished stock.

Open-pit methods of mining, by which coal or ore is mined from the surface by the use of steam or electric shovels has been developed to a point where approximately 19,000,000 tons of coal, 24,000,000 tons of copper ore, 32,000,000 tons of iron ore, 150,000 tons of bauxite, and 2,700,000 tons of pebble phosphate are mined annually in the United States in this manner. These quantities total 78,000,000 tons, and, according to the Department of Commerce, at least four times that amount of overburden is stripped to expose these minerals for mining. The power shovels used in the stripping operations range in dipper capacity from 3 to 12 cu. yd., weigh 125 to 850 tons, and may cost $100,000 or more.

A list of 1000 American books, pamphlets and publications on various phases of international business has been compiled by National Foreign Trade Council, New York. Of these, 170 have been marked as those currently in use by active foreign traders. A five-foot shelf of 40 books has also been selected by a consulting committee.

Using Electricity for Galvanizing

Accurate Control and Uniformity of Temperature, Assured by Electric Heat, Lower Costs of Hot Galvanizing

BY R. M. CHERRY*

ELECTRIC heat has been successfully applied to hot galvanizing for various types of products, such as wire, structural steel shapes, castings, and sheet metal parts and pails.

The temperature required for hot galvanizing ranges in most cases from 825 to 900 deg. Fahr., depending upon the class of work. Occasionally temperatures as high as 1000 deg. Fahr. may be used, as in the case of galvanizing light wire mesh. The life of the tank, amount of dross formed, fuel consumption, and quality of product are largely dependent upon accurate control of the desired temperature and upon uniform temperature throughout the tank.

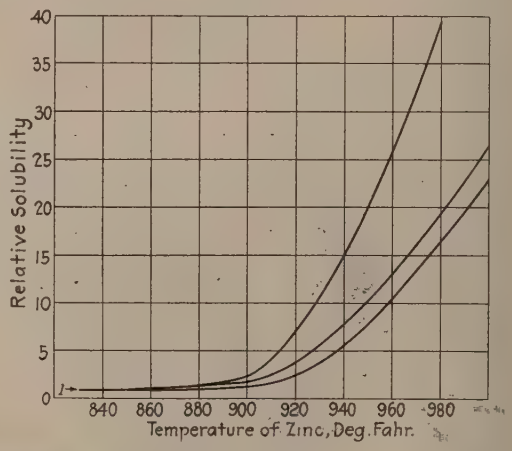
The accompanying curves illustrate the influence of these two factors. They show the relative solubility of iron in zinc at various temperatures and show that the analysis of the steel used for the tank has some effect on the rate of solubility. For the usual temperature range for galvanizing (825 to 900 deg. Fahr.), the rate of solubility is practically constant and the analysis of the steel has but little effect. If the temperature is permitted to reach, say, 950 deg. Fahr. at any part of the tank, the rate of solubility may be as high as 20 times that at 850 deg.

In the case of fuel-fired tanks, the heat source consists of one or more hot spots which are evened out by the circulation of hot gases. Naturally, when the heat source consists of such high temperature spots, there is danger of local over-heating of the tank. This explains the reason for so many failures of fuel-fired tanks at one or more localized sections, while the remainder of the tank may be in good condition.

*Industrial heating engineering department, General Electric Co.

Temperature of Heat Source Low

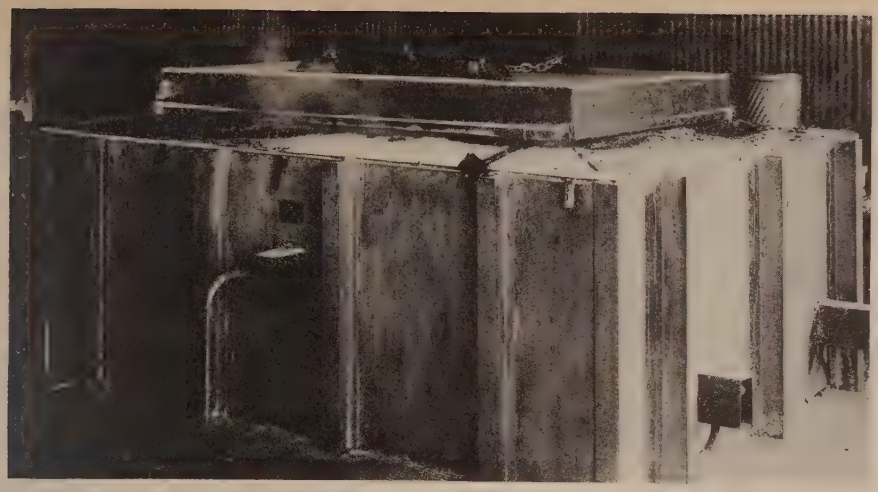
When electric heat is used, the temperature of the heat source (heating element) is relatively low—approximately 150 deg. Fahr. above the chamber temperature. The heat is applied uniformly throughout the heating chamber, there being no hot spots. Moreover, electric heat readily lends itself to easy automatic control. For very accurate temperature control, a two-point temperature control instrument is used with a thermo-couple inside the tank set at the desired temperature and a thermo-



RELATIVE Solubility of Iron in Zinc of Three Different Steels as Determined by E. Diegel, of Julius Pintsch Corporation, Reported in Zeitschrift des Vereines Deutscher Ingenieure, May 1, 1915

* * * *

STRUCTURAL Steel and Cast Iron Parts Are Galvanized in the Plant of the Delta Star Electric Co., Chicago, in a Tank 36 in. Wide Inside, 36 in. Deep and 15 Ft. Long. It is rated at 194 kw., taking 220-volt 3-phase 60-cycle current



FOR Galvanizing Transmission Line Parts, the Southern California Edison Co., Los Angeles, Uses a 70-kw. 220-Volt Electrically Heated Tank, 5 Ft. Long, 3 Ft. Wide and 3 Ft. Deep

couple in the heating chamber set for the required temperature gradient.

Accurate control of the temperature and uniform temperature throughout the tank insure maximum life for the tank and a minimum amount of dross. The increased tank life, lower dross, and elimination of firing labor result in a substantial reduction in the cost of galvanizing.

In many cases the major portion of the heat for a month's operation is used for maintaining temperature or for supplying stand-by losses. In a fuel-fired tank, the heat losses consist of those through the walls, those from surface of zinc and those carried out by the gases.

In the case of the electrically-heated tank the stand-by losses are those through well-insulated walls and the loss from the surface of the zinc, there being no stock losses. Since the walls are well insulated, the largest source of heat loss is that from the surface of the zinc. Since the area of that surface has a large effect on the amount of heat required, the size of the tank should be given careful consideration before an installation is made. For stand-by periods, a well-insulated cover should be used.

A tank failure usually starts with a slow leak. If this is detected, the tank can be emptied and replaced without damage to the brickwork. In the case of electrically-heated tanks, one or more alarm signal devices are placed in the heating chamber below the tank to detect any leak that may occur.

The device consists of two heat-resisting wires, about ¼-in. apart, connected to an alarm bell. The brickwork underneath the tank is so shaped as to accumulate zinc at one or more points where the devices are located. The molten zinc closes the electric alarm bell circuit, thereby warning the operator.

The power consumption of three sizes of electrically-heated tanks operating continuously, as determined by actual tests, is given in the following tables. The figures include the heat required to melt the make-up zinc.

No. 1 Tank—Inside dimensions 30 in. wide, 36 in. deep, 6 ft. long, rated 90 kw., 220 volts, three phase. Galvanizing miscellaneous steel parts at 850 deg. Fahr.

Lb. of Steel Galvanized Per Hr.	Lb. Galvanized Per Kwhr.	Kwhr. Per Ton Galvanized	Cost of Power Per Ton at 1c. Per Kwhr.
500	10.6	188	1.88
1,000	15.6	128	1.28
1,500	18.5	108	1.08

No. 2 Tank—Inside dimensions 36 in. wide, 36 in. deep, 15 ft. long, rated 198 kw., 220 volts, three phase. Galvanizing structural steel parts at 850 deg. Fahr.

2,000	13.5	148	1.48
3,000	16.6	121	1.21
4,000	18.5	108	1.08

No. 3 Tank—Inside dimensions 22 in. wide, 48 in. deep, 30 ft. 6 in. long, rated 405 kw., 220 volts, three phase. Galvanizing structural steel parts.

4,000	15.3	130	1.30
6,900	18.4	109	1.09
8,000	20.4	98	0.98

It is easy to calculate accurately the electric power consumption for a galvanizing tank or for any other heating process, since the efficiency of the generation of electric heat is 100 per cent. A complete cost analysis should include the maintenance of all equipment, dross loss, labor, fuel and power consumption and working condition and quality of product.

THE Walter Bates Steel Corporation, Gary, Ind., for Galvanizing Structural Steel Parts, Has an Electric Galvanizing Tank 22 In. Wide, 4 Ft. Deep and 30 Ft. 6 In. Long, Rated at 405 kw. at 220 Volts 3-phase Current

Aluminum Foundry Makes Use

WHAT strides are being made in the use of aluminum sand castings is well shown in a year-old foundry of the Aluminum Co. of America at Fairfield, Conn. Established to take care of Eastern needs particularly, its size, being about 4 acres in extent of floor space, indicates the volume that has developed, in the quest for markets among industries, by emphasis not only on the item of lightness but, through alloying other elements with aluminum, on the availability of intricate castings meeting special physical characteristics. The plant is an outgrowth of one built in Fairfield about 1906. This became the property of the Aluminum Co. of America, and a year ago across from the old plant the new foundry that is the subject of the accompanying illustrations was built.

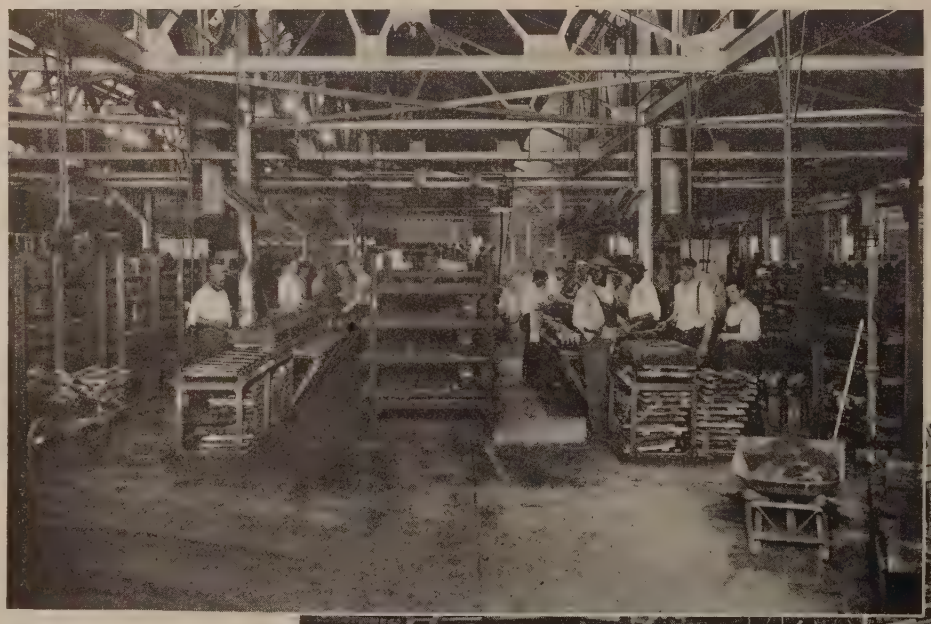
Aircraft and automobiles provide a large outlet but the plant is essentially a jobbing foundry with a few large companies supplying orders which held to make for mass production methods. What is especially noteworthy, however, are these features:

The plant has an X-ray equipment which is constantly in use searching for hidden defects as a means of improving practice and incidentally offering facilities for research which undoubtedly sooner or later will redound to the benefit of the industry as a whole.

Physical, chemical and photomicrographic laboratories form a main part of the plant in that tests are regularly made of samples of the castings of all heats. In conjunction with the X-ray investigation, the foundry is a fact-finding institution of great possibilities.

Pyrometry as a working tool has been made of paramount importance. It is depended on implicitly in the melting of all mixes, in controlling the pouring operations, in the operation of core ovens and, of course, in the heat-treating work.

Working areas are unusually light and airy, advantage having been taken in the design of building to secure facilities that are now available and go to make modern factories pleasant working places.



MANY of the Castings of Intricate Shape Are Made in Dry Sand Molds. They are assembled on roller tables and poured right in the core room, which is immediately adjacent to the bench and floor molding rooms

IN the Bench Molding Room, Each Bench Machine Is Backed Up Against a Low Concrete Wall and Is Separated from Its Neighbors by Another Low Wall

# of X-Ray Equipment

Jobbing Plant of Aluminum Co. of America at Fairfield, Conn., Is Also 100 Per Cent Under Pyrometric Control

From an exterior point of view the plant is a pleasing, impressive institution, and in decoration, fixtures and furnishings, a successful effort has been made to show numerous possible applications of aluminum products. The office building of Old Connecticut brick is flanked on each side by wing walls in which are inserted cast aluminum signs with the name of the company and its subsidiary, the United States Aluminum Co., which operates this plant. The main entrance steps have aluminum hand rails. A fence and gates of aluminum alloy inclose the property and to serve as a test of corrosion resistance have not been painted.

All the hardware, which is of Colonial design, is made of an aluminum alloy, this metal being used also for the interior mechanism of the locks, with the sole exception of the springs. All the electrical fixtures, including a large cast hanging lantern in the entrance hall, as well as two others on either side of the front door, are made of the same metal. The stairs to the second floor have aluminum treads, as well as rails. Aluminum furniture has been used, and aluminum paint on all exterior and interior trim.

The foundry itself is entered through the melting room, which is 190 ft. long, 70 ft. wide and 33 ft. high. Practically one end of this room opens up by means of rolling doors so that the men in effect are working substantially out of doors.

Melting is done by fuel oil. To each pot furnace is attached a pyrometer, and on the inner side of the room is a large elevated control chamber, where two men are always stationed, checking the temperatures of the metal in the furnaces at all times, to see not only that it is not overheated, but also that the temperatures established by the engineers are maintained. Loud annunciator bells ring as each furnace is ready to be ladled out, an illuminated number overhead on the wall indicating the furnace number.

Adjoining the melting room are the bench and floor

IN the Trimming Room Are Compressed Air Chipping and Other Tools and, as Shown Along the Far Side, a Battery of Grinding Wheels. The compressed air lines and special saddles for holding the work are shown

THE Dry Sand Molds, as They Are Progressively Built Up by the Insertion of Various Cores, Are Moved Along a Roller Table to a Pouring Space Adjacent to Which Are Located Electric Holding Furnaces

molding rooms, 60 x 150 ft. and 95 x 250 ft. respectively. The floor molding department is served by seven 1-ton, one 3-ton and one 5-ton cranes; has a monitor type roof with glass sides in the monitors, as well as large windows in the sidewalls.

The roof over the bench molding room is of sawtooth construction, and here each bench machine is backed up against a low concrete wall, and is separated from its neighbors by another low wall, which is topped by a 12-in. steel channel, making an unusually clean layout. Placed throughout both of these departments are pyrometers, so that all castings are poured at the correct temperature. Technical assistants are on duty at all times to see not only that temperatures of melting and pouring are as specified, but also that the rate of pouring is correct.

On one side of the bench foundry are rows of concrete bins where both molding and core sand are received from the cars on the company's private siding and delivered by electric truck to the molding floors.

The core room is immediately adjacent to both these rooms and is 110 x 150 ft. in plan. Here is a battery of seven oil-fired two-rack ovens, with one smaller tray oven. Pyrometers are attached to each oven and a check kept of them at all times. An additional battery of ovens is now being installed.

Many castings, on account of their intricate shape, are made entirely in dry sand molds. These are poured right in the core room. The metal which is melted in the melting room is transferred to electric holding furnaces in the core room. The transfer is made at as low a temperature as feasible and the temperature is brought up to pouring temperature in these holding furnaces, thus preventing any soaking at elevated temperatures.

In this department some of the molds, as for airplane cylinders, are assembled as respects their various cores by passage along a roller table. The cores are inserted from station to station along the roller table, jigs being employed for accurate setting and the mud paste used in setting is dried by hand torches. The particular casting mentioned has a full fin outside air cooling surface and requires in the molding a generous use of wires for molding sand support. At the end of the roller table the mold is ready for the pouring. The freshly poured mold is carried to a point near the shaking-out room, where it is allowed to cool in its sand a matter of two days.

The shakeout or knockout room, where the core sand and wires are removed from the castings, partly by vibrating air tools, is next to the cleaning room. Here, in addition to the standard equipment seen in similar establishments, are rows of benches, where operators, using rotary files, finish the rough cleaning of the castings before they are sand-blasted. In cleaning the spaces between the closely set ribs or fins of the airplane cylinder castings, the rotary files are driven by flexible shafting in flexible tubes easily handled by the operators. The rake of the cutting teeth of these files or milling cutters, which are of various shapes to accommodate the needs of the case, is such that the softer aluminum has no great tendency to pile up or clog up the file.

The inspection room, 80 x 100 ft., has besides the regular inspection benches tanks for pressure testing, accurate layout tables, and all the tools needed for the close inspection demanded on account of the accurate dimensional as well as physical and chemical specifications of the product of the foundry.

An overhead monorail runs along one side of this room. Beneath it are placed in baskets the castings that are to be

INSPECTION Includes Extensive Calipering of Wall Thicknesses, Hammer Tapping on All Surfaces at All Accessible for Discovering Hollowness by Sound (in Such Castings as Those of Rolls-Royce Engines Shown) and Hydrostatic Tests

THE Heat-Treating Equipment Includes Electric Furnaces and Quenching Tanks Here Shown Covered

THE X-Ray Equipment Has Been Used to Penetrate Thickness of Over 10 In. The interior view of the room, which is lead lined, shows an x-ray examination in progress of an airplane cylinder, while at the left of the entrance door may be seen the control apparatus in the ante-room

heat treated. A traveling crane takes these baskets to the heat treating room. Here one electric furnace has been running for some time, while another and larger one, 12 ft. long, 6 ft. high and 6 ft. wide, will soon be installed. In this room also are the steam aging tanks as well as the quenching tanks likewise pyrometrically controlled.

After heat treatment, the castings are returned to the inspection room for final inspection, whence they are taken to the adjacent room for shipment by railroad through one of the six doors which open on the private siding, or by motor truck through the two large doors on the end.

The laboratories of the plant cover chemical and physical work and photo-microscopic studies, but also the X-ray department, where a check is kept on the castings being made to insure soundness and freedom from hidden defects. Test specimens from every heat poured are analyzed and test bars are pulled. A check is likewise made on all incoming raw material.

The foundry has also wash and locker rooms, which include individual shower baths. The employees come and go through the bright and airy locker room and this fact has its effect, it is believed, upon their doing their share in keeping the foundry clean.

The pattern vault is a large building, 35 x 80 ft., fireproof, of vault construction, arranged so that the temperature is controlled at all times to keep the 5000 patterns arranged on the floors and racks under substantially ideal conditions. Immediately adjoining this is a carpenter and maintenance building, for the building of flasks and the proper maintenance of patterns and equipment.

Rust-Proofing Steel and Aluminum Aircraft Parts

ANODIC oxidation is a process for the protection of the surface of aluminum and its alloys by the formation of an adhered film of oxide on the surface.

Of the materials used on the British airship R-101, only two are aluminum alloys, viz., the aluminum-silicon alloy die castings and the duralumin in form of sections, close jointed tubes, solid drawn tubes, stampings, rivets and screw-machine parts.

The aluminum-silicon alloy as die cast has such excellent resistance to corrosion that anodic oxidation is unnecessary. All the duralumin parts, from tiny rivets to solid drawn tubes 2¾ in. diameter and 30 ft. long, however, have been given a film of oxide and a coating of lanoline. The operation of the process requires the closest control of

(1) Loading of the plant for current density. This varies with
  (a) The composition of the alloy
  (b) The state of the surface, i.e., whether machined, stamped and pickled or rolled
(2) Rate of voltage rise
(3) The duration of the "soak" at the "film forming voltage" (40 volts)
(4) Concentration of the electrolyte (chromic acid) in the bath

This process has proved an invaluable inspection agent in dealing with duralumin parts. The process of anodic oxidation, by exercising selective attack on faulty places, reveals at once localities of flaw or segregation which were masked to ordinary inspection.

Steel members of the airship R-101, which are not made of stainless steel, are treated by a rust-proofing process which is best described as closely controlled Sherardising.

Uniform results can be obtained by this well-known process only by close control of

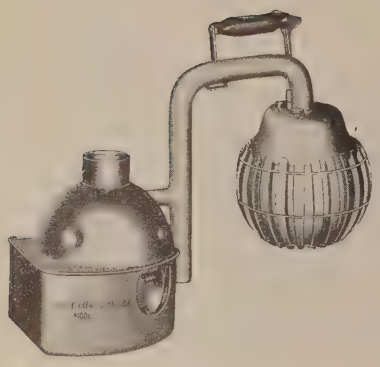
(1) Density of loading of work into the drums
(2) Composition, within close limits, of the mixture of zinc and zinc oxide dust
(3) Rate of increase of temperature
(4) The maximum temperature and the time of soak at maximum temperature

It has been found possible to control the thickness of coating within very close limits, so that it is safe to count upon an increase in dimensions due to the addition of a coating of thickness always lying between 0.0003 and 0.0006 in.

It has been established to the satisfaction of Boulton & Paul, the makers of this airship, that this rust-proofing is superior to electro deposition of zinc. The coat, it is emphasized, is well alloyed to the steel and is non-porous to the ordinary tests, and the ferroxyl test modified to suit the special requirements.

The process, properly and closely controlled, is an eminently satisfactory one, and among the many thousands of steel stampings and tubes which have been treated, the rejected parts sent back for re-treatment have not totalled a hundred.

Gas-Fired Ice Box



Simplified Domestic Refrigerator Unit Made of Sheet Metal and Tubing, Welded into Closed System, Tested at 600 Lb. Per Square Inch

BY J. B. NEALEY*

SIMPLIFICATION in design and mass production are the great forces that are putting the erstwhile luxuries of the rich into the hands of everyone. The brief history of mechanical refrigeration may be taken as an example. First the electric refrigerator appeared and attained wide popularity. Then came the gas refrigerator, made in one piece and without movable parts. Now we have the "poor man's refrigerator" known as the Icyball. It is as simple as a tea kettle, and it utilizes the cook stove to keep a food compartment cold.

This bizarre result is effected by the same principles of alternate evaporation and condensation of a volatile liquid, described in detail in THE IRON AGE for Feb. 2, 1928, when applied to a gas refrigerator. In the more expensive varieties there described, this circulation of the refrigerant was constant, and the unit could be built permanently into a cabinet. In the simpler variety now to be described the action is intermittent—the housewife puts the 35-lb. unit on her stove for a short time in the morning, then replaces it in the refrigerator. The cost of gas for each heating is less than two cents, and for the next 24 hours the Icyball will freeze ice cubes, desserts or salads, in addition to keeping the food compartment cold and dry.

The Icyball consists of two round chambers connected with a length of bent pipe, and equipped with a handle by which to carry it about.

The ball with the fins is called the hot ball and the other the cold ball. These two with their connecting tube are tightly sealed so that the ammonia solution contained inside cannot escape. The device is a product of the laboratories of the Crosley Radio Corporation, Cincinnati, and is being manufactured in a separate plant of this concern.

To start operation, the unit is lifted from the cabinet and stood in such a position that all of the liquid drains into the hot ball. The hot ball is then placed over a

*American Gas Association.

Unit Complete Except for Minor Attachments Is Galvanized in Gas-Fired Zinc Bath

burner of the kitchen stove, and the cold ball into an adjoining pail of cold water for about 90 min. This separates the ammonia gas from the solution, the former being driven into the cold ball, where it condenses. A little whistle blows when the evaporating process nears completion. Then the hot ball is cooled in the pail of water, the liquid ammonia in the cold ball commences to evaporate, it quickly drops to zero or below, and the unit is ready to replace in the refrigerator cabinet.

A separate unit known as a "stabilizer" keeps the cabinet cold while the Icyball is on the stove. This consists merely of a small sealed tank, containing about 14 lb. of glycerin solution, with a depression in the top in which the cold ball rests.

Unit Made of Welded Stampings

The manufacture of the Icyball progresses in a straight line; most of the handling of parts and subassemblies is done by continuous traveling or gravity conveyors.

Each of the balls is made of two hemispheres (steel stampings made in a single press operation) welded together with an oxy-acetylene flame. One ball is 10 in. diameter and the other 9½ in., while the connecting tube is 1¾ in. seamless steel tubing. The steam dome to make a liquid seal on the top of the hot ball is also a steel stamping with a bottom diameter of 7 in.

In the manufacturing department, gas welding stations are ranged alongside gravity conveyors, one main conveyor for each ball. Operators are specialists, welding one seam or attaching one part. Where these two conveyor lines meet, the balls are welded to the connecting tube and the unit passed along to the hydraulic test. A large acetylene generator for the oxy-acetylene welding has been erected in a fireproof room adjacent to the assembly lines; gas is piped through the plants at low pressure and each blowpipe outlet is protected by a hydraulic back-pressure valve.

Oxygen is furnished in individual cylinders, each with a regulator so that pressure can be adjusted appropriate for the thickness of the metal being welded.

The hydraulic test is so arranged that five units are connected to a header at one time and all are subjected to 600 lb. pressure. The strength of the welds and materials having thus been checked, the units are then tested with 200 pounds of air pressure to locate any pin hole leaks. Pressure in the system when in a refrigerator cabinet is about 20 lb. per sq. in.; during the heating period the temperature goes up to 300 deg. Fahr., and pressure to 230 lb., before the whistle blows.

To improve the radiation rate of the hot ball a number of fins made of strip steel stampings are spaced about it and clamped securely in a jig while binding them on with wire. The units are then conveyed to the galvanizing department.

Finish in Zinc Coat and Aluminum Paint

They are pickled and washed in a series of large vats. Galvanizing is then done in three boiler steel tanks five feet long, three feet wide and 30 in. deep. A 3-in. space between brick setting and tank allows the circulation of heat, the gas flames impinging on the bottom. Automatic controls maintain the temperature at 850 deg. Fahr. plus or minus five degrees. From 1½ to 1¾ lb. of zinc is used on each unit; the zinc coating also acts to solder on the fins, and to prepare other surfaces for soldering by hand.

An overhead monorail system serves the galvanizing department. The figure shows a fixture whereby the units are forced into the molten zinc. The half of the zinc bath in the foreground is covered with three inches of sal ammoniac flux. After the unit has been immersed about 90 sec. it is pushed along, still immersed, to the other end of the tank where there is no flux, and removed.

Units are next moved by conveyor to a battery of drill presses where openings for safety devices are made. All

Various Parts, Stamped or Bent from Strip or Tubing, Are Assembled in Simple Work-Holding Devices and Welded with Oxy-Acetylene Blowpipes

Part of Test Floor—Several Hundred Starting Units, Each One a Gas Plate and Water Pail, Required to Keep Pace with Production

fixtures are then soldered on, and the unit tested under 300-lb. pressure.

Ammonia Charged in Separate Room

A weighed amount of ammonia is next charged. This is done in a separate room, through a system of special piping leading from vacuum pumps and ammonia reservoirs. The aqua-ammonia is mixed in four high-pressure tanks, which are located on a floor above. While two of the tanks are draining, the other two are being refilled.

As soon as the units have been charged they are taken by conveyor to the second floor where each one is put through a complete test cycle, including heating and placing them in test boxes for 24 hr. in a room where a constant temperature of 90 deg. F. is automatically maintained. The units are then sprayed with aluminum paint, packed and dropped to the shipping department through chutes.

European Irons for Enamelware

AN article by Engineer A. Muller published in *La Revue de Fonderie Moderne* (June 10, 1929) gives some details regarding the production of iron destined for the manufacture of enamelware. As a rule these manufacturers do not attempt an exact chemical composition for the castings, and consequently the majority of them do not possess analytical laboratories. They endeavor to produce iron which is fluid, soft, easy to work, and, above all, free from defects while in the oven.

Iron Containing No Free Carbon Enamels Satisfactorily

Frequently insufficient attention is given to the physical reactions which take place between the iron and the enamel. These two materials differ widely in their characteristic properties, and often the faults which arise with one are attributed to the other. Thus, an iron containing no free carbon may be enameled satisfactorily, and without a preparatory coating; carbon plays an important part in reducing the oxides contained in the enamel—it causes the enamel to become transparent, uneven, and otherwise defective. Oxide of zinc is particularly affected by graphitic carbon; therefore certain enamels cannot be applied directly to the iron, and necessitate a preliminary coat.

Great care is therefore taken to make sure that the carbon is not excessive; 3.6 per cent is a satisfactory proportion, and 3.7 per cent is the limit. For the same reason the use of carbonaceous material, such as charcoal, is avoided in the molding materials. For thin castings phosphorus should not be less than 0.6 per cent nor more than 0.9 per cent; if phosphorus is too high the metal becomes so brittle that trouble is likely to occur during baking. An excess of phosphorus may be overcome by an increase in silicon, but the latter should not exceed 3.25 per cent. Sulphur is probably the most dangerous element, as beyond 0.09 per cent it causes the iron to be hard and brittle. The interplay of the various common elements, the one balancing the other, is illustrated by the following analyses, any of which will make satisfactory pieces intended for enameling:

Sulphur	0.07	0.08	0.09	0.10
Silicon	2.3	2.4	2.5	2.6
Total carbon ...	3.72	3.7	3.65	3.6
Graphitic carbon..	3.26	3.27	3.28	3.29
Manganese	0 6	0.7	0.8	0.9
Phosphorus	0.9	0.8	0.7	0.6

Castings must not remain too long in the sand as small stains of rust may thus be produced, and although almost imperceptible, they reduce the quality and adherence of the enamel.

Trade Practice Meetings of 62 Industries

Pamphlet Covering Conferences Published By Trade Commission—Codes Reflect Rising Standards

WASHINGTON, Aug. 13.—The Federal Trade Commission is having a pamphlet on trade practice conferences printed and is seeking the cooperation of trade associations and other organizations for its distribution. Copies will be available at 25c. each, from the Superintendent of Documents, Washington.

The pamphlet will cover 52 conferences. Since it went to press, however, 16 additional conferences have been held, making a total of 68. The number of industries affected is 62, some having held conferences twice. Rules have been issued in all but four or five instances, and between 25 and 30 applications for conferences are pending. The industries cover a wide range with a huge total capitalization, doing business under standards upon which they voluntarily agreed and which they set up in cooperation with the commission. That they are living up to the codes established is evidenced by the fact, pointed out to THE IRON AGE by M. Markham Flannery, director of the Trade Practice Division, that less than one dozen cease and desist orders were issued for the violation of the 400 rules promulgated by the commission. He expressed the view that the outstanding result of the conferences has been to put business on an equal basis, fair to all alike, including the consumer.

"These conferences," said Mr. Flannery, "mean big savings to industry, the Government and the people by settling in groups many cases which under former practice would have had to be settled individually. Also they have placed industry and business in a friendly attitude rather than in an attitude of antagonism."

It is the opinion of Mr. Flannery that a remarkable transformation has come over business within the past decade, and that this has been emphasized in trade practice conferences. The point was made by Mr. Flannery that business and industry are anxious to operate on high standards, and, when assured that codes may be set up that place each unit on a fair comparative level, they take action to do away with undesirable practices. The growing number of conferences and of affected industries is held to support this view. Previous to the setting up of the Trade Practice Division in June, 1926, the commission held only two or three conferences a year. Now the average is more than 20 each year, and it is rising. In May of the present year there were six conferences, in June, 11, and in September there will be perhaps eight or 10, none being held during July and the present month, owing to the fact that the commission is not in session.

The first trade practice conference was held in 1919, and concerned the creamery industry of the West, developing from an investigation under the old system of individual complaints and bringing about cooperation instead of hostility. It is estimated that the elimination of some practices by the creamery industry, such as providing free service, has saved it millions of dollars. Industries in the iron and steel and metalworking lines, it is claimed, also have saved large sums as the result of codes they have adopted under the trade practice rules. There are two sets of rules, Group I and Group II. The former condemn practices that are plainly illegal. Group II rules cover practices that may or may not be illegal. The commission gives no opinion one way or the other regarding such rules, but accepts them as expressions of the trade concerned. The legality or illegality of such rules can be determined only after investigation of individual cases. Some of the practices condemned under Group II rules are, on the other hand, manifestly legal, but are held by those participating in the conferences to be undesirable.

Reinforcing Institute Meeting

The Concrete Reinforcing Steel Institute will hold its next semi-annual meeting Sept. 30 to Oct. 2, at the Wawasee Hotel, Wawasee, Ind. The opening session will be held Monday evening, Sept. 30. The Wednesday morning session will be devoted primarily to the subject of concrete rib floor construction.

New Indiana Company Takes Over Two Plants

Properties of the Chrobaltic Tool Co. and of the Sheet Steel Products Co., both located at Michigan City, Ind., have been taken over by the Michiana Products Corporation of the same city, recently organized. This new company will continue the business and enlarge the facilities of the two absorbed companies. The present operating and sales organizations will be maintained with the exception that R. O. Gill has resigned to engage in a new business.

The Chrobaltic division of the new company will continue to manufacture heat and acid-resisting alloy castings and other stainless materials. An additional foundry was recently completed and the engineering department increased. The Sheet Steel Products division will continue to manufacture the Hall Winslow line of oil filters and air cleaners for truck, tractor, aeroplane and automobile engines, as well as pressed metal parts, tanks, equipment, etc., in standard special analyses and corrosive-resisting materials.

O. M. Carry is president of the Michiana Products Corporation with offices in Chicago, and W. B. Sullivan is vice-president and general manager, located at the plants in Michigan City.

Sheet Steel Used in Making Electric Portable Tools

The use of sheet steel stampings in the manufacture of electric portable tools is described in the current issue of "Making Markets," published by the Sheet Steel Trade Extension Committee. Speed Way Mfg. Co., Cicero, Ill., has found that tools fabricated with sheet steel casings are more compact than those made of other materials. Sixteen-gage sheets are used for heavy-duty tools and 22-gage for light-duty. The strength of steel makes the tools especially serviceable where rough handling is involved.

Plant Visitations During Metal Congress

An extensive plant inspection program has been arranged for the National Metal Congress to be held in Cleveland the week of Sept. 9, under the auspices of the American Society for Steel Treating. The schedule provides for a majority of the plant inspections in the mornings, so that the afternoons will be free to attend the National Metal Exposition at which over 250 exhibitors will occupy 80,000 sq. ft. in Cleveland's Public Auditorium. Plant inspections are scheduled as follows:

National Tool Co.
Lamson & Sessions Co.
Otis Steel Co.
Case School of Applied Science.
Industrial Brownhoist Corporation.
Columbia Axle Co.
Lakeside Steel Improvement Co.
White Motor Co.
Warner & Swasey Co.
Burdett Oxygen Co. of Cleveland.
Joseph T. Ryerson & Sons, Inc.
Lincoln Electric Co.
Vlchek Tool Co.
Gears and Forgings, Inc.
Eaton Axle & Spring Co., bumper division.
Ferro Machine & Foundry Co.
National Malleable & Steel Castings Co.
American Steel & Wire Co., Cuyahoga Works.
Nela Park.
National Acme Co.
Hupp Motor Car Corporation.
Great Lakes Aircraft Corporation.
Cleveland Tractor Co.

Wheel Plant in Mexico

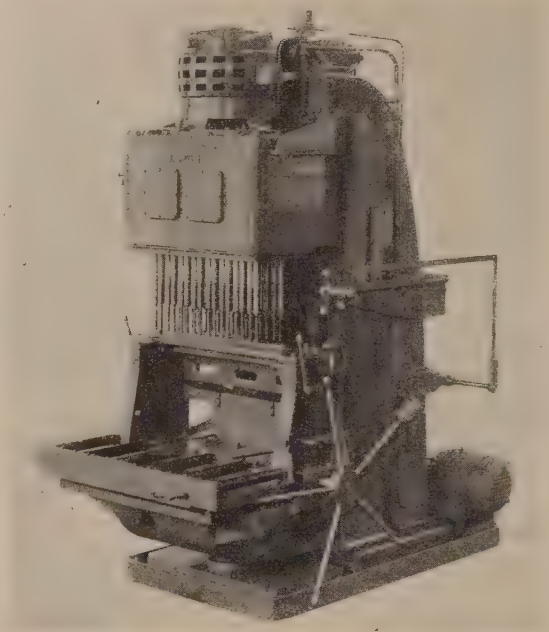
Construction of a plant for the production of wheels for railroad, street car and mining use has been completed by the Monterrey Iron & Steel Co., Monterrey, Mexico, and operations will begin in the next month. Contracts for wheels have been closed with Mexican railroads.

Multiple-Spindle Machine for Valve Holes

THE valve hole drilling, reaming, counterboring and spot facing machine illustrated, built recently by the Defiance Machine Works, Defiance, Ohio, is equipped with Oilgear hydraulic feed and a fixed-center direct-motor-driven head. The head is furnished with different numbers of spindles to suit requirements. All spindles are made of heat-treated alloy steel and are equipped with heat-treated helical gears. Wherever possible ball thrust bearings are employed. The heads are entirely inclosed and furnished with forced feed lubrication.

Oilgear feed permits close adjustment of feed rates to suit requirements and provides rapid traverse movement both to and from the work. The table of the machine is adjustable and has screw jack supports for overhang. It extends beyond the front of the machine and is fitted with rollers to connect it with conveyor tables for passing the blocks from one machine to another. The column is a heavy cored casting; it supports the Oilgear cylinders and also incloses the weights that counterbalance the heads. Fixtures, built to suit requirements, may be rigid or of sliding type with bushing plates and hardened jig eyes.

A 15 to 20-hp. 1200-r.p.m. motor is recommended for driving the head and a 2-hp. 900-r.p.m. motor for driving the Oilgear hydraulic pump. The floor space occupied by the machine is 64 x 108 in. The net weight is 18,500 lb.



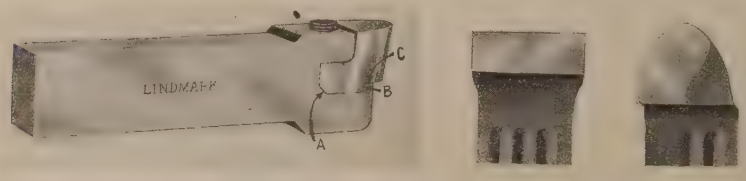
THE Fixed-Center Head Can Be Furnished with Spindles to Suit Requirements in Drilling, Reaming, Counterboring and Spot Facing Valve Holes in Automobile and Tractor Cylinder Blocks. Feed is by means of Oil-gear mechanism

Tool Holder for Large Lathes and Planers

RIGID support and convenient interchangeability of tool bits are features of the Lindmark tool-holder illustrated, which is being supplied by the Apex Tool Co., 50 Remer Avenue, Bridgeport, Conn., for use on boring mills, planers and heavy-duty lathes.

The tool bit has a broad bearing in the holder and is locked firmly in place by tightening the socket set screw, which causes the bit to slide over the beveled surface *A* of the holder, lock against the shoulder *B* and make contact with the forward part of the holder at *C*. The support is thus extended close to the cutting edge, most of the cutting strain being transmitted to the holder at *C*, and very little to the set-screw. It is stated that because of the firm support provided, which is claimed to approach that of a solid tool, Stellite tool bits may be used without danger of breakage. The grooves in the tool bits permit offsetting, to compensate for wear of the cutting edges. The bits may be removed conveniently for regrinding and replaced in exactly the same position without removing the holder from the machine.

The holder is a chrome-nickel steel drop forging, heat-treated to provide maximum toughness. It is stocked in two sizes, 1 x 1¼ x 6 in. and 1¼ x 1½ x 8 in., respectively, and in five styles: Straight, right and left-hand 45-deg. offset; and right and left-hand 90-deg. offset. High-speed steel tool bits are made in two sizes and in the following seven styles: Square nose, right and left-hand hog nose, right and left-hand side facing, and right and left-hand roughing. The Stellite bits, cast special for use in these holders, are furnished in right and left-hand hog nose and right and left-hand roughing styles only. Gooseneck and other type planer holders in 1-in. and 1¼-in. widths can be furnished on order.



With the Support Close to the Cutting Edge, Stellite Bits May Be Used. Grooves, shown in the square and hognose bits above, permit offsetting to compensate for wear

Combination Vise Equipped with Steel Slide

A COMBINATION pipe vise having a steel slide has been added to the line of the Simplex Tool Co., Woonsocket, R. I. The steel slide eliminates the possibility of breakage just back of the front jaw, and is particularly desirable for this type of vise the jaw of which is extra high.

The Steel Slide Eliminates Breakage Back of the Front Jaw

The pipe jaws are made of hardened tool steel and are reversible. The jaw inserts are also made of hardened steel and are fastened with screws and doweled to prevent loosening. The nut in the back jaw through which the operating screw goes is made of malleable iron, and is designed to eliminate lifting up at the back and so prevent breakage of this part. It is extra long and has two front supports, one above the other.

The property of the Penn-Seaboard Steel Corporation, New Castle, Del., is to be sold following a petition of the receivers of the corporation, Alexander F. Crighton and William P. Barba, provided creditors show no reason prior to Sept. 4 that such a sale should not be held.

Improved Nut and Screw Driving Machine

SPEED of operation, as compared to hand methods, and uniform tightening to predetermined standards are features of an improved model of the Reynolds nut driving machine which has been placed on the market by the Baush Machine Tool Co., Springfield, Mass.

Nuts and Cap Screws Are Driven Rapidly to Predetermined Tightness. Control is by foot lever

The machine was formerly built by the Metalwood Mfg. Co., Detroit, and was described in THE IRON AGE of Dec. 8, 1927. It has two spindles, one of which is mounted in a slide that is adjustable crossways of the column to permit varying the spindle center distance from 2 1/16 to 6 in., to suit the piece being assembled. A detachable socket wrench at the lower end of each spindle holds the nuts or cap screws through magnetic windings. The driving operation is controlled by foot lever and the tightness of the nuts or screws is determined by the adjustment of a rheostat. When the nuts or screws are driven to the predetermined tightness, the clutch circuit is caused to open automatically, which, when the foot lever is released, permits the work to be withdrawn from the wrenches. The arrangement is such that if one nut begins to tighten before the other, the leading nut will be slowed down until both nuts are equally tight.

Substitution of a centrifugal mechanism for making and breaking the magnetic clutch circuit through a mercury switch in place of the epicyclic mechanism previously employed is a major improvement. The electric circuit has been simplified and a more substantial switch provided. A direct current generator can be supplied where direct current is not otherwise available.

Small Part Heat-Treating Furnace

A NEW electric furnace for heat treating small parts is announced by the General Electric Co. It is of the mesh-belt conveyor type, and the automatic feed and discharge effects the labor savings.

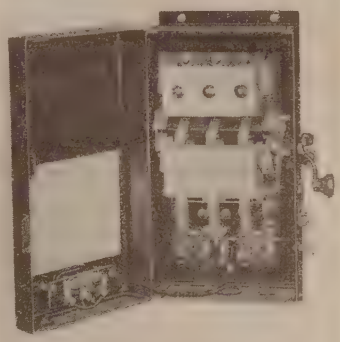
The furnace is about 8 ft. long, 4 ft. wide and 4½ ft. high overall. A small heat-insulated housing is provided for the feed end of the belt to prevent unnecessary losses. The principal feature of the furnace is the mesh-belt conveyor, made of heat-resisting alloy. The mesh belt is carried over two drums of the heat-resisting alloy, one of which is driven by motor.

The furnace can be adjusted for various speeds and temperatures, and an adjustable opening at the feed end accommodates work of different dimensions. After heat treating the work is discharged into a chute which may carry it to a box. quenching bath or some other subsequent process. To start the furnace in operation, the control is set for the desired temperature, and the speed is adjusted. The furnace will handle up to 300 lb. per hour, in shapes up to 2 x 16 in. overall.

AUTOMATIC Feed and Discharge Is a Feature of This Mesh-Belt Conveyor Type Electric Furnace. Both belt speed and temperature are adjustable and opening at the feed end may be of size to suit the work

New Automatic Motor Starter

SAVINGS in wiring costs are among the advantages claimed for a new combination automatic starter which is being manufactured by the Square D Co., Detroit, in three capacities and six types. Across-the-line starters up to 30 hp., 220 volts and 50 hp., 440 and 550 volts, two or three-phase, are employed, the starter being mounted with the motor circuit switch in one cabinet. The motor circuit switch acts not only as a disconnecting switch but is also capable of opening the circuit while the motor is under load.



An Across-the-Line Starter and Motor Circuit Switch Are Mounted in the Same Cabinet

To facilitate obtaining accurate working load data, the starter is arranged that a test jack may be inserted in the motor circuit while the motor is running. This test jack is put through openings in the door of the cabinet and is held firmly between the jaws of the switch by spring tension. The device may be provided with fuse blocks between the motor circuit switch and the starter, if desired.

Sixteen stoves are to be installed at the Lackawanna plant of the Bethlehem Steel Co. by the American Heat Economy Bureau Inc., Pittsburgh.

Holding Company to Be Dominant in Coke

New England Corporation Formed by Koppers Interests—Controls Many Properties

THE Koppers interests, Pittsburgh, have filed with the Massachusetts Commissioner of Corporations a voluntary trust, the Eastern Gas & Fuel Associates, with Charles A. Coolidge, Jr., and Paul C. Cabot, both of Boston, and Thomas J. Michie, Jr., Pittsburgh, included in the trustees. Headquarters will be in Boston.

Under the declaration, trustees are given broad powers. In addition to the investment trust with respect to securities, the trustees have the power to manufacture, produce, purchase, mine and otherwise acquire, hold, own, use, sell and otherwise dispose of and deal in gas, coke, oil, tar, chemicals, iron, steel and other metals.

Authorized shares in this voluntary trust, which may be issued from time to time at the discretion of the trustees, include 250,000 shares of prior preference, $100 par stock, paying 4½ per cent cumulative dividends; 1,000,000 shares of $100 par preferred, paying not more than 7 per cent in dividends; and 2,000,000 shares of no-par common stock. The prior preference stock, in the case of liquidation, is entitled to $105 per share, and the preferred stock $115.

The Koppers interests already have in operation a modern coke-making plant at New Haven, Conn., and are a factor in the Connecticut gas and coke field. Although no official announcement has been made by the Koppers interests, Boston banks report that they have acquired control of the Massachusetts Gas Companies, embracing the Mystic Iron Works, coal properties in the South, coke ovens located at Everett, Mass., steamships and valuable franchises in and about Boston as to the distribution of gas.

Assuming that the Koppers interests have acquired the Massachusetts Gas Companies, it is generally conceded that, with valuable properties in northern New York State, and with the acquisition of gas and lighting properties south of Boston, they will have a dominant position in the New England gas and coke market, except in the Providence, R. I., district.

Increases in Western Rate Revision

Examiners' Report Recommends New Class for Iron and Steel Products in Western Trunk Line Territory

WASHINGTON, Aug. 13.—Freight charges on iron and steel products moving on class rates in Western Trunk Line territory will be increased if the Interstate Commerce Commission adopts the recommendations submitted to it by William L. Koebel and Peter C. Paulson, examiners, in what is known as the Hoch-Smith Western class rate investigation. The proposals of the examiners do not affect commodity rates.

The proposed report, which was made public on Wednesday of last week, recommended that a new class be created for iron and steel articles in Western Trunk Line territory. At present, iron and steel products, when moving on class rates, are rated fifth class, which is about 40 per cent of first class. The examiners proposed that special treatment be given to iron and steel products to the extent of having set up for them a class (not designated by name or number) equal to 32.5 per cent of the first class scale that they recommend for application to the territory affected. The minimum carload would remain at 36,000 lb.

When the new scale in the Western Trunk Line territory goes into effect by the commission's decision, it will be of such a character as to fit in with the new rates on iron and steel in Official Classification territory, which are to become effective Oct. 20 as the result of the commission's decision in the Hoch-Smith Eastern iron and steel investigation. The result will be a revised system of iron and steel rates from the Atlantic Coast to the Rocky Mountains. Since iron and steel rates were revised in the Consolidated Southwestern cases in 1928 and in the Southeast in Southern Class Rates case in 1927, only the Pacific Coast territory is left for treatment.

Western Trunk Line territory, roughly, may be described as extending west from Lake Michigan and the Mississippi River to the Rocky Mountains and north from and including Kansas and northern Missouri to the Canadian border.

The revision covers class rates between points in Western Trunk Line territory and between points in that territory, on the one hand, and points in the entire country east of the Mississippi River and Lake Michigan, on the other. It also includes rates over the Lake-and-rail routes between Western Trunk Line territory and the East. Western Trunk Line territory, for the purpose of applying the rates recommended by the examiners, would be divided into three parts or zones. The lowest rated zone includes, roughly, that part of the territory east of the Missouri River and what is known as the Sioux Falls-Twin Cities-Duluth line. The intermediate zone lies to the west and includes most of eastern Kansas, southeastern Nebraska and the area east of a line from Sioux City, Iowa, through Mitchell and Aberdeen, S. D., and Fargo and Grand Forks, N. D., to Duluth. The highest rated zone includes that part of the territory west and north of the intermediate zone. It covers the Rocky Mountain part of the territory.

For application between points in the lowest rated zone the examiners recommended that a distance scale of rates nearly 83 per cent of the scale prescribed for Oklahoma and other Southwestern States in the Consolidated Southwestern cases. The scale recommended for the intermediate zone is the same as the Kansas-Missouri scale prescribed for southwestern Missouri and eastern Kansas in that case. The highest scale is identical with the Southwestern scale. For application between points in different zones the examiners recommended that the lower or lowest scale be applied for the entire distance, plus differentials for the distances in the higher rated zones. The measure and progression of the scales are briefly indicated by the first class rates below:

Miles	Scale I	Scale II	Scale III
5	32	33	36
100	66	73	79
200	91	101	109
300	109	124	133
400	127	146	157
500	142	162	174
800	187	211	227
900	198	223	240
1,500	264	296	318

In a statement concerning their work, the examiners said that "while the proposed basis would effect many reductions from the present rates, increases would predominate."

"The measure of the increase," continued the examiners, "is substantially greater in the lowest rated zone than in the others. The basis is designed with relation to adjustment in adjoining territories, but is also intended to give Western Trunk Line respondents (railroads) some additional revenues, which, it is believed, their financial condition warrants."

The method for ascertaining the rates to be applied is complicated whenever traffic is to be hauled from without Western Trunk Line territory to a point within it. For example, Chicago is in Illinois Freight Association territory. A shipment of iron and steel from that point to Denver would require the ascertainment of the distance the traffic moves in Illinois Freight Association territory and the distances it moves within each of the three zones into which Western Trunk Line territory would be divided. Distances would have to be computed by way of the shortest routes over which the traffic could be moved without transfer of lading.

Luntz Iron & Steel Co., Canton, Ohio, has announced the opening of a branch office at 320 Citizens National Bank Building, Kokomo, Ind., to do a general business in old materials. F. I. Kilcline is in charge.

British Plan Group Organizations

Negotiations Cover Heavy Industry—German Mills Laying Off Men—Tightening in Foreign Ores for American Market

(*By Cable*)

LONDON, ENGLAND, Aug. 12.

WITH the Cleveland holiday week in progress, new business in pig iron is small, but makers are preparing to increase their output. Four additional furnaces are expected to blow in on the Northeast coast during September, and, meanwhile, furnaces are well booked with tonnage.

Hematite iron prices are firmer, but occasionally show some irregularity. About 950 tons of special quality Hematite was shipped last week to the United States.

Finished steel is quiet because of the holidays. There is a fair domestic demand, but overseas business is meager. Some makers are still well booked ahead, and all are expecting an early revival.

Continental markets continue dull, but the belief is growing that an improvement is likely in the near future.

Tin plate inquiry is expanding, and with a good demand for deliveries up to the end of the year, makers have adopted a firmer attitude, and most mills are now quoting 18s. 6d. ($4.48) per base box, f.o.b. works port. Home demand is fair and some export sales have been effected.

Galvanized sheet business is slightly better, although Indian demand is still small. Far Eastern demand for black sheets has improved, and business is active in both the light and medium gages.

In an interview on his eighty-first birthday, Sir Arthur Dorman, Dorman, Long & Co., said: "British manufacturers realized that cooperation and united organization are essential if they were to maintain their position. Hence negotiations for unification of the heavy steel industry have been instituted. Preliminary efforts have met with fair success, and there is the probability that in the near future the British iron and steel industry will be organized into groups."

Armstrong Whitworth & Co. have booked orders for two Norwegian 9000-ton tank ships.

German activity is slackening, and the Vereinigte Stahlwerke A. G. is laying off shifts at Hoerde and the Deutsche Edelstahl Werke is to discharge another 500 men at Bochum. German mills are reported to have booked large tonnages of rolled steel for Holland and some important Russian contracts for ship plates. South Africa has placed an order for a tonnage of rails with Polish works, which are now competing keenly with the International Rail Makers Association.

British Pig Iron Buoyant—Steel Exports Fair

LONDON, ENGLAND, Aug. 1,—The iron and steel business here is affected by the holiday season, and improvement is not expected until early fall. Pig iron producers are optimistic and look for a heavy demand from domestic consumers, which will necessitate blowing in additional furnaces. It is expected that by September there will be 50 of a total of 95 furnaces in blast in the Cleveland district. Meanwhile, Cleveland producers have no iron available for delivery before October, and the only supplies available for prompt shipment are in the hands of merchants. Pig iron production costs have increased steadily throughout the year and no reduction is expected, as foreign ore is advancing. High iron ore prices, however, are encouraging the resumption of operations at domestic mines, but the coke shortage continues acute.

Excessive capacity is still a feature of the steel market. Domestic demand for heavy steel products has been active and is expected to increase, in view of important projects in prospect, such as bridge construction, road building and new power plants. Steel mills are still experiencing difficulty in regaining export markets and are represented in a delegation that has gone to South America to study the possibility of developing trade in certain special products.

Business with the Far East is irregular, especially with China, where buying has been affected adversely by the recent political developments. In Japan the rapidly increasing output of Japanese steel mills is curtailing imports. Through the steel makers' export committee, however, some fair shipyard contracts have been negotiated with Japan and also with Canadian buyers. Continental competition is not so keen as it was some time ago, but may again become an important factor as a result of the recent decline in the prices of European sellers.

British and Continental European Export prices per gross ton, f.o.b. United Kingdom Ports, Hamburg and Antwerp, with the £ at $4.85

British Prices, f.o.b. United Kingdom Ports

Cleveland No. 3 foundry	£3	12½s.	to	£3	13½s.	$17.58	to	$17.82
East Coast Hematite...	3	15	to	3	15½	18.18	to	18.30
Ferromanganese, export	13	10	to	14	0	65.47	to	67.90
Billets, open hearth....	6	7½	to	6	10	30.92	to	31.52
Sheet bars, open hearth	6	5	to	6	10	30.31	to	31.52
Black sheets, Japanese specifications	13	0	to	13	5	63.05	to	64.26
Tin plate, per base box	0	18¼	to	0	18½	4.42	to	4.48
Rails, 60 lb. and heavier	7	15	to	8	15	37.59	to	42.43
						Cents per Lb.		
Steel bars, open hearth	7	15	to	8	10	1.67	to	1.84
Beams, open hearth....	7	2½	to	7	12½	1.55	to	1.65
Channels, open hearth..	7	7½	to	7	17½	1.60	to	1.71
Angles, open hearth....	8	2½	to	8	12½	1.76	to	1.86
Ship plates, open hearth	7	12½	to	8	2½	1.66	to	1.76
Black sheets, No. 24 gage	10	5	to	10	10	2.21	to	2.27
Galvanized sheets, No. 24 gage	13	7½	to	13	10	2.89	to	2.92

Continental Prices f.o.b. Antwerp or Hamburg

Foundry iron, 2.50 to 3.00 per cent sil., 0.50 to 0.90 per cent phos.	£3	9s.	to	£3	13½s.	$16.73	to	$17.82
Foundry iron, 2.50 to 3.00 per cent sil., 1.00 per cent and more phos.	3	11				17.21		
Billets, Thomas	4	18	to	5	0	23.76	to	24.25
Sheet bars, Thomas....	4	10	to	5	0	21.82	to	24.25
Wire rods low C., No. 5 B.W.G.	6	4	to	6	6¼	30.06	to	30.61
Black sheets, No. 31 gage, Japanese.....	12	10				60.62		
Rails, 60 lb. and heavier	6	10*				31.52		
Rails, light	6	1½				29.46		
						Cents per Lb.		
Steel bars, merchant...	5	13	to	5	14	1.24	to	1.26
Steel bars, deformed...	5	12	to	5	12½	1.21	to	1.22
Beams, Thomas, British standard	5	2	to	5	7½	1.10	to	1.16
Channels, Thomas, American sections ...	5	15	to	6	0	1.24	to	1.32
Angles, Thomas, 4-in. and larger, over ⅜-in. thick.....	5	6				1.14		
Angles, Thomas, 3-in...	5	14½				1.25		
Ship plates, open-hearth inspected	7	10				1.62		
Hoop and strip steel, over 6-in. base.....	5	16	to	5	18	1.25	to	1.27
Wire, plain, No. 8 gage	7	8½				1.63		
Wire, galvanized, No. 8 gage	9	8½				2.03		
Wire, barbed, 4-pt. No. 12 B.W.G.	11	18½				2.58		
Wire nails, base.....	0	7¾				$1.87	per keg	
Wire nails, assortments, 1 to 6-in. keg.....	10	6½				2.23		

*Open-hearth steel, 10s. ($2.42) per ton extra.

Foreign Iron Ore Prices High

Swedish, Algerian and Spanish Mines Offer Extended Deliveries or Do Not Quote—Japanese Seek Supplies

NEW YORK, Aug. 13.—European demand for iron ore is at the highest peak since the war. Germany and Great Britain have been especially large buyers, and the leading foreign iron ore producers have booked a record tonnage in the first half of this year. North African, Swedish and Spanish mines are under contract for the greater part of their production next year and well into 1931, and are showing little interest in additional business, even at advanced prices. North African mines are either out of the market temporarily or are asking up to 12½c. per unit, c.i.f Atlantic port, with delivery long delayed. Swedish sellers are in most cases not interested in quoting. At these prices sales to consumers in the United States are practically impossible. While the condition of the iron ore market is attributed to a generally heavy demand from European consumers, Germany and Great Britain have been by far the largest buyers, contracting many months ahead. The London office of a large ore selling company, which controls North African mines, has taken contracts for about five times as much tonnage in the first half of the year as in the same period in 1928.

Faced with an inadequate supply of iron ore from the usual leading sources, Japanese consumers are apparently embarrassed. Recently Japanese furnaces have been depending largely upon purchases of iron ore in the Philippines and the Straits Settlements. Some cargoes of Whyalla manganiferous iron ore from the Broken Hill Proprietary Co. properties in Australia have arrived at Baltimore, and the Japanese, willing to pay slight premiums for high-grade ores, are apparently interested in importing from the same mines. However, the total tonnage of this ore available, it is said, is not very large.

The foreign fluorspar market is also strong. Prices have advanced in $19 per net ton, duty paid, Atlantic port, and sellers are unable to offer shipment before the end of November, or early in December. Some of the foreign producers have notified their agents not to accept any business without first consulting them.

European Car Builders' Syndicate Proposed

BERLIN, GERMANY, July 27.—Plans to form a syndicate of European railroad car builders have been modified to include car shops in Czechoslovakia, which are already members of a national association. Other producing countries which have been requested to become members include Austria, Hungary, Italy and Sweden. The aim of the association will be to control competition so as to permit profitable prices.

Despite the recent bank syndicate credit of 100,000,000 m. ($23,800,000) to finance orders of the Railroad Corporation placed with German builders, 90 per cent of which are members of the Wagenbauvereinigung (car builders association), the industry in Germany is depressed. Just prior to the war, Germany had 46 car building plants, which were booking orders averaging 370,000,000 m. a year, or based on post-war values, 500,000,000 m. ($119,000,000) a year. In 1924 there were 69 builders in Germany, but orders aggregated only 155,000,000 m. ($36,890,000). As a result of mergers and liquidations in the past few years, only 30 plants remained when the Railroad Corporation, last year, made a quota agreement with the association. Since then, eight of these have suspended operations.

In addition to the Wagenbauvereinigung, which handles orders from the Railroad Corporation, car builders in Germany have the Deutsche Wagenbau-Industrie (DEUWI), which handles agreements with the street car and other private companies and municipalities. Despite these agreements and associations, the depression of the business is such that it is considered likely that more mergers will be necessary and possibly some liquidations.

Germany Reduces Export Prices to Meet Belgium

BERLIN, GERMANY, July 27.—In the past week the volume of foreign orders has decreased and export prices of steel products have declined. Recently Continental business has been dominated by Belgian mills, which are reported to have diminishing backlogs. The holiday season has influenced the steel market and Far Eastern consumers have been inactive since the beginning of the dispute between Russia and China. With Belgium a keen competitor for new business, the German Stahlwerksverband has again cut its export prices, f.o.b. Antwerp, but even with this reduction, Belgian prices on steel bars are 1s. to 1s. 6d. (24c. to 35c.) a ton lower.

The difference between German and "world market" prices is still considerable. Prices established for August by the Ingot Steel Syndicate, for the purpose of calculating rebates to consumers manufacturing for export, show billets at 119 m. ($28.32) per ton in the domestic market and 108 m. ($25.70) per ton for export; slabs at 124 m. ($29.51) per ton in the domestic market and 108 m. ($25.70) per ton for export and bands at 165 m. per ton (1.75c. per lb.) in the domestic market and 124 m. per ton (1.31c. per lb.) in the export market.

Shipbuilding shows no improvement. In the second quarter of 1929 only 272,444 gross tons of shipping was under construction, compared with 406,000 tons in the first quarter. This decline is attributed to the approaching completion of the construction programs of the leading shipping companies. By mergers and liquidation of certain companies, shipbuilding capacity has been reduced to 650,000 tons, but even with this total there is but little prospect of full operation.

German Automobile Builders Want Higher Tariff

BERLIN, GERMANY, July 27.—The automobile industry continues to urge an increase in the tariff on motor cars to reduce American competition. The duties, which have been automatically reduced since 1925, reached their lowest point in July, 1928. It is claimed by German producers that the United States is driving all competitors out of the German market.

Statistics cited by producers show that in 1924, 19.8 per cent of the motor cars imported were from the United States, 24.5 per cent from France, 19.5 per cent from Austria and 7.6 per cent from Italy. In the first five months of this year, 85.1 per cent of the imports were from the United States, 5.5 per cent from France, 6 per cent from Italy, and 2.1 per cent from Austria. An association of German automobile consumers has been formed, the members of which pledge themselves to "unqualified preference for German cars."

Poland Retains Free List on Machinery

WARSAW, POLAND, July 29.—The Government has continued the free list on imports of machinery for industrial expansion until Dec. 31. Machinery for other purposes, when the machines are not yet produced in Poland, will be admitted at 25 per cent of the established duty. This reduction is also effective until the end of the year. The wire and wire nail industry is expanding rapidly, and, a mill that began operations in July was equipped with 150 wire nail machines, bought in Germany.

Turks to Build Steel Plant

HAMBURG, GERMANY, Aug. 1.—Plans for a Turkish Government steel plant provide for two blast furnaces of 500 tons daily capacity, four 100-ton open-hearth furnaces and bar, rod, shape and wire rod mills. Located near Angora, the plant will have a large supply of iron ore near at hand, but coal will be imported. Further details will be available in September, when bids will be asked on the plant and equipment.

New Record for Half Year Pig Iron

January-June Data Given in Detail on Opposite Page—Exceed Both Halves of 1928

OUTPUT of pig iron and ferroalloys for the first half of this year was the largest for any half-year on record. At 21,820,060 gross tons, it exceeded the previous half-year record of 21,016,475 tons, January to June, 1923, by 803,585 tons. The production to July 1, this year, was also larger than for either half of 1928. It was 3,133,758 tons larger than the first half of 1928, or nearly 17 per cent. Production of ferroalloys was larger than that for either half of last year.

Of the total output of pig iron and ferroalloys, 16,857,189 tons, or 78.7 per cent, was for makers' own use. In the first half of 1928 this percentage was 79.2. Of the total output of foundry pig iron, 1,958,718 tons, or 91.5 per cent, was made for sale. About 53 per cent of the ferromanganese and spiegeleisen was made for makers' own use. This proportion was 58 per cent last year. Again this year the ferromanganese output is not given separately from that of spiegeleisen.

Separate tables on the following page give coke pig iron, charcoal pig iron and ferroalloy production. Compiled by the American Iron and Steel Institute.

High-Speed Machine Threads Pipe Automatically

MILWAUKEE, Aug. 12.—A machine that is declared to be a mechanical marvel of the "giant hand" type and which will automatically thread and handle 600 pieces of pipe an hour was given its final test at West Allis, Wis., Aug. 5, before engineers from some of the largest pipe manufacturing plants in the United States. The machine was designed by Frank M. Davis, Davis & Thompson Co., West Allis, for the Youngstown Sheet & Tube Co. Engineers who saw the demonstration included F. H. Whitman and A. A. Jacel, A. O. Smith Corporation, Milwaukee, with others from the Globe Steel Tubes Co., Milwaukee, the National Tube Co. and Spang Chalfant Co., Pittsburgh.

The machine, which weighs about 25 tons, is 35 ft. long by 8 ft. wide and 7 ft. high. From the time that the pipe is picked up by the conveyor line until it is gripped by the chain and toggle clamping device, threaded and discharged, the operation is automatic and controlled by one man. It was demonstrated as a machine that with one man would do the work of ten or more present machines, each operated by two men. It will cut threads on steel pipe up to 4 in. in diameter.

Dallas Brass & Copper Co. To Build New Units

Three new building units to cost approximately $500,000 will be erected by the Dallas Brass & Copper Co., Chicago. They will consist of a large addition to the brass mill, a building to house the carpenter shop, and a building for the engineering department and machine shop.

The Dallas company, founded in 1907, erected a three-story plant at 820 Orleans Street in 1920, which housed a battery of mills to produce brass and copper strips and sheets. Five years later 12 acres were purchased at Sixty-sixth Street and Grand Avenue, where the first units of the present rolling mills were constructed. Later additional acreage was purchased on which a modern casting shop and complete brass and copper mills are now located. It is here that the new units will be erected. The Orleans plant is now largely devoted to general offices and departments which fabricate brass and copper products and lockseam tubing.

Iron and Steel Plants Draw Little on Foreign Labor

WASHINGTON, Aug. 13.—The limited extent to which the iron and steel industry of the United States now draws upon foreign skilled labor is indicated by the fact that during the fiscal year ended June, 1929, only 1440 immigrants were engaged by the industry. For the previous fiscal year, the total was 1857. These totals become smaller when the number of iron and steel workers emigrating from the United States is taken into account, those departing in the fiscal year 1929 having been 164 as against 326 in the previous fiscal year. Machinists coming to the United States totaled 1629 in the fiscal year 1929, as compared with 2032 in the previous fiscal year, while the numbers emigrating were 472 and 632, respectively.

COMING MEETINGS

August

Society of Automotive Engineers. Aug. 26 to 28. Joint meeting with Aeronautic Chamber of Commerce of the United States, Hotel Hollenden, Cleveland. C. F. Clarkson, 29 West Thirty-ninth Street, New York, general manager.

Conference on Human Relations in Industry. Aug. 28 to Sept. 1. Annual meeting under auspices of National Council of Y. M. C. A., Silver Bay, Lake George, N. Y.

September

Lake Superior Mining Institute. Sept. 6 and 7. Annual meeting, Houghton Club, Houghton, Mich. A. J. Yungbluth, Ishpeming, Mich., secretary.

American Manganese Producers' Association. Sept. 9 and 10. Annual meeting, Mayflower Hotel, Washington. Harold A. Pumpelly, Metropolitan Bank Building, Washington, secretary.

American Society for Steel Treating. Sept. 9 to 13. National metals congress and exposition, Hotel Cleveland and Public Auditorium, Cleveland. W. H. Eisenman, 7016 Euclid Avenue, Cleveland, secretary.

American Institute of Mining and Metallurgical Engineers. Sept. 9 to 13. Annual meeting of Institute of metals and iron and steel divisions, Hotel Cleveland, Cleveland. H. Foster Bain, 29 West Thirty-ninth Street, New York, secretary.

American Society of Mechanical Engineers. Sept. 11 to 13. Iron and steel division, Hotel Hollenden, Cleveland. Calvin W. Rice, 29 West Thirty-ninth Street, New York, secretary.

American Welding Society. Sept. 9 to 12. Fall meeting, Hotel Statler, Cleveland. M. M. Kelly, 33 West Thirty-ninth Street, New York, secretary.

Institute of Metals (British). Sept. 9 to 12. Fall meeting, Düsseldorf, Germany. G. Shaw Scott, 36 Victoria Street, London, S. W. 1, England, secretary.

Iron and Steel Institute (British). Sept. 10 to 13. Fall meeting, Newcastle-on-Tyne, England. George C. Lloyd, 28 Victoria Street, London, S. W. 1, England, secretary.

American Railway Tool Foremen's Association. Sept. 11 to 13. Annual convention, Hotel Sherman, Chicago. F. A. Armstrong, 546 West Monroe Street, Chicago, secretary.

Ohio Foundries Association. Sept. 15. Annual meeting, three-day trip on Ohio River steamer from Cincinnati to Ashland, Ky. E. F. Scott, Cleveland, secretary-manager.

American Electrochemical Society. Sept. 19 to 21. Fall meeting, William Penn Hotel, Pittsburgh. Colin G. Fink, Columbia University, New York, secretary.

American Refractories Institute. Sept. 24 and 25. Fall meeting with Refractories Division of the American Ceramic Society, Deshler-Wallick Hotel, Columbus, Ohio. Dorothy A. Texter, Oliver Building, secretary.

Concrete Reinforcing Steel Institute. Sept. 30 to Oct. 2. Semi-annual meeting, Wawasee Hotel, Wawasee, Ind. M. A. Beeman, 2112 Tribune Tower, Chicago, secretary.

National Industrial Advertisers' Association. Sept. 30 to Oct. 2. Eighth annual convention, Gibson Hotel, Cincinnati. Benjamin H. Miller, 420 Lexington Avenue, New York, secretary.

National Machine Tool Builders' Association. Sept. 30 to Oct. 4. Second machine tool exposition, Public Auditorium, Cleveland. E. F. DuBrul, 617 Vine Street, Cleveland, manager.

National Safety Council. Sept. 30 to Oct. 4. Eighteenth annual congress, Stevens Hotel, Chicago. W. H. Cameron, 108 East Ohio Street, Chicago, managing director.

1929 January-June Output of Pig Iron *(Compiled by American Iron and Steel Institute)*

HALF-YEARLY OUTPUT OF PIG IRON AND FERRO-ALLOYS BY STATES.

HALF-YEARLY PRODUCTION OF PIG IRON BY STATES.*

States.	Blast furnaces. (a)				Production of pig iron not including ferro-alloys—Gross tons.		
	In blast Dec. 31, 1928	June 30, 1929.			First half of 1928.	Second half of 1928.	First half of 1929.
		In	Out	Total			
Massachusetts	1	1	0	1	1,213,685	1,153,205	1,444,109
New York	12	16	7	23			
New Jersey	0	0	2	2			
Pennsylvania	63	71	24	95	5,762,007	6,290,398	7,200,722
Maryland	5	6	0	6			
Virginia	0	0	9	9			
West Virginia	3	3	1	4			
Kentucky	2	2	1	3	938,864	1,043,869	1,039,524
Mississippi	0	0	1	1			
Texas	0	0	1	1			
Tennessee	1	3	4	7			
Alabama	18	17	14	31	1,252,229	1,265,256	1,411,933
Ohio	43	45	12	57	4,296,980	4,720,045	4,972,419
Illinois	17	19	6	25	2,042,079	1,900,333	2,265,105
Indiana	14	16	2	18	2,345,888	2,237,177	2,582,253
Michigan	8	8	2	10			
Wisconsin	0	0	2	2			
Minnesota	2	3	0	3			
Missouri	0	0	2	2	460,609	479,024	488,589
Colorado	3	2	3	5			
Utah	1	1	0	1			
Total	193	213	93	306	18,312,341	19,089,307	21,404,654

(a) Completed and rebuilding pig iron furnaces.

HALF-YEARLY PRODUCTION OF COKE PIG IRON BY STATES.*

Massachusetts	1	1	0	1	1,213,685	1,153,205	1,444,109
New York	12	16	7	23			
New Jersey	0	0	2	2			
Pennsylvania	63	71	24	95	5,762,007	6,290,398	7,200,722
Maryland	5	6	0	6			
Virginia	0	0	9	9			
West Virginia	3	3	1	4	930,246	1,033,735	1,028,248
Kentucky	2	2	1	3			
Tennessee	1	2	4	6			
Texas	0	0	1	1			
Alabama	18	17	14	31	1,252,229	1,265,256	1,411,933
Ohio	43	45	12	57	4,296,980	4,720,045	4,972,419
Illinois	17	19	6	25	2,042,079	1,900,333	2,265,105
Indiana	14	16	2	18	2,275,403	2,183,454	2,526,025
Michigan	4	4	0	4			
Wisconsin	0	0	2	2			
Minnesota	2	3	0	3			
Missouri	0	0	2	2	460,609	479,024	488,589
Colorado	3	2	3	5			
Utah	1	1	0	1			
Total	189	208	90	298	18,233,238	19,025,450	21,337,150

HALF-YEARLY PRODUCTION OF CHARCOAL PIG IRON BY STATES.*

Tennessee	0	1	0	1	79,103	63,857	67,504
Mississippi	0	0	1	1			
Michigan	4	4	2	6			
Total	4	5	3	8	79,103	63,857	,67,504

HALF-YEARLY PRODUCTION OF ALL KINDS OF FERRO-ALLOYS BY STATES.†

New York	1	0	0	0	93,192	102,633	112,999
New Jersey	0	0	0	0			
Pennsylvania	5	8	4	12	185,021	185,176	215,709
Maryland	0	0	0	0			
Virginia	1	1	0	1			
West Virginia	0	0	0	0	29,407	43,019	37,455
Tennessee	0	1	1	2			
Alabama	1	0	0	0			
Ohio	2	2	1	3			
Iowa	0	0	0	0	66,451	49,167	49,243
Colorado	0	0	0	0			
Total	10	‡12	6	‖18	374,071	379,995	415,406

HALF-YEARLY PRODUCTION OF PIG IRON AND FERRO-ALLOYS ACCORDING TO FUEL USED.

Coke pig iron	189	208	90	298	18,233,238	19,025,450	21,337,150
Charcoal pig iron	4	5	3	8	79,103	63,857	67,504
Total pig iron	193	213	93	306	18,312,341	19,089,307	21,404,654
Total ferro-alloys	10	12	6	‡18	†374,071	†379,995	†415,406
Grand total	203	225	99	324	18,686,412	19,469,302	21,820,060

* Does not include the production of ferro-manganese, spiegeleisen, ferro-silicon, or other ferro-alloys.

† Includes ferro-manganese, spiegeleisen, ferro-silicon, and other ferro-alloys made in blast furnaces or in electric furnaces.

‡ During the first half of 1929 there were 18 blast furnaces which made ferro-alloys only or ferro-alloys and pig iron.

‖ Blast furnaces only; electric furnaces not included.

HALF-YEARLY OUTPUT OF PIG IRON BY GRADES AND FERRO-ALLOYS BY KINDS.

HALF-YEARLY PRODUCTION OF BASIC PIG IRON.

States.	First half of 1928.	Second half of 1928.	First half of 1929.
Massachusetts, New York	518,625	632,610	684,597
Pennsylvania—Allegheny County	1,787,345	1,840,625	2,183,721
" Other counties	1,855,362	2,240,235	2,562,927
Maryland, West Va., Kentucky, Ala.	1,141,242	1,236,267	1,402,065
Ohio	2,170,385	2,550,412	2,636,063
Indiana, Illinois	2,781,455	2,394,468	3,015,263
Michigan, Minnesota, Colorado, Utah	461,574	513,805	500,228
Total Gross tons.	10,715,988	11,408,422	12,984,864

HALF-YEARLY PRODUCTION OF BESSEMER AND LOW-PHOSPHORUS PIG IRON.

Pennsylvania	1,784,783	1,826,628	2,032,404
New York, Md., W. Va., Tenn., Ala.	497,099	316,863	482,965
Ohio	1,395,124	1,497,362	1,536,162
Indiana, Illinois	780,748	915,240	892,926
Total Gross tons.	4,457,754	4,556,093	4,944,457
Including low-phosphorus pig iron	160,681	76,125	174,593

HALF-YEARLY PRODUCTION OF FOUNDRY PIG IRON.

Massachusetts, New York	435,834	320,003	297,112
Pennsylvania	247,567	316,941	304,907
Virginia, Kentucky, Tennessee, Ala.	675,140	813,671	714,231
Ohio	285,049	247,180	333,555
Illinois	220,730	226,128	234,078
Michigan	175,303	115,017	164,111
Wisconsin, Minnesota, Colorado, Utah	65,775	65,452	63,176
Total Gross tons.	2,105,398	2,104,392	2,111,170

HALF-YEARLY PRODUCTION OF MALLEABLE PIG IRON.

Massachusetts, New York	106,426	105,701	305,160
Pennsylvania	32,757	53,356	55,117
Ohio	438,420	411,963	454,048
Kentucky, Illinois, Michigan, Minn.	368,996	405,351	459,975
Total Gross tons.	946,599	976,371	1,274,300

HALF-YEARLY PRODUCTION OF FORGE PIG IRON.

Pennsylvania	51,668	12,383	59,369
Virginia, Alabama, Ohio	9,257	15,054	10,802
Total Gross tons.	60,925	27,437	70,171

HALF-YEARLY PRODUCTION OF MISCELLANEOUS GRADES OF PIG IRON AND DIRECT CASTINGS.

New York, Pennsylvania	2,879	947	2,432
Alabama	2,295	4,266	878
Ohio	6,507	7,441	8,069
Indiana, Illinois, Michigan	13,996	3,938	8,313
Total Gross tons.	25,677	16,592	19,692

HALF-YEARLY PRODUCTION OF FERRO-ALLOYS BY KINDS.

Ferro-manganese and spiegeleisen	205,073	214,140	232,769
Ferro-silicon	152,389	151,206	160,786
Ferro-phos. and all other ferro-alloys	16,609	14,649	21,851
Total Gross tons.	374,071	379,995	415,406

PIG IRON AND FERRO-ALLOYS MADE FOR SALE OR FOR USE OF MAKERS IN THE FIRST SIX MONTHS OF 1929.

Pig iron and ferro-alloys.	For sale.	For maker's use.	Total. Gross tons.
Pig iron:			
Basic	1,155,923	1,828,941	12,984,864
Bessemer and low-phosphorus	239,976	4,704,481	4,944,457
Foundry	1,958,718	152,452	2,111,170
Malleable	1,153,818	120,482	1,274,300
Forge or mill	38,158	32,013	70,171
White and mottled, direct castings, etc.	872	18,820	19,692
Total pig iron Gross tons.	4,547,465	16,857,189	21,404,654
Ferro-alloys:			
Ferro-manganese and spiegeleisen	108,707	124,062	232,769
Ferro-silicon	160,786	.....	160,786
All other ferro-alloys	21,851	.....	21,851
Total ferro-alloys Gross tons.	291,344	124,062	415,406
Total pig iron and ferro-alloys Gross tons.	4,838,809	16,981,251	21,820,060

This Issue in Brief

Eliminates hot spots in galvanizing tanks by using electric heat. Tests reveal that solubility of the steel in the tank increases sharply at temperatures above 900 deg. Fahr. Thus the uniformity of electric heat lengthens the life of tank.—Page 404.

* * *

Rapid loss of heat is a difficult problem in forging seamless steel drums. Cooling rate may be reduced by heating the mandrel. Heat loss may be cut still further by employing a hollow mandrel. —Page 400.

* * *

Aluminum foundry uses X-ray to find hidden defects. Testing laboratories form a part of the plant itself, as analyses are regularly made of test bars drawn from each heat.—Page 406.

* * *

Flaws in duralumin parts are revealed by anodic oxidation process. Surface defects which would otherwise be unnoticed are exposed when oxide film is applied. The film is primarily designed to guard parts against corrosion.—Page 409.

* * *

Iron castings to be enameled should not contain over 3.7 per cent carbon. Otherwise the carbon content may cause the enamel to become transparent, uneven, and defective in other respects.—Page 412.

* * *

To improve rolling qualities of open-hearth free-cutting steel, increase the manganese content. The steel rolls much better with manganese about 1.25 per cent, rather than the usual 0.60 to 0.80 per cent.—Page 399.

* * *

Cooling conveyors carrying castings have baskets with bottoms turned up at an angle of 90 deg. on each side. This makes it easier to dump the contents.—Page 396.

Reduces rejections of blooms for cold-drawing bars from 20 per cent to less than 5 per cent by increasing manganese content to 1.25 per cent. The opinion that higher manganese content would induce brittleness and hardness was found to be erroneous.—Page 399.

* * *

Galvanizing dross reduced to a minimum by accurate control of temperature and by uniform temperature throughout the tank. This is made possible by use of electric heat. Lower galvanizing costs result from lower dross, longer tank life, and elimination of firing labor.—Page 404.

* * *

Solution of making steel which is free from seams and slivers lies between excessive care in handling and rolling the ingots after teeming, and the production of a tough metal that will roll without great care. In tonnage operations the latter is preferred, because it allows greater blooming mill production.—Page 399.

* * *

Saves 75 per cent of floor space by using vertical core ovens. Chevrolet core-making department has 16 vertical ovens 45 ft. high. Coremaker sets his own cores in the oven, taking out an empty tray. This eliminates the use of racks and the provision of aisles.—Page 397.

* * *

Airplane engine crankshafts are serial-stamped before and after machining. The steel forging is first heat treated, then inspected for flaws and stamped with a serial number. Spots are ground for hardness test. After rough milling the cheek edges, the serial number is re-stamped. —Page 402.

Sherardizes aircraft steel parts to prevent rusting. British aircraft builders believe sherardizing to be superior to rustproofing by electro deposition of zinc. —Page 409.

* * *

Waste molding sand is economically removed by mixing with water. A hydraulic pump, connecting with a 5-in. line, delivers the sand to a dump.—Page 396.

* * *

Galvanizing tank failures are reported to operator by alarm signal. Brick work underneath the tank is shaped so that leaking zinc will accumulate and sound alarm by closing circuit of two heat-resisting wires.—Page 405.

* * *

Sudden raise in discount rate will not force business curtailment, says economist. Tight money does not necessarily affect business quickly. In the long run, however, continued high money rates will force either business expansion or credit policy to give way.—Page 393.

* * *

Chromium plating practice favors sulphuric acid as a substitute for chromic sulphate, owing to high purity obtainable, says English metallurgist. The concentration of sulphuric acid in the solution has to bear a fixed relationship to the chromic acid content.—Page 394.

* * *

"Poor man's refrigerator," heated on gas stove, freezes cubes for 24 hours on two cents worth of gas. Freezing unit, after heating on gas stove, is placed in refrigerator. Units, made of welded stampings, are now in quantity production.—Page 410.

A. I. FINDLEY
Editor

THE IRON AGE

W. W. MACON
Managing Editor

ESTABLISHED 1855

Mergers and the "American System"

PRESIDENT HOOVER gave much prominence in his campaign speeches to the "American system." In stressing the importance of individual initiative and private enterprise, he struck a sympathetic chord in a people not far removed from pioneer days. One of our most cherished beliefs is that American progress has been chiefly due to the absence of frozen social classes and to the energizing force of ambition in all ranks of life.

How has the American system fared since its distinguished exponent took office? If invasion of business by the Government is made the test, it can be said that there has been little change. If all factors that influence the economic independence of the individual are considered, the answer is quite different. The trend toward business consolidations has become more pronounced. While the resulting corporate organizations are in private hands, the individual's freedom of action is being further circumscribed. In food products, for example, mergers of manufacturing companies are being tied up with nation-wide chain store organizations, with the logical outcome—if the scheme should be developed to finality—of cutting off independent retailers from sources of supply and depriving ultimate consumers of choice in buying.

Strange to say, the general public is as firmly convinced of the merit of consolidations as it was certain of their menacing character two decades ago. It sees in large-scale business the road to efficiency and the answer to increased competition. Promoters have capitalized the belief, floating the stock issues of mergers of all descriptions and incidentally reaping a harvest.

It is not to be gainsaid that consolidations appear to be justified in certain fields—for instance, in the production of rolled steel—but by no means are they always sound and economic. It must also be borne in mind that promoters are sometimes guilty of sharp practice. Profits claimed for consolidations are not always to be taken at face value; they may be obtained temporarily—and until stock is unloaded on the public—by cutting off so many necessary items of expense as to do irreparable injury.

If for the sake of argument it be granted that all consolidations are to survive, even those milked dry by promoters, the social implications of such a result would still be serious. Large-scale business demands large-scale financing, of which relatively few banking houses are capable. Thus it is not hard to envisage a great network of mammoth organizations controlled by a small group. That would be a far cry from the American system. It would reduce the mass of the population to cogs in a big business machine; it would provide little more stimulus to initiative than state socialism.

Fortunately so sweeping a change in our economic structure is not an early prospect. While size in business is a compelling factor in some directions, management will always be a more decisive influence. In the last analysis men rather than systems determine the destinies of industrial and commercial enterprises. Our greatest business successes have been traceable to executive ability of the first order. One need mention only Ford, Carnegie, Gary, DuPont and Rockefeller. Mergers may cause still more concern to champions of the American system before the trend of our economic development becomes clearly defined. Yet it may be confidently predicted that in the future, as in the past, many large businesses will retrograde and many small businesses will prosper and grow great.

Mounting Steel Records

IN the latter part of last year the steel industry began making new records covering 12-month periods. Production is now running so far above that of a year ago that a fresh reference to the subject is justified each month. In THE IRON AGE of July 11, it was noted that steel ingot production in 311 working days through last June totaled 54,675,000 tons. Now we find that production in the 12 months, 311 working days, through July was approximately 55,570,000 tons. Nearly 900,000 tons was added to the record of 12 consecutive months in a single month's time, and this month is altogether likely to add half a million tons more, making the 12-month total, September to August inclusive, fully 56,000,000 tons.

Prior to last year the largest output for 12 consecutive months was 47,000,000 tons, in the 12 months through May, 1927. The gain over that in the 12-month period just ended is 18.2 per cent, in 26 months, which represents a rate of increase of 8 per cent per annum. Contrasted with that annual increase are annual rates of 2 per cent from 1920 to 1923 and 3 per cent from 1923 to 1928.

Chances are that production will now taper off somewhat from last month's rate, but should next December be 13 per cent under July it would still equal December, 1928. When such a decrease would still leave a heavy production it must be considered a possibility, but there is ground for concern as to the influence it might have upon the minds of sellers, anxious to preserve the low average costs per ton that have been made lately by exceptionally heavy output.

Some of the influences that have brought about the 18 per cent increase from the 12 months through May, 1927, to the 12 months through July, 1929, are visible. Comparing the same 12-month periods, automobile production—cars and trucks in the United States and Canada—increased from 4,289,700 to approximately 5,800,000, or by 35 per cent. Fabricated structural steel shipments increased from 3,009,150 tons to approximately 3,400,000 tons, or by 13 per cent. Production of line pipe made a large increase. The increase in production of agricultural implements has been substantial.

The changes have not all been gains, however. Probably there has been a slight decrease in rails, and comparing these precise periods there may have been a slight decrease in freight car building. As the visible increases do not cover the total steel increase it is clear that there have been large gains in other lines of steel consumption not here considered.

Traits of the Prize-Winners

EDISON'S competitive examination for testing the brains of picked high school boys has acted much like Lindbergh's flight of May, 1927, as a stimulus to young manhood all over the country. Also, both the West Orange examinations and the Paris flight have demonstrated that, whatever the oncoming generation is casting away that the preceding one set store by, the two are not far apart in the standards they set up for prize-winners. Traits that have been admired in Lindbergh and young Huston, the winner of the Edison scholarship, are old-fashioned ones that have given Coolidge and Hoover so strong a hold on the people—common sense, a certain reserve, ability in any situation to do what the circumstances require, and a marked preference for knowing and doing over declaring. Popular approval of this last trait is encouraging when there is so much touting of "self-expression" and the go-getter salesman is to so many people the symbol of success.

Some of the Edison questions, especially the one asking how one marooned on an island and without tools would move a three-ton boulder so many feet horizontally and vertically, recall the scholarship established at Worcester Polytechnic Institute last year. It was to be awarded to the entering freshman who had shown the greatest amount of Yankee ingenuity; and at once it had to be determined what constitutes "Yankee ingenuity." Various definitions came from professors and practical men, but none was more fit than that of Frederick W. Shibley, New York, who identified it with "the inherent ability to solve a knotty problem in a simple and ingenious way, to accomplish a difficult mechanical job without employing the customary tools."

Mr. Shibley's definition recalls what the late James Gayley used to ask for when, as vice-president of the United States Steel Corporation, he advised the deans of various technical schools along in the spring of the year that the corporation was interested in prospective graduates who had shown special promise. In describing the type of men sought he wrote that scholarship, of course, was expected, but he was not looking for grinds. Rather he wanted the man who had in himself resources for overcoming unexpected difficulties; one who, if he met with a breakdown in taking a load of grain from the farm to town could make a tie-up of fence-rail and harness take the place of the broken wheel and with no outside help get the load to the mill.

More Copper to Come from Africa

DEVELOPMENT of the important copper properties in Central Africa continues apace. Large and very rich deposits of oxide ores have been mined for some years at Katanga, in the Belgian Congo, and the mines, smelters and refining plants are now operated according to the most modern practices. Yet, as we have heretofore pointed out, many factors have conspired to prevent a rapid expansion in the output of these bonanzas. If such a mine as the Star of the Congo could be opened in Montana or Arizona, its influence on world production and on the copper market would be almost immediate. But Katanga is in Central Africa; the haul is nearly 1800 miles by rail to port, and 9000 miles more by ship to any important customer. This isolation means not only expense in exporting the product to market, but also great expense for importing the necessary equipment, technicians and supplies. Furthermore, the African savage is not a particularly efficient workman, and the labor turnover is large. Lastly, coal and coke are 500 miles away.

These statements are not made to belittle the economic importance of the deposits in the Belgian Congo, but to cite some of the tremendous difficulties which have already been surmounted, and which have operated to restrict the production. Some of them will always be a brake on production; some are being eliminated, at least in part. For instance, a railroad is being built from Katanga to the west coast; 840 miles of the 1170 is already finished, with a motor truck road spanning the gaps. This new outlet will save 600 miles rail and 2600 miles of sea transport and correspondingly reduce time and expense of getting in and getting out.

A serious metallurgical difficulty at Katanga is the fact that practically all the ore is oxidized; little sulphide exists. This handicap will also be removed in the near future, for just across the boundary in Rhodesia great bodies of medium grade copper sulphides have been found. These can be mixed with the rich oxides and smelted to a matte (a more economical proceeding than reducing oxide direct to impure copper), and the sulphur can also be converted into sulphuric acid for leaching and refining purposes.

Under the circumstances, therefore, one can expect operations in the Belgian Congo to expand within the next few years, producing more copper and getting it to the market with more profit.

These new discoveries in Rhodesia are of great interest in themselves, beside the influence they will exert on operations at Katanga. Systematic prospecting of a region approximately 100 miles in diameter has brought to light five deposits, in which surface trenching and diamond drilling have proved up at least 75,000,000 tons of ore containing 3.5 per cent copper, with 200,000,000 tons additional classed as "probable ore." The ore is all within a few hundred feet of

the surface, in thick beds, easily mined. Prominent American engineers have been retained to design mills and smelters. It is estimated that Roan Antelope, one of the early discoveries, will be producing copper early in 1931, and in 1932 will put out 30,000,000 pounds of copper, at a cost slightly over 8 cents a pound. This is only one of five.

What these vast ore reserves and additions to smelting capacity will mean to the price and consumption of red metal needs no lengthy expounding. A mining region rivalling Arizona will be built up in Central Africa during the next decade. The relative amount of world's copper coming from this new center will steadily increase, at the expense of high-cost producers in the United States and elsewhere. It will be a powerful influence to keep the price of copper down to a moderate figure; and uses and consumption will continue to expand in the degree that the price is reduced. Cheaper copper means more used.

Chances of Coal Trade Betterment

SEVEN years ago occurred the great bituminous coal strike, bringing to general attention the fact that the coal trade was in an uneconomical position and quite lacking in efficiency to help itself and serve the public. The cry was "too many mines and too many miners" and the United States Coal Commission was set up to ascertain all the facts. This it did in thorough manner, but nothing happened at Washington. The coal trade was left to economic laws which every one recognized would work quite mercilessly to many if not all in the industry.

The fact that seven years have passed without the coal industry becoming righted does not prove that substantial improvement is impossible. Things have been slowly happening, without apparent result, but a great deal had to occur if the remedy were to be found. There are chances now that the coal trade is on the verge of an improvement, hardly a large one but one that would be very welcome considering the very poor position it has been in over so many years.

Quite a number of mines have disappeared from the practical reckoning and would not be brought into the producing ranks by any moderate upturn in prices obtainable. In number of miners there has been a large decrease. The Pittsburgh district is particularly a case in point, for in its union days it had altogether too many miners, and many men were brought in during the operation of changing the district to a non-union status. About two months ago opinions began to be expressed that miners were not plentiful in the district, while now there are definite reports that really good miners, men able to get out the tonnage and familiar with the mining laws, are actually scarce, that some large producers would like to have more good miners than they can secure. Many men have drifted into other occupations, this movement being facilitated by the general industrial and building activity.

The recent course of coal production indicates a heavy demand, although there has been no stocking and movement of domestic coal has not yet reached proportions that would count. Production in the last few months has been well above 1928, far above 1927, and only a trifle below 1926. It is true that after July 1 production in 1926 rose sharply, under stocking against the expected union suspension of April 1, 1927, showing a large leeway in available capacity; but three years later appearances are that the supply of miners is not nearly so large.

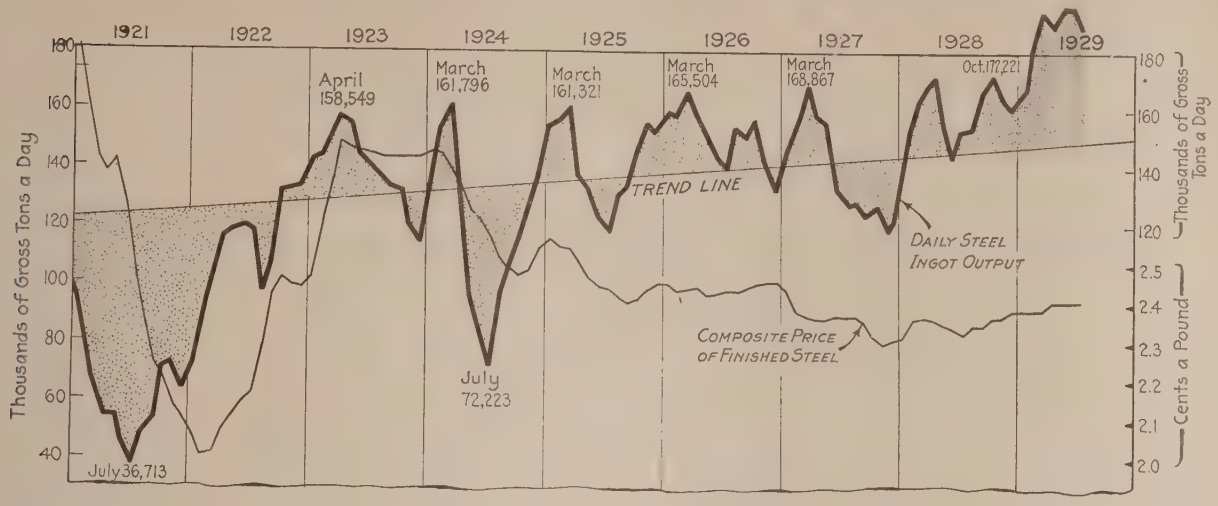
The human element may prove to be quite a factor. There has been a buyers' market in coal for so long that conditions are set for a possible reversal of buyers' policy. The very fact of conditions having so long been strongly in favor of buyers would make a firm, not to say a strong, coal market quite impressive. Selling of coal has appeared to be very difficult, and really has been, but the proportion of total production thus forced upon an unwilling market has not been large, producers in general having a large trade that takes care of itself.

Chicago Uses Steel Armoring to Obtain Longer Wearing Street Surface

CHICAGO has installed a section of Pavegard 10 ft. wide and 120 ft. long at the corner of Michigan Avenue and Randolph Street, one of its busiest corners, to obtain longer wearing surface at this point where the traffic burden is exceptionally heavy. This section has to withstand the stopping impact every 24 hr. of 1600 buses and 67,000 other vehicles which pass the corner in the course of a day.

Pavegard is made of steel strips which, when placed on edge, form a regular pattern or mesh. The accompanying illustration shows the method of assembling Pavegard. The tie-rods hold the strips together in a solid web or mesh, strips being alternately staggered at joints to preserve the continuity of the mat. In the Chicago installation, Pavegard has a 3-in. mesh, the bars being 1¼ in. deep. This was assembled on a concrete base, to which was added a binder of tar and gravel. The Pavegard was then asphalted in with topping and rolled, as is customary with this kind of pavement. Pavegard, which is manufactured by the Blaw-Knox Co., Pittsburgh, is characterized as a "steel armoring" for roads, streets and other lanes of traffic subjected to unusual wear.

Ingot Production in July Declined 4.7 Per Cent from the Record-Breaking Daily Rate of May. The trend line shows a normal growth of about 1,013,000 tons a year. Prices in July were 3 per cent better than at midyear of 1928



Largest July in Steel Ingot Production

Output Slightly More Than Previous Six Months Average—Year So Far 18 Per Cent Ahead of 1928

PRODUCTION of steel ingots in July declined from that of June, but it was the largest for any July. It was slightly ahead of the average of the preceding six months. It brought the year to date 18.2 per cent above the corresponding seven months of 1928.

At 4,838,093 gross tons for all companies, the decline from June was 43,277 tons, or less than 1 per cent. On a daily rate basis at 186,080 tons, the July rate was 9222 tons, or 4.7 per cent, under the record high of May. Output of July, 1928, the previous high July, was 3,805,598 tons, or more than 1,000,000 tons below July, 1929.

Open-hearth production in July fell off 1.7 per cent from that of June. Bessemer output, however, increased 4.4 per cent over June, but is still under May. However, in both May and July, the Bessemer output was 14.2 per cent of the total reported.

These data relate to open-hearth and Bessemer ingots only, because electric and crucible steel ingots are not now reported monthly by the institute. In 1928 ingots of these two types of steel amounted to 460,208 tons. This figures out to an average of about 1480 tons a day. Some such total would have to be added to each of the recent daily averages to obtain the total quantity of steel ingots made by American furnaces.

Particulars for the past 19 months are shown in the table. The diagram traces the course of ingot production and finished steel prices over the past eight years and seven months.

PRODUCTION OF OPEN-HEARTH AND BESSEMER STEEL INGOTS
(GROSS TONS)

1928 Months	Reported by Companies Which Made 94.51 Per Cent of the Steel Ingots in 1928		Calculated Monthly Output All Companies	No. of Working Days	Approximate Daily Output All Companies
	Open-Hearth	Bessemer			
January	3,273,294	498,691	3,990,902	26	153,496
February	3,300,407	521,250	4,043,457	25	161,738
March	3,692,648	567,330	4,507,217	27	166,934
April	3,505,104	564,110	4,305,382	25	172,215
May	3,394,301	582,128	4,207,212	27	155,823
June	3,010,341	528,193	3,743,903	26	143,996
July	3,068,257	528,588	3,805,598	25	152,224
Seven months	23,244,352	3,790,290	28,603,671	181	158,031
August	3,379,625	569,771	4,178,610	27	154,763
September	3,375,654	544,710	4,147,893	25	165,916
October	3,795,800	599,098	4,649,968	27	172,221
November	3,442,112	590,669	4,266,835	26	164,109
December	3,301,114	496,679	4,018,208	25	160,728
Total	40,538,657	6,591,217	49,865,185	311	160,338
1929					
January	3,694,218	549,616	4,490,354	27	166,309
February	3,599,224	489,279	4,326,000	24	180,250
March	4,183,869	596,691	5,053,258	26	194,548
April	4,026,576	640,351	4,938,025	26	189,924
May	4,276,186	707,484	5,273,167	27	195,302
June	3,990,798	622,585	4,881,370	25	195,255
July	3,922,532	649,950	4,838,093	26	186,080
Seven months	27,693,403	4,255,956	33,805,267	181	186,769

Iron and Steel Employment Rose in June

WASHINGTON, Aug. 13.—While employment in manufacturing industries in June declined 0.4 per cent and the payroll totals fell off 1.9 per cent as compared with May, employment in 206 iron and steel establishments rose to 286,815 from 286,103, a gain of 0.2 per cent while the weekly payroll declined 1.8 per cent to $9,415,266, from $9,590,202, according to the Bureau of Labor Statistics, Department of Labor. With the monthly average for 1926 equaling 100, the bureau's weighted index of employment in manufacturing industries for June, 1929, was 98.8 as compared with 99.2 for May and 93.1 for June, 1928. The weighted index of payroll totals for June of the present year was 102.8 as compared with 104.8 for May and 94.2 for June of last year.

Iron and Steel Markets

Steel Output Continues to Taper

Production Shows Further Slight Decline as Mill Backlogs Undergo Seasonal Reduction—Alabama Pig Iron Sold at $12.50

SEASONAL curtailment is making itself felt in the steel industry, but thus far the chief effects have been a decline in backlogs and a shortening of deliveries. Production has shown little reduction and the downward trend is not marked.

With the two largest steel producers still operating at close to rated ingot capacity, most of the loss in output is accounted for by other mills. In the Greater Pittsburgh district the total falling off since the first of the month is estimated at 5 per cent, and similar recessions are reported in some other centers. Chicago, on the other hand, reflecting an unusual demand for plates for pipe manufacture, continues to produce steel at a capacity rate.

The return to hand-to-mouth buying, heretofore mainly evident in lighter rolled products, is being more widely felt. At Pittsburgh, deliveries on shapes and bars can now be made in two or three weeks. This change is not necessarily of great significance. The experience of the industry in recent years is ample proof that a high rate of output can be maintained without heavy forward obligations. Undoubtedly the vacation season, now at its height, is also a factor in delaying purchasing programs.

The growth of miscellaneous uses for mill products has made it more difficult to gage the trend of steel consumption. At the same time the wide diversification of demand makes for a more even flow of business, with increased consumption in some directions tending to neutralize declines in others.

Among new outlets for steel the most outstanding in its stabilizing influence is the manufacture of pipe for gas and oil lines. This factor has been most important at Chicago, where steel bookings for the week were the sixth largest so far this year.

While the sharply reduced requirements of the automobile industry, the largest single consuming group, are not to be overlooked, Cleveland reports an upturn in specifications from a number of motor car makers who are bringing out new models. Whether this can be taken as an augury of general recovery in automotive demand is uncertain, in view of the large stocks of used cars reported in dealers' hands.

Railroads placed 75 per cent of the fabricated steel work awarded during the week, which totaled 43,000 tons. Outstanding transactions were 14,500 tons for two Pennsylvania Railroad bridges across the Hackensack River in New Jersey and 9400 tons for a New York subway section. Fresh inquiries call for 42,000 tons, of which 16,000 tons is for railroad and highway bridges.

The railroad equipment market is also more active, with new inquiries out for 1300 freight cars.

Rail production, now at 75 per cent at Chicago—an unusually high rate for August—will shortly undergo a seasonal reduction, which, however, is expected to be the last downward revision of schedules before the fall buying movement sets in. Seasonal curtailment in tin plate output is also looked for.

Aside from the more general prevalence of $2.40, Pittsburgh or Cleveland, on plain wire, steel prices have undergone no further change. The sharp gain in profits that has accompanied peak production is recognized, however, as a temptation to press for tonnage to the detriment of price stability.

Pig iron demand has improved at St. Louis, with buying of 25,000 tons of basic grade, and in the New York district, with sales of 22,000 tons. Foundry melt is well sustained except in the South, where the reduced operations of cast iron pipe makers are a factor, and in the Central West, where the declining requirements of the automotive industry are felt. Shipments from some northern Ohio blast furnaces are running 15 to 20 per cent under those of July.

Aggressive selling of Alabama iron has further accentuated competition in Northern markets. Southern foundry iron is now being freely quoted at $13, Birmingham, for deliveries in the Chicago district, and that price has been shaded 50c. a ton in one large transaction. The attention of Southern producers has also been turned to Europe, following the receipt of inquiries for pig iron for shipment to Italy.

Heavy melting scrap at Pittsburgh has advanced 50c. a ton on a large sale to a consumer. In face of this evidence of strength, shipments have been held up by two users and rejections are more frequent.

Steel ingot production in July, at 4,838,093 tons, was a record for that month, exceeding the previous July peak, last year, by more than 1,000,000 tons. The daily rate for July, at 186,080 tons, represented a decline of 4.7 per cent from the record rate of May, but was slightly higher than the average for the preceding six months. Output for the first seven months of the year was 18 per cent larger than for the corresponding period in 1928.

THE IRON AGE composite price for finished steel declined to 2.398c. a lb., from 2.412c., the figure at which it has held since March. The pig iron composite remains for the second week at $18.42 a gross ton.

A Comparison of Prices

Market Prices at Date, and One Week, One Month and One Year Previous, Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron, Per Gross Ton:	Aug. 13, 1929	Aug. 6, 1929	July 16, 1929	Aug. 14, 1928
No. 2 fdy., Philadelphia	$21.26	$21.26	$21.76	$20.26
No. 2, Valley furnace	18.50	18.50	18.50	16.50
No. 2 Southern, Cin'ti	17.69	17.69	17.69	19.19
No. 2, Birmingham	14.50	14.50	14.50	15.50
No. 2 foundry, Chicago*	20.00	20.00	20.00	17.50
Basic, del'd eastern Pa.	19.75	19.75	20.25	19.00
Basic, Valley furnace	18.50	18.50	18.50	16.00
Valley Bessemer, del'd P'gh.	20.76	20.76	20.76	18.76
Malleable, Chicago*	20.00	20.00	20.00	17.50
Malleable, Valley	19.00	19.00	19.00	17.00
Gray forge, Pittsburgh	19.76	19.76	19.76	18.01
L. S. charcoal, Chicago	27.04	27.04	27.04	27.04
Ferromanganese, furnace	105.00	105.00	105.00	105.00
Rails, Billets, etc., Per Gross Ton:				
Rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Light rails at mill	36.00	36.00	36.00	36.00
Rerolling billets, Pittsburgh	35.00	35.00	35.00	32.00
Sheet bars, Pittsburgh	35.00	35.00	35.00	32.00
Slabs, Pittsburgh	35.00	35.00	35.00	32.00
Forging billets, Pittsburgh	40.00	40.00	40.00	38.00
Wire rods, Pittsburgh	42.00	42.00	42.00	42.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.85	1.85	1.85	1.90
Finished Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Bars, Pittsburgh	1.95	1.95	1.95	1.90
Bars, Chicago	2.05	2.05	2.05	2.00
Bars, Cleveland	1.95	1.95	1.95	1.85
Bars, New York	2.29	2.29	2.29	2.24
Tank plates, Pittsburgh	1.95	1.95	1.95	1.90
Tank plates, Chicago	2.05	2.05	2.05	2.00
Tank plates, New York	2.22½	2.22½	2.22½	2.17½
Structural shapes, Pittsburgh	1.95	1.95	1.95	1.90
Structural shapes, Chicago	2.05	2.05	2.05	2.00
Structural shapes, New York	2.19½	2.19½	2.19½	2.14½
Cold-finished bars, Pittsburgh	2.30	2.30	2.30	2.10
Hot-rolled strips, Pittsburgh	1.90	1.90	1.90	1.75
Cold-rolled strips, Pittsburgh	2.75	2.75	2.75	2.90

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

Finished Steel,	Aug. 13, 1929	Aug. 6, 1929	July 16, 1929	Aug. 14, 1928
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 24, P'gh	2.85	2.85	2.85	2.65
Sheets, black, No. 24, Chicago dist. mill	*2.95*	3.05	3.05	2.75
Sheets, galv, No. 24, P'gh	3.50	3.50	3.60	3.40
Sheets, galv., No. 24, Chicago dist. mill	*3.60*	3.80	3.80	3.60
Sheets, blue, No. 13, P'gh	2.35	2.35	2.35	2.10
Sheets, blue, No. 13, Chicago dist. mill	2.45	2.45	2.45	2.20
Wire nails, Pittsburgh	2.55	2.55	2.65	2.55
Wire nails, Chicago dist. mill	2.60	2.60	2.70	2.60
Plain wire, Pittsburgh	*2.40*	2.50	2.50	2.40
Plain wire, Chicago dist. mill	*2.45*	2.55	2.55	2.45
Barbed wire, galv., Pittsburgh	3.20	3.20	3.30	3.20
Barbed wire, galv., Chicago dist. mill	3.30	3.30	3.35	3.25
Tin plate, 100 lb. box, P'gh	$5.35	$5.35	$5.35	$5.25
Old Material, Per Gross Ton:				
Heavy melting steel, P'gh	**$19.25**	$18.75	$18.50	$15.50
Heavy melting steel, Phila	16.50	16.50	16.50	13.00
Heavy melting steel, Ch'go	**15.00**	14.75	14.75	12.75
Carwheels, Chicago	14.00	14.00	14.00	12.75
Carwheels, Philadelphia	16.50	16.50	16.50	15.50
No. 1 cast, Pittsburgh	15.50	15.50	15.50	14.50
No. 1 cast, Philadelphia	16.50	16.50	16.50	15.50
No. 1 cast, Ch'go (net ton)	14.50	14.50	14.50	14.00
No. 1 RR. wrot., Phila	16.00	16.00	16.00	13.50
No. 1 RR. wrot., Ch'go (net)	**14.00**	13.50	13.50	11.00
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$2.75	$2.75	$2.75	$2.75
Foundry coke, prompt	3.75	3.75	3.75	3.75
Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents*	Cents
Lake copper, New York	18.12½	18.12½	18.12½	14.75
Electrolytic copper, refinery	17.75	17.75	17.75	14.50
Tin (Straits), New York	*46.37½*	47.25	47.25	48.25
Zinc, East St. Louis	6.80	6.80	6.70	6.25
Zinc, New York	7.15	7.15	7.05	6.60
Lead, St. Louis	6.55	6.55	6.55	6.00
Lead, New York	6.75	6.75	6.75	6.20
Antimony (Asiatic), N. Y.	8.75	8.75	8.25	10.00

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Pittsburgh

Notable Activity in Plates, Sheets and Cold-Rolled Strip —Advances in Scrap

PITTSBURGH, Aug. 13.—Steel operations in this and nearby districts have not declined materially in the last week and the total falling off since the first of the month probably does not amount to 5 per cent. As the industry entered August running at an average of about 95 per cent of capacity, such a decline amounts to very little when applied to aggregate production of steel. However, the tendency toward curtailment is continuing and there is no longer any doubt of the fact that the long delayed period of summer retrenchment is beginning. It is equally true that the curtailment is much less pronounced than usual and that the steel industry is in a much more prosperous condition than it ordinarily is at this time of the year.

The volume of specifications so far this month seems to be less than July, although notable exceptions are plates, sheets and cold-rolled strip. The leading sheet maker has received shipping orders in August at a higher rate than during July and one or two leading independents report similar activity. Other companies have felt the slump in automotive demand more severely and the Ford Motor Co. is the only one of the larger motor car builders which has not reduced its steel requirements. One or two important automobile makers are now getting into production on new models, but the steel industry as a whole is not feeling any appreciable increase in the requirements of this important consuming channel. The notable thing about steel demand at this time is its wide diversification and sustained strength in the face of declining requirements by the largest consuming industry.

Sheet mills in the district have at least a month's operations scheduled and the same is now true of cold-rolled strip, for which demand seems to have improved in the last two weeks. This has resulted in stronger prices and the market is again quotable at 2.75c. to 2.85c., Pittsburgh. Sheet prices are not quotably weaker, and although the market is still soft, some makers are taking a firmer stand on prices. Wire nails are weak, but in this district this softness has not extended to wire products. In other lines prices are holding at the quoted levels.

Sales of billets, slabs and sheet bars have been made at $35, Pittsburgh, and although mills have contract business on their books at lower figures for billets and slabs, the market on spot tonnages is not less than $35.

The pig iron market is dull, sales being confined almost entirely to small tonnages for immediate shipments. Contract shipments are not so heavy as they were in July and some stacks are beginning to build up stocks again.

The scrap market has developed added strength in the last week, a large tonnage of No. 1 heavy melting steel having been sold at $19.50. This is an advance of 50c. a ton over recent levels and strength is also reflected in other grades of scrap.

Pig Iron.—Buying is at a standstill with the exception of small tonnages, usually required for immediate shipment. A few lots of basic iron have been sold since the first of the month,

but no purchases of more than 1000 tons have been reported. Large users of basic iron have sufficient tonnage on contract to last them for several weeks, and fill-in orders are few and far between. Shipments are keeping up fairly well but are not as heavy as they were last month. The dullness of the market is beginning to be reflected in growing furnace stocks, and in no case are local or Valley stacks building up their backlogs. Howeyer, it seems fairly certain that large tonnages of iron will be placed in September for delivery during the closing months of the year, particularly if foundry activity is accelerated by that time. The price situation is the brightest spot in the market, with all quotations apparently holding. Basic and foundry iron are being sold regularly in small lots at $18.50, Valley, and malleable and Bessemer are unchanged at $19. The local Pittsburgh furnace is quoting prices 50c. above these levels.

Prices per gross ton, f.o.b. Valley furnace:

Basic	$18.50
Bessemer	19.00
Gray forge	18.00
No. 2 foundry	18.50
No. 3 foundry	18.00
Malleable	19.00
Low phos., copper free	27.00

Freight rate to Pittsburgh or Cleveland district, $1.76.

Prices per gross ton, f.o.b. Pittsburgh district furnace:

Basic	$19.00
No. 2 foundry	19.00
No. 3 foundry	18.50
Malleable	19.50

Freight rates to points in Pittsburgh district range from 63c. to $1.13.

Semi-Finished Steel.—Production of crude steel has not declined very much in this district, but the requirements of non-integrated finishing mills are not as large as they were, and larger companies are having their first opportunity in several months to build up their reserves of this material. It is probable that open-hearth production will not fall far below recent levels during August, as the taking out of a few furnaces by the smaller companies does not seriously affect the total output of the district, particularly when this output is at such high levels. Spot sales of semi-finished steel are not frequent, but the larger consumers are getting steel regularly on contract, in some cases at the same prices which prevailed during the second quarter. However, the $35, Pittsburgh or Youngstown, quotation seems to be holding on current small tonnages and if there have been contract renewals on billets and slabs at a lower figure the transactions have been made very quietly. On sheet bars the contract price was not changed, having remained at $35. Shipments of wire rods are holding up fairly well, although a few consumers who make products going largely to the automotive industry are not quite so active. The price is well established at $42, Pittsburgh or Cleveland.

Bars, Shapes and Plates.—The heavy hot-rolled products are still accounting for the high production schedules in many mills, but shipping orders on bars and shapes have declined to a point where an improvement in business will soon be necessary if this condition is to be continued. Most mills can make deliveries on bars and shapes in two or three weeks. Demand for bars is rather well diversified and the requirements of cold-finishing departments show no further curtailment. Structural awards in the district are not heavy, but a fair amount of bridge work is being placed from time to time and 1300 tons of steel was recently taken for an addition to the United States Aluminum plant at New Kensington, Pa. Considerable prospective work, which has not reached the stage of definite inquiry, is before the trade, and with the large fabricating shops in the district operating at a high rate, the outlook is generally favorable. Plate business is still exceeding all expectations and current shipping orders allow mills little opportunity to improve on deliveries. However, consumers are more farsighted than they were earlier in the year in making known their requirements and the pressure for deliveries is abating to some extent. Prices seem to be holding on the general run of business, the quotation on bars, shapes and plates being 1.95c., Pittsburgh.

Rails and Track Supplies.—The market is now without sizable inquiries, although the New York, New Haven & Hartford has not fully closed against its recent inquiry for accessories. Specifications are gradually tapering off, but supplementary purchases are being made from time to time and the market is not entirely devoid of activity. Prices are generally satisfactory, although the $36, Pittsburgh, price on light rails from billets is occasionally being shaded $2 a ton to meet the competition of the rerolled product.

Bolts, Nuts and Rivets.—Demand is keeping up unusually well for this time of the year and the industry is probably operating at about 60 per cent of capacity. Railroad car builders in the district are still taking large tonnages, although the railroads themselves have become less active as buyers. Demand from the jobbing industry is keeping up. Prices are well established at 70 per cent off list for bolts and nuts and $3.10 per 100 lb., Pittsburgh, for large rivets.

Wire Products. — Shipments of manufacturers wire show little if any decline from July levels and are considerably ahead of the usual average for this time of the year. Present specifications indicate little curtailment in the near future. On plain wire for manufacturing purposes prices are holding at 2.50c. to 2.60c., Pittsburgh. Reports of shading these quotations on wire for jobbers are not confirmed in this district. The nail market is unchanged, with prices weak and demand quiet. On the general run of business the ruling quotations range from $2.55 to $2.65 per keg.

Tubular Goods.—Lap-weld mills in this and the Valley district are now fairly well scheduled for several weeks and the position of seamless units is even better. No large pipe line awards have been reported during the last week, but the largest of these projects, a line running into Chicago from the Texas Panhandle, is expected to be placed this month. Other large prospective jobs seem to be in a rather indefinite state. Specifications for mechanical tubing have

The Iron Age Composite Prices

Finished Steel

Aug. 13, 1929, 2.398c. a Lb.

One week ago	2.412c.
One month ago	2.412c.
One year ago	2.348c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products make 87 per cent of the United States output of finished steel.

	High		Low	
1929	2.412c.,	April 2;	2.391c.,	Jan. 8
1928	2.391c.,	Dec. 11;	2.314c.,	Jan. 3
1927	2.453c.,	Jan. 4;	2.293c.,	Oct. 25
1926	2.453c.,	Jan. 5;	2.403c.,	May 18
1925	2.560c.,	Jan. 6;	2.396c.,	Aug. 18

Pig Iron

Aug. 13, 1929, $18.42 a Gross Ton

One week ago	$18.42
One month ago	18.54
One year ago	17.04
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low	
1929	$18.71,	May 14;	$18.29,	March 19
1928	18.59,	Nov. 27;	17.04,	July 24
1927	19.71,	Jan. 4;	17.54,	Nov. 1
1926	21.54,	Jan. 5;	19.46,	July 13
1925	22.50,	Jan. 13;	18.96,	July 7

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base per Lb.
F.o.b. Pittsburgh mill	1.95c.
F.o.b. Chicago	2.05c.
Del'd Philadelphia	2.27c.
Del'd New York	2.29c.
Del'd Cleveland	1.92½c. to 1.95c.
F.o.b. Cleveland	1.90c. to 1.95c.
F.o.b. Lackawanna	2.05c.
F.o.b. Birmingham	2.15c.
C.i.f. Pacific ports	2.35c.
F.o.b. San Francisco mills	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills, 40, 50, 60-ft.	2.05c.
F.o.b. Pittsburgh mills, cut lengths	2.30c.
F.o.b. Birmingham, mill lengths	2.15c.

Rail Steel

F.o.b. mills, east of Chicago dist.	1.85c. to 1.90c.
F.o.b. Chicago Heights mill	1.95c.
Del'd Philadelphia	2.27c.

Iron

Common iron, f.o.b. Chicago	2.05c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	2.12c.
Common iron, del'd New York	2.14c.

Tank Plates

	Base per Lb.
F.o.b. Pittsburgh mill	1.95c.
F.o.b. Chicago	2.05c.
F.o.b. Birmingham	2.15c.
Del'd Cleveland	2.14c.
Del'd Philadelphia	2.15c.
F.o.b. Coatesville	2.05c.
F.o.b. Sparrow Point	2.05c.
F.o.b. Lackawanna	2.05c.
Del'd New York	2.22½c.
C.i.f. Pacific ports	2.35c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh mill	1.95c.
F.o.b. Chicago	2.05c.
F.o.b. Birmingham	2.15c.
F.o.b. Lackawanna	2.05c.
F.o.b. Bethlehem	2.05c.
Del'd Cleveland	2.14c.
Del'd Philadelphia	2.01c. to 2.06c.
Del'd New York	2.14½c.
C.i.f. Pacific ports	2.35c.

Hot-Rolled Hoops, Bands and Strips

	Base per Lb.
6 in. and narrower, P'gh	2.00c.
Wider than 6 in., P'gh	1.90c.
6 in. and narrower, Chicago	2.20c.
Wider than 6 in., Chicago	2.10c.
Cooperage stock, P'gh	2.20c.
Cooperage stock, Chicago	2.30c.

Cold-Finished Steel

	Base per Lb.
Bars, f.o.b. Pittsburgh mill	2.30c.
Bars, f.o.b. Chicago	2.30c.
Bars, Cleveland	2.35c.
Shafting, ground, f.o.b. mill	*2.65c. to 3.60c.
Strips, P'gh	2.75c. to 2.85c.
Strips, Cleveland	2.75c. to 2.85c.
Strips, del'd Chicago	3.05c. to 3.15c.
Strips, Worcester	2.90c. to 3.00c.
Fender stock, No. 20 gage, Pittsburgh or Cleveland	4.25c.

*According to size.

Wire Products

(Carload lots, f.o.b. Pittsburgh and Cleveland, to jobbers and retailers.)

	Base per Keg
Wire nails	$2.55 to $2.65
Galvanized nails	4.55 to 4.65
Galvanized staples	3.25 to 3.35
Polished staples	3c. to 3.10c.
Cement coated nails	$2.55 to $2.65

	Base per 100 Lb.
Bright plain wire, No. 6 to No. 9 gage	$2.40 to $2.50
Annealed fence wire	2.55 to 2.65
Spring wire	3.50 to 3.60
Galv'd wire, No. 9	3.00 to 3.10
Barbed wire, galv'd	3.20 to 3.30
Barbed wire, painted	2.95 to 3.05
Woven wire fence (per net ton to retailers)	65.00

Chicago district mill and delivered Chicago prices are $1 per ton above the foregoing. Birmingham mill prices $3 a ton higher; Worcester, Mass. (wire), mill $3 a ton higher on production of that plant; Duluth, Minn., mill $2 a ton higher; Anderson, Ind., $1 higher.

Cut Nails

	Per 100 Lb.
Carloads, Wheeling, Reading or Northumberland, Pa.	$2.70
Less carloads, Wheeling or Reading	2.80

Light Plates

No. 10, blue annealed, f.o.b. P'gh.	2.10c. to 2.20c.
No. 10, blue annealed, f.o.b. Chicago dist.	2.30c.
No. 10, blue annealed, del'd Phila.	2.42c. to 2.52c.
No. 10, blue annealed, B'ham	2.35c.

Sheets

Blue Annealed

	Base per Lb.
No. 13, f.o.b. P'gh	2.25c. to 2.35c.
No. 13, f.o.b. Chicago dist.	2.45c.
No. 13, del'd Philadelphia	2.67c.
No. 13, blue annealed, B'ham	2.50c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh	2.85c.
No. 24, f.o.b. Chicago dist. mill	2.95c. to 3.05c.
No. 24, del'd Philadelphia	3.17c. to 3.27c.
No. 24, f.o.b. Birmingham	3.00c. to 3.10c.

Metal Furniture Sheets

No. 24, f.o.b. P'gh	4.10c. to 4.20c.

Galvanized

No. 24, f.o.b. Pittsburgh	3.50c. to 3.60c.
No. 24, f.o.b. Chicago dist. mill	3.60c. to 3.70c.
No. 24, del'd Cleveland	3.59c. to 3.69c.
No. 24, del'd Philadelphia	3.92c. to 4.02c.
No. 24, f.o.b. Birmingham	3.75c. to 3.85c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.90c. to 3.00c.
No. 28, f.o.b. Chicago dist. mill	3.00c. to 3.10c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh	4.10c.

Long Ternes

No. 24, 8-lb. coating, f.o.b. mill	4.00c.

Vitreous Enameling Stock

No. 24, f.o.b. Pittsburgh	3.90c.

Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills	$5.35
Standard cokes, f.o.b. Gary	5.45

Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)
(Per Package, 20 x 28 in.)

8-lb. coating I.C.	$11.20
15-lb. coating I.C.	14.00
20-lb. coating I.C.	15.30
25-lb. coating I.C.	$16.70
30-lb. coating I.C.	17.75
40-lb. coating I.C.	19.85

Alloy Steel Bars

(F.o.b. makers' mill)

Alloy Quality Bar Base, 2.65c. to 2.75c. per Lb.

S.A.E. Series Numbers		Alloy Differential
2000	(1½% Nickel)	0.25
2100	(1½% Nickel)	0.55
2300	(3½% Nickel)	1.50
2500	(5% Nickel)	2.25
3100	Nickel Chromium	0.55
3200	Nickel Chromium	1.35
3300	Nickel Chromium	3.80
3400	Nickel Chromium	3.20
4100	Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50
4100	Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600	Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel)	1.05
5100	Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100	Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100	Chromium Spring Steel	0.20
6100	Chromium Vanadium Bars	1.20
6100	Chromium Vanadium Spring Steel	0.95
9250	Silicon Manganese Spring Steel (flats)	0.25
	Rounds and squares	0.50
	Chromium Nickel Vanadium	1.50
	Carbon Vanadium	0.95

Above prices are for hot rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is ¾c. per lb. higher. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis.

Billets under 4 x 4 in. carry the steel bar base. Slabs with a sectional area of 16 in. or over carry the billet price. Slabs with sectional area of less than 16 in. or less than 2½ in. thick, regardless of sectional area, take the bar price.

Rails

	Per Gross Ton
Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	36.00
Light (from rail steel), f.o.b. mill	34.00
Light (from billets), f.o.b. Ch'go mill	36.00

Track Equipment

	Base per 100 Lb.
Spikes, ⅝ in. and larger	$2.80
Spikes, ½ in. and smaller	2.80
Spikes, boat and barge	3.00
Tie plate, steel	2.15
Angle bars	$2.75
Track bolts, to steam railroads	$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel Inches	Black	Galv.	Iron Inches	Black	Galv.
⅛	45	19½	¼ and ⅜	+11	+36
¼ to ⅜	51	25½	½	23	5
½	56	42½	¾	28	11
¾	60	48½	1 and 1¼	31	15
1 to 3	62	50½	1½ and 2	35	18

Lap Weld

2	55	43½	2	23	9
2½ to 6	59	47½	2½ to 3½	28	13
7 and 8	56	43½	4 to 6	30	17
9 and 10	54	42½	7 and 8	29	16
11 and 12	53	40½	9 to 12	26	11

Butt Weld, extra strong, plain ends

⅛	41	24½	¼ and ⅜	+13	+48
¼ to ⅜	47	30½	½	23	7
½	53	42½	¾	28	12
¾	58	47½	1 to 2	34	18
1 to 1½	60	49½			
2 to 3	61	50½			

Lap Weld, extra strong, plain ends

2	53	42½	½	29	13
2½ to 4	57	46½	2½ to 4	34	20
4½ to 6	56	45½	4½ to 6	33	19
7 to 8	52	39½	7 and 8	31	17
9 and 10	45	32½	9 to 12	21	8
11 and 12	44	31½			

On carloads the above discounts on steel pipe are increased on block by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Steel		Charcoal Iron	
2 in. and 2¼ in.	40	1½ in.	1
2½ in.—2¾ in.	48	1¾ in.	8
3 in.	54	2 in.—2¼ in.	13
3¼ in.—3¾ in.	56	2½ in.—2¾ in.	16
4 in.	59	3 in.	17
4½ in. to 6 in.	48	3¼ in. to 3½ in.	18
		4 in.	20
		4½ in.	21

On lots of a carload or more, the above base discounts are subject to a preferential of two fives on steel and of 10 per cent on charcoal iron tubes. Smaller quantities are subject to the following modifications from the base discounts:

Lap Welded Steel—Under 10,000 lb., 6 points under base and one five; 10,000 lb. to carload, 4 points under base and two fives. Charcoal Iron—Under 10,000 lb., 2 points under base; 10,000 lb. to carload, base and one five.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	63	3 in.	48
1¼ to 1½ in.	55	3½ to 3½ in.	50
1¾ in.	39	4 in.	53
2 to 2¼ in.	34	4½, 5 and 6 in.	42
2½ to 2¾ in.	42		

Hot Rolled

2 and 2¼ in.	40	3¼ to 3½ in.	56
2½ and 2¾ in.	48	4 in.	59
3 in.	54	4½, 5 and 6 in.	48

Beyond the above base discounts a preferential discount of 5 per cent is allowed on carload lots. On less than carloads to 10,000 lb., base discounts are reduced 4 points with 5 per cent preferential; on less than 10,000 lb., base discounts are reduced 6 points, with no preferential. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage take mechanical tube list and discounts. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30%, base (carloads)	55
Carbon, 0.30% to 0.40%, base	50

Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

fallen off slightly in recent weeks on account of a lighter demand from the automobile industry. Boiler tubes are moving steadily.

Sheets.—Reports of current sheet demand are mixed. While at least one large producer has had shipping orders thus far in August slightly ahead of the daily average during July, a number of others report declines in specifications. The Ford Motor Co. seems to be the only large automobile maker which has not reduced its requirements in recent weeks, although one or two large interests are now getting into production on new models. However, demand is diversified and mills generally have sufficiently large backlogs on most of the finishes to assure a high rate of production for a month or more. On the blue annealed product delivery promises are extended for six or eight weeks. Some makers of automobile body sheets have caught up on their commitments and are able to make comparatively prompt shipments. The leading interest is operating its sheet mills at about 96 per cent of capacity and the larger independents average from 90 to 95 per cent. Prices have not achieved stability, but the tendency toward weakness is not so pronounced as it was two or three weeks ago. The galvanized product is quotable at 3.50c. to 3.60c., Pittsburgh, and black at 2.85c. Lower figures are reported occasionally, but are not common enough to be representative of the market. Light plates are unchanged at 2.10c. to 2.20c., the lower figure representing the competition of wide strip mills which are occasionally making even lower quotations. No deviations from the 2.35c., Pittsburgh, price on blue annealed sheets, No. 13 gage, are reported in this district. Tin mill black plate is still quotable at 2.90c. to 3c., Pittsburgh.

Tin Plate.—The market is exceedingly quiet, but week to week business is still sufficient to justify a high rate of operation. The leading interest is running its mills at about 86 per cent of capacity and at least two of the larger independents are at a somewhat higher rate. However, future prospects are not particularly good and the decline in container manufacturers' requirements which is to be expected at this time of the year will hardly be delayed much longer. Crop reports are mixed and tin plate makers are wondering whether the somewhat exaggerated estimates made by the canning companies on some crops will be offset by improvement in other lines.

Strip Steel.—Hot-rolled strip mills are in need of business and the light demand of recent weeks is beginning to be reflected in decreased operations. Specifications continue to decline and expected improvement from the automobile industry has not yet made itself felt. On the cold-rolled product, however, demand is considerably better and shows indications of continued improvement. Some makers have their mills scheduled for several weeks at close to capacity and shipments are more extended than they were a month ago. Cold-rolled strip prices are also continuing the recent tendency toward firmness. The market is again quotable at 2.75c. to 2.85c., Pittsburgh, as mills are again taking small tonnages at the higher price. On hot-rolled recent quotations are holding.

Cold-Finished Steel Bars.—This market is rather quiet, but demand is keeping up fairly well. Shipments can be made in about two weeks, with longer periods occasionally required for special sizes. With the exception of the automobile industry, there has been little decline in the requirements of the more important consuming lines and stocks of jobbers as well as makers are low. The price is holding at 2.30c., Pittsburgh.

Coal and Coke.—Production of furnace coke in the Connellsville district has declined slightly during the last week and the number of ovens in operation has dropped under the 3000 mark for the first time since early summer. Steel companies which were forced to supplement their own coke production by purchases in the open market at the time of heavy spring and early summer activity are now holding up shipments and further curtailment in the Connellsville region will probably be necessary to adjust supply to demand. Prices are holding at $2.75 to $2.85 per ton, Connellsville, with quotations 10c. to 15c higher asked for future delivery. The foundry coke market is dull with little buying and reduced shipments. Prices are soft on all except the premium grades which are firm at $4.85, ovens. Coal production is slightly higher in the West Virginia and Kentucky fields, and to a lesser extent in Ohio and western Pennsylvania. Prices are still badly demoralized.

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.25c.
Hoops	4.25c.
Black sheets (No. 24), 25 or more bundles	3.80c.
Galv. sheets (No. 24), 25 or more bundles	4.55c.
Light plates, blue ann'l'd (No. 10), 1 to 10 plates	3.45c.
Blue annealed sheets (No. 13), 1 to 10 sheets	3.60c.
Galv. corrug. sheets (No. 28), per square	$4.43
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count,	60 per cent off list
Machine bolts, 100 count,	60 per cent off list
Carriage bolts, 100 count,	60 per cent off list
Nuts, all styles, 100 count,	60 per cent off list
Large rivets, base per 100 lb.	$3.50
Wire, black soft ann'l'd, base per 100 lb.	$3.00 to 3.10
Wire, galv. soft, base per 100 lb.	3.00 to 3.10
Common wire nails, per keg	2.90 to 3.00
Cement coated nails, per keg	3.05

Old Material.—The scrap market has justified the strength of recent weeks, and No. 1 heavy melting steel is now quotable at $19 to $19.50 on the basis of a sale of several thousand tons to a Pittsburgh district consumer at the latter quotation. Hydraulic compressed sheets are also slightly stronger, small sales having been made at $18.60 to $18.75, representing an advance of 25c. over recent levels. This material is exceptionally scarce just now. The strength of the heavy melting steel market is also reflected in the high prices reported on the recent railroad lists, as a Youngstown dealer is said to have paid $19.75 for the Baltimore & Ohio list to be shipped to a consumer in a nearby district. The Pennsylvania list apparently did not bring quite this much, but went at a figure which fully justifies the strength of the market. Good steel is apparently very hard to pick up in this district, and with most mills demanding the highest quality product, railroad steel is practically governing present market prices. Other grades of steel are also stronger. Short shoveling steel turnings have been sold at $14 and perhaps higher, and machine shop turnings have advanced 50c. to a range of $13 to $13.50. Similar advances have been made in rails and also in specialties. In spite of the strength of the market, a number of bearish factors are at work. Holdups are in effect at at least two points and rejections are more frequent, particularly on grades of scrap which have been advancing most rapidly in the last few weeks. A number of large consumers are not buying, and the market is sustained by the high prices paid by two or three mills which are operating at capacity and requiring heavy shipments of scrap.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$19.00 to $19.50
No. 2 heavy melting steel	16.50 to 17.00
Scrap rails	18.50 to 19.00
Compressed sheet steel	18.50 to 18.75
Bundled sheets, sides and ends	17.00 to 17.50
Cast iron carwheels	16.50 to 17.00
Sheet bar crops, ordinary	20.00 to 20.25
Heavy breakable cast	13.00 to 13.50
No. 2 railroad wrought	19.00 to 19.50
Hvy. steel axle turnings	16.50 to 17.00
Machine shop turnings	13.00 to 13.50
Acid Open-Hearth Grades:	
Railr. knuckles and couplers	22.00 to 22.50
Railr. coil and leaf springs	22.00 to 22.50
Rolled steel wheels	22.00 to 22.50
Low phos. billet and bloom ends	23.00 to 23.50
Low phos., mill plates	23.00 to 23.50
Low phos., light grades	20.50 to 21.50
Low phos., sheet bar crops	20.50 to 21.50
Heavy steel axle turnings	16.50 to 17.00
Electric Furnace Grades:	
Low phos., punchings	20.00 to 21.00
Hvy. steel axle turnings	16.50 to 17.00
Blast Furnace Grades:	
Short shoveling steel turnings	13.50 to 14.00
Short mixed borings and turnings	12.50 to 13.00
Cast iron borings	12.50 to 13.00
Rolling Mill Grades:	
Steel car axles	21.50 to 22.00
Cupola Grades:	
No. 1 cast	15.00 to 16.00
Rails 3 ft. and under	20.00 to 21.00

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and under 10 in., Pittsburgh	$35.00
Rerolling, 4-in. and under 10 in., Youngstown	35.00
Rerolling, 4-in. and under 10 in., Cleveland	35.00
Rerolling, 4-in. and under 10 in., Chicago	37.00
Forging quality, Pittsburgh	$40.00 to 41.00

Sheet Bars

(Open Hearth or Bessemer)

	Per Gross Ton
Pittsburgh	$35.00
Youngstown	35.00
Cleveland	35.00

Slabs

(8 in. x 2 in. and under 10 in. x 10 in.)

	Per Gross Ton
Pittsburgh	$35.00
Youngstown	35.00
Cleveland	35.00

Skelp

(F.o.b. Pittsburgh or Youngstown)

	Per Lb.
Grooved	1.85c. to 1.90c.
Universal	1.85c. to 1.90c.
Sheared	1.85c. to 1.90c.

Wire Rods

(Common soft, base)

	Per Gross Ton
Pittsburgh	$42.00
Cleveland	42.00
Chicago	43.00

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.80
Old range non-Bessemer, 51.50% iron	4.65
Mesabi Bessemer, 51.50% iron	4.65
Mesabi non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.40

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algerian	12.00c.
Iron ore, low phos., Swedish, average 68% iron	11.00c.
Iron ore, basis Swedish, average 65% iron	10.00c. to 11.00c.
Manganese ore, washed, 52% manganese, from the Caucasus	33.00c.
Manganese ore, Brazilian, African or Indian, basic 50%	33.00c.
Tungsten ore, high grade, per unit, in 60% concentrates	$16.25 to $16.50
	Per Gross Ton
Chrome ore, 45 to 50% Cr_2O_3, crude, c.i.f. Atlantic seaboard	$22.00 to $24.00
	Per Lb.
Molybdenum ore, 85% concentrates of MoS_2, delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$2.75 to $2.85
Foundry, f.o.b. Connellsville prompt	3.75 to 4.85
Foundry, by-product, Ch'go ovens	8.00
Foundry, by-product, New England, del'd	11.00
Foundry, by-product, Newark or Jersey City, delivered	9.00 to 9.40
Foundry, by-product, Phila.	9.00
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry by-prod., del'd St. Louis	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.25 to $1.75
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, ¾-in. f.o.b. Pa. mines	1.90 to 2.00
Mine run gas coal, f.o.b. Pa. mines	1.65 to 1.75
Steam slack, f.o.b. W. Pa. mines	80c. to 90c.
Gas slack, f.o.b. W. Pa. mines	1.00 to 1.10

Ferromanganese

	Per Gross Ton
Domestic, 80%, seaboard	$105.00
Foreign, 80%, Atlantic or Gulf port, duty paid	105.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$31.00 to $34.00
Domestic, 16 to 19%	29.00 to 32.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$83.50
75%	130.00

	Per Gross Ton Furnace		Per Gross Ton Furnace
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	45.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton Furnace		Per Gross Ton Furnace
10%	$30.00	12%	$34.00
11%	32.00		

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton Furnace		Per Gross Ton Furnace
6%	$23.00	10%	$27.00 to $28.00
7%	24.00	11%	29.00 to 30.00
8%	25.00	12%	31.00 to 32.00
9%	26.00		

Other Ferroalloys

Ferrotungsten, per lb. contained metal del'd	$1.40 to $1.50
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.15 to $3.65
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	$160.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton	$91.00
Ferrophosphorus, electric 24%, f.o.b. Anniston, Ala., per gross ton	$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silicon, gravel, f.o.b. Illinois and Kentucky mines	$18.00
No. 2 lump, Illinois and Kentucky mines	20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	$18.25 to $18.75
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines	32.50

Fire Clay Brick

	Per 1000 f.o.b. Works	
	High-Heat Duty Brick	Intermediate Heavy Duty Brick
Pennsylvania	$43.00 to $46.00	$35.00 to $38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	.....
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00
Standard size	45.00

Chrome Brick

	Per Net Ton
Standard size	$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts, blank or tapped, hexagons	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	7.00c. to 6.75c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled thread up to and including ⅛ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagons nuts	70
Semi-finished hexagons castellated nuts, S.A.E.	70
Stove bolts in packages, P'gh	75, 20, 10 and 5
Stove bolts in packages, Chicago	75, 20, 10 and 5
Stove bolts in packages, Cleveland	75, 20, 10 and 5
Stove bolts in bulk, P'gh	75, 20, 10, 5 and 2½
Stove bolts in bulk, Chicago	75, 20, 10, 5 and 2½
Stove bolts in bulk, Cleveland	75, 20, 10, 5 and 2½
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55, 60 per cent apply.

Large Rivets

(½-In. and Larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$3.10
F.o.b. Chicago	3.20

Small Rivets

(⅞-In. and Smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70 and 10
F.o.b. Cleveland	70 and 10
F.o.b. Chicago	70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10 and 5
Milled standard set screws, case hardened	80 and 5
Milled headless set screws, cut thread	75 and 10
Upset hex. head cap screws, U.S.S. thread	85
Upset hex. cap screws, S.A.E. thread	85
Upset set screws	80, 10 and 5
Milled studs	70

Chicago

Specifications and Shipments in Balance—Plate Business, Partly for Pipe, Notably Heavy

CHICAGO, Aug. 13.—New orders for plates have again come to the fore to bring total sales of finished steel for the week to the sixth largest so far this year. Purchases of other steel commodities were also in good volume, this being especially true of bars. Pipe making accounts for the bulk of the plate tonnage, which is coming at an opportune time—midway between the third and fourth quarters.

Current specifications are fully equal to shipments and steel mill output remains at capacity. Mill stocks of cold iron are unusually small and scrap is playing an important role in ingot production.

Chicago rail mills will adjust schedules downward in the next ten days. Orders at hand, however, will sustain the then current operations until such time as producers can reasonably expect additional business for immediate rolling.

The Northern Pacific has ordered 300 flat cars and the Central of Georgia will buy 500 box cars. Evidence is stronger that additional purchases are to be made in the early fall.

Agricultural implement manufacturers are holding to a steady pace in production and they look forward with confidence, anticipating that high prices for farm products will sustain the farmers' buying power.

Little can be said of the structural market other than it is proving more active than had been anticipated by the trade. Current lettings are in fair volume, affording shops steady operations but no opportunity to build satisfying backlogs.

The iron and steel price structure is unaltered from a week ago. Quotations on the heavy tonnage commodities are steady while less certainty can be given to prices for wire and sheet mill products. Deliveries are improving, not so much on the score of lighter specifications but on account of the greater ease with which semi-finished steel can be allotted to finishing departments. With the change in this situation, local mills are again taking interest in small and miscellaneous tonnages, often fitting them into current rollings and so giving prompt deliveries.

Ferroalloys. — Shipments of these commodities remain in good volume but new buying is dull. Spiegeleisen is quoted $32 to $34 a ton, Hazard, Pa., and ferromanganese at $105 a ton, seaboard.

Prices delivered Chicago: 80 per cent ferromanganese, $112.56; 50 per cent ferrosilicon, $83.50 to $88.50; spiegeleisen, 19 to 21 per cent, $40.76.

Pig Iron. — Chicago prices for Northern foundry iron are firm at $20 a ton, local furnaces. New buying is in good volume, as melters continue to seek tonnages for delivery over the remainder of the year. A user in South Bend, Ind., will buy 1500 tons. Shipments are running a shade higher than in July. Relining of an Iroquois furnace has been set back and it is estimated now that this stack cannot be blown in before Sept. 1. Unexpected repairs have become necessary to the Federal furnace A and it was taken out of service Aug. 13 to be out until the first of the month. Merchant furnaces now in blast include two Iroquois, one Federal and Zenith stack at Duluth. The silvery market is quiet, as is also the charcoal iron market. Prices for Southern iron are weak.

Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	$20.00
N'th'n No. 1 fdy., sil. 2.25 to 2.75	20.50
Malleable, not over 2.25 sil.	20.00
High phosphorus	20.00
Lake Super. charcoal, sil. 1.50	27.04
So'th'n No. 2 fdy. (all rail)	$19.01 to 20.01
Low phos., sil. 1 to 2, copper free	29.50
Silvery, sil. 8 per cent	29.79
Bess. ferrosilicon, 14-15 per cent	46.29

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Structural Material. — Awards for the week total close to 5000 tons and fresh inquiry more than makes up the tonnage withdrawn from the pending lists. The Chicago, Milwaukee, St. Paul & Pacific has ordered 2000 tons for new car shops at Milwaukee and 1200 tons for grade elimination work. J. B. French & Co. has the general contract for a 31-story garage for Chicago and about 3000 tons of steel will be needed for a power-house at Powerton, Ill. On the whole, structural shops are operating not far from a normal summer rate. Their backlogs are not large but the inflow of new business is ample to hold output at a steady rate. Shops have had little opportunity to build up stocks of steel and are dependent on mill deliveries for their needs.

Mill prices on plain material, per lb.: 2.05c. base, Chicago.

Bars. — Current specifications for mild steel bars are fully equal to shipments and local mills continue to produce at capacity. Demand from automobile and parts makers is steady, with some indication, according to the local trade, that improvement is not far in the future. Price reductions in some lines of automobiles are stimulating sales. On the other hand, some dealers find sales slow and the used car problem a serious one. Agricultural implement manufacturers hold to a steady rate of output and look forward to the future with confidence. There is a general feeling that notwithstanding small crops the higher prices obtained for them will sustain the farmers' buying power and assure an active fall demand for farm machinery. The alloy steel bar market shows little change from a week ago. Spot buying is in fair size and specifications are in such volume that deliveries still range three to four weeks. There is a substantial demand for iron bars, part of which is no doubt brought about by the delivery situation in mild steel bars, these being two products which can be interchanged in many instances. Specifications for rail steel bars are a shade above shipments and deliveries range three to four weeks. The bed industry holds to a high rate of output and barn equipment manufacturers are enjoying a good mid-summer business. Interest in fence posts foretells the end of the summer lull in demand for this commodity.

Wire Products.—New orders for wire and nails are larger at the new levels of prices. August shipments continue to average larger than a year ago and wire mills are holding to a production rate of 65 per cent of capacity. Output still overbalances shipments, affording producers an excellent opportunity to round out stocks which they believe will be needed for the fall trade. Automobile manufacturers are taking steady quantities of wire. Jobbers from most parts of the country report a good summer demand except for woven wire fencing and steel posts.

Cold-Rolled Strip. — Specifications are in smaller total volume and barely support output at the new rate of 65 per cent of capacity. Producers' backlogs are large but the consumption of cold-rolled strips is undergoing a gradual decline. Prices are steady at 2.75c. to 2.85c. a lb., Cleveland, or 3.05c. to 3.15c. a lb., delivered Chicago.

Rails and Track Supplies.—Local rail mills, now producing at 75 per cent of capacity, will revise their schedules downward in the next ten days, but it is expected that this will be the last reduction necessary before fall purchases. There is some promise that a substantial tonnage will soon be bought for delivery this year. The Northern Pacific, which is in need of 15,000 tons, has not yet made definite inquiry. The light rail market is inactive. New purchases and fresh inquiry for track fastenings are the lowest in many weeks.

Prices f.o.b. mill, per gross ton: Standard section open-hearth and Bess. rails, $43; light rails, rolled from billets, $36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.15c.; angle bars, 2.75c.

Cast Iron Pipe.—This market shows some improvement from the viewpoint of a larger volume of orders from contractors. Public inquiries and lettings are few and far between, with no indication now that conditions will improve in the immediate future. Warren Township, Mich., is reported to have placed 100,000 ft. of 6 and 8-in. pipe with the American Cast Iron Pipe Co., and Castlewood, S. D., has

awarded 10,000 ft. of 4 and 6-in. pipe to the McWane Cast Iron Pipe Co. The United States pipe company has taken 90,000 ft. of 6 and 8-in. pipe for Hamilton County, Ohio, and Simmons & Co., Bloomington, Ill., are low bidders at Peoria, Ill., where 500 tons of pipe and fittings will be needed for a sewage disposal plant.

Prices per net ton, del'd Chicago: Water pipe, 6-in. and over, $45.20 to $46.20; 4-in., $49.20 to $50.20; Class A and gas pipe, $3 extra.

Sheets.—New business remains at a high level, with prices generally stable, with the exception of quotations on the galvanized commodity. Local producers expect to open fourth-quarter books in about two weeks. Light tank makers entered small specifications this week, while locker manufacturers are taking sheets in quantities which indicate capacity output. Shipments to the jobbing trade are lighter, a condition not unusual in the late summer.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 3.10c.; No. 24 galv., 3.65c. to 3.75c.; No. 10 blue ann'l'd, 2.35c. Deliv'd prices at other Western points are equal to the freight from Gary, plus the mill prices, which are 5c. per 100 lb. lower than Chicago delivered prices.

Plates.—Prospects for additional railroad car business are good. Inquiries definitely in the market call for over 20,000 tons of steel exclusive of wheels and axles. The Chicago & North Western is asking for prices on 150 tram cars and will revive an old proposition involving 1000 to 2500 freight cars. The Santa Fe will take bids on 200 underframes and, according to reports, will buy cars in the early fall. The Southern lines of the Southern Pacific are said to be near the point of asking for prices. Although car orders were large in the first half of this year, the railroads have not benefited from these purchases to the extent that they had expected. Car shops, starting with small organizations, found the labor problem a serious one. Mill deliveries through the spring and to midsummer further retarded car building programs, with the net result that deliveries from shops have been slower than anticipated. Movement of grain in the Missouri Valley States and the demand for cars for bulk loading of materials is placing a strain on the supply of box cars suitable for grain loading and on the supply of gondola type of cars. Two users of oil storage tanks have placed orders that aggregate 4000 tons. The tanks will be fabricated in Chicago shops and shipped to the West and the Southwest. Fresh inquiry is for not less than 7000 tons, on which local shops are bidding. Pending business now totals over 12,000 tons. Oil storage tank business this year has been much more uniform than it was in 1928. On the whole the demand for plates is heavy and in the aggregate sales of finished steel during the week plate tonnage looms large. Deliveries cover a wide range. Plates in some specifications cannot be had in less than nine to 12 weeks. The average on miscellaneous lots is six to eight weeks. Producers east of Chicago promise shipments in two to three weeks. More satisfactory allotment of semi-finished steel to finishing departments is enabling local mills to take odd lots and to give good deliveries when orders fit into rolling schedules.

Reinforcing Bars.—Awards during the week totaled close to 1500 tons, including 800 tons for a local office building and 450 tons for a Chicago public school. Fresh inquiries are light. The pending list still holds much promise in the way of tonnage, but on most of this business the quotations made are too low to permit satisfactory profits. Efforts to get better prices have not borne fruit. Most shops have small backlogs, and their need for business is proving an obstacle to price betterment. New contracts and fresh inquiries are given on page 442.

Bolts, Nuts and Rivets.—Railroads are again taking sizable quantities of these commodities. There is a fair demand for large rivets but specifications for light rivets are in small volume. Operations remain at 65 per cent of capacity and producers' stocks are growing.

Coke. — Shipments of by-product foundry coke continue to hold a small lead over the rate in July. Spot sales are scarce and prices are holding at $8 a net ton, local ovens.

Old Material.—The Chicago scrap market is marking time, while consumers and sellers wage a contest over the subject of prices. Brokers continue to buy at prices that are 50c. to 75c. above those obtained on the most recent sales. Some of this tonnage is going against old orders but much of it will not be on track for some time, giving scrap dealers a span of time in which they hope to build up the price structure. In view of several weeks in which brokers have consistently paid higher prices no more accurate statement can be made of the local market than that quotations are nominal. The available supply of cast iron borings is diminishing, as Michigan production moves East and output in northern Wisconsin is shipped to steel mills to the North. The Nickel Plate has closed a small list.

Prices deliv'd Chicago district consumers:

Per Gross Ton

Basic Open-Hearth Grades:	
Heavy melting steel	$15.00 to $15.50
Shoveling steel	15.00 to 15.50
Frogs, switches and guards, cut apart, and misc. rails	16.75 to 17.25
Hydraul. compressed sheets	13.50 to 14.00
Drop forge flashings	10.50 to 11.00
No. 1 busheling	13.25 to 13.75
Forg'd cast and r'l'd steel carwheels	18.75 to 19.25
Railroad tires, charg. box size	18.75 to 19.25
Railroad leaf springs cut apart	18.75 to 19.25
Acid Open-Hearth Grades:	
Steel couplers and knuckles	17.00 to 17.50
Coil springs	19.00 to 19.50
Electric Furnace Grades:	
Axle turnings	14.50 to 15.00
Low phos. punchings	16.75 to 17.25
Low phos. plates, 12 in. and under	16.75 to 17.25
Blast Furnace Grades:	
Axle turnings	10.75 to 11.25
Cast iron borings	10.25 to 10.75
Short shoveling turnings	10.25 to 10.75
Machine shop turnings	7.00 to 7.50
Rolling Mill Grades:	
Iron rails	16.00 to 16.50
Rerolling rails	17.75 to 18.25
Cupola Grades:	
Steel rails less than 3 ft.	17.75 to 18.25
Steel rails less than 2 ft.	18.25 to 18.75
Angle bars, steel	17.00 to 17.50
Cast iron carwheels	14.00 to 14.50
Malleable Grades:	
Railroad	17.00 to 17.50
Agricultural	15.50 to 16.00
Miscellaneous:	
*Relaying rails, 56 to 60 lb.	23.00 to 25.00
*Relaying rails, 65 lb. and heav.	26.00 to 31.00

Per Net Ton

Rolling Mill Grades:	
Iron angle and splice bars	15.00 to 15.50
Iron arch bars and transoms	21.00 to 21.50
Iron car axles	26.00 to 26.50
Steel car axles	17.00 to 17.50
No. 1 railroad wrought	14.00 to 14.50
No. 2 railroad wrought	13.50 to 14.00
No. 1 busheling	9.00 to 9.50
No. 2 busheling	7.00 to 7.50
Locomotive tires, smooth	14.50 to 15.00
Pipes and flues	10.00 to 10.50
Cupola Grades:	
No. 1 machinery cast	14.50 to 15.00
No. 1 railroad cast	13.75 to 14.25
No. 1 agricultural cast	13.25 to 13.75
Stove plates	12.25 to 12.75
Grate bars	11.75 to 12.25
Brake shoes	10.50 to 11.00

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars	3.00c.
Reinforc'g bars, billet steel	2.15c. to 2.35c.
Reinforc'g bars, rail steel	1.85c. to 1.95c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Bands ($\frac{1}{8}$ in. in Nos. 10 and 12 gages)	3.20c.
Hoops (No. 14 gage and lighter)	3.75c.
Black sheets (No. 24)	4.05c.
Galv. sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.35c.
Spikes, $\frac{1}{8}$ in. and larger	3.55c.
Track bolts	4.55c.
Rivets, structural	4.00c.
Rivets, boiler	4.00c.
	Per Cent Off List
Machine bolts	60
Carriage bolts	60
Coach or lag screws	60
Hot-pressed nuts, sq., tap. or blank	60
Hot-pressed nuts, hex., tap. or blank	60
No. 8 black ann'l'd wire, per 100 lb.	$3.45
Com. wire nails, base per keg	3.20
Cement c't'd nails, base per keg	3.20

New Blooming Mill at Cleveland

A new 32-in. reversing blooming mill will be added to the equipment of the Corrigan, McKinney Steel Co., Cleveland, to increase its semi-finished steel capacity. This will be used for the rolling of small billets. The contract for the mill, with tables and transfers, has been placed with the Mesta Machine Co., Pittsburgh. The mill will be driven by a 4000-hp. reversing motor, contract for which, together with a 3300-kw. flywheel generator set, has been placed with the General Electric Co.

New York

Pig Iron Competition Keener—Steel Bookings Continue Ahead of Those a Year Ago

NEW YORK, Aug. 13.—Pig iron demand has improved, notwithstanding the vacation season. Sales in this district during the week totaled about 14,000 tons, and in addition, considerable tonnage was bought here for delivery in other territories. Close to 7000 tons is under active inquiry. Shipments from furnaces are going forward against contracts without interruption, and melt is not only sustained, but is expected to increase. Manufacturers of radiators are running at a better rate, although still short of their operations a year ago, and other makers of heating equipment look for an increase in their production schedules before October. Both Alabama and eastern Pennsylvania producers have become more important factors in this market. Several thousand tons of Southern iron have been sold in this territory in the past fortnight. The new rate of $5.50 a ton to New York by rail and steamship through Savannah, Ga., has the advantage over the rail and barge rate via Norfolk, Va., of permitting smaller individual shipments, since free lighterage is allowed to any point in New York harbor on lots of 200 tons or over. Quotations at Birmingham range from $14 for No. 2 plain foundry to $13 for basic. Prices on eastern Pennsylvania foundry grade for delivery in this district range from $19 to $19.50, base, furnace. Buffalo foundry iron is still available at $17.50, base, furnace, with some orders bringing $18. The Crompton & Knowles Loom Works, Providence, R. I., and Worcester, Mass., has bought 1000 tons, and the Thatcher Co., Newark, N. J., has closed against its inquiry for 500 tons of foundry. The American Radiator Co. has placed about half of the 16,000 tons to be bought for its Western plants. The New York Air Brake Co. is in the market for 950 tons of foundry and malleable for its Watertown, N. Y., plant.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	$22.41 to $22.91
*Buf. No. 2, del'd east. N. J.	20.78 to 21.28
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	20.39 to 21.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	20.89 to 22.02

Freight rates: $4.91 from Buffalo, $1.39 to $2.52 from eastern Pennsylvania.

*Price delivered to New Jersey cities having rate of $3.28 a ton from Buffalo.

Fluorspar. — Foreign mines are heavily committed, but importers still have considerable gravel spar to sell and quotations as low as $18.25 a net ton, duty paid, are current.

Warehouse Business.—Buying is fair, but at the present rate August will not exceed July business totals and may be a smaller month. Structural steel business is limited to small lots and sheets are only moderately active. Prices are being maintained except for concessions of $1 to $2 a ton on black, galvanized and blue annealed sheets.

Cast Iron Pipe.—Current business in pressure pipe is limited to small lots purchased by private companies. The Middlesex Water Co., Perth Amboy, N. J., has awarded six miles of 20-in. water pipe to the Warren Foundry & Pipe Co. and the Public Works Engineering Corporation, New York, has closed on about 250 tons of 16-in., Class B water pipe for Champaign, Ill., with the National Cast Iron Pipe Co. Prices continue irregular, ranging from $31 to $33 a ton, f.o.b. northern foundry.

Prices per net ton deliv'd New York: Water pipe, 6-in. and larger, $33.60 to $34.60; 4-in. and 5-in., $36.60 to $37.60; 3-in., $43.60 to $44.60. Class A and gas pipe, $3 extra.

Finished Steel.—There has been some slowing down in buying, largely on account of the vacation season. However, bookings are considerably ahead of those in the corresponding period of 1928. Mills are running at capacity to relieve the pressure for shipments. Structural shapes are firm and unchanged at 2.29½c. delivered New York, on small lots and at 2.24½c. on the general run of business. The minimum for the largest orders is 2.19½c. Plates range from 2.22½c. to 2.32½c. Much interest continues to center in structural steel, the activities of which are being maintained at a high level. Lettings in the New York metropolitan district during July were 57,775 tons, as against 46,899 tons in June and 70,000 tons in July of last year, according to the Structural Steel Board of Trade. These figures do not include bridges, subway work and the like. The largest structural award of the week was 14,500 tons for two Pennsylvania Railroad bridges across the Hackensack River in New Jersey. Ten thousand tons for the passenger bridge went to the American Bridge Co. and 4500 tons for the freight bridge to the Phoenix Bridge Co. The McClintic-Marshall Co. will supply 9400 tons for route 106, section 6, of the New York subway. Fresh inquiries include 6000 tons for a building for the Farmers Loan & Trust Co., the general contract for which has been let to the George A. Fuller Co. No action has been taken on 20,600 tons for two subway sections in New York. Demand for sheet steel has subsided somewhat, thus allowing mills to catch up with back orders. The price situation has not altered, with galvanized selling at 3.50c., Pittsburgh, to both jobbers and consumers. The wire goods market is still weak and wire nails are quoted at from $2.50 to $2.55 a keg, Pittsburgh. Plain wire can be bought at $2.40 a 100 lb., Pittsburgh.

Mill prices per lb., deliv'd New York: Soft steel bars, 2.29c.; plates, 2.22½c.; structural shapes, 2.19½c.; bar iron, 2.14c.

Reinforcing Bars.—Igoe Brothers will furnish 600 tons of bars for a building for the Packard Motor Car

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.30c.
Soft steel bars, small shapes	3.25c.
Iron bars	3.24c.
Iron bars, Swed. charcoal	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Cold-roll. strip, soft and quarter hard	5.15c. to 5.40c.
Hoops	4.25c.
Bands	3.75c.
Blue ann'l'd sheets (No. 10)	3.85c. to 3.90c.
Long terne sheets (No. 24)	5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galv. annealed	5.15c.
Tire steel, 1½ x ½ in. and larger	3.30c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.65c.
Open-hearth spring steel, bases,	4.50c. to 7.00c.

	Per Cent Off List
Machine bolts, cut thread:	
¾ x 6 in. and smaller	60
1 x 30 in. and smaller	50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	60
¾ x 20 in. and smaller	50 to 50 and 10
Coach screws:	
½ x 6 in. and smaller	60
1 x 6 in. and smaller	50 to 50 and 10

	Per 100 Ft.
Boiler Tubes—	
Lap welded, 2-in.	$17.33
Seamless steel, 2-in.	20.24
Charcoal iron, 2-in.	25.00
Charcoal iron, 4-in.	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
⅛-in. butt	46	29
¾-in. butt	51	37
1-3-in. butt	53	39
2½-6-in. lap	48	35
7 and 8-in. lap	44	17
11 and 12-in. lap	37	12
Wrought Iron—		
⅛-in. butt	5	+19
¾-in. butt	11	+ 9
1-1½-in. butt	14	+ 6
2-in. lap	5	+14
3-6-in. lap	11	+ 6
7-12-in. lap	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box	$6.45	$6.20
Charcoal, per Box—	A	AAA
IC	$9.70	$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating	$10.00 to $11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets, Box Annealed—Black, C. R.

One Pass

	Per Lb.
Nos. 18 to 20	3.80c.
No. 22	3.95c.
No. 24	4.00c.
No. 26	4.10c.
No. 28*	4.25c.
No. 30	4.50c.

Sheets, Galvanized

	Per Lb.
No. 14	4.40c.
No. 16	4.25c.
No. 18	4.40c.
No. 20	4.50c.
No. 22	4.60c.
No. 24	4.75c.
No. 26	5.00c.
No. 28*	5.25c.
No. 30	5.65c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

Co. at Newark, N. J. For route 106, section 6, of the New York subway, 270 tons has been awarded to the McClintic-Marshall Co., while Carroll-McCreary Co., Inc., will supply 300 tons for a building at 40 Wall Street, New York. Action is expected shortly on 500 tons for an extension of the boardwalk at Rockaway Beach, N. Y. Prices are steady and unchanged.

Billet steel reinforcing bars in 40, 50 and 60-ft. lengths, 2.05c. per lb., Pittsburgh, and 2.30c. per lb., Pittsburgh warehouse, for cut lengths. Out of New York warehouse, 2.90c. per lb. for lots of 5 tons or more, 3.05c. for lots of 2 to 5 tons and 3.30c. for less than 2 tons, all delivered at job.

Coke.—Buying is light and prices are unchanged at $2.75 per net ton, Connellsville, for standard furnace coke, and $4.85 per net ton, ovens, for special grades of beehive foundry coke. Delivered prices of foundry coke are $8.56 per net ton, delivered to northern New Jersey, Jersey City and Newark, and $9.44 to New York or Brooklyn. By-product coke is quoted at $9 to $9.40 a net ton, Newark or Jersey City, and $10.06, New York or Brooklyn.

Old Material.—Except for active buying of No. 1 and No. 2 heavy melting steel by brokers filling contracts the market is rather inactive. No. 1 heavy melting steel is quoted at $16 per ton, delivered Bethlehem, Pa.; $16.25, delivered Claymont, Del., and $16.50 delivered Coatesville, Pa. No. 2 steel is being bought at $11.75 to $12 a ton, delivered Pottsville, Pa., $13.50 a ton, delivered Harrisburg, Pa., and $14 to $14.25 a ton, delivered Conshohocken, Pa. Cast scrap continues quiet with brokers offering about $14.50 a ton, delivered to Florence, N. J., or to Harrisburg, Pa.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel	$12.75 to	$13.35
Heavy melting steel (yard)	8.00 to	9.75
No. 1 hvy. breakable cast.	10.75 to	11.75
Stove plate (steel works).	8.00 to	8.25
Locomotive grate bars....	8.25 to	8.75
Machine shop turnings....	7.75 to	8.00
Short shoveling turnings..	7.75 to	8.00
Cast borings (blast furn. or steel works).....	7.00 to	7.75
Mixed borings and turnings	6.75 to	7.75
Steel car axles.....	19.50 to	20.00
Iron car axles.....	24.00 to	25.00
Iron and steel pipe (1 in. dia., not under 2 ft. long)		10.75
Forge fire	9.75 to	10.25
No. 1 railroad wrought...	12.00 to	12.50
No. 1 yard wrought, long..	11.00 to	11.50
Rails for rolling.....	13.25 to	13.75
Cast iron carwheels.....	12.50 to	13.00
Stove plate (foundry)....	8.00 to	8.50
Malleable cast (railroad).	14.00 to	14.50
Cast borings (chemical)..	10.00 to	10.50

Prices per gross ton, deliv'd local foundries:

No. 1 machry. cast.....	$17.00
No. 1 hvy. cast (columns, bldg. materials, etc.), cupola size.....	15.00
No. 2 cast (radiators, cast boilers, etc.)	14.50

Cleveland

Steel Demand Keeps Up in Surprising Volume—Pig Iron Sales Total 15,000 Tons

CLEVELAND, Aug. 13.—While some slowing down is reported among consuming industries, steel business is holding up well for August, the volume being about the same as during July. Specifications received by a few of the mills increased somewhat during the week owing to the release of orders by some of the automobile manufacturers for steel bars, auto body sheets and hot and cold-rolled strip steel. Most automobile companies outside of the Ford Motor Co. are now operating at considerably reduced schedules, but some are planning to increase production shortly on new models. Stocks of old cars are reported to be rather large and until these are materially reduced some of the motor car manufacturers will probably go rather slowly in making new models. Automobile rim and tire manufacturers, which have continued heavy operations, are now slowing down. Some of the automobile companies have sent inquiries to stamping plants for parts for the fourth quarter.

Deliveries on steel bars, plates and shapes show little change but are improving on sheets and on strip steel. Some of the continuous strip mills need tonnage and the same is true of some of the mills making cold-rolled strip and auto body sheets.

Outside of some weakness in wire, there is little change in the price situation.

Pig Iron.—The market was quieter the past week than during the previous few weeks. Sales by Cleveland interests in foundry and malleable iron amounted to 15,000 tons. The business included many small lots for early shipment. While some foundries are buying to cover for the remainder of the year, few that already have enough iron under contract to carry them through the third quarter are as yet showing any interest in the fourth quarter. There has been quite a slowing down in shipments this month to consumers in most fields, including the automotive industry. With some furnaces the decrease has been 15 to 20 per cent, as compared with the same period in July. Steel making grades are inactive. Lake furnace prices are firm and unchanged. Cleveland furnaces quote foundry and malleable iron at $18.50 furnace for outside shipment, and $19 for local delivery. In Michigan both grades are quoted at $20 furnace.

Prices per gross ton at Cleveland:

N'th'n fdy., sil. 1.75 to 2.25		$19.50
S'th'n fdy., 1.75 to 2.25....	$20.00 to	20.50
Malleable		19.50
Ohio silvery, 8 per cent...		28.00
Basic Valley furnace.....		18.50
Stand. low phos., Valley..	26.50 to	27.00

Prices except on basic and low phosphorus are delivered Cleveland. Freight rates: 50c. from local furnaces; $3 from Jackson, Ohio; $6 from Birmingham.

Iron Ore.—One 5000-ton lot of Lake Superior ore was sold in the week and a moderate amount of small lot business is in prospect from furnaces that because of continued good operations, will need additional ore to carry them through the winter. As most of the ore is going directly to the furnaces, the amount on docks has increased but slightly since the opening of navigation. The dock balance on Aug. 1 was 4,452,100 tons, as compared with 5,385,007 tons on the same date a year ago, according to the monthly report of the Lake Superior Iron Ore Association. Receipts at Lake Erie docks during July were 7,509,408 tons, and for the season until Aug. 1, 22,438,384 tons, as compared with 15,124,977 tons for the same period last year. Shipments from Lake Erie docks during July were 5,385,652 tons, and for the season until Aug. 1 were 17,182,569 tons, as against 11,410,116 tons up to Aug. 1, last year. Receipts until Aug. 1 at other parts, including South Chicago, Gary, and Indiana Harbor, were 8,845,556 tons, as compared with 6,791,432 tons up to Aug. 1, last year.

Semi-finished Steel.—Specifications for sheet bars, billets and slabs are holding up to recent volume, being sufficient to keep the leading local producer operating at 100 per cent of capacity, with full commitment for two weeks. As consumers are covered with contracts, there is no new inquiry.

Strip Steel.—Specifications for both hot and cold-rolled strip during the past week gained with some of the mills, coming from automobile companies that are bringing out new models. Some mills need tonnage in wide hot-rolled strip but are comfortably filled with orders for narrow material, while others are caught up with deliveries on narrow strip but are well supplied with orders for wide material. Cold-rolled strip can still be bought at 2.75c., Cleveland or Pittsburgh, although several mills are now asking 2.85c. As nearly all consumers are covered with contracts, the higher price cannot apply to much business before the fourth quarter.

Bolts, Nuts and Rivets.—Specifications for bolts and nuts are fair, being about the same since Aug. 1 as during the corresponding period of July. Business in the fore part of July showed quite a gain over the same period in June. Prices are firm. There is the usual seasonal decline in the demand for large rivets. Some

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and struc. shapes.....	3.00c.
Soft steel bars.....	3.00c.
Reinforc. steel bars.....2.25c. to	2.50c.
Cold-fin. rounds and hex.....	3.65c.
Cold-fin. flats and sq.....	4.15c.
Hoops and bands, No. 12 to ¼ in., inclusive	3.25c.
Hoops and bands, No. 13 and lighter	3.65c.
Cold-finished strip .....*5.95c.	
Black sheets (No. 24).....3.70c. to	3.90c.
Galvanized sheets (No. 24).4.60c. to	4.75c.
Blue ann'l'd sheets (No. 10).....	3.25c.
No. 9 ann'l'd wire, per 100 lb.....	$2.90
No. 9 gal. wire, per 100 lb.....	3.35
Com. wire nails, base per keg.....	2.90

*Net base, including boxing and cutting to length.

effort is being made, but apparently without success, to secure concessions from the regular $3.10 per 100 lb. price for large rivets.

Steel Bars, Plates and Shapes.—Specifications for steel bars received by the leading local producer increased from the automobile and agricultural implement industries the past week and other mills report a fair volume of business. Deliveries can be had in two or three weeks. Structural shapes continue to move fairly well. With considerable building work pending, conditions are brighter in that field. The Maumee River bridge, Toledo, for which bids have been taken, will require 7000 tons and a bank and office building in Akron, 5000 tons. The inquiry is out for the jail courts building, Cleveland, which will take 2000 tons. The demand for plates continues active. Orders include 700 tons taken by a Cleveland mill for locomotive works. Prices are firm at 1.90c. to 1.95c., Cleveland, for steel bars and 1.95c., Pittsburgh, for plates and shapes.

Sheets.—Specifications for good sized lots of automobile sheets were placed during the week by some of the Michigan automobile companies that are bringing out new models. However, business generally is light and mills continue to reduce their backlogs. Some mills are committed for several weeks on auto body sheets and others are in need of tonnage. Mills have enough black sheet business to maintain good operations for four weeks, but some need orders for blue annealed sheets. Enameling stock continues in good demand. Prices appear well stabilized at recent quotations. Black sheets are firm at 2.85c., Pittsburgh, and galvanized sheets range from 3.50c. to 3.60c. Less is heard than recently of shading from the 2.35c. price on blue annealed.

Warehouse Business.—The volume of business is holding up well for this season. One jobber reports a gain over July and another a slight falling off. Prices are firm.

Wire Products.—Prices on wire have become irregular. Plain wire is being quoted to jobbers at 2.40c., Cleveland, and the same price is being named on manufacturing wire for delivery in the Ohio territory outside of Cleveland. The weakness in nails continues. While definite prices seem to have about disappeared, $2.50 per keg seems to represent the market.

Coke.—By-product coke for domestic use is moving in good volume at $4.50 per net ton, Ohio ovens, for egg size. Foundry coke is quiet. Ohio by-product foundry coke is unchanged at $8.25 Painesville, for August shipment. Prices on premium brands of Connellsville foundry coke are unchanged.

Old Material.—A Cleveland consumer purchased a moderate tonnage of selected heavy melting steel scrap in the week at around $17 and dealers are offering $16.75 for this grade, indicating a slightly firmer market. Unselected material is unchanged at $15.50 to $16. Machine shop turnings are firmer and cast scrap is higher. Short shoveling turnings have brought $11.75 for small lots. In the Valley district prices are easier on steel making scrap. Dealers who recently paid up to $18.50 for No. 1 heavy melting steel for Youngstown delivery are now offering only $18 for that grade and $17.50 for compressed sheet steel scrap, as compared with a recent price of $18 or higher. Blast furnace scrap is unchanged.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$15.00 to $15.50
No. 2 heavy melting steel	14.50 to 15.00
Compressed sheet steel	15.00 to 15.50
Light bundled sheet stampings	12.00 to 12.50
Drop forge flashings	13.00 to 13.25
Machine shop turnings	9.75 to 10.25
Short shoveling turnings	11.50 to 11.75
No. 1 railroad wrought	13.50 to 14.00
No. 2 railroad wrought	16.00 to 16.50
No. 1 busheling	13.25 to 13.75
Pipes and flues	9.00 to 9.50
Steel axle turnings	12.50 to 13.00
Acid Open-Hearth Grades:	
Low phos., forging crops	17.75 to 18.00
Low phos., billet, bloom and slab crops	18.50 to 18.75
Low phos., sheet bar crops	18.00 to 18.50
Low phos., plate scrap	18.00 to 18.50
Blast Furnace Grades:	
Cast iron borings	10.50 to 10.75
Mixed borings and short turnings	10.50 to 10.75
No. 2 busheling	10.50 to 10.75
Cupola Grades:	
No. 1 cast	17.50 to 18.00
Railroad grate bars	11.00 to 12.00
Stove plate	12.00 to 12.50
Rails under 3 ft	18.50 to 19.00
Miscellaneous	
Railroad malleable	18.00 to 18.50
Rails for rolling	16.25 to 16.50

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.70c.
Plates, ⅜-in.	2.90c.
Structural shapes	2.70c.
Soft steel bars, small shapes, iron bars (except bands)	2.80c.
Round-edge iron	3.50c.
Round-edge steel, iron finished 1½ x 1½ in.	3.50c.
Round-edge steel, planished	4.30c.
Reinforc. steel bars, sq. twisted and deform.	2.60c. to 2.80c.
Cold-fin. steel, rounds and hex	3.60c.
Cold-fin. steel, sq. and flats	4.10c.
Steel hoops	3.55c.
Steel bands, No. 12 to ⅛-in. inclus.	3.30c.
Spring steel	5.00c.
*Black sheets (No. 24)	4.10c.
†Galvanized sheets (No. 24)	4.85c.
Light plates, blue annealed (No. 10)	3.25c.
Blue ann'l'd sheets (No. 13)	3.40c.
Diam. pat. floor plates—	
¼-in.	5.30c.
⅜-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

*For 50 bundles or more; 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.
†For 50 bundles or more: 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

Philadelphia

Plate and Shape Orders Good, But Bars and Sheets Are Quiet—Pig Iron Unchanged

PHILADELPHIA, Aug. 13.—Specifications on plate contracts continue in fair volume and shape mills are booking about the same tonnage as last month, but deliveries are no longer extended. Steel bars and black and galvanized sheets are quiet, but mills are maintaining a high rate of operation despite a considerable reduction in the unfilled tonnages on their books. Pig iron is quiet, but prices are maintained with only occasional concessions by eastern Pennsylvania furnaces, despite continued competition from Birmingham iron. Heavy melting steel prices are strong, but other grades are inactive.

Pig Iron.—Eastern Pennsylvania furnaces are making an effort to maintain foundry iron at a minimum of $21 a ton and concessions to $20.50 a ton are becoming less common, although Birmingham foundry iron is offered at $14 a ton, furnace, with a rail and water freight rate via Savannah, Ga., of $5.25 a ton, loaded on cars Philadelphia. Most foundry consumers have sufficient iron in stock or due on contracts to maintain their present schedules of production and have not yet begun to inquire for the last quarter. Basic iron is quiet since the purchase of about 18,000 tons by a Coatesville, Pa., consumer, but Birmingham furnaces are still actively seeking basic business in eastern Pennsylvania. The New York Air Brake Co., Watertown, N. Y., is inquiring for 950 tons of malleable and the General Electric Co., Schenectady, N. Y., is in the market for 500 tons of foundry iron.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil.	$21.26 to $21.76
East. Pa. No. 2X, 2.25 to 2.75 sil.	21.76 to 22.26
East. Pa. No. 1X	22.26 to 22.76
Basic (del'd east. Pa.)	19.75 to 20.25
Gray forge	20.00 to 20.50
Malleable	21.25 to 21.75
Stand. low phos. (f.o.b. N. Y. State furnace)	22.00 to 23.00
Cop. br'g low phos. (f.o.b. furnace)	23.50 to 24.00
Va. No. 2 plain, 1.75 to 2.25 sil.	24.04
Va. No. 2X, 2.25 to 2.75 sil.	24.54

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces: $4.54 from Virginia furnaces.

Bars.—The lull in the automobile industry is curtailing the tonnage of bars moving to consumers, but mills still have a fair backlog of business and the price is firm at 1.95c., Pittsburgh, or 2.27c., delivered Philadelphia.

Reinforcing Bars.—A substantial tonnage is required for current small reinforced concrete projects, but not much new business has appeared recently. Billet steel bars are still quoted at 1.95c. to 2.05c. per lb., Pittsburgh, or 2.27c. to 2.37c., delivered Philadelphia, with the $5 extra for cutting to length sometimes disregarded by the distributer. Rail steel bars are quoted at 1.95c., Franklin, Pa., or Tonawanda, N. Y., or 2.27c., delivered Philadelphia, with no extra for cutting to length.

Shapes.—Although building projects have declined considerably, the tonnage of structural steel in demand continues heavy, with an unusually large volume of bridge building requirements. Two bridges for the Pennsylvania Railroad over the Hackensack River totaling 14,500 tons and about 500 tons in other small bridges for the same railroad have been awarded to eastern Pennsylvania fabricating shops. Shape prices are unchanged at 1.95c. to 2.05c., f.o.b. nearest mill to consumer, or 2.01c. to 2.11c., delivered Philadelphia.

Plates.—Mills are maintaining a good rate of operation and in some instances specifications against contracts are coming in so well that mills expect August business to be slightly larger than July, unless buying declines toward the end of the month. The price is firm at 2.05c. per lb., Coatesville, or 2.15c., delivered Philadelphia.

Sheets.—Consumers are generally covered for immediate requirements and contract specifications are light. Blue annealed sheet demand continues moderately active and prices are unchanged at 2.35c., Pittsburgh, or 2.67c., delivered Philadelphia for No. 13 gage. Light plates, blue annealed, No. 10 gage, are 2.20c. Pittsburgh, or 2.52c., delivered Philadelphia. Black sheets are quiet and the price unchanged at 2.85c., Pittsburgh, or 3.17c., delivered Philadelphia. Galvanized sheets are quoted at 3.60c., Pittsburgh, or 3.92c., delivered Philadelphia, with occasional concessions of $1 a ton on desirable business. The Pennsylvania Railroad opens bids tomorrow on 400 tons of blue annealed, 300 tons of black and 100 tons of galvanized sheets.

Imports.—In the week ended Aug. 10, a total of 1747 tons of pig iron arrived at this port, of which 1000 tons was from the United Kingdom and 747 tons from British India. Ore imports consisted of 6000 tons of manganese ore from Brazil and 122 tons of chrome ore from Portuguese Africa. Steel imports were 129 tons of structural shapes from Belgium and 26 tons from France, 50 tons of steel bars from Germany and 14 tons of steel bands and 350 tons of skelp iron from France. A total of 47 tons of steel scrap was received from the United Kingdom.

Old Material.—Most grades of cast scrap show a slight undertone of weakness, except for an advance of 25c. a ton in cast borings on the basis of a sale to an eastern Pennsylvania merchant furnace at $11.75 a ton. Heavy melting steel prices are firm and a Phoenixville, Pa., mill, which normally buys No. 2 heavy melting steel, closed last week on a small tonnage of No. 1 heavy melting steel at $17 a ton, delivered. This is the third eastern Pennsylvania consumer of No. 2 steel, which has bought a small tonnage of No. 1 grade in the past few months.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	$16.50 to $17.00
Scrap T rails	16.00 to 16.50
No. 2 heavy melting steel	12.50 to 14.50
No. 1 railroad wrought	16.00 to 16.50
Bundled sheets (for steel works)	11.50
Hydraulic compressed, new	14.50 to 15.50
Hydraulic compressed, old	12.00 to 12.50
Machine shop turnings (for steel works)	11.50 to 12.00
Heavy axle turnings (or equiv.)	14.00 to 14.50
Cast borings (for steel works and roll. mill)	11.00 to 11.75
Heavy breakable cast (for steel works)	15.00
Railroad grate bars	12.00 to 12.50
Stove plate (for steel works)	12.00 to 12.50
No. 1 low phos., hvy., 0.04% and under	22.00 to 23.00
Couplers and knuckles	19.50 to 20.50
Rolled steel wheels	19.50 to 20.50
No. 1 blast f'nace scrap	10.50 to 11.00
Wrot. iron and soft steel pipes and tubes (new specific.)	15.00
Shafting	19.00 to 19.50
Steel axles	23.00 to 23.50
No. 1 forge fire	14.00
Cast iron carwheels	16.50 to 16.75
No. 1 cast	16.50 to 17.00
Cast borings (for chem. plant)	14.50
Steel rails for rolling	16.50 to 17.00

Acquires Company Making Electric-Weld Tubes

The Fretz-Moon Co., Butler, Pa., maker of electrically welded steel tubing in small sizes, has been acquired by interests identified with the Republic Iron & Steel Co., Youngstown, and Spang, Chalfant & Co., Inc., Pittsburgh. Changes in management will be made, but the company will continue to be operated as an independent unit.

Negotiating for Georgian Manganese Ore

A report from Moscow via London is that the United States Steel Corporation is negotiating to buy 80,000 to 150,000 tons of manganese ore annually for the next five years from the Georgian Manganese Trust, a semi-official Soviet organization which has controlled the property since W. A. Harriman & Co. gave up their lease. Confirmation or denial of the report could not be obtained prior to going to press.

Hudson Valley Furnace and Coke Plant Sold

Directors of Hudson Valley Coke & Products Corporation, Troy, N. Y., have recommended to stockholders the sale of the company's properties and assets to the Niagara Hudson Power Corporation, the transaction to be ratified at a special stockholders' meeting on Sept. 10. Under the terms of the sale the new owner will assume the mortgage and other indebtedness of the corporation and will pay in cash $39 for each share of Hudson Valley preferred stock outstanding and $1 for each share of common, or a total of $2,117,908 in excess of the corporation's indebtedness. Preferred stockholders are given the option of taking a cash settlement or 1⅓ shares of Niagara Hudson common stock.

The Hudson Valley Coke & Products Corporation was incorporated in New York in 1924, and two years later completed construction of a blast furnace and 55 by-product coke ovens at Troy. The corporation supplies gas under 20-yr. contracts to public utility companies furnishing all of the gas used in Albany, Schenectady, Troy and other small communities in the Albany district. The corporation has outstanding $5,000,000 of 8 per cent preferred stock and has 157,908 no par common shares outstanding of an authorized issue of 200,000 shares. It is estimated that about $7,000,000 is invested in property and plant equipment.

It is understood that the operating personnel of the Hudson Valley corporation will remain unchanged. Whether the blast furnace, which has been idle since October, 1927, will resume operations soon has not yet been determined.

Steel Corporation's July Orders Decrease

There was a decrease of 168,733 tons in the unfilled orders of the United States Steel Corporation at the end of July. This is the third successive month in which decreases have been registered. In June the decline was 47,257 tons, and in May, 123,596 tons. For five months previous to May increases were the rule. A year ago there was a decrease for July of 66,082 tons. The table gives the data for the last 19 months:

	1929	1928
Jan. 31	4,109,487	4,275,947
Feb. 28	4,144,341	4,398,189
Mar. 31	4,410,718	4,335,206
Apr. 30	4,427,763	3,872,133
May 31	4,304,167	3,416,822
June 30	4,256,910	3,637,009
July 31	4,088,177	3,570,927
Aug. 31	.....	3,624,043
Sept. 30	.....	3,698,368
Oct. 31	.....	3,751,030
Nov. 30	.....	3,673,000
Dec. 31	.....	3,976,712

Pittsburgh and Riverside Forging Merger

The Pittsburgh Forging Co., Pittsburgh, with plant at Coraopolis, Pa., maker of automobile and railroad forgings, will be merged with the Riverside Forge & Machine Co., Jackson, Mich., maker of automobile forgings, subject to the approval of stockholders of both companies. Edwin Hodge, Jr., president of the Pittsburgh company, is also president of the Riverside company, having succeeded George Wilkins, who remains as treasurer and a director of the Riverside Company.

General Bronze Co. Expands

The General Bronze Co., Pittsburgh, manufacturer of copper, bronze and brass castings, has completed installation of new machinery, including a boring mill, drill press, lathe, milling machines and grinding machine. Contract has been placed for a centrifugal molding machine. In addition, the melting capacity of the plant is being doubled by the installation of new furnaces.

Pacific Coast

Steel Business Quiet—Bids Opened on 2000 Tons of Plates for Penstock at Tacoma

SAN FRANCISCO, Aug. 10 (*By Air Mail*).—Business in iron and steel products on the Pacific Coast this week was by no means active. Reinforcing bars moved better than any other product and, while the aggregate tonnage was not especially heavy, numerous projects were placed. Plate fabricators are interested in the outcome of the opening of bids this week on 2000 tons for a penstock at Tacoma, Wash., and on 200 tons for a pipe line at Bremerton, Wash. Prices, generally, are holding well to the levels established some time ago.

Pig Iron.—Pig iron buying continues to be confined to tonnages for immediate needs, and no large sales or inquiries were reported. Quotations are unchanged.

Prices per gross ton at San Francisco:

*Utah basic	$25.00 to $26.00
*Utah fdy., sil. 2.75 to 3.25	25.00 to 26.00
**Indian fdy., sil. 2.75 to 3.25	25.00 to 26.00

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Bars.—Outstanding among reinforcing steel bar awards this week were 600 tons for the Shell Oil Building, San Francisco, and 400 tons for a warehouse for the American Can Co., San Francisco, both placed with the Soule Steel Co. The W. S. Wetenhall Co., booked 175 tons for an abattior in the same city. Included among the new inquiries are 630 tons for a printing plant in San Francisco and 150 tons for a theater in Stockton, Cal. In the San Francisco district 2.20c. a lb., base, continues to apply on out-of-stock lots by the carload, while 2.60c., base, applies on smaller quantities. In Los Angeles, 2.30c. a lb., base, is being quoted on carload quantities and 2.70c., base, on smaller tonnages. Demand for merchant bar material is confined to small lots composed of many sizes. Mill prices on this class of steel continue firm at 2.35c., c.i.f., Coast ports.

Plates.—Bookings this week were confined to lots of less than 100 tons, and no new inquiries of importance appeared. Bids were opened on 2000 tons for a penstock and surge tank at Tacoma, Wash., and on 200 tons for a riveted steel pipe line at Bremerton, Wash. Prices appear to be firm at 2.35c., c.i.f., Coast ports.

Shapes.—Only three projects calling for over 100 tons of structural shapes were placed during the week. The largest award was 257 tons for reclamation work at Boise, Idaho. Bids open Aug. 19 on 8000 tons for the St. John's bridge at Portland, Ore. Bids were opened this week on 700 tons of sheet piling for the Alki Street sea wall, Seattle. While a number of new projects are contemplated, new inquiries all called for lots of less than 100 tons each. Plain material is firm at 2.35c. a lb., c.i.f., Coast ports.

Cast Iron Pipe.—Demand is light, as is usual at this time of the year, and only one award in excess of 100 tons was reported. The Griffith Co. secured 217 tons of 6 to 12-in. Class B pipe for the improvement of Atlantic Street, Long Beach, Cal. Bids were opened this week on 875 tons of 10 to 24-in. Class B pipe for Bremerton, Wash. Anaheim, Cal., will open bids Aug. 22 for 377 tons of 6 to 10-in. Class B pipe. On Aug. 12, San Diego, Cal., will open bids for 144 tons of 4 and 6-in. Class B pipe for the improvement of Plata Avenue and on 201 tons of 4 and 6-in. Class C pipe for the improvement of El Prado Avenue. Bids will be opened Aug. 26 for 112 tons of 4 to 8-in. Class B Pipe for the improvement of Estrelle Street, San Diego.

Coke.—Movement of coke reflects the quiet condition noted in the pig iron market, and both sales and inquiries this week involved small lots for immediate shipment.

Birmingham

Pig Iron Inquiries Received From Italy—Shipments From Furnaces Improve—Cast Pipe Backlogs Shrink

BIRMINGHAM, Aug. 13.—Furnace interests report a good volume of pig iron shipments, following gradual improvement since the first of August. More iron is moving to district foundries, as well as to outside territories, and stock will be reduced if the present rate of deliveries continues. District requirements for the third quarter are about covered. More iron is under contract now than there was at this stage in either of the two preceding quarters. Furnace interests are continuing to press for business in competitive territories, although only few orders of any consequence have been booked so far. Additional trial orders in small lots, however, are being received from time to time. Two or three inquiries have been received for iron to be shipped to Italy, but there have been no active negotiations for sales to that country. Prices for No. 2 foundry remain at $14.50 Birmingham, for the district, while in competitive territories concessions of 50c. a ton are frequently reported. Nine furnaces are on foundry, seven on basic and one on recarburizing iron.

Prices per gross ton, f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil.	$14.50
No. 1 fdy., 2.25 to 2.75 sil.	15.00
Basic	14.50

Finished Steel.—Bookings in roofing sheets are declining. New business in bars, plates, shapes and railroad accessories continues at a rate unequalled for the season in this district. Though inquiries are not so heavy as they were 30 days ago, they indicate that August tonnage will be far above the average. Production of these products continues at close to 90 per cent of capacity. Barring an increase in bookings, rail mill operations will be suspended for a few weeks this fall. The usual summer lull is being felt in wire products, though it is not so marked as in preceding years. Prices are fairly steady except on galvanized sheets. New business in structural steel is slow to develop. Pending tonnage includes a few important projects to be placed within the next four weeks. The total number of active open-hearth furnaces remains at 19.

Cast Iron Pipe.—Pressure pipe manufacturers have reduced backlogs during the past two or three weeks because of a decline in new business. Operations since late July, however, have been at the highest rate of the year. Inquiries are becoming more spotty, and very little prospective tonnage developed during the week. Pending tonnage for August includes 6000 ft. of 8-in. pipe for Newton, N. C., to be let Aug. 13; 3000 ft. of 12 to 18-in. pipe for Gadsden, Ala., to be let Aug. 15, and 4 miles of 8 to 12-in. pipe for Hollywood, Fla., to be awarded Aug. 15. The base price continues at $37 to $38 a net ton, Birmingham, for 6-in. and larger pipe.

Old Material.—The improvement in demand for steel grades that began developing about two weeks ago is the only favorable feature in the dull market. Shipments of steel grades are reported slightly better than in July. Prices are unchanged.

Coke.—The movement of foundry coke continues favorable, and little surplus coke is accumulating. Foundry coke remains at $5 a net ton, Birmingham.

Prices per gross ton, deliv'd Birmingham dist. consumers' yards:

Heavy melting steel	$12.50
Scrap steel rails	12.50
Short shoveling turnings	9.00
Cast iron borings	9.00
Stove plate	$11.50 to 12.00
Steel axles	21.00
Iron axles	23.00
No. 1 railroad wrought	10.00 to 10.50
Rails for rolling	14.00 to 15.00
No. 1 cast	13.50
Tramcar wheels	13.00
Cast iron carwheels	12.50 to 13.00
Cast iron borings, chem.	13.50 to 14.00

Wagner Electric Corporation, St. Louis, has moved its Cleveland service station and branch sales office to a new building at 3756 Carnegie Avenue.

Boston

Southern Iron Selling at Low Delivered Prices—Billet Steel Reinforcing Bars Weaker

BOSTON, Aug. 13.—Because of the new rail and water rates from Birmingham and other Southern points to the New England seaboard, Southern iron is selling at unusually low delivered prices. A Cape Cod district melter has bought No 1X at $22.35 a ton, delivered; two central Massachusetts foundries have purchased No. 2X at $21.75 and another has closed at $21.15, delivered. A number of other orders are reported within the range of $21.15 and $21.75, delivered, for No. 2X. Such sales were made on a rail and water rate from Birmingham to New England seaboard of $5.75 a ton, as against the old rail and water rate of $6.91, and the all-rail rate of $9.61. The prices at furnace were $14.50 a ton, base, and less. The amount of iron sold is small, however, and because the supply at prevailing prices is reported limited, Buffalo and other Northern furnaces have not attempted to meet the Southern iron market, quoting $18 a ton, base, Buffalo, or its equivalent. One Buffalo stack, heretofore credited with making low prices, has practically withdrawn from the market for the remainder of 1929. A Worcester, Mass., textile machinery manufacturer has still to cover on 1000 tons of No. 2X and No. 1X. No other sizable inquiries are in the market.

Foundry iron prices per gross ton deliv'd to most New England points:

†Buffalo, sil. 1.75 to 2.25	$22.28 to $22.78
†Buffalo, sil. 2.25 to 2.75	22.78 to 23.28
*Buffalo, sil. 1.75 to 2.25	22.91 to 23.41
*Buffalo, sil. 2.25 to 2.75	22.91 to 23.91
East. Penn., sil. 1.75 to 2.25	22.65 to 23.15
East. Penn., sil. 2.25 to 2.75	23.15 to 23.65
Va., sil. 1.75 to 2.25	25.21
Va., sil. 2.25 to 2.75	25.71
*Ala., sil. 1.75 to 2.25	23.61
*Ala., sil. 2.25 to 2.75	24.11
†Ala., sil. 1.75 to 2.25	20.25
†Ala., sil. 2.25 to 2.75	20.75

Freight rates: $4.91 all rail from Buffalo, and $4.28 rail and water; $3.65 all rail from eastern Pennsylvania; $5.21 all rail from Virginia; $9.61 all rail from Alabama and $5.75 rail and water from Alabama to New England seaboard.
*All rail rate.
†Rail and water rate.

Imports.—Imports of pig iron at Boston in July totaled 950 tons, all from India. Receipts of ore consisted of 10,560 tons of Newfoundland and 12,700 tons of Bona, a total of 23,260 tons.

Fabricated Steel.—Most of the awards made during the week were for bridge work. With the exception of the Congress Street, Boston, bridge, requiring more than 1000 tons of steel, there is no prospective business of importance in the market. Competition among fabricators for small jobs, of which there are many, is keen and profits on such work are steadily declining.

Reinforcing Steel.—Sellers of billet steel bars are generally quoting 2.66½c. a lb., base, on lots of 100 tons and larger for shipment from stock, but buyers have succeeded in securing some concessions. Sales of the week included 250 tons for a local roundhouse for the Boston & Albany Railroad and 150 tons for a Boston & Maine Railroad roundhouse. A Boston & Maine hotel, 250 tons, and a Boston office building, 700 tons, are still pending. The rail steel bar market continues inactive, current business being in small tonnages. The open price of 2.26½c. a lb., base, delivered common Boston freight rate points, is being shaded.

Coke.—A seasonal letdown in by-product foundry coke specifications is reported; yet ovens are shipping more than they did a year ago. Prices remain at $11 a ton, delivered within a $3.10 freight-rate zone.

Old Material.—A better demand for steel turnings and forge flashings has stiffened prices, but the old material market in general appears less firm that heretofore, owing to a noticeable letdown in shipments. The decline in activity is attributed to a desire among buyers and dealers to await the outcome of the Pennsylvania Railroad scrap offerings. Because of the scarcity of desirable kinds of scrap the trade expects no serious setback in prices unless consumers should cease buying for a protracted spell.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$12.50 to $12.75
Scrap T rails	11.50 to 12.00
Scrap girder rails	10.50 to 11.25
No. 1 railroad wrought	11.00 to 11.50
No. 1 yard wrought	9.00 to 9.50
Machine shop turnings	7.00 to 7.50
Cast iron borings (steel works and rolling mill)	6.50 to 6.60
Bundled skeleton, long	10.00 to 10.50
Forge flashings	10.50 to 10.75
Blast furnace borings and turnings	6.10 to 6.50
Forge scrap	9.00 to 9.25
Shafting	14.00 to 15.00
Steel car axles	18.00 to 19.00
Wrought pipe 1 in. in diameter (over 2 ft. long)	9.75 to 10.00
Rails for rolling	12.50 to 13.00
Cast iron borings, chemical	10.00 to 10.25
Prices per gross ton deliv'd consumers' yards:	
Textile cast	$14.50 to $15.00
No. 1 machinery cast	15.00 to 15.25
No. 2 machinery cast	13.00 to 13.25
Stove plate	11.00 to 11.50
Railroad malleable	18.50 to 19.00

Buffalo

Steel Demand Below Average of Last Three Months—Advances in Scrap

BUFFALO, Aug. 13.—Consumers continue to buy sparingly, most contracts being limited to those upon which delivery will be completed in 30 days or less. Sellers claim increased strength in prices, with the district base at $19.50 on No. 2 plain foundry and $20 on malleable. In the East, shading of these prices does not exceed $1 a ton except on the largest inquiry, on which as low as $18 furnace is available from Buffalo producers. An inquiry for 1500 tons of malleable iron was the only new lot of consequence listed this week as new inquiry. Sales during the past ten days have been confined to lots of 500 tons and less. There are 14 furnaces in blast in the district. Shipments are not absorbing entire production of merchant stacks.

Prices per gross ton, f.o.b. furnace:

No. 2 fdy., sil. 1.75 to 2.25	$19.50
No. 2X fdy., sil. 2.25 to 2.75	20.00
No. 1 fdy., sil. 2.75 to 3.25	21.00
Malleable, sil. up to 2.25	20.00
Basic	18.50
Lake Superior charcoal	27.28

Finished Material.—Demand is less vigorous than its average during the past three months. Bar sales in particular have declined to some extent, with the number and size of orders showing reductions. Reinforcing bar demand is very good, and plates are moving freely. Sales of sheets have largely held their own, although price declines in black are noted, as compared with peaks of the second quarter. Several large pipe tonnages are about to be placed in this district, while fabricators also have a good late third quarter in sight. Prices are holding within $2 of the high point of the year with shading confined largely to the most attractive lots. Warehouses have shown a slight decline in their volume of busi-

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars, small shapes	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway rounds	6.60c.
Norway squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tie steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold-rolled steel—	
Rounds and hex	*3.55c. to 5.55c.
Squares and flats	*4.05c. to 7.05c.
Toe calk steel	6.00c.
Rivets, structural or boiler	4.50c.

	Per Cent Off List
Machine bolts	50 and 5
Carriage bolts	50 and 5
Lag screws	50 and 5
Hot-pressed nuts	50 and 5
Cold-punched nuts	50 and 5
Stove bolts	70 and 10

*Including quantity differentials.

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and struc. shapes	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.95c.
Cold-fin. flats, sq. and hex	4.45c.
Rounds	3.95c.
Cold-rolled strip steel	5.85c.
Black sheets (No. 24)	4.20c.
Galv. sheets (No. 24)	4.85c.
Blue ann'l'd sheets (No. 10)	3.50c.
Com. wire nails, base per keg	$3.60
Black wire, base per 100 lb.	3.75

ness this month. Open-hearth operation shows a drop this week with 31 furnaces making steel and six idle. Finishing mill schedules are practically unchanged, however.

Old Material.—Small lots of No. 1 heavy melting steel have been sold to district consumers at $18. Additional tonnage is wanted by consumers, but scarcity of supplies is making dealers cautious in booking orders. Dealers offer **$14.75 for No.** 2 steel for Bethlehem. Demand for short steel rails has improved. Sales slightly above $19.50 are reported, like prices having been paid for knuckles and couplers, also coil and leaf springs. There is a much better market for machine shop turnings, which have advanced as much as $1 a ton from July quotations. Mixed borings and turnings for blast furnace use are selling freely. Stove plate deliveries are heavy, although no new contracts are noted. There is a fair market for No. 1 cast, with $16 the price offered by consumers. Dealers say not only their own stocks but those of steel works have been reduced steadily and are much below the average for periods of operation comparable to that now general throughout the Buffalo district.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$18.50 to $19.00
No. 2 heavy melting steel	14.75 to 15.00
Scrap rails	16.50 to 17.00
Hydraul. comp. sheets	14.50 to 14.75
Hand bundled sheets	12.00 to 12.50
Drop forge flashings	14.25 to 14.50
No. 1 busheling	15.50 to 16.50
Hvy. steel axle turnings	14.00 to 14.50
Machine shop turnings	8.50 to 9.00
No. 1 railroad wrought	13.00 to 13.50
Acid Open-Hearth Grades:	
Knuckles and couplers	19.50 to 19.75
Coil and leaf springs	19.00 to 19.50
Rolled steel wheels	19.00 to 19.50
Low phos. billet and bloom ends	20.00 to 20.50
Electric Furnace Grades:	
Short shov. steel turnings	12.00 to 12.50
Blast Furnace Grades:	
Short mixed borings and turnings	11.00 to 11.50
Cast iron borings	10.50 to 11.00
No. 2 busheling	10.00 to 10.50
Rolling Mill Grades:	
Steel car axles	18.75 to 19.25
Iron axles	21.00 to 22.00
Cupola Grades:	
No. 1 machinery cast	16.00 to 17.00
Stove plate	13.00 to 13.50
Locomotive grate bars	12.50 to 13.00
Steel rails, 3 ft. and under	19.50 to 19.75
Cast iron carwheels	14.00 to 14.50
Malleable Grades:	
Industrial	18.00 to 18.50
Railroad	18.00 to 18.50
Agricultural	18.00 to 18.50
Special Grades:	
Chemical borings	12.50 to 13.50

St. Louis

Three Sales of Basic Pig Iron Total 25,000 Tons—Dealer-Buying Causes Further Advances in Scrap

ST. LOUIS, Aug. 13. — Three large consumers of basic pig iron came into the market last week for their requirements for the remainder of the year, and placed 25,000 tons with the St. Louis Gas & Coke Corporation. Two East Side melters bought 10,000 tons each, and an equipment builder in Illinois, 5000 tons. The Granite City producer also sold 1000 tons to a local jobbing foundry for the remainder of the year, 250 tons to an Illinois stove manufacturer for August and September delivery, 250 tons to a local engine builder and 100 tons to an Oklahoma melter for prompt shipment. Melters are still disturbed over the Southern price situation. The local producer announces it has made no change in its quoted prices, but is making concessions on high phosphorus iron where it encounters Southern competition.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill.	$20.00
Malleable, f.o.b. Granite City	20.50
N'th'n No. 2 fdy., deliv'd St. Louis	22.16
Southern No. 2 fdy., deliv'd	18.92
Northern malleable, deliv'd	22.16
Northern basic, deliv'd	22.16

Freight rates: 75c. (average) Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

Coke.—Furnace coke is moving well, but there has been a slight let-up in the demand for foundry coke. Buying of domestic coke by dealers is expected to show some activity this month.

Finished Steel.—The Granite City Steel Co. reports that all operations are virtually on a 100 per cent basis. There has been an improvement in specifications for galvanized sheets, while there has been a slight falling off in specifications for plates. The price situation generally is firm, except in the South, where concessions on galvanized sheets have been reported. Structural fabricators find business quiet, with only small tonnages being let.

Old Material.—The market is in the hands of dealers, who continue to pay advances in prices in order to stimulate shipments to cover contracts. There is said to be a considerable short interest in the trade. While consumers are pressing dealers for shipments against contracts, they are not placing much new business. No. 1 heavy melting steel is up 50c. and No. 2 grade is 25c. higher. Railroad lists: Atchison, Topeka & Santa Fe, 5883 tons; Wabash, 3060 tons; Southern Pacific, 2595 tons; Louisville & Nashville, 2270 tons; Pere Marquette, 1585 tons; Missouri-Kansas-Texas, 1500 tons; Nickel Plate, 34 carloads; Mobile & Ohio, 28 carloads; Chicago & Eastern Illinois, 18 carloads.

Dealers' buying prices per gross ton, f.o.b. St. Louis district:

No. 1 heavy melting or shoveling steel	$14.50 to $15.00
No. 2 heavy melting or shoveling steel	13.50 to 14.00
No. 1 locomotive tires	15.50 to 16.00
Miscel. stand.-sec. rails including frogs, switches and guards, cut apart	16.75 to 17.25
Railroad springs	18.50 to 19.00
Bundled sheets	10.00 to 10.50
No. 2 railroad wrought	14.00 to 14.50
No. 1 busheling	10.00 to 10.50
Cast iron borings and shoveling turnings	9.50 to 10.00
Iron rails	15.00 to 15.50
Rails for rolling	17.25 to 17.75
Machine shop turnings	9.00 to 9.50
Heavy turnings	10.00 to 10.50
Steel car axles	19.00 to 19.50
Iron car axles	27.50 to 28.00
Wrot. iron bars and trans.	22.00 to 22.50
No. 1 railroad wrought	13.50 to 14.00
Steel rails, less than 3 ft.	19.00 to 19.50
Steel angle bars	14.50 to 14.75
Cast iron carwheels	14.50 to 15.00
No. 1 machinery cast	15.00 to 15.50
Railroad malleable	15.50 to 16.00
No. 1 railroad cast	15.00 to 15.50
Stove plate	12.50 to 13.00
Agricult. malleable	15.00 to 15.50
Relay. rails, 60 lb. and under	20.50 to 23.50
Relay. rails, 70 lb. and over	26.50 to 29.00

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-fin. rounds, shaftings, screw stock	3.75c.
Black sheets (No. 24)	4.25c.
Galv. sheets (No. 24)	5.10c.
Blue ann'l'd sheets (No. 10)	3.45c.
Black corrug. sheets (No. 24)	4.30c.
Galv. corrug. sheets	5.15c.
Structural rivets	3.95c.
Boiler rivets	3.95c.
	Per Cent Off List
Tank rivets, 7/8-in. and smaller, 100 lb. or more	65
Less than 100 lb.	60
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-pressed nuts, sq., blank or tapped, 200 lb. or more	60
Less than 200 lb.	50
Hot-pressed nuts, hex., blank or tapped, 200 lb. or more	60
Less than 200 lb.	50

Canada

Large Structural Projects Up for Bids—Scrap More Active

TORONTO, ONT., Aug. 13.—The undertone of the pig iron market is improving. Inquiries are more numerous and many appear to be of the kind that will soon turn into actual sales. Small-tonnage spot orders predominate, but weekly sales totals are gaining. The daily iron melt is almost at capacity. Pig iron prices are firm but unchanged.

Prices per gross ton:

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75	$24.60
No. 2 fdy., sil. 1.75 to 2.25	24.10
Malleable	24.60
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75	$26.00
No. 2 fdy., sil. 1.75 to 2.25	25.50
Malleable	26.00
Basic	24.50
Imported Iron, Montreal Warehouse	
Summerlee	$33.50
Carron	33.00

Structural Steel.—While most fabricated steel awards of the week were in lots of 1000 tons, several orders pending for early closing call for 6000 and 8000 tons. Approximately 3500 tons of steel will be required for a 12-story building to be erected at Montreal, for the Montreal Star Co. Between 5000 and 6000 tons of steel will be needed for a bridge to be erected over the St. Jacques River for the Department of Public Highways, Quebec, Que., while in addition other large tonnages are in prospect for early closing. The Halifax-Dartmouth Bridge Co., Ltd., Halifax, N. S., has been formed, and proposes to build a steel bridge across Halifax Harbor. The center span will be 960 ft. long.

Old Material.—The market is passing out of the summer slump. New inquiries and orders are reported in better volume and activity on a par with that of May and June is looked for. Consuming plants as a whole are busy and their scrap requirements are steadily expanding. Mills, however, are well taken care of to the end of this quarter, except for fill-in supplies. The demand for steel scrap is spotty in Toronto, but is holding at a good level in the Montreal district. Prices are unchanged.

Dealers' buying prices:

	Per Gross Ton	
	Toronto	Montreal
Heavy melting steel.	$10.00	$8.50
Rails, scrap	11.00	9.00
No. 1 wrought	10.00	12.00
Machine shop turnings	7.50	5.00
Boiler plate	7.50	6.00
Heavy axle turnings	8.00	7.50
Cast borings	7.50	5.00
Steel turnings	7.50	6.50
Wrought pipe	6.00	6.00
Steel axles	15.00	20.00
Axles, wrought iron	17.00	22.00
No. 1 machinery cast	....	17.00
Stove plate	....	13.00
Standard carwheels	....	16.00
Malleable	....	13.00
	Per Net Ton	
No. 1 mach'ry cast	$16.00	....
Stove plate	12.00	....
Standard carwheels	15.00	....
Malleable scrap	14.00	....

Cincinnati

Demand for Roofing Sheets Gains—Scrap Buoyant

CINCINNATI, Aug. 13.—Local sellers of pig iron are unable to report any sizable sales for the week, and furnaces, which heretofore have reported good bookings each week, received only small orders, generally for carload lots. Except for an inquiry from the Anderson Stove Co., Anderson, Ind., for 500 to 1000 tons of either Northern or Southern iron, there is no sizable tonnage before the trade.

Prices per gross ton, deliv'd Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25	$19.89 to $20.39
Ala. fdy., sil. 1.75 to 2.75	17.69 to 18.19
Ala. fdy., sil. 2.25 to 2.75	18.19 to 18.69
Tenn. fdy., sil. 1.75 to 2.25	17.69 to 18.19
S'th'n Ohio silvery, 8 per cent	26.89

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

Finished Material.—Increasing demand for highway and roofing sheets caused the bookings of district sheet mills to exceed production during the past week and accordingly backlogs were expanded slightly. This gain in demand, combined with the heavy specifications from manufacturers of electrical devices, metal furniture and similar products, has offset the recession in automotive demand in all lines except high-finished sheets and cold-rolled strip. In these latter two products, district mills report that prompt deliveries can be made, but that in other lines shipments are still well extended. The price situation on galvanized sheets is showing improvement and it is believed that few, if any, further concessions will be encountered. The slackening of building operations here has noticeably affected structural steel demand, and fabricators report that their market is dull.

Coke.—Specifications on by-product foundry coke are heavier. District oven representatives state that, should coke continue to be taken on contract at the present rate, the total amount moved in August will be about equal to the July tonnage, which was the largest since March. New business continues to be quiet and, except for occasional spot shipments, fresh bookings are negligible.

Old Material.—With mill production continuing at a good rate and the better grades of scrap becoming increasingly scarce, the market here is firmer than at any time within the last four months. In fact, dealers continue to bid higher for heavy melting steel and similar grades, but even more attractive prices fail to bring out sufficient material to cover commitments. This situation has reduced yard stocks noticeably and the only accumulation of scrap on hand is in the cast iron grades. Accordingly, further price increases of 25c. a ton have been made on heavy melting steel and No. 2 railroad wrought, and the spread on cast iron borings has been broadened by making the top quotation $9.75, while No. 1 machinery cast is down 25c.

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel	$14.00 to $14.50
Scrap rails for melting	14.00 to 14.50
Loose sheet clippings	9.00 to 9.50
Bundled sheets	11.00 to 11.50
Cast iron borings	9.25 to 9.75
Machine shop turnings	8.50 to 8.75
No. 1 busheling	10.50 to 11.00
No. 2 busheling	7.00 to 7.50
Rails for rolling	14.50 to 15.00
No. 1 locomotive tires	14.25 to 14.75
No. 2 railroad wrought	14.00 to 14.50
Short rails	18.50 to 19.00
Cast iron carwheels	12.75 to 13.25
No. 1 machinery cast	19.00 to 19.50
No. 1 railroad cast	15.25 to 15.75
Burnt cast	10.25 to 10.75
Stove plate	10.25 to 10.75
Brake shoes	10.25 to 10.75
Agricultural malleable	14.25 to 14.75
Railroad malleable	15.25 to 15.75

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and struc. shapes	3.40c.
Bars, soft steel or iron	3.30c.
New billet reinforc. bars	3.15c.
Rail steel reinforc. bars	3.00c.
Hoops	4.05c.
Bands	3.50c.
Cold-fin. rounds and hex. Squares	3.85c. 4.35c.
Black sheets (No. 24)	4.05c.
Galvanized Sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.45c.
Structural rivets	3.85c.
Small rivets	65 per cent off list
No. 9 ann'l'd wire, per 100 lb	$3.00
Com. wire nails, base per keg	2.85
Cement c't'd nails, base 100 lb. keg	2.85
Chain per 100 lb	8.75
	Net per 100 Ft.
Lap-weld steel boiler tubes, 2-in.	$16.00
4-in.	33.00
Seamless steel boiler tubes, 2-in.	17.00
4-in.	34.00

Detroit

Further Increase in Ford Production Scheduled for August —Better Steel Demand Looked For

DETROIT, Aug. 13.—The automotive industry, as usual, holds the center of the stage in this district, with the low-priced cars right in front of the footlights. The lead developed last month by the Ford Motor Co. seems to be increasing, as it is understood that the Ford company has scheduled 190,000 units for August, while the Chevrolet Motor Co. will probably not get within 50,000 units of that total.

Complete statistics on July motor car production have not yet been received, but of those companies which have made returns, about half exceeded their estimated output for the month. The manufacturers whose final figures show an increase over early estimates for July are the Hupp Motor Car Corporation, Olds Motor Work, Graham-Paige Motors Corporation, H. H. Franklin Mfg. Co. and the Chrysler Corporation.

The Packard Motor Car Co. will introduce new models at increased prices some time during the fall. These will be eight-cylinder cars.

The Auburn Automobile Co's. new

ESTIMATED AUTOMOBILE PRODUCTION FOR AUGUST
(Actual Figures for June and July Shown)

	June	July	August (Estimated)
Auburn	3,144	2,026	2,000
Buick	14,665	26,279	30,000
Chevrolet	151,297	137,831	135,000
Chrysler	42,351	27,171	32,000
Ford	177,419	175,000	190,000
Franklin	1,405	1,325	1,200
Graham-Paige	5,987	4,849	4,500
Hudson-Essex	31,737	23,707	20,000
Hupmobile	2,030	2,494	2,500
Nash	9,070	6,672	7,000
Oldsmobile and Viking	7,361	11,220	12,000

Cord model, with a price range slightly over $3,000, is now under production, with a schedule for August of 1100 units. The rate will be gradually increased to a maximum of 1500 units a month.

The table on page 441 shows the production standing for the month just passed, in comparison with that for June and the estimated production for August:

Steel commitments from the automotive plants are not coming in as fast as might be desired, but a general improvement is looked for to take care of the expected production increases for September and October. Mill prices are generally firm.

Structural steel demand in this district has been light, but apparently a change is due in the next 10 days, when a number of small and medium-sized jobs will be announced for bids. One of these is a telephone building at Benton Harbor, Mich., which will probably require 360 tons. There are also projected telephone buildings at Saginaw and Detroit which have not yet progressed far enough to permit estimates of the steel tonnage.

The market on waste material in this district continues firm but no changes in price have been registered during the past week.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Hvy. melting and shov. steel	$14.25 to $14.75
Borings and short turnings	9.00 to 9.50
Long turnings	8.50 to 9.00
No. 1 machinery cast	12.50 to 13.00
Automobile cast	13.00 to 13.50
Hydraul. comp. sheets	14.00 to 14.50
Stove plate	9.00 to 9.50
New No. 1 busheling	12.50 to 13.00
Old No. 1 busheling	11.00 to 11.50
Sheet clippings	8.75 to 9.25
Flashings	13.00 to 13.50

Fabricated Structural Steel

Railroad Work Will Take Almost 75 Per Cent of Total Awards of 43,000 Tons

RAILROAD work played a conspicuous part in structural steel lettings the past week, awards by carriers having accounted for close to 75 per cent of the total of 43,000 tons. Over 19,000 tons will go into the construction of highway and railroad bridges. For the first time in many weeks non-industrial projects were a comparatively minor factor in the market. Outstanding transactions were 14,500 tons for two bridges across the Hackensack River in New Jersey for the Pennsylvania Railroad and 9400 tons for a New York subway section.

Highway and railroad bridges were the largest single source of new inquiries during the week. Slightly more than 16,000 tons out of a total of 42,000 tons of fresh work will be required for that purpose. Among the jobs on which bids are being taken are 7000 tons for a highway bridge at Toledo, 6000 tons for a New York bank building and 5000 tons each for a highway bridge at Quebec and for a bank building at Akron, Ohio. Awards follow:

BOSTON, 250 tons, River Street bridge, to Boston Bridge Works, Inc.

BOSTON, 160 tons, Lamson & Hubbard Co. store, to unnamed fabricator.

BEVERLY, MASS., 200 tons, Bass River bridge, to Boston Bridge Works, Inc.

GOULD'S MILL, VT., 200 tons, bridge, Springfield Terminal Railway, to Boston Bridge Works, Inc.

CENTRAL VERMONT RAILWAY, 200 tons, bridge at White River Junction, Vt., to American Bridge Co.

BOSTON & MAINE RAILROAD, 190 tons, machine shop at Somerville, Mass., to New England Structural Co.

NEW YORK, 300 tons, building at 1418 Broadway, to Taylor-Fichter Steel Construction Co., Inc.

NEW YORK, 2000 tons, office building at Madison Avenue and Fifty-seventh Street, to Taylor-Fichter Steel Construction Co., Inc.

NEW YORK, 1500 tons, hotel at Sixty-seventh Street and Broadway, to Dreier Iron Works, Inc.

NEW YORK, 500 tons, building for Lawyers' Club at 16 Vesey Street, to Taylor-Fichter Steel Construction Co., Inc.

NEW YORK, 500 tons, 170th Regiment Armory, to Dreier Iron Works, Inc.

NEW YORK, 9400 tons, route 106, section 6, of subway, to McClintic-Marshall Co.

PENNSYLVANIA RAILROAD, 14,500 tons; bridges over Hackensack River in New Jersey; 10,000 tons for passenger bridge, to American Bridge Co.; 4500 tons for freight bridge, to Phoenix Bridge Co.

PENNSYLVANIA RAILROAD, 1100 tons, bridges; 500 tons to American Bridge Co. and 600 tons to McClintic-Marshall Co.

LEBANON, PA., 180 tons, silk mill, to Progressive Iron Works, Reading, Pa.

READING, 325 tons, building for Y. M. C. A., to Progressive Iron Works.

SEABOARD AIR LINE, 200 tons, bridge at Raleigh, N. C., to American Bridge Co.

NEW KENSINGTON, PA., 1300 tons, United States Aluminum Co., to McClintic-Marshall Co.

LANSING, MICH., 1600 tons, power house, to Whitehead & Kales.

DETROIT, 200 tons, bridge for Detroit, Toledo & Shore Line Railroad, to American Bridge Co.

ECORSE, MICH., 375 tons, bridges at Highland Park and Ecorse for Detroit, Toledo and Ironton Railroad, to American Bridge Co.

GREENFIELD, OHIO, 700 tons, bridge for Detroit, Toledo and Ironton Railroad, to American Bridge Co.

CLEVELAND, 445 tons, First Christian Science Church, to Massillon Bridge & Structural Co.

BIG FOUR RAILROAD, 1000 tons, bridge construction, to American Bridge Co.

CHICAGO, 425 tons, Swift & Co., fertilizer plant, to Rochester Bridge Co., Rochester, Ind.

CHICAGO, 100 tons, building for Pie Bakers of America, to Midland Structural Steel Co., local.

CHICAGO, MILWUKEE, ST. PAUL & PACIFIC, 3200 tons; 2000 tons for car repair shops at Milwaukee, to Worden-Allen Co.; 1200 tons for grade separation work, to American Bridge Co.

EAST ST. LOUIS, ILL., 800 tons, mill building for Laclede Steel Co., to St. Louis Structural Steel Co.

ROCKFORD, ILL., 400 tons, Rockford Drop Forge Co., to Wisconsin Bridge Co.

KENOSHA, WIS., 200 tons, Young Men's Christian Association Building, to an unnamed bidder.

NORTHERN PACIFIC, 375 tons, viaduct at Superior, Wis., to American Bridge Co.; previously reported to an unnamed bidder.

SAWTELLE, CAL., 100 tons, Soldiers' Home addition, to Brombacher Iron Works.

OLYMPIA, WASH., 100 tons, bridge over Solduc River, to Isaacson Iron Works.

BOISE, IDAHO, 257 tons, reclamation work for United States Bureau of Reclamation, to unnamed interest.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

BOSTON, 600 tons, South Station.

NEW YORK, 1000 tons, building for Gordon Baking Co. in Queens.

NEW YORK, 6000 tons, Farmers Loan & Trust Co. building; general contract to George A. Fuller Co.

STATE OF NEW JERSEY, 2000 tons, bridge over Hackensack River; J. F. Chapman & Son, Hillside, N. J., low bidder on general contract.

PHILADELPHIA, 500 tons of sheet steel piling, Dorset Boulevard.

PHILADELPHIA, 1500 tons, reported as 800 last week, Henry Street Bridge.

JAMAICA, N. Y., 700 tons, garage for Nash Motors Co.

MONTREAL, 3500 tons for Montreal Star Co.

QUEBEC, 5000 tons, bridge over St. Jacques River for Department of Public Highways.

ROCHESTER, N. Y., 3500 tons, city bridge.

NILES, OHIO, 500 tons, Niles Trust Co. Building.

AKRON, OHIO, 5000 tons, bank and office building for Central Savings & Trust Co.

TOLEDO, 7000 tons, previously reported with tonnage unstated, Maumee River bridge; bids taken.

CLEVELAND, 600 tons, two grade elimination bridges for Cleveland Suburban Railway Co.

CLEVELAND, 2000 tons, jail courts building.

CLEVELAND, 200 tons, Lakewood sales and service station for Packard Motor Car Co.

CLEVELAND, 250 tons, hangar for Curtiss Aircraft Corporation.

FINDLAY, OHIO, 150 tons, building for Ohio Oil Co.

POWERTON, ILL., 3000 tons, power house; Sargent & Lundy, engineers.

CHICAGO, tonnage not stated, food products building; Burnham Brothers, Inc., architects.

CHICAGO, tonnage not stated, 31-story garage; J. B. French & Co., general contractor.

STURGEON BAY, WIS., tonnage not stated, 140-ft. lift span.

EAST ST. LOUIS, ILL., 425 tons, Curtiss Airport building.

DALLAS, TEX., 1200 tons, building for Bell Telephone Co.

PHOENIX, ARIZ., 400 tons, building for the Calumet & Arizona Mining Co.

SEATTLE, 700 tons sheet piling, sea wall on Alki Street; bids opened.

Non-Ferrous Metal Markets

Copper Demand Increasing, Tin Quiet and Steady, Zinc and Lead Firm

NEW YORK, Aug. 13.

Copper.—July statistics favorable to sellers, and expanding sales have been factors influencing a stronger copper market. In July, according to the American Bureau of Metal Statistics, there was an increase in stocks of refined copper of 14,689 tons over June and a decrease of 12,000 tons in blister copper. Thus the increase in copper above ground for the month was a little over 2500 tons. In view of the fact that only 40,200 tons was shipped abroad, as compared with 50,000 to 55,000 tons normally, this increase is considered bullish. Shipments to domestic consumers at 138,900 tons in July were about 4800 tons less than in June, while the foreign shipments last month were about 8200 tons less than in the previous month. A significant fact is that production at the mines at 2559 tons per day was nearly 200 tons per day less in July than in June and was about 600 tons per day less than the peak of 3163 tons in April, when curtailment in production was started; the July daily rate is the smallest since August last year. Sales of copper are reported as eminently satisfactory under present conditions. The total thus far to foreign consumers has been about 21,000 tons this month. Domestic sales are rapidly expanding, having been about 17,000 tons last week as compared with about 11,000 tons the week before and 4000 tons per week during the recent dull markets in the past two months. Prices continue very firm and unchanged. Electrolytic copper is quoted at 18c. delivered in the Connecticut Valley, with the official quotation of Copper Exporters, Inc., at 18.30c., c.i.f. usual European ports. There has been no change in these quotations since the middle of April. Lake copper is also firm and unchanged at 18 to 18.12½c., delivered.

Tin.—Sales of spot Straits tin for the week ended Saturday, Aug. 10, were about 1200 tons. The action of the Federal Reserve Board in increasing its rate from 5 to 6 per cent on Aug. 8 had its effect on the tin market in London, together with some sentimental influence on other metals. On the following day the London market declined and, because of this, sales in New York amounted to 600 tons. This was practically all bought by consumers, with deliveries as far ahead as March. It is believed that

THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY

	Aug. 13	Aug. 12	Aug. 10	Aug. 9	Aug. 8	Aug. 7
Lake copper, New York	18.12½	18.12½	18.12½	18.12½	18.12½	18.12½
Electrolytic copper, N. Y.*	17.75	17.75	17.75	17.75	17.75	17.75
Straits tin, spot, N. Y.	46.37½	46.50	.....	46.62½	46.87½	47.00
Zinc, East St. Louis	6.80	6.80	6.80	6.80	6.80	6.80
Zinc, New York	7.15	7.15	7.15	7.15	7.15	7.15
Lead, St. Louis	6.55	6.55	6.55	6.55	6.55	6.55
Lead, New York	6.75	6.75	6.75	6.75	6.75	6.75

*Refinery quotation; price ¼c. higher delivered in the Connecticut Valley.

Rolled Products

Prices on rolled non-ferrous products are unchanged from those prevailing one week ago.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—
- High brass ..... 23.25c.
- Copper, hot rolled ..... 26.75c.
- Zinc ..... 10.25c.
- Lead (full sheets) ... 11.00c. to 11.25c.

Seamless Tubes—
- High brass ..... 28.25c.
- Copper ..... 29.25c.

Rods—
- High brass ..... 21.25c.
- Naval brass ..... 24.00c.

Wire—
- Copper ..... 19.87½c.
- High brass ..... 23.75c.

Copper in Rolls ..... 26.75c.
Brazed Brass Tubing ..... 30.87½c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also to St. Louis on shipments to points west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide ..... 33.00c.
Tubes, base ..... 42.00c.
Machine rods ..... 34.00c.

Chicago Warehouse

(Prices Cover Trucking to Customers' Doors in City Limits)

	Base per Lb.
Sheets—	
High brass	23.25c.
Copper, hot rolled	27.75c.
Copper, cold rolled, 14 oz. and heavier	30.00c.
Zinc	10.75c.
Lead, wide	11.35c.
Seamless Tubes—	
Brass	28.25c.
Copper	29.25c.
Brass Rods	21.25c.
Brazed Brass Tubes	31.00c.

New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass	21.12½c. to 22.12½c.
Copper, hot rolled, base sizes	27.75c. to 28.75c.
Copper, cold rolled, 14 oz. and heavier, base sizes	30.00c. to 31.00c.
Seamless Tubes—	
Brass	26.00c. to 27.00c.
Copper	29.12½c. to 30.12½c.
Brazed Brass Tubes	29.12½c. to 30.12½c.
Brass Rods	18.87½c. to 19.87½c.

New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets (No. 9), casks	10.50c. to 11.00c.
Zinc sheets, open	11.50c. to 12.00c.

Metals from New York Warehouse

Delivered Prices, Per Lb.

Tin, Straits pig	48.00c. to 49.00c.
Tin, bar	50.50c. to 51.50c.
Copper, Lake	19.50c.
Copper, electrolytic	19.25c.
Copper, casting	19.00c.
Zinc, slab	7.75c. to 8.25c.
Lead, American pig	7.50c. to 8.00c.
Lead, bar	9.50c. to 10.00c.
Antimony, Asiatic	10.50c. to 11.00c.
Aluminum No. 1 ingots for remelting (guaranteed over 99% pure)	25.00c. to 26.00c.
Alum. ingots, No. 12 alloy,	24.00c. to 25.00c.
Babbitt metal, commercial grade,	25.00c. to 35.00c.
Solder, ½ and ½	30.75c. to 31.75c.

Metals from Cleveland Warehouse

Delivered Prices, Per Lb.

Tin, Straits pig	52.00c.
Tin, bar	54.00c.
Copper, Lake	19.50c.
Copper, electrolytic	19.25c.
Copper, casting	18.75c.
Zinc, slab	7.75c. to 8.00c.
Lead, American pig	7.25c. to 7.50c.
Lead, bar	9.75c.
Antimony, Asiatic	16.00c.
Babbitt metal, medium grade	18.75c.
Babbitt metal, high grade	56.00c.
Solder, ½ and ½	31.75c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged customers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	14.75c.	16.25c.
Copper, hvy. and wire	14.50c.	15.75c.
Copper, light and bottoms	12.50c.	13.75c.
Brass, heavy	8.50c.	9.50c.
Brass, light	7.50c.	8.50c.
Hvy. machine composition	12.00c.	13.00c.
No. 1 yel. brass turnings	9.75c.	10.50c.
No. 1 red brass or compos. turnings	11.25c.	12.25c.
Lead, heavy	5.25c.	5.75c.
Lead, tea	4.25c.	5.25c.
Zinc	3.50c.	4.25c.
Sheet aluminum	14.00c.	16.00c.
Cast aluminum	12.25c.	14.25c.

consumers here are well covered for this year and that they took advantage of the lower prices to cover future requirements. London quotations have been unusually steady up to Aug. 9, due largely to the support given to the market by the so-called "group." Prices at Singapore today were £217, equivalent to about 47c., New York. Thus, values in the Far East are still high relative to the London and New York markets. In London today spot standard was quoted at £208 10s., future standard at £212 10s. and spot Straits at £212. A fair business was reported in New York today with spot Straits quoted at 46.37½c.

Lead.—Demand is a little quieter than it was last week, but sales, which are largely confined to spot and nearby delivery of carload and small lots, continue in fair volume. There is some September business going, but the bookings are not yet large. Prices are very firm at 6.55c. St. Louis. The quotation of the leading interest is unchanged at 6.75c. New York.

Zinc.—The market is devoid of news features. Prices continue firm for Prime Western with most producers asking 6.80c. East St. Louis, or 7.15c., New York. Most orders, which are small, are for early shipment. The manifestation of increasing interest last week in future delivery has not continued to be evident thus far this week. Production of ore in the Joplin district was estimated at 13,500 tons, which was offset by nearly an equivalent amount of shipments. The ore surplus is now estimated at about 45,000 tons. The price is unchanged at $44 per ton, Joplin.

Antimony.—In a quiet market Chinese metal is quoted at 8.75c. for spot and 8.62½c. for future, duty paid, New York.

Nickel.—Wholesale lots of ingot nickel are quoted at 35c. per lb., shot nickel at 36c. and cathode electrolytic nickel at 35c.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is obtainable at 23.90c. per lb., delivered, according to published quotations.

Non-Ferrous Metals at Chicago

CHICAGO, Aug. 13.—This market is less active both in sales and inquiry. Prices for tin are easier while quotations on lead are advanced. The old metal market is quiet.

Prices per lb., in carload lots: Lake copper, 18.50c.; tin, 47.62½c.; lead, 6.70c.; zinc, 6.87½c.; in less-than-carload lots, antimony, 9.62½c. On old metals we quote copper wire, crucible shapes and copper clips, 14c.; copper bottoms, 11.50c.; red brass, 11.50c.; yellow brass, 8c.; lead pipe, 4.50c.; zinc, 3.25c.; pewter, No. 1, 24.50c.; tin foil, 26c.; block tin, 36c.; aluminum, 12.87½c.; all being dealers' prices for less-than-carload lots.

Reinforcing Steel

Awards Total Only 4800 Tons and Inquiries 2600 Tons

QUIETNESS still exists in reinforcing steel, awards in the past week having totaled only 4800 tons. Eight hundred tons was for an office building in Chicago and 600 tons for an office structure in San Francisco. New inquiries will require 2600 tons. Awards follow:

BOSTON, 250 tons, Boston & Albany roundhouse, to Truscon Steel Co.

SOMERVILLE, MASS., 150 tons, Boston & Maine roundhouse, to Joseph T. Ryerson & Son, Inc.

NEW YORK, 270 tons, route 106, section 6, of subway, to McClintic-Marshall Co.

NEW YORK, 300 tons, building at 40 Wall Street, to Carroll-McCreary Co., Inc.

NEWARK, N. J., 600 tons, building for Packard Motor Car Co., to Igoe Brothers.

CHICAGO, 800 tons, Trustee System building, to Calumet Steel Co.

CHICAGO, 400 tons, building for Warner Brothers, Inc., to an unnamed bidder.

CHICAGO, 100 tons, West Town Bank building, to Calumet Steel Co.

CHICAGO, 450 tons, Parker public school, to an unnamed bidder.

CHICAGO, 100 tons, Woolworth store, to Concrete Engineering Co.

BERWYN, ILL., 160 tons, bank building, to Calumet Steel Co.

SAN FRANCISCO, 400 tons, warehouse for American Can Co., to Soule Steel Co.

SAN FRANCISCO, 175 tons, abattoir, to W. S. Wetenhall Co.

SAN FRANCISCO, 600 tons, Shell Oil building, to Soule Steel Co.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

HARTFORD, CONN., 700 tons, warehouse.

NEW YORK, 500 tons, boardwalk at Rockaway Beach.

TOLEDO, 130 tons, Maumee River bridge.

CHICAGO, tonnage not stated, apartment building on North Sheridan Road; Levy & Klein, architects.

CHICAGO, 100 tons, garage on Plymouth Court; J. B. Franch, general contractor.

CHICAGO, 150 tons, public school.

HINSDALE, ILL., 200 tons, sewage disposal plant.

STOCKTON, CAL., 150 tons, theater; bids Aug. 12.

SAN FRANCISCO, 630 tons, printing plant on First Street; bids being taken.

Lincoln Company Enlarges Plant

To provide increased manufacturing facilities, the Lincoln Electric Co., Cleveland, manufacturer of Linc-Weld motors and Stable-Arc welders, has placed contracts for the erection of a plant addition which will add approximately ½ acre more floor space. The new structure will be aproximately 110 x 200 ft. and will have a 65-ft. span electric traveling crane. Steel structure is to be fabricated by the arc welding process in the plant of the Austin Co., Cleveland, which designed and will erect the building.

Railroad Equipment

Central of Georgia Will Buy 500 Box Cars

FRESH inquiries for almost 1300 cars, including 500 box cars for the Central of Georgia, 400 refrigerator cars for the Pacific Fruit Express and 200 gondola underframes for the Santa Fe, appeared during the past week. Aside from the purchase of 300 flat cars by the Northern Pacific, buying has been negligible. The Texas & Pacific has placed an order for 15 oil-burning locomotives. Details of the week's business follow:

Santa Fe is in market for 200 gondola underframes.

New York, New Haven & Hartford is inquiring for 12 steel underframes for wooden baggage cars and for from 2 to 20 oil-electric rail motor cars. This railroad has ordered one club car from Osgood Bradley Car Co.

Central of New Jersey is asking for revised bids on 250 70-ton steel mill gondola cars.

Pacific Fruit Express is expected to buy 400 50-ton refrigerator cars.

Patapsco & Back River has ordered two locomotives from Baldwin Locomotive Works.

Texas Corporation is inquiring for four tank cars.

Moss Tie Co. has contracted for one special box car with Mount Vernon Car Mfg. Co.

Philadelphia & Reading Coal & Iron Co. has purchased 10 automatic drop dump cars from American Car & Foundry Co. and three 30-ton electric locomotives from Westinghouse Electric & Mfg. Co.

Braden Copper Co. has ordered 23 30-ton flat cars from American Car & Foundry Co.

Phillips Petroleum Co. has ordered 10 tank cars from General American Tank Car Corporation and five tank cars from American Car & Foundry Co.

Cities Service Tank Line has bought four tank cars from American Car & Foundry Co.

Texas & Pacific has bought 15 oil-burning locomotives from Lima Locomotive Works.

Chicago & North Western will buy 150 tram cars.

Central of Georgia is in market for 500 box cars and may make inquiry for 50 flat cars.

Northern Pacific has ordered 300 flat cars from Siems-Stemble Co.

Unfilled Brass Ingot Orders

CHICAGO, Aug. 12.—On August 1, unfilled orders for brass and bronze ingots and billets on the books of the members of the Non-Ferrous Ingot Metal Institute amounted to a total of 13,243 net tons, according to an announcement of the institute issued today. This compares with 13,339 tons on June 1, with 17,215 tons on May 1, and with 22,755 tons on April 1.

Hickman, Williams & Co. have been made agents in the Chicago district for Pioneer iron, which is produced by Republic Iron & Steel Co.

PERSONAL

ROBERT W. WOLCOTT, president Lukens Steel Co., sailed Aug. 3 on the DeGrasse for a two months' trip to European countries. H. B. SPACKMAN, formerly vice-president and a member of the board of directors, also is in Europe for the summer.

—

HERMAN ARBER, who has been manager of the coil department of the Dudlo Mfg. Co., Fort Wayne, Ind., subsidiary of the General Cable Corporation, has been appointed General plant superintendent, succeeding WENDELL C. GLASS, who recently resigned. GEORGE KIERSPE, manager of the Dudlo coil department at Rome, N. Y., will assume Mr. Arber's former duties at Fort Wayne.

—

EDWIN KARLSON has been made vice-president in charge of manufacturing of the Peerless Motor Car Corporation, Cleveland. He was formerly with the Marmon Motor Car Co., Indianapolis. S. T. Creighton, also formerly with the Marmon company, has been appointed purchasing agent.

—

GEORGE P. LENZ has been appointed purchasing agent of the Corrigan, McKinney Steel Co., Cleveland, to succeed JOHN FIELDING, who has tendered his resignation, effective Sept. 1, to become associated with the Butler Consolidated Coal Co., Cleveland. Mr. Lenz has been with the company about 25 years, and for some time has been assistant purchasing agent.

—

CHARLES E. GRIFFITH has resigned as treasurer and director of the Illinois Iron & Bolt Co., Carpentersville, Ill., after having served the organization for 56 years. He was made secretary of the company in 1888 after having filled the position of bookkeeper for 25 years. At various times he acted as purchasing agent, and for many years has been a director of the company.

—

WALTER H. UNDERWOOD, formerly sales manager for the St. Louis Coke & Iron Co., is now in the pig iron sales department of the Chicago office of Hickman, Williams & Co.

—

CHARLES M. EASTERLY, formerly with the Inland Steel Co., Chicago, has been elected first vice-president in charge of sales of the Canton Rolling Mills Corporation, Canton, Ohio.

—

S. S. PORTER, vice-president, Calumet Steel Co., Chicago, returned Aug. 8 from a six weeks' motor trip through England and Scotland.

—

C. K. EVERITT, managing director and works manager, Edgar Allen & Co., Ltd., Sheffield, England, will attend the convention of the American Society for Steel Treating in September at Cleveland, in company with American agents for Allen steels.

PAUL A. MEEHAN, formerly with the American Dressler Tunnel Kilns, Inc., Cleveland, has been placed in charge of the newly-organized tunnel kiln department of the Simplex Engineering Co., Washington, Pa.

—

WILLIAM MCBRIDE, up to a year ago president of the Fort Pitt Spring & Mfg. Co., Pittsburgh, has been elected president of the Mead-Penn Iron Works Co., Meadville, Pa., succeeding OTTO KOHLER.

—

W. D. LITTLE, of the Hoskins Mfg. Co., Detroit, has been reelected chairman of the electric furnace section of the National Electrical Manufacturers Association, New York, and R. F. BENZINGER, associated with the Electric Furnace Co., Salem, Ohio, has been reelected secretary.

—

ALAN G. CARY has been appointed representative in the St. Paul and Minneapolis territory, with offices at 204 Endicott Building, St. Paul, for the Union Chain & Mfg. Co., Sandusky, Ohio.

—

WILLIS B. KYLE, who resigned July 1 as vice-president and general manager of the McClintic-Marshall Co., of California, has purchased a one-third interest in the Modern Iron Works, Los Angeles. He is being succeeded as manager of the McClintic-Marshall Co. in the Los Angeles district by E. F. GOHL.

—

PHILIP DRESSLER, president, American Dressler Tunnel Kilns, Inc., Cleveland, will personally take charge of all engineering and design work in connection with tunnel kiln installations. L. A. VINCENT, vice-president, will take care of the thermal engineering department of the company.

—

P. F. BAILLET has been made manager of foreign sales, with offices at 461 Eighth Avenue, New York, for Ampco Twist Drill Co., Jackson, Mich.

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E. F. DUBRUL, general manager, National Machine Tool Builders' Association, Cincinnati, has been appointed on the council of the American Institute of Weights and Measures in place of the late Worcester R. Warner.

—

FREDERICK H. PAYNE, president of the Greenfield Tap & Die Corporation, Greenfield, Mass., has been made president of the newly created Massachusetts Industrial Commission.

—

GEORGE MCLAUGHLIN, for a number of years a member of the Cincinnati office of the American Sheet & Tin Plate Co., has been promoted to assistant manager of sales at Cincinnati.

—

WILLIAM FORSSTROM, for the last nine years chief engineer of the Wisconsin Steel Works, International Harvester Co., has retired on account of ill health. He will make his permanent home in Tucson, Ariz., where he has business interests. Previous to his connection with the Wisconsin Steel Works, he was for four years chief engineer for the Youngstown Sheet & Tube Co., with headquarters at Youngstown. For 13 years Mr. Forsstrom was chief engineer for the LaBelle Iron Works, and previous to that he served the Jones & Laughlin Steel Corporation.

—

GEORGE W. DAVIS, Chicago branch manager of Gears & Forgings, Inc., has been transferred to the Milwaukee office, where he will have charge of sales.

—

O. H. AMMANN, engineer of the Fort Lee suspension bridge across the Hudson River, and GUSTAV LINDENTHAL, engineer of the Hell Gate Bridge, New York, have been added to the staff of the Rosenwald Museum of Industry and Science, Chicago.

—

E. R. S. REEDER, formerly district manager of sales for the Ludlum Steel Co., has been appointed manager of special contracts of the Widia department by Thomas Prosser & Son, New York, agents in the United States for Friedrich Krupp, A. G., Germany.

—

GEORGE R. HARRISON has been appointed Cleveland representative, with offices in the Rockefeller Building, for the Reading Chain & Block Corporation.

To Consolidate Aircraft and Propeller Companies

The Standard Steel Propeller Co., Pittsburgh, and the United Aircraft & Transport Corporation, New York, will be consolidated, pending the approval of holders of 75 per cent of the stock of the Standard Company. The United Company, which was formed several months ago by a merger of several large airplane and air transport companies, already controls the Hamilton Propeller Co.

The Standard company has been manufacturing steel propellers for some time and is at present working on plant additions at Homestead, Pa., which will quadruple present output. The company will remain at Pittsburgh and present officers will probably be retained.

The Ohio Gear Co., Cleveland, has appointed A. R. Young, Indianapolis, as its representative in western Ohio and in Indiana; the Specialty Sales & Engineering Co., in western Pennsylvania; and the E. G. Long Co., New York, in the New York district.

OBITUARY

HENRY S. PICKANDS, member of the firm of Pickands, Mather & Co., Cleveland, and prominent in the iron ore, pig iron and shipping industry, died of heart failure Aug. 10, in his office. He was 53 years of age. Mr. Pickands was born in 1875 in Marquette, Mich., and when he was six years of age his parents moved to Cleveland. He was

HENRY S. PICKANDS

graduated from University School, Cleveland, in 1894, and from Sheffield Scientific School of Yale University in 1897. On leaving college he went to work in the office of Pickands, Mather & Co., which had been founded in 1881 by his father, Col. James Pickands, and Samuel Mather. He became a partner in the firm in 1900. He devoted special attention to the operation of blast furnaces and docks and to the purchasing department of the firm. Aside from his membership in Pickands, Mather & Co., he had various business connections, being a director of the American Shipbuilding Co., vice-president of the Great Lakes Towing Co., director of the Union Trust Co., vice-president of the Interlake Steamship Co., all of Cleveland, and a member of the executive committee of the Empire Steel Corporation, Mansfield, director of the Zenith Furnace Co., Duluth, and president of the Toledo Furnace Co., Toledo. He took a deep interest in civic affairs and was noted for his philanthropies. He was chairman of the board of trustees of University School, Cleveland, and its leading benefactor. Always an ardent prohibitionist, he had been president of the Dry Maintenance League of Cleveland for the past nine years and at times took an active part in political campaigns as a speaker in behalf of prohibition. He was a member of the Cleveland Chamber of Commerce, Union Club, and University Club of Cleveland, Yale Club of New York, and various other clubs. Mr. Pickands was the second member of the firm to be taken away suddenly this year, Harry Coulby, another of the partners, having died early in the year.

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THOMAS E. GRIFFITH, for twelve years general manager of the W. S. Tyler Co., Cleveland, died Aug. 10, following an operation. He was 50 years of age and became connected with the company as an office boy about 35 years ago.

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MERTLAND M. HEDGES, formerly president of the Hedges-Walsh-Weidner Co., Chattanooga, Tenn., manufacturer of boilers, died at his home at Signal Mountain, Tenn., on Aug. 7, aged 69 years. Many years ago he and James F. Casey purchased the Webb Boiler Works at Chattanooga, changing its name to the Casey-Hedges Co. In 1927 it was consolidated with the Walsh & Weidner Boiler Co., as the Hedges-Walsh-Weidner Co. Mr. Hedges served as president of the new company until a few months ago, when he retired.

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J. C. WARD, managing director of Edgar Allen & Co., Ltd., Sheffield, England, and also a director of the Edgar Allen Steel Co., Inc., New York, died Aug. 8, aged 66 years. He was at one time president of the American company and also was formerly president of the American Manganese Steel Co., Chicago.

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LUTHER B. MCMILLAN, consulting engineer of Johns-Manville, Inc., New York, died Aug. 10, as the result of injuries received when the airplane of which he was owner and pilot crashed near the Newark, N. J., Metropolitan Airport on the evening of Aug. 9. He was an ardent aeroplanist and had made many extended trips throughout the country. He was born at Bem, Mo., Sept. 21, 1891, and was graduated from the Texas Agricultural and Mechanical College in 1911. After being awarded a fellowship at the College of Engineering of the University of Wisconsin, he was an instructor for two years at that institution. Since 1916 he has been identified with the Johns-Manville company. He was a conspicuous member of the American Society of Mechanical Engineers, being a member of the council of the society at the time of his death.

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WALTER BRADLEE SNOW, retired engineer, publicity man, and advertising agent, died at Falmouth, Mass., Aug. 9, aged 68 years. He was graduated from the Massachusetts Institute of Technology in 1882. In 1907 he organized Walter B. Snow and Associates as publicity engineers. He was president of the Reversible Collar Co., a trustee of the Watertown Savings Bank, and past secretary of the Massachusetts Commission for the Blind, a director of the Garland School for Homemaking, a member of the corporation of the Perkins Institution for the Blind, and a clerk of the Watertown Planning Board. He was the author of "Mechanical Draft" and "Steam Boiler Practice."

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ROLAND GERRY, for many years identified with the Jones & Laughlin Steel Corporation, Pittsburgh, died at his residence in that city on Aug. 9. He was born at Waterford, Me., in 1860, and prior to his retirement on Jan. 1, 1925, had spent his entire business career of 44 years with the Jones & Laughlin company. For many years he was manager of sales in the cold-rolled department, having general supervision over cold-finished steel bars and railroad track accessories. He relinquished those duties on Feb. 1, 1922, but remained with the company for the next three years as special sales agent and a director.

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HARRY E. KIES, manager, malleable and steel division, American Radiator Co., died Aug. 10 in the Buffalo General Hospital, following an operation, aged 60 years. He had been with the American Radiator Co. for many years.

Cadmium Output in 1928 Increased

The production of metallic cadmium in the United States in 1928 amounted to 1,875,896 lb., valued at $1,144,297, as reported by producers to the United States Bureau of Mines. This is an increase of 75 per cent in quantity over the production of 1,074,654 lb. in 1927. There were 233,101 lb. of cadmium, valued at $128,901, imported into the United States during 1928, compared with 22,400 lb., valued at $13,172 in 1927. No imports of this metal were recorded for 1926.

Value of Materials Used for Fireproofing Described

Relative values of different materials used for the fireproofing of steel structures are described in a booklet written by Jack Singleton, district engineer of the American Institute of Steel Construction, Inc., New York, and published by the institute. In his discussion, Mr. Singleton states that "when fabricating plants contract for, manufacture and erect a steel building for a client, their responsibility does not end there. The steel frame is not suitable for use without a myriad of attendant details, which must be settled before the building is ready for occupancy. Chief of these is the fireproofing of the steel skeleton, vitally necessary to protect the very investment itself."

Machinery Markets and News of the Works

Tool Buying Has Slackened

Sales, However, Are Running Well Ahead of Those in Same Period of Last Year

THERE has been a slackening in machine tool buying the past week, attributed in large measure to the vacation season. Sales, however, are running well ahead of those in August, 1928, and continued good demand from a variety of sources insures total bookings considerably above normal for this time of the year.

Some builders, including a Cleveland turret lathe maker, report that business this month has paralleled that in July, but most companies state that August has brought a slight recession.

The matter of deliveries is an important factor affecting sales at the moment. In numerous cases buyers are finding that they cannot get tools for at least several months or longer, and therefore are refraining from placing orders.

The General Electric Co. has contracted for additional equipment for its electric refrigerator manufacturing department, and the Westinghouse Electric & Mfg. Co., which is entering the electric refrigerator field, has purchased tools for its new production division. The International Harvester Co. has bought a few tools for its Rock Island, Ill., plant.

The Santa Fe has closed for several items, while the Chicago, Milwaukee, St. Paul & Pacific is inquiring for two switch planers.

New York

NEW YORK, Aug. 13.—Machine tool buying so far this month compares favorably with that of July. Orders are mostly for single tools, except for the continued buying by large users, especially the General Electric Co., which has pending two tools for its Lynn plant, and six engine lathes for Schenectady. The Westinghouse Electric & Mfg. Co., which has bought more than 25 tools since the first of the year for its refrigerator manufacturing plant at Springfield, Mass., has issued an additional inquiry that includes two production lathes. Deliveries on most tools are extended, in some cases into December and January.

Contract has been let by Chevrolet Motor Co., Detroit, to John W. Cowper Co., Inc., Buffalo, for new assembling plant at Tarrytown, N. Y., with main one-story unit, 400 x 1200 ft., and smaller buildings, to cost more than $2,000,000 with equipment.

Cylinder Grinding Co., New York, has leased building at 334 West Seventieth Street for new machine shop; part of works will be given over exclusively to production of piston rings.

Mohawk Carpet Mills, Inc., Amsterdam, N. Y., has plans for new steam power house to cost about $200,000 with equipment.

Board of Education, Rensselaer, N. Y., is said to be planning installation of manual training equipment in new junior high and grade school to cost about $200,000, for which revised plans are being drawn by C. H. Gardinier, 75 State Street, Albany, N. Y., architect.

John J. Raskob, identified with General Motors Corporation, and associates have acquired a majority interest in Aero Supply Mfg. Co., College Point, L. I., and will be active in management. Company specializes in manufacture of airplane hardware and is said to be planning extension. It recently acquired Standard Automatic Products Corporation, Corry, Pa., manufacturer of turnbuckles and kindred equipment for aircraft, and National Steel Products Co., Dayton, Ohio, manufacturer of steel specialties for airplanes, and will continue both companies as subsidiaries.

Albany Steel & Iron Supply Co., Albany, N. Y., is considering a one-story addition to storage and distributing plant to cost about $35,000 including equipment. F. A. Hunsdorfer is president.

C. M. Morhous, 13 Stetson Avenue, Plattsburg, N. Y., and associates have organized Mobodo Aircraft Co., with capital of $50,000, and plan early operation of local plant to manufacture airplanes and parts. L. A. Bouyea, Plattsburg, is also interested in new organization.

Todd Shipyards Corporation, 25 Broadway, New York, is establishing a new division at its South Brooklyn works for repair of marine turbine engines, including machinery and facilities for manufacture of turbine blades and other parts. C. C. Seigh, formerly connected with Westinghouse Electric & Mfg. Co., East Pittsburgh, will be in charge of department.

Westchester County Board of Supervisors, White Plains, N. Y., has authorized purchase of property at Croton Point Park for establishment of County airport. Present acquisition will soon be increased to about six acres by further purchases, and plans will be drawn for hangars, repair shops, and other units, to cost more than $100,000 with equipment. County engineering department will be in charge.

C. B. Meyers, 31 Union Square, New York, architect, has plans for multi-story automobile service, repair and garage building, to cost more than $150,000 with equipment.

Curtiss Airports Corporation, 27-29 West Fifty-seventh Street, New York, is said to have plans for airplane base and airport near Milwaukee, consisting of hangars, repair shops, and other units, to cost about $100,000 with equipment.

Western Electric Co., 195 Broadway, New York, manufacturer of telephone equipment, radio apparatus, cable, etc., has leased three buildings at plant of Riegel Sack Co., Jersey City, N. J., totaling 150,000 sq. ft. floor space, for new branch plant to be operated in conjunction with works at Kearny, N. J. Acquired property will be used primarily for production of telephone apparatus.

Wood Newspaper Machinery Corporation, 688 South Second Street, Plainfield, N. J., manufacturer of printing machinery, etc., will soon begin erection of one-story addition, 90 x 160 ft., for which general contract recently was awarded to Wigton-Abbott Corporation, 705 Park Avenue, New York, to cost over $65,000 with equipment.

Board of Education, Essex County Vocational Schools, Hall of Records, Newark, will receive bids on general contract until Aug. 27 for three-story boys' vocational school at Bloomfield, N. J., to cost $500,000 with equipment. Guilbert & Betelle, Chamber of Commerce Building, Newark, are architects. Robert O. Beebe is director.

Long Branch Country Club & Airport, Long Branch, care of R. Kearney Reid, Citizens' National Bank, Broadway, trustee, has plans for an airport at Eatontown, to include hangar, repair shop, and other units, to cost more than $75,000 with equipment. Arthur E. Gravatt, address noted, is architect for organization.

Globe Machine & Tool Co., Newark, has leased floor in building at 261 Rose Street, to manufacture tools, dies and kindred specialties.

Stilson Mfg. Co., West Orange, N. J., has leased building at 82 Main Street, for manufacture of metal goods and novelties.

South Atlantic

BALTIMORE, Aug. 12. — W. A. Fingles, Inc., 29 South Howard Street, Baltimore, manufacturer of sheet metal products, has rejected bids recently received for a two-story plant, to cost about $65,000 with equipment, and is said to be planning to ask new bids on general contract. E. G. Blanke, 330 North Charles Street, is architect. William A. Fingles is president.

Leathersteel Products Co., Garrett Building, Baltimore, has been organized to take over and expand company of same name, with headquarters at 73 Long Wharf, Boston, specializing in manufacture of combination steel-leather mats and similar products. Plans are under way for establishment of new plant at Baltimore, with removal of present Boston works to that location. Charles H. Dankmeyer is president of new company, and John H. Mooney, vice-president.

Sylvania Industrial Corporation, 122 East Forty-second Street, New York, recently organized with capital of $3,500,000, has taken over 200-acre tract near Rappahannock River, Fredericksburg, Va., and plans construction of mill to manufacture transparent and other processed paper products. Initial mill will cost over $750,000 with machinery. Project will include a machine shop and boiler house.

Firestone Tire & Rubber Co., Akron, Ohio, has purchased property on Oak Street, Baltimore, as site for three-story factory branch, service and sales building, 85 x 235 ft., to cost about $200,000 with equipment.

Goodyear Tire & Rubber Co., Akron, Ohio, is reported planning new mill near Rockmart, Ga., to cost more than $800,000 with equipment.

Arctic Air Co., Inc., Munsey Building, Baltimore, recently organized by Carter F. Hall, is considering establishment of plant near Wheeling, W. Va., to manufacture electrically-operated water-cooling equipment for railroads, industrial and other service, initial unit to cost about $30,000 with equipment.

Wicomico County Board of Education, Salisbury, Md., is considering installation of manual training equipment in new high school to cost about $300,000, for which bids will be asked soon on general contract. Smith & May, Calvert Building, Baltimore, are architects.

Nashville, Chattanooga & St. Louis Railway Co., Nashville, Tenn., in cooperation with United States Cold Storage & Warehouse Co., 2101 West Pershing Road, Chicago, is reported planning twelve-story cold storage warehouse and refrigerating plant at Atlanta, Ga., to include both dry and cold storage divisions, and railroad car facilities, to cost $2,000,000 with equipment.

Pitcairn Aviation, Inc., Land Title Building, Philadelphia, operated by North American Aviation, Inc., is said to be planning construction of hangar, 150 x 250 ft., with repair and reconditioning shop, at Candler field, Atlanta, Ga., to cost about $60,000 with equipment.

Board of Trustees, Loyola College, Charles Street, Baltimore, has plans for three-story engineering building, to cost about $150,000 with equipment, and expects to ask bids on general contract in fall. L. R. White, Hearst Tower Building, is architect.

Standard Paper Mfg. Co., Richmond, Va., has begun work on three-story addition to mill, 50 x 150 ft., to cost about $70,000 with machinery.

Mueller Co., Decatur, Ill., manufacturer of brass plumbing fixtures, has awarded contract to Smith & Williams, Atlanta, for a branch plant at Atlanta, to cost $80,000 with equipment.

Philadelphia

PHILADELPHIA, Aug. 12.—Contract has been let by John G. Lorenz Corporation, Thirty-third and Reed Streets, Philadelphia, manufacturer of steel and iron products, to Farrell-Roth Construction Co., 24 South Forty-sixth Street, for one-story addition, totaling 24,000 sq. ft. floor space, to cost about $80,000 with equipment. E. J. Fitzmaurice, Pennsylvania Building, is consulting engineer.

Eaton Bumper & Spring Service Co., 223 North Twenty-second Street, Philadelphia, a subsidiary of Eaton Spring & Axle Co., Cleveland, has leased new one-story building, 72 x 170 ft., to be erected at 1521 North Third Street, for a new service, repair and sales unit, to cost about $75,000 with equipment.

Crane Co., 1301 Locust Street, Philadelphia, with headquarters at 836 South Michigan Avenue, Chicago, is said to have plans for new local factory branch and distributing plant, to cost about $85,000 with equipment.

West Philadelphia Motor Co., 4615 Walnut Street, Philadelphia, has awarded general contract to Wark Co., 1600 Walnut Street, for two-story service, repair and sales building, 65 x 214 ft., to cost about $100,000 with equipment.

F. & E. Aubel, 2503 Germantown Avenue, Philadelphia, operating a general iron and steel works, are considering a new one-story unit, to cost about $60,000 with equipment.

Judson C. Burns, Inc., Eleventh and Chestnut Streets, Philadelphia, distributer of electric refrigerators, electric washing machines, etc., has leased new building totaling 20,000 sq. ft. floor space, for new storage and distributing plant, to include service and repair departments.

Koalamatic Combustion Co., Philadelphia, has been organized by Harry Fomalont, 106 South Fifty-ninth Street, and associates, to take over and expand company of same name, with local headquarters in Weightman Building, manufacturer of coal-saving devices, thermostat combustion units and kindred specialties. Horace J. Mullin, 2232 North Nineteenth Street, is interested in new organization.

Atlantic City Electric Co., Atlantic City, N. J., has plans for a new power switching and substation at Pleasantville, to cost more than $500,000 with equipment. It will be used in conjunction with new generating station at Deepwater Point on Delaware River, now in course of construction, to cost $10,000,000. Project will include steel tower transmission line from power plant to Pleasantville and neighboring points, to cost about $1,000,000.

Harrisburg Gas Co., Harrisburg, Pa., has plans for a one and two-story equipment, storage and distributing plant, with service and repair department, to cost about $175,000 with equipment. United Engineers & Constructors, Inc., Broad and Arch Streets, Philadelphia, is architect and engineer.

Traveling ovens, power equipment, conveying and other machinery will be installed by General Baking Co., 420 Lexington Avenue, New York, in new plant at Allentown, Pa., to cost $400,000. Company will build a similar plant at Detroit, to cost over $850,000 with equipment.

Philadelphia & Reading Coal & Iron Co., Reading Terminal, Philadelphia, will install coal-mining and operating equipment in connection with opening up of large new properties at Bear Valley Mines, near Shamokin, Pa., entire development to cost more than $300,000.

Detroit

DETROIT, Aug. 12.—Contract has been let by Auto Specialties Mfg. Co., Monroe, Mich., manufacturer of automobile jacks, malleable castings, etc., to Owen-Ames-Kimball Co., Grand Rapids, Mich., for group of one-story plant units to increase floor space about 85,000 sq. ft. Equipment will include two electric furnaces, conveying and other machinery, total project to cost $750,000. F. E. Davidson, 53 West Jackson Boulevard, Chicago, is architect.

City Council, Grand Haven, Mich., has plans for an addition to municipal electric light and power plant, to cost more than $200,000 with equipment. Giffles, Hamilton & Weber, Grand Rapids National Bank Building, Grand Rapids, are architects.

General Parts Corporation, recently organized, will take over and succeed to company of same name with main plant at Flint, Mich., manufacturer of automobile parts, as well as parts for electric locomotives, etc. New company has arranged for stock issue of $850,000, part of fund to be used for expansion.

Panyard Piston Ring Co., Muskegon, Mich., has been organized by P. P. Schnorbach and C. G. Bigge, both of Manistee, Mich., to take over plant and other assets of Panyard Machine & Mfg. Co., Muskegon, recently acquired at receiver's sale. New company will operate with capital of $50,000. Extensions and improvements will be made.

Checker Cab Mfg. Corporation, Gibson Street, Kalamazoo, Mich., manufacturer of taxicabs, will soon take bids on general contract for one and two-story addition, to cost over $400,000 with equipment. Albert Kahn, Inc., Marquette Building, Detroit, is architect and engineer.

Michigan Bell Telephone Co., 1365 Cass Avenue, Detroit, will soon take bids on general contract for a one-story equipment storage and distributing plant at Grand Rapids, to include mechanical and electrical repair and service departments, as well as automobile service division, to cost $185,000 with equipment. Smith, Hinchman & Grylls, Marquette Building, Detroit, are architects.

National Petroleum Corporation, Grand Rapids, Mich., has recently acquired producing properties of Puritan Oil Corporation, Muskegon, Mich., as well as oil lands in other counties. New owner contemplates extensions and improvements in Muskegon plant, including storage and distributing facilities.

Chevrolet Motor Co., Detroit, will soon take bids on general contract for one and two-story addition to local assembling plant, to cost more than $200,000 with equipment.

Detroit Butcher Supply Co., 1455 Gratiot Avenue, Detroit, manufacturer of knives, fixtures, etc., has awarded

general contract to W. S. Pocock & Co., 1726 Seward Street, for two-story plant, to cost about $55,000 with equipment. Pollmar & Ropes, Hoffman Building, are architects.

Chicago

CHICAGO, Aug. 12.—Local machine tool dealers look for a more active fall market as the result of industrial expansion now under way. Current sales are well above those of August, 1928, but in most instances show a decline from last month. The International Harvester Co. has placed a few orders for its Rock Island plant. Another farm implement manufacturer, who had expected to issue a list this summer, is said to be making use of considerable standard equipment which was replaced earlier in the year by special machine tools.

The Santa Fe has closed several items of long standing and the Northern Pacific will buy a 24-in. shaper. The Burlington is in need of a floor stand grinder and the American Steel Foundries will purchase a large turret lathe. Several railroads have asked for preliminary figures for use in preparing 1930 budgets. Deliveries remain stationary.

Chicago Steel Tank Co., 6400 West Sixty-sixth Street, Chicago, is building an addition, 120 x 500 ft. Foltz & Co. are architects and engineers.

Louis E. Emerman, machinery jobber, has purchased McCord Mfg. Co. plant at 120th Street and Illinois Central Railroad, and will concentrate distributing operations there.

Ero Mfg. Co., 2234 Ogden Avenue, Chicago, manufacturer of automobile equipment and accessories, has leased one-story and basement factory, 75 x 100 ft., at 2229 Ogden Avenue, for expansion.

Brooks, Bramhall & Dague, First National Bank Building, Decatur, Ill., architects, will soon take bids on general contract for two-story automobile service, repair and garage building, to cost $100,000 with equipment.

Greenlee Brothers, Inc., Columbia and Twelfth Streets, Rockford, Ill., manufacturer of wood-working machinery, tools, etc., has awarded general contract to Security Building Co. for one-story addition, 100 x 120 ft., to cost over $75,000 with equipment.

Golden Cycle Mill Co., Colorado Springs, Colo., A. E. Carlton, president, is planning construction of new flotation mill at mining properties, to cost about $65,000 with machinery.

Lyle Signs, Inc., 171 Twenty-seventh Avenue, S. E., Minneapolis, Minn., manufacturer of signs, displays, etc., has awarded general contract to Holm-Johnson Co., Essex Building, for one-story plant, 40 x 150 ft., with extension, 45 x 60 ft., to cost about $40,000 with equipment. C. P. Pesek, 1641 Hennepin Avenue, is architect.

Iowa Public Service Co., Sioux City, Iowa, has plans for new steam-operated electric power house at Storm Lake, Iowa, to cost about $45,000 with equipment.

State Board of Administration, Bismarck, N. D., is planning early call for bids for coal-handling, conveying and storage equipment for installation at Valley City, N. D., to cost about $17,000. Ernest R. Boyd, Jamestown, N. D., is architect.

The Crane Market

A FAIR volume of inquiry for overhead cranes is pending, but buyers are slow to place business. Buyers of crawl-tread cranes are active, but standard locomotive cranes are quiet. The Foundation Co., 120 Liberty Street, New York, has closed on four crawl-tread cranes for export and the Worthington Pump & Machinery Co., Harrison, N. J., has bought a used locomotive crane.

Among recent purchases are:

De Laval Separator Co., Poughkeepsie, N. Y., 5-ton, double-hook, magnet crane from Whiting Corporation.

Foundation Co., 120 Liberty Street, New York, four 15-ton crawl-tread cranes for export from Industrial-Brownhoist Corporation.

Worthington Pump & Machinery Co., Harrison, N. J., used 20-ton Orton locomotive crane, reported purchased from Philip T. King, New York.

Standard Oil Co., Whiting, Ind., crawl-tread locomotive crane from Orton Crane & Shovel Co.

Alex N. Smith, Harriman, N. Y., crawl-tread shovel and crane from Orton Crane & Shovel Co.

Rockford Iron Works, Rockford, Ill., 5-ton, 20-ft. span overhead electric crane from unnamed builder.

Crane Co., 836 South Michigan Avenue, Chicago, has plans for a one-story factory branch and distributing plant at Waukegan, Ill., to cost $55,000 with equipment. C. W. Webster, 5 North Genesee Street, Waukegan, is architect.

Board of Education, Quincy, Ill., is considering installation of manual training equipment in new three-story high school to cost $450,000, for which bids will be asked on general contract early in fall. Behrensmeyer & Haffner, W. C. U. Building, are architects.

General Mica, Inc., First National Bank Building, Pueblo, Colo., Joseph Stanko, head, has plans for first unit of new mica grinding and refining plant at Blende, about three miles from city, to cost about $30,000 with equipment.

New England

BOSTON, Aug. 12.—The past week was one of the quietest experienced in many months by machine tool dealers, and manufacturers also report a falling off in business. There has, however, been some activity in presses and hammers of the lighter type. New England dealers look for good business late in 1929 and early next year if actual and tentative inquiries can be taken as an indication. Deliveries, however, will be an important factor for several months. Particular interest is being taken in the development of aircraft manufacture in New England.

Although large tools are selling slowly, demand for small tools holds up remarkably well.

Bridgeport Brass Co., East Main Street, Bridgeport, Conn., contemplates erection of a storage shed, 42 x 77 ft. Light conveying and lifting equipment may be purchased.

Sikorsky Mfg. Co., Stratford, Conn., has plans for a one-story wind laboratory, 50 x 100 ft., for which fan and blower equipment is required.

Hollingsworth & Vose, 333 Washington Street, Boston, paper manufacturers, are erecting a machine shop addition at East Walpole, Mass. Metal-working tools are under consideration.

Pitney-Bowes Postage Meter Co., Stamford, Conn., manufacturer of postage affixing machines and parts, etc., has plans for a two-story addition, 60 x 300 ft., including improvements in present buildings, to cost more than $85,000 with equipment. Fletcher-Thompson, Inc., Bridgeport, Conn., is architect and engineer.

Strathmore Paper Co., Mittineague, Mass., has plans for a hydroelectric generating plant for mill service at West Springfield, Mass., to cost more than $75,000 with equipment. L. R. Howe is company architect in charge.

Wetmore-Morse Granite Co., Barre, Vt., has plans for a one-story machine and forge shop, 50 x 150 ft., to cost about $45,000 with equipment. L. F. Caroni & Co., 1056 Chapel Street, New Haven, Conn., are architects.

Boston & Albany Railroad Co., South Station, Boston, has awarded contract to J. F. Fitzgerald Construction Co., 38 Chauncy Street, for new engine house with repair facilities at Beacon Park yards, Allston, to cost more than $50,000 with equipment.

Eastern Aircraft Corporation, Pawtucket, R. I., recently organized by Ray C. Van Arsdale and associates, has acquired local plant of Pressed Metal Co., for manufacture of all-metal aircraft. Company will be affiliated with Bavarian Aircraft Corporation of Germany, and will produce in this country Messerschmidt type of aircraft now being manufactured there, initial models to cover a three-passenger cabin plane, seven-passenger plane, and small training plane.

Buffalo

BUFFALO, Aug. 12.—Spriesch Tool & Mfg. Co., 133 South Elmwood Avenue, Buffalo, manufacturer of tools, dies, etc., has plans for a one-story machine shop, to cost about $30,000 with equipment. Company was recently organized to take over business of Joseph Spriesch. George A. Setter, 67 Burch Avenue, West, is architect.

Eastman Kodak Co., Rochester, N. Y., has authorized an expansion and improvement program, to cost about $15,000,000 over three-year period, including buildings and equipment at local Kodak Park factories, and extensions in subsidiary plant of Tennessee-Eastman Corporation, Kingsport, Tenn., on which work recently was started. Last-noted project is reported to cost about $5,000,000.

Central High School District No. 1, Amherst, N. Y., is planning installation of manual training equipment in new high school to cost about $400,000. Paul H. Harbach and James W. Kideney, 271 Delaware Avenue, Buffalo, are architects.

Fleet Aircraft, Inc., 2050 Elmwood Avenue, Buffalo, manufacturer of commercial airplanes and parts, is considering establishment of a new assembling plant in Southern California for Pacific Coast trade, to cost more than $75,000 with equipment. Company is affiliated with Consolidated Aircraft Co., same address. Lawrence D. Bell is president.

Department of Public Works, Municipal Building, Buffalo, has plans for marine airport foot of Georgia Street, including hangars, repair shops and other units, to cost about $150,000 with equipment. Col. Howard Beck, 374 Delaware Avenue, city architect, is in charge.

Cleveland

CLEVELAND, Aug. 12.—Machine tool sales and inquiry tapered off the past week. However, the volume of business is still good for this season of the year. Orders were confined to single machines. Demand is well scattered with little business coming from the automotive industry. Turret lathe sales so far this month have equaled the good volume of business taken in the corresponding period of July. Prospective buyers are slow in placing orders, which is attributed in a large measure to the vacation season.

National Bronze & Aluminum Foundry Co., East Eighty-eighth Street and Laisy Avenue, Cleveland, will enlarge its plant by erection of a one-story building, 71 x 109 x 200 ft., monitor-type.

Dill Mfg. Co., 684 East Eighty-second Street, Cleveland, manufacturer of tire valves and valve parts, has acquired a building site on Mandalay Road on which it plans erection of a new factory to more than double present capacity.

Whiteway Stamping Co., 1201 East Fifty-fifth Street, contemplates erection of a new plant with 40,000 sq. ft. of floor space on part of site formerly occupied by King Bridge Co.

Plans are under way by Cleveland Heights Air Terminal, Marshall Building, Cleveland, R. P. Cunningham, vice-president, for airport on Ridgebury Boulevard, consisting of hangars, repair shops, oil storage and other buildings, to cost more than $1,000,000 including equipment.

Toledo Foundry & Machine Co., Toledo, Ohio, has plans for complete electrification of plant and will soon begin installation of equipment. W. J. Wuerfel is secretary and treasurer.

Hercules Motor Corporation, Canton, Ohio, manufacturer of gasoline engines for motor trucks, buses, etc., and other power units, has acquired 3-acre tract adjoining plant, and will erect one-story addition to total about 68,000 sq. ft. floor space, designed to increase present capacity about 50 per cent. It is estimated to cost over $350,000 with equipment.

A. L. Licker, Guarantee Title Building, Cleveland, and associates have awarded general contract to Simon Construction Co., 785 East Eighty-eighth Street, for one-story automobile service, repair and garage building, 80 x 430 ft., to cost $150,000 with equipment.

Benton & Anderson Co., Cleveland, manufacturer of welding equipment, etc., has purchased Taylor-Winfield Corporation, Warren, Ohio, manufacturer of electric butt and other welding apparatus, oil cans, etc., and will consolidate. Company will be operated as subsidiary. Expansion in output is planned. Purchasing company has factory branches at Chicago, Detroit and St. Louis.

Cleveland Electric Illuminating Co., Illuminating Building, Cleveland, has plans for new four-story steam-operated electric generating station at Ashtabula, Ohio, 250 x 325 ft., to cost more than $5,000,000 with equipment. Contract for superstructure has been let to Hunkin-Conkey Construction Co., Newman-Stern Building, Cleveland.

Board of Education, Mentor Rural School District, Mentor, Ohio, is considering installation of manual training equipment in new two-story high school addition to cost about $200,000. Miller & Son, 27 West Madison Street, Youngstown, are architects.

Pittsburgh

PITTSBURGH, Aug. 12.—The machinery trade in this district continues exceedingly active. Inquiries are still piling up and the volume of work in prospect indicates extension of heavy buying into the fall. Westinghouse Electric & Mfg. Co. is closing regularly against its third quarter list and is also issuing additional inquiries from time to time. United States Aluminum Co. has delayed the purchase of tools for its new machine shop at New Kensington until about Sept. 1. Another company in this district has inquired for 20 or more tools and the Bethlehem Steel Co. is expected soon to close against six machines for its Cambria plant at Johnstown.

Railroad buying leaves something to be desired, but the volume of industrial work has more than made up for this inactivity. However, the Baltimore & Ohio is now inquiring for several tools, including an 18-in. lathe and a 3-ft. radial drill.

Steel companies in this and nearby districts with large expansion programs under way are rather slow in making known their tool requirements, but the delay is welcomed by some dealers who will be in better position to quote on this business later in the year.

Pittsburgh Steel Co., Union Trust Building, Pittsburgh, has plans for new by-products plant at Gibsonton, near Monessen, Pa., to cost over $2,000,000 with equipment.

Coshocton Iron Co., East Monongahela, Pa., is erecting one-story addition to local mill, to cost over $130,000 with equipment. Company specializes in production of mining equipment, castings, etc., and is an interest of Combustion Engineering Corporation, 200 Madison Avenue, New York.

General Electric Co., Schenectady, will carry out an extension program at its New Kensington, Pa., works to cost about $100,000. Two new units are being established for pickling and other service, replacing other structures. Company has leased former plant of Commercial Box Co., and will remodel for making welding electrodes. F. H. Mains is local manager.

H. M. Cresswell, 215 Glen Avenue, Ellwood City, Pa., and associates have organized Standard Cotter Pin Co., with capital of $75,000, and plan early operation of local factory to manufacture cotter pins and other small iron and steel specialties. John J. Tyler, 416 Ninth Street, is interested in new company.

Pennzoil Co., Oil City, Pa., an interest of South Penn Oil Co., 545 William Penn Way, Pittsburgh, is planning expansion at its oil refinery, to include new filter press division, boiler house and other units, to cost more than $80,000 with equipment.

James L. Stuart, Oliver Building, Pittsburgh, engineer, has plans for a two-story automobile service, repair and garage building, 100 x 350 ft., to cost about $150,000 with equipment.

United Aircraft & Transport Co., New York, has purchased Standard Steel Propeller Co., 221 West Seventh Avenue, Pittsburgh, manufacturer of aircraft propellers and kindred products, and will operate as a division. Work is under way on addition to Standard company to cost more than $100,000 with equipment.

Gulf States

BIRMINGHAM, Aug., 12. — Alamo Airplane Co., Milam Building, San Antonio, Tex., has plans for aircraft manufacturing plant with initial unit, 106 x 300 ft., for parts production and assembling, to cost about $40,000 with equipment. A. W. Forrester is one of heads of company; Boyd Hammond is company engineer.

Orient Petroleum Co., Wichita Falls, Tex., has plans for extensions and improvements in local oil refinery to increase capacity from 2500 to 10,000 bbl. crude oil per day. Department will be installed for production of gasoline; expansion will be carried out in storage and distributing division. Entire project will cost over $500,000 including machinery. Company is a subsidiary of Atlantic-Pacific & Gulf Oil Co.

Champion Fibre Co., Canton, N. C., has purchased 225-acre tract at Fox, on Warrior River, about six miles from Tuscaloosa, Ala., as site for new mill to manufacture kraft paper stocks, to cost over $3,500,000 with machinery. Company is affiliated with Champion Coated Paper Co., Hamilton., Ohio.

Prest-O-Lite Co., 30 East Forty-second Street, New York, manufacturer of acetylene equipment, welding apparatus, etc., has awarded general contract to Frost Construction Co., Tampa, Fla., for local branch plant at Tampa, one-story, to cost $90,000 with equipment.

Roth Brothers Auto Supply & Machine Co., North Flores Street, San Antonio, Tex., has plans for three-story addition to service, repair and garage building, to cost over $100,000 with equipment. Ralph H. Cameron, Majestic Theater Building, is architect; Beretta-Stiles Co., National Bank of Commerce Building, is mechanical engineer.

Southern Air Transport Co., Fort Worth National Bank Building, Fort Worth, Tex., has approved plans for extensions at Menefee airport, New Orleans, including new repair, reconditioning and assembling building, entire program to cost about $60,000. Thomas Hardin is vice-president and general manager.

Eagle Aircraft Corporation, Kansas City, Mo., is arranging for establishment of factory branch, parts and distributing plant at Dallas, Tex. A hangar has been leased at Love Field and other buildings will be provided. E. E. Porterfield is president. Company also operates Lincoln-Page Co., Lincoln, Neb., and Wallace Aero Co., Chicago, as subsidiaries.

Swift & Co., Union Stock Yards, Chicago, is contemplating new plant at Paris, Tex., to cost about $135,000 with equipment.

City Council, Birmingham, is considering construction of a municipal airport on 300-acre tract near Tarrant City, to include hangars, repair shop, oil storage and other buildings, to cost more than $90,000 with equipment. A. J. Hawkins is engineer.

Packard Motor Car Co., Detroit, will soon begin superstructure for two-story service, repair and sales building at New Orleans, 120 x 150 ft., for which general contract recently was let to J. V. & R. T. Burke, Inc., New Orleans Bank Building, to cost about $120,000 with equipment. Albert Kahn, Inc., Marquette Building, Detroit, is architect and engineer.

Cincinnati

CINCINNATI, Aug. 12.—Although the volume of new business of district machine tool manufacturers has declined slightly, demand continues brisk for August and is on a higher level than for the corresponding period last year. Fresh bookings have increased the large amount of unfilled orders and assure capacity production well into the fall. Manufacturers continue to report extended deliveries and in some instances business has been refused because of inability to make early shipments.

Chicago, Milwaukee, St. Paul & Pacific is inquiring for two switch planers for its Tomah, Wis., shops. Canadian Ingersoll-Rand Co. is in the market for one 84-in. planer and the Great Lakes Steel Corporation is asking for a 96-in. open-side planer.

Contract has been let by Hobart Mfg. Co., Troy, Ohio, manufacturer of meat choppers and kindred products, to Henry Heiser, Dayton, for one-story addition to cost about $20,000.

Board of Education, Van Buren Township, Dayton, Ohio, is said to be planning installation of manual training equipment in new high school to cost about $275,000. Walker & Norwich, American Building, are architects.

Officials of Realty Enterprises, Inc., Marion E. Taylor Building, Louisville, are considering erection of three-story automobile service, repair and garage building, 80 x 230 ft., to cost about $100,000 with equipment.

Ohio Steel Foundry Co., Springfield, Ohio, has awarded general contract to A. G. Samuelson, Inc., Springfield, for a one-story addition, 100 x 200 ft., to cost about $45,000 with equipment.

Officials of Aluminum Co. of America, Inc., Oliver Building, Pittsburgh, have organized a new power subsidiary under name of Nantahala Power & Light Co., to carry out a hydroelectric power project in Tennessee, supplementing developments of Knoxville Power Co., Knoxville, another affiliated interest. New company will have a capital of $10,000,000. Plans are under way for a hydroelectric power plant near Fontana on Tennessee River, to be followed by similiar developments at Bushnell, Needmore and Aquone. Entire project will cost over $75,000,000 with transmission system, including hydroelectric power plant of the Knoxville Power Co., now under way at Calderwood.

Lincoln Service & Motor Sales Co., Dayton, Ohio, has plans for one-story service, repair and sales building, 100 x 225 ft., to cost about $110,000 with equipment. Fred J. Hughes, Dayton, is architect.

Indiana

INDIANAPOLIS, Aug. 12.—Board of Works, City Hall, Indianapolis, Theodore H. Dammeyer, president, is said to be planning an automobile service, repair and garage building for municipal cars, to cost about $100,000 with equipment.

Milroy Milling Co., Milroy, near Rushville, is planning to rebuild part of grain milling plant and elevator destroyed by fire Aug. 2.

General Insulating & Mfg. Co., Alexandria, is planning three-story addition, to cost more than $65,000 with equipment.

Standard Oil Co. of Indiana, Inc., Indianapolis, is arranging increase in capital from $375,000,000 to $450,000,000, part of fund to be used for purchase of Pan-American Petroleum & Transport Co., 120 Broadway, New York, and for expansion in refineries, pipe lines, storage and distributing plants and other properties.

Indianapolis Power & Light Co., Monument Place, Indianapolis, is arranging for construction of new steam-operated electric generating plant on White River, where site has been acquired, to cost more than $7,000,000, including steel tower transmission lines, power switching stations and other facilities.

Forse Equipment Co., Fairview and Fourteenth Streets, Anderson, manufacturer of machinery for dry-cleaning, parts, etc., is said to be planning establishment of new plant, to cost more than $40,000 with equipment.

Bloomington Limestone Co., Bloomington, has acquired properties of Indiana Oolitic Stone Co., in that vicinity, and plans expansion for development of limestone and other quarries, with additional loading, conveying and kindred equipment.

Wabash Foundry Co., Wabash, is erecting an addition which will increase present floor space 7200 sq. ft.

St. Louis

ST. LOUIS, Aug. 12.—City Council, Kirksville, Mo., has plans for a municipal electric light and power house, to cost over $70,000 with equipment. Black & Veatch, Mutual Building, Kansas City, Mo., are consulting engineers.

City Aviation Committee, Lawton, Okla., Harry Stackhouse, chairman, has plans for a hangar, 80 x 125 ft., at municipal airport, with repair and reconditioning facilities, to cost about $100,000 with equipment.

United Aircraft & Transport Corporation, New York, has purchased Stearman Aircraft Co., Wichita, Kan., manufacturer of commercial airplanes. Stearman company will be operated as a unit, with Lloyd Stearman in charge. Expansion in output is planned.

Schwartzmann Service Co., Inc., St. Louis, will erect a one-story and basement automobile service, repair and garage building, 135 x 182 ft., to cost more than $100,000 with equipment. E. E. Christopher, Louderman Building, is architect.

Farmers' Gin Co., Sayre, Okla., is considering erection of three cotton oil mills at Sayre and neighboring localities, to cost about $100,000 including equipment.

Jesco Lubricants, Inc., Kansas City, Mo., care of H. A. Miller, 4430 Park Street, architect, manufacturer of refined oil, has plans for new two-story plant at North Kansas City, to cost about $45,000 with equipment.

Watt Plumbing Co., 608 South Cincinnati Street, Tulsa, Okla., will soon begin construction of one-story storage and distributing plant, 140 x 300 ft., to cost about $50,000 with equipment. Mechanical shop and pipe fitting department are planned. N. B. Fleming, Commercial Building, is architect.

Chevrolet Motor Co., Detroit, is said to have acquired property at Little Rock, Ark., as site for new factory branch and parts station, one-story, 100 x 200 ft., to cost over $100,000 with equipment.

Curtiss-Wright Corporation, Buffalo, formed recently by merger of Curtiss Aeroplane & Motor Co., Buffalo, and Wright Aeronautical Corporation, Paterson, N. J., is concluding purchase of Travel Air Co., Wichita, Kan., manufacturer of airplanes and parts. It is proposed to continue plant at Wichita and expand capacity.

Stuart Aero Products, Inc., Thirteenth and Rutger Streets, St. Louis, has been organized and is operating plant manufacturing airplane parts. A. E. Stuart is president.

Milwaukee

MILWAUKEE, Aug. 12.—The slight decline noticed by some machine tool dealers is attributed to seasonal lull and the let-up in automobile output. Production, however, is being well maintained by other branches of the metal-working industry. Inquiries continue strong. Employment figures for Aug. 1 show that 43,761 persons were employed in Milwaukee industries during July as compared with 43,814 for the previous month.

Kohler Co., Kohler, Wis., has appropriated $1,000,000 for erection of three-story and basement addition, 80 x 600 ft., to be equipped with two Dressler tunnel kilns, each 400 ft. long, supplementing present four Dressler kilns.

Board of Water Commissioners, Sheboygan, Wis., will take bids until Aug. 27 for municipal water filtration plant to cost about $750,000, bids to be separate for equipment and structures. William Koehn is superintendent. Burdick & Howson, Chicago, and Jerry Donahue Engineering Co., Sheboygan, are consulting engineers.

Outboard Motors Corporation, Milwaukee, is about to start erection of $150,000 brick and steel addition to Evinrude factory, consisting of one-story shop, 80 x 255 ft.; testing room, 64 x 64 ft., and other buildings. When completed Lockwood Motor Co. division, Jackson, Mich., and Elto Outboard Motor Co. division, will remove to new structures. Stephen F. Briggs, Briggs & Stratton Co., Milwaukee, is chairman of board of directors, and J. Brown, of the same company, is engineer.

Curtiss Flying Service, Inc., New York, will start erection soon at Granville, Milwaukee County, of two hangars, 100 x 120 ft. each, with machine and service shop. Stone & Webster, Boston, have contract for buildings.

University of Wisconsin, Madison, has to let contract to C. B. Fritz & Co., 138 North Frances Street, Madison, for new mechanical engineering building, three stories, 230 x 230 ft. Total appropriation

is $577,000. Arthur Peabody is State architect.

Northwestern Motor Co., Starr Avenue, Eau Claire, Wis., has begun construction of a one-story addition, 42 x 125 ft., to gray iron foundry.

Unit Corporation of America, Fifty-third Avenue and Burnham Street, Milwaukee, is erecting a one-story factory to house Universal Power Shovel Co., Detroit, a subsidiary, which will move to Milwaukee about Aug. 15. Latter company manufactures excavators, gears, clutches and other mechanical devices.

Pacific Coast

SAN FRANCISCO, Aug. 8.—Contract has been let by Boiler, Tank & Pipe Co., 4061 Piedmont Avenue, Oakland, Cal., to Herrick Iron Works, Eighteenth and Campbell Streets, for one-story plant on 3-acre tract, initial unit to cost about $65,000 with equipment. A crane runway, 60-ft. span and 350 ft. long will be constructed.

Crescent City Grammar School District, Crescent City, Cal., has approved plans for a one-story manual training shop at local school, to cost about $25,000 with equipment. Norman R. Coulter, 46 Kearny Street, San Francisco, is architect.

S. & W. Lawn Sprinkler Co., 2308 West Washington Street, Los Angeles, has plans for one-story mechanical shop, to cost about $25,000 with equipment. Edward L. DiVall Co., 2406 West Washington Street, is architect.

Willard Storage Battery Co., East 131st Street and St. Clair Avenue, Cleveland, has engaged Claud Beelman, Union Bank Building, Los Angeles, architect, to prepare plans for new branch plant on site recently acquired in Union Pacific industrial district, to cost about $600,000 with equipment.

Anderson Barngrover Mfg. Co., West Julian Street, San Jose, Cal., manufacturer of fruit-handling and packing machinery, has plans for one-story assembling plant, 85 x 225 ft., to cost about $45,000 with equipment. Charles W. McKenzie, Bank of San Jose Building, is architect.

International Harvester Co., 606 South Michigan Avenue, Chicago, is planning new factory branch and distributing plant at Tacoma, Wash., to cost about $35,000 with equipment. A parts and service department will be installed.

Snohomish Iron Works, Snohomish, Wash., is said to be planning to rebuild part of plant recently destroyed by fire.

Board of City Trustees, Sacramento, Cal., is considering construction of municipal airport on 230-acre tract in East Sacramento district, including hangars, repair shops, oil storage and other buildings, to cost over $500,000 with equipment. Jens C. Petersen, California State Life Building, is architect.

Central Arizona Light & Power Co., Phoenix, will soon begin construction of steam-operated electric generating plant near city, to cost more than $2,000,000, including steel tower transmission system. Company is operated by Electric Bond & Share Co., 2 Rector Street, New York.

Firestone Tire & Rubber Co., 7 East Polk Street, Phoenix, Ariz., with headquarters at Akron, Ohio, has asked bids on general contract for new factory branch and distributing plant, 140 x 181 ft., to cost about $80,000 with equipment.

P. & C. Hand Forged Tool Co., Milwaukee, suburb of Portland, Ore., is contemplating erection of an addition or an entire new plant, to take care of increased business.

Los Angeles Steel Casting Co., Los Angeles, has been formed to take over business of Los Angeles Foundry Co., manufacturer of steel castings. Personnel of latter company will remain unchanged.

Canada

TORONTO, Aug. 12.—Some improvement is noted in demand for machine tools. Total sales for the week, however, were slightly below those of the previous week, due to the holiday on Monday. New business is appearing in good volume but generally in single tools for replacement. Inquiries are good and indicate a strong demand within the next few months. Small tools are active.

Canadian Lightning Fastener Co., St. Catharines, Ont., will build an addition to double present capacity. Contract for construction has been awarded to Newman Brothers. C. J. Gibson, Toronto, is architect. Equipment will be purchased.

British Metal Corporation of Canada, Sterling, N. B., will build an addition and erect a power house.

Bids will be called in about a week for main building, boiler house, etc., at Longueuil, Que., for Fairchild Aircraft, Ltd., 1253 McGill College Avenue, Montreal. W. H. Wardell, 1463 Union Avenue, is engineer.

Hiram Walker & Sons Metal Products, Ltd., Kildare Road, Walkerville, Ont., have started work on a one-story addition, 40 x 60 ft., to cost $25,000.

Tenders will be called soon for an addition to plant of Kingston Shipbuilding Co., Ltd., Kingston, Ont.

International Pulp & Paper Co., Ltd., Montreal, will start work soon on erection of a pulp and paper mill at Chatham, N. B. Later, company also proposes to build a mill at St. Leonard, N. B.

Hayes Wheels & Forgings, Ltd., has started work on an addition to Merritton, Ont., plant to cost $100,000 and will spend $325,000 on addition to plant and machinery at Chatham, Ont.

Plant of Canada Crushed Stone Co., Vinemount, Ont., was destroyed by fire with a loss of between $80,000 and $90,000, covered by insurance. Owners plan to rebuild immediately.

Simmons, Ltd., Montreal, will start work at once on an addition to local plant to cost $145,000.

Western Canada

Westminster Paper Co., New Westminster, B. C., whose mill was destroyed by fire, announces that it will rebuild on Fraser River, at a cost of $1,000,000.

Foreign

PLANS have been approved by Manila Electric Co., Manila, P. I., for a hydroelectric generating plant at Botocan Falls, near Mayjay, Province of Laguna, for initial capacity of 15,000 hp. Transmission line will be built to Manila and other points, project to cost more than $1,500,000 with equipment. It is proposed to purchase a considerable part of machinery in United States.

Ford Motor Co., Detroit, in connection with program for establishment of European plants, has authorized new assembling works near Warsaw, Poland, to cost more than $750,000 with equipment. Company is completing remodeling of plant at Marina, near Cork, Ireland, heretofore used as automobile assembling works and to be run in future exclusively for production of Fordson tractors.

Continuing its foreign expansion program, Spencer Kellogg & Sons, Inc., Niagara Square, Buffalo, manufacturer of linseed and other refined oils, has purchased plant and business of Copra Milling Corporation, Manila, P. I., producer of cocoanut oils. Extensions and improvements are planned.

Monterrey Iron & Steel Co., Monterrey, State of Nuevo Leon, Mexico, is building new mill for manufacture of steel wheels for street and railroad cars, as well as smaller wheel units for mining and industrial service. It is reported to cost more than $100,000 and is scheduled for service early in fall.

Uddeholm Co., Stockholm, Sweden, is planning construction of a new paper mill at Skoghall for production of kraft stocks. It is also proposed to build an addition to electro-chemical works in same district, entire project to cost about 5,000,000 kroner with machinery.

Officials of American & Foreign Power Co., operated by Electric Bond & Share Co., 2 Rector Street, New York, have organized Shanghai Power Co., to take over and operate electric power plant and properties of International Settlement, Shanghai, China, recently acquired. Plans are being considered for expansion.

New Trade Publications

Gas Burners.—American Gas Furnace Co., Elizabeth, N. J. In bulletin No. 6 is cataloged a number of gas burners produced by the company, including blow pipes, machlet tips, glass fires and fish tail burners.

Stationary Boiler Superheaters.—Superheater Co., New York. In bulletin T-19, entitled "Elesco Multiple-Loop Single-Pass Superheater," is shown the application of the same basic principle—multiple-loop, single-pass arrangement—to all Elesco superheaters for stationary boilers.

Duriron Centrifugal Pumps.—Bulletins 151 and 152, Duriron Co., Dayton, Ohio, describe pumps with 2 and 4 in. suctions for handling corrosive or abrasive fluids. Special features are a duriron shrouding which protects the shaft clear through the stuffing box, and a stuffing box which will not leak.

Tanks.—Commercial Shearing & Stamping Co., Youngstown, Ohio. A pamphlet of 12 pages describes the company's line of "cold-formed" tank heads and tank accessories.

Ladles.—Whiting Corporation, Harvey, Ill. Catalog No. 210, containing 24 well illustrated pages, gives full details and specifications of the company's new ball bearing helical worm-geared ladles, as well as information about the company's standard worm-geared ladle and pin spur-geared ladle. This catalog supersedes catalog No. 202.

THE IRON AGE

New York, August 22, 1929

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All-Metal Dirigible Has Gas-Tight Sheath Made of Aluminum Alloy Sheet

As a result of seven years of study and extensive experimentation on scale models, an all-metal dirigible has been constructed for the United States Navy by the Detroit Aircraft Corporation. Special equipment for riveting the thin sheets into a huge gas bag had to be perfected; several novel constructional methods were also devised. Its trial flights are scheduled to begin the week this article is printed.

This Navy dirigible, called the ZMC-2, resembles the Zeppelin type of airship in that it is a rigid ship, built to carry the strains and stresses of flight by means of a rigid hull. However, the means of carrying these shears and stresses have been worked out along entirely different engineering lines.

One fundamental principle enunciated by Count Zeppelin underlies all forms of aerial navigation. In explaining his early experiments with rigid airships, Zeppelin said: "The forces of nature cannot be eliminated, but they may be balanced one against the other." Continuing, he pointed out that ocean steamers are so built that they weigh less than the amount of water displaced by their hulls, and consequently they float above the water. Applying this principle to the lighter-than-air ship, Zeppelin devised a rigid hull so designed that when filled with a light gas it had sufficient buoyancy to lift a cabin suitable for motors, crew and a reasonable pay load, together with surplus fuel for emergencies.

As has been pointed out many times, the German airships were made possible by the discovery of aluminum alloys, which by suitable heat treatment could be made as strong as mild steel (volume for volume) and much stronger than a mild steel piece of equal weight. The skeletons of all Zeppelins have been made of these alloys of the duralumin type (with the exception of the British ship R-101, described in THE IRON AGE, June 27, which used a considerable quantity of stainless steel). Very complicated structural framing has been devised to meet the varying stresses imposed. Main frames are huge wheels, tied together to the center with wire cables. Frames are connected by a series of longitudinal girders, and the panels in the outer surface securely tied by cross bracing.

Recent trend in aircraft construction has been toward the simplification of this skeleton. In the all-metal dirigible ZMC-2 this idea has been developed to its logical conclusion. As may be seen from an interior view, the main frames are merely hoops built up of cellular metal girders, and the ship is practically free from internal tie wires. Furthermore, the cross bracings in the outer surface are dispensed with, because the sheet metal sheathing is riveted securely to girders and longitudinals, and is sufficient-

THE All-Metal Dirigible Grew like a Plant. A riveting machine travelled on a circular track, adding row after row of sheets to the sheathing, one half of the entire structure being lifted one course at a time.

ly rigid to carry the normal shearing stresses in the hull.

Studies of this design developed the facts that not only can an airship be built possessing all of the obvious advantages of all-metal construction but, contrary to common belief, "metalclad" construction in the larger sizes does not weigh very much more than a ship of the same size made with a fabric cover. This is due not only to the fact that the shell or hull plating of the metal airship itself carries the tensile and shear stresses, and reduces the internal framing necessary, but also acts as a gas tight bag. To illustrate the latter point more fully, consider the actual physical structure of the two different types:

The surface of the fabric covered ship consists of five layers (exclusive of framing), from outside to inside, thus:

1. Outer fabric cover with (2) doped coating.
3. Shear wiring.
4. Cord netting.
5. Gas cell fabric lined with gold-beater skin.

These five layers in the fabric covered rigid airship collectively perform the functions of:

1. Fairing the surface.
2. Protection against atmosphere.
3. Transmission of tensile stresses.
4. Accommodation of pressures.
5. Retention of buoyant gas.

The single metal surface in the metalclad ship performs all these functions and performs each of them with a saving in construction cost.

Riveting Machine for Thin Sheet

It will be apparent that some economical method of joining thin alloy sheet metal into a gas-tight unit is a prerequisite to the construction of any ship having these advantages. A riveting machine described in THE IRON AGE, Nov. 18, 1926, was devised for this purpose, which has successfully driven about 3,500,000 rivets, 0.035 in. diameter, in the ZMC-2, with only one-third of 1 per cent defective rivets. In its operation three strands of wire are fed into the machine like thread in a sewing machine. It inserts and completes 135 rivets a minute, or about 5000 rivets in one hour. The overlap is ½ in.; in this are driven three rows of rivets, 12 to the inch. The cost per lineal foot of seam is about the same as the cost of sewing, cementing and taping 1 ft. of fabric seam. Thus was answered the question of how to put the thin sheets of plating together.

The metal from which the sheathing is made is known as Alclad, 0.0095 in. thick, weighing approximately 0.165 lb. per sq. ft. (including overlap for seams). Alclad is aluminum clad duralumin—that is, a sheet of strong aluminum alloy of the duralumin type, covered on both sides by a thin coating of pure aluminum for corrosion resistance. Nearly all of the other parts of ZMC-2 are also made of this material, which has been used extensively in all-metal airplanes for some time past. There is therefore little of the experimental in its present use; its chief characteristics are uniformity, strength and high resistance to corrosion.

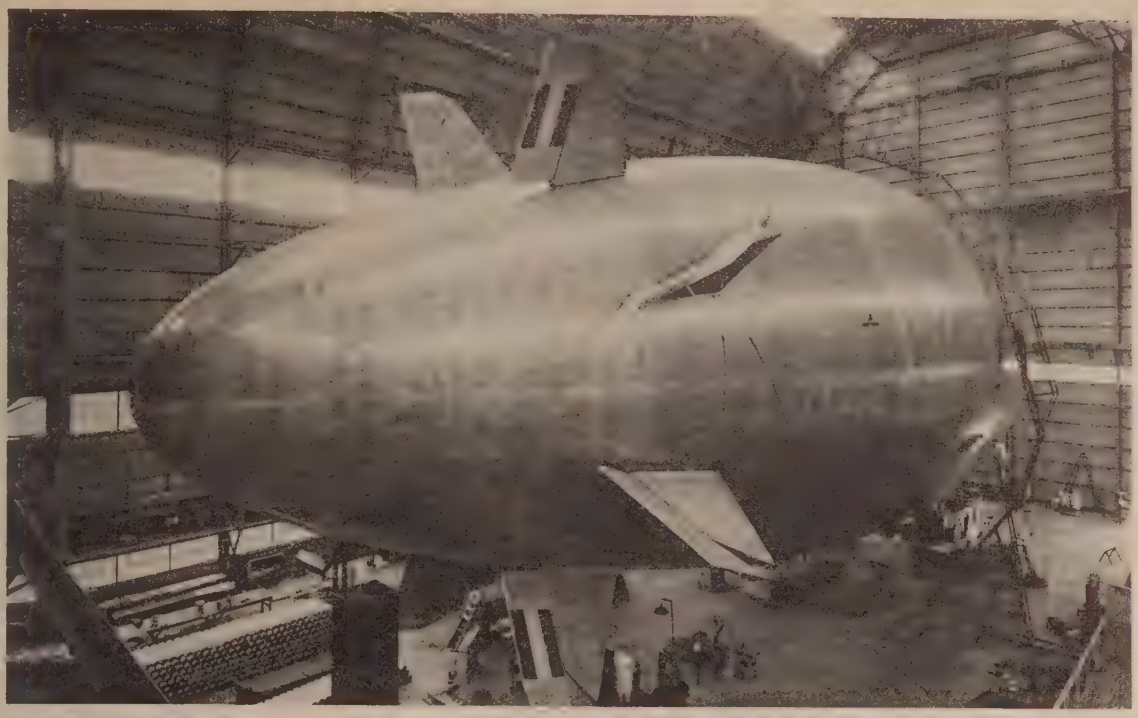
CONTROL Car for Crew of Three, Nearly Complete, Before Attachment to Hull. Dirigible will be driven by two Wright whirlwind motors, 220 hp. each, supported on outriggers one to right and one to left of control car

Development of Design

Some words descriptive of the preliminary work are appropriate.

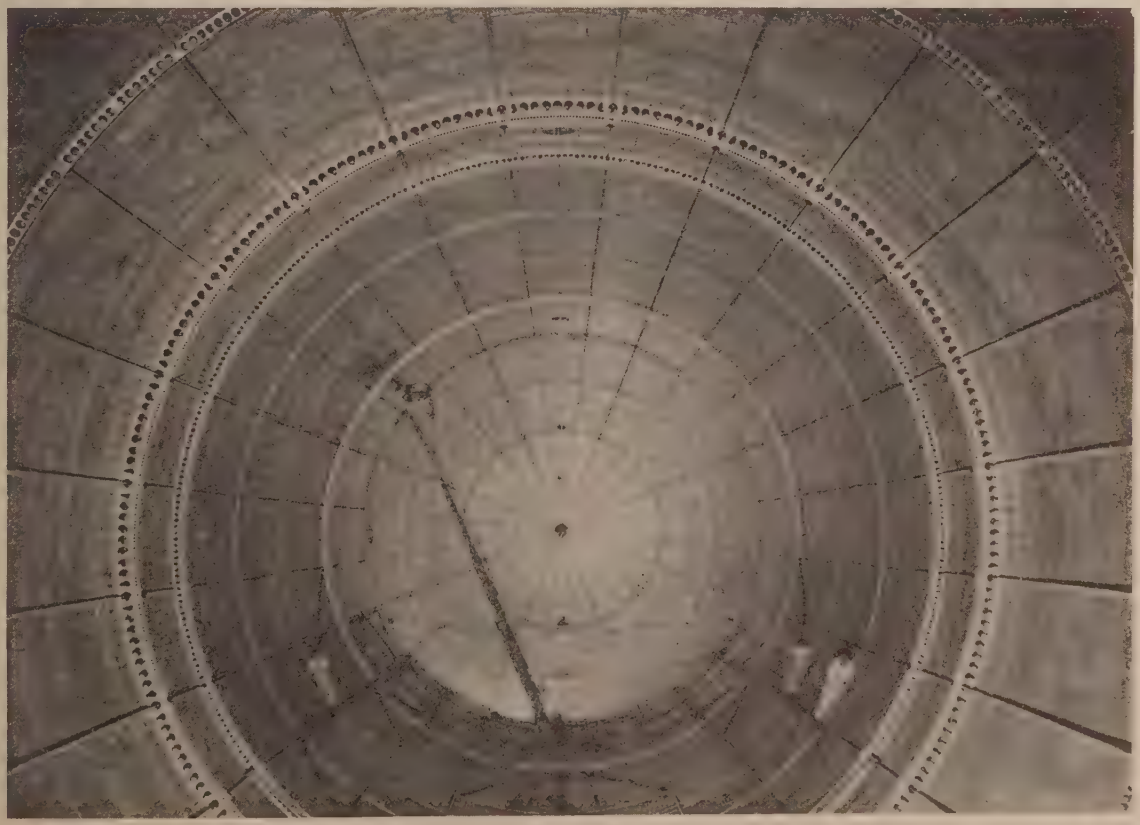
During the great war the engineering and productive skill of many of America's great industries were concentrated on the production of aircraft and aircraft engines, but the readjustment period immediately following the armistice threatened to wipe out the then infant aircraft industry. When the financial and industrial readjustment did not take place as rapidly as anticipated, a group of Detroit men, most of whom were prominently identified with the automotive industry, decided that some definite step should be taken, not only to save the engineering developments of the war period, but to begin a program of scientific research with the view of adapting the principles of military flight to commercial transportation.

In 1922 the Aircraft Development Corporation was formally organized to conduct this investigation. One of the



HULL of ZMC-2 Practically Complete, Looking Toward Prow. Six of the eight control fins are shown; the two at the sides have movements interlocked and act as elevators. The pairs on top and on bottom are rudders

THE Metal Sheath Is Structurally Part of the Dirigible, Taking Shear Stresses Normally Assumed by Intricate Cross Bracing. Note that the interior is comparatively free from tie wires, and the framing of main members and longitudinals is very simple



objectives was the application of the principle of all-metal construction to both heavier-than-air and lighter-than-air craft. At that time there was no metal alloy which could be worked into thin sheets combining the necessary strength with lightness, thickness and corrosion resistance to build an all-metal airship. Several years of experimentation followed.

Among the more prominent concerns assisting in the experimental and research work are: General Motors Corporation, Ford Motor Co., Aluminum Co. of America, Massachusetts Institute of Technology, University of Michigan, University of Detroit and the Detroit Edison Co. Detroit Aircraft Corporation was later organized to construct the ZMC-2 and to engage in other activities connected with aviation.

In the course of the development, metal ships of different sizes were designed in considerable detail and

General Specifications of ZMC-2

Length of hull	149 ft. 5 in.
Maximum diameter	52 ft. 8 in.
Fineness ratio	2.83
Displacement of hull	202,200 cu. ft.
Total ballonet displacement	50,600 cu. ft.
Ratio of ballonet volume to hull volume	25 per cent
Thickness of skin	0.0095 in.
Length of car	24 ft.
Width of car	6 ft. 6 in.
Number of air valves	3
Number of gas valves	2
Number of fins	8
Total fin area	440 sq. ft.
Total elevator area	190 sq. ft.
Total rudder area	95 sq. ft.
Total automatic rudder area	95 sq. ft.
Engines (Wright Whirlwind J-5)	2
Power at 1800 r.p.m.	440 hp.
Propeller diameter (all metal)	9 ft. 2 in.

Forecasted Performance

Gross lift (100 per cent inflation with 92 per cent helium)	12,242 lb.
Weight empty	8,900 lb.
Useful load	3,342 lb.
Crew (three)	600 lb.
Fuel (200 gal.)	1,200 lb.
Oil (25 gal.)	200 lb.
Ballast (50 gal.)	420 lb.
Radio	180 lb.
Passengers and cargo	742 lb.
Range with 250 gal. at cruising speed	680 miles
Maximum possible range (still air)	1,000 miles
Maximum speed at 440 hp.	62 miles per hr.
Cruising speed at 220 hp.	50 miles per hr.
Static ceiling	10,000 ft.

a thorough stress analysis, involving even the integration of all forces as applied to each square foot of the hull surface, was worked out carefully. A large metal model of the ZMC-2 was built to the scale of 1 to 30, and tested at different angles of pitch to verify the theory of the design, of the main bending and shearing actions, and of the factors of safety. Such systematic effort was necessary to develop, mathematically and experimentally prove, the theory of the metalclad airship. This combined research work represents the equivalent of 65 man-years.

Low Fineness Ratio for ZMC-2

The early Zeppelin and similar ships were very long when compared with their width. Some were ten or twelve times as long as they were thick. In the language of aeronautics, the ratio of "fineness," which is the ratio of length to the diameter of a ship, was as high as 10 or 12.

Since that time a general tendency has been to lower this ratio. The Zeppelins of 1918 and 1919 were about 8.6 times their diameters, and the Los Angeles, which is a post-war ship, has a ratio of 7.3.

Careful study of stresses and pressures on the surface of large airships combined with laboratory experiments proves that air resistance of ships with a ratio as low as 5 is even less than many of the long, slender ships.

This fact is due to the discovery that air currents flowing around a body completely immersed in the air have certain influences on long, narrow ships of great size which are not found in ships of shorter and thicker design. Thus the new British ships, R-100 and R-101, being built for trans-Atlantic travel with accommodations for 100 passengers, are about 130 ft. in diameter and 725 ft. long, and have a ratio of fineness of 5.5, the lowest of any dirigible attempted up to the ZMC-2, whose ratio is 2.83.

The designers of the ZMC-2 learned by experiments that rudders and elevators designed to utilize air that is flowing along the surface of a ship are more efficient than those which, placed at the stern, act on air that has already passed the body of the ship. They learned that by placing the elevators and the rudders on the side of the hull some distance from the stern of the ship, greater efficiency and better control could be had with the same surface areas.

It was also discovered that much of the air passing along the surface of a ship does not have any effect on the ordinary type of rudder and elevator. Because of this fact, the ZMC-2 has not the usual vertical rudder and horizontal rudders. Instead, it has a series of eight fins projecting from the hull about 30 ft. forward of the stern. These fins are so synchronized that two on each side act as elevators and two on the top and two on the bottom act as rudders.

In performance, the ZMC-2 will be similar to the non-rigid blimp made of fabric, but as an engineering achievement it is at least equal in importance to that of any rigid airship ever built.

Its size of 200,000 cu. ft. was determined to be sufficient to fulfill experimental requirements of the Navy Department.

After sufficient progress had been made in the underlying engineering work, Congress appropriated $300,000 for the purpose of building this experimental airship. Admiral William A. Moffett, Chief of the Bureau of Aeronautics, said:

"This all-metal dirigible of 200,000 cu. ft. capacity is separate and apart from the Navy's program to construct two airships of 6,500,000 cu. ft. each. It is metal covered, which is, from the standpoint of the Navy, entirely experimental. It incorporates many new and highly technical problems of all-metal construction, which have been developed by well known civilian engineers.

"The construction of this craft was authorized by Congress for the purpose of determining the advantages of all-metal lighter-than-air craft. This particular ship was designed and built in the most convenient size to provide a practical test of all-metal construction and to enable aeronautical engineers to develop the relative advantages thereof."

Summarizing the situation, it may be said that the all-metal dirigible combines three distinct characteristics, none of which have ever been incorporated in a lighter-than-air ship. They are as follows:

1. It will be built entirely of metal, instead of a sheathing fabric which hitherto has been used in dirigibles.

2. It will embody advanced principles in shape, that is, its diameter—50 ft.—will be only about one-third of its length—150 ft.—whereas the familiar Zeppelin type of airships have been from 7 to 12 times as long as they have been thick.

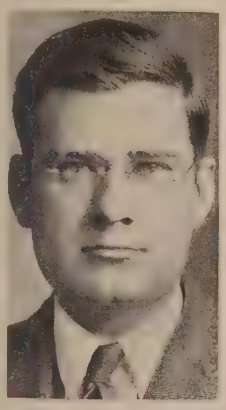
3. Its method of control will differ radically from previous dirigibles. Its elevators and rudders, which regulate its maneuvers up, down and sideways, instead of being at the rear end, will be in the form of eight fins projecting from the hull about 30 ft. forward of the stern.

British aircraft makers have been attracted by the possibilities of the nitriding process. Various parts are being made of it, including gudgeon pins, cylinders, gear wheels, cam shafts, pinions and tappets.

Engineering of Non-Ferrous Metals

Conditions Found in Modern Machines Require Close Specifications and Tests for Properties Now Known Only in an Empirical Way

BY JOHN R. TOWNSEND*



JOHN R. TOWNSEND

THE engineering aspects of non-ferrous metals are of importance when comparing the utility of these materials. The means of accomplishing greater economy in manufacturing operations are often known, but we are nevertheless hampered in the materials available for use.

Precedent has dictated the selection of non-ferrous metals for many years, but recent developments in the mechanical arts have drawn attention to the defects in some old materials and the advantages of some more recently developed. Demands for higher efficiency in the use of these metals requires materials unknown 25 years ago, materials combining great strength with light weight, hardness with toughness, wear resistance with ease of working, and metals having greater corrosion resistance, high endurance limit, heat resistance, improved electrical conductivity and a host of other special properties.

Obscure Causes of Common Failures

The essential requirements of all materials of construction are: strength, hardness, toughness, and elastic properties. These properties may be controlled by specifications employing common and well known tests. Experience has shown, however, that with non-ferrous metals it is especially necessary to control other properties, such as internal strain, fatigue endurance, "directional" properties, (or variations in strength and elasticity dependent upon the direction of rolling and drawing of sheet or rod stock), creep, season cracking, tension properties at elevated temperatures, corrosion and heat resistance. The lack of the proper attention to these properties of non-ferrous metals may result in the selection of a material, which has the desired strength, appearance and workability, yet may be decidedly dangerous to use and result in sudden and even disastrous failure of the parts involved.

Examples of such sudden failure are on every hand. For instance, a shop mechanic may report that a part has failed because it has "crystallized." He is most probably referring to a failure due to "season cracking," fatigue or creep or to a fracture produced at a temperature where the metal loses its ductility. All of these failures will resemble each other in that the fracture will be coarsely crystalline in appearance, due to the path of rupture favoring the trans-crystalline cleavages. It should be noted that each of these failures is due to different service conditions. Some of them are only common to certain non-ferrous metals, or vary in degree with these metals. This further complicates the problem.

Failures Occurring After Stresses Have Been Successfully Resisted

Season cracking, or the spontaneous failure of seemingly sound parts made of some brasses, bronzes or nickel silver, is due to a combination of high internal or applied stress and corrosion. Some non-ferrous metals are entirely free from this trouble; examples are nickel, copper, monel metal and Everdur. Other alloys are only susceptible for a limited range of composition. For example, brass containing 15 per cent zinc or less is free from this trouble. To correct the tendency, finished parts of brass may be annealed at a low temperature (which will relieve the internal strain), or sheet, rod and tube may be "sprung" or bent to equalize the manufacturing strains. Parts made to sustain load continuously and subject to atmospheric corrosion will fail if the conditions are severe enough.

Creep, or the continued movement or flow of a metal under load, is common for lead, tin and zinc at atmospheric temperatures and under moderate loading. Many other metals creep and eventually rupture when loaded at slightly elevated temperatures.

Whereas fatigue failure of steel parts under repeated stressing has been understood for many years and the endurance limit (or stress below which fracture does not occur under repeated loading) for steel is approximately 40 per cent of its ultimate strength, the endurance limit for some of the non-ferrous alloys has been found to be as low as 12 per cent of its ultimate strength!

Some non-ferrous metals have brittle ranges at elevated temperatures. For example, annealed high brass sheet has practically no ductility at 600 deg. Fahr., and will break easily at that temperature, revealing an intercrystalline fracture.

These various types of failure can be prevented either by selecting metals that are not subject to these troubles or by so proportioning each design as to eliminate them, at least within the life of the part.

At present our understanding of such common properties, as wear, punching, drawing, forming, welding, soldering, brazing and riveting, is mainly empirical, for we have as yet acquired relatively little systematic knowledge of these properties of non-ferrous metals.

Economic Factors Govern Use of Special Alloys

In addition to the above-mentioned properties concerned with *use* of these metals, there are a number of economic factors that must be taken into consideration when a metal or alloy is to be used in quantity and in a commercial manufacturing operation. These are cost, source of supply, uniformity of quality and the degree

*Bell Telephone Laboratories, New York.

to which the metal may be controlled by specifications.

The cost of the metal must be consistent with the use to which it is being put. When possible the source of supply should be wide spread, domestic, competitive and reasonably free from interruption. This ideal can not always be met, because nature has not provided us with unlimited and widespread domestic sources of supply of metals. Metals are bought in a world market, and this may sometimes cause the abandonment of native mines in favor of sources abroad which are richer and cheaper to work. For example, tin and antimony, which are extensively used in non-ferrous alloys are imported from abroad—tin from the East Indies and antimony from China.

Competitive sources of supply are necessary to obtain favorable prices. Here again, competition may be impossible. Then the force of other considerations must be great enough to overcome the objection to relying upon limited sources. Generally speaking, the newer alloys of exceptional and widespread utility are the result of long continued research activities by their inventors and are necessarily of higher price and limited source. The general policy of their producers, however, appears to be to market these alloys at but a slight increase over the cost of the ingredients, the increased demand for the base metals being considered an adequate return.

Rigid Specifications Necessary for Mass Production

The matter of specification requirements is also becoming one of increasing importance. It is absolutely essential that supplies of non-ferrous metals be uniform in quality, shape and thickness; if otherwise, design and manufacturing difficulties will arise. Modern high-speed production methods depend upon a careful set up of machinery and this in turn upon the continuous flow of uniform material, if the dimensions for formed, punched, drawn, welded and forged parts are to be sufficiently interchangeable, and high-speed production unhampered. Adequate supply consequently requires an intimate knowledge of the properties of metals, a thorough revision of our old methods of test and the creation of new ones to control more accurately these useful properties. Materials specifications, if they are to be wholly effective, to meet the requirements of uniformity, must contain in addition to specific requirements, methods for inspection and sampling. This is leading to a more general use of statistical methods of quality control as a means of guaranteeing the economical use of materials in high-speed production.

Surface Seams in Rails Cause of Crescent-Shaped Base Fractures

AS a sequel to a fatal derailment in 1928, James E. Howard, engineer-physicist of the Interstate Commerce Commission investigated the occurrence of seams in the base of rails. The accident in question was the result of a fracture from that cause. His remarks are summarized below.

Base fractures are commonly progressive, not immediately forming in new rails, but with an interval of time elapsing between their incipient formation and final rupture. They originate at a longitudinal seam in the lower surface of the base, thence gradually extending upward. A crescent-shaped piece of the base is eventually detached. The final stage of complete rupture is reached by the upward extension of the fracture from the base of the rail, traversing upward through the web and the head.

It has been the experience in the examination of crescent-shaped base fractures that such fractures invariably started at a longitudinal seam. In some cases the seam was several hundredths of an inch in depth and displayed blue-black walls. Such a seam or lap was made without doubt during the fabrication of the rail. Other explanations have been offered for the presence of some of these manifestations. Short, intermittent lines have been attributed to the breaking through of small blowholes which had formed near the surface when the ingot was cast.

The presence of surface seams covering a portion of the periphery of the head and a portion of the base led to the introduction of a deseaming process which at least removed the seaminess at the particular pass at which it was done. Diagonal rolling has been given consideration in the fabrication of rails.

Structural shapes display similar seaminess, often much exaggerated, and in which there is a relation between the location of the seams and the roll designs in which the shapes were formed. Seams are found at definite places in rolled angles, channels and beams, especially in the latter in pronounced degree.

Influences which lead to the formation of surface seaminess appear to cause different results on different occasions. Some rails are nearly free from seaminess, whereas others are very much affected, too seamy to justify putting them into the track.

Tests of bases of rails, by crosswise bending the flanges, display a high degree of strength, apparently in excess of service requirements. Such results, however, furnish additional examples of the remote relations between primitive static tests and the endurance to repeated strains of service. Variations in the state of seaminess of the bases of different rails, from those nearly immune and those extremely charged with numerous and deep seams, would appear to indicate that some control of conditions at the mill was possible during fabrication which would restrain their formation.

Short sections of rails from each of several rail mills were pickled in hot acid and their bases photographed. The results were not all the same in degree, but from no source were the rails presented of complete exemptions from base seaminess. General experience leads to the belief that fluctuations would be found if the tests were repeated, but substantially the same results would be reached.

A sharp reentering angle, as well known, is a menace to all grades of carbon steels which are exposed to repeated stresses, and especially alternating stresses. It is probably safe to say also menacing to steels exposed to shocks and vibratory stress.

Iron ore has been stripped and mined by steam shovels for years on an enormous scale. As a whole, operation is on a greater scale than that at open-pit copper mines, but no single iron mine handles nearly as much material as the Utah Copper Co. at Bingham, Utah, and few of the iron mines handle as much as the other open-pit copper mines. However, the removal of up to 21,000,000 cu. yd. of capping and 35,000,000 tons of iron ore in a season of eight months with 300 to 400 power shovels in operation and standard transportation systems is a great feat.

Electrifies Superior Strip Mills

Hot Rolling Mills Are Centralized and Equipped with Electric Drive with Minimum Loss of Production and an Increase in Capacity

BY H. H. WRIGHT*

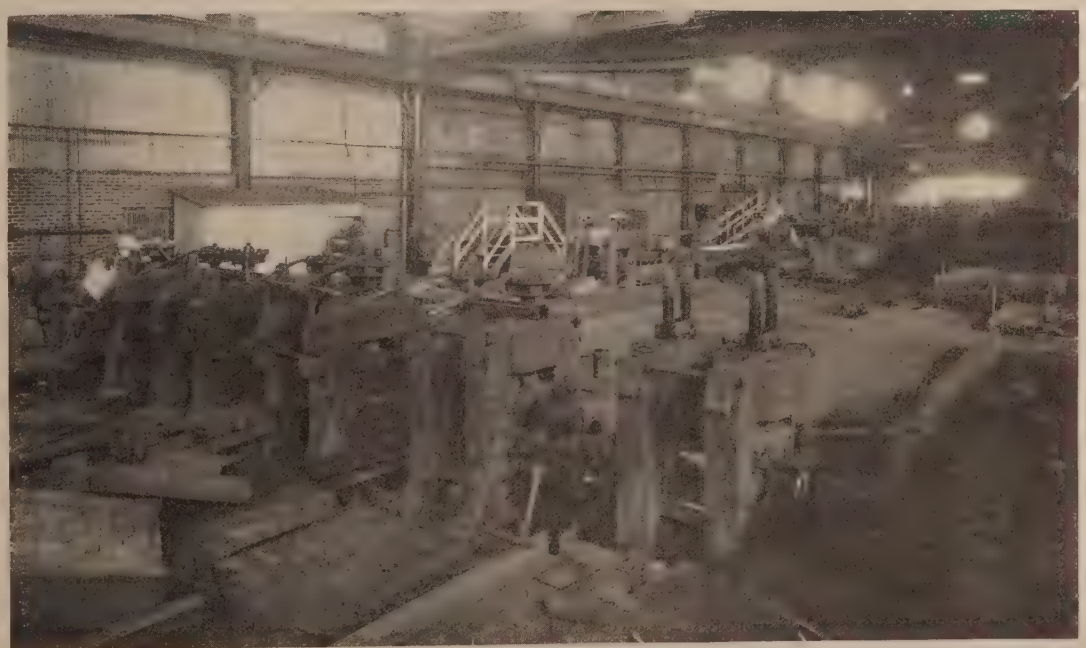
CENTRALIZATION of hot mill production in a group of mills which could be equipped with modern electric drive and otherwise adapted to the company's needs has been accomplished by the Superior Steel Corporation, Pittsburgh, at its Carnegie, Pa., works, with a minimum of expense and loss of production. With a growing demand for the strip steel products in which the company specializes, an increase in hot mill capacity had become imperative. With the exception of the 10-in. mill, all the hot mills were steam driven and the steam equipment had become uneconomical to operate. In making the changes the older steam mills were kept intact for use in emergencies and to help out in times of peak demand.

The 10-in. mill is an electrically driven unit, consisting of a 20-in. rougher, a vertical edger, a 10-in., three-stand intermediate train and a two-stand, 10-in. finishing train. The capacity of this mill was limited by the drive on the finishing train, which was an induction motor with no provision for speed adjustment. Near the 10-in. mill was a steam driven 14-in. mill, which was in good condition but uneconomical to operate because steam for the engines was supplied from an isolated boiler house on which the labor cost and standby losses were high.

It was decided that, by modifying the 14-in. mill slightly and replacing the engines with motor drive, practically all the requirements for heavy strip could be handled in this mill and that, by replacing the 10-in. mill finishing train drive with an adjustable-speed motor, the capacity for rolling medium widths could be increased satisfactorily. With the installation of a new electrically driven 8-in. mill, the hot mill capacity for narrow, medium and light-gage material could be rounded out and make it possible to shut down a steam-driven mill. This program was carried out and has resulted in an increase in hot mill capacity and reduced operating costs.

The modified 14-in. mill, shown in an accompanying illustration, consists of a 20-in., three-high breakdown stand in tandem with a 14-in., two-high flat pass and two vertical edgers; a three-stand 14-in. intermediate train, and a 14-in., two-stand finishing train. The original drive consisted of two engines, one of which drove the intermediate and finishing stands as a single five-stand train. The roughing mill engine was direct connected to the first

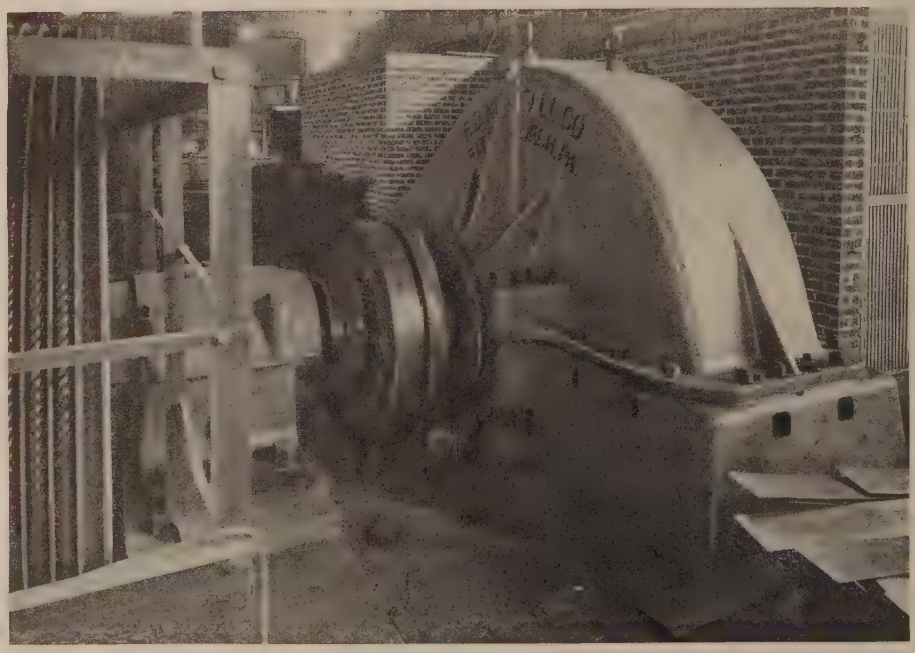
*General engineer, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.



THE 14-in. Mill as Seen from Finishing Side. The motors driving the edgers and intermediate stands are located in the motor room on the left. The drives for the roughing and finishing stands are in houses on the right

14-in. flat stand and drove the breakdown stand and vertical edgers through a rope transmission. To give greater flexibility the rope transmission on the edging stands was eliminated and individual adjustable-speed drive provided for each stand.

The breakdown stand and first flat stand could be driven satisfactorily by a 1500-hp. constant-speed motor, so the 1500-hp., 352-r.p.m. motor was taken from the finishing train of the 10-in. mill and connected to the first flat pass through a helical reduction gear unit which has a ratio of 352/120 r.p.m. The old engine shaft, flywheel and rope sheave and rope transmission to the breakdown stand were retained. The engine base and main bearing were entirely removed and a new pedestal installed to replace the main engine bearing. The gear unit and motor were mounted partly on the old engine foundation and partly on a new foundation, and to correct for possible misalinement of shafts due to unequal settling of foundation, flexible couplings were used on both the high and low-speed sides of the gear unit.



THE 1500-hp. Gear Unit on the 14-in. Mill. The bearing next to the rope sheave is located in the position formerly accepted by the engine main bearing

The vertical edging stands are each driven by a 300-hp., 600-volt, 600/1200 r.p.m., direct-current motor through a helical gear unit. All gear units, both for the edging rolls and the 1500-hp. main roll drives, have roller bearings.

The 14-in. intermediate train required a constant speed drive, and a 2000-hp. 180-r.p.m. direct-connected synchronous motor was installed. To allow adjustment for variation in roll diameter and draft, the two 14-in. finishing stands were equipped with a separate set of pinions and coupled to a 2000-hp., 600-volt, 200/360 r.p.m. direct-current motor. To replace the 1500-hp. motor, which was moved from the 10-in. mill finishing train to the 14-in. unit, a 1500-hp., 600-volt, 325/450 r.p.m. direct-current motor was installed.

The 8-in. unit has five stands and is equipped with two sets of pinions to allow the use of two motors. The roughing stand, intermediate stand and two edging stands are driven by an 800-hp., 450-r.p.m. synchronous motor and the finishing stand by a 500-hp., 600-volt, 400/600 r.p.m. direct-current motor.

Electric power for the entire plant is distributed about the plant at 2200 volts. The existing substation and motor room at the 10-in. mill was enlarged to house all the new switching equipment, the 2000-hp. synchronous motor, the 300-hp. edger motors and gear units for the 14-in. mill and the 2500-kw., 600-volt, three-unit, synchronous motor-generator which supplies 600-volt direct current to all the adjustable-speed motors. Direct current is distributed from the station at 600 volts through overhead cables, and the alternating-current motors, not located in the main substation, are supplied through 2200-volt, three-phase feeders.

The arrangement for generating at a central point all the 600-volt direct current required for a number of mills is ideal where the drives are not widely scattered. With this arrangement advantage can be taken of the fact that all motors are not fully loaded at one time, thus reducing the capacity of the generators. In this installation the combined capacity of all the 600-volt direct current motors is 4600 hp. and they receive power from a motor-generator of 2500 kw. capacity.

For the sake of simplicity in the control it was desirable to have the 800-hp. and 2000-hp. synchronous motors started by connecting them directly to the 2200-volt line without the use of auto-transformers or reactors. In the case of the 2000-hp. motor this method of starting would impose a sudden load on the system greater than the total plant load had previously been, which would affect the voltage of the entire system. This surge is practically eliminated by a very simple procedure. Before starting the 2000-hp. motor, the 2500-kw. synchronous motor-generator is started with no line disturbance by means of an auto-transformer. The set is brought up to speed, synchronized and full excitation applied. The 2000-hp. motor is then started at full voltage and, because of the effect of the motor-generator, which acts as a condenser, the resultant demand on the 2200-volt system is reduced to a low value.

The contract for the electrical equipment, gear units, couplings, pedestal bearing to replace the main engine bearing on the 14-in. mill, for the machine work involved in removing the engine crank disk and grinding a new journal on the engine shaft and for the labor and material was given to the Westinghouse Electric & Mfg. Co.

Germany's Electric Steel Furnaces

There Are Now 56 Arc and 13 Induction Units—Arc Furnaces More Popular — Operating Features of Both Types

A SURVEY recently completed by St. Kriz, in *Stahl und Eisen*, March 28, 1929, pages 417 to 425, under the auspices of the Verein deutscher Eisenhüttenleute, reveals the fact that there are 56 arc-type electric steel furnaces in operation ranging in capacity from 0.3 to 15.4 tons. There are also 13 induction furnaces of from 2.5 to 10 tons capacity.

The apparent popularity of the arc furnace over the induction type is probably due to its greater flexibility in the matter of material charged, long life, and better power characteristics.

Bottom contact, which in the early days of the industry was hailed as a forward step, is becoming obsolete. Only three of the 56 arc furnaces are so equipped.

The various essential features of the comparison, briefly enumerated, are as follows:

Size: As in the United States the most widely used are those from 2 to 8 tons capacity.

Transformer Rating: This varies uniformly with the size of the charge, being about 750 kva. for the 2-ton furnace and 4000 kva. for the 16-ton.

Furnace Voltage: For the small furnaces the voltage impressed during melting and refining runs about 80 to 100. In the larger units (12 to 15 tons) about 190 volts are used in melting and 120 in refining. In contrast to these figures which are for basic practice, furnaces running with acid slags may employ slightly higher voltage, due to the lower electrical conductivity of the slag. Variation in voltage is accomplished by taps on the primary or by changing from delta to star connections or both.

Reactances: Most installations contain reactance coils on the high-voltage side of the transformers, in order to steady the arcs and prevent surges in the circuit.

Hearth Dimensions: The cubical contents of the furnace below the working level are approximately 0.2 cu. meter per ton (about 7 cu. ft.), with a slag surface of about 0.5 sq. meter per ton (about 5.5 sq. ft.). Maximum depth of the bath is about 2 ft.

Hearth Material: In the basic furnaces, either magnesite or dolomite is used. In a few cases silica brick are used above the slag line, and in about a third of the furnaces a quarter or half-course of firebrick is used between shell and lining. The average life of the dolomite walls is 74 heats and of the hearth 416. For magnesite these figures are about 50 per cent greater.

Roof Material: Silica brick roofs of 10 to 12 in. thickness are almost universally used. Life of the roof varies from 23 to 138 heats. Expressed as pounds per ton of charge the consumption of silica varies from 3 to 50.

Cooling: Opinion is divided as to the economy of water cooling, except of the electrode clamps. Certain plants use water-cooled doors, door frames or roof frames. Others find the increased heat loss and repairs exceed the savings in materials.

Electrode Consumption: In 33 furnaces carbon electrodes are used, the average consumption being 32 lb. per ton of cold charge and 17 lb. per ton of steel with liquid charges. The Söderberg (self-burning) electrode is used in 5 furnaces, and is consumed at the average rate of 44 lb. per ton of solid charge. These are employed mainly for the larger sizes (15 to 17 in.), where the consumption of solid electrode is slightly higher than 44 lb. per ton.

Graphite electrodes are used by 23 furnaces, showing the following average results:

	Lb.
Per ton of cold charge.....	16.3
Per ton of hot charge.....	6.6
Per 1000 kwhr.....	17.4

Power Consumption: The rate of use of electrical energy during melting depends on the speed of melting and the size of the charge. Thus the average 7-ton furnace with a cold charge will melt in about 6 hr. using 700 kw., in 3 hr. with 1500 kw. and in 2 hr. with about 2200 kw. In the refining period the power input is dependent on the size of the charge, 500 kw. for the 4-ton, 750 kw. for the 7-ton and 1000 kw. for the 11-ton furnace.

Steel Plate Floor in Office Building

THE first important application of steel plate or "battledeck" flooring has been made by the Eastern Bridge & Structural Co. in the lobby of the Worcester Pressed Steel Co. Building, Worcester, Mass. The steel plates are 3/16-in. thick, 24-in. wide and largely in 12-ft. lengths. These are welded to 3-in. standard I-beams. The welds are continuous bead type, the plates being tack-welded in place before the running of the bead. Complete cost data are being compiled by the American Institute of Steel Construction, New York.

Machining Airplane Cylinders

Steps in Transforming a Forging Into a Finished Barrel and Preparing the Cylinder Head to Go Into Assembly

BY FAY LEONE FAUROTE*

EACH of the three Wright engines, the five-, seven- and nine-cylinder, uses the same unit assembly of cylinder, cylinder head and valve mechanism. Because of the unusual form and combination of steel and aluminum used, the method by which the components forming this unit assembly are fabricated and combined is sure to prove of interest to metal workers.

The cylinder head, which is cast from aluminum alloy in the Wright foundry, is cleaned, sand blasted, heat treated to 950 deg. Fahr. for 5 hr., cooled in still air, aged for one hour at 450 deg. Fahr., again heated to 950 to 975 deg. for 1 hr., cooled and aged again for 1 hr. at 450 deg.

For its first machining, the casting is chucked on the outside diameter at the open end against the face of the flange in a Gisholt turret lathe, and the rocker boxes, exhaust and intake ports are targeted. The flange is rough and finish turned, and the boss faced, bored and drilled. The component is then transferred to a Bullard Mult-Au-Matic, where the following operations take place:

Rough and finish face open end to 3.525 ± 0.005 in. dimension.

Break sharp edges on outside dimension.

Rough bore 5⅛-in. diameter x 1 13/64 in. deep.

Rough form dome 3⅛ in. deep from face.

Finish turn dome 2 11/16-in. radius x 3.150 in. deep and bore 5 1/32 in. diameter.

Finish bore thread diameter to 5.250 ± 0.002 in. x 1.250 ± 0.002 in. deep from face.

Form 3/16 in. x 5 23/64 in. diameter, undercut square with thread diameter, holding 1.250 ± 0.002-in. depth.

Chamfer 45 deg. to 5⅜ in. diameter.

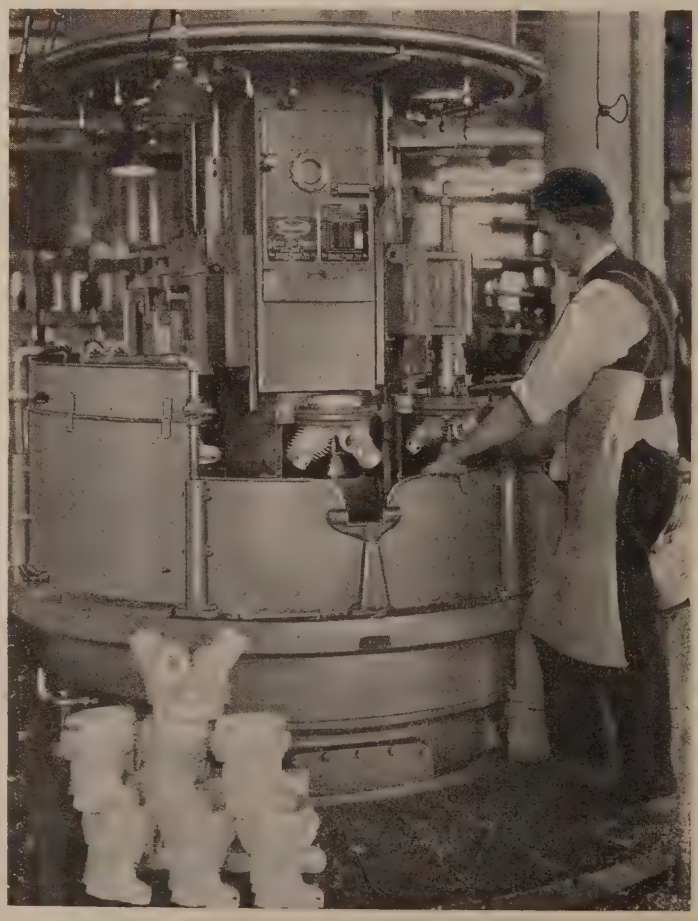
Form 1/32 x 45 deg. chamfer at outside diameter of flange.

Cut 5 11/32 in.-12P modified buttress thread.

There are six stations on the Bullard Mult-Au-Matic, one for chucking and five for machining. As a head is installed and moved to first operation, all stations are stepped up one and the finished head is removed. Thus five machining operations take place simultaneously. There are, at present, three Mult-Au-Matics at the Wright plant; one is used exclusively for machining cylinder heads and one exclusively for cylinder barrels. The other can be used for machining either the cylinder head or the barrel.

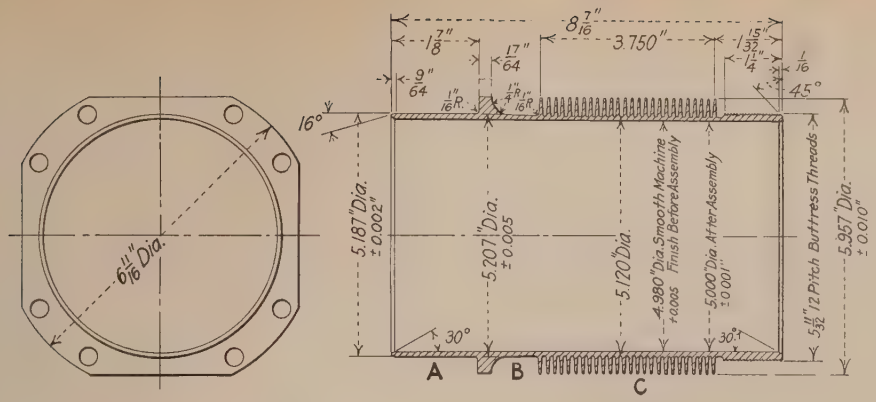
If necessary, following the above operations, the buttress thread is retapped on the drill press, after which the part is given a careful inspection, and a water test at from 500 to 600 lb. pressure. If leaks or sweating occur at the water test, sodium silicate is pumped into the cylinder at a temperature of 150 to 212 deg. Fahr. and at 500 to 600 lb. pressure. The cylinder is then washed in warm water for about a minute and baked for an hour at 500 to 600 deg. Fahr.

A 24-in. drill press is used for rough and finish boring the intake port and chamfering, after which a Leland-Gifford two-spindle special drill drills and reams the valve guide holes, spotfacing and cham-



BORING, Tapping and Finishing Dome on Cylinder Head of J-6 Series "Whirlwind" Engine on Six-Station Machine

*Mechanical engineer, New York. In THE IRON AGE of July 18, page 148, Mr. Faurote described the airplane engines of the Wright Aeronautical Corporation. In the issue of Aug. 8, page 337, he told how the connecting rods were machined and in the issue of Aug. 15, he covered the machining of the crankshaft. Remaining articles are devoted to the crankcase and to the assembly problem.

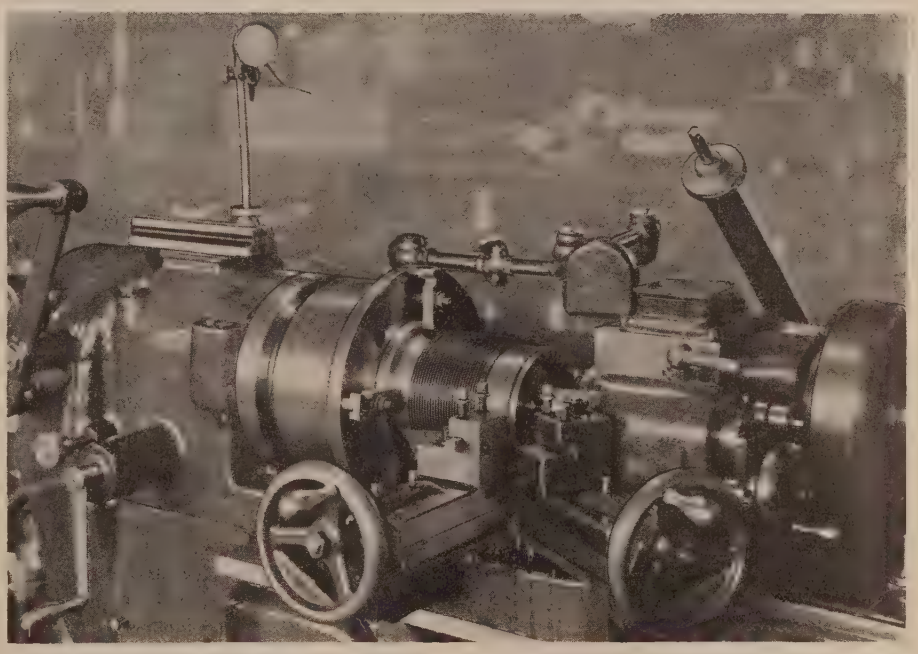


ACCURACY in Maintaining Precise Dimensions Features the Machining of Cylinder Barrels for Airplane Use, as with All Other Engine Parts. At left is the standardized "Whirlwind" Cylinder

MILLING thread on Cylinder Barrel, Facing and Chamfering Cylinder Seat in Same Operation, Thus Having Positive Square Seat with Thread (Right)

* * *

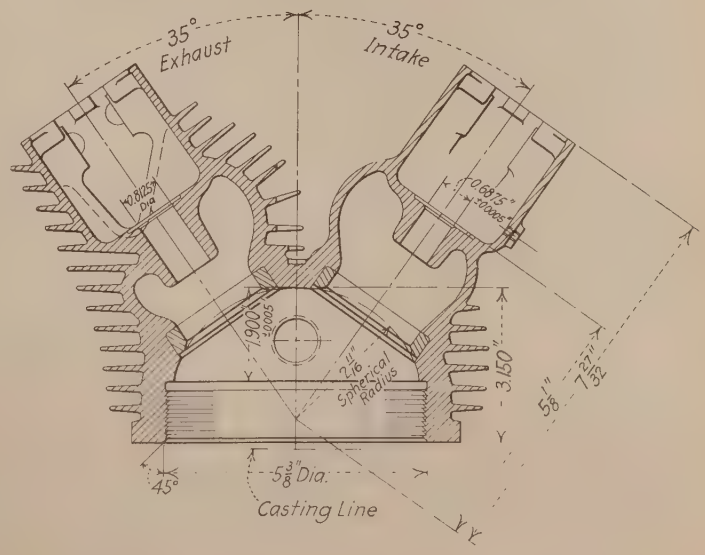
SECTION (Lower Right) Through Exhaust and Intake Ports on Cylinder Head, Indicating Extent of Cooling Ribs on Head and Exhaust



fering. The valve seats are then rough and finish bored and the bosses faced. The rocker box faces are milled on the Milwaukee special duplex miller, and the exhaust flanges are rough and finish milled on the No. 2 plain miller.

A Cincinnati horizontal miller, 18-in., then mills the rocker box bosses, and a Leland-Gifford two-spindle special drill drills and counterbores the intake and exhaust rocker boxes. A special Leland-Gifford two-spindle drill also drills and finish reams the bosses, and a single-spindle drill counterbores the rocker box boss. The rocker box faces are drilled and reamed, and the holes countersunk, and a 20-in. Barnes drill press drills a hole through the spark-plug boss, counterbores and countersinks and taps.

The No. 2 Leland-Gifford 20-in. three-spindle drill puts the "F" holes in the exhaust flange, countersinking and tapping them also. After counterboring the holes in the exhaust flange, the part is clamped in the drill jig and a hole is drilled through the boss on the



side of the intake rocker box. It is spotfaced and tapped. A bench operation removes the sharp edges in the cylinder bore and the spark-plug holes. The intake and exhaust port walls are filed and scraped, and cuts blended where necessary. After washing in hot water the cylinder head is given a complete inspection.

Machining the Cylinder Barrel

STEEL forgings for the Wright Whirlwind cylinder barrel are purchased already heat treated according to specifications. When received at the Wright plant they are inspected for dimensions, examined for defects and for external appearance relative to machining, such as scale, and tested for hardness.

The first machining operation is on the Fay automatic roughing lathe, which rough turns and forms the outside diameter. The process is as follows: First a hole is chucked in; then diameters 5 5/16 in. and 5 7/16 in. are formed (at *A* and *B* on diagram), making a flange 7/16 in. thick, forming an angle at back of flange and holding left end to a 15/16-in. dimension. Next a 5½-in. diameter is turned (at C in diagram), making 3 15/16 in. dimension over radiating fins. Then a 6 1/16-in. diameter is turned over the fins; also a 6 13/16-in. diameter over the flange. Finally the thread end is faced to 1 7/16-in. dimension.

Next the forging is taken to a Bullard Mult-Au-Matic. Here the flange outside diameter is finish turned to 6 11/16-in. diameter. A 4 15/16-in. rough bore is put through. Then the end is rough and finish faced to 1 25/32 in. from face of (unfinished) flange. The 5.187-in. diameter is rough turned to 5¼ in. Next the flange is rough faced to 1 27/32 in. from end, holding 1/16 in. radius in corner.

Then the back of flange is rough tapered and angled, making flange 11/32 in. thick. The 5.207-in. diameter is turned to 5¼ in.; ¼-in. and 1/16-in. radii are held, making width of cut 15/16 in. The 5.187-in. diameter is then finish turned to 5.205 ± 0.003 in. and the flange finish faced to 1⅞ + 0.000 — 0.010 in. from end.

Following this, the back of flange is finish tapered and angled, making flange 9/32 + 0.000 — 0.010 in. thick, and with 5.207 ± 0.005-in. diameter and 5.120 ± 0.005-in. diameter, holding ¼-in. and 1/16-in. radii and making width of cut 1 in. The bore through cylinder barrel is then finished through to 4.980 ± 0.002-in. diameter. A 30-deg. chamfer is formed to gage on inside of bore at both ends, and a 16-deg. chamfer is formed outside at left end, making 9/64 to 3/16 in.

The thread is milled and the end of cylinder is faced and chamfered all in one operation on a specially designed Hanson-Whitney thread miller. This provides for a positive square seat with relation to the thread. The threads, as usual, are cut on the barrel while it revolves; during each complete revolution of the barrel the tool traverses the width of one thread and the thread is thus made continuous.

Sharp edges at top of fins are broken slightly on a speed lathe before the cylinder barrel is given a thorough washing in gasoline. It is then inspected and delivered to finished stores or to the cylinder machining assembly.

Assembling Cylinder Barrel and Head

AT this point the cylinder barrel, which in the meantime has been machined as above (virtually in the same manner as described in the former articles on the manufacture of the Wright engine, THE IRON AGE, March 1, 1928, p. 591), is ready for assembly with the cylinder head. The cylinder is heated to 650 to 700 deg. Fahr. and held at this temperature for half an hour, after which it is removed from the furnace and set on pads of the fixture, open end up. The intake pipe connection is driven into seat, as are the exhaust valve seats and intake valve seats. The cylinder barrel is then screwed into place, the plugs and clamps removed and the assembled cylinder set on a bench to cool in an inverted position, that is, with the open end up.

After filing and scraping the intake and exhaust port walls and inspecting the assembly for cracks, the spark-plug inserts are screwed into place and the assembled cylinder given a hydraulic test at 500 to 600-lb. pressure per sq. in. Cylinders for Government use are always tested in the presence of the Government inspector.

The next operation is drilling eight 13/32-in. diameter holes through the flange on a special multiple-head Leland-Gifford drill. After riveting the intake connections to the cylinder head, a hole is drilled through the intake pipe connection, a hole drilled in the flange boss, reamed, formed and tapped. A Cincinnati duplex miller then straddle-mills the cylinder barrel flange to 2 31/32 in. from center, four sides. After removing all burrs, the job is washed in Oakite about 30 sec., then rinsed in cold water, then in hot, finally sprayed with Hilo metal primer, baked at 450 deg. Fahr. for 1½ hr., sprayed with Hilo black cylinder enamel, baked at 450 deg. Fahr. for 1½ hr. and cooled in air. All priming and enamel are of course kept off all finished surfaces on cylinder head, and also the lower flange face and cylinder barrel.

On a two-spindle sensitive drill, holes for the dowel pins are put in and the dowel pins placed. All the holes are retapped to remove the enamel, the valve guide holes rereamed, the intake and exhaust valve guides pressed into place and hand reamed, as are the rocker box holes also. A Cincinnati plain grinder with a live head squares up flange and grinds diameter to 5.187 ± 0.002 in. A back spotfacing machine spotfaces eight 13/32-in. holes in flange 11/16 in. diameter, after which the assembly is taken to a Heald automatic grinder, which rough and finish grinds the cylinder bore to 5.000 ± 0.001-in. diameter. The cylinder is finished by stoning on a Hutto lapping machine 5.000 ± 0.001 in. diameter. After washing thoroughly with gasoline and undergoing a complete inspection, the cylinder assembly is then delivered to the finished stockroom ready for the engine assembly line.

Soft Surface on Quenched High-Carbon Steel

In order to determine whether the speed of cooling was sufficient to retain austenite at the surface of quenched high carbon steel, or whether the expansion and contraction stresses would modify the theoretical condition materially, Professor Honda and his associates quenched a number of small blocks (20 x 20 x 40 mm.) of Swedish steel. Their results are given in *Science Reports*, Tohoku Imperial University, for May, 1929.

The specimens quenched were sawn lengthwise by a copper band with carborundum powder scattered over it, and one-half of them were again cut into halves. During these processes, the specimens were always cooled in water in order to avoid their tempering. Exterior and interior surfaces were then explored with microscope, with scleroscope and with X-ray diffraction apparatus.

Results, summarized in the table, show that the amount of retained austenite in the outer layer is greater than in the center, the excess increasing with carbon content and quenching temperature.

Carbon content per cent	*Quenching temperature deg. C.*	*Retained austenite X-ray Analysis external surface per cent*	*Retained austenite X-ray Analysis sectioned area per cent*	*Shore Hardness external surface*	*Shore Hardness sectioned area*
1.7	1190	36	19	60	71
1.7	1150	21	17	69	71
1.5	1100	13	8	65	70
0.9	1180	26	20	69	73
0.9	1070	22	15	72	80
0.9	900	20	15	74	65
0.9	800	12	5	72	63

Government-Built Steel Motor Boats

Fleet of Ten Built by United States Engineer Corps—Methods of Shop Fabrication Outlined

BY JOHN VAN HORNE*

THREE arc-welded steel motorboats for use as carriers and tow boats on the Mississippi River and its tributaries are being built by the Corps of Engineers, United States Army. This is the second fleet to be so constructed by the Army engineers; the first seven, launched over a year ago, have been in continuous service ever since.

These launches are constructed entirely of steel, all permanent connections being made by the electric arc-welding process. Each craft is 28 ft. long over all, 7 ft. wide and 2 ft. 4½ in. deep. The freeboard varies with the load, the draft being very little when the boat is not loaded. The boats have flat bottoms, slightly stepped close to the stern, and have a rather sharp rise at bow, making a broad, flat prow, similar to the seaplane type.

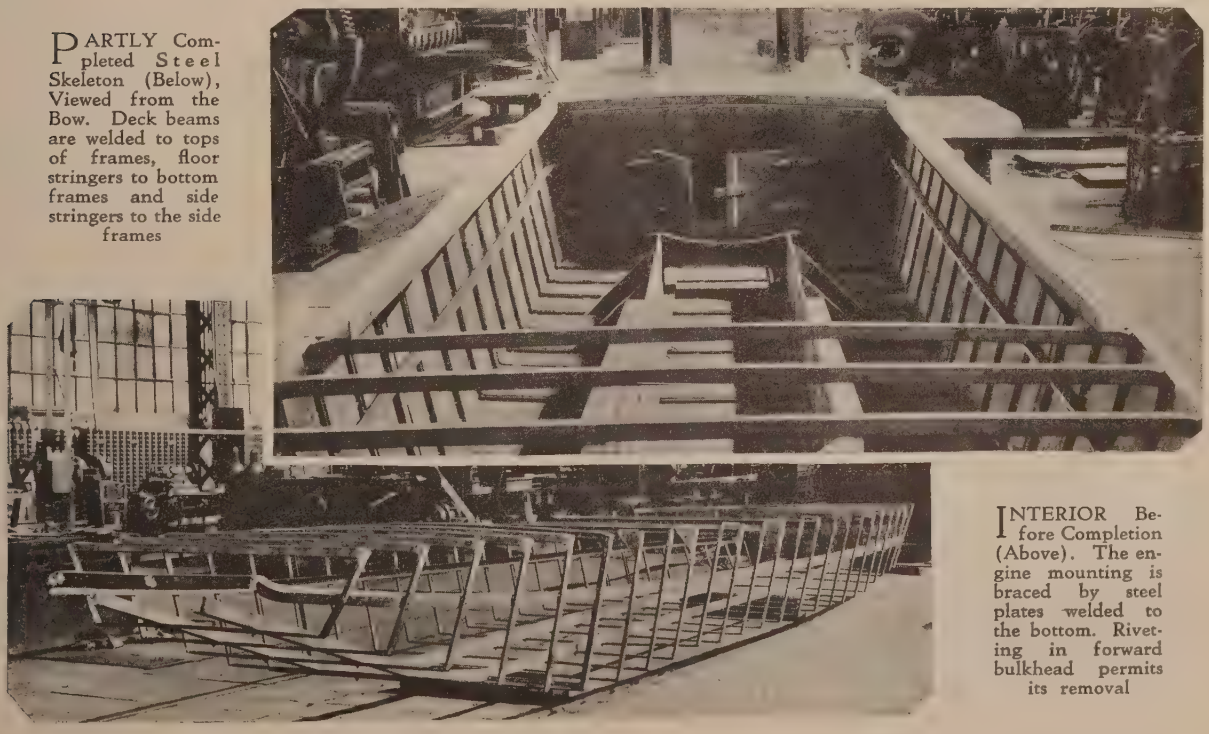
Some idea of the construction of these boats may be gained from the illustrations. One shows the partially completed steel skeleton of a hull. Each rib is made from one steel channel, 1½ x 9/16 x ¼ in., except that the frame at rear end of forward bulkhead is a 1½ x 1½ x ⅜-in. angle. The two floor stringers are 3 x 3 x ⅜-in. angles, punched and bolted in position to each frame, prior to arc welding.

Angle stringers are welded, on each side, to the channel frames. These stringers are punched, and bolted to the frames, to maintain perfect alinement until arc welded. Deck beams over the forward and after bulkheads are 1½ x 1½ x ⅜-in. angles, welded directly to top ends of frames. Clamps formed from flat plate are welded to alternate frames to carry the strip of deck on each side of the open cockpit.

An interior view from the uncovered after bulkhead, looking forward, shows the engine base or mounting. This is constructed entirely from ¼-in. steel plate, permanently welded to the floor or bottom of the craft and to the two floor stringers. The engine base is braced on two sides by triangular pieces of steel plate with bottom edges crimped and welded to the bottom plates.

The coaming around the cockpit consists of one piece

*Field engineer, Lincoln Electric Co., Cleveland.



PARTLY Completed Steel Skeleton (Below), Viewed from the Bow. Deck beams are welded to tops of frames, floor stringers to bottom frames and side stringers to the side frames

INTERIOR Before Completion (Above). The engine mounting is braced by steel plates welded to the bottom. Riveting in forward bulkhead permits its removal

of 2 x 2 x ¼-in. angle on each side and end. As can be seen in the interior view, the rear end of forward bulkhead is fabricated by riveting, so that it may be removed, when desired.

Bottom and side plates are joined to the frames by short fillet welds about 1½ in. long and approximately 7 in. apart. The bottom is of ¼-in. plate, the sides of 3/16-in. plate and the deck of No. 10 gage sheet steel. The bumpers at the bow are for pushing barges. They are constructed of 8 in. x 1¾ in. channels, braced by triangular pieces of 3/16-in. plate, and 2 x 2 x 3/16-in. angles attached to the deck and prow.

Each boat is to be powered by a 125-hp. six-cylinder gasoline engine.

Recommended Practice For Using Lanoline Rust-Preventive

AN extended investigation into the relative suitability of several substances for preserving bright steel parts against corrosion has been described by C. Jakeman of the National Physical Laboratory, Teddington, England. (Engineering Research Special Report No. 12.)

It was found that, in general, greasy preservatives are more satisfactory than hardening pastes or varnishes, and that, of all the substances tested, lanoline, whether brushed on or deposited from a solution, forms the best coating, and has very great adhesion to steel even at high temperatures.

Benzine is the best solvent for naphtha, but is to be avoided upon sanitary grounds. The only other satisfactory solvents found are solvent naphtha (a mixture of toluene and xylene) or a petroleum product known in England as "white-spirit." To promote drying, i.e. to reduce the time that the lanoline has a "tacky" feel, paraffin wax up to 10 per cent or ceresin up to 3 per cent can be used. In order that one may be sure a brushed surface has been entirely covered, 0.5 per cent of oil-soluble aniline scarlet BB or oil-soluble aniline blue may be used without detriment to the preservative coating.

Lanoline may be used either as a grease or a solution. As a grease it should be well rubbed in with a rag, and will adhere more readily and in a thinner coat if it is mixed with about 10 to 15 per cent of white-spirit. As a solution it may be applied by a brush or used for dipping, the solvent being either white-spirit or solvent naphtha free from benzine. Mixtures of 50 per cent by weight with either solvent are satisfactory for use at temperatures between 40 deg. and 80 deg. Fahr., and the lanoline dissolves readily at 140 deg. Fahr.

It is usually sufficient to clean the metal with a dry cloth before either dipping it or applying the solution, but with very fine work, such as gages or safety razor blades, it may be desirable to clean the metal thoroughly with petrol before applying a white-spirit solution, or with naphtha for a naphtha solution. Bolts machined with soluble oil as a cutting fluid may fail to take a lasting coat, but machined with lard oil take it readily.

A gallon of mixture, corresponding to about 1.9 gal. of preservative, will protect about 1200 sq. ft. of surface. As between the two solutions, both of which are equally effective, that made with white-spirit dries less rapidly than the naphtha solution, but is less inflammable. The effect, however, of the inflammable vapor given off from either solution after a few hours drying is negligible.

Rails of the same heat, some having been tested without ever having been in track, and some tested after having carried 20,000,000 tons of traffic, have been studied at the Bureau of Standards. It is found that the endurance limit of the steel has not been changed either up or down by the wheel loads. Consequently it is concluded that the so-called transverse fissure, a defect of the fatigue type, must start from nucleii existing in the rails before they are laid in track. (Technologic Paper No. 363.)

Mammoth Electrical Rotor Built of Welded Steel

THE extent to which welding is being used by electrical manufacturers in the construction of large equipment is illustrated by the 16-ft. spider made by the Westinghouse Electric & Mfg. Co., East Pittsburgh, for the Aluminum Co. of America, to be installed in the plant of the Knoxville Power Co., Knoxville, Tenn. It is to be the rotor for a 45,000-kva. alternating-current generator, attached to a vertical water wheel running at 150 r.p.m. The rotor is constructed entirely of heavy steel slabs and rolled steel shapes, and the joints are made by electric arc-welding. It weighs 60,000 lb., is 16 ft. diameter and 4 ft. 4 in. wide at the rim.

Transue & Williams Office Building and, at Right, Employees' Entrance

Forging and Stamping Equipment

Modern Practice, Exemplified in Transue & Williams Plant, Shows the Large Part Taken by Mechanical Handling

IMPROVED and increased facilities for the manufacture of steel forgings and the adoption of the most modern practices in forging operations and in the handling of work in process, effecting speed and economies in operation, have been provided in the forge shop of the Transue & Williams Steel Forging Corporation, Alliance, Ohio, which has recently completed an extensive revamping and expansion program. Efficiency in the stamping plant has also been increased by various improvements.

The combined use of hammers, headers and bull-dozers for continuous operations in metal forming is provided for in the arrangement of some of the forging units. Monorails serve some of the units to expedite the movement of work, permitting the forgings to be handled through all operations without reheating. For heat treating forgings new continuous electric furnaces have been installed and other electric furnaces are provided for heat treating special steels and for case hardening by the nitrogen process. The plant is equipped as a commercial shop for making forgings for all industrial uses in sizes from 1/10 lb. to 450 lb. Its capacity is 4000 tons of forgings per month.

A continuous forging unit for making crankshafts is one of the outstanding features of the plant. Finished shafts are produced from the billet in this unit in four operations with one heating of metal. This is accomplished by the arrangement of the forging equipment to permit the speeding up of operations. Another interesting feature of the plant is the trimming press department, which is equipped with conveyors for handling forgings and scrap.

Improvement of transportation methods was one of the first matters considered in modernizing the plant. Work in process is kept off the floor by being handled in standard skids, mostly 30 by 60 in. by 24 in. deep, holding approximately 4000 lb. These are handled by a battery of lift platform electric trucks, one of which is provided with a boom and hoist for lifting dies. Truck transportation necessitated good floors. Consequently new floors were laid in the shops and the areas around the shops, considerable of which is used for storage of work in process, and the roadways connecting the buildings were paved with brick or concrete to facilitate the operation of trucks. The floors are of a 6-in. concrete base and paving brick, with a 1-in. cushion of slag between the brick and concrete. The paving laid the past few months aggregated 135,000 sq. ft.

Furnaces in the Three Main Forge Shops

THERE are three forge shops and the flow of material in these is generally in the direction of the shipping department, which adjoins the cold trimming department.

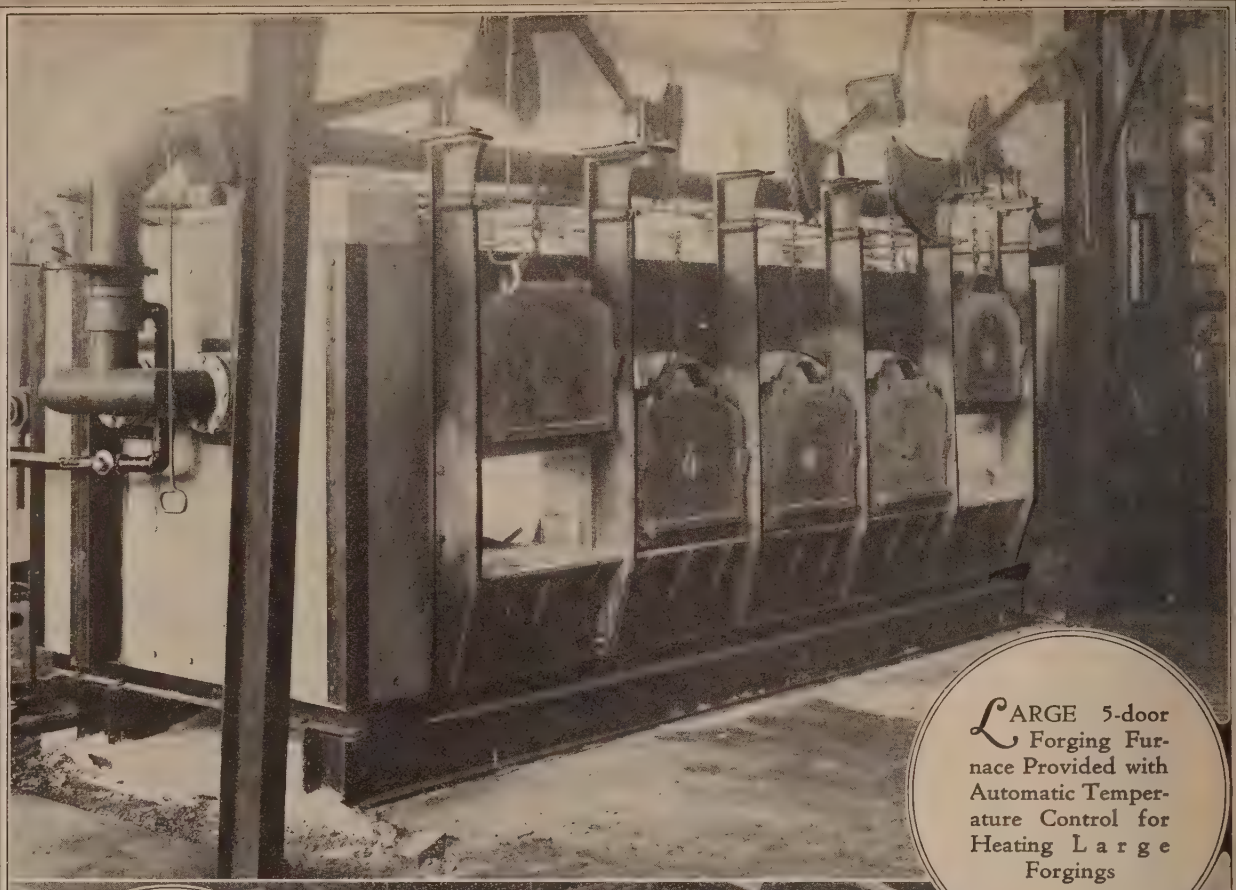
No. 1 forge shop contains mostly heavy equipment. This includes 8000, 10,000 and 16,000-lb. steam hammers. The largest hammer is used for railroad forgings and for heavy automobile and bus forgings, such as housing sections, crankshafts, front axles and other heavy parts. Heating furnaces are provided in sufficient size and number to afford ample heating service so that the proper heating and soaking temperature can be assured.

A large oil-fired forging furnace equipped with automatic temperature control was recently installed for precision heating of large axle forgings. The furnace is of the batch or "in and out" type, 14 ft. wide x 5 ft. deep. It is provided with five doors, each 2 ft. 1 in. wide by 17½ in. high. It is fired with four low-pressure burners, two being located in each wall. It is also equipped for firing with gas.

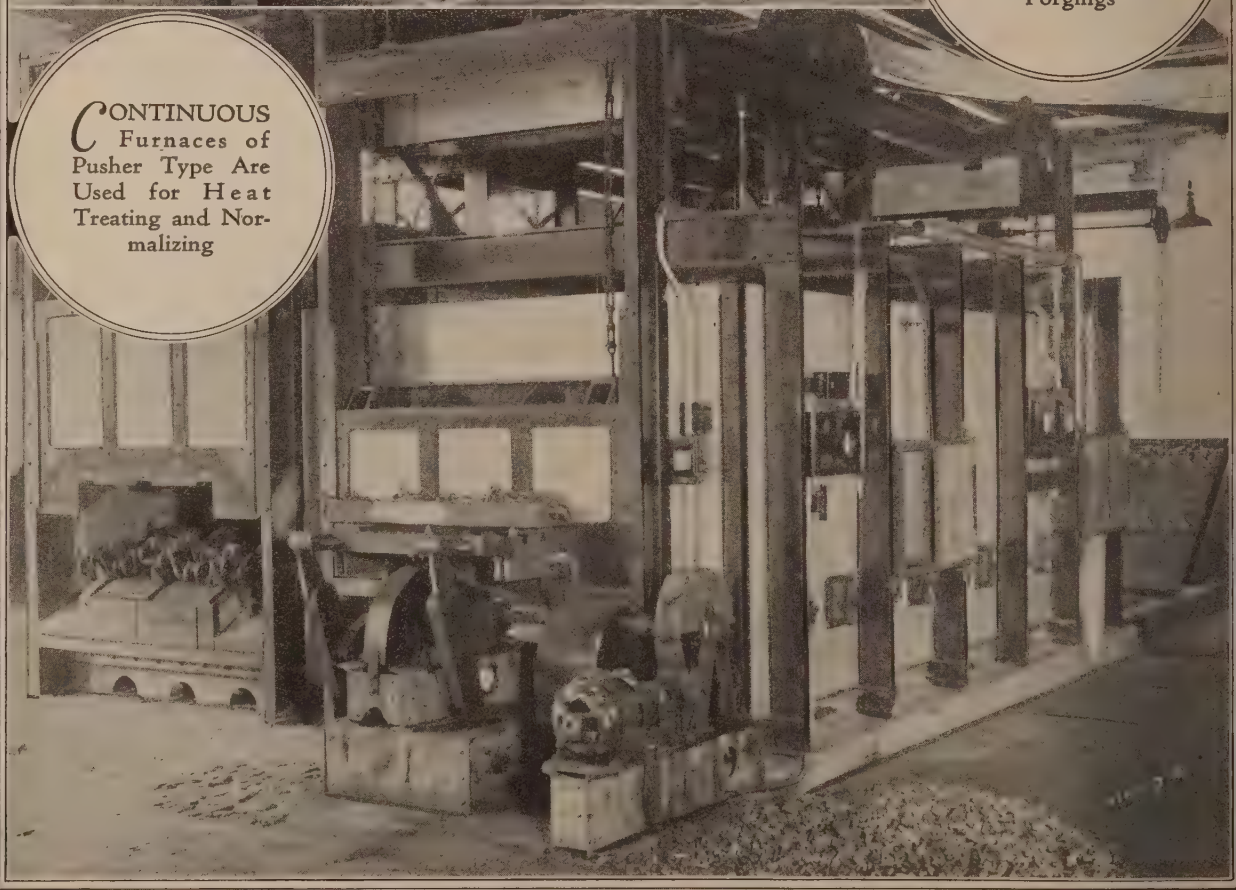
In this shop is a 5-in. and a 3-in. National forging machine. The larger machine is used for upsetting flanges on crankshafts, for forming helical worms and for other forging work, including piercing the hole through cluster and other gears. Equipment also includes a 28-in. and a 24-in. bulldozer that are used for such work as stretching axles, twisting crankshafts and forming pads.

The equipment in No. 2 shop is largely board drop hammers. As most of the work in this shop is cold trimmed, not much press equipment is required.

Two of the furnaces serving the hammers have air

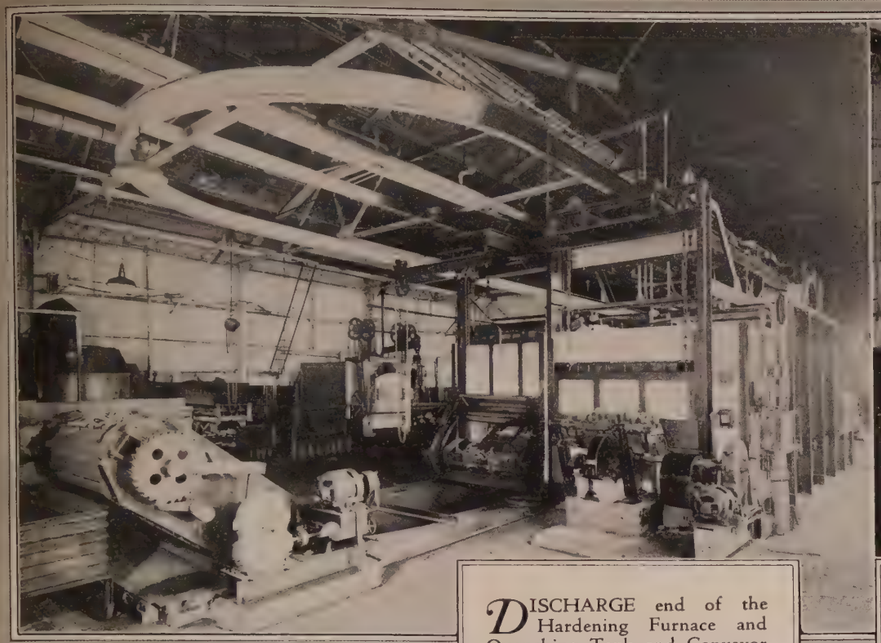


LARGE 5-door Forging Furnace Provided with Automatic Temperature Control for Heating Large Forgings

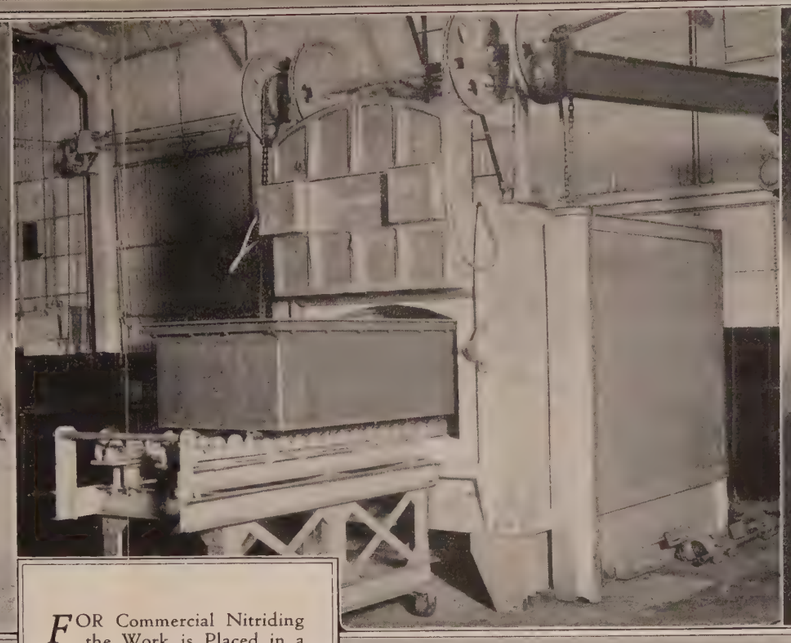


CONTINUOUS Furnaces of Pusher Type Are Used for Heat Treating and Normalizing

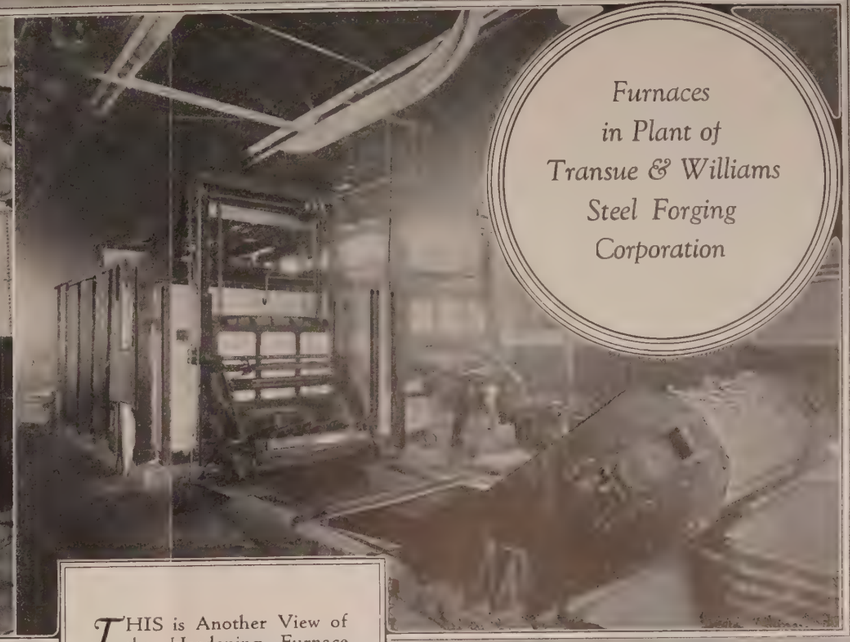
Furnaces in Plant of Transue & Williams Steel Forging Corporation



DISCHARGE end of the Hardening Furnace and Quenching Tank and Conveyor and At Right Loading End of Drawing Furnace

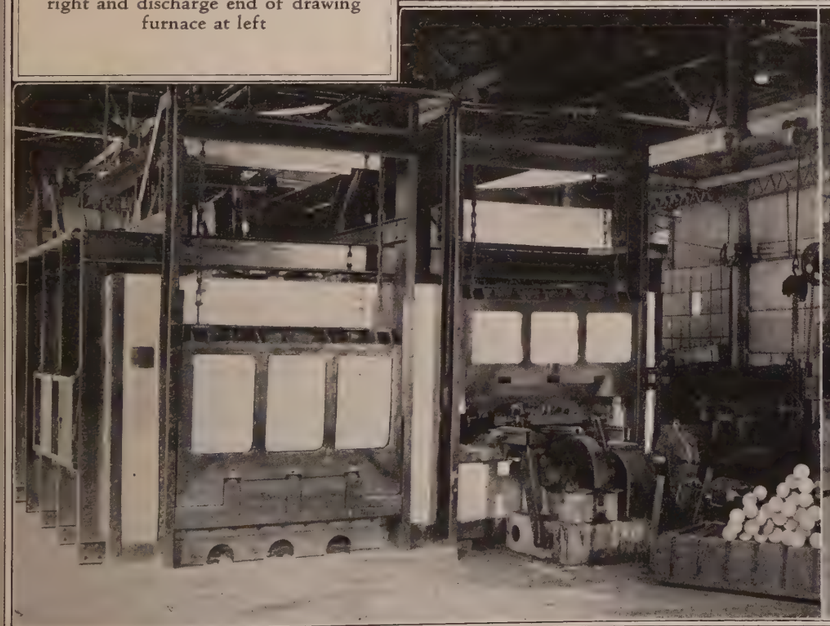


FOR Commercial Nitriding the Work is Placed in a Box of Heat Resisting Steel in an Electric Furnace

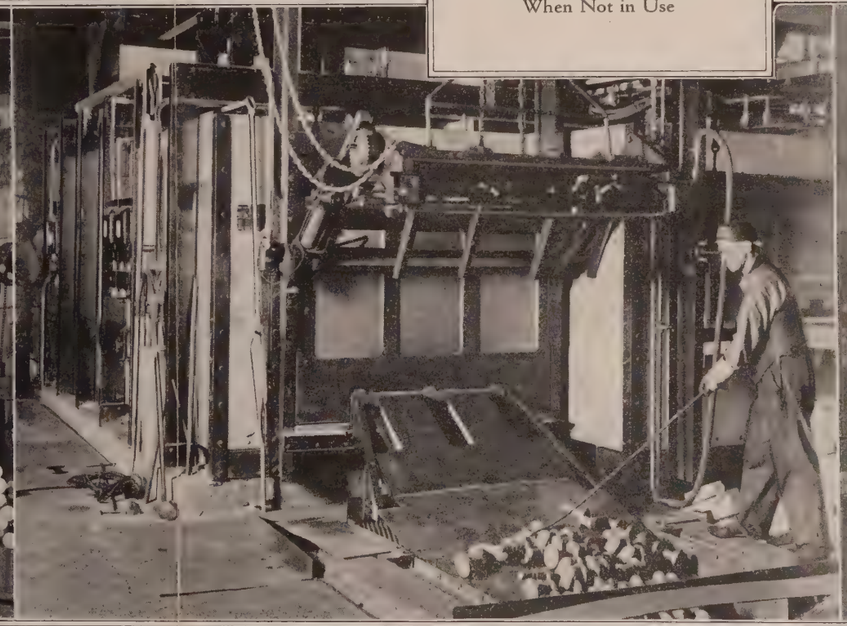


THIS is Another View of the Hardening Furnace Shown At Upper Left of This Group of Pictures

ANOTHER View of Furnaces Shown on Facing Page. Loading end of hardening furnace on right and discharge end of drawing furnace at left



THE Tray Dumping Mechanism at the Discharge End of Drawing Furnace Is Raised Up When Not in Use



DIE Blocks are Heated for Hardening in Two Electric Furnaces and Quenched in Oil Tanks in Front of the Furnaces

recuperators. The air before going to the furnaces is heated to 750 deg. Fahr. by waste gases taken from the front of the furnace, thereby improving atomization in the furnaces. This has resulted in a more uniform and constant temperature and a reduction in fuel oil consumption.

Light and medium heavy forgings are made in the No. 3 hammer shop, which is equipped with steam hammers ranging from 1000 to 6000-lb. capacity. The furnaces for the most part are placed in a line with the hammers in this as well as in the other two shops.

The continuous unit for forging crankshafts is located in this shop. This unit includes a continuous pusher type heating furnace, a 5000-lb. hammer for blocking, a 4000-lb. hammer for restriking, a hot trimming press and a 5-in. header for upsetting the flange. The flange is upset to exact size so that no flash is left to be trimmed off. All operations are done with one heating of the metal.

The continuous heating furnace, which is oil-fired, is 4 ft. wide and 27 ft. long inside, the heating section being 21 ft. long and the soaking section 6 ft. long. The burners are located at the sides in staggered position in the heating section and set on end in the soaking section. The bars are unloaded from skids, charged into the furnace in a single row by a mechanical pusher and discharged through a side door by the hammer operator. Inspection doors are provided at intervals down the one side of the furnace. It has automatic temperature control and temperature recording instruments.

The hammers, trimming press and upsetting machine are located in line and the work is swung from one machine to the next. After upsetting the shafts go to a continuous electric furnace for normalizing and then are pickled, straightened, inspected and shipped.

An arrangement that is unusual is provided at the No. 3 forge shop. The hammers are too close together to permit electric trucks to haul material back and forth between them. Also, because of a difference in grade, the floor is about 10 ft. above the outside ground level. The handling problem that was thus caused was solved by erecting a balcony at floor level along the outer side of the building wide enough for two trucks, and providing for passageways into it on each side of the hammers through which the material is hauled. Shop No. 1 is served by an overhead traveling crane and Nos. 2 and 3 by monorails for handling dies.

Unique Combination for Hardening and Drawing

MISCELLANEOUS forgings are heat treated in two large pusher type continuous electric furnaces in a single housing separated by an insulated wall. These furnaces were built for a large output as well as flexibility of operation in order to serve the needs of the contract forging shop, which cover the various heat treatments of steel forgings, such as normalizing, hardening, drawing and annealing. The unit was also designed to handle miscellaneous sizes and shapes of forgings, ranging from pieces weighing only a few ounces to crankshafts, front axles, etc., weighing over 100 lb. each.

One furnace is used for hardening and the other for drawing and both for normalizing. The arrangement of the two furnaces and a conveyor type quenching tank comprising the unit is counterflow—that is, the hardening furnace and quench tank are arranged in a line with the material moving through this part of the equipment in a direction opposite to that taken by the material moving through the drawing furnace, so that the charging end of the hardening furnace is adjacent to the discharging end of the drawing furnace and vice versa. The electrical capacity of the drawing furnace is sufficient for its use in normalizing or annealing, with a production in proportion to the furnace length.

The hardening furnace chamber has a capacity for heating 2100 lb. of steel per hour. The heating chamber is divided into three zones, each separately and automatically controlled. The drawing furnace has a capacity of 2450 lb. of steel per hour. This chamber is 3½ ft. longer than the hardening furnace, the additional length allowing for the extra time required for drawing when running continuously as a unit with the other chamber—that is, the parts after hardening and quenching are taken continuously and at the same production rate through the drawing chamber, thus synchronizing the two operations from a production standpoint.

The furnace is heated by resistors of the cast T-grid type. These are mounted in the roof and in the floor so that the work is heated from above and below.

Both furnaces have the same method of conveying material. At the charging end of each chamber is located a motor-driven pusher intermittently operated by an electric timer, the cycle of which is variable at 15 sec. intervals through a time range varying from 1 to 6 min. Three heat resisting alloy rails extend longitudinally through the furnace, these being supported upon transverse piers extending above the furnace bottom. Material is carried through the furnace on heat resisting alloy shoes resting upon and guided by the longitudinal rails. At the discharge end of each chamber the rails terminate in slope castings. Beyond the discharge door of the hardening furnace this casting is so arranged with slots that the material is carried directly into the quenching tank and the alloy shoes are dropped through the slots, thus avoiding repeated cooling, which is destructive to heat resisting alloys.

The doors at both ends are mechanically operated by motor-driven lifting mechanisms mounted above the furnaces. These are actuated by timers and synchronized with the pusher providing the following sequence of operation:

The doors on both ends of the chamber automatically rise.

The pusher head advances, conveying the unheated material into the furnace and discharging a set of shoes loaded with forgings from the chamber at the same time.

The pusher head recedes.

Both charging and discharging doors lower.

Larger forgings are carried through the furnace directly on the shoes from which they slide to the quenching tank conveyor. Small forgings are carried on trays on the shoes. The trays at the discharge end are received by an automatic air-operated dumper which turns the tray over, discharging the contents into a conveyor that carries the forgings into the quench tank. The tray is retained in the brackets of the dumping mechanism. A valve operation then rotates the brackets to the original position and the tray is removed for reloading. When large forgings are being handled, the tray dumper, then not in use, is swung upward clear of the furnace discharge slope. Parts that are to be normalized are also discharged upon the quenching tank conveyor, the quenching water being partly drained off so that the conveyor belt is above the water line.

The quenching tank, of steel plate construction, is 16 ft. long, 7 ft. wide and 4 ft. deep. Its conveyor, which is motor-driven, is of the beaded flight type. Effective use of the quenching medium is secured by a recirculating water system. A double propeller in the front end of the quenching tank causes the water to pass to the back of the tank and it returns to the propeller compartment back of baffles that are located at the sides of the tank. The conveyor with its supports is an integral unit and by the unfastening of a few bolts it can be moved forward in the tank several feet to facilitate the removal of scale.

The furnaces are operated at a temperature of 1550 to 1600 deg. Fahr. for hardening and also for normalizing, and at 800 to 1150 deg. for drawing. The time of heating is from 45 min. to 2¼ hr., depending on the work.

Die blocks are heated for hardening in two 60-kw. fur-

naces. These are 27 in. wide, 15 ft. high and 5 ft. deep. They can also be used for heating miscellaneous steel forgings to be annealed. They have a capacity for heating 450 lb. of steel per hour to a temperature of 1550 deg. Fahr. Variable power input permits either large or small dies to be brought to hardening temperature on the same time temperature cycle.

The hearth consists of two parallel lines of roller rails extending the full length of the furnace and with extensions in front. The dies are placed on trays on which they are shoved through the furnace on rollers that ride on the

Control Equipment for the Electric Furnaces is Located in a Sheet Steel and Glass Enclosed Room

rails. The rollers and rails are heat treated alloy steel. The heating elements, which are of standard T-Grid cast nickel chrome alloy, are placed in the roof and below the roller rails. Cast elements also extend into the throat or vestibule at the furnace front to provide compensation for heat lost through the doors.

Handling Stainless and Other Alloys

FOR heating high-chromium stainless steels and other special alloy steels for forging, there is a specially designed, oil-fired, semi-muffled type of furnace. This is designed so that the flame will not come in contact with the steel, which is heated by radiant heat from the arch and wall. The furnace is provided with Wilson-Maeulen automatic temperature control.

The manufacture of forgings of the special Nitralloy steel has been started in an experimental way. After parts made of this steel are forged they are rough machined and then are hardened, quenched and drawn. The finished machining follows, after which they are nitrided.

An electric furnace has been installed for commercial nitriding and experimental work. The work is placed in a nitriding box fabricated of heat-resisting steel. There are heating units on the six sides of the furnace chamber. The furnace has two thermocouples, one for the chamber and the other for the nitriding box. The former is connected to an indicating controlling pyrometer and the latter to a single point pyrometer for measuring the temperature in the nitriding box. Pipes integral with the box extend through tubes in the rear wall of the furnace and are connected to other pipes leading from the tank which supplies the ammonia for nitriding. This furnace was built by the Hevi-Duty Electric Co., Milwaukee.

The control equipment for the furnaces is in a separate room that is entirely inclosed in a two-story sheet steel and glass partition housing. The control for each chamber of the large continuous heat treating unit includes three panels, each having its own control pyrometer, thermostatic relays, circuit control switch and a radial tap switch for regulating the power input. Each of these panels corresponds to one of the three control zones in each chamber. In the rear of the panel are located the magnetic contactors, which are of the oil break type. These contactors are for making and breaking the power supply to each of the separate furnace control zones for automatic temperature control.

Above the control room in a second story is located the transformer equipment, stepping down the service current, which is 2400 volts, 3-phase, 60-cycle, to the proper voltage required for each section of the furnaces. The power comes to this compartment from an overhead line to a bus arranged in back of the transformers, with primary oil switch protection. The transformers, which are of the air-cooled type, are cooled by means of air supplied to the transformer compartment by means of an individual blower which brings the air directly from the outside of the building.

The continuous heat treating furnaces, the die block hardening furnaces, the large forging furnace, the billet heating furnace and the control equipment for the electric furnaces were supplied by the Electric Furnace Co., Salem, Ohio.

[A second installment of this article will cover the handling and trimming of forgings, three methods of cleaning forgings, handling dies, storing and preparing the steel stock, and the stamping department.]

Wire Corrosion Lessened By Copper, Says German Investigator

An investigation of corrosion tests of barbed wire and wire netting, both black and galvanized and with or without the addition of copper, has been made in Germany. The results were published in *Stahl und Eisen*, by K. Daeves and briefly they were as follows:

	Period of Exposure, Months	Kind of Steel	Copper, Per Cent	Loss in Weight, Per Cent
Black wire	21½	No copper added	0.03	23.0
		Copper added	0.23	16.0
Galvanized wire	21½	No copper added	0.03	12.0
		Copper added	0.23	7.0
Galvanized wire netting	18	No copper added	0.03	28.1
		Copper added	0.15	19.3

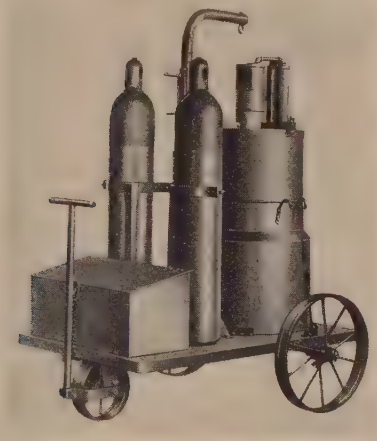
The copper content not only retards rusting but helps to preserve the zinc coating on the galvanized wire for a considerably longer time than on the wires without copper, says the author. Further corrosion tests with material containing various percentages of copper and with different coatings are in progress.

Flotation of Manganese Ores

Experiments by the United States Bureau of Mines and the Missouri School of Mines at Rolla, Mo., show that many of the oxidized ores of manganese contain that metal in the form of the mineral known as psilomelane. This mineral will float in ordinary oil emulsions. Experimental runs on one ore recovered 80 per cent of the manganese and rejected 94 per cent of the insoluble; this result was attained with reagents and practices no different from these in commercial operation on other ores.

Truck for Oxy-Acetylene Equipment

NEW types of trucks to accommodate Carbic low-pressure acetylene generators have been introduced by the Oxweld Acetylene Co., New York. One of these, shown in the view, also carries two cylinders of oxygen chained to a steel rack. The generator is secured to the steel deck by means of angle iron braces and two long bolts inserted in the handles of the generator and tightened by means of turnbuckles.



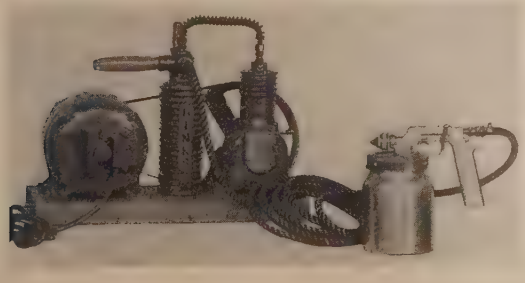
The Crane Is Used in Charging and Emptying the Acetylene Generator

A sturdy crane is provided to be used in charging and emptying the generator. With this crane it is an easy matter to lift the gas-bell out of the generator; the water and residue can then be drained off through the outlet at the bottom. The crane jib is made in three sections which can be telescoped when not in use to decrease the height. The truck has two 24-in. steel wheels with 3-in. tires, and a castor wheel which is 12 in. in diameter by 2 in. All wheels are provided with grease cups for lubrication.

General Utility Spray Painting Outfit

FOR touching up, refinishing, repainting, relacquering, spraying disinfectants and other general utility work, the Binks Mfg. Co., 3114 Carroll Avenue, Chicago, is offering a new Hurley all-purpose spray painting and finishing outfit.

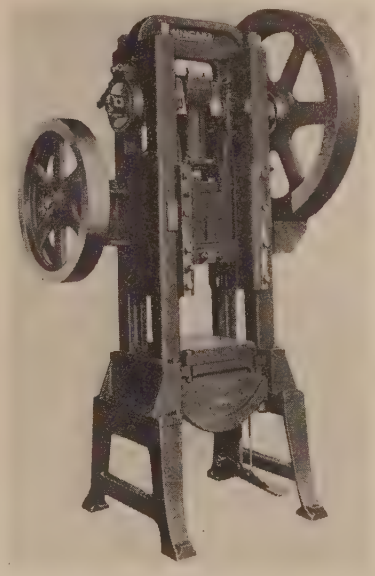
The outfit comprises a 1-qt. all-metal container, the company's new pressure cup spray gun that supplies an atomized flat spray 4 in. in width, and an air compressor, which is belt driven from a ¼-hp. General Electric motor and has a capacity of 2.16 cu. ft. of air per min. A cast-iron, ribbed air container is mounted between the motor and the compressor on a pressed metal base having rubber feet. The cylinder and base are cast in block of seasoned gray iron and are accurately machined.



The Spray Gun Supplies a 4-In. Wide Flat Spray. The 1-qt. container is made of metal

Small Press Has Frame of Tie-Rod Construction

TO meet the demand for a small press of unusual strength and rigidity, the Niagara Machine & Tool Works, Buffalo, has brought out a single-crank power press the frame of which is of four-piece steel tie-rod construction. Two sizes, designated as the No. 54 and the No. 56, are made, and can be furnished plain or single back-geared in belt or motor-driven types. The rated capacity is 32 and 56 tons, respectively. In addition to large and small blanking jobs, the machines are suitable for many of the lighter drawing operations.

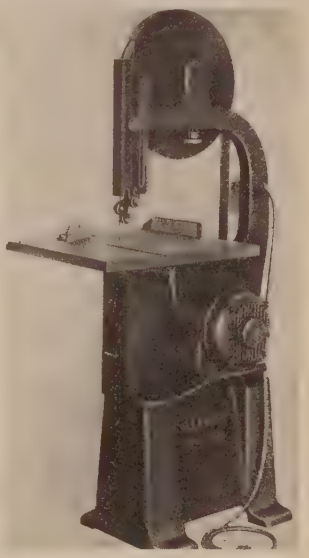


The Tie Rods, Shrunk in Place in the Frame, Add to Rigidity

The tie rods are shrunk in place in the frame. Strip stock can be fed from left to right through the openings in the uprights. The bed is at a convenient working height.

Band Saw with Direct-Connected Motor Drive

AN 18-in. portable band saw with motor-on-shaft drive and a 20 x 24-in. table that carries a miter cross-cut gage and parallel ripping fence, which increases the usefulness of the machine, has been added to the line of the Oliver Machinery Co., Grand Rapids, Mich. The distance from saw to column is 18 in. and the height from table to upper guide is 8 in. Saw blades from ⅛ to ½ in. wide, 9 ft. 8 in. long are used. By using gages the machine will rip material 11 in. wide and cross-cut and miter up to 8 in. The table tilts 45 deg. to the right.



The Lower Band Saw Wheel Is Mounted on the Motor Shaft. Rear view shows motor and floor base mounting

The cast-iron band saw wheels are 18 in. in diameter, have a 1¼-in. rubber-covered face, and are mounted in ball bearings. The upper wheel has 4-in. vertical adjustment for tensioning the saw and a micrometer tilting device for tracking the saw on the wheel. Guides are furnished both above and below the table. The saw runs against the outer edge of a hardened wheel which revolves on a ball bearing. Hardened steel adjustable side guides or lips prevent sidewise turning of the saw.

The column of the machine and the 18-in. floor base that is optional equipment are one-piece castings. Safeguards are provided at all necessary point. The ½-hp., 900-r.p.m. ball-bearing motor employed is entirely inclosed and takes current from either lighting or power circuits. For direct current and single-phase alternating current motors a tumbler switch is furnished, while for three-phase a.c. motors a "safety first" switch is mounted on the machine. Floor space occupied by the machine, which is designated as the No. 192, is 22 x 34 in.; the weight, with motor and floor base, is 625 lb.

Industrial Recession Is About Due

Greater Weight of Unfavorable Factors Must Make Itself Felt—Supplies Exceed Demand at Current Prices

BY DR. LEWIS H. HANEY
DIRECTOR, NEW YORK UNIVERSITY BUREAU OF BUSINESS RESEARCH

Favorable Factors

1. *Recovery in building activity in July.*
2. *High railroad freight traffic and earnings.*
3. *Increased exports.*
4. *Employment decreased less than usual in July.*
5. *High Federal Reserve ratio; gold imports.*

Unfavorable Factors

1. *Total industrial production above normal maximum limits.*
2. *Member banks over-loaned and money tight.*
3. *Decline in unfilled steel orders.*
4. *Decline in department store sales.*
5. *Automobile production decreased more than seasonally, with sales spotty and stocks of used cars accumulating.*
6. *Machine tool orders declined.*
7. *Commodity price movement lower again.*
8. *Widespread drouth damages grain and fruit crops.*

ONE must be impressed with the fact that there are very few *new* favorable factors to report this month and that the number of developments indicating the approach of declining business activity has increased. The public will probably not realize the turn for another two or three months, but some general business recession seems about to get under way.

That the steel industry is likely to share in the anticipated recession is indicated by the fact that the ingot output has now for three months been in excess of estimated current requirements, as illustrated by the composite demand line. Incidentally, the reports of better deliveries and the ability of iron and steel producers to build up stocks, again, confirm this indication.

Recession in Steel Output Forecast

NOT in the last decade, at least, has steel production been above the demand line, while the latter has itself been declining, without a recession occurring in steel production; and the present abnormal rate of steel production but makes such a recession the more probable. Furthermore, the average daily ingot output actually did decline in July, and at a rate somewhat more than usual for the season.

The June drop in indicated requirements for steel was due chiefly to lessening building activity, railroad traffic, mining and automobile production, all of which decreased more than usual for the season. These items more than offset the gains in general manufacturing, and in exports. A sharp recovery in construction contracts in July (chiefly public works and utilities), as well as some gain in freight traffic, promised larger requirements in that month, but not enough to balance current production. This conclusion is confirmed by the decrease in the unfilled orders of the Steel Corporation in July. And the rather unfavorable June showing made by orders for sheets and steel castings, together with the large decrease in orders for railroad equipment in July, is to be noted.

As to the future, the spurt in construction contracts is probably temporary. Declines in machine tool orders, automobile production and the steel ingot output are among the reasons for expecting some decrease in general manufacturing. In view of the copper and oil situations, there seems to be no reason to expect any gain in mining activity.

Other Factors

Crop damage here and in Canada, the largest importer of our products, cannot be fully compensated for by the price advances that have occurred. Moreover, taking all these things into consideration, it is reasonable to anticipate less than the usual seasonal gain in railroad transportation, and we note that the American Railway Association estimates car-loadings for the second half at a little lower rate than for recent years. Thus, a slackening of the steel demand in the last quarter is suggested.

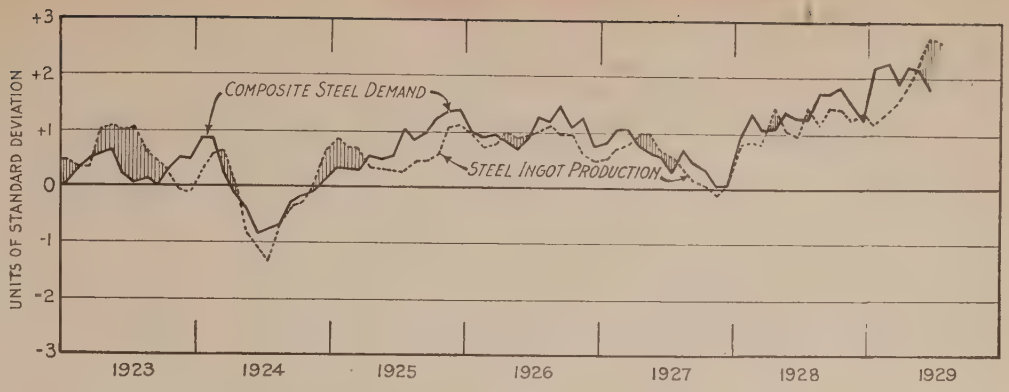
Barometer Predicts Moderate Let-Up

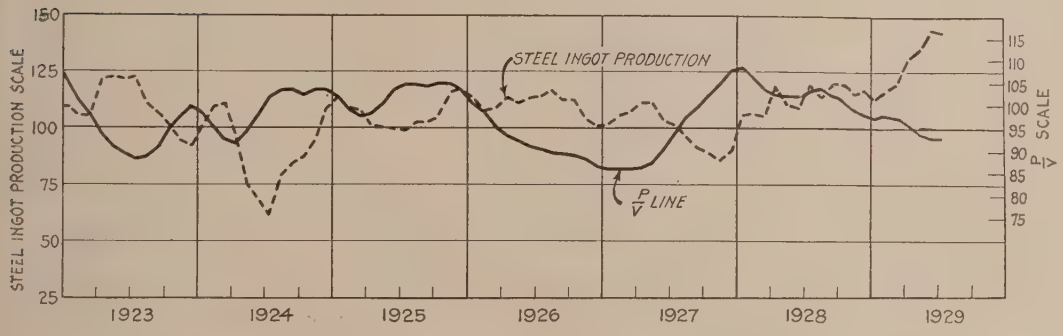
FURTHER support for the foregoing conclusion is given by the P-V line—a general business barometer based on the ratio of commodity prices to the physical volume of trade. This line has now fallen below normal, for the first time since the middle of 1927. It indicates that, *at the current price level*, the supply of commodities is in excess of the quantity demanded. It forecasts a moderate recession in business.

Being so closely linked with the general business situation, the steel industry is subject to the forecasts of this barometer. Thus we find that now, as in 1923 and 1926, the decline of the P-V line below normal has shortly preceded the peak of steel production. The July decline in ingot production is probably significant.

Allowing for the normal growth of the country's requirements, and for the usual seasonal variations, the average daily production of steel ingots decreased in July, so as to give us an "adjusted" index of 143, against 145 in June. A year ago the index stood at 119. It is significant both that the steel output is 43 per cent above esti-

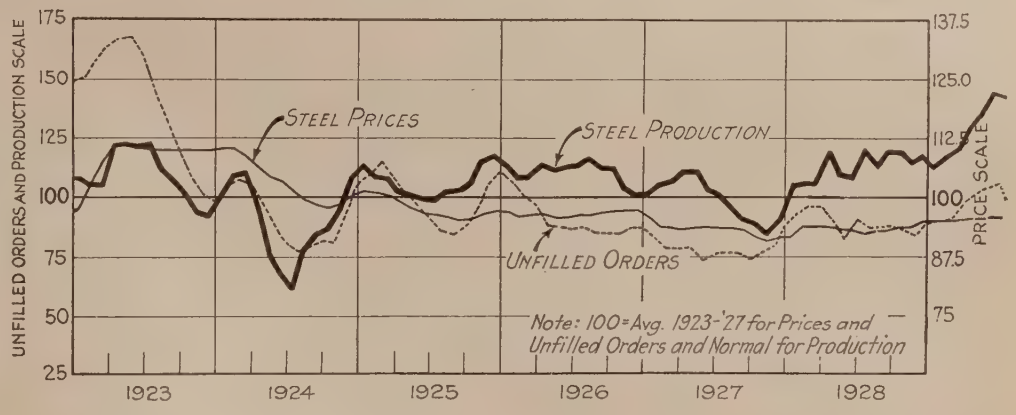
COMPOSITE Steel Demand Has Fallen Well Below the Level of Ingot Production (Adjusted). It is believed that demand will show a further moderate decline

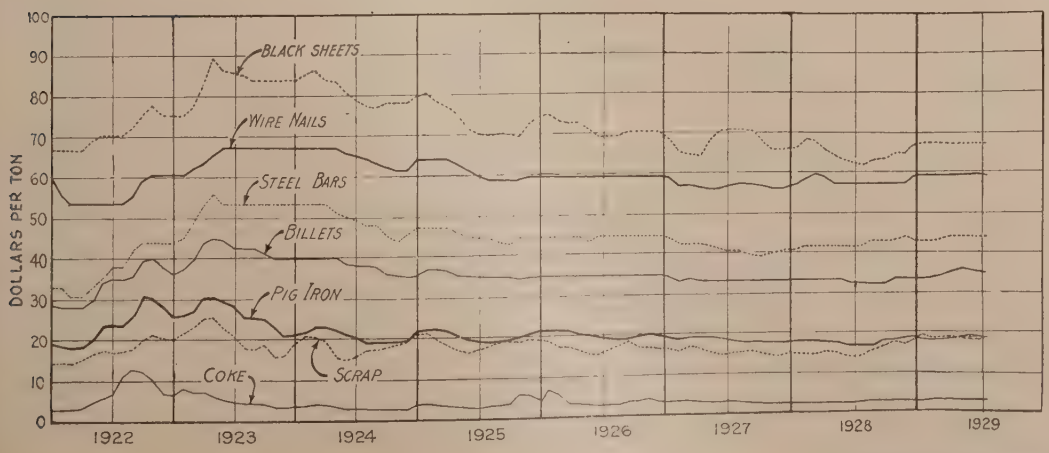




MOVEMENT of P-V Line Continues Below Normal. Steel production cannot much longer maintain its tremendous pace

STEEL Production in July, 43 Per Cent Above Normal Requirements, Was Almost Up to the 45 Per Cent Excess in June. Prices have declined slightly. Unfilled orders decreased heavily





BARS Are Likely to React to Lessened Automobile Demand and Sheet Prices Appear to Be Pegged. Pig iron cannot go much lower without a break in scrap prices and a reduced coke cost. Nails have responded to the decline in building construction

mated normal, and that the decrease was more than usual for the season.

Unfilled Orders Turn Downward

UNDER the circumstances, it is not surprising to find that the unfilled orders of the largest producer at the end of July were reduced to the lowest level since last December. The decline was the largest since May, 1928. It was decidedly more than seasonal and makes our adjusted index only 99 per cent of the average for the years 1923-1925, as compared with 106 in June and 87 a year ago.

Note that this is the first mid-year reversal of an upward trend in unfilled orders, following a prolonged rise, since 1923.

Naturally this situation has been attended by some price weakness. THE IRON AGE composite index of finished steel prices declined last week from a level which it has held since March. On June 20 (THE IRON AGE, page 1711), we pointed out that conditions then suggested that finished steel prices would hold steady until August—also that the steel industry was at or very near a peak, with some recession probable before fall. It now seems likely that finished steel prices will show continued irregularity and that they will gradually sag, on the average, until about the turn of the year, but that no large decline will occur before early 1930.

Incidentally, it also seems probable that steel production will not decline very sharply, if at all, in August or September, or until pig iron production has nearly caught up with it.

The very gradual rounding off of pig iron prices (now $18.42, against a July average of $18.44 and a June average of $18.65) indicates no early curtailment of pig iron production, a conclusion reinforced by the facts that such production is still low compared with the steel output, and that pig iron is relatively cheap.

Not Much Misalinement in Prices

THE structure of iron and steel prices is little out of normal adjustment. It resembles the structure found in similar periods, as in the latter part of 1926. Among the deviations from normal may be mentioned the higher level of steel scrap prices and the fact that wire nails and galvanized sheets are a little low.

Statisticians, however, will note at least two unusual movements. Nails have declined in price without a preceding decline in black sheets, and billets have shown some reduction without the usual drop in pig iron prices. The drop in nails is as anticipated, being due to the large reduction in residential building.

Sheet prices, as quoted, are clearly pegged. The underlying condition of demand and supply must be considerably weaker, and, though we must remember that this item has been relatively low for some time, sheets seem likely to sell lower, as nails have had to do. Concessions in the sheet market continue to be reported.

Bars appear to be a little too high with relation to most other items, and are likely to follow billets before long, particularly as the slump in automobile production is obviously hurting the demand.

Pig iron prices cannot go much lower, on account of the existing price levels for coke and steel scrap; but pig iron production is abnormally large, the demand is dull, and stocks are reported to be accumulating. Probably a decline in the pig iron market awaits only a break in scrap prices and a recession in steel production.

As to steel scrap, the price plainly is abnormally high, and the market situation is being weakened by the growing production of pig iron. As steel production declines, the scrap market is likely to break.

It is interesting to note that the unusually high prices of heavy melting scrap have come at a time when steel production is unusually large in comparison with the pig iron output. They are likely to last only as long as that condition continues.

Earnings of Steel Companies Show Large Gain

Report of Ludlum Steel Co., including Atlas Steel Co., for the quarter ended June 30, shows a net income of $311,958, after all charges, equivalent to $1.40 a share on 170,000 no-par value shares of common stock. This compares with $389,437, or $1.87 in the previous quarter. In the second quarter of 1928, net income, excluding that of the Atlas Steel Co., was $125,537, equivalent to 93c. a share on 135,000 shares of no-par value common stock.

The Ohio Seamless Tube Co. reports net earnings in the first six months of this year of $428,065, after all charges before dividends, equivalent to $4.78 a share on common stock outstanding, as against $267,238, or $2.74 a share in the same period of 1928.

The profit of the Empire Steel Corporation for the six months ended June 30 was $803,006, after interest, depreciation, etc., but before federal taxes. Net sales amounted to $15,492,278.

Toledo Steel Foundry Holds Open House

Open house was extended by the Industrial Steel Casting Co., Toledo, Ohio, to its friends, on Tuesday, Aug. 20. In sending out engraved invitations for the occasion, the company included an attractive folder, inscribed to each individual invited, which included over a dozen reproductions of photographs of the foundry, its equipment and products.

Commodity Prices Increased in July

Wholesale prices of commodities, as reported by the United States Bureau of Labor Statistics, advanced from 96.4 in June to 98 in July, both figures being based on 100 as the average of 1926. The figure was 98.3 in July, 1928, or slightly higher than at present. Six of the 10 groups showed increases, three showed decreases, mainly fractional. The largest increases were registered by farm products and foods.

Metals and metal products dropped from 105.1 in June to 105 in July, both being compared with 98.6 a year ago. The drop from June was brought about wholly by a decline from 98.2 to 97.9 of the iron and steel component. The non-ferrous metals gained fractionally from 104.8 to 105.1, while the other elements of the metal list showed no change.

Exports of Power Farming Equipment Increased

WASHINGTON, Aug. 19.—Increases in exports of tractors and harvesting machinery from the United States indicates that the movement toward power farming is progressing throughout the world, according to the Agricultural Implements Division of the Department of Commerce. During the six months ended June, 1929, shipments of power farming machinery have increased, while corresponding decreases have taken place in threshers, grain harvesters and binders. The most noteworthy improvement was in shipments of wheel tractors which showed a net gain in all types and sizes of $6,164,709. The most interesting feature of harvesting machinery exports was the remarkable gain in combines, which increased more than 2000 in number and more than $3,000,000 in value.

Distribution Census May Cover Construction

WASHINGTON, Aug. 16.—The executive committee for the Census of Distribution held a meeting here on Friday of last week and discussed questions relating to its forthcoming work. The possible inclusion of construction contractors with a view to ascertaining the distribution of materials used was one matter discussed. The committee, approved last week by Secretary of Commerce R. P. Lamont, is headed by F. M. Feiker, managing director of the Associated Business Papers, Inc., New York. Other members are Dr. Melvin T. Copeland, professor of marketing, Graduate School of Business Administration, Harvard University; W. E. Freeland, Freeland & Warren, Inc., Boston; Herbert P. Sheets, managing director, National Retail Hardware Association, Indianapolis, and Henry S. Dennison, president, Dennison Mfg. Co., Framingham, Mass.

Better Business in European Markets

Export Trade Improving—Cartel Memberships and Prices Under Review—Less Unemployment in Austria—Tin Plate Mill for Poland

(*By Cable*)

LONDON, ENGLAND, Aug. 19.

PIG iron is still quiet under the influence of the holidays, but inquiries for Cleveland foundry grades are increasing. The outlook for fall is firm, despite a steadily increasing output, especially as costs are increasing and consumers' stocks are small.

Export business has been curtailed by lack of supplies. East Coast hematite, mixed numbers, is selling at £3 15s. 6d. ($18.30) a ton, although furnaces claim that even £4 ($19.40) a ton would be unprofitable at present costs. Finished steel is quiet, with British prices firm. Some works, including Bolckow, Vaughan & Co. and the Cargo Fleet Iron Co., are still well engaged and omitted the usual holiday stop. Export business is quiet, but the Dominions are showing some interest in purchasing.

British exports in July were 35,500 tons of pig iron, of which the United States received 1600 tons. The total of iron and steel exports was 375,800 tons.

Tin plate business is improving with some good sales made for third quarter and a firm attitude on the part of makers, who have closed some good business for export to South America and Australia. Domestic demand is slightly more active. Galvanized and black sheets are quiet.

British makers have booked some good orders for railroad coaches and freight cars, including 285 for the Central Argentine Railway and 316 for the Rhodesia Railways.

Continental steel markets are stabilizing and prices are slightly firmer in some cases, but the anticipated general recovery has not yet begun. British finishing mills have taken a moderate tonnage of semi-finished material. Belgian and Luxemburg works are reported to be gradually refilling their order books, but delivery delays are still short.

French, German, Belgian and Luxemburg steel producers recently met to discuss means of arresting the decline and reestablishing prices at their former level.

German Cartel Prices Shaded —Luxemburg May Join

LONDON, ENGLAND, Aug. 5.—Control of domestic prices by the German syndicates is seriously threatened by the action of one of the large Westphalian steel merchants, who has acquired a small steel mill and begun the production of steel bars, rods and beams. While output of the mill does not exceed 50,000 tons a year, the fact that it is offering these products at 1.50 to 2.50 m. (36c. to 60c.) a metric ton less than the established syndicate prices is expected to disturb the market and a reduction of prices by the syndicates in certain districts is believed likely.

Recent developments have brought about a change in the relations of Luxemburg with Germany and Belgium. Formerly Luxemberg mills worked more closely with Belgium than with Germany, but recently they have been engaged in severe competition with Belgian mills and are beginning to cultivate closer relations with Germany. An increasing tonnage of Luxemburg steel is being sold through German sales organizations, not only in Germany but for export, and it is believed in some quarters that the Luxemburg mills will become members of the German cartels before long.

Austrian Business Good— Unemployment Declines

VIENNA, AUSTRIA, Aug. 3.—Unemployment has declined to about 100,000, the lowest point since 1924. The iron and steel industry is active largely on orders from the Government, especially for the state railroads. Wire rods, wire and sheet mills are quiet. Machinery builders are seeking increased export business.

Pig iron production in the first quarter of this year was 113,574 metric tons, steel ingot output 153,759 tons and rolling mill production 114,571 tons. The principal producer, the Austrian Alpin Montan A. G., reports a considerable increase in its output of iron ore and the company's steel mills are operating at 90 per cent to full capacity, with rolling mills at 103 per cent of rated capacity. Much of the business on the books of the Alpin Montan A. G. is for the railroads, placed under an investment plan, which provides for the renewal of permanent way material and rolling

British and Continental European Export prices per gross ton, f.o.b. United Kingdom Ports, Hamburg and Antwerp with the £ at $4.85

British Prices, f.o.b. United Kingdom Ports

Cleveland No. 3 foundry	£3	12½s.	to	£3	13½s.	$17.58	to	$17.82
East Coast Hematite...	3	15	to	3	15½	18.18	to	18.30
Ferromanganese, export	13	10	to	14	0	65.47	to	67.90
Billets, open hearth....	6	7½	to	6	10	30.92	to	31.52
Sheet bars, open hearth	6	5	to	6	10	30.31	to	31.52
Black sheets, Japanese specifications	13	0				63.05		
Tin plate, per base box	0	18¼	to	0	18½	4.42	to	4.48
Rails, 60 lb. and heavier	7	15	to	8	15	37.59	to	42.43
						Cents per Lb.		
Steel bars, open hearth	7	15	to	8	10	1.67	to	1.84
Beams, open hearth....	7	2½	to	7	12½	1.55	to	1.65
Channels, open hearth..	7	7½	to	7	17½	1.60	to	1.71
Angles, open hearth....	8	2½	to	8	12½	1.76	to	1.86
Ship plates, open hearth	7	12½	to	8	2½	1.66	to	1.76
Black sheets, No. 24 gage	10	5	to	10	10	2.21	to	2.27
Galvanized sheets, No. 24 gage	13	7½	to	13	10	2.89	to	2.92

Continental Prices f.o.b. Antwerp or Hamburg

Foundry iron, 2.50 to 3.00 per cent sil., 0.50 to 0.90 per cent phos.	£3	9s.	to	£3	13½s.	$16.73	to	$17.82
Foundry iron, 2.50 to 3.00 per cent sil., 1.00 per cent and more phos.	3	11				17.21		
Billets, Thomas	4	17	to	5	0	23.52	to	24.25
Sheet bars, Thomas....	4	9	to	5	0	21.58	to	24.25
Wire rods low C., No. 5 B.W.G.	6	4	to	6	6¼	30.06	to	30.61
Black sheets, No. 31 gage, Japanese.....	12	10	to	13	0	60.62	to	63.05
Rails, 60 lb. and heavier	6	10*				31.52		
Rails, light	6	1½				29.46		
						Cents per Lb.		
Steel bars, merchant...	5	13½	to	5	14	1.24	to	1.25
Steel bars, deformed...	5	12	to	5	12½	1.21	to	1.22
Beams, Thomas, British standard	5	5	to	5	6	1.13	to	1.15
Channels, Thomas, American sections ...	5	14	to	6	0	1.24	to	1.32
Angles, Thomas, 4-in. and larger, over ⅝-in. thick	5	6	to	5	8½	1.14	to	1.17
Angles, Thomas, 3-in...	5	14½				1.25		
Ship plates, open-hearth inspected	7	10				1.62		
Hoop and strip steel over 6-in. base.....	5	16	to	5	18	1.25	to	1.27
Wire, plain, No. 8 gage	7	8½				1.63		
Wire, galvanized, No. 8 gage	9	8½				2.03		
Wire, barbed, 4-pt. No. 12 B.W.G.	11	18½				2.58		
Wire nails, base.....	0	7¾				$1.87 per keg		
Wire nails, assortments, 1 to 6-in. keg.....	10	6½				2.23		

*Open-hearth steel, 10s. ($2.42) per ton extra.

stock through financing by Vienna banks. A program of orders for 1930 is being negotiated at present, which includes 60,000 tons of rails and other permanent way material, compared with 54,000 tons in 1929.

The company is engaged for the next three months on domestic orders and is in an independent position on export orders, which, at present prices, offer little or no profit.

German Mills to Cut Extra on Open-Hearth Steel

HAMBURG, GERMANY, Aug. 1.—It is expected that the extra for open-hearth steel for export will soon be reduced from 7s. 6d. ($1.82) per ton, to 5s. ($1.21) per ton. Until 1927 the extra was 5s. ($1.21) per ton, but it was then advanced. The reduction of the extra would be in line with efforts of German mills to increase export sales of open-hearth steel. Prior to 1927, little structural steel of open-hearth quality was sold for export, but now sales of shapes, plates and sheets average 35,000 tons a month. Most of these exports are to the United Kingdom and the British dominions, where there is a decided preference for open-hearth steel.

Tube Cartel Prices Shaded

HAMBURG, GERMANY, Aug. 3.—Although reports of disagreement among members of the International Tube Cartel are denied, evidence accumulates of lower prices on tubes than are recognized by the cartel. In the past week a contract on gas tubes for India was taken by a merchant at about 3 per cent less than the cartel quotation. Small tube contracts at concessions from the fixed prices are frequently reported. British merchants are importing tubes freely, the marketing agreement with the United Kingdom, which provides an allotment, not yet being in effect.

Poland to Make Tin Plate

HAMBURG, GERMANY, Aug. 3.—Polish mills are preparing to enter into the production of tin plate and by the end of 1930 production is expected to be sufficient to satisfy domestic requirements fully and permit some export. In the past, almost the entire Polish requirements of tin plate have been supplied by Welsh makers.

German Cast Scrap Weak

HAMBURG, GERMANY, Aug. 8.—Prices of machinery cast scrap have declined from 69 m. to 68m. ($16.42 to $16.18) per ton within the past week, while other grades are strong, with heavy melting steel firm at 66m. ($15.71) per ton, delivered to consumers' works.

Michigan Steel Corporation, Ecorse, Mich., has removed its Detroit offices to 2400 New Union Trust Building.

British Steel Exports Improving

Imports of Raw and Semi-Finished Material Offset by Exports of High Value—Short Rail Hauls a Factor

THAT the cheap labor, or cheap production advantage, of Continental countries over British steel producers has much diminished in the last year or two is suggested by E. T. Good in the *Engineer*, London. British shipbuilders, he points out, are not importing big tonnages of foreign plates today because of cheapness, as the cheapness has disappeared. In other lines it has lessened.

British exports for the first five months of this year, compared with the same period of 1928, showed an increase of 172,100 tons. Imports showed a decrease of 226,300 tons. The article continues: "But the tonnage figures do not tell the whole story. Whereas our imports average less than £9 value per ton, our exports are worth an average of more than £15 per ton. Actually, our exports in the first five months of this year have been worth £29,300,600 ($142,107,910), while our imports have been valued at only £9,882,100 ($47,928,185).

"Our biggest export line in tonnage is the galvanized steel sheet, worth about £15 ($72.75) a ton, and our second largest export tonnage is in tin plate, worth nearly £20 ($97) a ton. Though Germany, France and Belgium often beat us in export tonnage, we are always on top in value, except when we have a big mining stoppage. Twenty and more years ago we exported over 1,000,000 tons of pig iron annually—a low-priced raw material for foundries and steel works. Now we export less than half that tonnage of pig iron; but our exports of galvanized steel sheets and some other high-priced products have doubled, trebled and even quadrupled since the early years of the present century. On an iron and steel tonnage basis we are doing a much smaller share of the world's trade, but in value we continue to do at least fairly well.

"In no foreign country have they ore and coal and works all close together as we have.

"Again, no foreign country has either coal mines or iron and steel works near ports. We have. As regards imported ore we have some of our blast furnaces so situated that the ships can land the material right alongside the stacks, and we have coal pits and coke ovens practically at the back doors of our works. We have such a combination of geographical advantages—such short and cheap hauls by rail plus such shipping facilities—that a ton of British steel can be delivered in Canada for a much less, inclusive transport cost, than a ton of American steel can be delivered in that Dominion bordering on the United States.

"In Germany the average haul for raw materials to works and finished products to ports is about 150 miles. In France it is about 200 miles. In our country it is under 30 miles. Even in tiny Belgium the works are so situated that imported ore has to travel about 80 miles from the seaboard to the furnaces, and the finished steel for export has to travel the same distance to the docks, with the result that we hold a transport cost advantage over the Belgians. Over the Germans, the French and the Americans our advantage is very great."

Polish Membership in Steel Cartel Still Delayed

WARSAW, POLAND, Aug. 2.—The Polish Steel Syndicate has been renewed until Dec. 31, 1931. In its annual report the syndicate says that the inclusion of Polish mills in the International Tube Cartel has not had the expected result in preparing for Polish entry into the International Steel Cartel, for the obstacles to membership still exist. One obstacle has been removed by the German-Polish agreement on trade in iron and steel scrap, but this agreement is not effective until the pending German-Polish general commercial treaty has been negotiated.

The agreement for protection of markets adhered to by Poland, Czechoslovakia, Austria and Hungary has been extended to the end of this year and this also is a factor favorable to Poland's entry into the International Steel Cartel. Polish mills, however, are insistent upon their right of a monopoly in supplying their own domestic market, claiming that development of capacity in the past year justifies this demand. It is further pointed out that despite relatively low duties on steel, foreign competitors have sold but little tonnage to Polish consumers, except in wire rods and light gage sheets, not produced in Poland.

Wire Rod Cartel Reduces Far Eastern Prices

HAMBURG, GERMANY, Aug. 3.—Wire rod quotations to Far Eastern markets have been further reduced by the Continental Wire Rod Cartel. For Yokohama, Japan, and Hongkong, China, the new price is £7 13s. 6d. ($37.22) per ton, c.i.f., and for Shanghai, Tsingtau, China, and Osaka and Kobe, Japan, £7 15s. 6d. ($37.70) per ton, c.i.f.

Lower prices are said to have been necessary to meet American and Canadian competition, as Far Eastern agents of the cartel have frequently cabled that American and Canadian sales of wire rods are increasing. It is believed that with this reduction of about 5s. ($1.21) a ton, more wire rod business will be received by Continental mills from both Japan and China.

Makes Many Metal Tariff Reductions

Senate Committee Would Make Manganese Ore Free, Reduce the Ferroalloy, But Raise Minimum Duty on Steel

WASHINGTON, Aug. 20.—Revisions made by the 11 Republicans of the Senate Committee on Finance in the metal schedule of the House tariff bill include these changes:

Putting manganese ore on the free list and reducing the duty on ferromanganese from 1⅞c. a lb. of contained manganese to 0.65c.

Increasing the duty on pig iron from its present rate of $1.125 a ton to $1.50, and transferring sponge iron from a grouping with muck bar, bar iron and the like (taking, say, 0.3c. a lb.), to the pig iron paragraph, with a duty of $2 a ton.

Making the minimum duty on iron and steel bars and shapes and cast steel 0.3c. a lb. by eliminating a 0.2c. rate that the House bill provided to apply to steel valued at not over 1c. a lb.; thus, under the Senate committee change, the 0.3c. rate would apply for steel valued at not over 1½c. a lb., and not merely for steel in a range of prices between 1 and 1½c.

Raising the minimum chromium content in iron or steel, before the added 8 per cent ad valorem duty applies, to 0.3 per cent instead of 0.2 per cent.

The important changes are shown in the accompanying table. The subcommittee in charge of the metal schedule was headed by Senator Reed of Pennsylvania.

The proposed duty on 80 per cent ferromanganese would be $11.65 per ton, as against the prevailing duty of $33.60, a cut of $21.95 a ton.

The present duty of 1c. a lb. on the contained manganese, based on a 50 per cent ore, nets a duty of $11.20 per ton. It was left unchanged in the House Hawley bill. The vote to place it on the free list by the Senate committee was close, 6 to 5. Previously the Senate committee had voted 7 to 4 to give manganese ore a sliding scale of rates, beginning with 10 per cent ore, but rescinded its action shortly before it completed its work on the dutiable and free list.

While the duty on steel scrap was left unchanged at 75c. per ton, the Senate committee added the items "hammer scale, roll scale, and mill scale" in this class. On alloy scrap the Senate committee reduced to 3c. a lb. from 4c. a lb. the duty on the chromium content in excess of 0.3 per cent instead of 0.2 per cent.

An important change was made in the basket clause. The House bill provided a duty of 50 per cent on nonprecious metals coming under this clause, while the Senate cut the rate to 45 per cent. It is estimated that iron and steel products dutiable under this paragraph (399) are valued at about $9,000,000 annually.

The duty on steam turbines was reduced to 15 per cent from 30 per cent and on punches, shears and bar cutters it was reduced to 35 per cent from 40 per cent. These and other important changes are shown in the accompanying table.

Molders' patterns were named separately and the duty was fixed at 50 per cent as against various rates provided in the House bill. Upholstery nails, thumb tacks and chair glides were made dutiable at 40 per cent as against the House rate of 3c. a lb. Butts and hinges were specifically named by the Senate committee and the House duty of 50 per cent continued. In the House bill they would come under the basket clause. Slight changes were made in the phraseology in paragraph 352, covering twist drills and other metal-cutting tools, duties remaining at 50 and 60 per cent, the latter relating to alloy tools. The electrical paragraph (353) was changed to exclude clockwork mechanism included in electrical mechanisms. Laboratory instruments were also excluded, while electric meters were included.

Antimony metal, paragraph 376, was given a sliding scale by the Senate committee as against the House duty of 2c. a lb. Roughly the Senate scale provides a duty of 3½c. a lb. if the price is over 7c. and not over 8c., and it scales down to a duty of ½c. a lb. if the price is over 13c. a lb. A provision added describes "price" as meaning the wholesale price (averaged for a period of one week) of ordinary brands "in the New York market as shown by the last quotation (given in a recognized weekly trade journal to be designated from time to time by the Secretary of the Treasury) prior to the date of arrival of the imported antimony in the United States."

The duty on fluorspar was left unchanged at $8.40 per gross ton, while the duty of 23/40 of 1c. a lb. was continued on dead burned magnesite. The duty on crude magnesite was changed to 15/32 of 1c. from 5/16 of 1c. a lb. The duty on amorphous graphite was reduced to 5 per cent from 10 per cent.

Principal Senate Finance Changes in Metal Schedule of House Tariff Bill

Senate Committee Paragraph		Senate Committee	House Bill
301	Pig iron, per gross ton	$1.50	$1.125
301	Granular or sponge iron, per gross ton	2.00	0.3 (lb.)
302	Tungsten ore, lb. contained tungsten	45c.	50c.
1713	Manganese ore, lb. contained manganese	Free	1c.
302	Manganese alloys (includes ferromanganese), per lb. contained manganese	0.65c.	1⅞c.
302	Aluminum silicon alloys, per lb.	3½c.	5c.
302	Silicon aluminum alloys containing iron, per cent	25	5c. (lb.)
302	Ferro-chrome, chromium content, per lb.	2½c.	3½c.
302	Cerium metal, per lb.	$1	$2
302	Ferro-cerium, per lb.	$1	$2
	Per cent	25	25
312	Structural shapes, per lb.	0.3c.	0.2c.
312	Sheet piling, per lb.	0.3c.	0.2c.
316	Tungsten and molybdenum products, per cent	60	25 (up)
353	Electrical products, per cent	30	40
354	Pocket knives, valued not over 40c. per dozen, each	4c.	1c.
	Per cent	50	50
	Valued at more than 40c. per dozen, not more than 50c., each	7c.	5c.
	Per cent	50	50
369	All automobiles, motorcycles, light trucks, light busses, chassis and body, per cent	10	25
372	Steam turbines, per cent	15	30
372	Punches, shears and bar cutters, per cent	35	40
376	Antimony metal	Sliding scale per lb.	2c.
390	Nickel oxide, per lb.	Free	1c.
399	Basket clause (non-precious metals), per cent	45	50

Central Alloy's Sales of Toncan Iron Increase

During the first seven months of 1929 Central Alloy Steel Corporation sold more of its rust-resisting Toncan iron than in all of 1927 and came within 7 per cent of equaling the total volume for 1928, according to an announcement by the company. Sales to date are 62 per cent higher than for the same period last year. Total shipments of all the company's finished products in the first half of 1929 were 520,946 tons, against 476,946 tons in the first half of 1928.

Enduro-Nirosta steel, made by the Central Alloy Steel Corporation, has been specified for the kitchen equipment of the eastern Pennsylvania prison to be erected near Philadelphia. This company will also supply rust-resisting Toncan iron for all sheet and light plate metal work at the prison.

Titusville Iron Works Co., Titusville, Pa., has moved its New York sales office to 285 Madison Avenue. This company, which has manufactured steel heating and power boilers, tanks and engines for the past 65 years, has become a division of the Struthers Wells-Titusville Corporation, Titusville. The corporation consists of the Struthers Wells Co., Warren, Pa.; Titusville Forge Co. and the Titusville Iron Works Co. The sales offices of the three divisions at New York are in charge of M. A. Cordner, who has been associated with the Titusville Iron Works Co. for 25 years.

To Interpret the Chicago World's Fair

Committee of Engineers Will Plan That Exposition May Tell Story of 100 Years Advancement

IN order that engineering science may be adequately interpreted to the public and that its relation to the progress during the past century may be graphically depicted, leading engineering authorities in this country have been asked to serve on the National Research Council Science Advisory Committee to the Chicago World's Fair Centennial Celebration to be held in 1933. The engineers will strive to formulate a philosophy for the exposition of engineering knowledge which will reveal the advancement made in the United States since the beginning of the so-called industrial revolution and up to the present time.

The engineering members of the advisory committee include Dean Anson Marston, Department of Engineering, Iowa State College of Agriculture and Mechanic Arts, who will prepare data on civil engineering progress; William L. Batt, S-K-F Industries, New York; for mechanical engineering; C. F. Kettering, General Motors Research Corporation, Dayton, for automotive data; W. H. Eisenman, secretary American Society for Steel Treating, who will report on steel treating; Prof. A. H. White, Department of Chemical Engineering, University of Michigan, on chemical engineering; Prof. Arthur N. Talbot, Engineering Experiment Station, University of Illinois, on materials testing; Arthur D. Little, Cambridge, Mass., on chemistry; Prof. Colin G. Fink, Department of Chemical Engineering, Columbia University, on electro-chemistry; and Prof. C. K. Leith, University of Wisconsin, geology.

According to present plans the Chicago World's Fair will be different from any exposition heretofore held. The present plans are that the material progress made during the past one hundred years be displayed in such a way that visitors, in whatever field they may be interested, will be enabled to form not only a picture of the existing state of the art, but to form an idea of the development of that art from it genesis, so far as possible, in the fields of pure science knowledge.

The members of the executive committee of the advisory board are: Dr. Frank B. Jewett, chairman; Dr. George K. Burgess, Washington; Gano Dunn, New York; Dr. Vernon Kellogg, Washington; Prof. M. I. Pupin, New York; Dr. Max Mason, New York; and Dr. William Allen Pusey, Chicago. Maurice Holland, New York, has been appointed executive secretary and the committee has established offices at 40 West Fortieth Street, New York.

Colhed, a New Alloy Die Steel

A SPECIALLY made carbon-vanadium tool steel for cold-heading dies has recently been put on the market by the Vanadium Alloys Steel Co., Latrobe, Pa. It is manufactured in such a manner that the center of the bar is claimed to be as solid as the outside. Dies used for cold-heading work usually have the impression sunk in that part of the steel which corresponds to the center of the bar and many users of cold-heading dies have experienced considerable difficulty in sinking and chipping because of porosity of the steel, says a statement of the company.

This new steel, sold under the trade name of "Colhed," has a higher vanadium content than other carbon-vanadium steels now on the market. The thickness of the hardened case can be accurately controlled, it is claimed, by merely varying the temperature. The new steel has been under test in operating conditions for approximately two years and is now being introduced to the trade.

Dies made of "Colhed," cold formed a 15/16-in. square head on a ⅞-in. diameter bolt, have averaged, it is stated, 30 per cent better than a number of other steels. They cold formed the head on a No. 10 countersunk flathead screw, averaging 125,000 pieces per die, with runs as high as 300,000 pieces.

In cold forming alloy steel roller bearings, the new steel dies turned out 49,000 bearings per day. Some of the dies will be exhibited at the National Metal Exposition in Cleveland the week of Sept. 9.

Blast Furnace for Japan

The Asano Bussan Co. has retained the Freyn Engineering Co., Chicago, in connection with the design of a complete blast furnace plant to be located in Japan.

Japanese May Make Own Steel Piling

WASHINGTON, Aug. 17.—It is reported that the Yawata Steel Works in Japan is seriously considering the manufacture of sheet steel piling, according to a report received by the Department of Commerce from Tokio. With the great building activity which has taken place since 1923, a big market for sheet piling has developed in Japan, particularly with the introduction of improved methods of building construction. The Yawata Steel Works is understood to be seeking a share of this business and, inasmuch as all of the sheet steel piling which is imported is patented, the Yawata works is said to be endeavoring to design a purely Japanese type.

The report also says that, according to the sales department of the Yawata works, a larger proportion of wire rods should be supplied by Japanese mills, and the company proposes to increase its wire rod production next year. Imports of wire rods have been exceptionally heavy during the past two months, and the price has been declining. The present Continental quotations are about 105 yen ($49.03) while the Yawata works is quoting 100 yen ($46.70) for August delivery.

Jones & Laughlin Expands Employees' Program

The Jones & Laughlin Steel Corporation has expanded its employees' benefit program to provide a total of $60,000,000 in group life insurance. T. M. Girdler, president, has announced the placing of a contract for an increase of $35,000,000 protection for the 25,000 employees of the corporation and its subsidiaries, the increase to become effective Aug. 31. Under the new arrangement individual life insurance benefits for the majority of the employees are larger than heretofore. The increases range from $1,000 to $4,000, with benefits determined according to occupation.

Testing Society Data Misused by Advertisers

There have been instances of the misuse, by advertisers, of data published by the American Society for Testing Materials. As a result of this the executive committee of the society has adopted the following statement of policy:

> Data or statements, quoted from society reports for advertising purposes, must be properly acknowledged and must be clearly identified as such and set apart from any interpretations or comments on them that are made by the advertiser. It is preferable that such data or statements shall be quoted in full. When considered necessary to abstract portions of data or statements, such abstracting must be satisfactory to the responsible committee of the society and be sufficiently complete that it will not state or imply conclusions other than those stated in the official society reports.

If there are any who contemplate using the society's data for advertising, the staff of the organization is willing to review such advertising copy upon request.

A preliminary program of the third Empire Mining and Metallurgical Congress, to be held in South Africa, from March 24 to May 9, has been issued. The congress headquarters are at 100 Fox Street, Johannesburg, South Africa. The various mining and metallurgical societies of Great Britain, Canada, Australia, South Africa and India cooperate in these congresses, which are held every three years.

This Issue in Brief

Metalclad construction in the larger sizes of airships, contrary to common belief, does not weigh much more than a fabric-covered ship of the same size. Single metal surface of Alclad Navy dirigible performs all of functions of five layers, exclusive of framing, with a saving in construction cost.—Page 454.

* * *

Although endurance limit for steel (or stress below which fracture does not occur under repeated loading) is about 40 per cent of its ultimate strength, for some non-ferrous alloys it is as low as 12 per cent.—Page 457.

* * *

Crescent-shaped base fractures of rails originate at a longitudinal seam in the lower surface of the base, thence gradually extending upward, investigation reveals. Such a seam or lap, it is held, is made during fabrication of the rail.—Page 458.

* * *

Finished steel prices probably will gradually sag until about the turn of the year, states economist. Decline in pig iron market awaits only a break in scrap prices and a further recession in steel production.—Page 476.

* * *

Steel company increases hot-strip steel capacity and reduces operating costs by centralizing production in a group of mills equipped with electric drive. Older steam-operated mills have been kept intact for use in emergencies and in times of peak demand.—Page 459.

* * *

By using monorails to expedite the movement of work, forgings are handled through all operations without reheating, thereby reducing production costs.—Page 467.

Cost, source of supply, uniformity of quality and degree to which the composition can be controlled by specifications are factors to be considered in choosing a non-ferrous metal or alloy for use in a commercial manufacturing operation.—Page 457.

* * *

Industrial recession but of only moderate proportions, and in which the steel industry will participate, is predicted by Dr. Haney. Declines in machine tool orders, automobile production and steel ingot output are believed to presage some decrease in general manufacturing. The public may not discern the downward trend for another two or three months.—Page 474.

* * *

Continuous forging unit produces finished crankshafts with one heating of metal from the billet in four operations. Unit consists of continuous heating furnace, 5000-lb. hammer for blocking, 4000-lb. hammer for restriking, hot trimming press and 5-in. header for upsetting the flange.—Page 471.

* * *

Method of controlling ZMC-2, the Navy's new dirigible, differs radically from previous practice. Its elevators and rudders, instead of being at the rear end, are in the form of eight fins projecting from the hull about 30 ft. forward of the stern.—Page 456.

* * *

Diameter of new all-metal dirigible is only one-third of its length, whereas the length of the familiar Zeppelin-type of airships has been from 7 to 12 times its cross diameter. Short and thick ships have less air resistance.—Page 456.

Cylinder barrel for Wright whirlwind engine is rough turned and outside diameter formed on automatic roughing lathe. Flange outside diameter is finish turned and back of flange is rough tapered and angled and then finish tapered and angled on Bullard Mult-Au-Matic. Thread is milled and end of cylinder faced and chamfered on specially-designed thread miller.—Page 464.

* * *

Main frames of all-metal dirigible ZMC-2 are merely hoops built up of cellular metal girders. Ship is practically free from internal tie wires. The cross bracings in the outer surface are dispensed with, because the sheet metal sheathing is riveted securely to girders and longitudinals and is sufficiently rigid to carry the shearing stresses in the hull.—Page 453.

* * *

Season cracking, or the spontaneous failure of seemingly sound parts made of some brasses, bronzes or nickel silver, is due to a combination of high internal or applied stress and corrosion. To correct the tendency, finished brass parts may be annealed at a low temperature or sheet, rod and tube may be "sprung" or bent to equalize the manufacturing strains.—Page 457.

* * *

Five machining operations on cylinder head of Wright whirlwind engine are performed simultaneously on Bullard Mult-Au-Matic. There are six stations, one for chucking and five for machining. As a head is installed and moved to first operation, all stations are stepped up and the finished head is removed.—Page 462.

A. I. FINDLEY
Editor

THE IRON AGE

W. W. MACON
Managing Editor

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Steel Makes Its New Uses

WE are hearing constantly, in connection with the increase in steel production, that "steel is going into new uses." The common belief seems to be that it is only a matter of somebody finding the new uses, by way of new classes of wares being wanted by the public, or of steel being substituted for something else. Such a conception is inadequate, for often the larger demand is not a matter of steel as formerly made having a new outlet open up, but of steel itself being so improved as to become more widely usable. The improvements relate both to the character of the steel and to the form in which the mill is able to supply it.

There is the case of rails. Prior to 1906 more than half the rails being laid by regular railroads were under 85 lb. per yard. Last year one-fourth the standard rails produced were 120-lb. and over, and one-half were 100-lb. and over but under 120-lb. A reasonably close estimate may be made that if the same mileage of track that was laid last year in rails 100-lb. and over had been laid with 85-lb. rails instead, the quantity would have been just half a million gross tons less. Now, there was a time when the railroads were reluctant to adopt much heavier rails in fear that the texture would not be so good. The rail makers have dealt with that situation by producing these heavy rails of a quality that meets any reasonable expectation.

Hoops have been made almost from time immemorial. The steel industry devised means for rolling them wider and thinner, the material being called "strips," with a production last year of 2,161,988 gross tons, apart from production of 560,426 tons of hoops and bands. Yet in 1909 (when if there were any "strips" they were reported as bands and hoops), the combined production was 645,512 tons. It was the development in rolling that opened up the market.

Since 1909 production of sheets 13 gage and lighter has been multiplied three and a half times. That was largely a case of better sheets making their enlarged market—better in physical qualities and better in surface finish.

In 1909 only 158,978 tons of alloy steel ingots were made, less than 1 per cent of the total of ingots. Last year 3,045,225 tons of alloy steel ingots were made, or more than 6 per cent of the total. The tonnage was multiplied by 19 and the proportion increased nearly nine-fold.

There is another and important side to this matter. In various connections the steel industry, in a way, has worked against itself. By increasing tensile strength and trustworthiness it has enabled consumers to use less weight of steel to accomplish a desired result. The H or wide-flange beam section is an illustration as to the form of steel. In the long run, of course, the industry benefits by this particular kind of improvement, but the consumer benefits still more.

The proper conception, then, is that while people have been finding new uses for steel, the steel industry has been providing steel of better quality and wider variety of form, which enable it to fit into new uses.

Economic Topsy-Turviness

AS we read the accounts of current events and the expressions of current opinions on economic issues we confess to bewilderment or such a state of mind as Alice had in Wonderland.

Mathew Woll, a well-known vice-president of the American Federation of Labor, warns us that this country is jeopardizing its prosperity by exporting its surplus capital, by which apparently he means the use of our credit for creation of capital abroad. He foresees that such a creation of capital is going to result in production that will come into competition with the production from capital at home, and will, therefore, cause further unemployment here.

Labor leaders are greatly concerned about domestic unemployment. However, the Department of Commerce, the Harvard Economic Service, Colonel Ayres and other authorities tell us that we are still enjoying unprecedented prosperity, which, of course, does not harmonize with representations as to unemployment.

We suspect that the fears and tears of the labor leaders are associated with the unemployment of relatively few persons whom altered conditions have prevented from having everything their own way. The situation of the musicians, who made themselves prohibitive in the ordinary theater and now find themselves ousted by the phono-cinema, is a striking illustration of this.

Congress is trying to make a new tariff that will decrease competitive importations and in certain lines prevent them. Some Congressmen favor rates of duty that would be completely protective. We recognize our own need for an export trade and aim at the creation of a costly merchant marine which we wish to be kept occupied. But apparently many of us dream of selling without buying and at the same time expect Europe to pay its indebtedness to

us. Yet no one tells us how such results are going to be achieved.

Economic obtuseness is not, however, confined to the United States. In the Hague reparations conference Philip Snowden, chancellor of the British exchequer, is averse to the payment of reparations by Germany in goods, for he conceives that such receipts will deprive British capital and labor of the opportunity to produce. It is hard to see, however, how Germany is going to be able to pay otherwise than in goods, and whether that be done directly or indirectly does not seem to matter very much.

M. Loucheur of the French Ministry has the same aversion to payment in goods, but he also expresses fear of the American menace. Thus, while our own statesmen are dreading the European peril, the European statesmen fear an American peril.

At the same time M. Loucheur held up the United States as a model of how to obtain prosperity. In imitation, in his mind, it would be necessary only for Europe to raise its wage scale and so provide its population with increased buying power. A similar idea prevails in some quarters in this country, especially in the halls of the labor unions.

An American company became interested in a great industrial enterprise in Europe and introduced real American methods, which meant increased efficiency in production, in the course of which process it raised wages in order to secure the best workers and give them sufficient calories of food, at the same time reducing the number of workers. In this illuminating instance the local labor unions promptly objected to wages being raised and workers being displaced, and the national Government inquired what was going to be done with the thousands of inferior workers who were made idle.

Mr. Snowden and M. Loucheur, Mr. Woll and some of the proponents of general tariff advances at Washington are, of course, playing for their own hands. It is human nature for every one to want to get for himself all that he can. It is also human nature to want to have a cake and eat and keep the cake. In international economics, however, the playing of the games in this way certainly makes for bewilderment.

Color Sells Metal Partitions

COLOR is doing much to popularize the use of steel partitions in building construction. The consumption of single pickled full cold rolled sheets and of cold rolled strip steel in this field has increased notably in the last year or two. An outstanding advantage of metal partitions is that usually they are built in sections and are movable, permitting an easy rearrangement of floor space, which is often required both in commercial and industrial office buildings. Against the flexibility of steel partitions are the greater expense and much slower work in removing and replacing tile and plaster partitions, to say nothing of the litter created in tearing the latter out.

The adoption of the easily applied lacquers of nearly every hue has given a range of color choice in building partitions and removed the objections many have had to the use of steel for this purpose. The green coating once generally applied to such steel did not appeal to the artistic taste and created sales resistance to the metal partition industry. For partitions in factory buildings the cold looking but practical green coated metal is still being used, but for office partitions the vogue has turned to coatings of eye satisfying colors. Under present methods of manufacture the green enamel is applied to the metal by dipping and then is baked on. This provides protection against corrosion. Then the color coating is applied by spraying. One company is now making steel partitions in 72 colors or shades and in addition is supplying partitions in various grains. On some contracts the entire color scheme is worked out for groups of artistic offices, so that furniture, hangings and floor coverings may harmonize with what is selected for the partitions.

Ice Cream Pants for Steel Workers

EVEN the most casual visitor at the Huntington, W. Va., plant of the International Nickel Co. (where nickel and monel metal are smelted and rolled) is impressed with one marked characteristic. It is immediately evident in the parked and hedged grounds, and the lawns extending between the buildings, up to the very doors. Windows are washed and buildings brightly painted on roofs and sides. But it doesn't stop just there. Such cleanliness and orderliness rule on the inside of the buildings as well. In the roasting department, where the sulphur is driven off the copper and nickel matte, there is hardly a whiff of the sulphur smoke that all but suffocates the unsuspecting visitor in a copper smelter. And in steam hammer shop and rolling mills the heating furnaces, even though some of them are seven years old, look as if installed last month—clean, painted, doors fitting tight, no sign of sooty smoke; everything shipshape.

It takes more than a supply of clean natural gas fuel to explain this situation; it takes even more than the apparent desire to maintain the plant and equipment at 100 per cent efficiency. It is certainly related to a conviction on the part of the management and men that the plant must be scrupulously clean in order to produce a high-grade cold-rolled sheet or cold-drawn articles, all with surfaces free from slightest blemish.

"It's all very well to do such a thing in a plant whose product is worth 50 cents a pound," it might be objected, "but it would increase the expense burden unduly if the output sold for only 4 cents." As a matter of fact, such an objector could find much the same situation existing at the Nickel company's near neighbor, the Ashland plant of the American Rolling Mill Co. This, it will be recalled, is where the continuous rolling of sheets was developed. It also contains a modern open-hearth department, blooming mill, and extensive finishing departments. The parked grounds are not so extensive, but the steel making departments and heavy blooming mills are notably tidy and orderly. The reason is aptly stated in a sign posted on the safety bulletin board in the blooming mill: "You can't make good soup in a garbage can, nor can you make high-finish sheets in a dirty mill."

Such a sign might be more appropriate in the cold rolling department (almost everything made at Ashland requires one or more cold passes after the final

annealing and pickling). Prominent display in the blooming mill merely indicates that the entire staff, from scrap unloader to shipping room roustabout, must work together to keep dirt out of and away from the steel. It would be only natural for the men in the finishing mills, in the cold rolling and inspecting departments, to have this ideal more prominently in mind. They have no hope that carelessness on their part will be covered up by further operations on the same sheet. In fact, at Ashland the crew of one of the wet cold mills, under the leadership of their foreman and the approval of the management, started the style of coming to work in white shirts and duck pants. Why not? It is hot in the summertime in Kentucky, and why shouldn't they wear seasonable clothes? They work in as clean a place as a soda fountain and much cleaner than most kitchens, where white clothes are the expected uniform.

The only difficulty with such a scheme seems to be that the men might pay more attention to keeping their clothes clean than they would to keeping the mill going—especially after their wives had faced the laundry problem. Smocks or aprons doubtless would help. Experience might even show that it would pay for the employer to meet the laundry bills, as do the bakers and restaurant owners now. At any rate, the conditions in these two plants show that it is possible and even profitable to conduct heavy metallurgical operations in cleanly surroundings, when every one concerned realizes constantly that "You can't make good soup in a garbage can."

More Pig Iron in Steel

A CAREFUL estimate of basic open-hearth steel production in the first half of this year, compared with the basic pig iron production just reported, indicates that a trifle over 2 per cent more of such steel was represented by pig iron, instead of scrap, than in the year 1928, while there was a trifle less than 2 per cent more, comparing the average of 1927 and 1928.

This does not seem like much of a change, but it means about half a million tons of scrap in the half year, and that is quite an item when it comes to getting the scrap together. When about 24,250,000 tons of basic open-hearth steel ingots and castings were made in the half year, and 12,984,864 tons of basic pig iron, the total scrap used was, roughly speaking, the difference; but the major part of that scrap was works scrap which takes care of itself, rising and falling as total production of steel—including Bessemer—fluctuates.

Obviously this increased use of pig iron in steel making was not voluntary. Scrap in the three principal markets ranged $2 to $3 a ton higher in the first half of this year than in the year 1928, so that there is no difficulty in distinguishing which was cause and which was effect. The frequent comment made earlier in the year, that on account of higher scrap prices steel makers would use more pig iron, is borne out.

The statistics of pig iron production in the first half of this year, given in last week's IRON AGE, illustrate some other interesting points. There is no longer a relationship between Bessemer pig iron production and the production of Bessemer steel and acid open-hearth steel. In 1906 and 1907, the two peak years in Bessemer steel production, the production of Bessemer and acid open-hearth steel was 95 per cent of the production of Bessemer pig iron. In 1912 and 1913 the percentage dropped to 91½. An excess of pig iron is requisite on account of losses in steel making, partly compensated by the use of scrap, and for the manufacture of ingot molds. In the first half of this year production of Bessemer pig iron (excluding low phosphorus) was 4,769,864 tons, while production of Bessemer steel ingots was 3,606,000 tons, or only 76 per cent as much.

Production of foundry iron in the half year, 2,111,170 tons, represented a rate of 4,250,000 tons per annum. As early as 1903 foundry pig iron output ran that high, and there were four 5,000,000-ton years before the war. The production of gray iron castings has evidently decreased in the last 20 years, for it is reasonably certain that foundries are not using more scrap than formerly. Yet cast iron pipe, enameled sanitary ware and radiators have undoubtedly increased. The ordinary casting of 20 years and more ago, instead of growing, has been partly replaced by rolled steel and forged steel.

However, a good statistical showing is made for the malleable iron casting. Before the war there was never a million-ton year in production of malleable pig iron, though there were approaches in 1907 and 1913. Yet in just one-half of this year production was 1,274,300 tons, showing incidentally a 35 per cent increase over the first half of last year.

CORRESPONDENCE

Welded Joints in Structures Are Self-Tested

To the Editor: Those of us who have seen certain failures in arc welding put back its progress are very anxious to do everything we can to prevent the recurrence of such mistakes. There are many engineering data being formulated for the theoretical side of arc welding, but none of these figures avails if the weld is not made correctly. These short comments are along the lines of practical welding and how to inspect it, with special reference to the comforting thought that welds are self-testing.

I think the clearest view of an arc weld in a structure is that it is a casting, merging and joining rolled structural members. The casting (weld) has not been forged or rolled; it has the properties of a casting. If welded to a casting, it would be 100 per cent physically, mechanically and structurally. But welded to a forged or rolled section, it must be used under such conditions and in such a manner that the weld is not asked to stand the strains and stresses of the rolled or forged section.

We have been fortunate in solving this difficulty by making the welded section stronger than the members being joined. This is very easy to do by increasing the section 10 to 15 per cent at the joint, and as the weld is stiffer and the elastic limit is higher than for a rolled or forged section of metal of approximately the same chemical composition, all strains are transmitted to the parent metal.

Contraction occurring in an arc weld during cooling forms the long-sought-for test for welded joints; it also improves the weld by stretching it. For instance, if you

haven't made the weld correctly or of sufficient section, the contracting strains will crack the weld. Contraction of a hot joint either stretches the joint or moves the parent metal, and very seldom in structural welding are the parent members movable.

It doesn't harm either the weld section or the parent metal to be stretched; in fact, the more it is worked beyond the elastic limit, within reasonable limits, the better it is. If the ultimate strength is exceeded by the contracting stresses and the weld breaks either in itself or away from the parent metal, it gives you the inspection test that you are looking for and it shows you that it has to be re-welded. Never in all my experience have I seen a weld crack days, months, or years after it was made; it cracks when it cools, then and there, or never.

All this applies to structural steel that contains 0.25 per cent carbon and lower. It is a good rule to avoid welding higher carbon steel (that is, 0.35 carbon and over) while it is under stress. Our experience shows that high-carbon steel should not be welded if the joint carries loads that vary in intensity, unless the proper heat treatment can be subsequently done.

C. J. HOLSLAG,
Chief Engineer and Vice-President,
Electric Arc Cutting & Welding Co.
Newark, N. J.

New Method of Sales Promotion Work

Sales Executives of Members of Structural Steel Fabricators' Association to Work for New Uses

AN advisory committee on salesmanship covering the New York district has been established by the American Institute of Steel Construction, Inc. This committee is drafted from the sales executives of the fabricators of structural steel in that district. It will meet with the staff of the institute monthly to advise on the work of the national body as it regards the development of broader markets for structural steel.

The New York Advisory Committee, at its organization meeting in July, consisted of R. W. Knight, McClintic-Marshall Co., chairman; W. Spence, Hedden Iron Construction Co.; A. M. Conneen, 3rd, Hedden Iron Construction Co.; A. J. Post and L. A. Post, of Post & McCord; J. B. Cooke, Paterson Bridge Co.; J. N. Lord, Paterson Bridge Co.; John L. Hay, Jr., Hay Foundry & Iron Works; G. D. McNaughton, Levering & Garrigues, and Charles A. Gross, Shoemaker Bridge Co. This committee will deal directly with the executives of the American Institute of Steel Construction, Inc.

Among the subjects discussed at the organization meeting was the development of a market for steel framed residences, the utilization of steel in the erection of hangars, bridges and irrigation dams. Technical problems dealing with the development of a steel plate floor system, known as the "battledeck" floor, were discussed at length and numerous welded sections of such a floor were subjected to close examination and inspection.

A more scientific method of fireproofing structural steel and the broader adoption of steel in the erection of school buildings came up for analysis. The committee, in consultation with the executive staff of the institute, decided that there was a big field for cooperative effort, especially in the development of a more aggressive selling effort and sales training. The discussion resulted in some constructive recommendations. In extending the uses and the market for structural steel, the opportunities for joint action were considered such as providing a necessity for monthly consultation.

The first meeting was attended by the members of the executive staff of the American Institute of Steel Construction, Inc. They were Charles F. Abbott, executive director; F. N. Frankland, director of technical service; T. H. Hendrix, assistant to the executive director; V. G. Iden, director of public relations; J. N. Keenan, district engineer at New York; B. F. Hastings, district engineer at Philadelphia, and Donald McConaughy, representing the advertising agent, N. W. Ayer & Sons Co.

This is the first time, it is believed, that the sales representatives of constituent member firms have been drafted into the service of a national trade organization. The American Institute of Steel Construction, Inc., however, is distinctly a selling organization planned for the purpose of developing new uses and a broader market for steel in bridges, buildings and other structures. It is felt that, by drawing upon the selling staffs of its constituent members to supplement the work of the district engineers directly engaged by the institute, a much more aggressive campaign can be initiated in the spread of a better appreciation of structural steel among engineers, architects, owners and investors.

July Building Awards Were Second Largest on Record

Building contracts awarded during July in the 37 States east of the Rocky Mountains were the second largest monthly total on record amounting to $652,436,100, reports the F. W. Dodge Corporation. This was a gain of 12 per cent over the total for the same month of 1928 and of 20 per cent over that for June, 1929.

New York and northern New Jersey established a new July record with a volume of $219,884,400, representing an increase of 104 per cent over the preceding month and of 60 per cent over July, 1928. The Middle Atlantic States and Texas also reached a new high level for July, while the New England States had the second highest July on record.

Thirty-one per cent of the awards was for residential buildings, 30 per cent for public works and utilities, 14 per cent for commercial structures, 10 per cent for industrial buildings and 7 per cent for educational buildings.

Automobile Spring Plant Building at Detroit

Construction of a new plant for the manufacture of automobile springs has been started by the Detroit Steel Products Co., Detroit. The new unit will have a floor area of 125,000 sq. ft. and will cost $1,000,000. Rapid growth of the company's steel sash business is responsible for the expansion program. With the removal of the automobile spring division to the new plant, the present plant will be given over entirely to the production of steel sash.

Lake Erie Bolt & Nut Co. Buys American Bolt Co.

Lake Erie Bolt & Nut Co., Cleveland, has acquired the American Bolt Co., Birmingham, said to be the largest manufacturer of bolts and nuts in the South. The consolidation brings together two of the oldest bolt and nut companies in the country, the Lake Erie company having been established 75 years ago and the American company 82 years ago.

The American Bolt Co. was owned by Nathan L. Miller and F. H. Mohns of Birmingham. Mr. Miller, who has been president, will retire and the plant will be operated as a wholly owned subsidiary of the Lake Erie company with the present active management headed by Mr. Mohns. The name of the American Bolt Co. will be retained.

The fall meeting of the American Refractories Institute and the Refractories Division of the American Ceramic Society will be held on Sept. 24 at the Deshler-Wallick Hotel, Columbus, Ohio. Dorothy A. Texter, Oliver Building, Pittsburgh, is secretary of the American Refractories Institute.

Iron and Steel Markets

Steel Output High, Orders Decline

Heavy Production and Shipments Cutting Deeper Into Mill Backlogs—Automobile Steels Affected Most— Further Weakness in Southern Iron

A TAPERING demand for steel is yet to be reflected definitely in mill operations, which are still at a near-capacity rate in most districts.

Meanwhile shipments are cutting heavily into backlogs in some lines, and prospects for a continuance of present high output in September depend somewhat on the extent of the expected recovery in automobile buying.

Automobile steels, including body sheets, strip steel and bars, have been more affected by declining specifications than other products. Some automobile companies are rather slow in getting in production on new models, and meanwhile are taking steel in relatively small quantities and in less aggregate volume than they used last month. Indications point to heavier motor car output next month.

Other metal-working industries are on high production schedules and apparently are consuming steel in undiminished tonnage. Notable among the most active lines are building construction and the manufacture of oil tanks, fabricated pipe, farm tractors and steam shovels.

Plates are in the strongest position among finished steel products. Chicago plate mills are booked for four to ten weeks and Pittsburgh mills from six to eight weeks. At Chicago, 6500 tons of plates has been ordered for oil tanks to be built in the Southwest and 15,000 tons for similar work is pending.

In sheets, specifications are holding up fairly well, despite the decline in consumption by the automobile industry. The leading sheet producer is operating its mills at just under 100 per cent this week and has a backlog sufficient for 60 days. Tin plate demand is receding, however, partly because the bulk of the season's requirements has been covered, but also on account of lessened needs in California, where crop damage has reduced the food pack. Some strip steel mills have reached the point of being in actual need of orders.

Pipe mills are operating at about 65 per cent, which is considered a good rate in view of the large capacity and the volume of business which has gone in recent months to a fabricator of pipe electrically welded from plates. About 250,000 tons of pipe will be required for a gas line from Amarillo, Tex., to Omaha and Chicago which the Texas Co. is sponsoring. A 10,000-ton pipe line at Everett, Wash., is up for bids.

Rail mills, now at about a 75 per cent operation, will soon reach the end of their orders, with the beginning of the fall buying movement at least four to six weeks off. Mill schedules may be reduced somewhat further by Sept. 1.

Builders of railroad cars will complete their present orders within a month or so, and new car buying in prospect is not in large volume. Several roads mentioned as possible buyers have yet to issue formal inquiries. The week's orders totaled 750 cars.

Building construction continues active, the week's awards of structural steel, at 51,000 tons, having been the largest since the last week of June. Included were 8100 tons for New York subway work, 7000 tons for a bank building in Newark, N. J., and 7000 tons for a bridge at Toledo, Ohio. The pending list was augmented by 32,000 tons.

Despite the growing unevenness of demands for various forms of finished steel, ingot output in principal producing districts holds at about 95 per cent, the falling off in some lines being offset by continued large demands in others. There is promise of high ingot production during the remainder of the quarter, even assuming a further reduction in requirements of finished steel, as badly depleted stocks of raw steel will be built up.

Outstanding in the pig iron situation is the continued weakness of Southern iron, which has declined another 50c. a ton at Chicago to $12.50, Birmingham, thereby underselling Chicago iron on a delivered basis by $2 a ton. Elsewhere in the North, Alabama iron is competing strongly for business at prices ranging from $13 to $14, yet Northern iron prices have not been affected. Shipments of Birmingham district furnaces have increased in the past two weeks, largely because of sales to outside territories.

Some buying of iron for fourth quarter has been done, but generally melters are waiting. Most furnaces are sold up for this quarter, and one Buffalo interest has withdrawn from the market for deliveries earlier than October. At Cleveland, shipments have gained through releases by foundries in the automotive field.

Foundry equipment manufacturers report July the largest month for orders since last August. Bookings for the seven months of the year were 23 per cent ahead of the corresponding period of 1928 and shipments averaged 63 per cent above those of the January-July period last year.

Heavy melting steel scrap is up 25c. a ton at Chicago on sales of 15,000 tons or more and down 25c. a ton at Pittsburgh. Strength in scrap is apparent at St. Louis, Cleveland, Detroit and Birmingham.

THE IRON AGE composite prices remain at last week's levels, that for pig iron at $18.42 a ton and that for finished steel at 2.398c. a lb. Pig iron is $1.38 higher than a year ago and finished steel is $1 a net ton higher.

A Comparison of Prices

Market Prices at Date, and One Week, One Month and One Year Previous, Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron, Per Gross Ton:	Aug. 20, 1929	Aug. 13, 1929	July 23, 1929	Aug. 21, 1928
No. 2 foundry, Philadelphia	$21.26	$21.26	$21.76	$20.26
No. 2, Valley furnace	18.50	18.50	18.50	16.50
No. 2 Southern, Cin'ti	17.69	17.69	17.69	19.19
No. 2, Birmingham	14.50	14.50	14.50	15.50
No. 2 foundry, Chicago*	20.00	20.00	20.00	17.50
Basic, del'd eastern Pa.	19.75	19.75	20.25	19.00
Basic, Valley furnace	18.50	18.50	18.50	16.00
Valley Bessemer, del'd P'gh	20.76	20.76	20.76	18.76
Malleable, Chicago*	20.00	20.00	20.00	17.50
Malleable, Valley	19.00	19.00	19.00	17.00
Gray forge, Pittsburgh	19.76	19.76	19.76	18.01
L. S. charcoal, Chicago	27.04	27.04	27.04	27.04
Ferromanganese, furnace	105.00	105.00	105.00	105.00
Rails, Billets, Etc., Per Gross Ton:				
Rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Light rails at mill	36.00	36.00	36.00	36.00
Rerolling billets, Pittsburgh	35.00	35.00	35.00	32.00
Sheet bars, Pittsburgh	35.00	35.00	35.00	32.00
Slabs, Pittsburgh	35.00	35.00	35.00	32.00
Forging billets, Pittsburgh	40.00	40.00	40.00	38.00
Wire rods, Pittsburgh	42.00	42.00	42.00	42.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.85	1.85	1.85	1.90
Finished Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Bars, Pittsburgh	1.95	1.95	1.95	1.90
Bars, Chicago	2.05	2.05	2.05	2.00
Bars, Cleveland	1.95	1.95	1.95	1.85
Bars, New York	2.29	2.29	2.29	2.24
Tank plates, Pittsburgh	1.95	1.95	1.95	1.90
Tank plates, Chicago	2.05	2.05	2.05	2.00
Tank plates, New York	2.22½	2.22½	2.22½	2.17½
Structural shapes, Pittsburgh	1.95	1.95	1.95	1.90
Structural shapes, Chicago	2.05	2.05	2.05	2.00
Structural shapes, New York	2.19½	2.19½	2.19½	2.14½
Cold-finished bars, Pittsburgh	2.30	2.30	2.30	2.10
Hot-rolled strips, Pittsburgh	1.90	1.90	1.90	1.75
Cold-rolled strips, Pittsburgh	2.75	2.75	2.75	2.65

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

Finished Steel,	Aug. 20, 1929	Aug. 13, 1929	July 23, 1929	Aug. 21, 1928
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 24, P'gh	2.85	2.85	2.85	2.65
Sheets, black, No. 24, Chicago dist. mill	2.95	2.95	3.05	2.75
Sheets, galv., No. 24, P'gh	3.50	3.50	3.60	3.40
Sheets, galv., No. 24, Chicago dist. mill	3.60	3.60	3.80	3.60
Sheets, blue, No. 13, P'gh	2.35	2.35	2.35	2.10
Sheets, blue, No. 13, Chicago dist. mill	2.45	2.45	2.45	2.20
Wire nails, Pittsburgh	2.55	2.55	2.65	2.55
Wire nails, Chicago dist. mill	2.60	2.60	2.70	2.60
Plain wire, Pittsburgh	2.40	2.40	2.50	2.40
Plain wire, Chicago dist. mill	2.45	2.45	2.55	2.45
Barbed wire, galv., Pittsburgh	3.20	3.20	3.30	3.20
Barbed wire, galv., Chicago dist. mill	3.30	3.30	3.35	3.25
Tin plate, 100 lb. box, P'gh	$5.35	$5.35	$5.35	$5.25
Old Material, Per Gross Ton:				
Heavy melting steel, P'gh	*$19.00*	$19.25	$18.75	$15.50
Heavy melting steel, Phila	16.50	16.50	16.50	13.00
Heavy melting steel, Ch'go	**15.25**	15.00	14.75	12.75
Carwheels, Chicago	14.00	14.00	14.00	12.75
Carwheels, Philadelphia	16.50	16.50	16.50	15.50
No. 1 cast, Pittsburgh	15.50	15.50	15.50	14.50
No. 1 cast, Philadelphia	16.50	16.50	16.50	15.50
No. 1 cast, Ch'go (net ton)	14.50	14.50	14.50	14.00
No. 1 RR. wrot., Phila	16.00	16.00	16.00	13.50
No. 1 RR. wrot., Ch'go (net)	14.00	14.00	13.50	11.25
Coke, Connellsville,				
Per Net Ton at Oven:				
Furnace coke, prompt	$2.75	$2.75	$2.75	$2.75
Foundry coke, prompt	3.75	3.75	3.75	3.75
Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	18.12½	18.12½	18.12½	14.75
Electrolytic copper, refinery	17.75	17.75	17.75	14.50
Tin (Straits), New York	**46.50**	46.37½	47.25	47.87½
Zinc, East St. Louis	6.80	6.80	6.80	6.25
Zinc, New York	7.15	7.15	7.15	6.60
Lead, St. Louis	6.55	6.55	6.55	6.00
Lead, New York	6.75	6.75	6.75	6.20
Antimony (Asiatic), N. Y.	**9.00**	8.75	8.75	10.25

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Pittsburgh

Steel Making at 95 Per Cent Rate—Backlogs and Reserve Stock Needs Promise Continued High Operation

PITTSBURGH, Aug. 20.—Recession in steel market activity is of the most gradual character and is hardly discernible in ingot production, which in this district is at least 95 per cent of capacity. The principal steel making unit of the Steel Corporation and the district's largest independent company are practically at full capacity and of the other open-hearth furnaces numbering 58, only 11 are inactive.

This high rate of steel production, however, finds its principal foundation in commitments made some time ago, as new demands in a number of lines have been slowly but steadily tapering off for the past several weeks. It will be recalled that during the second quarter producers not only were committed against full current production, but in many lines were sold ahead for from one to more than two months. This was the result of fear on the part of consumers they would not get all the steel they wanted as promptly as they wanted it.

Deliveries against these forward protections now are serving, particularly in the case of the automotive industry, to obviate the necessity of large fresh buying. Companies making only a few products or serving a limited number of consuming industries are feeling the recession more heavily than those with wider distribution and a larger line of products. The latter still have really sizable order books, notably in the heavy tonnage products.

Few makers of bars can make quicker delivery than two weeks in any of the sizes and the demands upon local makers of plates, resulting from the shortage in the Chicago district, also make reasonably early shipment on new business difficult. Backlogs in strips are diminishing under the influence of heavy shipments and moderate new buying.

Reports as to sheet business vary somewhat, but at least the leading producer has experienced some increase in tonnage releases. Tin plate business is quiet, but that is a somewhat seasonal condition, with the canning season moving toward its peak and most of the requirements already spoken for. Business in wire products is good for the time of year.

Taken as a whole, business leaves little cause for complaint. While the trend is lower, it is not sharply so, and taking steel simply as steel without regard to its finished form, producers have enough specified tonnage not to be much concerned about maintaining a relatively full rate of steel making capacity during the remainder of this quarter. There are no reserve stocks and in the interest of economical plant operation, building up such stocks will be a possibility even if demands over the remainder of the year fail to turn upward from the present volume.

Prices generally are well maintained. In spots, they would not be called firm, but at least there is no downright weakness. Primary materials offer little of interest, except that scrap prices appear slightly softer

as a result of efforts by dealers to secure orders and a lack of interest by consumers in fresh supplies.

Pig Iron.—This market is steady as to prices, but business is very slow. Melters seem to have exceeded their requirements in their purchases for second quarter and now are able to go along without supplementing deliveries on those purchases to any considerable extent. Shipments on old orders are good and with a fairly heavy melt by the iron foundries it is believed most of the iron is going into consumption instead of to the melters' piles. Carnegie Steel Co. has taken off one of its Edgar Thomson blast furnaces for repairs, but Republic Iron & Steel Co. has put on its one idle Hazelton furnace in Youngstown, leaving the number of active stacks for this and nearby districts the same as a week ago.

Prices per gross ton, f.o.b. Valley furnace:

Basic	$18.50
Bessemer	19.00
Gray forge	18.00
No. 2 foundry	18.50
No. 3 foundry	18.00
Malleable	19.00
Low phos., copper free	27.00

Freight rate to Pittsburgh or Cleveland district, $1.76.

Prices per gross ton, f.o.b. Pittsburgh district furnace:

Basic	$19.00
No. 2 foundry	19.00
No. 3 foundry	18.50
Malleable	19.50

Freight rates to points in Pittsburgh district range from 63c. to $1.13.

Semi-Finished Steel.—Requirements of non-integrated steel manufacturers of billets, slabs and sheet bars are not so heavy as they were at the opening of the present quarter, since demands for strips and tin plate are notably lighter. The result is a somewhat easier supply situation, despite the fact that ingot production also has tapered slightly and much of the steel released for one use has gone into other channels. But there is no easing in prices. Buyers are largely under contract for the entire quarter and there is enough stability in finished steel prices to obviate pressure for lower prices on semi-finished. Prices appear firm at $35, Pittsburgh or Youngstown, for base size billets, slabs and sheet bars. Wire rods are firmly held at $42, base, Pittsburgh or Cleveland, and releases on contracts are steady.

Bars, Plates and Shapes.—The market is well maintained at 1.95c., base Pittsburgh, on these products on the general run of business. Plate prices are especially firm, because mills in this and nearby districts have commitments that preclude delivery promises of earlier than six weeks. It is reported that some mills that can make more prompt shipment are able to get 1.95c., f.o.b. mill, on shipments into the Pittsburgh district, or well in excess of 2c., delivered. Bar mill obligations range from two to three weeks in some sizes to as much as four weeks in others. The market is becoming limited in standard structural shapes, as so much of the current construction work is being supplied with special shapes. There are no large backlogs in standard structural shapes, but enough business is coming in daily to keep the mills steadily engaged.

Rails and Track Supplies.—This is usually a dull period in the demand for track accessories and the present is no exception. Most of the regular 1929 standard-section rail contracts have been completed, and it will be a month or so before 1930 requirements come before producers.

Wire Products.—Makers say that they still are able to get 2.50c. base, a lb. Pittsburgh, on plain or manufacturers' wire in this district, despite reports of lower prices in other consuming territories. Nails are commonly at $2.55, base, per keg, in carload lots. It seems that the order rather than its source governs the price, although there has been no formal abandonment of the plan announced late last year which set up prices for four or five distinct classes of buyers. Business as a whole is described as being somewhat above the average for this time of the year.

Tubular Goods.—Demand is sufficient to sustain an operation of welding and seamless pipe capacity in this and nearby districts of approximately 65 per cent. This is a better showing than it appears to be, as productive capacity, notably in seamless pipe, has grown materially in the past two years and the estimate is against the increased capacity. Although much large lap-weld pipe business has been lost by local producers to the Milwaukee company, producing electrically welded pipe, a fairly large amount of such business is coming to this district and most of the seamless pipe capacity is in this and nearby districts. Demand for butt-weld pipe is much less seasonal than formerly and there is not the variation in demand there was a few years ago. The automobile makers are taking less mechanical tubing than earlier in the year, but other tubing demands still bulk large. The pipe line which will convey natural gas from the Amarillo, Tex., field to Chicago, sponsored by the Texas Co., will probably be placed before the end of the year. This line, which will run first to Omaha and then to Chicago, will require 550 miles each of 22-in. and 24-in. pipe, amounting to approximately 250,000 tons. It is expected that the plans of companies owning by-product coke ovens to widen their markets for gas will result in a good demand later for line pipe.

Sheets.—Business has shown some increase in the past week and the leading interest, has found occasion to increase its rolling mill schedules to within a point or two of 100 per cent of capacity. This company has a backlog sufficient to insure substantially full operations for 60 days. Experience of most independent producers is of a similar tenor, but in the Youngstown district there are instances of makers having pretty well completed orders and being obliged to curtail production because of light strictly new buying. It is explained that so much tonnage is reaching buyers on old commitments that there is not much reason for additional purchases. Ford Motor Co. requirements are expanding, and there is a fairly well sustained demand from other builders. Introduction of new models is spread out over a more extended period than was true in recent years and changes in models do not mean such steep dips in the demand for steel. Sheet prices are not absolutely solid, but at the same time glaring weakness is lacking.

Tin Plate.—Mill operations reflect

The Iron Age Composite Prices

Finished Steel

Aug. 20, 1929, 2.398c. a Lb.

One week ago	2.398c.
One month ago	2.412c.
One year ago	2.348c.
10-year pre-war average	1.689c.

Based on steel bars, beams tank plates, wire, rails, black pipe and black sheets. These products make 87 per cent of the United States output of finished steel.

	High		Low	
1929	2.412c.,	April 2;	2.391c.,	Jan. 8
1928	2.391c.,	Dec. 11;	2.314c.,	Jan. 3
1927	2.453c.,	Jan. 4;	2.293c.,	Oct. 25
1926	2.453c.,	Jan. 5;	2.403c.,	May 18
1925	2.560c.,	Jan. 6;	2.396c.,	Aug. 18

Pig Iron

Aug. 20, 1929, $18.42 a Gross Ton

One week ago	$18.42
One month ago	18.42
One year ago	17.04
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low	
1929	$18.71,	May 14;	$18.29,	March 19
1928	18.59,	Nov. 27;	17.04,	July 24
1927	19.71,	Jan. 4;	17.54,	Nov. 1
1926	21.54,	Jan. 5;	19.46,	July 13
1925	22.50,	Jan. 13;	18.96,	July 7

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base per Lb.
F.o.b. Pittsburgh mill	1.95c.
F.o.b. Chicago	2.05c.
Del'd Philadelphia	2.27c.
Del'd New York	2.29c.
Del'd Cleveland	1.92½c. to 1.95c.
F.o.b. Cleveland	1.90c. to 1.95c.
F.o.b. Lackawanna	2.05c.
F.o.b. Birmingham	2.20c.
C.i.f. Pacific ports	2.35c.
F.o.b. San Francisco mills	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills, 40, 50, 60-ft.	2.05c.
F.o.b. Pittsburgh mills, cut lengths	2.30c.
F.o.b. Birmingham, mill lengths	2.20c.

Rail Steel

F.o.b. mills, east of Chicago dist.	1.85c. to 1.90c.
F.o.b. Chicago Heights mill	1.95c.
Del'd Philadelphia	2.27c.

Iron

Common iron, f.o.b. Chicago	2.05c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	2.12c.
Common iron, del'd New York	2.14c.

Tank Plates

	Base per Lb.
F.o.b. Pittsburgh mill	1.95c.
F.o.b. Chicago	2.05c.
F.o.b. Birmingham	2.20c.
Del'd Cleveland	2.14c.
Del'd Philadelphia	2.15c.
F.o.b. Coatesville	2.05c.
F.o.b. Sparrow Point	2.05c.
F.o.b. Lackawanna	2.05c.
Del'd New York	2.22½c.
C.i.f. Pacific ports	2.35c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh mill	1.95c.
F.o.b. Chicago	2.05c.
F.o.b. Birmingham	2.20c.
F.o.b. Lackawanna	2.05c.
F.o.b. Bethlehem	2.05c.
Del'd Cleveland	2.14c.
Del'd Philadelphia	2.01c. to 2.06c.
Del'd New York	2.14½c.
C.i.f. Pacific ports	2.35c.

Hot-Rolled Hoops, Bands and Strips

	Base per Lb.
6 in. and narrower, P'gh	2.00c.
Wider than 6 in., P'gh	1.90c.
6 in. and narrower, Chicago	2.20c.
Wider than 6 in., Chicago	2.10c.
Cooperage stock, P'gh	2.20c.
Cooperage stock, Chicago	2.30c.

Cold-Finished Steel

	Base per Lb.
Bars, f.o.b. Pittsburgh mill	2.30c.
Bars, f.o.b. Chicago	2.30c.
Bars, Cleveland	2.35c.
Shafting, ground, f.o.b. mill	*2.65c. to 3.60c.
Strips, P'gh	2.75c. to 2.85c.
Strips, Cleveland	2.75c. to 2.85c.
Strips, del'd Chicago	3.05c. to 3.15c.
Strips, Worcester	2.90c. to 3.00c.
Fender stock, No. 20 gage, Pittsburgh or Cleveland	4.25c.

*According to size.

Wire Products

(Carload lots, f.o.b. Pittsburgh and Cleveland, to jobbers and retailers.)

	Base per Keg
Wire nails	$2.55 to $2.65
Galvanized nails	4.55 to 4.65
Galvanized staples	3.25 to 3.35
Polished staples	3c. to 3.10c.
Cement coated nails	$2.55 to $2.65

	Base per 100 Lb.
Bright plain wire, No. 6 to No. 9 gage	$2.40 to $2.50
Annealed fence wire	2.55 to 2.65
Spring wire	3.50 to 3.60
Galv'd wire, No. 9	3.00 to 3.10
Barbed wire, galv'd	3.20 to 3.30
Barbed wire, painted	2.95 to 3.05
Woven wire fence (per net ton to retailers)	65.00

Chicago district mill and delivered Chicago prices are $1 per ton above the foregoing. Birmingham mill prices $3 a ton higher; Worcester, Mass. (wire), mill $3 a ton higher on production of that plant; Duluth, Minn., mill $2 a ton higher; Anderson, Ind., $1 higher.

Cut Nails

	Per 100 Lb.
Carloads, Wheeling, Reading or Northumberland, Pa.	$2.70
Less carloads, Wheeling or Reading	2.80

Light Plates

No. 10, blue annealed, f.o.b. P'gh	2.10c. to 2.20c.
No. 10, blue annealed, f.o.b. Chicago dist.	2.30c.
No. 10, blue annealed, del'd Phila.	2.42c. to 2.52c.
No. 10, blue annealed, B'ham	2.35c.

Sheets

Blue Annealed

	Base per Lb.
No. 13, f.o.b. P'gh	2.25c. to 2.35c.
No. 13, f.o.b. Chicago dist.	2.45c.
No. 13, del'd Philadelphia	2.67c.
No. 13, blue annealed, B'ham	2.50c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh	2.85c.
No. 24, f.o.b. Chicago dist. mill	2.95c. to 3.00c.
No. 24, del'd Philadelphia	3.17c. to 3.27c.
No. 24, f.o.b. Birmingham	3.10c.

Metal Furniture Sheets

No. 24, f.o.b. P'gh	4.10c. to 4.20c.

Galvanized

No. 24, f.o.b. Pittsburgh	3.50c. to 3.60c.
No. 24, f.o.b. Chicago dist. mill	3.60c. to 3.70c.
No. 24, del'd Cleveland	3.59c. to 3.69c.
No. 24, del'd Philadelphia	3.92c. to 4.02c.
No. 24, f.o.b. Birmingham	3.75c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.90c. to 3.00c.
No. 28, f.o.b. Chicago dist. mill	3.00c. to 3.10c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh	4.10c.

Long Ternes

No. 24, 8-lb. coating, f.o.b. mill	4.00c.

Vitreous Enameling Stock

No. 24, f.o.b. Pittsburgh	3.90c.

Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills	$5.35
Standard cokes, f.o.b. Gary	5.45

Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)
(Per Package, 20 x 28 in.)

8-lb. coating I.C.	$11.20
15-lb. coating I.C.	14.00
20-lb. coating I.C.	15.30
25-lb. coating I.C.	$16.70
30-lb. coating I.C.	17.75
40-lb. coating I.C.	19.85

Alloy Steel Bars

(F.o.b. makers' mill)

Alloy Quality Bar Base, 2.65c. to 2.75c. per Lb.

S.A.E. Series Numbers		Alloy Differential
2000	(1½% Nickel)	0.25
2100	(1½% Nickel)	0.55
2300	(3½% Nickel)	1.50
2500	(5% Nickel)	2.25
3100	Nickel Chromium	0.55
3200	Nickel Chromium	1.35
3300	Nickel Chromium	3.80
3400	Nickel Chromium	3.20
4100	Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50
4100	Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600	Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel)	1.05
5100	Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100	Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100	Chromium Spring Steel	0.20
6100	Chromium Vanadium Bars	1.20
6100	Chromium Vanadium Spring Steel	0.95
9250	Silicon Manganese Spring Steel (flats)	0.25
	Rounds and squares	0.50
	Chromium Nickel Vanadium	1.50
	Carbon Vanadium	0.95

Above prices are for hot rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is ¾c. per lb. higher. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis.

Billets under 4 x 4 in. carry the steel bar base. Slabs with a sectional area of 16 in. or over carry the billet price. Slabs with sectional area of less than 16 in. or less than 2½ in. thick, regardless of sectional area, take the bar price.

Rails

	Per Gross Ton
Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	36.00
Light (from rail steel), f.o.b. mill	34.00
Light (from billets), f.o.b. Ch'go mill	36.00

Track Equipment

	Base per 100 Lb.
Spikes, ⅝ in. and larger	$2.80
Spikes, ½ in. and smaller	2.80
Spikes, boat and barge	3.00
Tie plate, steel	2.15
Angle bars	$2.75
Track bolts, to steam railroads	$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel Inches	Black	Galv.	*Iron* Inches	Black	Galv.
⅛	45	19½	¼ and ⅜	+11	+36
¼ to ⅜	51	25½	½	23	5
½	56	42½	¾	28	11
¾	60	48½	1 and 1¼	31	15
1 to 3	62	50½	1½ and 2	35	18

Lap Weld

2	55	43½	2	23	9
2½ to 6	59	47½	2½ to 3½	28	13
7 and 8	56	43½	4 to 6	30	17
9 and 10	54	42½	7 and 8	29	16
11 and 12	53	40½	9 to 12	26	11

Butt Weld, extra strong, plain ends

⅛	41	24½	¼ and ⅜	+13	+48
¼ to ⅜	47	30½	½	23	7
½	53	42½	¾	28	12
¾	58	47½	1 to 2	34	18
1 to 1½	60	49½			
2 to 3	61	50½			

Lap Weld, extra strong, plain ends

2	53	42½	½	29	13
2½ to 4	57	46½	2½ to 4	34	20
4½ to 6	56	45½	4½ to 6	33	19
7 to 8	52	39½	7 and 8	31	17
9 and 10	45	32½	9 to 12	21	8
11 and 12	44	31½			

On carloads the above discounts on steel pipe are increased on block by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Steel		*Charcoal Iron*	
2 in. and 2¼ in.	40	1½ in.	1
2½ in.—2¾ in.	48	1¾ in.	8
3 in.	54	2 in.—2¼ in.	13
3¼ in.—3¾ in.	56	2½ in.—2¾ in.	16
4 in.	59	3 in.	17
4½ in. to 6 in.	48	3¼ in. to 3½ in.	18
		4 in.	20
		4½ in.	21

On lots of a carload or more, the above base discounts are subject to a preferential of two fives on steel and of 10 per cent on charcoal iron tubes. Smaller quantities are subject to the following modifications from the base discounts:

Lap Welded Steel—Under 10,000 lb., 6 points under base and one five; 10,000 lb. to carload, 4 points under base and two fives. Charcoal Iron—Under 10,000 lb., 2 points under base; 10,000 lb. to carload, base and one five.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	63	3 in.	48
1¼ to 1½ in.	55	3¼ to 3½ in.	50
1¾ in.	39	4 in.	53
2 to 2¼ in.	34	4½, 5 and 6 in.	42
2½ to 2¾ in.	42		

Hot Rolled

2 and 2¼ in.	40	3¼ to 3½ in.	56
2½ and 2¾ in.	48	4 in.	59
3 in.	54	4½, 5 and 6 in.	48

Beyond the above base discounts a preferential discount of 5 per cent is allowed on carload lots. On less than carloads to 10,000 lb., base discounts are reduced 4 points with 5 per cent preferential; on less than 10,000 lb., base discounts are reduced 6 points, with no preferential. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage take mechanical tube list and discounts. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30%, base (carloads)	55
Carbon, 0.30% to 0.40%, base	50

Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

to some extent the fact that Pacific Coast requirements were under early estimates on account of crop damage. Much tonnage produced for California was diverted elsewhere and reduced the requirements of the other consuming points by a corresponding amount. October specifications, which should have been in by Aug. 15, are not yet flowing in freely, but on the other hand there are occasional rush orders from points which are exceeding their estimated needs. Export business in tin plate is reported to be almost nil. Mill operations range from 75 to 85 per cent, with 80 per cent the general average.

Cold-Finished Steel Bars and Shafting.—If there has been a definite change in demand, it has been in the direction of an increase. As new models of motor cars begin to sell, parts makers get larger orders and in turn release more tonnage on orders. The market appears well established at 2.30c., base Pittsburgh, on the general run of business.

Strip Steel.—Mill activity in both hot and cold-rolled strips is somewhat out of tune with current demand; there is high engagement of productive capacity, but it appears to be chiefly on orders placed some time ago on which producers now are catching up. It is not hard to understand why there should be slackening in new buying, when it is considered that shipments are large enough to take care easily of the lighter requirements of the automotive industry, which is the largest single outlet for strip steel. The decline in demand from that source is rather sharp compared with the conditions of last year, when there was almost no decline in automobile production during the summer. But, taking the average of the past five years, the dip is rather less than usual. Prices appear well established at 1.90c to 2c., base Pittsburgh, for hot-rolled and at 2.75c. to 2.85c. base, for cold-rolled strips.

Coke and Coal.—If there is a definite trend in furnace coke prices it is downward, since extra demands that were coming from the steel companies, when high production of iron was urgent, have ceased and supplies are somewhat in excess of the regular demand. It has not been necessary lately for buyers to go above $2.75 a net ton at ovens for standard Connellsville beehive furnace coke, and for loaded cars on which consignment has been lacking even less has been done. Foundry coke is quotable all the way from $3.15 to $4.75, but on reputable brands of standard 72-hr. fuel, the market is not under $3.75, and on special brands the top quotation is readily obtained. Aside from the seasonal increase in the demand for coal for household use, the coal market is as dull as ever and prices show no tendency to get any firmer.

Old Material.—The market is dull and its tone indefinite. While good heavy melting steel is scarce, as is evidenced by recent purchases by two steel makers at $20 for strictly No. 1 railroad steel, another melter was able to buy a fair-sized tonnage of regular No. 1 grade at $18.50. The market on the steel works grades is probably as high as it will be for the present, because steel makers appear to be covered against their present order books and, while one of them is seeking supplies, the more common condition is that limitations are in force as to the amount of scrap that will be taken in. Some dealers, needing orders, are actively soliciting business in the heavy melting grade at $19. Recognizing recent sales, No. 1 heavy melting steel is quotable from $18.50 to $19.50. Price changes otherwise are unimportant. It is difficult to secure recent prices for machine shop turnings because the demand is now chiefly from dealers who sold.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$18.50 to $19.50
No. 2 heavy melting steel	16.50 to 17.00
Scrap rails	18.00 to 18.50
Compressed sheet steel	18.50 to 18.75
Bundled sheets, sides and ends	17.00 to 17.50
Cast iron carwheels	16.50 to 17.00
Sheet bar crops, ordinary	20.00 to 20.50
Heavy breakable cast	13.00 to 13.50
No. 2 railroad wrought	19.00 to 19.50
Hvy. steel axle turnings	16.50 to 17.00
Machine shop turnings	11.75 to 12.25
Acid Open-Hearth Grades:	
Railr. knuckles and couplers	22.00 to 22.50
Railr. coil and leaf springs	22.00 to 22.50
Rolled steel wheels	22.00 to 22.50
Low phos. billet and bloom ends	23.00 to 23.50
Low phos., mill plates	23.00 to 23.50
Low phos., light grades	20.50 to 21.50
Low phos., sheet bar crops	20.50 to 21.50
Heavy steel axle turnings	16.50 to 17.00
Electric Furnace Grades:	
Low phos., punchings	20.00 to 21.00
Hvy. steel axle turnings	16.50 to 17.00
Blast Furnace Grades:	
Short shoveling steel turnings	13.50 to 14.00
Short mixed borings and turnings	12.50 to 13.00
Cast iron borings	12.50 to 13.00
Rolling Mill Grades:	
Steel car axles	21.50 to 22.00
Cupola Grades:	
No. 1 cast	15.00 to 16.00
Rails 3 ft. and under	20.00 to 21.00

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.25c.
Hoops	4.25c.
Black sheets (No. 24), 25 or more bundles	3.80c.
Galv. sheets (No. 24), 25 or more bundles	4.55c.
Light plates, blue ann'l'd (No. 10), 1 to 10 plates	3.45c.
Blue annealed sheets (No. 13), 1 to 10 sheets	3.60c.
Galv. corrug. sheets (No. 28), per square	$4.43
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count,	60 per cent off list
Machine bolts, 100 count,	60 per cent off list
Carriage bolts, 100 count,	60 per cent off list
Nuts, all styles, 100 count,	60 per cent off list
Large rivets, base per 100 lb.	$3.50
Wire, black soft, ann'l'd, base per 100 lb	$3.00 to 3.10
Wire, galv. soft, base per 100 lb.	3.00 to 3.10
Common wire nails, per keg	2.90 to 3.00
Cement coated nails, per keg	3.05

Konel, New Heat-Resisting Metal, Put on Market

Development of a new metal known as "Konel," which is said to be much stronger than other metals at high temperatures and which can be used extensively in the moving parts of internal combustion engines and other extremely hot places, has been announced by the Westinghouse Electric & Mfg. Co., East Pittsburgh.

Originally developed at the company's research laboratories as a substitute for platinum in the manufacture of filaments for radio tubes, the new metal was discovered to be harder to forge than steel and to be very tough at high temperatures when most metals lose their strength.

As a substitute for platinum it is stated that Konel metal is already saving approximately $250,000 monthly in the manufacture of radio tubes.

Luria Office in Detroit

Luria Brothers & Co., Inc., Reading, Pa., has opened a district office in suite 2037 and 2038 Book Building, Detroit, in charge of C. H. R. MacKenzie, formerly associated with Joseph Schonthal Co., Columbus, Ohio. W. R. Richey will be Mr. MacKenzie's assistant. The Luria firm also has district offices at Pittsburgh, Philadelphia, Lebanon, New York and Boston, and has five scrap yards, located at Pittsburgh, Reading, Lebanon, Coatesville and Donaghmore, Pa. The company has been engaged in the scrap iron and steel business since 1889.

China Steel

Various types of substitute materials have appeared from time to time that gave the general surface appearance of clay wall tiling. They have included enameled paper, wall board and composition tile. Those that have survived have found a substantial market resulting from the present demand for attractive, elaborately fitted lavatories and bathrooms, according to *Industrial Bulletin* of Arthur D. Little, Inc.

Now comes a new material, "china-steel," with a porcelain enamel coating on die-formed metal tiles, specially designed for nailing into place. The surface coat of the new tile is very similar to that of the more expensive clay, and the joints may be pointed up in much the same way. It is lighter, thinner, and is warranted not to crack. Perhaps the greatest potential advantage is the freedom from dependence on skilled tile setters.

CARNEGIE LIBRARY OF ATLANTA

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and under 10 in., Pittsburgh	$35.00
Rerolling, 4-in. and under 10 in., Youngstown	35.00
Rerolling, 4-in. and under 10 in., Cleveland	35.00
Rerolling, 4-in. and under 10 in., Chicago	37.00
Forging quality, Pittsburgh	$40.00 to 41.00

Sheet Bars

(Open Hearth or Bessemer)

	Per Gross Ton
Pittsburgh	$35.00
Youngstown	35.00
Cleveland	35.00

Slabs

(8 in. x 2 in. and under 10 in. x 10 in.)

	Per Gross Ton
Pittsburgh	$35.00
Youngstown	35.00
Cleveland	35.00

Skelp

(F.o.b. Pittsburgh or Youngstown)

	Per Lb.
Grooved	1.85c. to 1.90c.
Universal	1.85c. to 1.90c.
Sheared	1.85c. to 1.90c.

Wire Rods

(Common soft, base)

	Per Gross Ton
Pittsburgh	$42.00
Cleveland	42.00
Chicago	43.00

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.80
Old range non-Bessemer, 51.50% iron	4.65
Mesabi Bessemer, 51.50% iron	4.65
Mesabi non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.40

Foreign Ore, c.i.f. Philadelphia or Baltimore	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algerian	12.00c.
Iron ore, low phos., Swedish, average 68% iron	11.00c.
Iron ore, basis Swedish, average 65% iron	10.00c. to 11.00c.
Manganese ore, washed, 52% manganese, from the Caucasus	33.00c.
Manganese ore, Brazilian, African or Indian, basic 50%	33.00c.
Tungsten ore, high grade, per unit, in 60% concentrates	$16.25 to $16.50

	Per Gross Ton
Chrome ore, 45 to 50% Cr_2O_3, crude, c.i.f. Atlantic seaboard	$22.00 to $24.00

	Per Lb.
Molybdenum ore, 85% concentrates of MoS_2, delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$2.75
Foundry, f.o.b. Connellsville prompt	$3.75 to 4.75
Foundry, by-product, Ch'go ovens	8.00
Foundry, by-product, New England, del'd	11.00
Foundry, by-product, Newark or Jersey City, delivered	9.00 to 9.40
Foundry, by-product, Phila.	9.00
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry by-prod., del'd St. Louis	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.25 to $1.75
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, ¾-in. f.o.b. Pa. mines	1.90 to 2.00
Mine run gas coal, f.o.b. Pa. mines	1.65 to 1.75
Steam slack, f.o.b. W. Pa. mines	80c. to 90c.
Gas slack, f.o.b. W. Pa. mines	1.00 to 1.10

Ferromanganese

	Per Gross Ton
Domestic, 80%, seaboard	$105.00
Foreign, 80%, Atlantic or Gulf port, duty paid	105.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$31.00 to $34.00
Domestic, 16 to 19%	29.00 to 32.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$83.50
75%	130.00

Per Gross Ton Furnace		Per Gross Ton Furnace	
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	45.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

Per Gross Ton		Per Gross Ton	
10%	$30.00	12%	$34.00
11%	32.00		

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

Per Gross Ton		Per Gross Ton	
6%	$23.00	10%	$27.00 to $28.00
7%	24.00	11%	29.00 to 30.00
8%	25.00	12%	31.00 to 32.00
9%	26.00		

Other Ferroalloys

Ferrotungsten, per lb. contained metal del'd	$1.40 to $1.50
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.15 to $3.65
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	$160.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton	$91.00
Ferrophosphorus, electric 24%, f.o.b. Anniston, Ala., per gross ton	$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silicon, gravel, f.o.b. Illinois and Kentucky mines	$18.00
No. 2 lump, Illinois and Kentucky mines	20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	$18.25 to $18.75
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines	32.50

Fire Clay Brick

	Per 1000 f.o.b. Works	
	High-Heat Duty Brick	Intermediate Heavy Duty Brick
Pennsylvania	$43.00 to $46.00	$35.00 to $38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	.....
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00
Standard size	45.00

Chrome Brick

	Per Net Ton
Standard size	$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts, blank or tapped, hexagons	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	7.00c. to 6.75c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled thread up to and including ⅛ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagons nuts	70
Semi-finished hexagons castellated nuts, S.A.E.	70
Stove bolts in packages, P'gh	75, 20, 10 and 5
Stove bolts in packages, Chicago	75, 20, 10 and 5
Stove bolts in packages, Cleveland	75, 20, 10 and 5
Stove bolts in bulk, P'gh	75, 20, 10, 5 and 2½
Stove bolts in bulk, Chicago	75, 20, 10, 5 and 2½
Stove bolts in bulk, Cleveland	75, 20, 10, 5 and 2½
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55, 60 per cent apply.

Large Rivets

(½-In. and Larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$3.10
F.o.b. Chicago	3.20

Small Rivets

(7/16-In. and Smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70 and 10
F.o.b. Cleveland	70 and 10
F.o.b. Chicago	70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10 and 5
Milled standard set screws, case hardened	80 and 5
Milled headless set screws, cut thread	75 and 10
Upset hex. head cap screws, U.S.S. thread	85
Upset hex. cap screws, S.A.E. thread	85
Upset set screws	80, 10 and 5
Milled studs	70

Chicago

Little Change in Steel Operations Likely for Several Weeks —Alabama Iron Makers Aggressive

CHICAGO, Aug. 20.—Pressure on local steel mills is relaxing, but in view of their heavy commitments producers are unlikely to show much change in their open-hearth operations for several weeks to come. A leading interest still finds specifications equal to shipments, but other mills are slowly reducing their backlogs. An important independent whose finishing mill operations have declined continues to produce steel ingots at capacity in order to restore depleted reserves of semi-finished material.

With deliveries slowly improving, specifying is at shorter range and production prospects for September have become more uncertain. While ingot output in the district is still at close to capacity, a decline to a rate of 85 or 80 per cent within the next 30 days is regarded as a possibility.

Railroad car builders, who form an important consuming group in this district, will complete their present production programs within a month or two. While almost every important Western carrier has been mentioned as a probable buyer of equipment this fall, few inquiries are actually out for figures. On the other hand, the vacation season, now at its height, has undoubtedly had an adverse effect on steel orders, with the likelihood that for this reason alone a recovery in demand will manifest itself next month.

An improvement in specifications from the automotive industry is also looked for. While releases from that source now are at a low ebb, increased operations among automotive foundries and better orders from a Western body builder point to heavier motor car production soon. Local mills, as well as producers elsewhere, may be adversely affected as a result of the reported intention of the Ford Motor Co. to supply all of its requirements in carbon and alloy bars from its own mills, beginning with September.

Structural steel lettings are heavier this week, and a larger amount of fabricating work is in prospect. A further decline in Alabama foundry iron to $12.50, Birmingham, has accentuated the competitive situation in the local pig iron market. Although Northern melters are no longer accustomed to using high phosphorus iron, the delivered price on the Southern product in Chicago is fully $2 a ton below that on local pig iron, and the margin is even greater at other points in this territory.

Pig Iron.—Southern foundry iron is now available in relatively small tonnages at $12.50, base Birmingham, a decline of 50c. a ton from the commonly quoted market of a week ago. The delivered price in Chicago is $18.50 a ton, or fully $2 a ton under the delivered quotation on Northern brands. Chicago district producers are still holding to $20, base, furnace, having made no move to meet the price competition from Alabama makers. It is generally recognized that foundry practice in this territory has got away from the use of iron containing high phosphorus and low manganese and that melters are reluctant to change their methods. Moreover local blast furnace interests are still in a strong position, having almost no stocks and being fortified with good backlogs. There is no question, however, that low prices on Alabama iron have caused many buyers to postpone forward purchasing, pending further price developments. Total sales of Southern iron in this territory in the past two months probably did not exceed 25,000 tons, but more and more trial orders are being placed. In the St. Louis district, sales of the Southern product are estimated at 50,000 tons. Foundry melt in Chicago and tributary areas is well sustained. There has been almost no seasonal letup in activity except among foundries serving the automobile industry. Output of motor car castings, moreover, seems to have passed its low point, since a number of important automotive foundries in western Michigan have increased their melt. Melters serving the tractor and machine tool industries are operating at a capacity rate. Inquiries have been put out for 6000 tons by stove and furnace interests in southern Michigan, indicating that they are getting ready for a seasonal increase in their manufacturing programs. The Oliver Farm Equipment Co., South Bend, Ind., has placed 3000 tons of foundry and malleable for delivery through the remainder of the year. The National Sewing Machine Co., Belvidere, Ill., is in the market for 1500 tons. Foundry grades from Lake Erie furnaces continue to be offered at concessions below the quotations of Chicago district producers. A cargo of boat iron was unloaded at Milwaukee last week.

Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	$20.00
N'th'n No. 1 fdy., sil. 2.25 to 2.75	20.50
Malleable, not over 2.25 sil.	20.00
High phosphorus	20.00
Lake Super. charcoal, sil. 1.50	27.04
So'th'n No. 2 fdy. (all rail)	$18.51 to 19.01
Low phos., sil. 1 to 2, copper free	29.50
Silvery, sil. 8 per cent	29.79
Bess. ferrosilicon, 14-15 per cent	46.29

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Plates.—Although specifications are not so large as recently, they still exceed shipments by a small margin. With 1000 tons to 1500 tons moving daily from local mills to the Milwaukee pipe fabricator, plates are in the strongest position among the finished rolled products. Demand for plates for oil storage tanks is also well sustained, 6500 tons of tankage having been placed in the Southwest during the week, with 15,000 tons of pending work still before the trade. Steel specifications from railroad car builders are expected to run out within the next month. While practically every important Western railroad has been mentioned as a probable buyer of equipment this fall, a relatively small amount of inquiry is actually in the market. Even if liberal orders were placed now, specifications for the steel could not reach the mills for at least 30 days. Plate deliveries range from four to six weeks on some specifications to eight, nine and 10 weeks on others. Mill prices are firm.

Ferroalloys. — New business is light, but shipments continue to go forward in record volume.

Prices delivered Chicago: 80 per cent ferromanganese, $112.56; 50 per cent ferrosilicon, $83.50 to $88.50; spiegeleisen, 19 to 21 per cent, $39.76 to $41.76.

Structural Material.—Mill deliveries of plain material show improvement, now ranging from four to six weeks. While one important local producer reports that the week's specifications were equal to shipments, the trend is undoubtedly toward a further reduction of backlogs. Competition among fabricators is still keen, with bids on current work low, but the amount of prospective work likely to mature this fall has assumed encouraging proportions. Among definite inquiries that have come out during the week is one for 4850 tons from the Great Northern Railway, representing 1930 bridge requirements. The Milwaukee Electric Railway & Light Co. is about to place 2000 tons for an office building at Milwaukee. The Pittsburgh Plate Glass Co. has awarded 2700 tons for a plant at Oklahoma City, Okla., to the Muskogee Iron Works. Plain material prices are unchanged.

Mill prices on plain material, per lb.: 2.05c. base, Chicago.

Bars.—Announcement that the Ford Motor Co. will supply all of its bar requirements from its own mills in September is of wide interest, since steel producers in this and other districts will be adversely affected. Bar demand from other automobile manufacturers continues to diminish as preparations go forward for the bringing out of new models. Improvement in specifications is expected some time in the first half of September, if not before. Meanwhile, deliveries from local mills have shortened, now ranging from four to six weeks. Steel requirements of tractor manufacturers are expected to show little reduction, in view of large orders recently received from the Soviet Government. Road machinery makers are reported less active than earlier in the year. Mill prices on mild steel bars are firm at 2.05c. a lb., Chicago. Backlogs of mills rolling alloy steel bars continue to decline in keeping with the reced-

ing operations of the automobile industry. There continues to be a well diversified demand for iron bars, part of it attributable to the recent tense situation in soft steel bars. Releases in rail steel bars are gradually tapering. Mill operations are well sustained, partly because of the building up of stocks of fence posts for the fall trade.

Sheets.—Recent cool weather has resulted in better mill operations, which now range from 75 to 80 per cent of capacity. Producers are booked three to four weeks ahead. Receipt of specifications from a Milwaukee builder of automobile bodies indicates that the leading Wisconsin motor car builder is getting under way on the production of new models. Weakness in prices has been confined mainly to galvanized sheets, with competition most severe in the Southwest.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 3c. to 3.05c.; No. 24 galv., 3.65c. to 3.75c.; No. 10 blue ann'l'd, 2.35c. Deliv'd prices at other Western points are equal to the freight from Gary, plus the mill prices, which are 5c. per 100 lb. lower than Chicago delivered prices.

Strip Steel.—Demand for hot-rolled strip continues to taper, but there has been no further reduction in specifications for cold-rolled material, output of which remains at 65 per cent of capacity. For mill prices see page 489.

Cast Iron Pipe.—Industrial buying is fair, but there are few municipal lettings and business from railroads and utilities is light. Operations of pipe foundries range from 60 to 70 per cent. Demand will improve in the fall if work now in engineers' offices reaches the market. Madrid, Neb., has awarded 120 tons of 2, 4 and 6-in. to the Central Foundry Co. Lamar, Colo., took bids Monday on 2300 tons of 14-in. and 350 tons of 4 to 10-in. centrifugal pipe. Royal Oak, Mich., also received tenders Monday on 450 tons of 6 and 8-in. Class B. The South Park Commissioners, Chicago, will take general contract figures Aug. 21 on 500 tons of 2 to 32-in. Class B. Prices are unchanged.

Prices per net ton, del'd Chicago: Water pipe, 6-in. and over, $45.20 to $46.20; 4-in., $49.20 to $50.20; Class A and gas pipe, $3 extra.

Rails and Track Supplies.—Local rail mills are still running at a 75 per cent rate, but will reduce operations toward the end of the month. The fall rail buying movement is expected to set in within the next four to six weeks. Bookings in track fastenings are of a routine character.

Prices f.o.b. mill, per gross ton: Standard section open-hearth and Bess. rails, $43; light rails, rolled from billets, $36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.15c.; angle bars, 2.75c.

Reinforcing Bars.—An increase in the amount of live pending work has encouraged distributers, although lettings are still only of fair proportions. Bookings in concrete bars so far this year has been 15 to 20 per cent smaller than during the same period in 1928. The decline is ascribed largely to a falling off in local apartment house and public school construction. Competition for current business is keen, with prices flexible.

Bolts, Nuts and Rivets.—Specifications for bolts and nuts have improved somewhat, but there has been a sharp drop in releases of small rivets because of the decline in automobile production. The customary summer slump in bolt and nut consumption by the farm equipment manufacturers has not materialized, specifications from tractor plants being particularly good.

Wire Products.—Specifications thus far in August have shown some improvement over those of the corresponding period last month, releases from jobbers being notably good for the season. It is too early for buyers to take interest in contracts and prices have not yet become sufficiently stabilized to encourage much new business of any kind. The trade is no longer so much concerned about mail-order-house sales of nails, barbed wire and fencing at blanket delivered prices with the freight allowed, believing that this development has been given more attention than it deserves. It is pointed out that sales through that channel do not constitute more than 5 per cent of the total consumption of the three products. For mill prices see page 489.

Coke.—Shipments of by-product foundry coke reflect a sustained melt throughout the territory served by local ovens. Prices continue at $8 a net ton, ovens.

Old Material.—Heavy melting steel has advanced on purchases of 15,000 tons by one independent steel producer and odd lots by another at $15.75 a gross ton, delivered. The price paid justifies the recent advancing tendency of the market when activity was confined to trading among dealers, although it falls short of the figures paid on considerable railroad material. Consumers contend that they are well stocked with scrap and that their requirements in September are likely to diminish. Sellers, while recognizing the possibility of reduced steel output next month, believe that consumption will still be large in comparison with the supply of scrap. Reduced output of scrap by automobile makers and other industries has prevented the accumulation of a large floating supply. Outside of steel works grades, the old material list has been quiet, with consumer purchases confined to scattered lots. Every test of the market, however, has brought out a higher price. The Rock Island took bids on a list of 3000 tons yesterday.

Prices deliv'd Chicago district consumers:

Per Gross Ton

Basic Open-Hearth Grades:	
Heavy melting steel	$15.25 to $15.75
Shoveling steel	15.25 to 15.75
Frogs, switches and guards, cut apart, and misc. rails	16.75 to 17.25
Hydraul. compressed sheets	13.50 to 14.00
Drop forge flashings	10.50 to 11.00
No. 1 busheling	13.25 to 13.75
Forg'd cast and r'l'd steel carwheels	18.75 to 19.25
Railroad tires, charg. box size	18.75 to 19.25
Railroad leaf springs cut apart	18.75 to 19.25
Acid Open-Hearth Grades:	
Steel couplers and knuckles	17.00 to 17.50
Coil springs	19.00 to 19.50
Electric Furnace Grades:	
Axle turnings	14.50 to 15.00
Low phos. punchings	17.00 to 17.50
Low phos. plates, 12 in. and under	16.75 to 17.25
Blast Furnace Grades:	
Axle turnings	12.50 to 13.00
Cast iron borings	10.25 to 10.75
Short shoveling turnings	10.25 to 10.75
Machine shop turnings	7.00 to 7.50
Rolling Mill Grades:	
Iron rails	16.00 to 16.50
Rerolling rails	17.75 to 18.25
Cupola Grades:	
Steel rails less than 3 ft.	17.50 to 18.50
Steel rails less than 2 ft.	19.00 to 19.50
Angle bars, steel	17.00 to 17.50
Cast iron carwheels	14.00 to 14.50
Malleable Grades:	
Railroad	17.00 to 17.50
Agricultural	15.50 to 16.00
Miscellaneous:	
*Relaying rails, 56 to 60 lb.	23.00 to 25.00
*Relaying rails, 65 lb. and heav.	26.00 to 31.00

Per Net Ton

Rolling Mill Grades:	
Iron angle and splice bars	15.00 to 15.50
Iron arch bars and transoms	21.50 to 22.00
Iron car axles	26.50 to 27.00
Steel car axles	17.50 to 18.00
No. 1 railroad wrought	14.00 to 14.50
No. 2 railroad wrought	13.50 to 14.00
No. 1 busheling	9.00 to 9.50
No. 2 busheling	7.00 to 7.50
Locomotive tires, smooth	14.50 to 15.00
Pipes and flues	10.00 to 10.50
Cupola Grades:	
No. 1 machinery cast	14.50 to 15.00
No. 1 railroad cast	14.00 to 14.50
No. 1 agricultural cast	13.25 to 13.75
Stove plates	12.25 to 12.75
Grate bars	11.75 to 12.25
Brake shoes	11.50 to 12.00

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars	3.00c.
Reinforc'g bars, billet steel	2.15c. to 2.35c.
Reinforc'g bars, rail steel	1.85c. to 1.95c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Bands (⅛ in. in Nos. 10 and 12 gages)	3.20c.
Hoops (No. 14 gage and lighter)	3.75c.
Black sheets (No. 24)	4.05c.
Galv. sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.35c.
Spikes, ⅜ in. and larger	3.55c.
Track bolts	4.55c.
Rivets, structural	4.00c.
Rivets, boiler	4.00c.

	Per Cent Off List
Machine bolts	60
Carriage bolts	60
Coach or lag screws	60
Hot-pressed nuts, sq., tap. or blank	60
Hot-pressed nuts, hex., tap. or blank	60

No. 8 black ann'l'd wire, per 100 lb.	$3.45
Com. wire nails, base per keg	3.20
Cement c't'd nails, base per keg	3.20

The Michigan Steel Corporation, Detroit, has moved its Detroit offices to 2400 New Union Trust Building, at Congress and Griswold Streets, that city.

New York

Pig Iron Sales Total About 10,000 Tons—Steel Orders Fall Off—8100 Tons Awarded for Subway

NEW YORK, Aug. 20.—Sales of pig iron in this district during the past week, at about 10,000 tons, were slightly smaller than in the previous week. Shipments on contracts are in good volume, and there is a fair total of new inquiry for foundry iron, but most buyers appear to be interested only in small lots for early delivery. Exceptions are an inquiry for 1000 to 2000 tons of foundry iron for delivery in the third and fourth quarter and another for 1000 tons for third quarter delivery, with shipments extending into the last quarter. Southern furnaces continue to be active factors, but sales are reported to have been small, although the new rail and water freight rates, via Savannah, with free lighterage in New York Harbor on 200 tons or more, make it possible to reach certain New York tidewater plants at a low rate. The free lighterage extends up the Hudson River to Edgewater, N. J., down the harbor to Sixty-ninth Street, Brooklyn, up the East River to Melrose Station and includes the Gowanus Canal and Newtown Creek in Brooklyn. Buffalo furnaces are endeavoring to maintain $18 a ton, base, on foundry iron, but $17.50 a ton has not entirely disappeared, although it is less common than a week or more ago. Eastern Pennsylvania sellers have quoted $19 to $19.50 a ton, furnace, on sales into this district. Although Alabama furnaces quote $14 a ton, Birmingham, for foundry grade and $13 a ton for basic iron, sales of foundry have been made at about $13 a ton when a sizable tonnage was involved.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	$22.41 to $22.91
*Buf. No. 2, del'd east. N. J.	20.78 to 21.28
East, Pa. No. 2 fdy., sil. 1.75 to 2.25	20.39 to 21.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	20.89 to 22.02

Freight rates: $4.91 from Buffalo, $1.39 to $2.52 from eastern Pennsylvania.

*Prices delivered to New Jersey cities having rate of $3.28 a ton from Buffalo.

Ferroalloys.—Demand for spiegeleisen is only moderate. Probably about 1000 tons has been placed in the last few weeks for spot and early delivery at unchanged quotations. No new business in ferromanganese is reported. Specifications on contracts continue heavy.

Finished Steel.—Business in the past week has tapered somewhat as a result of seasonal conditions. However, mills look for the slowing down in buying to be of short duration and already there are indications in some lines of better bookings. Production continues at capacity, with deliveries of bars, shapes and plates ranging from four to six weeks. Prices are firm, with structural shapes quoted at 2.19½c., New York, and plates at 2.22½c. Structural steel is less active than a week ago, but prospects are favorable for a large volume of lettings in the immediate future. The outstanding award of the past week was 8100 tons for route 107, section 6, of the New York subway. Another important letting was 7000 tons for a Newark, N. J., bank building. Inquiry has been made for 5800 tons for Kings County Hospital in Brooklyn. Sheet steel specifications and orders have been of fairly good volume, but have declined from those of the previous few weeks. Galvanized sheets are selling at 3.50c., Pittsburgh, and black at 2.85c. Blue annealed stock is firm at 2.35c. for No. 13 gage. Weakness persists in wire goods. Common wire nails are being sold at $2.55 per keg, Pittsburgh, or lower. Plain wire is priced at 2.40c. a lb., Pittsburgh. The Nippon Oil Co. has postponed for 30 days action on its export inquiry for 19,000 base boxes of tin plate.

Mill prices per lb., deliv'd New York: Soft steel bars, 2.29c.; plates, 2.22½c.; structural shapes, 2.19½c.; bar iron, 2.14c.

Reinforcing Bars. — The Kalman Steel Co. will furnish 800 tons of bars for the new Chevrolet assembly plant at Tarrytown, N. Y. Otherwise, awards have been for jobs taking only small tonnages. Fresh inquiries have been light, but mills are well engaged on a substantial volume of orders ranging from 25 to 100 tons each. Prices are steady and unchanged.

Billet steel reinforcing bars in 40, 50 and 60-ft. lengths, 2.05c. per lb., Pittsburgh, and 2.30c. per lb., Pittsburgh warehouse, for cut lengths. Out of New York warehouse, 2.90c. per lb. for lots of 5 tons or more, 3.05c. for lots of 2 to 5 tons and 3.30c. for less than 2 tons, all delivered at job.

Cast Iron Pipe. — Prices are unchanged, ranging from $31 to $33 a ton, f.o.b. Northern foundry. Most of the current buying is confined to orders for a carload to slightly less than 100 tons for privately owned companies. Some small export orders have been closed for shipment to the Philippine Islands and to Central American markets. The Plainfield Union Water Co., Plainfield, N. J., has closed on 288 tons of 12-in. water pipe with a Northern maker. Bloomfield, N. J., has opened bids on 150 tons of 6-in. Class C pipe.

Prices per net ton deliv'd New York: Water pipe, 6-in. and larger, $33.60 to $34.60; 4-in. and 5-in., $36.60 to $37.60; 3-in., $43.60 to $44.60. Class A and gas pipe, $3 extra.

Warehouse Business.—Consumer activity continues in the purchase of small lots of material from stock, but at the present rate August business is expected to be smaller than that of last month. There is a fair demand for galvanized sheets, but black sheets are quiet and prices on both grades are subject to some concessions. Buying of structural material is limited to small lots, and a renewal of activity is not expected until next month.

Coke.—The market is inactive except for shipments on contracts. Standard furnace coke is unchanged at $2.75 to $2.85 a net ton, Connellsville.

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.30c.
Soft steel bars, small shapes	3.25c.
Iron bars	3.24c.
Iron bars, Swed. charcoal	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Cold-roll. strip, soft and quarter hard	5.15c. to 5.40c.
Hoops	4.25c.
Bands	3.75c.
Blue ann'l'd sheets (No. 10)	3.85c. to 3.90c.
Long terne sheets (No. 24)	5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galv. annealed	5.15c.
Tire steel, 1½ x ½ in. and larger	3.30c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.65c.
Open-hearth spring steel, bases,	4.50c. to 7.00c.

	Per Cent Off List
Machine bolts, cut thread:	
¾ x 6 in. and smaller	60
1 x 30 in. and smaller	50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	60
¾ x 20 in. and smaller	50 to 50 and 10
Coach screws:	
½ x 6 in. and smaller	60
1 x 6 in. and smaller	50 to 50 and 10

	Per 100 Ft.
Boiler Tubes—	
Lap welded, 2-in.	$17.33
Seamless steel, 2-in.	20.24
Charcoal iron, 2-in.	25.00
Charcoal iron, 4-in.	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
⅛-in. butt	46	29
¾-in. butt	51	37
1-3-in. butt	53	39
2½-6-in. lap	48	35
7 and 8-in. lap	44	17
11 and 12-in. lap	37	12
Wrought Iron—		
⅛-in. butt	5	+19
¾-in. butt	11	+ 9
1-1½-in. butt	14	+ 6
2-in. lap	5	+14
3-6-in. lap	11	+ 6
7-12-in. lap	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box	$6.45	$6.20
Charcoal, per Box—	A	AAA
IC	$9.70	$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating	$10.00 to $11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets, Box Annealed—Black, C. R. One Pass

	Per Lb.
Nos. 18 to 20	3.80c.
No. 22	3.95c.
No. 24	4.00c.
No. 26	4.10c.
No. 28*	4.25c.
No. 30	4.50c.

Sheets, Galvanized

	Per Lb.
No. 14	4.40c.
No. 16	4.25c.
No. 18	4.40c.
No. 20	4.50c.
No. 22	4.60c.
No. 24	4.75c.
No. 26	5.00c.
No. 28*	5.25c.
No. 30	5.65c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

Special brands of beehive foundry coke are quoted at $4.85 a net ton, ovens, or $8.56 a net ton, delivered to northern New Jersey, Jersey City and Newark, and $9.44 to New York and Brooklyn. By-product coke is quoted at $9 to $9.40 a net ton, Newark or Jersey City, and $10.06, New York or Brooklyn.

Old Material.—Consumer buying of scrap is small. Prices of all grades are unchanged. Heavy melting steel continues active among brokers who are filling contracts, but all grades of cast scrap are quiet and prices are lacking in strength. Brokers are paying $14.50 a ton for heavy breakable cast to deliver on $15 contracts, but users are only offering $14 to $14.50 for new contracts.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel	$12.75 to $13.35
Heavy melting steel (yard)	8.00 to 9.75
No. 1 hvy. breakable cast	10.75 to 11.75
Stove plate (steel works)	8.00 to 8.25
Locomotive grate bars	8.25 to 8.75
Machine shop turnings	7.75 to 8.00
Short shoveling turnings	7.75 to 8.00
Cast borings (blast furn. or steel works)	7.00 to 7.75
Mixed borings and turnings	6.75 to 7.75
Steel car axles	19.50 to 20.00
Iron car axles	24.00 to 25.00
Iron and steel pipe (1 in. dia., not under 2 ft. long)	10.75
Forge fire	9.75 to 10.25
No. 1 railroad wrought	12.00 to 12.50
No. 1 yard wrought, long	11.00 to 11.50
Rails for rolling	13.25 to 13.75
Cast iron carwheels	12.50 to 13.00
Stove plate (foundry)	8.00 to 8.50
Malleable cast (railroad)	14.00 to 14.50
Cast borings (chemical)	10.00 to 10.50

Prices per gross ton, deliv'd local foundries:

No. 1 machry. cast	$17.00
No. 1 hvy. cast (columns, bldg. materials, etc.), cupola size	15.00
No. 2 cast (radiators, cast boilers, etc.)	14.50

Detroit Scrap Strong

DETROIT, Aug. 20.—While there have been no price changes the past week on old material in this district, there is an apparent shortage in offerings of some grades at prevailing prices. The strength of the market is shown by the fact that there seems to be enough material to be had by paying a premium.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Hvy. melting and shov. steel	$14.25 to $14.75
Borings and short turnings	9.00 to 9.50
Long turnings	8.50 to 9.00
No. 1 machinery cast	12.50 to 13.00
Automobile cast	13.00 to 13.50
Hydraul. comp. sheets	14.00 to 14.50
Stove plate	9.00 to 9.50
New No. 1 busheling	12.50 to 13.00
Old No. 1 busheling	11.00 to 11.50
Sheet clippings	8.75 to 9.25
Flashings	13.00 to 13.50

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and struc. shapes	3.00c.
Soft steel bars	3.00c.
Reinforc. steel bars	2.25c. to 2.50c.
Cold-fin. rounds and hex	3.65c.
Cold-fin. flats and sq.	4.15c.
Hoops and bands, No. 12 to ⅛ in., inclusive	3.25c.
Hoops and bands, No. 13 and lighter	3.65c.
Cold-finished strip	*5.95c.
Black sheets (No. 24)	3.70c. to 3.90c.
Galvanized sheets (No. 24)	4.60c. to 4.75c.
Blue ann'l'd sheets (No. 10)	3.25c.
No. 9 ann'l'd wire, per 100 lb.	$2.90
No. 9 gal. wire, per 100 lb.	3.35
Com. wire nails, base per keg	2.90

*Net base, including boxing and cutting to length.

Cleveland

Specifications Off Somewhat, But Full Capacity Production Continues—Better Sales of Pig Iron

CLEVELAND, Aug. 20.—Specifications for finished steel fell off somewhat the past week. However, mills in this district continue to operate at close to 100 per cent of capacity. While deliveries on most products as yet show little gain, the mill backlogs will be reduced considerably by Sept. 1, unless there is marked gain in specifications. No cancellations or suspensions from the motor car industry are reported, but the amount of steel that is being taken by that industry has been reduced sharply. Local forge and stamping plants engaged in automobile work are taking less steel than recently because of a curtailment in operations.

Automobile manufacturers are going rather slow in getting under production schedules on new models until their stocks of old cars are disposed of. Stocks of used cars have also been very large but these are believed to have been cut down considerably. While automobile manufacturers are buying forgings and other parts, they are following a conservative policy by placing orders for comparatively small quantities. The feeling in the automotive industry appears to be rather optimistic, with expectation, however, that it will hardly get back this year to the pace it set during the first half.

Metal working plants outside of the automotive field as a rule are keeping up close to recent operations. Manufacturers of steam shovels are still crowded with orders and are operating their plants at capacity.

Backlogs of auto body sheets have been about wiped out and mills need orders for hot and cold-rolled strip steel. Some of the strip sheet mills also need business. A Cleveland mill is now making regular water shipments of steel bars to Toledo in addition to Detroit.

Pig Iron.—Sales gained somewhat the past week, during which Cleveland interests took orders for 20,000 tons of foundry and malleable grades, as compared with 15,000 tons in the previous week. A large proportion of the business entered is for the fourth quarter now that the present quarter is more than half over. The reduction in price of Southern foundry iron has led some producers of Southern grades to seek business in Cleveland and in other parts of northern Ohio, but with present foundry practice the demand for iron with high phosphorus content is quite limited in this territory. Consequently it is not expected that Southern iron will become much of a factor here. While prices on Southern iron are not clearly defined, this iron is at present quoted at $13 to $13.50 in this territory. Prices on Northern foundry iron are unchanged at $18.50, Cleveland, for outside shipment, $19 for local delivery and $20, Lake furnace, for Michigan delivery. Shipments, which fell off during the first half of the month, increased the past week through releases from some of the foundries in the automotive field. Stove and furnace manufacturers continue good operations and are taking iron freely. Low phosphorus iron is moving slowly.

Prices per gross ton at Cleveland:

N'th'n fdy., sil. 1.75 to 2.25	$19.50
S'th'n fdy., 1.75 to 2.25	$19.00 to 19.50
Malleable	19.50
Ohio silvery, 8 per cent	28.00
Basic Valley furnace	18.50
Stand. low phos., Valley	26.50 to 27.00

Prices except on basic and low phosphorus are delivered Cleveland. Freight rates: 50c. from local furnaces; $3 from Jackson, Ohio; $6 from Birmingham.

Iron Ore.—The movement is maintaining the pace set earlier in the season and it is expected that water shipments will be in excess of 10,500,000 tons this month. Most consumers will continue present shipping schedules at least through September. Shippers see no reason to revise their recent predictions that the season's movement will exceed 65,000,000 tons and break all previous records.

Semi-finished Steel.—The demand for sheet bars, billets and slabs is not quite as heavy as recently and pressure for deliveries has disappeared. Shipments are being made against $35 contracts. Consumers generally are covered for the quarter and there is no new inquiry. A leading local producer continues to operate at 100 per cent of capacity and is gaining slightly on deliveries, although this plant is fully committed for nearly two weeks.

Steel Bars, Plates and Shapes.—The volume of business was not so heavy the past week as during the previous week. However, the tonnage entered so far this month does not show a marked falling off from the corresponding period of July. The decline in specifications is most noticeable in steel bars, owing to the slowing down of the automotive industry. Plates are still moving fairly well in small lots, but deliveries by some of the mills are now being promised in two weeks. In the building field there is good inquiry for small lots of fabricated material. The McClintic-Marshall Co. was low bidder for the Maumee River Bridge, Toledo, requiring 7000 tons. Five hundred tons of sheet steel piling will be required for the Ohio Savings Bank & Trust Co. Building, Toledo. Prices are steady at 1.90c. to 1.95c., Cleveland, for steel bars and 1.95c., Pittsburgh, for plates and shapes.

Sheets.—While business is fair, shipments exceed incoming orders, so that backlogs are being slowly re-

duced. Falling off in the demand from the recent peak is more noticeable in auto body sheets than in other grades, and some of the mills have caught up on deliveries on that grade. Automobile companies are restricting their purchases to rather small lots, apparently not wishing to make heavy commitments for extended deliveries until they know what their operating schedules will be during the next few weeks. Most mills are still comfortably filled on black sheets for three or four weeks. While the demand for wide blue annealed sheets is holding up well, some of the mills are in need of blue annealed tonnage. Considerable demand has developed recently from barrel manufacturers for No. 28 gage material for drums for insecticides. Prices appear better stabilized than recently. Black sheets are firm at 2.85c., Pittsburgh, and sheet mills are holding quite firmly to 2.35c. for blue annealed. While 3.50c. on galvanized has not disappeared, most mills are holding to 3.60c. and are taking business at that price.

Wire Products.—Demand for wire is slow. Plain wire is commonly quoted at 2.40c., Cleveland, for outside shipment and to local jobbers, although some of the mills are adhering to 2.50c. for manufacturers wire for local delivery. There appears to be no definite price basis for nails for shipment to competitive points. For local delivery some business is being taken in mixed car lots at $2.65 per keg.

Warehouse Business.—The seasonal lull is in evidence and business is lighter than last month. However, sheets are moving in good volume. No price concessions are reported.

Strip Steel.—Specifications for hot-rolled strip continue rather light and some of the mills need tonnage, particularly in wide material. Prices appear firm, although there is little new business. The demand for cold-rolled strip is also slow. While some of the mills have enough business to keep them operating well for three or four weeks, others need tonnage. The 2.85c. Cleveland and Pittsburgh price is generally quoted, although there has not been enough business recently to test this price, most consumers being under contracts at 2.75c.

Coke.—While shipments of foundry coke are fair, there is not much new business. Premium brands of Connellsville foundry coke are steady at a maximum of $4.85 a net ton. Ohio by-product foundry coke remains at $8.25, Painesville. By-product ovens are taking a fair amount of business in coke for domestic use, which is bringing $4.50, Ohio ovens, for egg size and $4 for nut.

Old Material.—While scrap is coming out somewhat more freely than recently, the market remains firm. There is some activity among dealers who are covering against short orders, but no new buying by mills is reported. A Cleveland mill is taking steel making scrap more liberally than recently but is not releasing orders for blast furnace material. Dealers are paying $15.25 to $15.50 for ordinary No. 1 heavy melting steel for one Cleveland mill and $16.50 for selected scrap for another local consumer. Compressed sheet steel is higher locally. In the valley district No. 1 heavy melting steel is bringing $18.50 and compressed sheet steel $18 from dealers.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$15.25 to $15.75
No. 2 heavy melting steel	14.50 to 15.00
Compressed sheet steel	15.50 to 16.00
Light bundled sheet stampings	12.00 to 12.50
Drop forge flashings	13.00 to 13.25
Machine shop turnings	9.75 to 10.25
Short shoveling turnings	11.50 to 11.75
No. 1 railroad wrought	13.50 to 14.00
No. 2 railroad wrought	16.00 to 16.50
No. 1 busheling	13.25 to 13.75
Pipes and flues	9.00 to 9.50
Steel axle turnings	12.50 to 13.00
Acid Open-Hearth Grades:	
Low phos., forging crops	17.75 to 18.00
Low phos., billet, bloom and slab crops	18.50 to 18.75
Low phos., sheet bar crops	18.00 to 18.50
Low phos., plate scrap	18.00 to 18.50
Blast Furnace Grades:	
Cast iron borings	10.50 to 10.75
Mixed borings and short turnings	10.50 to 10.75
No. 2 busheling	10.50 to 10.75
Cupola Grades:	
No. 1 cast	17.50 to 18.00
Railroad grate bars	11.00 to 12.00
Stove plate	12.00 to 12.50
Rails under 3 ft	18.50 to 19.00
Miscellaneous:	
Railroad malleable	18.00 to 18.50
Rails for rolling	16.25 to 16.50

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.70c.
Plates, ⅛-in.	2.90c.
Structural shapes	2.70c.
Soft steel bars, small shapes, iron bars (except bands)	2.80c.
Round-edge iron	3.50c.
Round-edge steel, iron finished 1½ x 1½ in.	3.50c.
Round-edge steel, planished	4.30c.
Reinforc. steel bars, sq. twisted and deform.	2.60c. to 2.80c.
Cold-fin. steel, rounds and hex	3.60c.
Cold-fin. steel, sq. and flats	4.10c.
Steel hoops	3.55c.
Steel bands, No. 12 to ⅛-in. inclus.	3.30c.
Spring steel	5.00c.
*Black sheets (No. 24)	4.10c.
†Galvanized sheets (No. 24)	4.85c.
Light plates, blue annealed (No. 10)	3.25c.
Blue ann'l'd sheets (No. 13)	3.40c.
Diam. pat. floor plates—	
¼-in.	5.30c.
⅛-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

*For 50 bundles or more; 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.
†For 50 bundles or more: 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

Philadelphia

Plate and Shape Mills Well Engaged—Pig Iron Price Firmer, But Untested by Large Sale

PHILADELPHIA, Aug. 20.—Plate mills are well engaged with current specifications and in most cases have tonnage in sight sufficient to make the August total of business larger than in July. Shape mills are also operating full and have received heavier orders this month than last, with the smaller fabricating shops increasingly active. The steel bar market, however, is quiet and deliveries are fairly prompt. Sheets are also inactive and black and galvanized sheet prices are still lacking in strength.

Bids opened by the Pennsylvania Railroad on plates, shapes, bars and sheets brought out quotations of 1.90c. to 1.95c., f.o.b. mill, on bars, 1.85c. to 1.95c., mill, on plates and 1.90c. to 1.95c., mill, on shapes. Sheet bids were 2.20c. for No. 10 blue annealed, 2.35c., mill, for No. 13 blue annealed, 2.85c. to 2.95c., mill, for black sheets and 3.50c. to 3.60c., mill, for galvanized. The Pennsylvania Railroad is reported to have closed on a tonnage of wrought iron pipe for use in electrification work.

Pig Iron.—Sellers of Southern pig iron are still competing for tonnage in eastern Pennsylvania, offering foundry iron at $13 to $14 a ton, f.o.b. furnace, on a rail and water freight rate for small lots, of $5.25 a ton, loaded on cars Philadelphia. Eastern Pennsylvania furnaces have developed a firmer attitude in the past week and show no inclination at present to offer any concession from $21 a ton, base, on foundry iron, but no sizable tonnage has been closed to offer a test of this price. Birmingham furnace interests are reported by sellers of managanese ore to be negotiating for more than their usual ore requirements, evidently for the purpose of increasing the manganese content of their pig iron to make it more satisfactory to Northern users. Inquiry is fair but mostly for small lots of foundry iron. An exception is 500 tons of No. 2 plain and No. 1X for the American Engineering Co., Philadelphia. Buyers are beginning to show some interest in their fourth-quarter requirements, but have not yet issued inquiries for the last quarter. Basic iron is quiet, with the two leading buyers in this district covered for the remainder of this quarter.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil.	$21.26 to $21.76
East. Pa. No. 2X, 2.25 to 2.75 sil.	21.76 to 22.26
East. Pa. No. 1X	22.26 to 22.76
Basic (del'd east. Pa.)	19.75 to 20.25
Gray forge	20.00 to 20.50
Malleable	21.25 to 21.75
Stand. low phos. (fo.b. N. Y. State furnace)	22.00 to 23.00
Cop. br'g low phos. (f.o.b. furnace)	23.50 to 24.00
Va. No. 2 plain, 1.75 to 2.25 sil.	24.04
Va. No. 2X, 2.25 to 2.75 sil.	24.54

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces; $4.54 from Virginia furnaces.

Bars.—Demand is small, but mills still have a fair backlog of orders on

their books and are maintaining 1.95c., Pittsburgh, or 2.27c., Philadelphia. At the opening of bids by the Pennsylvania Railroad on 6500 tons of bars, 1.90c., f.o.b. mills, was quoted by makers at Pottsville, Pa., and Steubenville, Ohio, and 1.95c., f.o.b. mill, by the other bidders.

Reinforcing Bars.—Billet steel bar prices show no improvement, and, with makers quoting down to 1.95c., Pittsburgh, or 2.27c., delivered Philadelphia, usually with no extra for cutting to length and occasionally shading this price, rail steel bar mills are booking but little business. The quotation on rail steel bars is 1.95c., Franklin, Pa., or Tonawanda, N. Y., or 2.27c., delivered Philadelphia, with no extra for cutting to length. The Magee Carpet Co., Bloomsburg, Pa., has awarded 100 tons of rail steel bars for a new building to the Danville Structural Steel Co. The Soldiers and Sailors Memorial Bridge, Harrisburg, Pa., requiring 3000 tons of bars, has been awarded to the Taylor-Davis Co.

Shapes.—Most eastern Pennsylvania shape mills are operating full and in some instances expect that August business will be larger than that for July. Orders from small fabricators are beginning to increase and on certain sizes mills are quoting slight delays in delivery. Prices are unchanged at 1.95c. to 2.05c., f.o.b. nearest mill to consumer, or 2.01c. to 2.11c., delivered Philadelphia. Bids on 2550 tons of shapes, opened by the Pennsylvania Railroad were 1.95c., f.o.b. mill, with two exceptions, which were 1.90c., f.o.b. Pottsville and f.o.b. Steubenville, Ohio, or Pittsburgh.

Plates.—Delays in deliveries are slightly longer than on other steel products, with mills well engaged and expecting August business to exceed July. Prices are firm at 2.05c., Coatesville, or 2.15c., delivered Philadelphia. At the Pennsylvania Railroad opening of bids on 20,000 tons of plates quotations were 1.95c., f.o.b. mill, except for bids of 1.85c., f.o.b. Cleveland, and 1.90c., f.o.b. Steubenville, or Pittsburgh.

Sheets.—Blue annealed sheet quotations are firm at 2.35c. per lb., Pittsburgh, for No. 13 gage and 2.20c., Pittsburgh for No. 10 gage, light plates, blue annealed. Black sheets are 2.85c., Pittsburgh, or 3.17c., delivered Philadelphia, and galvanized are 3.50c. to 3.60c., Pittsburgh, or 3.82c. to 3.92c., delivered Philadelphia. An automobile body builder in this district has closed a contract with a Middle-Western manufacturer of trucks to supply disk wheels on its output for the rest of this year. Bids on sheets for the Pennsylvania Railroad were 2.35c., f.o.b. mill for No. 13 gage and 2.20c., mill on No. 10 gage, quoted on 400 tons of blue annealed sheets, 2.85c. to 2.95c., f.o.b. mill, quoted on 300 tons of black sheets and 3.50c. to 3.60c., mill, quoted on 100 tons of galvanized sheets.

Imports.—In the week ended Aug. 17, a total of 6320 tons of iron ore arrived at this port from Algeria, 3909 tons of chrome ore from Cuba, 50 tons of pig iron from Sweden and 225 tons of spiegeleisen from the United Kingdom. Steel arrivals consisted of 106 tons of structural shapes from Belgium and 71 tons from Germany, 23 tons of steel bars from Germany and 15 tons of steel bands from France.

Old Material.—All grades are inactive, especially cast scrap. Eastern Pennsylvania consumers of heavy breakable cast are not offering more than $14 a ton on new purchases, although dealers are paying $14.50 a ton to fill contracts. Shipments of No. 1 heavy melting steel are in good volume to a consumer at Bethlehem, Pa., but mills at Coatesville, Pa., and Claymont, Del., have found it necessary to curtail shipments on contracts, which have been too heavy recently. A Claymont, Del., mill, which usually disposes of its low phosphorous plate scrap is using it, being unable to obtain enough for it from other consumers.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	$16.50 to	$17.00
Scrap T rails	16.00 to	16.50
No. 2 heavy melting steel	12.50 to	14.50
No. 1 railroad wrought	16.00 to	16.50
Bundled sheets (for steel works)		11.50
Hydraulic compressed, new	14.50 to	15.50
Hydraulic compressed, old	12.00 to	12.50
Machine shop turnings (for steel works)		12.00
Heavy axle turnings (or equiv.)	14.00 to	14.50
Cast borings (for steel works and roll. mill)	11.00 to	11.75
Heavy breakable cast (for steel works)		15.00
Railroad grate bars	12.00 to	12.50
Stove plate (for steel works)	12.00 to	12.50
No. 1 low phos., hvy., 0.04% and under	22.00 to	23.00
Couplers and knuckles	19.50 to	20.50
Rolled steel wheels	19.50 to	20.50
No. 1 blast f'nace scrap	10.50 to	11.00
Wrot. iron and soft steel pipes and tubes (new specific.)		15.00
Shafting	19.00 to	19.50
Steel axles	23.00 to	23.50
No. 1 forge fire		14.00
Cast iron carwheels	16.50 to	16.75
No. 1 cast	16.50 to	17.00
Cast borings (for chem. plant)		14.50
Steel rails for rolling	16.50 to	17.00

Electrochemists' Program for Fall Convention

Arrangements are rapidly being completed for the annual fall convention of the American Electrochemical Society to be held at the William Penn Hotel, Pittsburgh, Sept. 19 to 21. A symposium on "Contributions of Electrochemistry to Aeronautics" is attracting considerable attention and papers are already in hand for the session. Dr. J. D. Edwards of the Aluminum Co. of America, New Kensington, Pa., will preside. Among those who will take an active part are Edward P. Warner, editor of *Aviation;* Dr. George W. Lewis, director of aeronautical research, national advisory committee for aeronautics, and Starr Truscott, assistant to Dr. Lewis.

There will also be sessions on the electroplating and refining of various metals, including chromium, as well as sessions on organic electrochemistry. An attractive open discussion has been arranged for by the officers of the electrothermic division of the society and a number of electric furnace experts will participate. Some of the papers, already accepted, are the following:

"Recent Developments in the Analysis of Carbon in Iron and Iron Alloys," by N. A. Ziegler, of the Westinghouse Electric & Mfg. Co., Pittsburgh.

"The Use of Tantalum as Cathode for the Electrodeposition of Copper," by L. W. Strock and Hiram S. Lukens, of the University of Pennsylvania, Philadelphia.

"Cathode Potentials and Electrode Efficiencies of Copper in Copper Cyanide—Sodium Cyanide Solutions," by G. M. Smith and J. M. Breckenridge, of Vanderbilt University, Nashville, Tenn.

"The Determination of Sulphate in Chromic Acid and in Chromium Plating Baths," by H. H. Willard and Richard Schneidewind, of the University of Michigan, Ann Arbor, Mich.

"On the Road to Pure Iron and Some of its Indicated Properties," by T. D. Yensen, of the Westinghouse Electric & Mfg. Co., Pittsburgh.

Social features will include a smoker, a dinner and a dance.

The spring meeting of 1930 will be held in St. Louis. Carl Hambuchen and Gaston DuBois are the local committee. The headquarters will be held at the Coronada Hotel but the date has not yet been definitely decided, although it will probably be the last week in May. The symposium scheduled will deal with "Hydrometallurgy of Copper, Silver, Zinc, Lead and Cadmium," with T. H. Donahue of the Anaconda Lead Products Co. as chairman.

A motor boat engineering conference, sponsored by the Society of Automotive Engineers and the National Association of Engine and Boat Manufacturers, will be held at the Whittier, 461 Burns Drive, Detroit, Aug. 31.

MOVEMENT OF LAKE SUPERIOR ORE, IN GROSS TONS

Port	July, 1929	July, 1928	Season to Aug. 1 1929	Season to Aug. 1 1928
Escanaba	1,071,570	904,613	3,214,821	2,372,815
Marquette	634,369	573,426	2,262,363	1,448,674
Ashland	1,307,599	1,023,854	4,105,548	2,892,629
Superior	3,087,305	2,523,721	9,515,349	6,477,514
Duluth	3,484,009	2,970,629	10,429,324	7,539,541
Two Harbors	1,086,030	983,456	3,383,415	2,543,651
Total	10,670,882	8,979,699	32,910,820	23,274,824
Increase	1,691,183	.....	9,635,996	.....

Pacific Coast

Pipe Line at Everett, Wash., Will Take 10,000 Tons of Steel —Cast Iron Pipe More Active

SAN FRANCISCO, *Aug.* 17 (*By Air Mail*).—Demand for iron and steel products on the Pacific Coast has fallen off, as is usual at this season of the year, yet a fair volume of business has been booked. The cast iron pipe market was the most active of the week, about 3000 tons having been placed, and several fair-sized tonnages came into the market for figures. The Western Pipe & Steel Co. took 1928 tons of plates for a penstock and surge tank at Tacoma, and bids have been called for on 10,000 tons of plates for a riveted steel pipe line at Everett, Wash.

Pig Iron.—Foundry operations continue to show little signs of improvement, and as a result sales and inquiries are limited to small tonnages. Prices are unchanged.

Bars.—The largest inquiry for reinforcing bars calls for 2300 tons for a wharf at the foot of Ninth Avenue, Oakland, bids on which have been opened. Prices appear to be firmer now than at any time in more than a year, and 2.30c., base, is being quoted on carload lots, with 2.60c. applying on lesser lots. In the Los Angeles district, prices are $2 a ton higher. Movement of merchant steel bars is confined to unimportant lots. On this class of material, 2.35c., c.i.f., is firm.

Prices per gross ton at San Francisco:

*Utah basic	$25.00 to $26.00
*Utah fdy., sil. 2.75 to 3.25	25.00 to 26.00
**Indian fdy., sil. 2.75 to 3.25	25.00 to 26.00

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Plates.—Bookings, other than the 1928-ton lot for Tacoma, mentioned above, were in lots of less than 100 tons. Everett, Wash., will open bids Aug. 28 on 10,000 tons for a riveted pipe line. Alternate bids will be taken on wood and reinforced concrete pipe. No award has yet been made of 3000 tons for a pipe line at Bremerton, Wash. Prices appear firm at 2.35c., c.i.f. Coast ports.

Shapes.—Structural steel bookings were fairly large this week. The Judson-Pacific Co. took 400 tons for a factory for the Hazel-Atlas Glass Co., Oakland, 100 tons for an apartment in San Francisco, 100 tons for a memorial building in Vallejo, Cal., and 200 tons for a hangar for the Boeing Air Transport at Cheyenne, Wyo., placed through the Austin Co. of Washington. The Western Iron Works booked 300 tons for a store on Market Street, San Francisco. Shapes are firm at 2.35c., c.i.f. New inquiries include 350 tons for a Masonic Home at Decoto, Cal.

Cast Iron Pipe.—Demand for cast iron pipe has improved during the past week or 10 days. A fair-sized amount is up for figures. The Southern Pacific Co., San Francisco, has placed 1974 tons of 4 to 8-in. Class 150 pipe with various unnamed interests. The Pacific States Cast Iron Pipe Co. took 248 tons of 4 to 8-in. Class 150 pipe for a golf course at Palo Alto, Cal., for Stanford University. The United States Pipe & Foundry Co. booked 371 tons of 4 to 8-in. Class 150 pipe for the Naval ammunition depot, Hawthorne, Nev., and 106 tons of 8 and 18-in. Class 150 pipe for Alhambra, Cal. F. A. Rhodes secured 145 tons of 4 and 6-in. Class B pipe for San Diego. New inquiries include 1385 tons of 6 to 12-in. Class B or 150 pipe for the East Bay Municipal Utility District, Oakland, bids on which will be opened Aug. 19. The Spring Valley Water Co., San Francisco, has taken bids on 182 tons of 8-in. Class 150 pipe. Alturas, Cal., has opened bids on 199 tons of 4 to 8-in. Class B pipe. The R. E. Hazard Contracting Co. was low bidder on 144 tons of 4 and 6-in. Class B pipe for Plata Avenue and on 201 tons of 4 and 6-in. Class C pipe for El Prado Avenue, San Diego.

Railroad Material.—San Francisco will open bids Aug. 23 on 550 tons of 98 to 120-lb. girder rails, 21,000 tie plates, 13,000 brace tie plates, 130 kegs of track spikes, 30 kegs of track bolts and 82 special layouts.

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and struc. shapes	3.15c.
Soft steel bars	3.15c.
Small angles, ⅞-in. and over	3.15c.
Small angles, under ⅞-in.	3.55c.
Small channels and tees, ¾-in. to 2¾-in.	3.75c.
Spring steel, ¼-in. and thicker	5.00c.
Black sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.80c.
Galv. sheets (No. 24)	5.30c.
Struct. rivets, ½-in. and larger	5.65c.
Com. wire nails, base per keg	$3.40
Cement c't'd nails, 100 lb. keg	3.40

Birmingham

Southern Pig Iron Going to Outlying Territories—Steel Demand Continues Well Above Seasonal Average

BIRMINGHAM, Aug. 20. — District sales of pig iron are growing less owing to the fact that third quarter requirements generally have been covered. One company's third quarter sales to district consumers have slightly exceeded the probable make, and as a whole the margin between bookings and probable make is close. The extent that stocks are reduced will depend largely on the volume of sales to outside territories. Continued pressure by furnace interests for business in competitive territories has resulted in several round tonnage orders from the Middle West and Eastern territories. An increase in shipments in the past two weeks has been brought about by loadings for outside territories, as shipments to district consumers have shown very little increase, if any. Furnaces are maintaining a base price of $14.50 for No. 2 foundry for the district. Reported concessions of as much as $1.50 a ton in competitive territories on basic iron are not confirmed here but are not denied. The No. 1 furnace of the Republic Iron & Steel Co. was blown out for repairs on Aug. 14. The Alabama City furnace of the Gulf States Steel Co. was changed from basic to foundry iron on Aug. 12. Sixteen furnaces are active. Of this number, nine are on foundry, six on basic and one on recarburizing iron.

Prices per gross ton, f.o.b. Birmingham dist., furnaces:

No. 2 fdy., 1.75 to 2.25 sil.	$14.50
No. 1 fdy., 2.25 to 2.75 sil.	15.00
Basic	14.50

Finished Steel.—Backlogs of structural shapes and plates are practically as large now as three weeks ago, being sufficient for over three weeks' operations at the present rate. Backlogs of bars have dropped gradually during the past few weeks, but not to the extent that they have in comparable periods in the past, and new business is considered good. Sheet demand improved last week after a slight decline in the previous week. Wire products business is still well above normal for this season. Steel rail orders are being rapidly worked off, though no date has been set for closing the mill. Prices on galvanized sheets have been reduced to 3.75c. from 3.85c. All other prices are the same. With the orders booked last week and the others that are pending, structural steel fabricators will make a good showing for August in spite of the light business during the first half of the month. New orders of the Virginia Bridge & Iron Co. include 375 tons for railroad sheds at Birmingham; about 400 tons for a railroad station at Atlanta and 180 tons for the Lamson & Sessions Bolt Co. plant at Birmingham. The Ingalls Iron Works Co. has an order for 440 tons for the S. H. Kress store at Greenville, S. C. Reinforcing bar business is better than had been expected and operating schedules are still better than those of one year ago. The Tennessee company is working seven out of nine open-hearths at Ensley, a gain of one since a week ago. All eight are active at Fairfield and the Gulf States Steel Co. continues to work five of its six at Alabama City.

Cast Iron Pipe.—Dullness in the Southern territory is more pronounced and pressure pipe makers are relying largely on distant terri-

tories for new business. Plants in the district are bidding on several fair-sized projects in the Middle West to be awarded within the next week. The American Cast Iron Pipe Co. has booked 2500 tons of 6 and 8-in. pipe for Detroit. A new order of the National Cast Iron Pipe Co. calls for 200 tons for Fulton, Miss. A small project at Nashville, Tenn., has been let to the Alabama Pipe Co. The project at Gadsden, Ala., requiring about 3000 feet of 12 to 18-in. pipe may be awarded this week. The Hollywood, Fla., project has been postponed indefinitely. Plants continue to ship close to their output with operations unchanged. Prices remain at $37 to $38 a net ton, Birmingham, for 6-in. and larger diameters.

Coke.—Specifications on foundry coke under contract are undiminished. Of a total of 1380 by-product ovens, 1322 are active.

Old Material.—Gradual improvement in demand for steel grades during the past several weeks has given the market more strength than it had shown since early spring. Scrap steel rail prices have advanced from $12.50 to $14 and an increase of 50c. a ton has been made in quotations for heavy melting steel, rails for rolling and tramcar wheels. Cast iron carwheels have advanced $1 a ton. Demand for cast iron grades of scrap remains sluggish.

Prices per gross ton, deliv'd Birmingham dist. consumers' yards:

Heavy melting steel	$13.00 to	$13.50
Scrap steel rails		14.00
Short shoveling turnings		9.00
Cast iron borings		9.00
Stove plate	$11.50 to	12.00
Steel axles		21.00
Iron axles		23.00
No. 1 railroad wrought	10.00 to	10.50
Rails for rolling		15.50
No. 1 cast		13.50
Tramcar wheels		13.50
Cast iron carwheels	13.00 to	13.50
Cast iron borings, chem.	13.50 to	14.00

Boston

Pig Iron Buying Slackens—Most Grades of Scrap Easier —Structural Steel Prospects Promising

BOSTON, Aug. 20.—Pig iron buying dropped to small proportions the past week, but indications are it will shortly be more active, as several foundries are privately asking prices on round tonnages. Mystic Iron Works sales were 3000 tons, and, with one exception, at $20.21 to $21.31 a ton, on cars furnace, for No. 2X and No. 1X. The exception was a car of No. 2X at $19.89 a ton, furnace, on a high freight rate. Additional sales of No. 2X Southern iron at or very close to $22.25 to $22.75 a ton, delivered, are reported, these prices figuring back to $14 and $14.50 a ton, base furnace, allowing for a 50c. a ton loading charge. While Buffalo furnaces are endeavoring to hold their price to $18 a ton, base furnace, differentials on No. 1X iron have been waived the past week.

Foundry iron prices per gross ton deliv'd to most New England points:

†Buffalo, sil. 1.75 to 2.25	$22.28 to	$22.78
†Buffalo, sil. 2.25 to 2.75	22.78 to	23.28
*Buffalo, sil. 1.75 to 2.25	22.91 to	23.41
*Buffalo, sil. 2.25 to 2.75	22.91 to	23.91
East. Penn., sil. 1.75 to 2.25	22.65 to	23.15
East. Penn., sil. 2.25 to 2.75	23.15 to	23.65
Va., sil. 1.75 to 2.25		25.21
Va., sil. 2.25 to 2.75		25.71
*Ala., sil. 1.75 to 2.25		23.61
*Ala., sil. 2.25 to 2.75		24.11
†Ala., sil. 1.75 to 2.25	19.75 to	20.25
†Ala., sil. 2.25 to 2.75	20.25 to	20.75

Freight rates: $4.91 all rail from Buffalo, and $4.28 rail and water; $3.65 all rail from eastern Pennsylvania; $5.21 all rail from Virginia; $9.61 all rail from Alabama and $5.75 rail and water from Alabama to New England seaboard.
*All rail rate.
†Rail and water rate.

Cast Iron Pipe.—Newington, Conn., is asking bids on 2950 ft. of 10-in. pipe and 2500 ft. of 6-in., while Gardner, Mass., is in the market for 2000 ft. of 8 and 16-in. Current pipe business is confined to small tonnages placed privately. Foundries continue well sold ahead on small dimensions, but concessions are still obtainable on large pipe. Prices quoted openly on domestic pipe are: 4-in., $46.10 to $47.10 a ton, delivered common Boston freight rate points; 6 to 12-in., $40.10 to $41.10; 16 to 20-in., $39.10. A $3 differential is asked on Class A and gas pipe. Last week French interests unloaded 2931 tons of pipe at Providence, R. I., for the Warwick, R. I., water system. This pipe was sold several months ago.

Reinforcing Steel.—With the exception of 140 tons for a Brookline, Mass., bridge, sales of billet steel bars the past week were again in small tonnages. About 900 tons for two local jobs, pending for some time, may be placed this week, and several bridge jobs in Maine and Rhode Island bring the prospective orders up to about 2000 tons. While 2.66½c. a lb., base, from stock is openly quoted, that price is being shaded on highly competitive business. On rail steel bars, the open price is 2.26½c. a lb., base, delivered common Boston freight rate points.

Fabricated Steel.—Fabricators are figuring quite a number of worthwhile jobs, including 1050 tons for a Boston bridge, 1000 tons for South Station canopies and several other jobs ranging from 200 to 400 tons. Other jobs that will come up for figuring soon are a $2,000,000 State office building at Hartford, Conn., a 400-ton bridge in Connecticut, a State bridge at Fall River, Mass., and another at Weymouth, and a sports arena at Hartford. Although the market is more active than it has been in several months, competition for jobs by fabricators is keen and some low prices are being made on the most attractive business.

Coke.—With numerous foundries closed for a week or two for vacations and with others reporting a noticeable slackening in orders for castings, there has been a letdown in specifications for by-product foundry coke, which remains at $11 a ton, delivered within a $3.10 freight rate zone. The absorption of the New England Coal & Coke Co. by the Koppers interests will have no bearing on fuel prices the remainder of 1929, at least, buyers having been protected by the old management.

Old Material.—The flurry in some Eastern markets occasioned by the high prices paid the Pennsylvania Railroad for scrap has not been reflected in New England. While the market here for steel mill borings is a shade firmer because of good buying and limited supplies, that for most other materials is easier. No. 1 heavy melting steel is now generally $12.25 to $12.50 a ton, on cars shipping point, with an occasional transaction at $12.75, whereas a week ago $12.50 was the minimum. Girder rails do not fetch more than $11 a ton now, against $11.25 a week ago, while mixed borings and turnings prices are off 10c. to 25c. a ton, and chemical borings 25c. Inside prices are being paid more often than outside for other kinds of material shipped to steel mills. Owing to increased offerings, textile machinery cast has dropped to $14 to $14.50 a ton, delivered New England, off 50c. a ton, but No. 1 machinery cast values hold well.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$12.25 to	$12.75
Scrap T rails	11.50 to	12.00
Scrap girder rails	10.50 to	11.00
No. 1 railroad wrought	11.00 to	11.50
No. 1 yard wrought	9.00 to	9.50
Machine shop turnings	7.00 to	7.25
Cast iron borings (steel works and rolling mill)	6.50 to	6.75
Bundled skeleton, long	10.00 to	10.50
Forge flashings	10.50 to	10.75
Blast furnace borings and turnings	6.00 to	6.25
Forge scrap	9.00 to	9.25
Shafting	14.00 to	14.75
Steel car axles	18.00 to	18.50
Wrought pipe 1 in. in diameter (over 2 ft. long)	9.75 to	10.00
Rails for rolling	12.50 to	13.00
Cast iron borings, chemical	9.75 to	10.00
Prices per gross ton deliv'd consumers' yards:		
Textile cast	$14.00 to	$14.50
No. 1 machinery cast	15.00 to	15.25
No. 2 machinery cast	13.00 to	13.25
Stove plate	11.00 to	11.50
Railroad malleable	18.00 to	18.50

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars, small shapes	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway rounds	6.60c.
Norway squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tie steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold-rolled steel—	
Rounds and hex	*3.55c. to 5.55c.
Squares and flats	*4.05c. to 7.05c.
Toe calk steel	6.00c.
Rivets, structural or boiler	4.50c.

	Per Cent Off List
Machine bolts	50 and 5
Carriage bolts	50 and 5
Lag screws	50 and 5
Hot-pressed nuts	50 and 5
Cold-punched nuts	50 and 5
Stove bolts	70 and 10

*Including quantity differentials.

St. Louis

Pig Iron Users Disposed to Hold Off—Scrap Scarce and Strong

ST. LOUIS, Aug. 20.—Pig iron users are still disturbed by uncertain prices and are disposed to mark time. While the chief consumers are well covered, numerous smaller interests still have iron to buy for the remainder of this quarter and for the last three months of the year. Consumption continues on a large scale, and shipments since Aug. 1 exceed those of the corresponding period last year. Sales reported total about 14,000 tons, the largest single transaction having been 4000 tons of foundry iron taken by a radiator maker from the St. Louis Gas & Coke Corporation. Stove and implement makers figured in the latest buying to the extent of about 3500 tons. About 3500 tons of malleable was included in the week's sales.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill.	$20.00
Malleable, f.o.b. Granite City	20.50
N'th'n No. 2 fdy., deliv'd St. Louis	22.16
Southern No. 2 fdy., deliv'd	$16.92 to 18.92
Northern malleable, deliv'd	22.16
Northern basic, deliv'd	22.16

Freight rates: 75c. (average) Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

Finished Steel.—Business in sheets holds above the seasonal average, with blue annealed still leading in activity. Black sheets are in better demand, and the same is true of galvanized, particularly heavy corrugated material. Winding up of booked car business is reflected in a slowing down in plate specifications. Tin plate is moving in satisfactory volume. Structural fabricators complain of lack of new orders, particularly sizable jobs.

Old Material.—Strength characterizes the market for scrap iron and steel. Virtually all classes of material are strong, the one exception being cast, which has lagged for several weeks. The strongest section of the market comprises heavy melting steel and steel specialties, which have been marked up fractionally during the past several days. Little material is arriving, railroad deliveries having declined in volume, and practically nothing is coming from adjacent country shipping points. Yard stocks are small and assortments incomplete. Mills are resisting dealers' asking prices. Latest railroad offerings include the following lists: Chesapeake & Ohio, 6379 tons; Frisco, 10 cars; International Great Northern, 4300 tons; Chicago, Milwaukee, St. Paul & Pacific, three cars of mixed scrap and 1000 tons of rails; Burlington, 4900 tons, and Rock Island, 110 cars.

Dealers' buying prices per gross ton, f.o.b. St. Louis district:

No. 1 heavy melting or shoveling steel	$14.75 to $15.25
No. 2 heavy melting or shoveling steel	14.50 to 15.00
No. 1 locomotive tires	15.00 to 15.50
Miscel. stand.-sec. rails including frogs, switches and guards, cut apart	17.00 to 17.50
Railroad springs	19.00 to 19.50
Bundled sheets	10.50 to 11.00
No. 2 railroad wrought	15.00 to 15.50
No. 1 busheling	10.00 to 10.50
Cast iron borings and shoveling turnings	9.50 to 10.00
Iron rails	15.00 to 15.50
Rails for rolling	17.25 to 17.75
Machine shop turnings	7.00 to 7.50
Heavy turnings	10.00 to 10.50
Steel car axles	19.00 to 19.50
Iron car axles	26.50 to 27.00
Wrot. iron bars and trans.	21.50 to 22.00
No. 1 railroad wrought	13.75 to 14.25
Steel rails, less than 3 ft.	18.00 to 18.50
Steel angle bars	15.00 to 15.50
Cast iron carwheels	15.00 to 15.50
No. 1 machinery cast	15.25 to 15.75
Railroad malleable	15.00 to 15.50
No. 1 railroad cast	15.00 to 15.50
Stove plate	12.50 to 13.00
Agricult. malleable	15.00 to 15.50
Relay. rails, 60 lb. and under	20.50 to 23.50
Relay. rails, 70 lb. and over	26.50 to 29.00

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-fin. rounds, shaftings, screw stock	3.75c.
Black sheets (No. 24)	4.25c.
Galv. sheets (No. 24)	5.10c.
Blue ann'l'd sheets (No. 10)	3.45c.
Black corrug. sheets (No. 24)	4.30c.
Galv. corrug. sheets	5.15c.
Structural rivets	3.95c.
Boiler rivets	3.95c.
	Per Cent Off List
Tank rivets, 7/8-in. and smaller, 100 lb. or more	65
Less than 100 lb.	60
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-pressed nuts, sq., blank or tapped, 200 lb. or more	60
Less than 200 lb.	50
Hot-pressed nuts, hex., blank or tapped, 200 lb. or more	60
Less than 200 lb.	50

Buffalo

Pig Iron Seller Out of Market for Quarter

BUFFALO, Aug. 20.—Pig iron sales and inquiries are confined to small lots. The withdrawal of one furnace interest from selling for the remainder of this quarter has added strength to the market. Although prices are unchanged, there is talk of a 50c. a ton advance. Consumers in New England and elsewhere in the East, outside the immediate Buffalo district, are still able to buy foundry iron at $18, base, or slightly less in some instances, but prices in the district remain firm at the quotations below.

Prices per gross ton, f.o.b. furnace:

No. 2 fdy., sil. 1.75 to 2.25	$19.50
No. 2X fdy., sil. 2.25 to 2.75	20.00
No. 1 fdy., sil. 2.75 to 3.25	21.00
Malleable, sil. up to 2.25	20.00
Basic	18.50
Lake Superior charcoal	27.28

Finished Steel.—Sales of more than 1000 tons of reinforcing bars are reported, including 800 tons for the Chevrolet assembly plant at Tarrytown, N. Y. Four school jobs account for 200 tons. An addition to the Buffalo works of the General Electric Co. calls for 800 tons, which probably will be awarded soon. Sales of steel pipe are active, and the pending list totals from 4000 to 5000 tons, including 3000 tons for an oil line extension in western New York. Demand for wire mesh for road construction is exceptionally good.

Old Material.—Through an error in transmission, the quotations on No. 1 heavy melting steel appearing in the Aug. 15 issue of THE IRON AGE for the Buffalo district were $18.50 to $19. They should have been $17.50 to $18, and correction is accordingly made to that range. Scrap dealers are seeking material to ship on orders booked during the past two weeks, some of which were taken at $18 for No. 1 heavy melting steel, although a relatively small tonnage, it is stated, went at this price. Some dealers, however, are offering $17.75 for scrap to apply against such orders. Liberal purchasing of stove plate and No. 1 cast within the next week or two is indicated by inquiries which dealers have received for these grades. More liberal buying of machine shop turnings has advanced the price to $9. Good scrap is scarce in this district and dealers see strength in the present market situation.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$17.50 to $18.00
No. 2 heavy melting steel	14.75 to 15.00
Scrap rails	16.50 to 17.00
Hydraul. comp. sheets	14.50 to 14.75
Hand bundled sheets	12.00 to 12.50
Drop forge flashings	14.25 to 14.50
No. 1 busheling	15.50 to 16.50
Hvy. steel axle turnings	14.00 to 14.50
Machine shop turnings	9.00
No. 1 railroad wrought	13.00 to 13.50
Acid Open-Hearth Grades:	
Knuckles and couplers	19.50 to 19.75
Coil and leaf springs	19.00 to 19.50
Rolled steel wheels	19.00 to 19.50
Low phos. billet and bloom ends	20.00 to 20.50
Electric Furnace Grades:	
Short shov. steel turnings	12.00 to 12.50
Blast Furnace Grades:	
Short mixed borings and turnings	11.00 to 11.50
Cast iron borings	10.50 to 11.00
No. 2 busheling	10.00 to 10.50
Rolling Mill Grades:	
Steel car axles	18.75 to 19.25
Iron axles	21.00 to 22.00
Cupola Grades:	
No. 1 machinery cast	16.00 to 17.00
Stove plate	13.00 to 13.50
Locomotive grate bars	12.50 to 13.00
Steel rails, 3 ft. and under	19.50 to 19.75
Cast iron carwheels	14.00 to 14.50
Malleable Grades:	
Industrial	18.00 to 18.50
Railroad	18.00 to 18.50
Agricultural	18.00 to 18.50
Special Grades:	
Chemical borings	12.50 to 13.50

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and struc. shapes	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.95c.
Cold-fin. flats, sq. and hex.	4.45c.
Rounds	3.95c.
Cold-rolled strip steel	5.85c.
Black sheets (No. 24)	4.20c.
Galv. sheets (No. 24)	4.85c.
Blue ann'l'd sheets (No. 10)	3.50c.
Com. wire nails, base per keg	$3.60
Black wire, base per 100 lb.	3.75

Cincinnati

Pig Iron Sales Increase—Northern Prices Firm and Southern Are Weak—Scrap Market Strengthens

CINCINNATI, Aug. 20.—Pig iron sales of both Northern and Southern pig iron increased noticeably during the past week, as some district consumers entered the market to cover their needs for the remainder of this quarter and the early part of the fourth. The Indianapolis Castings Co., Indianapolis, took 1200 tons of Northern iron and the Anderson Stove Co., Anderson, Ind., bought 500 tons of the same grade. The reported prices on these and 1000 tons of miscellaneous orders figure back to about $18.50, base Lake furnace, allowing 25c. for silicon differentials. These orders reflect the continued firmness of the Northern market. A Valley furnace sold 2000 tons to an undisclosed buyer. Four sales of Southern iron also were reported. These were in quantities of 1000 tons, 400 tons, 250 tons and 200 tons and were the first sizable tonnages sold since the recent recession in Southern prices. Despite this renewal of interest in Southern iron, the market continues to be weak and, although quotations are being made on a $14.50 Birmingham base, reports of concessions down to $13.50 on tonnage orders have been heard. The only inquiry before the trade is from an Indiana consumer who is asking for 500 tons of malleable and 1000 tons of foundry iron.

Prices per gross ton, deliv'd Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25	$19.89 to $20.39
Ala. fdy., sil. 1.75 to 2.25	17.69 to 18.19
Ala. fdy., sil. 2.25 to 2.75	18.19 to 18.69
Tenn. fdy., sil. 1.75 to 2.25	17.69 to 18.19
S'th'n Ohio silvery, 8 per cent	26.89

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

Coke.—Although the melt is reported to be heavy for August, specifications for by-product foundry coke slackened slightly during the past week, but they are still on a higher level than during the same period last year. Except for the sale of 8000 tons of by-product foundry coke to a Cincinnati consumer, new business is quiet.

Finished Material.—For the second week this month, bookings of sheets kept pace with production, causing the backlogs of nearby producers to remain virtually steady. A Cincinnati manufacturer of metal furniture has made tentative inquiry for 300 tons of sheets. In contrast to the strength of the sheet market, wire nails and wire goods, although fairly active in sales, are suffering because of uncertainty of prices. Wire nail business is being taken at $2.50 and $2.55 a keg, Pittsburgh.

Old Material.—Further strengthening of the district scrap iron and steel market was noticed during the past week, as dealers bid up heavy melting steel, scrap rails for melting and No. 2 railroad wrought 25c. a ton. Continued scarcity in these grades is making it difficult for dealers to keep covered while the quietness of the cast iron grades is causing yard stocks in this type of old materials to increase.

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel	$14.25 to $14.75
Scrap rails for melting	14.25 to 14.75
Loose sheet clippings	9.00 to 9.50
Bundled sheets	11.00 to 11.50
Cast iron borings	9.25 to 9.75
Machine shop turnings	8.50 to 8.75
No. 1 busheling	10.50 to 11.00
No. 2 busheling	7.00 to 7.50
Rails for rolling	14.50 to 15.00
No. 1 locomotive tires	14.25 to 14.75
No. 2 railroad wrought	14.25 to 14.75
Short rails	18.50 to 19.00
Cast iron carwheels	12.75 to 13.25
No. 1 machinery cast	19.00 to 19.50
No. 1 railroad cast	15.25 to 15.75
Burnt cast	10.25 to 10.75
Stove plate	10.25 to 10.75
Brake shoes	10.25 to 10.75
Agricultural malleable	14.25 to 14.75
Railroad malleable	15.25 to 15.75

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and struc. shapes	3.40c.
Bars, soft steel or iron	3.30c.
New billet reinforc. bars	3.15c.
Rail steel reinforc. bars	3.00c.
Hoops	4.05c.
Bands	3.50c.
Cold-fin. rounds and hex.	3.85c.
Squares	4.35c.
Black sheets (No. 24)	4.05c.
Galvanized sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.45c.
Structural rivets	3.85c.
Small rivets	65 per cent off list
No. 9 ann'l'd wire, per 100 lb.	$3.00
Com. wire nails, base per keg	2.85
Cement c't'd nails, base 100 lb. keg	2.85
Chain, per 100 lb.	8.75
	Net per 100 Ft.
Lap-weld steel boiler tubes, 2-in.	$16.00
4-in.	33.00
Seamless steel boiler tubes, 2-in.	17.00
4-in.	34.00

Youngstown

Steel Output Decline Gradual and Small—Price Weakness Has Developed in Wide Strips

YOUNGSTOWN, Aug. 20.—Steel output in this district is declining gradually this month, although the total loss in output is not large. At least one important interest is admittedly maintaining its high operating rate in order to build up badly depleted stocks of finished steel. Valley steel mills are feeling the reduced operations of the automobile industry in some departments, but thus far the unusually high activity of the large steel consuming industries in the territory adjacent to Youngstown has offset lighter automobile steel requirements.

Prospects of a resumption in automobile buying next month are still good, but the heavier steel requirements expected at that time are not yet reflected to any large extent in steel company order books. However, sheet specifications are holding up fairly well and mills have large backlogs. The same may be said of cold-rolled strip, but tonnage releases on hot-rolled strip in both the narrow and wide sizes are disappointing. On the narrow widths, prices are being well maintained at 1.90c. and 2c., Pittsburgh, but severe price competition has developed on wide strips and mills must meet prices as low as 2.10c. and even 2c., Pittsburgh, on large business if they expect to share in it. This product is ordinarily sold on the same base as light blue annealed sheets, or 2.20c., Pittsburgh.

Sheet prices are about the same, with black sheets holding to 2.85c., Pittsburgh, on the general run of business. Galvanized sheets are being sold at 3.50c., but mills in this district refuse to go under 3.60c. except in unusual cases. Automobile body sheets seem to be holding at 4.10c., and the leading Valley maker is committed for several weeks. Metal furniture sheets are also in good demand, and have not experienced the decline in specifications which has occurred in the automobile material.

The pipe business in this district is better than it has been all year. Lap-weld mills are engaged at a comparatively high rate and the new electric welding pipe unit of the Republic Iron & Steel Co. is busy on recent large orders. Tin plate specifications are tapering off, but operations are still at about 85 per cent of capacity.

Steel ingot production of the leading makers averages from 90 to 95 per cent and sheet mills are still running at about 95 per cent. This rate will probably be maintained for at least another month on present business and thereafter will depend on automobile specifications.

The pig iron market is very quiet. No large transactions in basic iron have been reported in several weeks and sales of the foundry grade are confined to small lots. Shipments on contracts are not as heavy as they were last month, but steel foundry operations are good and iron is going to these users at an undiminished rate.

The scrap market has retained its recent strength and sales of heavy melting steel have been made at $19, delivered to Youngstown mills. Compressed sheets are not available at less than $18.50 and are not plentiful at that figure. Sales at higher prices are unconfirmed.

Automobile factories have entered the third week in August with production at a higher level than last month and well in excess of August of last year. Opinion that the August production will approximate 550,000 units is not uncommon in the industry at present, according to *Automotive Industries.*

Canada

Building Construction Is Still Active

TORONTO, ONT., Aug. 20.—Although the demand for merchant pig iron in the Canadian markets is gaining strength, new business is without feature. Sales for the week gained slightly over those of earlier weeks of the summer. Spot demand was responsible for all of the business of the week, with no forward delivery contracts reported. A steady demand prevails for foundry iron, with malleable moving in small tonnages. Prices are firm.

Prices per gross ton:

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75	$24.60
No. 2 fdy., sil. 1.75 to 2.25	24.10
Malleable	24.60
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75	$26.00
No. 2 fdy., sil. 1.75 to 2.25	25.50
Malleable	26.00
Basic	24.50
Imported Iron, Montreal Warehouse	
Summerlee	$33.50
Carron	33.00

Structural Steel.—Building activities are again taking on more life. Bridge construction projects are responsible for a growing demand for steel. Fabricating plants are operating at capacity. Several contracts in prospect range from 2000 to 8000 tons, and most of this business is expected to be closed within a couple of months. No let-up in building is in sight.

Old Material.—Some improvement developed in this market during the week. Business included a few substantial future delivery contracts. Local dealers report a steady demand for machinery cast. Prices are unchanged.

Dealers' buying prices:

	Toronto	Montreal
Per Gross Ton		
Heavy melting steel	$10.00	$8.50
Rails, scrap	11.00	9.00
No. 1 wrought	10.00	12.00
Machine shop turnings	7.50	5.00
Boiler plate	7.50	6.00
Heavy axle turnings	8.00	7.50
Cast borings	7.50	5.00
Steel turnings	7.50	6.50
Wrought pipe	6.00	6.00
Steel axles	15.00	20.00
Axles, wrought iron	17.00	22.00
No. 1 machinery cast	....	17.00
Stove plate	....	13.00
Standard carwheels	....	16.00
Malleable	....	13.00
Per Net Ton		
No. 1 mach'ry cast	$16.00	....
Stove plate	12.00	....
Standard carwheels	15.00	....
Malleable scrap	14.00	....

To Increase Wire Plant at Hamilton, Ont.

In connection with the expansion program of the Steel Co. of Canada, Ltd., Hamilton, Ont., the latest development calls for the erection of a galvanized wire plant at Hamilton. In addition to galvanized wire, barbed wire and other fencing material will be produced.

The company also let a contract for an addition to its Montreal plant.

The new 10 and 12-in. mills at Hamilton came into production at the end of June. The new ore docks at Hamilton to be 3000 ft. long will probably be completed early next year.

Mossberg Company Expands

The Mossberg Pressed Steel Corporation, Attleboro, Mass., has completed a two-story addition to its plant, nearly doubling the floor area. It will now be possible to put all but one or two departments of the plant on daylight production.

The company is engaged in the production of pressed steel beams, beam heads and drop wires for the textile industry and makes specialties used by manufacturers of wire, both bare and insulated. New presses and machine tools have been installed, and in the welding department some of the latest type semi-automatic equipment for gas, arc and spot welding.

Plaster Poured Stone for Foundry Patterns

A stone mixture for making foundry patterns which can be turned, planed, drilled, filed or finished with emery paper is being introduced into this country from Germany, where it was developed by the Monolith Steinmodellplatten Gesellschaft, M. B. H., Dresden. The material, which is designated as Titanite, will be sold in the United States by the S. Obermayer Co., Pittsburgh. It is easily mixed as whitewash and when poured into a mold will harden in six to eight hours. When set, the material is extremely hard and makers claim that 40,000 molds may be made from one pattern plate. Should subsequent alterations be required, Titanite as required may be added, which will set as hard as the original pattern.

The mold for Titanite can be made from any good quality molding sand in the same way as for an iron or plaster of paris pattern. The stone mixture is made up in proportions of five parts of powder to three parts of the solution and thoroughly mixed to a thick paste. It should be poured slowly into one corner of mold and not moved about over the entire surface. The mixture is particularly adapted to use in mass production foundries where thousands of molds must be made from the same pattern and where wear and shrinkage of ordinary wood patterns run into considerable expense.

Melting Non-Ferrous Metals and Alloys in a Cupola

Melting and refining non-ferrous metals in direct contact with a special carbon fuel in a cupola type of furnace is a new departure. This process has been developed by the Barrett Co., 40 Rector Street, New York. According to the company, the process is of particular value for the melting and casting of red brass or bronze, high lead-bearing alloys and casting copper.

Metal charges of 500 to 600 lb. are charged directly on top of an incandescent bed of what is known as "fixed carbon fuel," a product of the company, and are ready to be tapped into the pouring ladles in 11 to 16 min. The charges may consist of all chips (borings and turnings), of all ingots, or of mixed heats of chips, gates, scrap and ingots.

Pouring temperatures are regulated by air control and the depth of the bed of fuel, and a metal-pouring temperature of 2500 deg. Fahr. is claimed to be secured without any difficulty. Features of the new process are pointed out as follows:

High grade of metal secured at the tap hole, thereby reducing the number of rejections in the foundry and machine shop.

Low total cost of melting per ton and per metal charges, due to a high metal-to-fuel ratio.

High-speed melting.

High metal recovery.

Ability to use more foundry scrap, chips, etc., and less composition ingots without affecting the quality of the castings.

Low cost of furnace maintenance and upkeep.

Freedom in the foundry from heat, fumes, gases and noise.

Extreme flexibility of process and furnace.

Simplicity of operation.

Economy of floor space.

Production and Shipment of Raw Materials and Finished Products

	July, 1929	June, 1929	July, 1928
Electric industrial trucks and tractors (a)	169	201	107
Do., shipments, 7 months	1,272	....	833
Mechanical stokers sold (a)	186	203	....
Do., hp. rating	65,197	67,322	....
Bituminous coal (b), net tons	40,619,000	38,073,000	36,276,000
Anthracite (b), net tons	4,987,000	5,069,000	4,394,000
Beehive coke made (b), net tons	600,800	602,400	280,000
Portland cement made (b), bbl.	17,216,000	16,775,000	17,474,000
Do., shipped (b), bbl.	20,273,000	18,942,000	19,901,000
	June, 1929	May, 1929	June, 1928
Electric power (c), thousands kwhr.	7,768,790	8,083,400	(d)7,000,000
Do., by water-power (c)	3,071,756	3,482,431	....

(a) Department of Commerce.
(b) United States Bureau of Mines.
(c) United States Geological Survey.
(d) Approximate.

Non-Ferrous Metal Markets

Fair Demand for Copper and Tin—Lead and Zinc Quiet —All Prices Firm

NEW YORK, Aug. 20.

Copper.—Despite the announcement, early last week, of July statistics which were favorable to sellers and which it was thought might stimulate buying, the market has remained quiet. Buying by foreign consumers has continued at about the same pace as in the previous three weeks, and there have been fairly good purchases by domestic consumers. Demand from these has not increased, partly because they feel assured that the price will not advance and partly because they learned a lesson when they bid the market up on themselves last March. Orders on the books of consumers are satisfactory and are being augmented each week. Taken as a whole, the market is in a satisfactory condition and prices are stable. There has been no price change since the middle of April. Electrolytic copper is selling at 18c. a lb., delivered in the Connecticut Valley, and the quotation of Copper Exporters, Inc., is officially unchanged at 18.30c., delivered c.i.f. European ports. The Lake copper market is fairly active and firm at 18.12½c. delivered.

Tin.—This market could hardly be more featureless. For the week ended with Saturday, Aug. 17, sales of Straits tin were about 1000 tons. Large consumers, who usually buy far ahead, are uninterested. The only business is for spot and early delivery by such users as are accustomed to buy only for nearby positions. Their orders range from 5 to 20 tons each. The stability of prices, which has been prominent so long, continues. Fluctuations in the week have been only about ½c. a lb. The same steadiness prevails in the London market, where business also is in small volume. Spot Straits tin was quoted today at 46.75c. a lb., New York, as compared with 46.37½c. a week ago. In London today quotations were nearly £2 per ton higher than a week ago, with spot standard quoted at £209 17s. 6d., future standard at £213 15s. and spot Straits at £213 12s. 6d. The Singapore quotation today was £218 10s. Large consumers in this market are well covered ahead because, when prices were down to 45c. to 46c. a lb., they entered the market on a large scale.

Lead.—Demand is confined almost entirely to August delivery and in

THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY

	Aug. 20	Aug. 19	Aug. 17	Aug. 16	Aug. 15	Aug. 14
Lake copper, New York	18.12½	18.12½	18.12½	18.12½	18.12½	18.12½
Electrolytic copper, N. Y.*	17.75	17.75	17.75	17.75	17.75	17.75
Straits tin, spot, N. Y.	46.50	46.87½	....	46.62½	46.50	46.50
Zinc, New York	7.15	7.15	7.15	7.15	7.15	7.15
Zinc, New York	7.15	7.15	7.15	7.15	7.15	7.15
Lead, St. Louis	6.55	6.55	6.55	6.55	6.55	6.55
Lead, New York	6.75	6.75	6.75	6.75	6.75	6.75

*Refinery quotation; price ¼c. higher delivered in the Connecticut Valley.

Rolled Products

Prices on rolled non-ferrous products are unchanged from those prevailing one week ago.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—
- High brass ..... 23.25c.
- Copper, hot rolled ..... 26.75c.
- Zinc ..... 10.25c.
- Lead (full sheets) ... 11.00c. to 11.25c.

Seamless Tubes—
- High brass ..... 28.25c.
- Copper ..... 29.25c.

Rods—
- High brass ..... 21.25c.
- Naval brass ..... 24.00c.

Wire—
- Copper ..... 19.87½c.
- High brass ..... 23.75c.

Copper in Rolls ..... 26.75c.
Brazed Brass Tubing ..... 30.87½c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also to St. Louis on shipments to points west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide ..... 33.00c.
Tubes, base ..... 42.00c.
Machine rods ..... 34.00c.

Chicago Warehouse

(Prices Cover Trucking to Customers' Doors in City Limits)

Sheets—	Base per Lb.
High brass	23.25c.
Copper, hot rolled	27.75c.
Copper, cold rolled, 14 oz. and heavier	30.00c.
Zinc	10.75c.
Lead, wide	11.35c.
Seamless Tubes—	
Brass	28.25c.
Copper	29.25c.
Brass Rods	21.25c.
Brazed Brass Tubes	31.00c.

New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass	21.12½c. to 22.12½c.
Copper, hot rolled, base sizes	27.75c. to 28.75c.
Copper, cold rolled, 14 oz. and heavier, base sizes	30.00c. to 31.00c.
Seamless Tubes—	
Brass	26.00c. to 27.00c.
Copper	29.12½c. to 30.12½c.
Brazed Brass Tubes	29.12½c. to 30.12½c.
Brass Rods	18.87½c. to 19.87½c.

New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets (No. 9), casks ..... 10.50c. to 11.00c.
Zinc sheets, open ..... 11.50c. to 12.00c.

Metals from New York Warehouse

Delivered Prices, Per Lb.

Tin, Straits pig ..... 48.00c. to 49.00c.
Tin, bar ..... 50.50c. to 51.50c.
Copper, Lake ..... 19.50c.
Copper, electrolytic ..... 19.25c.
Copper, casting ..... 19.00c.
Zinc, slab ..... 7.75c. to 8.25c.
Lead, American pig ..... 7.50c. to 8.00c.
Lead, bar ..... 9.50c. to 10.00c.
Antimony, Asiatic ..... 10.50c. to 11.00c.
Aluminum No. 1 ingots for remelting (guaranteed over 99% pure) ... 25.00c. to 26.00c.
Alum. ingots, No. 12 alloy ..... 24.00c. to 25.00c.
Babbitt metal, commercial grade ..... 25.00c. to 35.00c.
Solder, ½ and ½ ..... 30.25c. to 31.25c.

Metals from Cleveland Warehouse

Delivered Prices, Per Lb.

Tin, Straits pig ..... 51.63c.
Tin, bar ..... 53.63c.
Copper, Lake ..... 19.50c.
Copper, electrolytic ..... 19.25c.
Copper, casting ..... 18.75c.
Zinc, slab ..... 7.75c. to 8.00c.
Lead, American pig ..... 7.25c. to 7.50c.
Lead, bar ..... 9.75c.
Antimony, Asiatic ..... 16.00c.
Babbitt metal, medium grade ..... 18.75c.
Babbitt metal, high grade ..... 56.00c.
Solder, ½ and ½ ..... 31.75c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged customers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	14.75c.	16.25c.
Copper, hvy. and wire	14.50c.	15.75c.
Copper, light and bottoms	12.50c.	13.75c.
Brass, heavy	8.50c.	9.50c.
Brass, light	7.50c.	8.50c.
Hvy. machine composition	12.00c.	13.00c.
No. 1 yel. brass turnings	9.75c.	10.50c.
No. 1 red brass or compos. turnings	11.25c.	12.25c.
Lead, heavy	5.25c.	5.75c.
Lead, tea	4.25c.	5.25c.
Zinc	3.50c.	4.25c.
Sheet aluminum	14.00c.	16.00c.
Cast aluminum	12.25c.	14.25c.

the last day or two sales have been good. There has been little buying by consumers for September, but this will probably develop soon. One large Middle Western producer has sold its August output. Prices continue firm at 6.55c., St. Louis, which has prevailed for some time. The leading interest continues to quote 6.75c., New York, as its contract price.

Zinc.—Demand continues in light volume and is made up principally of small lots for early shipment. Conditions which have prevailed for a week or two continue. Consumers are buying only from hand-to-mouth, but it is believed by some that they are not covered ahead and that purchases on a larger scale must soon appear. Despite this, quotations are firm at 6.80c. a lb., East St. Louis, or 7.15c., New York. On small lots this can possibly be shaded to 6.75c., East St. Louis. The price of ore continues at $44 a ton, Joplin. Production for the week ended Aug. 17 is estimated at 13,700 tons. Sales were again large at about 11,500 tons and shipments were about 12,465 tons. Surplus stocks now stand at about 46,300 tons.

Antimony.—Because an increase in the duty is proposed in the new tariff bill as it comes from the Senate, the market is more active and prices are a little higher. Chinese metal is quoted and sold today at 9c. per lb., New York, duty paid, for spot and nearby delivery with futures at 8.87½c.

Nickel.—In wholesale lots, ingot nickel is quoted at 35c. per lb., shot nickel at 36c. and cathode electrolytic nickel at 35c.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is obtainable at 23.90c. per lb. delivered, according to published quotations.

Non-Ferrous Metals at Chicago

CHICAGO, Aug. 20.—All of the metals are stronger and antimony has advanced to 9.85c. a lb. Tin is the most active metal. The old metals are quiet, with prices unchanged.

Prices per lb., in carload lots: Lake copper, 18.50c.; tin, 47.62½c.; lead, 6.70c.; zinc, 6.87½c.; in less-than-carload lots, antimony, 9.85c. On old metals we quote copper wire, crucible shapes and copper clips, 14c.; copper bottoms, 11.50c.; red brass, 11.50c.; yellow brass, 8c.; lead pipe, 4.50c.; zinc, 3.25c.; pewter, No. 1, 24.50c.; tin foil, 26c.; block tin, 36c.; aluminum, 12.87½c.; all being dealers' prices for less-than-carload lots.

Reinforcing Steel

Awards, Totaling 10,600 Tons, Were Largest Since May

AWARDS, totaling over 10,600 tons, were the largest since the middle of May. Three thousand tons of bars were for a bridge at Harrisburg, Pa., 2100 tons for a boulevard at Pittsburgh and 800 tons for an automobile assembly plant at Tarrytown, N. Y. The only inquiry of the week was 1000 tons for a reservoir and filtration plant at Youngstown. Awards follow:

BROOKLINE, MASS., 150 tons, bridge, to Concrete Steel Co.

TARRYTOWN, N. Y., 800 tons, assembly plant for Chevrolet Motor Co., to Kalman Steel Co.

NEW YORK, 121 tons, pier 3, North River, to Concrete Steel Co.

SAYREVILLE, N. J., 400 tons, building for East New Jersey Power & Light Co., to Concrete Steel Co.

HARRISBURG, PA., 3000 tons, soldiers' and sailors' memorial bridge, to Taylor-Davis Co.

BLOOMSBURG, PA., 100 tons, building for Magee Carpet Co., to Danville Structural Steel Co.

GREENVILLE, PA., 100 tons, sewage disposal plant, to Electric Welding Co.

PITTSBURGH, 2100 tons, Ohio River boulevard, to McClintic-Marshall Co.

CLEVELAND, 150 tons, highway work for Speedway Construction Co., to Pattison-Leitch Co.

CHICAGO, 700 tons, warehouse for Walgreen Drug Co., to Inland Steel Co.

ELKHART, IND., 285 tons, county line bridge, to Concrete Engineering Co.

CHICAGO, 150 tons, Henrici restaurant building, to Olney J. Dean & Co.

RACINE, WIS., 100 tons, apartment building, to Calumet Steel Co.

CHICAGO, 100 tons, Barco Mfg. Co. plant, to Concrete Steel Co.

CHICAGO, 400 tons, Wilbur Wright public school, to unstated bidder.

PEORIA, ILL., 1600 tons, filtration plant, to Laclede Steel Co.

OLYMPIA, WASH., 100 tons, Tacoma Avenue highway, to Northwest Steel Rolling Mills.

TACOMA, WASH., 154 tons, Lake Cushman project, to unnamed interest.

LOS ANGELES, 100 tons, apartment on Formosa Avenue, to unnamed interest.

SAN JOSE, CAL., 100 tons, bridge over Uvas Creek, to W. S. Wetenhall Co.

Reinforcing Bars Pending

YOUNGSTOWN, OHIO, 1000 tons, reservoir and filtration plant.

Foundry Equipment Orders Highest in Eleven Months

Orders for foundry equipment in July, reported by members of the Foundry Equipment Manufacturers Association, were the largest for any month this year and the largest since last August. Shipments were heavier than for June and a marked increase was recorded in the amount of unfilled orders.

Taking the average monthly shipments for 1922, 1923 and 1924 as 100, July's orders were 219.3, against 177.3 in June and 183.9 for the 12 months preceding July.

Shipments in July were 182.1, against 172.7 in June, 124.8 in July, 1928, and 196.8 for the 12 months preceding July.

The unfilled order index rose from 300.8 in June to 368.7. A year ago it stood at 332.1.

Railroad Equipment

North American Car Co. and Reading Buy Cars

RAILROADS ordered more than 750 cars the past week. The North American Car Co. bought 500 tank cars and the Reading purchased 200 gondolas. The market is almost devoid of new inquiries, although considerable business is pending. Details of the week's business follow:

Reading has ordered 200 70-ton gondolas from Bethlehem Steel Corporation.

Elgin, Joliet & Eastern has bought 25 air-dump cars from Magor Car Corporation and 25 from Differential Steel Car Co.

Chicago Great Western has ordered two caboose cars from Mount Vernon Car Mfg. Co.

North American Car Co. has purchased 500 8000-gal. tank cars from Pressed Steel Car Co.

Chicago & Alton has ordered two 60-ft. postal cars, two 70-ft. combination passenger and baggage cars and one 70-ft. baggage and mail car from Pullman Car & Mfg. Corporation.

Consolidated Railroads of Cuba have ordered four combination passenger and baggage gasoline rail motor cars from J. G. Brill Co.

Argentine State Railways is inquiring for two or three Garrett-type locomotives.

Central of Georgia is inquiring for 50 flat cars.

Great Northern has ordered 300 flat cars from Standard Steel Car Co.

Navy Calls for Bids on Steel and Machinery

The Bureau of Supplies and Accounts, Navy Department, will open bids on Sept. 3 for two precision horizontal boring, drilling and milling machines for the Washington Navy Yard to be used in the manufacture of guns for new cruisers. The bureau will receive bids on Sept. 3 for 200 metallic-ladder treads for use at the Brooklyn yard.

On Aug. 27 it will receive bids for 500 tons of medium black steel plates and 400 tons of shapes for delivery at the Philadelphia yard to be used in the modernization of the battleship Pennsylvania. On the same date the bureau will also receive bids for about 150 tons of plates and 140 tons of shapes for the Washington yard to be used in cruiser construction.

Adopts Five-Day Week

MILWAUKEE, WIS., Aug. 19.—The first important industry in Milwaukee to adopt the five-day working week plan is the Moe-Bridges Co., manufacturer of electric lighting specialties that are sold nationally. The company's force includes 325 employees, who will continue to put in 45 hr. weekly, as heretofore, by working 9 hr. a day instead of 8, giving them a Saturday as well as Sunday holiday. The plan is the result of a suggestion emanating from the employees themselves, according to C. A. Bridges, president, who adds that 60 per cent of them are skilled workers and 40 per cent are stockholders. Wages and salaries will be in no way affected by the change.

CARNEGIE LIBRARY OF ATLANTA

PERSONAL

F. C. HOSIMER has been transferred from the home office of the Wagner Electric Corporation, St. Louis, to the Chicago branch sales office.

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GEORGE E. LEARNARD has been elected chairman of the board of the International Combustion Tar & Chemical Corporation, New York, succeeding F. J. LEWIS, who has resigned because of the pressure of other business activities, but who will continue as a director. WALTER RUNGE has been made president, succeeding W. H. LEWIS, who has also resigned and who will be associated with the corporation in an advisory capacity. GRANT THORN has been elected vice-president in charge of sales.

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FRED A. CONKLE, formerly associated with the New England Road Machinery Co., Boston, has been appointed railroad representative for the sale of lift-trucks, stackers and skid-platforms by the Lewis-Shepard Co., Boston.

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WALTER M. MCFARLAND, manager of the marine department, Babcock & Wilcox Co., New York, and C. R. BURT, general manager, Pratt & Whitney Co., Hartford, Conn., have been appointed to represent the American Institute of Weights and Measures at the fiftieth anniversary celebration of the American Society of Mechanical Engineers next year.

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FRANK D. BREBNER, for many years in charge of the Newcastle, Ind., plant of the Chrysler Corporation, has been transferred to the staff of K. T. KELLER, vice-president in charge of manufacturing, Detroit. The direction of the Newcastle plant will be under E. S. CHAPMAN, who goes there from the manfacturing division of the Detroit office.

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OLAF ISACHSEN, sales manager of the Strand & Sweet Mfg. Co., Winsted, Conn., has resigned to associate himself with the Wheeler Wire Co., Bridgeport, Conn.

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JOHN R. JEFFERY, manager of the electrical department of the Allis-Chalmers Mfg. Co., Milwaukee, is retiring after completing 28 years of service with the company and one of its predecessors, the Bullock Electric Mfg. Co., Cincinnati. His assistant, R. S. FLESHIEM, has been appointed to succeed him, and L. W. GROTHAUS, also an assistant manager, has been transferred from the Bullock works, Norwood, Ohio, to Milwaukee to take Mr. Fleshiem's place.

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E. L. CORD, head of the Auburn Automobile Co., has acquired an interest in the Columbia Axle Co., Cleveland, and in the reorganization to be effected will become chairman of the board. EDWIN H. PARKHURST, formerly vice-president and general manager, will become president. W. R. HOPKINS and BEN F. HOPKINS, Cleveland, who controlled the company and were president and secretary-treasurer respectively, will retire from the board but will retain a substantial interest. R. E. FRIES and F. H. RAGAN will be vice-presidents in charge of sales and factory, respectively.

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M. A. GROSSMAN, chief research metallurgist of the Central Alloy Steel Corporation, Massillon, Ohio, has sailed for Europe to continue his study of the special European steels which the company is preparing to produce in this country.

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JOHN H. LAWRENCE, vice-president and manager of Thomas E. Murray, Inc., New York, since its organization, has been elected president. After graduation from Cornell University, he was employed in the engineering department of the New York Edison Co. In 1919 the late THOMAS E. MURRAY, to consolidate the various consulting engineering activities he had engaged in for many years, formed the company which bears his name, and selected Mr. Lawrence as active head in charge. Many of the largest power stations in the country have been designed by the company, including the Hell Gate Station, New York.

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PAUL D. MERICA has been appointed technical assistant to the president of the International Nickel Co., Inc., New York. Formerly he was assistant manager of that company's development and research department.

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E. J. SCHWANHAUSSER, for the past two years assistant manager of the Harrison, N. J., works of the Worthington Pump & Machinery Co., has been appointed manager of the Buffalo works of the company.

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FRED M. CROSS, manager of the Chicago pneumatic tool sales department of the Ingersoll-Rand Co., New York, has been made assistant general manager of pneumatic tool sales and will be located in the New York office. D. W. ZIMMERMAN takes his place in Chicago.

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AUGUST HERMAN TUECHTER, president, Cincinnati Bickford Tool Co., Cincinnati, was the recipient of the felicitations of some 400 employees of the company on the occasion of his sixtieth birthday, Aug. 15.

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J. F. LINCOLN, president Lincoln Electric Co., Cleveland, sailed on the Leviathan for London, where he will take charge of a demonstration for European engineers of the Electronic Tornado process of carbon arc welding. The demonstration will take place at the Allen Liversidge plant.

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E. I. EVANS has been appointed open-hearth superintendent of the Bourne-Fuller Co., Cleveland. He was formerly associated with the Worth Steel Co., Claymont, Del., having been open-hearth superintendent of that company for 11 years.

Koppers Interests to Own Mystic Iron Works

Koppers interests of Pittsburgh, through the recent organization of a holding company called Eastern Gas & Fuel Associates, will gain control of the Massachusetts Gas Companies, a New England public utility organization which owns the New England Coal & Coke Co. and the Mystic Iron Works, the latter the only producer of pig iron in New England.

Eastern Gas & Fuel Associates is offering to exchange its shares for securities of the Massachusetts Gas Companies. Stockholders in the former company will also share in the earnings of the Connecticut Coke Co., New Haven, Conn., and the Philadelphia Coke Co., Koppers interests.

H. B. Rust, who is president of the Koppers Co., Pittsburgh, has been elected chairman of Eastern Gas & Fuel Associates, while W. F. Rust, vice-president of the Koppers Co., is president of the new organization. Other officers are: Vice-presidents, H. Lee and Donald Mac Arthur; treasurer, S. T. Brown; secretary, E. H. Bird; assistant secretaries, John D. Shaner and David M. Gilmore. All of these officers hold similar positions with the Koppers Co.

James L. Richards, president, Massachusetts Gas Companies, and Frederick E. Snow, a member of the executive committee of Massachusetts Gas, are members of the executive committee of Eastern Fuel & Gas Associates, together with W. F. Rust, H. Lee, Donald Mac Arthur and Hugh F. Smith.

The Machine Tool Show

The National Machine Tool Builders' Association for the Machine Tool Show to be held in the Cleveland Public Auditorium, Sept. 30 to Oct. 4, inclusive, is planning to handle an increase in registrants of 50 per cent over the attendance at the first Machine Tool Show, held in the same Cleveland buildings in September, 1927.

The area of this year's show will exceed by 25 per cent that of the 1927 show. Some 5000 hp., it is announced, will be required to carry the maximum load for the machinery that will be in operation.

Nearly 250 separate displays will be presented, occupying areas ranging from 3000 sq. ft. down.

Fabricated Structural Steel

Awards of 51,000 Tons Were Largest Since Last Week of June—Inquiries Total 32,000 Tons

STRUCTURAL steel awards of 51,000 tons were the largest since the last week of June. About one-third of the tonnage will go into bridges. However, lettings were from widely diversified sources, a considerable percentage of the bookings having been designated for industrial work and for railroad projects. Structures for non-industrial purposes again were of minor importance. Outstanding contracts were 8100 tons for a New York subway section and 7000 tons each for a Newark, N. J., bank building and for a bridge across the Maumee River at Toledo.

Fresh inquiries were 32,000 tons, as against 42,000 tons during the previous week. Fifty-eight hundred tons is for a Brooklyn hospital and 4850 tons for bridges for the Great Northern Railroad. Awards follow:

STATE OF NEW YORK, 500 tons, highway bridge, to American Bridge Co.

NEW YORK, 8100 tons, route 107, section 6, of subway, to McClintic-Marshall Co.

NEW YORK, 2000 tons, apartment building at Ninetieth Street and Park Avenue, to Harris Structural Steel Co.

PENNSYLVANIA RAILROAD, 10,000 tons, passenger bridge across Hackensack River, to Bethlehem Steel Corporation; erroneously reported to American Bridge Co.

NEWARK, N. J., 7000 tons, National Newark & Essex Banking Co. building, to Hay Foundry & Iron Works.

ROCHESTER, N. Y., 3500 tons, Smith Street bridge, to Phoenix Bridge Co.

ATLANTA, GA., 400 tons, union passenger depot, to Virginia Bridge & Iron Co.

GREENSBORO, N. C., 440 tons, S. H. Kress Co. store, to Ingalls Iron Works Co.

BIRMINGHAM, ALA., 325 tons, sheds at terminal station, to Virginia Bridge & Iron Co.

BIRMINGHAM, ALA., 180 tons, plant for Lamson & Sessions Bolt Co., to Virginia Bridge & Iron Co.

CLEVELAND, 600 tons, grade elimination bridge for Cleveland Interurban Railway Co., to Bethlehem Steel Co.

LANSING, MICH., 1600 tons, municipal power house, to Whitehead & Kales Co.

TOLEDO, 7000 tons, suspension bridge over Maumee River; McClintic-Marshall Co., low bidder.

ROCK ISLAND, ILL., 1900 tons, wheel house and dock covering for International Harvester Co., to Lakeside Bridge & Steel Co.

FORT WAYNE, IND., 1700 tons, Lincoln National Bank building, to McClintic-Marshall Co.

CHICAGO, 400 tons, addition to building C-6, Corwith plant, Crane Co., to American Bridge Co.

LOCKPORT, ILL., 200 tons, township high school, to Mississippi Valley Structural Steel Co.

ST. LOUIS, 5800 tons, Illinois Terminal Co., bridge approach, to McClintic-Marshall Co.

CHICAGO, 1100 tons, factory addition for Edison Electric Appliance Co., to McClintic-Marshall Co.

ROCKFORD, ILL., 500 tons, plant for Rockford Drop Forge Co., to Wisconsin Bridge & Iron Co.

PERU, ILL., 300 tons, building for Western Clock Co., to Mississippi Valley Structural Steel Co.

OKLAHOMA CITY, OKLA., 2700 tons, Pittsburgh Plate Glass Co. plant, to Muskogee Iron Works.

KANSAS CITY, MO., 450 tons, railroad viaduct, to Kansas City Structural Steel Co.

CHEYENNE, WYO., 200 tons, hangar for Boeing Air Transport, Inc., to Judson-Pacific Co.

ALHAMBRA, CAL., 100 tons, Elks Club, to Pacific Iron & Steel Co.

SAN FRANCISCO, 100 tons, apartment building at Forty-fifth Avenue and Point Lobos, to Judson-Pacific Co.

SAN FRANCISCO, 300 tons, Sommer-Kaufmann store on Market Street, to Western Iron Works.

OAKLAND, CAL., 400 tons, factory for Hazel-Atlas Glass Co., to Judson-Pacific Co.

VALLEJO, CAL., 100 tons, Memorial building, to Judson-Pacific Co.

TACOMA, WASH., 1928 tons of plates, penstock for Lake Cushman project, to Western Pipe & Steel Co.

WEST VANCOUVER, B. C., 600 tons, Capilano bridge, to Western Canadian Structural Steel & Bridge Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

MONTREAL, QUE., 3000 tons, university buildings.

MONTREAL, QUE., 1000 tons, Young Men's Christian Association building.

BOSTON, 1000 tons, canopies for South Station.

PITTSFIELD, MASS., 385 tons, Longfellow Inn.

HARTFORD, CONN., 235 tons, First National Stores warehouse.

BROOKLYN, 5800 tons, Kings County hospital.

PHILADELPHIA & READING RAILROAD, 400 tons, bridge across Schuylkill River.

CLEVELAND, 150 tons, service building for White Motor Co.

MILWAUKEE, 2000 tons, office building for the Milwaukee Electric Railway & Light Co.

GREAT NORTHERN RAILWAY, 4850 tons, bridges.

MINNEAPOLIS, 2000 tons, Foshey Building.

DECOTO, CAL., 350 tons, administration building for Masonic Home.

EVERETT, WASH., 10,000 tons plates, pipe line.

German Truck Exports Increasing

HAMBURG, GERMANY, Aug. 10.—A good export trade has been developed by the Bussingwerke A. G., one of the leading German makers of large buses and trucks, specializing in capacities from 5 to 10 tons. The company recently received a large order from the Turkish Government and Russia has purchased more than 400 buses and heavy trucks from the Bussingwerke in the past two years and has just ordered 40 more. Spain and Portugal are also active customers. Despite the downward revision of the German tariff on motor cars this company has been able to meet foreign competition in the domestic market. In 1925 German imports of buses and trucks exceeded exports by 200 per cent, but in 1928 exports were seven times the imports.

July British Iron and Steel Output Heavy

LONDON, ENGLAND, Aug. 16 (*By Cable*).—Production of pig iron in July was 671,900 gross tons and that of steel ingots and castings was 803,800 tons. The July pig iron output was the largest this year. That for steel was the fifth largest, with the peak at 859,900 tons in March.

Comparisons of present output with other years is as follows:

	Pig Iron, Gross Tons	Steel Ingots and Castings, Gross Tons
1913—Av. monthly..	855,000	638,600
1920—Av. monthly..	669,500	755,600
1922—Av. monthly..	403,500	490,100
1923—Av. monthly..	620,000	706,800
1924—Av. monthly..	609,900	685,100
1925—Av. monthly..	519,700	616,400
1926—Av. monthly..	203,500	296,700
1927—Av. monthly..	607,800	758,200
1928—Av. monthly..	550,900	710,400
1929—Av. first quar..	558,000	801,400
1929—April	611,300	808,600
1929—May	654,800	840,400
1929—June	657,800	830,900
1929—July	671,900	803,800

The July output of pig iron compares with a monthly average of 599,600 tons for the first half. The steel production last month compares with 814,000 tons per month for the first half.

Obituary

ALFRED HUTCHINSON COWLES, inventor of the process whereby aluminum in commercial quantities could be produced, died at his home in Sewaren, N. J., Aug. 13, aged 70 years. He was born in Cleveland and was educated at Ohio State and Cornell universities. His interest in electrochemistry led to experiments with the electric furnace, especially in the production of aluminum and aluminum alloys. After many months of research with his brother, Edwin H. Cowles, the Cowles Electric Smelting & Aluminum Co. was formed, which completed an electric smelting plant in Lockport, N. Y., in 1885. At the time of his death he was president of the Electric Smelting & Aluminum Co., Lockport, N. Y.

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JOHN DAVID HURLEY, president, Independent Pneumatic Tool Co., Chicago, died of a heart attack in his rooms at the Edgewater Beach Hotel, Chicago, aged 74 years.

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W. CHARLES LIPE, president, W. C. Lipe, Inc., Syracuse, N. Y., mechanical engineering and machine specialties company, is believed to have lost his life in a boat collision on the St. Lawrence at Alexandria Bay, N. Y., on Aug. 16.

Machinery Markets and News of the Works

Tool Sales Have Declined

International Harvester Co. and Western Electric Co. Have Been Large Buyers

A FURTHER seasonal drop in machine tool sales occurred the past week. However, manufacturers and dealers report that business still is sustained far above the level normally reached in midsummer.

The placing of orders for a tractor plant of the International Harvester Co. at Rock Island, Ill., calling for a total expenditure of close to $500,000, has featured the market at Chicago. It is interesting to note that purchases of tools for tractor makers have accounted for from 25 to 60 per cent of dealers' total sales in the Chicago district this year.

Another important source of business has been the Western Electric Co. and a wide range of shops to which it has been compelled to farm out its work on talking motion picture equipment. The Cleveland Union Terminals Co., Cleveland, has completed the buying of a list of 25 tools for locomotive repair shops. The Westinghouse Electric & Mfg. Co., East Pittsburgh, has bought a number of items, but still has to contract for a large part of its third quarter requirements.

The Curtiss-Caproni Corporation, New York, which will equip a new plant at Baltimore for the manufacture of airplanes, has ordered tools against a list issued about two months ago.

Despite the falling off in business, the delivery situation has not been substantially bettered. One large machine tool builder cannot make shipments in less than eight months and another is refusing orders unless customers are willing to wait a year. While these are exceptional cases, it is not unusual to find dealers and manufacturers quoting from three to six months' deliveries on various types of machines.

Machine tool orders fell off somewhat sharply in July as compared with those of June, states the National Machine Tool Builders' Association. The association points out that in other years the seasonal decline has lasted from May to August and that perhaps for the very reason that the recession was postponed for two months this year, the July volume was lower than it might have been. According to the association's index, actual orders in July were 27 per cent higher than in July, 1928, and the three months' average showed a 40 per cent gain.

Says the association: "In the face of the high level of shipments, and the good backlog of unfilled orders, the letting down in orders must be regarded as beneficial to the industry rather than as an alarming sign. If the month of August makes no better showing than July, there would still be no cause for apprehension for the future. Normally, however, July is the poorest of the summer months."

New York

NEW YORK, Aug. 20.—Machine tool business is holding at a remarkably high rate for midsummer. Some local sales offices report a slight decline in bookings, but others are doing a volume of business that compares favorably with the best previous months of the year. One large distributer reports sales in the first half of August equaling those of the first half of July, and the latter month was one of the best of the year for this company. The demand for radial drills is a feature of the current situation. One company last week received orders for 11 radial drills in one day from nine different buyers. The Curtiss-Caproni Corporation, New York, which will equip a new plant in Baltimore for the manufacture of airplanes has placed a large number of orders against a list issued about two months ago.

Contract has been let by Eberhard Faber, Inc., 37 Greenpoint Avenue, Brooklyn, manufacturer of hard rubber goods, etc., to C. C. Woodruff, 213 Tenth Avenue, Long Island City, for five-story addition on Java Street, reported to cost about $65,000 with equipment. F. H. Klie, 250 Park Avenue, New York, is architect.

Rainbow Metal Units Corporation, 125 Harris Avenue, Long Island City, manufacturer of steel shelving, etc., has leased factory at 330 William Street for new plant. It is understood that present plant will be removed to new location and capacity increased for other pressed steel specialties.

General Gas & Electric Corporation, 50 Pine Street, New York, operating electric light and power properties in northern New York, New Jersey, South Carolina and other States, has arranged for increase in capital from 4,000,000 to 4,400,000 shares of stock, no par value, portion of proceeds to be used for expansion. Company has large hydroelectric power project under way on Saluda River in last-noted State, estimated to cost more than $15,000,000.

Department of Mental Hygiene, Capitol Building, Albany, N. Y., will receive bids until Aug. 28 for steel standpipe and elevated tank at Wassaic State School for Mental Defectives, Amenia, N. Y., 1,000,000 gal. and 300,000 gal. capacity respectively. Plans at office of Department of Public Works, Division of Engineering, 353 Broadway, Albany.

Victor C. Farrar, 1 Park Avenue, New York, architect, has filed plans for a one-story machine shop at 518 West Thirty-seventh Street, to cost about $20,000.

Pilot Radio & Tube Corporation, Brooklyn, has concluded arrangements for purchase of Twin Coupler Co., Inc., Poughkeepsie, N. Y., manufacturer of radio frequency coils and kindred products, and will consolidate with organization.

Continental Can Co., 1 Pershing Square, New York, has acquired five acres of land adjoining present plant in Clearing industrial district, Chicago, and has approved plans for new additions, including tin plate mill, sheet coating mill, lacquering plant, can-manufacturing unit, and storage and distributing plant, reported to cost about $1,000,000 with equipment. Work will be carried out in connection with $5,000,000 expansion fund arranged for this year. Company has concluded arrangements for purchase of plant and business of Gille Mfg. Co., Kansas City, Mo., manufacturer tin containers for food products, etc., and will consolidate with organization. Plant will be maintained at present location and operated as individual unit.

Seelig & Finkelstein, 66 Court Street, Brooklyn, architects, have plans for a two-story automobile service, repair and garage building at Raymond and Bolivar Streets, estimated to cost $100,000 with equipment.

Cable Radio Tube Corporation, 80 North Ninth Street, Brooklyn, is carrying out an expansion and improvement program, including installation of additional equipment for larger output. Negotiations

are said to be under way for the acquisition of two new plants to be operated in conjunction with present factory.

United Aircraft & Transport Co., operating Chance Vought Aircraft Corporation, Long Island City, and other similar interests, has acquired Avian Corporation, Los Angeles, manufacturer of all-metal aircraft of special type, and has organized new subsidiary under name of Northrop Aviation Corporation to take over and operate Avian interest. Plans are under consideration for new plant for Northrop organization at Burbank Field, Los Angeles, exclusively for Avian type aircraft, reported to cost more than $75,000 with equipment.

Bakelite Corporation, 247 Park Avenue, New York, manufacturer of insulating products, composition rubber goods, etc., has acquired land at Bound Brook, N. J., and plans new plant, on which work will be started in fall. It will cost more than $300,000 with equipment.

Jersey Central Power & Light Co., 20 South Street, Asbury Park, N. J., has awarded general contract to Deakman-Wells Co., 921 Bergen Avenue, Jersey City, N. J., for steam-operated electric generating plant on waterfront at South Amboy, N. J., for which foundations are under way, main unit, one story, 160 x 160 ft., to be equipped for initial output of 50,000 kw., reported to cost close to $4,500,000 with transmission system. Electric Managament & Engineering Corporation, 57 William Street, New York, is engineer, in charge.

Pennsylvania Railroad Co. is having plans drawn for an eight-story cold storage and refrigerating plant, 230 x 900 ft., on waterfront near Exchange Place, Jersey City, N. J., reported to cost close to $1,000,000 with equipment. George F. Bial, 147 Summit Avenue, Union City, N. J., is architect.

Tung-Sol Lamp Works, Inc., 95 Eighth Avenue, Newark, manufacturer of radio tubes and equipment, is said to be planning immediate call for bids for a four-story addition at High Street and Seventh Avenue, to cost approximately $200,000 with equipment. Portion of new unit will be used for manufacture of miniature electric lamps; company has acquired machinery and equipment of Neptron Corporation, a subsidiary of Hygrade Lamp Co., Salem, Mass., and will remove to new plant unit as soon as available. A new subsidiary has been formed under name of Brown & Caine, Inc., to maintain a plant at Chicago for manufacture of radio and automotive equipment. Fougner & Gautier, 103 Park Avenue, New York, are architects for new Newark factory.

Detroit

DETROIT, Aug. 20.—Grand Trunk Railroad Co., 400 East Jefferson Street, Detroit, has taken bids on new car and locomotive terminal repair shops at Pontiac, Mich., reported to cost over $85,000 with equipment.

Calumet Township Board of Education, Calumet, Mich., is considering installation of manual training equipment in new three-story high and grade school at Calumet and School Streets, estimated to cost $300,000, for which plans have been drawn by J. D. Chubb, 109 North Dearborn Street, Chicago, architect.

Clark Equipment Co., Buchanan, Mich., manufacturer of transmissions, axles, wheels, etc., has awarded general contract to Frank L. Shoemaker Construction Co., East Congress Street, Sturgis, Mich., for one-story plant at Berrien Springs, Mich., 130 x 200 ft., to cost close to $90,000 with equipment.

Scott Engineering Co., Plainwell, Mich., recently organized with capital of $50,000, has taken over local factory of Aluminum Products Co., for production of aircraft engines and parts.

Officials of Continental Motors Corporation, East Jefferson Avenue, Detroit have organized a subsidiary under name of Continental Aircraft Engine Co., with capital of 250,000 shares of stock, no par value, to operate a plant for manufacture of aircraft engines, including parts and assembling departments. R. W. Judson is president of both companies.

John Bean Mfg. Co., 735 Hazel Street, Lansing, Mich., manufacturer of mechanical equipment, has plans for a one and two-story addition to machine shop, reported to cost about $40,000 with equipment. J. N. Churchill, Prudden Building, is architect. H. C. Lisle is manager.

Bay City Shovels, Inc., Bay City, Mich., formerly Bay City Dredge Works, Inc., is completing a new one-story addition, totaling about 18,000 sq. ft. floor space, and will occupy for expansion in assembling division. Cost will be $50,000 with equipment.

Muskegon Motor Specialties Co., Muskegon, Mich., manufacturer of automotive parts and equipment, has awarded general contract to Strom Construction Co., Muskegon, for one-story addition, to cost more than $50,000 with equipment. Company has plans under way for another unit, one story, to be equipped as a heat-treating plant, to cost $30,000 with equipment. Fred L. Flanders is chairman of board.

Board of Education, Village of East Detroit, is said to be planning installation of manual training equipment in three-story junior high school addition, reported to cost more than $250,000, for which bids have been asked on general contract. Warren S. Holmes Co., Capitol Savings & Loan Building, Lansing, Mich., is architect.

Buffalo

BUFFALO, Aug. 20.—Curtiss-Wright Corporation, Buffalo, has been chartered under Delaware laws with capital of 12,000,000 shares of stock, no par value, to take over and consolidate Curtiss Aeroplane & Motor Co., with local plant at Vulcan and Kenmore Avenues, and Wright Aeronautical Corporation, Paterson, N. J., manufacturer of aircraft motors, merger becoming effective Aug. 15. New company plans immediate organization of aviation research corporation, with laboratories, shops, flying field, etc. C. M. Keys, heretofore head of Curtiss company, is president, and Charles L. Lawrence, vice-president.

Gordon F. Carr, 135 Chapin Street, Binghamton, N. Y., and associates have organized Carr Home Appliances Co., to operate a local plant for manufacture of electrical appliances and equipment. Ralph E. Cohee, 160 Chapin Street, is also interested in new company.

Houdaille-Hershey Corporation, 537 East Delavan Avenue, Buffalo, manufacturer of shock absorbers and other automobile equipment, has concluded negotiations for purchase of Skinner Co., Ltd., Gananoque, Ont., manufacturer of automobile bumpers and kindred products, and will consolidate with organization, operating as a Canadian subsidiary. Plans are under way for expansion in present Skinner plant, including installation of additional equipment, and for new plant at Oshawa, Ont., latter reported to cost more than $150,000 with equipment. Fred V. Skinner will continue as secretary and general manager of Skinner company.

Board of Education, Rochester, N. Y., plans installation of manual training equipment in proposed three-story addition to Washington junior high school on Clifford Avenue, reported to cost about $700,000, for which bids will soon be asked on general contract. Edward S. Gordon, 311 Alexander Street, is architect.

Stewart Motor Corporation, 93 Dewey Avenue, Buffalo, manufacturer of motor trucks, parts, etc., plans rebuilding of portion of repair shop recently destroyed by fire.

South Atlantic

BALTIMORE, Aug. 20. — Flynn & Emrich Co., 301 North Holliday Street, Baltimore, manufacturer of mechanical stokers, parts, etc., is said to be planning early call for bids for one-story foundry at Grantley Avenue and Western Maryland Railroad, reported to cost $75,000 with equipment. W. S. Austin, Maryland Trust Building, is architect and engineer. James F. Turner is general manager.

Virginia Electric & Power Co., 700 East Franklin Street, Richmond, has made application for permission to construct and operate a hydroelectric power plant on the Roanoke River, to be equipped for initial capacity of 25,000 kw. and ultimate output of 42,000 kw., reported to cost more than $1,000,000 with transmission system.

Toy & Specialty Mfg. Co., Richmond, Va., has been organized to take over and consolidate Berger Specialty Mfg. Co., 2008 East Main Street, and Bruner Lumber Co., Roane Street, manufacturer of light fabricated steel and other metal products, toys, aircraft landing apparatus, etc. Consolidated company will continue production at both plants, and plans immediate expansion with installation of additional equipment.

Platnick Brothers, Bluefield, W. Va., manufacturers of mechanical products, D. M. Platnick, head, are planning construction of one-story foundry at Big Stone Gap, Va., reported to cost about $24,000 with equipment.

City Council, Columbia, S. C., will receive bids until Aug. 27, for two horizontal piston pumping units, capacity of 3,500,000 gal. per day, with accessories. W. S. Tomlinson is city engineer.

Board of Education, Winston-Salem, N. C., has approved plans for two-story and basement high school, to cost about $225,000, and plans installation of manual training equipment. Northup & O'Brien, Starbuck Building, are architects.

J. Smith Lanier, president, West Point Telephone Co., West Point, Ga., is at head of project to construct and operate hydroelectric power plant on Chattahoochee River, near city, for which Federal permission has been granted. Station will have initial capacity of 15,000 kw. and ultimate output of 30,000 kw., and is reported to cost more than $500,000 with transmission lines. McDonald & Co., Atlanta, Ga., are engineers.

Curtiss Airports, Inc., 29 West Fifty-seventh Street, New York, has awarded general contract to Stone & Webster, Inc., 120 Broadway, and 49 Federal Street, Boston, for airport at Baltimore, including hangars, repair and reconditioning shops, oil storage and distributing units, and

other field structures, reported to cost more than $1,000,000 with equipment.

Chesapeake & Ohio Railroad Co., Richmond, Va., will not proceed with engine house and terminal shops at Elk, W. Va., at present time, recently noted in these columns.

Page County School Board, Luray, Va., is said to be planning installation of manual training equipment in proposed two-story high school, to cost about $160,000, for which it is purposed to ask bids on general contract early next month. Mims, Speake & Co., Luray, are architects.

B. F. Goodrich Co., Akron, Ohio, manufacturer of automobile tires and tubes, mechanical rubber goods, etc., is reported planning new mill at Atlanta, Ga., to be equipped for initial capacity of 10,000 tires and tubes a day, estimated to cost more than $1,200,000 with machinery. Company is completing construction of tire cord mill at Silvertown, near Thomaston, Ga., to cost more than $5,000,000, and proposes to have ready for service in fall.

Philadelphia

PHILADELPHIA, Aug. 20.—Contract has been let by Philadelphia & Reading Coal & Iron Co., Reading Terminal, Philadelphia, to Stone & Webster, Inc., 49 Federal Street, Boston, for two electric-operated coal breakers for central mine service in vicinity of Locust Summit, Pa., each to be equipped for capacity of 25,000 tons daily, and for complete electrification of mining properties throughout this district, estimated to cost about $20,000,000 with equipment.

Quaker Field Corporation, Philadelphia, care of P. J. Whelan, Bankers' Trust Building, recently organized under Delaware laws by Mr. Whelan and associates, plans construction of airport on 300-acre tract of land near Llanrich golf course, about six miles from center of city, to include hangars, repair and reconditioning shops, oil storage and distributing buildings, and other mechanical field units, reported to cost more than $1,000,000 with equipment.

Stokes & Smith Co., Wakeling Street and Summerdale Road, Philadelphia, manufacturer of paper box-making machinery, etc., has awarded general contract to Robert E. Lamb Co., 841 North Nineteenth Street, for one-story addition to be equipped as a grinding mill.

Frank M. Weaver & Co., Lansdale, Pa., plan rebuilding of portion of structural steel fabricating plant recently destroyed by fire with loss reported at $20,000 including equipment.

Rundle Mfg. Co., Cleveland Street, Milwaukee, manufacturer of plumbing equipment and supplies, is completing new Eastern branch plant on River Road, Delair, near Camden, N. J., consisting of one-story foundry, 150 x 325 ft.; three-story mill unit, 68 x 70 ft.; one-story enameling shop, 20 x 80 ft., and other structures, and plans early occupancy. A large part of output will be used for export. Entire project will represent investment of about $1,000,000. R. A. Wickland & Co., 205 West Wacker Drive, Chicago, are the engineers.

Joseph Stokes Rubber Co., Taylor and Webster Streets, Trenton, N. J., manufacturer of molded hard rubber goods, has filed plans for two one-story additions, 40 x 70 ft. and 36 x 58 ft. respectively, for which general contract recently was let to N. A. K. Bugbee & Co., 206 East Hanover Street.

Commissioner of Institutions and Agencies, State Office Building, Trenton, N. J., will receive bids until Aug. 27, for steel water tower and tank at Woodbine Colony for Feeble-Minded, Woodbine, N. J. Information at office of Division of Architecture and Construction, address noted.

Kellett Aircraft Co., care of Nicholas S. Ludington, 123 South Broad Street, Philadelphia, head of Central Airport, Camden, N. J., has been formed under Delaware laws and plans construction of new plant at airport noted for manufacture of special aircraft, for which patent license has been secured from Pitcairn-Cievra Autogiro Co., Land Title Building, Philadelphia, Harold F. Pitcairn, head. Initial unit will be one story and is reported to cost more than $65,000 with equipment.

Board of Education, Royersford, Pa., is considering installation of manual training equipment in new two-story junior and senior high school to cost about $230,000, for which bids will soon be asked on general contract. W. Marshall Hughes, 147 North Fifth Street, Reading, Pa., is architect.

Individual Drinking Cup Co., Easton, Pa., manufacturer of pressed paper drinking cups, etc., has asked bids on general contract for a three-story addition, reported to cost close to $100,000 with machinery. Ballinger Co., Twelfth and Chestnut Streets, Philadelphia, is architect and engineer.

Joseph Loeffler Machine Co., Philadelphia, has leased floor in building at 132 North Fourth Street for local works and headquarters.

Cleveland

CLEVELAND, Aug. 20.—While machine tool sales show a moderate decline as compared with July, business is regarded as good for this time of the year. The Cleveland Union Terminals Co. during the week distributed orders for nearly all the machinery required for its locomotive repair shops. Its inquiry was for about 25 machines. Other buying during the week was confined to single machines. No inquiry of size is pending. Business is well distributed among various industries. Deliveries have improved on some lines of drill presses, radial drills, lathes and grinders, but are still greatly deferred on some makes of planers and shapers. On large tools, no improvement in deliveries is reported.

Hoover Co., North Canton, Ohio, manufacturer of vacuum cleaners, etc., has awarded general contract to Warren-Hoffman Co., Witters Building, for four-story addition to cost about $100,000 with equipment. L. Christman and C. Firestone, 900 Renkert Building, Canton, are architects.

Tandem Wheel Co., Warren, Ohio, will establish a branch plant at Akron, Ohio. Portion of equipment will be removed from present works and additional machinery provided for increased output.

Canton Drop Forge & Mfg. Co., Canton, Ohio, is having plans drawn for one-story addition, 90 x 550 ft., reported to cost about $100,000 with equipment.

Apex Electrical Mfg. Co., 1067 East 152nd Street, Cleveland, manufacturer of electric-operated cleaning equipment, clothes washers, etc., has acquired plant and business of Johnson Washer Co., Oakland, Cal., manufacturer of kindred equipment, and will consolidate with organization. Oakland plant will be continued in operation for Pacific Coast trade and expansion carried out.

Whiteway Stamping Co., 1201 East Fifty-fifth Street, Cleveland, manufacturer of metal stampings, has awarded general contract to Boldt-Rapp Co., 6007 Euclid Avenue, for one and two-story plant on East Seventieth Street, estimated to cost $80,000 with equipment.

Williams Alloy Products Co., Elyria, Ohio, manufacturer of bearing metals, etc., is planning expansion and improvement program, including installation of additional equipment at local plant for larger output.

Goodyear Tire & Rubber Co., Akron, Ohio, has closed plant of subsidiary organization, Marathon Tire & Rubber Co., at Cuyahoga Falls, Ohio, and will remove this division to main Akron mills, where production will be concentrated in future.

Reliance Mfg. Co., Massillon, Ohio, manufacturer of lock nuts, lock washers, etc., has authorized an expansion and improvement program, including new one-story addition totaling about 10,000 sq. ft. floor space, with installation of heat-treating equipment, cutting, polishing and other machinery to be used for manufacture of new products of allied character. Work is reported to cost more than $70,000.

Crescent Engineering Co., 1215 West Bancroft Street, Toledo, Ohio, manufacturer of mechanical equipment, is having plans drawn for one-story plant unit at Dewey and Sylvania Avenues, reported to cost close to $35,000 with equipment. R. E. Dickman is head.

New England

BOSTON, Aug. 20.—New England tool builders report a further contraction in bookings. No new inquiries of importance have come into the market. General opinion is that sales will remain small for at least another month. Dealers, however, have a sizable number of prospects to work upon when the buying movement is resumed.

Contract has been let to Temple & Crane, Inc., Boston, for construction of the new power plant at Bristol, Conn., for the New Departure Mfg. Co. The main building will be of concrete, steel and brick, about 54 x 126 ft., with basement and one story high.

Chance Vought Corporation, aircraft, has completed plans for a one-story, 320 x 672 ft., manufacturing plant at East Hartford, Conn.

W. F. Gilbert, 127 Church Street, New Haven, Conn., has started work on a coal unloading plant. A grab bucket and other handling equipment is involved.

Leland-Gifford Co., 1027 Southbridge St., Worcester, Mass., machine tools, will soon start a one-story addition, 121 x 196 ft.

Sherms, Inc., 318 Warren St., Bridgeport, Conn., novelties, closed bids Aug. 20 for a one-story, 25 x 60 ft., manufacturing unit.

Marlboro Wire Goods Co., Lincoln Street, Marlboro, Mass., has started work on a manufacturing plant addition, to cost $45,000 without equipment.

Westerly, R. I., will close bids Aug. 26 for a two-story and basement junior high school and industrial school, to cost $500,000 without equipment.

Skayeff Ball Bearing Co., 330 New Park Avenue, Hartford, Conn., closes bids

Aug. 21 for a two-story, 75 x 150 ft., manufacturing plant and for alterations to another manufacturing unit.

Strathmore Paper Co., Front Street, Mittineague, Mass., is revising plans for a 54 x 60 ft. hydroelectric plant to be built at West Springfield, Mass.

Lux Clock Mfg. Co., 95 Johnson Street, Waterbury, Conn., has completed plans for a four-story, 45 x 140 ft., manufacturing plant addition.

Taylor & Fenn Co., Arch Street, Hartford, Conn., manufacturer of milling machines, drills, etc., has awarded general contract to Allyn Wadhams Co., 15 Lewis Street, for one-story addition to foundry, 54 x 180 ft., reported to cost close to $50,000 with equipment.

Segal Lock & Hardware Co., 155 Leonard Street, New York, with main plant at Brooklyn, has completed arrangements for purchase of Norwalk Lock Co., Norwalk, Conn., manufacturer of locks, builders' hardware, etc., and will consolidate with organization. It is proposed to continue acquired plant at present location with increased output.

Holyoke Water Power Co., Holyoke, Mass., has plans nearing completion for new hydroelectric power plant on its waterway, vicinity of mill of American Writing Paper Co., reported to cost $450,000 with equipment.

United Electric Railways Co., Woonsocket, R. I., has awarded general contract to O. D. Purington Co., Providence, R. I., for one-story service, repair and garage building, 107 x 175 ft., for company motor buses, at end of Park Avenue, reported to cost close to $100,000 with equipment.

Bolta Rubber Co., care of Eaton & Chandler, Lawrence, Mass., attorneys, representatives for company, has concluded negotiations for purchase of Mill No. 3A, of local Everett Mills, five story, totaling about 70,000 sq. ft. floor space, heretofore used for textile service, and will remodel and equip new plant for manufacture of hard rubber goods. Company will be incorporated under State laws with John Bolten as president, and Milton Shaw, vice-president.

Trumbull Electric Mfg. Co., Woodland Avenue, Plainville, Conn., manufacturer of electric switches, controls, etc., affiliated with General Electric Co., Schenectady, N. Y., is reported planning new addition to cost close to $50,000 with equipment.

Plant of Connecticut Telephone & Electric Co., Meriden, Conn., manufacturer of telephone equipment, electric fixtures, etc., in receivership for more than a year, has been closed for indefinite period, and will be offered at public sale at early date.

Board of Education, Norwalk, Conn., has authorized installation of manual training department, consisting of three shop units for machine, mechanical, electrical and other work, in new junior high school to cost in excess of $250,000 for which plans will be drawn by Frank Irving Cooper Corporation, 172 Tremont Street, Boston, architect.

United-Carr Fastener Corporation, Boston, has been organized to take over and consolidate United States Fastener Corporation, with local plant on Columbia Road, and Carr Fastener Co., 31 Ames Street, Cambridge, Mass., both manufacturers of metal fasteners, automatic machines for attaching fasteners, screw machine parts, etc. New company plans expansion program for enlarged output. M. F. Carr, formerly president of Carr company, will be chairman of board, and

The Crane Market

BUILDERS of electric overhead cranes are well engaged on orders from the Middle West and have some business from the South, but the New York and New England districts are quiet. There is also a decided lull in the locomotive crane business. The S. G. Schaefer Iron Works, Edgewater, N. J., recently in the market for a locomotive crane for steel erection has purchased a used Brownhoist locomotive crane, which has been on the Pennsylvania Railroad. The International Combustion Engineering Co., 200 Madison Avenue, New York, is reported to have closed on a 25-ton locomotive crane.

In the Chicago district the Edison Electric Appliance Co., Chicago, is inquiring for a 10-ton, 60-ft. span electric traveling crane.

Among recent purchases are:

Rockford Drop Forge Co., Rockford, Ill., two 10-ton, 49-ft., 7¼-in. span, electric traveling cranes from Wisconsin builder.

Union Pacific System, 5 drop pits for roundhouse from unnamed builder.

Sinclair Weeks, heretofore president of United States Fastener Corporation, will occupy same position with consolidated organization.

Milwaukee

MILWAUKEE, Aug. 20.—All items of machine tools are still facing a heavy demand far exceeding that of any recent years and in spite of a barely noticeable recession which is considered to be merely seasonal. Deliveries have not been improved noticeably. The busiest of the metal working plants at this time appear to be the manufacturers of tractors, farm implements and electrical equipment. While automobile production has naturally fallen off, inquiries from that source promise a liberal volume of future purchases and manufacturers of automotive parts continue programs of expansion. Railroad demand has not attained volume.

Wisconsin Malleable Iron Co., 94 South Bay Street, Milwaukee, plans rebuilding and re-equipment of parts of its plant damaged by fire Aug. 14. The boiler house, pattern shop, carpenter shop, core room, annealing house and shipping room are affected. W. H. Osborne is president.

Sherwood Mfg. Co., Hudson, Wis., originally of Minneapolis, producer of washing equipment, will move to the plant of the Northern States Power Co., Chippewa Falls, Wis., occupied by that concern during the construction of its hydroelectric plant in that city. George Sherwood is president.

Specialty Brass Co., Kenosha, Wis., maker of creamery fittings and milk pumps, will move its plant in Albany, N. Y., to Kenosha to secure concentration of all production, which will be increased 30 per cent thereby. Last year, the Albany plant produced $100,000 worth of equipment. Appliances for a new milk heating device, said to be revolutionary in the dairy industry, will be an added line. C. M. Anderson is president.

Fish Rotary Oven Co., Beloit, Wis., has completed removal of plant and offices to that city from Walworth. The new plant cost above $100,000 and includes a main shop, 100 x 210 ft., and a foundry with cupola and electric traveling crane. Three to four bakers' ovens a week will constitute the initial output. G. W. Curless is president, and George K. Blakely is secretary-treasurer.

West Allis, Wis., announces that the Pittsburgh-Des Moines Steel Co., 38 South Dearborn Street, Chicago, was the low bidder for furnishing and installing 1,000,000-gal. elevated steel tank for municipal water works at a cost of $70,700.

Kiel, Wis., will take sealed bids until Aug. 29 for construction of concrete reservoir and addition to pumping station, including furnishing of one 750-gal. and one 300-gal. centrifugal pump, air compressor and air lift pump. W. G. Kirchoffer, 22 N. Carroll Street, Madison, Wis., is designing engineer.

E. H. Krueger, Twenty-fifth and Cleveland Avenues, Milwaukee, has secured permit to build a one-story machine shop addition, 60 x 120 ft., at 1123 Cleveland Avenue, to cost about $30,000.

Pittsburgh

PITTSBURGH, Aug. 20.—The machine tool business continues to be good, and the constant flow of inquiries is surprising to most dealers who ordinarily expect a quiet August. Purchases are confined largely to single tools. The Westinghouse Electric & Mfg. Co. placed a number of items last week, but still has a large part of its third quarter list to buy. The Bethlehem Steel Co. has not yet closed against its inquiries for the Johnstown, Pa., plant, but immediate action is expected.

Work is progressing rapidly on the new seamless tube mill of the National Tube Co. at McKeesport, Pa., and tools and equipment will probably be placed in the fall. The cranes for this job will likely be ordered this week. Requirements of the Austin Motor Co. for its Butler, Pa., plant are not expected to be large, as the present plans of the company call for assembling of motor cars only and the plant will be extended slowly in the early days of operation.

Aetna-Standard Engineering Co., Youngstown, Ohio, manufacturer of rolling machinery, etc., has awarded general contract to J. H. DeCarpentier & Son, 327 Falls Avenue, for two one-story additions to branch plant at Ellwood City, Pa., reported to cost about $45,000.

Kerotest Mfg. Co., 2525 Liberty Avenue, Pittsburgh, manufacturer of oil well equipment and supplies, valves, etc., has superstructure in progress for a four-story addition, reported to cost close to $100,000 with equipment.

Farman Aircraft Co., care of Harrison R. Tucker, Tulsa, Okla., recently formed as an affiliated interest of Farman Brothers, Paris, France, manufacturers of large aircraft, is planning early construction of new plant in vicinity of Wheeling, W. Va., for manufacture of aircraft, motors, parts, etc., reported to cost more than $75,000 with equipment. Company also proposes to establish eastern assembling works and has taken options on site at Central Airport, Camden, N. J., for this plant.

Fairmont Mfg. Co., Fairmont, W. Va., is said to be planning expansion in duralumin sheet manufacturing plant, primarily for metal aircraft production, to include installation of rolling mill equipment, electric furnace and auxiliary equipment, reported to cost more than $75,000.

Kelly-Claude Neon Corporation, 231 Spahr Street, Pittsburgh, has been organized to take over and consolidate Alpha-Claude Neon Light Co., address noted, and Kelly Outdoor Advertising Co., Erie, Pa., to manufacture luminous tube electric signs, lamps, etc. Expansion plans are under way for increase in present production.

United States Engineer Office, Pittsburgh, will receive bids until Sept. 9 for a hydroelectric plant for Deadman Island Locks, Ohio River.

Board of Education, Blairsville, Pa., is considering installation of manual training equipment in proposed two-story high school, reported to cost about $220,000, for which bids will soon be asked on general contract. Vans Engineering Service, Blairsville, is architect and engineer.

General Bronze Co., 3212 Smallman Street, Pittsburgh, has concluded arrangements for purchase of Guaranty Iron & Steel Co., 3847 West Lake Street, Chicago, and Wisconsin Ornamental Iron & Bronze Co., Milwaukee, and will consolidate with organization. Proposed to continue plants at present locations and will carry out expansion program for increased output. Company is making improvements at Pittsburgh works, including installation of additional equipment.

Chicago

CHICAGO, Aug. 20.—The placing of orders for the "Farmall" tractor plant of the International Harvester Co. at Rock Island, Ill., features the activity in the machine tool trade. Purchases of special purpose tools have been virtually completed and the buying of standard machines is under way. Total expenditures for machine tools will be nearly $500,000. In addition, a large outlay will be made for foundry equipment. The improvements are being made to increase the output of tractors 40 per cent and the production of gasoline engines 25 per cent.

Purchases of machine tools for tractor plants have been an important factor in the local machinery market throughout the year, accounting for 25 to 60 per cent of dealers' total sales. Although a few instances of overexpansion in the farm equipment field are reported, they are not of an alarming character. In fact, one important producer of tractors now has nearly enough foreign business to occupy its plants without depending on domestic orders.

Another important source of business in machine tools has been the rapidly increasing output of talking motion picture equipment by the Western Electric Co. Orders have not only come in large numbers from that company but from a wide range of shops to which it has been compelled to farm out work. Production of this cinema improvement is still far short of the demand.

General business in machine tools is still well diversified and in encouraging volume, although showing the effects of the vacation season. For a number of leading dealers business to date this year has been at the highest rate in history, not excepting the war period and the post-war boom. Sales of one machinery house in the first seven months were within striking distance of the total for all of 1928.

Purchases by automobile companies are confined to scattered orders for tools to round out existing equipment. Railroad buying has not been conspicuous of late, and it is common opinion that no large programs will be launched in the near future. Leading Western lines have brought their shops up to a high standard of efficiency in recent years, and the O'Fallon decision has removed a potent reason for converting extra earnings into improvements.

Chicago, Milwaukee, St. Paul & Pacific has closed for two frog and switch planers for its Milwaukee shops.

Union Pacific System has placed orders for five drop pits for roundhouses.

Continental Can Co., Chicago, is spending $1,000,000 at its plant in the Clearing district. Improvements include additions to can plant, warehouse and tin mill. A lacquering plant will also be erected.

Edison Electric Appliance Co., Chicago, will soon start work on a one-story warehouse and manufacturing plant at South Menard Avenue and Taylor Street, to cost $400,000.

International Harvester Co., Chicago, is erecting a one-story steel storage building, 188 x 199 ft., at 1015 West 120th Street, to cost $68,000.

Heuser Mfg. Co., maker of screw machine products, 231 West Illinois Street, Chicago, has purchased a two-story and basement plant building at 1638 North Paulina Street.

Hawkeye Mfg. Co., maker of portable hog houses, brooder houses and self-feeders, Belmond, Iowa, has started building a new plant, 70 x 100 ft., to replace one recently destroyed by fire.

Elgin Stove & Oven Co., Elgin, Ill., will construct an addition, 48 and 82 ft. x 124 ft., to cost $10,000.

Michiana Products Corporation, Michigan City, Ind., has been organized to take over the Chrobaltic Tool Co. and the Sheet Steel Products Co., both of Michigan City. The Chrobaltic division will continue to manufacture heat and acid-resisting alloy castings, including stainless materials, and the Sheet Steel Products division will continue to make the Hall-Winslow line of oil filters and air cleaners for truck, tractor, airplane and automobile engines, as well as pressed metal parts, tanks, equipment, etc. O. M. Carry is president of the new company, with office at Chicago. W. B. Sullivan, first vice-president and general manager, has headquarters at Michigan City.

Clark Equipment Co., Buchanan, Mich., will soon construct an addition, 100 x 220 ft., to its tubular housing department.

Midway Foundry Co., St. Paul, Minn., will erect an addition to its foundry on Raymond Avenue, at a cost of $3,300.

Dallas Brass & Copper Co., 6601 Grand Avenue, Chicago, has awarded general contract to Dahl & Stedman, 11 South LaSalle Street, for one-story addition, 126 x 329 ft., reported to cost about $500,000 with equipment. Johnch & Ehmann, 140 South Dearborn Street, are architects.

Scully Steel & Iron Co., 208 South LaSalle Street, Chicago, has let contract to Boyle & Co., 105 West Monroe Street, for one-story storage and distributing plant at 2364 South Ashland Avenue, estimated to cost more than $50,000 with equipment.

Vortex Mfg. Co., Western and Austin Avenues, Chicago, manufacturer of paper drinking cups, etc., pressed paper goods and kindred specialties, has disposed of a stock issue to total $4,579,000, a portion of proceeds to be used for expansion. P. T. Potts is president.

City Council, Grafton, N. D., has called a special election to approve a bond issue of $77,000, fund to be used for a municipal electric light and power plant. Druar & Milinowski, Globe Building, St. Paul, Minn., are engineers.

Northwestern Re-Tinning Co., Hersey and Hampden Avenues, St. Paul, Minn., has leased a one-story building to be erected at 862 Seal Street, and will occupy for a new plant, reported to cost close to $25,000 with equipment. Mather & Fleishbein, Endicott Building, are architects.

Union Pacific Railroad Co., Omaha, Neb., has plans for a new engine house with shop facilities at Cheyenne, Wyo., estimated to cost about $40,000 with equipment. L. D. Huntley, Omaha, is chief engineer.

Board of Education, Burlington, Iowa, is considering installation of manual training equipment in new two-story junior high school on Oak Street, estimated to cost $240,000, for which plans will be drawn by C. L. Ritts, Eisfeld Building, architect.

Mercil Plating Co., 1911 Fulton Street, Chicago, manufacturer of plated metal products, has awarded contract to H. N. Samuel, 53 West Jackson Boulevard, for one-story addition, 20 x 101 ft., reported to cost about $30,000 with equipment.

Rockford Drop Forge Co., Ninth Street, Rockford, Ill., has awarded contract to Linden & Sons, Inc., 1110 Tenth Street, for one-story addition, 85 x 275 ft., reported to cost close to $150,000 with equipment. Lockwood Greene Engineers, Inc., 400 North Michigan Avenue, Chicago, is architect and engineer.

Iowa Railway & Light Co., Cedar Rapids, Iowa, will build a one-story power plant at Jefferson, Iowa, reported to cost in excess of $45,000 with equipment.

Central West Public Service Co., 117 North Thirteenth Street, Omaha, Neb., operating electric light and power properties in Iowa, Minnesota, North and South Dakota, is disposing of a note issue of $1,000,000, portion of proceeds to be used for expansion in power facilities and transmission system.

St. Louis

ST. LOUIS, Aug. 20.—Plans are being considered by Eagle Motor Truck Corporation, 6150-60 Bartmer Avenue, University City, Mo., for new one-story plant for parts production and assembling, reported to cost more than $65,000 with equipment. J. P. Reis is head.

Tunnison Brothers, 1530 West Main Street, Oklahoma City, Okla., manufacturers of sheet metal products, have begun construction of new one-story plant, 100 x 300 ft., at 513 North Indiana Street, reported to cost in excess of $70,000 with equipment.

Board of Education, Crawford, Neb., is said to be planning installation of manual training equipment in proposed two-story

high school, to cost about $160,000, for which bids will be asked on general contract early in September. Meginnis & Schaumberg, Federal Trust Building, Lincoln, Neb., are architects.

Precision Machinery Co., Seattle, Wash., is considering new branch plant unit at Centralia, Mo., for manufacture of rotary pumping machinery, parts, etc. Negotiations are under way with Centralia Chamber of Commerce for suitable site.

Rex Art Casket Co., 1608 North Thirteenth Street, Kansas City, Kan., has plans for a two-story and basement addition, 50 x 125 ft., reported to cost close to $25,000 with equipment.

Cincinnati

CINCINNATI, Aug. 20.—A slight letup in the demand for machine tools during the past month is aiding district tool builders to diminish their large amount of unfilled orders, which will require about two and a half months' production to fill. Despite this easing off in demand, total fresh bookings during July were 27 per cent higher than July, 1928, and reflected the continued widening of interest in new equipment and replacements in practically all lines of industry. So far, August bookings are a trifle under those of July, although in certain quarters manufacturers report that new business this month is better than that of July. This, however, is not sufficient to affect the market generally. The Missouri and Pacific Railroad is reported to be in the market for three motor-driven lathes.

Ohio Pattern Works & Foundry Co., 2730 Spring Grove Avenue, Cincinnati, has awarded general contract to William Juergens & Son, 4434 Glenway Avenue, for one-story foundry addition, reported to cost close to $40,000 with equipment.

General Motors Corporation, General Motors Building, Detroit, has concluded negotiations for purchase of plant and business of Day-Fan Electric Co., Dayton, Ohio, manufacturer of radio equipment and parts, and will operate as unit of organization in future. Expansion is planned for increased output.

Exact Weight Scale Co., 265 West Spring Street, Columbus, Ohio, is having plans drawn for one-story plant unit on West Fifth Street, estimated to cost $65,000 with equipment. Carmichael & Milsbaugh, 8 East Long Street, are architects; bids will soon be asked on general contract.

Columbia Gas & Electric Corporation, Cincinnati, is negotiating for purchase of Binghamton Gas Works, Inc., Binghamton, N. Y., and will operate in conjunction with present properties at Olean, N. Y., and vicinity. Plans are under way for expansion in natural gas holdings in that district, including construction of pipe lines to Binghamton and neighboring districts. Columbia company has also acquired controlling interest in Cincinnati, Newport & Covington Light & Traction Co., operating at Newport and Covington, Ky., and in Cincinnati Gas Transportation Co., and plans extensions and improvements in plants and system.

Second National Garage, Inc., Nashville, Tenn., recently organized by E. B. Craig, National Life & Accident Insurance Co., 301 Seventh Avenue, and associates, has awarded general contract to John Oman, Jr., Chamber of Commerce Building, for five-story service, repair and garage building, 100 x 200 ft., at Polk Avenue and Seventh Street, estimated to cost in excess of $500,000 with equipment. Hart, Freeland & Roberts, Independent Building, are architects.

Advance Battery Mfg. Co., Louisville, has awarded general contract to National Concrete Construction Co., Louisville, for one-story addition on East Lee Street, reported to cost close to $20,000 with equipment.

Indiana

INDIANAPOLIS, Aug. 20.—Hetherington & Berner, fabricators of structural steel and manufacturers of dredging machinery, with factory in Indianapolis, has been acquired by the Berner interests, represented by Robert Berner. Mr. Berner has taken over the operation of the plant.

Extensive remodeling now is under way at the plant and the personnel of the Robert Berner Structural Steel Co. has been transferred to the Hetherington & Berner plant. The Berner plant will be sold. Hetherington & Berner plant includes structural steel fabrication plant, machine shop, pattern-making shop and foundry. Officers of the new corporation will be Mr. Berner, president; R. H. Dickson, vice-president, and F. C. Miller, secretary-treasurer.

Real estate and other property of the Wayne Machinery Co., Fort Wayne, Ind., has been sold to C. L. Schust, Walter Meyer and Clifford Kern for $24,000, subject to approval of the trustee in bankruptcy. Mr. Schust of the C. L. Schust Co. said he would move his sheet metal business to the plant and will lease a part of the building to Meyer and Kern, who will carry on business similar to that of the Wayne Machinery Co. under the name of the Indiana Machinery Co.

Land on New Haven Avenue, Fort Wayne, Ind., has been acquired by George A. Jacobs and Wendell C. Glass, former officials of the Dudlo Manufacturing Corporation there, and their new associates as the site for an industrial plant they will erect for the manufacture of wire of all kinds. An office building has been started. The first unit of the plant will be 200 x 300 ft.

Titan Electric Co., Butler, Ind., manufacturer of electrical equipment, has arranged for removal of plant to Adrian, Mich., where increased capacity will be carried out.

Auburn Automobile Co., Auburn, Ind., has secured a substantial interest in Columbia Axle Co., 850 East Seventy-second Street, Cleveland, manufacturer of automobile axles, etc., and will be active in management in future. Proposed to expand output for axles for new Cord automobile. E. L. Cord, president of Auburn company, will be chairman of board of Columbia organization, and Edwin H. Parkhurst, heretofore vice-president and manager of last-noted company, will be president.

Tokheim Oil Tank & Pump Co., 1602 Wabash Avenue, Fort Wayne, Ind., manufacturer of gasoline pumps and equipment, has asked bids on general contract for one and two-story addition, 30 x 800 ft. and 40 x 160 ft., reported to cost about $100,000 with equipment. Pohlmeyer & Pohlmeyer, Central Building, are architects.

Rubush & Hunter, American Central Life Insurance Building, Indianapolis, architects, have plans for a new seven-story automobile service, repair and garage building, 68 x 195 ft., at 147 East Market Street, estimated to cost $500,000 with equipment.

Noblitt-Sparks Industries, Inc., 603 East Washington Street, Indianapolis, manufacturer of metal products, has approved plans for an addition to plant at Glenwood, Ind., reported to cost over $50,000 with equipment.

Gulf States

BIRMINGHAM, Aug. 20.—Kansas City Southern Railroad Co., Beaumont, Tex., with main offices at Kansas City, Mo., is arranging for new terminal yards and shops at Dowling, near Beaumont, including engine house, machine shops, boiler shops and other units, entire project to cost close to $1,000,000 with equipment. Company engineering department is in charge.

Lamson & Sessions Bolt Co., 1971 West Fifty-eighth Street, Cleveland, has awarded contract to Johnson Construction Co., Marlin Building, Birmingham, for new plant at North Birmingham, consisting of several one-story units, with main mill, 160 x 240 ft., power house and other buildings, entire project to cost close to $500,000 with equipment. George S. Rider, Century Building, Cleveland, is engineer.

St. Louis & Southwestern Railroad Co., Tyler, Tex., plans rebuilding of portion of local car repair shops, recently destroyed by fire with loss reported at close to $50,000, including equipment.

Pacific Coast

SAN FRANCISCO, Aug. 20.—Plans are being completed by Neilson Steel Aircraft Co., Second and Camelia Streets, Berkeley, Cal., for two-story addition, 60 x 200 ft., reported to cost about $65,000 with equipment. Engineering department of company is in charge. Thomas Neilson is president.

Southern California Edison Co., Los Angeles, has made application for permission to issue bonds in amount of $15,000,000, portion of fund to be used in connection with extensions and improvements in electric light and power properties. Plans have been approved for a power substation at Compton to cost about $200,000 with equipment, and for similar unit at Moneta, to cost approximately $50,000.

Western Metal Products Co., 1160 Bryant Street, San Francisco, has awarded general contract to R. C. Stickle, South San Francisco, for one-story plant at South San Francisco, estimated to cost about $35,000 with equipment. Engineering department of company is in charge.

Inland Light & Power Co., Portland, Ore., has secured permission from Federal Power Commission to construct and operate a hydroelectric generating plant on Lewis River, vicinity of Woodland, Wash., to develop a total capacity of 170,000 hp., estimated to cost about $20,000,000, including steel tower transmission system.

Boeing Airplane Co., Seattle, has approved plans for extensions in plant to increase present floor area from 300,000 to about 400,000 sq. ft., new units to be used for parts production and assembling, reported to cost more than $250,000 with equipment. J. G. Johnson is president.

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Heat Treatment Well Grounded in Experience But Not Yet a Science

BY JOSEPH R. MILLER*

UNDENIABLY, the earlier applications of heat treatment to metals were developed through trial and error. While it may seem from a review of the exactly formulated methods now followed in routine heat treatments that a scientific basis had been reached for the explanation and prediction of the results of heating and cooling the metals, especially steels, upon their structure and properties, the fact remains that our formulations are based upon much experimentation and upon little exact science or mathematical theory. Until we know more clearly the mechanics underlying the constitution of matter, particularly the thermal principles, we shall hardly reach a strictly scientific basis for any operations that deal with those mechanics so directly as do the operations in heat treating.

Case Similar to Colored Glazes in Ceramics

BESIDES, the finer touches of real artisanship apply in many special treatments, as in the case of tool steels and special new steels, and on larger masses and complicated shapes in the more ordinary steels as well. The case is similar to that in the production of colored decorations and glazes in ceramics which present-day science is able, through chemistry, to duplicate in a definite quality. But how shall we ever again attain the matchless beauty of the glazes and enamels of Kang Hsi or Chein Lung, for these were the products of the clever craftsman favored by friendly hills where he selected his materials. Shall we ever know those mixes?

As did this ancient artificer in the porcelains, so the heat treater, in spite of his superior sources of information, must refer to the "log" book of his trade and see what has been done on similar work in the past, improve the method as he can, and, above all, keep a careful record of both his work and its results for future reference. He can trust best his own experience. He cannot, without experience, predict or formulate a process. He cannot, without reserve, use the experience of another. This, of course, does not refer to routine treatments that are well worked out, for almost anyone can do these; they are neither art nor science, but simply formulas to follow.

Rate of Cooling a Vital Factor

WHILE we know some of the essentials of the theory of the reorganization of metal structures when heated and cooled, knowledge of the subject is broadening. From a large amount of experimentation it seems now to be fairly well determined that the point at which transformation in the metal (steel) structure takes place is determined by the rate of cooling. It is not a fixed point.

Also, it is indicated that certain microstructures heretofore thought to represent definite states of the metal are in reality different simply in fineness of structure; that is, if enough steps are taken in producing the differences, the change is a gradual one from a coarse to a fine structure of the same characteristics.

Thus on the one hand a troublesome variable is introduced in the process, while on the other we are taught to study more carefully our technique in the use of the microscope. These two developments are merely an indication of others on the way. Better than ever do we recognize the incompleteness of our present information. The facts that we need to know are very imperfectly understood, and it may be a long time before they are understood.

The limitations that surround the treatments of large masses are particularly a hardship to the heat treater. Experimentation on pieces of large size is expensive. Also costly work may be destroyed by wrong treatments and for these reasons progress is slow and results are not broadly published. Those in metallurgical charge of such work are wary in its doing and wary in what they say about it. Each approaches a new job with his records of former work before him and deviates as little as possible from what he has known to be successful on the nearest similar job. The successful conduct of such heat treatments is an art of the highest order.

X-Ray a Decided Aid

AN additional aid to the heat treater is the X-ray, for with it we may sift out and observe a little more clearly the ultimate structure that is being transformed. This seems, so far, to have best application to treatments in connection with cold working, which-at present give rise to some uncertainties. Just how much those uncertainties are due to heat treatments and how much they may be due to imperfections and variations of the steel itself is more difficult to determine than in similar complications with larger pieces not cold worked. However, it is certain that the field of adaptation of heat treatments and cold working properly combined for superior results has hardly been explored beyond the range of wire sizes.

*Pittsburgh.

Heat Treating Aluminum Alloys

Recent Progress Has Been Rapid—Views on Theory of Quenching and Aging—Uses of Heat-Treated Aluminum and Alloys

BY ROBERT J. ANDERSON, D. SC.*

HEAT-TREATMENT processes in the aluminum field may be classified broadly as follows:

1.—Annealing wrought aluminum and aluminum alloy manufactures for the purpose of softening, thereby permitting further cold work.

2.—Heating aluminum alloy castings to relieve internal strains, improve machinability, cause accelerated aging, confer permanent growth, or promote spheroidization. Heating is also applied in certain processes devised to stop leaks in castings or to improve resistance to corrosion.

3.—Quenching cast and wrought alloys after soaking at suitable temperatures to confer hardening power.

4.—Aging cast and wrought alloys for the purpose of hardening and strengthening after quenching.

Sound theory to explain the mechanism of the hardening of light aluminum alloys by quenching followed by aging had been developed by 1921. The chief difficulties of practice had been considerably overcome by 1925. In the past few years, however, much has been learned about both the theory and practice of aluminum alloy heat treatment, and recent progress has been quite noteworthy. The precipitation theory has been corroborated by ample experimental evidence. New alloys have been developed, based on metallographic study of the constitution of aluminum alloy systems. Refinements in practice have come with the application of rigid technical control and the improvement of appliances for heat treating. Moreover, valuable experience has been gained in handling a wide diversity of manufactures in production. Finally, marked increase in the uses of heat-treated aluminum alloy parts in a wide variety of fields has attended the developments just mentioned.

Theory of Quenching and Aging Heat Treatment

HEAT treatment of aluminum alloys is based on technical phenomena which are common to alloys in general. It is interesting to point out, in passing, however, that the mechanism of the aging effect was first elucidated for aluminum alloys only about 10 years ago and subsequently applied to other alloys. The present generally accepted theory which explains the hardening and strengthening of aluminum alloys on quenching followed by aging may be briefly summed up as follows:

(1) The alloying constituents which cause hardening from solid solutions with aluminum; (2) the solid solubility increases markedly with increase in temperature; and (3) the hardening is caused on aging by the precipitation of the dissolved substance in minute particles.

The aging may be carried out at the ordinary temperature or some moderately elevated temperature may be necessary.

The aging effect in quenched alloys is not an unusual phenomenon, but it is always observable in alloys which possess a transformation or a eutectoid change, or in which the solid solubility of one constituent (the solute) in another (the solvent) is increased considerably by raising the temperature. Precipitation on aging is accompanied by increase in strength, elastic limit, and hardness, and precipitation is the cause of these and other changes. Several theories have been advanced to explain why precipitation should cause hardening and other changes, but these cannot be taken up here.

Precipitation Involves Two Processes

Very recent work by Gayler and Preston indicates that precipitation from solid solution entails two processes:

(1) Rejection of the atoms of the dissolved metal from the lattice of the solid solution, accompanied by the possible formation of molecules, and (2) coagulation of the rejected atoms or molecules.

These two processes probably overlap. These investigators also find that the parameter of quenched-and-aged duralumin is measurably less than that of the annealed and slowly cooled alloy (which latter is the same as that of aluminum). In other words, the solution of copper in aluminum is attended by a (small) contraction of the aluminum lattice. That this lattice disturbance occurs on precipitation is shown by the broadening of the lines of the X-ray spectrum. Hardness is therefore said to be due to distortion of the matrix by the precipitation of highly dispersed particles. Maximum hardness has previously been ascribed to a critical dispersion of the precipitated particles.

The solid solubility of many metals in aluminum as affected by temperature has been thoroughly investigated, and the information made available by recent research has been of inestimable value in the development of alloys and in better understanding of the heat-treating processes. The application of dilatometry to the study of aging has been receiving considerable attention recently.

Annealing Governed by Certain Principles

PRINCIPLES governing the annealing of cold-worked aluminum and aluminum alloys are the same as those applying to metals in general. The object of annealing cold-worked metal is ordinarily to effect softening so that the material may be subjected to further deformation. Thus, commercial aluminum is furnished in the form of dead-soft circles for utensil drawing and as sheet and coil for forming and stamping. The demands of consumers for aluminum sheet capable of resisting severe cold drawing operations have become increasingly severe. Consequently, the aluminum sheet mill operator has had to pay special attention to the control of his annealing methods and furnish sheet to grain-size specifications.

Continuous Annealing for Aluminum Metal

Continuous methods of annealing have been developed in recent years for aluminum circles, sheet, and coil. Continuous, or so-called flash annealing, has been found ad-

*Vice-president in charge of production, Fairmont Mfg. Co., Fairmont, W. Va.

vantageous. With this process, individual pieces (or pieces stacked a few high) are passed through a heated chamber at such a rate of speed that the metal is exposed to the heat for only a short time. Grain-size control is practical and simple with continuous annealing. In mass (bulk) annealing, the question of stacking has received much attention with a view to permitting uniform and thorough circulation of the heat. Load temperatures are correlated with furnace temperatures in mass annealing. Time and temperature of exposure in annealing are now closely regulated. Mass annealing has been replaced to a considerable extent by continuous methods.

Quenching Heat Treatment for Alloys

VARIOUS aluminum alloys possess only ordinary mechanical properties as rolled or cast, but they can be heat treated to yield a wide range of properties. The tensile strength obtainable in some alloys by heat treatment is nothing short of remarkable. This also applies to the ductility and hardness. There has been considerable development of recent years in special aluminum alloys to be heat treated, both for cast and wrought manufacturers. So far, in alloys for working, nothing has been brought out that excels ordinary duralumin in all-around mechanical properties and usefulness.

Leading Proprietary Alloys

Most of the aluminum alloys used for parts to be heat treated contain copper or magnesium silicide, or both. Among the alloys claimed to be proprietary may be mentioned the following: Lautal, Carbium, Almelec, Scleron, Montegal, Aldrey, Constructal, 25S, and 51S. Lautal has attained considerable use abroad for both cast and wrought parts. The nominal composition is 94:4:2 aluminum-copper-silicon. Aldrey, also known as Wire Alloy No. 3, is typical of the compositions which have been developed abroad for use as cable for electric power transmission. This alloy contains 0.4 per cent magnesium, 0.5-0.6 per cent silicon, 0.3 per cent iron, and the remainder aluminum. There has been an influx of special heat-treated alloys for cable conductors in Europe. Mention should be made here of so-called Alclad. As usually supplied, Alclad consists of duralumin sheet coated with a thin layer of *pure* (Hoopes) aluminum. The material combines the good mechanical properties of duralumin with the corrision-resisting qualities of *pure* aluminum.

In the case of casting alloys, the following may be mentioned: 95:5, aluminum-copper: 95.8:4:0.2, aluminum-copper-magnesium, 94:5:1, aluminum-copper-silicon: 88.5:-10:1.25:0.25, aluminum-copper-iron-magnesium: and 92.5:-4:1.5:2, aluminum-copper-magnesium-nickel. The foregoing are nominal compositions, the alloys being made from aluminum containing say 0.2 to 0.3 per cent silicon and 0.3 to 0.6 per cent iron.

While many aluminum alloys are suitable for the production of cast or wrought parts to be heat treated, the bulk of present commercial requirements can readily be met with a relatively few compositions. One reason for the large number of alloys which have been developed lies in the attempts of competitors to get around patent claims.

There is a demand for alloys to be used in castings production, which, without quenching heat treatment, will age spontaneously to yield enhanced mechanical properties. Some development work has already been done in this direction. A wider field could be found for aluminum alloy castings if alloys could be developed which would harden and strengthen substantially by simple air aging for a few days, or by low temperature heating for a few hours, after casting.

Heat-Treating Equipment

EARLY equipment used for heat treating aluminum alloys was generally crude, inefficient, and poorly adapted for the work. Later, furnaces designed for steel treating were used. Today, with a more comprehensive understanding of the theoretical aspects of aluminum alloy heat treating, furnace equipment is designed to meet the special requirements of the operations to be carried out. Various types of heating equipment are still used in practice for annealing, soaking, and aging processes. Irrespective of the design of the equipment and method of heating, the chief requirements are accuracy of temperature control and uniformity of heat distribution.

In the writer's opinion, the supremacy of electric heating can hardly be questioned except on the grounds of first cost of installation and power operating costs. These higher costs may be outweighed by several advantages not obtainable with other methods of heating. The writer prefers electrically heated and automatically controlled equipment for annealing, soaking, and aging processes.

Car-type furnaces (batch or semi-continuous) are being favored over the older pan-type furnaces for the mass annealing of aluminum. In the case of continuous equipment for annealing sheet and circles, the usual construction involves a continuous moving belt or conveyor made of woven wire screen or separate wires, or bands, driven by variable speed mechanism. Such a belt passes through a relatively long chamber of restricted height. The continuous coil annealing furnace is a recent

Dr. Robert J. Anderson

FOR many years Doctor Anderson has been an investigator of aluminum. He has been identified with it from its early days as well as with other branches of the non-ferrous industry. He is the author of numerous technical articles and papers, and of a book on aluminum. At the invitation of THE IRON AGE, he has given in the accompanying article a review of recent developments in the rapidly expanding field of aluminum alloy heat treatment, as well as some ideas as to the future.

development of importance. In the operation of this, aluminum coil is unwound from a drum, passed through the heated chamber of the furnace, and wound up at the other end on a blocker. A similar furnace has been developed for annealing aluminum foil.

Continuous Electric Furnaces Preferred

Continuous belt or pusher furnaces have been built for heating and soaking castings prior to the quench, particularly for such production jobs as pistons. Continuous aging oven may be combined. With such a unit, castings are charged onto the conveyor at one end of the soaking furnace, pass through the heated chamber, discharge into the quenching tank, are picked up by the conveyor in the tank, and are discharged onto the conveyor of the continuous aging oven where the heat treatment is completed. Such a unit is practically automatic in operation. Batch type furnaces are still largely used for soaking castings, and most aging operations are conducted in batch.

Special holders and jigs are used to advantage in heat treating certain manufactures to prevent distortion on heating and handling. Forced circulation of furnace and oven atmospheres has been found advantageous in maintaining uniformity of heat distribution.

Uses to Which Heat-Treated Alloys Are Put

THE development of heat-treatment processes as applied to aluminum alloys, both cast and wrought, has greatly extended the possible uses of these materials and broadened the market for their manufacture. There have been many interesting developments of recent years which have made possible the use of heat-treated aluminum alloy parts in construction in place of malleable iron, steel, copper, brass, and bronze.

Heat treatment has made possible the production of light aluminum alloy parts with so much higher mechanical properties that such materials are now used for a wide variety of engineering purposes where it was formerly impractical to consider aluminum alloys at all. Heat-treated aluminum alloys are now in regular competition with both cuprous and ferrous alloys.

So far, the chief applications of heat-treated aluminum alloys have come in the transportation field, including aircraft, motor cars, trucks, and buses. Interesting uses have been made of heat-treated alloys in the construction of street railroad cars, steam railroad passenger cars, and parts of locomotives. Certain of these applications are in the experimental stage. Substantial increase in the use of heat-treated aluminum alloys is seen in the modern tendency to save weight and increse speed in all kinds of transport. For highly stressed parts, the unheat-treated aluminum-alloy casting has passed out of the picture. Increasing use of duralumin-type alloy sheet and shapes is seen with the tendency toward all-metal construction of aircraft, while the modern Zeppelin-type ship could not be built without the use of this material.

Future Trend Outlined

IT is significant to the future business welfare of metal producers and manufactures that the heat treatment of aluminum alloy parts is not only here to stay, but is causing radical departures in practice. While possible future developments are difficult to predict, the writer believes that the progress of the past will be overshadowed in the next ten years. The number of alloys for use in heat-treated manufactures will doubtless increase. It is quite unlikely that these alloys will be found accidentally, but rather will be developed by systematic research. Also, with more alloys available, it will be possible to select material especially suited for particular purposes. The use of heat-treated structural shapes and forgings is expected to increase greatly.

With the development of heat treatment and new alloys, in the future a large proportion of the aluminum-alloy castings consumed by the engineering trades will be of the type once regarded as special, namely, special composition and heat-treated. Heat-treatment plant is now a necessary adjunct of the modern aluminum alloy foundry. Commercial heat-treatment plants are being called on to heat treat aluminum alloy parts, both cast and wrought. If the price of aluminum should be reduced appreciably, there would be a large increase in the use of heat-treated aluminum alloy manufactures, particularly in competition with steel.

Correct Wrapping Prevents Spots on Plated Ware

W. P. BARROWS, research associate of the American Electroplaters' Society at the Bureau of Standards, has studied the causes of "crystal spots" and "stain spots" on plated ware, especially builders' hardware. His findings, published in Research Paper No. 72, Bureau of Standards, are summarized as follows:

Two distinct defects have been included under the term "spotting out." One class called crystal spots appears only on metals having an "oxidized" surface—that is, one colored with copper sulphide or other sulphides and subsequently lacquered. The other, called stain spots, appears especially on cast metals, either plain or lacquered, as discolored irregular areas, usually with a small dark spot near the center.

Crystal spots consist of cuprous sulphide growing usually between the coloring layer of cuprous sulphide on the metal and the lacquer film. Their formation is caused or accelerated by sulphur in even minute amounts, such as may be carried in the atmosphere or from rubber bands or wrapping paper or cardboard cartons. Promising remedies are (a) exclusion of sulphur from the surroundings, (b) the use of lacquers found to retard spotting, (c) the application of a thin film of a grease, such as petrolatum, to the lacquered surface, and (d) the use of wax paper for wrapping.

Stain spots are caused by acid or a chemical compound absorbed in minute cavities in the metal during the plating process. In a humid atmosphere, these chemicals absorb moisture and exude upon and stain the surface. Alkaline substances are especially difficult to remove from the metal, once it is there, and it is not practicable to eliminate alkaline substances from the cleaning and plating solutions.

Sometimes porosity of the metal may be reduced by a change in pattern or in casting conditions. No method of rinsing or neutralizing was found entirely effective to clean the surface; baking at high temperatures before lacquering is sometimes helpful.

The two most effective remedies are to induce the action by exposing the articles to a high humidity before final finishing, or to use a lacquer which retards spotting. Phenol-condensation lacquers are less permeable to moisture than nitrocellulose lacquers, and are also more effective in retarding stain spotting.

A Year's Progress in Steel Treating

From the Viewpoint of the Testing Engineer—Nitriding, High-Test Iron, Bridge Wire and Gas Carburizing Among Features

BY H. F. MOORE*

THE testing engineer is not among the pioneer workers in heat treating. His viewpoint, then, is that of one who observes tendencies as to general agreement as to theory and technique among pioneer workers, and the tendencies to the formation of "current practice" in heat treating.

General Agreement Exists as to Principles

An outstanding feature of the past year has been the tendency to a fairly general agreement as to principles of heat treating, especially heat treating of iron and steel. An excellent example of this is seen in the statement of "Principles of the Heat Treatment of Steel" prepared by the metallurgical staff of the United States Bureau of Standards and issued in the *Transactions* of the American Society for Steel Treating. In the 90 pages of this pamphlet there is presented a concise statement, intelligible to the beginner in the study of heat treatment. Of course this statement, like all similar ones of physical "laws" is not to be regarded as final, but the fact that such a statement can be made is evidence not only of the skill of the authors, but also of the growing degree of stabilization of ideas on the subject.

Nitriding a Signal Feature

ANOTHER outstanding feature of heat-treating progress during the year is the development of the nitriding process for hardening the surface of steel. The layer of hard material produced by current processes seems to be very thin, and the use of the process for *strengthening* steel parts seems not to have encroached seriously as yet on the field of the case carburizing process. However, surface hardness without distortion of a piece, and a wide range of possible heat treatments of the core without much disturbance of the surface hardness seem to be features of the nitriding process which will render it very valuable to the maker of steel parts which have to withstand abrasive action.

What further possibilities (and limitations) of the process will develop as it is used in practice are matters of prime interest to all users of steel.

Advances Made in Heat-Treating Gray Iron

CAST iron foundrymen seem to have awakened to the possibilities of their product. This was shown by a special session of the American Foundrymen's Association in April [THE IRON AGE, April 18, page 1072], devoted to high-strength cast iron, and by the symposium on cast iron at the meeting of the American Society for Testing Materials in June [THE IRON AGE, July 4, page 6].

Heat treatment and alloying of gray cast iron have been found capable of giving a much better structural material than the ordinary gray iron of former days. The long structure-weakening flakes of graphite found in ordinary cast iron can apparently be induced to take unto themselves more globular and less damaging forms. Of course, this has been possible by the malleabilizing process for a long time, but heat treatment by other, and quicker, methods give promise of usefulness, although their usefulness and limitations are not yet clearly defined.

Gas Carburizing a Tempting Field

Progress in case carburizing, as seen by the testing engineer, has been mainly along the lines of improved technique, and in the development of gas carburizing. Gas carburizing, in which there is no need of expensive and frequently-renewed carburizing boxes, is indeed a tempting field for study. The necessity of heat treatment of

*Research professor of engineering materials, University of Illinois, Urbana, Ill.

Prof. H. F. Moore

AN authority on fatigue testing, Professor Moore is widely known among steel treaters and materials engineers. At the invitation of THE IRON AGE, he has reviewed in the accompanying article the more recent events in heat treating steel. He is a past-president of the American Society for Testing Materials and active in the work of the American Society for Steel Treating, as well as in research organizations and other technical societies.

carburized steel pieces, is more and more being recognized, and the fields of carburizing, nitriding, and of heat treating without alteration of chemical content are gradually becoming defined.

Steel Rail Heat Treatment Being Developed

PROGRESS in the field of heat treating plain carbon and alloy steels has been less spectacular, but the precision of the heat-treating processes and of measurement of temperatures has gone steadily forward. The behavior peculiar to the various alloying elements,—nickel, chromium, manganese, silicon, vanadium, molybdenum, tungsten, cobalt, and perhaps others—is becoming better understood. There seems to be a fair prospect of finding ways to use the less expensive alloying elements for a good many kinds of service. Some interesting work has been done in the preliminary development of heat treatments for railroad rails.

Designers Using Steel Must Know Heat Treating

A field, vitally related to the work of the heat treater, is found in the drafting rooms and designing offices of makers of steel articles. The draftsman and designer is gradually gaining an understanding of the possibilities of heat treatment, and of its limitations. He must soon develop designing methods which shall take into account not merely the computed stresses and strains in his machine parts, but also the design of those parts so that they can be effectively heat treated without danger of destructive internal stresses.

The year has not passed without some costly lessons. Perhaps the most dramatic of these has been the troubles which have shown up in heat-treated wire for cables. Evidently here is a field requiring much study, with the possibility of the emergence to prominence of new factors which may weaken steel. The writer has heard of several conflicting theories of the cause of this trouble with wire for cables,—he is not going to advance any theory, but to urge that the progress of the investigation of this trouble, an investigation carried on by a number of laboratories—be closely watched by every steel treater and user.

Future of Tungsten Carbide

No record of the year's progress would be complete without a mention of the appearance of the new alloy, tungsten carbide, as a cutting tool—although this is not a steel at all. It was several years ago that Rosenhain in one of his addresses predicted the development of the tungsten-carbon alloys along lines roughly parallel to the development of the iron-carbon alloys. The tungsten-carbon alloys now used are a cutting-tool material rather than a structural material. What the future will bring is an intensely interesting uncertainty.

To the work and prospects of the steel treater the words of E. E. Slosson, spoken to the industrial chemists, are very true. In this field the progress of the past, instead of discouraging the hope of future progress, indicates numerous opportunities for it. In the field of heat treatment "there are as good fish in the sea as ever have been caught."

Navy Uses Color Markings for Identifying Metals

According to an announcement just made public by the Federal Standard Stock Catalog Board, Federal Co-ordinating Service, the following color designations will be used in marking the ends of metals (bar, billet, ingot and slab) for convenience in identifying:

Black (solid)—Copper, hard-drawn.
Black, with brown stripe—Steel, corrosion-resisting.
Black, with green stripe—Steel (SAE 1035), heat-treated.
Black, with lead stripe—Steel, Class A, bolt-material.
Black, with pink stripe—Steel (SAE 1035), semi-finished.
Black, with white stripe—Copper-nickel alloy.
Black, with yellow stripe—Manganese-nickel.
Blue (solid)—Bronze, rivet, medium.
Blue, with black stripe—Bronze, journal.
Brown (solid)—Steel, medium.
Brown, with black stripe—Steel, Class B, cold-rolled.
Brown, with blue stripe—Steel, nickel (SAE 2325).
Brown, with green stripe—Steel, Carbon (SAE 1035).
Brown, with lead stripe—Steel, carbon (SAE 1020).
Brown, with red stripe—Steel, carbon (SAE 1025).
Brown, with pink stripe—Steel, chrome-vanadium (SAE 6130).
Brown, with white stripe—Steel, carbon (SAE 1095).
Brown, with yellow stripe—Steel, nickel (SAE 2330).
Green (solid)—Steel, tool, carbon, Class 1.
Green, with black stripe—Steel, tool, carbon, Class 2.
Green, with blue stripe—Steel, tool, carbon, Class 3.
Green, with brown stripe—Steel, tool, carbon, Class 4.
Green, with lead stripe—Steel, tool, tungsten, Class 1.
Green, with pink stripe—Steel, tool, tungsten, Class 2.
Green, with red stripe—Steel, tool, carbon, Class 5.
Green, with white stripe—Steel, tool, carbon, Class 1, drill-rod.
Green, with yellow stripe—Steel, tool, tungsten, Class 1, drill-rod.
Lead (solid)—Aluminum.
Lead, with black stripe—Aluminum-alloy.
Pink (solid)—Brass, Naval, rolled.
Pink, with black stripe—Brass, commercial.
Pink, with lead stripe—Steel, chrome-vanadium (SAE 6145).
Pink, with red stripe—Steel, Grade P, semi-finished.
Pink, with white stripe—Steel, Grade V, semi-finished.
Red, (solid)—Steel, rivet, medium.
Red, with yellow stripe—Steel, rivet, Class B.
Red, with green stripe—Steel, spring.
Red, with white stripe—Steel, rivet, high-tensile.
White (solid)—Iron, wrought.
White, with black stripe—Steel, Class Ac, heat-treated.
White, with brown stripe—Steel, Class An, heat-treated.
White, with green stripe—Steel, Grade T, semi-finished.
White, with lead stripe—Steel, Class B, heat-treated.
White, with pink stripe—Steel, Grade N, semi-finished.
White, with red stripe—Steel, Class HG, heat-treated.
White, with yellow stripe—Steel, Grade W, semi-finished.
Yellow (solid)—Steel, machinery, cold-rolled.
Yellow, with black stripe—Steel, Grade R, semi-finished.
Yellow, with blue stripe—Steel, Class B-s (special), heat-treated.
Yellow, with brown stripe—Steel, Class C, heat-treated.
Yellow, with green stripe—Steel, Class C, semi-finished.
Yellow, with lead stripe—Steel, Class S, semi-finished.
Yellow, with pink stripe—Steel, Class B, bolt-material.
Yellow, with red stripe—Iron, cast.
Yellow, with white stripe—Steel, Class A, cold-rolled.

These colors have been used by the Navy for about fifteen years and presumably will be adopted by all departments and establishments of the Government after the issuance of the sheet of the Federal Standard Stock Catalog.

This method of identification, which represents a step in the simplification and standardization program of the Government, may be found applicable, by industry, or serve as a basis for a similar program.

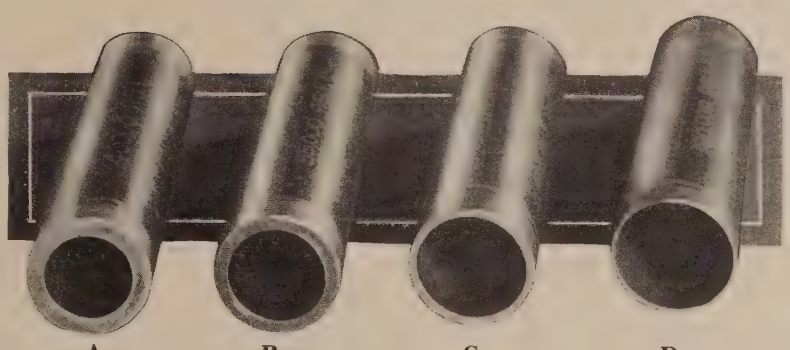
Austenitic chrome-nickel steel has been used in England for numerous seaplane parts. Cold worked wire of this type of material makes excellent springs, which have the added advantage of resisting the corrosion due to marine conditions. It also appears to be a satisfactory material for obtaining not only rustless rivets but also nuts and bolts, split pins, spar and hull fittings, skin plating and struts for floats. A modification in the composition of the austenitic nickel-chromium steels has resulted in the production of extremely satisfactory materials for exhaust manifolds and pipes.

Heat Treating Aircraft Parts

Large Electric Furnaces Handle Delicate Members Without Distortion—Exceptional Properties Obtained in Alloy Steels of Thin Section

BY HORACE C. KNERR*

HEAT treatment of delicately constructed aircraft members is one of the chief problems confronting the industry. The incorporation of steel, not heat treated, into wing spars, landing gear, struts, engine supports and sections of the fuselage, has frequently necessitated the use of fairly thick tubing—so thick, in fact, that the resulting weight was unsatisfactorily great, if not in some cases prohibitive. If these various parts could be successfully heat treated, a thinner section of tubing could be used with a saving in weight and an increase in strength and serviceability. To do this, however, without excessive distortion has hitherto been extremely difficult or impossible.



Type of Steel	Commercial Grade	Mild Carbon, Normalized	Chrome-Molybdenum, Normalized	Chrome-Molybdenum, Heat-Treated
Tube	A	B	C	D
S.A.E. No.	1015	1025	4130X	4130X
Ultimate strength, lb. per sq. in.	40,000	55,000	95,000	200,000
Breaking strength of tube, lb.	23,600	25,800	25,600	27,700
Size, dia. wall, in.	1 x 0.250	1 x 0.187	1 x 0.095	1 x 0.047
Weight per ft., lb.	2.00	1.65	0.92	0.50

A method for successfully heat treating such delicate parts has recently been perfected and has resulted in large savings in weight and improvement in strength and safety of aircraft, at the same time opening the way for more extensive and more efficient use of high-grade alloys in the construction of aircraft. It is the aim of the present article to describe how this has been accomplished.

Steel and Other Materials Compared

STEEL is the lightest of all materials of construction, when strength and weight are regarded concurrently as they should be in the design of aircraft and other structures where weight and inertia are important factors.

One of the most important considerations in determining whether a certain material should be used in aircraft construction is its strength-weight factor. This factor is obtained by dividing the ultimate strength of the material in thousand of pounds per square inch by its specific gravity. This result is, of course, purely an abstract figure, having no inherent meaning in itself, but it provides a "rating" which is easily obtained and sound in principle.

Table I gives the strength-weight factors of typical materials used in aircraft construction.

Wood is virtually obsolete as a structural material for aircraft. It is obvious, from the strength-weight factors, that metal construction is lighter than wood where design is such that the full strength of the metal is taken advantage of.

The table and accompanying cut of tubes give a forceful illustration of the weight savings possible through the use of heat-treated alloy steel of high strength. The circles represent sections through tubes of equal outside diameter, but having wall thicknesses selected so that all will have the same strength in tension or simple compression.

A duralumin tube corresponding to those of that table would have a wall thickness of 0.40 in. and would weigh 0.06 lb. per ft. Therefore it would be 20 per cent heavier than the heat-treated alloy steel tube.

It appears that unheat-treated steel cannot long survive as a material of construction for aircraft, except in those parts which act as long columns, and where structural strength is therefore determined by the modulus of elasticity of the material and not by its tensile strength.

On the basis of strength-weight efficiency, it is plain that unheat-treated steel cannot compete with duralumin, but by heat treating a suitable alloy steel to even the moderate value of 150,000 lb. per sq. in., it becomes relatively as light or lighter than duralumin.

It seems certain that both aluminum alloys and heat-treated alloy steels will have an increasing use in aircraft construction, neither one replacing the other, but each finding the application which its particular characteristics will best serve. Steel of high strength probably will be employed for landing gear, engine mounts, wing beams and fuselage structures, especially for aircraft of medium and large size, while duralumin will have its place in the structural parts of small ships and for wing surfaces, fuselage covering, engine cowling and boat hulls in gen-

*Consulting metallurgical engineer and president Metallurgical Laboratories, Inc., Philadelphia.

Table I—Strength-Weight Factors of Materials

		S.-W. Factor
Wrought metals (tension):		
Music wire (0.10 in. dia.)	400 ÷ 7.85	51
Alloy steel heat-treated (high)	200 ÷ 7.85	25
Alloy steel heat-treated (medium)	150 ÷ 7.85	19
Duralumin	55 ÷ 2.85	19
Magnesium alloy	34 ÷ 1.75	19
Alloy steel heat-treated (low)	125 ÷ 7.85	16
Alloy steel normalized	95 ÷ 7.85	12
Mild steel normalized	55 ÷ 7.85	7
Aluminum annealed	12 ÷ 2.7	4.4
Wood (compression):		
Balsa	2.2 ÷ 0.12	18
Douglas Fir	6 ÷ 0.54	11
Spruce	4.3 ÷ 0.43	10
Oak (white)	5.9 ÷ 0.74	8

eral. Both steel and aluminum alloys depend, of course, upon heat treatment for their high strength.

Properties of Chrome-Molybdenum Steel

OWING to its remarkable combination of properties, chrome-molybdenum steel, No. 4130X, is rapidly becoming the standard structural material for aircraft.

This steel (Table II) is readily worked into seamless tubing of the required diameters and thin walls, as well as into sheet and bar stock. When properly made and annealed, it will withstand severe cold forming as in the manufacture of fittings, and can be readily hot worked as in the bending of tubes or the production of forgings. It is easily machined in the annealed state, and one of its outstanding characteristics is superior machineability in comparison with other alloy steels, after heat treatment to a given high strength and hardness. It has exceptionally fine welding characteristics under the oxyacetylene flame, and also is readily welded electrically.

By means of a normalizing treatment consisting simply in heating above the critical temperature, about 1600 deg. Fahr., and allowing to cool freely in air, it develops a tensile strength of 95,000 lb. per sq. in. or over, with a yield point of 60,000 lb. per sq. in. or over, and an elongation of more than 12 per cent in 2 in.

Oil Better Than Water for Quenching

After welding, a section near the weld has unavoidably been heated to an annealing temperature. This portion has a strength of something better than 80,000 lb. per sq. in. These physical properties are satisfactory for certain parts of aircraft where the members act as "long columns" and design stresses are determined principally by the elastic modulus of the material.

One of the most satisfactory characteristics of this steel, however, is its response to heat treatment, consisting of quenching from about 1600 deg. Fahr. followed by suitable tempering. It may be quenched either in oil or in water. Various authorities (including certain Government specifications) have heretofore recommended quenching in water, but experience at the Metlab plant has shown that oil quenching is decidedly preferable for parts other than those of large or heavy cross section.

Oil produces as good or better tensile strength than water and gives a higher combination of strength and ductility. It also appears to give a higher yield point or elastic limit for a given tensile strength. At the same time there is little tendency to cause warping during the quenching operation and the liability to cracking in quenching is practically eliminated, whereas these are considerable when water is the quenching medium.

Values given in Table III are typical of the results obtained in the heat treatment of this steel by the method described in this article.

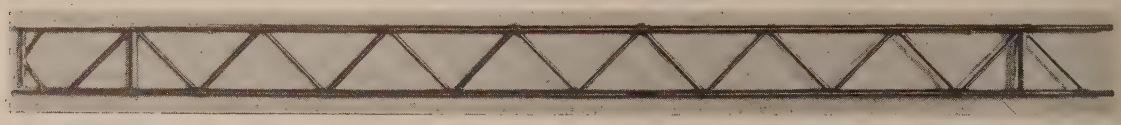
Table III—Typical Tensile Properties of Chrome-Molybdenum Steel, No. 4130X, Oil-Quenched and Tempered

	Yield Point, Lb. per Sq. In.	Ultimate Tensile, Lb. per Sq. In.	Elong. in 2 In. Min. Per Cent
Specified	110,000	125,000	11.0
Obtained	115,000	130,000	*16.0*
Specified	130,000	150,000	9.0
Obtained	140,000	155,000	*12.0*
Specified	140,000	175,000	7.0
Obtained	160,000	180,000	*10.0*
Specified	150,000	200,000	5.0
Obtained	185,000	215,000	*8.0*

Note.—Owing to geometric effects in the specimen, specified elongation must be much lower for thin specimens than for thick. The above values are corrected for thickness.

Manufacturing and Treating Problems

FABRICATION of aircraft parts consists primarily in the cutting to size and shape of sheet and tubing, bending and forming, and assembly by welding. Machining operations in the ordinary sense are restricted to a few parts requiring accurate surfaces and fit, such as axles, end fittings for struts and engine mounts and the like. Where a moderate strength is sufficient, the steel may be fabricated in the normalized condition and left so. For important structural parts which are subjected to high stresses, shock, fatigue and overload, this steel is fabricated in the annealed state, and heat treated after welding. In some cases, it is desirable to heat treat parts before assembly and then assemble by means of (tubular) rivets, instead of welding. The good machining qualities of chrome-molybdenum steel make it possible to cut, drill and otherwise machine parts prior to assembly which have been treated to a strength of 150,000 to 200,000 lb. per sq. in.



A WING Spar Made of Steel Tubing Heat Treated Successfully After Assembly. Length 10 ft. Heat treated to 135,000 lb. per sq. in. A delicate member which can be handled in a vertical furnace

Table II—Chrome-Molybdenum Steel, Composition No. 4130X Army-Navy Standard

	Per Cent
Carbon	0.25 to 0.35
Manganese	0.40 to 0.60
Phosphorus (max.)	0.040
Sulphur (max.)	0.045
Chromium	0.80 to 1.10
Molybdenum	0.15 to 0.25

Heat treatment of aircraft parts is in a class by itself. Made, as they are, of tubing and sheet ranging in thickness from about 0.035 in. to ¼ in. and varying in size, shape and length from small fittings to axles 6 or 8 ft. long, engine mounts 3 ft. sq. and wing spars 25 ft. in length, they are extraordinarily delicate at the quenching temperature and exceedingly liable to distortion. They are likely to cool prematurely and irregularly during transfer from the furnace to the quenching tank. Because of their thinness, a small amount of scale or decarburization has a large effect in reducing the strength of the members. They are often of complex form. Typical heat-treated parts are shown in some of the illustrations.

Attempts to heat treat aircraft parts by the usual methods and in the ordinary furnaces are generally disas-

trous. During heating through the critical range they sag under their own weight. On lifting out of the furnace for quenching they sag again, in other directions. Upon quenching horizontally they warp again due to side contact of the quenching medium. There are therefore three chances for distortion. Attempts to straighten after heat treatment usually result in denting or crushing, because of the thinness of the walls.

Difficulties encountered were so serious, and the failures so costly, that many aircraft engineers became discouraged and gave up the idea of using alloy steels where heat treatment was required, sacrificing lightness or using more costly or less satisfactory means of construction.

The author's contact with these problems as chief metallurgist of the Naval Aircraft Factory, Philadelphia, convinced him that the difficulties could be solved only by suspending the parts vertically during heating, in such a way as to avoid all tendency to distortion, in a furnace permitting close control of both atmosphere and temperature, and arranged for quenching the charge without rehandling it, by lowering it without other movement into a quench tank placed directly beneath. Furthermore, the charge must be kept under control during quenching, being lowered rapidly, but without swinging, out of the furnace into the quenching tank, where it must be brought to rest beneath the surface without shock. Quenching should be in oil.

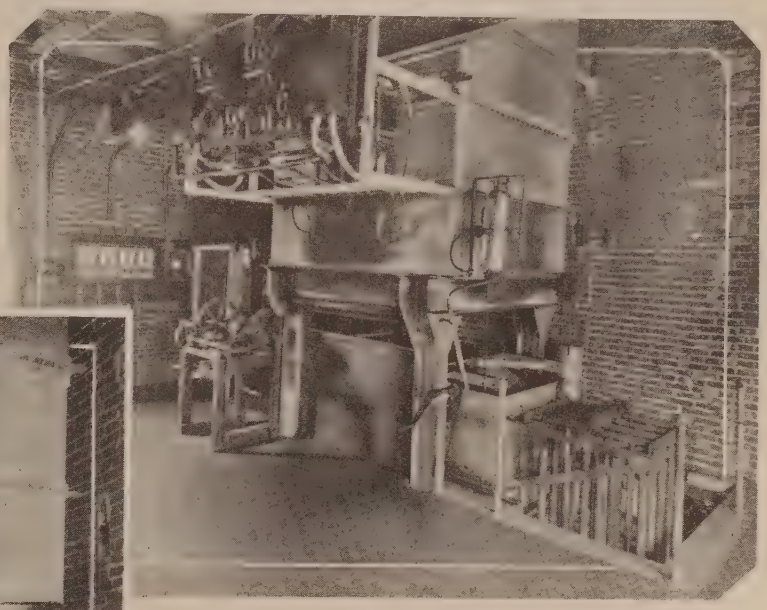
The advantages of oil as a quenching medium have been outlined, but its use entails a serious fire hazard which must be guarded against. When the oil enters hot tubular members at the moment of quenching, there is a tendency for it to break down into its more volatile constituents. These are superheated on passing upward through the tubes and issue from the open end as a mass of flame. Should a charge become stuck part way out of the oil bath, or be lowered too slowly, a very large amount of flame may be produced, with serious consequences. In obtaining the advantage of the use of oil as a quenching medium, it is necessary to overcome this danger.

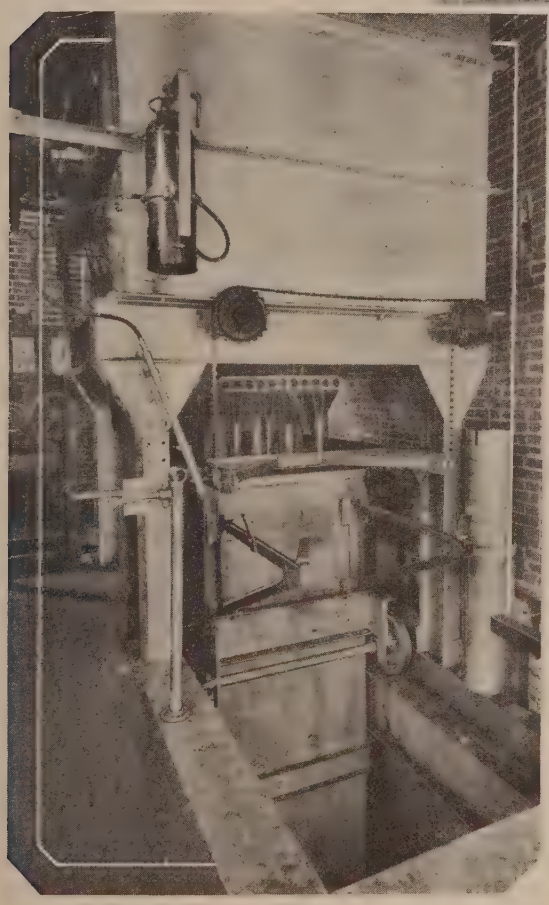
Aircraft parts may be divided roughly into four classes:

1. Fittings and other small miscellaneous parts.
2. Bulky parts such as engine mounts, fuselage sections, landing gear of the V-strut type, etc.
3. Long straight members including axles, struts and wing beams.
4. Tubing and bar stock to be fabricated after heat treatment.

For economical operation these call for three furnaces of different size and shape. A small furnace for class 1, a furnace of large section and moderately great length for class 2, and a furnace of moderate section but great length

BELOW Is Furnace 11 Ft. High and 33 in. Sq. Inside. Quench tank is directly under furnace in position it would be in for quenching. The charge is shown almost in the oil with the alloy spider just appearing below the furnace





THE General View of 10-Ft. Furnace. Furnace resting on framework in centre of picture (above). Quench tank is seen just to right of legs of furnace. A charge has been hung on the alloy spider which is resting on the rack attached to the quench tank. The next operation would be to lower the door, roll it to one side and move the tank so that rack is directly under furnace opening and pull the charge up into the furnace. The automatic controllers and recorder are seen to the left on the wall. The control relays are mounted in front of the furnace. The winch for raising and lowering the work is directly to the left of the furnace

CENTER Section Cross Tube on Bottom of Fuselage, Heat Treated to 200,000 Lb. per Sq. In.

for classes 3 and 4. Small parts may, of course, be treated in either of the furnaces intended for parts of class 2 or 3, when the quantity warrants.

Necessity for close and automatic temperature control, and the vertical position of the heating chamber favor the use of electrical heating. Electrical furnaces of the size required to handle aircraft parts of classes 2, 3 and 4 and having the necessary temperature regulating equipment and the mechanism for handling the charge are quite costly. They must have a reasonably large capacity in pounds per hour to avoid an excessive labor cost per pound of work heat treated. For anything like continuous operation they would therefore have an output far in excess of the production requirements of even the largest aircraft manufacturer today or for some time to come.

To the high first cost, maintenance, depreciation and electrical stand-by charges, there must be added the burden of overhead of a highly trained staff. The heat treatment of aircraft parts calls for specialized metallurgical knowledge on the part of the management and carefully trained operatives at the furnace.

The answer to the problem is believed to be found in the creation of a central plant with specially designed furnaces operated by specialists and fully equipped in every way, including laboratory facilities, to which aircraft manufacturers may send their parts for heat treatment. By massing the production in this way, the cost of treatment per pound is brought down to a reasonable figure. Such a plant has been established in Philadelphia, a location which probably is near the center of production of the aircraft industry and otherwise favorably situated. The plant is described in the following:

Design of the New Furnaces

TWO furnaces designed by the author constitute the major items of equipment. One has a heating chamber 3 ft. sq. and 10 ft. high, for the treatment of parts of moderate length but large width, such as landing gear, engine mounts, fuselage sections and the like. The other is capable of handling parts up to 25 ft. long and 2 ft. in diameter, such as wing beams, spars and straight tubing and bar steel. Small parts are handled in quantities in either furnace.

These furnaces are similar in construction and operation. They really should be referred to as heat-treating machines, as the furnace itself is only one unit in a relatively complex mechanism, every part of which must function correctly and with precision in order that satisfactory results may be obtained.

Each furnace has a capacity of 400 lb. of steel per hr. By operating continuously it would therefore be possible to turn out 57,600 lb. of work in either furnace in a 6-day week. This is equivalent to more than 5,000,000 lb. a year for both furnaces together, which presumably would be ample capacity for the needs of the entire aircraft industry for some time to come.

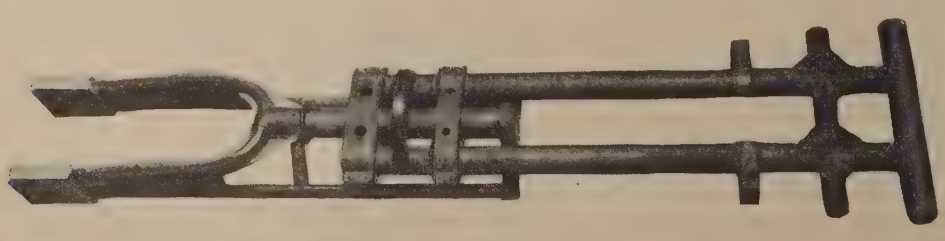
At the present time, when the demands are small in comparison with the furnace capacity, each furnace is used for quenching on one or two days only of each week. As the power stand-by charge is high, and is determined by the peak load in any month, the two furnaces are connected with the same main power switch, and used alternately, never simultaneously. The temperature controllers and recorders are arranged so that they may be connected with either one furnace or the other and so that one set suffices for both. When production increases to a point warranting the extra stand-by charges involved in operating both furnaces at once, this can easily be arranged by adding another main switch and control panel and making a few changes in wiring.

The furnace heating elements consist of nichrome ribbons suspended upon General Electric refractories. The lining is of supersilocel brick and is backed up by 13 in. or more of silocel powder insulation. The heating elements are divided into horizontal zones, the 10-ft. furnace having 4 zones and the 25-ft. furnace 6 zones. The zones nearest the top and bottom are of shorter length than the intermediate zones, in order to take care of end losses.

Each zone is automatically controlled by a Wilson-Maeulen controller. It is possible to maintain temperature uniformity throughout the heating chamber within plus or minus 10 deg. Fahr. at any temperature up to 1700 deg. Fahr. The temperature at various points in the furnace is recorded continuously on a Leeds & Northrup multiple point recorder. The recorder and controllers are on entirely independent thermocouple circuits so as to afford a check and warning should any part of either system get out of order. A fan is provided to circulate the furnace atmosphere and insure uniformity at low as well as high operating temperatures.

The two furnaces have about the same power demand, about 90 to 95 kw. and are connected with a 220 volt, three-phase line. Radiation losses are about 30 kw. at 1600 deg. Fahr. They are placed vertically side by side upon structural steel columns, and having a working space between them. The quench tanks are mounted directly beneath the furnaces on small cars having ball-bearing wheels which run on tracks attached to the columns, permitting the tanks to be moved laterally. The bottom of each furnace is fitted with a door or plug, which is first lowered and then moved to one side when charging or discharging the furnace.

The furnaces are elevated to such a height on



FRONT Landing Gear, Fabricated and Heat Treated by Metlab. Heat treated to 180,000 lb. sq. in. Overall height, 5 ft., 6 in.

the structural steel framework as to be conveniently operated from the second floor of the building, thus avoiding the necessity for a large excavation in order to accommodate the quenching tanks. The tank for the 10-ft. furnace together with its sump tank is entirely above ground level; the lower part of the tank for the 25-ft. furnace, itself 27-ft. deep, moves in a concrete lined well 12-ft. deep, the remainder being above ground.

Both furnaces are in a small building separated by a brick wall from the main building and reached through a fire door. The work is prepared in the main building and passed through the fire door for loading and back again after treatment. This arrangement removes the fire hazard from the main building, which is utilized for manufacturing purposes.

All openings in the furnace, such as power and thermocouple leads, are sealed, so that no draft occurs and the atmosphere of the heating chamber can be closely controlled. Oxidation of the work is thereby avoided.

A sump tank, which is stationary and provided with water-cooling coils, is placed on the ground directly beneath the quench tank of the 10-ft. furnace. By means of a centrifugal pump the oil is pumped from the sump tank to an inlet in the bottom of the quench tank and allowed to overflow through a manifold at the top of that tank, from where it returns through a down pipe to the sump tank. The hottest oil therefore overflows immediately and is cooled while new oil replaces it in the tank from below. This produces an ideal circulating arrangement. Additional and quite strong circulation is produced in the quench tank by means of stirring devices. The same sump tank is used for both furnaces, being connected with the circulating system of either quench tank by means of three-way valves.

Quenching and Tempering

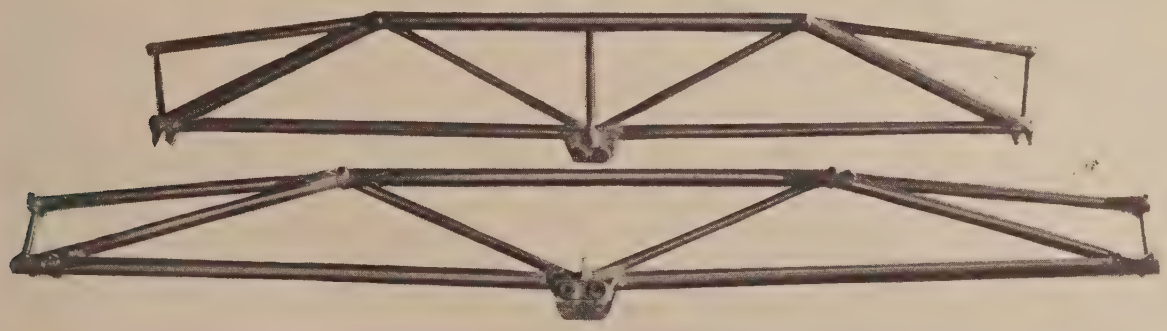
THE work to be heat treated is hung on a rack or spider of heat-resisting alloy, by means of nichrome wires or hooks. It is suspended in such a way as to be free from all tendency to sag under its own weight while hot. The spider and charge are now raised into the heating chamber where they remain suspended until ready to be quenched. The quenching tank is then brought into position directly below the opening in the bottom of the furnace, and the charge is lowered straight down into it, without other motion.

While the production demands are not great, a furnace is used for quenching on one day and for tempering on the following day. The temperature of the heating chamber has by then dropped to that required for tempering (600 to 1100 deg. Fahr.), so that only a small amount of current is needed for the latter. The operations during tempering are similar to those during quenching, except that the oil is drained from the quenching tank. When it becomes necessary to run the furnaces continuously for quenching at 1600 deg. Fahr., separate furnaces designed especially for the purpose will be installed for tempering. These will be of different and simpler construction.

Some Results Obtained

THESE furnaces have been used for about a year, in the heat treatment of a great variety of aircraft parts. The percentage of loss due to unsatisfactory treatment, including warping, has been nearly zero. The physicial properties obtained are usually far in excess of the specified values (see Table III) and in fact exceeded expectations for this grade of steel. Examples of high-tensile properties of test specimens of parts are shown in Table IV. This steel is in no sense "brittle," as specimens can be bent nearly double without cracking.

LANDING Gear, Heat Treated to 180,000 Lb. per Sq. In.



Center Section Spars, Front and Rear. Heat treated to 180,000 lb. per sq. in. Length, 8 ft.

Distortion has been reduced to a negligible point. The first wing beam treated was 10 ft. long. After treatment the deformation was less than 3/16 in. in 10 ft. and this has been bettered in the considerable number of such beams treated to date. Parts of complex form, such as shown in illustrations, have been treated without noticeable distortion.

Duralumin Treated in These Furnaces

THESE furnaces are suitable also for the heat treatment of duralumin and other aluminum alloys, either cast or wrought. These alloys, when made up into delicate and complex parts such as bulkheads for flying boats, fuel tanks, etc., have a persistent tendency to distortion

Table IV.—Typical Examples of Physical Properties Obtained by the Heat Treatment Described

Dimensions, Inches	Area, Sq. In.	Yield Point Lb. per Sq. In.	Ultimate Strength Lb. per Sq. In.	Elongation Per Cent in 2 In.		
				Max.	Min.	Aver.
0.083 x 0.489	0.0406	192,000	211,000	6.0	5.5	5.75
0.154 x 0.495	0.0762	201,000	213,000	8.5	8.0	8.25
0.112 x 0.495	0.0554	200,000	211,000	7.0	7.0	7.00
0.083 x 0.490	0.0407	191,500	226,000	5.0	4.0	4.50
0.188 x 0.710	0.133	212,000	229,000	9.0	9.0	9.00
2¼ x 0.125	0.817	185,000	230,000	11.0	8.5	9.75

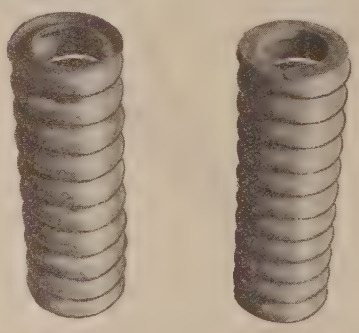
*Tube tested in full section; other flat specimens cut from wall, gage section ½ in. by 2 in.

†These values are high in view of thinness of specimen.

during heat treatment when treated in the ordinary way, even though the temperature is low, because of the great plasticity of the metal at the quenching temperature.

Such parts may be heat treated in these furnaces by suspending them with iron wires from the spider at as many points as necessary to distribute the weight evenly and avoid sag. In one case parts treated in this furnace were straightened after quenching with approximately a half hour's work, whereas it had previously taken five or six man-hours of labor to accomplish the result after quenching in water.

It has been shown that the corrosion of duralumin is influenced by the rate of cooling during the quenching operation.* Quenching in water produces a greater resistance to corrosive attack than quenching in oil or cooling in air, although the tensile properties obtained are practically the same with oil, hot or cold water, and only moderately lower with air.



COMPARISON of Springs Made from Solid Spring Stock and Chrome-Molybdenum Steel Seamless Tubing. The spring on the left, made from tubing, weighs two-thirds of the one on the right, made of solid stock, and carries a 15 per cent greater load. Heat treated to 200,000 lb. per sq. in.

water.

The new form of duralumin, known as Alclad, which has a thin coating of almost pure aluminum on its surfaces, has an immensely greater resistance to corrosion than ordinary duralumin. As this material owes its resistance to corrosion to the coating and not to the properties of the metal itself, it is probable that oil quenching would be satisfactory and would show no inferiority in its resistance to corrosion compared with Alclad quenched in water.

It has been found that oil produces very much less distortion in quenching than water. Owing to the fact that duralumin is soft immediately after quenching, it is common practice to make up parts, quench them and then do any necessary straightening while the material is still plastic. Due to the considerable distortion caused in water quenching, this straightening operation is often quite costly and tedious. It may therefore be avoided by using Alclad and quenching in oil, heating being done in an electric furnace instead of molten salt to avoid the adherence of the latter to the work. The elimination of salt as a heating medium removes another possible source of corrosion.

Other Uses for the Furnaces

These furnaces are finding many uses outside of the aircraft industry, wherever parts of relatively thin section and long length must be heat treated without distortion. For example, hollow steel rolls such as are used in the textile and linoleum industries; arbors; blades, such as are used in paper machinery; shafts, both hollow and solid, such as are used in the oil industry.

The furnaces are satisfactory for carburizing long members, such parts being packed in tubular retorts of thin wall. Heating while suspended vertically avoids the sag which usually occurs during carburizing in horizontal boxes.

Complete testing and metallographic laboratory facilities are a part of the plant equipment. Tensile test specimens representing the material are introduced with each charge and are tested immediately after heat treatment.

Aircraft manufacturers located at a distance from the plant usually find the delay incidental to shipping their parts for heat treatment and return interferes with production schedules and adds an item of expense. In connection with the heat-treating plant, a fabricating shop for aircraft parts has therefore been established in which wing beams, landing gear and other parts requiring heat treatment are made up to the aircraft manufacturer's blue prints and specifications, heat treated and shipped to the aircraft plant ready for final assembly.

*"Duralumin" *Transactions* of American Society for Steel Treating, 1922, by Horace C. Knerr.

Surface of Drilled, Reamed and Press-Finished Holes

Smoothness of interior finish of drilled, reamed, or press-finished holes has been studied by Dr. O. Schlippe (*Engineering*, July 12, 1929, page 33). The quality of the surface left in a drilled hole depends upon the metal and the speed; those drilled in harder steels and cast iron are generally smoother than in copper. Smoothness is also promoted by low speeds and small feeds. Reamers make a much better hole, if sufficient care be taken not to gouge the surface with tiny chips entrained in the cutter.

Aside from grinding and polishing, the best hole is made by press finishing, i.e., forcing a polished steel ball through a slightly undersize hole, already drilled and reamed. This gives a work hardened surface, smooth as a mirror, similar in aspect to a cleaned gun-barrel.

Doctor Schlippe's studies were made on gelatine casts of the surfaces, and are summarized in the table. The reamed holes, though much smoother than the drilled ones, have tiny and sharp corrugations which scatter the light and give a dull luster. Press finishing obviously cannot smooth out the irregularities in drilled holes in a single pass, unless the increase in radius is of the same order as the deepest groove. Several passes with increasing ball sizes may be necessary before this end is reached.

Worked by	Material.	Maximum Groove Depth in Microns (0.001 mm.)
Twist-drill	Ingot-iron	About 30
"	Open hearth steel	" 20
"	Perlitic cast iron	" 45
"	Bronze	" 12
"	White metal	" 10
Reamer, machined	Ingot-iron	" 8
" by hand most carefully	" "	" 5
Reamer, by hand	Open hearth steel	" 6
" " "	Perlitic cast iron	" 12
" " "	Bronze	" 5
" " "	White metal	" 5
Press finish-ball	All materials	About 1 to 2

Revises Specification For Manganese Steel Welding Rod

Chemical specifications for manganese steel welding wire have been revised by the American Welding Society to read as follows:

Carbon	1.10 to 1.35 per cent
Manganese	11 to 14 per cent
Phosphorus	0.05 to 0.09 per cent
Sulphur	0.007 to 0.04 per cent
Silicon	0.10 to 0.20 per cent

Such rods are intended for use in building up surfaces where an extremely hard, tough metal is required, such as track frogs, crossing centers, switch points and dredge buckets.

Strip or open-pit mining is adapted to minerals of low market value. For instance, anthracite averages $5.60 in value a short ton and bituminous coal $2.20; copper, $2.80 to $4.40 a long ton; iron, $4.55 a long ton; bauxite, $6.15 a short ton; and pebble phosphate, $3 a long ton.

Making a Whirlwind Crankcase

Successive Steps in Machining the Castings for a Nine-Cylinder Wright Engine—Multiple Operations Performed Simultaneously or in Sequence

BY FAY LEONE FAUROTE*

MANUFACTURE of the Wright crankcase begins in the foundry with the act of making an assembly of the cores in the mold. Due to the intricate form of some of these aluminum-alloy castings, it is of the utmost importance that all cores be properly placed and the molds be well ventilated.

After pouring, the molds are shaken out, core wires removed, sprues and risers sawed off on the band-saw, the casting chipped with chisels and files, snag-ground on an emery wheel and finally sand-blasted. They are then given a general inspection on a checking fixture for the correct location of pads, bosses, etc. After being pickled long enough so that cracks, seams and other defects, if any exist, may be easily spotted, the castings are thoroughly washed in boiling water, and meticulously inspected.

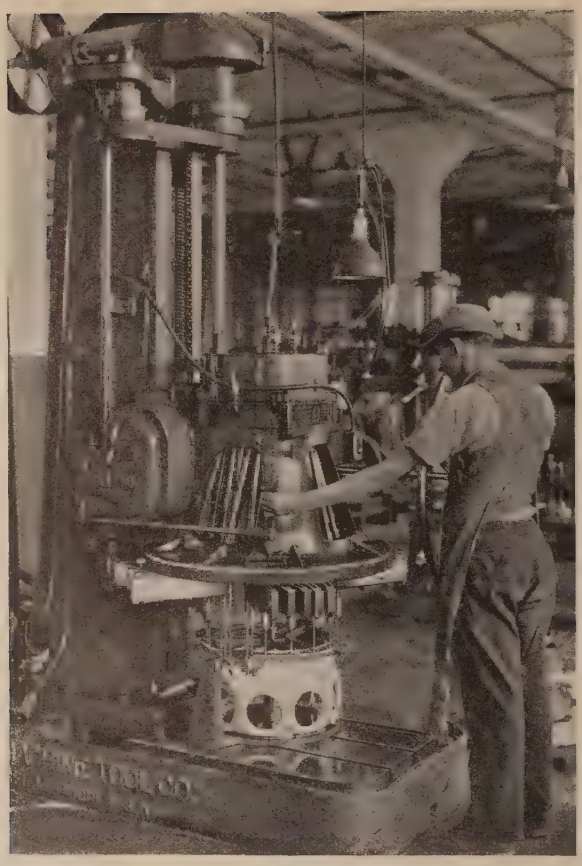
The first series of machine operations on the crankcase castings, which are performed on a 36-in. Bullard vertical turret lathe, are as follows:

Rough and Finish Face and Turn Flange, Recess and Bore

Rough face rear section flange to 6 13/16 in. from center of cylinder hole (check 3/16 in. thickness of flange).
Rough face crankshaft bearing hub to 2.297 in. ± 0.004 in. from face of flange.
Rough turn 12 9/16-in. diameter to 12⅝-in. diameter, making 2.262-in. dimension 2¼ in.
Rough form recess to 12⅝ in. diameter, holding 45-deg. angle.
Turn 12⅝-in. diameter making 2.917-in. dimension 2 29/32 in.
Rough bore 3.703-in. diameter hole to 3 41/64 in. diameter.
Rough bore 17.312-in. diameter to 17¼-in. diameter x 5/16 in. deep.
Finish face flange to 6 25/32 in. from center of cylinder holes.
Finish turn 12 9/16-in. diameter up to 2.262-in. ± 0.002-in. dimension.
Finish form recess to 12 9/16-in. diameter, turning 12 9/16-in. diameter up to 2.917 ± 0.002-in. dimension.

*Mechanical engineer, New York. In THE IRON AGE of July 18, page 148, Mr. Faurote described the airplane engines of the Wright Aeronautical Corporation. In the issue of Aug. 8, page 337, he told how the connecting rods were machined, in the issue of Aug. 15, page 402, he covered the machining of the crankshaft, and in the issue of Aug. 22, page 462, he outlined the steps in machining the cylinders. A final article will be devoted to the assembly work.

TURNING and Facing Flange, and Boring Main Bearing Hole in Crankcase, Main Section, of J-6 Series Engine



Multiple Drilling All Flange Holes in One Operation on Crankcase of J-6 Series, Nine-Cylinder Whirlwind

Finish bore 17.312 ± 0.0015-in. diameter x 5/16 in. deep, holding 1/16-in. radius and forming 1/16 in. x 45 deg. chamfer.
Finish bore 3.703 ± 0.0005-in. diameter hole.
Finish bore 3/16 in. wide x 3⅞ in. diameter recess in 3.703-in. hole, holding 1/32-in. radius in corner ⅜ in. from face of boss.

Next the front face of hub is faced, turned and chamfered on a 36-in. Bullard. The operations, after clamping casting in fixture, are as follows:

Rough face front section to 10 5/16 in. diameter overall.
Rough turn 16.249-in. diameter to 16 5/16 in. diameter x 5/16 in. long.
Finish face to 10 9/32 in. overall.
Finish turn 16.249 ± 0.0015 in. x 5/16 in. to size, holding 5/64-in. radius.
Form 1/16 in. x 45-deg. chamfer.
Rough face crankshaft bearing hub to 1.031 in. overall.
Form 1/16 in. x 45-deg. chamfer in 3.703-in. diameter hole.
Break sharp edges.

Next the 20 flange holes are drilled on a No. 2 Baush multiple drill, using a jig. Money has not been spared in securing machines which will lower production costs. The drilling has this series of operations:

Set casting in baseplate.
Set jig in place and target cylinder pads and valve tappet guide bosses.
Clamp fast.
Drill twenty 11/32-in. diameter holes through.

A 3-ft. sensitive radial drill is used for two successive operations. First it serves to drill and countersink blind holes, as follows:

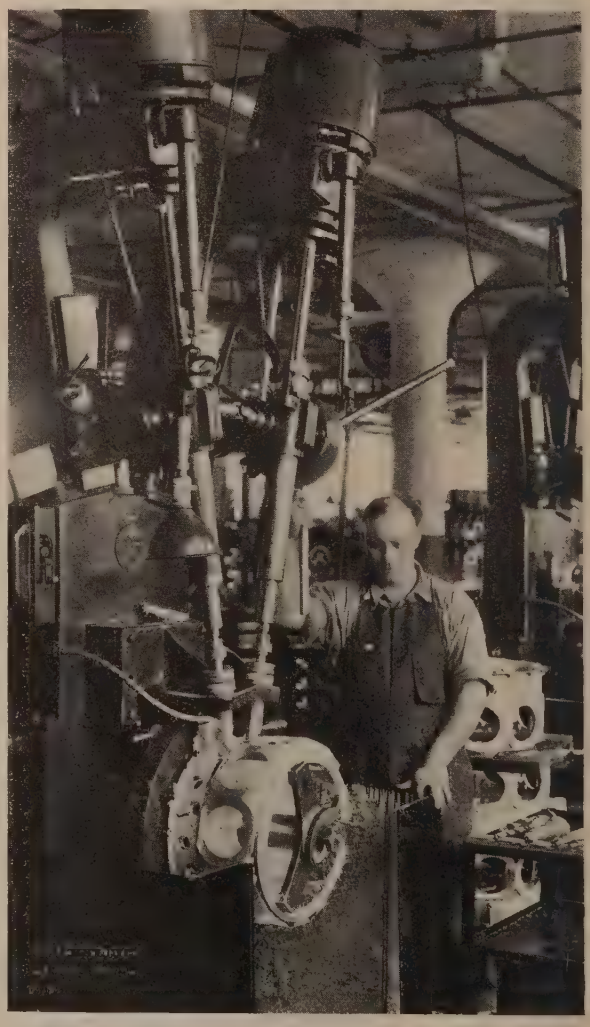
Drill three 11/32-in. diameter holes x 3/64 in. deep. (Grind point of standard drill to 7 deg.)
Remove jig.
Countersink slightly to remove burrs (flange face side only).
Use hand burring countersink.

Five holes then are drilled with the 3-ft. sensitive radial drill:

Drill two 23/64-in. diameter holes and ream to 0.375 in. ± 0.001-in. diameter through (these holes are held close, contrary to B. P., for later machining operations).
Drill three 11/32-in. diameter holes x 3/64 in. deep to point of drill. (Grind point of standard drill to 7 deg.)

Then with a Baush multiple drill, 14 "F" holes, 0.257-in. diameter x ⅞ in. deep, are drilled in front section mounting flange. The casting is next transferred to the table of the 3-ft. sensitive radial drill. Then the fourteen 5/16 in.-18P tap holes in front section mounting flange are counterbored to 21/64 in. diameter x 1/64 in. deep.

Next a 45-deg. pad is milled on a plain miller, milling a 45-deg. face, holding 2 23/32-in. dimension and 8 31/32-in. dimension.



Drilling, Reaming, Tapping Valve Guide Holes in Crankcase, Main Section, of Nine-Cylinder Engine

The oil strainer housing is milled on a No. 2 plain miller, rough and finish milling it to 12 in. from centerline. A 0.125-in. feeler is used to set for the finish cut.

The nine cylinder pads are milled on a rigid mill, being rough and finish milled to 9.000 ± 0.005 in. from center. The measure is made from center plug with flush pin gage.

Nine cylinder holes are rough and finish bored to 5.196 ± 0.005-in. diameter and then chamfered 1/16 in. x 45 deg. with a heavy-duty drill.

Valve tappet holes are drilled, bored and reamed on a Leland-Gifford two-spindle special drill. Proper position of valve tappet guides is essential for smoothly working valve actuating mechanism. The work proceeds with the following series of operations:

Drill two valve tappet holes (exhaust and intake) at 1.797 ± 0.003 in. and 2.452 ± 0.001 in. dimension from rear flange, ¾ in. diameter, through bosses and carrier ring. Index and repeat to a total of nine operations.

Step drill two valve tappet holes (exhaust and intake) 15/16 in. to 1¼-in. diameter (1¼-in. diameter to 8 3/32 in. from center). Index and repeat to total of nine operations.

Bore two valve tappet holes (exhaust and intake) 1 3/64 in. diameter and 0.900 in. diameter through. Index and repeat to total of nine operations.

Counter bore two valve tappet holes (exhaust and intake) to 1.293 ± 0.002-in. diameter to 8 1/16 in. from center. Form 1/32-in. x 45-deg. chamfer at 1 3/64-in. diameter hole. Index and repeat to total of nine operations.

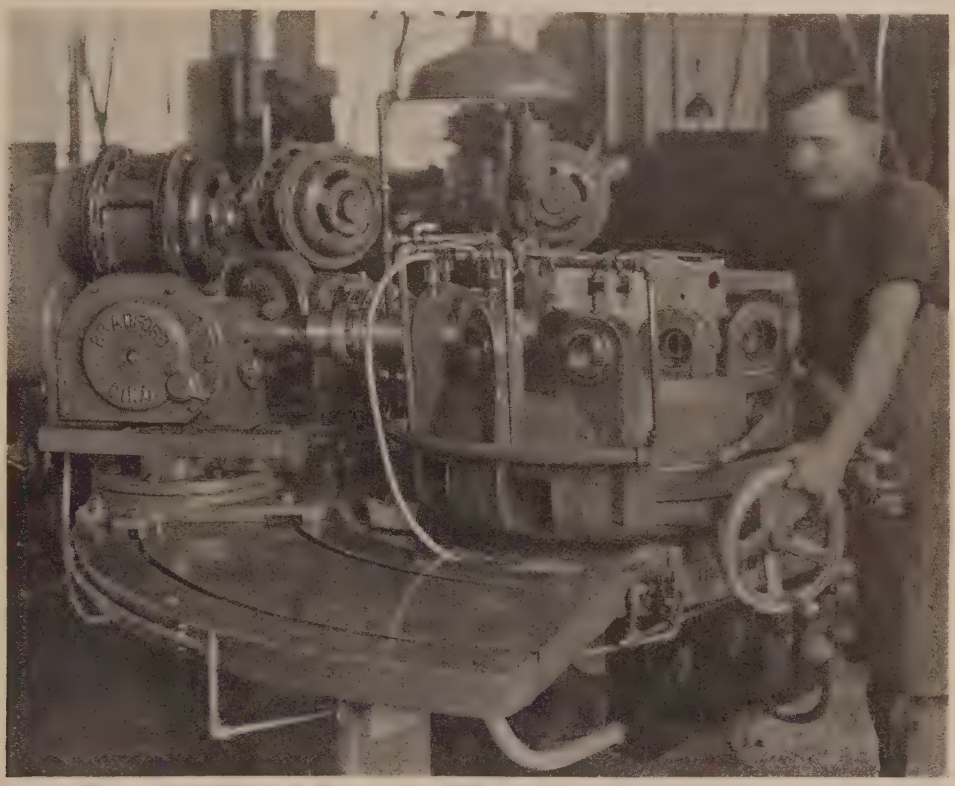
Spotface two valve tappet holes (exhaust and intake) 1½ in. diameter to 8⅝ in. dimension from center. Form 1/16-in. x 45-deg. chamfer at 1.293-in. diameter hole. Index and repeat to total of nine operations.

Line ream two valve tappet holes to 1.0625 ± 0.0005 in. and 0.916 ± 0.0005 in. diameter. Index and repeat to total of nine operations.

Tap two valve tappet holes 1⅜ in.-12P USSF to gage to ⅜ in. dimension full thread. Index and repeat to total of nine operations.

Cylinder pad holes are drilled, counterbored and tapped, using a Leland-Gifford special drill, with the following operations:

Drill eight 5/16-in. diameter holes 1 in. deep in cylinder pad.
Index and repeat for total of nine pads.
Counterbore eight holes 13/32 in. diameter x 1/64 in. deep.
Index and repeat for total of nine pads.



SPOT Facing, Boring and Tapping Intake Port Holes in Crankcase, Rear Section, of Nine-Cylinder Whirlwind Engine

Tap eight ⅜ in.-16P USSF ⅞ in. deep.
Index and repeat for total of nine pads.

Next, the bolt bosses are machined on a drill press to 5 7/16 in. diameter at cylinder pads 4, 5, 6 and 7. The next process is to drill, spotface, chamfer and tap the lifting boss and oil-strainer housing, using a radial drill:

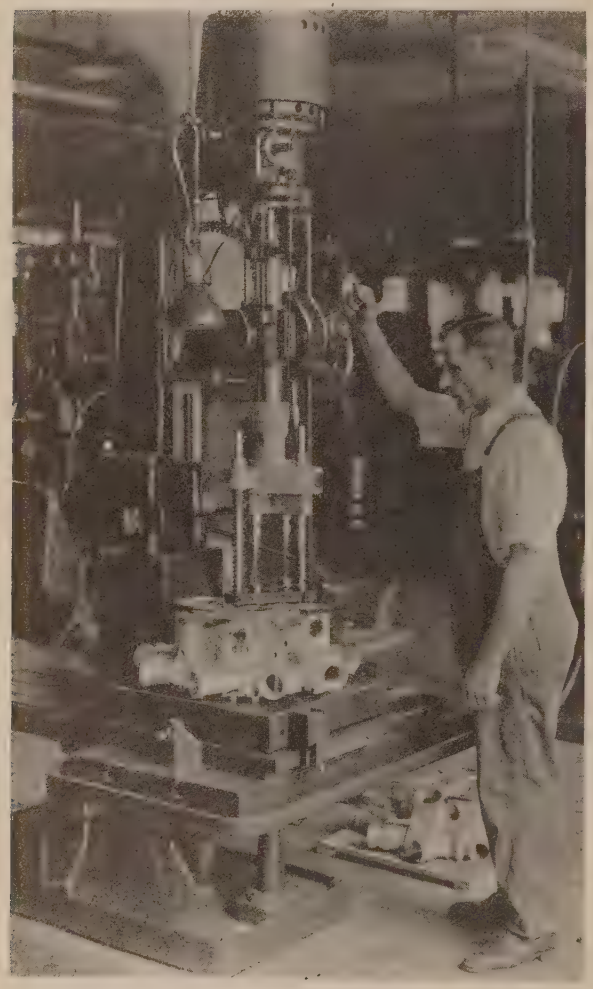
Drill 21/32-in. diameter hole in lifting eye boss 11/16 in. deep.
Spotface 1¼ in. diameter to 9¼ in. dimension from center.
Chamfer 1/16 in. x 45-deg.
Tap ¾ in.-10P USSF 9/16 in. deep full thread.
Index and repeat operation on other hole.
Index.
Drill 1 11/32-in. diameter hole in oil-strainer housing.
Redrill to 1.543 ± 0.003 in. diameter through outside wall only.
Counterbore to 1 15/32 in. diameter x 1/16 in. deep.
Chamfer outer wall 1/16 in.-45-deg.
Tap 1⅝ in.-12P USSF thread.

A 30-deg. angle hole is then bored and drilled, with the casting on the table of a drill press, and a 9/16-in. hole is bored and drilled, as follows:

Bore ⅝-in. diameter hole ½ in. deep at 2 23/32-in.

dimension, using ⅝-in. diameter two-lip end mill, holding 30-deg. angle.
Drill ⅝-in. diameter hole 1 in. deep at 2 23/32-in. dimension, holding 30-deg. angle.
Bore 9/16-in. diameter hole ½ in. deep at 8 31/32-in. dimension, using 9/16-in. diameter two-lip end mill.
Drill 9/16-in. diameter hole at 8 31/32-in. dimension.

Using a sensitive radial drill two 45-deg. stud holes are drilled and tapped, following which the outer boss



Drilling Magneto Pad Holes in Crankcase, Rear Section, Nine-Cylinder Engine. Note threading on inside of intake ports

holes are drilled, primed, reamed and tapped with the sensitive radial drill, in the following manner:

Drill two "F" (0.257-in.) diameter holes in 45-deg. face through.
Tap two 5/16 in.-18P USSF to gage.
Drill 7/32-in. diameter hole through outer boss with standard drill.
Redrill 7/32-in. diameter hole, breaking through into 3.703-in. hole.
Redrill 7/32-in. diameter hole to "F" (0.257-in.) diameter x ⅜ in. deep.
Remove jig.
Line ream 0.232 ± 0.001-in. and 0.242 ± 0.001-in. diameters.
Tap 5/16 in.-18P USSF 5/16 in. deep.

A 15-deg. oil hole is drilled with a sensitive radial drill to ¼-in. diameter and 3 19/32 in. deep.

Continuing with a sensitive radial drill, eight ⅜-in. diameter oil drains are drilled through four ribs on the inside of the crankcase. The 1⅝-in. diameter flange clearance is formed with the radial drill to 1 33/64-in. dimension from rear section flange.

Fourteen mounting flange holes ¾ in. deep are tapped with a tapping machine. After the piece is placed on the table, the 5/16-in.-18P USSF holes are tapped in front section mounting flange.

With a back spotfacing machine 20 mounting bosses are back spotfaced to ¾ in. diameter and ½ in. dimension.

A keyway is then slotted with a vertical slotter to 0.313 ± 0.001 in. wide and to 3.843 + 0.003 — 0.000 in. depth from opposite face of bore, holding 1/16-in. radii in corners.

Using a sensitive radial drill, an oil hole is drilled, counterbored and reamed:

Drill 7/64-in. diameter hole breaking into 0.232 ± 0.001-in. diameter hole.
Counterbore 9/32 in. diameter x 1/16 in. deep.
Ream to 0.123 ± 0.001 in. diameter.

Vent holes are then drilled, on the bench, in all ⅜-in.-16P stud holes which are not drilled through. The crankshaft bearing hub is finish faced on a 36-in. Bullard to 2.312 ± 0.002 in. from face of flange. The crankshaft hub is then finish faced to 1.000 ± 0.002 in. dimension, also on a 36-in. Bullard.

The crankcase is then taken to the bench, where all sharp edges caused during machining operations are removed, such as ends of threads or sharp edges of drilled or bored holes projecting on the inside of the crankcase. All cored and drilled oil passages are inspected and cleaned if necessary. Threaded holes are inspected and retapped if necessary.

Next the crankcase is washed and cleaned thoroughly in a tank, after which it is primed with a first coat of metal primer on the outside of the casting, using an air drying primer. Following this, sandpapering is done if necessary, and then the finish coat of enamel is applied and dried in air.

The crankcase is now ready for inspection, after which it is delivered to finished stock.

High Elastic Limit Steel for Ships

Ship plate and shapes heat treated for high elastic limit are being used by Alfred Holt & Co., the British shipping firm, for the entire stress-carrying portion of their newly built ships. The extra strength allows the dimensions to be reduced an average of about 12 per cent, a clear gain for the cargo capacity. Similar material is also being used for part of the superstructure of a very large liner being built for the Canadian Pacific, in order to increase the stability.

According to P. G. Rouse, writing in the *Engineer*, July 19, this steel is called "Martinel," or "Martin Elastic Limit Steel," after its proponent, F. G. Martin. It is a "special quality steel subjected after rolling to a special heat treatment which insures the formation of the micro structure most favorable to the greatest elastic limit." Micrographs are given, showing the well known banded structure of ordinary mild steel as rolled, and a fine grained mixture of pearlite and ferrite, with small traces of banding, said to be characteristic of Martinel steel. Physical properties quoted are:

	Ordinary Mild Steel	Martinel Steel
Elastic limit, lb. per sq. in.		
Minimum	9,000	33,000
Maximum	31,000	45,000
Average	19,000	37,000
Average ultimate strength	65,000	72,000
Elongation, per cent		20 to 30

Metal Exposition Opens Sept. 9

Cleveland Show Will Contain Exhibits of 250 Companies in Treating, Welding, and Making Metals— Five Societies to Hold Meetings

NEARLY 250 companies are to present exhibits at the National Metal Exposition in the Public Auditorium, Cleveland, Sept. 9 to 13, in connection with the National Metal Congress. Under the auspices of the American Society for Steel Treating, which is holding its eleventh annual convention at that time, four other societies also have arranged for technical meetings and for participation in the exposition: American Welding Society, institute of metals and iron and steel divisions of the American Institute of Mining and Metallurgical Engineers and the iron and steel division of the American Society of Mechanical Engineers.

On the following pages there is presented a list of the exhibitors, covering what each will display, who will be there and so on. In addition, there will be found illustrations of some of the special equipment which will be featured among the exhibits. There are also reproductions of photographs of 16 of the chairmen of the 37 chapters of the A.S.S.T.

On other pages will be found five special articles on heat treating and related subjects. These are offered as a contribution to parallel the stupendous efforts of the A.S.S.T. to signalize the continued advances in an industrial technology of the first magnitude.

List of Exhibitors and Their Products

A

Abrasive Co., Philadelphia. Booths 342 and 396.
Featuring Red Center snagging wheel for grinding steel castings; showing abrasive wheels of Borolon, S. B. Borolon and Electrolon in various sizes, shapes, grains and grades for such operations as cylindrical grinding, surface grinding, tool and cutter grinding, internal grinding and cutting off work. Borolon Grain for use in drawing die molds. Represented by: S. M. Hershey, sales manager; John F. Guthrie, W. A. McMillan, I. R. Blair, R. A. Shaffer, vice-president; and J. F. Fischer, assistant sales manager.

Air Reduction Sales Co., New York. Booths 252 and 331.
Airco 99.5 per cent oxygen and Airco acetylene in cylinders; Airco-Davis-Bournonville oxygen discharge manifold; Airco-Davis-Bournonville welding and cutting torches, regulators and supplies; Airco national carbide; No. 4-A Oxygraph; New No. 4 Camograph. Represented by: S. P. Fetter, G. J. Dekker, H. L. Rogers, F. E. Rogers, T. M. Hamer, C. A. Daley, R. F. Helmkamp, F. J. Maeurer, and G. Van Alstyne.

Ajax Electrothermic Corporation, Trenton, N. J. Booth 399.
Model of a 500-lb. coreless induction furnace; polished section of ingot made in high frequency induction furnace by Heppenstall Forge & Knife Co.; two small laboratory coreless induction furnaces; moving picture showing high frequency (coreless) induction furnaces in operation; and photographs of installations. Represented by: Dudley Willcox, treasurer and assistant general manager; and Robert N. Blakeslee, secretary and sales manager.

Allegheny Steel Co., Brackenridge, Pa. Booth 70.
Heat and corrosion resisting Ascoloy and Allegheny metal with examples of completed installations; semi-finished samples of Allegheny metal and Ascoloy material in process of fabrication into parts of various types of equipment. Represented by: O. M. Otte, F. S. White, and Banks E. Eudy.

Edgar Allen Steel Co., Inc., New York. Booth 284.
Imperial Major high speed steel; extra special high speed steel; special high speed steel; turning and finishing steels; Minerva air hardening steel; self hardening steel; special chisel steel; red label steel; tack knife steel; die casting steel; solid double six production steel; hollow double six production steel; Class P tool steel; class E tool steel; Stag tool steel; Talon tool steel. Represented by: Henry Sears Hoyt, president; J. King Hoyt, Jr., secretary and treasurer; V. A. Green, vice-president and general manager; C. K. Everitt, managing director Edgar Allen & Co., Ltd., Sheffield, England; E. R. Carnell, director; H. R. Adams, and R. M. Brushingham.

Allied Products Corporation, Detroit. Booth 274.
Victor Peninsular Division, cold-headed products; Indiana Lamp Division, automotive lighting equipment; and Richard Brothers Division, replaceable and interchangeable punches and dies. Represented by: T. S. Higbee and J. E. Gladden.

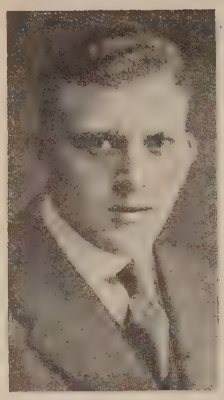
Aluminum Co. of America, Pittsburgh. Booths 334, 335, 336, 337.
Ingots; forgings; permanent mold castings; sand castings; die castings; magnesium products; wire; rod; bar aluminum; tubing; conduit; pipe fittings; streamline tubing; aluminum foil; seals and caps; electrical conductors; transmission cable; collapsible tubes; extruded molding and structural shapes; shingles; downspouts; gutters; flashings; corrugated roofing; radio parts of aluminum; beams; window sash; carpet frames; aluminum doors; screw machine products; aluminum paint and bronze powder; welded chemical vessels; permanent mold cast and stamped cooking utensils; equipment for demonstrating the deflection of aluminum and steel; aluminum chairs; ladders; waste-baskets; and costumers, etc. This exhibit is comprehensive and attempts to trace the manufacture of aluminum from the crude ore to the finished product. Represented by: F. C. Shoupe and others.

American Brass Co., Waterbury, Conn. Booth 235.
Charles Gallo, welding expert, will demonstrate Tobin bronze and other Anaconda copper alloy welding rods; display of Everdur metal, a copper-silicon-manganese alloy; collection of various iron and steel pieces welded with Anaconda copper alloy welding rods. Represented by: W. H. Dowd, W. C. Swift, T. S. Foote, H. M. Paxon, G. E. Newton, and C. G. Goodman.

American Car & Foundry Co., New York. Booth 318.
No. 3 three-electrode heater for heating rivets; No. 3 one-electrode two-path heater for heating material for forging or upsetting. Represented by: F. C. Cheston, John S. Helt and Harold C. Cheston.

American Electric Furnace Co., Boston. Booths 402 and 439.
Model HB-1, 8 x 16-in. high speed furnace and B-2, 12 x 24-in. box furnace will be in full operation, showing the patented atmospheric control feature. The following models are also on exhibition: P-3, 12-in. pot furnace; P-7, 16-in. pot furnace; 18-in. tilting pot furnace; and nitriding furnace. Represented by: K. A. Juthe, president; S. N. Juthe, vice-president; A. J. Hanson, chief engineer; John C. Juthe, sales manager; A. B. Beach, E. E. Bolds, A. A. Anderson, A. D. Heath, L. A. McCalla, L. A. Smith, W. P. Barba and W. T. Haggas.

American Engineering Co., Philadelphia. Booth 398.



E. C. BAIN
Chairman
New York Chapter

R. E. SHERLOCK
Chairman
Buffalo Chapter

American Gas Association, New York. Gas Section.
Industrial gas section is again sponsoring a combined exhibit of the leading manufacturers of industrial gas furnaces and accessory equipment. The equipment being displayed by each of these manufacturers is described elsewhere. A control laboratory is being operated under the direction of W. E. Jominy, research fellow of the association at the University of Michigan. Represented by: E. D. Milener, industrial research representative and C. W. Berghorn, secretary industrial gas section of the American Gas Association; A. M. Apmann, chairman, and Karl Emmerling, vice-chairman, committee on display and contact with national industrial organizations; and J. C. Shanks, industrial gas representative, East Ohio Gas Co.

American Gas Furnace Co., Elizabeth, N. J. Gas Section.
Continuous rotary retort heating machine for hardening, annealing or tempering bolts, rivets, chain links, pins of various kinds; mesh wire conveyor heating machine; reciprocating hearth heating machine for hardening and annealing all kinds of small and medium sized articles, such as flat and coil springs, stamped and pressed metal parts; heating machine for tempering, temper coloring, gun metal finishing and all work requiring temperatures below 1000 deg. Fahr.; melter for gold and silver, also for coal ash fusion point determination; rotary brass melter; high speed oven furnace; large oven furnace for heat treating; rotary retort; carburizer; vertical retort gas carburizer. Represented by: P. C. Osterman, vice-president; Elmer C. Cook, Theodore Farwick, Sr., John Mehrman, William H. Kelsey, William J. Barenscheer and O. T. Muehlemeyer.

American Steel & Wire Co., Chicago, New York and Cleveland. Booth 265.
Premier-tested welding wire and rods in various grades for use in practically every welding need in the electrical and gas field; cold-rolled strip steel; springs; screw stock; coated and plain wire nails; and various manufacturing wires. Represented by: F. Connell, G. S. Rose, A. G. Bussman, W. E. Mackley, E. S. Humphrys, C. J. McGregor, R. C. Fisher, W. H. Cordes, E. E. Louis, A. T. Merriman and P. G. Gilroy.

Ampco Twist Drill Co., Jackson, Mich. Booth 312.
Two Melling Mill-Drill-Matics in operation; milling, drilling, reaming and burring standard S.A.E. 5/16-in. yoke ends at a production speed; also drill display board showing the complete line of small tools manufactured; new patented mandrel which is being marketed under the trade names of 4 in 1. Represented by: O. Monrad, president; E. Loy, secretary and general manager; E. Leypoldt, R. Rice, D. O'Brien, Fred E. Kelley, F. J. Sikorovsky, George Melling.

Anchor Drawn Steel Co., Latrobe, Pa. Booths 10, 12, 39 and 41.
Gold Anchor drill rod; Blue Anchor carbon steel drill rod; Red Anchor carbon steel drill rod; and special cold drawn shapes of high speed, stainless, carbon and alloy tool steels. Represented by: R. C. McKenna, president; Floyd Rose, vice-president; and George Morrison.

Armstrong-Blum Mfg. Co., Chicago. Booth 383.
Marvel metal band saw; Marvel automatic high speed saw; Marvel hack sawing machines; two entirely new hack saw machines, Marvel Nos. 6 and 6-A shown for the first time. Marvel high speed edge hack saw blades. Represented by: Harry J. Blum, secretary; Stanley A. Woleben, Joseph C. Fletcher, Walter S. Ryan, Allan M. Andrews, Harry A. Welch and John E. Van Doren.

Armstrong Brothers Tool Co., Chicago. Booth 381.
Lathe, planer and shaper tools; drop forged lathe dogs; clamps; ratchet drills; drilling posts; drop forged wrenches; stocks and dies; pipe vises; pipe cutters; pipe wrenches and machine shop specialties. Represented by: Paul L. Armstrong, A. Arbogast, George Nufer and W. Welter.

Armstrong Cork & Insulation Co., Lancaster, Pa. Booth 98.
Armstrong's corkboard insulation for cold storage and constant temperature rooms and for the walls and roofs of buildings; Armstrong's cork covering for the insulation of low temperature lines and tanks; Armstrong's insulating brick and Nonpareil insulating brick for the insulation of boiler settings, heat treating furnaces and other high temperature furnaces, ovens, kilns, etc., Armstrong's cork machinery isolation for sound deadening and vibration absorption under machines. Represented by. H. B. Gates.

Automatic Nut-Thread Corporation, Philadelphia. Booth 304.
No. 3 Threadnut automatic nut tapping machine, newly redesigned; No. 2 Threadnut automatic nut tapping machine, newly re-designed with cabinet base; and No. 1 Threadnut hand operated tapping machine, using bent shank tap and continuous tapping. Represented by: Erie M. de Sherbinin, president; Robert B. Webster, secretary-treasurer; Christian S. Sorensen, general manager; Fred D. Creasop, Victor E. Pearson, Joseph T. Ramella.

Automatic Temperature Control Co., Inc., Philadelphia. Booth 351.
Two balancing three-position controllers with anticipating features; one three-position single motor controller; one two-position single motor controller; three-position slow motion controller operating 8-in. air and 1-in. oil valves. A proportional hand control operating oil and air valves as a unit; a self-cleaning oil valve with adjustable orifices designed for hand operation; an electric heater controller designed to save power as compared with rheostat operation of small electric furnaces; a time lag relay. Represented by: G. S. Frazee, Ivan Johanson, R. A. Smart and J. D. Andrews, sales manager.

B

W. O. Barnes Co., Inc., Detroit. Booth 406.
Hack saw machine (motor driven) using Barnes red arrow high-speed steel hack saws, cutting different metals. Represented by: W. O. Barnes, president; J. H. Flavell, secretary-treasurer; F. M. Shaw, eastern sales manager; Roy Schindley, A. G. Young, J. M. Munro, C. B. Cecil, western sales manager; L. Robertson, manager, W. Robertson Machine & Foundry Co.

Bastian Blessing Co., Chicago. Booth 239.
Oxyacetylene welding and cutting torches and regulators; oxygen and acetylene manifolds; acetylene generator; high pressure forged fittings; drum valves and accessories; featuring oxyacetylene welding as applied to piping systems. Represented by: E. L. Mills, sales manager; E. N. Stevens, assistant sales manager; and Earl M. Evleth.

Bausch & Lomb Optical Co., Rochester, N. Y. Booths 7 and 9.
Wide field binocular microscope suitable for viewing opaque specimen; magnifiers and readers; microtomes; colorimeters and other optical and measuring instruments; toolmaker's microscope; photomicrographic and projection apparatus; metallographic equipment. Represented by: I. L. Nixon, M. H. Stevens, H. L. Shippy and A. R. Farmer.

Bell & Gossett Co., Chicago. Booths 344 and 345.
(See Case Hardening Service Co. listing.)

Bellis Heat Treating Co., Branford, Conn. Booth 352.
Lavite & Lavite furnaces; electric furnaces tempering Lavite, for tempering temperatures 270-1200 degrees Fahr.; carbon Lavite, for hardening and annealing temperatures 1000-2000 degrees Fahr.; high speed Lavite, for temperatures 2000 to 2500 degrees Fahr. Represented by: A. E. Bellis, president; C. E. Wister and J. W. Black.

Bellevue Industrial Furnace Co., Detroit. Booth 393.
Twenty-five kw. electric furnace for hardening and carburizing, also preheating of high-speed steel, 1600 to 1800 deg. Fahr.; 40 kw. high temperature furnace for hardening high-speed steel, equipped with Globar non-metallic heating elements for 2450 deg. Fahr. Represented by: Walter E. Hinz, president; Louis J. Raymo, sales manager; and Arnold Pfau, Jr.

Bethlehem Steel Co., Bethlehem, Pa. Booths 44, 46, 65 and 67.
Airplane steels; forgings; test specimens pertinent to airplane

engine building; tool steels; Mayari iron; Silvery Mayari; sheets and structural sections. Represented by: T. F. Fitzgibbons, F. H. Baldwin, J. H. Bateman, E. A. Buxton, G. P. Witteman, H. R. Weeman, D. C. Roscoe, H. W. Hibshman, W. E. Titus, R. S. Tucker, H. E. Graffin, G. Cushman, J. W. Codding, F. E. Fisher, R. MacDonald, W. B. Pritchard, W. R. Shimer, J. H. Stoll, A. P. Spooner, P. E. McKinney and J. F. Gaffney.

Binghamton Flexible Shaft Co., Binghamton, N. Y. Booth 365.

Bliss & Laughlin, Inc., Harvey, Ill., and Buffalo. Booth 72.
Cold drawn steel, turned and polished shafting, turned and ground shafting and special finished steel. Represented by: Walter R. Howell, vice-president and general manager; W. P. Mitchell, general sales manager; C. L. Huff, George Spaulding, C. H. Beach and T. D. Taylor.

Botfield Refractories Co., Philadelphia. Booth 210.
Adamant fire brick cement; Adachrome fines; Adachrome aggregate; Adamant gun; and Adapatch. Represented by: A. H. Engstron, sales manager; and W. B. Smith.

Bourne-Fuller Co., Cleveland. Booths 25 and 27.
Specimens of steel sections rolled in alloy and carbon steels, bolts, nuts and rivets—standard and special for aircraft, automotive, railroad and other industries. Represented by: H. H. Pleasance, C. F. Newpher, N. C. Bolton, R. C. Klemm, H. D. Burket and R. D. Titus.

Bristol Co, Waterbury, Conn. Booth 386.
Bristol's pyrometer controller, indicating pyrometer, recording pyrometers and all types of automatic temperature control equipment; new line of automatic temperature controller, including motor valves for gas, oil, air and steam, of the floating type; special pyrometer controller for automatically controlling hot blast temperatures on blast furnaces in operation; Bristol safety set screws and belt lacing. Represented by: H. L. Griggs, general sales manager; R. M. Walker, H. W. Moss, L. G. Bean, E. L. Stillson, Mr. Trumbull and W. F. Emery.

Brown Instrument Co., Philadelphia. Booth 272.
Pyrometers, indicating, recording, controlling, signalling; flow meters, indicating and recording; thermometers, recording and controlling; CO_2 meters, indicating and recording; pressure gauges, recording and controlling; automatic control valves; and thermocouples and protecting tubes. Represented by: R. P. Brown, president; C. H. Kerr, vice-president and general manager; G. W. Keller, vice-president and general sales manager; J. P. Goheen, secretary; G. W. W. Cornman, treasurer; O. B. Wilson, G. L. Clapper, J. L. Whitten, L. C. Wilson and H. G. Hoffman.

Brown Lynch Scott Co., Monmouth, Ill. Booth 388.
New style carburizing compound cleaner and grader. Represented by: J. A. Scott, secretary and general manager; W. B. Lynch and S. W. Perry.

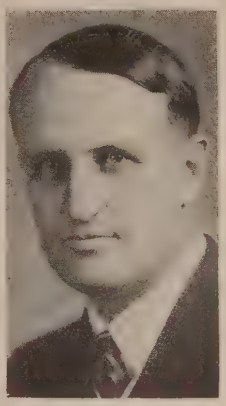
C

Calorizing Co., Pittsburgh. Booth 324.
Calite alloys—group of miscellaneous castings used in the heat treating trade such as carburizing boxes, cyanide pots, hearth plates, rollers for continuous furnace operation, etc.; Calorized steel parts such as oil still tubes, cyanide and salt pots, pyrometer protection tubes, bolts and nuts, etc. Represented by: B. J. Sayles, president and general manager; D. T. Downes, chief engineer; H. Schultz, N. E. Ward, R. S. Brown and N. A. Milmine.

Andrew C. Campbell, Inc., Bridgeport, Conn. Booth 403.
Three Campbell nibbling machines, actually doing work of cutting metal of varied thickness, etc. Represented by: H. R. Powell and J. Johnson.

Carboloy Co., Inc., New York. Booths 255 and 325.
A Warner & Swasey No. 3A universal hollow-hexagonal turret lathe equipped throughout with Carboloy cutting tools and operated at high production speeds and output on various steels, irons, bronzes, and other materials; a large exhibit of Carboloy tools of various shapes and styles. There is also exhibited Carboloy wire drawing dies and specimens of drawn wire. Represented by: P. R. Mallory, president; E. H. Wilkinson, vice-president; A. R. Howell, sales manager; G. V. Rockey, G. N. Sieger, and Zay Jeffries, A. A. Merry, W. G. Robbins, W. W. Fullager, W. J. Lindner, P. Petroff, W. H. Martin and W. S. Huson.

Carborundum Co,, refractory division, Perth Amboy, N. J. Booths 347 and 387.
Complete assortment of standard shapes of refractory materials (Carbofrax and Aloxite) including brick, tile and special shapes; Infrax insulating brick and high temperature refractory cements; silicon carbide grain and Carborundum firesand; Globar-equipped electric furnace; Carbo-



E. C. SMITH
Chairman
Canton-Massillon
Chapter

H. S. BINNS
Chairman
Cincinnati Chapter

radiant chamber. Represented by: W. M. Smith, sales manager furnace department; R. A. Beverly, S. A. Fenno, J. A. King, R. A. Barr, and W. C. Thiess.

Carborundum Co., Niagara Falls, N. Y. Booths 347, 387, 346 and 389.
Abrasive Division—Complete line of Carborundum and Aloxite wheels in Redmanol and rubber bonds; Globar Division—Globar furnace and Globar heating elements and terminals. Represented by: S. F. Courter, general sales manager; G. W. Chormann, B. H. Work, E. C. Christensen, W. U. Parrott, H. W. Collinson and J. C. Rice.

Carpenter Steel Co., Reading, Pa. Booth 81.
Carpenter stainless steel No. 5. Represented by: F. A. Bigelow, president; J. H. Parker, vice-president; R. V. Mann, F. R. Palmer, B. H. DeLong, G. V. Luerssen, P. B. Greenawald, G. H. Edmonds, W. M. Loos, C. A Heil, R. L. Williams, K. L. Crickman, V. W. Gardner, H. G. Roodhuyzen, J. S. Bailey, C. H. Breed and E. von Hambach.

Case Hardening Service Co., Cleveland. Booths 344 and 345.
Hardening room materials and equipment: Bohnite; Caseite; Cyanide; Drawite; Bathite; Ni-Cro-Al, nickel-chromium-aluminum alloy pots and boxes; Cleancoat; Non-Case; pressed steel pots; B and G oil coolers; Hevi-Duty electric furnaces in operation. Represented by: W. C. Bell, president; E. J. Gossett, vice-president; J. S. Ayling, sales manager; and B. C. Cleveland.

Central Alloy Steel Corporation, Massillon, Ohio. Booths 14, 16, 43 and 45.
Applications of Agathon Alloy steels; Toncon copper-molybdenum iron; Enduro Nirosta steel; and Agathon Nitralloy. Represented by: B. F. Fairless, president; J. M. Schlendorf, vice-president in charge of sales; W. M. Garrigues, general sales manager; M. J. R. Morris, F. L. Gibbons, A. Schaeffer and D. B. Carson.

Char Products Co., Indianapolis. Booth 377.
Full line of carburizing compounds and carbon products giving particular attention to the unusual physical properties of some of the products. Demonstrating the non-burning qualities of the non-burning type of Char carburizers and the resistance of this type of material to abrasive action. Represented by C. Q. Swenson, C. B. Edwards, and William Higburg, sales manager.

Chemical Rubber Co., Cleveland. Booth 283.
Laboratory equipment. Represented by: A. Friedman, president; E. Hartle and I. W. Brandel.

Chicago Steel & Wire Co., Chicago. Booths 315 and 317.

Chicago Steel Foundry Co., Chicago. Booths 285 and 287.
Chrome-nickel alloy castings for use at high temperatures; boxes; pots; and furnace parts; sheet alloy fabricated parts; special high strength chrome-nickel castings. Represented by: David Evans, president; C. M. Evans, assistant to president; Herman Georgen, sales manager; J. W. Frank, William J. Chapin, Gordon McMillan.

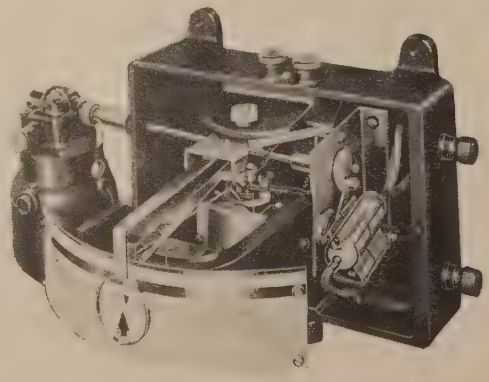
Chrobaltic Tool Co., Michigan City, Ind. Booth 204.
Heat resisting and acid resisting castings, including Fire Armor and Zorite alloy. Represented by: W. B. Sullivan,

Heat-Treating Furnaces

A COOL front furnace, as produced by the W. S. Rockwell Co., 50 Church St., New York, will be on exhibition at the company's booth at the National Metal Exposition. A battery of such furnaces is here illustrated. The cool front serves to provide improved working conditions and better heating results over a wide range of heat-treating operations.

A New Mild Steel Electrode

MARKETED as the new Yellow Jacket electrode, the Fusion Welding Corporation, 103rd Street and Torrence Avenue, Chicago, will exhibit at the National Metal Exposition details of this new product and some of its results. It is designed to throw a preponderance of heat into the work, producing what welders call extremely deep penetration. Its field of application is heavy welding, such as structural welding, heavy pipe, etc. The accompanying illustration shows pipe welded with this electrode in a wide excavation.



A New Control Pyrometer

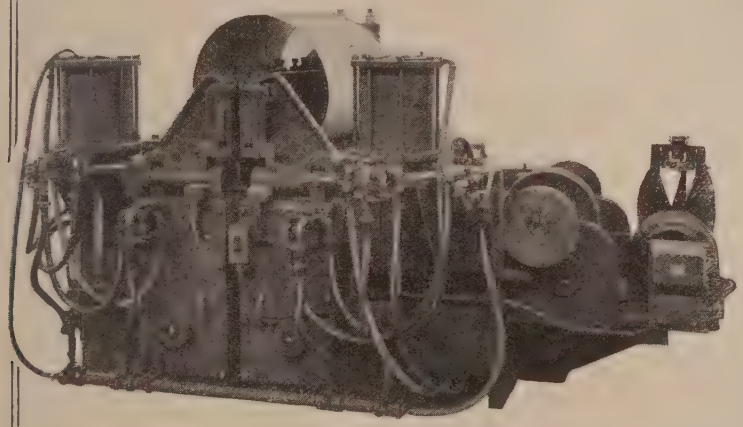
AS the opening gun of a campaign announcing a development of large importance to all steel treaters the Republic Flow Meters Co., Chicago, will exhibit at the National Metal Exposition a control pyrometer which eliminates the use of auxiliary relays.

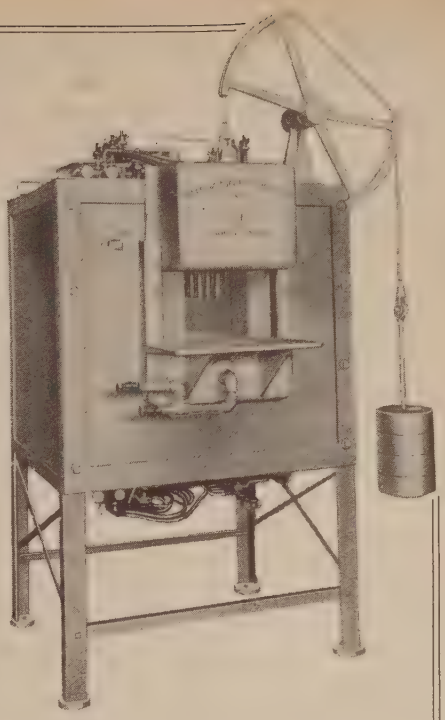
Electric High-Speed Furnace

AT the booth of the American Electric Furnace Co., Boston, the furnace illustrated will be in operation, as well as one of the company's box furnaces. This high-speed furnace is known as Model HB-1 and is 8 in. by 16 in. The high-speed furnaces are designed to eliminate direct intense radiation and have automatic control.

Barrel Welder

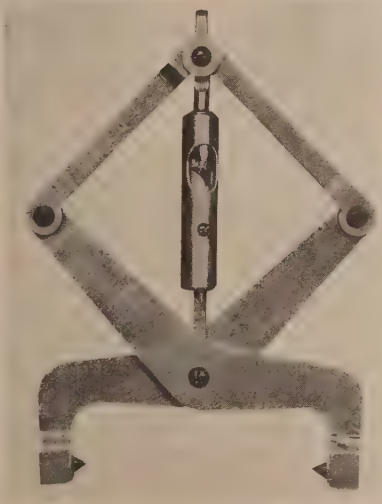
A WELDER for the flash butt welding of the seams of steel barrels has been developed by the Federal Machine & Welder Co., Warren, Ohio. The illustration shows it in operation. It is rated to weld a seam 40 in. long in No. 12-gage metal and, by means of a regulating coil, to weld the same length seam equally well in No. 24, or any intermediate gage. It can handle barrels or tanks from a minimum diameter of 14½ in. at a rate of 60 to 100 an hour.





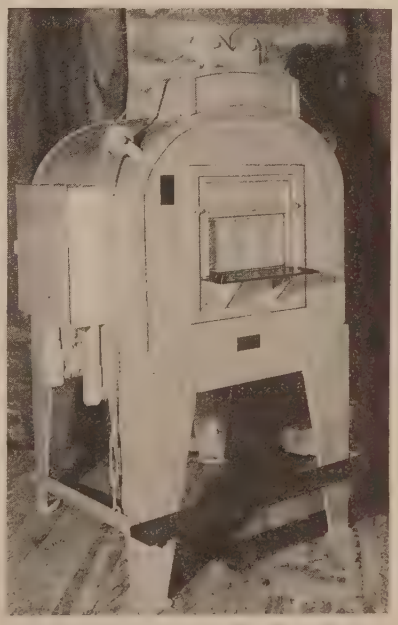
Electric Heat-Treating Furnace

ONE of the new furnaces, brought out by the Century Co., Taunton, Mass., No. 3 Model HS furnace, is here illustrated. It will be exhibited at the company's booth during the National Metal Congress. Temperatures for which it is rated range between 1200 and 2400 deg. Fahr. Features include the manner of wall insulation, door construction and terminal design.



Tongs Without Any Parts

THE tongs here illustrated, for hot and cold steel ingots, molds, slabs, etc., and for handling large bales, are made by the Heppenstall Forge & Knife Co. of Pittsburgh, from heat-treated alloy steel. They can be suspended from a hoist by single rope by means of which they are manipulated. They can also be operated by the crane man.



vice-president and general manager; L. H. Whiteside, C. M. Conner, J. F. Sweeney, A. A. Cash, O. G. Voss, T. A. Meyer, Charles Peterson, H. Klouman, E. Whiteside.

James Clark, Jr., Electric Co., Louisville, Ky. Booth 365.

Clark Tructractor Co., Battle Creek, Mich. Booth 102.
Clark 5-ton Truclift, gas powered industrial lift truck; Clarktor Tructractor, 4-wheeled, gas powered factory tractor, equipped with self-starter, generator, lights, etc.; Clarkat Tructractor, 3-wheeled, small tractor with turning radius of 51 in.; Whale auto end dump Tructractor, capacity 30 cu. ft. or two tons. Represented by: C. E. Staninger, Everett M. Sharp, R. J. Burrows, president; C. I. Ucker, G. A. Smith, special representative.

Cleveland Twist Drill Co., Cleveland. Booths 408, 409, 425 and 427.
Two high speed drill presses demonstrating Cle-forge high speed drills at various speeds and feeds; complete display of tools including high-speed drills and reamers tipped with tungsten carbide. Represented by: W. E. Caldwell, J. B. Dillard, H. P. Jenson, H. G. Smith, W. C. Weidig, G. Burkhardt, Alfred Jacquin, T. F. Mummery, H. E. Bergquist, Thomas Thomas, E. P. Horan, I. P. Farnum, R. D. Boltey, D. D. Burdett, C. F. Petzinger, T. Skove.

Climax Molybdenum Co., New York. Booth 4.
Molybdenum in all forms. Represented by: B. F. Phillipson, president; J. B. Thorpe, assistant to president; W. P. Woodside, J. Kent Smith, H. P. Furlong, R. L. Rolf, George O. Loeffler, Alan Kissock.

Clipper Belt Lacer Co., Grand Rapids, Mich. Booth 80.
Clipper belt lacers, all models, including the new Clipper speed lacers, Clipper belt cutters with safety features, Clipper belt hooks, electrically operated Clipper ship. Represented by: Earl H. Forsyth.

Coats Machine Tool Co., Inc., New York. Booth 29.
Complete line of Krupp Mikrotast gages made by the Krupp Steel Works of Germany, for internal and external gaging; light contact Krupp Mikrotast for gaging fine wire exhibited for the first time in United States, Krupp Mikrotast grinding gages for use on cylindrical grinders while in operation. Represented by: Charles E. Coats, treasurer.

Colonial Steel Co., Pittsburgh. Booths 10, 12, 39 and 41.
Ohio, a new high-carbon high-chromium air hardening die steel; Colonial No. 7, a special carbon-vanadium crucible-made tool steel; Red Star, a carbon tool steel; stainless irons and steels; high-speed, alloy and carbon tool steel sheets; high-speed, alloy and carbon tool steel rings, disks and special forgings; copper-clad, ground rods and line material; hot rolled special shapes; plow steel, soft center; jail bar and safe steel; mining drill steel, solid and hollow; special die blocks. Represented by: R. C. McKenna, president; Floyd Rose, vice-president; Lawrence Wood, sales manager; J. P. Gill, N. B. Hoffman, H. M. Bray, George Morrison, F. L. Stevenson, R. W. Harris, Charles Schnibble.

Colt's Patent Fire Arms Mfg. Co., Hartford, Conn. Booth 437.
Two types of Colt Autosan. A two-tank conveyor machine as furnished for a nationally known bearing manufacturer, embodies many outstanding Colt Autosan features. Represented by: George Webb, H. S. Seiferman, C. M. Jackson, G. E. MacMannus, F. R. Murphy.

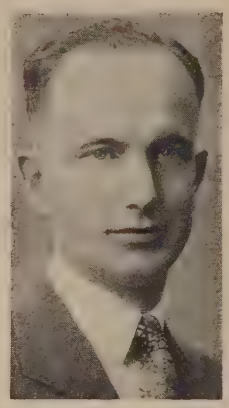
Columbia Tool Steel Co., Chicago Heights, Ill. Booth 62.
Alloys, tool steel, ingots, etc. Represented by: Arthur T. Clarage, president; G. C. Beebe, W. G. Sonderman, E. D. Roberts, E. W. Luecht.

Crucible Steel Co. of America, New York. Booths 38, 40, 42 and 63.
Corrosion-resisting articles, indicating the possibilities of this type of material for various purposes. Represented by: B. F. Hufnagel, president; J. A. Mathews, A. T. Galbraith and J. M. McComb, vice-presidents; H. L. Gellinger, auditor; R. Michener, general sales agent; R. E. Christie, assistant general sales agent; J. P. Jayme, E. P. Gaffney, R. H. Heatley, F. E. Phelps, R. W. Crane, M. S. Dravo, R. C. Webster, J. T. Carroll.

D

Dardelet Threadlock Corporation, New York. Booth 276.
Vibrating machine; bolt threader; nut tapper; test specimens; samples of taps and dies; exhibition of various uses of the Dardelet thread; samples of nuts and bolts. Represented by: A. Morris Thomson, vice-president; Charles J. Gass, Major William E. Hoke, Norman C. McLoud.

Darwin and Milner, Inc., Cleveland. Booths 66 and 87.
Full line of tool steels with specimens of dies and samples of work done; cast dies, etc., made from patent Cobaltcrom steel; full line of magnets made from cobalt magnet steel; hacksaw blades; other special steels, etc., from English works, Darwins, Ltd., Sheffield, England; Darwin safety razor blades made from patent Cobaltcrom tool steel. Represented by: Victor F. J. Tlach, John C. Koch, Harry L. Harrison, C. F. Lear, Max Opp, Herman O. Baberadt, H. J. Burnett, C. A. Bowman, H. R. Bowman, Jr.



H. B. KNOWLTON
Chairman
Fort Wayne Group

GEORGE M. NAUSS
Chairman
Washington-Baltimore Chapter

Dearborn Chemical Co., Chicago. Booth 92.
Samples and literature pertaining to No-Ox-Id rust preventive; Dearborn cleaners; Dearborn feed water treatment. Represented by: E. M. Converse, C. A. Remsen, J. A. Crenner, C. I. Loudenback, E. H. Ruhlman.

A. P. De Sanno & Son, Philadelphia. Booth 376.
Radiac cut-off machines for cutting materials with the use of an abrasive wheel; No. 1 machine for solid stock up to 1¼ in. in diameter; No. 1A machine for solid stock up to 2 in. in diameter. Represented by: A. P. De Sanno, Sr., Alphonso De Burnay, Benjamin G. Hardy, L. C. Buckingham.

Detroit Alloy Steel Co., Detroit. Booth 326A.
Wood patterns used in manufacturing Dasco alloy tool castings; Dasco alloy tool steel castings as cast; and pressed metal dies made of Dasco alloy tool steel. Represented by: Hugh Martin, president; H. H. Wyatt, secretary-treasurer; H. F. Kluender and W. A. Spindler.

DeWalt Products Corporation, Leola, Pa. Booth 320.
DeWalt "Wonder-Worker," a portable electric woodworker for maintenance and general construction, also for specialized woodworking operations such as cross-cutting, ripping, dadoing, mitering, tenoning, shaping, etc.; DeWalt "Wonder Metal Worker," the new circular saw method of cutting seamless and welded steel tubing and formed metal products; DeWalt jointer, a 6-in. jointer with 44-in. table. Represented by: Paul Gardner, president; Robert H. Mulch, general sales manager; L. J. McLaughlin, J. C. Mann.

Donner Steel Co., Inc., Buffalo. Booth 412.
Cold drawn bars and die rolled parts. Represented by: W. F. Vosmer, vice-president; A. G. Greenamyer, general superintendent; C. A. Cherry, assistant to vice-president; D. G. Baxter, assistant general superintendent; R. E. Sherlock, W. C. Peterson, L. C. Miller, F. H. Lammert, P. M. Guba, H. C. Richardson, E. D. Pumphrey.

Driver-Harris Co., Harrison, N. J. Booths 64 and 65.
Nichrome castings, retorts, carburizing boxes, pots, pyrometer tubes, furnace parts and other castings for heat resisting purposes; Nichrome B for addition to cast iron; Nichrome sheet carburizing containers; samples of intricate castings made of Nichrome; Nichrome wire for use as elements in industrial furnaces and other heat-resisting applications. Represented by: F. L. Driver, Jr., president; S. M. Tracy, treasurer; Harry D. McKinney, general sales manager; G. A. Lennox, assistant sales manager; W. E. Blythe, L. H. Waldrip, J. C. Bilek, J. C. Henderson, J. B. Shelby.

Duraloy Co., Pittsburgh. Booth 208.
Recuperator on rod heating furnace; typical Duraloy-Sklovsky units operating with gas; model of Kathner normalizing furnace and Conklin sheet piler; section of typical sheath-type shaft; Y-valves; miscellaneous pipe fittings; cast impeller; hearth plate; rolling mill guides. Represented by:

EDWARD E. FOSS
Chairman
Golden Gate Chapter

CARL G. JOHNSON
Chairman
Worcester Chapter

C. P. Mills, chief engineer; E. S. Lawrence, metallurgist; and H. Hobbs, district representative.

Duriron Co., Inc., Dayton, Ohio. Booth 359.
New No. 80 Duriron centrifugal pump operating to show self-priming feature; new Duriron "Y" valve, plunger release valve, Duriron-Nordstrom valve, standard valve, Duriron pipe and fittings, Duriron fan, Duriron circulating steam jet, tank outlets, etc.; Durimet welded tank for pickling and Durimet material in the form of sheet and bars. Represented by: E. B. Thacker, W. B. Earnshaw, M. W. Smith, R. Rourke, E. D. Brauns.

E

Eastman Kodak Co., Rochester, N. Y. Booth 5.
X-ray negatives and photographs of castings showing internal flaws detected by the use of X-rays in the examination of these materials. Represented by: E. E. Smith.

Eclipse Fuel Engineering Co., Rockford, Ill. Gas section.
No. 245 oven furnace, hearth 24 x 48 in. complete single valve control and automatic temperature control, gas operated; injectors and burners of various kinds for gas; gas forge; high pressure gas; gas high-speed steel furnace; blast boiler; automatic shop room furnace; several gas-fired automatic boilers; and pressed steel pot display. Represented by: O. M. Olsen, sales manager; Kurt A. Scharban, works manager; D. A. Campbell, O. N. Sellers, E. A. Stoner.

Birger Egeberg, Meriden, Conn. Booth 410.
Volumetric carbon determination apparatus—determinations to be made in 3½ min.; optical pyrometer, vest-pocket size; and quick acting laboratory balance. Represented by: Birger Egeberg, manager.

Electric Steel Founders' Research Group, Chicago. Booths 89, 91, 93.
Representative small and medium-sized steel castings of carbon or common steels, and alloy or special steels, made in electric furnaces; physical test specimens, physical test report data; and photographs showing group plant equipment and operations. Represented by: R. A. Bull, director; C. N. Ring, assistant director; and representatives of group companies.

Electro Alloys Co., Elyria, Ohio. Booths 348 and 385.
Thermalloy castings of various types such as used in electric furnace construction and heat treating department equipment. Represented by: W. J. Hansen, H. P. Miller, A. M. Miller, Jr., J. W. Henry; J. B. Thomas, treasurer; A. L. Garford, president; W. C. Whyte, vice-president.

Electro Refractories Corporation, Buffalo. Booth 15.
Silicon carbide brick, in various shapes; high temperature cement; and Mag-NO-Spall brick (new electrically fused non-spalling magnesite brick); Tercod crucibles; Buffalo patch cement. Represented by: L. U. Milward, president; and C. A. Asher, vice-president; G. S. Diamond, works manager; C. L. Miller, C. F. Leitten, C. B. Davis, Jr., T. W. Campbell, D. B. Milward.

Elkon, Inc., Division of P. R. Mallory Co., Inc., Indianapolis. Booths 259 and 260.
Welded Ford A chassis on which are 1139 welds, 95 per cent of which are made with Elkonite dies and electrodes; Elkonite tip for the Brewster etchograph machine in demonstration. Represented by: A. O. Brauen, general sales manager; E. W. Brewer, L. F. Crease, C. R. Frede, J. F. Jenks, E. O. Oberdick, G. V. Rocky, G. N. Sieger, J. A. Tolelk, R. R. Tomkins, J. A. Weiger.

Ellwood Ivins' Steel Tube Works, Philadelphia. Booth 410.
Seamless steel tubing; seamless aluminum tubing; seamless duralumin tubing; and seamless alloy tubing. Represented by: Horace S. Kircher, vice-president; Stanley Jeffries, Henry W. Avery.

Endicott Forging & Mfg. Co., Inc., Endicott, N. Y. Booth 90.
Steel drop forgings used in airplane, automobile and machinery fabrication. Represented by: S. J. Marshall, president; T. B. Kelday, superintendent; George B. Reed, sales manager.

Enduro Nirosta Committee. Booth 11.
Applications of Krupp Nirosta steel in various fabricated forms. Represented by: Central Alloy Steel Corporation, Massillon, Ohio; Ludlum Steel Co., Watervliet, N. Y.; and Babcock & Wilcox Tube Co., New York City.

Evans-Wallower Zinc Co., New York. Booth 397.

F

Falls Electric Furnace Corporation, Buffalo. Booth 341.
General heat treating furnaces of box type for temperatures up to 2000 deg. Fahr., one for operation from tool room bench and one hearth type of larger size cold for inspection; sample sections of Falls full-formed radiating sheet units. Represented by: H. J. McCauley, president; J. R. Eves, vice-president; and T. J. Llewellyn, salesman.

Federal Machine & Welder Co., Warren, Ohio. Booths 226 and 228.
One standard No. 1 portable butt welder which can be used in standard 110-volt circuit for welding up to 1/16 gage wire; one semi-automatic type 2-A butt welder capable of welding up to ⅝-in. round or equivalent cross section; one automatic type No. 60 butt welder capable of welding up to 1¼-in. round or equivalent cross section; one automatic Junior spot welder, a standard production machine on light gage material making from 60 to 120 spots per min.; 1-612-B heavy duty full automatic spot or projection welder. Represented by: H. L. McCreery, J R. Kilpatrick, sales manager.

R. Y. Ferner Co., (United States and Canadian representatives of Societe Genevoise d'Instruments de Physique, of Geneva, Switzerland), Washington, D. C. Booth 374.
Swiss jig borer No. 4; Micro-indicator tubes and stands for high-precision measurements in inspection work; universal measuring machine; measuring microscopies of high precision. Represented by: R. Y. Ferner, proprietor; Fernand Turrettini, director general of Societe Genevoise; Walter S. Ryan, John Cetrule, Lambert Neff and Charles T. Ameel.

Ferry Cap & Set Screw Co., Cleveland. Booth 211.
Hardened and ground spring bolts; alloy steel parts used in automobile engines; special automatic screw machine parts; standard cap and set screws; and Ferry patent acorn nuts. Represented by: H. D. North, vice-president; H. B. Pulsifer, E. W. Ferry, E. G. Greene, H. A. Keith, William Murphy.

A. Finkl & Sons Co., Chicago. Booth 77.
Photographs of plant equipment and products. Represented by: E. H. Graham, T. P. Wallace, J. M. Curley, W. H. Rieger, J. C. Vance, C. E. Finkl, general manager; Fred Finkl, secretary; Frank Finkl, general superintendent; William Finkl and M. R. Chase.

Firth-Sterling Steel Co., McKeesport, Pa. Booths 69 and 71.
Special lathe designed for operating at exceptionally high speeds on which cutting demonstrations with Dimondite, the new tungsten carbide cutting material, are being carried on. Represented by: L. Gerald Firth, general manager; D. G. Clark, director of sales; Robert S. Stevick, works manager; G. J. Comstock, O. K. Parmiter, A. S. Martin, C. G. Thoma, A. E. Barker, O. T. Smith, H. I. Moore, E. T. Jackman, G. A. Jacobs, W. C Royce, W. J. MacFarland, J. V. Little, R. F. Kimber, F. N. Mead, I. Olsen, Harry Jarvis, Fred Jarvis, G. R. Bunting, J. Johnson and W. A. Ruppel.

Flannery Mfg. Co., Pittsburgh. Booth 366.
Various sizes of Niclad pots for use in the heat treating, annealing and cyaniding of steels. Represented by: J. Rogers Flannery, president; E. G. Flannery, H. D. Tietz, G. R. Greenslade, and John J. Kenney.

J. B. Ford Co., Wyandotte, Mich. Booth 76.
Wyandotte metal cleaners for cleaning before all finishing

operations; metal cleaners for cleaning before handling, assembling and inspection, and for removing japan, lacquer, paint, etc.; metals cleaned with Wyandotte metal cleaners will also be exhibited. Represented by: B. N. Goodell, W. M. Cole, George J. Lawrence, S. H. Renton, C. S. Tomkins, L. C. Warden, and C. R. Beaubien.

Fort Pitt Steel Castings Co., McKeesport, Pa. Booths 89 and 91.
Electric steel castings.

Fusion Welding Corporation, Chicago. Booths 315 and 317.
Line of equipment and supplies for fusion welding and cutting. Demonstrations will be conducted continuously, showing the work which can be done with the various special wires in the extensive Weldite line of welding rods. Various types of Fuzon arc welders will be shown in operation. Many unusual welding operations will be presented, such as the production of abrasion resistant deposits, corrosion resisting deposits, high speed work and high strength. The Carbo-Flux process of welding will be demonstrated. Represented by: J. B. Green, president; L. F. Collins, sales manager; E. J. Shuler, R. W. Holt, J. W. Wolcott, F. O. Weber, Jack McLean and R. F. Beazell.

G

Garlock Packing Co., Palmyra, N. Y. Booth 339.
Complete line of mechanical packings. Represented by: R. W. Perkins, B. B. Franklin and C. E. Hermansader.

Gas Products Co., Cleveland. Booth 239.
Oxygen and acetylene gas supplies and welding supplies. Represented by: S. M. Wells, manager.

Gathmann Engineering Co., Baltimore. Booth 1.
Ingot mold designs for improving surface of ingots; etched ingot sections; motion pictures illustrating ingot solidification. Represented by Emil Gathmann, president; G. A. Dornin and Mark Gathmann.

Gehnrich Oven Co., Inc., Long Island City, N. Y. Gas Section.
Automatic conveyor oven for japanning and enameling. This unit has a two-strand return pass conveyor provided with dip tank and drain board and heated by Gehnrich indirect gas system. Represented by C. L. Gehnrich, president; A. V. Maday, vice-president; W. Gehnrich, vice-president; H. P. Rasmussen and Herman Gehnrich.

General Alloys Co., Boston. Booths 32 and 53.
Full line of nickel-chromium heat treating containers and furnace parts made from Q-Alloys; carburizing boxes; cast, all sheet, combination cast bottom sheet body, combination corrugated sheet sides and cast corners (Patented); carburizing tubes; lead, salt and cyanide pots; supporting rings; cyaniding baskets; grid trays; full line of Link-Belt Q-Alloy chain for operation at high temperatures; also Q-Alloy point bars for vitreous enameling. Represented by: H. H. Harris, president; W. K. Leach, general manager; G. C. McCormick, chief engineer; W. R. Blair, F. J. Blaney, J. J. Baum, J. J. Donovan, W. A. Toohill, A. L. Grinell, J. H. Abbott, R. M. Kirk, Ralph Hare, H. G. Chase, E. R. Dougherty, C. E. Malley, J. C. Van Arman and R. N. Graves.

General Electric Co., Schenectady, N. Y. Booths 256, 257, 258, and 319, 321, 323.

Gibb Welding Machines Co., Bay City, Mich. Booth 237.
Spot welders; welding presses and Gibseamers (electric seam welders). Announcement and display of several new principles never before applied to electric spot and seam welding. Represented by: W. H. Gibb, president; C. E. Shearer and W. O. Little.

Globar Corporation, Niagara Falls, N. Y.
Ten kw. high temperature electric heating elements in actual operation in a special furnace constructed for the purpose. Represented by: A. H. Heyroth, general manager; K. E. Rogers, sales manager; B. A. Bovee, chief engineer; W. S. Evans and N. H. Berry.

H

Halcomb Steel Co., Syracuse, N. Y. Booths 59 and 61.
Aircraft parts; tool alloy; non-corrosive and special steels and alloys. Represented by H. A. Pardee, H. J. Stagg, J. T. Leyden, S. C. Spalding, J. F. Kirwan, Arthur Schroeder, Howard Hinkley, T. F. Wood, Harold Barlow, Allan Fraser, Leslie Hawkridge and Lee Evans.

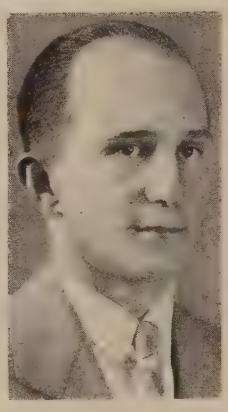
Harrington Co., Philadelphia. Booth 433.
Harrington hoists and trolleys; Peerless spur geared hoists; Harrington screw hoists; Harrington differential hoists; Harrington electric hoists. Represented by: R. E. Bishop, secretary and sales manager; I. E. Bauer and J. A. Slaughter.

Harris Calorific Co., Cleveland. Booth 234.
Multi-stage welding regulators; approved welding torches of various designs and models; gas welding and cutting equipment; high temperature gas apparatus of various kinds; complete line of general accessories for welding and cutting metals. Represented by: J. M. Mathews, secretary and general sales manager; S. A. Oviatt, W. J. Krull and Otto Fathauer.

C. I. Hayes, Inc., Providence, R. I. Booth 390-A.
Electric Globar furnace for heat treating high-speed steel tools and equipped with attachment for furnace atmosphere control. Represented by: C. I. Hayes, chief engineer; J. E. Hines, sales manager; and C. G. Paulson.

Haynes Stellite Co., Kokomo, Ind. Booth 230.
Haynes Stellite cutting tools; demonstrations of Stelliting with Haynes Stellite welding rod; and Haystellite cutting tools. Represented by: F. P. Gormely, vice-president and general manager; F. T. McCurdy, assistant superintendent; W. A. Moore and E. E. Gordon.

Heppenstall Forge & Knife Co., Pittsburgh. Booth 82.
Complete working model of Gellert lifting tongs especially designed for the lifting of die blocks without the assistance of a man guiding the operation; shear knives; section of split ingot showing hard quality in EIS steel; Hardtem die block. Represented by: C. W. Heppenstall, president; B. B. Weinberg, vice-president; J. A. Succop; R. B. Heppenstall, vice-president; George I. Allen; F. C. Moyer, vice-president Heppenstall Steel Co.; George O. Desautels; Carl J. Sauer, manager Heppenstall Forge Co., Bridgeport, Conn.; A. J. Porter, Jr., sales manager Heppenstall Forge Co.; A. L. Wurster and L. A. Daines.



ADAM M. STEEVER
Chairman
Chicago Chapter

R. H. PATCH
Chairman
Philadelphia Chapter

E. F. Houghton & Co., Philadelphia. Booths 354, 355, 371 and 373.

I

Illinois Steel Co., Chicago. Booths 58 and 79.
Motion picture showing the basic processes of making steel and illustrating in detail the operations of the electric furnace and alloy steel departments at the South Chicago plant. Represented by: W. I. Howland, Jr., assistant general manager of sales; R. Korsan, J. H. McKown, A. R. Williard, R. G. Glass, F. B. Mulvaney, E. Davidson, Fred W. Bendell, C. R. Moffat, James R. Mills, manager of sales, Cleveland; G. A. Price, G. Landrus, J. Hornbrook, W. H. Brainard, C. E. McIntyre, R. C. O'Neill, H. W. Parker, W. S. Saylor, C. T. Siebert.

Index Machinery Corporation, Cincinnati. Booth 360.
Huster filing and sawing machine, a tool especially designed

THE IRON AGE will occupy booth 372 at the Steel Treaters' Exposition. Members of the editorial, advertising, sales promotion and subscription departments will be present. Copies of THE IRON AGE and reprints will be available.

for the making of dies and odd shaped parts. Represented by: Joseph F. Geers, president and general manager; James J. Dillon, Max A. Knorpp.

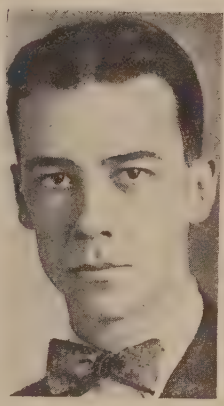
International Nickel Co., Inc., New York. Booth 94.
Display material to illustrate the use of nickel and nickel alloys in industrial applications. Represented by: T. H. Wickenden, Charles McKnight, H. J. French, N. B. Pilling, F. B. Coyle, J. S. Vanick, C. A. Crawford, R. J. McKay, T. J. Wood, O. B. J. Fraser, J. W. Sands, A. L. Roberts, D. E. Ackerman, R. L. Suhl, R. A. Wheeler, L. Muller-Thym, E. J. Bothwell, H. C. Armstrong.

Interstate Iron & Steel Co., Chicago. Booths 52 and 73.

Irwin Lumber Co., Erie, Pa. Booth 338.

J

William Jessop & Sons, Inc., New York. Booth 23.
Reception, description and distribution of matter pertaining to product of company. Represented by: F. C. A. H. Lantsberry, president; Robert Ross, secretary; C. L. Bailey, Hans Johnson, G. J. MacQuarrie, H. S. Norman, L. H. Cummings.



A. W. GROSVENOR
Chairman
St. Louis Chapter

WALTER L. TRUMBAUER
Chairman
Lehigh Valley Chapter

Jessop Steel Co., Washington, Pa. Booth 8.
Tool steel bars; fractured pieces and microscope for examination; finished dies and parts made for our tool steels; display boards of cold rolled strip steel, razor blade steel; stainless steel articles and parts; finished cutlery display boards both stainless and carbon steel of Jessop manufacture; evolution of finished saws, displaying various steps from the raw material to the finished tool. Represented by: S. A. Grayson, president; R. E. Emery, vice-president; F. T. Youngman, secretary-treasurer; R. J. Murray, V. M. Wellman, D. J. Hanna, A. G. Lambert, W. A. Salt, C. M. Cunningham, W. J. Frederick, and J. C. Dawson.

Johns-Manville Corporation, New York. Booth 395.
With the merger of the Johns-Manville Corporation and Celite Products Co., insulation display covers the complete field in high temperature and low temperature insulation. Display includes building materials, such as asbestos shingles, Transite, industrial flooring, etc., and a complete line of packings. Represented by: Eugene Dowling, G. E. Grimshaw, J. W. Blenmker, R. S. Hemmingson.

Jones & Laughlin Steel Corporation, Pittsburgh. Booths 55 and 57.
Hot-rolled and cold-finished steels, including Jalcase steel parts, cold-finished steel sections, light weight channels, junior beams, steel piling, tubular products and other items of interest. Represented by: W. B. Todd, manager of sales, cold-finished sales department; J. D. Allen, C. C. Henning, J. H. Flaherty, W. R. K. Scott, H. W. Graham, E. A. France, J. G. Hutchinson, A. A. Wagner, assistant manager of sales, hot-rolled sales department. From Higgins-Bothwell Co., Detroit: W. J. Bothwell, J. T. Ferris, J. W. Robinson, R. W. Light, W. E. Danz.

K

K-G Welding & Cutting Co., Inc., New York. Booth 262.
Generators, oil burning equipment; all types of welding, gas welding and cutting torches; new style "K" oxygen and acetylene regulators. Represented by: William D. Flannery, E. Brass, H. H. Kress, William Munn, P. Noren, John Evans, A. W. Carr.

Keller Mechanical Engineering Corporation, Brooklyn. Booths 407 and 429.
A type BL Keller full automatic tool room machine, equipped with two-template rigging and attachment for locating and jig boring; a type R-6 Keller cutter and radium grinder; a KELLocatER complete unit with overarm and improved spindle (power feed); the line of Kellerflex flexible shaft machines, including the new 1 HP outfit. Represented by: S. A. Keller, treasurer; A. S. Keller, advertising manager; Henry Schreiber, Charles Bitter, P. C. Renno, W. L. MacRae, E. D. Ashley, Arthur Jenner, Paul Loewenberg.

J. W. Kelley Co., Cleveland. Booth 68.
Beacon brand products including carburizing compounds; lead pot carbon; annealing carbon; quenching oil; tempering oil; industrial oil; heat treating salts; and tempering salts; Greene quenching and washing machine. Represented by: J. W. Kelley, president; J. E. Burns, vice-president; H. B. Northrup, secretary; P. E. Holder, H. M. Webb, P. J. Myall, J. H. Hopp, C. F. Boyd.

Kelley-Koett Mfg. Co., Covington, Ky. Booth 314.
X-ray apparatus for fluoroscopic and radiographic study of metals, also assortment of films showing results of radiographic tests. Represented by: W. S. Werner, secretary and chief engineer; Dr. Hahn and H. C. Steadman.

C. M. Kemp Mfg. Co., Baltimore. Gas Section.
Improved Kemp system for the industrial utilization of natural or artificial gas, burner equipment adaptable to all industrial process heating supplied by this Kemp system is displayed; Nash motor operated similar to the "block test" at the Racine plant is also shown. Represented by W. M. Ponder, R. S. Van Note, W. S. Bassett, F. H. Andrews, William Hunt and E. B. Dunkak, sales manager.

Charles F. Kenworthy, Inc., Waterbury, Conn. Booth 327.
Pictures of various installations; and samples of annealed products. Represented by: C. F. Kenworthy, president; H. A. Kenworthy, general manager; R. E. Worthington, R. N. Griswold.

Keystone Lubricating Co., Philadelphia. Booth 3.
Keystone safety lubricating system including the new Keystone pneumalectric lubricating system, which provides for completely automatic operation. The pressure is maintained by a motor compressor set which delivers grease to a rotary distributor, from which lines lead to the various bearings of a machine unit. Represented by: G. W. Hall, Philip King, Vic. Berguson, R. McDaniel, M. C. Schwenk.

L

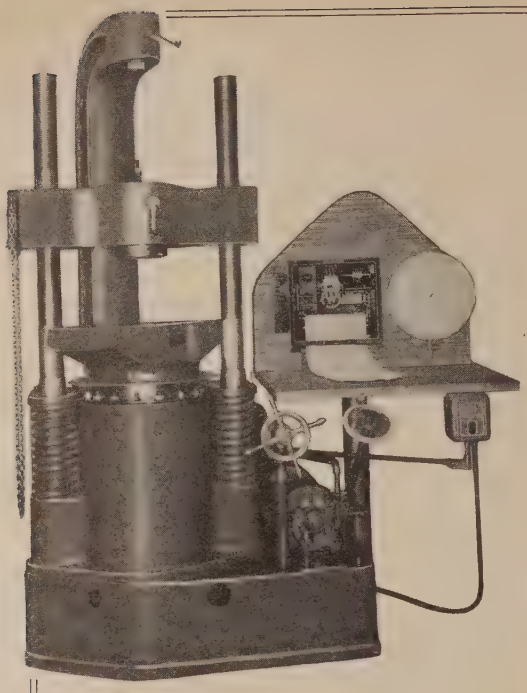
Lakeside Steel Improvement Co., Cleveland. Booth 6.
Photomicrographs and fractures of various grades of steel treated and untreated; heat treated parts, such as motor blocks, drive shafts, axle shafts, connecting rods, pistons, skid chain, bolts and nuts and various automotive parts, besides a collection of airplane parts which were heat treated at the plant of the Lakeside Steel Improvement Co., such as connecting rods, airplane struts, boomracks, ratchets, clevises and turn buckles. Represented by: C. W. Derhammer, president; R. T. Morrow, vice-president; R. L. Rolf, secretary and metallurgical engineer; John Hume, Jr., assistant metallurgical engineer.

Lava Crucible Co. of Pittsburgh, Pittsburgh. Booth 60.
Full line of the various types of super-refractories in standard brick, standard tile, special shapes, plastics, cement and graphite crucibles. Represented by: Furman South, Jr., president; H. E. White, D. E. MacLean, R. P. South, C. H. Knappenberger.

E. J. Lavino & Co., Philadelphia. Booths 349 and 350.
Many varieties and grades of chrome ores from all parts of the world, in the crude and ground form; "Lavino" chrome, magnesite and silica brick; Kromepatch, multi-bond refractory cement; Neutragrog, a chemically neutral aggregate for monolithic construction; plastic K-N chrome, a prepared chrome product ready for molding in place. Represented by: R. E. Griffith, A. DeMacedo, J. B. Luckie, R. C. Hanson, W. C. Holzworth, H. W. Pigott, P. S. Haserodt.

Lebanon Steel Foundry, Lebanon, Pa. Booths 89 and 91.
Electric steel castings.

Leeds & Northrup Co., Philadelphia. Booths 353 and 375.
Automatic temperature controllers; pyrometers; temperature recorders; temperature indicators; portable precision potentiometers; portable temperature indicators; thermocouples; miniature Hump furnace and Leeds and Northrup potentiometer; miniature Homo furnace and Leeds and Northrup potentiometer pyrometer. Represented by: H. Brewer, A. F.

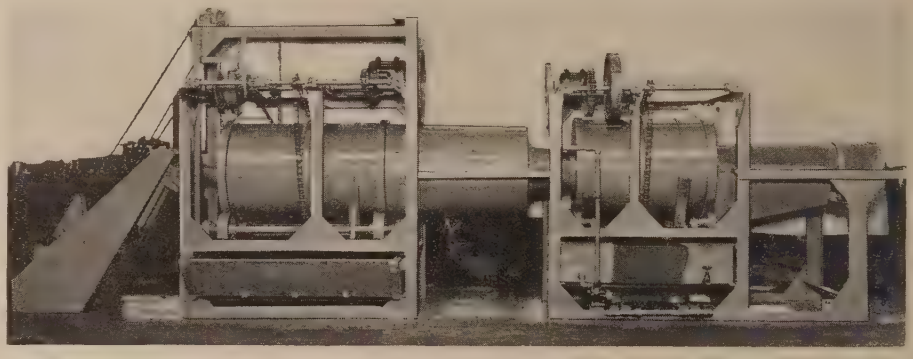


Testing-Machine Recorder

A NEW testing-machine recorder has been developed by the Southwark Foundry & Machine Co., Philadelphia, in conjunction with the Leeds & Northrup Co., also of Philadelphia. This equipment, as illustrated, draws on an enlarged scale an accurate stress-strain diagram of materials tests, showing the critical points in great detail. The range of the recorder may be varied by changing the voltage of the electrical circuits. Both stress and strain are picked up by electric telemeters and transmitted through wires to the remote potentiometer recorder which is, in reality, a double recorder. Its initial appearance will be at the National Metal Exposition.

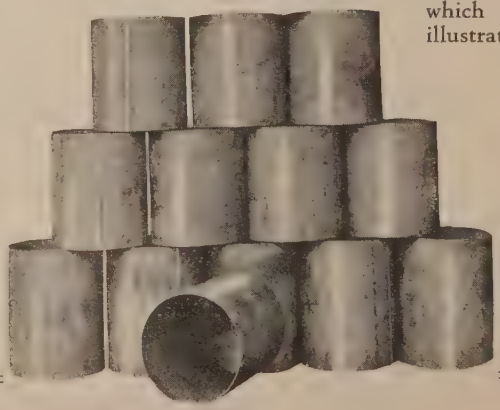
Ideal Acid Flotation Process Tumbler

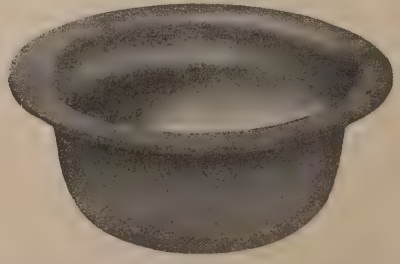
FOR removing scale from forgings, stampings and similar parts, N. Ransohoff, Inc., Cincinnati, will exhibit at its booth at the National Metal Exposition an acid flotation tumbling equipment.



Heat-Resisting Alloys

IN its booth at the National Metal Exposition, the Chicago Steel Foundry Co. of Chicago will exhibit its heat-resisting alloy known as Pyrasteel in the shape of castings designed for special purposes and old castings which have rendered exceptionally long service. The illustrations show some of the shapes in which the alloy containers for heat treating are made.



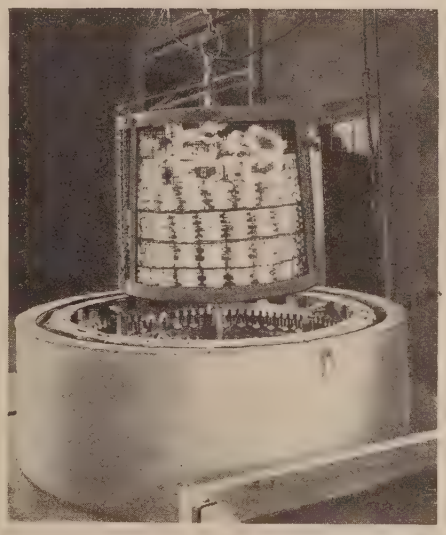


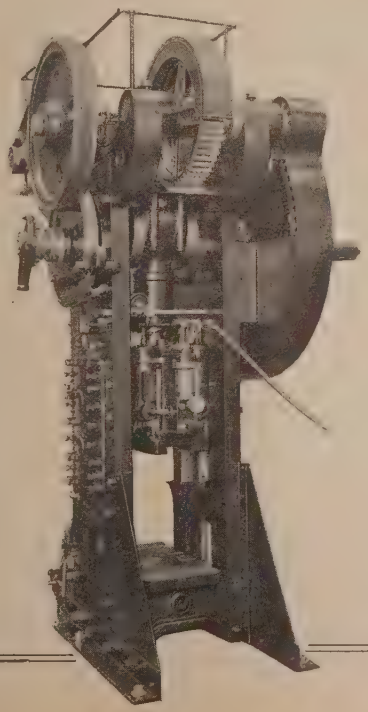
Electric Heat-Treating Department

FOR the manufacture of precision twist drills, reamers, cutters, etc., Whitman & Barnes, Inc., Detroit, has a heat-treating department here illustrated. Temperature and time are controlled automatically from a central station. The various tools are tested for hardness, and actual performance tests are run. A research department is also maintained.

Electric Furnace for Heat Treating Aluminum Alloys

A NEW furnace has been recently announced by the General Electric Co., Schenectady, N. Y., for heat treating aluminum alloys. It is a pit type, cylindrical unit. In a typical application of this furnace, shown in the illustration, a run of castings, weighing approximately 500 lb., plus a basket weight of 700 lb., both at room temperature, was placed in a furnace at a temperature of 900 deg. Fahr. In 1½ hr. the center of the charge was at the heat-treating temperature. The working dimensions are a diameter of 4 ft. and a depth of 6 ft.





A New Hydraulic Eccentric Press

AN eccentric press with a hydraulic pressure regulating device has been installed in a drop forging plant in the Chicago territory by Henry Pels & Co., 90 West Street, New York. The regulating device is designed to release the pressure automatically as soon as the permissible maximum is reached, which, on this particular machine, is 330 tons. The compression fluid will escape into the overflow tanks, the plunger will continue its movement without forcing the ram any further and, upon its return stroke, will draw the compression fluid back into the cylinder by suction, so that the machine can continue to work without interruption even after the overload protection device has operated. The press has been used for straightening automobile crank shafts.

Moranty, E. G. Estabrook, P. H. Taylor, G. W. Tall, A. E. Tarr, J. E. Korp, and T. C. Smith.

E. Leitz, Inc., New York. Booths 74 and 95.
Leitz micro-metallograph; Leitz metallurscope; Guthrie-Leitz grinding and polishing machine; line of Leitz microscopes of smaller size and numerous accessories. Represented by: R. Tvestmann, O. Soetbeer, S. Borell.

Lincoln Electric Co., Cleveland. Booth 224.
The new improved Lincoln "Stable-Arc" welder and the latest type of welding accessories and supplies. During exhibition, range boilers automatically arc-welded by the Electronic Tornado process of carbon arc welding. Represented by: A. F. Davis, vice-president; Maurice Taylor, T. P. Tarbell, B. F. Kessler, O. P. Hanchette, R. B. Tuhey, A. T. Smith.

Linde Air Products Co., New York. Booths 225, 227 and 229.
Complete line oxyacetylene welding and cutting apparatus and supplies; complete line welding generators; Carbic flood lights. Represented by: H. F. Buckley, T. C. Fetherston, H. H. Griffith, H. H. Dya, De W. Endicott.

Ludlum Steel Co., Watervliet, N. Y. Booths 22 and 51.
Enduro KA2 steel; nitralloy steel; tool steels; carbon and alloy; high-speed, die, chisel, non-shrinking oil-hardening, carburizing, ball bearing, permanent magnet, and heat-resisting steels; forgings, drill rods; shown in finished forms; rustless iron and steel; shown in finished forms; Straus metal, tungsten carbide cutting material, manufactured under license agreement with Carboloy Co. and under direct supervision and with benefit of original Krupp experience. Represented by: H. G. Batcheller, vice-president; F. B. Lounsberry, vice-president; J. E. Polhemus, A. F. Dohn, C. B. Templeton, H. A. DeFries, J. T. Norton, Ralph DeVries, A. K. Martin, C. W. Lindemuth, W. H. Vrooman, C. B. Boyne, K. G. Reynolds, W. Westover, W. H. White, T. C. Sherman, H. I. Askew, J. C. Gearhardt, H. Hardwicke, P. E. Floyd, G. F. Wilson, G. Peterson, G. D. Sleeth, W. P. Ehrenberg, P. R. Thurston, W. Kinsey, G. D. Howk, J. E. Jones, E. E. Sanborn.

M

Paul Maehler Co., Chicago. Booth 206.

Mahr Mfg. Co., Minneapolis, Minn. Booth 356.
Enlarged photographs, photostats and prints illustrating outstanding continuous furnaces, car-type furnaces and batch-type furnaces of standard and special design, installed in leading industrial plants of the country. Represented by: W. G. Barstow, sales manager; O. E. Ertl, chief engineer; D. H. Ruhnke, A. J. Nordenson, Minneapolis; B. G. Harmon, R. G. White, A. E. Stenzel, R. A. Ledebur, A. F. Tenney.

Manhattan Rubber Mfg. Co., Abrasive Wheel Department, Passaic, N. J. Booth 361.
Typical examples of parts ground with Manhattan rubber-bonded wheels. These include products of many large and well known manufacturers. They range from the rougher classes of work, such as manganese steel track castings, high speed billets, forgings, etc., to the finer operations such as cutlery, thin circular knives and high grade ball bearings. Represented by: W. H. Steinberg, C. M. Lawton, C. A. Fox, C. E. Forney, R. G. Brinkerhoff, Howard Pyle.

Marburg Brothers, Inc., New York. Booth 203.
Thiel precision die filing and sawing machines. Represented by: Theodore H. Marburg, president; O. P. Brett, Richard Krause, Herbert Zimmerman.

McCann-Harrison Corporation, Cleveland. Booths 273 and 289.
One model continuous conveyor beam furnace. Represented by: H. P. McCann, president; Robert L. Corbett, sales manager; Edward Busch and Charles L. Stuart.

Metal & Thermit Corporation, New York. Booth 236.
Heavy thermit welding samples and metal samples. Represented by: Henry D. Kelley.

Michigan Steel Casting Co., Detroit. Booths 87, 89 and 91.
Misco alloys in the form of castings, rolled bars, wire, and sheets—to show the possibilities of fabrication using the afore-mentioned, several fabricated pieces are shown, such as Misco combination cast base sheet wall carburizing boxes, dipping baskets, dipping racks, Hump furnace racks, etc. Represented by: F. J. Stanley, general manager; E. D. Flintermann, sales manager; J. D. Corfield, A. A. Gould.

Michiana Products Corporation—Chrobaltic Tool Co. Division, Michigan City, Ind. Booth 204.
Heat resisting and acid resisting castings, including the Fire Armor and Zorite alloy. Represented by: W. B. Sullivan, vice-president and general manager; L. H. Whiteside, C. M. Conner, J. F. Sweeney, A. A. Cash, O. G. Voss, T. A. Meyer, Charles Peterson, H. Klouman, E. Whiteside.

Midvale Co., Philadelphia. Booths 54 and 75.
Miscellaneous forgings, tool steel products and alloy steel

J. G. GAGNON
Chairman
Detroit Chapter

JAMES TAYLOR
Chairman
Schenectady Chapter

products. Represented by: A. C. Dinkey, president; Stuart Hazlewood, vice-president in charge of sales; H. L. Frevert, vice-president in charge of operations; Howard Myers, engineer of tests; J. R. Adams, superintendent special products; Francis B. Foley, research engineer; Henry Ziesing, assistant general sales manager; H. E. Rowe, bar steel sales manager; Walter B. Smyth, Fred W. Sager, Harvey Garrett, Robert M. Bird, Thomas Besom, Herbert Cox, J. H. Glass, L. C. Berkey, Harry Teel.

A. Milne & Co., New York. Booth 284.
Milne tool and die steels; hollow drill steel; solid drill steel; auger drill steel; special sections; MR Swedish Lancashire iron; Swedelec cold drawn electrical iron; Nohab anvils; forged tools; Wardlow's file steel; Wardlow's cutlery sheets; Prince ball bearing steel; Reynolds aircraft tubing. Represented by: V. A. Greene, general sales manager; Henry Sears Hoyt and J. King Hoyt, Jr., members of the firm; A. G. Reid, B. Brower, Miss K. E. McDonald, H. R. Adams.

Milwaukee Die Casting Co., Milwaukee. Booth 47.
Many sizes and shapes of tin, lead, zinc, and aluminum-base alloy die castings; also a die showing how die castings are made; working model demonstrating die cast gears are also in operation. Represented by: C. H. Frantz, sales engineer, and H. F. Schroeder, vice-president.

Morse Twist Drill & Machine Co., New Bedford, Mass. Booth 56.
High speed and carbon twist drills; reamers; milling cutters; taps and dies. Represented by: W. T. Read, vice-president and treasurer; F. O. Lincoln, vice-president, in charge of sales; R. F. Chase.

N

National Electric Light Association, New York. Booths 448, 449, 450, 451 and 452.
Photographs illustrating applications of electric furnaces to steel heat treating; this exhibit is sponsored by the industrial heating committee, and is of an educational nature. Represented by: J. L. Faden, chairman, industrial heating committee; Robert M. Keeney, vice-chairman; R. T. Kaighin, secretary; James H. Faulkner, Charles E. Russell, O. Wilhelmy, H. J. Hall, C. P. Yoder.

New Jersey Zinc Co., New York. Booth 414.
Endless chain of approximately 40 die castings of small and intricate design moving along front wall of booth. On center back wall is theater having about eight particularly interesting die castings of larger size. Also rolled zinc chromium plated and nickel plated, which is being used in many industries. Represented by: C. R. Maxon, S. E Maxon, R. M. Curts, R. Davidson, W. J. Keuhn, W. P. Hardenbergh, Jr.

Northwestern Mfg. Co., Milwaukee. Booth 234.
One 300-ampere arc welder; and one non-operating gasoline engine driven arc welder; also welding parts. Represented by: K. L. Hansen, F. A. Wilch, A. H. Friese.

Norton Co., Worcester, Mass. Booths 288 and 290.
High-speed grinding equipment; American electric furnace; Norton abrasive products; and Norton heavy refractories. Represented by: Robert Kirkpatrick, sales manager, refrac-

H. L. HOPKINS
Chairman
Case Group

H. F. DAVIS
Chairman
Ontario Chapter

tories division; H. A. Blackburn, K. H. Bird, A. R. Sandine, R. H. Cannon, A. T. Douglas, H. R. Swanberg.

Nugent Steel Castings Co., Chicago. Booths 89 and 91.
Electric steel castings.

O

Ohio Steel Foundry Co., Springfield, Ohio. Booth 278.
Fahrite, a heat resisting alloy for temperature up to 2200 deg. Fahr. Produced in a complete range of nickel-chromium and iron-chromium base alloys. Represented by: W. J. Gilmore, vice-president; W. J. Hayes, Jesse F. Monfils.

Tinius Olsen Testing Machine Co., Philadelphia. Booth 48.
A 100,000-lb. capacity Olsen 3-screw rotating gear nut-type automatic and autographic universal testing machine with automotive quick change eight-speed reverse gear box drive, complete with attachments for various forms of tests and latest extensometer equipment; Olsen combined impact tension and cantilever type (Izod type) of impact tester; Haight alternate stress testing machine for determining fatigue limit in tension and compression; Olsen direct motor-driven production type Brinell hardness tester; Herbert pendulum hardness tester with operating stand; Herbert direct motor driven production type "Cloudburst" hardness tester for hardness testing and also arranged for superhardening steel parts; Olsen direct motor driven production type ductility testing machine for determining the drawing quality of sheet metal; Olsen proving or verifying rings of various capacities; various types of strain gages and measuring instruments used in connection with testing equipment; Olsen-Lundgren dynamic balancing machine operating on centrifugal high tension spark principle; Olsen-Lundgren automatic weighting static balancing machine for statically balancing rotating parts. Represented by: T. Y. Olsen; R. B. Lewis; Jacob Lundgren; and Bruce L. Lewis.

P

Page Steel & Wire Co., New York. Booth 311.
Testing machines showing De Forest magnetic method of testing Page Armco welding wire for gas and electric welding. This machine is a development of the research department of the company and is a rapid non-destructive test method. Represented by: W. T. Kyle, J. J. Flaherty, C. A. McCune and W. L. Walsh.

Park Chemical Co., Detroit. Booth 15.
Case hardening compounds; cyaniding compounds; drawing salts; re-heating salts; lead pot covering; carbon preventer; lacquer rubbing compounds; masking compounds; and quenching and drawing oils. Represented by: Joseph N. Bourg, vice-president and general manager; J. C. Thompson, F. W. Faery.

Henry Pels & Co., Inc., New York. Booths 203, 205, and 207.
Type FV-55 big billet shear—capacity 5¼-in. cold steel bars; Type STAQ-16 gate shear—capacity 80-in. x ⅝-in. steel plate; Type Pg. 35 closed throat press—capacity 220 tons—equipped with dies for manufacture of spring leaves; Type BLUEFGA-22sp. combination punch, plate shear, angle, bar and tee cutter, with extra high punch throat for large H-columns and Bethlehem beams; Type MAE-16 combination punch, plate shear, angle, bar and tee cutter with built-in notcher—for medium capacities; Type ME-10 combination punch, plate shear, angle, bar and tee cutter with built-in Coper—for lighter capacities; Type EFG-16 angle, bar and tee cutter—capacity 6 x 4-in. angles, etc. Represented by: C. L. Martin, vice-president; T. F. Kane, E. E. Tailfer, and J. A. Weigand.

Permutit Co., New York. Booth 370.
Water softening and filtering equipment for industrial plants; Ranarex instruments for recording gas density, ammonia gas, etc. Represented by: H. M. Danner and H. M. Olson.

Pittsburgh Instrument & Machine Co., Pittsburgh. Booth 96.
Testing machines, Brinell testers—precision, production, power-driven and hand-operated; impact testing machine; sheet metal tester; metallographic grinder; Brinell microscope; depth indicator; proving ring; and for the first time direct-reading Brinell instrument attached to Brinell machine showing the diameter of ball impressions on a ground glass plate while the test load is applied. Represented by: Charles Trueg and Walter Kammerer.

Pressed Steel Co., Wilkes-Barre, Pa. Booth 410-A.
Complete line of Lite-Wate Rezistal carburizing and annealing boxes; welded and seamless formed containers. Seamless formed stampings of various grades of chrome and chrome-nickel alloys. Represented by J. H. MacVeigh, vice-president and sales manager; F. A. Schmidt, works manager.

Production Machine Co., Greenfield, Mass. Booth 306.
Type "A" centerless polishing and finishing machine (heavy duty); type "S" centerless polishing and finishing buffing machine; and type "R" combined disk-grinder and polishing machine. Represented by: W. S. Howe, president; A. H. Behnke, vice-president and sales manager; T. A. Welsh, superintendent.

Thomas Prosser & Son, New York. Booth 401.
Commercial tool grinder; Monarch lathe; Widia tungsten carbide lathe tools, planer tools, shaper tools, drills, reamers, milling cutters, boring and special tools. Widia tungsten carbide tools will be demonstrated cutting various materials at high speeds, speeding up production with corresponding reduction in costs. Represented by: R. D. Prosser, general manager; W. E. Guild, sales manager; E. R. S. Reeder, J. A. Deakin, J. Hugo Smith, H. B. Spaulding, H. E. Berry, L. N. Hall.

R

N. Ransohoff, Inc., Cincinnati. Booth 392.
Star return tumbling barrel; enlarged photographs of various jobs for descaling forgings, cleaning stampings, etc.; samples of work done by this equipment. Represented by: N. Ransohoff and D. M. Powers.

Reeves Pulley Co., Columbus, Ind. Booth 316.
Several different designs of the Reeves variable speed transmission, a compact, mechanical unit which is used in conjunction with any type of production machine or conveyor to provide the ability to secure infinite speed variation and adjustability. Represented by: Carl M. Reeves, vice-president, and C. L. Irwin.

George P. Reintjes Co., Kansas City, Mo. Booth 279.
Interlocking arch tile consisting of shapes that completely build any varying spans of roof and door arches over forging and heat treating furnaces. Represented by: George P. Reintjes.

Republic Flow Meters Co., Chicago. Booth 275.
New Republic control pyrometer; also complete exhibit of Republic flow meters, CO_2 meter and gas meters. Represented by: K. B. Roudebush, C. H. Tate, T. E. Bell, C. E. Pritchett, R. C. Ascher, E. Schneider.

Riehle Brothers Testing Machine Co., Philadelphia. Booth 100.
Vickers hardness tester; calibrating rings; Brinell machine; mirror extensometer reading to one hundred thousandth of an inch; and similar apparatus. Represented by: A. Fuller Riehle, vice-president and superintendent.

Stanley P. Rockwell Co., Hartford, Conn. Booth 404.
Rockwell dilatometer with inclosed panel attached to pit type electric furnace. The furnace is operated to demonstrate the simplicity of heat treatment by the Volcrit method. Portable quenching tank agitator which can be attached to practically any quenching tank as desired, and produces swirling action in the quenching medium or jet against the work being quenched. Represented by: Stanley P. Rockwell, president; and William A. Stumpf, sales manager.

John A. Roebling's Sons Co., Trenton, N. J. Booth 234.
Samples of welding wire. Represented by: R. R. Newell.

Roessler & Hasslacher Chemical Co., New York. Booths 19 and 21.
Complete line of chemicals used in the case hardening, heat

treatment, and heat coloring of steel; complete line of chemicals used in the electroplating of metals; demonstration of electroplating of copper, cadmium and zinc on steel; a demonstration of heat coloring of steel; demonstration of a new method for the approximate determination of cyanide in case hardening baths. Represented by: Walter M. Gager, Charles H. Proctor, Carl Dittmar and Carl Hamann.

Rotor Air Tool Co., Cleveland. Booth 343.
Portable pneumatic drills; grinders; sanders; and buffers. Represented by: H. P. Bailey, president; K. L. Pohlman, vice-president; W. G. Baily and C. B. Scott.

Ruemelin Mfg. Co., Milwaukee. Booth 326-A.
Sanitary sand blast cabinet complete; No. 5 exhaust-type fan; midget sand blast gun; operator's sand blast helmet; Junior sand blast generator. Represented by: H. A. Flitz and T. C. Tipper.

Rustless Iron Corporation of America, New York. Booth 93.
Articles made from rustless iron, such as automobile parts, bars, strip, sheets, wire, tubes, etc.; raw material—chrome ore. Represented by: Dr. M. H. Sommer and A. L. Grinell.

Ryan, Scully & Co., Philadelphia. Booth 348.
New type of automatic control valve that contains features of program control and multiple stage adjustment and is to be known as multiple stage control; new type of continuous belt, which weighs less than 4 lb. a sq. ft., is made of alloy links of patented character and is capable of carrying 90 lb. a sq. ft.; miscellaneous types burner equipment. Represented by: F. J. Ryan, president; Gordon A. Webb, A. H. Kruger and J. Kniveton.

Joseph T. Ryerson & Son, Inc., Chicago. Booth 368.
Samples of general steel products; cold-rolled steel products; tool and alloy steels; and rust and heat resisting alloys. Represented by: H. B. Ressler, general manager of sales; Fred Doran, G. Van Dyke, A. Y. Sawyer and Charles Kehr.

S

Safety Equipment Service, Cleveland. Booth 233.
Safety equipment and devices; Super-drednaut goggles for chippers, grinders, welders and all industrial uses; Dr. Wood respirators; "Safety Service" clothing made of asbestos, leather, fire resisting duck, water resisting duck, acid proof cloth, rubber and other materials; "Safety Service" safety shoes; sand blast and dust hoods; welding helmets; gas masks; safety and danger signs; first aid kits and supplies. Represented by: Buel W. Nutt, president; Harry F. Lea, Andrew Evers, F. C. Blake and E. C. Lyon.

Selas Co., Philadelphia. Booth—Gas Section.
Selas gas mixing machines operating various industrial gas appliances, such as brazing torches, self-heating solder irons, burner tips for japanning, wire ovens, etc.; needle flame burners for can manufacturing, wire fusing, etc. Selas-fired industrial gas furnace and various furnace burners and bunsens. Represented by: Fred Hess, manager; and E. A. Furkert.

George Scherr Co., Inc., New York. Booth 200.
Carl Zeiss precision measuring machines and instruments; Taylor rotary cutting-off machine; Schuchardt & Schutte thread milling machine demonstrated with thread holes. Represented by: George Scherr, president and manager; Fritz Konig, vice-president; George Kaner and George Van Daplank.

Sentry Co., Taunton, Mass. Booth 391.
Sentry size No. 2 model H S and size No. 1 model L furnaces with control, also high-speed steel hardening using the Sentry diamond block method. Represented by: F. B. Crocker and A. A. Haryer.

Shakeproof Lock Washer Co., Chicago. Booth 357.
Entire line of standard lock washers and locking terminals; large exhibit of the Shakeproof locking principle and the actual locking of the washers practically demonstrated. Represented by: Herbert M. Howison and Jack M. Gribbie, sales manager.

Shawinigan Products Corporation, New York. Booth 239.
Carbide and carbide packages. Represented by: W. P. Chur.

Shore Instrument & Mfg. Co., Jamaica, N. Y. Booth 17.
Regular line of hardness testing instruments consisting of C-2 scleroscope, bulb type; "D" scleroscope, dial type; Shore monotron; rubber testing instruments; optical pyrometers, Pyroscope, types A and B; Localcase and Localhard are shown with samples of their usage. Represented by: F. G. Kendall, sales manager; and J. M. Kendall.

Simonds Saw & Steel Co., Fitchburg, Mass. Booth 342.
Metal-cutting circular and band saws; files, hack saw blades; high-speed, carbon, magnet and special tool steels. Represented by: C. R. Pafenbach, steel sales manager; George T. Curtis and Harry P. Baumann.

Sivyer Steel Casting Co., Milwaukee. Booths 89 and 91.
Electric steel castings.

David H. Smith & Sons, Inc., Brooklyn. Booth 438.
Smith billet shears; Smith angle bending rolls; and Smith model 91 size 16 special. Represented by: William H. Kay, manager machinery sales; Dudley J. Smith, vice-president; Olaf Olsen, and Cleveland Tool & Supply Co., salesmen.

Snap-On Wrench Co., Chicago. Booth 280.

Southern Manganese Steel Co., St. Louis. Booth 18.
Fahralloy high temperature and corrosion resisting products. Represented by: F. A. Fahrenwald, A. W. Daniels, general sales manager; Russell J. Williams, assistant sales manager; and D. M. Powers.

Southwark Foundry & Machine Co., Philadelphia. Booth 31.
Southwark-Emery universal testing machine; 40,000-lb. hydraulic testing machine for field tests of welded-joint development in combination with Union Carbide & Carbon Research Laboratories; McCollum-Peters electric telemeter in operating exhibit showing the remote recording of stress, strain and pressure; Whittemore strain gage; Huggenberger tensometer. Represented by: F. G. Tatnall, manager, testing equipment division; H. A. Weaver and H. J. Ruch.

Spencer Turbine Co., Hartford, Conn. Booth 291.
Spencer turbo-compressors which are used for supplying air in connection with oil and gas burning industrial furnaces, foundry cupolas, etc. Represented by S. E. Phillips, president; F. A. Wright, F. E. Warnke and R. A. Brackett.

Square D Co., Detroit. Booth 332.

William K. Stamets, Cleveland. Booths 205, 205-A and 207.

Standard Alloy Co., Inc., Cleveland. Booth 33.
Standard alloy lead pots; cyanide pots; normalizing and pack heating furnace discs and spacers; insulated shaft assembly for normalizer; enameling burning racks; chain grate castings for heat resisting service; furnace trays and shoes; roller rails; skid rails and shoes; pump casings and impellers; furnace parts and miscellaneous heat and acid resisting castings covering in general the heat treating and chemical field. Represented by: Harvey M. Smith, sales manager; Frank F. Jackson, superintendent; Emerson M. Williams, secretary; Charles D. Cutting, H. A. Cutting, W. D. Mann, George S. McFarland and A. D. Darragh.

Standard Equipment Co., Inc., New Haven, Conn. Booth 379.
Photographs showing installations of the Standard patent scouring machine now in operation removing scale from hot-rolled and annealed strip steel and allied equipment such as pulling rolls, compressed air controlled, winders with independent foot treadle clutch control on each reel; new type of collapsible take-up reel with quick adjustable flange. Represented by: Charles A. Dreisbach, president; and Burton L. Hoskins, director.

Steel City Testing Laboratory, Detroit. Booth 102.

Stoody Co., Whittier, Cal. Booth 241.
Various welding rods and welding equipment, including grinders and electrode holders. Represented by: Robert L. Ozias and C. E. Phillips.

Strong, Carlisle & Hammond Co., Cleveland. Booth 209.
No. 659 Duralumin treating furnace having a connected load of 15 kw. single phase 110 volts, operating through a tapped transformer having three reduced capacity taps under 110 volts at 99, 88 and 77 volts. Element, ribbon resistor of low watt density. Leeds & Northrup automatic temperature control. Represented by: G. S. Peterson, sales manager furnace department; Jacob Weintz and A. B. Lindsay.

D. A. Stuart & Co., Chicago. Booth 78.
Various parts machined with new type metal working oils; Bottles containing samples of principal well-known Stuart products, this list including Stuart's Thred-Kut oil, Super-Kool base oil; Codol liquid grinding compound, Kleen-Kut soluble oil, Drawsol deep drawing compound, No. 34 soluble quenching oil. Represented by: C. H. Baker, G. A. Dudley, W. M. Duncan, W. H. Huelster, T. B. Langdon, director of sales; and W. H. Oldacre, director of engineering and research.

Sullivan Machinery Co., Chicago. Gas Section.

Surface Combustion Co., Toledo. Gas Section.
Heat treating furnace equipment with automatic temperature control; surface combustion burners and inspirators and their application; newly-designed forging furnace. Represented by F. H. Adams, vice-president and general manager; C. B. Phillips, vice-president and general sales manager; C. H. Blesch, A. L. Hollinger, W. O. Owen, Eugene A

Weaver, F. H. Trembly, S. R. Anderson, J. M. Brown and O. R. Olson.

T

Taylor-Winfield Corporation, Warren, Ohio. Booth 244.
Both spot and butt welding equipment and a portable type of spot welding machine. Represented by: F. C. Terry and engineers from main plant.

Thompson Grinder Co., Springfield, Ohio. Booth 378.
R. R. Moore fatigue testing machine running tests on various metals and their alloys. Specimens will be exhibited from parts taken from actual service failures, such as aeroplane propellers, struts, crank shafts, oil tubes, etc. The effect of various shapes of specimens such as grooves, threads, fillets, will be illustrated by the test run. Represented by W. G. Baldenhofer and R. R. Baldenhofer.

Timken Steel & Tube Co., Canton, Ohio. Booths 24 and 36.
Moving exhibit illustrating the use of Timken steel and the services available through the Timken company. Represented by: M. T. Lothrop, president; A. J. Sanford, vice-president in charge of sales; W. G. Hildorf, chief metallurgist; R. L. Wilson, Robert Atkinson and Walter Wiewel.

Toledo Scale Co., Toledo, Ohio. Booth 328.

Tomkins-Johnson Co., Jackson, Mich. Booth 369.
Die sinking milling cutters; air-operated chucks and cylinders. Represented by: R. B. McDonald, sales manager; A. R. Johnson, treasurer; and H. A. Tomkins, president.

Torchweld Equipment Co., Chicago. Booth 264.
Torchweld hand welding torches; Torchweld machine welding torches; Torchweld hand cutting torches; Torchweld machine cutting torches; Torchweld decarburizing equipment; Torchweld leadburning equipment; Torchweld acetylene generators; Torchweld gas pressure regulators; and accessories and supplies. Represented by: W. A. Slack, president; R. M. Smith, assistant sales manager; H. G. Larisch, C. E. Davis and W. E. Lyons.

Harold E. Trent Co., Philadelphia. Booth 341.
Electric furnaces and temperature control for heat treating, pit type, pot type, oil quench type furnaces. Represented by: H. E. Trent.

U

Una Welding & Bonding Co., Cleveland. Booth 261.
Una welders, both AC-dc and DC-dc types. Una automatic welding head; complete line of Una welding rods for manual and automatic welding. Represented by: E. R. Alexander, E. W. Kronbach, A. A. Probeck, H. P. Blum, W. J. Bushea, L. S. Burgett and J. P. Austin.

United Engineering Society (Endowment Committee), New York. Booth 435.
Large photographs and diagrams.

V

Vanadium Alloys Steel Co., Latrobe, Pa. Booths 10, 12, 39 and 41.
Red Cut superior high-speed steel; Non-shrinkable die steel; Marvel hot working die steel; choice hot working die steel; Colhed, a new steel recently developed for cold heading; Crocar, a new high carbon high chromium steel; fractures and tools of above. Represented by: R. C. McKenna, president; Floyd Rose, vice-president; L. D. Bowman, works manger; J. P. Gill, R. B. George, W. R. Mau, W. D. Fisher, T. J. Van de Motter and C. V. Reilly.

Vanadium Corporation of America, New York. Booths 20 and 49.
Ferro-vanadium, ferro-chromium, ferro-silicon, and other steel-making alloys; ores; oxides; chemical compounds of vanadium, tungsten, molybdenum, chromium, and other rare and semi-rare metals; Vanadium steel forgings and castings. Represented by: J. A. Miller, general manager of sales; H. T. Chandler, N. Petinot, C. N. Dawe, C. B. Woodworth, T. N. Bourke, B. D. Saklatwalla, vice-president; Jerome Strauss, G. L. Norris and A. W. Demmler.

Van Dorn Electric Tool Co., Cleveland. Booth 35.
Portable electric drills; grinders; reamers; tappers; screw drivers; nut setters; stationary grinders; electric socket wrenches; and portable electric hammers. Represented by: F. Schneider, president; F. H. Zulauf, vice-president and general manager; R. W. Procter, sales manager; E. W. Waechter, assistant sales manager; S. S. Waters, L. L. Charnicky, F. R. Du Guay and F. H. Schell.

Victor-Peninsular Division, Detroit. Booth 274.

Victor X-Ray Corporation, Chicago. Booth 322.
Extensive display of X-ray negatives, showing imperfections in materials, such as castings, welding and assemblies. Illustrating the value of X-ray in determining necessary changes in processes and the effects caused by such changes, as well as effects caused by the personal factor of the operators. Represented by: E. W. Page.

W

Water Treatment Co. of America, Pittsburgh. Booth 227.
Reception and literature. Represented by: Harry L. Baer, president; and George Neilson, vice-president.

Weidemann Machine Co., Philadelphia. Booth 6.
New patented spring winder; new forged steel vise; Eda multiple punch-press. Represented by: O. F. Weidemann and G. A. Hancock.

Weldit Acetylene Co., Detroit. Booth 242.
Welding and cutting (oxyacetylene) equipment and Gasavers. Represented by: O. L. Smith, president; J. B. Manor and J. Bronson.

Westinghouse Electric & Mfg. Co., East Pittsburgh. Booth 305.
Weldomatic automatic welding outfit shown for the first time, including the new type head, the control and the operator's panel. This set is in operation on pipe seam welding, and a 400-amp. welding set will supply the current to this automatic welding set; pipe handling tool which adjusts the pipe for automatic welding; 200-amp. portable motor-driven welding set; 200-amp. portable gas engine-driven welding set; 400-amp. portable motor-driven welding set. Represented by: W. W. Reddie, R. L. Cronemeyer, G. H. Koch, F. M. Bernard, W. G. Pearson, C. W. Babcock and P. H. Grunnagle.

Wheeling Mold & Foundry Co., Wheeling, W. Va. Booth 400.
Model steam hammer showing application of steel and alloy steel castings, dies and die blocks; representative test specimens; and sections of alloy rolls and castings. Represented by: H. E. Field, president; E. A. Balsley, vice-president; R. C. Heaslett, D. Wyman and George Chandler.

Wheelock, Lovejoy & Co., Inc., Cambridge, Mass. Booths 84, 86 and 88.
Moving pictures of various activities in different warehouses, such as loading, cutting, testing, heat treating, etc. Represented by: A. Oram Fulton, president; Frederick H. Lovejoy, vice-president; George S. Longley, Jr., Edward C. Bartlett, Stanley W. Parker, C. Robert Jenks, Murray N. Allison, George A. Baron, Henry A. Bischoff, A. Reed Townsend and Floyd J. DeVan.

Whitman & Barnes, Inc., Detroit. Booth 83.
Complete line of drills, reamers, milling cutters and end mills, mounted on display boards. Represented by: Fred J. Smith and E. T. Oliver.

Wickwire Spencer Steel Co., New York. Booths 238 and 240.
Wisscoloy spiral conveyor belt traveling through an electric furnace operating at from 1800 to 2000 deg. Fahr. Samples of Wissco oil-tempered valve spring wire and a special valve spring wire made from an imported Swedish stock will be tested in a Tinius Olsen testing machine. Samples of a special tempering wire and music wire will also be tested. Represented by: F. W. Hale, sales manager, wire conveyor belts department; Dwight Granger, chief engineer; Jay R. Worsfold, sales manager; E. C. Stout, sales manager, spring department; R. H. Clapp, sales manager, wire department; U. V. Westover, G. W. Nelson, V. C. King, M. G. Werme, E. F. Early, R. R. Tatnall, R. C. Jordan and F. J. Connors.

Williams & Co., Inc., Cleveland. Booth 243.
Williams gas and electric and Wilson Welder & Metal Co. Colortipt welding rods. Metals which may be observed in welding operation are soft, medium and high carbon steels, cast iron, brass, bronze and copper, monel metal, nickel and aluminum. Represented by: E. C. Edmundson, general manager; W. J. Lyons, N. J. Carbis, J. H. Penske, Jr., K. J. Burkholder, B. F. Prentiss, H. M. Turner, Wilson Welder & Metals Co., engineers.

Willson Products, Inc., Reading, Pa. Booth 251.
Perfection of its glass in its ability to stop harmful rays by means of a galvanometer and thermocouple is shown. Represented by: F. H. Klein.

Wilson-Maeulen Co., Inc., New York. Booth 405.
Indicating pyrometers; recording pyrometers; automatic temperature controllers; electric resistance thermometers; and Rockwell hardness testers. Represented by: John P. Roberts, Harvey Lee, G. B. Duff, M. A. Schreiner, F. Walter and C. E. Hellenberg.

Z

Ziv Steel & Wire Co., Chicago. Booths 66 and 87.

Twenty Years of Alloy Steels

Last Year's Output Nearly 3¼ Million Tons—Electric Alloy Castings a Feature—Some Factors in Establishing Alloy Industry

BY EDWIN F. CONE*

EXCEEDING for the first time 3,000,000 gross tons, American production of alloy steels in 1928 made some unusual records. At 3,214,909 tons, it was larger than the previous year's total, which was a record, by over 683,100 tons, or 27 per cent. With the exception of the year 1922, following the depression in 1921, this is the largest expansion for any one year in the industry's history. In a 20-yr. period, a new industry has been created. This large growth has been signalized by a large expansion in electric alloy steel, particularly electric alloy castings.

In 1924 it was regarded as noteworthy that the total of alloy steel passed 5 per cent of the country's entire steel production. In 1928 the proportion went over 6 per cent, or to 6.23 per cent. The figures are shown in Table I.

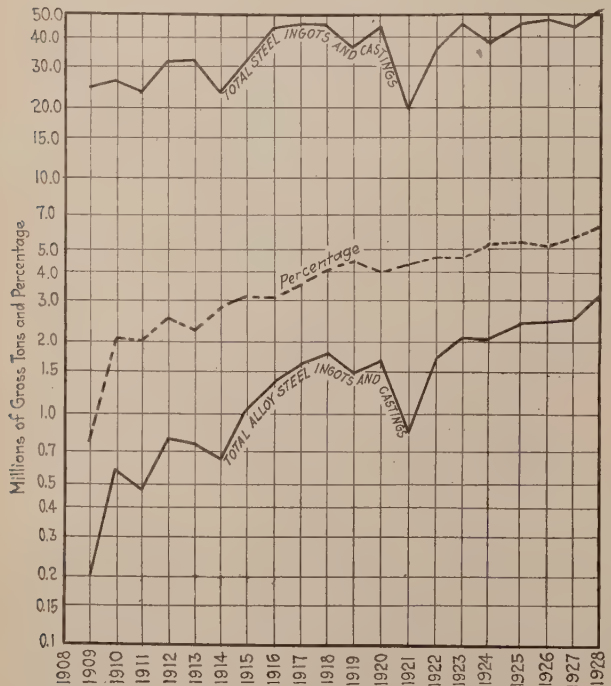
More Electric Alloy Steel Castings

AS to electric alloy steel castings, the expansion which started in 1921 and to which attention was called in an article similar to this, in THE IRON AGE of Sept. 3, 1925, has continued on a rapidly rising scale. From 10,084 tons in 1921 it went to 28,821 tons in 1924, and advanced last year to 79,434 tons, as shown in Table IV. In round numbers, output was 15 per cent of all the electric alloy steel in 1924, and 18 per cent in 1928. It trebled in the three years from 1921 to 1924 and was eight times as much in 1928 as in 1921.

One cause for the expansion, and operative for some years, continues—greater use of heat-treated electric alloy castings for such service as is performed by forgings. Other factors are increased demand for manganese electric castings and for rustless iron and similar castings. Ability to heat treat these has been a development in quite recent years, resulting also in a broadening demand. Quenching steel castings, recently thought impossible, is now regular practice in some foundries.

As to electric alloy steel as a whole, the last four years has been featured by largely augmented consumption. In 1924 the production of alloy steel (Table III) made in electric furnaces was 188,563 tons, or 9.3 per cent of all

*Associate editor, THE IRON AGE, New York.



HOW the Proportion of Alloy Steel to the Total Steel Produced Has Been Gradually Increasing. This ratio chart makes the rates of fluctuation truly comparable

Table I—Production of Alloy Steel Ingots and Castings in the United States

	Alloy Steel, Gross Tons	Total Steel, Gross Tons	Alloy Steel of the Total, Per Cent	Tons of Total Steel to 1 Ton Alloy Steel
1909.....	181,980	23,955,021	0.75	131.6
1910.....	567,819	26,094,919	2.17	45.9
1911.....	481,459	23,676,106	2.03	49.1
1912.....	792,501	31,251,303	2.53	39.4
1913.....	714,357	31,300,874	2.28	43.8
1914.....	646,953	23,513,030	2.75	36.3
1915.....	1,021,147	32,151,036	3.17	31.4
1916.....	1,362,615	42,773,680	3.18	31.3
1917.....	1,644,335	45,060,607	3.65	27.4
1918.....	1,787,852	44,462,432	4.02	24.8
1919.....	1,481,188	34,671,232	4.27	23.4
1920.....	1,660,292	42,132,934	3.94	25.3
1921.....	809,548	19,783,797	4.10	24.3
1922.....	1,673,496	35,602,926	4.70	21.3
1923.....	2,106,489	44,943,696	4.70	21.3
1924.....	2,026,409	37,931,939	5.35	18.7
1925.....	2,432,973	45,393,524	5.36	18.6
1926.....	2,463,414	48,293,763	5.10	19.6
1927.....	2,531,748	44,935,185	5.59	17.7
1928.....	3,214,909	51,544,180	6.23	16.0

Table II—Production of Alloy Steel Castings in the United States

	Total Alloy Castings, Gross Tons	Total Alloy Steel, Gross Tons	Percentage of Castings of Total
1909.....	23,002	181,980	12.64
1910.....	29,357	567,819	5.17
1911.....	56,290	481,459	11.69
1912.....	103,109	792,501	13.01
1913.....	88,927	714,357	12.44
1914.....	69,846	646,953	10.79
1915.....	97,896	1,021,147	9.58
1916.....	56,458	1,362,615	4.14
1917.....	67,529	1,644,335	4.10
1918.....	66,485	1,787,852	3.71
1919.....	45,372	1,481,188	3.06
1920.....	68,353	1,660,292	4.11
1921.....	40,255	809,548	4.97
1922.....	59,104	1,673,496	3.53
1923.....	92,220	2,106,489	4.37
1924.....	85,948	2,026,409	4.24
1925.....	112,583	2,432,973	4.63
1926.....	146,101	2,463,414	5.93
1927.....	145,844	2,531,748	5.72
1928.....	169,684	3,214,909	5.28

the alloy steel. In 1928 it had expanded over 2¼ times to 433,096 tons, or 13.47 per cent of the total, which in the same time had increased 58.5 per cent. In each of the last three years more alloy steel was made in electric furnaces than in 1918, while 20 years ago no electric alloy steel was reported.

Larger Demand for Alloy Castings

RECENT expansion in alloy steel castings, which includes electric, open-hearth and others, has been gradual but pronounced. At 169,684 tons in 1928, the total was nearly twice that of 1924 and the largest on record.

This review, based on data of the American Iron and Steel Institute, covers 20 years. At the beginning of that period practically no alloy steel was made on a commercial scale. The tonnage of high-speed steel was small. Last year not far from 3¼ million tons was made, with the possibility that this year it will approximate 3¾ millions.

Factors in 20 Years' Development

IN 20 years a large new industry has become flourishing, for today many various types of alloy steel are indispensable to other industries. These steels have helped to make possible the present day automobile. They are the basis for the high development of today's airplane. They are essential in the design and building of corrosion-resisting material of many kinds and have contributed to the revolution in certain methods of manufacture, such as nitric acid, oil cracking and so on. Their incorporation in the modern locomotive is of economic and engineering importance.

To the electric furnace we are indebted for ferroalloys and thus new steels, and for the melting of high-grade steels and the production of difficult ones; also for the efficient heat treatment of all types of steel. To heat-treating processes and equipment we are indebted for means to develop the best qualities in both old and new steels, carbon as well as alloy.

Progress in the last 20 years has been phenomenal. Heat treaters, who are celebrating next month, at a convention of a great society, eleven years of development, have even greater developments to look forward to—not only in steel, but also in aluminum and its alloys. In the latter field heat treatment is creating new products and a new industry.

Features of 20 Years' Progress in Alloy Steels

- In 1928 only 16 Tons of Total Steel to 1 Ton of Alloy: In 1909 this Ratio was 131.6 to 1.
- In 1928 over 3,000,000 Tons of Alloy Steels Produced: In 1909 About 182,000 Tons.
- In 1928 Electric Alloy Steel Castings Made Up Over 18 Per Cent of Total Electric Alloy Steel: In 1909 None Was Reported.

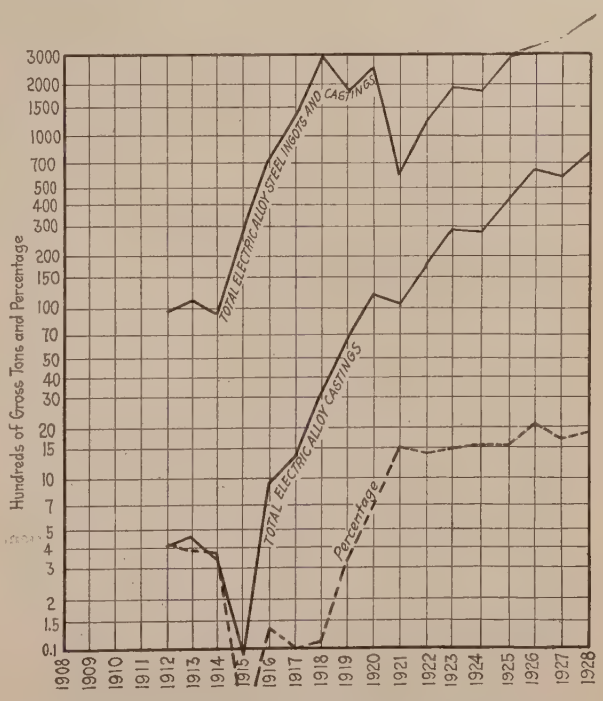
Table III—Production of Alloy Steel Made in Electric Furnaces in the United States

	Electric Alloy Steel, Gross Tons	Total Alloy Steel, Gross Tons	Electric Alloy Steel of Total Alloy Steel, Per Cent
1909	.....	181,980	....
1910	608	567,819	0.11
1911	.....	481,459	....
1912	9,619	792,501	1.21
1913	11,264	714,357	1.57
1914	9,344	646,953	1.44
1915	27,944	1,021,147	2.73
1916	71,129	1,362,615	5.22
1917	130,578	1,644,335	7.94
1918	290,961	1,787,852	16.26
1919	181,632	1,481,188	12.26
1920	245,572	1,660,292	14.78
1921	63,246	809,548	7.81
1922	125,419	1,673,496	7.49
1923	194,976	2,106,489	9.25
1924	188,563	2,026,409	9.30
1925	293,780	2,432,973	12.00
1926	306,811	2,463,414	12.45
1927	343,517	2,531,748	13.57
1928	433,096	3,214,909	13.47

Table IV—Production of Alloy Steel Castings Made in Electric Furnaces in the United States

	Electric Alloy Castings, Gross Tons	Total Electric Alloy Steel, Gross Tons	Electric Alloy Castings of Total Alloy Steel, Per Cent
1909	.....	.....	....
1910	8	608	1.32
1911	.....	.....	....
1912	402	9,619	4.18
1913	443	11,264	3.93
1914	340	9,344	3.64
1915	96	27,944	0.34
1916	926	71,129	1.30
1917	1,296	130,578	0.99
1918	3,076	290,961	1.05
1919	6,057	181,632	3.33
1920	11,710	245,572	4.77
1921	10,084	63,246	15.94
1922	17,760	125,419	14.20
1923	29,054	194,976	14.90
1924	28,821	188,563	15.25
1925	44,406	293,780	15.10
1926	64,003	306,811	20.86
1927	59,157	343,517	17.22
1928	79,434	433,096	18.34

Hard wearing metal, to replace worn surfaces of rails, conveyor flights, gear teeth and the like, is deposited by the electric arc (according to a process developed by Alloy Welding Processes, Ltd., of England), using a mild steel electrode, covered with a proper compound of manganese. Alloying into a hard, tough, manganese steel occurs simultaneously with deposition of the weld material.



CASTINGS of Electric Alloy Steel Have Been Increasing Rapidly in Tonnage and in the Percentage of All Alloy Steel Made in Electric Furnaces

Calculations for Bending Rolls

Establishing Diameter with Definite Deflection and Unit Stresses, and Determination of the Limiting Conditions

BY RENE TILKIN*

METHODS generally used for calculating the diameters of the rolls of a bending machine, to bend a certain plate to a given diameter, are of the cut-and-try type. The results obtained are far from accurate. Our purpose is to elaborate formulas which will permit calculating those diameters with great accuracy, and with little expenditure of time.

When establishing a series of rational bending machines the starting point for calculating the diameters of the rolls is not the stress in the metal, but rather the deflection per unit of length of the rolls, due to the application of the bending force to the plate. The deflection of the rolls should be small enough so that the resulting deformations of the plate are not prejudicial to their use.

Some specialists have tried to avoid the effect of the deflection by giving the contour of the rolls a form approximately like the curve caused by the deflection. It is doubtful if this practice is justified. It gives rolls of such a form that the side in contact with the plate becomes a straight line at the end of the bending operation, when rolling the thickest and widest plate for which the machine is calculated.

At any other moment of the rolling, and for all other dimensions of plates, the curve remains in the rolls, thus causing the plate to bear on one point only on each roll; the driving is incorrect and deformations are unavoidable. Moreover, finishing the rolls to an exact shape is rather difficult, and the increased labor costs more than offset the benefits derived from a decreased weight of the rolls. Furthermore, the thinner plates will be handled with the least deformation on machines provided with rolls having a very small deflection, and this is the most frequent requirement.

Having thus stated the conditions of the problem, we will solve it for a bending machine with three rolls disposed as in Fig. 1. The factors which apply to these types of machines are:

1. Elastic limit of the metal of the plate to be rolled: 32,000 lb. to the square inch (for steel).

2. Maximum stress in the plate at the end of rolling: 45,000 lb. to the square inch (for steel).

3. Modulus of elasticity of the roll metal: 29,000,000.

4. Smallest diameter to which the plate may be rolled: 1½ times the diameter of the roll around which the plate wraps itself.

All calculations are made for the moment of greatest stress, such moment being obtained when rolling the heaviest plate to the smallest diameter. The load on the upper roll then is equal to the force required to bend the plate in its middle point, the plate being supported by the bottom rolls at points which are tangential points of the bent plate in the rolls.

The curvature of the plate modifies that load a little, but the difference may safely be ignored. We may neglect also the deflection due to the weight of the rolls, as well as the small difference (clearance) between the width of the greatest plate to be rolled and the length of the rolls. In the figures the plate is supposed without thickness and represented by a line.

Fixed Relations Established

MR. TILKIN'S equations establish a series of relationships between the main dimensions of the rolls used in bending steel plates. Summarized, these are as follows:

Diameter of single (upper) roll is 1.136 times that of each of the two lower rolls.

Distance between bearing lines of plate on lower rolls is 0.945 of the diameter of the lower rolls, when the latter are 1.5 diameters apart.

Stresses induced in the rolls are a function of the thickness and the width of the plate being bent. Critical conditions, explained in the text, are found when the width reaches 79 times the thickness, and again at 109 times the thickness.

Bending Machine With Three Rolls

For three-roll machines the distance between the center-lines of the lower rolls may be taken equal to 1½ times their diameter. We may allow a deflection of 0.012 in. for each foot length of the rolls. The flexure stress of the rolls should not exceed 17,000 lb. to the square inch. The following symbols will be used hereafter:

Diameter of the bottom rolls	d (inches)
Diameter of the upper roll	D (inches)
Thickness of the plates to be rolled	E (inches)
Moment of inertia of the bottom rolls	i
Moment of inertia of the upper roll	I
Stress in the bottom rolls	r (lb. per sq. in.)
Stress in the upper roll	R (lb. per sq. in.)
Length of the rolls (this length being supposed equal to the width of the greatest plate)	L (inches)
Bending force required on each bottom roll	f (pounds)
Bending force required on the upper roll	F (pounds)

Ratio of the Diameters of the Rolls

It may be shown that the ratio D/d of the diameters of the upper and bottom rolls is a constant, if we assume the deflection to be the same on all rolls. The value of this constant depends only on the distance between the center-lines of the bottom rolls, and on the minimum diameter to be rolled on the machine. If $\frac{D}{d}$ is α, then $D = \alpha d$.

*329 Rue des Vennes, Liège, Belgium.

Let us analyze force F (Fig. 2) with its components f f on the bottom rolls. The distance $M\,O$, between center of curvature of plate and center of each bottom roll, is $0.5\,d + 0.75\,\alpha\,d$.

Then $$\frac{F}{f} = \frac{y}{0.5\,d + 0.75\,\alpha\,d} = \frac{y}{d\,(0.5 + 0.75\,\alpha)} \qquad (1)$$

On the other hand, in triangle MOB,

$$\left(\frac{y}{2}\right)^2 = (0.5\,d + 0.75\,\alpha\,d)^2 - (0.75\,d)^2$$

whence $y = 2\,d\,\sqrt{0.5625\,\alpha^2 + 0.75\,\alpha - 0.3125}$

Introducing this value of y in equation (1),

$$\frac{F}{f} = \frac{2\,\sqrt{0.5625\,\alpha^2 + 0.75\,\alpha - 0.3125}}{0.5 + 0.75\,\alpha} \qquad (2)$$

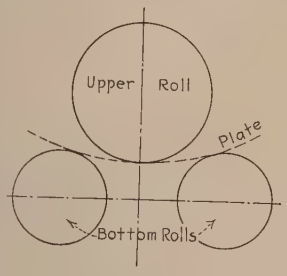


Fig. 1 — General Relations of the Three Rolls Constituting a Set and the Plate Being Bent

The condition for having the same deflection on all rolls is:

$$\frac{5\,F\,L^3}{384\,E\,I} = \frac{5\,f\,L^3}{384\,E\,i} \qquad (3)$$

Which, by simplifying, becomes

$$\frac{F}{f} = \frac{I}{i} \qquad (4)$$

But for a circle $I = \frac{\pi\,(\alpha d)^4}{64}$ and $i = \frac{\pi d^4}{64}$; hence $\frac{F}{f} = \alpha^4$

Introducing this value for $\frac{F}{f}$ in equation (2), we obtain:

$$\alpha^4 = \frac{2\,\sqrt{0.5625\,\alpha^2 + 0.75\,\alpha - 0.3125}}{0.5 + 0.75\,\alpha}$$

from which $\alpha = 1.136$.

The problem now is simplified, since we need only calculate the diameter of the bottom rolls. Multiplying this value by 1.136 will give the diameter of the upper roll.

Diameter of the Bottom Rolls

To find the diameter of the bottom rolls we must first establish the equation of the following three conditions, the unknown quantity being the diameter d:

(1) Force F required on the upper roll.

(2) Stress of the metal per unit of surface on the upper roll, R.

(3) Maximum deflection in the middle of the upper roll.

We should first find x, the distance (see Fig. 2) between the bearing points on lower rolls of the heaviest plate when it is rolled to the smallest diameter.

$$\frac{x}{1.5\,d} = \frac{0.75\,\alpha\,d}{0.75\,\alpha\,d + 0.5\,d}$$

Substituting 1.136 in place of α,

$$x = 0.945\,d$$

We now can write the equations:

$$\frac{0.945\,d\,F}{4} = \frac{L\,e^2}{6} \times (45{,}000) \qquad (5)$$

$$\frac{F\,L}{8} = \frac{3.14\,(1.136\,d)^3}{32} \times R \qquad (6)$$

$$\frac{0.012\,L}{12} = \frac{5\,R\,L^2}{24 \times 29{,}000{,}000 \times 1.136\,d} \qquad (7)$$

from (5), $F = \frac{31{,}750\,L\,e^2}{d}$ or $F\,d = 31{,}750\,L\,e^2$ (8)

from (6), $F\,L = 1.152\,d^3\,R$ (9)

from (7), $R = \frac{158{,}100\,d}{L}$ (10)

If, in equation (9), R is replaced by its value as found in (10),

$$F\,L^2 = 182{,}000\,d^4 \qquad (11)$$

and dividing equation (8) by (11),

$$\frac{d}{L^2} = \frac{31{,}750\,L\,e^2}{182{,}000\,d^4}$$

whence:

$$d^5 = 0.174\,L^3\,e^2 \qquad (12)$$

Taking the logarithmic value of both members of equation (12),

$$\log d = \frac{3\log L + 2\log e - 0.76}{5} \qquad (13)$$

This formula enables us to calculate the diameter of bottom rolls of a bending machine for rolling a steel plate of all lengths and thicknesses, under the conditions set forth above.

It is, however, necessary to check the stress R of the metal of the upper roll and r of the bottom roll, in case their values should exceed the permissible limit. First will be found the ratio R/r. The general formula for the stress of a beam uniformly loaded gives the system:

$$\begin{cases} \frac{F\,L}{8} = \frac{3.14\,(1.136\,d)^3\,R}{32} \\ \frac{f\,L}{8} = \frac{3.14\,d^3\,r}{32} \end{cases}$$

Dividing the first equation by the second,

$$\frac{F}{f} = \frac{(1.136)^3\,R}{r} \qquad (14)$$

but, according to equation (2), replacing α by its value 1.136 gives

$$\frac{F}{f} = \frac{2\,\sqrt{0.5625 \times (1.136)^2 + 0.75 \times 1.136 - 0.3125}}{0.5 + 0.75 \times 1.136} = 1.664$$

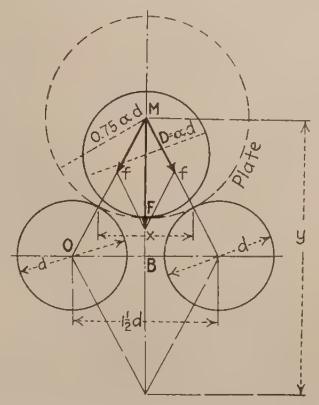


Fig. 2 — Schematic Arrangement of Rolls and Plate, with Relative Dimensions and Clearances as Explained in the Text

and replacing $\frac{F}{f}$ by its value as found in (14)

$$\frac{R}{r} = \frac{1.664}{1.466} = 1.136 \text{ or } r = 0.88\,R \qquad (15)$$

The value of R is found by using equation (10).

Cases When the Stress of the Rolls Is Too Great

When checking the values of r and R by means of equations (10) and (15) it is often found that the limit of 17,000 lb. to the square inch is exceeded for one or both of these values. That would be the case for the upper roll when the ratio $\frac{L}{d}$ is below $\frac{158{,}100}{17{,}000} = 9.3$ (see equation 10). It would be the case for the three rolls when the ratio $\frac{L}{d}$ is below $\frac{158{,}100 \times 0.88}{17{,}000} = 8.18$ (see equation 10, combined with 15).

From equation (12),

$$\frac{d^5}{L^5} = 0.174\,\frac{e^2}{L^2} \text{ or } \frac{L^5}{d^5} = \frac{5.76\,L^2}{e^2}$$

From $5.76\,\frac{L^2}{e^2} = (9.3)^5$, we find $L = 109\,e$

From $5.76\,\frac{L^2}{e^2} = (8.18)^5$, we find $L = 79\,e$

Thus it follows that:

(Case 1) If the width of the plate is equal to (or greater than) 109 times its thickness, formula (13) may be used as it is.

(Case 2) If the width of the plate is between 109 and 79 times its thickness, the diameter of the upper roll must be increased to reduce the stress in the metal.

(Case 3) If the width of the plate is equal to (or smaller than) 79 times its thickness, the diameters of all three rolls should be increased.

Special Formulas for Case 2

To determine the diameter of the upper roll, the equation of the diameter should be found as a function of the stress of the metal only. From equation (5),

$$F = 31{,}750\,\frac{L\,e^2}{d}$$

Replacing F by this value and $1.136\,d$ by D in equation (6),

$$31{,}750\,\frac{L\,e^2\,L}{d\,8} = \frac{3.14\,D^3\,R}{32}$$

$$\text{or } D^3 = 2.39\,\frac{L^2\,e^2}{d} \text{ and } D = 1.335\,\sqrt[3]{\frac{L^2\,e^2}{d}} \qquad (16)$$

Special Formulas for Case 3

When the stress in all three rolls exceeds the permissible stress, one must try to find the diameters without taking into account the deflection per unit of length of the rolls. The results obtained with equation (15) are too great, and the deflection of the rolls will be diminished by increasing their diameter. The diameters must be found with respect to an equal stress in all three rolls, rather than with respect to equal deflection. This will be done by the same method as was used to establish the principal equation (13).

Ratio of the Diameter of the Rolls

In the case of an equal stress, the ratio $\frac{D}{d}$ is a constant when the distance of the center-lines of the bottom rolls is $1\frac{1}{2}\,d$, and when the smallest diameter of the bend of the plate is $1\frac{1}{2}$ times the diameter of the upper roll.

Let us write $\frac{D}{d} = \phi$, then $D = \phi\,d$.

From Fig. 2, the conditions for writing equation (2) are still the same, thus:

$$\frac{F}{f} = \frac{2\,\sqrt{0.5625\,\phi^2 + 0.75\,\phi - 0.3125}}{0.5 + 0.75\,\phi}$$

The stress in the upper roll is given by equation

$$\frac{F\,L}{8} = \frac{3.14\,D^3}{32}\,R, \text{ which gives } R = \frac{32\,F\,L}{8 \times 3.14\,D^3}$$

The stress in the bottom rolls is

$$\frac{f\,L}{8} = \frac{3.14\,d^3}{32}\,r, \text{ which gives } r = \frac{32\,f\,L}{8 \times 3.14\,d^3}$$

But, for the condition $R = r$,

$$\frac{32\,F\,L}{8 \times 3.14\,D^3} = \frac{32\,f\,L}{8 \times 3.14\,d^3}, \text{ which gives } \frac{F}{f} = \frac{D^3}{d^3} \qquad (17)$$

and replacing $\frac{F}{f}$ and D^3 by their values,

$$\phi^3 = \frac{2\,\sqrt{0.5625\,\phi^2 + 0.75\,\phi - 0.3125}}{0.5 + 0.75\,\phi}$$

This latter equation gives as the constant

$$\phi = 1.19$$

Research for the Bottom Rolls

To find the diameters of the bottom rolls we may consider the following two conditions under the form of algebraic equations, the unknown quantity being the diameter d:

1. Force required on the upper roll.

2. Stress of the metal per unit of area of the upper roll. To find x for $\phi = 1.19$:

$$x = \frac{0.75\,\phi \times 1.5\,d}{0.75\,\phi + 0.5} = 0.953\,d$$

The two equations may be written

$$\text{A)}\ \frac{0.953\,d\,F}{4} = \frac{L\,e^2}{6} \times 45{,}000$$

$$\text{B)}\ \frac{F\,L}{8} = \frac{3.14\,(1.19\,d)^3 \times 17{,}000}{32}$$

From (A), $F = \frac{L\,e^2 \times 45{,}000 \times 4}{6 \times 0.953\,d} = \frac{31{,}500\,L\,e^2}{d}$

and substituting in (B),

$$\frac{31{,}500\,L^2\,e^2}{8\,d} = \frac{3.14 \times 1.566\,d^3 \times 17{,}000}{32}$$

or $d^4 = 1.507\,L^2\,e^2$, whence $d = 1.108\,\sqrt{L\,e}$ (18)

Examples

We shall examine the following three cases:

1. Thickness of the plate ½ in.; width 6 ft.; ratio $\frac{L}{2} > 109$

2. Thickness of the plate ¾ in.; width 5 ft. 6 in.; ratio $109 > \frac{L}{e} > 79$

3. Thickness of the plate 1 in.; width 5 ft.; ratio $\frac{L}{e} < 79$

Case 1. Applying equation (13),

$$\log d = \frac{3\,\log 72 + 2\,\log 0.5 - 0.76}{5} = 0.8418$$

whence $d = 7$ in.; we derive from it $D = a\,d = 1.136 \times 7 = 8$ in.

$$\text{and } R = \frac{158{,}100\,d}{L} = \frac{158{,}100 \times 7}{72}$$

= 15,400 lb. to the square inch.

Case 2. Applying equation (13) for the bottom rolls,

$$\log d = \frac{3\,\log 66 + 2\,\log 0.75 - 0.76}{5} = 0.89$$

whence $d = 7\frac{3}{4}$ in.

Applying equation (15) for the upper roll,

$$D = 1.325\,\sqrt{\frac{66^2 \times 0.75^2}{7.75}} = 9.1 \text{ in.}$$

$R = 17{,}000$ lb. to the square inch and

$$r = 0.88 \times \frac{158{,}100 \times 7.75}{66} = 16{,}340 \text{ lb. to the square inch.}$$

Case 3. Applying equation (18) for the bottom rolls, $d = 1.108\,\sqrt{60 \times 1} = 8.58$ in. and $D = 1.19\,d = 10.21$ in. we have $r = R = 17{,}000$ lb. to the square inch.

High-Strength Brass Made in England

A high-tensile alloy, called P. M. G. brass, has been developed by Vickers-Armstrong, according to the *Engineer*, June 14. It contains no low-melting metals, and is comparable in cost to gun-metal, but of superior physical properties, as shown by the following figures:

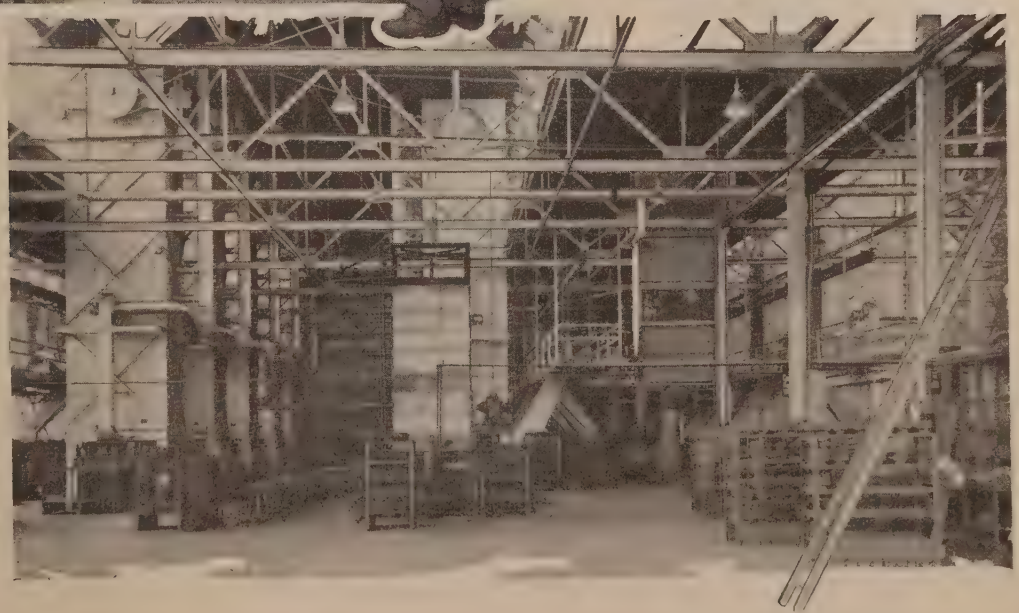
	Cast P.M.G. Brass	*Forged or Extruded P.M.G. Brass*	*Cast Gun-metal*
Specific gravity	8.39	....	8.82
Yield point lb. per sq. in.	24,500 to 30,000	45,000 to 50,000	18,000
Ultimate, lb. per sq. in.	40,000 to 50,000	75,000 max.	36,000 to 50,000
Elongation in 2 in.	18 to 8	42 to 38	28 to 8
Brinell hardness	100 to 115	....	75 to 95
Izod toughness ft.-lb.	20	36	14

Castings machined to wall thickness of ⅜ in. are watertight at 2000 lb. per sq. in. pressure. Strength is affected by elevated temperature less than gun-metal.

Cores Baked in Vertical Ovens

SIXTEEN vertical core ovens, 45 ft. high, are used in the Oakland foundry at Pontiac, Mich. These save a great amount of space in comparison with the horizontal type. Two illustrations show the making of crankcase cores and placing them on the trays of the oven. The third picture gives an indication of the great capacity of this unit and shows, at the same time, the unusual cleanliness of the room. Cores of this type are made two at a time on a roll-over machine. The cores are loaded four abreast in two rows on the trays, being placed there by the core-makers themselves, whose work is done closely around the oven. This eliminates use of racks and all necessity for aisles.

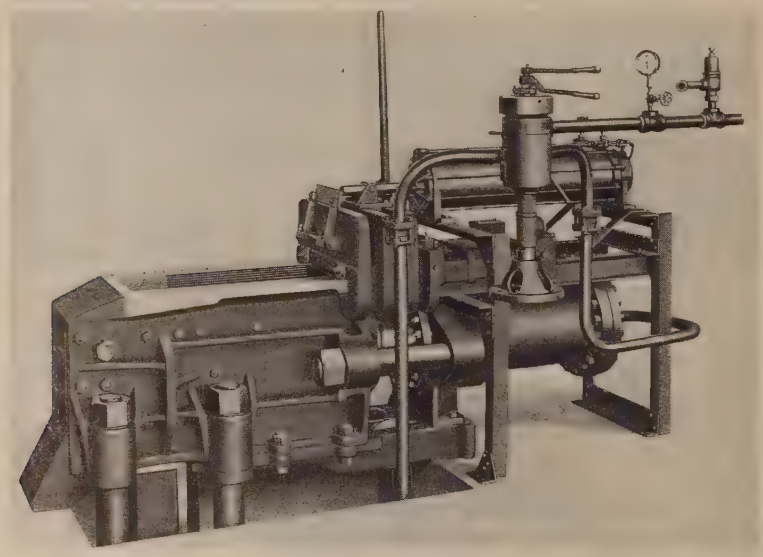
EACH Core-Maker Loads His Own Cores on the Furnace Trays. To this end the core-making benches are grouped closely around the furnaces



SEVERAL Vertical Core Furnaces Can Be Placed in the Space Which a Single Horizontal Furnace of Same Capacity Would Demand

Machine for Baling Forge Flashings

FORGE flashings and similar heavy material may be compressed into bales measuring 12 x 12 x 18 in. and weighing from 300 to 500 lb., on the heavy-duty hydraulic baling press illustrated, which has been brought out by the Galland-Henning Mfg. Co., Milwaukee.



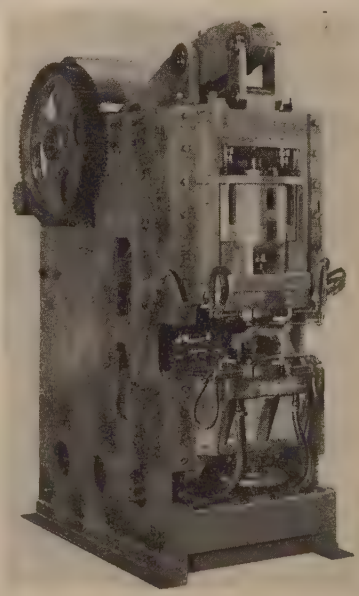
Flashings Are Compressed Into 12x12x18-In. Bales Weighing from 300 to 500 Lb.

The box into which the scrap is put is 48 in. long 18 in. wide and 36 in. deep. It is equipped with heat-treated steel liner plates to protect it from the cutting effect of the material to be baled, which is compressed under heavy lateral pressure. The rams are made large; the low-pressure or horizontal ram is of forged steel and the high-pressure or vertical ram is made of a special chilled material to eliminate scoring. The cover is air operated, a pneumatic hoist placed horizontally on the structural steel framework of the press being employed. The entire equipment is operated through a Nopak hydraulic valve, which requires no packing and makes use of an accumulator unnecessary. The lateral operating principle of this valve is said to assure effective operation and eliminate tendency of pounding, while under high pressure.

Heavy-Duty Power-Driven Vertical Welder

FOR welding light structural steel shapes and for multiple projection welding of medium and heavy stampings and forgings the Thomson Electric Welding Co., Lynn, Mass., is offering a new power-driven vertical machine.

The transformer is rated at 350 kva. Movement of the upper slide is obtained through a heavy rocking arm or lever actuated by cam. The camshaft is driven by a 4½-hp. four-speed motor through a speed reducer, the motor having push button control. The cam is large and has an insert that furnishes the final pressure on the weld. This insert is removable and can be shaped to suit various conditions. Dual pressure arrangement consisting of three springs, two light springs set in the upper slide head with a heavy spring between them, is said to permit lower welding currents than with one heavy spring. The light springs apply pressure at the time the current is turned on, and the heavy spring provides a positive bump or blow as the weld is finished, the pressure exerted by all three springs being adjustable. Mounting the springs directly over the work is intended to provide more sensitive pressure arrangement than otherwise.



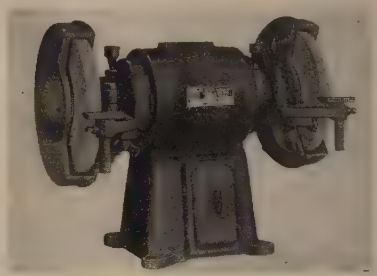
Welder for Light Shapes, Forgings and Stampings

The knee of the machine is adjustable vertically to compensate for die wear or to accommodate work of different thicknesses. With the exception of the lower slide, upper terminal block and upper slide, all frame parts are made from arc welded steel plate and bar stock, the various units thus fabricated being either bolted or welded together. The weight of the machine, which is designated as the model 290, is approximately 10,000 lb.

Bench Grinder for General Shop Use

AN improved 1-hp. bench grinder equipped with either alternating or direct current motor that is controlled by a safety type switch located in the base of the machine is being manufactured by the Schauer Machine Co., Cincinnati.

The motor is entirely inclosed so that the machine may be used either for wet or dry grinding. With d.c. motor the 10 x 1-in. grinding wheels operate at 2000 r.p.m. and with an a.c. motor, at 1750 r.p.m. Wheel guards are of improved type, and the tool rests are mounted so that they may be adjusted readily to any position. End bells are designed to provide maximum working space between the motor housings and the wheels. The shaft is mounted in solid race double-row ball bearings that are inclosed in dust-proof housings and run in grease. The height from the base to the center of the wheels is 11 in. The weight of the machine is 162 lb.



The Bench Machine May Be Used for Wet as Well as Dry Grinding

Tool Steel Makers for 25 Years

The Columbia Tool Steel Co., Chicago Heights, Ill., celebrated the twenty-fifth anniversary of its incorporation on Aug. 25. Founders were E. T. Clarage, A. R. Waters and A. J. Scheid. A. R. Waters, who is still a resident of Chicago Heights, assumed the general managership of the company from the beginning and at the death of E. T. Clarage succeeded him as president. Mr. Waters retired from that post in 1925 and was succeeded by A. T. Clarage, son of the first president.

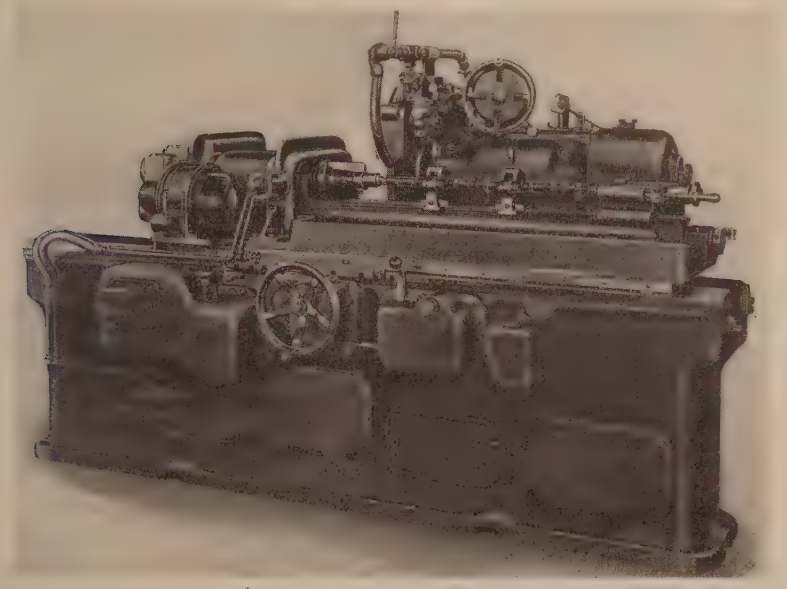
New Hydraulic Cam Grinder

Features Include Hydraulically-Controlled Timing Mechanism and Slow Down Work-Drive-Motor Control

TO meet the demand for a cam grinder having automatic features that permit one operator to attend three or four machines, the Landis Tool Co., Waynesboro, Pa., has brought out the 5 x 40-in. grinder here illustrated. In addition to the timing mechanism, the work carriage traverse, wheel feed, work cradle and diamond wheel truing device are hydraulically actuated.

Although designated as semi-automatic, the machine is full-automatic after the grinding cycle for the first cam has begun. The operator simply dogs the cam shaft, places it in the machine, throws the quick-acting work-rest jaws into position, moves a lever to start the work rotating, and then throws the main control lever. The latter causes the work carriage to move, bringing the first cam to the grinding position, at which point the latch on the front of the bed drops into the first notch of a hardened plate on the front of the carriage. The oil pressure is immediately cut off from the carriage-traversing cylinder, and oil enters the hydraulic straight infeed cylinder, causing the wheel base to feed in rapidly. At the same time the oil pressure in the work crade cylinder is reversed, swinging the cradle back until the master cam comes in contact with the roller. By this time the grinding wheel has made contact with the work and the feeding-in movement has slowed down to the predetermined grinding speed. The wheel feed continues at the predetermined rate until the wheel-base comes against a positive stop, indicating that the work has been ground to size. Shortly before the end of the cut, the work speed slows down automatically, but the fast work speed is resumed again as soon as the cam is finished.

By the time the first cam has been ground to size, the timing cam has made one revolution, whereupon it trips the latch that causes the wheel-base to move backward rapidly to its starting position. The cradle then swings forward and the table traverses, bringing the second cam on the shaft into grinding position, where it stops as the latch enters the second notch in the notched plate. As the table brings the second cam to the grinding position, the master cam roller automatically indexes on its shaft so as to bring it in line with the second cam on the master. From this point on the cycle of operations is the same as with the first cam on the shaft, the cycle being automatically repeated for each cam, including the fuel pump cam, if that is used.



One Operator Can Attend Three or Four of the Cam Grinders

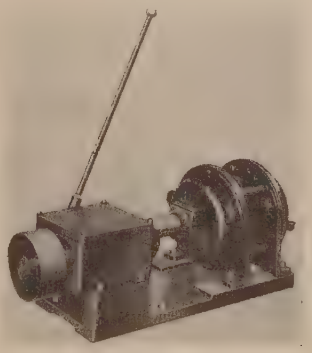
After the last cam on the shaft is finished the wheel-base moves to its extreme backward position, the work cradle swings away from the roller and the carriage moves a short distance and throws the main control lever, which stops all movements except work rotation. The arrangement is such that if the first shaft is ground from left to right, the second shaft may be ground from right to left, the automatic movements functioning the same with the work carriage traversing in either direction. The hydraulically driven wheel-truing device is arranged to permit quick truing of the wheel without disturbing the work.

Heavy and rigid construction together with accurate timing of the grinding cycle slow down work drive motor control and the other feature of the machine is said to result in work of unusual accuracy and finish. A 24-in. grinding wheel is employed, and end drive to the grinding wheel spindle is through multiple V-belts. A 15-hp. constant-speed motor is used for the main drive and a ½-hp. variable-speed motor for the work drive. The net weight of the machine, with both motors, is 10,000 lb. A d.c. generator may be mounted on the machine when direct current is not otherwise available.

Roller-Bearing Speed Box for Garvin Tappers

TO increase the production and range of the Garvin No. 1 automatic tapping machine, the Western Machine Tool Works, Holland, Mich., has designed a Timken tapered roller bearing equipped speed box that provides three selective speeds. The unit may be obtained for either direct-connected motor drive or for single pulley drive, and may be adapted to any machine now in use.

Gears are made of chrome-nickel steel, heat treated and hardened, are of coarse pitch and run in a bath of oil. The ends of the gear teeth are rounded to facilitate engagement. The sliding cone gear has a long bearing on the shaft to prevent chattering and provide easy shifting. All shafts are ground and are equipped with fine thread nuts for close adjustment of the Timken bearings, which adjustment may be made from the outside of the box. Bearings, shafts, and shifter forks are lubricated by oil bath.



Motor-Driven Speed Box for Garvin Tapper

With a 12-in. driven pulley spindle speeds of 300, 400 and 600 r.p.m. are obtainable; with an 8-in. pulley, the speeds are 450, 600 and 900 r.p.m. For the motor-driven speed box a 1-hp. 1200 r.p.m. motor is recommended.

Hardinge Sales Co., Inc., New York, has been appointed exclusive distributer in the New York metropolitan area for the shop furniture division of the New Britain Machine Co., New Britain, Conn., manufacturer of pressed steel factory equipment.

Drop Forging Institute to Meet in September

The fall meeting of the American Drop Forging Institute will be held at Buckwood Inn, Shawnee-on-Delaware, Sept. 25, 26 and 27. A. C. Johnson, secretary of the Rockford Drop Forge Co., is president of the institute. The meeting will be addressed by Charles F. Abbott, executive director of the American Institute of Steel Construction, on the subject, "Rationalization of Production," and also by Dr. Zay Jeffries, director of research, United States Aluminum Co., on the subject, "Looking Toward the Future." There will also be papers on forging problems by some of its members.

C. H. Smith, president Steel Improvement & Forge Co., Cleveland, is chairman of the convention committee.

Gray Iron Institute Meets in October

The annual meeting of the Gray Iron Institute will be held at the Hotel Cleveland, Cleveland, Oct. 16. The various officers and committees will present plans for future procedure and discussions of various topics will be included in the program. Five directors will be elected for a three-year period and proposed changes in the by-laws will be voted upon. A group luncheon will be served at noon and the annual dinner will take place in the evening. A program is being arranged to follow the dinner.

On Oct. 15 the various committees and board of directors will hold meetings. Any member interested in the work of any of the committees is welcome to attend either the committee meetings or the meeting of the board of directors.

Ohio Foundrymen to Hold Sectional Meetings

Sectional meetings for the discussion of foundry problems will be held by the Ohio Foundrymen's Association, Inc., in place of the annual meetings, which have been held for a number of years. It is planned to hold four sectional meetings in different parts of the State at different times during the year. These sessions will take the form of luncheon meetings, and it is aimed to secure good speakers to talk on various subjects. After the talks there will be round table discussions to take up the remainder of the afternoon.

The meetings will be open to all members of the foundry industry throughout the State and also to foundrymen from neighboring States. The largest attendance naturally will come from the section in which the meeting is held. By having sectional meetings in different parts of the State it is expected that a larger attendance will be secured than at an annual meeting with a two-day session.

The first meeting will be held in Toledo late in September or early in October. With the adoption of this plan by the board of administration, the proposed plan of holding a two-day meeting on an Ohio River boat during a trip from Cincinnati has been abandoned.

27 Steel Vessels Under Construction

Steel vessels to the number of 27 were under construction in the United States on June 30, according to Lloyd's Register of Shipping. These represented a total of 119,098 gross register tons, a figure exceeded by construction under way in France, Germany, Great Britain, Japan, Netherlands and Russia.

Of the American ships building, one is of over 20,000 tons, two of between 10,000 and 15,000 tons, six between 8000 and 10,000 tons, four between 2000 and 4000 tons and nine under 2000 tons. The remaining five are barges averaging 1160 tons. Four of the ships, totaling 11,000 tons, are tankers, and 11, totaling 25,200 tons, are motorships.

Sees Active Business for Some Time

"Industrial and trade activity should continue at the present high rate for some time," the Conference of Statisticians in Industry, operating under the auspices of the National Industrial Conference Board, declares in its August report. The conference analysis emphasizes the improvement in building construction, which established a new high monthly record owing to extensive undertakings in public works, and points out that, although agriculture suffered considerable losses in certain sections, these were nearly balanced by bumper crops in other sections, so that the total purchasing power of agriculture for the year should come close to that of last year.

Exceptional activity in both industry and trade continued throughout the midsummer season, new July production records having been made in both the iron and steel and automobile industries, and building activity increased in spite of the fact that a seasonal decline would have been in order. Distribution as indicated by freight car loadings continued on the upgrade, increases being noticeable for all commodities excepting livestock during July.

The Davison Coke & Iron Co., Pittsburgh, on Aug. 1 fired the first battery of coke ovens at its Neville Island plant and will begin actual production of by-product coke within 60 days. The second battery of ovens will be lighted in about four weeks. The coke will be used as blast furnace fuel at the company's Neville stack and the furnace will supply slag to a nearby cement plant.

Industrial Analysis of Puget Sound District

Markets, manufacturing costs, supplies of raw materials and legal matters covering the Puget Sound district are taken up in some detail in a 48-page booklet recently issued by the Seattle Chamber of Commerce. The area specifically covered consists of the States of Washington, Oregon, Idaho and Montana.

In the booklet are shown the population and industrial growth of the district, production and purchasing power, transportation facilities, mineral output and the foreign trade. Under the heading of manufacturing costs are taken up, in order, problems of labor, power, fuel, taxes, and the question of factory sites and structures. Raw materials are briefly discussed, lumber being the largest manufacturing industry.

Minimum wages, interest rates, industrial insurance, securities acts and general laws covering corporations are discussed in several pages, while living conditions and certain miscellaneous data finish the work. All in all it gives a good picture of conditions in the district surveyed, and indicates possibilities lying ahead for manufacture and commerce.

Writes on Public Ownership

With the contention that public ownership means management by men inexperienced in business, Edward N. Hurley, chairman of the board, Hurley Machine Co., Chicago, and former chairman, Federal Trade Commission, war chairman, United States Shipping Board, and member World War Debt Commission, has prepared a brief monograph devoted to private and public ownership.

"I have observed," writes he, "that as a rule even poorly-managed private enterprises are better directed than are public concerns. The mental attitude of Americans expressed in continual complaint about city government and school administrations is significant evidence on this point. The fact that taxes go up, year after year, while the prices of many services decrease, as industries increase their efficiency, proves that 'hard facts' justify our chronic political grouch.

"A few years ago automobiles, radio sets and such things were luxuries, even for rich men. Now they are in reach of nearly every purse. But schooling costs more to the taxpayer and renter; justice in our courts is more and more a luxury."

A copy of Mr. Hurley's little article can probably be obtained from the Illinois Manufacturers' Association, 120 South La Salle Street, Chicago.

The Edward G. Budd Mfg. Co. Philadelphia has received a contract for all-steel bodies amounting to $30,000,000 or $35,000,000.

Railroads Want Reopening of Rate Case

Carriers Ask Commerce Commission for Reconsideration of Decision—Also Say Time Allowed Is Insufficient

WASHINGTON, Aug. 27.—Railroads have informed the Interstate Commerce Commission that they will seek a reopening of the general Eastern steel rate case, affecting rates on manufactured iron and steel throughout Official Classification territory, decided under the Hoch-Smith resolution. This step will be taken for the purpose of reargument and reconsideration respecting the level of the prescribed mileage scales and the port differentials. Also, they declared in a statement filed last week with the commission, they intend to file a revised petition for permanent fourth section (short haul) relief.

In their memorandum they declared that, owing to alleged contradictions and conflicts in the fourth section phase of the decision, they are unable to publish a mileage scale of rates without adequate fourth section relief, and request was made for postponement of the effective date, which the commission fixed at not later than Oct. 20.

Speaking through their tariff agents, the railroads said that the fourth section order incorporated in the decision was intended to establish rates over the direct routes and that if it were not possible to publish concurrently the rates over the indirect routes the old basis of rates might remain effective over the indirect routes for a period of six months after Oct. 20. It was stated that it would be impossible to publish the new rates over the direct and indirect routes within the time required.

The carriers said that the new fourth section order does not even grant temporary relief over the indirect lines in order to establish and maintain the new adjustments. Aside from what was termed "the chaotic and discriminatory situation" that would result from compliance with both the rate and fourth section order," which, it seems, would be equally as objectionable to the shipping public as it is to the carriers," the petitioners said that it would be impossible, even over certain direct routes, to publish and make effective, as prescribed, the scale of rates ordered or any other scale. It was stated that "there is 'irreconcilable' conflict between the rate making formula prescribed and the fourth section limitations imposed."

The claim was made that compliance with the fourth section order would disrupt and distort the scale of rates prescribed. To support this contention the petition said that there are instances where there will be fourth section departures on the only open working routes and that likewise there doubtless would be instances where there will be complication "even over the most direct working routes between two points."

The contention was set up that it was obviously in the public interest that the new rate structure be made effective simultaneously over all established routes. The time afforded was declared to be insufficient to permit such a course, even assuming that the restrictions could be otherwise complied with.

The commission, according to the petition, had entered a permanent fourth section order totally unadapted to and inconsistent with the rate structure prescribed without having had the hearing and full investigation recited in the permanent order. By reason of the alleged contradictory situation regarding the fourth section order, the agents said they were preparing a new fourth section application in order to make the relief adaptable to and consistent with the distance scales. The petition said that the carriers were not able to publish any mileage scale of rates without having adequate fourth section relief.

Review of the case also is to be asked, it was said, by petitions to be filed by shipper organizations.

Chicago-Milwaukee Reduced Steel Rate Suspended

WASHINGTON, Aug. 27.—The Interstate Commerce Commission has suspended from Aug. 23 to March 23, schedules of the Chicago & North Western, Elgin, Joliet & Eastern and Chicago, Milwaukee, St. Paul & Pacific railroads reducing rates on iron and steel products from the Chicago district to the Milwaukee district from 9.5c. to 8c. a 100 lb. The action followed protests from the East Side Manufacturers' Association, Granite City, Ill., the Laclede Steel Co., with plant at Alton, Ill.; the American Rolling Mill Co., Middletown, Ohio, and the Green Bay Association of Commerce, Green Bay, Wis. The protesting interests charged that the schedules would increase the advantage of iron and steel producers in the Chicago and Milwaukee districts.

The East Side Manufacturers' Association declared that through years of effort and expense its members had built up a material business at Milwaukee, Kenosha and Racine, Wis., despite the advantage of location enjoyed by competitors in the Chicago district. Prior to the decision in the Jones & Laughlin case, it was stated, Chicago possessed a rate advantage of 13.5c. but the finding in that proceeding increased Chicago's advantage to 15.5c. The proposed schedules, if permitted to become effective, it was contended, would set up a spread of 17c. against the East St. Louis district.

Under the decision in the general Eastern steel rate case, affecting all of Official Classification territory, the association pointed out that the disadvantage of the East St. Louis district would be 14.5c., exceeding by 5c. the disadvantage of that district under rates voluntarily established prior to the Jones & Laughlin decision. It was declared that the plan to increase the spread to 17c. would exclude East St. Louis producers from the Milwaukee market. Similar points were made by the Laclede Steel Co.

The American Rolling Mill Co. said the existing Chicago-Milwaukee rate of 9.5c. is unreasonable in view of the fact that under the C. F. A. scale the haul called for a rate of 18c. while under the Eastern rate case it would be 14c. This point also was made by the Green Bay Association of Commerce.

In defending their position, the railroads declared that the cut in the rate was necessary in order to meet fourth sections situations and that unless the rate were reduced steel would move from the Chicago district to the Milwaukee district by water. The carriers stated that it had been shown that the boats would take the traffic at 8c. a 100 lb.

Suggestions Invited for Manufactures Census

WASHINGTON, Aug. 27.—With a view to making the forthcoming census of manufactures as responsive as possible to the need of industry for accurate information concerning its own activities, the special advisory committee designated by Secretary of Commerce Lamont has requested manufacturing organizations, trade associations, and individual manufacturers for advice and suggestions as to the form of the schedule to be used in the enumeration.

The subjects covered by the schedule used in the 1927 census are: Description of establishment; character of industry; time in operation; persons engaged; salaries, wages, and materials; products; power; coal consumed. The committee has invited suggestions concerning the form of questions under all of these subjects except production, which will be taken up directly by the Bureau of the Census with the industrial associations.

In view of the fact that it will be necessary to begin the printing of the general schedule early next month, comments on the general schedule should be sent to the secretary of the committee, Thomas W. Howard, 1615 H Street, Northwest, Washington, as promptly as possible in order that they may be given consideration by the committee preparatory to recommending the revision of the schedule.

Not Much Activity in European Markets

British Holidays Slow Down Business—German Use of Machinery Increasing—Russia to Foster Manganese Ore Output

(*By Cable*)

LONDON, ENGLAND, Aug. 26.

CLEVELAND pig iron delivery delays are shorter as a result of the small holiday demand and increasing output. It is now possible to place orders for foundry grades for delivery in the second half of September. The fall outlook is still regarded favorably and prices are unlikely to recede, as raw material prices are firm. Hematite has a strong undertone, but selling prices are still less than production costs.

Finished steel is firm and most works on the Northeast Coast are resuming operations after the holiday with fair order books. Some apprehension, however, has been created by the weakness in Continental prices.

Tin plate is steady and mills are better engaged following some recent good buying and the accumulation of orders during the holiday stoppages. Most Welsh mills have now resumed operations and many are not prepared to accept less than 18s. 6d. ($4.49) per base box, f.o.b. works port. Further sales of tin plate have been made to the Continent and to South America, and Far Eastern users are interested. Galvanized sheets are quiet, but prices are steady. The black sheet market is dull.

The Buttweld Proprietary Co., with capital stock of £1,000,000, has been formed at Melbourne, Australia, to manufacture steel tubes by arrangement with Stewarts & Lloyds, Ltd., and the Broken Hill Proprietary Co.

Continental steel markets are easier and there is some pessimism among mills. French works are active on domestic orders, but Belgian, Luxemburg and German makers are seeking more business. The market is evidently affected by the holidays and the increase in output authorized by the International Steel Cartel.

The next meeting of the International Tube Cartel will be at Paris, Sept. 25 and 26. Despite dissolution of the European Hoop Iron and Tube Strip Cartel, the strip steel mills are still cooperating on prices for large contracts, and efforts are being made to renew the cartel.

Belgian output in July was 347,000 tons of pig iron and 345,000 tons of steel.

Holidays Affect British Market

Pig Iron Consumers Delay Fall Buying—Steel Export Quiet and Drop in Shipbuilding Contracts

LONDON, ENGLAND, Aug. 15.—August being a holiday month here, business generally is quiet and conditions can hardly be considered normal. This week, for example, is the recognized holiday in the Cleveland district, and although there appears to have been a demand for prompt shipment pig iron, consumers' stocks being depleted, inquiry generally has been sluggish. Users are inclined to delay committing themselves for fall requirements. The furnaces in that district, however, are preparing for further expansion of output in the belief that a heavy demand will develop before the winter. East Coast hematite prices are firmer, makers having little to sell for early delivery. Although there have lately been heavier imports of foreign ore into the Tees, a severe ore shortage is not yet impossible.

While there has been some foreign semi-finished steel bought, domestic output is still good. Some mills are fairly well engaged on orders and it is expected that before long some good tonnages will be placed. In finished iron and steel, apart from holiday interruptions, domestic demand continues moderate, but export inquiry is slack except for some business from India.

Some shipbuilding contracts have been made lately. Armstrong-Whitworth & Co. have taken two motor-driven tank ships of 9000

British and Continental European Export prices per gross ton, f.o.b. United Kingdom Ports, Hamburg and Antwerp with the £ at $4.85

British Prices, f.o.b. United Kingdom Ports

Cleveland No. 3 foundry	£3	12½s.	to	£3	13½s.	$17.58	to	$17.82
East Coast Hematite	3	15	to	3	15½	18.18	to	18.30
Ferromanganese, export	13	10	to	14	0	65.47	to	67.90
Billets, open hearth	6	7½	to	6	10	30.92	to	31.52
Sheets bars, open hearth	6	5	to	6	10	30.31	to	31.52
Black sheets, Japanese specifications	13	0				63.05		
Tin plate, per base box	0	18¼	to	0	18½	4.42	to	4.48
Rails, 60 lb. and heavier	7	15	to	8	15	37.59	to	42.43
						Cents per Lb.		
Steel bars, open hearth	7	15	to	8	10	1.67	to	1.84
Beams, open hearth	7	2½	to	7	12½	1.55	to	1.65
Channels, open hearth	7	7½	to	7	17½	1.60	to	1.71
Angles, open hearth	8	2½	to	8	12½	1.76	to	1.86
Ship plates, open hearth	7	12½	to	8	2½	1.66	to	1.76
Black sheets, No. 24 gage	10	5	to	10	10	2.21	to	2.37
Galvanized sheets, No. 24 gage	13	7½	to	13	10	2.89	to	2.92

Continental Prices f.o.b. Antwerp or Hamburg

Foundry iron, 2.50 to 3.00 per cent sil., 0.50 to 0.90 per cent phos.	£3	8s.	to	£3	11½s.	$16.49	to	$17.33
Foundry iron, 2.50 to 3.00 per cent sil. 1.00 per cent and more Phos.	3	11				17.21		
Billets, Thomas	4	17	to	4	17½	23.52	to	23.64
Sheet bars, Thomas	4	17	to	4	17½	23.52	to	23.64
Wire rods low C., No. 5 B.W.G.	6	5	to	6	6¼	30.30	to	30.61
Black sheets, No. 31 gage, Japanese	12	10	to	13	0	60.62	to	63.05
Rails, 60 lb. and heavier	6	10*				31.52		
Rails, light	6	1½				29.46		
						Cents per Lb.		
Steel bars, merchant	5	13	to	5	14	1.24	to	1.25
Steel bars, deformed	5	12	to	5	12½	1.21	to	1.22
Beams, Thomas, British standard	5	5	to	5	6	1.13	to	1.15
Channels, Thomas, American sections	5	14	to	5	18	1.25	to	1.27
Angles, Thomas, 4-in. and larger, over ⅜-in. thick	5	6	to	5	6½	1.14	to	1.15
Angles, Thomas, 3-in.	5	13½				1.24		
Ship plates, open-hearth inspected	7	10				1.62		
Hoop and strip steel over 6-in. base	5	16	to	5	18	1.25	to	1.27
Wire, plain, No. 8 gage	7	8½				1.63		
Wire, galvanized, No. 8 gage	9	7½				2.03		
Wire, barbed, 4-pt. No. 12 B.W.G.	11	12½				2.58		
Wire nails, base	7	10½				$1.63	per keg	
Wire nails, assortments, 1 to 6-in. keg	10	6½				2.23		

*Open-hearth steel, 10s. ($2.42) per ton extra.

tons each for Norwegian interests; builders on the Humber River have received orders for three steam trawlers, and Yarrow & Co., Ltd., Glasgow, have secured an order from the Jugoslavian Government for the construction of a powerful flotilla leader. They have also received instructions from the Colombian Government to build three shallow draft gunboats. Generally, however, shipbuilding has not improved, recent orders being inadequate to replace vessels being completed. Orders for new merchant ships are small and the Government's decision to suspend work on its program of naval construction will exercise an important influence on the industry.

Germany Second as User of Machinery

HAMBURG, GERMANY, Aug. 12.—Per capita use of machinery in various countries has recently been investigated by the German Federation of Machinery Manufacturers. The investigation shows that Germany's total investment in machinery in 1924 was only 27 m. ($6.43) per capita, but it increased to 36.20 m. ($8.62) in 1925 and to 47.50 m. ($11.30) per capita in 1928. Although the 1928 figure was in excess of the British per capita use of machinery, it was far less than in the United States.

According to the Federation statistics, the per capita use of machinery in 1925 was 99.40 m. ($23.66) in the United States, 98.50 m. ($23.44) in Canada, 42.80 m. ($10.19) in Australia, 36.20 m. ($8.62) in Germany, 14.50 m. ($3.45) in France, 14.10 m. ($3.36) in South Africa, 13.10 m. ($3.12) in Czechoslavakia, 4.1 m. ($0.96) in Russia, 6. 70 m. ($1.59) in Japan, 0.70 m. ($0.16) in India and 0.20 m. ($0.05) in China.

World figures on per capita use of machinery in 1928 are being compiled by the German Federation of Machinery Manufacturers, but are not yet completed. Preliminary statistics show use at 47.50 m. ($11.30) per capita in Germany, 46.30 m. ($11.02) in Great Britain and 17.90 ($4.26) in France.

South African Manganese Ore Agent Appointed

The Manganese Corporation, Ltd., with headquarters in London and administrative offices in Johannesburg, South Africa, has appointed William H. Muller & Co., 122 East Forty-second Street, New York, agent for the United States in the sale of its manganese ore. The property of the company is in Postmasburg, South Africa, and will be connected with main line railroad early next year, so that sizable shipments are expected to begin in April, 1930. The ore, it is stated, has a minimum of 52 per cent manganese and a maximum of 0.15 per cent phosphorus.

Polish Wages Under Dollar a Day

Workers, However, Receive Coal and Other Allowances—American Capital in Eight Steel Producing Works

IN a report on the steel industry of Poland, W. H. Myer, assistant chief, Iron and Steel Division, Department of Commerce, says in part: "The recent acquisition by American interests of important holdings in some of the major units of the Polish iron and steel industry has focused attention on this situation in Europe and the United States."

Poland's position as a nation producing and exporting iron and steel is outlined. The Polish attitude toward the International Steel Cartel is explained and the agreements with Germany on pipe and scrap are described. At present four large Polish mills are members of the International Tube Cartel. These are the Bismarckhütte, Krolewska and Laura foundries, Bank foundry and the Sosnowiec Pipe Works. The mutual territorial protection afforded to members of the Cartel includes the Polish companies. Polish domestic sales are not limited but export quotas are determined.

Of employment and wages in Poland, the report continues: "The firms making up the membership of the Union of Polish Iron Foundries employed 39,480 workers at the end of January, 1927. The number had increased to 44,716 at the end of December of that year. By the end of December, 1928, employment had risen to 52,753 workers.

"The question of wages has such an important bearing on production costs that it seems worth while to give in some detail the earnings of workers in the Polish industry, as officially stated by the Union of Polish Iron Foundries. The following figures are all for 1927, as the 1928 report is not yet available.

"In the whole Polish industry the average cash daily earnings per worker, including overtime pay, were: In blast furnaces, 8.22 Zloty ($0.925) per day; in steel mills, 8.10 Zloty ($0.911); in rolling mills, 8.81 Zloty ($0.991).

"Workers in the plants in the Kielce and Krakow provinces received less than the above figures, while wages in Polish Upper Silesia were higher than the average for the whole country. These figures are the average for all workers, including skilled and unskilled.

"Some idea of the wages paid to skilled workers may be gained from the following average cash earnings per day: Blast furnaces, firemen, 11.58 Zloty ($1.303); steel works, firemen, 11.69 Zloty ($1.315); rolling mills, skilled operators, 12.66 Zloty ($1.424). The highest average wages were those paid to steel works 'firemen' in Polish Upper Silesia, which were 15.22 Zloty ($1.712) per day.

"In addition to wages paid in cash, it is customary for workers to receive coal allowances and other payments in kind. However, the total value of these additional wages amounted to only 3.1 per cent of cash payments, so that it is not difficult to see that the actual wage scale is low, according to American ideas.

"It is further interesting to note that reductions were made from workers' earnings to the extent of slightly more than 7 per cent of total wages. These deductions were for sickness benefit societies, unemployment fund, workers' common fund, income tax, and certain other statutory deductions.

American Investments

"Within recent months, press announcements have been made concerning substantial investments of American capital in the shares of some of the most important operating companies. These are the Bismarckhütte and the United Krolewska and Laura Foundries. Bismarckhütte operates the Bismarck and the Bethlen Falva works. It also owns all stock of the Katowice Mining & Metal Co. which operates the Marta and Hubertus plants. The Silesia company, also owned by Bismarckhütte, operates the Silesia works. The United Krolewska and Laura Foundries operate the Krolewska, the Laura and the Zgoda works.

"There are thus eight operating plants in which American capital has been invested. The importance of these can be judged by the percentage of total Polish production emanating from them, which is as follows: Pig iron, 39.82 per cent; steel ingots and castings, 50.01 per cent; rolled products, 39.37 per cent; iron and steel pipe, 56.48 per cent."

Russia Plans to Increase Manganese Ore Output

MOSCOW, RUSSIA, Aug. 11.—The Government's five-year plan of industrial development, to be completed by the business year 1932-1933, contemplates considerable expansion in manganese ore production at both the Nikopal and Tchiaturi deposits. It is also planned to erect a blast furnace at the mines at a cost of 25,000,000 rubles, for the production of ferromanganese. An effort will also be made to increase output at both the Nikopol and Tchiaturi mines, production will be centralized and modern equipment installed and the port of Poti, Georgia, on the Black Sea will be modernized.

It is estimated that the output of ore per employee at the mines can be increased 74 per cent by modernization and that production costs can be reduced 35.5 per cent. The program

calls for a production of 2,290,000 tons of manganese ore at Tchiaturi by 1932-1933. It is noteworthy that the combined exports of Tchiaturi and Nikopol in 1913 were 1,193,800 tons, but had declined to 784,600 tons in the business year 1926 to 1927 and to 498,800 tons in 1927 to 1928. The supply at Tchiaturi is 200,000,000 tons of 40 to 50 per cent manganese ore.

Prior to the war these deposits furnished 52 per cent of the world demand for manganese ore, but in 1928 they supplied only 21.4 per cent. Although exports of Tchiaturi ore are considerably smaller than in prewar years, exports of ore from the Nikopol mines are larger. It was the rapid development of the Nikopol mines that is reported by the Government to have been a factor in the relinquishment of the Harriman concession, which was at Tchiaturi. The entire export of Georgian manganese ore is now controlled by Manganexport, with main sales offices in Berlin, Germany. At present, according to Government engineers, the prices quoted for Russian manganese ore are unremunerative, but losses are accepted so that foreign exchange may be accumulated.

British to Study Design of Steel Structures

LONDON, ENGLAND, Aug. 17.—The Department of Scientific and Industrial Research has completed arrangements for an investigation, to begin in the early autumn, into the application of modern theory of structures to the design of steel structures.

The suggestion to hold the inquiry was made by the British Steelwork Association, a recently formed organization, which comprises practically all British fabricating firms and rollers of structural steel, and has for its objective the promotion of new and extended uses of steel.

The association invited the Department of Scientific and Industrial Research to organize an investigation into the problem, and it offered a financial contribution of £2,000 a year for five years, which will cover about one-half the estimated cost.

To insure the ready acceptance of the results of the investigations, the department has appointed a committee composed of representatives of the association, the Institution of Civil Engineers, and nominees of the department, under the chairmanship of Sir Clement Hindley.

Germany Divides with Saar Reparations Orders

HAMBURG, GERMANY, Aug. 12.—An agreement has been made between the German and Saar steel industries, by which about 10 per cent of all orders for rails, track supplies and steel for bridges to be booked to reparations account will be placed with mills in the Saar. The agreement is effective until 1935.

Would Make Canada Independent in Steel

Ontario Government Prepared to Pay Bounty on Ore—Electric Furnace Reduction Planned

A MOVEMENT to make Canada independent of other countries for its supplies of iron ores was announced on Aug. 24 in Sault Ste. Marie, Ont., by Hon. G. H. Ferguson, prime minister of Ontario. He stated that the provincial Government was prepared to pay a bounty of 1c. a unit, which in the case of the ores concerned is estimated will run from 50c. to 75c. a ton of ore.

Ore consumed in Ontario steel mills is brought from the Lake Superior district mines in the United States. It is stated that the bounty will make it possible to compete favorably with the imported ores, as it will amply cover the increased cost entailed in the use of the Ontario iron ores.

In commenting on the announcement, J. D. Jones, vice-president Algoma Steel Corporation, Sault Ste. Marie, stated at the meeting where the Prime Minister made this announcement:

"There are in Canada immense reserves of iron ores of excellent metallurgical quality, and large tonnages of these are contiguous to the Great Lakes water system. The Lake Superior ores are divided into two classes, siderite and magnetite. The beneficiation of these ores has been successfully accomplished.

"The cost of production of beneficiated ores is, of course, greater than the cost at which the American Lake Superior ores can be laid down on Canadian furnace docks, and, therefore, Government assistance in the way of bounties will be required to establish firmly the Canadian iron ore industry.

"The cost of producing iron ore is largely a matter of sustained tonnage production, and no assistance can be definitely established until Canada's furnaces are put in a position where they can be assured of a reasonable tonnage production. With reasonable tonnage production assured it will be possible to turn our attention to the production of Canadian ores and thereby permit the economical working of our iron ore problem."

Plans to Make Sponge Iron

Robert Turnbull, president Volta Mfg. Co., Welland, Ont., spoke of the development of a new electric furnace, especially adaptable to the reduction of Canadian ores. Mr. Turnbull was formerly associated with Dr. Heroult and assisted in the installation of the first electric steel melting furnaces in the United States.

Mr. Turnbull stated: "Furnaces are now being built and installed in Canada which will produce steel ingots at a cost considerably lower than that of the imported article, and the time is not far distant when Canada will be completely independent of other nations for the steel ingot supply, providing a certain condition is met. That is the substitution, or rather, the adding to the tonnage of the steel scrap supply of some other basic raw material, because as the tonnage of manufactured steel increases, there will not be sufficient steel scrap in the country to meet the demand.

"After considering the matter some time I came to the conclusion, as others, I believe, have done, that there was only one answer to the problem, and that was to develop an economical method for the production of sponge iron, and at the same time use such a process in solving the problem of utilizing Canadian ores exclusively in the manufacture of iron and steel in electric furnaces.

"The cycle of operations in our proposed process for the production of sponge iron is as follows: The ore to be treated is crushed, then mixed with a reducing agent, carbon, and pressed into a briquette of special form. These briquettes are then automatically conveyed to the furnace and charged through a hopper into the preheating chamber, and from there to the first reducing chamber, where a partial reduction of the ores takes place.

"The charge is then passed automatically through the second chamber, where are located the resistors supplying the electric heat. This chamber is kept at a constant temperature by automatic regulation, the reduced iron leaving the furnace automatically. This is again crushed, passed over a magnetic separator where the iron is removed from the gangue, then to a press, where the iron, which is in granular form like fine sand, is pressed into any desirable shape. Then the product is ready for the open-hearth or electric furnace to be melted into steel.

"The entire operation as outlined is automatic, and labor cost should be extremely low. A new furnace is now being completed, and if successful a commercial unit will be built at some point where cheap electric power and iron ore are available."

Diesel Engine Driven Plane Flies 15 Hours

HAMBURG, GERMANY, Aug. 12.—The German aircraft builder Junkerswerke at Dessau has improved its Diesel engine for airplanes so that in a recent test an airplane equipped with a Diesel engine remained in the air for 15 hr. It is believed that the German commercial air service will equip some planes with Diesel engines in an effort to reduce operating costs.

This Issue in Brief

Heat treating is an art of the highest order. In formulating a new process, the heat treater can trust best his own experience. He cannot, without reserve, use the experience of others. Rate of cooling is a vital factor in heat treating and X-ray is a decided aid.—Page 513.

* * *

Successive steps in machining the crankcase of the nine-cylinder Wright Whirlwind engine include multiple operations, which are performed simultaneously or in sequence. In one case, 20 flange holes are drilled simultaneously on a multiple drill.—Page 525.

* * *

Aluminum alloys can be heat treated to yield a wide range of properties. The tensile strength obtainable in some alloys by heat treatment is remarkable. This also applies to ductility and hardness. Heat treating department is now a necessary adjunct to the modern aluminum alloy foundry.—Page 515.

* * *

Substantial savings in weight and improvement in strength and safety of aircraft result from using delicately constructed steel alloy parts heat treated by a new process. Parts are handled without distortion in large electric furnaces. Cost of heat treating has been reduced by establishing centrally-located plant for the industry, where work may be done on a production basis.—Page 519.

* * *

Products and personnel of 250 exhibitors indicate in part the commercial and technical promise of the metal exposition in Cleveland in the week of Sept. 9. —Page 529.

Exports of iron and steel products in first seven months of 1929 were the largest for any corresponding period since 1921. In rolled and finished steel, the gain over 1928 was 19 per cent.—Page 583.

* * *

American output of alloy steels in 1928 exceeded 3,000,000 gross tons for the first time. Expansion in production of electric alloy steel castings has been rapid.—Page 544.

* * *

Sixteen vertical core ovens, 45 ft. high, save much space in comparison with the horizontal type in Michigan automobile foundry. Each core-maker loads his own cores on furnace trays. This eliminates the use of racks and the necessity for aisles.—Page 549.

* * *

Remedies for crystal spots on plated ware, especially builders' hardware, are the exclusion of sulphur from the surroundings, the use of lacquers which retard spotting, application of a thin film of grease to the lacquered surface and the use of wax paper for wrapping.—Page 516.

* * *

United States Navy uses standard colors to mark ends of bars, billets and other metals for identification. This system probably will be adopted by all departments of the Government.—Page 518.

* * *

Machinery exports in July were the second highest ever recorded. The total for the first seven months of the year reached a new high level for that period, amounting to more than $362,000,000.—Page 585.

Long structure - weakening flakes of graphite found in ordinary cast iron can apparently be induced to take more globular and less damaging forms. Although this has been done by the malleabilizing process, heat treatment by other and quicker methods gives promise of usefulness.—Page 517.

* * *

Diameter of single (upper) roll used in bending steel plates is 1.136 times that of each of the two lower rolls. Stresses induced in the rolls are a function of the thickness and the width of the plate being bent. Critical conditions are found when the width reaches 79 times the thickness and again at 109 times the thickness.—Page 546.

* * *

Progress in case carburizing, as seen by the testing engineer, has been mainly along the lines of improved technique and in the development of gas carburizing. Since there is no need for expensive and frequently-renewed carburizing boxes in gas carburizing, this field is especially tempting for further study.—Page 517.

* * *

Metal construction is lighter than wood for aircraft parts where the design is such that the full strength of the metal is taken advantage of. Wood is virtually obsolete as a structural material for aircraft.—Page 519.

* * *

Trend toward a fairly general agreement as to principles of heat treating and the development of the nitriding process for hardening steel surfaces are outstanding features of steel treating in the past year, states authority.—Page 517.

A. I. FINDLEY
Editor

THE IRON AGE

W. W. MACON
Managing Editor

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Is There Inflation?

WRITING in the current bulletin of his company, Col. Leonard P. Ayres, vice-president of the Cleveland Trust Co., points out that up to the end of 1928 stock prices had risen to 55 per cent above normal, and so far in 1929 they have continued up until they are now about 76 per cent above normal. He proceeds to explain that "the generally vigorous and persistent advance in the earnings of the leading industrial corporations during the last five years probably constitutes the most important single cause behind this unprecedented advance in stock prices. Investors are buying stocks, instead of bonds and mortgages, because they realize that, if corporate earnings continue to advance, the yields will eventually become adequate."

Colonel Ayres's explanation is sound in so far as it goes, but manifestly it does not go far enough. For one thing we need to understand better the reason for the advance in corporate earnings. Anyway, we shall feel considerably more comfortable if we understand it.

In the first place we have had a steady increase in population and have made no economic mistakes leading to extensive unemployment. In other words, an increasing number of workers has been working as nearly to full time as seasonal conditions and their own wishes permit, and at the same time their number has been swelled in effect by greater mechanization and improved organization. The earnings of the railroads and other public services were bound to be increased by such conditions if by nothing else.

At the same time numerous corporations have been engaged in doing new things. There have been phenomenal developments in the chemical industry, in the production of rayon, and in the conquest of the air. Also the public appetite for amusement has led to great earnings by the purveyors to that demand in radio-telephony, in theatrical shows, and most lately in the phono-cinema. The interest in automobiling has waxed, not waned, and the earnings originating through it spread to the production of iron and steel, petroleum, copper, cement, and so on. On the other hand there have been some reverses. The fertilizer manufacturing concerns have not done well. The desire of the women of the world to wear their skirts supra-knee high has played mischief with the textile industry except in its rayon branch, which has supplied the girls with the material for their stockings and underwear.

At the present time we have right before us the development of a new group of copper deposits in Rhodesia that give sound promise of proving to be the greatest occurrence of copper the world has known. By the time their copper is ready to come on the market it will be needed for more telephone, light and power lines, more electrical machinery, etc. It is entirely reasonable that the stocks of those companies should be bid up even if they are making no present return and indeed are absorbing capital and credit for their equipment.

All of this fails, however, to explain the rapidity and violence of the rise in corporate securities, running to 76 per cent in the space of two or three years and bringing the grand total of quotational value up to something in excess of 200 billion dollars, according to one estimate. Any such figure is to be viewed with reservation, for among other things there are duplications from one listed company's ownership of stock in others. Nevertheless, we may easily accept that the aggregate of the quotational value of corporate shares, listed and unlisted, eliminating all duplication, has attained an enormous total and one that is out of all reasonable proportion to our national wealth if computed on the basis of 1913 prices. Heretofore we have suggested that our national wealth if uniformly written up would be far in excess of what the Census and other authorities have estimated.

Now, the probability is that this is just the process that has been lately going on. We had previously written up our real estate and some other things, but had not done so with our railroads and mines and many of our factories. The process that has been going on has been characterized by some financiers as inflation. It creates, indeed, an expanded basis for credit and such use has been made of it, to the despair of the Federal Reserve Board. However, it is certainly not a general inflation, but rather it is in the way of being an equalization in inflation. We have been inflated to about 160 per cent in our general index of price level. We have been bringing our national capitalization up to the same figure or something like it.

So we will answer our captional interrogation in the affirmative, and will agree that we are having inflation, but so have we been ever since the index of general price level began to rise sharply, about 1916. However, we are certainly not experiencing any currency inflation or anything that has to do with the quantitative theory of money. Nor are we overproducing commodities and building up accumulations in which credit is being frozen. And somehow we fail to become alarmed about the inflation that has been blossoming in the stock market.

Heat Treatment as a Science

FOR many years the old-fashioned tool maker has been able, and still is, to bestow a fine cutting edge of long life on a rough piece of steel. His eye and experience tell him just when the tool has reached the proper heat for forging and quenching. He knows not the reasons why. Similarly the blacksmith fashions out of a crude piece of metal a hard, serviceable product. Science is not recognizable in these accomplishments.

The last fifteen years have been a marvel of progress in the heat treatment of metals. Expansion of the steel treaters' organization from a small beginning to a great technical society in eleven years is impressive witness to the fact. In this issue of THE IRON AGE, which especially emphasizes this progress, one writer observes that not yet have operations in this field been brought under scientific control. Too many uncertainties remain to be cleared up. Yet each year records progress in organizing our knowledge.

A leading testing engineer, whose researches in fatigue of metals are known internationally, points out on another page that lately general agreement has been reached as to the principles of heat treatment, also that advances in gray iron are signal. Another writer, who has specialized in aluminum alloys, tells of their rapidly growing uses, under heat treatment. They promise soon to figure in the construction of street railroad cars, steam railroad passenger cars and parts of locomotives, as they are already doing in the building of aircraft, motor cars, trucks and buses—such is the modern demand for saving in weight and increase in speed.

We need not doubt that heat treatment will yet be known as a science in the full three-fold sense of exact knowledge of facts, exact knowledge of laws, and exact knowledge of proximate causes. But, as is indicated on the first reading page of this issue, that goal is some distance ahead.

Automotive Industry's Earnings

TWO years ago General Motors attracted much attention by having earnings in the first half of the year 42 per cent in excess of Steel Corporation earnings. In the first half of this year there was only 15 per cent excess. Yet the automobile industry has been extremely active, even more so than the steel industry. *Automotive Industries* compiles a comparison of earnings of ten representative passenger car companies, showing first-half earnings totaling $203,732,321 for last year and $206,586,527 for this year, making only 1.4 per cent increase. General Motors, representing about three-fourths of the total, decreased 6 per cent. Peerless had an increased loss, Pierce-Arrow converted a loss into a very substantial profit, and some others had large decreases in earnings.

Large earnings in the first half of 1927 were not difficult to understand. Total production was only 11½ per cent under the record first half and as Ford production disappeared entirely before the end of the half year, non-Ford production had a large increase.

The small gain this year over last in automobile industry earnings, when activity has been so great and when nearly all other industries have shown large gains, affords food for thought, there being basis for making some plausible guesses.

The most interesting comparison is between steel and automobiles. The steel companies have had a larger increase in earnings than in tonnage, there being a substantial increase in earnings per ton, yet without any really material increase in realized prices. The explanation is that with full operation the extra tonnage produced cost less per ton, general running expenses not increasing in anything like the same proportion as tonnage.

It was not thus with the automobile industry, whose profits per car evidently decreased. On account of changes in models and specifications direct comparison of costs and list prices cannot be made, but it is not difficult to form a conception of the general merchandizing situation in the industry. At the opening of this year capacity was far in excess of any previous production and clearly it was a case of finding out who would survive. For eventual success a large turnover was absolutely essential. Any car that went down in sales would lose ground, no matter how much profit there were per car, because the public would lose interest.

The automobile industry knew that it was entering a year of intense competition, in all probability a crucial year for not a few of the individual producers. There has been intensive sales effort. While the steel industry sold its extra tonnage this year at practically no additional expense—and its selling expense is always relatively low—the automobile industry, it being understood that Ford is not included in this discussion at all, went to much expense to sell its extra quantity. It is a detail whether the extra expense was in pricing cars low relative to cost or in extra selling expense, including advertising, unusual commissions and other special allowances. While the public no doubt has been really anxious to buy automobiles it has been given a great deal of expensive encouragement.

Here, then, is the great difference between steel and automobiles. An additional tonnage of steel has been sold at almost no expense, while an additional number of automobiles has been sold at a very high expense. Nobody is particularly to blame; the circumstances were simply laid out by the march of events.

More Pig Iron to Steel in Europe

LAST year the steel ingots and castings produced in the United States weighed 35.1 per cent more than the pig iron produced. For Europe, including the United Kingdom, the excess was only about 17.4 per cent. There is quite a difference. Why? As the United States is a relatively new country one would rather expect the divergence to be in the other direction.

It is necessary to get clearly in mind in the first place that the apparent excess of steel over pig iron is not a real excess. The major part of the scrap used in any steel works is the scrap the works produces itself in converting steel ingots into merchantable material. Last year the United States produced 50,325,393 tons of steel ingots, but only 37,177,939 tons

of rolled steel, the difference being chiefly works scrap; and through conversion of skelp into pipe, rods into wire, etc., the merchantable material as shipped was less than the rolled steel. The production of pig iron and ferroalloys was 38,155,714 tons, showing a slight excess over the merchantable steel. That excess, plus the pig iron used in making iron and steel castings was, in a rough way, the measure of the outside scrap, whether old material or industrial scrap, used by the steel works.

We cannot assume that European makers crop their ingots less by reason of making better ingots than we do. In the present consideration practice must be taken as much the same here and abroad. We cannot study the different countries in detail, because much pig iron moves from one country to another. Poland made more than twice as much steel as pig iron and Italy three and a half times as much, but that was due to importing pig iron. Both France and Luxemburg made only 93 per cent as much steel as pig iron, which was due to exporting pig iron.

The question will naturally arise, whether these much older countries, long producers, are originating more old material than we are. Assuming, for illustration, that material comes back as scrap a quarter century after it is made, we were making 25 years ago only half as much pig iron, while Europe was making fully four-fifths as much as at the present time. It might be concluded that the relative outcome of old material should therefore be greater in Europe than in the United States.

We can be sure, however, that this is not the case. Europeans have not gone in so much as we for steel structures and other things that can be wrecked in time and the material reclaimed, nor if they did would they abandon the things so soon for bigger things. The per capita consumption being smaller, the material is more widely dissipated.

In addition to this consideration, we may be reasonably certain that Europe as a whole puts a larger proportion of its pig iron into iron castings than we do. It is a notable fact that our production of iron castings has not grown in the last 20 years. Precise statistics would probably show a decrease. One can only estimate by observing that the production of pig iron for foundry work has not increased, while the proportion of scrap used in foundries has probably decreased.

These two considerations fit into one general conclusion, that the United States, although new, has progressed beyond Europe, replacing its steel after shorter periods of service, and using on a larger scale rolled steel and forgings in preference to iron castings.

Bolts, Bearings and Profits

BEARINGS and bolts are relatively inconspicuous machine elements and they get less attention from the designer and constructor than moving parts like cranks, gears and shafting, or shock-resisting details like springs or cutting tools. Yet they are of major importance in operation, as many a maintenance man can testify. In this age when machinery does everything that can be done without human labor, the machine owner makes money only when the machine runs. And it runs on bearings and is held together by bolts. Operators therefore call down blessings on the man who provided generous bearings and ample lubrication to the journals, and properly objurgate the unknown designer who skimped material in studs, bolts and rivets.

Everyone knows that there have been important advances in the methods of lubrication. We see fewer greasy mechanics with long-spout oilers, sprinkling oozy liquid on everything surrounding the elusive oil hole. Much complicated machinery has an oil circulating system built into it, supplying every rubbing surface with a generous and constant supply of cool, filtered oil. In other equipment the oil-can nuisance has been scotched by grease cups or by periodically forcing into the bearings grease under pressure. The use of high-grade roller and ball bearings and a better knowledge of the manufacture and properties of bearing bronzes and other alloys have also improved the operating efficiency of much machinery.

As a notable case in point we have in mind one entire rolling mill which is equipped with a force-feed system of lubrication reaching every bearing—on motors, drive, roll housings, tables, manipulators and all auxiliaries. Oil is circulated, cooled, filtered and reused. Oil supply is so interlocked with main control circuits that if the circulation should be interrupted for any cause the entire mill closes down. The excellence of this system is such that make-up oil amounts to about 30 cents a day, or as much as one oiler might waste in an hour.

But the greatest profit from such a well designed system comes from the fact that the machinery is always ready to operate. Generous design in all parts, and especially in bearings and bolts, enabled this same mill to operate throughout 1928 with total delays chargeable to failures in equipment amounting to 19 minutes. It is not a brand new mill, either—just built right and maintained right. Ability to run when wanted is the ideal.

Another citation: This ability to run when wanted is one of the greatest advantages of the oil-electric locomotive. One sizable steel plant requiring five steam locomotives for switching service has been able to replace them with four oil-electrics, because the old equipment was down such a large percentage of the time for cleaning boilers, fires and grates, for loading coal or water, or for repairs and inspection. Of course, the oil-electrics do not operate 100 per cent of the time; they must load oil and also undergo inspection and repairs. But the general quality of material, workmanship and design in the newer equipment is so much better than in the old that such delays are hardly 5 per cent of the time. To say nothing of the smoke nuisance and fire hazard, such an "ability to serve" means much in reducing repair gangs, auxiliary repair equipment and even in some instances operating labor.

These instances are cited to substantiate the original proposition that machines make money only when they operate, that they operate on bearings and are tied together with bolts, and that money spent in generous proportions and intelligent design will pay good dividends in operating economies. And these propositions hold for entire establishments as well as individual machines.

CORRESPONDENCE

American Costs of Concentrating Manganese Ores

To the Editor: Referring to your discussion (THE IRON AGE, Aug. 8) of the Bradley manganese leaching process:

You comment on the ammonia leaching process of Mr. Benedict of the Calumet & Hecla; but it is not necessary to do much guessing as to the cost of that process. The company gives the cost of the copper recovered as around 7c. per lb.; and if the recovery is 12 lb. per ton of sand, that means an operating cost of 84c. a ton, which includes smelting the precipitate to refined copper.

The Bradley process is the type of process adapted to American production, the basic law being that means must be devised that do away with hand labor. It makes no difference how complicated a process may be (if it succeeds in its object) if the labor cost is low, and the labor costs in such processes as this are low. That is the whole story.

The great successes in American mining today are in those cases where there is a large tonnage that can be extracted cheaply and then subjected to concentrating processes. The matter of grade of ore is nothing or next to nothing, if there is plenty of it and if modern technology is applied, with low labor cost.

If there is a duty, where the Bradley process and other processes will meet their trials is in competition with natural deposits of good grades of manganese ore here. There are those who assume to know so much of creation that they know there is practically no manganese ore in the United States. This is highly absurd. Nobody knows anything about the actual resources of manganese in the United States. It is known, however, from a great number of researches that the chemical composition of the continents of the earth is much the same, as anybody can ascertain by referring to the reports of exhaustive researches given by Dr. F. W. Clarke of the U. S. Geological Survey in Bulletin 770, "The Data of Geochemistry."

It is also well known by competent geologists that the supposed ore-forming processes have been much the same in the different continents and it is a fair and safe conclusion that the United States has its share of both high-grade and low-grade manganese ores. What the United States lacks, when it comes to producing tin and tungsten, manganese and chrome, and most minerals, is labor at 10 cents a day and 25 cents a day. There are probably 500 known manganese ore deposits in the Appalachian ranges alone that could be immediately operated at a good profit if there were a supply of cheap coolie labor to dig the dirt and pick out the lumps of manganese.

Any analogies in the consideration of manganese which it is attempted to apply to American production and Indian production are entirely unsafe. Methods of production must be adapted to conditions and these are highly variable. When a native population in Africa, estimated at 200,000,000, with access to natural resources on a grander scale than in this country, has been put into action, larger interests than those in manganese—such as iron, steel, copper, corn and cotton—will find out something about paying $4 a day for labor and trying to compete with 10-cent labor.

ANSON G. BETTS.

West Cummington, Mass., Aug. 15.

Republic to Acquire Union Drawn Steel Co.

CLEVELAND, Aug. 27.—The Republic Iron & Steel Co., Youngstown, and the Union Drawn Steel Co., Beaver Falls, Pa., have agreed upon terms by which the Union Drawn company is to be acquired by the Republic organization, according to a statement by Cleveland financial interests who have been negotiating the deal. The Union Drawn company, which is the largest independent maker of cold drawn steel products in the country, operates three plants at Beaver Falls and one each at Gary, Ind., Hartford, Conn., Massillon, Ohio, and Hamilton, Ont.

Terms of the proposed sale have not been made public and will be subject to approval of stockholders of Union Drawn company.

Low Expansion Alloy for Gas Engine Pistons

A new alloy, developed by Aluminum Co. of America is being used by Reo Motor Car Co. for pistons. Reo engineers think it is better than the former plain skirt aluminum piston, which has been so successful in the past. The new material is called Low-Ex and has a thermal expansion rate 12 to 15 per cent less than that of previously used alloys, while the heat conductivity is 15 to 20 per cent greater. As a result, piston clearance is reduced 0.003 in., which means longer piston life due to greater wearing margin.

Whitcomb Company to Make Oil Electric Engines

The George D. Whitcomb Co., manufacturer of industrial and railroad locomotives, has broken ground for the construction of a new factory unit. The expansion is for oil-electric locomotives from 20 to 100 tons.

Program for Iron and Steel Institute's Fall Meeting

The autumn meeting of the (British) Iron and Steel Institute will be held at Newcastle-upon-Tyne, England, in the Festival Hall of the North-East Coast Exhibition, Sept. 10 to 12. The following is the list of the technical papers scheduled:

"Notes on Wire for Mining Ropes," by A. T. Adam.

"The Solubility of Carbide in Ferrite," by H. A. Dickie.

"Electrical Conductivity of Magnesite and Some Other Refractory Materials in Relation to the Temperature and Their Other Properties," by E. Diepschlag and F. Wulfestieg.

"Notes on the Damping-Down and Re-Starting of Blast Furnaces," by C. S. Gill.

"The Hardening of Superhardened Steel by Magnetism—The Lattice Resonance Hypothesis," by E. G. Herbert.

"Crystallization and Segregation Phenomena in 1.10-Per Cent Carbon Steel Ingots of Smaller Sizes," by A. Hultgren.

"High Elastic Limit Structural Steels," by J. A. Jones.

"The Hardness of Vacuum-Annealed Crystals of Iron," by H. O'Neill.

"Iron in Antiquity," by T. A. Rickard.

"The Correlation of Fatigue and Overstress," by J. H. Smith, C. A. Connor and F. H. Armstrong.

"The Coalescence of Pearlite," by J. H. Whiteley.

"Iron-Silicon-Carbon Alloys—Constitutional Diagrams and Magnetic Properties," by T. D. Yensen.

Bar Mill Rate Unchanged

For September-October, tonnage rates for boilers and finishers in midwestern mills continue without change from the July-August rate. At the bi-monthly examination of sales sheets, the average selling price of bar iron shipped during the 60 days ended Aug. 20 was disclosed as 2c. a lb., or unchanged from the previous settlement.

Grefco chrome high temperature cement and Standard silica bonding cement, products of the General Refractories Co., Philadelphia, are now being sold through dealers.

Iron and Steel Markets

Output Reduced in Some Products

Rollings of Rails, Tin Plate, Bars and Strip Steel Lower— Ingot Production of Leading Companies Still High— Large Sales of Southern Pig Iron

REDUCED mill operations in rails, tin plate, merchant and alloy steel bars and strip steel are offset to some extent by continued large output of other products, notably plates, structural material and sheets.

The larger producers, including the Steel Corporation and at least two of the leading independents, having diversified lines, are still maintaining ingot output at 90 to 95 per cent of capacity, while some of the smaller companies average about 85 per cent.

New business and specifications for nearly all steel products except plates and sheets have been in smaller volume than shipments this month, resulting in a reduction in backlogs and shortening of deliveries.

The lull in demand is regarded as merely the seasonal expectation that has come much later in the year than usual. The decline in the requirements of the automobile industry is partly responsible, although other factors are at work, such as a setback in farm implement manufacturing.

Ingot production this month should show a slight loss from that of July. Last year the low point came in June, with each succeeding month bringing an increase up to the last two of the year. Indications point to the present volume of ingot output holding fairly well for another month, by which time the trend of fall business will have become apparent.

Prospects as to the extent of the possible recovery in automobile manufacturing and revival of railroad car buying are still in doubt. A fall buying movement in rails and tin plate is regarded as certain to revive declining rollings of those items.

Automobile output in August will be slightly larger than in July, which was the low month since February, but steel orders from the motor car builders have increased very slowly. Ford production this month is expected to reach 200,000 units, but Chevrolet's schedule is well below its recent peak. Other motor car companies, some of which had sharply reduced their August programs, are expected to manufacture on a greater scale next month.

Demand for sheets has held up surprisingly well in spite of the decline in automobile demand. Orders this month have been almost equal to shipments. At the beginning of August independent mills had unfilled orders for a month and a half, while the leading interest has two months' bookings and is again operating this week just under 100 per cent.

This is an in-between season for rails and tin plate and both have had sharp curtailment in rollings. The rail buying movement is expected to get started earlier than usual this year, and 20,000 tons is already mentioned as a possible purchase before Sept. 15 for fall delivery. Meanwhile, some rail mills have reached the end of their obligations. This is true of one at Chicago, though the other there has a 75 per cent schedule arranged into October, while the Ensley mill of the Tennessee Coal, Iron & Railroad Co. has been shut down, together with four open-hearth furnaces which were supplying it with steel.

Tin plate operations have declined to an average of 80 per cent or less. Though the leading producer is at better than 85 per cent, output of independent mills ranges from 50 to 75 per cent. Within a month, however, mills will begin rolling on next year's business.

Structural steel demand during August has been heavy, on top of a seven months' total which exceeded that for the same period last year by 16 per cent. Although the week's awards dropped to 22,000 tons from more than 50,000 tons in the preceding week, fresh inquiries totaled 58,000 tons, of which 27,000 tons is for bridges, one at Cleveland calling for 15,000 tons.

Plate mills are still operating at close to capacity. Plates are the only steel product in which deliveries have not been materially cut down. Among new requirements is 30,000 tons for four ships.

Railroad equipment orders, totaling nearly 1800 cars, of which 1393 are for the Lackawanna road, were the largest in any week since June.

Steel prices are holding remarkably well despite lessened demand. The fact that a fourth-quarter contract for black sheets has been made at the present quotation of 2.85c. a lb., Pittsburgh, points to a continuance of current prices to the end of the year, notwithstanding talk of an advance.

Heavy sales of Southern pig iron have placed producers in that district in a somewhat more favorable position. One company, which has sold upward of 50,000 tons in the North in the week, has withdrawn from the market, and the others show a tendency to stiffen their quotations, although much of the week's business was taken at prices ranging from $12 to $13.50, Birmingham. Sales included 20,000 tons to two Delaware River cast iron pipe makers, 10,000 tons of basic to an Illinois steel company and 10,000 tons of foundry iron to other Chicago district consumers.

Northern iron remains fairly steady in the face of the Southern competition, though prices have given way 50c. a ton at St. Louis, and Buffalo iron is lower in New England.

THE IRON AGE pig iron composite price has dropped to $18.25 a gross ton, the year's low, from $18.42 last week. Finished steel remains at 2.398c. a lb. for the third week.

A Comparison of Prices

Market Prices at Date, and One Week, One Month and One Year Previous, Advances Over Past Week in Heavy Type, Declines in Italics

	Aug. 27, 1929	Aug. 20, 1929	July 30, 1929	Aug. 28, 1928
Pig Iron, Per Gross Ton:				
No. 2 foundry, Philadelphia	$21.26	$21.26	$21.26	$20.26
No. 2, Valley furnace	18.50	18.50	18.50	16.50
No. 2 Southern, Cin'ti	*17.19*	17.69	17.69	19.94
No. 2, Birmingham	14.50	14.50	14.50	16.25
No. 2 foundry, Chicago*	20.00	20.00	20.00	18.00
Basic, del'd eastern Pa.	19.75	19.75	20.00	19.00
Basic, Valley furnace	18.50	18.50	18.50	16.00
Valley Bessemer, del'd P'gh.	20.76	20.76	20.76	18.76
Malleable, Chicago*	20.00	20.00	20.00	18.00
Malleable, Valley	19.00	19.00	19.00	17.00
Gray forge, Pittsburgh	19.76	19.76	19.76	18.01
L. S. charcoal, Chicago	27.04	27.04	27.04	27.04
Ferromanganese, furnace	105.00	105.00	105.00	105.00
Rails, Billets, Etc., Per Gross Ton:				
Rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Light rails at mill	36.00	36.00	36.00	36.00
Rerolling billets, Pittsburgh	35.00	35.00	35.00	32.00
Sheet bars, Pittsburgh	35.00	35.00	35.00	32.00
Slabs, Pittsburgh	35.00	35.00	35.00	32.00
Forging billets, Pittsburgh	40.00	40.00	40.00	38.00
Wire rods, Pittsburgh	42.00	42.00	42.00	42.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.85	1.85	1.85	1.90
Finished Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Bars, Pittsburgh	1.95	1.95	1.95	1.90
Bars, Chicago	2.05	2.05	2.05	2.00
Bars, Cleveland	1.95	1.95	1.95	1.85
Bars, New York	2.29	2.29	2.29	2.24
Tank plates, Pittsburgh	1.95	1.95	1.95	1.90
Tank plates, Chicago	2.05	2.05	2.05	2.00
Tank plates, New York	2.22½	2.22½	2.22½	2.17½
Structural shapes, Pittsburgh	1.95	1.95	1.95	1.90
Structural shapes, Chicago	2.05	2.05	2.05	2.00
Structural shapes, New York	2.19½	2.19½	2.19½	2.14½
Cold-finished bars, Pittsburgh	2.30	2.30	2.30	2.10
Hot-rolled strips, Pittsburgh	1.90	1.90	1.90	1.75
Cold-rolled strips, Pittsburgh	2.75	2.75	2.75	2.65

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

	Aug. 27, 1929	Aug. 20, 1929	July 30, 1929	Aug. 28, 1928
Finished Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 24, P'gh.	2.85	2.85	2.85	2.65
Sheet, black, No. 24, Chicago dist. mill	2.95	2.95	3.05	2.75
Sheets, galv., No. 24, P'gh.	3.50	3.50	3.60	3.40
Sheets, galv., No. 24, Chicago dist. mill	3.60	3.60	3.80	3.60
Sheets, blue, No. 13, P'gh.	2.35	2.35	2.35	2.10
Sheets, blue, No. 13, Chicago dist. mill	2.45	2.45	2.45	2.20
Wire nails, Pittsburgh	2.55	2.55	2.60	2.55
Wire nails, Chicago dist. mill	2.60	2.60	2.65	2.60
Plain wire, Pittsburgh	2.40	2.40	2.50	2.40
Plain wire, Chicago dist. mill	2.45	2.45	2.55	2.45
Barbed wire, galv., P'gh.	3.20	3.20	3.30	3.20
Barbed wire, galv., Chicago dist. mill	3.30	3.30	3.35	3.25
Tin plate, 100 lb. box, P'gh.	$5.35	$5.35	$5.35	$5.25
Old Material, Per Gross Ton:				
Heavy melting steel, P'gh.	$19.00	$19.00	$18.75	$16.00
Heavy melting steel, Phila.	16.50	16.50	16.50	13.00
Heavy melting steel, Ch'go.	15.25	15.25	14.75	12.75
Carwheels, Chicago	14.00	14.00	14.00	12.75
Carwheels, Philadelphia	16.50	16.50	16.50	15.50
No. 1 cast, Pittsburgh	15.50	15.50	15.50	14.75
No. 1 cast, Philadelphia	16.50	16.50	16.50	15.50
No. 1 cast, Ch'go (net ton)	14.50	14.50	14.50	14.25
No. 1 RR. wrot., Phila.	16.00	16.00	16.00	13.50
No. 1 RR. wrot., Ch'go (net)	14.00	14.00	13.50	11.25
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	*$2.65*	$2.75	$2.75	$2.75
Foundry coke, prompt	3.75	3.75	3.75	3.75
Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	18.12½	18.12½	18.12½	14.75
Electrolytic copper, refinery	17.75	17.75	17.75	14.50
Tin (Straits), New York	*46.12½*	46.50	47.25	47.50
Zinc, East St. Louis	6.80	6.80	6.80	6.25
Zinc, New York	7.15	7.15	7.15	6.60
Lead, St. Louis	6.55	6.55	6.55	6.22½
Lead, New York	6.75	6.75	6.75	6.40
Antimony (Asiatic), N. Y.	9.00	9.00	8.62½	10.25

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Pittsburgh

Industry Marking Time to Discover Trend of Demand, Meanwhile Operating Close to 95 Per Cent

PITTSBURGH, Aug. 27.—The steel industry in the Pittsburgh and tributary producing districts is marking time and it will be another month before the trend for the fourth quarter will be clearly discernible. New business and shipping orders on all products except plates and some finishes of sheets are far from sufficient to sustain present operating schedules and backlogs are already considerably reduced in some lines.

Nevertheless, the Steel Corporation subsidiaries and the leading independent producer in the immediate Pittsburgh district are still able to utilize capacity ingot output in their various finishing departments and have not yet begun to accumulate raw steel to any marked extent for their reserve stocks. For this reason it will be another month before any decided curtailment in the rate of steel making will be necessary and present operations, which are still not far below 95 per cent of the theoretical top, are not expected to decline immediately. And during that month improved demand from leading consuming industries may change this decline into an increase.

The present lull in demand is entirely natural and not alarming in its proportions. Fortunately, it finds the leading companies so well supplied with old business that new tonnage is not immediately necessary to sustain activity. However, rollings against old rail contracts have now been largely completed and it will be several weeks until new orders are placed.

The same is true with regard to tin plate, specifications for which have receded sharply this month. Leading independent makers of tin plate have reduced their operations to an average of not more than 65 per cent of capacity, although the Steel Corporation subsidiary is still above 85 per cent.

The decline in demand from the automotive industry has affected steel most seriously. Only one or two of the large makers of automobiles have begun to specify steel for new models and others, particularly manufacturers of cars in the low priced field, have practically withdrawn from the consuming market. The Ford company is the one exception. Its requirements are as large as ever.

This curtailment has forced makers of strip steel, who have been operating on a hand-to-mouth basis for some time, to slow down their mills, with prospects of even lighter schedules before demand again develops. Sheet makers, however, who are favored with unusually heavy commitments, report a sustained demand from other consuming industries and still have sufficient shipping orders for several weeks' work.

Prices are holding remarkably well despite declining demand, and no further weakness has developed during the last week. Galvanized sheets are still soft, but leading independents are taking a firmer price stand and there is talk of an advance in quotations. At least one fourth quarter contract for black sheets has been closed at 2.85c., Pittsburgh.

The pig iron and scrap markets are

quiet. A few small fourth quarter pig iron inquiries are coming out, but buying is confined to small spot tonnages. Heavy melting steel is not quotably weaker, although there has been no buying to give it strength.

Pig Iron.—Fourth-quarter inquiries are beginning to reach the trade, although no sizable tonnages are reported. Spot sales are being made regularly and leading sellers believe that foundries in the district will have their stocks and contract tonnages completely used up by the end of the next month. Consequently heavy fourth-quarter buying is expected, particularly if conditions throughout the industry are sustained at recent levels. The firmness of the price is regarded very favorably by both the producers and consumers of iron, as the uncertainty of the market in recent summers has been disturbing to both. Southern iron is rather effectively barred from this territory by freight rates, although existing levels permit competition to a few points not ordinarily serviced by Valley furnaces. However, furnaces in that district have lost no business to Birmingham producers. Present quotations of $18.50, Valley, on foundry and basic iron and $19 on malleable and Bessemer are likely to be retained in the fourth quarter.

Prices per gross ton, f.o.b. Valley furnace:

Basic	$18.50
Bessemer	19.00
Gray forge	18.00
No. 2 foundry	18.50
No. 3 foundry	18.00
Malleable	19.00
Low phos., copper free	27.00

Freight rate to Pittsburgh or Cleveland district, $1.76.

Prices per gross ton, f.o.b. Pittsburgh district furnace:

Basic	$19.00
No. 2 foundry	19.00
No. 3 foundry	18.50
Malleable	19.50

Freight rates to points in Pittsburgh district range from 63c. to $1.13.

Semi-Finished Steel.—The smaller integrated steel companies in this and nearby districts are now beginning to replenish their stocks of semi-finished steel which were badly depleted during the spring. These same companies have also curtailed their steel production and, as a group, are not operating at more than 85 per cent of capacity. However, the Steel Corporation subsidiaries and the largest independent producers are still finding use for capacity output in their various finishing departments and are running their open-hearth furnaces and blooming and billet mills at close to theoretical capacity. Careful allocation of tonnage leaves little surplus for accumulation. Open-market transactions in billets, slabs and sheet bars are uncommon and the price on small tonnages of all three products seems definitely established at $35 a ton, Pittsburgh or Youngstown. It is conceded that considerable billet and slab contract tonnage is moving at lower figures and fourth quarter prices are a matter of conjecture. Wire rods are firm at $42, Pittsburgh and Cleveland, and shipments are holding up well for this time of the year.

Bars, Shapes and Plates.—The well sustained demand for the heavy hot-rolled products has long since ceased to be a surprise to the industry, and local offices find nothing unusual in the limited curtailment which is occurring at this time in bars and shapes. During the greater part of the year demand has been well diversified and now the only falling off in bars has been from mills serving the automobile industry. During August backlogs on bars and shapes have been drawn on to a certain extent, but at present it is difficult to get shipments in less than two or three weeks. On reinforcing bars the time must be extended to four weeks. Fabricating shops in the district are well engaged, but will again be in need of business by the end of the quarter. Present inquiry indicates that such business will be forthcoming. During the week the Pittsburgh and West Virginia Railroad took 2100 tons of shapes for viaducts on its Connellsville extension. Plate demand seems to be as strong as ever. This district is still feeling the pressure for deliveries in the Chicago area and, although little business from that territory has actually been placed with nearby mills, they have greatly extended their normal Western territory in many instances. Requirements from barge builders are heavy, and present orders on the books of these companies will keep them busy until November. The same cannot be said of railroad car builders, who will need orders by the end of the quarter if their shops are to be kept busy.

Rails and Track Supplies.—This market is very quiet, and it will be several weeks before any improvement in demand can be looked for. The Atlantic Coast Line is inquiring for 10,000 kegs of railroad spikes, but otherwise sizable inquiries for accessories are lacking.

Bolts, Nuts and Rivets.—This industry is operating at 75 per cent of capacity, although there is a growing tendency toward curtailment. Jobber demand has held up well during the summer and heavy shipments are going to fabricating shops, the barge builders and to makers of railroad equipments. The railroads themselves have also been good buyers, but demand from this source has declined seasonably in recent weeks. Prices are generally well maintained.

Wire Products.—August business in manufacturers' wire is going to show a decided improvement over the same month last year and will be ahead of the month just passed with one maker. However, specifications from jobbers are off and business has not been improved by price weakness on products going to that trade. Fencing and wire nails are quiet, with prices apparently checked at recently quoted levels.

Tubular Goods.—Steady demand for seamless and lap-weld tubing is fully sufficient to sustain operations at a rate unchanged from last week, or approximately 65 per cent of full theoretical capacity. Some makers notice a slight improvement in the movement of oil country products in the last few days, but this may be only temporary. Shipments of butt-weld pipe are rather light, but higher building operations in some parts of the country are expected to lead to a stronger demand. Specifications for mechanical and boiler tubing have been declining this month and the tendency has not yet been checked.

Sheets.—The sheet business is holding its own in spite of curtailed automobile demand. A few companies which make automobile body sheets

The Iron Age Composite Prices

Finished Steel

Aug. 27, 1929, 2.398c. a Lb.

One week ago	2.398c.
One month ago	2.412c.
One year ago	2.348c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products make 87 per cent of the United States output of finished steel.

	High		Low	
1929	2.412c.,	April 2;	2.391c.,	Jan. 8
1928	2.391c.,	Dec. 11;	2.314c.,	Jan. 3
1927	2.453c.,	Jan. 4;	2.293c.,	Oct. 25
1926	2.453c.,	Jan. 5;	2.403c.,	May 18
1925	2.560c.,	Jan. 6;	2.396c.,	Aug. 18

Pig Iron

Aug. 27, 1929, $18.25 a Gross Ton

One week ago	$18.42
One month ago	18.38
One year ago	17.34
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low	
1929	$18.71,	May 14;	$18.25,	Aug. 27
1928	18.59,	Nov. 27;	17.04,	July 24
1927	19.71,	Jan. 4;	17.54,	Nov. 1
1926	21.54,	Jan. 5;	19.46,	July 13
1925	22.50,	Jan. 13;	18.96	July 7

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base per Lb.
F.o.b. Pittsburgh mill	1.95c.
F.o.b. Chicago	2.05c.
Del'd Philadelphia	2.27c.
Del'd New York	2.29c.
Del'd Cleveland	1.92½c. to 1.95c.
F.o.b. Cleveland	1.90c. to 1.95c.
F.o.b. Lackawanna	2.05c.
F.o.b. Birmingham	2.20c.
C.i.f. Pacific ports	2.35c.
F.o.b. San Francisco mills	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills, 40, 50, 60-ft.	2.05c.
F.o.b. Pittsburgh mills, cut lengths	2.30c.
F.o.b. Birmingham, mill lengths	2.20c.

Rail Steel

F.o.b. mills, east of Chicago dist.	1.85c. to 1.90c.
F.o.b. Chicago Heights mill	1.95c.
Del'd Philadelphia	2.27c.

Iron

Common iron, f.o.b. Chicago	2.05c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	2.12c.
Common iron, del'd New York	2.14c.

Tank Plates

	Base per Lb.
F.o.b. Pittsburgh mill	1.95c.
F.o.b. Chicago	2.05c.
F.o.b. Birmingham	2.20c.
Del'd Cleveland	2.14c.
Del'd Philadelphia	2.15c.
F.o.b. Coatesville	2.05c.
F.o.b. Sparrow Point	2.05c.
F.o.b. Lackawanna	2.05c.
Del'd New York	2.22½c.
C.i.f. Pacific ports	2.35c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh mill	1.95c.
F.o.b. Chicago	2.05c.
F.o.b. Birmingham	2.20c.
F.o.b. Lackawanna	2.05c.
F.o.b. Bethlehem	2.05c.
Del'd Cleveland	2.14c.
Del'd Philadelphia	2.01c. to 2.06c.
Del'd New York	2.14½c.
C.i.f. Pacific ports	2.35c.

Hot-Rolled Hoops, Bands and Strips

	Base per Lb.
6 in. and narrower, P'gh	2.00c.
Wider than 6 in., P'gh	1.90c.
6 in. and narrower, Chicago	2.20c.
Wider than 6 in., Chicago	2.10c.
Cooperage stock, P'gh	2.20c.
Cooperage stock, Chicago	2.30c.

Cold-Finished Steel

	Base per Lb.
Bars, f.o.b. Pittsburgh mill	2.30c.
Bars, f.o.b. Chicago	2.30c.
Bars, Cleveland	2.35c.
Shafting, ground, f.o.b. mill	*2.65c. to 3.60c.
Strips, P'gh	2.75c. to 2.85c.
Strips, Cleveland	2.75c. to 2.85c.
Strips, del'd Chicago	3.05c. to 3.15c.
Strips, Worcester	2.90c. to 3.00c.
Fender stock, No. 20 gage, Pittsburgh or Cleveland	4.25c.

*According to size.

Wire Products

(Carload lots, f.o.b. Pittsburgh and Cleveland, to jobbers and retailers.)

	Base per Keg
Wire nails	$2.55 to $2.65
Galvanized nails	4.55 to 4.65
Galvanized staples	3.25 to 3.35
Polished staples	3c. to 3.10c.
Cement coated nails	$2.55 to $2.65
	Base per 100 Lb.
Bright plain wire, No. 6 to No. 9 gage	$2.40 to $2.50
Annealed fence wire	2.55 to 2.65
Spring wire	3.50 to 3.60
Galv'd wire, No. 9	3.00 to 3.10
Barbed wire, galv'd	3.20 to 3.30
Barbed wire, painted	2.95 to 3.05
Woven wire fence (per net ton to retailers)	65.00

Chicago district mill and delivered Chicago prices are $1 per ton above the foregoing. Birmingham mill prices $3 a ton higher; Worcester, Mass. (wire), mill $3 a ton higher on production of that plant; Duluth, Minn., mill $2 a ton higher; Anderson, Ind., $1 higher.

Cut Nails

	Per 100 Lb.
Carloads, Wheeling, Reading or Northumberland, Pa.	$2.70
Less carloads, Wheeling or Reading	2.80

Light Plates

No. 10, blue annealed, f.o.b. P'gh	2.10c. to 2.20c.
No. 10, blue annealed, f.o.b. Chicago dist.	2.30c.
No. 10, blue annealed, del'd Phila.	2.42c. to 2.52c.
No. 10, blue annealed, B'ham	2.35c.

Sheets

Blue Annealed

	Base per Lb.
No. 13, f.o.b. P'gh	2.25c. to 2.35c.
No. 13, f.o.b. Chicago dist.	2.45c.
No. 13, del'd Philadelphia	2.67c.
No. 13, blue annealed, B'ham	2.50c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh	2.85c.
No. 24, f.o.b. Chicago dist. mill	2.95c. to 3.00c.
No. 24, del'd Philadelphia	3.17c. to 3.27c.
No. 24, f.o.b. Birmingham	3.10c.

Metal Furniture Sheets

No. 24, f.o.b. P'gh	4.10c. to 4.20c.

Galvanized

No. 24, f.o.b. Pittsburgh	3.50c. to 3.60c.
No. 24, f.o.b. Chicago dist. mill	3.60c. to 3.70c.
No. 24, del'd Cleveland	3.59c. to 3.69c.
No. 24, del'd Philadelphia	3.92c. to 4.02c.
No. 24, f.o.b. Birmingham	3.75c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.90c. to 3.00c.
No. 28, f.o.b. Chicago dist. mill	3.00c. to 3.10c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh	4.00c. to 4.10c.

Long Ternes

No. 24, 8-lb. coating, f.o.b. mill	4.00c.

Vitreous Enameling Stock

No. 24, f.o.b. Pittsburgh	3.90c

Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills	$5.35
Standard cokes, f.o.b. Gary	5.45

Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)
(Per Package, 20 x 28 in.)

8-lb. coating I.C.	$11.20
15-lb. coating I.C.	14.00
20-lb. coating I.C.	15.30
25-lb. coating I.C.	$16.70
30-lb. coating I.C.	17.75
40-lb. coating I.C.	19.85

Alloy Steel Bars

(F.o.b. makers' mill)

Alloy Quality Bar Base, 2.65c. to 2.75c. per Lb.

S.A.E. Series Numbers		Alloy Differential
2000	(½% Nickel)	0.25
2100	(1½% Nickel)	0.55
2300	(3½% Nickel)	1.50
2500	(5% Nickel)	2.25
3100	Nickel Chromium	0.55
3200	Nickel Chromium	1.35
3300	Nickel Chromium	3.80
3400	Nickel Chromium	3.20
4100	Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50
4100	Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600	Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel)	1.05
5100	Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100	Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100	Chromium Spring Steel	0.20
6100	Chromium Vanadium Bars	1.20
6100	Chromium Vanadium Spring Steel	0.95
9250	Silicon Manganese Spring Steel (flats)	0.25
	Rounds and squares	0.50
	Chromium Nickel Vanadium	1.50
	Carbon Vanadium	0.95

Above prices are for hot rolled steel bars, forging quality. The differential for cold-drawn bars is ¾c. a lb. higher, with standard classification for cold-finished alloy steel bars applying. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis.

Billets under 4 x 4 in. carry the steel bar base. Slabs with a sectional area of 16 in. or over carry the billet price. Slabs with sectional area of less than 16 in. or less than 2½ in. thick, regardless of sectional area, take the bar price.

Rails

	Per Gross Ton
Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	36.00
Light (from rail steel), f.o.b. mill	34.00
Light (from billets), f.o.b. Ch'go mill	36.00

Track Equipment

	Base per 100 Lb.
Spikes, ⅝ in. and larger	$2.80
Spikes, ½ in. and smaller	2.80
Spikes, boat and barge	3.00
Tie plate, steel	2.15
Angle bars	$2.75
Track bolts, to steam railroads	$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel Inches	Black	Galv.	*Iron* Inches	Black	Galv.
⅛	45	19½	¼ and ⅜	+11	+36
¼ to ⅜	51	25½	½	23	5
½	56	42½	¾	28	11
¾	60	48½	1 and 1¼	31	15
1 to 3	62	50½	1½ and 2	35	18

Lap Weld

2	55	43½	2	23	9
2½ to 6	59	47½	2½ to 3½	28	13
7 and 8	56	43½	4 to 6	30	17
9 and 10	54	42½	7 and 8	29	16
11 and 12	53	40½	9 to 12	26	11

Butt Weld, extra strong, plain ends

⅛	41	24½	¼ and ⅜	+13	+48
¼ to ⅜	47	30½	½	23	7
½	53	42½	¾	28	12
¾	58	47½	1 to 2	34	18
1 to 1½	60	49½			
2 to 3	61	50½			

Lap Weld, extra strong, plain ends

2	53	42½	½	29	13
2½ to 4	57	46½	2½ to 4	34	20
4½ to 6	56	45½	4½ to 6	33	19
7 to 8	52	39½	7 and 8	31	17
9 and 10	45	32½	9 to 12	21	8
11 and 12	44	31½			

On carloads the above discounts on steel pipe are increased on block by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Steel		*Charcoal Iron*	
2 in. and 2¼ in.	40	1½ in.	1
2½ in.—2¾ in.	48	1¾ in.	8
3 in.	54	2 in.—2¼ in.	13
3¼ in.—3¾ in.	56	2½ in.—2¾ in.	16
4 in.	59	3 in.	17
4½ in. to 6 in.	48	3¼ in. to 3½ in.	18
		4 in.	20
		4½ in.	21

On lots of a carload or more, the above base discounts are subject to a preferential of two fives on steel and of 10 per cent on charcoal iron tubes. Smaller quantities are subject to the following modifications from the base discounts:

Lap Welded Steel—Under 10,000 lb., 6 points under base and one five; 10,000 lb. to carload, 4 points under base and two fives. Charcoal Iron—Under 10,000 lb., 2 points under base; 10,000 lb. to carload, base and one five.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	63	3 in.	48
1¼ to 1½ in.	55	3¼ to 3½ in.	50
1¾ in.	39	4 in.	53
2 to 2¼ in.	34	4½, 5 and 6 in.	42
2½ to 2¾ in.	42		

Hot Rolled

2 and 2¼ in.	40	3¼ to 3½ in.	56
2½ and 2¾ in.	48	4 in.	59
3 in.	54	4½, 5 and 6 in.	48

Beyond the above base discounts a preferential discount of 5 per cent is allowed on carload lots. On less than carloads to 10,000 lb., base discounts are reduced 4 points with 5 per cent preferential; on less than 10,000 lb., base discounts are reduced 6 points, with no preferential. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage take mechanical tube list and discounts. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30%, base (carloads)	55
Carbon, 0.30% to 0.40%, base	50

Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

principally are rapidly reducing their backlogs, but others report specifications fully equal to July and almost sufficient to maintain the present high operating rate. The leading interest has scheduled its mills again this week at slightly under 100 per cent of capacity and has enough tonnage in the aggregate on its books to assure a high operating rate for about two months. Insistent pressure for deliveries is still being encountered frequently, and even on galvanized sheets, on which price competition is the keenest, delivery promises average about four weeks. Prices show little change. Talk of advances by leading independents has not materialized. Fourth quarter business on black sheets has been closed at 2.85c., Pittsburgh, although no producer has officially opened its books for that period. On current business, concessions from this figure have practically disappeared and blue annealed sheets seem to be steady at 2.35c., Pittsburgh, for the No. 13 gage. Occasional shading on light plates where wide strip competition is encountered is reported. On galvanized sheets, price conditions are still rather chaotic, although some makers continue to adhere to a 3.60c. price. A large part of current tonnages is being taken at figures about $2 under this. Automobile body sheets are being sold at 4c. to 4.10c., and metal furniture sheets at 4.10c. to 4.20c., Pittsburgh, with demand for the latter exceedingly strong.

Tin Plate.—Mill operations continue to decline, and, although the leading interest operated last week at between 85 and 90 per cent of capacity, the average for the industry was considerably lower. The larger independents report operating rates of from 50 to 75 per cent, and the lightness of specifications coming in just now promises little improvement for at least a month. By that time advance business for the coming season will begin to come out and mills will soon begin rolling on tonnage for the next year. Crop conditions are not promising, and the California fruit pack is no larger than was predicted.

Strip Steel.—Strip demand has declined to the point where sharp curtailment in mill operations can no longer be avoided, and practically all of the leading makers began the present week with reduced schedules. This condition is not expected to last much longer than the middle of September, when heavier requirements are expected from the automotive industry. August specifications for hot-rolled strip are expected to fall at least 25 per cent behind July and cold-rolled tonnage will also show a decline, although less pronounced. Some mills still have enough tonnage of the latter material on their books to last for three or four weeks. In the face of reduced demand prices are holding extraordinarily well. On hot-rolled material, no deviations from the full quoted schedules have been reported and cold-rolled is now well established at 2.75c. to 2.85c., Pittsburgh or Cleveland.

Coal and Coke.—With demand for furnace coke declining much more rapidly than production, prices have weakened, and this grade is now quotable at $2.65 to $2.75, Connellsville, a decline of 10c. a ton from recent minimums. At least 2500 ovens are still running in the coke region. This price weakness is expected to be only temporary, as demand is bound to improve in the fall and producers would be unwilling to make future commitments at the above figures. Foundry coke is not quotably weaker, although the market is very dull. The premium grades are not affected by the present weakness, although reduced shipments are also reported by makers of these brands. Coal prices show no tendency to become stabilized, although domestic demand is improving seasonably.

Old Material.—Sales to mills during the week have been negligible and such transactions as are reported do not justify any changes in the quotable market on No. 1 heavy melting steel. One mill in the district is reported to have bought at $18.50 but other small sales of first grade material have commanded as high as $19.25 and $19.50. Hydraulic compressed sheets are still very scarce in this district and sales are lacking. Dealers have been able to buy this material in the Pittsburgh district at $18.25 and less, and the market is now quoted at $18.25 to $18.75. Machine shop and short shoveling steel turnings are still bringing a good price from dealers who are covering on recent high priced sales, and small tonnages of steel turnings were sold during the week at $14. Machine shop turnings are quotable at $12.75 to $13.25 and are unchanged from the previous week. They were erroneously shown in this column last week at a price $1 a ton under this figure. The scrap market in general is awaiting the trend of steel operations, and will probably turn definitely either upward or downward after Labor Day. If there is any tendency at present, it is in the direction of weakness, and this trend will probably show itself in the bids on the Pennsylvania Railroad list, which are to be opened on Sept. 4. The list is an unusually large one, containing a total of 70,000 tons, of which 10,000 tons is No. 1 heavy melting steel and 13,400 tons rails.

Warehouse Prices, fo.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.25c.
Hoops	4.25c.
Black sheets (No. 24), 25 or more bundles	3.80c.
Galv. sheets (No. 24), 25 or more bundles	4.55c.
Light plates, blue ann'l'd (No. 10), 1 to 10 plates	3.45c.
Blue annealed sheets (No. 13), 1 to 10 sheets	3.60c.
Galv. corrug. sheets (No. 28), per square	$4.43
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count,	60 per cent off list
Machine bolts, 100 count,	60 per cent off list
Carriage bolts, 100 count,	60 per cent off list
Nuts, all styles, 100 count,	60 per cent off list
Large rivets, base per 100 lb.	$3.50
Wire, black soft, ann'l'd, base per 100 lb.	$3.00 to 3.10
Wire, galv. soft, base per 100 lb.	3.00 to 3.10
Common wire nails, per keg	2.90 to 3.00
Cement coated nails, per keg	3.05

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$18.50 to $19.50
No. 2 heavy melting steel	16.50 to 17.00
Scrap rails	18.00 to 18.50
Compressed sheet steel	18.25 to 18.75
Bundled sheets, sides and ends	17.00 to 17.50
Cast iron carwheels	16.50 to 17.00
Sheet bar crops, ordinary	20.00 to 20.50
Heavy breakable cast	13.00 to 13.50
No. 2 railroad wrought	19.00 to 19.50
Hvy. steel axle turnings	16.50 to 17.00
Machine shop turnings	12.75 to 13.25
Acid Open-Hearth Grades:	
Railr. knuckles and couplers	21.75 to 22.25
Railr. coil and leaf springs	21.75 to 22.25
Rolled steel wheels	21.75 to 22.25
Low phos. billet and bloom ends	22.50 to 23.00
Low phos., mill plates	22.50 to 23.00
Low phos., light grades	20.50 to 21.50
Low phos., sheet bar crops	20.50 to 21.50
Heavy steel axle turnings	16.50 to 17.00
Electric Furnace Grades:	
Low phos., punchings	20.00 to 21.00
Hvy. steel axle turnings	16.50 to 17.00
Blast Furnace Grades:	
Short shoveling steel turnings	13.50 to 14.00
Short mixed borings and turnings	12.50 to 13.00
Cast iron borings	12.50 to 13.00
Rolling Mill Grades:	
Steel car axles	21.50 to 22.00
Cupola Grades:	
No. 1 cast	15.00 to 16.00
Rails 3 ft. and under	20.00 to 21.00

Sales Prices of Ingot Brass in August

CHICAGO, Aug. 27.—The Non-Ferrous Ingot Metal Institute reports the average prices per pound received by its membership on commercial grades of the six principal mixtures of ingot brass during the 28-day period ended Aug. 16, as listed below. As there are, as yet, no generally accepted specifications for ingot brass, it must be understood that each item is a compilation representing numerous sales of metal known to the trade by the designation shown, but each item, in reality, includes many variations in formulae. Until the program of standardizing the principal specifications, now progressing in cooperation with the American Society for Testing Materials, is completed, the following specifications will be understood to refer to "commercial grades."

	C. per Lb.
Commercial 80-10-10 (1 per cent impurities)	17.011
Commercial 78 per cent metal	15.094
Commercial 81 per cent metal	15.386
Commercial 83 per cent metal	15.826
Commercial 85-5-5-5 metal	15.897
Commercial No. 1 yellow brass ingot	12.882

The Swedish Iron & Steel Corporation, 64 Rutledge Street, Brooklyn, N. Y., has removed its general offices to 17 Battery Place, New York.

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and under 10 in., Pittsburgh	$35.00
Rerolling, 4-in. and under 10 in., Youngstown	35.00
Rerolling, 4-in. and under 10 in., Cleveland	35.00
Rerolling, 4-in. and under 10 in., Chicago	37.00
Forging quality, Pittsburgh	$40.00 to 41.00

Sheet Bars

(Open Hearth or Bessemer)

	Per Gross Ton
Pittsburgh	$35.00
Youngstown	35.00
Cleveland	35.00

Slabs

(8 in. x 2 in. and under 10 in. x 10 in.)

	Per Gross Ton
Pittsburgh	$35.00
Youngstown	35.00
Cleveland	35.00

Skelp

(F.o.b. Pittsburgh or Youngstown)

	Per Lb.
Grooved	1.85c. to 1.90c.
Universal	1.85c. to 1.90c.
Sheared	1.85c. to 1.90c.

Wire Rods

(Common soft, base)

	Per Gross Ton
Pittsburgh	$42.00
Cleveland	42.00
Chicago	43.00

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.80
Old range non-Bessemer, 51.50% iron	4.65
Mesabi Bessemer, 51.50% iron	4.65
Mesabi non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.40

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algerian	12.00c.
Iron ore, low phos., Swedish, average 68% iron	12.50c.
Iron ore, basis Swedish, average 65% iron	11.00c.
Manganese ore, washed, 52% manganese, from the Caucasus	32.00c. to 33.00c.
Manganese ore, Brazilian, African or Indian, basic 50%	33.00c.
Tungsten ore, high grade, per unit, in 60% concentrates	$16.25 to $16.50

	Per Gross Ton
Chrome ore, 45 to 50% Cr_2O_3, crude, c.i.f. Atlantic seaboard	$22.00 to $24.00

	Per Lb.
Molybdenum ore, 85% concentrates of MoS_2, delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$2.65 to $2.75
Foundry, f.o.b. Connellsville prompt	$3.75 to 4.75
Foundry, by-product, Ch'go ovens	8.00
Foundry, by-product, New England, del'd	11.00
Foundry, by-product, Newark or Jersey City, delivered	9.00 to 9.40
Foundry, by-product, Phila.	9.00
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry by-prod., del'd St. Louis	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.25 to $1.75
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, ¾-in. f.o.b. Pa. mines	1.90 to 2.00
Mine run gas coal, f.o.b. Pa. mines	1.65 to 1.75
Steam slack, f.o.b. W. Pa. mines	80c. to 90c.
Gas slack, f.o.b. W. Pa. mines	1.00 to 1.10

Ferromanganese

	Per Gross Ton
Domestic, 80%, seaboard	$105.00
Foreign, 80%, Atlantic or Gulf port, duty paid	105.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$31.00 to $34.00
Domestic, 16 to 19%	29.00 to 32.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$83.50
75%	130.00

	Per Gross Ton Furnace		*Per Gross Ton Furnace*
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	45.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		*Per Gross Ton*
10%	$30.00	12%	$34.00
11%	32.00		

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		*Per Gross Ton*
6%	$23.00	10%	$27.00 to $28.00
7%	24.00	11%	29.00 to 30.00
8%	25.00	12%	31.00 to 32.00
9%	26.00		

Other Ferroalloys

Ferrotungsten, per lb. contained metal del'd	$1.40 to $1.50
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.15 to $3.65
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	$160.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton	$91.00
Ferrophosphorus, electric 24%, f.o.b. Anniston, Ala., per gross ton	$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silicon, gravel, f.o.b. Illinois and Kentucky mines	$18.00
No. 2 lump, Illinois and Kentucky mines	20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	$18.25 to $18.75
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines	32.50

Fire Clay Brick

	Per 1000 f.o.b. Works	
	High-Heat Duty Brick	Intermediate Heavy Duty Brick
Pennsylvania	$43.00 to $46.00	$35.00 to $38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	.....
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00
Standard size	45.00

Chrome Brick

	Per Net Ton
Standard size	$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts, blank or tapped, hexagons	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	7.00c. to 6.75c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled thread up to and including ⅛ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagons nuts	70
Semi-finished hexagons castellated nuts, S.A.E.	70
Stove bolts in packages, P'gh	75, 20, 10 and 5
Stove bolts in packages, Chicago	75, 20, 10 and 5
Stove bolts in packages, Cleveland	75, 20, 10 and 5
Stove bolts in bulk, P'gh	75, 20, 10, 5 and 2½
Stove bolts in bulk, Chicago	75, 20, 10, 5 and 2½
Stove bolts in bulk, Cleveland	75, 20, 10, 5 and 2½
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55, 60 per cent apply.

Large Rivets

(½-In. and Larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$3.10
F.o.b. Chicago	3.20

Small Rivets

(7/16-In. and Smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70 and 10
F.o.b. Cleveland	70 and 10
F.o.b. Chicago	70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10 and 5
Milled standard set screws, case hardened	80 and 5
Milled headless set screws, cut thread	75 and 10
Upset hex. head cap screws, U.S.S. thread	85
Upset hex. cap screws, S.A.E. thread	85
Upset set screws	80, 10 and 5
Milled studs	70

Chicago

Production at Near-Capacity Rate, But Bookings Continue to Taper—10,000 Tons Southern Iron Bought

CHICAGO, Aug. 27.—Steel ingot production in this district remains at a near-capacity rate, but it is headed for a definite recession. The extent of the decline cannot be predicted because it will depend in part upon unknown quantities.

Opinions vary widely as to prospects in the automobile industry. Motor car output is believed to have increased slightly in August and will probably show a further gain next month. However, some well informed observers expect the September total to be the highest of any of the remaining months of the year. Another period of reduced activity in the final quarter would be in keeping with the belief that a recession is due to compensate for the extraordinary output of the first half of the year. It would also be in line with performance in previous years.

A fall rail buying movement is sure and there are indications that it may set in earlier than usual. The volume of railroad equipment business that will come out, on the other hand, is still uncertain. The Santa Fe, Illinois Central, Rock Island and Burlington are mentioned as probable buyers of large numbers of cars, but no definite information regarding such programs has yet been given out by the railroads themselves. Even if large equipment orders were placed at the present time, a number of important Western car shops would still face shutdowns of two to three months, since it takes that long to assemble materials. In fact, any cars placed in September will be for first-quarter delivery. The only cars actually pending in this market are 1000 for the St. Paul, 550 for the Central of Georgia and 400 for the Pacific Fruit Express. Figures have gone in on the cars for the last two roads, so that orders may be placed in a week or two.

Among the other large outlets for steel, the Milwaukee fabricator of pipe continues to take large quantities, although no additional pipe line business has been reported for some time.

Prospects in structural steel are regarded bright, but at current writing fabricators are estimating on very little work.

Farm equipment plants are still busy, although they have experienced a setback, described by some as a seasonal lull. A year ago they operated through the summer with virtually no curtailment of schedules. Business in combines has not been up to expectations and bookings in some types of tractors have declined. Among the reasons given for the recession in farm equipment business are the severe drought in Canada and the American Northwest and a cloudburst in Kansas. In the one case the crop yield was sharply reduced and in the other crops were destroyed.

Mill bookings continue to taper and deliveries are shortening. Books have not yet been opened for fourth quarter, except on cold-rolled strip, and there is little talk of changes in prices. Some producers will take advantage of the two days over Sunday and Labor Day to make impera-

tive repairs on mill motors, postponed from July 4.

Pig Iron.—Sales of Southern iron in this district during the week totaled more than 10,000 tons. An Illinois sewing machine manufacturer bought 2000 tons and three Michigan stove companies closed for 7300 tons. One prominent Alabama producer has withdrawn from the market, but at least two others are still quoting $12.50, base, Birmingham, on foundry iron, and in at least one instance differentials in the higher silicon ranges have been waived. An inquiry for 1500 tons from a Wisconsin farm equipment maker is about to be closed. Prices on Northern iron are unchanged. Local furnaces have good backlogs and are booking a fair amount of fourth-quarter business. They are also receiving numerous orders for fill-in tonnages for the remainder of this quarter. The amount of spot business is testimony to the continued caution of users. There has been no overbuying and foundry stocks have been consistently at low level. Melt is well sustained and in some directions, notably among automotive foundries, shows signs of expanding. Shipments from Chicago furnaces in August are expected to show a slight gain over those of July, with the likelihood that they will equal those of June. The Iroquois and Federal furnaces now being repaired will be ready to relight soon. There is also the possibility of some local steel works pig iron reaching the market in September. Steel works blast furnaces have had little or no surplus iron thus far this year.

Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	$20.00
N'th'n No. 1 fdy., sil. 2.25 to 2.75	20.50
Malleable, not over 2.25 sil.	20.00
High phosphorus	20.00
Lake Super. charcoal, sil. 1.50	27.04
So'th'n No. 2 fdy. (all rail)	$18.51 to 19.01
Low phos., sil. 1 to 2, copper free	29.50
Silvery, sil. 8 per cent	29.79
Bess. ferrosilicon, 14-15 per cent	46.29

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Ferroalloys.—Activity is confined to spot sales of small lots. The trade is speculating on the effect that the proposed reduction in duty on ferromanganese, as recommended by the Senate Committee on Finance, will have on prices.

Prices delivered Chicago: 80 per cent ferromanganese, $112.56; 50 per cent ferrosilicon, $83.50 to $88.50; spiegeleisen, 19 to 21 per cent, $39.76 to $41.76.

Semi-Finished Steel.—While the leading interest has little semi-finished steel to offer in view of the large aggregate requirements of its own mills and its affiliated companies, material can be obtained without much difficulty from other producers. Moreover, some interests that recently scoured the open market for extra requirements are now piling steel from their own mills.

Warehouse Business.—Demand has declined no more than was to be expected at this time of month and at this season of the year. Business is still much better than that of twelve months ago.

Plates.—Deliveries continue to improve, though they still range from four to 10 weeks. Activity in railroad equipment is still at low ebb, but predictions are freely made that 10,000 to 12,000 cars will come into the market between now and Oct. 15. Demand for oil storage tanks has declined. Awards for the week total 2500 tons and new inquiries call for about the same tonnage. Mill prices on plates are unchanged at 2.05c., Chicago.

Sheets.—Specifications have shown some improvement. Deliveries range from four to five weeks and mill output from 80 to 85 per cent. Prices on blue annealed are holding, but weakness persists in galvanized.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 3c. to 3.05c.; No. 24 galv., 3.65c. to 3.75c.; No. 10 blue ann'l'd, 2.35c. Deliv'd prices at other Western points are equal to the freight from Gary, plus the mill prices, which are 5c. per 100 lb. lower than Chicago delivered prices.

Bolts, Nuts and Rivets.—Specifications for bolts and nuts are in keeping with the seasonal lull in the farm equipment industry. Releases first showed a drop in July, although specifications for that month still proved 15 per cent higher than in July, 1928. Specifications in August have shown a further decline, but have been virtually equal to those of the corresponding month last year. Current business is sufficient to justify operations of 65 to 75 per cent in Western bolt and nut plants, although some companies are able to run at a higher rate by building up depleted stocks. For mill prices see page 565.

Bars.—Diminishing backlogs are reflected in easier deliveries, which range from four to six weeks for one local mill to three to four weeks for others. Farm equipment plants are not taking as much steel as 90 days ago, but on the whole are still very busy. The falling off in tractor production has been confined mainly to the large models, output of small tractors remaining heavy. The recession in activity is ascribed to the drought in Canada and the American Northwest. Mill prices on soft steel

bars are unchanged at 2.05c., Chicago. Demand for alloy steel bars is in keeping with conditions in the automobile industry. Reports received here indicate that motor car output may show appreciable recovery after the middle of September. Specifications for rail steel bars from the farm equipment makers have tapered somewhat, but releases from bed companies show no decline. One prominent bed maker expects his last half output to show a gain of 33 to 50 per cent over that for the first six months of 1929.

Rails and Track Supplies.—One local rail mill has virtually disposed of its obligations, but the other is still operating at 75 per cent and, following recent additions to existing contracts, will probably maintain that rate until October. The railroads are preparing their budgets earlier this year and there are some indications, possibly because of unavoidable delays in deliveries during the current year, that the fall buying movement will get under way sooner than usual. In certain quarters it is believed that inquiries for 20,000 tons of rails for shipment this year will come out before Sept. 15. The customary run of specifications in track supplies has been augmented by tonnages supplementing recent additions to rail contracts. Light rails are inactive.

Prices f.o.b. mill, per gross ton: Standard section open-hearth and Bess. rails, $43; light rails, rolled from billets, $36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.15c.; angle bars, 2.75c.

Structural Material. — There has been further shortening of deliveries on plain material, with one mill offering shipments in three to four weeks and another in three to seven weeks. Construction prospects, however, are regarded as promising. Bridge work and industrial plant projects are a feature of current and pending activity. One of the rapidly growing new outlets for fabricated steel is the commercial airport. Five hangars taking an average of 1000 tons apiece have been placed in various parts of the country within the past 60 days. In the past week the Wayne County airport hanger, near Detroit, 1100 tons, was awarded to the R. C. Mahon Co. Fabricators in this district are short of work and bids on current jobs are highly competitive. Mill prices on plain material remain at 2.05c., Chicago.

Mill prices on plain material, per lb.: 2.05c. base, Chicago.

Reinforcing Bars.—A few large individual tonnages have been placed recently, but business in the aggregate shows no improvement and bending shop operations continue to range from 60 to 70 per cent of capacity. With the approach of fall, however, the desirability of getting projects under way before winter is becoming a factor, and the trade expects the next six weeks to be more active than any corresponding period so far this year. Prices are still flexible. The Kalman Steel Co. will supply 1000 tons for a Barrington, Ill., building of the Jewel Tea Co.

Cast Iron Pipe.—Aside from a fair run of business from contracts and scattered orders from public utilities, the market is quiet. Municipal buying remains light. Royal Oak, Mich., has awarded 450 tons of 6 and 8-in. pipe to the Lynchburg Foundry Co. Dearborn Township, Mich., has placed 30,000 ft. of 6 and 8-in. with the American Cast Iron Pipe Co. New Haven, Mo., has let 150 tons of 4, 6 and 8-in. to the McWane Cast Iron Pipe Co.

Prices per net ton, del'd Chicago: Water pipe, 6-in. and over, $45.20 to $46.20; 4-in., $49.20 to $50.20; Class A and gas pipe, $3 extra.

Cold-Rolled Strip.—Demand from the automobile industry has shown no particular improvement, possibly because of stocks still in the hands of consumers, but motor car production is increasing and for the month of August will show a gain over July. The August output of the Ford Motor Co. is expected to reach 200,000 vehicles, a gain of 25,000 over the July total. Production of the Chevrolet Motor Co. has declined and for the month may not exceed 110,000 cars, compared with nearly 138,000 in July. This company expects to produce an average of 100,000 cars monthly during the rest of the year, which will bring the total output for the first year of its six-cylinder model to 1,400,000. This figure will surpass that for the first twelve months' production of the present Ford model. The leading producer of cold-rolled strip has opened books for the fourth quarter at 2.75c. to 2.85c., Cleveland or Pittsburgh, or 3.05c. to 3.15c., delivered Chicago, the prices now ruling.

Wire Products.—Jobbers' specifications have increased somewhat, but the current volume of business is still considerably below that of a year ago. Mills have not yet opened books for fourth quarter. Production remains at 65 per cent of capacity. Mill prices, which have shown no significant change, are printed on page 565.

Hot-Rolled Strip.—Mill operations have dropped materially in the last few weeks in accord with the recent decline in automobile production. Mill capacity in this district will be expanded by the construction of a new mill at Gary, now under way, and the revamping of the other mills at that plant.

Old Material. — The week has brought out no further important consumer purchases of basic open-hearth grades. The failure of the market to advance to $16 or higher on the mill orders for heavy melting steel placed a week ago was a surprise, in view of high prices recently paid by dealers, but there is no doubt that steel companies have become less concerned about supplies because of probable curtailment in their open-hearth operations next month. Other grades continue to show evidences of strength, with aggregate demand still large and prices firm or rising. The St. Paul took bids on 5000 tons yesterday.

Prices deliv'd Chicago district consumers:

Per Gross Ton

Basic Open-Hearth Grades:	
Heavy melting steel	$15.25 to $15.75
Shoveling steel	15.25 to 15.75
Frogs, switches and guards, cut apart, and misc. rails	16.75 to 17.25
Hydraul. compressed sheets	13.75 to 14.25
Drop forge flashings	10.75 to 11.25
No. 1 busheling	13.25 to 13.75
Forg'd cast and r'l'd steel carwheels	18.75 to 19.25
Railroad tires, charg. box size	18.75 to 19.25
Railroad leaf springs cut apart	18.75 to 19.25
Acid Open-Hearth Grades:	
Steel couplers and knuckles	17.00 to 17.50
Coil springs	19.00 to 19.50
Electric Furnace Grades:	
Axle turnings	14.50 to 15.00
Low phos. punchings	17.00 to 17.50
Low phos. plates, 12 in. and under	17.00 to 17.50
Blast Furnace Grades:	
Axle turnings	13.00 to 13.50
Cast iron borings	10.50 to 11.00
Short shoveling turnings	10.50 to 11.00
Machine shop turnings	7.50 to 8.00
Rolling Mill Grades:	
Iron rails	16.00 to 16.50
Rerolling rails	18.00 to 18.50
Cupola Grades:	
Steel rails less than 3 ft.	17.50 to 18.50
Steel rails less than 2 ft.	20.00 to 20.50
Angle bars, steel	17.00 to 17.50
Cast iron carwheels	14.00 to 14.50
Malleable Grades:	
Railroad	17.00 to 17.50
Agricultural	15.50 to 16.00
Miscellaneous:	
*Relaying rails, 56 to 60 lb.	23.00 to 25.00
*Relaying rails, 65 lb. and heav.	26.00 to 31.00

Per Net Ton

Rolling Mill Grades:	
Iron angle and splice bars	15.00 to 15.50
Iron arch bars and transoms	21.50 to 22.00
Iron car axles	26.50 to 27.00
Steel car axles	17.50 to 18.00
No. 1 railroad wrought	14.00 to 14.50
No. 2 railroad wrought	13.75 to 14.25
No. 1 busheling	9.00 to 9.50
No. 2 busheling	7.00 to 7.50
Locomotive tires, smooth	14.50 to 15.00
Pipes and flues	10.00 to 10.50
Cupola Grades:	
No. 1 machinery cast	14.50 to 15.00
No. 1 railroad cast	14.00 to 14.50
No. 1 agricultural cast	13.25 to 13.75
Stove plates	12.25 to 12.75
Grate bars	11.75 to 12.25
Brake shoes	11.50 to 12.00

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars	3.00c.
Reinforc'g bars, billet steel	2.15c. to 2.35c.
Reinforc'g bars, rail steel	1.85c. to 1.95c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Bands (⅝ in. in Nos. 10 and 12 gages)	3.20c.
Hoops (No. 14 gage and lighter)	3.75c.
Black sheets (No. 24)	4.05c.
Galv. sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.35c.
Spikes, ⅝ in. and larger	3.55c.
Track bolts	4.55c.
Rivets, structural	4.00c.
Rivets, boiler	4.00c.

	Per Cent Off List
Machine bolts	60
Carriage bolts	60
Coach or lag screws	60
Hot-pressed nuts, sq., tap. or blank	60
Hot-pressed nuts, hex., tap. or blank	60
No. 8 black ann'l'd wire, per 100 lb.	$3.45
Com. wire nails, base per keg	3.20
Cement c't'd nails, base per keg	3.20

New York

Pig Iron Sales Gain with Southern Sellers Extending Activity—August Steel Buying Below That of July

NEW YORK, Aug. 27.—Sales of pig iron in the past week showed a considerable increase, with a total in excess of 17,000 tons. Some sizable single orders included about 1000 tons for a New Jersey consumer, placed with a northern New York producer, but most of the 17,000 tons was made up of small lots, some for third quarter, but largely for last quarter delivery. Consumers' stocks of foundry iron are not heavy, and some of the present buying is attributed to the activity of Southern sellers offering the foundry grade at $13 to $13.50 a ton, Birmingham, which stimulates consumers to obtain comparative prices from their usual sources of supply and results often in an order for a small tonnage of either Northern or Southern iron. Of the total business in the past week, it is estimated that about 3000 tons was sold by Southern furnaces. Northern producers have good backlogs on their books, but competition from the South makes the price situation somewhat irregular. In one instance, a Birmingham furnace quoted $20 a ton, delivered to northern New Jersey, for No. 1X foundry iron. Buffalo sellers are quoting $18 a ton, furnace, for foundry iron, but $17.50 a ton is still obtainable by buyers when a sizable tonnage is involved, or there is competition from Southern iron. Eastern Pennsylvania producers occasionally meet this competition. Southern sellers are quoting $13 to $13.50 a ton for foundry grade. Recent inquiries include 4,000 to 5,000 tons of various grades of foundry iron and 180 tons of low phosphorus iron for plants of the General Electric Co. Manning, Maxwell & Moore, Inc., New York, is in the market for 150 tons of foundry iron for Fitchburg, Mass. No. 2 furnace at Port Henry, N. Y., went out of blast Aug. 21 for relining, but will be blown in early in October.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	$22.41 to $22.91
*Buf. No. 2, del'd east. N. J.	20.78 to 21.28
East, Pa. No. 2 fdy., sil. 1.75 to 2.25	20.39 to 21.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	20.89 to 22.02

Freight rates: $4.91 from Buffalo, $1.39 to $2.52 from eastern Pennsylvania.
*Prices delivered to New Jersey cities having rate of $3.28 a ton from Buffalo.

Warehouse Business.—Buying from stock has been light in the past week and not much improvement is expected until after Labor Day. Black and galvanized sheet prices are still subject to concessions of $1 to $2 a ton, and blue annealed sheet prices are also shaded. Structural material is not being bought at present, but fall buying is expected early next month.

Cast Iron Pipe.—Business is in most cases limited to small lots for private buyers, with some municipal orders pending. Bids have been opened by the Department of Water Supply, Gas and Electricity, New York, on contracts requiring about 1100 tons of 20-in. and 24-in. water pipe. Ogdensburg, N. Y., will open bids Aug. 28 on 75 tons of 3-in. to 12-in. pipe and fittings, and Montclair, N. J., has opened bids on 35 tons of 6-in., Class B pipe. At the recent opening of bids on 150 tons of Class C, 6-in. pipe by Bloomfield, N. J., the low bid was $34.50 a net ton, delivered, quoted by R. D. Wood & Co., Florence, N. J.

Prices per net ton deliv'd New York: Water pipe, 6-in. and larger, $33.60 to $34.60; 4-in. and 5-in., $36.60 to $37.60; 3-in., $43.60 to $44.60. Class A and gas pipe, $3 extra.

Reinforcing Bars. — The Kalman Steel Co. has been awarded 450 tons of bars for an industrial plant at Rensselaer, N. Y. The Taylor-Davis Co. will supply 1200 tons for a hosiery factory at Philadelphia. Bids are being taken on about 1500 tons of bars for a Pennsylvania Railroad warehouse in Jersey City. The volume of work ranging from 100 tons downward continues plentiful. Quotations are firm and unchanged.

Billet steel reinforcing bars in 40, 50 and 60-ft. lengths, 2.05c. per lb., Pittsburgh, and 2.30c. per lb., Pittsburgh warehouse, for cut lengths. Out of New York warehouse, 2.90c. per lb. for lots of 5 tons or more, 3.05c. for lots of 2 to 5 tons and 3.30c. for less than 2 tons, all delivered at job.

Finished Steel.—From the standpoint of fresh bookings, August has failed to keep pace with July, and in some cases the recession has been of considerable proportions. Sales of bars, shapes and plates have consisted mostly of small tonnages to companies in widely diversified manufacturing lines. The quietness in the market is attributed partly to the effects of the vacation season. Prices are steady and there are no indications of a change in the immediate future. Sellers are of the opinion that the volume of business will turn upward early in September. Lessened activity is noted in structural steel, but the amount of pending work is large. The most important award of the week was 1700 tons for a highway bridge in New Jersey. A commissary building on 161st Street, New York, for the New York Central Railroad will require 3000 tons of steel. The placing of 13,200 tons for a subway section in Queens is not expected until after Sept. 9. District offices of sheet steel makers report a slight gain in specifications and orders. Substantial tonnages of galvanized sheets for roofing purposes have been sold in the South, and the roofing season in that district has been fully up to normal. Prices have not changed, with galvanized stock selling at 3.50c., Pittsburgh, black at 2.85c. and blue annealed at 2.35c. for No. 13 gage. Quotations of wire goods have continued rather soft. Mills are understood to be taking

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.30c.
Soft steel bars, small shapes	3.25c.
Iron bars	3.24c.
Iron bars, Swed. charcoal	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Cold-roll. strip, soft and quarter hard	5.15c. to 5.40c.
Hoops	4.25c.
Bands	3.75c.
Blue ann'l'd sheets (No. 10)	3.85c. to 3.90c.
Long terne sheets (No. 24)	5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galv. annealed	5.15c.
Tire steel, 1½ x ½ in. and larger	3.30c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.65c.
Open-hearth spring steel, bases,	4.50c. to 7.00c.

	Per Cent Off List
Machine bolts, cut thread:	
¾ x 6 in. and smaller	60
1 x 30 in. and smaller	50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	60
¾ x 20 in. and smaller	50 to 50 and 10
Coach screws:	
½ x 6 in. and smaller	60
1 x 6 in. and smaller	50 to 50 and 10

	Per 100 Ft.
Boiler Tubes—	
Lap welded, 2-in.	$17.33
Seamless steel, 2-in.	20.24
Charcoal iron, 2-in.	25.00
Charcoal iron, 4-in.	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
½-in. butt	46	29
¾-in. butt	51	37
1-3-in. butt	53	39
2½-6-in. lap	48	35
7 and 8-in. lap	44	17
11 and 12-in. lap	37	12
Wrought Iron—		
½-in. butt	5	+19
¾-in. butt	11	+ 9
1-1½-in. butt	14	+ 6
2-in. lap	5	+14
3-6-in. lap	11	+ 6
7-12-in. lap	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box	$6.45	$6.20
Charcoal, per Box—	A	AAA
IC	$9.70	$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating	$10.00 to $11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets, Box Annealed—Black, C. R. One Pass

	Per Lb.
Nos. 18 to 20	3.80c.
No. 22	3.95c.
No. 24	4.00c.
No. 26	4.10c.
No. 28*	4.25c.
No. 30	4.50c.

Sheets, Galvanized

	Per Lb.
No. 14	4.40c.
No. 16	4.25c.
No. 18	4.40c.
No. 20	4.50c.
No. 22	4.60c.
No. 24	4.75c.
No. 26	5.00c.
No. 28*	5.25c.
No. 30	5.65c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

orders for common wire nails at $2.55 a keg, Pittsburgh, or lower, and for plain wire at $2.40 a 100 lb., Pittsburgh.

Mill prices per lb., deliv'd New York: Soft steel bars, 2.29c.; plates, 2.22½c.; structural shapes, 2.19½c.; bar iron, 2.14c.

Coke.—Standard furnace coke is inactive and the price is unchanged at $2.75 to $2.85 per net ton, Connellsville. Special brands of beehive foundry coke are quoted at $4.85 per net ton, ovens, or $8.56 a net ton, delivered to northern New Jersey, Jersey City and Newark, and $9.44 to New York and Brooklyn. By-product coke is quoted at $9 to $9.40 a net ton, Newark or Jersey City, and $10.06, New York or Brooklyn.

Old Material.—A large eastern Pennsylvania consumer has closed on about 25,000 tons of No. 1 heavy melting steel at $16.50 a ton, delivered, the same price as was paid by this consumer on its last previous purchase. Brokers are paying $16 to $16.50 a ton, delivered eastern Pennsylvania for No. 1 steel, the price depending upon the shipment. A shortage of good No. 2 heavy melting steel is reported by some brokers shipping to eastern Pennsylvania, but this is attributed to the increased tonnage of this grade being shipped to the consumer at Bethlehem, which accepts No. 2 steel at $1.50 to $2 a ton less than the price for No. 1 heavy melting steel.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel	$12.75 to $13.35
Heavy melting steel (yard)	8.00 to 9.75
No. 1 hvy. breakable cast.	10.75 to 11.75
Stove plate (steel works).	8.00 to 8.25
Locomotive grate bars....	8.25 to 8.75
Machine shop turnings....	7.75 to 8.00
Short shoveling turnings..	8.00 to 9.00
Cast borings (blast furn. or steel works).....	7.00 to 7.75
Mixed borings and turnings	6.75 to 7.75
Steel car axles	19.50 to 20.00
Iron car axles	24.00 to 25.00
Iron and steel pipe (1 in. dia., not under 2 ft. long)	10.75
Forge fire	9.75 to 10.25
No. 1 railroad wrought...	12.00 to 12.50
No. 1 yard wrought, long..	11.00 to 11.50
Rails for rolling.....	13.25 to 13.75
Cast iron carwheels.....	12.50 to 13.00
Stove plate (foundry).....	8.00 to 8.50
Malleable cast (railroad).	14.00 to 14.50
Cast borings (chemical)..	10.00 to 10.50

Prices per gross ton, deliv'd local foundries:

No. 1 machry. cast.....	$17.00
No. 1 hvy. cast (columns, bldg. materials, etc.), cupola size.....	15.00
No. 2 cast (radiators, cast boilers, etc.)	14.50

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and struc. shapes.....	3.00c.
Soft steel bars	3.00c.
Reinforc. steel bars.....	2.25c. to 2.50c.
Cold-fin. rounds and hex.....	3.65c.
Cold-fin. flats and sq.....	4.15c.
Hoops and bands, No. 12 to ¼ in., inclusive	3.25c.
Hoops and bands, No. 13 and lighter	3.65c.
Cold-finished strip.....	*5.95c.
Black sheets (No. 24).....	3.70c. to 3.90c.
Galvanized sheets (No. 24).	4.60c. to 4.75c.
Blue ann'l'd sheets (No. 10).....	3.25c.
No. 9 ann'l'd wire, per 100 lb.....	$2.90
No. 9 gal. wire, per 100 lb.....	3.35
Com. wire nails, base per keg.....	2.90

*Net base, including boxing and cutting to length.

Cleveland

Prompt Deliveries of Steel Possible and Backlogs Being Reduced—Steady Volume of Pig Iron Buying

CLEVELAND, Aug. 27.—The volume of business in finished steel declined somewhat last week. With the slowing down during the previous week orders for the last half of August will be somewhat less than those for the first half. However, some of the mills have booked more tonnage at a higher rate this month than in July. Backlogs on most products are being gradually reduced and fairly prompt deliveries can now be made. Some mills need orders for full finished sheets and for hot and cold strip steel. So far there has been little curtailment in mill operations, although some sheet mills are no longer running at capacity.

The automotive industry has further curtailed production and its specifications for steel. The Chevrolet Motor Co. is understood to have greatly reduced its orders for steel preparatory to cleaning up stocks and bringing out new models in October. Several other motor car companies have not yet got under production on new models and those with new designs are placing specifications rather sparingly. However, the Ford Motor Co. is keeping up its daily output of 8000 cars. Forge shops in this territory making automotive parts are reported to be operating at 35 to 60 per cent of capacity. Automobile stamping plants have also materially reduced their operations.

The agricultural implement industry continues in good operation. While there has been some curtailment of other metal-working industries, they generally are operating well for this time of the year. Consumers are as yet showing no interest in fourth quarter contracts and there is no discussion of prices for that delivery.

Iron Ore.—Lake Superior iron ore is still being consumed at a rate of close to 6,000,000 tons a month. The amount used in July was 5,808,473 tons, a gain of 131,821 tons over June, which had one less day, according to the monthly report of the Lake Superior Iron Ore Association. The amount used in July last year was 4,632,907 tons. Ore at furnaces Aug. 1 amounted to 24,245,139 tons. The total at furnaces and Lake Erie docks Aug. 1 was 28,697,239 tons, as compared with 27,208,622 tons on the same day a year ago. Central district furnaces during July consumed 2,901,232 tons, an increase of 46,491 tons over June. Lake front furnaces, including Canadian furnaces, used 2,585,411 tons, a gain of 73,222 tons. Eastern furnaces consumed 151,448 tons, an increase of 7459 tons, and all-rail furnaces smelted 170,382 tons, a gain of 4649 tons. There were 196 furnaces in blast using Lake ore July 31, a decrease of one for the month.

Pig Iron.—Furnaces continue to sell a moderate volume of foundry and malleable iron, mostly in small lots for delivery usually extending through the remainder of the year. Business taken by Cleveland interests during the week aggregated 23,000 tons, as compared with 20,000 tons during the previous week. There is more activity in the Buffalo than in the northern Ohio or Michigan territories. Shipments are fair for this season of the year, although they will not be quite as heavy this month as in July. The automotive industry, which cut its shipping schedule sharply in July, has not increased its orders this month and, in fact, some motor car foundries are taking less iron than in July. Recent low prices on Southern foundry iron have been withdrawn and producers are quoting this iron at $14.50, Birmingham. While the price cut had a sentimental effect on the market, the lower prices do not appear to have brought out any business in the northern Ohio territory, as the reduction did not seem enough inducement for consumers to use a different grade of iron than they had been accustomed to for some time. Prices of Northern foundry iron are steady at $18.50, Cleveland, for outside shipment, $19 for local delivery, and $20, Lake furnace, for shipment to Michigan points.

Prices per gross ton at Cleveland:

N'th'n fdy., sil. 1.75 to 2.25	$19.50
S'th'n fdy., 1.75 to 2.25....	$20.00 to 20.50
Malleable	19.50
Ohio silvery, 8 per cent...	28.00
Basic Valley furnace.....	18.50
Stand. low phos., Valley..	26.50 to 27.00

Prices except on basic and low phosphorus are delivered Cleveland. Freight rates: 50c. from local furnaces; $3 from Jackson, Ohio; $6 from Birmingham.

Steel Bars, Plates and Structural Material.—Specifications declined the past week, the falling off being most noticeable in steel bars, which is due to the lessened demand from the automotive industry. Most of the bar mills are now in position to make fairly prompt shipments. Specifications for alloy steel bars are light and there is not much demand for reinforcing bars. Plate deliveries by some mills are easier but with others no improvement is noted. Demand for structural shapes is holding up fairly well. Little inquiry came from the building field during the week, although several good sized jobs are pending. The Lorain-Central bridge, Cleveland, is expected to come out for bids next month. This will require 15,000 to 18,000 tons of structural steel. No deviation is reported from regular prices, which are 1.90c. to 1.95c., Cleveland, for steel bars, and 1.95c., Pittsburgh, for plates and shapes.

Sheets.—New demand was light the past week. Deliveries have further improved, particularly on full fashioned sheets, and some mills need orders for that grade. However, pro-

ducers still have good backlogs of black sheets, with fall commitments as high as six weeks. Orders from the steel barrel industry have shown an improvement and the demand from other industries outside of the automotive field is holding up well. Prices are fairly steady. Black sheets are firm at 2.85c., Pittsburgh. While not common, there are still reports of $2 a ton concessions to 2.25c., for blue annealed and 2.10c. for light blue annealed plates.

Wire Products. — Manufacturers' wire is in fair demand and appears to be holding to 2.50c. in Cleveland, but 2.40c. is commonly quoted outside, and local jobbers are buying plain wire at the lower price. The nail situation continues very unsatisfactory in volume and price.

Cold-Finished Steel Bars.—Demand has declined sharply this month, as screw machine and upsetting plants have reduced operations owing to lack of orders from the automotive industry. The 2.35c., Cleveland, price is being maintained.

Warehouse Business. — Demand is fair, although not so good as in July. While orders are plentiful, they are mostly for small lots. Plates and blue annealed sheets are among the more active items. Prices are firm.

Strip Steel.—Specifications for hot and cold-rolled strip, which fell off with the curtailment of the automotive industry, have not picked up this month. While mills are getting a fair amount of business against contracts, shipments are in excess of incoming orders. Some mills still have a six weeks' backlog in wide strip orders, but need tonnage in narrow material, while others still have good backlogs of narrow strip, but need orders for wide material. The need of orders for cold-rolled strip has become more pronounced. While most mills are now quoting this at 2.85c., Cleveland and Pittsburgh, the 2.75c. price has not disappeared.

Coke. — Ohio by-product foundry coke has been reestablished at $8.25, ovens, for September shipment. The volume of business is good for this time of the year. Connellsville foundry coke is quiet and prices are unchanged. Producers continue to sell by-product coke for domestic use in good volume for fall shipment. The market appears firm at $4.50, ovens, for egg coke and $4 for nut.

Bolts, Nuts and Rivets.—Specifications for bolts and nuts are coming out in about the same volume as last month and are good from jobbers and from manufacturing industries except the automotive field. Rivets are moving slightly better than last month. Attempts are still being made to secure concessions from the $3.10 price for large rivets, but apparently without success.

Old Material—Scrap is coming out more freely than recently, but is fairly firm except on blast furnace grades. While local mills are taking a moderate amount of scrap on contract, they are not making any new purchases. There is a fair volume of activity among dealers. No. 1 railroad steel is bringing $17 a ton from dealers for local delivery, an advance of 50c. a ton, and dealers would probably pay $17.25 for a round tonnage. Dealers are paying $15.25 to $15.50 for ordinary heavy melting steel scrap for delivery to another local consumer. Short shoveling turnings have advanced 50c. a ton. A local mill paid $12.50 for a small lot. Dealers are paying $10.50 for machine shop turnings for Youngstown delivery. Blast furnace scrap is being freely offered at $10.50.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$15.25 to $15.50
No. 2 heavy melting steel	14.50 to 14.75
Compressed sheet steel	15.50 to 16.00
Light bundled sheet stampings	12.00 to 12.50
Drop forge flashings	13.00 to 13.25
Machine shop turnings	9.75 to 10.25
Short shoveling turnings	11.75 to 12.25
No. 1 railroad wrought	13.50 to 14.00
No. 2 railroad wrought	16.00 to 16.50
No. 1 busheling	13.25 to 13.75
Pipes and flues	9.00 to 9.50
Steel axle turnings	12.50 to 13.00
Acid Open-Hearth Grades:	
Low phos., forging crops	17.75 to 18.00
Low phos., billet, bloom and slab crops	18.50 to 18.75
Low phos., sheet bar crops	18.00 to 18.50
Low phos., plate scrap	18.00 to 18.50
Blast Furnace Grades:	
Cast iron borings	10.50 to 10.75
Mixed borings and short turnings	10.50 to 10.75
No. 2 busheling	10.50 to 10.75
Cupola Grades:	
No. 1 cast	17.50 to 18.00
Railroad grate bars	11.00 to 12.00
Stove plate	12.00 to 12.50
Rails under 3 ft	18.50 to 19.00
Miscellaneous:	
Railroad malleable	18.00 to 18.50
Rails for rolling	16.25 to 16.50

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.70c.
Plates, ⅜-in.	2.90c.
Structural shapes	2.70c.
Soft steel bars, small shapes, iron bars (except bands)	2.80c.
Round-edge iron	3.50c.
Round-edge steel, iron finished 1½ x 1½ in.	3.50c.
Round-edge steel planished	4.30c.
Reinforc. steel bars, sq. twisted and deform.	2.60c. to 2.80c.
Cold-fin. steel, rounds and hex	3.60c.
Cold-fin. steel, sq. and flats	4.10c.
Steel hoops	3.55c.
Steel bands, No. 12 to ⅛-in. inclus.	3.30c.
Spring steel	5.00c.
*Black sheets (No. 24)	4.10c.
†Galvanized sheets (No. 24)	4.85c.
Light plates, blue annealed (No. 10)	3.25c.
Blue ann'l'd sheets (No. 13)	3.40c.
Diam. pat. floor plates—	
¼-in.	5.30c.
⅜-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

*For 50 bundles or more: 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.
†For 50 bundles or more: 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

Philadelphia

Steel Specifications Curtailed By Holiday — Pipe Shops Buy 20,000 Tons of Southern Iron

PHILADELPHIA, Aug. 27.—Steel and pig iron buying has been temporarily delayed in many cases by the approach of Labor Day, but steel mills are maintaining high operating rates, and current and prospective business in plates is large, with close to 50,000 tons of business in prospect for car and ship building. Shape mills are also maintaining good operating rates, but shape prices show no tendency to advance.

Pig iron is active and, with Birmingham producers curtailing operations, eastern Pennsylvania furnaces foresee a more stable market.

Reinforcing bar prices are irregular and both billet and rail steel bar makers are granting considerable concessions on desirable business.

Pig Iron.—A good volume of inquiry for foundry iron to be delivered in the third and last quarter has accumulated in the past week and a substantial tonnage of foundry iron has been closed, most of the orders going to Southern furnaces. One interest in the Birmingham district has sold about 50,000 tons of iron to various districts in the past week and withdrawn from the market, blowing out its furnace. Sales of Birmingham iron in this district have included 15,000 tons to a Florence, N. J., pipe foundry and 5000 tons to a Burlington, N. J., pipe interest. Quotations on Southern foundry iron continue at $13 to $13.50 a ton, furnace. The American Engineering Co., Philadelphia, has not yet closed on 500 tons of foundry iron and purchase is not expected for a fortnight or more. The Coatesville Boiler Works, Coatesville, Pa., has closed on 250 tons of No. 2X foundry iron with an eastern Pennsylvania producer. Foundry iron is quoted by eastern Pennsylvania furnaces at $21, base, and any concession from this price would be only on sizable tonnages.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil.	$21.26 to $21.76
East. Pa. No. 2X, 2.25 to 2.75 sil.	21.76 to 22.26
East. Pa. No. 1X	22.26 to 22.76
Basic (del'd east. Pa.)	19.75 to 20.25
Gray forge	20.00 to 20.50
Malleable	21.25 to 21.75
Stand. low phos. (f.o.b. N. Y. State furnace)	22.00 to 23.00
Cop. br'g low phos. (f.o.b. furnace)	23.50 to 24.00
Va. No. 2 plain, 1.75 to 2.25 sil.	24.04
Va. No. 2X, 2.25 to 2.75 sil.	24.54

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces; $4.54 from Virginia furnaces.

Bars.—Mill deliveries are fairly prompt, but operating rates are still high and prices firm at 1.95c. per lb., Pittsburgh, or 2.27c., delivered Philadelphia.

Reinforcing Bars.—Competition between billet and rail steel bars has become unusually keen with distributers of billet steel bars meeting the

rail steel bar quotation of 1.95c., Franklin, Pa., or Tonawanda, N. Y., or 2.27c., delivered Philadelphia, which has forced some rail steel bar sellers to offer considerable concessions to obtain any business. Occasionally distributers, who have quoted on a project to furnish rail steel bars, find it advantageous to furnish billet steel. The Farm Show Building in Harrisburg, requiring 800 tons of reinforcing bars, brought out a low bid of $1,840,000, but all bids were rejected as only $1,000,000 is available for the project. Billet steel bars are quoted at 1.95c. to 2c., Pittsburgh, or 2.27c. to 2.32c., delivered Philadelphia, with the $5 extra for cutting to length sometimes disregarded by the seller.

Shapes.—A substantial tonnage of business is being booked and mills are as well engaged as during July. Prices, however, are unchanged at 1.95c. to 2.05c., nearest mill to consumer, or 2.01c. to 2.11c., delivered Philadelphia. Some good business is in prospect for ships to be built by the New York Ship Building Corporation, Camden, N. J., and for railroad cars to be constructed by the American Car & Foundry Co., probably at Berwick, Pa.

Plates.—Mills are fully engaged and have in prospect about 30,000 tons of plates for four ships for the Export Steamship Corporation and 5000 tons of plates in a cruiser for the United States Navy to be built by the New York Ship Building Corporation at Camden, N. J. A substantial tonnage of plates will be required for the 1000 freight cars for the Delaware, Lackawanna & Western Railroad, which will probably be built at Berwick, Pa. Recently, universal mills have been operated at a higher rate than for some time and a plate mill in the Pittsburgh district, which produces pipe, is almost out of the market on universal plate skelp. Plate prices are unchanged at 2.05c., Coatesville, or 2.15c., delivered Philadelphia.

Sheets.—Blue annealed sheet prices are unchanged at 2.35c., Pittsburgh, or 2.67c., delivered Philadelphia, for No. 13 gage and light plates, blue annealed, No. 10 gage, are quoted at 2.20c., Pittsburgh, or 2.52c., delivered Philadelphia. The New York Ship Building Corporation, Camden, N. J., is inquiring for a carload or more of black sheets for the United States Navy cruiser, which it is building. Black sheets are unchanged at 2.85c., Pittsburgh, or 3.17c., delivered Philadelphia. Galvanized sheets are in good demand and prices range from 3.55c. to 3.60c., Pittsburgh, or 3.87c. to 3.92c., delivered Philadelphia.

Imports.—In the week ended Aug. 24, a total of 1332 tons of pig iron arrived at this port, of which 1230 tons was from British India and 102 tons from Norway. Steel imports consisted of 102 tons of structural shapes and 15 tons of steel scrap from Germany and 497 tons of structural shapes, 75 tons of steel bands and 47 tons of steel bars from Belgium.

Old Material.—Available supplies of good No. 2 heavy melting steel are not large and with a heavy tonnage of this grade moving to the consumer at Bethlehem, Pa., dealers report some difficulty in securing material to fill orders at Conshohocken, Phoenixville and Harrisburg, Pa. The consumer at Bethlehem, Pa., has closed on 25,000 tons of No. 1 heavy melting steel at $16.50 a ton, delivered. Short shoveling turnings have been bought by dealers at $12.50 a ton, delivered eastern Pennsylvania and the market on cast borings is firmer. Heavy breakable cast is quiet and buyers are unwilling to pay more than $14.50 a ton, while sellers are asking $15, delivered.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	$16.50 to $17.00
Scrap T rails	16.00 to 16.50
No. 2 heavy melting steel	12.50 to 14.50
No. 1 railroad wrought	16.00 to 16.50
Bundled sheets (for steel works)	11.50
Hydraulic compressed, new	14.50 to 15.50
Hydraulic compressed, old	12.00 to 12.50
Machine shop turnings (for steel works)	12.00
Heavy axle turnings (or equiv.)	14.00 to 14.50
Cast borings (for steel works and roll. mill)	11.00 to 11.75
Heavy breakable cast (for steel works)	15.00
Railroad grate bars	12.00 to 12.50
Stove plate (for steel works)	12.00 to 12.50
No. 1 low phos., hvy., 0.04% and under	22.00 to 23.00
Couplers and knuckles	19.50 to 20.50
Rolled steel wheels	19.50 to 20.50
No. 1 blast f'nace scrap	10.50 to 11.00
Wrot. iron and soft steel pipes and tubes (new specific.)	15.00
Shafting	19.00 to 20.00
Steel axles	23.00 to 23.50
No. 1 forge fire	14.00
Cast iron carwheels	16.50 to 17.00
No. 1 cast	16.50 to 17.00
Cast borings (for chem. plant)	14.50
Steel rails for rolling	16.50 to 17.00

Steel Corporation Retires Subsidiary Bonds

The United States Steel Corporation has recommended that bonds of two of its subsidiaries be called for redemption on Nov. 1. They are bonds of the Indiana Steel Co. (first mortgage 5 per cent bonds due 1952) of a face value of $20,979,000 and the National Tube Co. (first mortgage 5 per cent bonds due 1952) of $10,971,000.

The operation calls for an aggregate sum of $33,358,500, funds for which have been provided from current resources. "It is estimated that through the retirement of these two issues of bonds the net cash saving in interest and sinking fund requirements will amount to approximately $730,000 annually," says Corporation's statement.

Will Make Electric Furnaces

The Bellevue Industrial Furnace Co., Detroit, has added an electric furnace division, thus to make a complete line of combustion furnaces.

Arnold Pfau, formerly connected in a consulting capacity with the Globar Corporation, has taken charge of the electric furnace division.

Canada

No Let Up in Sight in Dominion Business

TORONTO, ONT., Aug. 27.—Despite the fact that mills and foundries and other concerns associated with the iron and steel industry have been operating at almost capacity from the first of the year, there is little prospect of curtailed production among the various plants in the immediate future. Foundries and rolling mills continue at capacity, with the majority reporting backlogs sufficient to maintain present operations to the end of the year.

Pig Iron.—The general tone of the market is steadily becoming brighter. While no large orders have been closed during the week, individual tonnages are being stepped up to some extent and total sales are improving each week. Foundry iron has a strong call in the Toronto and Montreal districts for spot delivery. Shipments against contracts continue in good volume. Inquiries for fourth quarter are appearing. Prices are firm but unchanged.

Prices per gross ton:

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75	$24.60
No. 2 fdy., sil. 1.75 to 2.25	24.10
Malleable	24.60
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75	$26.00
No. 2 fdy., sil. 1.75 to 2.25	25.50
Malleable	26.00
Basic	24.50
Imported Iron, Montreal Warehouse	
Summerlee	$33.50
Carron	33.00

Old Material.—More active trading is reported by local dealers. The demand is mostly for small lots for spot delivery, but total sales for the week were in greater tonnage than those of earlier summer weeks.

Dealers' buying prices:

	Per Gross Ton	
	Toronto	Montreal
Heavy melting steel	$10.00	$8.50
Rails, scrap	11.00	9.00
No. 1 wrought	10.00	12.00
Machine shop turnings	7.50	5.00
Boiler plate	7.50	6.00
Heavy axle turnings	8.00	7.50
Cast borings	7.50	5.00
Steel turnings	7.50	6.50
Wrought pipe	6.00	6.00
Steel axles	15.00	20.00
Axles, wrought iron	17.00	22.00
No. 1 machinery cast	....	17.00
Stove plate	....	13.00
Standard carwheels	....	16.00
Malleable	....	13.00
Per Net Ton		
No. 1 mach'ry cast	$16.00	....
Stove plate	12.00	....
Standard carwheels	15.00	....
Malleable scrap	14.00	....

Russia Buys German Plates

HAMBURG, GERMANY, Aug. 12.—The Vereinigte Stahlwerke A. G., Düsseldorf, has received a contract from the Russian Government to supply all ship plates and structural material needed by Russian shipyards during 1930. The shipbuilding program of these yards is reported as eight to ten vessels.

Pacific Coast

Steel Prices Well Maintained—Bridge Takes 1150 Tons of Bars—Another Requires 8000 Tons of Shapes

SAN FRANCISCO, Aug. 24 (*By Air Mail*).—Movement of iron and steel products during the past week was confined, with few exceptions, to unimportant tonnages, and few new inquiries for tonnage lots came up for figures. The outstanding award of the week went to the Northwest Steel Rolling Mills and called for 1150 tons of reinforcing steel bars for the West Garfield Street bridge, Seattle. Bids were opened on 8000 tons of structural shapes for a bridge at Portland and on 1385 tons of cast iron pipe for Oakland, Cal. The price structure appears to be well maintained.

Pig Iron. — Little of real importance transpired in the pig iron market, sales and inquiries having been limited to small lots. Prices are unchanged.

Prices per gross ton at San Francisco:

*Utah basic	$25.00 to $26.00
*Utah fdy., sil. 2.75 to 3.25	25.00 to 26.00
**Indian fdy., sil. 2.75 to 3.25	25.00 to 26.00

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Bars. — Demand for reinforcing steel bars is by no means heavy, the majority of lettings calling for lots ranging from 30 to 60 tons. The Soule Steel Co. took 100 tons for a college building in Pasadena, Cal. Several fair-sized tonnages are pending, including 2300 tons for a wharf at Ninth Street, Oakland, 285 tons for paving work in Marin County, Cal., and 210 tons for a wharf at Fourteenth Street, Oakland. Out-of-stock quotations continue on a fairly firm basis in the San Francisco district at 2.30c., base, on carload lots and at 2.60c. on smaller tonnages. In Los Angeles, carload quantities are being quoted at 2.40c., base, and 2.70c. applies on less-than-carload lots. Movement of merchant bar steel is restricted to unimportant lots composed of numerous sizes. On this class of material, 2.35c., c.i.f., prevails.

Plates.—No large bookings were reported this week, and few inquiries of importance are before fabricators for figures. No action has yet been taken on 3000 tons for a pipe line at Bremerton, Wash. Bids will be opened next week on 10,000 tons for a riveted pipe line at Everett, Wash. Prices appear to be firm at 2.35c., c.i.f. Coast ports.

Shapes. — Most of the structural lettings this week called for lots of less than 100 tons. The McClintic-Marshall Co. took 140 tons for an apartment building on Pacific Street, San Francisco. Bids were opened this week on 8000 tons for a bridge in Portland and on 1000 tons for a hotel in Oakland. New inquiries include 738 tons for a bridge near Yreka, Cal., bids on which are to be opened Sept. 11. Domestic shapes continue firm at 2.35c., c.i.f.

Cast Iron Pipe.—Awards of cast iron pipe, with two exceptions, were confined to lots of less than 100 tons. The Heafey-Moore Co., Oakland, secured 199 tons of 4 to 8-in. Class B pipe for Alturas, Cal. An unnamed interest took 162 tons of 6 and 8-in. Class B pipe for Great Falls, Mont. Bids were opened this week on 1385 tons of 6 to 12-in. Class B pipe for the East Bay Municipal Utility District, Oakland. Los Angeles will open bids on Aug. 27 for 192 tons of 2-in. Class B pipe. Anaheim, Cal., opened bids this week on 377 tons of 6 to 10-in. Class B pipe. On Aug. 26 Coquille, Ore., will open bids on 303 tons of 10-in. Class B pipe.

Steel Pipe.—Demand for oil country goods has improved during the past week or two and, while few large lots have been reported, distributers are ordering replacements, which in the aggregate have involved large tonnages, one interest reporting orders totaling over 2000 tons during the past 10 days. The Pacific Gas & Electric Co., San Francisco, has withdrawn its inquiry for 2263 tons of 8⅝-in. O. D. gas pipe for installation in Monterey, Salinas and Gilroy. This company has an inquiry out for 38,000 ft. of 8⅝-in. O. D. plain end pipe weighing 24.496 lb. per ft. involving 465 tons and also another inquiry for 260 tons of 1¼ to 4-in. standard pipe.

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and struc. shapes	3.15c.
Soft steel bars	3.15c.
Small angles, ¼-in. and over	3.15c.
Small angles, under ¼-in.	3.55c.
Small channels and tees, ¾-in. to 2¾-in.	3.75c.
Spring steel, ¼-in. and thicker	5.00c.
Black sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.80c.
Galv. sheets (No. 24)	5.30c.
Struct. rivets, ½-in. and larger	5.65c.
Com. wire nails, base per keg	$3.40
Cement c't'd nails, 100 lb. keg	3.40

Birmingham

Sales of Iron as Low as $12 Reported—Ensley Rail Mill Shuts Down

BIRMINGHAM, Aug. 27.—Southern sales of pig iron have been light, owing to previous placement of requirements. Most of the important buyers had covered their needs for August when the month began and they have, likewise, bought through September. However, next month's melt will require more iron than has been booked at this time and additional buying is looked for within the next two weeks. The daily run of small business continues at an even rate. Southern demand during the remainder of the quarter will just about take care of current production, while the aggressive bidding for tonnage in the Eastern and Middle Western markets will result in the moving of yard stocks. Shipments this month by the three merchant producers in the Birmingham district have been ahead of their make. Quotations in the Southern market continue on the $14.50 base, but various concessions are being made at competitive points, and prices as low as $12 are reported. The Tennessee company last week banked Bessemer No. 4, which has been on recarburizing iron. Central Iron & Coal Co., at Holt, Ala., also blew out its stack. This furnace, on foundry iron, had been in operation for 39 months on the same lining, and will be out for several months because of the present condition of the market. It will be relined, but work is not to be started immediately. The Tennessee company also changed Ensley No. 1 and No. 3 from basic to foundry, as a result of the closing down of the Ensley rail mill. After being on foundry for one week, the Gulf States Steel stack at Alabama City was changed back to basic. Fourteen furnaces are now in blast in Alabama, five on basic and nine on foundry. There has been a reduction in active furnaces during the month of three.

Prices per gross ton, f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil.	$14.50
No. 1 fdy., 2.25 to 2.75 sil.	15.00
Basic	14.50

Finished Steel. — New tonnage in structural shapes, plates, bars, sheets and miscellaneous lines continues at the high level of the past few months, with an increase shown in sheets. There is very little rail tonnage left on the books of the Tennessee company and its Ensley rail mill was closed down last week. The remaining business is being handled by the small Fairfield mill. New business of the structural steel and bar fabricators consisted only of small orders, with the exception of the structural steel contract for the new plant of the Brown Paper Mill Co., at Monroe, La., amounting to 2000 tons and secured by the Virginia Bridge & Iron Co. With the closing of the rail mill at Ensley, the Tennessee company decreased open-hearth operations to three of nine furnaces. Seven out of eight open-hearths are being run at Fairfield. The Gulf States Steel Co. has all six of its open-hearths at Alabama City in operation.

Cast Iron Pipe. — Pressure pipe manufacturers report only a fair amount of routine business, with no

large orders during the last week. One company accumulated about 2000 tons, while another ran slightly ahead of that figure. Shipments continue at a rate equaling production. Prices remain at $37 to $38 a net ton, Birmingham, for 6-in. and larger diameters.

Coke.—There is very little new business in foundry coke. Movement on contract is steady and ahead of that at this time last year. Quotations remain at $5 for both spot and contract.

Old Material.—The gradual improvement of the past several weeks is being maintained and the outlook is better than at any other time since early spring. There have been no changes in quotations since two weeks ago, when a number of grades advanced.

Prices per gross ton, deliv'd Birmingham dist. consumers' yards:

Heavy melting steel	$13.00 to $13.50
Scrap steel rails	14.00
Short shoveling turnings	9.00
Cast iron borings	9.00
Stove plate	$11.50 to 12.00
Steel axles	21.00
Iron axles	23.00
No. 1 railroad wrought	10.00 to 10.50
Rails for rolling	15.50
No. 1 cast	13.50
Tramcar wheels	13.50
Cast iron carwheels	13.00 to 13.50
Cast iron borings, chem.	13.50 to 14.00

St. Louis

Steel Plant Buys 10,000 Tons of Southern Basic—Scrap Scarcity Strengthens Market

ST. LOUIS, Aug. 27.—The sale of 10,000 tons of Southern basic iron to a Peoria melter was the outstanding development in the pig iron situation in this district during the week. The buyer, the Keystone Steel & Wire Co., has heretofore used no iron of this description, and the purchase was made for use as a substitute for scrap, which is scarce and expensive. Sales otherwise consisted of foundry and malleable grades, totaling about 4000 tons, divided between Northern and Southern iron. Leading users are well supplied, but the smaller concerns are holding off, and still have considerable buying to do for the rest of the year. Prices remain uneven. The Southern basic sold is believed to have gone at a price figuring below $13, furnace. The melt holds up well and shipments continue in good volume.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill.	$19.50 to $20.00
Malleable, f.o.b. Granite City	20.50
N'th'n No. 2 fdy., deliv'd St. Louis	22.16
Southern No. 2 fdy., deliv'd	$16.92 to 18.92
Northern malleable, deliv'd	22.16
Northern basic, deliv'd	22.16

Freight rates: 75c. (average) Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

Finished Steel.—Numerous small lots of reinforcing concrete bars are being taken, mainly for road and river improvement work. The only letting of size was 1600 tons for a storage sewage disposal plant at Peoria, Ill., to the Laclede Steel Co. Warehouse business is fairly active, with a better demand than heretofore for fencing, roofing and the lines used in the rural areas. Makers and distributers of sheets report satisfactory conditions. The leading district producer is operating all sections at capacity. Specifying by car and automobile builders has tapered off.

Coke.—Deliveries of metallurgical coke on contract are in considerable volume, reflecting a melt of greater than ordinary seasonal proportions. New buying, however, lags, and is confined to immediate needs. A slight revival in domestic sizes has been noted since Aug. 15. Demand for industrial grades is about normal for this time of year. Prices are unchanged.

Old Material. — Strength marks scrap iron and steel in this district. There is a scarcity of material, most pronounced in steel works scrap. Steel grades are wanted and are difficult to obtain at prices the mills are willing to offer. Yard stocks are not of sufficient size to alleviate the situation and arrivals from the country are light. The carriers, much preoccupied with a grain movement of record size, have neither time nor facilities to increase their old material deliveries. Interest is being taken in malleable grades, and a slightly firmer tone prevails in cast items than heretofore. Railroad lists before the trade include: Nashville, Chattanooga & St. Louis, 13 cars; Pullman Co., 1 car; Union Pacific, 3900 tons; Nickel Plate, 54 cars; Frisco, 71 cars; Chicago, Milwaukee, St. Paul & Pacific, 127 cars, and Chicago & Eastern Illinois, 6 cars.

Dealers' buying prices per gross ton, f.o.b. St. Louis district:

No. 1 heavy melting or shoveling steel	$14.75 to $15.25
No. 2 heavy melting or shoveling steel	14.50 to 15.00
No. 1 locomotive tires	15.00 to 15.50
Miscel. stand.-sec. rails including frogs, switches and guards, cut apart	17.00 to 17.50
Railroad springs	19.00 to 19.50
Bundled sheets	10.50 to 11.00
No. 2 railroad wrought	15.00 to 15.50
No. 1 busheling	10.00 to 10.50
Cast iron borings and shoveling turnings	9.50 to 10.00
Iron rails	15.00 to 15.50
Rails for rolling	17.25 to 17.75
Machine shop turnings	7.00 to 7.50
Heavy turnings	10.00 to 10.50
Steel car axles	19.50 to 20.00
Iron car axles	26.50 to 27.00
Wrot. iron bars and trans.	21.50 to 22.00
No. 1 railroad wrought	13.75 to 14.25
Steel rails, less than 3 ft.	18.00 to 18.50
Steel angle bars	15.25 to 15.75
Cast iron carwheels	15.00 to 15.50
No. 1 machinery cast	15.25 to 15.75
Railroad malleable	15.50 to 16.00
No. 1 railroad cast	14.75 to 15.25
Stove plate	12.50 to 13.00
Agricult. malleable	15.25 to 15.75
Relay. rails, 60 lb. and under	20.50 to 23.50
Relay. rails, 70 lb. and over	26.50 to 29.00

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-fin. rounds, shaftings, screw stock	3.75c.
Black sheets (No. 24)	4.25c.
Galv. sheets (No. 24)	5.10c.
Blue ann'l'd sheets (No. 10)	3.45c.
Black corrug. sheets (No. 24)	4.30c.
Galv. corrug. sheets	5.15c.
Structural rivets	3.95c.
Boiler rivets	3.95c.
	Per Cent Off List
Tank rivets, ⅞-in. and smaller, 100 lb. or more	65
Less than 100 lb.	60
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-pressed nuts, sq., blank or tapped, 200 lb. or more	60
Less than 200 lb.	50
Hot-pressed nuts, hex., blank or tapped, 200 lb. or more	60
Less than 200 lb.	50

Buffalo

Boat Shipments of Pig Iron Going to Chicago and Detroit—Steel Mills Maintain High Output

BUFFALO, Aug. 27.—The pig iron market continues strong, with considerable booking of small lots, principally for the fourth quarter. Buffalo producers are shipping a good deal of iron to Chicago and Detroit, where they have little difficulty in realizing a price equivalent to $18.50, Buffalo, for No. 2 plain. The westward shipments are being made by boat. The General Electric Co. is in the market for 500 tons of No. 1 foundry for its Schenectady plant and the New York Air Brake Co., which had been in the market for 500 tons of foundry and malleable, has covered for part of its requirements for its Watertown plant. One inquiry for basic has been received from the East and is for 2,000 to 3,000 tons. Most of the business taken in the East is at a minimum of $18, with $18.50 applying on much of it.

Prices per gross ton, f.o.b. furnace:

No. 2 fdy., sil. 1.75 to 2.25	$19.50
No. 2X fdy., sil. 2.25 to 2.75	20.00
No. 1 fdy., sil. 2.75 to 3.25	21.00
Malleable, sil. up to 2.25	20.00
Basic	18.50
Lake Superior charcoal	27.28

Finished Iron and Steel.—Operations of local steel mills continue at an unchanged pace, and demand for all lines is good. The General Electric Co. has awarded 3,000 tons for a new powerhouse at Tonawanda, N. Y., and the State has let 200 tons for a new cell building at Auburn prison, Auburn, N. Y. Bates & Rogers are low on the general con-

tract for a viaduct over the New York Central tracks at Harlem avenue, Buffalo, which will require 200 to 300 tons of reinforcing bars and 300 tons of structural steel. School No. 67, Buffalo, calls for 600 tons of structural steel and 150 tons of reinforcing bars. A considerable volume of small reinforcing bar business has been placed.

Old Material. — There is little change in the market, though some disposition to spottiness has developed. Dealers are expecting momentarily an increased demand for No. 1 machinery cast and stove plate, which may be quite apparent by Sept. 1. Dealers are paying up to $17.75 against a recent order of No. 1 heavy melting steel taken at $18, and it develops that an order of No. 1 heavy melting steel was placed at $17 shortly after the $18 purchase, at a plant where inspections give the dealers slightly more leeway. Some sales of cast iron borings are reported at the current quotations. The demand for specialties has improved, and sales of short rails at $19.50 and railroad knuckles and couplers at $19.50 are reported. The market for machine shop turnings has strengthened, with sales reported at $9 to $9.50.

Prices per gross ton. f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$17.50 to $18.00
No. 2 heavy melting steel	14.75 to 15.00
Scrap rails	16.50 to 17.00
Hydraul. comp. sheets	14.50 to 14.75
Hand bundled sheets	12.00 to 12.50
Drop forge flashings	14.25 to 14.50
No. 1 busheling	15.50 to 16.50
Hvy. steel axle turnings	14.00 to 14.50
Machine shop turnings	9.00 to 9.50
No. 1 railroad wrought	13.00 to 13.50
Acid Open-Hearth Grades:	
Knuckles and couplers	19.50 to 19.75
Coil and leaf springs	19.00 to 19.50
Rolled steel wheels	19.00 to 19.50
Low phos. billet and bloom ends	20.00 to 20.50
Electric Furnace Grades:	
Short shov. steel turnings	12.00 to 12.50
Blast Furnace Grades:	
Short mixed borings and turnings	10.50 to 11.50
Cast iron borings	10.50 to 11.50
No. 2 busheling	10.00 to 10.50
Rolling Mill Grades:	
Steel car axles	18.75 to 19.25
Iron axles	21.00 to 22.00
Cupola Grades:	
No. 1 machinery cast	16.00 to 17.00
Stove plate	13.00 to 13.50
Locomotive grate bars	12.50 to 13.00
Steel rails, 3 ft. and under	19.50 to 19.75
Cast iron carwheels	14.00 to 14.50
Malleable Grades:	
Industrial	18.00 to 18.50
Railroad	18.00 to 18.50
Agricultural	18.00 to 18.50
Special Grades:	
Chemical borings	12.50 to 13.50

Warehouse Prices, f.o.b. Buffalo

	Base per Lb
Plates and struc. shapes	3.40c
Soft steel bars	3.30c
Reinforcing bars	2.95c
Cold-fin. flats, sq. and hex.	4.45c
Rounds	3.95c
Cold-rolled strip steel	5.85c
Black sheets (No. 24)	4.20c
Galv. sheets (No. 24)	4.85c
Blue ann'l'd sheets (No. 10)	3.50c
Com. wire nails, base per keg	$3.60
Black wire, base per 100 lb.	3.75

Boston

Buffalo Pig Iron Now at $17 to $18 Range—Scrap Prices Firmer—Coke Shipments Heavy

BOSTON, Aug. 27.—Pig iron sales the past week ran close to 6000 tons. The largest transaction was 1000 tons of No. 2X and No. 1X to a Massachusetts textile machinery manufacturer by the Mystic Iron Works. Most of the business otherwise was in small tonnages, with Connecticut foundries the principal buyers. Third quarter contracting is virtually over, and quite a few foundries are covered for fourth quarter. A Massachusetts textile machinery maker is in the market for an indefinite tonnage, but probably will purchase about 2000 tons. There are no other open inquiries of size. Southern iron is still available at $14 a ton, base furnace. One Buffalo stack has accepted business at $17 a ton, base furnace, but others in that district maintain a base price of $18 a ton. No. 2X Indian iron is available at $21.75 to $22 a ton, on dock here, duty paid. All recent sales except one made by the Everett, Mass., furnace were at $20 to about $22 a ton, furnace, for No. 2X and No. 1X. The exception was a small tonnage of No. 2X at $19.50 a ton, furnace, on a high freight and in active competition.

Foundry iron prices per gross ton deliv'd to most New England points:

†Buffalo, sil. 1.75 to 2.25	$21.28 to $22.28
†Buffalo, sil. 2.25 to 2.75	21.78 to 22.78
*Buffalo, sil. 1.75 to 2.25	21.91 to 22.91
*Buffalo, sil. 2.25 to 2.75	22.41 to 23.41
East. Penn., sil. 1.75 to 2.25	22.65 to 23.15
East. Penn., sil. 2.25 to 2.75	23.15 to 23.65
Va., sil. 1.75 to 2.25	25.21
Va., sil. 2.25 to 2.75	25.71
*Ala., sil. 1.75 to 2.25	23.61
*Ala., sil. 2.25 to 2.75	24.11
†Ala., sil. 1.75 to 2.25	19.75 to 20.25
†Ala., sil. 2.25 to 2.75	20.25 to 20.75

Freight rates: $4.91 all rail from Buffalo, and $4.28 rail and water; $3.65 all rail from eastern Pennsylvania; $5.21 all rail from Virginia; $9.61 all rail from Alabama and $5.75 rail and water from Alabama to New England seaboard.
*All rail rate.
†Rail and water rate.

Reinforcing Steel.—The sale of 300 tons of billet steel bars for a Waltham, Mass., hospital and a grist of smaller tonnages brought New England sales the past week up to about 1000 tons, the largest amount in any similar period in a long time. About 1500 tons in large and small jobs is pending. With the speeding up of business there is less inclination to make price concessions, particularly on lots of less than 100 tons, and 2.66½c. a lb., base, from stock prevails. The market for rail steel bars is a little more active, with 2.26½c. a lb., base, delivered common Boston freight rate points, the openly quoted price.

Cast Iron Pipe.—The only open municipal business in sight is 1½ miles of 6, 8, 10 and 12-in. pipe for Putnam, Conn. Private business is holding up well. Prices quoted openly on domestic pipe are: 4-in., $46.10 to $47.10 a ton, delivered common Boston freight rate points; 6 to 12-in., $40.10 to $41.10; 16 to 20-in., $39.10. A $3 differential is asked on Class A and gas pipe.

Warehouse Business. — The closing days of August have brought a rather pronounced betterment in the movement of iron and steel and kindred products out of warehouses. Wire nails have been reduced 10c. to $3.40 per keg, base, out of warehouse, and to $2.65 per keg, base Pittsburgh, on direct mill shipments. This reduction, according to warehouses, is confined to Atlantic seaboard points and is due to the influx of German nails at Boston and elsewhere.

Coke.—Specifications against last half by-product foundry coke contracts have materially stepped up, and indications are that August billings will be exceptionally large for a midsummer month. The price remains at $11 a ton, delivered within a $3.10 freight rate zone. The New England Coal & Coke Co's. 1929 domestic coke sales will be far in excess of those for any previous year in the history of the company. The Providence Gas Co. expects to have its new battery of 25 ovens in operation by Dec. 1, next, which will about double its coke supply.

Old Material.—Old material prices are firmer than a week ago, but with one exception no higher, although outside quotations are being paid by brokers more often than inside. Numerous sales of steel turnings at $7.50 a ton, on cars shipping point, are reported, whereas a week ago $7.25 was the top price. While No. 1 heavy melting steel transactions the past week were within a range of $12.25 to $12.75 a ton, most business was at $12.50 to $12.75, with $12.75

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars, small shapes	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway rounds	6.60c.
Norway squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tie steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold-rolled steel—	
Rounds and hex.	*3.55c. to 5.55c.
Squares and flats	*4.05c. to 7.05c.
Toe calk steel	6.00c.
Rivets, structural or boiler	4.50c.

	Per Cent Off List
Machine bolts	50 and 5
Carriage bolts	50 and 5
Lag screws	50 and 5
Hot-pressed nuts	50 and 5
Cold-punched nuts	50 and 5
Stove bolts	70 and 10

*Including quantity differentials.

predominating. The long bundled skeleton market is quite active for Worcester, Mass., consumption. Although by no means active, the market for specification pipe is more so than it has been the past two months. There is also quite an improvement in the demand for No. 1 railroad wrought at $11 a ton, on cars shipping point. New England foundries are buying larger quantities of machinery cast, but largely from local or nearby yards. During the next six weeks the United Electric Railway Co., Providence, R. I., will produce about one car a day of scrap metal from obsolete trolley cars, in addition to steel wheels, axles, trolley stands and other equipment.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$12.25 to $12.75
Scrap T rails	11.50 to 12.00
Scrap girder rails	10.50 to 11.00
No. 1 railroad wrought	11.00 to 11.50
No. 1 yard wrought	9.00 to 9.50
Machine shop turnings	7.00 to 7.50
Cast iron borings (steel works and rolling mill)	6.50 to 6.75
Bundled skeleton, long	10.00 to 10.50
Forge flashings	10.50 to 10.75
Blast furnace borings and turnings	6.00 to 6.25
Forge scrap	9.00 to 9.25
Shafting	14.00 to 14.75
Steel car axles	18.00 to 18.50
Wrought pipe 1 in. in diameter (over 2 ft. long)	9.75 to 10.00
Rails for rolling	12.50 to 13.00
Cast iron borings, chemical	9.75 to 10.00
Prices per gross ton deliv'd consumers' yards:	
Textile cast	$14.00 to $14.50
No. 1 machinery cast	15.00 to 15.25
No. 2 machinery cast	13.00 to 13.25
Stove plate	11.00 to 11.50
Railroad malleable	18.00 to 18.50

Detroit

August Auto Output May Exceed July's

DETROIT, Aug. 27. — Automotive production apparently will be slightly larger in August than in July and should be better than the volume of August, 1928. The Ford Motor Co. and Chevrolet Motor Co. are proceeding at high production rates. The Ford Motor Co. is understood to have about 200,000 unfilled orders for the current month.

According to H. G. Klinger, vice-president and general sales manager of the Chevrolet Motor Co., the sales quota set for the period of Sept. 1 to Jan. 1 is 300,000 units.

There have been no changes in scrap prices during the past week. The market is firm and sales in small tonnages bring the top of the range.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Hvy. melting and shov. steel	$14.25 to $14.75
Borings and short turnings	9.00 to 9.50
Long turnings	8.50 to 9.00
No. 1 machinery cast	12.50 to 13.00
Automobile cast	13.00 to 13.50
Hydraul. comp. sheets	14.00 to 14.50
Stove plate	9.00 to 9.50
New No. 1 busheling	12.50 to 13.00
Old No. 1 busheling	11.00 to 11.50
Sheet clippings	8.75 to 9.25
Flashings	13.00 to 13.50

Cincinnati

Southern Pig Iron Weakness Does Not Affect Northern Iron—Sheet Orders Equal 80 Per Cent of Shipments

CINCINNATI, Aug. 27.—With most of the district consumers of pig iron apparently covered for the third quarter, sales of pig iron during the past week were slightly below those of the preceding week. Total sales were around 6000 tons, of which about 1000 tons was Southern iron. Sales of Southern iron gave further opportunity to test Southern prices here, and indicated that the market is about $13.50 to $14, base Birmingham, although price uncertainty still indicates a weak market. Reports that the Republic Iron & Steel Co. is booked for the remainder of this year and that other furnaces have cut surplus stocks helped to allay some of the apprehensions regarding the Southern situation. Recent sales of Northern iron indicate that the market is well established at about $18.50, base Valley Furnace, and virtually no concessions are being granted. A Mansfield, Ohio, consumer is inquiring for 350 tons of malleable iron and a Huntington, W. Va., melter is asking for 200 tons of Northern foundry.

Prices per gross ton, deliv'd Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25	$19.89 to $20.39
Ala. fdy., sil. 1.75 to 2.25	17.19 to 18.19
Ala. fdy., sil. 2.25 to 2.75	17.69 to 18.69
Tenn. fdy., sil. 1.75 to 2.25	17.19 to 18.19
S'th'n Ohio silvery, 8 per cent	26.89

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

Finished Material.—A slight recession of the demand for sheets last week was reported by district sheet mills. With mills maintaining capacity production, backlogs were reduced. In fact, the leading interest in this district indicates that backlogs are being cut at the rate of about 2000 tons a week and fresh bookings during the past week were about equal to 80 per cent of output. Although the demand for galvanized sheets is fairly brisk, the market is affected by reports of price concessions in the South. It is said that business has been placed at $3.35, Birmingham, as against the usual formal quotation of $3.75.

Coke.—Specifications of by-product foundry coke slackened slightly during the past week, although consumers have taken coke on contract at a good rate for August. While prices on foundry by-product coke will continue at about $10.05, delivered in Cincinnati, during September, quotations on domestic grades will be increased 25c. a ton on Sept. 1.

Old Material—The continued difficulty dealers have in obtaining sufficient good scrap to cover commitments is contributing strength to the old material market, but the reluctance of mills to pay higher prices has halted increases by dealers. There is very little buying, although consumers are accepting shipments on contract. Yard stocks of the steel grades are nearly depleted, and the only accumulation of old materials is in the cast iron grades.

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel	$14.25 to $14.75
Scrap rails for melting	14.25 to 14.75
Loose sheet clippings	9.00 to 9.50
Bundled sheets	11.00 to 11.50
Cast iron borings	9.25 to 9.75
Machine shop turnings	8.50 to 8.75
No. 1 busheling	10.50 to 11.00
No. 2 busheling	7.00 to 7.50
Rails for rolling	14.50 to 15.00
No. 1 locomotive tires	14.25 to 14.75
No. 2 railroad wrought	14.25 to 14.75
Short rails	18.50 to 19.00
Cast iron carwheels	12.75 to 13.25
No. 1 machinery cast	19.00 to 19.50
No. 1 railroad cast	15.25 to 15.75
Burnt cast	10.25 to 10.75
Stove plate	10.25 to 10.75
Brake shoes	10.25 to 10.75
Agricultural malleable	14.25 to 14.75
Railroad malleable	15.25 to 15.75

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and struc. shapes	3.40c.
Bars, soft steel or iron	3.30c.
New billet reinforc. bars	3.15c.
Rail steel reinforc. bars	3.00c.
Hoops	4.05c.
Bands	3.50c.
Cold-fin. rounds and hex.	3.85c.
Squares	4.35c.
Black sheets (No. 24)	4.05c.
Galvanized sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.45c.
Structural rivets	3.85c.
Small rivets	65 per cent off list
No. 9 ann'l'd wire, per 100 lb.	$3.00
Com. wire nails, base per keg	2.85
Cement c't'd nails, base 100 lb. keg	2.85
Chain, per 100 lb.	8.75
	Net per 100 Ft.
Lap-weld steel boiler tubes, 2-in.	$16.00
4-in.	33.00
Seamless steel boiler tubes, 2-in.	17.00
4-in.	34.00

Youngstown

Production in Mahoning Valley Turns Upward

YOUNGSTOWN, Aug. 27.—Iron and steel production takes an upturn this week in the Mahoning Valley, showing a gain of two open-hearth furnaces.

The Mahoning Valley Steel Co. has started eight sheet mills at its Niles plant, bringing the total number of active units in the district to 113 out of 120, against 97 in the preceding week. Of 51 independent open-hearth furnaces, 46 are active.

Rolling mills will suspend next Monday for the Labor Day observance.

Steel operations average 85 per cent this week. The Sharon Steel Hoop Co. has one strip mill off and is operating its steel plant at Lowellville at 80 per cent. The Republic Iron & Steel Co. is operating all four of its blast furnaces in its Haselton group. Twenty-eight of the district's 34 stacks are in blast.

Structural Steel Orders Heavy in July

WASHINGTON, Aug. 23.—Orders for fabricated structural steel in July, reported to the Department of Commerce by 193 firms, totaled 277,119 tons, representing 91 per cent of their capacity of 302,990 tons. This compares with 279,729 tons in June, reported by 218 firms, representing 89 per cent of their capacity of 312,885 tons.

Computed orders in July were 350,350 tons, against 342,650 tons, and computed shipments were 304,150 tons, or 79 per cent of capacity, compared with 292,600 tons or 76 per cent. July orders were the largest, with the exception of March, for any month this year, and were exceeded only once (August) last year.

For the first seven months of the current year computed orders totaled 2,271,500 tons, against 1,867,250 tons for the like period of last year. Computed shipments were 2,009,700 tons, or 75 per cent of capacity, against 1,690,150 tons, or 63 per cent of capacity, last year.

Newton's Michigan Mill Ready in January

The Newton Steel Co. is now roofing the buildings for its new plant at Monroe, Mich., which will consist of eight sheet mills designed to produce high finished automobile stock. The plant will have capacity for 20,000 tons of sheets monthly, about the same as its plant at Newton Falls, Ohio. It is expected the plant will be ready for experimental rolling in December and for commercial production in January.

Doubt Special Session Will Pass Tariff Bill

WASHINGTON, Aug. 27.—With the administrative features drafted, the Senate Committee on Finance has now finished revising the House tariff bill and the measure will come up for consideration in the Senate on Sept. 4, according to present plans. Like all tariff measures it is to be bitterly contested and there appears to be the general view that it will not pass at the special session.

Indications that some of the Republican leaders share this opinion is the statement given out last week by Senator Watson of Indiana, majority leader, that the bill must be passed by the first of the year. Previously Senator Watson had expressed the opinion that the bill would be passed. at the special session, and apparently there are some who still think this may be done.

Much discussion has centered around the placing of manganese ore on the free list and despite the comparative obscurity of the item so far as the general public is concerned, it appears to be getting a political importance that had hardly been anticipated. Apparently but little notice has been given to the fact that the Senate Committee in making manganese duty free reduced the duty on virtually all important iron and steel products and some of their remanufactures. The assumption is that if manganese ore should be restored to the dutiable list by the Senate, the stated reduction in rates on steel also would be removed.

Chairman Smoot of the Finance Committee estimated that the average ad valorem rate in the metal schedule of the Committee bill is 34.76 per cent and that its revenue would be $42,848,180 annually as against an average ad valorem rate of 39.63 per cent, netting $51,535,850 in the House bill and an average ad valorem rate of 35.07 per cent, netting $45,603,592, in the present Fordney-McCumber act. He said that 51 changes were made in the metal schedule.

In its report last week THE IRON AGE stated that the Senate Committee reduced the duty on punches, shears and bar cutters to 35 per cent from the duty of 40 per cent carried in the House bill. The Senate Committee reduced the rate to 30 per cent.

Sheet Steel Sales Gain in July

Sales of steel sheets by independent mills gained 10 per cent in July over June and production and shipments showed only a slight decline from the previous month according to the monthly report of the National Association of Flat Rolled Steel Manufacturers. However, production and shipments in June were considerably below the peak attained in May. Sales during the month were only about 7000 tons less than shipments. Unfilled orders are still heavy although they have declined each month since the peak of 835,801 tons in April. The July report and comparisons, in net tons, follow:

	July	June	May
Total number of mills	723	722	722
Capacity per month, tons	486,430	451,125	502,600
Percentage reporting	67.9	67.8	67.6
Sales, tons	337,222	307,911	279,783
Production	323,905	337,841	393,430
Shipments	344,676	347,989	392,336
Unfilled orders	658,155	676,568	713,568
Unshipped orders	107,751	111,333	119,535
Unsold stocks	47,103	52,274	48,334
Percentages of Capacity			
Sales	102.2	100.6	82.4
Production	98.1	110.4	115.8
Shipments	104.4	113.7	115.5
Unfilled orders	199.4	221.1	210.1
Unshipped orders	32.6	36.4	35.2
Unsold stocks	14.3	17.1	14.2

Laclede Builds Tube Mill

The Laclede Steel Co., St. Louis, has broken ground for a tube mill on a site adjacent to its steel works at Alton, Ill. Steel pipe will be made to serve the St. Louis district and the Southwest.

Higher British Tool Steel Prices Expected

LONDON, ENGLAND, Aug. 19.—It is probable that prices of high-speed tool steels will increase owing to the recent rapid advance in the prices of tungsten, according to the *Commercial.* When the metal-working trades last year were consuming relatively little tool steel, ferrotungsten fell to 30c. a lb., and tungsten powder to 36c. When ferrotungsten is, say, 30c. per lb., wolfram ore from which it is made is worth $75 per ton. The slump in tungsten caused the closing of many of the wolfram ore mines in Burma.

In pre-war days German interests owned the major supplies of wolfram ore, but during the war period British steel interests, mainly those at Sheffield, became the owners of the wolfram ore mines in Burma. It remains to be seen how far it is necessary to increase output to meet the needs of the tungsten works at Widnes and those of the makers of British tool steels.

Austin Co. to Build Russian Automobile Plant

The Austin Co., Cleveland, has received official confirmation of the recently published report that it has been awarded a contract for the design and construction of an automobile plant for the Soviet Government at Nishni Novgorod, Russia. The plant will be designed to manufacture 100,000 Ford cars annually and the Ford Motor Co. will provide technical assistance in equipping the plant and will assist in the manufacturing operations when the factory is completed. The project involves an expenditure of $20,000,000. The engineering work will be handled in the main office of the Austin Co. in Cleveland.

The contract calls for a power house, foundry and complete automobile plant, which will cover a 5,000 acre site. Housing will be provided for 25,000 people. The works will be erected by Soviet labor under the direction of American construction engineers. Upon completion of the designing and engineering details of the project, the Austin Co. will send a staff of experts to Russia to start the work of actual construction. The plant is scheduled to be completed in about two years.

Ohio Foundries Operate at Over Capacity Rate

Ohio foundries operated at 105.3 per cent during July, a slight falling off from June when their operations were at the rate of 110.6 per cent, according to the monthly report of the Ohio Foundries Association, Inc., based on data supplied by 32 foundries. Operations during July, 1928, were 103 per cent of capacity.

Non-Ferrous Metal Markets

Copper More Active—Tin Very Dull—Lead Sales Larger —Zinc Firm—All Prices Steady

NEW YORK, Aug. 27.

Copper.—Demand from both domestic and foreign consumers is increasing and the market is gathering strength almost every day. Yesterday, in particular, sales to domestic consumers exceeded 7500 net tons, and the market was quite active today. Buying is largely for September delivery, but there has already appeared some October demand, which has been covered. It is estimated that domestic consumers have bought close to 65 per cent of their September requirements. There are also some sales each day for immediate shipment. Foreign buying has increased, with the average for the last few days approximating 2000 to 3000 gross tons a day. Conservative calculations place the foreign sales for this month at about 45,000 tons, as compared with 21,000 tons two weeks ago, and with average normal purchases of at least 50,000 tons monthly. Foreign buyers have purchased only about 35 per cent of their September needs. In general, the buying is broad, including wire makers, brass producers and miscellaneous melters. On Monday one producer's sales ranged from 50,000 lb. up to over 2000 tons in single transactions. There is no change in prices, which are firm at 18c., delivered in the Connecticut Valley for electrolytic copper. The quotation of Copper Exporters, Inc., is 18.30c. c.i.f., usual European ports. Lake copper, particularly for spot and nearby delivery, is in active demand. One producer sold 500,000 lb. Monday. Prices are unchanged at 18c. to 18.12½c., delivered.

Tin.—In a very quiet market, sales of spot Straits tin for the week ended Saturday, Aug. 24, were about 700 tons. The market is devoid of features. Transactions have been almost entirely for spot and early September delivery and they are made by consumers who do not usually buy far ahead. In London, the market is also very quiet. Price fluctuations are small and therefore the so-called group has neither to buy nor sell to stabilize the market. Sales in the Far East, which are in fair volume, are at full prices. Very little activity is looked for from now on until after Labor Day. Spot Straits tin today

THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY

	Aug. 27	Aug. 26	Aug. 24	Aug. 23	Aug. 22	Aug. 21
Lake copper, New York	18.12½	18.12½	18.12½	18.12½	18.12½	18.12½
Electrolytic copper, N. Y.*	17.75	17.75	17.75	17.75	17.75	17.75
Straits tin, spot, N. Y.	46.12½	46.37½	....	46.75	46.62½	46.37½
Zinc, East St. Louis	6.80	6.80	6.80	6.80	6.80	6.80
Zinc, New York	7.15	7.15	7.15	7.15	7.15	7.15
Lead, St. Louis	6.55	6.55	6.55	6.55	6.55	6.55
Lead, New York	6.75	6.75	6.75	6.75	6.75	6.75

*Refinery quotation; price ¼c. higher delivered in the Connecticut Valley.

Rolled Products

Prices on rolled non-ferrous products are unchanged from those prevailing one week ago.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—
- High brass ..... 23.25c.
- Copper, hot rolled ..... 26.75c.
- Zinc ..... 10.25c.
- Lead (full sheets) ... 11.00c. to 11.25c.

Seamless Tubes—
- High brass ..... 28.25c.
- Copper ..... 29.25c.

Rods—
- High brass ..... 21.25c.
- Naval brass ..... 24.00c.

Wire—
- Copper ..... 19.87½c.
- High brass ..... 23.75c.

Copper in Rolls ..... 26.75c.
Brazed Brass Tubing ..... 30.87½c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also to St. Louis on shipments to points west of that river.

- Sheets, 0 to 10 gage, 3 to 30 in. wide ..... 33.00c.
- Tubes, base ..... 42.00c.
- Machine rods ..... 34.00c.

Chicago Warehouse

(Prices Cover Trucking to Customers' Doors in City Limits)

	Base per Lb.
Sheets—	
High brass	23.25c.
Copper, hot rolled	27.75c.
Copper, cold rolled, 14 oz. and heavier	30.00c.
Zinc	10.75c.
Lead, wide	11.35c.
Seamless Tubes—	
Brass	28.25c.
Copper	29.25c.
Brass Rods	21.25c.
Brazed Brass Tubes	31.00c.

New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—		
High brass	21.12½c.	to 22.12½c.
Copper, hot rolled, base sizes	27.75c.	to 28.75c.
Copper, cold rolled, 14 oz. and heavier, base sizes	30.00c.	to 31.00c.
Seamless Tubes—		
Brass	26.00c.	to 27.00c.
Copper	29.12½c.	to 30.12½c.
Brazed Brass Tubes	29.12½c.	to 30.12½c.
Brass Rods	18.87½c.	to 19.87½c.

New York Warehouse

Delivered Prices, Base Per Lb.

- *Zinc sheets (No. 9), casks* ..... 10.50c. to 11.00c.
- *Zinc sheets, open* ..... 11.50c. to 12.00c.

Metals from New York Warehouse

Delivered Prices, Per Lb.

- Tin, Straits pig ..... 48.00c. to 49.00c.
- Tin, bar ..... 50.50c. to 51.50c.
- Copper, Lake ..... 19.50c.
- Copper, electrolytic ..... 19.25c.
- Copper, casting ..... 19.00c.
- Zinc, slab ..... 7.75c. to 8.25c.
- Lead, American pig ..... 7.50c. to 8.00c.
- Lead, bar ..... 9.50c. to 10.00c.
- Antimony, Asiatic ..... 10.75c. to 11.25c.
- Aluminum No. 1 ingots for remelting (guaranteed over 99% pure) ... 25.00c. to 26.00c.
- Alum. ingots, No. 12 alloy ..... 24.00c. to 25.00c.
- Babbitt metal, commercial grade ..... 25.00c. to 35.00c.
- Solder, ½ and ½ ..... 30.25c. to 31.25c.

Metals from Cleveland Warehouse

Delivered Prices, Per Lb.

- Tin, Straits pig ..... 51.75c.
- Tin, bar ..... 53.75c.
- Copper, Lake ..... 19.50c.
- Copper, electrolytic ..... 19.25c.
- Copper, casting ..... 18.75c.
- Zinc, slab ..... 7.75c. to 8.00c.
- Lead, American pig ..... 7.25c. to 7.50c.
- Lead, bar ..... 9.75c.
- Antimony, Asiatic ..... 16.00c.
- Babbitt metal, medium grade ..... 18.75c.
- Babbitt metal, high grade ..... 56.00c.
- Solder, ½ and ½ ..... 31.75c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged customers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	14.75c.	16.25c.
Copper, hvy. and wire	14.50c.	15.75c.
Copper, light and bottoms	12.50c.	13.75c.
Brass, heavy	8.50c.	9.50c.
Brass, light	7.50c.	8.50c.
Hvy. machine composition	12.00c.	13.00c.
No. 1 yel. brass turnings	9.75c.	10.50c.
No. 1 red brass or compos. turnings	11.25c.	12.25c.
Lead, heavy	5.25c.	5.75c.
Lead, tea	4.25c.	5.25c.
Zinc	3.50c.	4.25c.
Sheet aluminum	14.00c.	16.00c.
Cast aluminum	12.25c.	14.25c.

was quoted at 46.12½c., New York. London prices today were a little lower than a week ago with spot standard quoted at £208 7s. 6d., future standard at £212 7s. 6d., and spot Straits at £212 7s. 6d. The Singapore price today is £217 10s.

Lead. — A considerably stronger market has developed. Sales have increased in volume and some fairly large transactions are reported. Delivery involved in some cases includes October, with some inquiry appearing for November, but most of the demand is for nearby and September. Prices are unchanged, that of the leading interest in the West standing at 6.55c., St. Louis. The leading interest continues to quote 6.75c., New York, as its contract price.

Zinc.—A better demand is reported, with a consequently firmer market. A week ago some shading of the quotation of most sellers was heard of, but this has disappeared. Demand for spot is better than for futures. There has, however, been no change in quotations, which continue at 6.80c., East St. Louis, or 7.15c., New York. Ore is still selling at $44 a ton, Joplin. Sales for the week ended Saturday, Aug. 24, were smaller than the previous week at 10,930 tons. Shipments, however, were the largest since April at over 13,200 tons, about the same as the production for the week, estimated at 13,550 tons. Reports are that efforts are being made to shut down the mines the week of Labor Day.

Antimony. — Conditions continue about the same as a week ago. Demand is more active and prices are very firm, owing partly to the prospect of an increase in the duty. Chinese metal is quoted and sold at 9c. a lb., New York, duty paid, for spot and nearby delivery, with futures at 8.87½c.

Nickel.—In wholesale lots, ingot nickel is quoted at 35c. a lb., with shot nickel at 36c. and cathode electrolytic nickel at 35c.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is obtainable at the published quotation of 23.90c. a lb., delivered.

Non-Ferrous Metals at Chicago

Aug. 27.—There has been a considerable increase in interest in all the metals, with business generally in somewhat better volume. Tin has declined to 47½c., but the other metals are unchanged. Old metal prices are unaltered.

Prices per lb., in carload lots: Lake copper, 18.50c.; tin, 47.40c.; lead, 6.70c.; zinc, 6.87½c.; in less-than-carload lots, antimony, 9.85c. On old metals we quote copper wire, crucible shapes and copper clips, 14c.; copper bottoms, 11.50c.; red brass, 11.50c.; yellow brass, 8c.; lead pipe, 4.50c.; zinc, 3.25c.; pewter, No. 1, 24.50c.; tin foil, 26c.; block tin, 36c.; aluminum, 12.87½c.; all being dealers' prices for less-than-carload lots.

OBITUARY

DR. JEREMIAH W. JENKS, research professor of government at New York University and president of the Alexander Hamilton Institute, died in New York, Aug. 24, aged 72 years. He graduated from the University of Michigan, studied law and was admitted to the bar but later became a teacher, being appointed in 1885 to the chair of political science at Knox College, Illinois. Later came professorships in Indiana University, Cornell, and New York University. He frequently served on Federal commissions dealing with economic questions. From 1889 to 1901 he was expert agent of the United States Industrial Commission charged with investigating trusts and industrial combinations in the United States and Europe. He acted in 1903 in the interest of the Mexican and Chinese Governments in their effort to secure the cooperation of the United States in establishing a fixed relationship between the money of gold standard and silver using countries. He was an authority on Oriental affairs and an official adviser and firm friend of the Chinese. In 1922 he investigated economic conditions in Germany to aid the Government in stabilizing the mark. He wrote a number of books on economic, educational and social questions and many Government reports on labor, finance and industry. He will be remembered as a friend of youth who gladly served his day and labored in season and out of season for betterment in government, in business and in the lives of every-day men and women.

GEORGE W. THOMSON, for many years Chicago district manager of the Norton Co., died Aug. 22, following a short illness. He was born in Fall River, Mass., 50 years ago. He was 12 years old when the family moved to Worcester, Mass., and a few years later went to work for the Norton Co. In 1910 he was assigned to the sales department covering Connecticut, and later Philadelphia.

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WALTER A. WINDSOR, president, Marietta Mfg. Co., Point Pleasant, W. Va., manufacturer of steel barges, died on Aug. 20 in a Cincinnati hospital, following an operation. He was born at Marietta, Ohio, 40 years ago, and entered the business of which his father was the head, soon after his graduation from Marietta College. During his presidency the plant of the company was removed from Marietta to Point Pleasant, and became one of the leading barge builders on the lower river. Mr. Windsor was also president of the Point Pleasant and Gallipolis Bridge Co., and of the Citizens National Bank, Point Pleasant.

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JOHN J. THEOBALD, for many years superintendent of the Spencer, Mass., plant of the Wickwire Spencer Steel Corporation, and for the past six years retired, died suddenly on Aug. 20, while attending the funeral of a friend in Spencer. He had served as president of the Spencer Chamber of Commerce and was a trustee of the Spencer Savings Bank.

Further Decrease in Imports of Pig Iron

Imports of pig iron into the United States in July dropped to 6743 gross tons from 11,396 tons in June and 14,393 tons in May. The July figures, however, were more than 10 per cent higher than a year ago, when 6055 tons came in.

For the seven elapsed months of the calendar year incoming tonnages have been within 2 per cent of the corresponding total last year. There has been only a slight change in the line-up of the supplying countries, British India having replaced United Kingdom in the lead, with the Netherlands, as last year, in third place.

UNITED STATES IMPORTS OF PIG IRON BY COUNTRIES OF SHIPMENT
(In Gross Tons)

	July		Seven Months Ended July	
	1929	1928	1929	1928
United Kingdom	412	50	27,284	34,777
British India	5,120	2,994	30,559	26,774
Germany	....	....	103	95
Netherlands	818	2,325	18,292	15,840
Canada	54	....	525	378
France	....	300	101	300
Belgium	....	....	184	202
Norway	....	....	1,340	91
Sweden	306	355	1,309	1,396
All others	33	31	507	1,497
Total	6,743	6,055	80,204	81,350

The Weaver Brothers Co., Adrian, Mich., has been made sales representatives in the metal pickling field for the Johnson-Carlson Tank Co., Chicago, manufacturer of wood tanks.

PERSONAL

K. L. GRIFFITH has been elected president of the Seneca Iron & Steel Co., Buffalo, succeeding Hugh Kennedy, deceased. JAMES PATERSON and CLIFFORD HUBBELL were elected vice-presidents, ALEX PATERSON and T. W. PATERSON, treasurer and secretary, respectively.

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S. S. FOX has been made manager and W. R. COLLARD, assistant manager of the Detroit office of the Joseph Schonthal Co., Columbus, Ohio.

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J. J. BRADY has been appointed district manager of the Boston office of the Combustion Engineering Corporation, New York, and M. E. YEAGER, sales engineer. The company's New England representation through the Schumaker-Santry Co. has been discontinued.

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F. L. FARRELL and D. F. JONES, formerly of the Schumaker-Santry Co., Boston, have associated themsevles as Farrell & Jones, 10 High Street, Boston, and have taken over the accounts formerly handled by Schumaker-Santry Co.

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THOMAS L. THOMAS, formerly of the McKay Machine Co., has joined the Youngstown Foundry & Machine Co., Youngstown, Ohio, as manager of the machine department, and takes charge of production and sales. The company manufactures shears, roll lathes, spike machines and sheet mill equipment and will soon extend the latter line.

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DR. OTTO PETERSEN, managing director of the Verein deutscher Eisenhüttenleute, Düsseldorf, Germany, and editor of *Stahl und Eisen*, will arrive in New York, Sept. 2, aboard the steamer New York to spend a short time in the United States en route to the Engineering Congress in Japan this fall.

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I. F. BAKER has been appointed European sales manager of the Westinghouse Electric International Co., with headquarters at 2 Norfolk Street, Strand, London. He has been sales manager of the power division of the company in New York, and during his connection with the Westinghouse company, which began in 1909, he has served in the export sales department of the parent company, as Japanese manager for the International company, and as managing director of the company's Japanese subsidiary.

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B. F. PIERSON, for many years with the Boston office of Niles-Bement-Pond Co., has joined the sales force of Manning, Maxwell & Moore.

WILLIAM J. WALSH, founder and president of the Walsh Holyoke Steam Boiler Works, Inc., Holyoke, Mass., has relinquished his activities in the business other than in an advisory capacity. He is succeeded by W. BRUCE PIRNIE, Springfield, Mass., a director of the Cheney-Bigelow Wire Co., and president of the Pirnie-Simmons Co. C. E. HEYWOOD and VINCENT P. MARRIN will continue as treasurer and assistant treasurer, respectively, of the boiler company.

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F. J. MUELLER, general foreman of the core department, Hammond, (Ind.) works, American Steel Foundries, has been appointed assistant works manager at the Indiana Harbor, Ind., plant.

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WILLIAM A. FORBES, assistant to president, United States Steel Corporation, New York; CHIH-HUNG CHOW, metallurgist, Lorain works, National Tube Co.; LEONARD C. GRIMSHAW, assistant metallurgist, Ludlum Steel Co., Watervliet, N. Y.; WALTER G. HILDORF, metallurgical engineer, Timken Roller Bearing Co. and Timken Steel & Tube Co., Canton, Ohio; SAMUEL R. ROBINSON, foundry manager, Industrial Brownhoist Corporation, Bay City, Mich.; WILLIAM H. STEWART, vice-president, Bethlehem Steel Export Corporation, New York, and LAWRENCE H. WETHERELL, Cambridge, Mass., metallurgist, Wetherell Brothers Co., are on the voting list of the autumn meeting, Sept. 10, for election to membership in the (British) Iron & Steel Institute.

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WILLIAM GUMMERE, open-hearth superintendent, John A. Roebling's Sons Co., Trenton, N. J., has been appointed general manager in charge of operation at Trenton and is succeeded in the open-hearth department by R. MERCUR, JR.

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STANTON L. DREIFUS, who has been connected with the scrap iron and steel industry for 25 years, has joined the organization of the Schiavone-Bonomo Corporation, scrap dealer, 11 West Forty-second Street, New York.

Extensive Safety Program at Chicago Meeting

Many sections of the National Safety Council have individual programs in the eighteenth annual Safety Congress to be held in the Stevens and Congress Hotels, Chicago, Sept. 30 to Oct. 4. Among the items are the following:

Paper, "Industrial Relations in Accident Control," by C. W. Bergquist, Western Electric Co., Chicago.

"Talk for Junior Safety Men," by Earl F. Blank, Jones & Laughlin Steel Corporation, Pittsburgh.

"Safety Committee in Action," a playlet directed by J. W. Benner, Homestead Works, Carnegie Steel Co., Munhall, Pa.

"Report on Annealing of Chains," by R. F. Thalner, safety director, Buick Motor Co., Flint, Mich.

"Structural and Sheet Metal Fabrication." by Daniel L. Royer.

"Noise and Its Relation to Accidents," by Dr. H. Clyde Snook.

"Hazards of Inter-department Trucking," by R. F. Thalner.

"Mechanical Safeguards on Construction Equipment," by E. H. Lichtenberg, chief engineer, Koehring Co., Milwaukee.

"Training Workers for Safety in Industry," by J. C. Wright, director, Federal Board of Vocational Education, Washington.

"Symposium on Physical Examinations in Industry," by Dr. C. H. Watson, medical director, American Telephone & Telegraph Co., New York; F. B. Thatcher, assistant general manager, By-Products Coke Corporation, Chicago; A. T. Lancaster, general foreman, Hawthorne Works, Western Electric Co., Chicago, and Dr. Guy L. Kiefer, commissioner of health, State of Michigan, Lansing.

"Report of Foundry Research Committee," by F. G. Bennett, Buckeye Steel Castings Co., Columbus, Ohio.

"What Is Safety First?" by P. J. Stremmel, general superintendent, Granite City Steel Co., Granite City, Ill.

"Report of Safe Practices Committee," by J. M. Woltz, Youngstown Sheet & Tube Co., Youngstown, Ohio.

"Progress in Gas Welding Safety," by H. S. Smith, consulting engineer, Union Carbide Co., New York.

"Safety Kinks in the Metal Industry," a film-strip, by John A. Oartel, Carnegie Steel Co., Pittsburgh, followed by general roundtable discussion.

Addresses before the Metals Section, by Dr. Harry Myers, Frigidaire Corporation, Dayton, Ohio; George Seyler, works manager, Lunkenheimer Co., Cincinnati; and J. E. Culliney, Bethlehem Steel Corporation, Bethlehem, Pa.

"Method of Promoting Accident Prevention," by F. C. Miller, Colorado Fuel & Iron Co. Trinidad, Colo.

"Safe and Unsafe Practices in Mining," a film-strip, by H. G. Hensel, Youngstown Sheet & Tube Co., Chicago.

"Power Press Accidents and Their Causes," by J. E. Walters, General Electric Co., Lynn, Mass.

"Drop Forge Manufacturing and Safety," by S. M. Havens, Wyman-Gordon Co., Harvey, Ill.

"Safe Dies a Necessity," by R. A. Shaw, tool and die stamping division, Murray Corporation of America, Detroit.

"Safety Devices for Modern Machine Tools," by Luther D. Burlingame, Brown & Sharpe Mfg. Co., Providence.

Roundtable discussion on power press problems, led by C. B. Bartlett, Geuder, Paeschke & Frey Co., Milwaukee.

Crucible Steel Co. of America and the Halcomb Steel Co. have acquired a site, 156 x 180 ft., on East Fifty-fifth Street, Cleveland, on which they will build a two-story warehouse and office building with 30,000 sq. ft of floor space.

Fabricated Structural Steel

New Work, Amounting to 58,000 Tons, Is Largest Since Middle of July

MORE than one-half of the structural steel lettings the past week, totaling 22,000 tons, were for industrial projects. New work, amounting to 58,000 tons, was the largest since the middle of July. Twenty-seven thousand tons will go into the construction of bridges. Highway bridges at Cleveland and Portland, Ore., will require 15,000 tons and 8000 tons, respectively. Awards follow:

BOSTON, 1000 tons, South Station canopies, to New England Structural Co.

WALTHAM, MASS., 300 tons, hospital, to Barker Steel Co.

STATE OF NEW YORK, 175 tons, highway bridge, to American Bridge Co.

NEW YORK, 1500 tons, House of Detention on Tenth Street, to McClintic-Marshall Co.

STATE OF NEW JERSEY, 225 tons, highway bridge in Bergen County, to McClintic-Marshall Co.

STATE OF NEW JERSEY, 400 tons, highway bridge in Atlantic County, to Bethlehem Steel Co.

STATE OF NEW JERSEY, 1700 tons, highway bridge on route 75, sections 18 and 19, to Bethlehem Steel Co.

SAYREVILLE, N. J., 1000 tons, power house for Raritan River Power Co., to American Bridge Co.

PHILADELPHIA, 1000 tons, Dorset Boulevard, to Bethlehem Steel Co.

STATE OF PENNSYLVANIA, 100 tons, bridge over Cheat River, to Jones & Laughlin Steel Corporation.

STATE OF PENNSYLVANIA, 600 tons, highway bridge in Northumberland County, to McClintic-Marshall Co.

MONROE, LA., 2000 tons, Brown Paper Mill Co., to Virginia Bridge & Iron Co.

TONAWANDA, N. Y., 3000 tons, power house for General Electric Co., to McClintic-Marshall Co.

AUBURN, N. Y., 200 tons, cell building at Auburn prison, to Kellogg Structural Steel Co.

PITTSBURGH & WEST VIRGINIA RAILROAD, 2100 tons, viaducts on Connellsville extension, to American Bridge Co.

CLEVELAND, 900 tons, building for Bourne-Fuller Co., to Massillon Bridge & Structural Co.

DETROIT, 1100 tons, Wayne County airport hangar, to R. C. Mahon Co.

CHICAGO, 260 tons, plant addition, Taylor Forge & Pipe Works, to A. Bolter's Sons.

HAMMOND, IND., 800 tons, Lever Brothers soap plant, to Duffin Iron Works.

MILWAUKEE, 1250 tons, office building for the Milwaukee Electric Railway & Light Co., to Wisconsin Bridge & Iron Co.

MENASHA, WIS., 500 tons, factory addition for Marathon Paper Co., to Worden-Allen Co.

MILWAUKEE, WIS., 250 tons, emergency hospital of city of Milwaukee, to Wisconsin Bridge & Iron Co.

DALLAS, TEX., 1200 tons, Bell Telephone Co. Building, to McClintic-Marshall Co.

SAN FRANCISCO, 140 tons, apartment building, Pacific near Webster Street, to McClintic-Marshall Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

FALL RIVER, MASS., 100 tons, State bridge.

LITTLE FALLS, N. Y., 400 tons, high school.

SCARSDALE, N. Y., 300 tons, New York Telephone Co. building.

NEW YORK, 600 tons, apartment house at 1050 Fifth Avenue.

NEW YORK CENTRAL RAILROAD, 3000 tons, commissary building on 161st Street, New York.

PENNSYLVANIA RAILROAD, 2000 tons, warehouse in Jersey City.

STATE OF NEW JERSEY, 1000 tons, six highway bridges.

EDGEWATER, N. J., 6000 tons, assembly plant for Ford Motor Co.

CAMDEN, N. J., 800 tons, Camden Athletic Club building.

PENNSYLVANIA RAILROAD, 2400 tons, miscellaneous transmission line equipment.

PHILADELPHIA, 1600 tons, Henry Avenue bridge; F. A. Canuso & Son, low bidder on general contract.

BUFFALO, 600 tons, school No. 67.

BUFFALO, 300 tons, New York Central viaduct, Harlem Avenue.

CLEVELAND, 15,000 to 18,000 tons, Lorain-Central bridge.

CHICAGO, 3700 tons, Wendell Phillips Senior High School; Vierling Steel Works, low bidder.

PORTLAND, ORE., 8000 tons, St. John's bridge.

PHOENIX, ARIZ., 550 tons, generating plant for Central Arizona Light & Power Co.; bids being taken.

SACRAMENTO, CAL., 738 tons, bridge.

OAKLAND CAL., 1000 tons, hotel at Fourteenth and Jackson Streets.

SAN FRANCISCO, 150 tons, addition to apartment building at Sacramento and Mason Streets.

Railroad Equipment

Delaware, Lackawanna & Western Orders 1393 Cars

ORDERS were placed the past week for slightly less than 1800 cars. Of that number, 1393 are for the Delaware, Lackawanna & Western. Fresh inquiries are light. Details of the week's business follow:

Brooklyn & Queens Transit Corporation has ordered 50 single and center exit surface car bodies from J. G. Brill Co. and 50 from Osgood Bradley Co. The former also will supply 100 sets of trucks.

Delaware, Lackawanna & Western has ordered 141 steel suburban motor cars, equipped with roller bearings, from Pullman Car & Mfg. Corporation, 700 box cars, 250 hopper cars and two baggage and mail cars from American Car & Foundry Co. and 300 box cars from Magor Car Corporation. This carrier has placed an order with American Car & Foundry Co. for conversion of 141 suburban passenger cars into multiple-unit trailer cars.

South Buffalo Railway is inquiring for three eight-wheel switching locomotives.

Nashville, Chattanooga & St. Louis is in the market for five mountain-type locomotives.

Southern Pacific, Texas Lines, is inquiring for replacement parts to rebuild 400 box cars.

Columbia & Greenville has bought 300 box cars from American Car & Foundry Co.

Canadian National has contracted for one gasoline combination passenger and baggage rail motor car with the J. G. Brill Co.

Natchez, Columbia & Mobile is in the market for one or two 2-8-2 type locomotives.

Condon, Kinzua & Southern is expected to buy one 2-10-2 type locomotive.

Reinforcing Steel

Awards Total 5200 Tons and Inquiries 5500 Tons

AWARDS in the past week totaled 5200 tons, the largest having been 1200 tons for a Philadelphia hosiery plant. New projects will take about 5500 tons. A wharf at Oakland, Cal., will require 2300 tons. Awards follow:

RENSSELAER, N. Y., 450 tons, factory, to Kalman Steel Co.

PHILADELPHIA, 1200 tons, hosiery plant, to Taylor-Davis Co.

BARRINGTON, ILL., 1000 tons, warehouse for Jewel Tea Co., to Kalman Steel Co.

CHICAGO, 100 tons, plant for Ajax Quilting & Mfg. Co., to Inland Steel Co.

CHICAGO, 100 tons, factory, Diversey Boulevard and Tripp Avenue, to Concrete Engineering Co.

CHICAGO, 400 tons, film exchange building for Warner Brothers, to Concrete Engineering Co. (previously credited to unstated distributer).

KOHLER, WIS., 700 tons, Kohler Co. plant addition, to American System of Reinforcing.

SEATTLE, WASH., 1150 tons, West Garfield Street bridge, to Northwest Rolling Mills.

PASADENA, CAL., 100 tons, Atheneum building of California Institute of Technology, to Soule Steel Co.

Reinforcing Bars Pending

PENNSYLVANIA RAILROAD, 1500 tons, warehouse at Jersey City.

HARRISBURG, PA., 800 tons, farm show building.

PHILADELPHIA, 280 tons, laboratory for Gulf Refining Co. at Girard's Point.

PHILADELPHIA, 300 tons, Henry Avenue bridge.

BUFFALO, 150 tons, school No. 67.

BUFFALO, 200 tons, New York Central viaduct, Harlem Avenue.

FINDLAY, OHIO, 125 tons, building for Ohio Oil Co.

CHICAGO, 200 tons, apartment building at 6230 Kenmore Avenue; H. Janisch & Co., general contractor.

SUPERIOR, WIS., 500 tons, elevator, general contract awarded to Fegles Construction Co., St. Paul, Minn.

OAKLAND, CAL., 2300 tons, wharf foot of Ninth Street.

OAKLAND, CAL., 210 tons, wharf foot of Fourteenth Street.

SACRAMENTO, CAL., 285 tons, paving in Marin County.

Large Steel Exports Continue

Seven-Month Total Largest Since 1921—Gain Over 1928 in Rolled and Finished Was 19 Per Cent—Imports Heavier, Too

WASHINGTON, Aug. 29.—Aggregating 270,532 gross tons, exports of iron and steel products from the United States in July of the present year exceeded those of June, amounting to 247,811 tons, by 22,721 tons and were the largest since April, when they totaled 287,297 tons. For the seven months ended with July exports were 1,862,371 tons, or 251,604 tons greater than last year, with a total of 1,610,371 tons. Exports in July of last year amounted to 253,405 tons. The daily average for July, 1929, was 8727 tons, compared with 8260 tons in June.

Imports in July also showed an increase, rising to 71,378 tons from 63,635 tons in June, a gain of 7743 tons. For the first seven months they were 429,223 tons, a decrease of 18,432 tons under the imports of 447,655 during the corresponding period of last year. Imports in July of last year were 53,567 tons. The daily average in July was 2302 tons, against 2121 tons in June.

Of the 37 classes listed in THE IRON AGE export table, gains were made in outgoing shipments in 20, with losses in the remaining 17, when compared with exports in June. Pig iron exports increased to 7777 tons from 3101 tons and reflected an unusual situation in that outgoing shipments exceeded imports, the latter amounting to only 6743 tons. Exports of scrap in July were 47,018 tons, against 42,816 tons.

In the finished lines, galvanized sheets exported in July increased to 14,154 tons from 12,604 tons and exports of black steel sheets increased to 18,259 tons from 15,718 tons while exports of plates rose to 19,675 tons from 17,640 tons. Among the products showing declines were plain structural shapes which dropped to 29,946 tons from 31,268 tons and tin plate, which fell to 16,875 tons from 18,041 tons.

Pig iron was exported in July chiefly to Japan, 5702 tons, and to Canada, 1724 tons. Scrap exports were widely distributed, Canada taking 11,281 tons; Italy, 9609 tons; Japan, 8861 tons; Poland, 6633 tons; Germany, 4900 tons; Spain 2347 tons and Mexico, 2007 tons.

Of the 6447 tons of casing and oil line pipe exported, 2112 tons went to Venezuela and 1370 tons to Canada. Canada took 4050 tons and the United

Exports of Iron and Steel from the United States

(In Gross Tons)

	July		Seven Months Ended July	
	1929	1928	1929	1928
Pig iron	7,777	8,598	38,567	33,927
Ferromanganese	40	1,137	1,053	5,998
Scrap	47,018	43,932	296,738	295,063
Pig iron, ferroalloys and scrap	*54,835*	*53,667*	*336,358*	*334,988*
Ingots, blooms, billets, sheet bar	1,236	941	26,287	11,240
Skelp	13,976	15,079	67,771	61,636
Wire rods	5,822	3,638	28,882	22,167
Semi-finished steel	*21,034*	*19,658*	*122,940*	*95,043*
Steel bars	17,183	13,795	129,803	84,563
Alloy steel bars	547	1,102	11,947	8,594
Iron bars	167	471	2,921	2,314
Plates, iron and steel	19,675	14,648	126,971	86,374
Sheets, galvanized	14,154	15,341	100,574	90,466
Sheets, black steel	18,259	19,100	111,022	109,411
Sheets, black iron	1,428	1,355	9,073	8,843
Hoops, bands, strip steel	4,734	4,987	47,592	32,684
Tin plate; terne plate	16,875	21,528	152,996	146,627
Structural shapes, plain material	29,946	14,533	175,812	104,406
Structural material, fabricated	10,392	14,191	65,063	54,417
Steel rails	9,999	11,079	95,565	120,203
Rail fastenings, switches, frogs, etc.	3,102	2,504	20,149	30,078
Boiler tubes	1,746	1,573	11,306	9,931
Casing and oil-line pipe	6,447	10,189	79,421	64,632
Black and galvanized welded pipe	14,880	11,436	83,664	65,337
Malleable iron screwed pipe fittings	1,070	1,115	7,361	5,526
Plain wire	3,591	3,264	29,728	26,936
Barbed wire and woven wire fencing	5,695	5,537	41,383	43,963
Wire cloth and screening	125	216	1,037	1,065
Wire rope	736	386	4,658	2,964
Wire nails	1,352	1,425	9,210	10,032
Other nails and tacks	1,033	837	6,382	6,095
Horseshoes	37	64	220	269
Bolts, nuts, rivets and washers, except track	1,232	1,262	9,359	7,762
Rolled and finished steel	*184,405*	*171,939*	*1,333,217*	*1,123,492*
Cast iron pipe and fittings	3,849	2,490	20,944	19,850
Car wheels and axles	1,645	928	14,112	8,552
Car castings	901	776	7,980	7,713
Steel castings	966	1,097	7,265	6,337
Forgings	1,039	1,168	8,252	6,140
Castings and forgings	*8,400*	*6,459*	*58,553*	*48,592*
All other	1,858	1,683	11,303	8,652
Total	270,532	253,405	1,862,371	1,610,767

Imports of Iron and Steel into the United States

(In Gross Tons)

	July		Seven Months Ended July	
	1929	1928	1929	1928
Pig iron	6,743	6,055	80,204	81,350
Ferromanganese*	5,213	2,891	37,797	27,296
Ferrosilicon‡	1,079	332	5,216	2,043
Ferrochrome†	142	58	382	396
Scrap	9,101	3,688	52,374	26,532
Pig iron, ferroalloys and scrap	*22,278*	*13,024*	*175,973*	*137,617*
Steel ingots, blooms, billets and slabs	3,519	1,218	15,902	13,088
Wire rods	1,242	595	9,838	10,012
Semi-finished steel	*4,761*	*1,813*	*25,740*	*23,100*
Rails and splice bars	1,067	1,534	4,127	11,180
Structural shapes	18,247	11,192	87,354	100,034
Boiler and other plates	34	198	2,456	3,355
Sheets and saw plates	2,818	1,160	13,248	15,999
Steel bars	3,209	4,992	21,481	55,338
Bar iron	127	35	2,110	1,386
Hoops, bands and cotton ties	6,770	6,630	21,448	21,495
Tubular products (wrot.)	3,192	2,918	25,248	23,973
Nails, tacks, staples	800	1,020	5,340	4,863
Tin plate	31	159	173	751
Bolts, nuts, rivets and washers	29	11	165	154
Round iron and steel wire	490	408	3,756	2,440
Barbed wire	577	226	3,542	1,975
Flat wire; strip steel	137	132	1,240	1,339
Steel telegraph and telephone wire	.....	10	.....	153
Wire rope and strand	247	168	1,511	971
Other wire	17	42	366	320
Rolled and finished steel	*37,792*	*30,835*	*193,565*	*245,726*
Cast iron pipe	6,383	7,731	32,657	39,248
Castings and forgings	164	164	1,288	1,964
Total	71,378	53,567	429,223	447,655
Manganese ore*	48,406	21,447	214,008	105,364
Iron ore	301,418	183,256	1,769,154	1,415,669
Magnesite (dead burned)	.....	3,912	12,111	31,386

*Manganese content only.
‡Silicon content only.
†Chromium content only.

Kingdom 1024 tons of the 10,773 tons of black welded pipe exported. Of the 17,183 tons of steel bars exported, 8433 tons went to Canada, 2688 tons to the United Kingdom and 2265 tons to Japan. Canada took 26,601 tons of the plain structural shapes and 4334 tons of the tin plate shipments, while China took 2737 tons of tin plate and Japan 1994 tons. The great bulk of steel plates, 16,931 tons, went to Canada.

Philippine Islands was the largest buyer of galvanized sheets, taking 3302 tons, Canada taking 2546 tons. Exports of black steel sheets to Canada were 7559 tons, while Japan took 3624 tons. The exports of black steel sheets to Canada were 7559 tons, while Japan took 3624 tons. The exports of steel rails, amounting to 9999 tons, were distributed rather evenly, Argentina taking 1857 tons; Chile, 1609 tons; Mexico, 1413 tons and Canada, 1128 tons. Japan took only 175 tons.

Total exports to Canada in July were 118,069 tons. For the seven months ended with July, shipments to Canada amounted to 792,942 tons, compared with 633,877 tons for the corresponding period of last year. This gain was almost two-thirds of the total gain to all countries. Exports to Japan in July totaled 31,330 tons; for the first seven months they were 218,072 tons, compared with 214,541 tons during the like period of last year.

UNITED STATES IMPORTS OF IRON AND STEEL PRODUCTS
(In Gross Tons)

	July	June
Austria	50	34
Belgium	15,497	9,888
Bulgaria	170	....
Czechoslovakia	....	660
France	13,556	9,965
Germany	13,163	12,580
Italy	217	387
Netherlands	837	....
Norway	1,668	3,677
Poland	....	1,629
Sweden	3,491	3,835
Switzerland	40	3
United Kingdom	4,034	5,790
Europe	*52,723*	*48,448*
Canada	13,305	10,042
Mexico	33	39
Cuba	195	1,200
British India	5,120	3,903
Japan	2	3
Total	71,378	63,635

While there were gains made in imports in only 10 of the 26 classes as against 15 losses, with no incoming shipments in either month of telegraph and telephone wire, the increased movement in July as compared with June was due to the sharp rise in receipts of structural shapes, amounting to 18,247 tons as against 12,274 tons. Pig iron imports dropped from 11,396 tons in June.

Of the incoming shipments of structural shapes, Belgium provided 9322 tons; Germany, 4434 tons and France, 4233 tons. France supplied 6213 tons of the 6383 tons of cast iron pipe imported. Of the 3209 tons of steel bars imported, 1550 tons came from Sweden, 682 tons from Belgium, 407 tons from France and 359 tons from Germany.

Canada was the source of 2799 tons of the 5213 tons of ferromanganese imported; Norway, 1212 tons and the United Kingdom, 1077 tons. Soviet Russia provided 41,355 tons of the 48,406 tons of manganese concentrates imported; Brazil, 4077 tons and India, 2844 tons. The principal countries from which products were imported in July were Belgium, 15,497 tons; France, 13,556 tons; Canada, 13,305 tons and Germany, 13,163 tons. In June no country furnished as much as 13,000 tons.

Destination of Iron and Steel Exports from the United States
(In Gross Tons)

Country of Destination	July, 1929	June, 1929	July, 1928	January Through July 1929	January Through July 1928
North and Central America and West Indies	*143,303*	*139,449*	*121,410*	*958,054*	*772,689*
Canada and Newfoundland	118,163	117,056	100,358	793,777	636,192
Cuba	5,847	4,624	6,289	42,199	37,535
Guatemala	949	335	264	4,776	6,099
Honduras	495	736	508	7,222	4,459
Mexico	11,906	10,876	6,999	57,991	46,796
Panama	780	1,040	1,248	11,001	9,756
Salvador	462	234	307	4,675	2,218
British West Indies	697	1,662	514	13,082	4,881
Other West Indies	3,006	2,127	4,348	17,390	19,383
Other Central America	998	759	575	5,941	5,370
South America	*28,701*	*27,026*	*38,366*	*244,022*	*255,716*
Argentina	6,421	8,420	6,544	60,208	57,746
Brazil	6,739	4,681	9,527	40,255	50,835
Chile	5,074	2,879	4,157	36,915	40,282
Colombia	2,725	2,723	7,391	27,455	42,597
Peru	3,076	2,365	900	20,748	14,290
Uruguay	381	374	354	5,822	5,438
Venezuela	4,024	5,139	9,239	49,337	41,139
Other South America	261	395	254	3,282	3,389
Europe	*36,905*	*31,599*	*32,300*	*229,557*	*181,973*
Belgium	149	165	1,690	1,949	8,987
France	3,636	1,564	440	13,490	2,939
Germany	5,017	766	192	17,741	20,607
Italy	10,333	10,495	8,274	74,765	52,375
Netherlands	226	168	99	1,740	1,432
Poland and Danzig	6,634	7,406	13,765	54,396	45,805
Rumania	479	182	537	2,284	2,933
Soviet Russia	131	159	407	2,243	1,976
United Kingdom	6,005	5,455	5,010	37,316	31,464
Other Europe	4,295	5,239	1,886	23,633	13,455
Far East	*59,388*	*46,982*	*60,189*	*416,906*	*391,346*
British Malaya	382	85	442	4,790	3,856
China	4,740	4,587	6,723	46,091	64,258
Netherlands East Indies	7,452	3,269	3,690	44,273	17,741
India and Ceylon	382	1,440	764	11,628	14,326
Japan	31,330	27,558	32,969	218,072	214,541
Kwantung	617	609	1,498	8,488	4,479
Philippine Islands	11,302	5,078	11,093	58,353	55,226
Australia	2,116	2,593	1,610	13,563	9,195
New Zealand	142	226	164	2,937	1,211
Other Asia and Far East	925	1,537	1,236	8,711	6,513
Africa	*2,235*	*2,755*	*1,140*	*13,832*	*9,043*
Union of South Africa	1,168	1,029	333	5,361	3,813
Egypt	585	1,100	323	5,780	3,411
Mozambique	328	288	311	1,432	790
Other Africa	154	338	173	1,259	1,029
Total	270,532	247,811	253,405	1,862,371	1,610,767

Increased Orders for Steel Castings

WASHINGTON, Aug. 27.—Making a gain of 8451 tons, orders for commercial steel castings in July totaled 103,447 tons, or 71 per cent of capacity, compared with 94,996 tons, or 65 per cent of capacity, in June, according to reports received by the Department of Commerce from 127 producers with a present capacity of 145,700 tons, which represents more than 80 per cent of the total capacity of the country. Production in July was 119,474 tons, or 82 per cent of capacity, against 116,009 tons, or 80 per cent of capacity, in June.

Orders for railroad specialties in July were 37,383 tons, or 55 per cent of that class of capacity, against 34,947 tons, or 52 per cent of capacity, in June. Orders for miscellaneous castings were 66,064 tons, or 85 per cent of such capacity, compared with 60,049 tons, or 77 per cent of capacity.

Total orders for the first seven months were 827,176 tons, against 576,260 tons for the corresponding period of last year. Production was 790,757 tons in seven months, compared with 605,913 tons.

New Fractional Motor Plant

The Domestic Electric Co., Cleveland, according to Carl A. Duffner, president, has purchased a group of buildings and a tract of land at Kent, Ohio, to be devoted to the manufacture of fractional horsepower motors of the universal type. The new plant will more than double the capacity of the present plant in Cleveland. All buildings are reinforced concrete with automatic sprinkler systems, three stories in height.

The motors are designed for nationally advertised electric household appliances, electric-driven tools and commercial electric appliances. The Domestic company is a division of Black & Decker, Towson, Md. Other companies in this group are the Van Dorn Electric Tool Co., Cleveland; Black & Decker Mfg. Co., Ltd., Canada; Black & Decker, Ltd., England; and Marschke Mfg. Co., Indianapolis.

Second Highest Machinery Exports

Total for Seven Months Greatest Ever Made—Imports Far Above Last Year—Agricultural Implements Large in Both Lists

WASHINGTON, Aug. 24.—Continuing their rising tendency, exports of machinery of all kinds in July were valued at $56,973,585, as compared with $49,732,282 in June, an increase of $7,241,303. The total was the second highest ever recorded, having been exceeded only by the $59,507,795 of last March. For July of last year they were valued at $47,830,687.

For the first seven months machinery exports were valued at $362,757,783, a gain of $74,177,580 (or 26 per cent) over exports for the corresponding period of 1928 with a value of $287,580,203. The total this year makes a new high record for that period.

Exports of machinery and vehicles in July were valued at $107,697,415, against $104,994,973 in the preceding month and $95,663,337 in July of last year. For the first seven months they were valued at $779,356,344, against $603,803,130 for the corresponding period of last year, an increase of $175,553,214, or 29 per cent.

Exports of industrial machinery in July, as classified by the Division of Statistics, Department of Commerce, were valued at $25,322,120, against $22,392,023 in June and $20,902,855 in July of last year. For the first seven months of 1929 they were valued at $163,872,038, compared with $129,259,555 for the corresponding period of 1928.

Exports of power-driven metal-working machinery, as listed in THE IRON AGE table, totaled 1180 units, valued at $1,480,982 as compared with 886, valued at $1,537,399 in June. Exports of agricultural machinery and implements in July were valued at $14,722,000, against $12,041,000 in June and $13,996,000 in July of last year. They aggregated $86,791,000 for the first seven months of the present year, against $68,007,000 for the same period of 1928.

Imports of machinery and vehicles in July were valued at $4,036,771, compared with $3,714,910 in June and $2,306,665 in July of last year. For the first seven months they were valued at $25,896,311, compared with $16,238,818 for the like period of last year.

Imports of industrial, office and printing machinery in July, 1929, were valued at $2,288,438, against $2,111,168 in June and $1,516,328 in July of last year. They rose to $14,775,972 during the first seven months of the current year, against $9,947,108 for the corresponding period of last year.

Imports of machinery as listed in THE IRON AGE table were valued at $2,855,506 in July, against $2,609,261 in June and $1,613,165 in July of last year. For the first seven months they were valued at $19,630,421, against $12,119,581 for the similar period of 1928.

Machinery Exports from the United States

(By Value, in Thousands of Dollars)

	July		Seven Months Ended July	
	1929	1928	1929	1928
Locomotives	$814	$625	$1,748	$1,650
Other steam engines	17	90	289	640
Boilers	109	114	1,145	695
Accessories and parts	57	27	560	363
Automobile engines	549	1,354	8,297	9,347
Other internal combustion engines	816	876	5,950	4,989
Accessories and parts	428	303	2,790	2,253
Electric locomotives	121	36	563	1,069
Other electric machinery and apparatus	1,197	805	7,877	4,608
Excavating machinery	918	470	5,060	4,480
Concrete mixers	167	104	877	614
Road-making machinery	313	252	2,144	1,755
Elevators and elevator machinery	452	477	3,033	2,624
Mining and quarrying machinery	1,688	1,120	10,050	8,133
Oil-well machinery	2,346	1,587	15,229	8,406
Pumps	1,018	754	7,264	4,628
Bending and power presses	386	208	2,224	1,124
Forging machines	141	57	914	464
Machine tools*	2,913	2,562	20,041	14,706
Other metal-working machinery and parts	633	565	4,537	3,536
Textile machinery	1,192	1,094	8,180	7,924
Sewing machines	994	726	6,180	5,198
Shoe machinery	124	106	1,184	1,053
Flour-mill and gristmill machinery	40	46	343	277
Sugar-mill machinery	197	340	1,639	2,500
Paper and pulp-mill machinery	293	227	1,901	1,931
Sawmill machinery	65	92	533	550
Other woodworking mach'ry	254	128	1,413	1,044
Refrigerating and ice-making machinery	1,442	1,088	9,157	5,315
Air compressors	733	660	4,573	4,135
Typewriters	2,396	1,507	14,605	13,189
Power laundry machinery	256	93	1,248	679
Typesetting machines	485	435	3,569	2,704
Printing presses	536	464	4,402	3,515
Agricultural machinery and implements	14,722	13,996	86,791	68,007
All other machinery and parts	18,162	14,443	116,448	93,475
Total	$56,974	$47,831	$362,758	$287,580

*Principal details in another table.

Exports of Power-Driven Metal-Working Machinery

	July, 1929		June, 1929	
	No.	Value	No.	Value
Engine lathes	72	$155,015	65	$182,174
Turret lathes	43	104,389	34	112,281
Other lathes	65	119,984	82	155,430
Vertical boring mills and chucking machines	20	62,880	7	25,035
Thread-cutting and automatic screw machines	114	176,920	82	139,858
Knee and column type milling machines	24	48,860	32	79,526
Other milling machines	44	99,031	76	148,434
Gear-cutting machines	55	191,494	41	117,640
Vertical drilling machines	40	25,520	36	51,231
Radial drilling machines	10	31,830	9	25,024
Other drilling machines	451	97,408	81	78,314
Planers and shapers	41	77,610	79	100,262
External cylindrical grinding machines	76	166,979	44	134,868
Internal grinding machines	29	68,774	41	121,314
Metal-working tool-sharpening machines	96	54,288	177	66,008
Total	1,180	$1,480,982	886	$1,537,399

Imports of Machinery Into the United States

(By Value)

	July		Seven Months Ended July	
	1929	1928	1929	1928
Metal-working machine tools	$136,582	$50,209	$756,542	$367,147
Agricultural machinery and implements	851,341	315,010	6,294,201	3,228,226
Electrical machinery and apparatus	380,468	161,535	1,669,777	1,322,076
Other power-generating mach'ry	101,969	38,480	755,301	123,308
Other industrial machinery	868,622	734,139	6,999,812	5,337,416
Vehicles except agricultural	516,524	313,792	3,154,788	1,741,408
Total	$2,855,506	$1,613,165	$19,630,421	$12,119,581

July Automobile Output Lowest Since February

WASHINGTON, Aug. 23.—Motor vehicles to the number of 500,331 were produced in the United States in July, passenger units totaling 426,159; trucks, 73,118; and taxicabs, 1054, according to the Department of Commerce. Production in June totaled 545,375 vehicles, of which 452,624 were passenger cars, 91,373 were trucks and 1378 were taxicabs. Canadian production in July was 17,461 units, of which 13,600 were passenger cars and 3861 were trucks, comparing with 21,492 in June, of which 16,511 were passenger cars and 4981 were trucks.

For the first seven months of the current year 3,723,723 motor vehicles were produced in the United States, 3,198,497 being passenger cars, 513,539 trucks and 11,687 taxicabs. Motor vehicle production for the corresponding period of last year totaled 2,593,607 units, of which 2,301,199 were passenger cars, 288,835 trucks and 3573 taxicabs. The increase in passenger cars was 39 per cent; in trucks, 78 per cent; in taxicabs, 227 per cent.

Truck and taxicab production in seven months was greater than the entire year's production for any year previous to 1928, when 527,623 were made. Passenger car output in seven months was greater than for the 12 months of 1927. Total production in July, while larger than for any month of any preceding year, was the lowest since February.

Canadian output for the first seven months of 1929 was 205,822, of which 165,213 were passenger cars and 40,609 were trucks. For the corresponding period of last year the total was 150,214 units, of which 127,991 were passenger cars and 22,223 were trucks.

Labor Maintains Efficiency

Although high wages have in the past been regarded as a signal for a falling off in labor efficiency, no such tendency seems apparent in the present era of prosperity, according to the Business Conditions Weekly of the Alexander Hamilton Institute. Since 1919 factory wages have increased 19 per cent. At the same time, factory output has increased 43 per cent and the cost of labor per unit has fallen about 22 per cent.

This extraordinary increase in factory labor efficiency, doubtless due partly to use of machinery, is accompanied by evidence of labor contentment. During the first five months of 1929 there has been a monthly average of only 72 strikes as compared with a monthly average of 303 for 1919.

Malleable Castings Orders, Output, Shipments Fall

WASHINGTON, Aug. 24.—Orders for malleable castings in July totaled 61,988 net tons, compared with 65,377 tons in June, according to reports received by the Department of Commerce from 123 firms operating 137 plants. A year ago the orders were 60,964 tons in July. Output was 70,132 tons, or 73.2 per cent of capacity in July, against 72,512 tons, or 75.2 per cent of capacity, in June and 60,290 tons, or 63.1 per cent, a year ago. Shipments were 69,940 tons in July, 72,608 tons in June and 60,084 tons in July, 1928.

For the first seven months, orders aggregated 526,867 tons this year, against 444,973 tons last year. Production was 538,718 tons, or 80.4 per cent of capacity, compared with 455,164 tons, or 67.4 per cent of capacity.

Orders, shipments and production in July made the lowest totals for any month so far in 1929. Production, however, was higher in July than for any month of 1928, and shipments were above any 1928 month except March.

Factory Earnings Remain High

Average weekly earnings in representative factories in New York State, including all employees in both office and shop, were $30.02 in June. There has been a gradual drop from the record of $30.35 in March to $30.07 in April and $30.03 in May. Otherwise, except for $30.12 last December, there has been no month in which the average has been above $30. It was $29.48 in June, 1928, registering a drop to $29.15 in July before the fall improvement began.

Employment and Payroll Totals in Identical Plants in June and May[a]

	Establishments	Number on Payroll		Weekly Payroll [b]	
		June	May	June	May
Iron and steel	206	286,815	286,103	$9,415	$9,590
Foundry and machine shop	1,057	291,801	290,977	9,109	9,265
Machine tools	145	39,929	39,329	1,321	1,312
Hardware makers	69	32,559	32,795	853	863
Steam and hot-water appliances	111	32,584	33,258	948	988
Stoves	113	20,136	20,291	566	579
Structural ironwork	165	28,536	27,994	863	853
Cast iron pipe	44	12,477	12,069	293	281

[a] United States Bureau of Labor Statistics.
[b] Thousands of dollars

Fabricated Plate Orders Ahead of Last Year

WASHINGTON, Aug. 26.—Orders for fabricated steel plate in July totaled 46,686 tons, according to reports received by the Department of Commerce from 48 firms, and represented 61.7 per cent of capacity. This compares with 45,918 tons or 57.5 per cent of capacity in June, and with 35,959 tons and 46.8 per cent in July, 1928. Orders in July and June, respectively, were distributed as follows: Oil storage tanks, 14,963 tons and 6890 tons; refinery materials and equipment, 3180 tons and 4383 tons; tank cars, 1835 tons and 1998 tons; gas holders, 5352 tons and 5444 tons; blast furnaces, 2650 tons (the largest total in many months) and 1003 tons; stacks and miscellaneous, 18,706 tons and 26,200 tons.

For the first seven months orders have aggregated 330,300 tons, or 59.5 per cent of capacity, against 296,442 tons, or 53.3 per cent of capacity, for the corresponding period of last year.

Pittsburgh Water Shipments in July

The United States Engineer Office, Pittsburgh, reports a movement of 102,963 net tons of iron and steel products on the Ohio River in July, compared with 116,679 tons in June, and 90,145 tons in July, 1928. On the Monongahela River 109,051 net tons of these products were carried in July, against 116,157 tons the month before and 91,834 tons in July last year. Allegheny River commerce in iron and steel products amounted in July to only 25 tons; in June it was 722 tons, while it was nil in July last year.

Factory Building Cost Down

The cost of new factory construction is 10 per cent below the average for the last 10 years, according to a survey of building costs throughout the country just made by the Austin Co., engineer and builder, Cleveland. This company has found that the cost of industrial construction is now 40 per cent under the peak reached in 1920 and is at its lowest point since late in 1922. The computation is based on a standard building, 100 x 200 ft., and includes the cost of material and labor.

Trackwork Shipments Drop

Shipments of trackwork in July, as reported by the American Iron and Steel Institute, totaled 13,844 net tons, compared with 14,838 tons in June and 16,333 tons in May. Shipments in July, 1928, were 11,776 tons. The year to Aug. 1 shows shipments of 99,281 tons, against 88,905 tons for the corresponding seven months of 1928,

Machinery Markets and News of the Works

Tool Market Shows Vitality

New York District Bookings Unusually Good, But Business Elsewhere Has Tapered

ALTHOUGH August sales have not kept pace with those of July, largely on account of seasonal conditions, the machine tool business has shown remarkable midsummer vitality.

Bookings in the New York district have been especially good, and one important Eastern seller expects August to be the best month of the year. However, the volume of orders in other parts of the country has tapered somewhat and the actual placing of contracts has been delayed in many cases because of the absence of executives on vacations.

With few exceptions, sales have consisted of one or two machines each. The unfavorable delivery situation is proving a handicap to machine tool builders in closing inquiries. In fact, some buyers, notably the smaller ones, are withdrawing from the market rather than wait indefinitely for delivery of tools.

The General Electric Co. has made further purchases and has issued a fair-sized list, which includes equipment to be used in a department developing new apparatus for recording and reproducing talking motion pictures. The International Harvester Co. is reported to have bought most of its equipment for its tractor plant at Rock Island, Ill., and the Westinghouse Electric & Mfg. Co. has been ordering freely against its third quarter requirements.

The New York Central is inquiring for a number of tools for its Harmon, N. Y., shops, but otherwise prospective railroad business is negligible. A Connecticut manufacturer has contracted for 12 milling machines and another New England company has purchased $40,000 worth of tools.

New York

NEW YORK, Aug. 27.—Machine tool business in this district shows remarkable midsummer vitality. One of the important New York sellers expects that its August business will be the largest of any month this year. Others are also doing well, although some report slightly less volume than was booked in July. One of the large orders of the week came from a New England company and totaled more than $40,000. Pending inquiries from a New Jersey company total about $80,000. The General Electric Co. has bought a number of tools and has issued a fair-sized list, some of the new equipment to be used in the department which is developing a new apparatus for recording and reproducing talking moving pictures. The New York Central Railroad has issued a number of inquiries for tools for its new shop at Harmon, N. Y., and it is understood that a list of considerable size will be purchased. A Western aircraft company will locate in Elizabeth, N. J., and is expected to be a buyer of some shop equipment.

Contract has been let by American Can Co., 230 Park Avenue, New York, to United Engineering & Construction Co., Front Street, Elizabeth, N. J., for additions to plant at 330-32 Elizabeth Avenue, Newark, consisting of three one-story units 100 x 120 ft., 81 x 84 ft., and 60 x 81 ft., last noted with three-story extension, and one-story boiler plant, to be used for machine shop and other mechanical service, reported to cost about $140,000 with equipment. Company engineering department is in charge. Following recent purchase of plant of Canadian Canners, Ltd., Simcoe, Ont., for reported consideration of approximately $1,000,000, plans are reported under way for two and three-story plant, 100 x 150 ft., and 100 x 250 ft., at that place, to cost upward of $800,000 with equipment.

N. Liesenbein's Sons, Inc., 257 Hancock Street, Long Island City, manufacturer of furniture frames, etc., has purchased four-story factory, 80 x 100 ft., at Hinsdale Street and Atlantic Avenue, Brooklyn, and will occupy for new plant at early date.

F. L. Smith Machine Co., Inc., 633 West Forty-fourth Street, New York, has filed plans for extensions and improvements in five-story plant, reported to cost about $35,000. Russell G. Cory, 30 Church Street, is architect and engineer.

Aero Supply Co., College Point, L. I., manufacturer of aircraft hardware, etc., has work under way on new addition and will equip to provide about 25 per cent in present capacity, reported to cost more than $60,000. Company has recently acquired National Steel Products Co., Dayton, Ohio, manufacturer of steel specialties for aircraft; and Standard Automatic Products Corporation, Corry, Pa., manufacturer of turnbuckles, etc., for airplane service.

Cutler-Hammer Mfg. Co., 8 West Fortieth Street, New York, manufacturer of electrical control devices and equipment, with main plant at Milwaukee, is having plans drawn for a six-story addition, 90 x 150 ft., to New York works at Southern Boulevard and 144th Street, to cost more than $300,000 with equipment. Barney-Ahlers Construction Corporation, 110 West Fortieth Street, is architect and engineer.

Airport Lighting, Inc., 10 East Fortieth Street, New York, recently organized under Delaware laws with capital of 100,000 shares of stock, no par value, plans operation of plant for manufacture of automatic electric lighting equipment for night landing at airports. F. G. Ericson is president.

Brooklyn Edison Co., Pearl and Willoughby Streets, Brooklyn, operated by New York Edison Co., Irving Place and Fifteenth Street, New York, has authorized enlargement of steam-operated electric generating plant on Hudson Avenue, to increase capacity from 340,000 to 450,000 kw., estimated to cost $7,000,0000. Contract for prime movers has been let, and awards for auxiliary equipment will be made at early date. Expansion is scheduled for completion in about 12 months.

Alfred Hofmann, Inc., 635 Fifteenth Street, West New York, N. J., manufacturer of knitting machinery for hosiery mills, with assembling division for imported machines for like service, has plans for a two-story addition, 100 x 125 ft., including improvements in present plant, reported to cost more than $70,000 with equipment. Lockwood Greene Engineers, Inc., 1 Pershing Square, New York, is architect and engineer.

American Transformer Co., 178 Emmet Street, Newark, manufacturer of transformers for electric power and radio service, has awarded general contract to J. J. Thomas, 428 Peshine Avenue, for two-story addition to cost close to $40,000 with equipment.

Durant Motor Co., 250 West Fifty-seventh Street, New York, will discontinue operations at plant on Frelinghuysen Avenue, Newark, on Sept. 30, and works will be closed down permanently about middle of October. Equipment now in service for metal division, last remaining unit at plant, will be removed to plant of City Auto Stamping Co., Toledo, Ohio, which will furnish metal stampings in future for main plant of Durant company at Lansing, Mich. Negotiations are reported un-

der way by American Eagle Aircraft Corporation, Kansas City, Mo., for acquisition of Newark plant, for use as Eastern branch works.

Pennsylvania Dock & Warehouse Co., Jersey City, N. J., recently organized, will construct and operate eight-story cold storage warehouse and refrigerating plant, 230 x 900 ft., on local site, near Exchange Place, referred to in these columns last week as project of Pennsylvania Railroad Co., which will have financial interest in new company. Entire plant will cost close to $5,000,000 with machinery, instead of smaller amount previously noted. Company has arranged for bond issue of $5,750,000, to provide funds for project. George F. Bial, 147 Summit Avenue, Union City, N. J., is architect. W. J. MacMillan is president.

Charles Shilowitz, 26 Journal Square, Jersey City, N. J., architect, has plans for a four-story automobile service, repair and garage building at Sip and Summit Avenues, reported to cost over $400,000 with equipment.

Philadelphia

PHILADELPHIA, Aug. 27.—Delta File Works, Inc., 4837 James Street, Philadelphia, manufacturer of files, rasps, etc., has awarded general contract to William F. Lotz, Frankford Street and Oxford Avenue, for one-story addition, 40 x 75 ft., reported to cost about $25,000 with equipment.

I. Fischman & Sons, Inc., Tenth Street and Allegheny Avenue, Philadelphia, manufacturer of soda fountain equipment, is planning consolidation of three existing plants in new two- and three-story factory on Erie Avenue, from F to G Streets, including former plant of Stanley H. Knight Co., 216 West Superior Street, Chicago, lately acquired for consolidation with Fischman organization. New plant will provide about four times present floor space, and is estimated to cost $1,500,000 with machinery. Maurice Fischman is president.

Wilkening Mfg. Co., Fifteenth and Mount Vernon Streets, Philadelphia, manufacturer of piston rings, etc., is considering new two-story plant at Spring and Sevent-first Streets, reported to cost more than $45,000 with equipment. F. W. Wilkening is president.

City Council, Philadelphia, will take title early in September to Hog Island shipyard from the Government, totaling about 995 acres of land, as site for proposed municipal airport. Plans will be prepared for hangars, repair and reconditioning shops and other mechanical field units, as well as marine and rail facilities, entire project to cost $1,000,000, in which amount a bond issue is being arranged.

Hiergesell Brothers, 2011 Bellevue Avenue, Philadelphia, manufacturer of scientific instruments, thermometers, etc., has leased a floor in building at 2518 North Broad Street, and will occupy for increased manufacture.

Interests headed by Janney & Co., 1529 Walnut Street, Philadelphia, and Prince & Whitely, 25 Broad Street, New York, investment securities, have purchased control of Autocar Co., Ardmore, Pa., manufacturer of motor trucks. Company will be reorganized and general expansion program carried out for increased production. Robert P. Page, Jr., will continue as president; J. C. Taney, heretofore treasurer, has been elected senior vice-president.

City Council, Haddonfield, N. J., is reported considering construction of municipal electric light and power plant, and artificial gas plant, and will have estimates of cost made in near future. Frederick T. Holloway is commissioner of public works.

Board of Education, Mechanicsburg, Pa., is said to be planning installation of manual training equipment in new addition to high school at High and Simpson Streets, to cost $180,000, for which bids have been asked on general contract. C. J. Lappley, Front and Harris Streets, Harrisburg, Pa., is architect.

Glen Alden Coal Co., Scranton, Pa., will carry out an expansion and improvement program at its Diamond colliery near Hazleton, Pa., to include the electrification of the properties, with installation of electric hoists, pumping apparatus, etc. Colliery will be closed for six weeks to carry out work.

Plans have been arranged for merger of Wilburham-Greene Blower Co., Pottstown, Pa.; Cartersville Blower Co., Cartersville, Pa.; and Stacey Brothers Gas Construction Co., Carthage Pike, Cincinnati, manufacturers of gas works machinery, mechanical blowers, etc. Consolidated organization plans expansion program for increased output. Carmi H. Thompson will be president.

Lycoming Mfg. Co., Williamsport, Pa., Manufacturer of automobile engines, parts, etc., a subsidiary of Auburn Automobile Co., Auburn, Ind., has awarded general contract to Austin Co., 1015 Chestnut Street, Philadelphia, and Cleveland, for two-story addition on Park Avenue, reported to cost about $90,000 with equipment. It is understood that erection will be carried out by Fell Co., William Street, Williamsport.

Delaware Electric Power Co., Wilmington, Del., is carrying out an expansion and improvement program in power plants and system to cost more than $1,000,000, providing for increased generating and transmission line facilities.

Board of Trustees, Benton School District, Benton, Pa., is having plans drawn for a one-story manual training shop in connection with new gymnasium. W. Walter Witman, 1916 Market Street, Harrisburg, Pa., is architect.

New England

BOSTON, Aug. 27.—Compared with June and July, August will be a lean month for a majority of New England machine tool dealers and manufacturers but will compare favorably with August, 1928. Manufacturers have sufficient backlogs, in a majority of instances, to keep plants running on current operating hours during the remainder of 1929, and quite a few well into 1930. The only important sale reported the past week by local dealers was more than a dozen milling machines to a Connecticut manufacturer.

Eastern Aircraft Corporation, Pawtucket, R. I., recently organized to manufacture all-metal aircraft, is establishing new plant near What Cheer airport, and will specialize in production of seven and three-passenger cabin type planes from designs and patents of Bayerische Flugzeugwerke, A. G., Augsburg, Germany, for which American rights have been secured. Company has arranged for stock issue to total $875,000, portion of fund to be used for plant facilities and operations. Ray C. Van Arsdale is president; Alexander Klemin is consulting engineer.

Superior Spring & Mfg. Co., 373 Washington Street, Hartford, Conn., with headquarters at New Haven, Conn., has acquired property at 397 Washington Street, 60 x 150 ft., as site for new plant, reported to cost more than $45,000 with equipment.

Union Twist Drill Co., 70 Monroe Street, Athol, Mass., has plans for a two-story addition, 60 x 100 ft., reported to cost close to $45,000 with equipment.

Federal Electric Co., 8700 South State Street, Chicago, has concluded arrangements for purchase of Loper Fire Alarm Co., Stonington, Conn., manufacturer of wireless fire alarm systems and devices, and will consolidate with organization. It is proposed to remove Stonington plant to Chicago, where production will be concentrated and increased. A. P. Loper, heretofore head of acquired company, will continue with organization as consulting engineer.

Yale & Towne Mfg. Co., Stamford, Conn., locks, etc., is building a one-story, 100 x 150 ft. unit No. 19 and foundry addition.

South Atlantic

BALTIMORE, Aug. 27.—Western Electric Co., 195 Broadway, New York, has approved plans for a one-story power house at new cable and telephone equipment manufacturing plant at River View Park, Baltimore, now in course of construction, to cost about $150,000 with equipment. Entire project will cost more than $10,000,000. H. K. Ferguson Co., Hanna Building, Cleveland, is engineer.

Excelsior Pearl Works, Inc., 131 Ingraham Street, Brooklyn, N. Y., manufacturer of buttons, has purchased property at Federalsburg, Md., and plans early erection of one-story factory, totaling about 30,000 sq. ft. floor space, reported to cost about $70,000 with equipment. Company is now operating three plants and plans removal of branches to new location, with later concentration of all production at that location, following building of other units.

Sylvania Industrial Corporation, 122 East Forty-second Street, New York, has awarded general contract to Hughes-Foulkrod Co., Schaff Building, Philadelphia, for initial units of proposed mill for manufacture of transparent paper products at Fredericksburg, Va., to include a machine shop and boiler plant, estimated to cost $750,000 with equipment. Ballinger Co., Twelfth and Chestnut Streets, Philadelphia, is architect and engineer.

Consolidated Gas, Electric Light & Power Co., Lexington Building, Baltimore, has filed plans for seven-story equipment storage and distributing plant, 86 x 140 ft., at 416-30 South Eutaw Street, to include mechanical repair and service shop, estimated to cost $170,000 with equipment.

Coastal Public Service Co., Guyton, Ga., is planning extensions and improvements in local electric light and power plant, including installation of generator unit, crude oil engine and auxiliaries, reported to cost more than $100,000.

City Council, Griffin, Ga., is planning for bids early next month for pumping machinery and auxiliary power equipment, pipe lines, etc., for a municipal waterworks, to develop capacity of 3,000,000 gal. a day, estimated to cost about $275,000. Robert & Co., Bona Allen Building, Atlanta, Ga., are engineers.

Norfolk & Western Railway Co., Norfolk, Va., plans installation of elevating, conveying and other mechanical-handling equipment at new warehouses and dis-

tributing plants at Lambert's Point, consisting of two units, 120 x 500 ft., and 120 x 800 ft., estimated to cost $260,000. General contract has been let to John P. Pettyjohn, 212 Eighth Street, Lynchburg, Va. W. P. Wiltsee is chief engineer.

Virginia Public Service Co., Charlottesville, Va., has acquired plant and property of Leesburg Electric Co., Leesburg, Va., and will consolidate with organization. Plans are under way for extensions and improvements in Leesburg plant, with installation of additional equipment for increased output; additions will be made in transmission lines.

Detroit

DETROIT, Aug. 27.—Western Gear Co., 3428 Scotten Street, Detroit, has arranged for a division of operations, including general manufacture of new gears and transmissions for automobile service, and formation of subsidiary organization to take over replacement branch of business. New building has been leased and will be used to more than double former capacity. Arrangements have been made for a heat-treating plant to occupy a separate unit.

Ford Motor Co., Detroit and Dearborn, Mich., is having plans completed for new power plant on Oakman Boulevard, near Ford airport, Dearborn, reported to cost in excess of $150,000 with equipment. Albert Kahn, Inc., Marquette Building, Detroit, is architect and engineer.

Covel Mfg. Co., Benton Harbor, Mich., manufacturer of saw-filing machinery and kindred mechanical equipment, has awarded general contract to M. W. Stock & Sons, Broad Street, St. Joseph, Mich., for one-story addition on Graham Avenue, estimated to cost about $40,000 with equipment.

Board of Water Commissioners, 735 Randolph Street, Detroit, is asking bids until September 11, for equipment for municipal waterworks at Springwells Station, including two 1000-hp. steam boiler units with complete accessories, two superheaters for boilers, two underfeed stokers for boilers, two economizers and two air preheaters. Specifications on file at Department of Water Supply, Division of Engineering, 8100 West Warren Avenue, Dearborn, Detroit; George H. Kenkell is general manager and chief engineer.

Ex-Cell-O Aircraft & Tool Corporation, 1200 Oakman Street, Detroit, manufacturer of precision tools, Diesel engine parts, etc., has filed plans for addition to plant to increase present floor space by more than 150 per cent, reported to cost more than $150,000 with equipment. Portion of new unit will be used for production of line of new specialties, including new precision equipment and parts for airplane motors. N. A. Woodworth is president.

Central Machine Co., 6320 East Fort Street, Detroit, is planning two-story addition to machine shop, 60 x 100 ft., to cost about $45,000 with equipment.

Wayne County Board of Supervisors, Barlum Tower Building, Cadillac Square, Detroit, will soon take bids for aircraft hangar at county airport, Middlebelt and Goddard Roads, with repair and reconditioning shop facilities, estimated to cost more than $300,000 with equipment. Plans are also under way for one-story power plant at same location to cost in excess of $85,000. B. Russell Shaw, Arcade Building, St. Louis, is architect and engineer for both projects.

Department of Water and Electric Light, 116 West Ottawa Street, Lansing, Mich., has awarded general contract to H. G. Christman Co., Lansing, for addition to municipal electric light and power plant at Moores River Park, to cost about $750,000 with machinery. J. E. Woodwell, 501 Fifth Avenue, New York, is consulting engineer.

Pittsburgh

PITTSBURGH, Aug. 27.—Westinghouse Electric & Mfg. Co. is reported to be buying freely against its third quarter machine tool list. The report of most dealers is that business still is good, although typical of this time of the year, the absence on vacations, of those in charge of purchases, means that the actual placing of orders is delayed. With the awarding of the cranes for the steel works at the McKeesport works, National Tube Co., it is believed the machine tool requirements are nearer consideration.

Standard Steel Specialty Co., Beaver Falls, Pa., manufacturer of machine keys and other mechanical products, has plans for one-story addition, 60 x 120 ft., to plant at West Mayfield, reported to cost about $75,000 with equipment.

Fokker Aircraft Corporation of America, Inc., Glendale, near Wheeling, W. Va., is projecting plans for two new branch plants, one to be located in vicinity of San Francisco, for parts production and assembling, and other at McCook Field, Dayton, Ohio, recently acquired, both works reported to cost more than $200,000.

Youghiogheny & Ohio Coal Co., of Pennsylvania, Inc., Commonwealth Building, Pittsburgh, operating bituminous coal mining properties in western Pennsylvania, has arranged for a bond issue of $2,000,000, portion of fund to be used for extensions and improvements in plants for increased capacity.

West Virginia Airways, Inc., Charleston, W. Va., recently organized by Harold B. Shadle, Edgewood Drive, and associates with capital of $100,000, plans establishment of flying school and commercial flying facilities at municipal airport, including repair and reconditioning shops, airplane accessory shop, and other units, reported to cost over $60,000.

Hale Aeroplane & Motor Vehicle Mfg. Co., Welch, W. Va., has been organized with capital stock of $50,000 to manufacture airplanes. Company is contemplating construction of plant. William Hale is president.

Buffalo

BUFFALO, Aug. 27.—Consolidated Aircraft Corporation, 2050 Elmwood Avenue, Buffalo, has acquired tract of 30 acres of land near municipal airport, Long Beach, Cal., and plans new plant for Pacific Coast trade, one-story, including parts and assembling divisions, reported to cost more than $100,000 with equipment. Company recently secured a substantial interest in Kinner Airplane & Motor Corporation, Glendale, Cal., manufacturer of aircraft motors, and which will be used in airplanes to be built by company at projected plant.

Cutler Desk Co., 20 Churchill Street, Buffalo, manufacturer of metal and wood office furniture, has awarded general contract to B. Rebascher & Sons, Inc., 110 Timon Street, for extensions and improvements in factory to cost about $30,000.

Morrison Steel Products Co., 201 Urban Street, Buffalo, manufacturer of automobile parts and equipment, has filed plans for one-story plant at 127 Kehr Street, to cost close to $30,000 with equipment.

Vernon E. Cook, 724 North Washington Street, and Leo R. H. Burton, 109 West Garden Street, Rome, N. Y., have organized new company under name of Burton, Cook & Co., and plan operation of local plant for manufacture of machinery and mechanical equipment.

Simmons Co., 420 Canal Street, Syracuse, N. Y., manufacturer of brass and other metal bedsteads, springs, etc., with main works at Kenosha, Wis., has asked bids on general contract for new three-story branch plant and distributing works at Sizer Street and Raynor Avenue, reported to cost over $85,000 with equipment. Paul Hueber, 212 Harrison Street, is architect.

Irving Air Chute Co., 372 Pearl Street, Buffalo, manufacturer of aviation equipment, is said to be arranging for early operation of new branch plant at Los Angeles, to cost more than $75,000 with equipment. New unit will be used for manufacturing for Pacific Coast trade.

Cleveland

CLEVELAND, Aug. 27.—Machine tool sales continue to taper off. Starting with a fair volume of business at the first of the month there has been a rather steady decline in orders from week to week. Buying the past week was limited for the most part to single tools for replacement purposes. Detroit reports a quiet market as the motor car industry is buying little equipment at present. While some machine tool manufacturers have caught up a little on shipments of tools in some sizes, the general delivery situation shows little improvement and some business is not being placed because prospective purchasers cannot secure fairly prompt deliveries.

Dill Mfg. Co., 684 East Eighty-second Street, Cleveland, manufacturer of automobile tire valves, valve fittings, steering locks, etc., is said to be planning new one-story addition on Mandalay Road, to cost in excess of $40,000 with equipment. J. D. Williamson is president.

Cleveland Universal Jig Co., 2005 Rockwell Avenue, Cleveland, has awarded general contract to Ellsasser Construction Co., 1517 Prospect Avenue, for one and two-story plant unit on St. Clair Avenue, reported to cost close to $40,000 with equipment. Kalsch & Hoeffler, 4500 Euclid Avenue, are architects and engineers.

Boom Boiler & Welding Co., 2313 Elm Street, Cleveland, has taken over the plant and business of Blackwell Welding Co., Toledo, Ohio, and will continue operations as a branch. W. J. Heller will be manager.

Linderme Tube Co., 1291 East Fifty-third Street, Cleveland, manufacturer of steel tubing, etc., has plans under way for one-story addition, 60 x 100 ft., to cost close to $50,000 with equipment. Emil Linderme is president.

Newburgh Steel Co., 6318 Kinsman Road, Cleveland, will soon take bids for a one and two-story addition on Tullamore Road, reported to cost more than $70,000 with equipment. George S. Rider Co., Century Building, is architect and engineer.

General Fireproofing Co., Youngstown, Ohio, has work under way on new addition to cost about $100,000 and will equip for production of aluminum chairs for office service and kindred furniture. Unit is scheduled to be ready for occupancy in November.

Bruce-Macbeth Engine Co., 2111 Center Street, Cleveland, manufacturer of gas engines, parts, etc., is reported planning one-story addition to cost in excess of $45,000 with equipment. C. E. Curtis is general manager.

Middle States Air Service, Inc., Akron, Ohio, care of C. W. Frank, Akron Savings & Loan Building, architect, has plans under way for hangar at Fulton Field, with repair and reconditioning shop facilities, estimated to cost $80,000 with equipment.

Chicago

CHICAGO, Aug. 27.—Purchases of machine tools for the "Farmall" tractor plant of the International Harvester Co. at Rock Island, Ill., may be completed this week. Outside of this list there are no large inquiries in the market. Business is at about the same rate as in July, but somewhat smaller than in earlier months of the year. Demand is well diversified and is generally of a hand-to-mouth character, since prompt delivery is commonly asked. In fact, some buyers, notably the smaller ones, are withdrawing inquiries because of the delayed shipments on many types of machine tools. Deliveries on most classes of tools range from 10 to 12 weeks, and in extreme instances manufacturers will not promise shipments before January or February. Chicago, Burlington & Quincy is in the market for two axle lathes.

Illinois Anthracite Corporation, 307 North Michigan Avenue, Chicago, has awarded contract for seven-story electric transformer building, 47 x 84 ft., to cost $20,500.

Crane Co., 936 South Michigan Boulevard, Chicago, placed contract for one-story plant addition, 120 x 220 ft., at 4100 South Kedzie Avenue, to cost $110,000.

Iver Larsen & Sons, pattern makers, 165 North Jefferson Street, Chicago, sustained damage to their plant recently by fire.

E. A. Wheeler and William F. Walker have opened a machine shop at 330 Wabash Avenue, Decatur, Ill.

Anaconda Wire & Cable Co., Sycamore Ill., will install wire-drawing machines and electric annealing ovens in its plants and expects to require 100 to 150 additional employees.

Cook Electric Co., 2700 Southport Avenue, Chicago, has acquired from Teletype Corporation property 123 x 232 ft., at 2731 High Street, improved with a one and two-story plant and office building and a one-story warehouse.

General Porcelain Enameling Co., 4100 Schubert Avenue, Chicago, has awarded contract for a one-story factory, 26 x 125 ft., to cost $3,000.

Wolverine Carburetor Co. of Michigan, manufacturer of carbureters, has taken possession of factory formerly occupied by the J. C. Mfg. Co. at Jackson, Mich.

Chicago, Rock Island & Pacific Railroad Co., La Salle Street Station, Chicago, has filed plans for addition to engine house, 20 x 300 ft., with repair facilities, at 4701 Wentworth Avenue, to cost about $45,000 with equipment. A. T. Hawk is company architect.

The Crane Market

INQUIRY for locomotive cranes is increasing with some good business in prospect for export and a fair volume of inquiry from contractors. The Amtorg Trading Corporation, New York, is taking bids on two 20-ton and one 15-ton locomotive cranes for export to Russia and Japanese trading companies in New York are in the market for a locomotive crane for Japan. In the domestic field, the New York Central Railroad is inquiring for a 25-ton locomotive crane. In the New York district, the Brooklyn Edison Co., is in the market for a 75-ton trolley for a Case overhead crane in a sub-station. The United States Metals Refining Co., Carteret, N. J., is about to close on seven 15-ton electric traveling cranes for Copper Cliffs, Canada. Low bidder on the sub-stations to be erected for the Board of Transportation, New York, which will require six 30-ton electric cranes was the Erickson Engineering Co., New York.

It is rather generally conceded in the Pittsburgh district that this year has been the best since the war. Most builders have sufficient orders to insure full operation to the end of the year. The National Tube Co., which recently bought 24 cranes for McKeesport, Pa., will shortly buy a number for the new seamless tube mill. Cranes have also been placed by the Wheeling Steel Corporation and the Corrigan, McKinney Steel Co.

Among recent purchases are:

Arizona Edison Co., Casa Grande, Ariz., 10-ton 50-ft. span hand power crane from Box Crane & Hoist Corporation.

De Laval Cream Separator Co., Poughkeepsie, N. Y., two 2-ton, 23-ft. and 28-ft. spans, 3-motor overhead cranes and seven 1-ton, 23-ft. span hand power cranes with electric hoists from Shepard Niles Crane & Hoist Corporation.

Wright Aeronautical Corporation, Paterson, N. J., 2-ton hand power crane from Box Crane & Hoist Corporation.

Temple Corporation, 1925 South Western Avenue, Chicago, manufacturer of all-electric radio equipment and devices, has purchased property at West Sixty-fifth Street and La Vergne Avenue, as site for new plant which will more than triple present capacity. Existing plant will be removed to new location as soon as unit is ready. Project is estimated to cost more than $400,000 with equipment. Foltz & Co., 510 North Dearborn Street, are architects.

Mid-West Bottle Cap Co., Belvidere, Ill., manufacturer of metal bottle caps, etc., has asked bids on general contract for one and one-half story addition, reported to cost about $30,000 with equipment. Bradley & Bradley, Brown Building, Rockford, Ill., are architects.

Iowa-Nebraska Light & Power Co., Lincoln, Neb., has approved plans for addition to steam-operated electric power plant at Shenandoah, Iowa, 53 x 75 ft., reported to cost in excess of $100,000 with equipment.

Chicago & Northwestern Railways Co., 400 West Madison Street, Chicago, has awarded contract to G. A. Johnson & Sons, 730 Rush Street, for addition to engine house, with repair facilities, at Council Bluffs, Iowa, reported to cost about $40,000 with equipment.

Sundstrand Machine Tool Co., Rockford, Ill., manufacturer of machine tools, has disposed of a stock issue of 63,250 shares, portion of proceeds to be used for expansion. Hugo L. Olson is president.

McQuay Radiator Corporation, 1600 Broadway, N. E., Minneapolis, Minn., manufacturer of unit heaters for industrial service, is completing erection of new two-story and basement plant unit, and plans early installation of equipment. Expansion will cost in excess of $50,000. Perry E. Crosier, New York Life Building, is architect.

George D. Whitcomb Locomotive Works, Rochelle, Ill., is erecting plant addition, 52 x 63 ft., at cost of $15,000.

Milwaukee

MILWAUKEE, Aug. 27.—Whatever decline there may have been recently in orders for machine tools or other metalworking equipment has hardly been perceptible locally. Deliveries have not improved in the slightest up to this time, although some manufacturers through increased manufacturing facilities or increased factory efficiency expect to hasten deliveries. Some dealers say that a considerable share of their August volume may be attributed to the closing of business during August which had been pending in July and even in June. Demand now is greatest from agricultural implement factories at Milwaukee, Racine and Madison, from commercial truck manufacturers and from manufacturers of electrical equipment both for public utilities and private industrial plants. Demand from passenger automobile manufacturers and railroads is at low ebb.

Rundle Mfg. Co., Milwaukee, manufacturer of enameled iron ware and bathroom equipment will triple its output through the construction and equipment of a new plant, ground for which is now broken at Camden, N. J., with adjoining deep water wharfage on the Delaware River. Financing of the new factory has been arranged by an issue of $1,000,000 first mortgage 6 per cent bonds. At least 80 per cent of the company's output during the life of the issue is contracted to Sears, Roebuck & Co., according to the company's statement in the bond issue circulars. The new Camden plant will be only one story high but will contain 240,000 sq. ft. Henry Held is president and H. J. Held, secretary and general superintendent, both at Milwaukee. A. C. Held is treasurer, vice-president and general manager at Camden.

Control of Milwaukee Air Power Pump, 10 Keefe Avenue, Milwaukee, has passed from John R. Ball, late president and treasurer, to Julius P. Heil, president of the Heil Co., Milwaukee, manufacturer of steel tanks and dump bodies, but the Heil Co. is in no way concerned. The pump concern manufactures forced water systems and oil burning appliances for domestic or industrial uses. Under Julius Heil as the newly named president, his son, Joseph F. Heil, treasurer, Homer S. Rogers, continuing as vice-president, and F. W. Richert, as secretary, the concern will install additional equipment in the present building and seek national distribution for all its products.

Smith Engineering Works, 78 Capitol Drive, Milwaukee, has begun construction of one story plant addition, 90 x 150 ft., at about $75,000 cost, to increase production in the rock crusher department. A new portable type of rock crusher will be introduced. Charles F. Smith is president and general manager.

Wisconsin Ornamental Iron & Bronze Co., 1665 Booth Street, Milwaukee, manufacturer of bronze products used in build-

ing construction, following its recent merger with the General Bronze Co., Long Island City, N. Y., will double its output through the construction of additions on which work has not yet been started. E. A. Ernst, president of the Wisconsin company will remain in charge at Milwaukee.

Michigan College of Mining and Technology, Houghton, Mich., has selected Derrick Hubert, Menominee, Mich., as architect for $300,000 mechanical engineering building, plans scheduled to be ready late in September or early in October. R. R. Seeber is dean of college of mechanical engineering.

Tank Aero Corporation, 271 First Avenue, Milwaukee, plans two-story addition, 100 x 150 ft., or will lease equivalent space for production of a new design of air-cooled V-type, 8-cylinder, 125 h. p. aircraft engine already tested in flights and which will supplement present production of 42 water cooled airplane engines monthly. New machinery valued at $60,000 has already been installed in the Tank plant and the Milwaukee Parts Co., manufacturers of automotive and aircraft parts has been merged with the concern. A. J. Tank is chief engineer, general manager and vice-president.

Wisconsin-Timken Axle Co., Oshkosh, Wis., has broken ground for one-story, 40 x 132 ft., addition to heat treating plant to cost about $30,000. An addition to the machine shop is being completed. The Wisconsin plant produces double reduction drive axles for buses and trucks besides axles for railroad gas or oil-driven coaches.

State Industrial School for Girls, Oregon, Wis., will construct $20,000 water works improvements including 100,000 gal. storage reservoir, 10,000 gal. receiving reservoir, air compressor, air lift, motor and steam-driven centrifugal pumps, sewer and water mains, manholes, hydrants and valves. School is under the jurisdiction of the State Board of Control, A. W. Bayley, secretary.

Eggers Veneer Seating Co., Two Rivers, Wis., has let contracts for construction of additions to cost about $75,000.

Cincinnati

CINCINNATI, Aug. 27.—Demand for machine tools shows a slight seasonal recession, affording district manufacturers further opportunity to cut into their large amount of unfilled orders. Fresh bookings are still greater than those of a year ago, and the number of small inquiries indicates that business for the remainder of this year will continue at a high level. The demand continues to be well diversified and is for both replacements and new equipment, but orders rarely call for more than two machines. An Eastern manufacturer placed an order with a local builder of planers for two large tools.

Andrews Steel Co., Newport, Ky., has awarded general contract to D. Meinken & Son, 2143 Bernard Avenue, Cincinnati, for two-story addition, to be equipped primarily for laboratory service, reported to cost about $40,000. Tietig & Lee, 34 West Sixth Street, Cincinnati, are architects.

Tennessee Eastman Corporation, Kingsport, Tenn., has approved plans for steam-operated electric power plant at local chemical works, reported to cost more than $150,000 with equipment, in connection with a general expansion and improvement program to cost more than $1,500,000. Baker & Spencer, 17 Battery Place, New York, are engineers for power station.

United States Foil Co., Grand and Thirtieth Streets, Louisville, manufacturer of tin foil, etc., has plans under way for two-story plant, 100 x 200 ft., on Hall Avenue, for production of tin, aluminum and lead foils, reported to cost close to $70,000 with equipment.

Holston River Power Co., Kingsport, Tenn., has secured Federal permission for construction of power dams on Holston and Watauga Rivers for a hydroelectric power project to develop a capacity of 74,000 hp. It will include transmission system and is reported to cost more than $1,500,000. Company is affiliated with American Cyanamid Co., 535 Fifth Avenue, New York.

St. Louis

ST. LOUIS, Aug. 27.—Elmore Centrifugal Products Corporation, 6527 Manchester Avenue, St. Louis, has been incorporated with capital of $150,000 to take over business of G. H. Elmore, Philadelphia, manufacturing Elmore continuous centrifugal dryer. A solid bowl type machine, which separates liquids from solids by a continuous process is being developed. A testing laboratory and offices have been established at above address, but temporarily the machine will be manufactured on contract. Harry Scullin, president Scullin Steel Co., is chairman of executive committee. G. H. Elmore is president and A. L. Sautter secretary and treasurer.

Multiplex Display Fixture Co., 918 North Tenth Street, St. Louis, has asked bids on general contract for two-story and basement addition, 96 x 105 ft., reported to cost about $40,000 with equipment. Otto J. Krieg, Wainwright Building, is architect.

Board of Education, Lyons, Kan., is considering installation of manual training equipment in new two-story and basement senior high school, estimated to cost $180,000, for which bids are being received on general contract. Mann & Co., Rorabaugh-Wiley Building, Hutchinson, Kan., are architects.

Black Servant Mfg. Co., 2951 North Market Street, St. Louis, William F. Brinkman, president, manufacturer of underfeed stokers for power plant service, has acquired building and will establish new plant, including departments for parts production and assembling, reported to cost in excess of $75,000 with equipment.

Indiana

INDIANAPOLIS, Aug. 27.—Inca Mfg. Corporation, Fort Wayne, Ind., recently organized to manufacture magnet wire, windings and electrical specialties for the automotive, radio and electrical industries, has awarded general contract to Buesching-Hagerman & Co., local, for plant, 200 x 300 ft., on New Haven Avenue. Company is in market for materials and equipment for plant, which will begin operations in October. George W. Spindler is secretary and treasurer.

Wandtke Pattern & Foundry Co., Inc., 1700 Ohio Avenue, Anderson, Ind., has been incorporated for $25,000 to manufacture wood and metal patterns and brass, bronze and aluminum castings. Company is now conducting jobbing foundry in new plant at above address. H. J. Wandtke is president.

Mid-states Steel & Wire Co., Oak Street, Crawfordsville, Ind., is said to be considering new one-story addition to cost over $40,000 with equipment. E. J. Sommer is general manager.

Borg-Warner Corporation, Muncie, Ind., manufacturer of automobile brakes, gears, and kindred products, has concluded arrangements for purchase of Norge Corporation, 670 East Woodbridge Street, Detroit, manufacturer of electric refrigerating equipment, and its affiliated interest, Detroit Gear & Machine Co., same address. Acquiring company will continue operations at present location and plans expansion program for larger output.

Davis Foundry Co., Newcastle, Ind., manufacturer of grey iron castings, plans rebuilding of portion of foundry destroyed by fire, Aug. 17, with loss estimated at $45,000, including equipment.

Merger plans have been perfected by Buescher Band Instrument Co., and C. G. Conn, Ltd., manufacturer of brass musical instruments, both of Elkhart, Ind., and Leedy Mfg. Co., 1033 East Palmer Street, Indianapolis, manufacturer of similar instruments. Companies will retain present identities and plants will continue at existing locations, with expansion in different divisions for enlarged output.

Pacific Coast

SAN FRANCISCO, Aug. 27.—Marchant Calculating Machine Co., Emeryville, Cal., manufacturer of computing machines and parts, has awarded general contract to W. C. Keating, Central Bank Building, Oakland, Cal., for one and two-story addition to cost about $60,000 with equipment. Miller & Warnecke, 1404 Franklin Street, Oakland, are architects.

Burgess Aeronautical & Engineering Corporation, 128 Santa Monica Boulevard, Santa Monica, Cal., is planning new local plant for manufacture of special aircraft of amphibian type, with rotary valve engines and accessories, consisting of one-story units, reported to cost in excess of $70,000 with equipment.

Wise Mfg. Co., Berkeley, Cal., manufacturer of mechanical equipment, has concluded arrangements for purchase of Standard Die & Tool Co., Oakland, Cal., and will consolidate with organization. It is proposed to continue Standard plant at present location and carry out expansion program for increased capacity.

Board of Education, San Francisco, will soon take bids on general contract for addition to junior high school at Francisco, Powell and Stockton Streets, to include group of six machine shops for manual training service, estimated to cost $400,000. S. Heiman, 57 Post Street, is architect; Coddington & Duncan, 222 Kearny Street, are the engineers in charge.

Puget Sound Power & Light Co., Seattle, has made application for permission to use water from Lake Washington, near site of proposed new steam-operated electric generating plant for service for that station, estimated to cost $7,000,000, including steel tower transmission line for connection with system at Seattle and other points.

Pacific Electric Railway Co., Pacific Electric Building, Los Angeles, has plans under way for a new terminal at Long Beach, to include group of repair and mechanical shops for electric car service, car house and other traction units, with service, repair and garage building for motor coaches. Entire project will cost

in excess of $250,000. Engineering department of company is in charge.

Pacific Gas & Electric Co., 245 Market Street, San Francisco, has filed plans for an equipment storage and distributing plant on block bounded by Shotwell, Folsom, Eighteenth and Nineteenth Streets, including meter repair and mechanical division, with automobile service, repair and garage unit, and other shops, reported to cost more than $500,000 with equipment.

Day & Night Water Heater Co., Monrovia, Cal., manufacturer of water heaters for domestic service, parts, etc., is having plans drawn for a one-story addition to cost about $35,000 with equipment. A traveling crane will be installed. Hamm, Grant & Bruner, Inc., Ferguson Building, Los Angeles, is architect and engineer.

Gulf States

BIRMINGHAM, Aug. 27. — Central Power & Light Co., Frost Bank Building, San Antonio, Tex., operated by Central & South West Utilities Co., Dallas, Tex., is said to be planning new steam-operated electric light and power plant in vicinity of Laredo, Tex., with initial capacity of about 30,000 kw. Project will include transmission line to connect with main system of company, and it is reported will cost in excess of $400,000.

P. H. Schindler Machine Works, 423 Poydras Street, New Orleans, La., has leased a one-story building at 623 Peters Street, and will establish a new machine shop at that location.

City Council, Delray, Fla., will receive bids until Sept. 16 for equipment for municipal waterworks, including one engine-driven centrifugal pumping unit and four motor-driven centrifugal pumps, with accessory equipment. Main Engineering Co., 112 Marion Street, Daytona Beach, Fla., is engineer.

Canada

TORONTO, ONT., Aug. 27. — Ratepayers of Simcoe, Ont., have passed a by-law granting a fixed assessment to the American Can Co. of $200,000 for 10 years. Company recently purchased the can plant of the Canadian Canners and two blocks of land at Simcoe. It is the intention of the company to start work immediately on the erection of a plant to cost $1,000,000.

Ferranti Electric Co., Ltd., 26 Noble Street, Toronto, has awarded general contract to Thomson Brothers, Toronto, for the erection of manufacturing plant at Mount Dennis, Ont., to cost $250,000. Reid & Brown Structural Steel & Iron Works, Toronto, has the steel contract.

Canadian Steel Foundries, Ltd., has awarded contract to John MacGregor, Ltd., 1410 Stanley Street, for the erection of a two-story plant addition at Longue Pointe, Que., to cost $75,000.

Canadian National Railways will erect car shops at Truro, N. S., to be 40 x 180 ft. Construction work will be carried out by company bridge and building departments. R. U. Appleton is general manager of Atlantic region.

McKinnon Industries division of General Motors of Canada, St. Catharines, Ont., will award contracts immediately for the erection of a $175,000 addition to plant, it was announced by H. J. Carmichael, president of McKinnon Industries.

Dominion Bridge Co., 1139 Shaw Street, Toronto, Ont., has purchased a site at Mount Dennis, Ont., where it will erect a plant to cost $1,500,000. Construction work to be started next spring.

Beauharnois Electric Co., 107 Craig Street West, Montreal, has awarded contract to the Beauharnois Construction Co., 112 St. Lawrence Street, for the construction of canal and power development plant at Beauharnois to cost $65 - 000,000. Preliminary work will be started at once and it is expected to have the plant completed in 1932. Consulting engineer is Fred Brown, 117 St. Catharine Street West, Montreal.

Western Canada

Dominion Bridge Co., Calgary, Alta., has permit to erect a plant at 801 Twenty-fourth Street, to cost $80,000.

City council, Calgary, Alta., intends to spend $2,000,000 to $3,000,000 on waterworks plant and system.

Canadian Industries, Ltd., 611 Paris Building, Winnipeg, Man., has purchased site at East Selkirk, Man., and will start work immediately on the erection of a plant for the manufacture of explosives, etc.

Western Foundries, Ltd., Lethbridge, Alta., is planning to build a plant to cost $25,000. Two buildings will be erected, one 48 x 80 ft. and the other 60 x 115 ft. Equipment and tools will be purchased.

The Radio Industries of Canada, Ltd., Winnipeg, Man., has established headquarters at Calgary, Alta., and intends to erect $30,000 manufacturing plant.

Seaboard Oil Refining Co., Vancouver, B. C., has been incorporated with a capital stock of $2,000,000. Company will immediately proceed with the erection of an oil refinery. David B. Boyd, Standard Bank Building, is local manager for the company.

Foreign

ELECTRICAL Administration, Soviet Russian Government, Moscow, is arranging an appropriation of 415,000,000 rubles (about $207,500,000) for power plant construction during fiscal year 1929-30, starting Oct. 1, to include 10 new central generating plants comprising station at Malaya Vishera, with capacity of 132,000 kw.; at Bobrikov, 150,000 kw.; Uzh, 150,000 kw.; Samara, 22,000 kw.; Kuznetz, Siberia, 44,000 kw., all of hydroelectric generating type; with steam-electric generating stations at Moscow and Leningrad, with capacities of 75,000 kw. and 30,000 kw. respectively. From fund noted, 42,000,000 rubles (about $21,000,-000) will be used for work on Dnieper River hydroelectric power project during fiscal year, work on which is now under way and which is scheduled for completion in October; this station will have a capacity of 800,000 hp., divided into 10 turbo-generator units. Hugh L. Cooper, 101 Park Avenue, New York, is consulting engineer for last-noted project. Amtorg Trading Corporation, 261 Fifth Avenue, New York, is official buying agency for Soviet Union.

International General Electric Co., Schenectady, N. Y., subsidiary of General Electric Co., in cooperation with International Pirelli Co., Ltd., Brussels, Belgium, an interest of Pirelli Co., Milan, Italy, has concluded arrangements for purchase of controlling interest in National Copper Mfg. Co., Rio de Janeiro, Brazil, known as "Conac," manufacturer of electric wire, cables, etc. New owners plan immediate expansion in present plant, with installation of equipment for production of underground transmission cables, telephone wire, etc., reported to cost over $250,000.

Grigsby-Grunow Co., Ltd., subsidiary of Grigsby-Grunow Co., 2038 North Kolmar Avenue, Chicago, manufacturer of radio sets and equipment, has taken option on plant site at London, England, and will soon begin erection of multi-story unit, reported to cost over $350,000 with equipment. It is proposed to have plant ready for service by close of year. Bert J. Grigsby is president and general manager.

Soviet Russian Rubber Trust, Moscow, through Amtorg Trading Corporation, 261 Fifth Avenue, New York, has closed negotiations with Seiberling Rubber Co., Akron, Ohio, manufacturer of automobile tires and tubes, for technical assistance for new plant at Yaroslavl, to be equipped for initial capacity of 3100 automobile tires, 9000 bicycle tires and 480 motorcycle tires a day, reported to cost over $1,000,000 with equipment. Seiberling company will prepare plans for plant, supervise construction and operation. Machinery purchases will be made by Amtorg organization. M. Nickoforov, chairman of board of Rubber Trust, is now in United States to perfect final arrangements.

Compania Electrica de Santo Domingo, C. por A., Puerto Plata, Dominican Republic, West Indies, a subsidiary of Southern Cities Utilities Co., Fox Building, Philadelphia, has concluded arrangements for purchase of electric light and power properties, and waterworks of Dominican Republic, at Puerto Plata and Santiago. Plants and system will be consolidated under one management, including properties at La Vega, lately acquired by same interests. Expansion and improvements are planned for increased power facilities and transmission service.

Soviet Russian Government, Moscow, through Amtorg Trading Corporation, 261 Fifth Avenue, New York, official buying agency, is said to have awarded general contract to Austin Co., Euclid Avenue, Cleveland, for construction of plant at Nizhni-Novgorod for manufacture of Ford type automobiles and motor trucks, for which agreement for technical service was recently made with Ford Motor Co., Detroit. New plant will be equipped for annual production of 70,000 motor trucks and 30,000 automobiles, including parts and assembling, and is reported to cost more than $10,000,000 with machinery.

New Trade Publications

Locomotives With Internal Combustion Engine Drive. — George D. Whitcomb Co., Rochelle, Ill. The advantages, uses and economies effected by using locomotives powered with internal combustion engines are set forth in an eight-page pamphlet.

Casters and Trucks.—Service Caster & Truck Co., Albion, Mich. Catalog No. 29, containing 24 illustrated pages, gives the specifications of and describes the company's casters and trucks. A special page is devoted to information about how to measure a caster and what to call the parts.

Seamless Steel Tubes.—Globe Steel Tubes Co., 1345 Burnham Street, Milwaukee. Booklet of 24 pages, illustrating and describing the manufacture of seamless steel tubes. The tubes made by this company have special reference to the automotive industry and locomotive and merchant boilers.

THE IRON AGE

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Materials Handled Economically

Marked Savings Obtained by Studebaker Corporation from Operation of Transportation Department Employing 200 Men and Like Number of Equipment Units

BY JOHN R. SULLIVAN*

AT the Studebaker Corporation, production is carried on in a number of separate buildings. Bodies, for example, are made in a five-story factory located at some distance from the assembly building. Body stampings are turned out in another structure, while other parts originate in the foundry, forge shop and power plant departments, each of which occupies its own building. In addition, there are still other buildings that contribute their share toward the manufacture of Studebaker automobiles.

It is little wonder, under the circumstances, that efficient and economical means of transporting materials in and among the many buildings is a major problem. For its solution the company created some years ago a transportation department, the growth of which has paralleled that of the company's production facilities.

*Supervisor of transportation, Studebaker Corporation, South Bend, Ind.

Today the department consists of approximately 200 men and a similar number of equipment units. Among the types of carriers are steam locomotives, Fordson tractors, gasoline trucks, electric trucks, electric-lift trucks, hand-lift trucks, side-dump trucks and various kinds of truck trailers.

The use of hand-lift trucks is minimized. Wherever possible they are in service only for short hauls to deliver material to power trucks, and for moving parts from one floor to another in the same building. Wherever power trucks have been installed, electric trucks are employed for transportation inside buildings, and gasoline trucks and tractors for outside work and for interdepartmental hauls.

An effort is made to move materials between departments on the ground floor or outside buildings so that power equipment can be used. In the body department, for instance, there are several stations to which hand

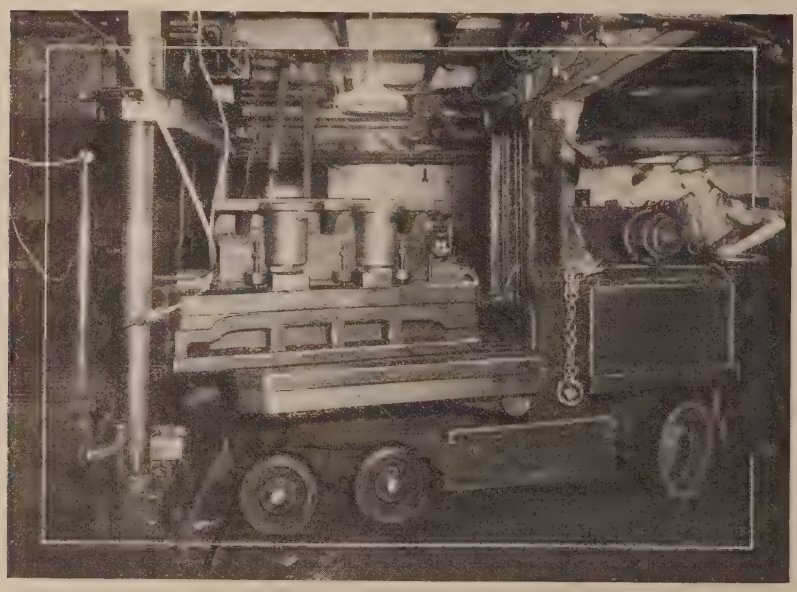
BODIES Are Transported from Body Plant to Assembly Building on Flat-Type Railroad Cars with Specially Constructed Double-Deck "Uprights"

trucks bring material on elevators to the main floor, where it is prepared for haulage by tractors operating on regular schedules.

Trucks Handle Overflow from Conveyors

Delivering parts from the machining, forging, stamping, foundry and spring departments to the assembly lines, the transportation department must coordinate its activities with those of mechanical conveyors, which have recently been installed in numerous departments. Sometimes a conveyor is taxed beyond its capacity, and in such instances the transportation department with trucks and trailers relieves the pressure. To cite a specific case, the final assembly lines might unavoidably be slowed up temporarily and before word could be passed along to sub-assembly departments, parts on conveyors might accumulate so rapidly as to create congestion. Trucks and trailers then are used to take off some of the material and deliver it to its destination.

So far as possible each operator has a routine daily schedule. Generally he traverses his route a number of times during the day, recording the time of arrival at the end of every trip. The department has a central office where all telephone calls pertaining to special movements of material are received. The routing man there enters calls on a special chart, turning them over to the operators whose schedules are light at the moment. This is done through working gang bosses, who keep in touch with the office in person or by telephone. When assigned a special job, the operator receives from the routing office a slip giving information about the task. Upon completing the work, he delivers the slip back to the routing clerk, who records the closing of the transaction.



LIFT Trucks, Capable of Handling Dies Weighing 30,000 Lb., Are Used to Mount Dies on Presses

Schedule Based on Number of Cars Produced

The department's daily schedule is based on the number of finished automobiles produced each hour. In the majority of departments supplying assembly lines with parts, deliveries are made every half hour. However, at some points the time is reduced to 15 min. This is necessitated by the fact that there is practically no "bank" or stock of certain parts for the assembly lines, so that deliveries must be made to the assembly building almost as quickly as parts are produced.

Since there is no storage space for finished parts, except a small bank, which soon would disappear unless frequently and regularly replenished, any department which falls much under its scheduled output is likely to tie up production in the entire plant. The same condition would be created if the transportation department failed to meet its responsibilities.

Incoming and outgoing freight cars are handled in the company's yards by the Studebaker industrial railroad, which operates in the same manner as independent carriers and is under the supervision of the Interstate Commerce Commission. It has a personnel of 30 men and owns 12½ miles of track. Four locomotives are in service, each having a crew of five men, including an engineer, fireman, switchman and a conductor. Four railroads—New York Central, Pennsylvania, Wabash and Grand Trunk—have receiving tracks at the entrance to the company's yards and at this point deliver freight cars to the company's railroad system. All incoming and outgoing freight cars are weighed by a weighmaster and are routed by a yardmaster. The railroad handles approximately 9000 carloads of raw materials and finished automobiles each month.

The duty of maintaining its locomotives devolves upon the railroad, and a special crew of three men, two during the day and one at night, is assigned this task. Track maintenance, however, is taken care of by the maintenance department.

Sixty Per Cent Saved in Hauling Refuse Sand

Marked savings have been made in the cost of hauling refuse cinders and sand from the foundry to a dumping ground outside the city limits of South Bend. A few years ago the department contracted with a hauling company to have this material removed, but installation of its own equipment for this purpose has reduced the expense 60 per cent. Equipment comprises various types of refuse side-dump wagons, ramps, chutes and gasoline tractors. The refuse, which amounts to about 300 cu. yd. daily, is handled by a train consisting of a gasoline tractor and six side-dump wagons.

One of the most important tasks of the department is the transportation of bodies from the body factory to the assembly building. This is accomplished by means of a locomotive and four flat-type railroad cars with specially constructed double-deck "uprights." Each car has a capacity of 12 bodies, six on the lower deck and six on the upper.

Bodies Lowered to Loading Dock

At the end of the body assembly lines on the sixth floor of the body factory is a "lowerator" elevator, which delivers bodies to the loading dock on either the mezzanine or the main floor, the delivery point depending upon whether bodies are to be loaded on to the upper or lower decks of the railroad cars. Each loading dock is equipped with an electric hoist, which lifts bodies on to trucks. The trucks operate on rails extending from the dock to the door of the railroad cars, on to which bodies are pushed by hand. When a car is filled the gates on the sides of the car are closed and the bodies are automatically locked in position.

When cars reach the assembly building, bodies are unloaded in a manner similar to that in which they were

PARTS Are Carried From Manufacturing Departments to Assembly Building on Trailers Pulled by Gasoline Truck

Studebaker

RECORD OF TRANSPORTATION DEPARTMENT CALLS

INSTRUCTIONS:—Entries made in original daily by transportation department dispatcher from calls as received. Retained in Transportation Department.

Date_____

	From	Material	To	Time Received	Time Assigned	Pick Up Number	Driver	Requested by

Studebaker

MONTHLY SUMMARY OF TRUCK RECORD

INSTRUCTIONS:- Entries made daily by Transportation Dept. from D-1849. Summarized monthly and filed.

Month_____
Truck No._____
Type_____

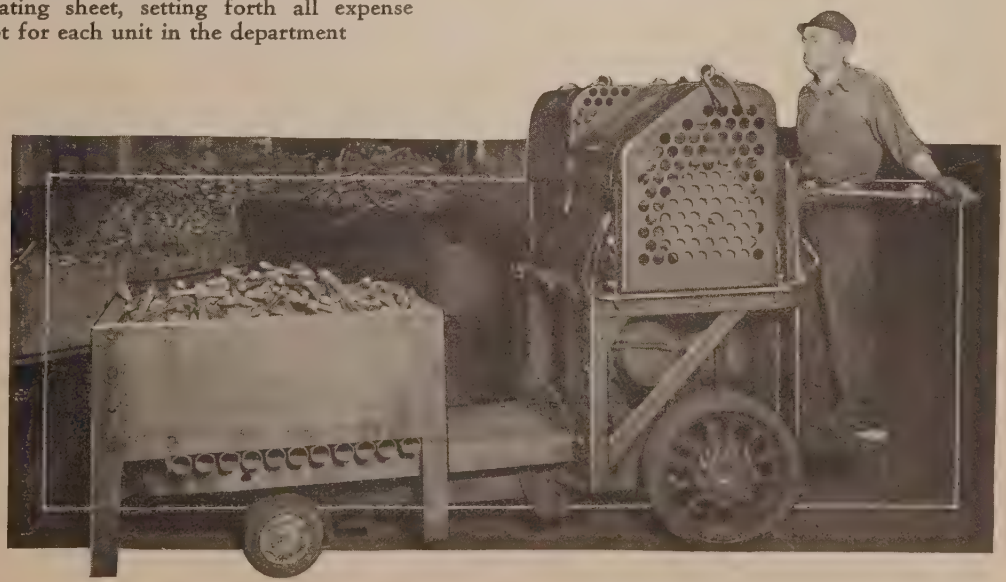
Date	Driver	Miles	Actual Weight Handled	Total Weight	Ton Miles	Gallons Gasoline Used	Quarts Oil Used

Summary

Gasoline_____
Oil_____
Tires_____
Material_____
Labor_____
Wages_____
Supervision_____
License_____
Total Cost per month_____
Cost per mile_____
Cost per Ton mile_____

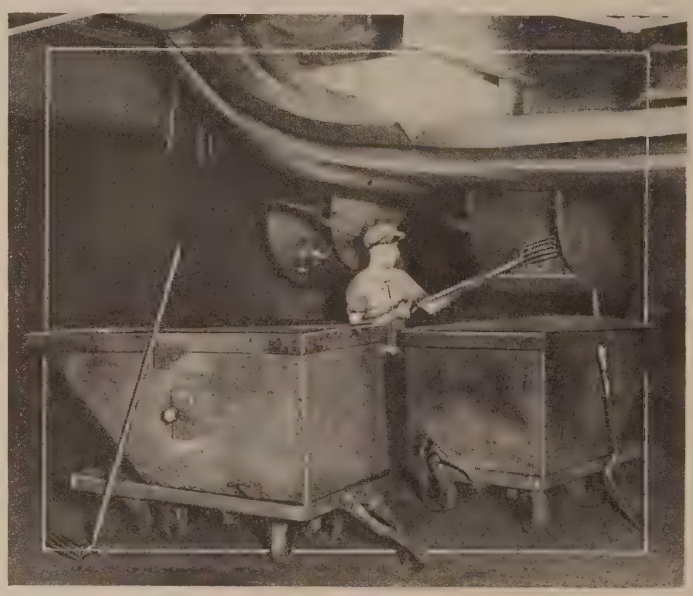
SPECIAL Calls Received by Transportation Department Are Recorded on Sheet Shown Above. Monthly maintenance operating sheet, setting forth all expense items, is kept for each unit in the department

IN Forge Shop Material Is Moved from One Operation to Next in Steel Trays Carried by Electric Lift Trucks



loaded at the body factory and are taken by elevator to the fourth floor, where they are held temporarily until they go to the assembly line. Through a hole in the floor they are lowered by electric hoist to the chassis on the assembly line on the third floor. Numerous models of cars are assembled at the same time on one chassis line, and therefore it is imperative that bodies be delivered to the chassis line according to the sequence of the model of cars going through at the moment. The lowerator in the body factory and the elevator in the assembly building each have a capacity of 120 bodies an hour, or one every half minute. In handling bodies the transportation department employs 30 men.

Panels, doors and other metal parts produced in the body stamping department are delivered to the assembly department by gasoline tractors and trailers. Within the body stamping department, electric lift trucks and trailers are used. The outstanding pieces of equipment are two Elwell-Parker electric "hi-low" lift trucks capable of handling dies weighing 30,000 lb. These trucks are utilized to mount dies on presses. They make possible a change from one set-up to another in a few minutes as compared with several hours by the former method, the quick change keeping the presses in almost continuous operation and thus cutting down production costs. The labor expense of eight men has been saved in this manner.



REFUSE from Foundry, Such as Core and Molding Sand, Passes from Foundry Floor Down Through Chutes into Trailers Stationed in Tunnels Running Underneath Foundry. Trailers are hauled by electric tractors to crane bay, where refuse material is transferred by crane to large chutes, through which it is dumped into refuse wagons outside building

Trucks Facilitate Forge Shop Operations

In the forge shop, material in process is moved from one operation to the next in steel trays carried by electric lift trucks. Trays are of various sizes and shapes and are placed at the side of hammers and heat treating furnaces, where they are in the most accessible position. The department is so laid out that material passes through a complete cycle without backtracking and the use of electric lift trucks and trays facilitates the forward movement. During final inspection the material is transferred from trays to trailers to be hauled by a gasoline tractor to the assembly building.

Getting into the foundry, the duties of the transportation department are as well defined as in other departments. The industrial railroad delivers all raw materials in freight cars into the foundry receiving bay. Charges for the cupolas are handled by specially designed conveyors and trucks operating on tracks. Electric trucks and trailers are used extensively in taking castings from the molding floor to the cleaning room and thence, after inspection, to the machine shop. Refuse, such as core and molding sand, passes from the foundry floor down through chutes into trailers stationed in tunnels running underneath the foundry. The trailers are hauled by electric tractors to the crane bay of the foundry, where refuse material is transferred by crane from the trailers to large chutes, through which it is dumped into refuse wagons outside the building.

For foundry work the transportation department has 20 men and a like number of pieces of equipment. Men are divided into gangs directed by gang bosses. In every case the gang boss drives a piece of equipment, but his duties in this respect are so arranged that he has considerable free time in which to supervise the activities of his men and to coordinate them.

Incoming and outgoing express shipments and less-than-carload freight are handled by two Fordson tractors and a fleet of trailers. Each morning the drivers of the tractors distribute the trailers at the four railroad freight depots. On the return trip the trailers are hauled to various receiving points, to which the materials are to be delivered. This plan has proved economical, because it keeps trucks in active service rather than tied up for an indefinite period at depots during loading and unloading.

Maintenance and repair of all rolling stock used by the department have been so systematized that an accurate record of operating costs is available at all times. The department carries its own stores division. Every part or piece of equipment is requisitioned out of stores and is charged against the individual unit for which it is intended. Incidentally, each unit has a number for identification purposes.

For each unit a monthly maintenance operating sheet is carried, and on it is recorded the driver's wages, repair men's wages and the cost of all supplies, such as gasoline, oil, charging of batteries and repair parts. At the end of every month the actual operating expenses for the previous 30 days are calculated so that the department knows exactly what each unit in service is costing. For large expenses, such as the purchase of tires, the amount is not charged against a single month, but is pro-rated over a period of several months.

Germany Takes Half the World's Tungsten

China dominates the world tungsten market due to the possession of huge deposits permitting surface mining with cheap labor. Of the 8000 metric tons of ore (basis 60 per cent WO_3) produced in the Orient, 5200 net tons was imported by Germany. According to Colin G. Fink, *Metal Industry*, 1928, this is almost half the world's output. A great many deposits are known in the United States, but only a few are producing; the total marketed in 1928 was 1290 net tons of 60 per cent WO_3 concentrate, valued at $761,000. The largest producer is the Nevada-Massachusetts Co. at Mill City, Nev., where the output is expanding.

Assembling an Airplane Engine

Process Is Done Twice, with Intermediate Close Inspection —Frame Used to Hold Crankcase

BY FAY LEONE FAUROTE*

IT is interesting to watch the assembly of a Wright Whirlwind engine. In the first place, all of the parts, which have been manufactured in the various bays, after traveling in the logical order from one machine to another as the process progresses, finally, after numerous tests and inspections, are carefully wrapped or placed in sub-divided trays to protect them from harm in transit, and taken from the stockroom. A group of finished parts required, withdrawn from here as needed, begins the small assembly.

The crankcase is set on a frame—a special assembling device mounted on wheels and capable of being rolled along a track from one assembly station to another. After putting up the crankcase, the smaller parts are added to it. The crankshaft with its bearings next goes in; then the master rod. The link rods with the pistons attached are fitted to the master rod and the whole mounted on the crankshaft.

The intermediate section of the crankcase, carrying the valve tappets, is then added. The camshaft, the cam driving gear, go in next. Finally, the cylinders with the valve rockers, valves and springs are bolted to the crankcase. The push-rod housing, the push rods, intake manifold, magnetos and spark plugs are next added.

After wiring, the engine is timed, the magnetos synchronized, the carbureter and the manifold assembly and the rear section of the crankcase attached; the rocker-box covers screwed on. The engine is then ready for test.

It is given a run of 5 hr., driving a four-bladed propeller (see test chart). If it measures up to established standards, it is then disassembled, thoroughly washed, minutely inspected and examined for flaws, then taken back to the assembly line and carefully reassembled for delivery to the purchaser. After being weighed, dry, it is then greased and oiled, taken to the final testing room and run for 2 hr., where a final record of its performance must meet the same standards. Then it is retouched and is coated with slushing oil for protection, numbered, registered and crated for delivery.

Nowhere along the line is close vigilance slackened. There is always ever present the knowledge that here is a piece of mechanism upon which a man's life may depend.

*Mechanical engineer, New York. In THE IRON AGE of July 18, page 148, Mr. Faurote described the Wright airplane engines. In subsequent articles he described various machining operations: Aug. 8, the connecting rods; Aug. 15, the crankshaft; Aug. 22, the cylinders, and Aug. 29, the crankcase.

SECONDARY Assembly Line of Whirlwind Engines Is Shown at Left

PULLING a Dismantled Production Engine (Right) Back on the Secondary Assembly Line. All Army and Navy engines after primary assembly are tested for 5 hr., then completely torn down and inspected and re-assembled. Then they are given a secondary run-in test for 2 hr.

Inhibitors in Pickling Process

Experiments Show That Only Enough Acid Is Consumed to Remove Scale—Hydrogen Evolved Reduces Inhibitor Rather Than Replaces Metal

BY ALLISON D. TURNBULL*

IT is a well known fact inhibitors have a two-fold purpose in the pickling bath, namely, to prevent the reaction between acid and metal and to reduce acid evaporation from the surface of the bath. Generally speaking, the latter is a result of the first mentioned.

Steam cannot be entirely prevented from issuing from a pickling bath; it would be against the laws of aqueous tension and vapor pressure. But the protective coating that forms on a bath containing inhibitors will stop much of the steaming. The comparative vapor tensions of the atmospheric layer immediately above the blanket cannot be in equilibrium with the attenuating layer of the pickling solution found just beneath this foam coating. The coat is frequently punctured, acid being carried over in the steam bubbles, an action which can be compared to break-down of an overcharged condenser.

A more stable condition may indeed be secured if the solutions are indirectly heated, i.e., by closed pipe systems made of non-corrosive metal. Shooting live steam into a pickling vat causes dilution of the acid and creates eddy currents that sweep the inhibiting substance away from the surface of the metal.

Inhibitor Should Not Be Proportioned to Make-Up Acid

Unless a correct balance is achieved between the inhibitor and the conditions that influence the cleaning, efficient action cannot be expected. The amount of acid added from time to time is frequently but erroneously taken as a criterion of the proper quantity of inhibitor necessary to prevent the actions mentioned in the first paragraph. This misapprehension is responsible for a control that gives only more or less satisfactory results. There are other factors that should be taken into consideration; for instance, the diameter of the steel rod to be cleaned has a distinct bearing on the amount of inhibiting substance, inasmuch as the surface area of the metal is governed by the diameter, and the action desired is distinctly a surface effect.

When steel rods are cleaned in dilute acid, the oxide scale first succumbs; after the metal is laid bare the steel begins to corrode. Hydrogen gas is evolved, which causes the surface of the metal to become embrittled. This action is more intense when the percentage of acid is low, necessitating long cleaning periods. Rough, embrittled surfaces offer ample secretion for occluded hydrogen, which if left in the metal will cause breaks in the drawing dies because of the ineffectiveness of the lubricant. In passing, it might be remarked that it is imperative that moisture be kept out of all wire drawing greases or soaps, used in the dry drawing process.

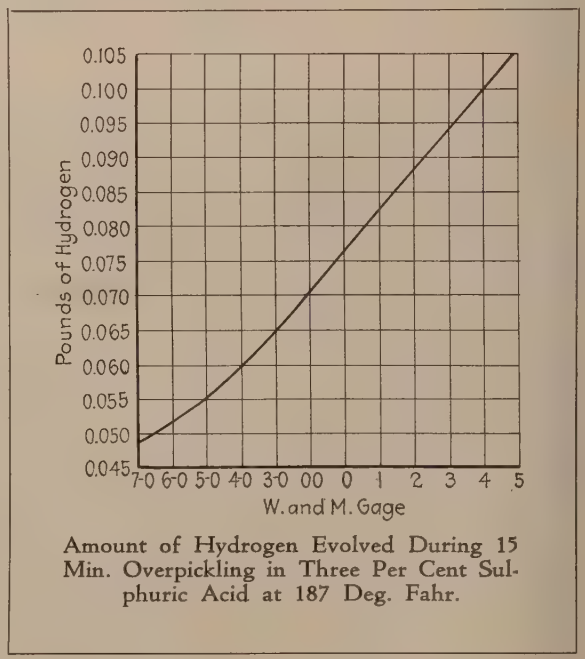
In dilute acids having no inhibitor, the greater the surface to be pickled, the greater the metal lost. Curve 1 shows the evolved hydrogen gas that accompanies over-pickling various sizes of rods for 15 min. in a 3 per cent solution of sulphuric acid (by weight) at 187 deg. Fahr.

Pickling Without Inhibitor Forms Hydrogen

When one ton of rods having a diameter of 0.207 in. are overpickled for a period of 15 min. in a 4.21 per cent sulphuric acid solution at 200 deg. Fahr., 30 lb. of iron dissolves, according to the following equation:

$$Fe + H_2SO_4 = FeSO_4 + 2H$$

For each pound of ferrous iron dissolved there is 0.036 lb. of hydrogen gas liberated. (If the solution is highly oxidizing the change from the ferrous to ferric sulphate occurs almost instantaneously.) Hence in the case under consideration 0.036 times 30 or 0.108 lb. of hydrogen was set free. Similarly in overpickling a No. 4 gage (W. & M.) wire rod, which incidentally has a smaller surface, 0.100 lb. of the gas was liberated. These calculations follow curve 1 very closely.



Amount of Hydrogen Evolved During 15 Min. Overpickling in Three Per Cent Sulphuric Acid at 187 Deg. Fahr.

Curve 2 pictures what happened in the above pickling bath where the 30 lb. of iron were dissolved. For the first minute or two the acid is not affected because the metal is absorbing heat from the solution. At three minutes the acid was rapidly attacking the oxide scale, continuing for another 9½ min. At this time all the scale was removed and the acid concentration had fallen from 4.21 to 3.4 per cent, a loss of 0.8 per cent. After

*Research Products Engineering Department, Northern Electric Co., Ltd., Montreal, Canada.

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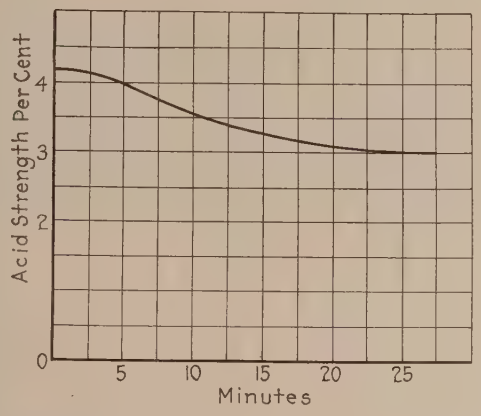
this the curve still droops, indicating that acid was being consumed. At 27½ min. the rods were removed; the bath had only 3 per cent acid. (The stock selected for the test was medium carbon steel, having a moderate scale.)

This example shows the utter waste of both metal and acid that accompanies improper pickling. The rods were practically free of any oxide film at 13 min. but a



Consumption of Sulphuric Acid When Pickling 0.207-In. Rods at 200 Deg. Fahr.

few spots remained, necessitating further immersion, during which time the acid was free to attack the steel of the rod as well as the spots of oxide.

Pickling With Inhibitor Forms Water

Compare this with curve 3, representing a pickling solution that is properly inhibited. The action in such a case is as follows:

$$FeO + H_2SO_4 = FeSO_4 + H_2O$$

Instead of the harmful hydrogen gas being produced, water only is formed.

As a case in point, steel rods of the type usually classified as "white ends," having 0.04 per cent carbon, were pickled for 28 min. in a 4 per cent sulphuric acid bath. The inhibitor was a very cheap substance found to suit the average pickling vat. It can be seen that the acid concentration dropped 0.5 per cent in 10 min. and at 15 min. from the start was at 3.45 per cent; thereafter it remained constant until the batch of rods was removed. One infers from this that the scale was practically removed in the 15-min. period; after that time the acid remained dormant.

Vats used for all these tests were of the standard groove fit, wood construction. The capacity of each was exactly 1006 imperial gallons. Although live steam is utilized for heating, all steam valves were tightly shut during the trials. Before the test was made the accurate weight of the batch of rods was taken, viz., 2144 lb. During the pickling the loss in weight was exactly 36 lb. or 1.67 per cent. The specific gravity of the bath before and after the trial was 1.08 and 1.0836 respectively. The total percentage drop in the acid was 0.55 per cent and the consumption was 55 lb. of 66 deg. Baumé sulphuric acid.

Theoretically, the amount of 100 per cent acid necessary to remove 36 lb. of ferrous oxide is 49.1 lb., which is equivalent to 51.5 lb. of 66 deg. Baumé acid.

The difference between the theoretical and actual usage is 3.5 lb., which is creditable indeed. When it is considered that there was some evaporation and that no tub is 100 per cent efficient, the figures are remarkably close.

Proof That Steel Is Not Attacked

As was previously stated, 36 lb. of scale was removed during the pickling. To further show that the acid did not attack the steel base, a check can be made in the following manner:

Weight of solution before the rods were immersed is: 1106 gal. x 1.08 sp. gr. x 10 lb. or 10864.8 lb.

Similarly the weight of the solution after the test is 1106 x 1.0836 x 10 or 10901.0 lb.

Difference in the two values = 10901.0 — 10864.8 = 36.2 lb., the amount of iron oxide removed from the rod combining with acid to form ferrous sulphate and water.

Inhibitor Is Essentially Cellulose

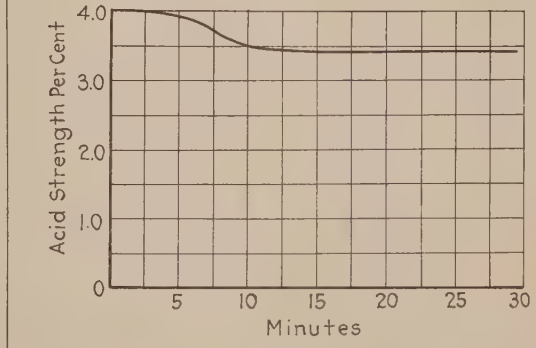
The question now arises, just what is an inhibitor? Inhibiting action is undoubtedly due to organic substances present in the compound. Carbohydrates having a high value of the carbo-hydrogen radical, such as sugar ($C_{12}H_{22}O_{11}$) or starch ($C_6H_{11}O_6$) have good inhibiting qualities. We might go further up in the scale and say that the supposedly existant C_{100} H_{300} O_{150} is the formula of a true inhibitor.

If cellulose be placed in a dilute solution of sulphuric acid which is evolving hydrogen from a metal, the following reaction occurs between cellulose and water

$$C_6H_{10}O_5 + H_2O = C_6H_{12}O_6$$

While $C_6H_{12}O_6$ is in the process of formation all the free hydrogen is powerless to attack the metal. Pure cellulose could be used in pickling solutions, providing that there was a correct amount of the substance placed in the bath. Too little would be inefficient, while too much would be a waste.

What takes place in a pickling bath when an inhibitor is present? Many theories have been advanced. Observa-



Consumption of Acid Containing Proper Inhibitor

tions taken over a period of eight months, using four different classes of inhibitors, lead the writer to believe that a highly reducing condition must be created in the solution.

Numerous bodies with sluggish reactions are capable of chemical combination at the instant they break away from another compound. Speaking generally, when a chemical change occurs between molecules, there is, first of all, a decomposition of the molecules and then a rearrangement of the constituent atoms to form new molecules. But an appreciable amount of time necessarily elapses while the atoms are falling into the new arrangements; during this momentary freedom or nascent state,

the atoms act as individuals, and enter into combination more easily than if held in restraint by the forces binding them into molecule.

In the case of inhibitors the hydrogen acts as a reducing agent by actually entering into the molecule.

Carbohydrates like dextrose and glucose are highly reducing. For instance if we place a quantity of starch into a dilute solution of sulphuric acid at 120 deg. Fahr., and add an alkali to neutralize the acid, we have a reducing solution. This fact is utilized in metal plating, where the solution must be of a reducing nature.

Returning to the example previously considered, of a bath of acid ranging around 4.21 per cent at 190 deg. Fahr. Suppose we add a measured quantity of inhibitor of such a grade as associated with "mill wheat" (such substance being capable of releasing 76 per cent of cellulose under proper conditions). It seemingly dissolves. We then immerse a batch of rods in the solution, and shortly thereafter particles of ferric oxide and ferric sulphate can be observed floating to the surface of the bath. The mucilaginous character of the inhibitor binds these substances into a thick, reddish brown coating. The bath is now in a reducing condition. A sample of the solution when examined under a polariscope shows a distinct rotation of the plane of polarized light, nearly always toward the right, indicating that dextrose has been formed, but possibly there has been a formation of glucose, since it gives the same indication (both these are isomeric compounds, i.e., they have the same composition although with different properties, since the atoms are located differently in the molecule).

What Happened When Rods Were Overpickled

Nascent hydrogen tends to oxidize the dextrose, hence it is not capable of plating out on the metal, and hence the metal does not dissolve.

Consider again the first example where a ton of 16.5-gage rods was overpickled for approximately 15 min. and 30 lb. of iron was dissolved. The hydrogen liberated in this instance was 0.108 lb. Referring to the formula:

$H_2O + C_6H_{10}O_5 = C_6H_{12}O_6$ it is seen that for each pound of the inhibitor ($C_6H_{10}O_5$) there is 0.0123 pounds of hydrogen oxidized to H_2O. Actually the substance used in these trials was composed of 76.4 parts cellulose ($C_6H_{10}O_5$) so 1.31 lb. of it must be used to take up 0.0123 lb. of the gas.

But there happened to be 0.108 lb. of hydrogen evolved in this process, necessitating $\frac{0.108 \times 1.31}{0.0123} = 11.5$ lb. of inhibitor.

From experiment it was found that 11 to 12 lb. of the substance was necessary to give the results obtained in the second trial. It will be remembered that this was the test where the acid did not react with the metal after the oxide was removed. Consequently, practice bears out the theory.

Amount of Inhibitor Added Decreases With Age of Solution

A sufficient quantity of the substance must be added from time to time in order to make up for depreciation and losses sustained when the rods are removed from the vats. It was found that once the salting charge was given, i.e., 11.5 lb., a tapering amount was necessary to continue the protection. Usually one pound was added with each ton charged. Such additions were made five or six times. Following batches then receive an amount that varies from ½ lb. down to ¼ lb. per ton of charge. The last two batches do not require any inhibitor. The average consumption over a period of say one month ranges between ¾ and 1 lb. per net ton of rods pickled.

Curve 1 shows the fact that as the gage of the rod decreases, the hydrogen gas capable of being evolved from that rod also decreases. This curve is true for all sizes of wire and rods when they are overpickled as noted, i.e., for 15 min. in a 3.0 per cent solution heated to nearly 200 deg. The real criterion determining the amount of inhibitor is the square feet of surface of metal to be cleaned.

During an average month, using the inhibitor under discussion, 2594 tons of rods was cleaned. Exactly 132-100 lb. of 66 deg. acid was consumed doing this work, or an average of 50.9 lb. per net ton. Pains were taken to secure accurate data regarding the amount of oxide on an average rod, the result being 1.7 per cent. Theoretically 48.3 lb. of acid would be required to remove this quantity of scale from one ton of stock, leaving a difference of 2.6 lb. per net ton between the actual usage and the theoretical. It is understood that the solutions are not "killed" down to such a weak concentration that a long period of time would be necessary for the pickling operation, consequently there was always some free acid remaining in the bath when it was discarded. This accounts for most of the 2.6 lb. surplus.

Airplane Disaster Caused by Fatigue of Steel

FRACTURE under fatigue of studs in the front big-end bearing of the starboard engine is found to be the cause of the disaster of the London-Paris airplane which, on June 17, plunged into the British Channel, killing several passengers. A report, recently issued by the British Air Ministry, based on a formal investigation, states that this was the primary cause, according to the London *Iron and Coal Trades Review.*

Speaking in more detail, the report says that this mishap is described as of a type which is unavoidable. The report also is to the effect that Major Cooper's detailed examination revealed that the front, or No. 4, connecting rod assembly was completely broken up, obviously the result of a fracture of the big-end bearing studs. According to his opinion, with which the court agrees, the pair of studs on the port side of the bearing fractured due to fatigue, the front stud being the first to fail, followed by the two studs on the starboard side also failing. None of the damaged or broken parts was discolored by heat, so it was said.

After a careful consideration of the evidence, which dealt exhaustively with the manufacture of these studs and the suitability of the steel used therein, the court gave out the opinion that nothing that human foresight could have done, in providing against this primary cause of the starboard engine becoming relatively useless, had been omitted either by D. Napier & Sons, Ltd., or on the part of Imperial Airways, Ltd., or their personnel. "It is a case," says Sir Arthur Colefax, author of the report, "similar to many with which all who have to do with machinery are familiar—the metal of some part becoming fatigued for some reason which remains an unsolved mystery. Evidence was given of an almost identical mishap to an engine in an R. A. F. machine, and also of some few other instances of studs failing. Such evidence has not enabled me to carry the matter any further."

Work in Process Is Stored in Skids in the Yard. At the end of article is shown the steel storage yard

Handling Forgings, Dies and Stampings in Transue & Williams Plant

WHAT constitutes the furnace equipment for a modern forging plant supplying forgings of a wide variety of size and weight was described in THE IRON AGE of Aug. 22, page 467, drawing on the practice and experience of the Transue & Williams Steel Forging Corporation, Alliance, Ohio, for this purpose. The present article is devoted to arrangements for handling, to three methods of cleaning forgings and to provisions for storing and preparing steel.

THE trimming presses are arranged in two lines and have a belt conveyor beneath each row of machines for carrying the forgings and another conveyor belt running in the opposite direction between the line of machines and located slightly above the floor level for handling the scrap. The forgings fall from the trimming presses to the conveyor belt and the press operator throws the flashings to the scrap belt.

At the end of the press line the scrap belt goes up a slight incline and the scrap is dumped from the belt into the hopper of a dump body skid in which an electric truck carries it to a baling press. All the forge shop scrap, except very heavy flashings, is baled.

The two belts carrying the trimmed forgings turn up an incline at the other end of the presses and then move along in a horizontal position for a short distance, providing ample space for inspection and sorting, which is done while the work is moving. Various kinds of forgings are moving on the belts at the same time and the inspectors throw each type in the proper skid. The receiving skids are placed in a row along the outer sides of the belt conveyors. The defective pieces are thrown into small tote boxes.

The trimming presses are individually driven through belts from motors located above the machines. The majority of the presses are of the Toledo make.

Tools and spare keys for setting the dies are conveniently carried in metal tables mounted on castors, one table being provided for six presses.

Three methods of cleaning are used, pickling, shot blasting and tumbling. Trimmed forgings after sorting go to a point where one of these three cleaning operations is done. Large forgings, such as rear axle housing forgings weighing up to 320 lb., are shot blasted on a rotary table machine. For cleaning No. 14 steel grit heat treated is used. Forgings in intermediate sizes are pickled. This is done in a separate detached pickling building, which is equipped with a 4-arm Mesta pickling machine with a 12,000-lb. lift. The building is 45 x 50 ft., 26 ft. high, with windows on all sides extending to the eaves.

Tumbling Smaller Forgings

THE smaller forgings are cleaned in two 48 x 60-in. continuous tumbling barrels located in the trimming department at the end of the press line. Each machine is served by a power loader designed so that a loaded skid is placed on the loader by a truck and the skid and its contents, about 2500 lb., is raised and the skid is dumped directly into the barrel. This is proving a highly economical handling arrangement. The forgings are rotated 20 to 30 min., and each machine has a capacity of 45 tons per day. Skids receive the forgings at the discharge end of the tumbling barrels. The tumbling mills were built by Ideal Industrial Machinery, Cincinnati.

A new arrangement has been provided in the handling of dies which is proving efficient. New dies are now prepared for the layout bench in the die storage building, which is equipped with two planers and a drilling machine for that work. Keyways and shanks are also put in the dies in this department. Then the dies go direct to the layout bench. With this arrangement it is not necessary to take the new dies to the regular die shop. The die

room is 100 by 200 ft. and contains about 75 machine tools used in die sinking. The die storage building is 52 x 175 ft. In it are stored 1800 sets of dies and there is sufficient room for 2500 sets. Dies are stored in steel racks, the width of which diminishes from the bottom shelf up, so that dies can be lifted from all shelves of the rack with an electric traveling crane. The racks are numbered and a complete filing system is kept for the dies.

The steel yard is conveniently arranged for the handling of stock. It is 600 ft. long and 60 ft. wide, its size being sufficient to store 5000 tons of material. The stock is carried in piles arranged according to types of material. The yard is served by a 15-ton gantry crane with a 60-ft. span. This unloads stock from cars to stock piles and also delivers it to a 4-wheel wagon at the entrance to the shear building. The wagon is moved a few feet to permit the stock to be picked up by a 5-ton electric traveling crane that serves the shear building and delivers the stock to the shear. This building is 60 x 120 ft.

Heavy Stock Sheared Hot

A HEATING furnace was installed recently in the shear house for heating plain carbon bars that are too large to cut cold or larger than 7½ in. in diameter and for heating alloy bars that if cut cold would sustain fracture. This is a continuous oil-fired pusher type furnace, 18 ft. long and 6 ft. 6 in. wide. The bars are heated to a temperature of 1000 to 1200 deg. for hot shearing. They pass through the furnace on skid bars and are discharged upon an incline leading to an alligator shear and after shearing pass to a roller table. This shearing unit is so arranged that it may also be used for cold shearing. In that case the bars are handled without passing through the furnace.

The shear house equipment includes a recently installed Pels shear with a capacity for shearing bars 7½ in. in diameter, three alligator shears, a guillotine and a friction saw with a 3½ ft. diameter cutting blade. As an auxiliary to the overhead crane the shear house has an industrial track extending through its center equipped with a car for handling stock. From the shears the stock is taken in skids to one of the three forging units as designated on a travel card.

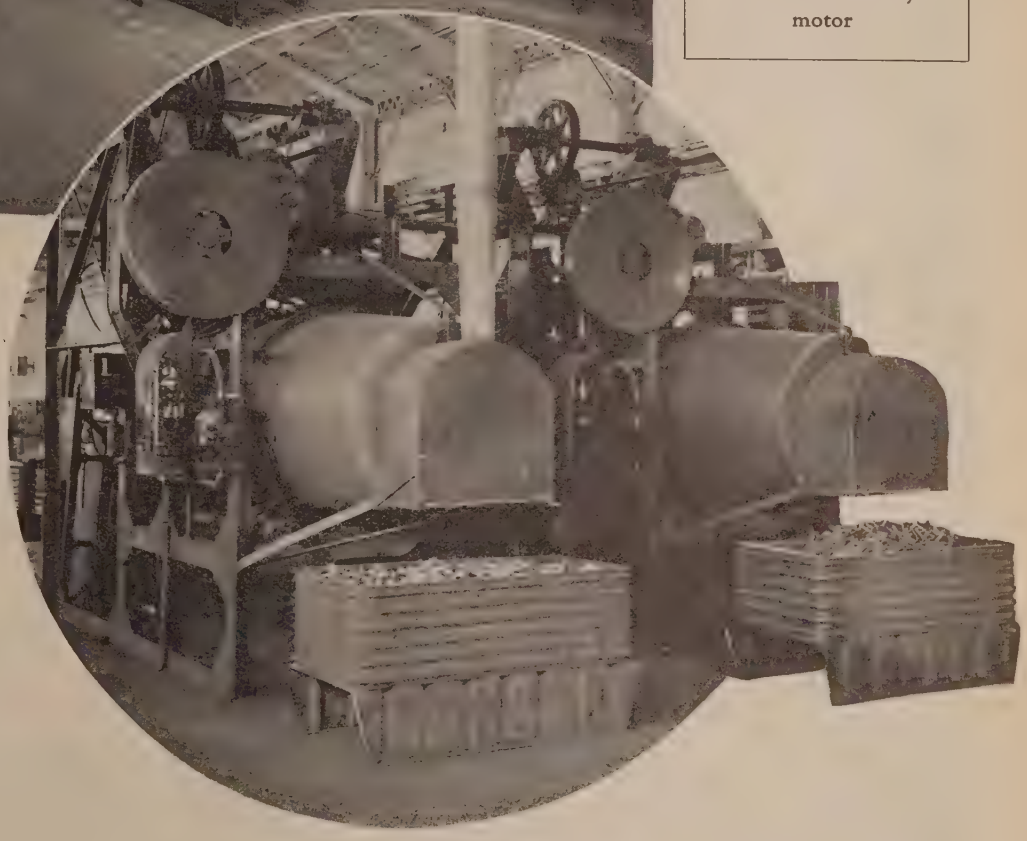
The forging capacity has been increased by the recent addition of 20 hammers. The present forging equipment consists of 1000-lb., 1200-lb., 2000-lb., 2500-lb., 3000-lb., 4000-lb., 5000-lb., 6000-lb., 8000-lb., 10,000-lb., and 16,000-lb. steam hammers as well as 1000-lb., 1500-lb., 2000-lb., 2500-lb. and 3500-lb. board drop hammers; heading or upsetting machines ranging from 1 to 5 in. capacity and 2 bulldozers. In addition to replacing some of the larger hammers which are becoming obsolete, the company has placed orders for twelve additional new hammers, to be manufactured from its own design.

A central storeroom has just been completed in which practically all stores are kept. This is 80 ft. long and 40 ft. wide and has an 8-ft. balcony on each side. It is well

BELT Conveyors in the Cold Trimming Department Carry the Forgings from the Presses after Trimming. The forgings are inspected and sorted as they move along the belt and are thrown in the tote boxes back of the belts

AT the Right Is Shown the Arrangement of the Trimming Presses in the Press Room and the Discharge End of Scrap Conveyor

CONTINUOUS Tumbling Barrels Are Located at the End of the Trimming Press Line. The forgings after trimming are dumped directly from tote boxes into the tumbling barrels, electric trucks placing the boxes in the hopper of the loader, which is elevated by a motor



THE Discharge End of the Tumbling Barrels Are Provided with Hoods and Connected with an Exhaust System for Carrying Away the Dust

lighted through a monitor roof. The inspection department consists of three divisions, hot, cold and final inspection. Shipping facilities are provided for handling 500,000 lb. of finished forgings per day. New departments include a chemical and metallurgical laboratory with 1500 sq. ft. of floor space and a hospital in a new building 16 x 36 ft., provided with first aid equipment.

The power plant equipment includes five 500-hp. Sterling boilers fired with Riley underfeed stokers and three Westinghouse low-pressure turbines, one of 1500-kw. capacity, one of 750-kw. capacity and one of 300-kw. capacity. A substation was recently built that enabled the company to purchase 1000 kw. of power from a commercial power company should a breakdown occur in its own power plant.

Stamping Department

THE stamping plant for the most part produces deep drawn stampings for the automotive and other industries. An overhead endless chain conveyor for handling work in process was recently erected in this plant. Its use is resulting in a reduction in handling costs, speeding up production and materially cutting down the amount of work stored on the floor. This conveyor, 730 ft. long, loops around through the press room, assembly room, inspection, pickling and annealing departments and shipping platform. The conveyor has hooks on 20-in. centers on which the work is suspended and it moves 35 ft. per min. It carries all work in process in which there are larger than ¼-in. holes, which comprises 60 per cent of the stampings. At various points the conveyor loops down from the ceiling, bringing it to a convenient level for loading and unloading. As pickling and annealing are required between press operations on nearly all deep drawn work, some of the work makes as many as three circuits of the conveyor.

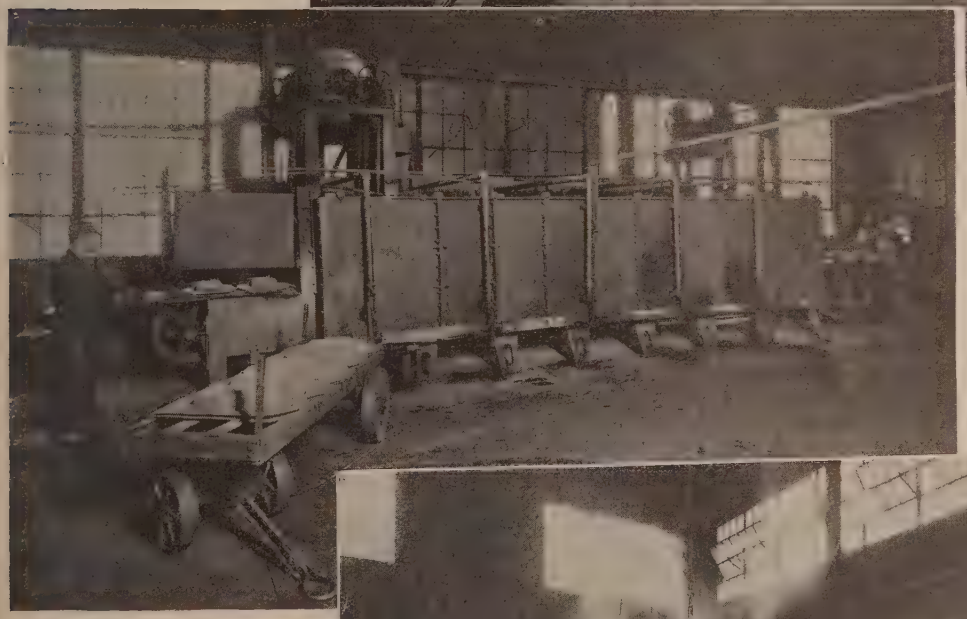
Annealing is done in a continuous oil-fired furnace 22 ft. long provided with a chain type conveyor consisting of four chains that run in alloy steel channels. Work remains in the furnace 2½ to 3 min. The furnace tempera-

BANJO Axle Housings for Trucks Are Forged on a 16,000-Lb. Steam Hammer, the Largest in the Plant (below)

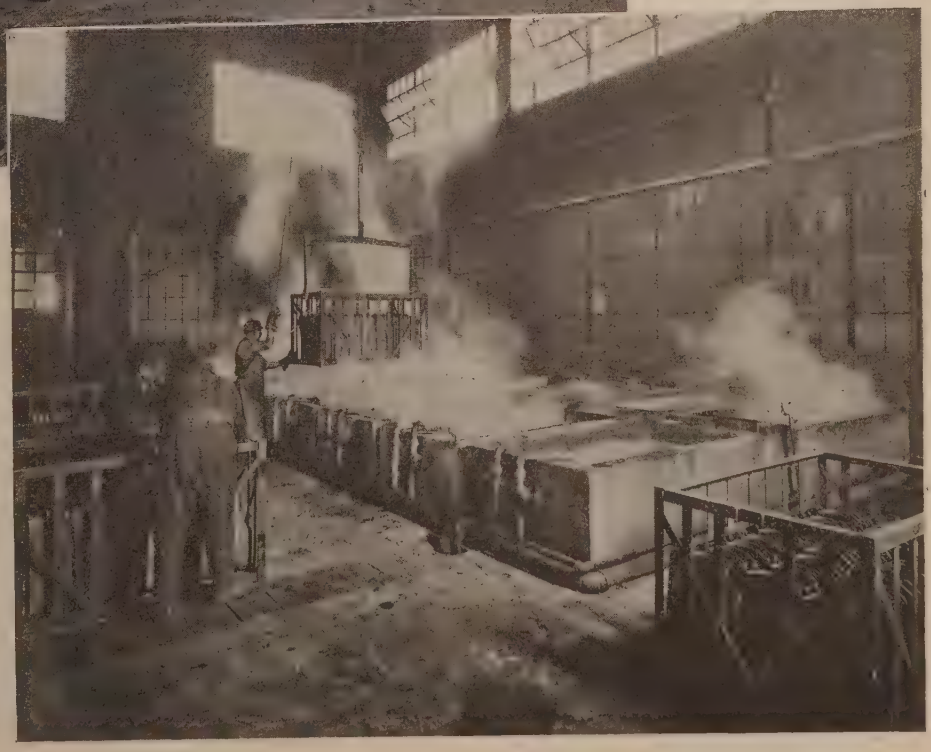
THE Pickling Department for Forgings, with Its Mesta Machine, Is Located in a Separate High-Roofed Building with Glass on All Sides, Affording Good Ventilation and Light (above)

AT Right, View Down the Center of the Light Hammer Shop

PRESS Room in the Stamping Plant Has an Endless Chain Conveyor for Handling Material in Process



STAMPINGS (At Left) Are Annealed in a Continuous Oil-Fired Furnace



PICKLING Tanks (At Right) in the Pickling and Annealing Department of the Stamping Plant

ture, which is under thermostatic control, is 1450 to 1700 deg. Fahr. Hoods connected to 24-in. stacks are located at the loading and discharge end to carry away the heat and fumes.

Recently construction was started on a new die room for the stamping plant. This is of the most modern daylight construction, 65 x 160 ft. New modern equipment for the manufacture of stamping dies is being installed and the building will be provided with two cranes for the efficient handling of large dies. A battery of six new Toledo presses has been ordered and will be installed within the next 60 days.

The aim of this company is to diversify its output. Extensive development has been under way for some months in forgings and stampings for industrial applications other than automotive, so that the fluctuation in automotive production will no longer affect the output or earnings of Transue & Williams. A good share of the output is now being taken by the electrical manufacturers, conveyor manufacturers, packing houses, boiler manufacturers, agricultural implement manufacturers, machine tool manufacturers, golf club manufacturers, etc.

The Transue & Williams plant occupies a 32½-acre site and includes 28 buildings with a floor space of 262,150 sq. ft. The company employs 1100 men. Its officers are J. R. Gorman, president; H. G. Sharp, vice-president and general manager; H. C. Senour, secretary-treasurer, and Charles T. Kingston, works manager.

A SECOND Hudson River Bridge at Poughkeepsie Has Reached the Cable Spinning Stage. Here is shown the gap between one of the two piers or towers and the shore anchorage. The bridge will be 4000 ft. long, with a 1500-ft. main river span. There will be a driveway of 30 ft. and five sidewalks

Fatigue Tests on Drums and Shells

Riveted Manganese Steel Drum Failed in Head; Riveted Carbon Steel Drum Did Not Fail; Welded and Forged Shells Failed at Tapped Hole

BY H. F. MOORE*

ADVENT of higher pressures in steam boilers has necessitated the use of plate material of increased thickness for the shells. This has appreciably affected the problems of design and manufacture of boiler drums. In the United States, riveted drums are in service for steam pressures up to approximately 800 lb. per sq. in., which seems to be about the limit for this type of construction. For steam pressures of the order of 1500 lb. per sq. in., solid or forged drums have been used. For pressure vessels other than steam boilers, drums have been built with welded seams in quite heavy plates.

In view of the highly satisfactory service obtained from riveted drums, it has seemed desirable to have a direct experimental comparison of strength between riveted drums and other types of drums, and also to make tests of drums with riveted seams using plate material of greater tensile strength than that of ordinary boiler plate.

Realizing that an ordinary static pressure test to destruction gives only a limited measure of the value of the construction used, the Babcock & Wilcox Co. has for some time been making tests on drum shells of various types under repeated applications of pressure. These experiments are still in progress, but it seems desirable to present certain results already obtained for information, with the distinct understanding that the conclusions here given are tentative and that further results may be expected as the tests proceed.

The apparatus described in this article and the methods of test developed have been designed and developed by the laboratory force of the Barberton plant of the Babcock & Wilcox Co. The writer has served as a special consultant in the conduct of the fatigue experiments.

The specimens tested were full size boiler drums, or shells of full size drum diameter (3 ft. to 3 ft. 6 in. inside). The expense and time necessary for preparing such specimens and making the tests was so great that comparatively few specimens have been tested. In making ordinary fatigue tests, six or more small specimens of each metal to be tested are subjected to various stresses, and usually some tests for each metal are run to at least 10,000,000 cycles of stress. In this manner it is possible to determine the "endurance limit" for nearly every metal below which the metal in question will withstand an indefinitely large number of cycles of stress without fracture.

This method was not feasible for the tests of full size drum shells. It was decided to determine the relative length of endurance of specimens (that is, the number of repetitions of stress to failure), although this is by no means the best criterion of strength under repeated stress. However, in the ordinary service of a boiler the cycle of stress on the shell is repeated at most a few thousand times, and the stress is not reversed, varying from zero to a maximum with slight fluctuations near the maximum stress. Thus it was feasible to run the tests to numbers of cycles of stress greatly in excess of the number of cycles to be expected in the normal service of a boiler.

It is a well known fact that a very slight change in the stress, if it is above the endurance limit of a metal, will make a large change in the number of times that stress must be imposed to cause fracture. From his general experience with fatigue testing, the writer believes that a decrease of 33⅓ per cent in the stress might mean an increase in "life" of about 25 times. It would seem, then, to be a conservative statement that if, under test, a boiler drum shell withstood without fracture 150,000 cycles of stress varying from zero to a stress 50 per cent above working stress, it might be concluded that a similar drum shell made of the same material would not fail by fatigue under normal length of service at working stress.

The tests herein described were planned on this basis, applying repeated cycles of stress 50 per cent above the working stress to specimen drum shells, and noting the length of life before fracture, and the location and character of the fracture.

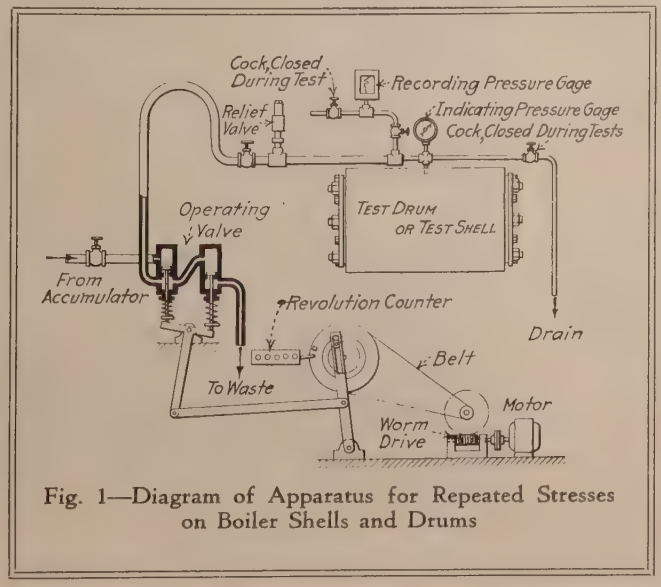


Fig. 1—Diagram of Apparatus for Repeated Stresses on Boiler Shells and Drums

A diagram of the apparatus used is shown in Fig. 1, and photographs of the set-up at the Barberton shops of the Babcock & Wilcox Co. are shown in Figs. 2, 3 and 4. Water under a pressure of 1600 lb. per sq. in. is taken from the accumulator-controlled pressure mains of the plant. This water goes through a reducing valve to produce the pressure desired in the test, and then through

*Research professor of engineering materials, University of Illinois; in connection with these tests, special consulting engineer with the Babcock & Wilcox Co.

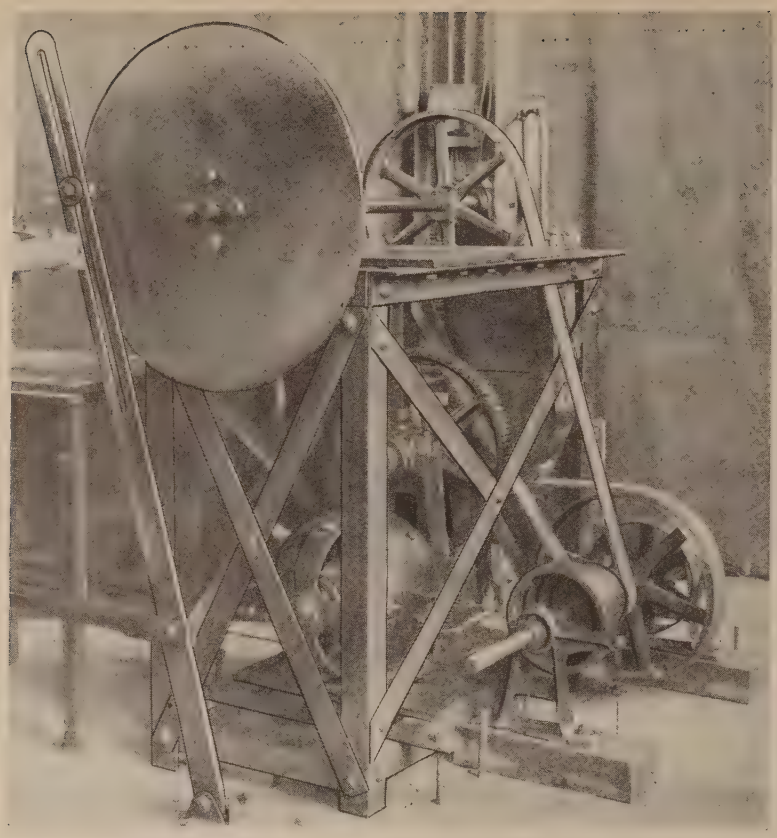


Fig. 2—Motor Drive and Link Motion for Operating Hydraulic Valves

a set of mechanically operated valves (Fig. 3), which alternately admit water under pressure to the test drum shell and allow the pressure in the drum shell to be relieved through the exhaust pipe. These mechanically operated valves are driven through link work by an electric motor whose speed can be varied, and the link work is fitted with a revolution counter which indicates the number of cycles of pressure applied. Several sets of such valves are operated by the one motor, and several test drum shells can be tested at one time. The pressure applied to each specimen is shown on a Bourdon gage directly attached to the specimen, and is also measured on a recording pressure gage. The equipment was ordinarily operated so as to give six repetitions of stress per minute.

In addition to observations to detect incipient fracture in a test shell (usually shown by leakage or a fine stream or spray of water), careful measurements of the minute changes of form under load were made. Some of these were made by means of a 2-in. Berry strain gage and others by means of micrometer dial gages attached to a framework supported from the test drum shell. The principal utility of the measurements of minute strain was to determine whether any marked permanent distortions of the specimens occurred as the tests progressed.

Two types of test specimen were used. The first, which was used for riveted construction, consisted of a drum shell with standard heads riveted to it. This type of specimen is referred to as a "test drum." The second type of specimen consisted of the test shell with an inner shell of smaller diameter, leaving an annular space between the two shells into which water under pressure was admitted. Figure 5 shows the general arrangement of this type of specimen, which is referred to as a "test shell."

Drums and Shells Tested

One of the specimens was a manganese steel test drum. The plate material in this specimen showed an analysis of 0.29 per cent carbon, 1.95 per cent manganese, 0.025 per cent phosphorus, and 0.036 per cent sulphur. Physical properties were: yield point 83,500 lb. per sq. in., tensile strength 106,500 lb. per sq. in., elongation in 8 in. 16 per cent, and reduction of area 36 per cent. The plate material for the remaining specimens was ordinary carbon steel boiler plate, and both the chemical analysis and the physical properties showed thoroughly satisfactory results for the metal in each specimen.

The designation of each test specimen, ruling dimensions of each test specimen, the type of joint, the range of test pressures and resultant computed stresses, the number of cycles of stress for fracture, and the character of the fracture, are given in Table I.

Comments on Each Test

The manganese steel test drum was cold riveted Slight trouble with the gaskets at the manholes occurred

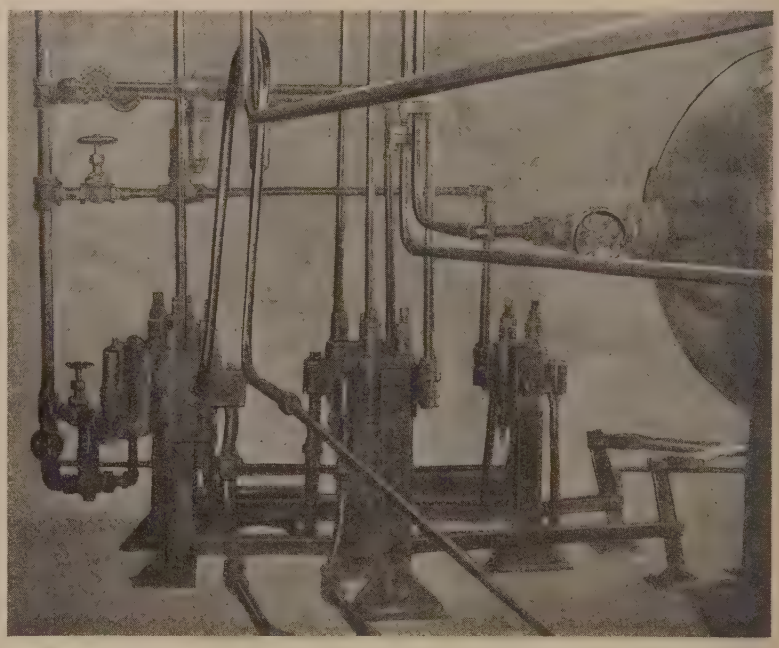


Fig. 3—Hydraulic Valves for Testing Several Drums Simultaneously

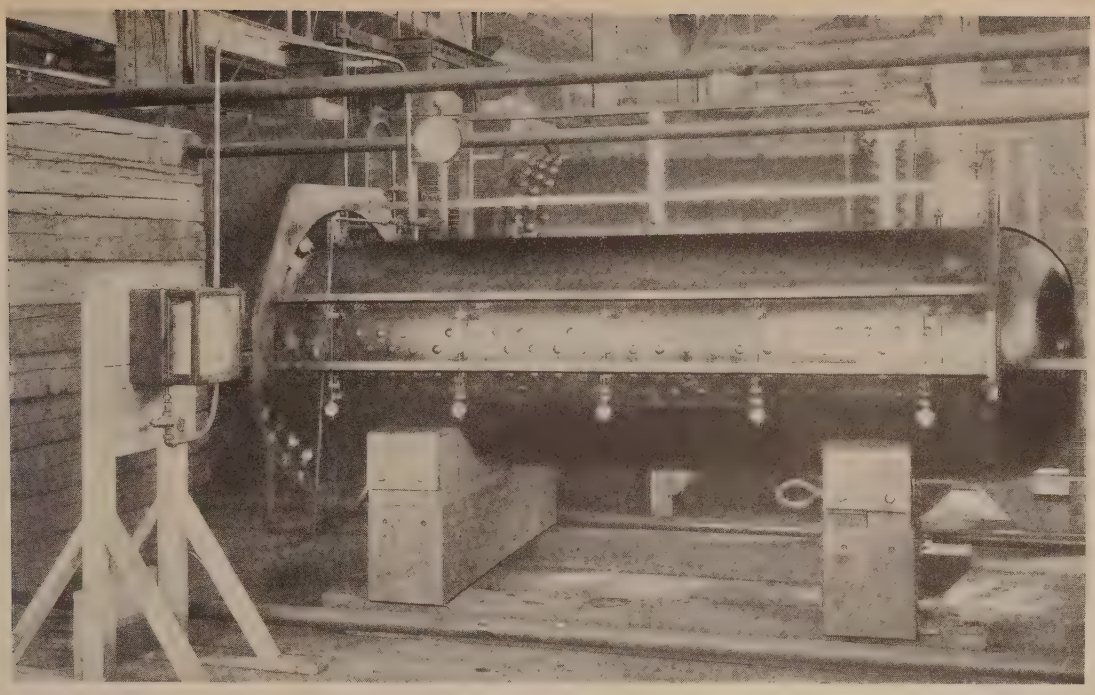


Fig. 4—Two Drums Under Test

during the first few hundred cycles of pressure. Between 3000 and 4000 cycles slight leaks appeared along the buttstraps and in one head seam. No leaks developed at the rivets. At 7100 cycles it was necessary to stop the test to replace a gasket on one manhole cover, and at this time the head seam was calked. The test was resumed, and after 45,000 cycles of pressure a slight leak appeared in both head seams. One of these leaks increased until at 65,000 cycles it was necessary to stop the test and recalk this head seam. Test was resumed, and at 92,000 cycles one manhole cover was replaced by a heavier cover. After 130,225 cycles a leak had developed near the manhole opening which was evidently a fracture. The test was stopped and examination showed a crack about 3¾ in. long located as shown in Fig. 6. The metal around this fracture was removed, a thin plate fitted into the hole and the rest of the opening filled with weld metal. The test was started again, but after 143 additional cycles of pressure the drum head split violently, as shown in Fig. 7. Examination showed a slight fracture extending into the edge of the shell. Strain measurements showed considerable variation, but no outstanding evidence of permanent distortion except in the immediate vicinity of the location where the original crack developed.

The A. S. M. E. standard drum (that is, one designed and constructed according to the provisions of the boiler code) was riveted in the usual way. After 25,000 cycles of pressure had been applied minute leaks developed along the lower edge of a buttstrap and in both head seams. After 32,000 cycles the test was stopped and the seams calked. The test was resumed and after 431,000 cycles a very minute leak (about one drop per minute) developed at the bottom of one head seam. At 629,000 cycles slight leaks had developed along the lower edge and the end of one buttstrap. The test was stopped and the joints recalked; thereupon the test was resumed, a total of 1,013,840 cycles of pressure was applied without developing any fracture. The measurements of strain gave no evidence of permanent deformation during the test.

Arc welded test shell "A" is shown, in diagram, in Fig. 5. The stresses set up were practically pure hoop tension. Arc welding was done by hand, using ordinary bare welding wire. After 5530 cycles of pressure, fracture developed in the welded seam at the junction of base metal and weld metal.

Arc welded test shell "B" is also shown, in diagram, in Fig. 5. The seam was arc welded by hand, using a processed electrode (covered electrode). After 163,000 cycles of pressure, the longitudinal seam of the *inner* shell of the test apparatus fractured. This inner shell was repaired and the test continued. After 417,381

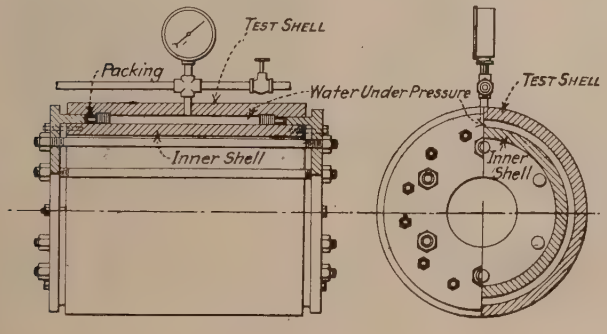


Fig. 5—(At Left) Test Shell for Determining Fatigue Strength of Welded or Forged Cylinders

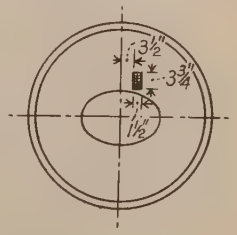
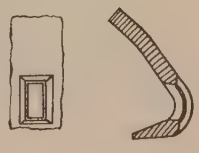


Fig. 6—Sketch of Original Check in Drum Head and Method of Repair



cycles, the outer shell fractured, not in the weld, but at the tapped hole where the pressure gage connection was made. This is a point of stress concentration, and its significance is discussed later. During the test the strain measurements showed no sign of permanent deformation.

Arc welded test shell "C" is shown, in diagram, in Fig. 5. The seam was also welded, using a processed electrode. After 160,000 cycles of pressure the packing of the joint between inner and outer shells became loose. The test was stopped and the packing replaced; thereupon the test was resumed, and after 561,984 cycles the outer shell cracked at the gage connection (a ½-in. pipe thread). The failure was similar to that for arc welded test shell "B," and is shown in Fig. 8. The crack barely reached through to the outer surface, but was several inches long on the inside. During the test the strain measurements showed no evidence of permanent deformation in the steel test shell.

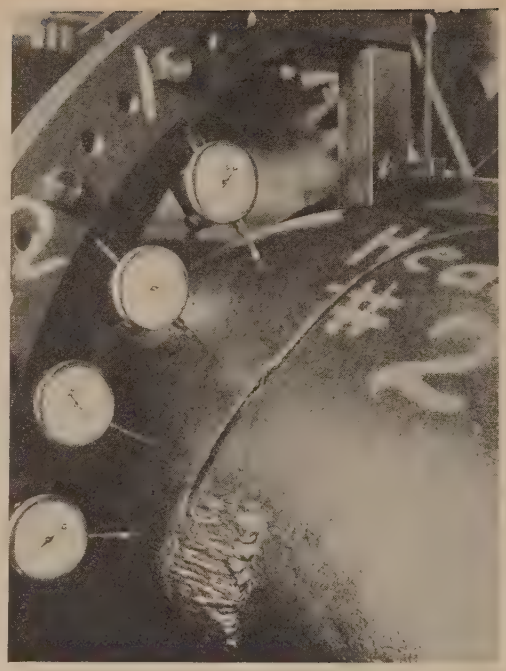


Fig. 7—Long Crack Skirting Edge of Welded Patch in Drum Head of Manganese Steel

Arc welded test shell "D" was a duplicate of shell "C" in construction, type of welding wire used, and method of testing. After 435,883 cycles of pressure failure occurred at the gage connection, as in the case of shell "B" and shell "C."

The forged steel test shell was a forging without any longitudinal seam. After 20,000 cycles of pressure the inner shell of the test apparatus cracked in the longitudinal seam; it was repaired and the test continued. After 446,950 cycles the outer shell fractured at the pressure gage connection in a manner very similar to the fracture for arc welded test shells "B," "C" and "D." The strain measurements showed no evidence of permanent distortion.

Stresses Concentrated at Holes

It is obvious that, until many more tests have been made, nothing in the nature of final conclusions can be drawn as to the fatigue resistance of boiler seams. However, in view of the very meager amount of data concerning the behavior under repeated stress of such seams, and of welded joints in general, these few test results seem worthy of attention.

In the case of the test shells which fractured at the tap hole for the gage connection, it is to be noted that according to the theory of elasticity such a hole would cause a stress-intensification at its edge amounting to three times the computed stress in the plate. The practical effect of such holes, as judged by repeated-stress tests seems to be less than this theoretical value. Haigh and Wilson[1] have made tests of specimens of structural steel under cycles of tensile stress varying from zero to a maximum, and they report a reduction of strength due to a hole of only a very slight amount for structural steel, although later tests showed a larger reduction for harder steel with a hole in it. Tests at the University of Illinois[2] on specimens of soft steel subjected to cycles of reversed bending show a reduction of strength of about 50 per cent due to the hole. In this connection it is to be noted that the "A. S. M. E. standard drum" (line 2, table I), which did *not* fracture, had such a tapped hole in its outer shell. However, owing to the allowance for efficiency of the riveted joint, the stress at the tapped hole (which was some distance away from a riveted seam) was only 13,200 lb. per sq. in., as compared with 16,500 lb. per sq. in. for the stress at the riveted seam.

A fair value for endurance limit of boiler plate steel under reversed bending is 26,000 lb. per sq. in. For cycles of stress varying from zero to a maximum it may be expected that the value of endurance limit will rise to about 39,000 lb. per sq. in.[3] This would indicate that the practical stress-concentration factor at the tapped hole in the case of the shells tested lay between 39,000 ÷ 13,200

[1] (British) Association for the Advancement of Science, 1923. Report of Section "G."

[2] Bulletin 152, Engineering Experiment Station, University of Illinois, pages 25 to 34.

[3] Moore and Kommers "The Fatigue of Metals," page 185.

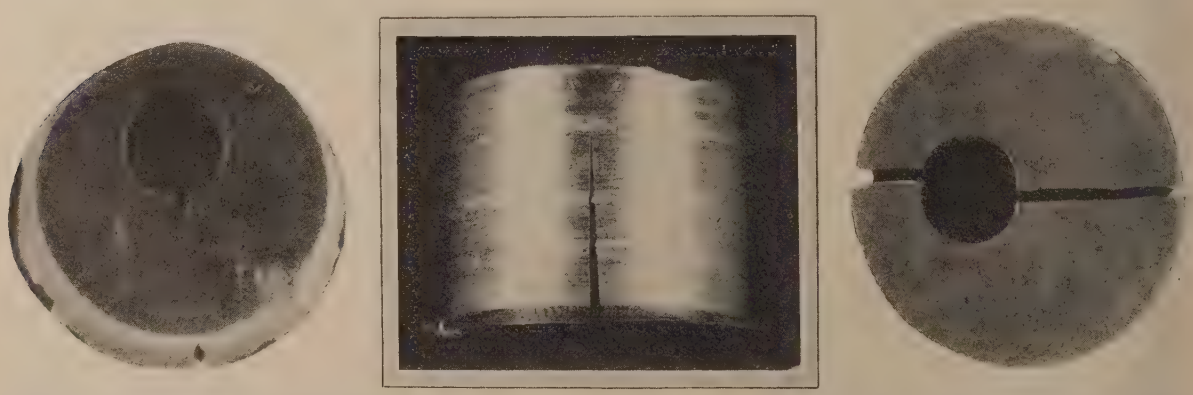


Fig. 8—Plug Specimen Cut from Arc Welded Test Shell C Where Broken at Tapped Hole for Pressure Gage. At left is view of outer surface of plate; in center is the side of the plug specimen, and at right the fracture shows open to a considerable distance on each side of the hole

TABLE I—SUMMARY OF TEST RESULTS

Specimen	Shell Dimensions: Inside Diameter, In.	Shell Dimensions: Plate Thickness, In.	Longitudinal Seams	Efficiency of Joint, Per Cent	Lb. per Sq. In.: Max. Allowable Working Pressure	Lb. per Sq. In.: Range of Test Pressure [a]	Lb. per Sq. In.: Range of Tensile Hoop Stress [a]	Number of Cycles of Pressure Applied During Test	Failure
Manganese steel test drum, riveted	35⅝	1.00	Two at 180 deg.	71	838	0–1,260	0–31,500 0–22,400 [b]	130,225	Failure in drum head below manhole.
A.S.M.E. standard drum, riveted	42	2.00	Two at 180 deg.	80	838	0–1,260	0–16,500 0–13,200 [b]	1,013,840	No fracture
Arc welded test shell "A"	42	2.00	One	100 [c]	1,047	0–1,570	0–16,500	5,530	In longitudinal seam near middle of length at junction of base metal and weld metal
Arc welded test shell "B"	42	2.00	One	100 [c]	1,047	0–1,570	0–16,500	417,381	At ½-in. tap hole for gage, not at weld
Arc welded test shell "C"	42	2.00	One	100 [c]	1,047	0–1,570	0–16,500	561,984	At ½-in. tap hole for gage, not at weld
Arc welded test shell "D"	42	2.00	One	100 [c]	1,047	0–1,570	0–16,500	435,883	At ½-in. tap hole for gage, not at weld
Forged test shell	42	1.875	None	100	1,047	0–1,570	0–18,000	446,950	At ½-in. tap hole for gage

[a] Test pressure 1.5 times working pressure. Maximum stress under test pressure is 1.5 times working stress.
[b] The higher of the two ranges is the range of computed stress through the line of rivets; the lower of the two ranges is the range of computed stress in the shell away from the riveted seam.
[c] The efficiency of the welded joints is taken at the nominal value of 100 per cent.

and 39,000 ÷ 16,500, that is between 2.95 and 2.36. Possibly the rather rough finish left by the tap, and the irregularities of outline due to the threads, may make this factor higher than would have been the case for a smooth drilled hole.

It should be noted that the riveted drum specimens stood up well under repeated cycles of pressure, and it seems in order to inquire why the stress-concentration at the rivet holes was not more in evidence. In the case of the "A. S. M. E. standard drum," the grip of the rivets on the plate may have spread the stress in the vicinity of the rivet hole. There also may be a factor affecting strength of riveted joints similar to the effect reported by R. R. Moore[4], later checked by tests at the University of Illinois, who found that a *single* groove in a test specimen reduced the fatigue strength much more than did a series of grooves. Possibly a series of holes acts in a similar fashion.

[4] Proceedings, American Society for Testing Materials, Vol. 26, Part II, page 225, (1926).

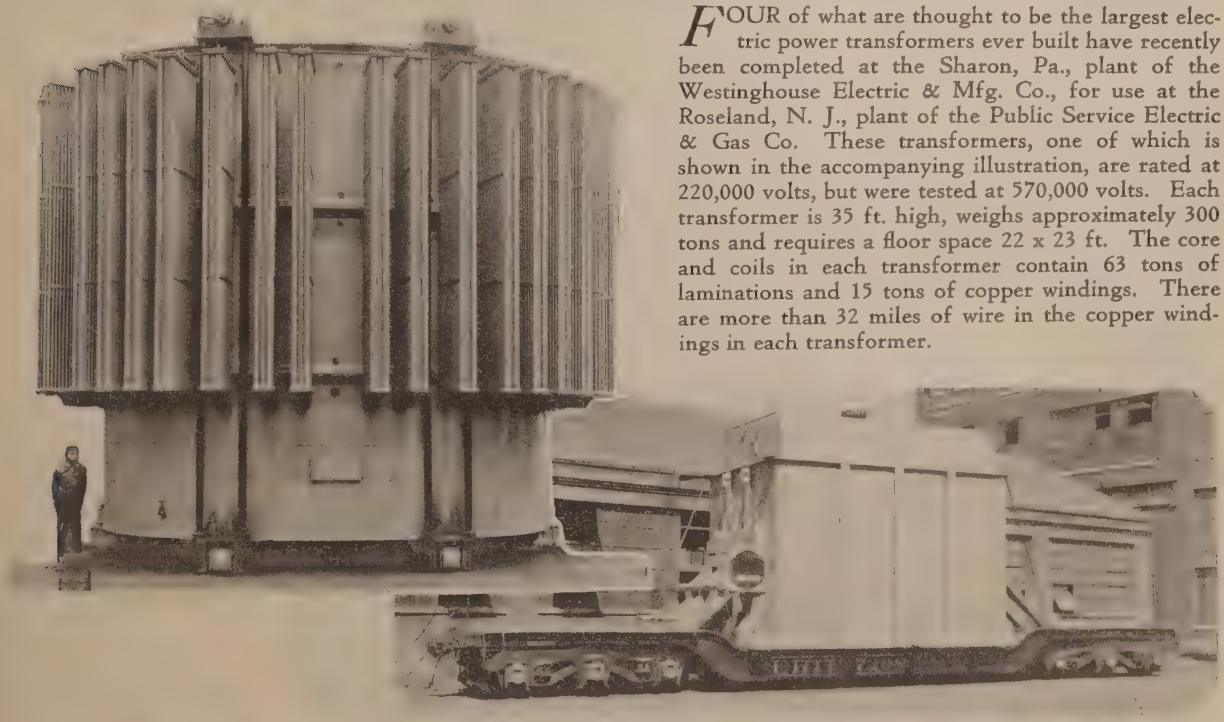
During the tests some corrosion of the metal was noted, but there is no apparent evidence that corrosion fatigue played an important part in the test results.

The results of these few tests do seem to furnish a basis for three conclusions:

(1) Welded joints in test drum shells have been made which do not weaken the fatigue strength of the shell as much as does the tapping of a hole for a gage connection.

(2) Welded joints in test drum shells have been made which withstood cycles of stress varying from zero to a value 50 per cent above the allowable working stress for more than 400,000 cycles. This is at least 50 times as many cycles as would be developed in the normal life of a boiler.

(3) The strength of a welded seam under repeated cycles of pressure is greatly affected by variation of welding practice. It is evident that, if it is expected to obtain welded joints at all resistant to repeated stress, it is very necessary to develop and maintain good, uniform welding practice, and carefully inspect the welding.



FOUR of what are thought to be the largest electric power transformers ever built have recently been completed at the Sharon, Pa., plant of the Westinghouse Electric & Mfg. Co., for use at the Roseland, N. J., plant of the Public Service Electric & Gas Co. These transformers, one of which is shown in the accompanying illustration, are rated at 220,000 volts, but were tested at 570,000 volts. Each transformer is 35 ft. high, weighs approximately 300 tons and requires a floor space 22 x 23 ft. The core and coils in each transformer contain 63 tons of laminations and 15 tons of copper windings. There are more than 32 miles of wire in the copper windings in each transformer.

To Melt 2200 Tons of Iron a Day

Enlarged Chevrolet Gray Iron Foundry Has 11 Cupolas and 14 Continuous Molding and Pouring Conveyors

BY FRED L. PRENTISS

A DAILY melting output of 2200 tons of iron is expected to be obtained in the enlarged gray iron foundry of the Chevrolet Motor Co., Saginaw, Mich. Large extensions to this plant were recently completed, more than doubling its capacity, and already 1875 tons has been melted and poured in one day.

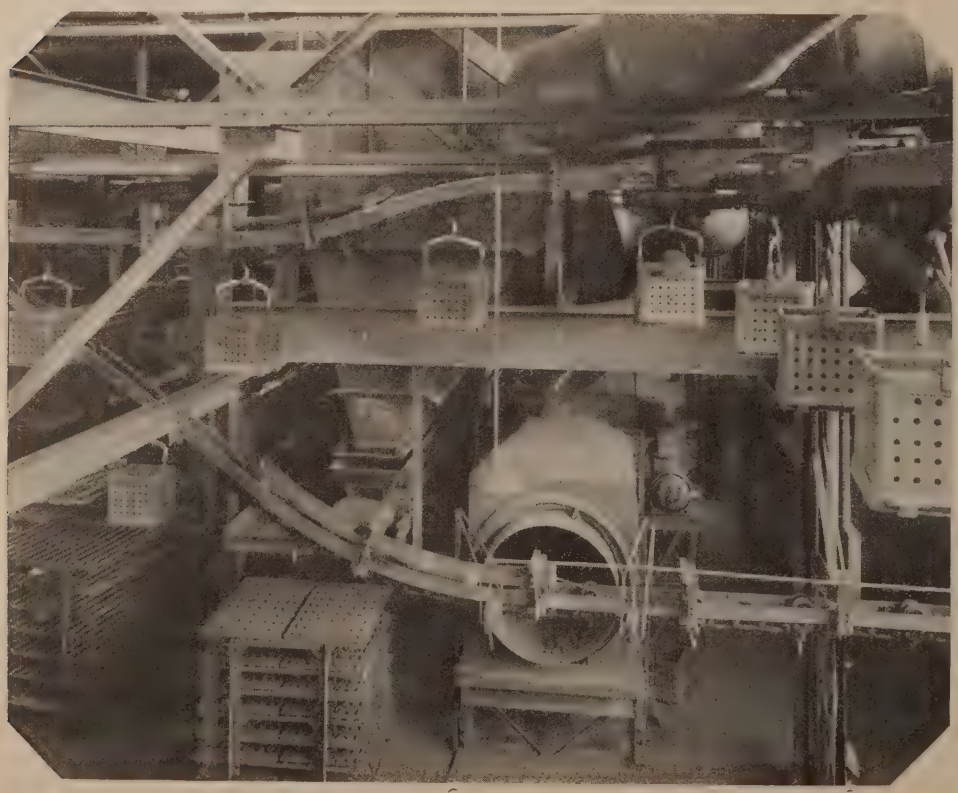
Built in 1919 as the foundry of the Saginaw Products Co., a unit of the General Motors Corporation, this plant was enlarged and modernized in 1926. A description of the foundry as then equipped appeared in THE IRON AGE, April 8, 1926. With the shifting of foundry production work by the General Motors Corporation and the building of two large new foundries, the Buick foundry at Flint and the Oakland-Pontiac foundry in Pontiac, the Saginaw foundry that had been making cylinder blocks and other castings for Buick and Chevrolet cars became a Chevrolet foundry, and the name of this unit was changed accordingly.

More Than Twice as Many Units

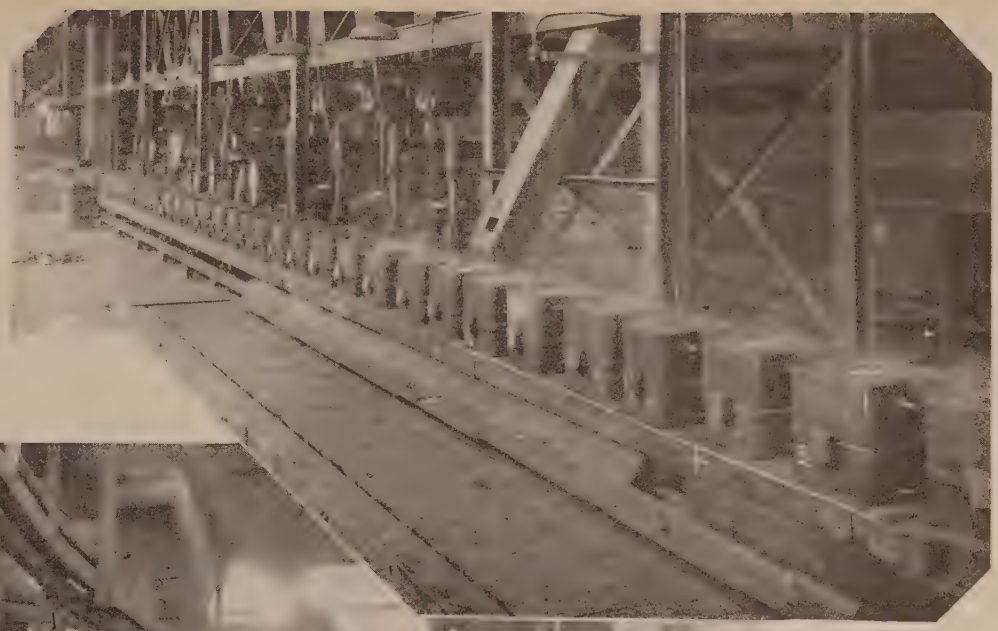
With the recent enlargement the number of cupolas has been increased from 5 to 11, and the number of conveyors for continuous molding and pouring from 6 to 14. The plant has been enlarged materially to provide additional floor space to make room for the increased capacity. While the layout of the old foundry has been generally followed in the arrangement of the new equipment, the new portion of the plant has some new and interesting features in equipment and handling arrangements which represent developments that have been made in the foundry industry in the past two or three years. Probably the most important innovation is the change in the method of handling castings between the shake-out and the cleaning room.

Large production makes possible the provision of a separate molding unit for each of the more important smaller castings. In the new part of the foundry there are two mold conveyors for pistons, one for clutch housings, one for transmission housings, one for flywheels, one for tappets and two for miscellaneous small castings. Cylinder blocks are made on three of the old conveyors and cylinder heads on the other three.

The mold conveyors are of the run-around car type, which have taken the place of the drag line conveyors now being generally used. Cast iron cars on 4-ft. centers support the ends of ship channel sections 18 in. wide, which overlap the car, forming a continuous plate type



PASSING from the Shake-out to an Apron Conveyor, the Castings and Sand Are Delivered to a Revolving Screen (Shown in Lower Center). From this the castings are discharged into buckets, in which they are picked up, and after cooling while moving on this 1400-ft. conveyor, are delivered to the cleaning department



ONE of the Molding Units Used in Making Pistons. The pouring conveyor is shown at the side of the mold conveyor (At Right)

COOLING Conveyor Carries the Castings into the Cleaning Room, Where the Loaded Baskets Are Dumped into Hoppers Above the Tumbling Barrels (At Left)

table which protects the rails and conveyor chain from falling sand and runouts and makes the table easier running and safer for the workmen. Each car is mounted on four bronze-bushed wheels with closed ends. The conveyor is driven by a drop forged chain suspended from the bottom of the cars, the drive being of the cantilever type.

Three of the mold conveyors are 220 ft. long, four 115 ft. long and one 161 ft. long. The conveyors have a speed range of 15 to 30 ft. a minute, the speed being adjusted according to the kind of molds being poured. At the side of the pouring zone are pouring conveyors 25 to 50 ft. long raised slightly above the foundry floor and moving at the same speed as the mold conveyors. Molds after pouring run around the end of the conveyor to the shake-out, passing beneath a hood on the return side for carrying away heat and fumes. Each unit has a power return flask conveyor. The molding machinery and other foundry equipment were supplied by William H. Nicholls Co., Inc., Richmond Hill, N. Y.

At the shake-out end the castings and sand are knocked out through a grating on to an apron conveyor. Gases and smoke are drawn away through a hood above the shake-out. The castings and sand are carried upward and discharged from the apron conveyor into a revolving screen located on the foundry floor. This screen is 54 in. in diameter and 10 ft. 4 in. long over all. The screen itself is a perforated plate 6 ft. long at the center of the revolving barrel. The screen is set at a slight angle, so that gravity will cause the castings to move slowly through it while it revolves. At the discharge end the castings fall into baskets under an overhead castings conveyor or, if desired, can be discharged on to a truck.

The castings are carried in buckets suspended from this conveyor, which also serves as a cooling conveyor. The buckets are of perforated steel, about 2 ft. square, holding up to 800 lb. In front of the discharge end of the screen at the floor level is a turntable equipped with two air jacks. An empty basket is lifted off the conveyor and at the same time a loaded basket is hung on the conveyor by means of these jacks. The table is then swung around, placing the empty basket in the loading position. To allow them to cool off, before reaching the tumbling mills in the cleaning room, the castings travel overhead for about 2 hr. The cooling conveyor extends over hoppers above the tumbling mills, into which the castings are discharged by tripping the hinged bottom of the basket. From the hoppers they are discharged through gates into the tumbling mills.

Each molding unit has a screen for separating the sand from the castings. There are three castings conveyors, one serving three units. These travel from 3 to 12 ft. a minute, depending on the kind of casting. Each is 1400 ft. long, and the baskets are hung on 3-ft. centers.

Various advantages are claimed for this method of handling castings from the shake-out to the tumbling

mills. As the castings are carried below the floor when shaken out, only the flasks remaining on the floor, there is less smoke and heat in the vicinity of the shake-out. The castings are always kept moving and less sand is carried into the tumbling mills than would be the case were the castings not carried through the revolving screen.

Sand-Handling System Carries Many Tons

The sand shaken from the castings in the revolution of the screen passes through the screen on to a belt conveyor beneath, over a magnetic pulley which removes the iron and is carried upward to an overhead sand screen. From this screen the sand is discharged into a pug mill, then passes through a conditioner and into a 75-ton storage bin. From this it is fed through cutting feeders on to a belt into a bucket elevator, which discharges it to a flight conveyor for distribution into the molders' hoppers. Each unit has its own sand conditioning and distribution plant.

LARRY Car Loaded by an Automatic Skip, Delivering Coke to a Bin Back of the Cupolas

In the new core room 100 tons of core sand is used an hour. In this department are 64 two-rack type oil-fired core ovens arranged in two batteries, each consisting of 16 ovens in a row placed back to back with another 16. These ovens are 6 ft. wide x 12 ft. 4 in. deep by 7 ft. high, inside dimensions. Each battery is fired with four 3-in. Multi-spray oil burners supplied by the Industrial Heating Equipment Co., one burner for eight ovens, automatically controlled by a Wilson-Maeulen automatic controller.

Three Melting Units Always Fired

The new cupolas are 9½ ft. in diameter, lined down to about 72 in. Three cupolas are always in use and are operated for nearly 22 hr. Because of the long period of operation, unusually heavy linings are provided in the melting zones.

An overhead crane delivers pig iron and scrap from railroad cars to the charging floor. The charging buckets are placed on an electrically driven scale-trolley, which is loaded by hand. Five of these trolleys run across the charging floor at right angles to the row of six cupolas, their tracks being slightly below the charging floor level. When a bucket is loaded the trolley moves it forward to a point midway between two cupolas. Here the bucket is on a level with a gravity conveyor that extends both ways in front of the cupola. Beneath the gravity conveyor there is an air hoist which pushes the buckets either to the left or right in front of a cupola door and at the same time places an empty bucket on the trolley. The loaded bucket is delivered in the cupola by an overhead crane.

Coke and limestone charges are handled on the opposite side of the cupolas. With the exception of the way these materials are charged in the cupolas, the method of handling coke and limestone is similar to that used in the foundry of the Buick Motor Co., described in THE IRON AGE of Nov. 27, 1927. Coke is dropped from railroad cars into a track hopper and carried up in a fully automatic skip, which delivers it into a cab-equipped larry car. This discharges the material into storage bin back of the cupola.

From the bin the coke is drawn out through double gates into the basket of a scale-equipped charging machine. This charger travels the full length of the floor back of the cupola and can be spotted in front of any cupola. The coke basket is run into the cupola, and the bottom of the basket pulled out under the load, giving an even distribution of the coke through the area of the cupola.

The mold conveyors, casting conveyors, sand-handling equipment, coke and limestone-handling equipment were built by the C. O. Bartlett & Snow Co., Cleveland. The Whiting Corporation supplied the cupolas and the material charging equipment. The tumbling mills were built by the W. W. Sly Co. The new core ovens were built by Holcroft & Co., and the core-sand mixing machines were supplied by the Standard Sand & Machine Co., Cleveland.

Creep of Low-Carbon Boiler Steels

CREEP experiments on 0.10 and 0.17 per cent steel have been made at the British National Physical Laboratory. In these tests nickel-plated tension pieces were loaded with a constant quiescent mass, and the amount of extension observed at intervals for several weeks.

Curves, where extension is plotted against time, are of two general types. In one, the extension rapidly subsides, and after a few days no further stretching occurs, or perhaps at a very small rate. These temperature and stress limits, below which a steel pressure vessel would be entirely stable (except for corrosion), are as follows:

0.17 Carbon Steel		0.10 Carbon Steel	
Temperature, Deg. C.	Stress, Lb. per Sq. In.	Temperature, Deg. C.	Stress, Lb. per Sq. In.
515	8,700	500	7,850
545	5,600	525	5,400
615	2,240	570	2,240

The initial stretching at loads at and below these limits apparently work hardens the metal, and raises the elastic limit above the limiting stress, whereupon the elongation stops. (When creep ceases, the material is elastic up to the applied stress.) However, when the work hardening is not sufficient to counterbalance the softening due to temperature, any initial creep would be continuous as long as the load is applied or until fracture results.

Light Alloys for Aircraft

Aluminum, Magnesium and Beryllium Are the Principal Metals—Research Constantly Discovering Desirable New Combinations

AIRCRAFT manufacturers have been making wonderful strides in building better and safer as well as larger airplanes and an important aid in this development work is being rendered by the manufacturers of the aluminum alloys used in airplane construction. That there is a constant striving for greater strength and lightness in metals used in airplane construction was brought out in papers presented at an aeronautical meeting held jointly by the Society of Automotive Engineers and the Aeronautical Chamber of Commerce of America at the Hotel Statler, in Cleveland, last week in connection with the annual air races.

Several technical sessions were held, the one Wednesday being devoted to light alloys. This was presided over by Carl B. Fritsche, president of the Aircraft Development Corporation, Detroit, which recently completed the all-metal dirigible ZMC-2 for the Navy Department, described in THE IRON AGE, Aug. 22. Mr. Fritsche remarked at the opening of the meeting that there is a definite trend toward all-metal construction in the aircraft industry.

Wide Variety of Aluminum Alloys Used

ALUMINUM and magnesium, being the lightest commercial metals, are the most suitable for use in aircraft construction, declared E. H. Dix, Jr., metallurgist, Aluminum Co. of America, New Kensington, Pa. Unalloyed, these metals are soft and weak, so that their application is limited. Sheets of 99 per cent aluminum can be hardened by cold working so that they are strong enough for cowling and gasoline tanks. The addition of 1¼ per cent of manganese increases the strength and hardness of this alloy. In sheet form it is now used extensively for cooking utensils, and should, because of its corrosive resistance, sooner or later find useful application in the aircraft industry.

Heat treated aluminum alloys are of the greatest importance to aircraft construction, as they possess mechanical properties comparable with those of structural steel. However, because the modulus of elasticity of aluminum and its alloys is practically one-third that of steel, it is necessary to use somewhat thicker sections than would be dictated if relative tensile strengths alone were considered. For this reason aluminum sections are usually about one-half the weight of steel.

Most aluminum castings produced in this country have copper as the principal alloying constituent, and aluminum-copper alloys containing 4 per cent of copper form the base of the most important heat treatable alloys. Duralumin contains 3½ to 4 per cent copper and ½ per cent each of manganese and magnesium. Silicon is used extensively as an alloying element for casting alloys. Nickel is being used to an increasing extent in metal for pistons and cylinder heads. Physical properties of these alloys are given in the table.

Magnesium Alloy Castings Are Heat Treated

IN the magnesium base alloys, aluminum and manganese are the most important alloying elements. Aluminum is used up to 12 per cent and produces alloys that are susceptible to heat treatment. One of the most useful magnesium alloys contains 7 per cent of aluminum and 0.4 per cent of manganese. As sand cast and heat treated this alloy shows a tensile strength of 29,000 to 38,000 lb. per sq. in. and an elongation of 10 to 6 per cent. It is used for starter and pump housings, gearcases and covers, motor cover plates, intake manifolds and sections of crankcases. These parts usually are heat treated if additional strength is required. For rolled sheet, plate, or bar, pure magnesium or an alloy containing 4 per cent of aluminum and 0.4 per cent of manganese is used. The magnesium alloys mentioned, as now made, are stable under atmos-

TABLE I—PROPERTIES OF THE PRINCIPAL ALUMINUM ALLOYS

Alloy Designation	Nominal Composition						Mechanical Properties			
	Cu	Fe	Si	Mg	Mn	Al	Tensile Strength, Lb. per Sq. In.	Yield Point, Lb. per Sq. In.	Elongation, Per Cent in 2 In.	Comparative Corrosion Rating [f]
2SO [a]	..	..	..	..	..	99	12,000 to 16,000	.....	30-45	A
2SH [b]							22,000 to 30,000	.....	4-1	A
3SO [a]	..	..	..	..	1.25	97	15,000 to 18,000	.....	15-30	A
3SH [b]							27,000 to 35,000	.....	4-1	A
17ST [c]	4.0	..	..	0.5	0.5	92	55,000 to 63,000	30,000 to 40,000	18-25	C
Alclad 17ST [c]	4.0	..	..	0.5	0.5	92	50,000 to 58,000	27,000 to 36,000	18-25	A
A 17ST [c]	2.5	..	..	0.3	..	95	35,000 to 45,000	15,000 to 20,000	20-28	C
B 17ST [c]	3.5	..	..	0.3	..	94	42,000 to 50,000	20,000 to 25,000	20-28	C
25SW [d]	4.5	..	0.8	..	0.8	92	45,000 to 53,000	15,000 to 30,000	15-22	C
25ST [e]							55,000 to 63,000	30,000 to 40,000	16-25	E
51SW [d]	..	..	1.0	0.6	..	96	30,000 to 40,000	15,000 to 20,000	20-30	B
51ST [e]							45,000 to 50,000	30,000 to 40,000	10-18	E
C17SW [d]	4.0	..	1.25	0.5	0.5	92	55,000 to 63,000	30,000 to 40,000	18-25	D
C17ST [e]							63,000 to 70,000	50,000 to 55,000	8-14	E
195 [g]	4.5	..	..	..	..	93	28,000 to 50,000	13,500 to 27,000	12-0	C

[a] Soft annealed wrought material.
[b] Hard-rolled material.
[c] Quenched and naturally aged.
[d] Quenched.
[e] Quenched and artificially aged.
[f] A indicates highest corrosion resistance.
[g] Refers to castings only; properties vary with heat-treatment.

pheric conditions and no defects from corrosion have been reported.

Mr. Dix discussed at some length the corrosion of aluminum alloys, which the author said has been a greatly overemphasized subject. He pointed out that corrosion is always an important problem in the aircraft industry, because, owing to the lightness of planes, a slight deterioration by corrosion might result in structural failures. Because of the greatly accelerated conditions under which laboratory tests are made it is dangerous to interpret these tests in the terms of service conditions. In the method now generally used standard tensile specimens are exposed to a corrosive condition and a tensile test is made on these samples after different periods of exposure. The tensile strength and elongation thus observed are compared with the same properties obtained from similar samples that have not been subjected to corrosive influences.

Three Types of Corrosion

THE speaker pointed out that corrosion of metals may occur in general in three ways. There may be a uniform solution of the surface, which moderately decreases the tensile strength. This type of corrosion need not be greatly feared, as its extent can be determined by visual inspection. The pitting type of corrosion is more serious, as this causes a decrease in the ductility as well as in the tensile strength. The third type, inter-granular corrosion, proceeds along grain boundaries and therefore considerable corrosion may occur, although only a small amount of it may be visible. This corrosion causes a decrease in tensile strength with a marked reduction in elongation.

Artificial aging of certain of the heat treatable aluminum alloys at an elevated temperature to produce maximum strength in hardness causes a marked decrease in corrosion resistance. For this reason the artificial aging of thin sheets of alloys for aircraft construction is not recommended.

The speaker discussed some of the qualities of Alclad, which is a corrosion resistant aluminum sheet. This is produced by covering the strong aluminum alloy core with thin layers of extremely pure aluminum. The high purity aluminum on the surface not only protects the alloy from corrosion by acting as a covering, but also exerts an electrolytic protection over any exposed areas of the underlying alloy, as at the sheared edges of the sheet or in abraded areas.

Methods of painting aluminum alloys as a protection against corrosion have been developed which are proving very satisfactory in commercial use. While sand blasting and other methods of cleaning before painting have been used, Mr. Dix stated it is now generally believed that cleaning with certain mild chemical cleaners which remove the grease without attacking the metal is the most satisfactory method.

During a discussion of the paper, Mr. Dix expressed the opinion that the electric furnace will ultimately be used for heat treating some of the strong aluminum alloys that are now usually heat treated in a bath of fused sodium nitrate, because of the necessity of having close temperature control.

Forging Alloys of Aluminum

MODERN light alloys and their application to aircraft engine design were discussed in a paper by G. D. Welty, engineer, Aluminum Co. of America, Cleveland. He pointed out that there are properties in metal for some uses that exceed in importance the properties of strength and lightness. One of these is the property of thermal conductivity.

There are three strong wrought alloys in common use in the aircraft industry today. One known as 17-S is used mostly in the form of sheet, tubing and extruded shapes for such parts as frame work and wing coverings. For the latter purpose the sheet is usually given a coating of high purity aluminum (Alclad).

The two other commonly used alloys, 25-S and 51-S (Table I), are better suited for making forgings, and are used extensively in aircraft engines. 25-S, heat treated and aged, has high tensile strength and a Brinell hardness of 110. This combination of properties makes it suitable for use in highly stressed parts such as propeller blades, connecting rods for in-line engines and link rods for radial engines. This alloy can also be used as a bearing material running directly against the journal.

Alloy 51-S, heat treated and aged, is lower in ultimate strength than 25-S, but is practically its equivalent in yield point and hardness. Forgings can be made from this alloy which would be difficult, if not impossible, to make from the harder alloys. Mr. Welty said that it is widely used for such parts as crankcases and nose sections for radial engines.

Selecting the Proper Alloy Casting

IT was pointed out that selecting the most suitable alloys for aircraft engine castings often presents a more complicated problem than in the case of forgings, because such questions as production in permanent molds, strength at high temperatures, bearing characteristics, thermal conductivity and cost are frequently important factors. The old reliable alloy, No. 12 (containing 8 per cent copper and the balance commercially pure virgin aluminum), is used in large quantities by the automotive industry for engines up to 400 hp. of the in-line or the V type. However, in radial engines and in large V-type engines, where efforts are being made to reduce weight, the modern heat treated casting alloys of aluminum or magnesium have displaced No. 12 for major parts. Mr. Welty made a comparison of properties of the two alloys to emphasize the advance that has been made through the development of heat treated compositions. The tensile strength of sand cast alloy No. 195 is about 50 per cent more than No. 12, and the elongation is more than four times as much. A ½-in. sand-cast test specimen of No. 195 can be bent through an angle of more than 90 deg. before fracture occurs. This was unheard of in cast alloys a few years ago. He also referred to the lower density of the No. 195 alloy, which is of importance because of the saving in weight.

Tough Alloys Cut with Tungsten Carbide Tools

THE author mentioned an aluminum piston alloy developed during the past few years, which he said is beginning to have commercial application. The advantages of this piston alloy consist chiefly in a lower coefficient of expansion and the lower specific gravity. This alloy, he said, is difficult to cut, but with the cemented tungsten carbide tools now available it can be readily machined.

Discussing the place of magnesium in the aircraft industry, the author recommended careful tests before adopting magnesium alloys for major structural castings. Through long intensive research work, magnesium products can now be made that are harder and far more resistant to corrosion than formerly produced. As a result the magnesium industry is now emerging from an experimental stage to a sound commercial basis.

Possibilities of the Light Metal Beryllium

THE new metal beryllium was discussed by C. B. Sawyer, Brush Laboratories, Cleveland. This metallic element somewhat resembles both magnesium and aluminum. Its density is about the same as magnesium and its strength is high, being comparable to that of steel and its modulus of elasticity is about the same as steel. Its coefficient of thermal expansion and its melting point are

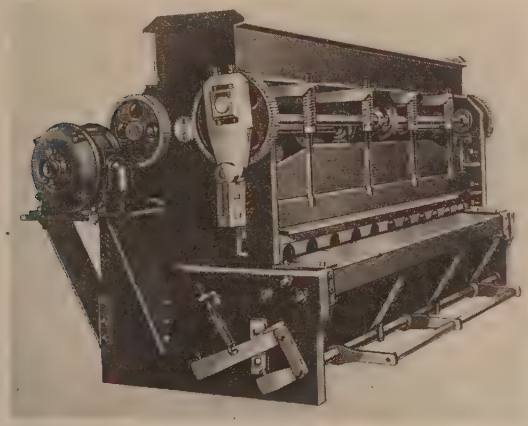
(*Concluded on page* 646)

Welded-Steel Overhead Drive Gap-Type Shear

AN overhead drive gap-type squaring shear having a non-deflecting welded plate steel frame has been added to the line of the Dreis & Krump Mfg. Co., 7430 Loomis Street, Chicago.

Timken roller bearings are provided on the flywheel shaft and the "super" hold-down employed is intended to provide uniform pressure on the metal before and during the cutting operation. Lubrication is centralized and, as in the company's underdrive weld-steel squaring shears, sheet steel guards are provided at both ends as well as front and rear.

A feature is the simple adjustment in the connecting bars for raising and lowering the upper knife bar. This adjustment is necessary in changing from shearing sheets requiring only one stroke of the upper knife bar to the shearing of sheets requiring more than one stroke, and vice versa. It is stated that in shearing a sheet requiring just one stroke, the blades should pass one another at the finishing point, while in shearing a sheet requiring more than one stroke, the blades should meet within the thickness of the material being sheared at the finishing point. Adjustment is quickly made by turning the adjusting screws in the connecting bars up or down, as required. Standard gaps are 18 and 24 in., but special gaps can be furnished.



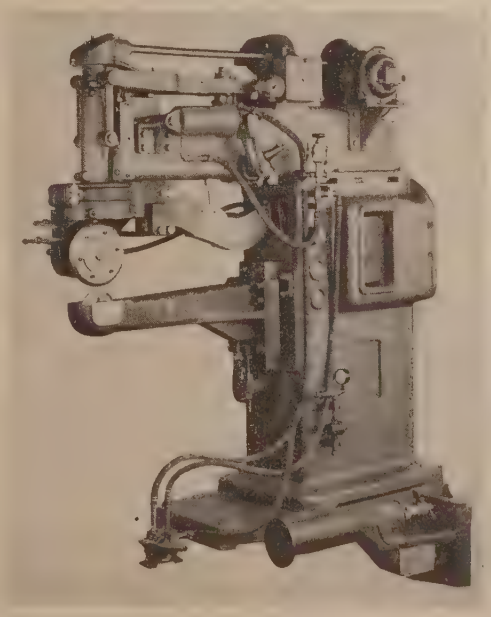
THE Gap Shear Has Direct - Connected Motor Drive and Easily Adjustable Connecting Bar

Heavy-Duty Double-Roller Seam Welder

A HEAVY-DUTY double-roller 30-in. throat seam welder incorporating improved methods of mounting and cooling of upper and lower roller electrode is illustrated herewith.

Drive of the upper roller electrode is through motor, speed - reduction unit and gearing, including change gears for altering the speed of the upper roller. Pressure on the work or the electrodes is obtained by means of an air cylinder that operates through an adjustable spring. Turning on and off of the welding current is controlled automatically through pressure cylinder. The initial air-line pressure to the cylinder may be varied through an adjustable relief valve, the pressure cylinder being controlled by means of a foot valve. The upper roller, which is of offset or open-side type, can be quickly replaced. The roller is a copper forging and is mounted on the large hub of shaft which is made of durable material. This shaft, as well as the bearing housing, is water cooled, and the construction of the bearing housing and its mounting is such that they may be rotated through 90 degrees without disconnecting or breaking any electrical joint. The same simplicity of roller mounting is used on the lower horn, and this horn, as well as the roller shaft, is water cooled.

The machine is designed for use on either cylindrical steel or iron, up to No. 14 gage. It is built by the Thomson Electric Welding Co., Lynn, Mass., and can be furnished with a transformer rated at 100, 150 or 175 kva.



Automatic Device for Arc Welding Operations

AN improved automatic welding outfit known as the Weldomatic is a recent development of the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. It is designed to operate from either variable or constant-voltage welding motor-generator sets and to meet a demand for an automatic welder of compact dimensions to facilitate mounting on the welding tools, as well as a device that is as reliable as the usual shop tool. It automatically strikes and holds an arc between an electrode and the work to be welded without the aid of an operator, except for pressing the starting button.

The Weldomatic Strikes the Arc Between Electrode and the Work Without the Aid of an Operator

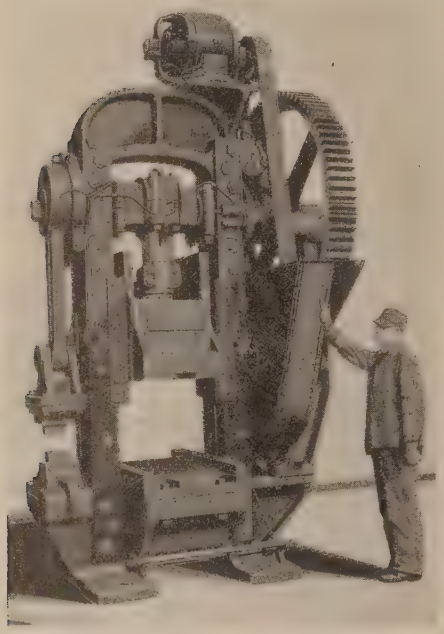
The feeding device permits its ready application to work handling tools. The drive motor is mounted in a cylindrical frame which supports the nozzle assembly. The nozzle has adjustments for being moved in two planes, and the assembly can be easily changed for either right hand or left hand work.

For the tractor plant to be built for the Soviet Government at Stalingrad, Albert Kahn, Detroit, is architect and the Truscon Steel Co., Youngstown, Ohio, will supply the building materials.

Press With Forged Steel Side Frames

A NEW straight-sided trimming press featuring forged steel side frames and friction slip flywheel has been brought out by Chambersburg Engineering Co., Chambersburg, Pa.

The forged steel side frames minimize breakage and the friction slip flywheel is intended to guard against overloading, stalling and breaking. Adjustment of the frictions is rarely necessary after slipping, and therefore lost time from this cause is practically eliminated. Before shipment each press is given an "overload-stall" test. Each machine must retain proper alinement when the ram is stalled at full speed near the bottom of its stroke, and must function satisfactorily after the test without adjustment. All shafts are on one side of the press and the driveshaft is mounted in roller bearings. The machine is furnished with or without the sprue cutter.

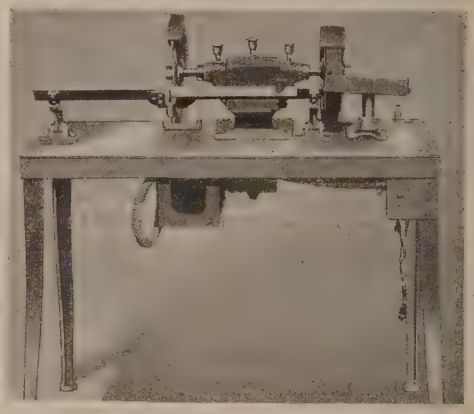


(Left) The Forged-Steel Side Frames Minimize Breakage and the Friction Slip Flywheel Guards Against Overloading

New Core Making Equipment

A CORE cutting-off and coning machine and a new core making machine, both motor driven, have been placed on the market by the Wadsworth Core Machine & Equipment Co., Akron, Ohio.

The cutting-off and coning machine, illustrated herewith, is of ⅜ in. to 2¼-in. capacity and is driven by a ¼-hp., 110-volt, alternating current motor that takes current from a light or power circuit. The motor is controlled by a push-button switch located at the operator's right hand. All working parts of the machine, including the cutting-off and coning wheels, are completely guarded. The swinging rest for holding the core while being cut off has a graduated scale and a movable stop that can be adjusted to give various lengths of cores, and an adjustable core rest for the coning wheel permits the operator to make any desired taper or cone on the end of the core.



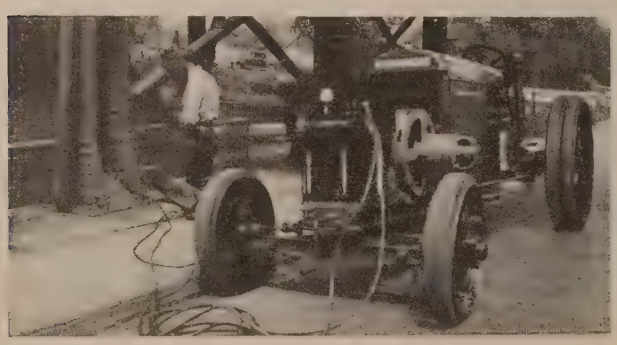
(Right) Core Cutting-Off and Coning Machine Equipped with Motor Drive to Increase Output

Designated as the No. 1 and similar to the previous model, the new motor-driven core making machine uses the same dies, conveyor screws and other accessories of the former machine. The capacity is from ⅜ in. to 3 in. It is driven by a ½-hp. 110-220 volt direct connected motor that takes current from the lighting circuit, and is equipped with a simple safety clutch that is intended to protect both the gears and the motor. The machine is stopped and started by means of push-button switch. All parts of the machine are accessible and ample lubrication is provided. The motor-driven machine provides for higher output than the hand-operated unit.

Tractor-Mounted Arc Welder

AN arc welding unit consisting of a Lincoln stable arc welder mounted on a McCormick-Deering tractor is being built by the Pontiac Tractor Co., Pontiac, Mich. It is furnished either with a 200 or a 300-ampere machine, and is intended for utility work of wide range.

The extension frame in this mounting is such that the tractor is simply set into a 4 in. I-beam frame and the front axle assembly is set ahead under the frame, thereby lengthening the wheelbase. This construction is intended to reinforce the tractor and give it balance, making it easy to steer with the added weight. The welder unit complete with the panel is mounted on this frame member ahead of the tractor and is driven by belt from the power pulley at the side of the tractor. Dual 48 x 4-in. tires are used in the rear. The road speed of the machine is 15 miles an hour.



With a Road Speed of 15 Miles an Hour, the Tractor-Mounted Welder Is Adapted for Utility Work of Wide Range

Wire enameling machines formerly built by the Strand Enamel Works, Winsted, Conn., will be manufactured and marketed exclusively by Sleeper & Hartley, Inc., Worcester, Mass. The Strand company will continue the manufacture and sale of enameling materials.

Midwest Air Filters, Inc., Bradford, Pa., has moved its New York district sales office from East Forty-fifth Street to 347 Madison Avenue.

This Issue in Brief

Riveted test boiler drum of manganese steel fails in head in fatigue tests. After 45,000 cycles of pressure at 50 per cent above working stress, slight leaks appear in head seams.—Page 610.

* * *

Disassembles airplane engines after 5-hr. test run. Parts are then washed and inspected, engine is reassembled and given final test.—Page 597.

* * *

Congestion due to conveyor tie-ups or "slow-downs" is avoided by use of trucks and trailers, which take some of the material off the mechanical conveyors and deliver it to its destination.—Page 594.

* * *

Automobile plant maintains a separate conveying department with a central office. The routing man enters on a special chart all calls for special movements of materials, turning the calls over to operators whose schedules are light at the moment.—Page 594.

* * *

Steel is not attacked if pickling is done properly, tests reveal. When steel rods are cleaned in dilute acid, the oxide scale first succumbs; after the metal is laid bare the steel begins to corrode. —Page 598.

* * *

Fatigue of steel caused airplane disaster. Examination of fractured bearing stud in engine of destroyed British plane reveals no heat discoloration.—Page 600.

* * *

Strength of welded boiler seams under repeated cycles of pressure is greatly affected by variations in welding practice, tests reveal. Necessity for developing good, uniform welding practice, plus careful inspection, is indicated, says engineer.—Page 611.

Welded joints in test drum shells have been developed which withstood cycles of stress varying from zero to a value 50 per cent above the allowable working stress for more than 400,000 cycles. This is at least 50 times as many cycles as would be developed in the normal life of a boiler.—Page 611.

* * *

Pitting type of corrosion is more to be feared than surface corrosion, for the former causes a decrease in ductility as well as in tensile strength of aluminum alloys. The third type, intergranular corrosion, proceeds along grain boundaries, and, although only a small amount may be visible, considerable corrosion may occur.—Page 616.

* * *

New August pig iron production record established with average daily output of 121,151 tons, which was ¾ per cent below July daily rate. On Sept. 1 there were 210 furnaces in blast, a net loss of 6 for the month.—Page 624.

* * *

Saves 60 per cent of cost of handling refuse materials. Purchase of gasoline tractor, side-dump wagons and chutes more than halves the expense of waste removal, compared with cost of having work done by an outside hauling company.—Page 594.

* * *

Stamping department costs sharply cut by using electric lift trucks for changing heavy dies. Labor expense of eight men is saved.—Page 596.

* * *

Artificial aging of aluminum alloy sheets for aircraft construction is not recommended. Though maximum strength and hardness are attained, corrosion resistance is reduced.—Page 616.

Reduces forging plant costs by using power loader to dump small forgings into cleaning barrels. Loaded skid is placed on loader by a truck and the skid and its contents are raised and dumped directly into tumbling barrel.—Page 601.

* * *

Breaks in drawing dies will result from ineffectiveness of the lubricant if occluded hydrogen is left in the stock after the pickling operation. Rough, embrittled surfaces offer ample secretion for the hydrogen.—Page 598.

* * *

Tapped hole in boiler shell under pressure fatigue test proves weaker than welds. Tests suggest incorrectness of theory that a hole causes a stress-intensification at its edge amounting to three times the computed stress in the plate.—Page 609.

* * *

Scrap-conveying belt carries forging flashings from trimming presses direct to dump-body skid. Skid is then emptied into a baling press.—Page 601.

* * *

Pickling costs can be cut if solution is properly inhibited. Proper use of inhibitors prevents production of harmful hydrogen, and water only is formed.—Page 598.

* * *

Foundry solves problem of smoke and heat in the vicinity of shake-out by performing this operation below the floor. Castings and sand are knocked out through a grating on to an apron conveyor. Gases and smoke are drawn away through a hood above the shake-out.—Page 613.

A. I. FINDLEY
Editor

THE IRON AGE

W. W. MACON
Managing Editor

ESTABLISHED 1855

Our Machine Tool Prosperity

AS with steel, the demand for machine tools this year has far outstripped all expectations. The traditional summer slump has not come. In June the National Machine Tool Builders' Association observed that "activity is not likely to continue at the present level"; yet in spite of the absence of many purchasing executives on vacations and the letdown in the automobile industry, July and August brought only a moderate recession in machine tool buying. Many companies have unfilled orders on their books in substantially as large a volume as at the beginning of the summer. Some lines are so well sold up that the best possible deliveries now offered extend into the first quarter of 1930.

Such a situation the machine tool industry has not known since the war. Even during the exceptionally prosperous 1919-1920 period the manufacturers were constantly menaced by the thousands of used tools still in process of liquidation after the war.

Present conditions bear no resemblance to a boom. There has been no enormous expansion of metal-working plants, such as occurred during the war, to account for a demand in excess of output. Some large lots of tools have been bought, but in the main the industry has received the bulk of its orders in units of one to half a dozen machines from widely diversified lines of manufacture.

Progress in design has brought into use tools which in output and reduction of operator attendance have so far surpassed those of ten years ago that manufacturers who would keep their costs on a level with their competitors' have been forced to adopt the newer equipment.

Companies which install machines of greater productive efficiency are not always able to keep their competitors from knowing the cost reductions achieved. Competition is such today that the improved process of one manufacturer soon becomes the practice of the more progressive of his rivals.

Machine tool builders who are trying to scan the future believe that another era of rehabilitation of machine tool equipment in American manufacturing plants is really just beginning. Perhaps no single current development is of more widespread interest than the experiments with tungsten carbide cutting tools, with their promise of the extension of machine shop work into hitherto unoccupied fields.

Apparently most users of machine tools are not waiting for the full fruition of prospective machine tool changes, but are availing themselves of the best of current models, so that no time may be lost in putting their shop costs on the lowest possible basis. Only a minimum of postponed buying has resulted from the fact that in another month an unusual array of the products of machine tool design, including many tools not shown before, will be seen at the National Machine Tool Exposition in Cleveland.

Scrap Supply Has Not Failed

IN 1906, when Bessemer steel output was at its maximum and the steel ingot figures showed 54½ per cent Bessemer and 45½ per cent open-hearth, no one would have believed that if in 1929 we were to make 87½ per cent open-hearth and only 12½ per cent Bessemer there would be enough scrap to go around. The prediction would have been made with confidence that a much larger percentage of pig iron and a much smaller percentage of scrap would have to be used, the point being that substantially all the scrap made in rolling Bessemer steel is available for open-hearth use.

Yet the fact is that in 1906 the total production of basic pig iron was 52 per cent of the total production of basic open-hearth steel ingots and castings, while in the first half of this year the proportion was approximately 53½ per cent, showing an almost negligible rise of 1½ points.

Various influences have been at work to offset and preserve a good supply of scrap for open-hearth steel making. First, the proportion of works scrap to ingot production has increased. In 1906 rolled steel production was 76.9 per cent of ingot production, while in 1928 the proportion was down to 73.9 per cent. Second, 2,186,557 tons of rolled iron was produced in 1906, chiefly from scrap, but in 1928 only 484,977 tons. There was not merely a failure to keep pace with the general increase in scrap supply, but the actual release of more than a million tons of scrap. Third, the foundry industry has failed to keep pace, if, indeed, it has not decreased its scrap consumption. Fourth, in the consumption or working up of steel there is a larger percentage of scrap produced, due in chief to the more intricate operations performed. The automobile industry is a very large producer of scrap relative to its steel purchases.

The four trends mentioned are readily observed. Two additional trends will be admitted, although

they cannot be measured. In the first place, the layer of steel spread over the country has become denser or thicker, and thus it is easier than formerly to gather old material. Possibly there is a partial offset to this in the smallness to which we now reduce some steel, to the tin can, for instance. Second, things move faster nowadays and in many cases scrap comes back sooner. The increase in weight of railroad rolling stock and the advent of the automobile have necessitated greater replacement of bridges than in the old days. Buildings now being torn down contain much more steel than those torn down in 1906.

The future is another matter. Several of the trends mentioned will not continue to help the scrap supply. Pig iron may come into its own. Production of sound ingots at a cost competitive with the convenient method of cropping to get sound steel would make a great difference.

Building Up Industry in Russia

OFFICIAL reports and statements of unofficial observers unite in declaring that the manufacturing industries in Russia are generally producing at a higher rate than prior to 1914. Russia always has been a nation of peasant farmers, and even yet the per capita consumption of such things as electricity, sewing machines and even agricultural machinery is very low.

As is well known, during the revolution production was almost at a standstill. After some disastrous experiments in over-centralization, the Soviet Government has reverted lately to a workable economic policy in the form of various industrial trusts, each responsible for the small details of production, and subject to control of the state only on such questions as policy, labor management and volume of production. New projects are being financed by the central government as rapidly as the balance of trade and foreign credit permits. Apportionment of funds is made according to a five-year budget which contemplates, among other things, the trebling of pig iron production and doubling the output of rolled steel by 1933.

One traveler, who has written for the *Iron and Steel Industry* (London), was particularly struck with the Leningrad Metal Factory, typical of the new plants being erected. "Imagine, if you can," he writes, "a boiler factory built by a philanthropic millionaire, solely with a view to the health, comfort and cleanliness of the workers. A place of light and spaciousness. Windows, beautifully designed, occupied almost the entire breadth and depth of the two ends of the first shop one entered. They are wide and lofty like the windows of a cathedral. The gangways are wide. Floorings are clean and smooth. Machinery was active and efficient. There was no sign of idleness or indiscipline."

The British observer was of the opinion that overhead charges were entirely disregarded in this plant. That does not exactly follow. While we in America have not yet reached the plane of putting cathedral windows into boiler shops, we have discovered that a wall made of glass is quite frequently cheaper than a wall of brick when everything is taken into consideration. In other words, American industry has long recognized that what might appear to be wasteful expenditures for the employees—like physical examinations, medical dispensary service and care of health, sanitary latrines and drinking fountains, rest periods, special light and even artificial weather, spacious working places, parked grounds, clean, well painted shops, elimination of noise, heat, smoke and dust—all these things make for better efficiency in the workman, lower labor turnover and a lowered manufacturing cost for a superior article.

A modern Russian factory is not to be criticized, therefore, for its spaciousness, cleanliness and ornamentation. The Soviets are getting the best kind of tools, but unfortunately, do not know yet how to use them. The result is that a Diesel engine which could be bought in Germany for $2,000 costs them $3,500 to build at home, even though the Soviet Government has built the factory (and capital costs are zero), though the industrial trusts have a monopoly (and selling costs are at a minimum) and though the state theoretically regulates the cost of living and the labor cost.

Research and Human Satisfactions

"WERE it not for the very great improvements in electric power and electric lighting which have been made by the industrial scientists during the past 25 years," writes John J. Carty, vice-president American Telephone & Telegraph Co., "the bill which the public is now paying for electric current would be greater by more than two billion dollars a year."

Without wishing to dispute the argument about the value of industrial research, we think that General Carty reaches his objective from the wrong direction. If these many improvements had not been made, the public would not be using nearly so much power as it does today. The advantage of research is not primarily that profits are enlarged, or that selling prices are reduced; it is that the utility is increased. More and more electricity is used by more and more people, with a tremendous increase in human satisfactions.

That is the achievement of research in all the industries.

Steel Extras Holding

BETTER merchandising methods in steel came strongly to the front in trade discussions late in 1927. Lately the matter has had little prominence, as heavy demand has made the flow of orders quite smooth. There is one phase of this general subject that deserves attention now as much as at any other time, for it encourages effort to make further improvement, and that is the matter of extras, differentials, etc. What steel sellers have done in the last few years by way of revising their lists and rules, and of adhering to them, is remarkable when we think of the violations in earlier years and the indisposition of sellers

to make changes when such changes were clearly dictated by considerations of cost and other factors.

In the last three years there have been many changes and improvements of this sort, more than anyone is likely to recall off-hand. In not a few cases there was opposition as well as a doubt whether sellers would really adhere to the new rules laid down, but in every instance so far as known the new practices came into vogue with little difficulty.

No doubt there has been a gradual change in the mental attitude of buyers which helped to put these reforms into effect. Cost accounting has been vastly improved and the average buyer, when the mill tells him it costs so much to fill this or that specification, realizes that the mill knows what it is talking about; that there is no effort to squeeze out an extra profit on the particular sizes or forms of material involved. The steel consumer has his own experiences in cost accounting and is ready to admit that the steel producer is in the same position.

Just three years ago the sheet steel industry made a sweeping change in its gage differentials on black and galvanized sheets. For many years 28 gage had been base, and costs had become such that the established differentials were not in keeping. The differential, for instance, between 28 gage and 24 gage was less than the difference in cost, and accordingly there was shading of the 28 gage base price when the specification involved 24 gage. The change consisted in making 24 gage the base, instead of 28, and gage differentials were revised so as to give a wider spread between 24 and 28, in keeping with costs. Some buyers had doubts whether mills would promptly and fully adhere to the new system, but there was no trouble. Later the sheet mills reduced the cash discount from 2 per cent to ½ per cent and there was much complaint, chiefly by jobbers, but the change was made.

There was a card on wire nails which was not in keeping with latter day costs. As of Dec. 1, 1927, the nail manufacturers adopted a new card in line with the conditions. There was criticism and a little doubt whether the new card would be followed, but the whole matter has passed into history.

Various other revisions could be listed. It is sufficient to point out that in the last few years steel makers have been able to put their prices into closer alinement with costs and to effect these reforms with an acquiescence on the part of buyers which would not have been expected in the old days. This encourages the making of such further changes as may be suggested by costs and sales conditions.

Pure Iron

A RECENT technical paper by T. D. Yensen of the research department of the Westinghouse Electric & Manufacturing Co. draws our attention to the fact that at present science and technology know no such thing as pure iron. Purity is, of course, an indefinite term in respect to anything short of the absolute and may always remain so. However, we gradually increase in refinement. We used to speak of substances as being pure when perhaps they were rather far from being so. A distinction might then be made as to the same substance produced in small quantity for laboratory use by characterizing it as "chemically pure," and the conventional abbreviation c.p. still remains a part of our technical vernacular. Some commodities now regularly produced are superior in refinement to the old c.p. grades. In small quantities the ability of ordinary, or even extraordinary, chemical analysis is surpassed and we have to coin a new phraseology and speak of a substance as being spectroscopically pure.

According to Mr. Yensen, the highest grade of iron that has been commercially available is one guaranteed to contain 99.85 per cent Fe. That is considerably short of the grade of first-class commercial copper, lead and zinc. What is called "high-grade" zinc is available in great tonnage with 99.93 to 99.97 per cent Zn. A super-zinc is produced in large tonnage with 99.99 per cent Zn. From the research laboratories come samples of spectroscopically pure metal with 99.9999 per cent Zn.

In its work on iron the Westinghouse laboratory during the past 10 or 15 years has been able to produce metal containing 99.95 per cent Fe. We infer that recently it has been possible to go even higher than that. As has been the experience with other metals, the removal of impurities in terms of the last few hundredths of 1 per cent shows enormous changes in some of the properties of the metal. The most striking things so far observed as regards iron are immense increases in magnetic permeability and much lower hysteresis values. There are indications that pure iron may have a hysteresis loss approaching zero. These are important things for electrical manufacturing.

Of course there are many uses for which pure iron is not wanted. Manifestly steel owes its valuable properties to other elements that are combined with iron. So it is with zinc. Super-zinc finds special uses; but on the other hand some manufacturing is best done with spelter containing a little cadmium, or a little lead, or a little of both. Alloying elements that develop valuable properties obviously are not to be regarded as impurities.

One of the startling things of modern metallurgy has been the powerful effect of the addition (or subtraction) of minute quantities of other metals to an iron, copper, lead or zinc base. And one of the practical developments therefrom has been the increased buying by manufacturers according to specifications. We have traveled a long way from the abracadabric days when in deference to the ideas of a Welsh foreman metal could be used successfully only if it were cast in a mold with a certain brand; and when smelters kept an assortment of molds with different brands to satisfy the requirements of different Welsh foremen.

A Diesel engined tractor, exhibited at a recent agricultural exhibition in England, has a variable gear in its transmission, so arranged that the speed reduction is automatically adjusted by an infinite number of steps to correspond with the tractive effort at the draw bar, required to pull the load. The engine exhibited had run 100,000 miles without repairs to the transmission.

Appeals for Support of Reserve Board

System to Be Sharply Contested Issue in Congress, Says Alvan T. Simonds—Results Will Be Far-Reaching

"AS we look ahead at industrial and business conditions, perhaps the most important question is whether or not the Federal Reserve Board will be able to control the use of credit and keep at a reasonable point the cost of borrowing money for use in commerce and industry," says Alvan T. Simonds, president, Simonds Saw & Steel Co., Fitchburg, Mass., in the September issue of *Looking Ahead.*

"The Reserve System, when it was adopted, was expected to do this. It was also expected to eliminate bank failures among its member banks. It was also hoped that few banks would find it profitable to remain outside the system. The root of the plan was protection for all who entrusted their money to the banks."

Mr. Simonds says that it is a common duty to support the Government as represented by the Federal Reserve Board. In Great Britain, he declared, the Bank of England is regarded as a part of the nation's defense and Chancellor of the Exchequer Snowden recently called upon other financial institutions, in no uncertain terms, to lend their support to the bank. He asked more of them than the Federal Reserve Board would think of asking for in America.

Referring to current agitation aimed at the Reserve System, Mr. Simonds added, "We shall do well to watch and study the situation as it develops, for it promises to bring before Congress and the country one of the most perplexing and most sharply contested post-war financial issues. Upon the settlement of this issue may depend industrial, commercial and financial prosperity in the United States for years to come. A new patriotism, perhaps a higher patriotism, is called for, especially on the part of some of those of great financial influence."

Commenting on the current stage of production in this country, Mr. Simonds points out that since 1919 there have been three complete cycles in industrial output in terms of volume (not dollars), as reported by the Federal Reserve *Bulletin.* Each peak has been higher than the preceding one and each has come later in the year than in the preceding cycle. The fourth cycle, now in progress, has thus far been in the ascending stage and it is still uncertain whether, following precedent, the peak will be later than it was in 1926, in the previous cycle. Industrial production, as reported monthly in the Federal Reserve *Bulletin,* does not include output of agriculture or fisheries.

Foundry Equipment Makers Consider Exports

The continuance of excellent business conditions in the foundry machinery field for the remainder of this year was predicted at the forty-eighth meeting of the Foundry Equipment Manufacturers Association held at the Hotel Van Curler, Schenectady, N. Y., Aug. 29 and 30. It was pointed out that the index of gross orders for foundry equipment for the month of July, 219.3, was the highest since August, 1928.

Reports were presented at the meeting by S. T. Johnston, S. Obermayer Co., Chicago, M. J. Evans, Whiting Corporation, Harvey, Ill., and H. Cole Estep, secretary-treasurer of the association, covering opportunities in Europe for the promotion of export trade in American foundry equipment, based on observations at the recent International Foundrymen's Congress in London.

E. O. Shreve, head of the Industrial Division of the General Electric Co. and J. P. Jones, manager of machinery sales of the General Electric Co., entertained the visiting delegates during the meeting. An inspection tour of the General Electric Research Laboratories took place Friday morning followed by luncheon at the General Electric Works, at which Mr. Shreve discussed the sales problems of machinery manufacturers.

At the Association's luncheon Thursday, Aug. 29, Dr. A. W. Hull, assistant director of research, General Electric Co., outlined some of the research problems now confronting the General Electric organization, with special reference to the application of vacuum tubes to the control of power circuits.

The members of the association presented past president S. C. Vessy, W. W. Sly Mfg. Co., Cleveland, a golf bag in recognition of his services to the organization. An enjoyable tournament was held at the Mohawk Golf Club.

The next meeting will be held in New York, Nov. 19.

Federal Reserve Is Subject of Simonds Contest

"The Federal Reserve System and the Control of Credit" is the subject of the Alvan T. Simonds economic contest for 1929. Papers must be submitted by Dec. 31, 1929. Rules may be obtained by writing the contest editor, Simonds Saw & Steel Co., Fitchburg, Mass.

Robert F. Elder, Berlin, N. H., the winner of the first prize of $1,000 in the Simonds economic contest for 1928 on the subject, "Reducing the Costs of Distribution," has been appointed instructor in marketing at the Massachusetts Institute of Technology. According to the authorities of that school, "Mr. Elder came to our attention as the result of his prize-winning essay. We probably never would have known of his talents had it not been for the prize offered by Mr. Simonds."

Connersville and Wilbraham Blower Companies Bought

The Stacey Engineering Co., a new Ohio corporation operating as a holding company, took over the following manufacturing concerns on Aug. 31:

Stacey Brothers Gas Construction Co., Cincinnati, Connersville Blower Co., Connersville, Ind., and Wilbraham-Green Blower Co., Pottstown, Pa.

These companies for a long period of years have been engaged in the construction of gas holders, blowers and other apparatus. The new concern has also a substantial interest in other allied concerns.

The new company is headed by Beman G. Dawes, chairman of the board, Pure Oil Co., and with him are associated Carmi A. Thompson, Cleveland, and F. S. Heath, Columbus. The board of directors includes Wayne Stacey, William A. Miller, John T. Wilkin and Charles A. Ward. Carmi A. Thompson is president, John T. Wilkin, F. S. Heath and Wayne Stacey, vice-presidents; D. H. Mulloney, secretary; Charles A. Ward, treasurer.

The Stacey Brothers company has made a specialty of low-pressure telescopic gas holders. The Connersville company started in a small way in 1893 and manufactures more than 100 different types of blowers, and in addition controls patents on a new type of station meter. The Wilbraham-Green company is one of the oldest companies of its kind in existence.

All three of these companies will be officered by their present organizations. The home offices of the Stacey Engineering Co. for the present will be located in Columbus.

Chrome Ore in Cuba

The owner of a chrome deposit located in the Province of Matanzas, Cuba, is desirous of establishing contact with consumers in the United States. The property is now idle but if a steady market can be located the owner states that delivery to the port of Havana can be commenced within a month. Analysis of the ore shows content of: Cr_2O_3 43.84 per cent, iron 12.2 per cent, silica 1.05 per cent. The owner of this deposit is seeking a market for the ore, not the sale of the property. Further information will be furnished on direct request to Minerals Division, Bureau of Foreign and Domestic Commerce, Washington.

New August Record in Iron Output

Daily Rate Less Than July by Only 949 Tons or 0.75 Per Cent—Eight Months' Total 1,213,000 Tons Over Next Largest—Net Loss of Six Furnaces

AUGUST pig iron production established two new records—the largest for that month in history and a new high total for the first eight months of any year.

From returns collected by wire on Tuesday, Sept. 3, the August output was 3,755,680 gross tons or 121,151 tons per day for the 31 days. This compares with 3,785,120 tons for the 31 days in July when the daily rate was 122,100 tons. This is a loss in daily rate of 949 tons or about 0.75 per cent. The next largest August was 111,274 tons per day in 1923.

New Record for Eight Months

For the eight months ended with August the total production was 29,181,760 tons. The nearest approach to this was the 27,969,000 tons to Sept. 1, 1923—an increase of about 1,213,000 tons, or 4.3 per cent. Compared with the first eight months' output in 1928 of 24,729,315 tons, the increase this year was 4,453,445 tons, or 18 per cent.

Rate of Operation on Sept. 1

There were 210 furnaces operating on Sept. 1 with an estimated operating rate of 119,130 tons per day. On Aug. 1, there were 216 furnaces active, having an estimated operating rate of 121,965 tons daily. There were nine furnaces shut down dur-

Daily Average Production of Coke Pig Iron in the United States by Months Since Jan. 1, 1925—Gross Tons

	1925	1926	1927	1928	1929
Jan.	108,720	106,974	100,123	92,573	111,044
Feb.	114,791	104,408	105,024	100,004	114,507
Mar.	114,975	111,032	112,366	103,215	119,822
Apr.	108,632	115,004	114,074	106,183	122,087
May	94,542	112,304	109,385	105,931	125,745
June	89,115	107,844	102,988	102,733	123,908
½ year	105,039	109,660	107,351	101,763	119,564
July	85,936	103,978	95,199	99,091	122,100
Aug.	87,241	103,241	95,073	101,180	121,151
Sept.	90,873	104,543	92,498	102,077	.....
Oct.	97,528	107,553	89,810	103,832	.....
Nov.	100,767	107,890	88,279	110,084	.....
Dec.	104,853	99,712	86,960	108,705	.....
Year	99,735	107,043	99,266	103,382	.....

Pig Iron Production by Districts, Gross Tons

	Aug. (31 days)	July (31 days)	June (30 days)	May (31 days)
New York and Mass.	253,889	256,697	246,124	265,512
Lehigh Valley	88,395	95,571	102,302	108,803
Schuylkill Valley	74,871	71,350	70,265	74,312
Lower Susq. and Lebanon Valleys	37,706	37,775	44,651	33,392
Pittsburgh district	827,285	815,045	787,313	814,944
Shenango Valley	139,835	144,455	148,675	157,952
Western Pennsylvania	150,272	146,886	143,474	159,960
Maryland, Va. and Ky.	115,804	123,447	117,250	135,073
Wheeling district	130,296	127,136	133,450	147,933
Mahoning Valley	368,609	373,181	372,030	380,129
Central and North'n Ohio	377,604	387,383	374,138	388,958
Southern Ohio	54,842	52,232	46,345	47,635
Illinois and Indiana	773,150	772,276	771,070	795,902
Mich., Minn., Mo., Wis., Colo. and Utah	147,992	146,304	131,514	145,840
Alabama	205,209	225,513	219,235	235,117
Tennessee	9,921	9,869	9,389	6,620
Total	3,755,680	3,785,120	3,717,225	3,898,082

Daily Rate of Pig Iron Production by Months—Gross Tons

	Steel Works Iron	Merchant Iron*	Total
August, 1928	82,642	18,538	101,180
September	82,590	19,487	102,077
October	88,051	20,781	108,832
November	88,474	21,610	110,084
December	85,415	23,290	108,705
January, 1929	85,530	25,514	111,044
February	89,246	25,261	114,507
March	95,461	24,361	119,822
April	95,680	26,407	122,087
May	100,174	25,571	125,745
June	99,993	23,915	123,908
July	98,044	24,056	122,100
August	98,900	22,251	121,151

*Includes pig iron made for the market by steel companies.

Coke Furnaces in Blast

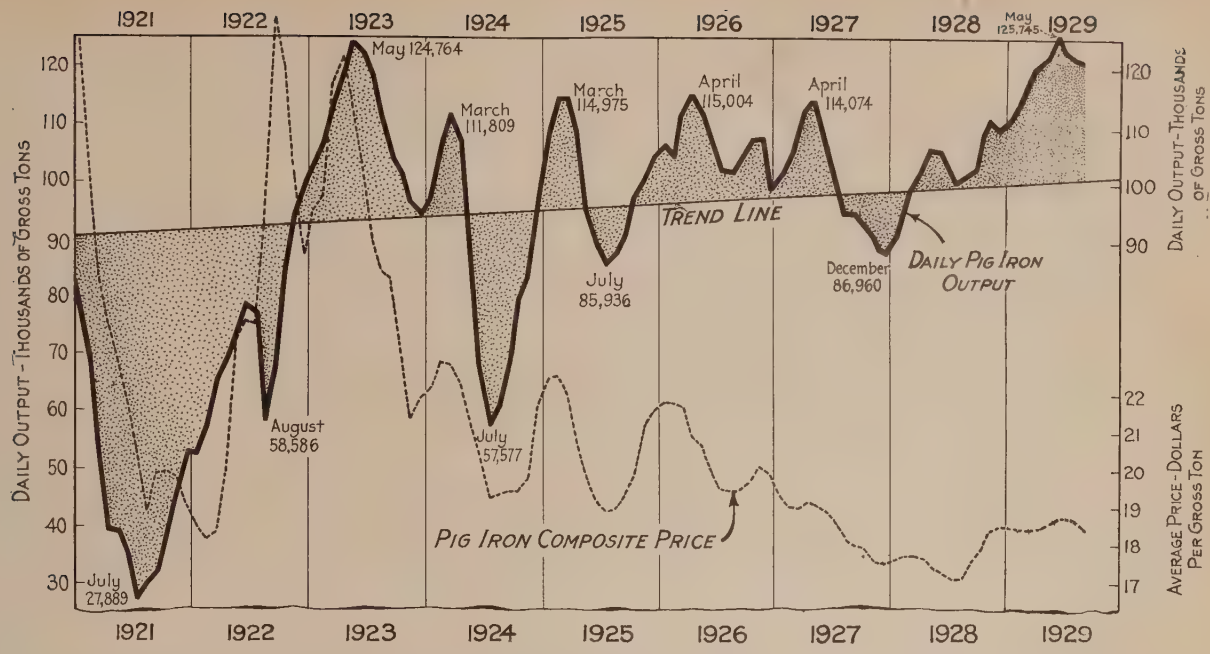
	Sept. 1 Number in Blast	Sept. 1 Gross Tons per Day	Aug. 1 Number in Blast	Aug. 1 Gross Tons per Day
New York:				
Buffalo	14	7,320	14	7,295
Other N. Y. and Mass.	2	595	3	980
New Jersey	0	....	0	....
Pennsylvania:				
Lehigh Valley	7	2,290	8	3,085*
Schuylkill Valley	5	2,415	5	2,300
Susquehanna Valley	2	1,215	2	1,170
Ferromanganese	0	....	0	....
Lebanon Valley	0	....	0	....
Ferromanganese	0	....	0	....
Pittsburgh District	40	25,382	41	26,225
Ferro. and Spiegel	3	540	3	485
Shenango Valley	8	4,510	8	4,370
Western Pennsylvania	8	4,510	7	4,185
Ferromanganese	3	385	3	425
Maryland	6	3,220	6	3,345
Wheeling District	7	4,200	7	4,135
Ohio:				
Mahoning Valley	20	12,400	19	12,040
Central and Northern	19	12,000	20	12,495
Southern	4	1,770	4	1,700
Illinois and Indiana	35	24,940	35	24,915
Mich., Wis. and Minn.	6	2,825	7	3,405
Colo., Mo. and Utah	3	1,430	3	1,315
The South:				
Virginia	0	....	0	....
Ferromanganese	1	95	1	90
Kentucky	1	415	1	420
Alabama	14	6,360	17	7,270
Ferromanganese	0	....	0	....
Tennessee	2	315	2	315
Total	210	119,130	216	121,965

*Includes spiegeleisen.

Production of Coke Pig Iron in United States by Months Beginning Jan. 1, 1927—Gross Tons

	1927	1928	1929
Jan.	3,103,820	2,869,761	3,442,370
Feb.	2,940,679	2,900,126	3,206,185
Mar.	3,483,362	3,199,674	3,714,473
Apr.	3,422,226	3,185,504	3,662,625
May	3,390,940	3,283,356	3,898,082
June	3,089,651	3,082,000	3,717,225
½ year	19,430,678	18,520,921	21,640,960
July	2,951,160	3,071,824	3,785,120
Aug.	2,947,276	3,136,570	3,755,680
8 mos.	25,329,114	24,729,315	29,181,760
Sept.	2,774,949	3,062,314	.....
Oct.	2,784,112	3,373,806	.....
Nov.	2,648,376	3,302,523	.....
Dec.	2,695,755	3,369,846	.....
Year*	36,232,306	37,837,804	.....

*These totals do not include charcoal pig iron. The 1928 production of this iron was 142,960 gross tons.



Production of Pig Iron So Far This Year Has Averaged Slightly Over 120,000 Tons a Day

Inclined line represents the gradually increasing theoretical needs of the country, ascertained by a balancing of the ups and downs in production. It shows an average yearly increase in consumption of about 423,000 tons

ing August and three blown in—a net loss of six furnaces. This compares with a net loss of two furnaces during July.

Independent steel companies did not blow in any furnaces during August but they blew out one. The Steel Corporation blew in two furnaces and shut down four. Four merchant furnaces were blown out in August and only one was blown in. There was therefore a net loss of three steel-making and three merchant furnaces.

Loss in Merchant Iron

The loss in merchant iron during August was 1805 tons per day, the daily rate being 22,251 tons against 24,056 tons in July. In steel-making iron there was a gain of 856 tons per day, or 98,900 tons per day in August and 98,044 tons per day in July.

Ferromanganese in August

There was 28,461 tons of ferromanganese made in August as against 31,040 tons in July. The August output was the third largest this year. Two companies were making spiegeleisen on Sept. 1.

Furnaces Blown In and Out

Only three furnaces were blown in during August: No. 3 Isabella furnace of the Carnegie Steel Co. in the Pittsburgh district; the Colonial furnace in western Pennsylvania, and the Cherry Valley furnace in the Mahoning Valley.

There were nine furnaces blown out or banked during August: One furnace of the Witherbee-Sherman Co. at Port Henry, N. Y.; "B" furnace at the Bethlehem plant of the Bethlehem Steel Corporation in eastern Pennsylvania; one Duquesne and one Edgar Thomson furnace of the Carnegie Steel Co. in the Pittsburgh district; one River furnace in northern Ohio; one furnace of the Minnesota Steel Co. in Minnesota; and one Pioneer furnace of the Republic Iron & Steel Co., one Ensley furnace of the Tennessee Coal, Iron & Railroad Co., and the Tuscaloosa furnace in Alabama.

Production of Steel Companies for Own Use—Gross Tons

	Total Pig Iron Spiegel and Ferromanganese			Ferromanganese*		
	1927	1928	1929	1927	1928	1929
Jan.	2,343,881	2,155,133	2,651,416	31,844	22,298	28,208
Feb.	2,256,651	2,274,880	2,498,901	24,560	19,320	25,978
Mar.	2,675,417	2,588,158	2,959,295	27,834	27,912	24,978
Apr.	2,637,919	2,555,500	2,826,028	24,735	18,405	22,413
May	2,619,078	2,652,872	3,105,404	28,734	29,940	25,896
June	2,343,409	2,448,905	2,999,798	29,232	32,088	33,363
½ year	14,876,355	14,675,448	17,040,842	166,939	149,963	160,836
July	2,163,101	2,464,896	3,039,370	26,394	32,909	31,040
Aug.	2,213,815	2,561,904	3,065,874	21,279	24,583	28,461
8 mos.	19,253,271	19,702,248	23,146,086	214,612	208,455	220,337
Sept.	2,090,200	2,477,695	.....	20,675	22,278	.....
Oct.	2,076,722	2,729,589	.....	17,710	23,939	.....
Nov.	1,938,043	2,654,211	.....	17,851	29,773	.....
Dec.	1,987,652	2,647,863	.....	20,992	28,618	.....
Year	27,345,888	30,211,606	.....	291,840	312,061	.....

*Includes output of merchant furnaces.

Empire Steel to Increase Open-Hearth Capacity

The Empire Steel Corporation will enlarge its steel-making capacity at Mansfield, Ohio, by the erection of two new 100-ton open-hearth furnaces, making six in all. With the additional melting equipment, this company will make steel for something over 60 per cent of its total requirements. The present open-hearth building will be extended and a new ladle crane, charging machine and other equipment will be added to provide a complete unit.

The group life insurance plan of the General Electric Co. has been revised so that premiums paid by new employees will be in accordance with their age rather than an average rate common to all employees. Plans for free insurance and additional pensions, also equalizing benefits according to age, have been announced.

Iron and Steel Markets

Decline in Pig Iron Output Is Slight

August Production Only 0.75 Per Cent Below July—Steel Output Shows Little Change, Although Tapering—Steel Prices Reaffirmed

PIG iron production in August was a record for that month and was the fourth largest output for any month. At 3,755,680 tons, the August total is exceeded only by the figures for July and May, 1929, and May, 1923. The decline from the previous month was only ¾ of 1 per cent.

In daily rate of output August ranks sixth with 121,151 tons, being surpassed by the months mentioned and by June, 1923, and June, 1929. The next largest August production was in 1923, when the daily average was 111,274 tons.

Pig iron output thus far this year, at 29,181,760 tons, has established a new eight months' record, forging ahead of the previous high mark, for the corresponding period in 1923, by 4.3 per cent.

A further tapering of output in September is indicated by a net loss of six active furnaces and a daily operating rate of 119,130 tons on Sept. 1, compared with 121,965 tons for the 216 stacks in blast Aug. 1.

The trend of steel ingot production in September also appears to be downward. Although no marked recession is looked for, mill backlogs are still being reduced and the full effects of fall demands will probably not be felt until October. Steel producers plan to take advantage of the breathing spell to make long delayed and much needed repairs to open-hearth furnaces and other equipment.

Whether expectations will be fully realized is, of course, open to question, since the vitality of steel demand has been a surprise to producers and consumers alike throughout the year. Thus far in September, aside from the temporary effects of the holiday interruption, there has been no appreciable change in operating conditions. The larger producers, owing to the diversification of their output, continue to run at 90 to 95 per cent of ingot capacity, and will probably not drop below a 90 per cent rate for several weeks. The current average for Steel Corporation subsidiaries is estimated at 94 per cent. On the other hand, output for some of the smaller producers has dropped to 85 per cent or less.

The middle of this month is now expected to mark the beginning of a fall buying movement in steel, following the completion of the vacation period and the formulation of programs for the remainder of the year by the directing executives of steel consuming companies.

In rails autumn demand has already set in, with an inquiry for 8000 tons from a Southwestern road and with fully 30,000 tons expected to come into the market in the next fortnight.

In structural steel, likewise, there are signs of expanding demand. For a leading Eastern producer of plain material, increased business toward the end of August brought the month's bookings 10 per cent above July. The unusually large amount of prospective tonnage in fabricated steel work has been augmented by fresh inquiries for 30,000 tons, including 10,000 tons for the Chicago *Tribune* Tower, Chicago. Structural steel work likely to be awarded in New England in the last quarter is double the tonnage placed in the corresponding period in 1928. Structural lettings of the week, at 26,000 tons, were light.

The automobile and railroad equipment industries remain the chief uncertainties affecting the immediate outlook in steel. A substantial tonnage of automobile body sheets for the final quarter has been placed at 4.10c., Pittsburgh, and considerable additional business in sheets from some of the motor car builders is pending, with prospects for a decided improvement in demand from that source before the end of the month, as production gets under way on new models.

Existing prices are being reestablished on most forms of finished steel, but thus far little fourth quarter contract business has actually been taken. A notable exception is the placing of automobile body sheets at 4.10c., following the disappearance of concessions of $2 a ton. Fourth quarter prices named on other finishes of sheets by a number of companies are 2.85c., Pittsburgh, for black, 2.35c. for blue annealed, 4.20c. for metal furniture sheets and 3.90c. for vitreous enameling stock.

The competitive situation in the pig iron market appears to be growing less acute, following heavy sales by Alabama furnaces, which have reduced their stock piles and buttressed their backlogs. Although $12.50, Birmingham, is still quoted on the Eastern seaboard, higher prices are now being asked in the Middle West. Pig iron buying has been in fair volume in the East, but considerable fourth-quarter business is still to be placed throughout the country.

Lake shipments of iron ore in August, at 10,806,967 tons, broke all monthly records, surpassing the previous high mark of 10,709,260 tons reached in August, 1926. The movement for the season until Sept. 1 was also a record, aggregating 43,717,787 tons.

Scrap markets show little change except at Pittsburgh, where an easier tone is reflected in a decline of 25c. in heavy melting grade to $18.75 a ton.

THE IRON AGE composite prices are unchanged, pig iron at $18.25 a ton and finished steel at 2.398c. a lb. Both are about $1 a ton higher than a year ago.

A Comparison of Prices

Market Prices at Date, and One Week, One Month and One Year Previous, Advances Over Past Week in Heavy Type, Declines in Italics

	Sept. 3, 1929	Aug. 27, 1929	Aug. 6, 1929	Sept. 4, 1928
Pig Iron, Per Gross Ton:				
No. 2 foundry, Philadelphia	$21.26	$21.26	$21.26	$20.26
No. 2, Valley furnace	18.50	18.50	18.50	16.50
No. 2 Southern, Cin'ti	17.19	17.19	17.69	19.94
No. 2, Birmingham	14.50	14.50	14.50	16.25
No. 2 foundry, Chicago*	20.00	20.00	20.00	18.00
Basic, del'd eastern Pa.	19.75	19.75	19.75	19.00
Basic, Valley furnace	18.50	18.50	18.50	16.00
Valley Bessemer, del'd P'gh	20.76	20.76	20.76	18.76
Malleable, Chicago*	20.00	20.00	20.00	18.00
Malleable, Valley	19.00	19.00	19.00	17.00
Gray forge, Pittsburgh	19.76	19.76	19.76	18.01
L. S. charcoal, Chicago	27.04	27.04	27.04	27.04
Ferromanganese, furnace	105.00	105.00	105.00	105.00
Rails, Billets, Etc., Per Gross Ton:				
Rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Light rails at mill	36.00	36.00	36.00	36.00
Rerolling billets, Pittsburgh	35.00	35.00	35.00	32.00
Sheet bars, Pittsburgh	35.00	35.00	35.00	32.00
Slabs, Pittsburgh	35.00	35.00	35.00	32.00
Forging billets, Pittsburgh	40.00	40.00	40.00	38.00
Wire rods, Pittsburgh	42.00	42.00	42.00	42.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.85	1.85	1.85	1.90
Finished Steel, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Bars, Pittsburgh	1.95	1.95	1.95	1.90
Bars, Chicago	2.05	2.05	2.05	2.00
Bars, Cleveland	1.95	1.95	1.95	1.85
Bars, New York	2.29	2.29	2.29	2.24
Tank plates, Pittsburgh	1.95	1.95	1.95	1.90
Tank plates, Chicago	2.05	2.05	2.05	2.00
Tank plates, New York	2.22½	2.22½	2.22½	2.17½
Structural shapes, Pittsburgh	1.95	1.95	1.95	1.90
Structural shapes, Chicago	2.05	2.05	2.05	2.00
Structural shapes, New York	2.19½	2.19½	2.19½	2.14½
Cold-finished bars, Pittsburgh	2.30	2.30	2.30	2.10
Hot-rolled strips, Pittsburgh	1.90	1.90	1.90	1.75
Cold-rolled strips, Pittsburgh	2.75	2.75	2.75	2.65

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

	Sept. 3, 1929	Aug. 27, 1929	Aug. 6, 1929	Sept. 4, 1928
Finished Steel, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Sheets, black, No. 24, P'gh	2.85	2.85	2.85	2.65
Sheets, black, No. 24, Chicago dist. mill	2.95	2.95	3.05	2.75
Sheets, galv., No. 24, P'gh	3.50	3.50	3.50	3.40
Sheets, galv., No. 24, Chicago dist. mill	3.60	3.60	3.80	3.60
Sheets, blue, No. 13, P'gh	2.35	2.35	2.35	2.10
Sheets, blue, No. 13, Chicago dist. mill	2.45	2.45	2.45	2.20
Wire nails, Pittsburgh	2.55	2.55	2.55	2.55
Wire nails, Chicago dist. mill	2.60	2.60	2.65	2.60
Plain wire, Pittsburgh	2.40	2.40	2.50	2.40
Plain wire, Chicago dist. mill	2.45	2.45	2.55	2.45
Barbed wire, galv., Pittsburgh	3.20	3.20	3.20	3.20
Barbed wire, galv., Chicago dist. mill	3.30	3.30	3.35	3.25
Tin plate, 100 lb. box, P'gh	$5.35	$5.35	$5.35	$5.25
Old Material, Per Gross Ton:				
Heavy melting steel, P'gh	*$18.75*	$19.00	$18.75	$16.60
Heavy melting steel, Phila	16.50	16.50	16.50	13.00
Heavy melting steel, Ch'go	15.25	15.25	14.75	12.75
Carwheels, Chicago	14.00	14.00	14.00	12.75
Carwheels, Philadelphia	16.50	16.50	16.50	15.50
No. 1 cast, Pittsburgh	15.50	15.50	15.50	14.75
No. 1 cast, Philadelphia	16.50	16.50	16.50	15.50
No. 1 cast, Ch'go (net ton)	14.50	14.50	14.50	14.25
No. 1 RR. wrot., Phila	16.00	16.00	16.00	13.50
No. 1 RR. wrot., Ch'go (net)	14.00	14.00	13.50	11.25
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$2.65	$2.65	$2.75	$2.75
Foundry coke, prompt	3.75	3.75	3.75	3.75
Metals, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Lake copper, New York	18.12½	18.12½	18.12½	14.75
Electrolytic copper, refinery	17.75	17.75	17.75	14.50
Tin (Straits), New York	*45.50*	46.12½	47.25	48.00
Zinc, East St. Louis	6.80	6.80	6.80	6.25
Zinc, New York	7.15	7.15	7.15	6.60
Lead, St. Louis	6.55	6.55	6.55	6.22½
Lead, New York	6.75	6.75	6.75	6.40
Antimony (Asiatic), N. Y.	*8.62½*	9.00	8.75	10.12½

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Pittsburgh

Decline in Steel Output This Month, If Any, Will Be Gradual—Some Uncertainty as to Fall Prospects

PITTSBURGH, Sept. 3.—The general suspension of operations over the holiday week-end will cut down aggregate steel output for the initial week of the new month, but last week mills were run at a rate not far below 95 per cent of capacity.

Gradual decline during the month is anticipated, but, with the larger steel producers in the district operating at close to capacity, the average is not likely to fall much below 90 per cent. Unless demand for finished steel products is showing marked improvement by the end of the month a much sharper decline in ingot production is to be expected.

Specifications slackened in nearly all lines of finished products during the last two weeks in August, but shipments were well sustained, and the aggregate movement of steel from local mills during the month was not very much below that in July.

In bars, shapes, tin plate, strip steel and some finishes of sheets backlogs were sharply reduced. Semi-finished steel was available in satisfactory quantities and mills were able to ease the pressure for deliveries on all products except plates and sheets. On plates, delivery promises still range from four to six weeks, while a few of the larger sheet mills are scheduled at close to capacity for the remainder of the month.

Prospects for increased steel consumption during September are still rather uncertain. Rail tonnages are expected to be placed earlier than usual this year, beginning probably before another month has passed.

Reports are heard of possible heavy car purchases in the near future, but current inquiries are light and near-by car shops are completing old orders rapidly. River transportation companies are expected to place a large number of barges this fall, as the river improvement program is to be entirely completed next month and inland water transportation will be fully taken advantage of by many additional shippers.

Indications of heavier buying by automobile companies are beginning to appear and a few rush orders for sheets from Michigan companies have recently come to local mills. It is thought that shipments of automobile steel will not decline much further and will show considerable improvement before the end of the month as motor car makers get into production on new models.

Farm implement makers served by Pittsburgh district mills are beginning to get into production on next year's probable requirements and shipments of steel are increasing.

Pipe prospects are good and present mill operations are comparatively high. A number of large line pipe projects are in prospect and feeder pipe for lines under construction is now accounting for considerable tonnage appearing on mill schedules.

The pig iron market is showing its first signs of real activity since early summer. Fourth quarter inquiries are beginning to come before the trade. Scrap is weaker, mill buying still being limited.

Pig Iron.—Sellers in this district

report increasing interest in fourth quarter tonnage, although few actual inquiries have come before the trade. However, consumers' stocks are at a minimum and most of them have no iron coming on old contracts. This leads to the belief that there will be heavy buying of all grades of iron in September in both the Pittsburgh and Valley districts. The leading merchant interest reports considerably better sales than were expected during August, although most of the transactions involved small tonnages. Shipments also held up well during the month, considering the fact that a light foundry melt is usual at this time of the year. The Westinghouse Air Brake Co., Wilmerding, Pa., has closed on a tonnage of foundry and malleable iron for delivery over the remainder of the year. This business was divided between the local merchant interest and a Valley maker, and the malleable is said to have been taken at $20.26, delivered. This figures back to $19.50, Pittsburgh district furnace, and $18.50, Valley, the shading of the Valley price having been necessary to meet the local competition. In the immediate Valley territory, quoted furnace prices are holding, and a recent sale of 3000 tons of basic iron in that district brought the full quoted price of $18.50. Foundry iron is holding at the same figure, while malleable and Bessemer are offered at $19, Valley furnace. The Pittsburgh local furnace is quoting prices 50c. above these figures.

Prices per gross ton, f.o.b. Valley furnace:

Basic	$18.50
Bessemer	19.00
Gray forge	18.00
No. 2 foundry	18.50
No. 3 foundry	18.00
Malleable	19.00
Low phos., copper free	27.00

Freight rate to Pittsburgh or Cleveland district, $1.76.

Prices per gross ton, f.o.b. Pittsburgh district furnace:

Basic	$19.00
No. 2 foundry	19.00
No. 3 foundry	18.50
Malleable	19.50

Freight rates to points in Pittsburgh district range from 63c. to $1.13.

Semi-finished Steel. — Non-integrated steel makers are beginning to show interest in their fourth quarter semi-finished steel requirements, and, in contrast with the present quarter, are expected to cover early. In the third quarter they had sufficient steel under contract to last for several weeks and in most cases were able to supplement this with small extensions of contracts just sufficient to carry them into the fall. For the fourth quarter they will need to buy their usual tonnages, and the question of price is again assuming importance. During this quarter the price on spot tonnages of billets and slabs has been $35, Pittsburgh or Youngstown, and although little has been moving at that figure, any open reduction for fourth quarter contracts would give the market a weak tone which the large sellers, who are also makers of finished steel products, are particularly anxious to avoid at this time. On the other hand, buyers of semi-finished steel are not going to pay more for their supplies without vigorous protest. On sheets bars, there is little argument, as the price has held at $35 all the year, an advance to $36 for a few months in the spring having been purely nominal. There is no reason to expect any change in the sheet bar price for the last quarter. The same thing is true of wire rods, which have held at $42, Pittsburgh or Cleveland, during the year.

Bars, Shapes and Plates.—Deliveries on bars and shapes are constantly improving, but plate tonnage is coming to local mills at about the rate at which it is going out. New orders for plates, however, are diminishing and by the middle of October the bulk of the shipments to the railroad car and barge builders will have been made. Unless a fresh buying movement in cars or barges develops by that time, plate tonnages are likely to slip off sharply. Structural mills are still operating at a high rate, particularly on the heavier materials going into bridges. But fabricating shops are rapidly working into their backlogs and even the larger interests will soon begin to need business. Large new projects in the district are developing slowly, but formal inquiry is expected shortly on a bridge over the Ohio River at McKee's Rocks, which will require 15,000 tons of shapes. An addition to the Bell Telephone Building in Pittsburgh will also call for a round tonnage. Shipments of reinforcing bars are holding up, but awards have declined and the bulk of buying on road and other construction jobs to be completed before cold weather sets in has been completed. The merchant bar business has naturally felt the decline in demand for automobile steel, but agricultural implement makers served by Pittsburgh mills are specifying freely and expect heavy fall operations. Prices on the heavy hot-rolled products are holding at 1.95c., Pittsburgh.

Wire Products. — Manufacturers' wire shipments in August were just about equal to those of July and considerably ahead of those in August, last year. However, specifications declined somewhat during the past month and prospects for September are rather uncertain. Prices on manufacturers' wire are holding at 2.50c., Pittsburgh, but it cannot be denied that the weakness in prices to jobbers in nearby territories is having a depressing influence on the market. Nails and barbed wire are also weak in both demand and price. Some improvement in jobber demand for fencing is expected in the next few weeks.

Tubular Goods.—No new developments are reported in the large line pipe projects which have been talked of recently. The line to run from Texas into Chicago by way of Omaha, which is being sponsored by the Texas Co., is now reported to have been placed tentatively some time ago with the Milwaukee fabricator. Another line into Chicago with a similar origin is also being considered by the Doherty interests, and Pittsburgh and Youngstown pipe makers have been asked to prepare estimates. It is stated by informed persons that neither of these lines is a certainty and that negotiations may lead to the abandonment of one plan and the concentration of both interests in one project. Demand for butt-weld pipe shows little change and apparently has not been influenced by the reported increase in building proj-

The Iron Age Composite Prices

Finished Steel

Sept. 3, 1929, 2.398c. a Lb.

One week ago	2.398c.
One month ago	2.412c.
One year ago	2.348c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products make 87 per cent of the United States output of finished steel.

	High		Low	
1929	2.412c.,	April 2;	2.391c.,	Jan. 8
1928	2.391c.,	Dec. 11;	2.314c.,	Jan. 3
1927	2.453c.,	Jan. 4;	2.293c.,	Oct. 25
1926	2.453c.,	Jan. 5;	2.403c.,	May 18
1925	2.560c.,	Jan. 6;	2.396c.,	Aug. 18

Pig Iron

Sept. 3, 1929, $18.25 a Gross Ton

One week ago	$18.25
One month ago	18.42
One year ago	17.34
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low	
1929	$18.71,	May 14;	$18.25,	Aug. 27
1928	18.59,	Nov. 27;	17.04,	July 24
1927	19.71,	Jan. 4;	17.54,	Nov. 1
1926	21.54,	Jan. 5;	19.46,	July 13
1925	22.50,	Jan. 13;	18.96,	July 7

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base per Lb.
F.o.b. Pittsburgh mill	1.95c.
F.o.b. Chicago	2.05c.
Del'd Philadelphia	2.27c.
Del'd New York	2.29c.
Del'd Cleveland	1.92½c. to 1.95c.
F.o.b. Cleveland	1.90c. to 1.95c.
F.o.b. Lackawanna	2.05c.
F.o.b. Birmingham	2.20c.
C.i.f. Pacific ports	2.35c.
F.o.b. San Francisco mills	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills, 40, 50, 60-ft.	2.05c.
F.o.b. Pittsburgh mills, cut lengths	2.30c.
F.o.b. Birmingham, mill lengths	2.20c.

Rail Steel

F.o.b. mills, east of Chicago dist.	1.85c. to 1.90c.
F.o.b. Chicago Heights mill	1.95c.
Del'd Philadelphia	2.27c.

Iron

Common iron, f.o.b. Chicago	2.05c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	2.12c.
Common iron, del'd New York	2.14c.

Tank Plates

	Base per Lb.
F.o.b. Pittsburgh mill	1.95c.
F.o.b. Chicago	2.05c.
F.o.b. Birmingham	2.20c.
Del'd Cleveland	2.14c.
Del'd Philadelphia	2.15c.
F.o.b. Coatesville	2.05c.
F.o.b. Sparrows Point	2.05c.
F.o.b. Lackawanna	2.05c.
Del'd New York	2.22½c.
C.i.f. Pacific ports	2.35c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh mill	1.95c.
F.o.b. Chicago	2.05c.
F.o.b. Birmingham	2.20c.
F.o.b. Lackawanna	2.05c.
F.o.b. Bethlehem	2.05c.
Del'd Cleveland	2.14c.
Del'd Philadelphia	2.01c. to 2.06c.
Del'd New York	2.14½c.
C.i.f. Pacific ports	2.35c.

Hot-Rolled Hoops, Bands and Strips

	Base per Lb.
6 in. and narrower, P'gh	2.00c.
Wider than 6 in., P'gh	1.90c.
6 in. and narrower, Chicago	2.20c.
Wider than 6 in., Chicago	2.10c.
Cooperage stock, P'gh	2.20c.
Cooperage stock, Chicago	2.30c.

Cold-Finished Steel

	Base per Lb.
Bars, f.o.b. Pittsburgh mill	2.30c.
Bars, f.o.b. Chicago	2.30c.
Bars, Cleveland	2.35c.
Shafting, ground, f.o.b. mill	*2.65c. to 3.60c.
Strips, P'gh	2.75c. to 2.85c.
Strips, Cleveland	2.75c. to 2.85c.
Strips, del'd Chicago	3.05c. to 3.15c.
Strips, Worcester	2.90c. to 3.00c.
Fender stock, No. 20 gage, Pittsburgh or Cleveland	4.25c.

*According to size.

Wire Products

(Carload lots, f.o.b. Pittsburgh and Cleveland, to jobbers and retailers.)

	Base per Keg
Wire nails	$2.55 to $2.65
Galvanized nails	4.55 to 4.65
Galvanized staples	3.25 to 3.35
Polished staples	3c. to 3.10c.
Cement coated nails	$2.55 to $2.65
	Base per 100 Lb.
Bright plain wire, No. 6 to No. 9 gage	$2.40 to $2.50
Annealed fence wire	2.55 to 2.65
Spring wire	3.50 to 3.60
Galv'd wire, No. 9	3.00 to 3.10
Barbed wire, galv'd	3.20 to 3.30
Barbed wire, painted	2.95 to 3.05
Woven wire fence (per net ton to retailers)	65.00

Chicago district mill and delivered Chicago prices are $1 per ton above the foregoing. Birmingham mill prices $3 a ton higher; Worcester, Mass. (wire), mill $3 a ton higher on production of that plant; Duluth, Minn., mill $2 a ton higher; Anderson, Ind., $1 higher.

Cut Nails

	Per 100 Lb.
Carloads, Wheeling, Reading or Northumberland, Pa.	$2.70
Less carloads, Wheeling or Reading	2.80

Light Plates

No. 10, blue annealed, f.o.b. P'gh	2.10c. to 2.20c.
No. 10, blue annealed, f.o.b. Chicago dist.	2.30c.
No. 10, blue annealed, del'd Phila.	2.42c. to 2.52c.
No. 10, blue annealed, B'ham	2.35c.

Sheets

Blue Annealed

	Base per Lb.
No. 13, f.o.b. P'gh	2.25c. to 2.35c.
No. 13, f.o.b. Chicago dist.	2.45c.
No. 13, del'd Philadelphia	2.67c.
No. 13, blue annealed, B'ham	2.50c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh	2.85c.
No. 24, f.o.b. Chicago dist. mill	2.95c. to 3.00c.
No. 24, del'd Philadelphia	3.17c. to 3.27c.
No. 24, f.o.b. Birmingham	3.10c.

Metal Furniture Sheets

No. 24, f.o.b. P'gh	4.10c. to 4.20c.

Galvanized

No. 24, f.o.b. Pittsburgh	3.50c. to 3.60c.
No. 24, f.o.b. Chicago dist. mill	3.60c. to 3.70c.
No. 24, del'd Cleveland	3.59c. to 3.69c.
No. 24, del'd Philadelphia	3.92c. to 4.02c.
No. 24, f.o.b. Birmingham	3.75c.

Tin Mill Black Plate

No 28, f.o.b. Pittsburgh	2.90c. to 3.00c.
No. 28, f.o.b. Chicago dist. mill	3.00c. to 3.10c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh	4.00c. to 4.10c.

Long Ternes

No. 24, 8-lb. coating, f.o.b. mill	4.10c.

Vitreous Enameling Stock

No. 24, f.o.b. Pittsburgh	3.90c.

Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills	$5.35
Standard cokes, f.o.b. Gary	5.45

Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)
(Per Package, 20 x 28 in.)

8-lb. coating I.C.	$11.20
15-lb. coating I.C.	14.00
20-lb. coating I.C.	15.30
25-lb. coating I.C.	$16.70
30-lb. coating I.C.	17.75
40-lb. coating I.C.	19.85

Alloy Steel Bars

(F.o.b. makers' mill)

Alloy Quality Bar Base, 2.65c. to 2.75c. per Lb.

S.A.E. Series Numbers		Alloy Differential
2000	(1¼% Nickel)	$0.25
2100	(1½% Nickel)	0.55
2300	(3½% Nickel)	1.50
2500	(5% Nickel)	2.25
3100	Nickel Chromium	0.55
3200	Nickel Chromium	1.35
3300	Nickel Chromium	3.80
3400	Nickel Chromium	3.20
4100	Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50
4100	Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600	Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel)	1.05
5100	Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100	Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100	Chromium Spring Steel	0.20
6100	Chromium Vanadium Bars	1.20
6100	Chromium Vanadium Spring Steel	0.95
9250	Silicon Manganese Spring Steel (flats)	0.25
	Rounds and squares	0.50
	Chromium Nickel Vanadium	1.50
	Carbon Vanadium	0.95

Above prices are for hot rolled steel bars, forging quality. The differential for cold-drawn bars is ¾c. a lb. higher, with standard classification for cold-finished alloy steel bars applying. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis.

Billets under 4 x 4 in. carry the steel bar base. Slabs with a sectional area of 16 in. or over carry the billet price. Slabs with sectional area of less than 16 in. or less than 2½ in. thick, regardless of sectional area, take the bar price.

Rails

	Per Gross Ton
Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	36.00
Light (from rail steel), f.o.b. mill	34.00
Light (from billets), f.o.b. Ch'go mill	36.00

Track Equipment

	Base per 100 Lb.
Spikes, ⅝ in. and larger	$2.80
Spikes, ½ in. and smaller	2.80
Spikes, boat and barge	3.00
Tie plate, steel	2.15
Angle bars	$2.75
Track bolts, to steam railroads	$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel Inches	Black	Galv.	Iron Inches	Black	Galv.
⅛	45	19½	¼ and ⅜	+11	+36
¼ to ⅜	51	25½	½	23	5
½	56	42½	¾	28	11
¾	60	48½	1 and 1¼	31	15
1 to 3	62	50½	1½ and 2	35	18

Lap Weld

2	55	43½	2	23	9
2½ to 6	59	47½	2½ to 3½	28	13
7 and 8	56	43½	4 to 6	30	17
9 and 10	54	42½	7 and 8	29	16
11 and 12	53	40½	9 to 12	26	11

Butt Weld, extra strong, plain ends

⅛	41	24½	¼ and ⅜	+13	+48
¼ to ⅜	47	30½	½	23	7
½	53	42½	¾	28	12
¾	58	47½	1 to 2	34	18
1 to 1½	60	49½			
2 to 3	61	50½			

Lap Weld, extra strong, plain ends

2	53	42½	½	29	13
2½ to 4	57	46½	2½ to 4	34	20
4½ to 6	56	45½	4½ to 6	33	19
7 to 8	52	39½	7 and 8	31	17
9 and 10	45	32½	9 to 12	21	8
11 and 12	44	31½			

On carloads the above discounts on steel pipe are increased on block by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Steel		Charcoal Iron	
2 in. and 2¼ in.	40	1½ in.	1
2½ in.—2¾ in.	48	1¾ in.	8
3 in.	54	2 in.—2½ in.	13
3¼ in.—3¾ in.	56	2½ in.—2¾ in.	16
4 in.	59	3 in.	17
4½ in. to 6 in.	48	3½ in. to 3½ in.	18
		4 in.	20
		4½ in.	21

On lots of a carload or more, the above base discounts are subject to a preferential of two fives on steel and of 10 per cent on charcoal iron tubes. Smaller quantities are subject to the following modifications from the base discounts:

Lap Welded Steel—Under 10,000 lb., 6 points under base and one five; 10,000 lb. to carload, 4 points under base and two fives. Charcoal Iron—Under 10,000 lb., 2 points under base; 10,000 lb. to carload, base and one five.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	63	3 in.	48
1¼ to 1½ in.	55	3¼ to 3½ in.	50
1¾ in.	39	4 in.	53
2 to 2¼ in.	34	4½, 5 and 6 in.	42
2½ to 2¾ in.	42		

Hot Rolled

2 and 2¼ in.	40	3¼ to 3½ in.	56
2½ and 2¾ in.	48	4 in.	59
3 in.	54	4½, 5 and 6 in.	48

Beyond the above base discounts a preferential discount of 5 per cent is allowed on carload lots. On less than carloads to 10,000 lb., base discounts are reduced 4 points with 5 per cent preferential; on less than 10,000 lb., base discounts are reduced 6 points, with no preferential. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage take mechanical tube list and discounts. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30%, base (carloads)	55
Carbon, 0.30% to 0.40%, base	50

Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

ects during July and August. The year as a whole has been far from satisfactory in this product. Shipments of mechanical tubing are declining, but still are at a high rate for this season. Demand for boiler tubing is fairly good and there is a satisfactory movement of locomotive tubing.

Strip Steel.—Hot-rolled strip mills began the week with operating schedules well below 75 per cent of capacity, while cold-rolling units will do little better. Business has been reduced strictly to a hand-to-mouth basis and specifications received during the next week or two may lead to improvement on very short notice. On the whole, however, heavier shipping orders are not expected to develop before the end of the month, as at at least two points, and other users made in this and nearby districts goes to the automobile industry. Companies supplying the Ford Motor Co. are in a fairly good position, but this company's sources of supply are scattered, with no maker receiving enough tonnage to maintain a very high operating rate at this time. In the face of declining demand, prices are holding remarkably well, with the hot-rolled material quoted at 2c., Pittsburgh, for 6-in. and narrower, and 1.90c., for the wider sizes. On cold rolled, quotations range from 2.75c. to 2.85c., Pittsburgh or Cleveland, depending on the tonnage.

Cold-Finished Steel Bars and Shafting. — Shipments last month were at a fair rate for this season of the year and showed little change from July. No marked improvement in demand is expected early this month, but present specifications are coming from diversified sources and the industry is in a healthy condition. Particular satisfaction is derived from the price structure, as quotations are steady at 2.30c., base Pittsburgh. On fourth quarter business, the recently announced card of extras becomes effective and producers will soon open their books for that period.

Sheets.—Trends in the sheet market are mixed and, while a number of independent companies report a marked decline in specifications during the last two weeks of August, one of the largest makers reduced its obligations during the month only 1 or 2 per cent. The leading interest operated its mills last week at as high a rate as any during the year, the percentage having been barely under 100. One large independent company in this district is also at capacity, while others range down to about 90 per cent. The average for the industry as a whole is certainly not below 95 per cent, although this high rate is rapidly reducing the backlogs of many companies. With few exceptions, deliveries on all the common finishes of sheets can be made in four weeks or less, and with some companies immediate rolling schedules may be arranged. All the large sheet consuming industries, except the automobile, are still very active users, and large makers of special finished sheets are in a particularly favorable position. The requirements of the agricultural implement industry are large and seem to be tending toward increases. Heavy shipments are going to the railroad car builders, but car shops in this district are rapidly completing recent orders and will sharply curtail their steel orders in about six weeks unless more car orders are placed. Prices are no weaker, and leading independent manufacturers of galvanized sheets are soon expected to withdraw the $2 preferential to jobbers, which has been largely responsible for price weakness over the last year. Jobbers and also some consumers are still able to buy galvanized sheets at 3.50c., Pittsburgh, but some mills are firmly adhering to the 3.60c. base. On black sheets, the prevailing price is 2.85c., Pittsburgh, and no further weakness in blue annealed is reported. The 4c., Pittsburgh, price on automobile sheets mentioned last week has been made only in isolated cases to very large buyers and the general market is better represented by 4.10c.

Tin Plate.—Operations in Pittsburgh and tributary districts last week averaged a little better than 75 per cent of capacity, but would have been somewhat higher this week had it not been for the holiday. The leading interest operated its mills at better than 85 per cent, and will continue that schedule. Little improvement is expected this month, as the present season's requirements of the larger container manufacturers have nearly all been shipped, and it is too early for next year's tonnage.

Coal and Coke.—The coke market has not gained strength in the last week, but production has been further adjusted to reduced demand and quotations of less than $2.75, Connellsville, on the furnace grade are soon expected to disappear. Shipments of foundry coke have not improved, but demand seems to be somewhat better and a stronger price situation is developing. Coal demand is also improving seasonably, but prices have gained little strength.

Old Material.—In another week of very little mill buying, prices seem to be somewhat weaker, and No. 1 heavy melting steel is now quotable at $18.50 to $19. One consumer was able to buy a small tonnage at $18.50, but dealers are paying this price and more to cover old sales, and it is unlikely that any large tonnage will be sold at this time at much under $19. The closing of the Pennsylvania Railroad list tomorrow is being anxiously watched by dealers in this district and will probably indicate to some extent the trend of the market. Shipments of scrap to local mills are still rather heavy, although open-hearth operations have been considerably reduced at at least two points, and other users have held up shipments in order to clear up stock piles or rearrange their yards. The course of the market for steel-making scrap during the next two months will depend entirely upon the rate of steel operations. Some of the other grades are slightly weaker, particularly machine shop turnings and short shoveling steel turnings, which have recently been quoted at rather high levels as a result of heavy buying to supplement the use of the higher-priced grades of steel. The monthly list of the Baltimore & Ohio Railroad, which will close on Sept. 9, contains 19,000 tons of steel scrap, including 6000 tons of rails and 2000 tons of No. 1 heavy melting.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$18.50 to $19.00
No. 2 heavy melting steel	16.50 to 17.00
Scrap rails	18.00 to 18.50
Compressed sheet steel	18.25 to 18.75
Bundled sheets, sides and ends	17.00 to 17.50
Cast iron carwheels	16.50 to 17.00
Sheet bar crops, ordinary	20.00 to 20.50
Heavy breakable cast	12.50 to 13.00
No. 2 railroad wrought	18.50 to 19.00
Hvy. steel axle turnings	16.50 to 17.00
Machine shop turnings	12.50 to 13.00
Acid Open-Hearth Grades:	
Railr. knuckles and couplers	21.75 to 22.25
Railr. coil and leaf springs	21.75 to 22.25
Rolled steel wheels	21.75 to 22.25
Low phos. billet and bloom ends	22.50 to 23.00
Low phos., mill plates	22.50 to 23.00
Low phos., light grades	20.50 to 21.50
Low phos., sheet bar crops	20.50 to 21.50
Heavy steel axle turnings	16.50 to 17.00
Electric Furnace Grades:	
Low phos., punchings	20.00 to 21.00
Hvy. steel axle turnings	16.50 to 17.00
Blast Furnace Grades:	
Short shoveling steel turnings	13.00 to 13.50
Short mixed borings and turnings	12.00 to 12.50
Cast iron borings	12.00 to 12.50
Rolling Mill Grades:	
Steel car axles	21.50 to 22.00
Cupola Grades:	
No. 1 cast	15.00 to 16.00
Rails 3 ft. and under	20.00 to 21.00

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.25c.
Hoops	4.25c.
Black sheets (No. 24), 25 or more bundles	3.80c.
Galv. sheets (No. 24), 25 or more bundles	4.55c.
Light plates, blue ann'l'd (No. 10), 1 to 10 plates	3.45c.
Blue annealed sheets (No. 13), 1 to 10 sheets	3.60c.
Galv. corrug. sheets (No. 28), per square	$4.43
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count,	60 per cent off list
Machine bolts, 100 count,	60 per cent off list
Carriage bolts, 100 count,	60 per cent off list
Nuts, all styles, 100 count,	60 per cent off list
Large rivets, base per 100 lb.	$3.50
Wire, black soft, ann'l'd, base per 100 lb.	$3.00 to 3.10
Wire, galv. soft, base per 100 lb.	3.00 to 3.10
Common wire nails, per keg	2.90 to 3.00
Cement coated nails, per keg	3.05

American LaFrance & Foamite Corporation, manufacturer of motor fire apparatus and fire extinguishing equipment, is moving its Utica, N. Y., branch office and factory to its main plant at Elmira, N. Y.

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and under 10 in., Pittsburgh	$35.00
Rerolling, 4-in. and under 10 in., Youngstown	35.00
Rerolling, 4-in. and under 10 in., Cleveland	35.00
Rerolling, 4-in. and under 10 in., Chicago	37.00
Forging quality, Pittsburgh	$40.00 to 41.00

Sheet Bars

(Open Hearth or Bessemer)

	Per Gross Ton
Pittsburgh	$35.00
Youngstown	35.00
Cleveland	35.00

Slabs

(8 in. x 2 in. and under 10 in. x 10 in.)

	Per Gross Ton
Pittsburgh	$35.00
Youngstown	35.00
Cleveland	35.00

Skelp

(F.o.b. Pittsburgh or Youngstown)

	Per Lb.
Grooved	1.85c. to 1.90c.
Universal	1.85c. to 1.90c.
Sheared	1.85c. to 1.90c.

Wire Rods

(Common soft, base)

	Per Gross Ton
Pittsburgh	$42.00
Cleveland	42.00
Chicago	43.00

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.80
Old range non-Bessemer, 51.50% iron	4.65
Mesabi Bessemer, 51.50% iron	4.65
Mesabi non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.40

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algerian	12.00c.
Iron ore, low phos., Swedish, average 68% iron	12.50c.
Iron ore, basis Swedish, average 65% iron	11.00c.
Manganese ore, washed, 52% manganese, from the Caucasus	32.00c. to 33.00c.
Manganese ore, Brazilian, African or Indian, basic 50%	33.00c.
Tungsten ore, high grade, per unit, in 60% concentrates	$16.25 to $16.50

	Per Gross Ton
Chrome ore, 45 to 50% Cr_2O_3, crude, c.i.f. Atlantic seaboard	$22.00 to $24.00

	Per Lb.
Molybdenum ore, 85% concentrates of MoS_2, delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$2.65 to $2.75
Foundry, f.o.b. Connellsville prompt	$3.75 to 4.75
Foundry, by-product, Ch'go ovens	8.00
Foundry, by-product, New England, del'd	11.00
Foundry, by-product, Newark or Jersey City, delivered	9.00 to 9.40
Foundry, by-product, Phila.	9.00
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry by-prod., del'd St. Louis	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.25 to $1.75
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, ¾-in. f.o.b. Pa. mines	1.90 to 2.00
Mine run gas coal, f.o.b. Pa. mines	1.65 to 1.75
Steam slack, f.o.b. W. Pa. mines	80c. to 90c.
Gas slack, f.o.b. W. Pa. mines	1.00 to 1.10

Ferromanganese

	Per Gross Ton
Domestic, 80%, seaboard	$105.00
Foreign, 80%, Atlantic or Gulf port, duty paid	105.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$31.00 to $34.00
Domestic, 16 to 19%	29.00 to 32.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$83.50
75%	130.00

Per Gross Ton Furnace		Per Gross Ton Furnace	
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	45.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

Per Gross Ton		Per Gross Ton	
10%	$30.00	12%	$34.00
11%	32.00		

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

Per Gross Ton		Per Gross Ton	
6%	$23.00	10%	$27.00 to $28.00
7%	24.00	11%	29.00 to 30.00
8%	25.00	12%	31.00 to 32.00
9%	26.00		

Other Ferroalloys

Ferrotungsten, per lb. contained metal del'd	$1.40 to $1.50
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.15 to $3.65
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	$160.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton	$91.00
Ferrophosphorus, electric 24%, f.o.b. Anniston, Ala., per gross ton	$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silicon, gravel, f.o.b. Illinois and Kentucky mines	$18.00
No. 2 lump, Illinois and Kentucky mines	20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	$18.25 to $18.75
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines	32.50

Fire Clay Brick

	Per 1000 f.o.b. Works	
	High-Heat Duty Brick	Intermediate Heavy Duty Brick
Pennsylvania	$43.00 to $46.00	$35.00 to $38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	.....
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00
Standard size	45.00

Chrome Brick

	Per Net Ton
Standard size	$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts, blank or tapped, hexagons	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	7.00c. to 6.75c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled thread up to and including ⅛ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagons nuts	70
Semi-finished hexagons castellated nuts, S.A.E.	70
Stove bolts in packages, P'gh	75, 20, 10 and 5
Stove bolts in packages, Chicago	75, 20, 10 and 5
Stove bolts in packages, Cleveland	75, 20, 10 and 5
Stove bolts in bulk, P'gh	75, 20, 10, 5 and 2½
Stove bolts in bulk, Chicago	75, 20, 10, 5 and 2½
Stove bolts in bulk, Cleveland	75, 20, 10, 5 and 2½
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55, 60 per cent apply.

Large Rivets

(½-In. and Larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$3.10
F.o.b. Chicago	3.20

Small Rivets

(7/16-In. and Smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70 and 10
F.o.b. Cleveland	70 and 10
F.o.b. Chicago	70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10 and 5
Milled standard set screws, case hardened	80 and 5
Milled headless set screws, cut thread	75 and 10
Upset hex. head cap screws, U.S.S. thread	85
Upset hex. cap screws, S.A.E. thread	85
Upset set screws	80, 10 and 5
Milled studs	70

Chicago

Steel Specifications Expand Slowly After Moderate Recession—Ingot Output Still at Near-Capacity Rate

CHICAGO, Sept. 3.—Specifications for finished steel are expanding, after several weeks in which no gains were recorded. The improvement is not impressive from the standpoint of reflecting larger output by the major manufacturing groups which cut production in the early summer months.

There is still some uncertainty as to the course of business in farm machinery, though at the moment activity is at a substantial pace. Scattered reports lead to the impression that automobile production is a trifle heavier, but schedules for steel shipments reflect this only in small degree.

Railroad car builders are close to the point when new orders will come too late to prevent a drop from the present rate of building. The only order of moment this week is for 500 underframes placed with a Western builder. It is reported that action will not be taken until Sept. 12 on 1000 cars to be purchased by the St. Paul. The prospect for locomotive business from Western railroads is more favorable. The Frisco Lines are contemplating coming into the market; the Missouri Pacific is considering 25 new locomotives and the Burlington may buy 10 engines.

Broader interest in new building construction is shown by reports from many of the cities in the West. A large office and hotel project is well under way in Cincinnati. Several new buildings requiring large tonnages of steel are being planned at Milwaukee. At New Orleans, the outlook is reported bright for the fall months.

Taken as a whole, the local steel market remains as in recent weeks. Output of steel ingots is near capacity, though signs are increasing that curtailment may be necessary late in September. New sales do not sustain backlogs. Improvement in deliveries tends only to make users more insistent on still better promises.

Pig Iron.—The Federal furnace, which has been down for repairs, was relighted Sept. 1, and the Iroquois stack, which also has been out for needed repairs, will be blown in about Sept. 15, according to present plans of the operators. Active merchant stacks now number five, including the Zenith furnace at Duluth. Prices for Southern iron are still mixed. One producer is said to have withdrawn from the market with full order books. Others are quoting $13.50 a ton, Birmingham, for tonnage lots and $14 for small orders. Delivery at Chicago is figured on the all-rail rate, bringing the asking delivered price range to $19.51 to $20.01. Against these prices, however, is a sale of 1500 tons made early in the week to a western Illinois melter at $12.50 a ton, Birmingham. Shipments of silvery are steady and sales total about 1000 tons in the last week. Orders for charcoal iron range from carloads up to 150 tons each. The Northern iron market is well established at $20 a ton, local furnace.

Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	$20.00
N'th'n No. 1 fdy., sil. 2.25 to 2.75	20.50
Malleable, not over 2.25 sil	20.00
High phosphorus	20.00
Lake Super. charcoal, sil. 1.50	27.04
So'th'n No. 2 fdy. (all rail)	$18.51 to 19.01
Low phos., sil. 1 to 2, copper free	29.50
Silvery, sil. 8 per cent	29.79
Bess. ferrosilicon, 14-15 per cent	46.29

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Ferroalloys.—Consumption of spiegeleisen continues at a high rate. New buying is dull. Several small lots of ferromanganese have been taken at $105 a ton, seaboard.

Prices delivered Chicago: 80 per cent ferromanganese, $112.56; 50 per cent ferrosilicon, $83.50 to $88.50; spiegeleisen, 19 to 21 per cent, $39.76 to $41.76.

Sheets.—Roofers are building up fall stocks of galvanized sheets and, as a result, have stimulated the demand for this grade of sheets. Current sales are in good volume at prevailing prices. However, producers have not opened books for the fourth quarter and consumers generally will make commitments only for nearby needs. Specifications match production, which stands at 80 per cent of capacity. Light tank makers are well engaged. The Inland Steel Co. has announced the following sheet prices which are to become effective at once for the remainder of the year: Blue annealed sheets, No. 10 gage, 2.30c. a lb., Chicago district mill, and No. 13 gage, 2.45c.; galvanized, 3.70c., and black sheets, 3.05c. a lb. at the mill.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 3c. to 3.05c.; No. 24 galv., 3.65c. to 3.75c.; No. 10 blue ann'l'd, 2.35c. Deliv'd prices at other Western points are equal to the freight from Gary, plus the mill prices, which are 5c. per 100 lb. lower than Chicago delivered prices.

Hot-Rolled Strip Steel.—The Acme Steel Co. has opened fourth quarter books on hot-rolled strips at present quotations.

Cold-Rolled Strip.—Although books are open for fourth quarter, buyers are showing little interest in future needs. Current specifications are in smaller volume than a week ago and output has been reduced to 65 per cent of capacity. It is reported here that consumption of cold-rolled strips by the automobile industry in August was a trifle larger than in July.

Bars.—Both sales and specifications for mild steel bars show some improvement over the average of recent weeks. New orders, however, fall far short of shipments, and producers' backlogs are steadily declining. Demand is broad and well diversified. Both farm implement and automobile manufacturers are taking bars at a steady rate. It is the impression here that the automobile industry will place heavier specifications about the middle of September. Road machinery builders and crane shops are operating at close to capacity, a situation which has prevailed throughout the year. Output of alloy steel bars holds steady at 70 per cent of capacity. Specifications are equal to shipments, but new buying is in small volume and backlogs are light. Prices for iron bars are steady at 2.05c. a lb., Chicago. With much of the railroad needs out of the way, both new business and releases against old obligations are light. Rail steel bar mills continue to operate on a double-turn basis, though in some cases hours have been cut. Prices remain steady at 1.95c. a lb., Chicago Heights, and it is the general impression that there will be no change when books are opened for the fourth quarter. Deliveries range from two to three weeks. Stocks of fence post material are in good shape for the expected fall demand, which is beginning to make itself felt.

Rails and Track Supplies.—Rail mill operations hold to 70 per cent of capacity and schedules are arranged for September. Fresh inquiry is for 8000 tons for a Southwestern railroad, and it is rather commonly expected by the local trade that fully 30,000 tons for fall rolling will be in the market by the middle of September. New orders for light rails can be measured only by a few carloads; however, shipments in the last four weeks have been well above the average for several years.

Prices f.o.b. mill, per gross ton: Standard section open-hearth and Bess. rails, $43; light rails, rolled from billets, $36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.15c.; angle bars, 2.75c.

Structural Material.—Although deliveries on shapes have been steadily improving, the range now being four to six weeks, fabricators find it difficult to obtain steel to meet their obligations. Contractors are rushing work to avoid erection in cold weather. Shops, still pursuing the policy of holding stocks at a minimum, report mill deliveries unsatisfactory. The general level of prices being obtained for fabricated material is too low to permit shops to draw on warehouses, and, moreover, the character of much of the material needed is not of the kind and size usually carried by jobbers. The net result is that mills are being forced to rearrange schedules whereby deliveries on some shapes can be given in 10 days. Fresh inquiry is developing over a wide territory. At Chicago, more than 10,000 tons will be needed for an addition to the Chicago Tribune plant. At New Orleans, where a new pumping station is being considered, the building program is steady and the outlook is considered satisfactory. New office buildings requiring round tonnages are

being projected at Louisville, Ky., Des Moines, Iowa, and Milwaukee. At Cincinnati, there will be erected on property owned by the Presbyterian Church a 43-story office, hotel and garage building. The Foshay Tower addition at Minneapolis, which calls for 1700 tons, has been awarded to a Chicago fabricator.

Mill prices on plain material, per lb.: 2.05c. base, Chicago.

Cast Iron Pipe.—This market remains listless, though there is now more indication that heavier purchases may be made in the late fall. A number of municipalities which elected new officials last spring are arranging programs, and several engineers state that plans are near completion for several sizable water main projects. Northfield, Ill., has awarded 200 tons of cast iron pipe to a contractor, and Crystal Falls, Mich., has closed for 100 tons of 10-in. pipe with the Central Foundry Co. Lamar, Colo., has placed 12 miles of pipe. The 14-in. pipe is reported to have been taken by the United States Pipe & Foundry Co., and the smaller sizes by the McWane Cast Iron Pipe Co. Chicago is giving consideration to the purchase of a large tonnage of 48-in. feeder mains. Carload orders are fewer in number, except from the railroads, which are finding wider use for cast iron pipe. Prices are steady and deliveries are prompt on most sizes.

Prices per net ton, del'd Chicago: Water pipe, 6-in. and over, $45.20 to $46.20; 4-in., $49.20 to $50.20; Class A and gas pipe, $3 extra.

Bolts, Nuts and Rivets.—Shipments of these commodities in August were about 10 per cent lighter than in the corresponding month last year. Fourth quarter contracts are being prepared at unchanged price schedules. Output is near 70 per cent of capacity, and stocks in the hands of producers are in good condition for the fall trade. Specifications continue at the August rate.

Wire Products. — Production of wire products has been cut to 63 per cent of capacity as demand dwindles. At this rate shipments are equal to production and mill stocks remain stationary, except in woven wire fencing, in which commodity an effort is being made to increase quantities in the hands of producers. The jobbing trade finds demand less insistent, while on the other hand the use of manufacturers' wire is holding at a level even with that in the previous week. Shipments of nails are light and prices are weak, as shown by concessions often granted from current quotations. Use of reinforcing mesh is fully equal to that of a year ago at this time. Shipments are large as contractors order out material with the expectation of completing contracts before frost. Western producers of wire and wire products anticipate an active fall trade, which they believe will open about the middle of September.

Plates.—Total inquiry for tank plates, augmented this week by 5000 tons for two new projects, is in excess of 14,000 tons. One project calls for 2500 tons for delivery in the Southwest and a like tonnage is before the trade for export. The Winkler Engineering Corporation, Wichita, Kan., has ordered 750 tons of tankage which will be fabricated at Joliet, Ill. Local plate shops are well engaged and have satisfactory backlogs. It is reported from St. Louis that makers of large tanks are only moderately busy, while light tank manufacturers are operating double turn with large orders ahead. Diversified orders for plates are in fair volume. Chicago producers will promise deliveries in four to 10 weeks, and when orders match with rollings somewhat better can be done. Producers in the East name three weeks or better. It is reported that definite action will not be taken on the 1000 cars for the St. Paul railroad until about Sept. 12. The local plate market is strong, with prices remaining firm at 2.05c. a lb., Chicago.

Reinforcing Bars.—Bending shops in this district are increasing output as a result of recent orders. Several fabricators are now engaged at close to capacity, while for the district as a whole the increase is not far from 10 per cent. The enlarged volume of contracts, as well as some stimulation in new inquiries, is bringing about a more determined effort to get higher prices, but bids already submitted are checking this move. Rail steel bars are commonly quoted at 1.85c. to 1.95c. a lb., Chicago Heights, and the billet steel commodity brings 2.15c. a lb., Chicago, with less desirable business being taken at 2.35c. Large awards are absent from the market this week, but small tonnages, many of which are for alteration work, are more numerous than in recent weeks.

Coke. — Shipments of by-product foundry coke are approximately equal to local oven capacity. With the bulk of users under contract for the remainder of the year, current buying is of little moment. The price remains at $8 a ton, Chicago ovens.

Old Material.—Both tendencies and opinions in the Chicago scrap market are decidedly mixed. One mill has bought 5000 tons of heavy melting steel at $15.75 a ton, delivered, which is the price reached in the recent advance. Short interests contend that lower prices are in the offing, while there are those who confidently believe that the market may rise to higher levels. Balanced against the prospect of lighter demand for the heavy tonnage grades are lack of stocks in yards, curtailment of production of scrap and the fact that many makers, who in some cases are also buyers of scrap, are holding tonnages in anticipation of higher prices. Demand for specialties, especially from malleable and steel foundries, is well sustained. A 1000-ton order for railroad malleable has been placed by a melter at Peoria, Ill., at $18.50 a gross ton, delivered. Gray iron foundries are using smaller quantities of scrap. Taken as a whole, there still seems to be a good balance between consumption and production of scrap, and on this score some sellers look for a steady market. The Pennsylvania will sell 50,000 tons on Sept. 4.

Prices deliv'd Chicago district consumers:

Per Gross Ton

Basic Open-Hearth Grades:	
Heavy melting steel	$15.25 to $15.75
Shoveling steel	15.25 to 15.75
Frogs, switches and guards, cut apart, and misc. rails	16.75 to 17.25
Hydraul. compressed sheets	13.75 to 14.25
Drop forge flashings	10.75 to 11.25
No. 1 busheling	13.25 to 13.75
Forg'd cast and r'l'd steel carwheels	18.75 to 19.25
Railroad tires, charg. box size	18.75 to 19.25
Railroad leaf springs cut apart	18.75 to 19.25
Acid Open-Hearth Grades:	
Steel couplers and knuckles	17.00 to 17.50
Coil springs	19.00 to 19.50
Electric Furnace Grades:	
Axle turnings	14.50 to 15.00
Low phos. punchings	17.00 to 17.50
Low phos. plates, 12 in. and under	17.00 to 17.50
Blast Furnace Grades:	
Axle turnings	13.00 to 13.50
Cast iron borings	10.50 to 11.00
Short shoveling turnings	10.50 to 11.00
Machine shop turnings	7.50 to 8.00
Rolling Mill Grades:	
Iron rails	16.00 to 16.50
Rerolling rails	18.00 to 18.50
Cupola Grades:	
Steel rails less than 3 ft.	17.50 to 18.50
Steel rails less than 2 ft.	20.00 to 20.50
Angle bars, steel	17.00 to 17.50
Cast iron carwheels	14.00 to 14.50
Malleable Grades:	
Railroad	17.00 to 17.50
Agricultural	15.50 to 16.00
Miscellaneous:	
*Relaying rails, 56 to 60 lb.	23.00 to 25.00
*Relaying rails, 65 lb. and heav.	26.00 to 31.00

Per Net Ton

Rolling Mill Grades:	
Iron angle and splice bars	15.00 to 15.50
Iron arch bars and transoms	21.50 to 22.00
Iron car axles	26.50 to 27.00
Steel car axles	17.50 to 18.00
No. 1 railroad wrought	14.00 to 14.50
No. 2 railroad wrought	13.75 to 14.25
No. 1 busheling	9.00 to 9.50
No. 2 busheling	7.00 to 7.50
Locomotive tires, smooth	14.50 to 15.00
Pipes and flues	10.00 to 10.50
Cupola Grades:	
No. 1 machinery cast	14.50 to 15.00
No. 1 railroad cast	14.00 to 14.50
No. 1 agricultural cast	13.25 to 13.75
Stove plates	12.25 to 12.75
Grate bars	11.75 to 12.25
Brake shoes	11.50 to 12.00

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars	3.00c.
Reinforc'g bars, billet steel	2.15c. to 2.35c.
Reinforc'g bars, rail steel	1.85c. to 1.95c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Bands (¼ in. in Nos. 10 and 12 gages)	3.20c.
Hoops (No. 14 gage and lighter)	3.75c.
Black sheets (No. 24)	4.05c.
Glav. sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.35c.
Spikes, ⅜ in. and larger	3.55c.
Track bolts	4.55c.
Rivets, structural	4.00c.
Rivets, boiler	4.00c.

	Per Cent Off List
Machine bolts	60
Carriage bolts	60
Coach or lag screws	60
Hot-pressed nuts, sq., tap. or blank	60
Hot-pressed nuts, hex., tap. or blank	60

No. 8 black ann'l'd wire, per 100 lb.	$3.45
Com. wire nails, base per keg	3.20
Cement c't'd nails, base per keg	3.20

New York

Pig Iron Bookings 25,000 Tons, Sharp Competition Stimulating Demand—Structural Steel Orders Heavier

NEW YORK, Sept. 3.—Sharp competition in the pig iron market appears to have stimulated demand. Bookings for the week, including sales of iron for shipment to plants outside this district, totaled 25,000 tons. An inquiry for 10,000 tons of basic for a Bridgeport, Conn., plant, is reported still pending. The Thatcher Co., Newark, N. J., has closed for 2000 tons of foundry for its Garwood, N. J., works. The General Electric Co. has placed orders for 5000 tons for its Schenectady, N. Y., Bayway, N. J., and New England foundries. The American Radiator Co.'s purchases over the past three weeks have totaled 22,000 tons, and it still has 15,000 tons to buy for plants in various districts. Southern and eastern Pennsylvania irons have figured more largely in recent transactions than Buffalo brands. Alabama foundry grade is still available at as low as $12.50, base Birmingham, although higher prices are asked when Northern manganese specifications are duplicated. No. 2 plain from eastern Pennsylvania is being sold at $19, furnace, for delivery in this section, and that price has been shaded in a few instances. Buffalo foundry iron still ranges from $17.50 to $18, base furnace, with the price attitude of producers tending toward greater firmness. Buffalo producers have been shipping more iron to Detroit and Chicago than last year, and are not burdened with excessive stocks at furnaces. One steel works interest is reported to have virtually withdrawn from the market, and another Buffalo steel plant is conserving its pig iron supplies because of furnace trouble. The Port Henry, N. Y., stack, which was recently blown out for relining, will not get back into blast for about six weeks. Pig iron shipments are going forward to foundries without interruption; in fact, melt shows some sign of improving. Better operations are noted in the radiator industry, which has been running at 55 to 60 per cent of capacity for several months.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	$22.41 to $22.91
*Buf. No. 2, del'd east. N. J.	20.78 to 21.28
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	20.39 to 21.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	20.89 to 22.02

Freight rates: $4.91 from Buffalo, $1.39 to $2.52 from eastern Pennsylvania.

*Prices delivered to New Jersey cities having rate of $3.28 a ton from Buffalo.

Cast Iron Pipe.—Prices are unchanged and show no tendency to advance. Northern foundries are well occupied with the larger sizes of pressure pipe, but are seeking tonnage in the smaller diameters. The United States Army has awarded about 75 tons of 8 and 12-in. centrifugal pipe for Camp Stotsenburg at Manila, P. I., to the American Cast Iron Pipe Co. Private buying has been limited to occasional carload lots. About 6000 tons of water pipe for the Eastman Kodak Co., Rochester, N. Y., has not yet been awarded.

Prices per net ton deliv'd New York: Water pipe, 6-in. and larger, $33.60 to $34.60; 4-in. and 5-in., $36.60 to $37.60; 3-in., $43.60 to $44.60. Class A and gas pipe, $3 extra.

Warehouse Business. — Although August sales of material from stock compared favorably with July, the second half of the month was rather quiet. Consumers have been limiting their purchases to small orders. Black, galvanized and blue annealed sheet prices are still subject to occasional shading on desirable business.

Reinforcing Bars.—Although small lettings have been fairly numerous, jobs running 100 tons or over have been scarce. Prices are unchanged.

Billet steel reinforcing bars in 40, 50 and 60-ft. lengths, 2.05c. per lb., Pittsburgh, and 2.30c. per lb., Pittsburgh warehouse, for cut lengths. Out of New York warehouse, 2.90c. per lb. for lots of 5 tons or more, 3.05c. for lots of 2 to 5 tons and 3.30c. for less than 2 tons, all delivered at job.

Finished Steel.—The leading Eastern producer of structural steel states that the increased rate of bookings during the latter half of August, as compared with the slackened buying in the first half, brought the total for the month to a point 10 per cent above July orders. Structural awards have been holding up well for this time of the year. A considerable portion of the tonnage in the New York metropolitan area is going into apartment buildings and non-industrial structures of various kinds. A substantial amount of plate business is pending, including 2000 tons for a car builder near by. Prices of bars, shapes and plates are firm and unchanged. A few fourth quarter inquiries have appeared, but mills are not yet ready to accept orders for that period. However, they have indicated that quotations for delivery over the remainder of the year will stay at the current level. An important sheet steel manufacturer reports that August sales exceeded those of July by a comfortable margin. Some sheet mills still are engaged at capacity. Prices are firm at 3.50c., Pittsburgh, for galvanized, 2.85c. for black and 2.35c. for No. 13 gage blue annealed. The wire market is rather dull, with little fresh business coming out at the moment. Common wire nails are priced at $2.50 to $2.55 a keg, Pittsburgh, and plain wire at $2.40 a 100 lb., Pittsburgh.

Mill prices per lb., deliv'd New York: Soft steel bars, 2.29c.; plates, 2.22½c.; structural shapes, 2.19½c.; bar iron, 2.14c.

Coke.—Prices on furnace coke are easier. Better beehive grades, recently held at $2.80 a net ton, Connellsville, are now available at $2.70, with $2.65 a possibility. So-called standard furnace coke ranges from $2.60 to $2.65, Connellsville. Special brands of beehive foundry coke are still bringing $4.85, Connellsville, or $8.76, delivered to northern New Jersey points. Other brands are available at as low as $3.75, Connellsville. By-product foundry coke is quoted at $9 to $9.40 a net ton, Jersey City or Newark, and $10.06, New York or Brooklyn.

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.30c.
Soft steel bars, small shapes	3.25c.
Iron bars	3.24c.
Iron bars, Swed. charcoal	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Cold-roll. strip, soft and quarter hard	5.15c. to 5.40c.
Hoops	4.25c.
Bands	3.75c.
Blue ann'l'd sheets (No. 10)	3.85c. to 3.90c.
Long terne sheets (No. 24)	5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galv. annealed	5.15c.
Tire steel, 1½ x ½ in. and larger	3.30c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.65c.
Open-hearth spring steel, bases,	4.50c. to 7.00c.

	Per Cent Off List
Machine bolts, cut thread:	
¾ x 6 in. and smaller	60
1 x 30 in. and smaller	50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	60
¾ x 20 in. and smaller	50 to 50 and 10
Coach screws:	
½ x 6 in. and smaller	60
1 x 6 in. and smaller	50 to 50 and 10

Boiler Tubes—	Per 100 Ft.
Lap welded, 2-in.	$17.33
Seamless steel, 2-in.	20.24
Charcoal iron, 2-in.	25.00
Charcoal iron, 4-in.	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
½-in. butt	46	29
¾-in. butt	51	37
1-3-in. butt	53	39
2½-6-in. lap	48	35
7 and 8-in. lap	44	17
11 and 12-in. lap	37	12
Wrought Iron—		
½-in. butt	5	+19
¾-in. butt	11	+ 9
1-1½-in. butt	14	+ 6
2-in. lap	5	+14
3-6-in. lap	11	+ 6
7-12-in. lap	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box	$6.45	$6.20
Charcoal, per Box—	A	AAA
IC	$9.70	$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating	$10.00 to $11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets, Box Annealed—Black, C. R. One Pass

	Per Lb.
Nos. 18 to 20	3.80c.
No. 22	3.95c.
No. 24	4.00c.
No. 26	4.10c.
No. 28*	4.25c.
No. 30	4.50c.

Sheets, Galvanized

	Per Lb.
No. 14	4.40c.
No. 16	4.25c.
No. 18	4.40c.
No. 20	4.50c.
No. 22	4.60c.
No. 24	4.75c.
No. 26	5.00c.
No. 28*	5.25c.
No. 30	5.65c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

Old Material.—No transactions of consequence have been reported in the past week. Consumers of scrap are in most cases offering to buy at the prices now being paid by brokers to fill their present contracts. As a result, prices have not developed any definite tendency either to advance or recede. No. 1 heavy melting steel is being bought at $16 to $16.50 a ton, delivered eastern Pennsylvania. No. 2 heavy melting steel is still moving in substantial tonnages to the consumer at Bethlehem, Pa., being taken in at a minimum reduction of $1.50 a ton from the price of No. 1 steel, or $15 a ton, delivered. As brokers are unable to offer more than $14.25 a ton, delivered to other eastern Pennsylvania mills, on the basis of contracts at $14.50 a ton, holders of this grade prefer to ship to Bethlehem.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel	$12.75 to $13.35
Heavy melting steel (yard)	8.00 to 9.75
No. 1 hvy. breakable cast.	10.75 to 11.75
Stove plate (steel works).	8.00 to 8.25
Locomotive grate bars....	8.25 to 8.75
Machine shop turnings....	7.75 to 8.00
Short shoveling turnings..	8.00 to 9.00
Cast borings (blast furn. or steel works).....	7.00 to 7.75
Mixed borings and turnings	6.75 to 7.75
Steel car axles	19.50 to 20.00
Iron car axles	24.00 to 25.00
Iron and steel pipe (1 in. dia., not under 2 ft. long)	10.75
Forge fire	9.75 to 10.25
No. 1 railroad wrought...	12.00 to 12.50
No. 1 yard wrought, long..	11.00 to 11.50
Rails for rolling.....	13.25 to 13.75
Cast iron carwheels.....	12.50 to 13.00
Stove plate (foundry)....	8.00 to 8.50
Malleable cast (railroad).	14.00 to 14.50
Cast borings (chemical)..	10.00 to 10.50

Prices per gross ton, deliv'd local foundries:

No. 1 machry. cast.....	$17.00
No. 1 hvy. cast (columns, bldg. materials, etc.), cupola size.....	15.00
No. 2 cast (radiators, cast boilers, etc.)	14.50

Michigan Shipments of Pig Iron to Increase

DETROIT, Sept. 3.—Scheduled pig iron shipments for September indicate an increase over July or August, and furnaces serving the district have no excess iron in stock.

There have been no changes in prices of old material. With the lower automotive production, current orders have been absorbing the scrap output.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Hvy. melting and shov. steel	$14.25 to $14.75
Borings and short turnings	9.00 to 9.50
Long turnings	8.50 to 9.00
No. 1 machinery cast.....	12.50 to 13.00
Automobile cast	13.00 to 13.50
Hydraul. comp. sheets....	14.00 to 14.50
Stove plate	9.00 to 9.50
New No. 1 busheling.....	12.50 to 13.00
Old No. 1 busheling.....	11.00 to 11.50
Sheet clippings	8.75 to 9.25
Flashings	13.00 to 13.50

The American Rolling Mill Co. has ordered two more 300-hp. oil-electric locomotives for use in the Ashland, Ky., plant. The units are to be duplicates of the four already in service, and are built jointly by the Ingersoll-Rand Co., General Electric Co. and the American Locomotive Co.

Philadelphia

Buying Has Slackened But Plate Mills Are Running Full—Galvanized Sheets Still Lack Firmness

PHILADELPHIA, Sept. 3.—Steel buying slackened last week, but mills are maintaining from 90 per cent to full operations. Plate mills are especially well engaged and still have considerable shipbuilding tonnage in prospect. Sheet demand is fair, but galvanized sheet prices still lack strength. Consumers of sheets are moderately active except in the radio manufacturing field, where there has apparently been a slight recession from original production programs in some instances.

Pig iron is quiet, but most of the eastern Pennsylvania basic users and large consumers of foundry iron have yet to cover their fourth quarter requirements.

The iron and steel scrap market is less active than at any time this year.

Pig Iron.—Withdrawal of the Republic Iron & Steel Co. from the pig iron market is believed by some Northern furnaces to have made the purchase of Southern basic iron by eastern Pennsylvania consumers less likely, as this interest has been offering basic with a lower phosphorus and higher manganese content than is usually produced in the Birmingham district. A user of basic at Coatesville, Pa., has inquired for 500 tons of special analysis for prompt shipment. Foundry iron buying has been light in the past week, but prices are being maintained fairly well, with small lots bringing $21, base furnace. While some foundries have bought iron for delivery beginning in this quarter and extending into the last quarter, a considerable number have not yet inquired for fourth quarter.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil.	$21.26 to $21.76
East. Pa. No. 2X, 2.25 to 2.75 sil.	21.76 to 22.26
East. Pa. No. 1X.....	22.26 to 22.76
Basic (del'd east. Pa.)....	19.75 to 20.25
Gray forge	20.00 to 20.50
Malleable	21.25 to 21.75
Stand. low phos. (f.o.b. N. Y. State furnace)...	22.00 to 23.00
Cop. br'g low phos. (f.o.b. furnace)	23.50 to 24.00
Va. No. 2 plain, 1.75 to 2.25 sil.	24.04
Va. No. 2X, 2.25 to 2.75 sil.	24.54

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces; $4.54 from Virginia furnaces.

Bars.—Demand is still in small volume and deliveries are fairly prompt. The price is unchanged at 1.95c. a lb., Pittsburgh, or 2.27c., delivered Philadelphia.

Reinforcing Bars.—A number of small projects, each requiring less than 100 tons of reinforcing bars, are pending. Even on the small tonnages competition between billet steel and rail steel bar producers is keen. Prices are unchanged at 1.95c. to 2c. a lb., Pittsburgh, or 2.27c. to 2.32c., delivered Philadelphia, for billet steel bars. In many instances the usual extra of $5 a ton for cutting to length is not charged by the distributer. Rail steel bars are quoted at 1.95c. a lb., Franklin, Pa., or Tonawanda, N. Y., or 2.27c., delivered Philadelphia, with no extra for cutting to length, and this price is occasionally shaded to obtain tonnage in competition with billet steel bars.

Shapes.—Operating rates of most mills are 90 per cent or more, and deliveries range from a week to three weeks. Fabricating shops are well engaged and are bidding on some substantial tonnages for erection this fall. Prices are unchanged at 1.95c. to 2.05c., f.o.b. nearest mill to consumer, or 2.01c. to 2.11c., delivered Philadelphia.

Plates.—In most instances eastern Pennsylvania mills are operating full, and in some cases deliveries of universal plates, which have been available in a few days, have become extended to a week or more. Buying has slackened somewhat in the past week, but this is considered to have been only a temporary lull caused by the holiday. The leading interest is reported to have received an order for 15,000 tons of plates for two ships to be built for the Export Steamship Corporation by the New York Shipbuilding Co. at Camden, N. J. Another lot of 15,000 tons is still to be awarded. Prices are unchanged at 2.05c., Coatesville, or 2.15c., delivered Philadelphia.

Sheets.—Blue annealed sheet prices are firm at 2.35c., base Pittsburgh, for No. 13 gage, or 2.67c., delivered Philadelphia, and light plates, blue annealed, are 2.10c. to 2.20c., Pittsburgh, for No. 10 gage, or 2.42c. to 2.52c., delivered Philadelphia. Black sheet quotations are fairly stable at 2.85c., Pittsburgh, or 3.17c., delivered

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier.....	2.70c.
Plates, ⅜-in.	2.90c.
Structural shapes.....	2.70c.
Soft steel bars, small shapes, iron bars (except bands).....	2.80c.
Round-edge iron.....	3.50c.
Round-edge steel, iron finished 1½ x 1½ in.	3.50c.
Round-edge steel planished.....	4.30c.
Reinforc. steel bars, sq. twisted and deform. .....2.60c. to	2.80c.
Cold-fin. steel, rounds and hex.....	3.60c.
Cold-fin. steel, sq. and flats.....	4.10c.
Steel hoops	3.55c.
Steel bands, No. 12 to ⅛-in. inclus.	3.30c.
Spring steel	5.00c.
*Black sheets (No. 24).....	4.10c.
†Galvanized sheets (No. 24).....	4.85c.
Light plates, blue annealed (No. 10)	3.25c.
Blue ann'l'd sheets (No. 13).....	3.40c.
Diam. pat. floor plates—	
¼-in.	5.30c.
⅜-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

*For 50 bundles or more: 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.
†For 50 bundles or more: 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

Philadelphia, but galvanized sheets range from 3.50c. a lb., Pittsburgh, or 3.82c., Philadelphia, on desirable business to 3.60c., Pittsburgh, or 3.92c., Philadelphia. Although 3.50c., Pittsburgh, is the minimum at which galvanized sheet business has been taken in eastern Pennsylvania, Southern buyers claim to have bought at 3.40c., Pittsburgh. Local consumers of sheets have not been specifying so heavily in some cases as had been expected. A radio manufacturer is reported to be producing considerably less than originally planned in this year's production program.

Imports.—In the week ended Aug. 31, 1054 tons of pig iron arrived at this port from British India and 5300 tons of chrome ore was received from British South Africa. Steel imports consisted of 28 tons of drill steel, 1 ton of strip steel, 25 tons of iron bars, 8 tons of steel rods and 10 tons of steel billets from Sweden, 4 tons of strip steel and 4 tons of steel scrap from Germany and 21 tons of steel scrap from the United Kingdom.

Old Material.—No new scrap sales of size have been made in the past week, and, with eastern Pennsylvania consumers of No. 1 heavy melting steel well stocked at present, dealers have in most cases been offering only $16 a ton, delivered, to fill their contracts. New contracts for requirements to the end of the year are expected before long, but at present the market is decidedly inactive.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	$16.50 to $17.00
Scrap T rails	16.00 to 16.50
No. 2 heavy melting steel	12.50 to 14.50
No. 1 railroad wrought	16.00 to 16.50
Bundled sheets (for steel works)	11.50
Hydraulic compressed, new	14.50 to 15.50
Hydraulic compressed, old	12.00 to 12.50
Machine shop turnings (for steel works)	12.00
Heavy axle turnings (or equiv.)	14.00 to 14.50
Cast borings (for steel works and roll. mill)	11.00 to 11.75
Heavy breakable cast (for steel works)	15.00
Railroad grate bars	12.00 to 12.50
Stove plate (for steel works)	12.00 to 12.50
No. 1 low phos., hvy., 0.04% and under	22.00 to 23.00
Couplers and knuckles	19.50 to 20.50
Rolled steel wheels	19.50 to 20.50
No. 1 blast f'nace scrap	10.50 to 11.00
Wrot. iron and soft steel pipes and tubes (new specific.)	15.00
Shafting	19.00 to 20.00
Steel axles	23.00 to 23.50
No. 1 forge fire	14.00
Cast iron carwheels	16.50 to 17.00
No. 1 cast	16.50 to 17.00
Cast borings (for chem. plant)	14.50
Steel rails for rolling	16.50 to 17.00

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and struc. shapes	3.00c.
Soft steel bars	3.00c.
Reinforc. steel bars	2.25c. to 2.50c.
Cold-fin. rounds and hex	3.65c.
Cold-fin. flats and sq.	4.15c.
Hoops and bands, No. 12 to ¼ in., inclusive	3.25c.
Hoops and bands, No. 13 and lighter	3.65c.
Cold-finished strip	*5.95c.
Black sheets (No. 24)	3.70c. to 3.90c.
Galvanized sheets (No. 24)	4.60c. to 4.75c.
Blue ann'l'd sheets (No. 10)	3.25c.
No. 9 ann'l'd wire, per 100 lb.	$2.90
No. 9 gal. wire, per 100 lb.	3.35
Com. wire nails, base per keg	2.90

*Net base, including boxing and cutting to length.

Cleveland

Present Prices on Some Steel Products Extended to Fourth Quarter—Larger Automobile Buying Expected Soon

CLEVELAND, Sept. 3.—Present prices are expected to be reestablished for the fourth quarter on finished steel in about all forms except possibly on cold-rolled strip, for which makers are asking an advance of $2 a ton. A small amount of business in steel bars has been placed for that delivery by an extension of an existing contract. A Cleveland mill is quoting the current price on plates for the coming quarter. Several sheet mills making various grades except galvanized have named present prices for the fourth quarter, but no definite announcement seems to have been made as yet on galvanized sheets. Alloy steel bars are expected to be reestablished at the 2.65c. base.

Mills that have opened their books for the coming quarter are not yet seeking contracts for that delivery, and consumers as a rule are not yet showing much interest in contracts. A considerable tonnage in automobile body sheets for the last quarter was taken during the week, but with that exception little fourth quarter business has been placed.

Specifications with some of the mills increased a little during the week, but with others were very light. August made a good showing in the volume of business in steel bars, plates and structural shapes and the tonnage entered by some of the local sales offices exceeded that of both July, this year, and August of last year.

Inquiries from some of the automobile manufacturers for sheets are now pending for the fourth quarter, and considerable business is expected to come from that source during the next 10 days.

Some of the sheet mills which had recently curtailed production increased operations this week after the holiday shutdown.

Pig Iron.—Sales by Cleveland interests fell off somewhat the past week. However, there was a slight increase in activity in the nearby Cleveland district, where a number of smaller foundries came into the market for lots up to 300 or 400 tons of foundry and malleable iron for the fourth quarter. Low prices on Southern foundry iron have brought some business in competition with Northern grades in the northern, central and southern Ohio territories, but evidently they have not resulted in any weakness in Northern iron prices. Southern foundry iron is still available at $13.50, Birmingham, while $14 appears to be the maximum price. Lake furnace prices are unchanged at $18.50, Cleveland, for outside shipment and at $19 for local delivery. For Michigan delivery, $20 furnace is the ruling price. Shipments by some furnaces having heavy commitments with the automotive industry declined in August. However, local furnaces whose product is more generally distributed among various consuming industries shipped a little more iron in August than in July.

Prices per gross ton at Cleveland:

N'th'n fdy., sil. 1.75 to 2.25	$19.50
S'th'n fdy., 1.75 to 2.25	$19.50 to 20.00
Malleable	19.50
Ohio silvery, 8 per cent	28.00
Basic Valley furnace	18.50
Stand. low phos., Valley	26.50 to 27.00

Prices except on basic and low phosphorus are delivered Cleveland. Freight rates: 50c. from local furnaces; $3 from Jackson, Ohio; $6 from Birmingham.

Bars, Plates and Shapes.—Specifications for steel bars are not expected to show much change until some of the automobile companies release orders for steel for new models, which have not yet been placed on a production basis. Bar mills still have fair backlogs. Some of the plate mills show a gain in deliveries. Inquiry in the structural field is rather light. Two inquiries have come from Toledo for sheet steel piling, one for 400 tons for the Maumee River bridge and one for 900 tons for the New York Central Railroad docks. Present prices will probably continue through the fourth quarter. A local mill is quoting steel bars rather freely at 1.90c., Cleveland, while other producers are naming 1.95c. Plates and shapes are firm at 1.95c., Pittsburgh.

Sheets.—Specifications in the automotive industry took a little spurt the past week and some business in auto body sheets are placed in the Michigan territory for the fourth quarter at the ruling 4.10c. Pittsburgh price, which several mills have named for that delivery. Some producers have reestablished prices at 2.85c., Pittsburgh, for black, 2.35c. for light gage blue annealed, 4.20c. for metal furniture sheets and 3.90c. for vitreous enameling sheets for the last quarter. Demand in this territory is rather light. Most of the mills still have good backlogs except in auto body sheets. Regular prices appear to be well maintained for current orders.

Strip Steel.—Several mills have reestablished hot-rolled strip prices for the fourth quarter at the present basis of 1.90c., Pittsburgh, for wide and 2c. for narrow material. As mills withstood sharp resistance to these prices for the third quarter from the automotive industry, they do not expect to have difficulty in maintaining them in the final quarter. Some of the mills still have good backlogs. One sizable order placed by an Ohio consumer during the week went to a Chicago mill which could make good deliveries. A real test on cold-rolled strip prices will come when consumers contract for the coming quarter. Mills recently advanced their price to 2.85c., Cleveland and Pittsburgh,

and are naming this for the last quarter. However, shipments this month will be against old 2.75c. contracts. Specifications are light and some of the mills need orders.

Iron Ore.—Iron ore shipments by water during August broke all previous monthly records. The total movement was 10,806,967 tons, compared with a previous record of 10,709,260 tons in August, 1926. The movement until Sept. 1 also broke previous records, having been 43,717,787 tons, compared with 32,517,693 tons during the corresponding period last year, or a gain of 31.4 per cent. The previous record up to Sept. 1 was 39,334,-264 tons in 1918.

Wire Products. — Manufacturers' wire is still in fair demand. While 2.40c. a lb., Cleveland, is the ruling price quoted to local jobbers and for outside shipment, some of the mills are getting 2.50c. locally. Nails are in light demand and weak. They are being sold at $2.50 a keg by one Central Western jobber.

Semi-Finished Steel.—Specifications against contracts for sheet bars, billets and slabs are lighter than recently. A local producer is still operating all of its open-hearth furnaces, but is catching up on deliveries and can now make shipments in about 10 days. The market is devoid of inquiry.

Warehouse Business.—The volume is holding up well for this season of the year. One jobber reports a gain and another a slight loss as compared with July. Prices are firm.

Coke.—The market is not active. There is a moderate demand for small lots of the better grades of Connellsville foundry coke, which are bringing $4.85 a net ton. Some business in Ohio by-product foundry coke for September shipment has been placed since the reestablishment of the $8.25, Painesville, price.

Old Material.—Little of interest occurred in the market in the past week. While scrap is coming out more freely than recently, no apparent weakness has developed. Local mills continue to take shipments in about the same rate as during the past few weeks, but are making no additional purchases. Dealers are paying $17 for selected No. 1 heavy melting steel for delivery to one local mill and $15.50 for lighter material for another mill. Up to $15 is being paid for No. 2 grade, which is slightly firmer. Short shoveling turnings are not as firm as recently. Dealers are buying blast furnace scrap against outstanding orders at quoted prices.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades:		
No. 1 heavy melting steel	$15.25 to	$15.50
No. 2 heavy melting steel	14.50 to	15.00
Compressed sheet steel	15.50 to	16.00
Light bundled sheet stampings	12.00 to	12.50
Drop forge flashings	13.00 to	13.25
Machine shop turnings	9.75 to	10.25
Short shoveling turnings	11.75 to	12.25
No. 1 railroad wrought	13.50 to	14.00
No. 2 railroad wrought	16.00 to	16.50
No. 1 busheling	13.25 to	13.75
Pipes and flues	9.00 to	9.50
Steel axle turnings	12.50 to	13.00
Acid Open-Hearth Grades:		
Low phos., forging crops	17.75 to	18.00
Low phos., billet, bloom and slab crops	18.50 to	18.75
Low phos., sheet bar crops	18.00 to	18.50
Low phos., plate scrap	18.00 to	18.50
Blast Furnace Grades:		
Cast iron borings	10.50 to	10.75
Mixed borings and short turnings	10.50 to	10.75
No. 2 busheling	10.50 to	10.75
Cupola Grades:		
No. 1 cast	17.50 to	18.00
Railroad grate bars	11.00 to	12.00
Stove plate	12.00 to	12.50
Rails under 3 ft.	18.50 to	19.00
Miscellaneous:		
Railroad malleable	18.00 to	18.50
Rails for rolling	16.25 to	16.50

Railroad Equipment

Norfolk & Western to Buy 1000 Hopper Cars

WHILE railroads are showing some interest in buying new equipment, as evidenced by purchases of 525 cars in the past week, inquiries have been light. The Central of New Jersey has ordered 200 70-ton steel gondolas and the New York Board of Transportation 300 steel subway cars. The Fruit Growers Express has contracted for 500 underframes. The Norfolk & Western is in the market for 1000 hopper cars. The New York Central has placed an order for 35 oil-electric switching locomotives. Details of the past week's business follow:

New York Central has ordered 35 oil-electric switching locomotives from American Locomotive Co.

Virginia Iron, Coal & Coke Co. has placed an order for two small electric locomotives with Baldwin Locomotive Works.

Philadelphia & Reading Coal & Iron Co. has bought three electric locomotives from Baldwin Locomotive Works.

Humble Oil & Refining Co. has contracted for a small steam locomotive with Baldwin Locomotive Works.

Central Railroad of New Jersey has ordered 200 70-ton steel gondolas from Bethlehem Steel Co.

New York City Board of Transportation has ordered 300 steel subway cars from American Car & Foundry Co.

Sterling Coal Co. has purchased 200 mine cars from the Bethlehem Steel Co.

Bessemer & Lake Erie has ordered 25 gondolas from Greenville Steel Car Co.

Great Northern is inquiring for two electric locomotives.

American Rolling Mill Co. has ordered two 300-hp. oil-electric locomotives from American Locomotive Co., Ingersoll-Rand Co. and General Electric Co.

Western Electric Co. has bought a 300-hp. oil-electric switching locomotive from Westinghouse Electric & Mfg. Co.

Birmingham Southern is expected to buy 25 50-ton all-steel box cars.

New York, New Haven & Hartford is asking for bids on five oil-electric rail motor cars.

Winston Brothers, Cincinnati, has ordered 150 dump cars from Western Wheeled Scraper Co.

Norfolk & Western will buy 1000 hopper cars.

Fruit Growers Express has ordered 500 underframes from Ryan Car Co.

St. Louis-San Francisco may come into the market for a number of 2-8-4 locomotives.

Missouri Pacific is figuring on buying 25 engines of either the 4-8-4 or the 2-8-4 type.

Chicago, Burlington & Quincy is considering the purchase of 10 engines.

Reinforcing Steel

Past Week Was Quietest of Year —Awards of 1700 Tons

WITH awards totaling only 1700 tons and with no fresh inquiries of consequence appearing, the past week was the quietest of the year. A warehouse at Hartford, Conn., which will require 650 tons, was the largest letting. Awards follow:

HARTFORD, CONN., 650 tons, warehouse, to Truscon Steel Co.

FALL RIVER, MASS., 125 tons, State bridge, to Truscon Steel Co.

CAMBRIDGE, MASS., 200 tons, school, to Concrete Steel Co.

BATTLE CREEK, MICH., 450 tons, sanitarium, to Kalman Steel Co.

GREELEY, COLO., tonnage not stated, two miles of 27-in. reinforced concrete pipe, to an unnamed bidder.

DENVER, tonnage not given, three miles of 66-in. reinforced concrete pipe, to an unnamed bidder.

ELLENSBURG, WASH., 143 tons, canal project, to unnamed bidder.

LONGVIEW, WASH., 125 tons, gates for Long Bell Lumber Co., to unnamed bidder.

Larger Carnegie Beams

The Carnegie Steel Co. has announced new 33 and 36-in. Carnegie beam and girder sections, which will be available for the trade some time after Oct. 1. The sections will be rolled at the company's Homestead works. Heretofore Carnegie beams have only been made in sections up to 30 in. The new 33 in. sections will range from 125 to 260 lb. per lin. ft., and the 36 in. from 147 to 300 lb. per lin. ft.

Foundry Meeting at St. Louis

The St. Louis District Foundrymen's Club will be addressed at its monthly meeting in St. Louis on the evening of Sept. 13 by Dr. Richard Moldenke, Watchung, N. J. Invitations have been issued to foundrymen in neighboring cities.

MacFarland & Little, Philadelphia, steel mill agents for tool steels, drawn steel, drill rods, etc., have moved their offices and warehouse from Arch Street to 1121 Frankford Avenue. William J. MacFarland and Joseph V. Little have been partners in this firm for 47 years. For the past 33 years they have been exclusive agents in the Philadelphia district for the Firth-Sterling Steel Co., McKeesport, Pa.

Pacific Coast

Structural Steel Awards Nearly 10,000 Tons Including 7000 Tons for Portland, Ore., Bridge

SAN FRANCISCO, Aug. 31 (*By Air Mail*).—The structural steel market was active during the past week on the Pacific Coast, and close to 10,000 tons was placed. Demand otherwise continues to reflect the usual mid-summer lull, the majority of inquiries and sales being confined to relatively small lots. Plate fabricators are keenly interested in the outcome of the Everett, Wash., pipe line project, involving 10,000 tons of plates. Alternate bids were taken on wood and reinforced concrete pipe. Bids have been opened on a quantity of track material, including 550 tons of girder rails for the Municipal Railroad, San Francisco. The price structure continues on an even keel, with little or no shading.

Pig Iron.—Movement of foundry pig iron is in small lots. No change in prices has occurred.

Prices per gross ton at San Francisco:

*Utah basic	$25.00 to $26.00
*Utah fdy., sil. 2.75 to 3.25	25.00 to 26.00
**Indian fdy., sil. 2.75 to 3.25	25.00 to 26.00

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Bars.—Only two awards involving more than 100 tons of reinforcing steel bars were reported this week. Both went to unnamed interests. Pending business is not heavy. An award is expected next week on 2300 tons for a wharf in Oakland. Out-of-stock prices continue on a fairly firm basis of 2.30c., base, on carload lots and 2.60c. on less than carload lots. In the Los Angeles district prices $2 a ton higher prevail. Merchant bar steel continues to move in small lots only and no large inquiries are current. On this class of material, 2.35c., c.i.f., is general.

Plates.—The Western Pipe & Steel Co. was low bidder on 10,000 tons for a pipe line at Everett, Wash. Action on 3000 tons for a pipe line at Bremerton, Wash., has again been postponed owing to financing delays. Prices appear to be firm at 2.35c., c.i.f. Coast ports.

Shapes. — Structural steel shape bookings were the heaviest since early in March, totaling nearly 10,000 tons. The outstanding award was 7000 tons for the St. John's Bridge at Portland, Ore., 5000 tons having been placed with the Wallace Bridge & Structural Steel Co. and 2000 tons with the United States Steel Products Co. German interests were awarded 950 tons of sheet piling for the Akli Avenue sea wall in Seattle at a price reported to be $45 a ton, c.i.f., duty paid. The Consolidated Steel Corporation secured 350 tons for a factory for the Willard Storage Battery Co., Los Angeles, and 200 tons for a factory in El Segundo, Cal. No award has yet been made on the West Garfield Street bridge, Seattle, involving 400 tons. New inquiries include 325 tons for an addition to the American Can Co. plant, San Francisco, 450 tons for a power house in San Francisco for the Pacific Gas & Electric Co., and 405 tons for a bridge over the Trinity River for the State. Prices continue on a firm basis at 2.35c., c.i.f.

Cast Iron Pipe.—S. A. Moceri took 515 tons of 6 to 12-in. Class B pipe for the improvement of McKinley Hill district, Tacoma. The United States Pipe & Foundry Co. secured 303 tons of 10-in. Class B pipe for Coquille, Ore., and the Pacific States Cast Iron Pipe Co. took 192 tons of 2-in. Class B pipe for Los Angeles. The American Cast Iron Pipe Co. was low bidder on 377 tons of 6 to 10-in. Class B pipe for Anaheim, Cal., and the R. E. Hazard Contracting Co. was low bidder on 112 tons of 4 to 8-in. Class B pipe for the improvement of Estelle Street, San Diego.

Track Material.—The United States Steel Products Co. was low bidder on 82 special layouts, 21,000 tie plates, 30 kegs of track bolts, 130 kegs of track spikes, 13,000 brace tie plates and 550 tons of 98 to 129-lb. girder rails. Its bid was $60.75 on 450 tons of 105-lb. girder rails.

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and struc. shapes	3.15c.
Soft steel bars	3.15c.
Small angles, ⅜-in. and over	3.15c.
Small angles, under ⅜-in.	3.55c.
Small channels and tees, ¾-in. to 2¾-in.	3.75c.
Spring steel, ¼-in. and thicker	5.00c.
Black sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.80c.
Galv. sheets (No. 24)	5.30c.
Struct. rivets, ½-in. and larger	5.65c.
Com. wire nails, base per keg	$3.40
Cement c't'd nails, 100 lb. keg	3.40

Birmingham

Pig Iron Sales Larger, Mostly for Shipment to North—Open-Hearth Operations at Low Point of Year

BIRMINGHAM, Sept. 3.—A good volume of new pig iron tonnage was booked last week for September delivery, this coming from melters who have been buying from month to month and close to current needs. Additional buying will develop during the next week or so, as a number of small melters are still not covered for September. There has been practically no activity in fourth quarter iron to date. The general run of small-lot orders continues at a fair rate. Yard stocks of Birmingham furnaces were reduced in August for the second consecutive month. All three merchant producers reported shipments larger than production, and the August decrease in stocks was greater than in July. This was largely due to shipments outside of the South. A substantial tonnage is said to have been booked in competitive markets at price concessions from $1 to $2 under Southern market quotations. Iron in the Southern market continues at $14.50 base. Within the past week there were no changes in furnace operations, but during August three furnaces were blown out, two of them by merchant foundry producers. Fourteen furnaces are now in blast. The Republic Iron & Steel Co. is relining a stack blown out the middle of August and expects to have it back in operation the early part of October.

Prices per gross ton, f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil.	$14.50
No. 1 fdy., 2.25 to 2.75 sil.	15.00
Basic	14.50

Finished Steel.—Demand for finished products, other than rails, continues undiminished, and operations remain at a high point. Quotations have not been changed in the past several weeks, but concessions are being made when the business justifies. On the whole, price conditions are as stable as in other markets. Fabricators of structural steel and reinforcing steel are beginning to feel the recession in building demands. Two of the larger structural steel fabricators still have some unfilled tonnage, and one, in particular, reports orders on hand for 60 days. New business is light and a curtailment in operations has started. The Ingalls Iron Works secured 220 tons of structural steel for conveyor and bins from the Tennessee Copper Co. at Copperhill, Tenn. Bar fabricators report only a general run of small orders. Open-hearth operations are at the lowest point of the year, owing to the reduction that took place at Ensley works of the Tennessee company when the rail mill was closed. Three of nine are being operated at Ensley, but seven of the eight at the Fairfield works are active. The Gulf States Steel Co. is operating all six at Alabama City.

Cast Iron Pipe.—Pressure pipe manufacturers report a general quietness, with present business largely made up of small orders. Prices remain at $37 to $38 a net ton, Birmingham, for 6-in. and larger diameters.

Coke.—New tonnage in foundry coke is restricted, as most of the third quarter tonnage is under contract. Shipments continue satisfactory. Prices are still $5 for both spot and contract.

Old Material.—Steel grades are active, but cast iron grades are moving

slowly. Prices are the same as for the past several weeks.

Prices per gross ton, deliv'd Birmingham dist. consumers' yards:

Heavy melting steel	$13.00 to $13.50
Scrap steel rails	14.00
Short shoveling turnings	9.00
Cast iron borings	9.00
Stove plate	11.50 to 12.00
Steel axles	21.00
Iron axles	23.00
No. 1 railroad wrought	10.00 to 10.50
Rails for rolling	15.50
No. 1 cast	13.50
Tramcar wheels	13.50
Cast iron carwheels	13.00 to 13.50
Cast iron borings, chem.	13.50 to 14.00

Large Production of By-Product Coke

Total output of by-product coke for the 31 days of July amounted to 4,613,723 net tons, an average of 148,830 tons a day, according to the Bureau of Mines. In comparison with the June daily average of 150,319 tons, this was a decrease of 1 per cent, but in comparison with July of last year it was an increase of 18 per cent, the respective totals for these months being 4,509,564 tons and 3,911,082 tons.

There were 86 by-product plants in operation during July, and they produced 94 per cent of their capacity.

Total output of beehive coke is estimated at 600,200 tons, a decrease of 0.4 per cent when compared with 602,400 tons, the revised figure for the preceding month, but an increase of 121 per cent over July, 1928. The combined output of by-product and beehive coke was 5,213,923 tons, 2 per cent above June.

In seven months, production of by-product coke has reached 31,307,452 tons, by far the highest total on record. This is 14 per cent ahead of last year. Except for May, the July total output is the greatest ever made in one month.

E. J. Schwabach Co. and I. J. Louis & Co., commodity houses, both of 60 Beaver Street, New York, merged Aug. 31. Henceforth business will be transacted under the name of the former company. The firm holds memberships in all the principal commodity exchanges.

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-fin. rounds, shaftings, screw stock	3.75c.
Black sheets (No. 24)	4.25c.
Galv. sheets (No. 24)	5.10c.
Blue ann'l'd sheets (No. 10)	3.45c.
Black corrug. sheets (No. 24)	4.30c.
Galv. corrug. sheets	5.15c.
Structural rivets	3.95c.
Boiler rivets	3.95c.

	Per Cent Off List
Tank rivets, 7/8-in. and smaller, 100 lb. or more	65
Less than 100 lb.	60
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-pressed nuts, sq., blank or tapped, 200 lb. or more	60
Less than 200 lb.	50
Hot-pressed nuts, hex., blank or tapped, 200 lb. or more	60
Less than 200 lb.	50

St. Louis

Tone Is Firmer in Pig Iron—Scrap Scarce and Strong and Prices Are Advancing

ST. LOUIS, Sept. 3—While current sales of pig iron are not in large volume, the market has a firmer tone. The situation has been cleared by the recent heavy sales by Southern blast furnaces, which reduced their stock piles and buttressed their backlogs. Throughout this district the remainder of 1929 requirements have been pretty well covered. Advantage has been taken by melters of the competition between Northern and Southern furnaces to lay up liberal stocks at low prices. The extreme low figures of the past several weeks have disappeared, and now the lowest which can be done on No. 2 Southern hereabouts is $13.25 to $13.50, furnace. Sales reported in the past week total about 6000 tons, of which the St. Louis Gas & Coke Co. took 2400 tons, the rest having been divided between Alabama and Chicago district makers. August shipments exceeded those of July, also the August, 1928, total.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill.	$19.50 to $20.00
Malleable, f.o.b. Granite city	20.00
N'th'n No. 2 fdy., deliv'd St. Louis	22.16
Southern No. 2 fdy., deliv'd	18.92 to 18.92
Northern malleable, deliv'd	22.16
Northern basic, deliv'd	22.16

Freight rates: 75c. (average) Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

Finished Steel.—Small jobs, aggregating a fair tonnage, are reported by fabricators and concrete bar interests, but individual lettings are not of large size. Numerous projects are pending. The largest transaction was 450 tons of reinforcing concrete bars for the McMillan Hospital, placed with the Laclede Steel Co. Warehousemen report business satisfactory. Galvanized sheets have improved further, and the movement of tin plate is normal for the season. Prices are steady.

Coke.—Preliminary reports of by-product interests in this district indicate total August shipments in excess of those in the same month last year. Demand for foundry coke holds up well, but purchasing is on an immediate requirement basis. Contracting by industrial users is in fair volume, but domestic sizes continue slow.

Old Material.—All grades of scrap iron and steel are strong, with heavy melting steel and steel specialties leading the demand. Mills are in need of material, and, while reluctant to pay the prices asked, have been forced recently to meet dealers' terms on some items. Railroad offerings have increased, but are still bringing top prices, and bidding for them is spirited. Inquiries for a number of grades have been received here from other centers, notably Chicago. Country mixed scrap is scarce, and has been advanced $1 per ton. Malleable was marked up another 50c., and fractional advances were recorded on several other items. The following railroad lists appeared: Mobile & Ohio, 29 cars; Pennsylvania, 69,945 tons; Missouri Pacific, 170 cars; Big Four, 1150 tons; Missouri-Kansas-Texas, 3000 tons; Cotton Belt, 15 cars; Rock Island, 10 cars; Belt Railway, 11 cars, and New Orleans Great Northern, 65 tons.

Dealers' buying prices per gross ton, f.o.b. St. Louis district:

No. 1 heavy melting or shoveling steel	$14.75 to $15.25
No. 2 heavy melting or shoveling steel	14.50 to 15.00
No. 1 locomotive tires	15.50 to 16.00
Miscel. stand.-sec. rails including frogs, switches and guards, cut apart	17.00 to 17.50
Railroad springs	19.50 to 20.00
Bundled sheets	10.50 to 11.00
No. 2 railroad wrought	15.00 to 15.50
No. 1 busheling	10.00 to 10.50
Cast iron borings and shoveling turnings	9.50 to 10.00
Iron rails	15.00 to 15.50
Rails for rolling	17.25 to 17.75
Machine shop turnings	7.00 to 7.50
Heavy turnings	10.00 to 10.50
Steel car axles	19.50 to 20.00
Iron car axles	26.50 to 27.00
Wrot. iron bars and trans.	21.50 to 22.00
No. 1 railroad wrought	13.75 to 14.25
Steel rails, less than 3 ft.	18.00 to 18.50
Steel angle bars	15.25 to 15.75
Cast iron carwheels	15.00 to 15.50
No. 1 machinery cast	15.25 to 15.75
Railroad malleable	16.00 to 16.50
No. 1 railroad cast	14.75 to 15.25
Stove plate	12.50 to 13.00
Agricult. malleable	15.25 to 15.75
Relay. rails, 60 lb. and under	20.50 to 23.50
Relay. rails, 70 lb. and over	26.50 to 29.00

Cincinnati

Pig Iron Demand Slows Up—Alabama Iron Sold at $13 to $14, Birmingham

CINCINNATI, Sept. 3—District consumers of pig iron continue reluctant to enter the market for sizable quantities of iron. Sales last week declined sharply from the level of the preceding week. Most furnaces are marking time, taking small orders and awaiting the renewed interest of buyers, when fourth quarter requirements force them into the market. Total sales last week were about 4000 tons, compared with 6000 the preceding week. Of this tonnage, 1200 tons, in small lots, was placed with Southern furnaces at about $14, base, Birmingham. A Tennessee furnace which heretofore had accepted orders on a basis of $13.50, Birmingham, refused a fair tonnage at this quotation, and notified its selling agent that no more iron would be sold at less than $14, base, Birmingham, for delivery into this district. Heretofore, Southern furnaces have maintained quotations

at $14 for Cincinnati delivery, although tonnage orders and business outside the metropolitan area were taken at $13.50 and in a few instances at $13. Except for an inquiry from a Louisville, Ky., consumer for 600 tons of Southern foundry, there is no pending business before the trade.

Prices per gross ton, deliv'd Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25	$19.89 to $20.39
Ala. fdy., sil. 1.75 to 2.25	17.19 to 18.19
Ala. fdy., sil. 2.25 to 2.75	17.69 to 18.69
Tenn. fdy., sil. 1.75 to 2.25	17.19 to 18.19
S'th'n Ohio silvery, 8 per cent	26.89

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

Coke.—With most foundries covered for their fuel needs for the remainder of this quarter and in some instances through the fourth, no new business, except for occasional spot shipments, has been reported. Specifications for by-product foundry coke have tapered still more during the last week, although district foundries are reported to be busy. Prices on by-product foundry grades continue firm at about $10.05, delivered in Cincinnati.

Old Material. — Dealers are still competing strongly for heavy melting steel and other good grades of old material, but mills are not willing to pay current prices. New business is quiet. As old contracts end, mills renew quietly for short periods.

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel	$14.25 to $14.75
Scrap rails for melting	14.25 to 14.75
Loose sheet clippings	9.00 to 9.50
Bundled sheets	11.00 to 11.50
Cast iron borings	9.25 to 9.75
Machine shop turnings	8.50 to 8.75
No. 1 busheling	10.50 to 11.00
No. 2 busheling	7.00 to 7.50
Rails for rolling	14.50 to 15.00
No. 1 locomotive tires	14.25 to 14.75
No. 2 railroad wrought	14.25 to 14.75
Short rails	18.50 to 19.00
Cast iron carwheels	12.75 to 13.25
No. 1 machinery cast	19.00 to 19.50
No. 1 railroad cast	15.25 to 15.75
Burnt cast	10.25 to 10.75
Stove plate	10.25 to 10.75
Brake shoes	10.25 to 10.75
Agricultural malleable	14.25 to 14.75
Railroad malleable	15.25 to 15.75

Finished Material.—The return of several automobile manufacturers to the district sheet market, combined with the well-sustained demand from users of specialty sheets, brought new bookings of district sheet mills to a point above capacity last week. Backlogs, which had been cut into materially during the last few weeks, again were increased. During the early part of the week an improvement in deliveries had been noticed, but the entry of automotive manufacturers, most of whom placed rush orders, has again complicated the situation. Thus, promises of four to six weeks on blue annealed sheets and three to four weeks on black sheets are about the earliest shipments reported, while full pickled and other special grades are still well extended. Prices in all grades, except galvanized sheets, are firm and no changes for the fourth quarter are anticipated.

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and struc. shapes	3.40c.
Bars, soft steel or iron	3.30c.
New billet reinforc. bars	3.15c.
Rail steel reinforc. bars	3.00c.
Hoops	4.05c.
Bands	3.50c.
Cold-fin. rounds and hex.	3.85c.
Squares	4.35c.
Black sheets (No. 24)	4.05c.
Galvanized sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.45c.
Structural rivets	3.85c.
Small rivets	65 per cent off list
No. 9 ann'l'd wire, per 100 lb.	$3.00
Com. wire nails, base per keg	2.85
Cement c't'd nails, base 100 lb. keg	2.85
Chain, per 100 lb.	8.75
	Net per 100 Ft.
Lap-weld steel boiler tubes, 2-in.	$16.00
4-in.	33.00
Seamless steel boiler tubes, 2-in.	17.00
4-in.	34.00

Boston

Pig Iron Sales for Week Exceed 10,000 Tons — Slight Easing in Scrap Prices

BOSTON, Sept. 3.—Sales of pig iron the past week exceeded 10,000 tons, about 80 per cent of which was Southern and Mystic iron. No lots larger than 500 tons were sold to any one consumer, and practically all were for fourth quarter delivery, an indication that the small and medium-sized foundries have started an active buying movement for final 1929 requirements. A Massachusetts machinery manufacturer has yet to cover on 2000 to 3000 tons. Little change is noted in prices. While most Buffalo stacks are openly quoting $18 a ton, base, furnace, that price has been shaded, and it is still possible to obtain iron made in that district at $17, base furnace. Most of the Southern iron sold the past week was at $14.50 a ton, base furnace, but at least one furnace went to $14 rather than lose the order. Sales by the Mystic Iron Works were generally at $20 to $21.75 a ton, furnace, for No. 2X and No. 1X, depending on the freight rate. Some Indian iron has been bought at $21.75 to $22 a ton, on dock here, duty paid.

Foundry iron prices per gross ton deliv'd to most New England points:

†Buffalo, sil. 1.75 to 2.25	$21.28 to $22.28
†Buffalo, sil. 2.25 to 2.75	21.78 to 22.78
*Buffalo, sil. 1.75 to 2.25	21.91 to 22.91
*Buffalo, sil. 2.25 to 2.75	22.41 to 23.41
East. Penn., sil. 1.75 to 2.25	22.65 to 23.15
East. Penn., sil. 2.25 to 2.75	23.15 to 23.65
Va., sil. 1.75 to 2.25	25.21
Va., sil. 2.25 to 2.75	25.71
*Ala., sil. 1.75 to 2.25	23.61
*Ala., sil. 2.25 to 2.75	24.11
†Ala., sil. 1.75 to 2.25	19.75 to 20.25
†Ala., sil. 2.25 to 2.75	20.25 to 20.75

Freight rates: $4.91 all rail from Buffalo, and $4.28 rail and water; $3.65 all rail from eastern Pennsylvania; $5.21 all rail from Virginia; $9.61 all rail from Alabama and $5.75 rail and water from Alabama to New England seaboard.

*All rail rate.

†Rail and water rate.

Warehouse Business. — Consumption of warehouse products, which showed some increase late in August, is expected to improve further during the remaining four months of 1929 owing to the activity of metal-working shops. That competition for business is keen among warehouses handling domestic steels and those offering imported material is evidenced by the growing willingness to shade regular list prices. Concessions vary according to the size and desirability of the order.

Shapes and Plates. — Despite reports from other sections of the country of a tapering off in business, local mill representatives say New England bookings are holding up well and running well ahead of last year. Deliveries on plates, while better than they were a month or two ago, are still delayed. It is estimated that consumption of standard shapes in New England the last quarter of 1929 will nearly double that for the corresponding period last year. For attractive tonnages, 1.90c. a lb. can still be done, but 1.95c. is the general asking price. A local fabricator has closed on 3000 tons of steel for a Boston district job. Because the work was placed without competition details are withheld.

Cast Iron Pipe.—Prospective pipe business dropped off materially the past week. Braintree, Mass., is asking bids on a round tonnage of 6-in. pipe, and Southwick, Mass., on six miles of 8 and 10-in. stock. Because of the sold-up condition of foundries on small pipe, prices are well maintained despite the dearth of prospective business, yet attractive tonnages of large pipe unquestionably can be had at concessions. Prices quoted openly on domestic pipe are: 4-in., $46.10 to $47.10 a ton, delivered common Boston freight rate points; 6 to 12-in., $40.10 to $41.10; 16 to 20-in., $39.10. A $3 differental is asked on Class A and gas pipe.

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars, small shapes	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway rounds	6.60c.
Norway squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tie steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold-rolled steel—	
Rounds and hex.	*3.55c. to 5.55c.
Squares and flats	*4.05c. to 7.05c.
Toe calk steel	6.00c.
Rivets, structural or boiler	4.50c.
	Per Cent Off List
Machine bolts	50 and 5
Carriage bolts	50 and 5
Lag screws	50 and 5
Hot-pressed nuts	50 and 5
Cold-punched nuts	50 and 5
Stove bolts	70 and 10

*Including quantity differentials.

Imports and Exports. — Arrivals of foreign iron at this port during the first half of August were 973 tons of Indian and 500 tons of Dutch, a total of 1473 tons, which compares with 548 tons during the first half of July, this year, and 695 tons in the first half of August, last year. Arrivals of ore the first half of August were 6750 tons of Bona and 11,380 tons of Newfoundland, a total of 18,130 tons, as compared with 16,510 tons the first half of July, this year, and 12,583 tons the first half of August, 1928. Scrap exported to Danzig the first half of August, this year, amounted to 3180 tons.

Coke. — The by-product foundry coke situation has not changed. Specifications against last half contracts exceed expectations. The price is holding firmly at $11 a ton, delivered within a $3.10 freight rate zone.

Old Material.—Pre-holiday buying of scrap fell off a little, and the market for No. 1 heavy melting steel and forge flashings was a little easier, while $10 a ton on cars, shipping point, was the general market for long bundled skeleton. Shading of prices, however, is reported as temporary, and will, it is believed, be followed by a resumption of buying at full prices owing to the continued scarcity of most material wanted by Pennsylvania mills. Brokers say they have a considerable tonnage yet to cover. New England foundries have shown more interest in pig iron than in scrap. The market for No. 1 machinery cast is firm at $15 to $15.50 a ton, delivered, but $14 to $14.50 a ton for textile cast is maintained with difficulty owing to increasing supplies. July scrapping of textile machinery was the heaviest for any one month since records have been maintained, and a lot of machinery also was discarded in August.

Buying prices per gross ton, fo.b. Boston rate shipping points:

No. 1 heavy melting steel	$12.00 to $12.50
Scrap T rails	11.50 to 12.00
Scrap girder rails	10.50 to 11.00
No. 1 railroad wrought	11.00 to 11.50
No. 1 yard wrought	9.00 to 9.50
Machine shop turnings	7.00 to 7.50
Cast iron borings (steel works and rolling mill)	6.50 to 6.75
Bundled skeleton, long	10.00 to 10.50
Forge flashings	10.25 to 10.50
Blast furnace borings and turnings	6.00 to 6.25
Forge scrap	9.00 to 9.25
Shafting	14.00 to 14.75
Steel car axles	18.00 to 18.50
Wrought pipe 1 in. in diameter (over 2 ft. long)	9.75 to 10.00
Rails for rolling	12.50 to 13.00
Cast iron borings, chemical	9.75 to 10.00

Prices per gross ton deliv'd consumers' yards:

Textile cast	$14.00 to $14.50
No. 1 machinery cast	15.00 to 15.50
No. 2 machinery cast	13.00 to 13.25
Stove plate	11.00 to 11.50
Railroad malleable	18.00 to 18.50

Buffalo

Pig Iron Inquiries Total 10,000 to 12,000 Tons — Steel Mills Operating Well — Scrap Steady and Firm

BUFFALO, Sept. 3.—Producers are interested in an aggregate of 10,000 to 12,000 tons of pig iron inquiry from various sources, principally from Eastern points. Fewer inquiries are being received from the district, most of the business here being closed through personal solicitation before reaching the inquiry stage. An inquiry from New Jersey is for 1000 to 2000 tons of foundry, and several lots of 400 or 500 tons of foundry and malleable are pending. A New England basic user is putting out feelers for a considerable tonnage, but the exact amount is not known. Producers here are adhering to a $19.50 base for the district.

Prices per gross ton, f.o.b. furnace:

No. 2 fdy., sil. 1.75 to 2.25	$19.50
No. 2X fdy., sil. 2.25 to 2.75	20.00
No. 1 fdy., sil. 2.75 to 3.25	21.00
Malleable, sil. up to 2.25	20.00
Basic	18.50
Lake Superior charcoal	27.28

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and struc. shapes	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.95c.
Cold-fin. flats, sq. and hex.	4.45c.
Rounds	3.95c.
Cold-rolled strip steel	5.85c.
Black sheets (No. 24)	4.20c.
Galv. sheets (No. 24)	4.85c.
Blue ann'l'd sheets (No. 10)	3.50c.
Com. wire nails, base per keg	$3.60
Black wire, base per 100 lb.	3.75

Finished Iron and Steel.—All mills are maintaining high production schedules. The Donner Steel Co. was temporarily operating five open-hearths, but has now increased to seven. Little new business was placed with structural fabricators during the week, but several jobs are in prospect. Tonnage is being figured now for the new State prison at Attica, N. Y., and for a marine aerodrome for the city of Buffalo. A local maker took 180 tons of reinforcing mesh for State highways and 80 tons for a highway job at Ludlowville, N. Y.

Old Material.—The market is holding well. Demand for shipment on the last large tonnage of No. 1 heavy melting steel sold here has increased, making conditions a little more difficult for the dealers, who are paying $17.75 for material for shipment on this order. A few sales of No. 1 machinery cast scrap have been made at $16. Some short steel rails, railroad knuckles and couplers and rolled steel wheels have been sold at $19.50. Sales of short shoveling turnings have been made at $12.50 to $13, and sales of mixed borings and turnings and of cast iron borings at $12 to $12.25. Strength of the outside markets is making it difficult to pick up tonnages in this district and most of the dealers are short on all material sold during the past month. Dealers are expecting a sizable buying movement soon. Most of the scrap immediately east of Rochester is going to Pittsburgh and Youngstown districts. A large consumer of scrap in Buffalo continues to receive two boat loads of material from Detroit each week, and is maintaining its stockpile despite heavy operation.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$17.50 to $18.00
No. 2 heavy melting steel	14.75 to 15.00
Scrap rails	16.50 to 17.00
Hydraul. comp. sheets	14.50 to 14.75
Hand bundled sheets	12.00 to 12.50
Drop forge flashings	14.25 to 14.50
No. 1 busheling	15.50 to 16.50
Hvy. steel axle turnings	14.00 to 14.50
Machine shop turnings	9.00 to 9.50
No. 1 railroad wrought	13.00 to 13.50
Acid Open-Hearth Grades:	
Knuckles and couplers	19.50 to 19.75
Coil and leaf springs	19.00 to 19.50
Rolled steel wheels	19.00 to 19.50
Low phos. billet and bloom ends	20.00 to 20.50
Electric Furnace Grades:	
Short shov. steel turnings	12.50 to 13.00
Blast Furnace Grades:	
Short mixed borings and turnings	11.50 to 12.25
Cast iron borings	11.50 to 12.25
No. 2 busheling	10.00 to 10.50
Rolling Mill Grades:	
Steel car axles	18.75 to 19.25
Iron axles	21.00 to 22.00
Cupola Grades:	
No. 1 machinery cast	16.00 to 17.00
Stove plate	13.00 to 13.50
Locomotive grate bars	12.50 to 13.00
Steel rails, 3 ft. and under	19.50 to 19.75
Cast iron carwheels	14.00 to 14.50
Malleable Grades:	
Industrial	18.00 to 18.50
Railroad	18.00 to 18.50
Agricultural	18.00 to 18.50
Special Grades:	
Chemical borings	12.50 to 13.50

Canada

General Outlook Holds Much Promise

TORONTO, ONT., Sept. 3.—The general outlook in the iron and steel industry of Canada continues to hold much promise for the last quarter of this year. The production of pig iron and steel continues at a high rate. While July production figures were at about the highest point this year, the output during August was sustained.

It has just been announced that the Algoma Steel Corporation, Sault Ste. Marie, Ont., has received a new rail order from the Canadian Pacific Railway. While the actual tonnage has not been given out, it was stated that the order will keep the rail mill going for a month. This order, together with backlogs, will supply enough business for the rail mill until about Dec. 1.

Pig Iron.—Slow but steady improvement features the general trend of pig iron business. New orders are mostly in small tonnages, but the total volume is fairly good. Several orders during the week called for lots up to 500 tons, and others of like size are said to be pending. Some melters are showing interest in fourth quarter needs. Local blast furnace representatives look for considerable future

buying when books are opened for the last quarter about Sept. 15. Pig iron prices are unchanged.

Prices per gross ton:

Delivered Toronto

No. 1 fdy., sil. 2.25 to 2.75	$24.60
No. 2 fdy., sil. 1.75 to 2.25	24.10
Malleable	24.60

Delivered Montreal

No. 1 fdy., sil. 2.25 to 2.75	$26.00
No. 2 fdy., sil. 1.75 to 2.25	25.50
Malleable	26.00
Basic	24.50

Imported Iron, Montreal Warehouse

Summerlee	$33.50
Carron	33.00

Structural Steel.—While new business is slow, the prospective demand for structural steel continues large. Bridge construction work in Ontario, Quebec and British Columbia, already announced, will call for large tonnages, and on some of this work bids are now being received.

Old Material.—Steadily improving demand features business in this market. Sales are generally in better tonnage than at any time in the past two months, and consumers are showing more interest in their present and future scrap needs. Small contracts are being placed for delivery during the next month or six weeks, and inquiries are coming out for supplies to be delivered to the end of the year. Steel scrap developed a stronger demand during the week, with a few large tonnage orders reported in the Toronto and Hamilton districts. Iron scrap sales, however, continue to be the prominent feature of the market.

Dealers' buying prices:

	Per Gross Ton	
	Toronto	Montreal
Heavy melting steel.	$10.00	$8.50
Rails, scrap	11.00	9.00
No. 1 wrought	10.00	12.00
Machine shop turnings	7.50	5.00
Boiler plate	7.50	6.00
Heavy axle turnings	8.00	7.50
Cast borings	7.50	5.00
Steel turnings	7.50	6.50
Wrought pipe	6.00	6.00
Steel axles	15.00	20.00
Axles, wrought iron	17.00	22.00
No. 1 machinery cast	....	17.00
Stove plate	....	13.00
Standard carwheels	....	16.00
Malleable	....	13.00
	Per Net Ton	
No. 1 mach'ry cast	$16.00	....
Stove plate	12.00	....
Standard carwheels	15.00	....
Malleable scrap	14.00	....

Chicago - Green Bay, Wis., Rate "Not Unreasonable"

WASHINGTON, Sept. 3.—The rate of 20.5c. per 100 lb. on iron and steel articles from Chicago (and points taking the same rate) to Green Bay, Wis., is not unreasonable or otherwise unlawful, according to a proposed report of Examiner Williams A. Maidens, made public today. The examiner said, however, that the rate is not in harmony with the rate in effect from the same territory to Milwaukee.

The Chicago-Milwaukee rate is 9.5c. and was declared to be "very much depressed." The complaint against the Chicago-Green Bay rate was made by the Green Bay Association of Commerce on behalf of the Northwest Engineering Corporation and other iron and steel users.

Youngstown

Decline in Automobile Curtails Strip Mill Operations—One Sheet Producer Offering Immediate Shipments

YOUNGSTOWN, Sept. 3.—The steel industry in the Valleys faces a month of uncertainty. Incoming specifications and orders will be watched with more interest than they have been at any time this year. Local executives see nothing alarming in prospect, as steel demand may ordinarily be expected to grow stronger in September and October. But the very heavy consumption of steel in the first eight months of the year has led some to believe that the usual autumn improvement will not develop marked proportions. Such a view is undoubtedly based on the uncertainty in the automobile industry. Valley steel companies are dependent on this industry for an important share of their prosperity. Local steel consuming companies are each year taking larger proportions of the output of Youngstown mills, but the industry here must still look to outside sources of outlet in disposing of that percentage of production which enables the mills to operate at a high and consequently profitable rate.

The large output of pipe in the Valleys is nearly all shipped to distant points, and at present the prospects for this product are unusually good. Local mills have taken numerous small feeder lines for many of the larger pipe line projects placed this year. These orders have permitted comparatively high and well diversified operations in recent weeks. Local mills are taking advantage of water shipment on this material, and large tonnages of pipe are moving by rail to Ambridge and Woodlawn, Pa., where it is transferred to barge and shipped to Southern points.

Sheet backlogs are gradually being used up, and one large producer has just notified the trade that it is able to make immediate shipments of all the common finishes. Others are better supplied with commitments and will be able to maintain fair operations for the greater part of the month on present tonnage. Sheet operations last week averaged about 90 per cent of capacity, but the holiday this week, coupled with slightly lower rolling schedules, will reduce this percentage about five points. Strip operations are at not more than 75 per cent of capacity and further curtailment is probable before the expected increase in automobile requirements calls for larger tonnages.

Recent price weakness in sheets has apparently been checked. On galvanized, local mills are occasionally forced to go to 3.50c., Pittsburgh, but the usual quotation is 3.60c. and some business is being taken at that figure. On black sheets, the price is steady at 2.85c., Pittsburgh, and blue annealed material is holding at 2.20c. for the No. 10 gage base and 2.35c. for the No. 13. On wide strips, the market is fairly well represented by a 2.10c., quotation. Both hot and cold-rolled strip are established at recent prices of 1.90c. and 2c., Pittsburgh, on the hot-rolled and 2.75c., to 2.85c. on the cold-rolled.

Fourth quarter pig iron buying has not yet begun and only small and scattered inquiry for this period has developed. Consumers of basic will soon have to come into the market, but purchases are likely to be delayed as long as possible in order to figure out the turn of the market. Prices seem to be unusually firm at $18.50, Valley, for foundry and basic iron and $19 for malleable and Bessemer, and no advance is anticipated for fourth quarter.

The scrap market is holding its recent strength. Sales of No. 1 heavy melting steel have been made in the last week at $19. Hydraulic compressed sheets range from $18 to $18.50, but recent sales have been made at the higher figure. Specialties are strong and also the lighter grades of steel, such as machine shop turnings and short shoveling steel turnings.

Rome Iron Mills Leased

The Rome Iron Mills, Inc., announce that it has leased its plant at Rome, N. Y., to the Wrought Iron Co. of America. The mill organization has been retained and the Wrought Iron Co. of America intends to continue making the same grades of iron as in the past.

The Wrought Iron Co. of America was formed by a merger of the Lebanon Iron Co., Lebanon, Pa., and the Scranton Bolt & Nut Co., Scranton, Pa.

Ohio Steel Foundry Co., Lima, Ohio, has placed a contract for the erection of a foundry building, 100 x 200 ft., at its Springfield plant. This will be equipped with an electric furnace and modern foundry equipment and will be used exclusively for the manufacture of Fahrite heat resisting alloy castings and for the company's other alloy products. These alloy castings have been produced for the past seven years in the company's electric steel foundry at Springfield. With the erection of the new foundry the manufacture of alloy castings will be segregated in a separate building and under separate supervision.

September in automobiles promises to show a total output fully equal to and probably higher than that for August, says *Automotive Industries.*

CARNEGIE LIBRARY OF ATLANTA

Non-Ferrous Metal Markets

One Producer Raises Copper Price to 18¼c.—Sales Heavy —Lead Active—Tin Quiet

NEW YORK, Sept. 3.

Copper.—Buying turned sharply upward in the past week and reached a total of about 50,000 tons, most of which consisted of domestic sales. However, foreign bookings during August were far ahead of those in July. As the buying movement gained momentum, consumers who had been holding off for several months came into the market to protect themselves against the possible results of a situation favoring producers. The Labor Day holiday only halted activities temporarily, for this morning foreign orders alone amounted to 3500 tons. With order books well augmented, the leading producer today announced an advance of ¼c. a lb. to 18.25c., delivered in the Connecticut Valley, for electrolytic copper. Other sellers have not yet followed this lead and are continuing to quote 18c. However, they declare that they have booked about all of the tonnage they care to take at 18c. and today were refusing some business at that figure. This action naturally indicates that within a day or two the market probably will be 18.25c. Some producers are inclined to look upon the advance as a mistake, stating that it would be much better to encourage consumers to buy freely by keeping prices at the level which has prevailed for the past few months. Lake copper is moving in liberal volume and the price ranges from 18c. to 18.12½c., delivered. In most cases, bookings have been for August and September delivery.

Copper Averages.—The average price of Lake copper for August, based on daily quotations in THE IRON AGE, is 18.12½c., delivered New York. The average price of electrolytic copper is 17.75c., refinery, or 18c., delivered in the Connecticut Valley.

Tin.—The past week has been one of the quietest of the year. Sales of about 750 tons were almost exclusively for delivery in the next two months. Despite the dullness, the market has a firm undertone and prices held well until today, when spot Straits tin dropped to 45.50c., New York. The decline reflected the weakness of the situation at London, where prices were lower, with spot standard quoted at £204 10s., future standard at £208 10s., and spot

THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY

	Sept. 3	Aug. 31	Aug. 30	Aug. 29	Aug. 28
Lake copper, New York	18.12½	18.12½	18.12½	18.12½	18.12½
Electrolytic copper, N. Y.*	17.75	17.75	17.75	17.75	17.75
Straits tin, spot, N. Y.	45.50	....	46.25	46.12½	46.12½
Zinc, East St. Louis	6.80	6.80	6.80	6.80	6.80
Zinc, New York	7.15	7.15	7.15	7.15	7.15
Lead, St. Louis	6.55	6.55	6.55	6.55	6.55
Lead, New York	6.75	6.75	6.75	6.75	6.75

*Refinery quotation; price ¼c. higher delivered in the Connecticut Valley.

Rolled Products

Prices on rolled non-ferrous products are unchanged from those prevailing one week ago.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—
- High brass ..... 23.25c.
- Copper, hot rolled ..... 26.75c.
- Zinc ..... 10.25c.
- Lead (full sheets) ... 11.00c. to 11.25c.

Seamless Tubes—
- High brass ..... 28.25c.
- Copper ..... 29.25c.

Rods—
- High brass ..... 21.25c.
- Naval brass ..... 24.00c.

Wire—
- Copper ..... 19.87½c.
- High brass ..... 23.75c.

Copper in Rolls ..... 26.75c.

Brazed Brass Tubing ..... 30.87½c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also to St. Louis on shipments to points west of that river.

- Sheets, 0 to 10 gage, 3 to 30 in. wide ..... 33.00c.
- Tubes, base ..... 42.00c.
- Machine rods ..... 34.00c.

Chicago Warehouse

(Prices Cover Trucking to Customers' Doors in City Limits)

Sheets—	Base per Lb.
High brass	23.25c.
Copper, hot rolled	27.75c.
Copper, cold rolled, 14 oz. and heavier	30.00c.
Zinc	10.75c.
Lead, wide	11.35c.
Seamless Tubes—	
Brass	28.25c.
Copper	29.25c.
Brass Rods	21.25c.
Brazed Brass Tubes	31.00c.

New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High. brass	21.12½c. to 22.12½c.
Copper, hot rolled, base sizes	27.75c. to 28.75c.
Copper, cold rolled, 14 oz. and heavier, base sizes	30.00c. to 31.00c.
Seamless Tubes—	
Brass	26.00c. to 27.00c.
Copper	29.12½c. to 30.12½c.
Brazed Brass Tubes	29.12½c. to 30.12½c.
Brass Rods	18.87½c. to 19.87½c.

New York Warehouse

Delivered Prices, Base Per Lb.

- *Zinc sheets (No. 9), casks* ..... 10.50c. to 11.00c.
- *Zinc sheets, open* ..... 11.50c. to 12.00c.

Metals from New York Warehouse

Delivered Prices, Per Lb.

- Tin, Straits pig ..... 48.00c. to 49.00c.
- Tin, bar ..... 50.50c. to 51.50c.
- Copper, Lake ..... 19.50c.
- Copper, electrolytic ..... 19.25c.
- Copper, casting ..... 19.00c.
- Zinc, slab ..... 7.75c. to 8.25c.
- Lead, American pig ..... 7.50c. to 8.00c.
- Lead, bar ..... 9.50c. to 10.00c.
- Antimony, Asiatic ..... 11.00c. to 11.50c.
- Aluminum No. 1 ingots for remelting (guaranteed over 99% pure) ... 25.00c. to 26.00c.
- Alum. ingots, No. 12 alloy ..... 24.00c. to 25.00c.
- Babbitt metal, commercial grade ..... 25.00c. to 35.00c.
- Solder, ½ and ½ ..... 30.25c. to 31.25c.

Metals from Cleveland Warehouse

Delivered Prices, Per Lb.

- Tin, Straits pig ..... 51.25c.
- Tin, bar ..... 53.25c.
- Copper, Lake ..... 19.50c.
- Copper, electrolytic ..... 19.25c.
- Copper, casting ..... 18.75c.
- Zinc, slab ..... 7.75c. to 8.00c.
- Lead, American pig ..... 7.25c. to 7.50c.
- Lead, bar ..... 9.75c.
- Antimony, Asiatic ..... 16.00c.
- Babbitt metal, medium grade ..... 18.75c.
- Babbitt metal, high grade ..... 55.50c.
- Solder, ½ and ½ ..... 31.75c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged customers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	14.75c.	16.25c.
Copper, hvy. and wire	14.50c.	15.75c.
Copper, light and bottoms	12.50c.	13.75c.
Brass, heavy	8.50c.	9.50c.
Brass, light	7.50c.	8.50c.
Hvy. machine composition	12.00c.	13.00c.
No. 1 yel. brass turnings	9.75c.	10.50c.
No. 1 red brass or compos. turnings	11.25c.	12.25c.
Lead, heavy	5.25c.	5.75c.
Lead, tea	4.25c.	5.25c.
Zinc	3.50c.	4.25c.
Sheet aluminum	14.00c.	16.00c.
Cast aluminum	12.25c.	14.25c.

Straits at £208 10s. The break in London was caused by the publication of the monthly figures of the National Metal Exchange, which showed an increase in August of 2611 tons in the visible supply. The Singapore price today was £212 15s.

Lead.—Bookings in the past seven days were equal to those of the best previous week this year. Consumers in general are manifesting interest in covering their requirements for September and October. The volume of inquiries indicates that buying should be well sustained in the immediate future. Despite the strength of the market, producers are not attempting to push up prices and the leading interest in the West is quoting 6.55c., St. Louis. The largest producer is adhering strictly to 6.75c., New York, as its contract price.

Zinc.—The market is extremely weak, with consumers buying only in small quantities. Inquiries are of moderate volume, but producers do not anticipate an appreciable improvement in bookings during the coming week. Prime Western zinc is selling at 6.80c., East St. Louis.

Antimony.—Although Chinese metal is quoted at 9c. a lb., New York, duty paid, distress lots out of warehouses have been sold at as low as 8.62½c. In some cases 8.75c. is being asked, but no business is being done at that figure. The easing of the political situation in the Far East has been partially responsible for the weakness which has appeared in the local market.

Nickel.—Ingot nickel is quoted in wholesale lots at 35c. a lb., shot nickel at 36c. and cathode electrolytic nickel at 35c.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is being quoted at 23.90c. a lb., delivered.

Non-Ferrous Metals at Chicago

Sept. 3.—Interest in non-ferrous metals continues to expand and sales for the week showed considerable improvement. Shipments against past obligation were in larger volume.

Prices per lb., in carload lots: Lake copper, 18.50c.; tin, 47.25c.; lead, 6.70c.; zinc, 6.90c.; in less-than-carload lots, antimony, 9.85c. On old metals we quote copper wire, crucible shapes and copper clips, 14c.; copper bottoms, 11.50c.; red brass, 11.50c.; yellow brass, 8c.; lead pipe, 4.50c.; zinc, 3.25c.; pewter, No. 1, 24.50c.; tin foil, 26c.; block tin, 36c.; aluminum, 12.87½c.; all being dealers' prices for less-than-carload lots.

Fabricated Structural Steel

Non-Industrial Projects Will Take Large Portion of Past Week's Awards and Inquiries

STRUCTURAL steel lettings, amounting to 26,000 tons, were slightly better than those of the previous week. Non-industrial projects will take almost one-half of the tonnage. Outstanding awards were 7000 tons for a highway bridge at Portland, Ore., and 3000 tons for an apartment house in New York.

Structures for non-industrial purposes also predominated the fresh inquiries which appeared during the week. Ten thousand tons will go into an addition to the *Chicago Tribune* Building and 3000 tons into an office building at Milwaukee for the Chicago & North Western Railroad. Awards follow:

SPRINGFIELD, VT., 175 tons, high school, to unnamed fabricator.

NASHUA, N. H., 100 tons, office building, to unnamed fabricator.

FALL RIVER, MASS., 100 tons, State bridge, to Boston Bridge Works, Inc.

BRANFORD, CONN., 100 tons, foundry, to Palmer Steel Co.

STAMFORD, CONN., 600 tons, First National Bank Building, to McClintic-Marshall Co.

NEW YORK, 1700 tons, Lenox Hill Hospital, to Harris Structural Steel Co.

NEW YORK, 1000 tons, Gordon Baking Co. building in Queens, to Levering & Garrigues Co.

NEW YORK, 800 tons, Fox Film building on West Fifty-sixth Street, to Hinkle Iron Co.

NEW YORK, 3000 tons, apartment building at Seventy-first Street and Park Avenue, to Hinkle Iron Co.

NEW YORK, 1600 tons, apartment building at Riverside Drive and Seventy-seventh Street, to Easton Structural Steel Co.

NEW YORK, 600 tons, apartment building on East Seventy-ninth Street, to Harris Structural Steel Co.

MINEOLA, N. Y., 700 tons, hangars at Roosevelt Field, to Jones & Laughlin Steel Corporation.

PHILADELPHIA & READING RAILROAD, 600 tons, car shops at Wayne, Pa., to McClintic-Marshall Co.

HARRISBURG, PA., 1300 tons, Hotel Harrisburger, to McClintic-Marshall Co.

STATE OF PENNSYLVANIA, 160 tons, Erie County highway bridge, to American Bridge Co.

CHICAGO, 110 tons, building for Cushman's Sons, Inc., to New City Iron Works, local.

CHICAGO, MILWAUKEE, ST. PAUL & PACIFIC, 140 tons, highway bridge, to American Bridge Co.

READING RAILROAD, 360 tons, bridge at Saint Clair, Pa., to Bethlehem Steel Co.

COPPERHILL, TENN., 250 tons, Tennessee Copper Co. conveyor and bins, to Ingalls Iron Works, Birmingham.

FINDLAY, OHIO, 210 tons, office building for Ohio Oil Co., to Massillon Bridge & Structural Co.

MINNEAPOLIS, 1700 tons, addition to Foshay Tower, to Duffin Iron Co., Chicago.

WICHITA, KAN., 750 tons, tanks, awarded to a Joliet fabricator by Winkler Engineering Corporation.

PORTLAND, ORE., 7000 tons, St. John's bridge; 5000 tons to Wallace Bridge & Structural Steel Co. and 2000 tons to United States Steel Products Co.

SEATTLE, 950 tons, sheet piling, Alki Avenue sea wall, to German bidders.

VICTORIA, B. C., 350 tons, bridge over Capilano River, to Western Canada Structural Steel & Bridge Co.

TILLAMOOK, ORE., 105 tons, Nehalem River bridge, to unnamed bidder.

LOS ANGELES, 350 tons, factory for Willard Storage Battery Co., to Consolidated Steel Corporation.

EL SEGUNDO, CAL., 200 tons, factory on 114th Street, to Consolidated Steel Corporation.

PHOENIX, ARIZ., 600 tons, power house for Central Arizona Light & Power Co., to Allison Steel Co.

NIZHNI-NOVGOROD, RUSSIA, tonnage not stated, automobile plant for Ford Motor Co., to Austin Co., Cleveland.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

PROVIDENCE, R. I., 100 tons, United States Rubber Co. plant.

FAIRFAX FALLS, VT., 100 tons, State bridge.

NEW YORK, 1100 tons, Western Hotel.

NEW YORK CENTRAL RAILROAD, 1000 tons, work at Grand Central Terminal in New York.

BROOKLYN, 700 tons, public school No. 230.

ATTICA, N. Y., 300 tons, New York State prison.

PHILADELPHIA, 3000 tons, Market Street National Bank building.

KITCHENER, ONT., 500 tons, market building.

TORONTO, ONT., 1500 tons, technical school on Mount Pleasant Road.

PROVINCE OF QUEBEC, 500 tons, two bridges over Gatineau River at Hull and Wright for Provincial Government.

LOUISVILLE, KY., 2000 tons, office building; Holabird & Roche, architects.

CHICAGO, 10,000 tons, addition to *Chicago Tribune* plant.

INDIANA HARBOR, IND., 2400 tons, extension to Inland Steel Co. plant.

MILWAUKEE, 3000 tons, office building for Chicago & North Western.

DES MOINES, IOWA, 2400 tons, office building.

FARGO, N. D., 400 tons, highway bridge.

SPENCES BRIDGE, B. C., 2000 tons, bridge for Canadian Pacific Railroad over Nicola River.

SAN FRANCISCO, 325 tons, addition to American Can Co. plant; bids being taken.

SAN FRANCISCO, 450 tons, power house for Pacific Gas & Electric Co.; bids being taken.

SACRAMENTO, CAL., 405 tons, bridge over Trinity River, Humboldt County; bids Sept. 25.

Federal Screw Works to Acquire Cleveland Plant

Superior Screw & Bolt Mfg. Co., East 93d Street and Aetna Road, Cleveland, will be taken over by the Federal Screw Works, Detroit, as a result of negotiations which are reported to have been closed, although details are not yet available. The Superior company specializes in the manufacture of high carbon steel screws and bolts. Its officers are B. G. Tremaine, Jr., chairman; Norton T. Jones, president; C. L. Wedow, secretary, and A. E. Fox, treasurer.

PERSONAL

J. M. ROTH, chairman of the board of the Copperweld Steel Co., Glassport, Pa., has resigned after having served the company in various capacities since its founding. He is the inventor of the hot molten welding process patent on copper-welded wire and other products. He was instrumental in the founding of the company, and served as its president until 1926, when he became chairman of the board. He has been succeeded by HARRISON NESBIT, president Bank of Pittsburgh, who has been a director of the company for some time. FRANK R. FROST, president Superior Steel Corporation, Pittsburgh, has also been made a director of the Copperweld company.

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OTIS L. DAVIS has joined the staff of the Brainard Steel Corporation, Warren, Ohio, in the capacity of sales engineer. Since graduating from the University of Iowa he has been with the Western Electric Co. and more recently with the Acme Steel Co., Chicago, as sales supervisor, developing special lines.

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EDWIN W. ELY has been appointed chief of the Division of Simplified Practice, Department of Commerce. He had been acting chief of the division since the promotion of Ray M. Hudson to assistant director of the Bureau of Standards. Other promotions made include that of I. J. Fairchild to chief of trade standards and of Dr. A. S. McAllister to chief of the Division of Specifications.

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THOMAS B. FRANK, treasurer Cincinnati Planer Co., Cincinnati, has been selected to head the New England Cost Conference to be held at Babson Park, Wellesley Hills, Mass., this week. He is a member of the board of directors of the National Association of Cost Accountants.

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ADRIAN B. WEAVER has resigned from the Chicago sales force of Hickman, Williams & Co., pig iron brokers.

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B. F. MOHR, assistant to the vice-president in charge of operations, Illinois Steel Co., Chicago, has returned from a two and one-half months' trip to Europe.

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RALPH SCOTT, formerly sales manager of the Gardner-Denver Co., is en route to London, England, where he is to be stationed as one of the company's foreign branch managers. W. G. AGNEW, until recently sales representative for the company in Arizona, is to be in charge of the company's foreign branch at Lima, Peru. The Gardner-Denver Co. manufactures rock drills and drilling machinery, with plants in Denver, Quincy, Ill., and La Grange, Mo.

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JOHN FRASER and WILLIAM ELLIS HUGHES have been made directors of A. G. Kidston & Co., Ltd., engaged in the iron, steel and machinery business in Glasgow and London.

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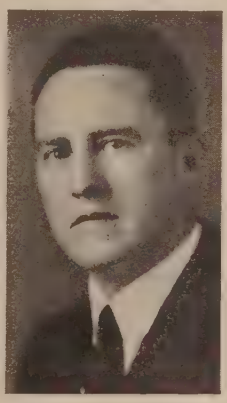
BLAKE C. HOOPER has been appointed sales manager of the Baker Industrial Truck Division of the Baker-Raulang Co., Cleveland. His first contract with the industrial truck business was in 1916 when he became a manufacturer's representative in St. Paul. In 1921 he was



BLAKE C. HOOPER

appointed Northwest representative of the Baker-Raulang Co. For nine years prior to his entering the industrial truck field, he served in various engineering capacities for the Chicago & Alton, Illinois Central and Rock Island railroads. He will continue in active charge of the company's railroad department.

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L. E. GRIFFITH has been elected to the board of directors and a vice-presidency of the Riley Stoker Corporation, Worcester, Mass. He was graduated from Lafayette College, Easton, Pa., in 1912. His sales-engineering experience included connections with the Babcock & Wilcox Co. and the United Machine & Mfg. Co. When the Riley Stoker Corporation purchased the United Machine & Mfg. Co., Mr. Griffith was president of the latter company.

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WILLARD E. FREELAND, some years ago New England editor for THE IRON AGE, later professor of marketing at the Massachusetts Institute of Technology, and recently head of Freeland & Warren, Inc., engaged as consultant in organization, management, merchandising and marketing, announces the formation of a new company to succeed Freeland & Warren, the name of the new company being Freeland, Wansker, Bates & Lawrence, Inc., 805 Statler Building, Boston.

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MORTEN GRINDAL, who spent about a year in the United States investigating foundry apparatus and machinery, has established his own firm in Sweden as a maker of foundry equipment. He had formerly been engaged in this and allied lines in Norway. His company is the A.-B. Motala Maskiner, Motala, Sweden, and, among other things, has a type of molding machine by which the sand is packed in the flask by subjecting the mold carrier to a hammering action while the mold is under pressure. He has filed patent applications in the United States.

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PROF. DR. F. KÖRBER, director of the Kaiser-Wilhelm-Institute für Eisenforschung, Düsseldorf, and Prof. Dr. Ing. E. H. SCHULZ, director of the research department of the Vereinigte Stahlwerke, Dortmund, are on a tour of inspection and study in the United States, with present headquarters at the Pennsylvania Hotel, New York.

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CHARLES P. PERIN, Perin & Marshall, consulting engineers, New York, has returned from a brief visit to England.

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JAMES A. FARRELL, president and chief executive officer of the United States Steel Corporation, will return to New York on the Aquitania Sept. 6 from a sojourn in France and Spain.

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JAMES C. ALLEY, pig iron broker, New York, has returned from a two months' motor trip through England, Scotland, Wales and Ireland.

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E. A. MERCNER, of the Philadelphia sales office of the Bethlehem Steel Co., has been appointed resident agent of a new office the company has opened in the Manufacturers' Association Building, York, Pa. J. E. MURPHY, also of the Philadelphia office, has been appointed resident agent in charge of an office opened in the Wilkes-Barre Deposit & Savings Bank Building, Wilkes-Barre, Pa.

The Orton Crane & Shovel Co. has appointed Thomas D. Crowley & Co., 8 South Michigan Avenue, Chicago, as special railroad sales representative in the United States for the Orton line of locomotive cranes, crawling - tread cranes, shovels and draglines, gantry cranes, truck cranes, and clamshell and orange-peel buckets. Mr. Crowley has been identified with the railroad industry over 25 years. In 1922 he organized his own company for handling railroad equipment.

OBITUARY

EDWARD WORCESTER, until 1922 vice-president in charge of sales, National Tube Co., died at his daughter's home in Pittsburgh on Aug. 28, aged 74 years. He was born at East Bridgewater, Mass., and began his business career with the Chapman Valve Co,

EDWARD WORCESTER

After five years he resigned to become identified with the sales department at the Chicago plant of the National Tube Co. Later he returned to Boston to take charge of sales for the Walworth Mfg. Co. In 1882 he again returned to Chicago, where he was secretary of the Crane Brothers Mfg. Co. In 1886 he became associated with the National Tube Co. at St. Louis, and a short time later was transferred to McKeesport, Pa., where he served as assistant sales manager. He was elected a vice-president of the company in 1903, and served in that capacity until his resignation late in 1922.

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JACOB SCHONFARBER, general manager Atlantic Tubing Co., Providence, R. I., for whom funeral services were held in that city Tuesday, Aug. 27, will be buried in Baltimore, his native city. He was the victim of an automobile accident Friday night, Aug. 23.

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FRANKLIN REDMAN HENRY, president Majestic Mfg. Co., St. Louis, maker of cooking apparatus, died Aug. 25, aged 62 years. Before becoming affiliated with the manufacturing company he was a street railway executive in St. Louis. He was a director of the Mississippi Valley Merchants State Trust Co. In 1908 he became vice-president and general manager of the Majestic company and was made its president in 1923.

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JOSEPH WOLTER, a pioneer shipbuilder in Wisconsin, died at his home in Sturgeon Bay, Wis., Aug. 23, at 72 years of age. He was president of Sturgeon Bay Shipbuilding Corporation, one of the founders of the Rievolt & Wolter Shipbuilding Corporation, Sheboygan, and of the Sheboygan Dredge & Dock Co.

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HENRY A. TUTTLE, president H. A. Tuttle Mfg. Co., Stamford, Co., which was liquidated in 1906, and later associated with the Evans Stamping & Plating Co., Taunton, Mass., and known also in the gear manufacturing industry, died Wednesday, Aug. 28, at his home in Upton, Mass. Mr. Tuttle was born in Galesburg, Ill., 66 years ago.

Lower Rail-Water Rates to Texas Proposed

Reduction of 7.5c. Per 100 Lb. Suggested in Tariffs Filed with Interstate Commerce Commission

WASHINGTON, Sept. 3.—Rail-and-water freight lines have filed schedules with the Interstate Commerce Commission proposing reduced rates from Atlantic seaboard steel mills to points in Texas.

The reduction to the so-called group 3 in Texas, which includes such points as Dallas, Denison and Corsicana, will amount to 7.5c. per 100 lb. The points of origin include Sparrows Point, Md., and steel centers in eastern Pennsylvania.

The rail-and-water lines, through their agent, W. J. Sedgman, intend to put the lower rates into operation as an offset to the low proportional rates on steel products from the Cleveland, Youngstown, Pittsburgh and Buffalo districts to Western seaboard points, which were allowed on July 10, when the Interstate Commerce Commission decided not to suspend them despite protests from the Chicago Association of Commerce, the Youngstown Chamber of Commerce and the Bethlehem Steel Corporation.

In support of the new schedules proposed in the Sedgman tariffs, it is contended that Eastern steel mills have been deprived of some of their advantage as a result of the low proportionals, and the new rates from the Eastern points have been offered in an effort to restore, in part at least, the situation as it existed prior to July 10.

The filing of the Sedgman tariffs has brought a protest from the independent steel producers in the Chicago district, including the Acme Steel Co., Inland Steel Co., Interstate Iron & Steel Co., Clayton Mark & Co. and the Chicago Association of Commerce. Steel producers in the Chicago district, it is stated, use the all-rail routes to the Southwest, while competitors as near by as Lorain, Ohio and Cleveland are able to use the rates of the rail-and-water lines because of the low proportional rates.

The effect upon the steel consumers in Texas is to permit them, under the proportional rates and the proposed Sedgman rates from the East, to draw upon a larger area in buying their steel.

Electrochemists to Discuss Aeronautics

At the coming convention of electrochemists to be held in Pittsburgh, Sept. 19 to 21, emphasis will be placed on the close interrelation of aeronautics and electrochemistry.

W. P. Dobson and A. S. L. Barnes, engineers of the Hydro-Electric Power Commission of Toronto, Ont., will present data on the production of hydrogen by electrochemical decomposition of water. Some of the newer types of cells will take as much as 15,000 amp., producing 250 cu. ft. of hydrogen an hour.

Light Alloys for Aircraft

(*Concluded from page* 616)

about the same as cast iron. Its resistance to corrosion is greater than that of aluminum. With these excellent properties, beryllium has a serious fault as a structural material in that it lacks ductility. However, he believed that a ductile alloy consisting almost entirely of beryllium will eventually be developed; the task is not easy, although work has so far met with much encouragement. Light ductile alloys containing up to 60 per cent of beryllium have been made with a reported tensile strength of 80,000 lb. per sq. in. Such alloys have a density nearer to magnesium and should have a wide field of application.

For some uses it is not necessary to have an alloy that is even moderately ductile. In its unalloyed and rather brittle state beryllium could probably be used for pistons and for castings where low density would allow it to replace cast iron to advantage. There seems to be an adequate supply of beryl and the speaker believed that beryllium eventually will be produced at $1.40 to $2.70 per lb.

The Houston, Tex., office of the Chain Belt Co., Milwaukee, manufacturer of Rex deep well oil chains, conveyors and concrete mixers, has moved to larger quarters at 1310 Second National Bank Building. Russell G. Davis is manager.

Manganese Producers to Discuss New Processes

American Manganese Producers Association will meet at the Mayflower Hotel, Washington, Sept. 9 and 10. On the first day the meeting will listen to a report on the condition of the industry by representatives from States in which manganese occurs. On Sept. 10 the following papers describing recent developments in concentration of manganese ore will be read:

"The Bradley Process," by Wilson Bradley, president Bradley-Fitch Co.

"Flotation of Carbonate and Oxide Manganese Ores," by Will H. Coghill, superintendent, Bureau of Mines Experimental Station, Rolla, Mo.

"New Processes," by Prof. A. T. Sweet, Michigan College of Mines.

Italy to Make Magnesium, Aluminum and Alloys

A group of metallurgical industries is in process of completion in the new port of Venice, consisting of three allied electrometallurgical installations for the manufacture of magnesium-aluminum and its products, according to Consul James B. Young at Venice. The group includes an aluminum industry, a magnesium industry and one producing magnesium-aluminum and its products, working these two component metals and their alloys. The plants of this group will be adjacent to each other.

One of the primary objects of these new industries is the Italian manufacture of light metals, especially for the aircraft industry as well as for automotive, electrical and other consumption. The well-known properties of magnesium and its alloys form a demand for these metals. Magnesium-aluminum is showing the first signs of a possible future general supplanting of copper for high-tension electric power transmission lines in Italy, and the Venetian plant, not yet completed, already has a contract for wire for that purpose.

The aluminum plant of this group has been completed and in operation for some months with an output of about 3000 metric tons of aluminum a year. Production will be increased to about 6000 tons a year by the addition of five more batteries of electric furnaces. When completed it is planned to have an approximate total output of 20,000 tons of alumina, 6000 tons of aluminum and 6000 electrodes.

The magnesium plant now in process of construction is to start with an output of about 250 tons of magnesium annually. This is to be doubled in the near future, and later development will bring a total annual output of 2000 tons.

It is the intention to reduce the dependence of Italy on foreign copper and at the same time to build up an exportation of magnesium electrometallurgical products, as well as of aluminum and aluminum products and alloys.

Dr. Gwyer for Institute of Metals Fall Lecture

Arrangements for the Düsseldorf meeting of the Institute of Metals are now complete. Over 200 persons from ten different countries will take part. The proceedings will open on Sept. 9 with the annual autumn lecture, which will be given by Dr. A. G. C. Gwyer on "Aluminum and Its Alloys." Dr. Gwyer of Warrington, England, is a member of council of the Institute of Metals and an original member of the institute. He studied at University College (now the University of Bristol). He spent two years at the University of Göttingen, carrying out metallographical research under Prof. Tammann. In 1912 he became research metallurgist to the British Aluminum Co., Ltd., Milton, Staffordshire. He was transferred in 1915 to the Warrington Works of the same company and in 1920 was appointed chief metallurgist.

Spiegeleisen Imports Are Large This Year

Shipments of spiegeleisen from foreign makers into the United States are on a larger scale this year than for some time. To Aug. 1, this year, Government statistics show that 11,243 tons had been entered, having a valuation of $326,910 or approximately $29 per ton. This year's shipments, which are at the rate of 1606 tons per month, are nearly four times the receipts in 1928, which were 435 tons per month. In 1927 the imports were 621 tons per month.

Tungsten's Industrial Value —American Requirements

The enormous saving to industry which has resulted from the use of tungsten is revealed in a bulletin which has just been issued by the Commerce Department. Two uses of this metal, the bulletin points out, overshadow all others, namely, high-speed tool steel and tungsten filament used in incandescent lights. The use of tungsten in high-speed tool steel exercises an important influence upon industries of all kinds. In comparison with steels used a few years ago, high-speed tungsten tool steel has caused a five-fold increase in efficiency, has eliminated waste in time, and has saved millions of dollars annually in labor.

The use of the tungsten filament decreases the power requirement and increases the candle power of the globe. It has been estimated that, owing to the adaptation of tungsten in incandescent light, a net saving of $240,000,000 a year has resulted.

Requirements of the United States are estimated to be about 4000 tons annually of 60 per cent tungstic trioxide concentrate, with domestic production amounting to about one-quarter of this amount. By far the greater part of the world's production comes from China, and that country may be said to dominate the world's market in tungsten. The bulk of the world production of this metal is utilized by the steel-manufacturing countries.

Graduate Courses in Metallurgy

Evening courses in engineering and chemistry, leading eventually to the master's degree, are announced by Polytechnic Institute of Brooklyn, Court and Livingston Streets, Brooklyn, N. Y. These courses are in chemistry, civil engineering, electrical engineering, mechanical engineering, mathematics, physics and engineering economics.

Two of the courses deal with metallurgy and metallography. The course in industrial metallurgy is to be given on Thursday evenings from 6:30 to 8:30. The course in nonferrous metallography will be given on Wednesday evenings from 6:30 to 9:30, the first hour of this period being devoted to a lecture, and the remaining two hours to laboratory practice.

In celebration of the completion of extensions to its foundry, the Industrial Steel Castings Co., Toledo, Ohio, kept open house Aug. 20 and entertained guests from Chicago, Detroit, Cleveland and other cities. After luncheon in the plant the foundry was inspected by the guests. With its additions, the company has increased its molding capacity 250 per cent and its pattern department 500 per cent. This enlargement is the second in three years.

Production and Shipment of Raw Materials and Finished Products

	July, 1929	June, 1929	July, 1928
Steel barrels produced (a)	790,175	774,853	647,844
Steel barrels shipped (a)	782,411	779,567	645,881
Steel barrels unfilled orders (b)	1,372,697	1,548,999	1,232,412
Steel barrels produced (a), 7 months	5,041,199	.....	4,356,436
Babbitt metal consumed (a), lb.	5,360,711	5,927,907	4,692,825
	June, 1929	May, 1929	June, 1928
Sheet-metal Ware: (a)			
Galvanized, shipped, dozens	140,096	189,098	189,218
Galvanized, shipped, value	$609,487	$748,831	$723,086
Enameled, shipped, dozens	337,375	352,885	299,078
Enameled, shipped, value	$1,210,568	$1,309,747	$1,141,195

(a) United States Department of Commerce.
(b) End of month.

Growing Size of Airplane Industry

Approximately 25,000 people are employed directly in the manufacture of airplanes and airplane motors in the United States, according to a survey made by the Bureau of Labor Statistics, Department of Labor. It is pointed out that modern industrial development is creating an increasing amount of labor-saving machinery which is displacing men and that, therefore, the development of any new industry is of great importance in giving employment to the men displaced by improved machinery elsewhere.

Aside from manufacturing, the airplane industry gives employment to much other labor, both directly and indirectly, the bureau states. Factories and hangars must be built; pilots both for mail and commercial work must be employed; schools of instruction are coming into existence; and many mechanics and other ground employees are needed at air fields. Employment is given also, it is stated, to persons engaged in the manufacture of material, metal, wood, cloth, rubber, etc., used in planes. Moreover, airplanes also have their effects on the production, distribution and consumption of gasoline.

In an article in the August issue of *Monthly Labor Review*, the bureau said that plants manufacturing airplanes are found in 29 States, New York being the most important, with 4396 employees, followed by California, with 1605. Other States with more than 1000 persons employed in the making of airplanes are Michigan, Washington, Kansas and Ohio.

Of the 101 firms from which reports were received, 78 produced airplanes during 1928, the output being 4886 planes. The indications were said to be that the 1929 production will be much greater. Of the 23 plants engaged in making motors, 17 had some product in 1928, when 3684 motors were made in these plants. New Jersey and Connecticut were the ranking States.

Iron Ore Imports Much Heavier in July

July imports of iron ore at 301,418 gross tons were the largest since August, 1927, when 303,586 tons came in. With that exception, the July total was the largest since July, 1923, when 439,367 tons was received. While the July tonnage was only 24 per cent greater than in June, it exceeded July, 1928, by about 65 per cent.

For the seven elapsed months a total of 1,769,154 tons has come in. This shows a gain of 21 per cent over the imports for the corresponding period of last year. Chile still leads, with a little more than half the total. The principal differences from last year include the doubling of shipments from Cuba, a great increase in those from Sweden, where a year ago a strike was in progress, and a large reduction in imports from French Africa.

SOURCES OF AMERICAN IMPORTS OF IRON ORE
(In Gross Tons)

	July		Seven Months Ended July	
	1929	1928	1929	1928
Canada	2,051	1,596	2,556	44,322
Cuba	68,450	11,000	388,350	190,286
Chile	140,192	102,000	912,867	817,500
Spain	18	4,300	38,231	16,203
Sweden	42,388	.....	165,470	19,614
French Africa	11,750	40,760	109,660	282,131
Other countries	36,569	23,600	152,020	81,613
Total	301,418	183,256	1,769,154	1,451,669

Offers Free Course in Physical Chemistry

To bridge an important gap in engineering education, by making available to older men employed in the chemical industries the latest developments in chemical engineering, Cooper Union's Institute of Technology, New York, will inaugurate in the fall a free evening course in physical chemistry, thermodynamics and allied subjects.

The purpose of the course, it is explained, is to assist those men who obtained their engineering degrees, before some of the most recent discoveries and methods were taught, to supplement their experience by a complete knowledge of the best modern practice, as recommended by the foremost engineering schools.

Propose Studies on Wire Rope

All persons interested in the manufacture or use of wire rope are invited to a conference at Engineering Societies Building, New York, at 2 p. m., Sept. 13. This is the third conference on this subject to be held within six months under the auspices of the American Society of Mechanical Engineers research committee and Engineering Foundation to discuss the desirability of organizing a research committee in the United States to advance the knowledge of the properties and life of wire rope through a cooperative investigation.

The formal part of the program will consist of brief papers presented by men well informed on the many applications of wire rope in the various fields of engineering and industry. Dr. Conrad Matschoss, director Verein Deutscher Ingenieure, will be present and will tell of the studies now being conducted by the German wire rope committee. A report, prepared by Dr. W. A. Scoble, will also be read describing the work of the Wire Ropes Committee of the Institution of Mechanical Engineers in Great Britain.

Free Course Offered by San Francisco Steel Treaters

A free course in practical metallurgy has been sponsored by the Golden Gate Chapter of the American Society for Steel Treating at San Francisco. There are to be 18 lectures covering the manufacture of steel, with particular stress upon heat treatment and specifications for various uses. A laboratory course will also be given to those qualified. This course will cover actual heat treatment, physical tests and microscopical examination of the commonly used steels.

Registrations may now be made for the course at the Humboldt Evening High School, Eighteenth and Dolores Streets, San Francisco. The chairman of the educational committee is S. R. Thurston.

Advantages of Steel-Frame Houses Pointed Out

Many advantages of steel-frame residences were revealed in a recent prize contest for that type of structure sponsored by the Connecticut Architectural League. L. R. Hammond, chairman of the contest committee, in reporting results to the American Institute of Steel Construction, Inc., stated that information obtained through the contest indicates that steel frame is the method of house construction which will most nearly permit 75 per cent of the work to be done in the factory on a basis of 312 days of work for 312 days of pay, as against 312 days of pay for 200 days of work, the present arrangement.

In addition, the steel frame provides opportunity for a quality of precision and coordination of all service installations, such as water, heat, electric power and light and ventilation, with a corresponding great reduction in cost, which seems practically impossible in older methods of house construction.

Chart on Molybdenum Steels

An attractive chart has been issued by the Climax Molybdenum Co., 61 Broadway, New York, showing the ratio of carbon steel to alloy steel production from 1921 to 1928 inclusive, with a small chart, as an insert, illustrating the approximate annual production in tons of molybdenum steel and iron for the same period. The ratio of carbon steel to alloy steel production was 15.03 to 1 in 1928 as against 23.43 to 1 in 1921. The consumption of molybdenum alloy steel is estimated to have reached 400,000 tons in 1928, as against only 150,000 tons in 1925 and about 10,000 tons in 1921.

European Markets Show Little Activity

German Output High But Business Quiet—British Structural Material Shows Fall Revival—France Worried Over American Tariff

(*By Cablegram*)

LONDON, ENGLAND, Sept. 2.

DESPITE the effect of the holidays, Cleveland blast furnaces are still busy, with little foundry iron to offer for September. An early improvement in the demand is generally anticipated. Hematite is rather more firm but the price still remains below cost.

New demand for British finished steel is dull, but there is increasing demand for structural material, which is considered a favorable augury of approaching autumn revival. Mills rolling sections are quite active.

Considerably better demand has developed for tin plate and prices have advanced fully 3d. to 18s. 6d. ($4.48) to 18s. 9d. ($4.54) basis. Welsh steel bars have been raised officially 3s. 9d. (85c.) to £6 10s. ($31.52) delivered. The reason is said to be the improved industrial outlook here, due to the reparations settlement at The Hague. Inquiries for tin plate are coming forward from most of the overseas consuming countries.

Brisk demand has been seen latterly for galvanized sheets, but India still is apathetic. Makers are now more comfortably placed and most of them are quoting £13 10s. ($65.47) f.o.b. works port.

Black sheet markets are slow, but the undertone is firm on account of dearer sheet bars.

Formation of a big British steel works combine, referred to in previous cablegrams, has now been concluded in principle, it is stated, between Dorman, Long & Co., Ltd., Middlesbrough, and Bolckow, Vaughn & Co., Ltd., also at Middlesbrough. It will probably eventually take in other North East Coast firms, to form a North East Coast combine, and other developments later.

David Colville (David Colville & Sons, Ltd., Glasgow) is said to be initiating steps for a consolidation of Scottish steelworks.

Clyde shipbuilding results in August included the launching of 17 vessels, aggregating 49,000 gross register tons. The total for eight months is less than last year.

Babcock & Wilcox, Ltd., London, has purchased a 49 per cent interest in the Polish boiler works of Zieleniewski, Fitzner, Gamper.

Continental markets are still rather easy, though sentiment is again tending toward optimism.

The International Wire Cartel is meeting in Luxemburg on Sept. 17, and the Irma (International Rail Maker's Association) at Vienna on Sept. 25.

German output for July was 1,200,000 (metric) tons of pig iron, 1,466,000 tons of raw steel (ingots and castings) and 1,029,000 tons of rolled steel.

Saar raw steel production in July made a new post-war record at 198,000 tons, but pig iron output was lower, at 184,000 tons.

Italian steelworks have established a central selling syndicate, after the lapse of 18 months.

German Business Quiet

Iron and Steel Output at High Level—Machinery Exports Larger Than Last Year

BERLIN, GERMANY, Aug. 19.—The improvement in business apparent in the spring has slackened and reports of the labor unions on unemployment show a slight increase in July. The number of bankruptcies is larger than a year ago. The trend of wages is slightly upward, but the average weekly wage of skilled workers in the iron, steel and non-ferrous metal industries in July was $12 with unskilled labor earning an average of $9.02. These are wage-agreement rates and include the legal supple-

British and Continental European Export prices per gross ton, f.o.b. United Kingdom Ports, Hamburg and Antwerp with the £ at $4.85

British Prices, f.o.b. United Kingdom Ports

Cleveland No. 3 foundry	£3	12½s.	to	£3	13½s.	$17.58	to	$17.82
East Coast Hematite...	3	16				18.39		
Ferromanganese, export	13	10	to	14	0	65.47	to	67.90
Billets, open hearth....	6	7½	to	6	10	30.92	to	31.52
Sheets bars, open hearth	6	5	to	6	10	30.31	to	31.52
Black sheets, Japanese specifications	13	0				63.05		
Tin plate, per base box	0	18½	to	0	18¾	4.48	to	4.54
Rails, 60 lb. and heavier	7	15	to	8	15	37.59	to	42.43
						Cents per Lb.		
Steel bars, open-hearth	7	15	to	8	10	1.67	to	1.84
Beams, open-hearth....	7	2½	to	7	12½	1.55	to	1.65
Channels, open-hearth..	7	7½	to	7	17½	1.60	to	1.71
Angles, open-hearth....	8	2½	to	8	12½	1.76	to	1.86
Ship plates, open hearth	7	12½	to	8	2½	1.66	to	1.76
Black sheets, No. 24 gage	10	5	to	10	10	2.21	to	2.27
Galvanized sheets, No. 24 gage.....	13	7½	to	13	10	2.89	to	2.92

Continental Prices f.o.b. Antwerp or Hamburg

Foundry iron, 2.50 to 3.00 per cent sil., 0.50 to 0.90 per cent phos.	£3	8s.	to	£3	11½s.	$16.49	to	$17.33
Foundry iron, 2.50 to 3.00 per cent sil. 1.00 per cent and more phos.	3	11				17.21		
Billets, Thomas	4	16	to	4	16½	23.28	to	23.39
Sheet bars, Thomas....	4	15½	to	4	16	23.16	to	23.28
Wire rods low C., No. 5 B.W.G.	6	5	to	6	6¼	30.30	to	30.61
Black sheets, No. 31 gage, Japanese.....	12	10	to	13	0	60.62	to	63.05
Rails, 60 lb. and heavier	6	10*				31.52		
Rails, light.....	6	1½				29.46		
						Cents per Lb.		
Steel bars, merchant...	5	13	to	5	14	1.24	to	1.25
Steel bars, deformed...	5	12	to	5	12½	1.21	to	1.22
Beams, Thomas, British standard	5	2	to	5	6½	1.12	to	1.17
Channels, Thomas, American sections....	5	14	to	5	18	1.25	to	1.27
Angles, Thomas, 4-in. and larger, over ⅝-in. thick.....	5	5	to	5	5½	1.15	to	1.16
Angles, Thomas, 3-in...	5	12½				1.24		
Ship plates, open-hearth inspected	7	8				1.63		
Hoop and strip steel over 6-in. base.....	5	17	to	5	18	1.29	to	1.30
Wire, plain, No. 8 gage	7	7				1.62		
Wire, galvanized, No. 8 gage	9	7½				2.03		
Wire, barbed, 4-pt. No. 12 B.W.G.	11	12½				2.58		
Wire nails, base.....	7	10½				$1.63 per keg		
Wire nails, assortments, 1 to 6-in. keg.....	10	6½				2.23		

*Open-hearth steel, 10s. ($2.42) per ton extra.

ments paid to married workers with two children.

The vacation season and uncertainty as to the result of the reparations conference at The Hague have checked activity in the steel industry. Recently stocks of steel companies have advanced rapidly, as a result of high rates of production, large exports and general optimism over renewal of the domestic syndicates and prolongation of the International Steel Cartel. Following the announcement that the General Electric Co. in the United States will participate in the Allegemeine Electricitäts Gesellschaft in Germany, stock of the latter company has advanced from 160 to 205.

German Production High

Pig iron production in July reached a new high of 1,203,510 tons. In the first seven months of the year pig iron output was 7,772,314 tons, compared with 7,621,974 tons in the first seven months of 1928. The total production of pig iron for this year is expected to exceed the 1927 total of 13,102,528 tons, the largest post-war year. The domestic pig iron market is unchanged, but some tendency to weakness is evident in export prices.

The export market for rolled products has begun to improve following the recent period of weakness in prices and the Stahlwerksverband has advanced its export price on steel bars at £5 14s. to £5 15s. a ton (1.23c. to 1.24c. a lb.), f.o.b. Antwerp or Hamburg. The export price of beams and certain other products has been slightly reduced. The wire market is weak. Wire rod demand is small and with the exception of some revision of prices for export to Far Eastern markets the International Wire Rod Cartel has retained the official price of £6 5s. ($30.31) per ton.

Export business in machine tools and agricultural machinery is increasing. The Westmark Industrie Co., jointly operated by the Karl-August Huette and the Hoch und Tiefbaufirma Gruenzig, has received a 50,000,000 m. ($11,900,000) contract to sink mines, furnish equipment and erect 1000 dwellings for miners for the Société des Charbonnages de Faulquamont. The entire transaction will be charged to reparations account as deliveries in kind. Exports of machinery in the first half of this year totaled 304,134 tons, a monthly average of 51,000 tons, compared with an average of 44,800 tons a month in 1928.

The small automobile market is more active, with current sales about 5 per cent greater than a year ago. The motorcycle industry reports record production with 115,000 motorcycles produced in the first half of this year and a total output of 190,000 estimated for the entire year. Imports of motorcycles in the first half of this year were 5643, compared with 4377 exported.

Japan Inquires for German Wire Mill Machinery

HAMBURG, GERMANY, Aug. 19.—Builders of wire drawing machinery and rolling mills have received inquiries from Japan for equipment for a new mill to produce wire rods and wire at the Imperial Steel Works at Yawata. The estimated capacity of the new mill is 150,000 tons a year, but it is reported that a definite decision to establish it has not yet been reached. Most of the wire mills recently built in Japan have been equipped with German machinery.

Cartel Meeting to Discuss Syndicates and Quotas

BERLIN, GERMANY, Aug. 19.—The next meeting of the International Steel Cartel will be held Sept. 12, probably in Vienna, at which time it is expected that the cartel will be prolonged for a brief period to permit negotiations to settle various differences of opinion. Belgium is understood to be indifferent and somewhat opposed to the creation of selling and price-fixing syndicates for separate products. Belgian objections are based on the fact that lower production costs in Belgium permit Belgian mills to sell profitably in open competition.

Much of the discussion at the cartel meeting is expected to be devoted to the question of larger quotas. Belgium as well as Germany has never been satisfied with the quotas. It is claimed by Rhenish-Westphalian mills that Belgian producers, to establish proof of the necessity of an increase in their quotas, are pushing production, even though present sales do not warrant present operations.

Germany Buys Swedish Ore

DÜSSELDORF, GERMANY, Aug. 21.—The Vereinigte Stahlwerke A. G. has concluded a new contract for iron ore with the Grängesberg company for delivery of Swedish ore in 1933 to 1942. In the second quarter of this year imports of iron ore were 5,029,200 tons, compared with 3,307,600 tons in the same period of 1928, when deliveries were curtailed by the strike in Sweden. The iron ore market is active and German consumers are paying 2s. (48c.) a ton more on new contracts than was paid on contracts last year. The entire German manganese ore requirements for 1930 are reported to have been covered.

African Manganese Ore Sold

Recently South African manganese ore has appeared in the European market and the South African Manganese Ore Corporation has appointed William H. Muller & Co., of The Hague, Holland, as distributers. The quality of the ore is said to be high with manganese content ranging up to 54 per cent.

Tariff Proposals Stir France to Discussion

BORDEAUX, FRANCE., Aug. 15.—The United States tariff proposals have aroused considerable discussion among steel producers in France and it is generally believed that, under the proposed schedule, export of iron, steel and machinery to the United States will be practically impossible. At the same time it is suggested in many quarters that American competition in Continental markets and throughout the world will increase as production grows in excess of domestic requirements.

It is not expected that the representations of 38 nations will have any important influence on application of the new tariff and it is pointed out that, even though certain duties are not increased, they may be raised 50 per cent at a later date under the flexible provision of the tariff.

Locomotive Building Capacity Reduced

BERLIN, GERMANY, Aug. 19.—As part of the movement that has developed to reduce locomotive building capacity, the Locomotivfabrik Hohenzollern, controlled by the Haniel interests, has closed and transferred its quota in the association of locomotive builders to the Friedrich Krupp A. G. The quota of 7.85 per cent, added to the present Krupp quota, gives the latter company a total of 13.8 per cent of the German output.

It is expected that the Linke-Hofmann-Buschwerke and possibly the Allegemeine Electricitäts Gesellshaft will surrender their quotas, which will hasten the concentration of capacity. It is reported that the negotiations between the Rumanian Government and the Allegemeine company for 100 locomotives have been concluded.

Germans Sue Competitor for Price Cutting

HAMBURG, GERMANY, Aug. 19.—An unusual legal proceeding has been taken by former members of the Syndicate of Weldless Bored Tubes, which was formed in February and automatically dissolved this month. Dissolution of the syndicate was the result of one member selling tubes at prices considerably less than the established schedule of the cartel. The remaining members have now taken legal action before the Cartel Court, claiming damages from the member underselling the established market, for dissolution of the cartel and for loss of various orders. The damages claimed are in excess of the penalty provided in the cartel agreement. As such cases are frequent among the cartels, the decision of the Court is considered of great importance.

Administrative Changes in Tariff Bill

Senate Finance Committee Would Determine Competitive Level, Cost of Transportation and Labor Participation

WASHINGTON, Sept. 3.—The Senate Committee on Finance, in its majority report on the tariff bill, made public today, said that its changes of the House bill affect about 40 upward revisions of individual rates in the metal schedule and over 60 downward revisions, including items transferred to or from the free list. The plan is to report the bill tomorrow to the Senate and to take it for consideration on Thursday.

Reference was made to the fact that all duties in the steel schedule were reduced by an amount compensatory both for the transfer of manganese ore to the free list and for reductions in the rates on manganese alloys.

"Advances in research and in the development of new products since the tariff act of 1922 resulted in a more comprehensive treatment of alloys in the House bill," the report continued. "There are, however, a number of products of the rare metals which were not adequately provided for in the House bill, and a revision of a few of the rates appeared warranted. The rates on tungsten ore, alloys of silicon, and aluminum, chromium and its alloys, and cerium metal and its alloys were decreased. Reclassification of tantalum and its alloys and the addition of carbides of tungsten and molybdenum and products composed of these metals results in some instances in increases in rates.

"Nickel oxide was transferred to the free list, as were zinc dross and skimmings. A sliding scale, based on New York market prices, was introduced for antimony metal with rates designed to exercise a stabilizing influence on prices which have shown marked fluctuations during post-war years. It is thought that the present bill provides adequately for non-ferrous metals and their derivatives and that the phraseology and rate structure is sufficiently comprehensive to provide equitable rates for products most likely to be developed within the next few years."

The Senate committee modified the House bill so as to retain the existing law providing for six bipartisan commissioners. Under the present act the term of a commissioner is 12 yr. The House bill provided for terms of 7 yr. The Senate committee amendment proposes terms of 6 yr. except that in case of the first six new appointees, their terms are to be designated by the President at the time of nomination so they may expire one at the end of each of the first 6 yr. after the date of the enactment of the bill. The increase in salary of the commissioners to $12,000, as provided in the House bill, was retained.

Describing the difficulties in administering the flexible provisions of the tariff act which permits the President, after investigation by the Tariff Commission, to increase or decrease duties by not more than 50 per cent, the Senate committee provided for factors not included in the House bill for ascertaining whether or not the foreign and domestic articles are upon a competitive level in the domestic market.

It inserted a definition of the term "costs of transportation," not defined in the present law." The committee is of the opinion that the imported article should be allowed costs of transportation from areas of substantial production in the principal competing foreign country to the principal port of importation in the United States, and that the domestic article be allowed the costs of transportation from areas of substantial production that can reasonably be expected to ship the article to such principal port of importation."

In ascertaining the principal competing country with respect to any imported article the President is to take into consideration the quantity, value, and quality of the article imported from each competitive country and any other differences in the conditions under which the article imported from each such country competes with the like or similar competitive domestic article.

The Senate committee continues the provision in the present law and in the House bill which provides for appeal from the Customs Court of Appeals to the United States Supreme Court in suits relating to unfair methods in the import trade and left the final decision with the Customs Court.

The Senate committee continues largely the foreign basis of valuation but calls for alternative systems of American valuation in cases where United States appraisers are unable to satisfactorily determine foreign costs of value. The Senate committee also inserted an amendment requiring the commission to convert the duties named in the bill to equivalent rates on the basis of domestic value, as distinguished from American valuation, and to report to Congress. This provision looks to the eventual adoption of the United States value as the basis of fixing ad valorem rates of duties.

The Senate committee bill provides that United States value of imported merchandise shall be the price at which the imported merchandise is offered for sale in the principal market in the United States in wholesale quantities, or, if similar imported merchandise is not so offered for sale in the United States, then an estimated value, based on the price at which comparable merchandise, imported or domestic, is offered for sale, with such adjustments as may be necessary owing to differences in the characteristics of given products.

Several requests of the American Federation of Labor were granted by the Senate committee. One was that articles designated by an American trade mark must be actually manufactured in the United States instead of in foreign countries with lower labor costs. Another was complied with when the committee added "mined or produced" to the act forbidding the importation of convict-manufactured goods. Another provision permits labor organizations, along with domestic manufacturers, to appear as a party in interest in any reappraisement proceeding and in any protest against the collector's decision.

Canadian Pig Iron Output at Peak in July

TORONTO, ONT., Sept. 3.—Production of pig iron in Canada in July amounted to 99,786 tons, according to a statement published by the Dominion Bureau of Statistics. This output was the highest recorded for the current year and marked an advance of 11 per cent over the 89,873 tons produced in June, and a gain of 5 per cent over the total of 95,422 tons made in July, 1928.

Compared with the figures for June, data for July showed an advance in the output of basic iron to 79,241 tons from 68,059 tons and a slight drop in foundry iron output to 14,779 tons from 16,252 tons; production of malleable iron was 5766 tons against 5562 tons in June.

For the seven months ended July 31 the production of pig iron in Canada was 618,343 tons, an increase of 10 per cent over the total of 563,435 tons made during the corresponding period of 1928, which in turn was 24 per cent greater than the output of 454,710 tons produced during the first seven months of 1927. This year's output included 480,999 tons of basic iron, 101,831 tons of foundry iron and 35,513 tons of malleable.

Production of ferroalloys in Canada in July totaled 7030 gross tons, an increase of 12 per cent over the June output of 6261 tons.

Output of steel ingots and direct steel castings amounted to 129,827 tons in July. This total represented an increase of 9 per cent over the output of 119,505 tons of the previous month and was 57 per cent greater than the total of 82,807 tons reported for July, 1928. Output of ingots increased to 123,248 tons from 113,341 tons and steel castings to 6579 tons from 6164 tons in June. For the seven months ended July 31, 1929, the production of steel ingots and direct steel castings was 868,669 tons, or 19 per cent more than the 731,145 tons during the first seven months of 1928, which in turn was 35 per cent over the 542,560 tons reported for the corresponding period of 1927. This year's output to date included 826,848 tons of ingots and 41,821 tons of castings.

Iron and Steel Institute to Hold Extra Meetings

In addition to the regular autumn meeting of the Iron and Steel Institute at Newcastle-upon-Tyne, England, Sept. 9 to 11, a meeting has been arranged for Tuesday, Sept. 17, in the Secondary Schools, Doncaster Road, Scunthorpe, England, by arrangement with the Lincolnshire Iron and Steel Institute. Another extra meeting will be held at the Birmingham Chamber of Commerce, Birmingham, England, Thursday evening, Sept. 26, by arrangement with the British Cast Iron Research Association. At each of these additional meetings some of the papers which are scheduled for the autumn general meeting will be repeated.

Donner Steel to Expand; Earnings Increase

Announcement has been made by the Donner Steel Co. of the acquisition of a tract of land adjoining its present plant in Buffalo as the site for a new finishing mill, details of which are temporarily withheld. The company has also purchased 30 acres of property across the street from the present plant. This tract will be used in the future for docking and switching facilities. The installation of the new mill will cost $2,000,000.

Net income of the Donner company for the first six months of 1929 showed an increase of 227 per cent over the corresponding period in 1928 and indications are that the net income for the year will be the largest in the history of the plant.

Larger Stocks of Industrial Coal

Stocks of anthracite and bituminous coal in industrial plants in the United States and Canada on Aug. 1 are estimated by the National Association of Purchasing Agents at 32,712,000 net tons. This shows a gain of more than 4 per cent from the 31,415,000 tons on July 1 and is the largest total since May 1. It is estimated that industrial consumption during July was 35,040,000 tons, whereas United States production totaled 45,635,000 tons.

Supplies on hand are estimated as averaging 27 days' use at current rates of consumption. Steel mills have 27 days' supplies; railroads, 19 days'; by-product coke plants, 24 days'; electric utilities and coal gas plants, 46 days' and other industries, 32 days'.

To Demonstrate Haystellite Cutting Tools

Demonstrations of Haystellite, the cast tungsten-carbide cutting alloy made by the Haynes Stellite Co., Kokomo, Ind., will be conducted in the show rooms of Strong, Carlisle & Hammond, 1392 West Third Street, Cleveland, during the week of the National Metals Exposition, to be held in Cleveland, Sept. 9-13.

Cast iron and semi-steel will be machined on a special heavy-duty high-speed lathe equipped with the Haystellite tools.

Packages Bound by Metal Tie

A metal tie binding method has been developed by the Gerrard Co., Inc., Chicago. Wire is looped around a package, threaded through the machine and the tie completed with one throw of the lever forward and backward which tensions, seals and trims the ends. It is claimed that shippers using this method are saving 30 per cent and upward in time.

Pullman Co. to Buy 18 Machine Tools

The Pullman Co. will buy the following motor-driven machine tools for Buffalo, N. Y.: 4 14-in. grinders; 1 21-in. grinder; 1 36-in. x 8 ft. planer; 1 20-in. drill press; 1 18-in. engine lathe; 1 4-ft. radial drill; 1 24-in. heavy-duty drill; 1 18-in. shaper; 1 No. 2 milling machine; 1 16-in. lathe; 1 24-in. lathe; 1 power hack saw; 1 bolt threader, 2-in; 1 18-in. drill; 1 bench grinder.

To Make Roller Bearings

Tyson Roller Bearing Co., Canton, Ohio, has been organized with a capital stock of $3,000,000, and it is announced it will shortly begin the erection of the first unit of a new plant. The company will manufacture a type of roller bearing designed by Frank Tyson, who will be chief engineer of the new organization.

Production and Shipment of Steel Furniture and Shelving

	July, 1929	June, 1929	July, 1928
Steel furniture, new orders (a)	$2,559,991	$2,521,630 (c)	$2,594,216
Do., shipments (a)	2,624,552	2,573,674	2,515,482
Do., unfilled orders (a) (b)	2,240,260	2,320,032	2,071,553
Steel shelving, new orders (a)	939,057 (d)	958,866	713,330
Do., shipments (a)	867,496 (e)	920,355	722,516
Do., unfilled orders (a) (b)	999,328 (f)	934,129	705,657

(a) United States Department of Commerce.
(b) End of month.
(c) Smallest since November, 1927.
(d) Smallest since last February.
(e) Smallest since last December.
(f) Largest on record.

COMING MEETINGS

Lake Superior Mining Institute. Sept. 6 and 7. Annual meeting, Houghton Club, Houghton, Mich. A. J. Yungbluth, Ishpeming, Mich., secretary.

American Manganese Producers' Association. Sept. 9 and 10. Annual meeting, Mayflower Hotel, Washington. Harold A. Pumpelly, Metropolitan Bank Building, Washington, secretary.

American Society for Steel Treating. Sept. 9 to 13. National metals congress and exposition, Hotel Cleveland and Public Auditorium, Cleveland. W. H. Eisenman, 7016 Euclid Avenue, Cleveland, secretary.

American Institute of Mining and Metallurgical Engineers. Sept. 9 to 13. Annual meeting of Institute of Metals and iron and steel division, Hotel Cleveland, Cleveland. H. Foster Bain, 29 West Thirty-ninth Street, New York, secretary.

American Society of Mechanical Engineers. Sept. 11 to 13. Iron and steel division, Hotel Hollenden, Cleveland. Calvin W. Rice, 29 West Thirty-ninth Street, New York, secretary.

American Welding Society. Sept. 9 to 12. Fall meeting, Hotel Statler, Cleveland. M. M. Kelly, 33 West Thirty-ninth Street, New York, secretary.

Institute of Metals (British). Sept. 9 to 12. Fall meeting, Düsseldorf, Germany. G. Shaw Scott, 36 Victoria Street, London, S. W. 1, England, secretary.

Iron and Steel Institute (British). Sept. 10 to 13. Fall meeting, Newcastle-on-Tyne, England. George C. Lloyd, 28 Victoria Street, London, S. W. 1, England, secretary.

American Railway Tool Foremen's Association. Sept. 11 to 13. Annual convention, Hotel Sherman, Chicago. F. A. Armstrong, 546 West Monroe Street, Chicago, secretary.

American Electrochemical Society. Sept. 19 to 21. Fall meeting, William Penn Hotel, Pittsburgh. Colin G. Fink, Columbia University, New York, secretary.

American Refractories Institute. Sept. 24 and 25. Fall meeting with Refractories Division of the American Ceramic Society, Deshler-Wallick Hotel, Columbus, Ohio. Dorothy A. Texter, Oliver Building, Pittsburgh, secretary.

American Drop Forging Institute. Sept. 25 to 27. Fall meeting, Buckwood Inn, Shawnee-on-Delaware, Pa. C. H. Smith, president, Steel Improvement & Forge Co., Cleveland, chairman of convention committee.

Concrete Reinforcing Steel Institute. Sept. 30 to Oct. 2. Semi-annual meeting, Wawasee Hotel, Wawasee, Ind. M. A. Beeman, 2112 Tribune Tower, Chicago, secretary.

National Industrial Advertisers' Association. Sept. 30 to Oct. 2. Eighth annual convention, Gibson Hotel, Cincinnati. Benjamin H. Miller, 420 Lexington Avenue, New York, secretary.

National Machine Tool Builders' Association. Sept. 30 to Oct. 4. Second machine tool exposition, Public Auditorium, Cleveland. E. F. DuBrul, 617 Vine Street, Cleveland, manager.

National Safety Council. Sept. 30 to Oct. 4. Eighteenth annual congress, Stevens Hotel, Chicago. W. H. Cameron, 108 East Ohio Street, Chicago, managing director.

Machinery Markets and News of the Works

August Makes Unusual Showing

Tool Sales Were Little Short of July Level—General Electric Inquiring for 80 Machines

SIZABLE purchases by several important buyers and a consistently good volume of orders from miscellaneous sources raised the August level of machine tool sales to a point little short of July and within striking distance of June and May.

In view of the fact that August is usually a rather dull midsummer month, with business adversely affected by the vacation season, this is regarded as an exceptionally good showing.

Moreover, inquiries are of such substantial volume that bookings should continue at a satisfactory rate during the next few months.

Although fresh orders have tapered slightly in the past month, the delivery situation has not improved. Most of the leading machine tool builders have enough business to last out the year and deliveries extending into 1930 are now commonly quoted on a number of types of tools.

The International Harvester Co. has bought most of the special purpose tools and standard machines for its Farmall tractor plant at Rock Island, Ill., but still must buy tool room equipment.

The General Electric Co. is inquiring for about 80 machine tools, many of which are reported to be for the department developing apparatus for talking motion pictures. The list includes 20 engine lathes, 19 milling machines, five of which are of the vertical type, six hand screw machines, seven sensitive drilling machines and a variety of other types of tools.

Tool and die shops are exceptionally busy and have been steady buyers in the Chicago market. Good used tools are scarce and used tools are not looked upon as offering serious competition to new equipment.

New York

NEW YORK, Sept. 3.—The General Electric Co., Schenectady, N. Y., has issued an inquiry for about 80 machine tools, many of which are said to be for the department working on the development of apparatus for talking moving pictures. The list includes 20 engine lathes, 19 milling machines, including five vertical, 6 hand screw machines, 7 sensitive drilling machines and a variety of other types of tools. August business has been exceptionally good with many of the leading sellers, the volume running close to that of July, which in a few instances was the best month of the year. Most of the leading machine tool builders have enough business on their books to last out the year. Deliveries extending into 1930 are now commonly quoted on a number of types of tools.

Dry Ice Corporation of America, Inc., 50 East Forty-second Street, New York, manufacturer of freezing materials under a carbon dioxide gas process, is arranging expansion program during next six to nine months, including construction of six new plant units at points in South and on Pacific coast, to increase present output from 170 to 370 tons per day, reported to cost $225,000 with equipment. Enlargements will also be made in several present plants. Robert R. Rust is president.

Brooklyn Edison Co., Pearl and Willoughby Streets, Brooklyn, is having plans drawn for six-story equipment storage and distributing building, with mechanical service and repair divisions, as well as automobile service, repair and garage department at Fourth Avenue and Third Street, to cost $1,000,000 with equipment, Voorhees, Gmelin & Walker, 101 Park Avenue, New York, are architects.

H. J. Nurick, 44 Court Street, Brooklyn, architect, has plans for a multi-story automobile service, repair and garage building at Livonia Avenue and Barrett Street, to cost about $100,000 with equipment.

Curtiss Airports Corporation, 27-29 West Fifty-seventh Street, New York, is planning airport at Alameda, Cal., near San Francisco, for land and seaplanes, with hangars, repair and reconditioning units, oil storage and distributing buildings and other field structures, at cost of more than $1,000,000 with equipment.

Seal Lock Burial Vault Co., 10-208 Ninety-fifth Avenue, Richmond Hill, L. I., will take bids for new one-story plant on Sixty-eighth Road, Forest Hills district, to cost about $45,000 with equipment. W. J. Boegel, 185 Madison Avenue, New York, is architect.

National Container Corporation, Review Avenue, Long Island City, manufacturer of corrugated paper, cardboard and other containers, has concluded arrangements for purchase of plant and business of Hygrade Eagle Corrugated Paper Products Corporation, Hunters Point Avenue and Manley Street, Long Island City, and will consolidate with latter. Expansion program will be arranged for increased output. Purchasing company will increase capital from 110,000 to 140,000 shares of stock, no par value, portion of fund to be used for acquisition and development.

General Cable Corporation, Graybar Building, New York, has purchased plant at Kingsland Avenue and Hamilton Street, Harrison, N. J., now occupied by A-A Wire Co., manufacturer of insulated wire and cables, a unit of organization, consisting of group of eight one-story units, totaling 160,000 sq. ft. floor space, and will develop as permanent plant for above unit. Property was originally built and occupied by New Jersey Tube Works.

Standard Underground Cable Co., Seventeenth and Pike Streets, Pittsburgh, unit of General Cable Corporation, has awarded general contract to Public Service Production Co., Public Service Terminal, Newark, N. J., for two-story addition to plant at Perth Amboy, N. J., to cost about $50,000 with equipment. Portion of Pittsburgh works will be removed to new structure.

Central Hudson Gas & Electric Corporation, 50 Market Street, Poughkeepsie, N. Y., has arranged for sale of block of stock to total about $7,500,000, majority of proceeds to be used for expansion and improvements, including power development and transmission line construction.

Standard Oil Co. of New Jersey, 26 Broadway, New York, has taken options on tract of about 200 acres on Staten Island, with waterfront facilities, and is said to be planning construction of new storage and distributing plant to cost $500,000 with equipment. A finishing and packing plant for petroleum products is also planned.

North Jersey District Water Supply Commission, 24 Commerce Street, Newark, will receive bids until Sept. 17, for 42 perforated copper screens and 70 galvanized steel frame shutters for Wanaque Dam water project. Morris R. Sherrerd is consulting engineer.

Eastern New Jersey Power Co., 601 Bangs Avenue, Asbury Park, N. J., has plans for two-story addition to steam-operated electric power plant at Allenhurst, N. J., to cost $200,000 with equipment. Management, Engineering & Development Co., Electric Building, Asbury Park, is architect and engineer.

Matawan Tile Co., Matawan, N. J., manufacturer of floor and wall tile prod-

ucts, plans rebuilding of portion of plant destroyed by fire, Aug. 27, with loss reported at close to $100,000, including equipment. Bennett K. Eskesen is president.

Western Electric Co., 195 Broadway, New York, has leased building at 225-239 Warren Street, Newark, N. J., totaling 47,000 sq. ft. floor space, and will remodel and equip for manufacture of precision equipment, including television and similar apparatus.

Public Service Electric & Gas Co., Public Service Terminal, Newark, has plans for new plant for manufacture of motor bus bodies on waterfront property at Sewaren, N. J., to cost $100,000 with equipment. Company will also build new steam-operated electric generating plant at same location to cost $4,000,000. Public Service Production Co., an affiliated organization, same address, will be in charge of construction work.

Philadelphia

PHILADELPHIA, Sept. 3.—Bids will be received on general contract until Sept. 15 by I. Fischman & Sons, Inc., Tenth Street and Allegheny Avenue, Philadelphia, manufacturer of soda fountain equipment, for new two and three-story plant on Erie Avenue, to occupy block front from F to G Streets, estimated to cost $1,500,000 with machinery. Clarence E. Wunder, 1520 Locust Street, is architect.

Baker Steel Co., G and Venango Streets, Philadelphia, plans rebuilding portion of machine shop at F and Atlantic Streets, destroyed by fire Aug. 27.

Reading Co., Reading Terminal, Philadelphia, has awarded general contract to Arey-Hauser Co., Elverson Building, for one-story electric car construction and repair shop, 137 x 325 ft., with lean-to extension, 25 x 119 ft., at Nineteenth Street and Wagner Avenue, Wayne Junction, to be used in connection with railroad electrification program in this district. Cost will be $300,000 with equipment. Clark Dillenback is company architect.

E. S. Dailey, 4459 Hurley Street, Philadelphia, and associates have organized Adams Foundry Co., and plan operation of local machine shop, pattern shop and foundry for manufacture of finished castings, tools, etc. James B. Clarke, 6220 Homer Street, is interested in new organization.

Pennsylvania Railroad Co., Broad Street Station, Philadelphia, has awarded contract to United Engineers & Constructors, Inc., 112 North Broad Street, for one and one-half story interlocking machine and operating building at West Philadelphia yards, estimated to cost $50,000.

John A. Roebling's Sons Co., South Broad Street, Trenton, N. J., has begun construction of one-story addition to rope shop No. 1, 240 x 315 ft., for manufacture of wire strand and wire rope. Equipment from present building will be removed to new unit and additional machinery provided for enlarged output. Work has also been started on one-story addition to plant at Roebling, N. J., near Trenton, 200 x 500 ft., to be equipped for manufacture of copper wire. Entire expansion will cost $125,000 with equipment.

Board of Education, Chambersburg, Pa., plans installation of manual training equipment in new senior high school at Third and Queen Streets, estimated to cost $280,000, for which plans are being drawn by Lawrie & Green, 821 North Third Street, Harrisburg, Pa., architects.

Pennsylvania Stamping Co., Red Lion, Pa., has taken over local one-story factory, 80 x 200 ft., formerly occupied by Red Lion Carton Co., for manufacture of patented crates and kindred products.

Board of Trustees, State Teachers' College, East Stroudsburg, Pa., C. B. Bensinger, president, State Capitol Building, Harrisburg, Pa., is having plans prepared for extensions and improvements in power plant to cost $50,000 with equipment. Davis & Lewis, Board of Trade Building, Scranton, Pa., are architects.

Penn Jersey Metal Products Corporation, Newton Avenue and Line Street, Camden, N. J., recently incorporated for $125,000, is now operating plant doing general machine work of jobbing character and manufacturing tools, dies and metal stampings. Company will be in market from time to time for machine tools and presses. William Fraser, Jr., is president and William N. Marshall secretary and treasurer.

New England

BOSTON, Sept. 3.—Local machine tool dealers report the past week quiet. The most important sale was five small tool room lathes to a Connecticut plant. Otherwise business was confined to single tools. An encouraging report is that a number of manufacturers who have contemplated buying equipment and who previously signified intentions of holding off until having opportunity to inspect machines at the national exhibit, now say they probably will make purchases before the show, owing to the fact that the delivery situation has not improved.

Pittsburgh Plate Glass Co., Pittsburgh, has plans for a warehouse at East Hartford, Conn., for which conveying equipment will be required.

United States Rubber Co., New York, is taking bids for a one-story, 300 x 100-ft. manufacturing unit at Providence, R. I. Purchase of motors and conveying equipment is contemplated.

Superior Spring & Mfg. Co., 373 Washington St., Hartford, Conn., has completed plans for a one-story, 14 x 28-ft., and two-story, 58 x 128-ft. manufacturing and storage plant.

Eastern Massachusetts Electric Co., 197A Washington St., Salem, Mass., is having plans made for a powerhouse, for which a crane will be bought.

The Whitin Machine Works, Whitinsville, Mass., has acquired the American Casablancas Co., manufacturer of spinning machinery, and will transfer production to its plants.

Nutmeg Crucible Steel Co., Branford, Conn., is planning construction of a one-story, 100 x 70-ft. foundry, to cost $20,000 without equipment.

Negotiations have been completed by Anthracite Operators Conference, 120 Broadway, New York, for purchase of controlling interest in Balanstat Corporation, Springfield, Mass., manufacturer of thermostat heat control equipment. Production is now being carried on at plant of Porter-McLeod Machine Co., Hatfield, Mass., and will be continued there temporarily. Later it is proposed to build new plant to make not only heat control, but also new forced draft equipment, another specialty of Balanstat company. George D. Roberts is treasurer.

Following recent acquisition of Lamson Oil Co., Inc., Field's Point, Providence, R. I., by Richfield Oil Corporation, purchasing company has plans for new local storage and distributing plant, with capacity of 260,000 gal., to cost $65,000 with equipment. Clinton B. Lamson is president.

Atlantic Public Utilities, Inc., Park Square Building, Boston, operating electric light and power properties in Massachusetts, Maine, New Hampshire and other States, is disposing of bond issue of $1,500,000, portion of proceeds to be used for expansion. R. W. Gilbert is president.

To provide funds for purchase of Norwalk Lock Co., Norwalk, Conn., manufacturer of locks, builders' hardware, etc., and for expansion in present facilities, Segal Lock & Hardware Co., 155 Leonard Street, New York, is arranging for increase in capital from 155,000 to 400,000 shares of stock, no par value. Increased capacity is planned.

Holo-Krome Screw Corporation, Hartford, Conn., will begin manufacture of hollow set and hollow cap screws at 80 Pliny Street, where company occupies 20,000 sq. ft. of space. Production will be 75,000 screws daily. Company will be in market regularly for chrome nickel steel. Plant will include heat treating department. W. A. Purtell is president.

South Atlantic

BALTIMORE, Sept. 3.—Baltimore & Ohio Railroad Co., Baltimore, has approved plans for a mechanical coal-handling plant at Fairmont, W. Va., to replace existing wood tipple. New unit will supply combination coal and sand service, with capacity of 300 and 100 tons of material, respectively, and will cost $50,000 with equipment. H. A. Lane is chief engineer.

Annapolis Water Co., Annapolis, Md., will receive bids until Sept. 16 for new pumping plant and filtration works for municipal water system, estimated to cost $100,000 with machinery. City will share in expense. W. C. Monroe, City Hall, is city engineer in charge.

Stonleigh Stores Corporation, 810 North Charles Street, Baltimore, Albert P. Strobel, Jr., president, is completing plans for five-story automobile service, repair and garage building, with addition of three stories underground, 190 x 194 ft., at Saratoga and St. Paul Streets, to cost $1,500,000 with equipment, William G. Nolting, Keyser Building, is architect.

Dixie Dowel Co., Winston-Salem, N. C., recently formed by R. C. Vaughn, Wachovia Bank Building, and associates with capital of $100,000, is planning operation of local plant for manufacture of dowel pins and kindred products.

Consumers Utilities Co., Winchester, Va., is said to have plans for artificial gas plant at Harrisonburg, Va., where franchise recently was granted, to cost $100,000 with high pressure distributing system, etc. Charles E. Stoddard is company engineer.

Smith-Douglas Co., Board of Trade Building, Norfolk, Va., has arranged for purchase of tract of about 10 acres on Bradley Road, near city limits of Danville, Va., and plans new commercial fertilizer plant to cost $60,000 with equipment.

West Point Power Co., West Point, Ga., has secured Federal permission for new hydro-electric power development on Chattahoochee River, at point between West Point and Franklin, with capacity of 100,000 hp. Plans will be drawn by McDonald & Co., Southeastern Trust Building, Atlanta, Ga., engineers.

De la Howe State School, Willington, S. C., is planning installation of power equipment and proposes early purchase of 25-hp. steam turbo-generator and accessory equipment.

Mica Products Corporation, Martinsville, Va., recently organized with capital of $100,000, plans extensive operation of feldspar and mica properties in Virginia and North Carolina, where the company has group of 35 mines. Grinding mills will be operated in different centers for commercial production. Executive offices will be maintained at Norfolk, Va. H. C. Field is president.

Pitcairn Aviation, Inc., Land Title Building, Philadelphia, is asking bids until Sept. 10 for hangars at Candler Field, Atlanta, Ga., to include reconditioning and repair shop facilities, etc., 150 x 250 ft., to cost $60,000 with equipment. Branch office is in Fourth National Bank Building, Atlanta, with John K. Otley in charge.

Detroit

DETROIT, Sept. 3.—Saranac Machine Co., West Main Street, Benton Harbor, Mich., has asked bids on general contract for two-story addition, to cost $27,000 with equipment. H. W. Harper, Fidelity Building, is architect.

Airparts Tool Co., Detroit, recently organized, will take over and consolidate Wayne Tool Co., 642 Catherine Street, and H. R. Krueger & Co., 439 East Fort Street, both manufacturers of production tools, jigs, dies, etc. New company plans expansion and improvement program for increased output. Joseph W. Rothmeyer, heretofore president of Wayne company, and H. R. Krueger, head of Krueger company, will continue in charge of consolidated organization.

Packard Motor Car Co., East Grand Boulevard, Detroit, has awarded contract to W. J. C. Kaufmann, 10,610 Shoemaker Street, for superstructure for addition to power plant at East Palmer and Bellevue Avenues, to cost more than $200,000 with equipment. Sessions Engineering Co., General Motors Building, is engineer.

Lake Orion Airport, Inc., Lake Orion, Mich., care of L. C. Anderson, Lake Orion, recently formed by Mr. Anderson and associates, plans construction of municipal airport, including hangar, repair and reconditioning shop and other field units, to cost $60,000 with equipment.

Mechanical Handling Systems, Inc., 3454 Denton Street, Detroit, has asked bids on general contract for one-story addition to cost $70,000 with equipment.

City Commission, Wyandotte, Mich., is considering construction of a municipal electric light and power plant.

New Orleans Fruit Co., Harrison and Water Streets, Flint, Mich., has plans for two-story cold storage and refrigerating plant to cost about $130,000 with machinery.

Highland Park Tool Co., 15 Victor Avenue, Highland Park, Detroit, is considering one-story addition to cost $30,000 with equipment. W. A. N. Pares is head.

Following recent purchase of plant of Field Body Corporation, Owosso, Mich., by Weatherproof Body Corporation, Corunna, Mich., new owner is planning for early operation as branch plant for manufacture of automobile bodies. An extension and improvement program to cost $75,000 is under way. E. C. Morine is president of Weatherproof company.

Pittsburgh

PITTSBURGH, Sept. 3.—The machinery business in this district has been rather quiet in the last two weeks as this period seems to have been the height of the vacation season. However, with the Labor Day holiday past, improvement is expected and judging by the volume of inquiry before the trade the present month should be a very active one. Tools placed recently have come from scattered sources, with individual orders predominating. However, large plants in the district have been closing regularly against their quarterly lists.

More than usual interest is attached to the heavy volume of business in heavy machinery and equipment for steel mill use which is coming to makers in this district. The American Sheet & Tin Plate Co. will soon place orders for four 4-high mills to be used at its McKeesport and Mercer, Pa., works. The H-beam mill for the new structural mill of the Illinois Steel Co. at Gary, Ind., will be built by Pittsburgh interests and orders have also been placed here recently for the equipment at the Monroe, Mich., plant of the Newton Steel Co., Youngstown. The Corrigan, McKinney Steel Co., Cleveland, is also understood to have placed a new billet mill with a local buider. Equipment for a number of large installations in the immediate Pittsburgh district, which have been mentioned previously, is still pending and the Wheeling Steel Corporation has recently announced an expansion program at its Steubenville, Ohio, works which will require considerable equipment.

Westinghouse Electric & Mfg. Co., East Pittsburgh, has engaged John H. and Wilson C. Ely, 605 Broad Street, Newark, N. J., to prepare plans for new factory branch, storage and distributing plant on tract of land on Haynes Avenue, Newark, recently acquired, to cost $500,000 with equipment.

Pittsburgh Forgings Co., First National Bank Building, Pittsburgh, with plant at Coraopolis, Pa., has concluded arrangements for merger with Riverside Forge & Machine Co., Jackson, Mich. Both plants will be continued. Edwin Hodge, Jr., president of Pittsburgh company, will occupy same position with combined organization, and G. H. Wilkins, heretofore president of Riverside company, will be treasurer.

Cooper-Bessemer Corporation, Grove City, Pa., manufacturer of Diesel and other engines, etc., plans extensions and improvements in power plant, including installation of additional equipment, to cost $40,000.

Sylvania Products Co., Emporium, Pa., manufacturer of radio tubes and equipment, is completing new three-story addition, 80 x 200 ft., and will install equipment to give employment to about 300 additional operatives. Expansion will cost $100,000 with machinery.

Crotty & Co., Inc., Parkersburg, W. Va., is being formed with capital of $200,000 to take over and expand local plant and business of company of same name, manufacturer of oil well tools and equipment. James F. Alexander, Parkersburg, has secured controlling interest in company and will head new organization. Henry L. Crotty will continue as an official of company.

Buffalo

BUFFALO, Sept. 3.—Sterling Engine Co., 1250 Niagara Street, Buffalo, manufacturer of gas engines, parts, etc., is completing plans for two-story addition, to cost about $50,000 with equipment. F. J. and W. A. Kidd, 522 East Franklin Street, are architects.

Consolidated Aircraft Corporation, 2050 Elmwood Avenue, Buffalo, is planning early removal of plant of Thomas-Morse Aircraft Corporation, Ithaca, N. Y., manufacturer of all-metal airplanes, recently acquired, to Buffalo, where new unit will be established for this branch of production, including aircraft for military service. Present capacity will be increased. Lawrence D. Bell is vice-president of purchasing company.

McCauley Metal Products, Inc., 660 Grant Street, Buffalo, has asked bids on general contract for one-story addition, portion to be used for storage and distributing service, to cost $40,000. A. B. Meissner, 55 Tuxedo Place, is architect.

General Specialty Co., Buffalo, has been formed with capital of $30,000 to take over and expand company of same name with local plant at 65 Carroll Street manufacturing metal goods. Edward E. Gansworth is president.

Marcellus Casket Co., Van Rensselaer Street, Syracuse, N. Y., has awarded general contract to W. J. Burns Co., Keith Theater Building, for four-story addition to cost about $90,000 with equipment. M. L. King, Dennison Building, is architect.

Cleveland

CLEVELAND, Sept. 3.—While machine tool sales were rather light the past week the volume of business during last month was quite satisfactory considering that August is usually a dull month. Dealers' sales ran considerably under those in July. A slight spurt in orders last week by a local turret lathe manufacturer brought its August sales up close to those of July. Business during the week was well distributed among various industries and most orders were for single machines. While buying by the automotive industry continues light, a few orders came from automobile plants in the Michigan territory. Deliveries on most lines show only a slight improvement.

Plans are being drawn by Electric Products Co., 1725 Clarkstone Road, Cleveland, manufacturer of electrical equipment, for two-story addition, 80 x 100 ft., reported to cost about $60,000 with equipment. H. M. Morse Co., 750 Prospect Street, is architect and engineer.

Youngstown Steel Door Co., Arcade Building, Cleveland, manufacturer of steel car doors, etc., is building new plant at Youngstown, Ohio, to cost $100,000 with machinery. Company's products are now being fabricated at plant at Midland Steel Products Co., Cleveland, but all production will be concentrated at new Youngstown plant in future. Company is identified with Youngstown Sheet & Tube Co., Youngstown.

City Council, Bucyrus, Ohio, plans municipal airport, with hangar, reconditioning and repair shop and other mechanical and field units, estimated to cost about $40,000 with equipment.

Geometric Stamping Co., 121 East 131st Street, Cleveland, is said to be planning new addition, consisting of another story

on present two-story shop, to cost $40,000 with equipment.

National Bronze & Aluminum Foundry Co., East Eighty-eighth Street and Laisy Avenue, Cleveland, has plans for one-story foundry, 71 x 109 ft., to cost $50,000 with equipment.

St. Louis

ST. LOUIS, Sept. 3.—St. Louis Rust Proof Co., Broadway and Poplar Street, St. Louis, has begun work on a new two-story plant unit, totaling about 13,500 sq. ft. floor space, to be equipped for chromium plating service, to cost about $28,000 with equipment. A. C. Eckhardt is president.

Mack International Motor Truck Corporation, 2804 Pine Street, St. Louis, with headquarters at 25 Broadway, New York, has awarded a general contract to Fruin-Conlon Contracting Co., Merchants Laclede Building, for one-story factory branch, 200 x 287 ft., with assembling and service departments, on Chouteau Street, near Jefferson Avenue, St. Louis, to cost about $230,000 with equipment. H. E. Foster, 400 West Madison Street, Chicago, is architect and engineer.

Mexica Refractories Co., Mexico, Mo., has preliminary plans under way for new plant for manufacture of fire brick and refractory shapes, reported to cost about $50,000 with equipment. J. B. Arthur is president.

City Council, Russellville, Ark., has approved plans for a municipal electric light and power plant, and will arrange fund at early date of $245,000 for construction and equipment, including distributing system. W. L. Winters, Merchants Bank Building, Fort Smith, Ark., is engineer.

City Council, Little Rock, Ark., has been authorized by public vote to arrange bond issue of $200,000 for municipal airport, including hangars, repair and reconditioning shops, oil storage and distributing building, and other field units. City engineer in charge.

Cincinnati

CINCINNATI, Sept. 3.—Demand for machine tools during August, while not up to the high level of July, was unusually good for this period of the year. Bookings during the last week, however, were in better volume than during the preceding week and added further to the large quantity of unfilled orders now on file. This steady demand throughout the summer has been substantial rather than sensational, orders generally being for one or two machines. Local builders of machine tools have maintained capacity production throughout the summer months. Despite this continued factory activity, deliveries are extended, and three to four months is about the best that can be promised. Inquiries reflect the continued healthy interest of buyers both in replacements and new equipment. While domestic business has been brisk, foreign business has been lagging. Word from two Russian commissions, which received quotations from several local manufacturers, is being awaited, but so far only requests for further information have been received.

Contract has been let by Royal Blue Bed Spring Co., 3274 Beekman Street, Cincinnati, to H. C. Hazen Contracting Co., 2070 Reading Road, for extensions and improvements in factory unit at 2549 Cummins Street, to cost about $38,000. W. O. Lathrop is head.

Commerce Garage Co., Chamber of Commerce Building, Cincinnati, has filed plans for a seven-story service, repair and garage building, 60 x 190 ft., on Race Street, to cost close to $300,000 with equipment.

Eagle Engineering Co., Springfield, Ohio, manufacturer of special machinery, parts, etc., is said to be planning one-story addition on adjoining site, 160 x 180 ft., on West Main Street, reported to cost more than $45,000 with equipment.

Aluminum Co. of America, Inc., Oliver Building, Pittsburgh, will soon break ground for a one-story addition to plant at Maryville, Tenn., 45 x 490 ft., to cost more than $125,000 with equipment.

Advance Battery Co., 227 East Lee Street, Louisville, has begun superstructure for a new one-story addition, to cost about $20,000 with equipment.

United Welding Co., Middletown, Ohio, has plans for a new one-story addition to cost $25,000 with equipment.

Quartermaster, Construction Department, Air Corps, United States Army, Wright Field, Dayton, Ohio, has plans under way for a one-story mechanical and repair shop to cost about $250,000 with equipment.

Chicago

CHICAGO, Sept. 3.—August fell little short of July in machine tool bookings and was within striking distance of June and May. An important factor contributing to the past month's business in this district was the buying of equipment for the Farmall tractor plant of the International Harvester Co., at Rock Island, Ill. Orders for most of the special purpose tools have now been placed and purchases of standard machines are approaching completion, with the buying of tool room equipment still to be done. The purchasing program now being concluded is expected to raise the output of the Farmall plant to 200 tractors a day. In view of steadily expanding demand, it is intimated that still further expansion of capacity is now being considered.

Although there have been no other outstanding machine tool lists before the trade during the month, business from miscellaneous sources has been consistently in good volume. In some cases orders have been referred until after the impending machine tool show at Cleveland, and vacations have also been a factor in slowing up buying, but withal aggregate business booked by local distributers has been far above normal for the summer season. Evidences of tapering industrial operations are not lacking, but there have been partially offsetting increases in activity also, with the consequence that the net letup has been small.

Sellers point out that the most important incentive for machine tool buying—the high cost of labor—is, to a large extent, independent of passing fluctuations in industrial activity. Metal working shops generally are alert to the necessity for cutting all possible corners to reduce their cost burden and realize that the replacement of obsolete or obsolescent equipment is in the interests of real economy.

Used tools are no longer serious competitors of new equipment. In fact, good used tools are scarce.

Machine tool deliveries have shown slight improvement, but are still very much extended.

Business prospects for this month have been brightened by the inauguration of purchases by the Continental Motors Corporation, Muskegon, Mich., which has not been an important buyer for a considerable period. There are also indications that added business will come from automobile manufacturers in the Central West.

Tool and die shops are exceptionally busy and are consistent buyers in the Chicago market. The Western Electric Co. is farming out less work in connection with the manufacture of sound-moving picture apparatus, indicating that its own production in this field is getting into full swing.

The Rock Island is inquiring for a 5-ft. universal radial drill for delivery at Horton, Kan. Other Western railroads show little interest in machine tools except for the preparation of preliminary figures for 1930 budgets. It is still too early to estimate the probable outlays of the railroads for equipment.

A number of large lists are in prospect for public schools on the west side of Chicago, the program for one school alone calling for 50 engine lathes. No action on this equipment can be looked for, however, until the city's finances are straightened out.

Reports vary as to collections, but on the whole it appears that obligations are being met satisfactorily.

Crane builders are heavily engaged; one leading company is booked so far ahead that it is virtually out of the market.

Western Clock Co., Buffalo Street, Peru, Ill., has awarded general contract to Jobst & Sons, Lehman Building, Peoria, Ill., for four-story addition to be used for parts production and assembling, to cost $200,000 with equipment. A. S. Goodenough is engineer

Ora-Tone Radio Co., 1010 George Street, Chicago, manufacturer of radio equipment, plans replacement of portion of plant recently destroyed by fire with loss of $40,000, including equipment.

Lyon Metal Products Co., Montgomery Street, Aurora, Ill., has awarded contract to Sumner-Sollitt Co., 307 North Michigan Avenue, Chicago, for one-story addition to power plant, to cost $70,000 with equipment. Frank D. Chase, Inc., 720 North Michigan Avenue, Chicago, is architect and engineer.

Chicago Steel Tank Co., 6400 West Sixty-sixth Street, Chicago, has filed plans for one-story addition, 120 x 200 ft., designed to increase capacity about 40 per cent, particularly in connection with steel tanks for oil burner installations. Cost will be $125,000 with equipment. Foltz & Co., 510 North Dearborn Street, are architects.

Central West Public Service Co., 117 North Thirteenth Street, Omaha, Neb., is planning enlargements in steam-operated electric generating plant at Woonsocket, S. D., including installation of equipment to double present capacity, at cost of $90,000.

International Harvester Co. of America, Inc., 606 South Michigan Avenue, Chicago, is planning one and two-story factory branch, storage and distributing plant at Grand Forks, N. D., to cost $60,000 with equipment. W. D. Price is construction superintendent.

City Council, Cedar Rapids, Iowa, is planning municipal airport, including hangars, repair and reconditioning shops, oil storage and distributing buildings and other units, to cost $180,000 with equipment. A special election has been called on Sept. 12, to approve bonds to finance the project.

Board of Education, Administration Building, Denver, Colo., plans installation of manual training equipment in new high school at Mariposa Street and Forty-first Avenue, to cost $500,000, for which plans will be drawn by T. H. Buell & Co., United States National Bank Building, architects.

Ruth Automatic Garage, Inc., 38 South Dearborn Street, Chicago, has awarded general contract to J. B. French Co., 30 North Michigan Avenue, for 28-story service, repair and garage building at 329-335 Plymouth Court, to cost $1,000,000 with equipment. A. S. Graven, Inc., 100 North La Salle Street, is architect.

Milwaukee

MILWAUKEE, Sept. 3.—Easier tendencies have not been as marked in machine tools as had been anticipated, but some dealers report that demand has fallen off, while others find the previous high level is maintained. Inquiries for September are showing surprising volume, with more than the expected amount coming from the automotive industry. Nearby automobile manufacturers plan resumption of large production within several weeks following a pronounced lull. Leading manufacturers in almost all lines continue production at capacity. Jobbing machine shops have all the work they can handle, but tool and die makers report the decline normal at this time. Woodworking plants are experiencing a spurt of activity.

Simmons Co., New York, is starting construction of addition to plant at Kenosha, Wis., to cost at least $100,000 for production of "Zalmite," newly perfected base for furniture metal composed of products formerly wasted. Foundations contemplate eventual erection of six-story building, but one story and basement only are to be erected at present.

Wisconsin Ornamental Iron & Bronze Co., 1665 Booth Street, Milwaukee, recently merged with General Bronze Co., Long Island City, N. Y., has let general contract to S. M. Siesel Co., 160 Ogden Avenue, Milwaukee, for one-story addition to brass foundry, 75 x 116 ft., to cost about $40,000 with equipment. E. A. Ernest is president.

City of Sheboygan, Wis., announces low bidder for construction of buildings and structures for new municipal filtration plant is Verhulst Co., Inc., Calumet Drive, Sheboygan, at $251,000, but equipment bids although opened have not been disclosed. Total authorized fund for plant is $750,000. Alvord, Burdick & Crawford, Chicago, and Jerry Donahue Engineering Co., Sheboygan, are the engineers.

City Council, Chilton, Wis., has authorized sale of $215,000 bond issue to purchase local plant of Oconto Waterworks Co. Proposed improvements include deep well pump with electric drive and standpipe at estimated cost of $35,000 to $38,000. Gordon & Bulot, 53 West Jackson Boulevard, Chicago, are engineers.

Royal Airways Corporation, 614 East Gorham Street, Madison, Wis., is ready for bids on airplane hangar of stucco and tile on steel framework, 100 x 130 ft., including service shop, at Pennco field. E. N. Quinn is president and general manager and Flad & Moulton, Washington St., Madison, are architects.

Northern Engraving Co., LaCrosse, Wis., has let contracts to F. R. Scwalbe & Sons, LaCrosse, for addition to plant producing automobile dash boards and art metal products, one-story, 100 x 200 ft. P. M. Gellatt is president.

The Crane Market

INQUIRY for cranes has been light, but with Labor Day past a continuation of buying activity is expected. The United States Meals Refining Co., Cartaret, N. J., has closed on a list of fourteen overhead cranes for Canada with the Dominion Bridge Co. The New York Central Railroad is in the market for two 25-ton locomotive cranes, and the Mitsubishi Shoji Kaisha, 120 Broadway, New York, has been taking bids on one locomotive crane for export to Japan.

Among recent purchases are:

United States Metals Refining Co., Cartaret, N. J., fourteen 10-ton overhead traveling cranes for Copper Cliffs, Ont., from Dominion Bridge Co.

Foundation Co., 120 Liberty Street, New York, two 15-ton electric traveling cranes for Chicago, Milwaukee & St. Paul Railroad from Milwaukee Electric Crane & Mfg. Corporation.

Raymond Concrete Pile Co., 140 Cedar Street, New York, 30-ton locomotive crane from Ohio Locomotive Crane Co.

David Ripley & Sons and Frank W. Hopping, Newark, N. J., 7½-ton crawl-tread crane from Browning Crane Co.

Walsh Construction Co., Syracuse, N. Y., 30-ton locomotive crane from Browning Crane Co.

C. V. Dandignac, Port Richmond, S. I., New York, 7½-ton truck crane from Browning Crane Co.

Goodman Mfg. Co., Chicago, 10-ton, 21-ft. span, 3-motor, overhead traveling crane from unnamed builder.

Illinois Steel Co., Joilet, Ill., 10-ton, 62-ft. span, 4-motor, overhead crane from Milwaukee Electric Crane & Mfg. Corporation.

Emerson Brantingham Co., Rockford, Ill., 3-ton, 3-motor, overhead crane from unnamed builder.

Indiana

INDIANAPOLIS, Sept. 3.—Following recent acquisition of Allison Engineering Co., Main and Thirteenth Streets, Indianapolis, manufacturer of gas engines, etc., by General Motors Corporation, General Motors Building, Detroit, site is being cleared preparatory to construction of new plant units, for which plans are in progress. Works will be used for production of aircraft motors. An expansion plan is to be carried out by new owner during next 12 to 18 months to cost more than $400,000 with equipment. N. H. Gilman is president.

Edwards Iron Works, 2101 South Main Street, South Bend, Ind., has awarded general contract to Charles A. Jordan Co., 725 Wilber Street, for one-story addition, 200 x 325 ft., to cost about $85,000 with equipment.

Warner Gear Co., Muncie, Ind., a division of Borg-Warner Corporation, manufacturer of automobile gears, etc., is completing a new one-story unit to be equipped for about 30 per cent increase in present capacity, estimated to cost about $1,000,000 with machinery. C. S. Davis is president of parent organization.

W. W. Ahlschlager, 65 East Huron Street, Chicago, architect, has plans under way for multi-story automobile service, repair and garage building at Ohio and Illinois Streets, Indianapolis, reported to cost close to $900,000 with equipment.

Reynolds Regulator Co., 1520 Lincoln Street, Anderson, Ind., is said to be planning one-story addition to cost about $35,000 with equipment.

Northern Indiana Public Service Co., Hammond, Ind., is planning four-story electric-operated pumping plant at Long Beach, Ind., reported to cost more than $75,000 with equipment. L. C. Bernard, First Trust and Savings Bank Building, Hammond, is architect; A. P. Melton, 504 Broadway, Gary, Ind., is engineer.

Gulf States

BIRMINGHAM, Sept. 3.—Houston Armature Works, Inc., Preston Avenue, Houston, Tex., is planning new one-story electrical equipment plant on site lately acquired at Broadway and Prairie Avenue, to be one-story, to cost about $45,000 with equipment. A. C. Kater is president.

Texas-Louisiana Power Co., Fort Worth Club Building, Fort Worth, Tex., has approved plans for immediate construction of addition to steam-operated electric generating plant at Pecos, Tex., estimated to cost $200,000 including transmission line extensions.

Galveston Wharf Co., Galveston, Tex., has filed plans for new grain elevator, 230 ft. high, with capacity of 6,000,000 bushels, to include conveying, elevating, screening and other equipment, estimated to cost $1,500,000.

McWane Cast Iron Pipe Co., 3700 North Eleventh Avenue, Birmingham, Ala., has awarded general contract to A. F. Felix, 2119 North First Avenue, for one-story and basement addition, 40 x 100 ft., to cost about $40,000 with equipment. Miller & Martin, Title Guarantee Building, are architects.

Southern Air Transport System, Fort Worth, Tex., has plans nearing completion for hangar at Love Field, Dallas, Tex., consisting of two bays, 110 ft. and 90 ft. respectively, with repair and reconditioning shops in rear, estimated to cost about $85,000 with equipment.

Board of Education, Greenville, Miss., is planning installation of manual training department in new two-story E. E. Bass junior high school, estimated to cost $200,000, for which bids will be received on general contract on Sept. 17. N. W. Overstreet, Fire Insurance Building, Jackson, Miss., is architect.

Port of Corpus Christi, Corpus Christi, Tex., plans installation of conveying, elevating and other mechanical-handling equipment at new loading terminal, estimated to cost $300,000, for which fund has been arranged. Structure will be occupied under lease by Duval Texas Sulphur Co., Corpus Christi.

Pacific Coast

SAN FRANCISCO, Aug. 29. — Contract has been let by Southern Pacific Railway Co., Los Angeles, to Robert McKee, 515 Hewitt Street, for group of locomotive repair shops on San Fernando Road, consisting of engine house, machine shop, 73 x 225 ft.; power house, 50 x 54 ft.; and six other one-story units, to cost $350,000 with equipment. Engineering department of company is in charge.

Los Angeles Engine Works, Inc., Los Angeles, has awarded general contract to Ted R. Cooper Co., Western Pacific Building, for one-story plant, 50 x 140 ft., on Turner Street, to cost $50,000 with equipment.

Board of County Supervisors, Hall of Records, Los Angeles, is asking bids until Sept. 10 for a 300 kva. generator set for the Los Angeles general hospital.

Standard Auto Body Co., Fifteenth Street and Central Avenue, Los Angeles, has awarded general contract to Jergesen & Dequine, 1316 Paloma Avenue, for one-story addition, 100 x 150 ft., to cost $65,000 with equipment. Richard D. King, Van Nuys Building, is architect.

Charles W. Ertz, Pittock Block, Portland, Ore., architect, will soon take bids on general contract for two-story automobile service, repair and garage building, at Burnside and Thirteenth Streets, 200 x 200 ft., to cost $150,000 with equipment.

Olympic Forest Products Co., Port Angeles, Wash., is perfecting plans for new local pulp mill in conjunction with saw mill. The first noted will have a capacity of about 150 tons per day, to be tripled at later date. The saw mill will be equipped for output of 1,000,000 ft. per month. Entire project will cost $1,000,000 with machinery.

Spring Street Iron Works, Klamath Falls, Ore., is considering rebuilding portion of plant recently destroyed by fire with loss of $70,000 with equipment.

Compton Union High School, Compton, Cal., plans construction of manual training shops at proposed new junior high school group in Haynes-Clearwater district, estimated to cost $100,000. Frank M. Goodwin, Stockwell Building, Compton, is architect.

Dabney-Mills Alloys Corporation, Long Beach, Cal., has been formed to manufac ture and sell diamond substitute and hard facing metals in the oil and other industries. Factory at 3454 Pine Avenue and sales office and warehouse at 3508 Atlantic Avenue are in operation. Company will be regular user of ferrotungsten, ferrochromium, ferrosilicon and nickel shot. F. R. Shumack is purchasing agent.

Canada

TORONTO, Ont., Sept. 3.—While most machine tool orders are for one or two tools each, buying in general is fairly extensive because of heavy replacement needs. Many small lists are appearing with the result that builders and distributers are looking for a brisk fall demand. The display of tools and machinery at the Canadian National Exhibition, being held in Toronto, is also a factor toward betterment in machine tool sales. The automotive industry and railways are buying regularly for replacement purposes, but orders for new plant equipment are somewhat limited.

Swansea, Ont., will build two sewage pumping stations on Queen Street, for which bids are being received by N. L. Ivey, 107 Runnymede Road, Toronto. Equipment will be purchased.

Bids are being taken for a $300,000 factory at Longueuil, Que., for Fairchild Aircraft, Ltd., 1253 McGill College Avenue, Montreal, Que. W. H. Wardell, 1463 Union Avenue, Montreal, is consulting engineer. The main building will be 140 x 260 feet.

Plans are being prepared by James, Proctor & Redfern, Ltd., 36 Toronto Street, Toronto, for the erection of a one-story brick and steel factory addition to plant of Sieberling Rubber Co. of Canada, Ltd., at 99 Paton Road, Toronto. Cost is estimated at $25,000.

The Hull Match Co., Montreal, has awarded general contract to A. F. Byers & Co., 1226 University Street, Montreal, for a factory on Montclair Boulevard, Perry & Luke, 1190 University Street, Montreal, are architects.

Dominion Bridge Co., Vancouver, B. C., has plans for construction of $1,000,000 plant.

Hayes Wheel & Forgings of Canada, Ltd., Merriton, Ont., has awarded general contract to E. P. Muntz, Ltd., Temple Building, Toronto, for machine shop to cost $100,000. H. G. Acres & Co., Ferry Street, Niagara Falls, Ont., are consulting engineers.

Foreign

IN connection with development of motor truck body manufacturing facilities, including extensions in Amo works at Moscow, Soviet Russian Government, Moscow, is planning purchase of machine tools, bench tools, woodworking machinery and other mechanical equipment in United States, through Amtorg Trading Corporation, 261 Fifth Avenue, New York, official buying agency for Soviet Union. The Amo plant will be developed for a capacity of 25,000 2-ton trucks per year, while plants at Yaroslav and Spartalk will be equipped for gross production of 1000 heavy truck units and 2500 light trucks a year respectively. Arrangements have been concluded with Hercules Motor Corporation, Canton, Ohio, manufacturer of gasoline motors of heavy type, for technical assistance in establishment of division at Yaroslav works for production of units of this kind.

Director of Aviation, Department of War, Sanitago, Chile, is selecting site and will prepare plans for establishment of civil airport, including hangars, repair and reconditioning shops, oil storage and distributing buildings, and other field units. Entire project will cost $500,000.

Following recent organization of Andrews Toledo, Ltd., Sheffield, England, to take over local plant and business of Jno. Hy. Andrews & Co., Ltd., manufacturer of drill and tool steels, steel rods, etc., new company is planning for complete modernization of works, including installation of additional equipment for increased output. Property will be transferred early in November. J. F. Parker is chairman of board of new organization.

New Trade Publications

Steel Strips for Cement Floors.—Lockstrip Mfg. Corporation, Long Island City, N. Y. Several new brochures on Lockstrip for cement floors to supplant scoring, form an expansion joint and flush finish surface, have been published.

Motor Control Equipment.—Electric Controller & Mfg. Co., Cleveland. A four-page pamphlet relates the advantages of using the company's motor starters and automatic compensators.

Large Vertical Motors. — Wagner Electric Corporation, St. Louis. A new bulletin, No. 159, has been issued, covering all types of large vertical motors, in ratings of from 1½ to 30 hp. As illustrated by diagrams in the bulletin, a feature of the motors is that they all have the same flange or lug dimensions, making it possible for manufacturers and users of small motor-driven machinery to interchange motors of different types and ratings on the same mounting dimension.

Switchboard Meters.—Sangamo Electric Co., Springfield, Ill. An addenda to bulletin No. 73 describes Sangamo type HN a.c. switchboard meters.

Boiler Feed Control.—Northern Equipment Co., Erie, Pa. Catalog of 16 pages, illustrating and describing the Copes system of boiler feed control, showing methods of attachment and some of the records taken from instrument charts. The actuating element is a thermostat.

Fire-Fighting Equipment.—American LaFrance & Foamite Corporation, Elmira, N. Y. A 176-page catalog, which contains complete listings and descriptions of portable fire-fighting equipment, is virtually a text book on the subject of fire apparatus. The catalog is divided into eight sections and has a comprehensive index.

Electric Steel Castings.—Belle City Malleable Iron Co., Racine, Wis. A new 20-page, 6 x 9 booklet on the application and production of basic electric steel castings, besides showing and describing the facilities for the making of electric steel castings, gives many pointers on the effective use of steel castings, illustrated by actual examples. Details of the problems are given to facilitate the use of these ideas on other products and by other manufacturers.

Steel Castings.—Lebanon Steel Foundry, Lebanon, Pa. Bulletin No. 19 of two pages, entitled "Controlling Production," illustrated, is another of a series in the story of Lebanon electric furnace steel castings. It discusses the system used by this company in keeping track of and controlling the many varieties of castings which are constantly being produced.

Steel Castings.—Nugent Steel Casting Co., Chicago. Bulletin No. 119 of two pages, illustrated, is entitled "Improving an Age-Old Product." It discusses how the company makes the same metal into a better swivel than used to be produced and saves the manufacturer one operation.

Electric Heat in Industry. Public Service Co. of Northern Illinois, Chicago. Brochure of photographs of installations of electric furnaces for steel melting, heat treating, baking various products and for cooking.

THE IRON AGE

New York, September 12, 1929

ESTABLISHED 1855 VOL. 124, No. 11

Lacquer Department Conveyorized

Studebaker Doubles Output, Saves 15 Per Cent on Labor and Reduces Rejections 25 Per Cent by Installing New System

BY BURNHAM FINNEY*

WHEN the Studebaker Corporation decided recently to concentrate all manufacturing activities at South Bend, Ind., it was faced with the necessity of greatly increasing its output there to take care of the volume of automobiles formerly made at Detroit. Instead of constructing additional units at a high cost, it examined ways and means by which operations might be carried on more intensively in its present buildings, and finally decided to install an extensive mechanical conveying system reaching into many departments.

The conveyorizing of the lacquer department was included in the expansion program. By means of the new system, production of hoods in the department has been increased from 400 to 800 in a 10-hr. day and the output of sets of sheet metal parts has mounted from 125 to 350 in the same working period. Concurrently, labor saving has amounted to 15 per cent and rejections have declined 25 per cent.

*THE IRON AGE, New York.

HOODS Are Carried Through All Operations in Department on Overhead Chain Conveyor

Sheet metal parts going through the lacquer department consist of the running board splash apron, radiator splash apron, fenders, gas tank covers and hoods. They are brought from final inspection in the stamping department to the lacquer department on an overhead chain conveyor and there are transferred by hand by two men to another overhead chain conveyor. The department is served by two conveyor lines, one for hoods and one for other parts. Both conveyors are constructed of 4-in. I-beams with steel angle supports. Running on the I-beams are two-wheel trolleys with standard H attachments connected by No. 458 drop forged chain.

As they move along the conveyor line, the running board splash aprons, radiator splash aprons, fenders and gas tank covers (hereafter referred to as the "fender line") are cleaned with Rex Pamco Reducer to remove spots and are sprayed with Rex Pamco Cleaner to take off all grease and slight rust from previous handling. The spraying booth is an individual unit with an air-agitated pressure tank located outside the booth. The cleaner is forced by air through two hose into the booth, where a workman sprays it on the sheet metal parts.

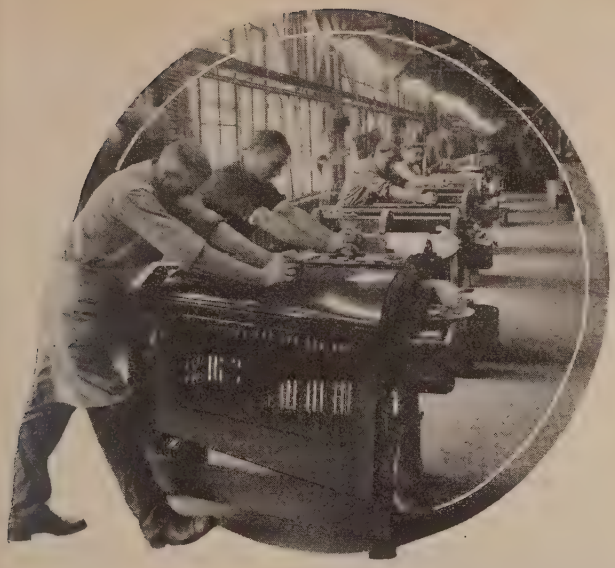
Fenders Baked in Drying Oven

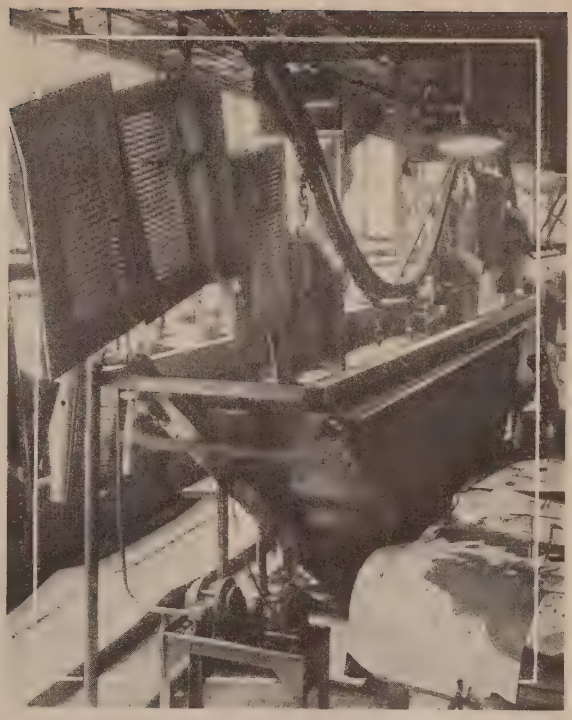
Passing out of the spray booth on the conveyor, fenders are air-dried while moving toward the drying oven, where they are baked from 20 to 30 min. at 400 deg. Fahr. This oven, manufactured by Young Brothers Co., Detroit, is of standard panel design, with the oil heating unit situated in a pent house on the roof of the building. Heat is forced through ducts from the heating unit to the oven and is drawn out there by means of exhaust fans.

In the oven the Rex cleaner flakes on the fenders, so that the first operation after emerging from the oven is the scuffing off of this material. This is done by rubbing the fenders by hand with steel wool, after which they are wiped down with an alcohol cloth to make sure that no rust has accumulated. For spraying the prime coat, fenders are carried through a booth in which the Floco system of automatic shower bath is used. This booth contains a series of shower spray heads, some of which are turned upward and some downward, so that all parts of the fenders have the spray of paint turned directly on them. The spray heads are adjustable to suit local conditions. A number of drain pans form the floor of the booth. Through these pans the paint returns to the storage tank, where it is ready to be pumped again into the Floco system.

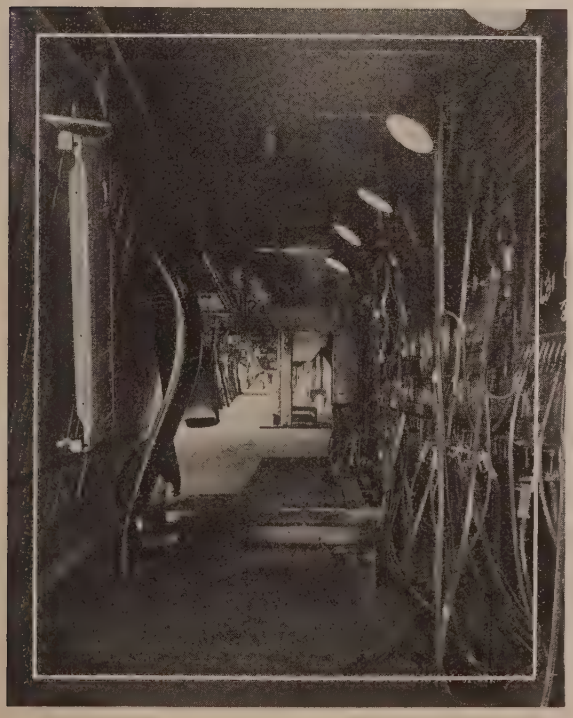
The supply tank for the Floco system is located in a service elevator tower on the third floor. From this tank the material is pumped to a second supply tank, in the sawtooth of the fourth floor, which is of small capacity

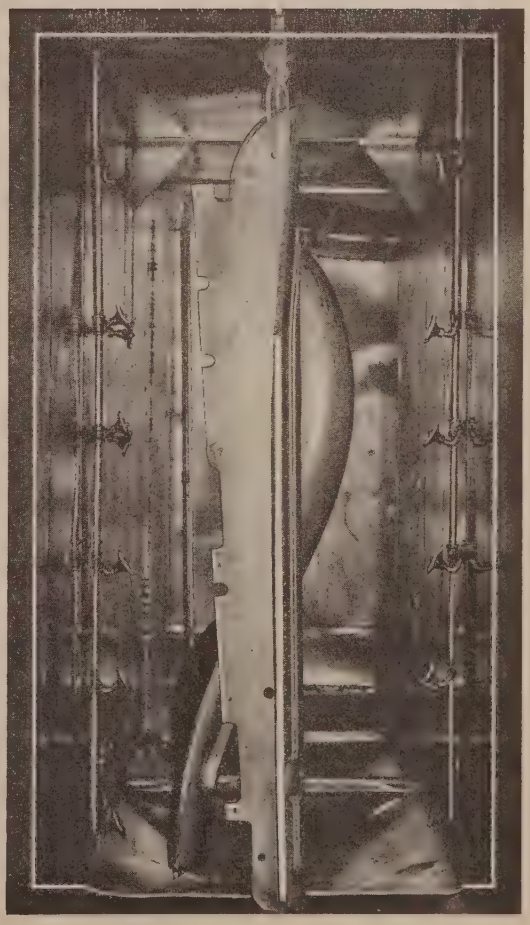
AFTER Hinges, Corner Pads and Handles of Hoods Have Been Assembled and Riveted, Hoods Are Put on Special Slat Conveyors Where They Are Striped with a Striping Pencil (Bottom). The striping operation is shown above





AFTER the Lacquering Operation, Sheet Metal Parts Are Taken from Conveyor, Put on Special Rubbing Bucks and Rubbed Down by Hand with Oil, Pumice Stone and Water (Upper Left). Hoods are dipped in a tank for the priming coat, the paint in the tank being specially agitated at the top and bottom (upper right). Booth in which Rex Pamco cleaner is sprayed on fenders and other parts is individual unit with air agitated pressure tank located outside booth. Cleaner is forced by air through two hose into booth (lower left). Prime coat is sprayed on fenders by Floco System of automatic shower bath (lower right). Booth contains series of adjustable shower spray heads. Several drain pans form the floor of the booth





and is designed to keep the pump constantly primed, thus giving to the spray heads a proper pressure.

Fenders Pass Along Conveyor Bank

Coming out of the Floco booth, fenders pass along a considerable bank in the conveyor for dripping purposes. The bank is in a special glass-inclosed room, offering protection against dust and dirt, where the floor is made up of a series of drip pans. From this room the conveyor leads into a drying oven, where the prime coat is baked on for a period of 2 hr. at a temperature ranging from 370 to 400 deg. Fahr. Coming from the oven, the fenders are cooled for 5 min. and then are lightly sanded. From this point they start a journey through a number of spray booths and drying ovens, during which they are sprayed outside with from six to eight coats of lacquer, are air-dried for 10 min. between each coat, and are oven-dried for 45 min. at 170 deg. Fahr. They are water-sanded, mist-coated and retouched. They are then sprayed inside with black paint, again oven-dried for 45 min. at 170 deg. Fahr., removed from the conveyor for a Parko-Rub, and polished. After being polished, they are hung on a conveyor and are delivered to the final car assembly line, passing en route through a finished stockroom, where they can be removed for storage, if desired.

Hoods go through a similar process, except that they are dipped in a tank for the priming coat, the paint in the tank being specially agitated at the top and bottom. Moreover, after polishing operations, hoods are sent by overhead conveyor to the assembly department, where hinges, corner pads, and handles are assembled and riveted. They are then put on a slat conveyor on which they are striped with a striping pencil. Finally the two halves of each hood are assembled and are placed on an overhead I-beam conveyor to be delivered to the final car assembly line.

Ovens Are Constructed of Wood

Ovens in which lacquer coats are dried are economically constructed of wood framework with plaster board sides. Since the temperature of the oven never exceeds approximately 170 deg. Fahr., the use of such material is feasible.

After the coat has been thoroughly dried, following the lacquer spraying operation, sheet metal parts are taken from the conveyors by hand and are put on special rubbing bucks. Here they are rubbed down by hand with oil, pumice stone and water. Under each rubbing buck is a drain to carry away the drip or splash of the liquid.

The floor of the spraying booths is a mastic deck with drains connected to a sewer. The mastic deck is composed of material similar to asphalt, which is laid on top of the original cement floor of the booth. With this construction it is possible to wash booths with water and a lacquer remover about twice a week to keep them from collecting a thick layer of lacquer dust. For use in case of fire, booths are equipped with automatic sprinkling heads. In addition, there are two sprinkler heads in the exhaust stack of each booth.

At various points along the conveyor line, and also after final inspection, are repair stations where any work that is scratched or otherwise marred can be removed and put through a special process to restore its original appearance.

The fender painting conveyor is 4608 ft. long and is driven by one 5-hp. motor operating at 1200 r.p.m., with a dual caterpillar drive. The motor is connected to a Reeves Class 1, Type E variable-speed drive, which in turn drives two Jones No. 15 double-type reducers from a common shaft. The ratio of the reducers is 44 to 1. This in turn drives bevel gears directly connected with spur gears with a shear pin coupling to chain sprockets.

COMING Out of Floco Booth, Fenders Pass Along Bank in Conveyor for Dripping Purposes. Bank is in glass-inclosed room the floor of which consists of a series of drip pans

The entire conveying system in the department was designed and installed by the Jervis B. Webb Co., Detroit. The special conveyor for the striping of hoods was supplied by the Chain Belt Co., Milwaukee, and the lacquer mixing equipment is the product of the Binks Spray Equipment Co., Chicago.

For instrument boards, garnish molding and door-panel units, the layout had to be made so that parts could be run in grain, or lacquer or metallic enamel. This was made possible by using the same combination ground color and primer for both lacquer and grain. Complete car sets are obtained within a 3-hr. period. Parts are delivered to the final body assembly line by an overhead I-Beam conveyor carrying crates, each of which contains a complete set of garnish moldings, door panels and instrument board for one car. The layout utilizes 3166 ft. of conveyor, and in 32,248 sq. ft. of floor space 4875 garnish moldings, 2700 garnish door panels and 800 instrument boards are produced in a 10-hr. day, with a production increase of 200 per cent and a cost reduction of 35 per cent.

Uses Universal Heat-Treating Unit

Packard Plant Has Three Furnaces, with Pushers and Pullers Interconnected with Time Controls, Forming One Continuous and Automatic Outfit

BY F. W. MANKER

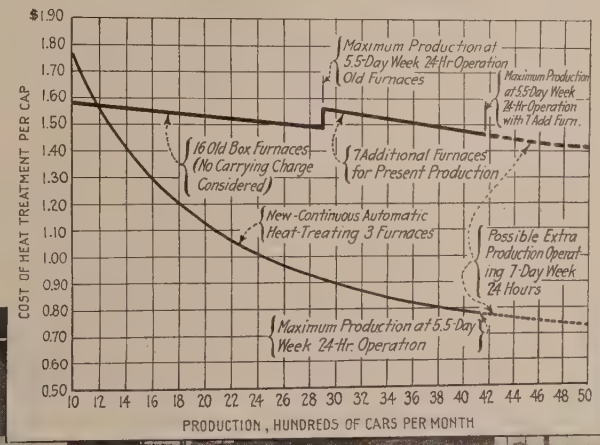
THREE large furnaces and a quench tank, set in a straight line in series, so that the work can pass progressively through each in turn, have been put into operation by the Packard Motor Co., Detroit.

Inter-connected conveyors and automatic temperature controls make this unit continuous and automatic in operation. It can be adjusted for four operations at once—such as normalizing, heating for hardening, quenching and drawing—or it can be divided up so that one class of work can be annealed or normalized while another is being hardened and drawn.

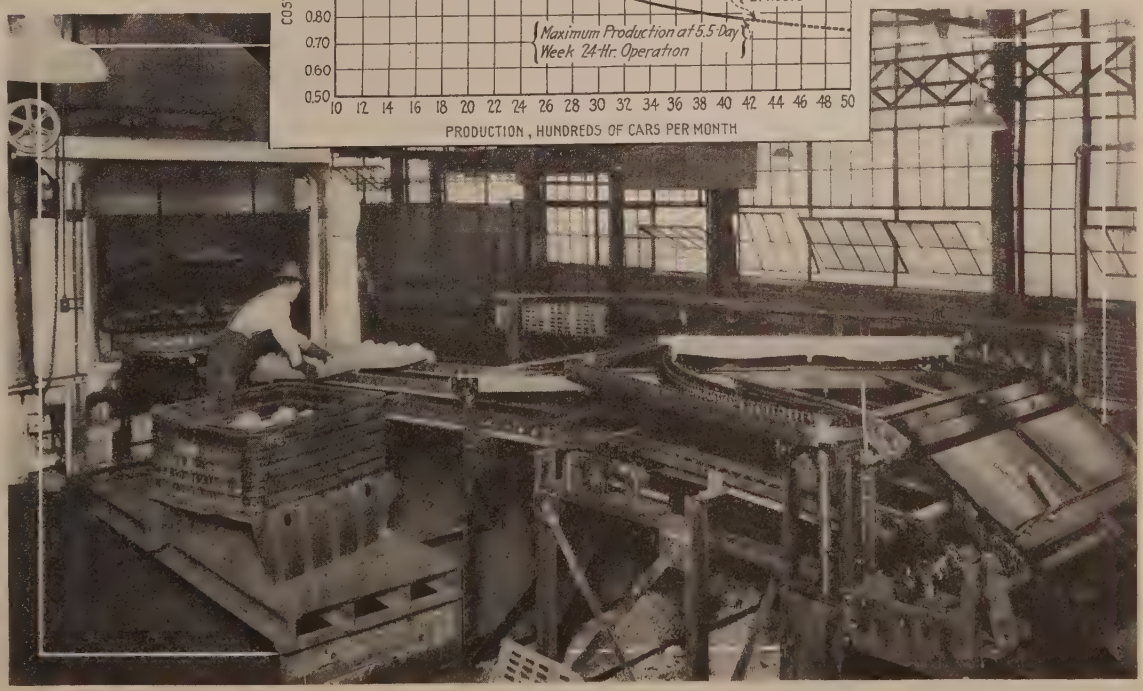
By altering the time cycles and temperatures of the various units, all sizes of work, from small forgings up to large axles, can be treated interchangeably. Parts being treated regularly in this installation include front and rear axles, connecting rods, transmission gears, differential driving pinions, steering knuckles, steering knuckle levers, etc. That, this range in size is possible is due to the fact that a standard grid-type tray, of alloy steel and 14 in. wide, is used to carry the work through the furnaces.

Only two operators are employed, one to load the work on the trays at the charging end of the first furnace and the other to reload as the work comes out of the

COMPARISON of Heat-Treating Costs (Right) by the Continuous Method with Previous Costs Shows the Advantage of the Former at All Except a Very Low Production Rate


$1.90
1.80
1.70
1.60
1.50
1.40
1.30
1.20
1.10
1.00
0.90
0.80
0.70
0.60
0.50
COST OF HEAT TREATMENT PER CAR
10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50
PRODUCTION, HUNDREDS OF CARS PER MONTH
Maximum Production at 5.5-Day Week 24-Hr Operation Old Furnaces
Maximum Production at 5.5-Day Week 24-Hr Operation with 7 Add Furn.
16 Old Box Furnaces (No Carrying Charge Considered)
7 Additional Furnaces for Present Production
New-Continuous Automatic Heat-Treating 3 Furnaces
Possible Extra Production Operating 7-Day Week 24 Hours
Maximum Production at 5.5-Day Week 24-Hr. Operation

CHARGING End of Normalizing Furnace (Below). At right is the conveyor which brings returning trays to the correct position and drops them to the gravity conveyor which feeds them to the charging table



quench to go through the drawing furnace. The trays are returned, oriented automatically and passed into the first furnace again without further attention.

Packard engineers developed the conveyor system at either end, as well as that between the hardening and drawing furnaces. The furnaces and the remainder of the conveyor system were designed and built by the Surface Combustion Co., Toledo, Ohio. These furnace walls are made of 9 in. of firebrick and 9 in. of insulation and are held together with buckstays.

In cross section each furnace is 6.5 ft. wide and 3.2 ft. high. The first is 22 ft. long and the others 25 ft. The first furnace has eight gas burners close to the discharge end, as this is the most critical point of the heat treating cycle. These fire directly into the heating chamber. At the discharge end are two oil burners firing into tunnels, running the length of the furnace under the hearth, and

with which the pusher operates, and this in turn is controlled by a Stromberg time clock.

At the discharge end a mechanical puller reaches into the furnace, engages the trunnions of the trays and pulls them forward. This is operated by the same time clock, in series with a relay to correct for the time lag between the two movements. The puller is used because it was not found practicable to put all the load on the pusher.

Work which is to be normalized only is automatically dumped, after passing through the normalizing furnace, on to the normalizing cooling conveyor, pan type. This carries it along and then automatically discharges it, in about an hour, into tote boxes. The trays continue on, so as not to interrupt the cycle for other work. The transfer is made through a chute which drops the work directly on to the normalizing cooling conveyor. To get sufficient clearance for a gravity drop the receiving end of

OUTLET End of Hardening Furnace, at Right Side of Picture, with Quench Tank Below and Pass-over Conveyor Above It. The slat conveyor for bringing parts up from the quench is at lower left corner

discharging their products of combustion through numerous ports.

By dividing the furnace into three zones—preheating, heating and soaking—a proper heat gradient is obtained. Automatic temperature control is located in each zone and recording pyrometers are provided. Hot gases pass along toward the charging end, giving off their heat to the cold incoming work, moving in the opposite direction, thereby insuring efficient operation.

Waste heat from each furnace is discharged through a vent in the roof, close to the charging end. In the vent is a recuperator. Fresh air for combustion is forced through the coil in this recuperator, heated to some 600 deg. Fahr. and then delivered to the burners.

Inspirators at the gas burners regulate the gas-air ratio. Thus a reducing, neutral or oxidizing atmosphere can be obtained at will, and automatically maintained.

Trays of work are pushed through, by a mechanical pusher, on three alloy-steel rails. This pusher is motor driven, through a bell-crank link drive. The time the work is in the furnace is controlled through the frequency

this conveyor commences at a point below the floor. It may be seen coming up through the floor in one illustration.

If, on the other hand, hardening is to follow, the trays travel along the conveyor which bridges the gap between the two furnaces, and into the hardening furnace. This roller conveyor is 22 ft. long, this distance giving the work the proper cooling before it enters the hardening furnace.

As with the normalizing furnace, the hardening furnace is divided into three heating zones, automatically controlled as to temperature. There are the same type pusher and puller. This furnace has ten gas burners and two oil burners, operating as in the normalizing furnace. At the discharge end the work is dumped through a chute into a quench tank. As in the normalizing furnace, any desired heat gradient can be maintained.

Dumping is done in a unique manner. The trays have a trunnion at each end, on the advancing side, but are supported by the rails underneath. These rails end at

OUTLET End of Drawing Furnace. The 23-ft. dog-chain cooling conveyor in foreground suffices for air cooling. Parts drop from it into tote boxes and are then passed through the cleaning room

the quench chute and the trunnions ride on to another set of rails on the sides of the furnace. As the tray leaves the supporting rails it upsets, swinging by the trunnions from the side rails, and the work drops off into the quench.

At this point the puller reaches in, engages the trunnions, and pulls the tray out on to the rails of the pass-over conveyor, over the quench tank and to the loading table of the drawing furnace and places it in position to receive the work again. The parts are brought up to this point out of the quench by a slat-type continuous conveyor and an operator reloads them into the trays.

The drawing furnace is similar to the others except that it is heated by only two burners. After the work has passed through the proper heat gradient, it is pulled out on to a dog-chain cooling conveyor, 23 ft. long. When finally the tray of cooled pieces is dumped, the work drops into tote boxes for removal to the cleaning room.

DISCHARGE from End of Normalizing Furnace Appears at Extreme Left with Chute (A) to Normalizing Cooling Conveyor. At right this conveyor rises from the receiving position and runs alongside the furnaces

This conveyor then makes a turn with the tray and upsets it on to a single-strand chain conveyor, where it rides on edge and between two guide rails. This conveyor runs the length of the three furnaces and delivers the tray on to a "turn around" conveyor in front of the charging end of the normalizing furnace.

As the tray is tipped over on to this "turn around" conveyor, it lies flat but with the trunnions pointing to the rear. To correct its position the conveyor, which consists of two parallel traveling chains with slats between, makes a complete turn with it and drops it down on to a short gravity conveyor which feeds it to the loading platform of the normalizing furnace.

Production has been greatly in excess of that from the furnaces formerly used. The output of this installation is equal to that of 24 box furnaces, and two men only are required, as contrasted with 12 men on the box furnaces. Due to atmospheric control, scaling and pitting has been almost entirely eliminated, and spoilage has been reduced considerably over the entire range.

Handling Steel Tubes into Storage with One Operator

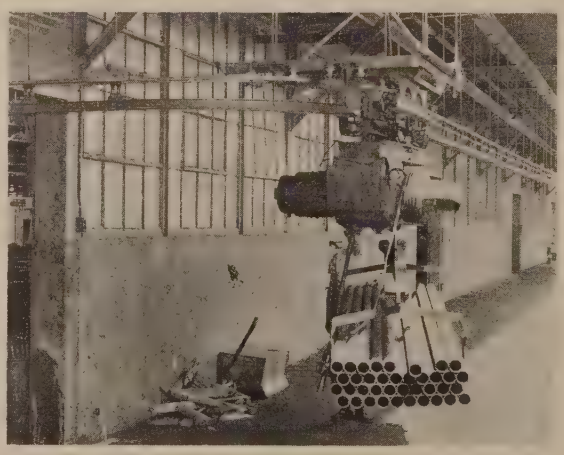
USING a combination of an overhead carrying device and a permanent stacking rack, steel tubes in loads up to 2 tons are handled from unloading platform to storage and from storage to point of use in the plant of the Spicer Mfg. Co., Toledo, Ohio. The system was put in by Cleveland Electric Tramrail, Wickliffe, Ohio.

The permanent stacking rack consists, as one photograph shows, of two U-shaped steel bars for each load handled. The illustrations show 38 tubes in such a rack being taken from the platform alongside railroad car and dropped in position in the storage pile. This method of handling permits intensive use of the storage space, as aisles between loads are not necessary. Tubes of the same size and specification are piled in successive loads, one above the other, and may be removed as needed with the minimum of handling.

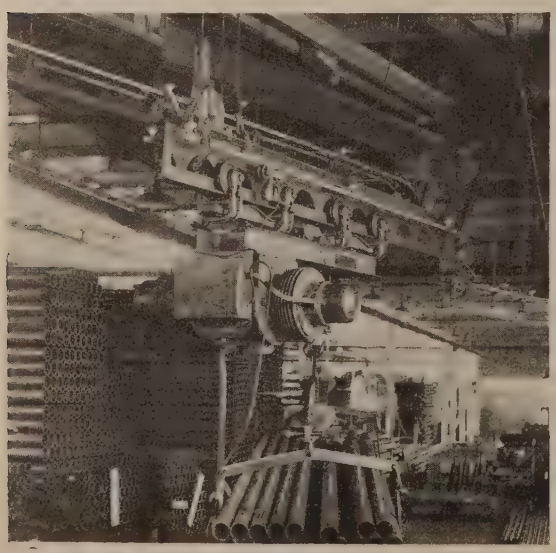
Two men in the railroad car unload the tubing by hand directly into the rack. One operator does all the transporting from that point into storage and again out of storage and into use. He needs no assistance beyond the floor-operated tramrail carrier running over the standard overhead rail system. He can pick up and store a carload of tubing in one-half day, and, depending somewhat upon the distance he has to move the loads, can keep two men in the car busy unloading and stacking on the platform.

One photograph shows the transfer between the low-level rail used on the platform, which passes through the door, and the high-level rail within the storage and manufacturing building. The section which is raised is operated by push-button control. Safety devices installed on this equipment prevent the load from running off the section being raised and also prevent the load from running over the end of either rail when the connecting system is not in position to receive it. A pin and socket device is used to produce proper alinement between the elevating section and the upper and lower rails with which it functions.

As the doorway through which the load passes from the platform has an automatic fire-door to conform with Underwriters' regulations, the section of track passing through the doorway is fitted with a swinging link which operates automatically as the moving fire-door comes in contact with the throw-out mechanism. This permits the door to be closed—either automatically, in case of fire, or manually, at the end of the day.



Picking Up a Lift from Incoming Platform



Raising a Load from Low-Level to High-Level Track

Depositing a Lift of Tubing on the Pile

Material Handling Applied to Nitrate

Chilean Industry Revolutionized by Labor-Saving Equipment —Twice as Much Nitrate Recovered from Ore with Sharp Cut in Cost

BY STERLING H. BUNNELL

AMERICAN material-handling machinery is successfully replacing labor, even where it is cheap. In the Chilean nitrate industry, Guggenheim Brothers have introducd a completely mechanized and highly efficient system of handling nitrate ore and extracting the nitrate or saliter. The new system is operated by a Diesel-engine plant aggregating 22,000 hp., and all heat in the engine exhaust gases and the jacket water is utilized in warming solutions used in the plant operation. The result, as compared with the Shanks system, which has been in general use without any essential improvement since its original invention long ago, is the recovery of about twice as much of the nitrate contents of the caliche in the ground, with only 30 per cent of the labor, and about 18 per cent of the fuel per ton of nitrate, and a reduction in cost amounting to over $10 a ton.

The story of the great Chuquicamata copper deposit, containing 1½ per cent copper and considered utterly without value some 20 years ago, is generally known. The development by E. A. Cappelen Smith of the Guggenheim interests of mechanical means for crushing and leaching the low-grade rock in enormous quantities made Chuquicamata the enormously valuable mine of the Chile Exploration Co.

Old Practice Wasteful

The nitrate grounds, where more than 100 nitrate plants were operating, many of them at a loss and none with more than a bare profit, invited a similar development. The practice was to break up the caliche rock by hand, haul it to the extraction plant in small railroad cars or mule carts, crush it to 3-in. lumps and load it by hand into shallow iron tanks, where it was flooded with liquor from the previous operation. The broken rock and liquor were then heated by steam at about 40 lb. pressure and the liquor was actively boiled for several hours, until the greater part of the sodium nitrate contained in the caliche was dissolved. The saturated hot liquor was then drawn off into shallow open tanks and allowed to cool for six days, by which time a considerable quantity of the nitrate was crystallized out. The cooled mother liquor was then pumped back to tanks full of fresh caliche, while the wet crystals were shoveled out of the crystallizing tanks, carried to a drying floor, and left several weeks to drain off the excess water.

Waste was evident all along the line; the steam heated tanks were not jacketed, the crystallizing tanks were exposed to the hot sun by day, and the spent caliches or "ripio" still contained about one-third of the original nitrate contents, so that only about 60 per cent of the nitrate contents of the caliche was recovered. Further, only about 75 per cent of the caliche excavated ever reached the plant, the rest being broken fine or otherwise left on the ground. Very slight use was ever made of mechanical methods for handling the crushed rock; and, in contrast with American practice, there seems never to have been a consulting engineer or constructing firm specializing in the improvement of Shanks-system nitrate plants.

Cappelen Smith conceived the idea of constructing a huge nitrate plant, using the identical system that had proved successful in handling and leaching copper ore. On a tract of caliche land containing about 3 square miles, located about 60 miles from the port of Tocopilla in Chile, the Maria Elena nitrate plant was built. The caliche rock is brought to the crusher house in 30-ton railroad cars, and dumped in a revolving car dumper. The rock is crushed successively in jaw, gyratory and Symonds crushers to a size about ½-in., and at the rate of about 16,000 tons a day.

From the crusher house, the material is transported by a long conveyor belt, which discharges by a tripper into a movable vat-filling and spreading mechanism, carried on a cantilever bridge supported on a gantry on railroad tracks, as shown in one of the accompanying illustrations. The loader bridge can thus fill in uniform layers any one of a series of 10 concrete tanks about 100 ft. square by 20 ft. deep.

After filling with rock, the tank is flooded with mother liquor, which is warmed by waste heat from the Diesel engines and circulates through three tanks in succession, until its nitrate content is built up to near saturation. The strong liquor is then circulated through a series of countercurrent coolers, the last of which are refrigerated, so that the nitrate is caused to crystallize out. The cooled liquor returns through the countercurrent coolers, taking on heat from the hot liquor coming from the leaching vats and thus conserving all possible heat energy. The condensers of the refrigerating machines are cooled by liquor requiring to be heated.

New Equipment and Methods Yield Savings

When the oldest of the three tanks in the series gives up the last of its nitrate, it is cut out and a tank of fresh rock is cut in. After draining the tank of mother liquor, the spent caliche is unloaded by grab buckets from two cantilever bridges working together in the same tank. The wet ripio, which contains only 2 to 3 per cent nitrate, is delivered by hoppers in the gantries supporting the unloading bridges to railroad cars and hauled away to a dump. The gantries and tracks supporting the unloading bridges are located on the opposite side of the leaching tanks from the loading bridge and constructed high enough to pass over the latter, so that the operation can proceed in regular order from one end of the row of tanks to the other, returning from tank No. 10 to tank No. 1 at the beginning of the line.

Besides the large rock-crushing plant, leaching tanks and material-handling machinery, the equipment comprises an elaborate system of pipes or valves by which any of the tanks can be connected into the system as required, a pump house with 26 motor-driven centrifugal pumps, the countercurrent coolers, crystallizing tanks, handling

DRAG Scrapers (A) Remove the Overburden of Earth from the Caliche. Mining is by power shovels. The shovels load the caliche into steel cars (D) on the track alongside. Trains are moved by electric locomotive (C) operating by trolley on main lines and by storage battery on loading tracks. Power for the shovels is supplied from portable transmission towers. Jackhammer drilling (B) prepares the caliche for blasting

mechanism, centrifugals and conveyor belts for drying the nitrate and delivering it to the loading platform, ammonia refrigerating machinery, air compressors and a very complete machine shop with iron and steel foundry. The plant proper is more than a mile in length.

Power Scrapers and Shovels Employed for Mining

The development by Col. Robert Marsh, Jr., of a successful system of using large drag scrapers and power shovels for mining caliche is an equally important innovation at the Maria Elena plant. The practice of the Shanks plants has been to mine entirely by hand, with some blasting by black powder in hand-drilled holes. The miner piles his lumps of caliche for inspection by an overseer, who makes a crude test of a few pieces by touching them with a smoldering wick called a "mecha," and judging the percentage of saliter by the emission of sparks. Hand mining is an expensive and slow operation, requiring a large number of men, all of whom must be provided with housing at the cost of the plant, as the nitrate region is a desert incapable of supporting life except in such organized industrial communities.

But the application of shovels to caliche mining was not easy. The caliche lies in irregularly distributed layers from one to several feet thick, generally overlain by a stratum of "costra," which is a low grade nitrate-bearing rock, and above that by a layer of "chuca," or fine earth. Below the caliche is found "coba," rock containing no nitrate, and below this is the hard packed earth known as "banco." There may be a thin salt layer above the caliche, and all these layers vary greatly in thickness and distribution.

The only way to ascertain the amount and quality of the caliche is by digging holes through the various layers, and sampling from the sides of the holes; and the methods in use are so uncertain that it is customary to apply arbitrary discounts, or "castigos," to the official test reports, cutting off two or three points from the nominal 20 per cent which is near the minimum for profitable operation by the Shanks system.

Economy in Payroll Pays for Mining Equipment

The mechanical mining operation thus requires the stripping of an irregular overburden of part loose earth, part rock, from an irregular layer of nitrate-bearing rock, generally less than 3 ft. thick, and varying in nitrate content from perhaps 20 per cent at one point to zero in a

test hole 20 to 30 ft. distant, perhaps again showing 20 per cent in a hole farther on. As the power shovel cannot pick and choose its material, but must take it as it comes, it was evident that the grade of caliche recovered by mechanical methods would average much less than the 15 to 20 per cent that would be obtained by individually hand-picking each lump. The shovel, however, would get all the caliche, the good with the poor, while the hand operation left at least 25 per cent in the discard.

The economy of the mechanical mining operation would be enormous, as over 20 tons would be handled per man, against only 2 or 3 tons by hand. Computation showed that in an operation of the magnitude planned the saving in housing and welfare work by reason of the reduction in labor force would amount to nearly $4,000,000, enough to pay for the complete mechanical mining equipment.

The system worked out by Colonel Marsh comprises a rectangular loop of railroad track, crossed by loading tracks which are easily movable. By sampling by test holes with much more care than was ever the practice with hand mining, the depth of the overburden and the caliche are ascertained, and any patches of worthless material approximately located, so that the mining operation can skip them. The overburden, after being loosened by blasting with black powder, using compressed air drills and electric shot-firing, is removed by drag-line scrapers and deposited on the previously worked ground. Following the drag-line scraper, an electric shovel loads the caliche, also loosened by blasting, into steel cars on the loading track alongside.

The cars are moved in trains of six by electric locomotives, operating by trolley on the loop track of the yard tracks, and by storage battery when on the loading tracks. Power for the shovels is carried by overhead electric conductors supported on steel transmission towers on skids. When the caliche has been exhausted from a strip of ground alongside the loading track, the transmission towers are simply dragged, by hitching on a mule, to a new position, and the track is picked up, steel ties and all, in 66-ft. lengths by a suspension frame attached to a drag line hook. Thus in a short time the whole of a loading track may be shifted to a new position, and regular working can proceed over the entire area.

The Maria Elena plant, when put into operation, had

CALICHE Rock Is Brought in 30-Ton Cars to the Crusher House (F). Dumped into a revolving car dumper, the rock is crushed successively in jaw, gyratory and Symonds crushers. It is then transported by a long conveyor belt (G) and picked up by a loading bridge (H), which distributes it in a series of ten concrete tanks (J). Here the rock is treated with hot mother liquor, which, after becoming saturated, is passed through coolers to crystallizing vats. Nitrate stock piles above these vats are shown in upper left. In the middle foreground is a concrete tank partly emptied of spent caliche. In the distance (E) may be seen the workingmen's town

considerable surplus capacity; but the grade of the caliche proved to run lower than expected. The efficiency of the extraction was, however, so good that nearly 90 per cent of the saliter in the caliche was recovered, in spite of the fact that the caliche occasionally ran as low as 8½ per cent in saliter content. It should be noted that the Shanks-system plants become very inefficient with caliche of even 15 per cent content, so that all rock running below 15 per cent is discarded and left in the waste pile.

As the inevitable operating difficulties of a new plant were smoothed out, the output of the Maria Elena plant increased, until it became evident that it would have a capacity of 500,000 tons of saliter per year, and would recover about twice as much saliter from a given area of caliche ground as would be possible with the Shanks system, besides working profitably on material too poor for any Shanks plant.

About 9000 persons form the community at Maria Elena; and this is about one-third the number that would be required to produce the same amount of saliter by Shanks plants, of which it would take four or five of the largest size to equal the output of Maria Elena.

Change of Great Importance to Chile

The completion of the plant, with the successful solution of all difficulties and the expansion of production to double the original schedule, settled all doubts as to the economies effected by the Guggenheim system. The operating managers of Lautaro Nitrate Co. made many visits to the Maria Elena plant and inspected its operations thoroughly. They studied the operating costs and production figures, and became convinced that the Guggenheim system outclassed the best possible Shanks plants. Negotiations were accordingly begun that resulted in the control of the Lautaro Nitrate Co. passing to the Guggenheim interests, and in new financing for immediate construction of a 500,000-ton plant on caliche lands recently purchased by the Lautaro company and not yet developed with a production system.

The wasteful practices in the production of Chilean nitrate hitherto, by which the best spots were mined first and the poor material left untouched, have resulted in the loss of a large proportion of the nitrate in lands already worked, and a corresponding loss to the Chilean Government in revenue that would have been obtained from the saliter. The development of the unworked territory and large plants capable of producing saliter at low cost will be of great advantage to Chile, strengthening an industry that has been operating under great difficulties, and maintaining the revenue of the Chilean Government from the nitrate deposits, which are the principal source of Chile's national wealth.

Importance of Good Steel-Plant Lighting Systems

UNDER the conditions which now obtain in steel plants, according to M. H. Morgan, Jr.:*

1. Good light is cheap—because of great advances in the art of making electric lamps and shades and because of the low cost of electric power to steel plants.

2. Good light is of the essence of safety—because we must be able to see well to be safe.

3. Good light is a powerful aid to production—because men can and will do more and better work when they can see well.

Good light is cheaper in most cases than the very floor it illuminates; it is about the same in both first cost and operation as toilet and janitor facilities. A good interior lighting system may be installed in steel works buildings for from 5c. to 10c. a sq. ft., depending upon the class of work done and the amount of light which that work requires. This system may be maintained and operated for 2c. to 4c. a sq. ft. a year, assuming that it is used 12 out of the 24 hr., which is an average figure.

Exterior lighting is harder to estimate. If existing buildings and poles may be used to support fixtures and wiring, the cost of installation is about half that already given. The intensity used is much less and the operating cost somewhat less than half, because it is practically never necessary to use outdoor lights during daylight, whereas a dark, cloudy day frequently requires artificial lighting of interiors.

Safety Conserved by Good Lighting

Good light is of the essence of safety. Sight is by far the most useful, the keenest and the most important of the senses which inform us of obstacles, moving objects or other impending dangers; and safety most often depends upon quickness of perception of impending danger.

A report of accident causes concerned with lighting is made every few years to the Illuminating Engineering Society by the Travelers' Insurance Co. In 1910 the report showed that 23 per cent of industrial accidents were due to inadequate or improper lighting; in 1918 the figure was 10 per cent; in 1928 it was still 15 per cent, in spite of the vast improvement effected in lighting systems.

Better Output Where Lighting Is Good

A distinct gain in production is the usual result of increasing the illumination, in plants of almost every kind, from "fair" to that of the present standards. A reduction in the amount of "seconds" produced, and less spoiled material due to the workman's greater sureness of eye and lessened tendency to make mistakes, is also a usual secondary result. This conclusion is the result of tests made during the past five years upon shops and even entire plants before, and again after, bringing the lighting up to present standards.

These tests were conducted in some cases by the management of the plant; in others by the National Electric Light Association or the lamp manufacturers. The number and variety of tests, the fact that they come from so many different sources, and their substantial agreement show that the tendency toward increased production and increased accuracy of work with bettered lighting is a real and a forceful one. I quote below from several such reports:

Character of Work	Light Intensity		Increase in Production
	Old	New	
Making babbitted bearings	4.6	12.7	15 per cent
Heavy machine work	3	11.7	10 per cent
Manufacturing piston rings	1.2	18	25 per cent
Inspecting roller bearings	5	20	12.5 per cent

A good steel mill lighting system will have certain recognizable qualities, chief among which are:

1. Adequate intensity of light.
2. Freedom from glare——uniformity.
3. Provision for cleaning.
4. Provision for turning lamps off or on singly or in small groups.

*Electrical engineer, Carnegie Steel Co., Edgar Thomson plant, Braddock, Pa. From a paper before Association of Iron and Steel Electrical Engineers.

Classes for Open-Hearth Furnacemen

Instruction on Important Phases of Steel Making Given at Six Months Intervals Pays Big Dividends in Improved Furnace Efficiency

BY MARTIN J. CONWAY*

MARTIN J. CONWAY

ABOUT 18 months ago some careful computations were made to contrast the estimated cost of various kinds of fuel in the open-hearth department of the Lukens Steel Co. We have 18 basic furnaces with total rated capacity of 1350 tons, and six smaller acid-lined furnaces (total rated capacity 240 tons). Up to the time of the investigation these had been fired with gas made in a battery of 52 stationary producers, using western Pennsylvania bituminous coal.

It appeared that large annual savings, running into six figures, could be made by the use of the heavy oil available at refineries at Marcus Hook, Del., the residue after distilling gasoline and lubricating oils from crude petroleum. This was to be delivered by motor truck and trailer via 35 miles of improved highway. (It may be remarked in passing that this method of transport has proved entirely satisfactory; several trucks, each with trailer carrying 120 bbl. per load, are in service. Costs are materially lower than the railroad freights—whether the latter are much too high is another question.)

Classes Instituted to Facilitate Change to Fuel Oil

From an engineering standpoint the change from gas to oil was not without difficulty. From an operating standpoint there were many chances for trouble, for none of the first helpers or melter foremen had ever run furnaces with oil fuel. It would be easy for a workman to melt down the furnace ports with the short, sharp flame, thus causing greater expense in refractories than the anticipated savings in fuel.

To avoid such untoward developments, the management approved our proposal to institute a training course for open-hearth operators. We were to meet on a certain afternoon each week, immediately after change in shifts. Melter foremen and first and second helpers for the entire plant came, on their own time, to a convenient and quiet corner of the storeroom, where benches, blackboard and other equipment were provided. Owing to rotation of shifts the instructors, who included the open-hearth superintendent and the fuel engineer, went over the same ground three times in succession, and devoted one hour each week to the actual work of instruction (although many hours were necessary for preparation). Each man came once every three weeks until four lessons were given. In all 12 weeks were required.

Model of Furnace Used to Advantage

Aside from a careful consideration of the topics to be discussed and the method of conveying somewhat technical information in terms the workmen could understand, the principal work of preparation consisted of building a scale model of the furnace, blocks, chambers, flues and valves. This was done by the pattern-making apprentice, and the views show it to be a creditable job. The roofs of furnace and chambers can be removed, so the interior shape and construction of the hearth and checkers can be observed. The blocks are also sectionalized so that the relationship of ports, downtakes and slag pockets can be studied. One end of the furnace was built to illustrate the prevailing conditions with gas firing; the other end represented the way the new oil fuel would be used.

This model proved to be invaluable. Most furnace men think that all there is to their furnace is above the charging floor—what they see in their daily work. Many of them, if they think of the checker work at all, think vaguely that it is part of the foundation, just under the hearth. Few indeed would be able to visualize the various flue connections, and be able to tell *why* certain changes should be made in the valves, flues and checkers to correct a definite condition in the hearth.

After the "training course" had been organized and properly advertised all the men fell into the spirit of it promptly. Absences were rare. Close attention and active discussion was the rule.

Ordinarily I would talk extemporaneously for about 20 min., covering all the points in an outline before me. Then the open-hearth superintendent would take about an equal length of time, developing certain phases of the subject in shop language, and illustrating his points with incidents which occurred recently in the department. Finally the meeting was open for questions, either from the floor or from the plant question box.

At the end of the fourth lesson, each man was given a copy of the lecturers' notes, neatly bound in a folder, and a group of photographs of the model.

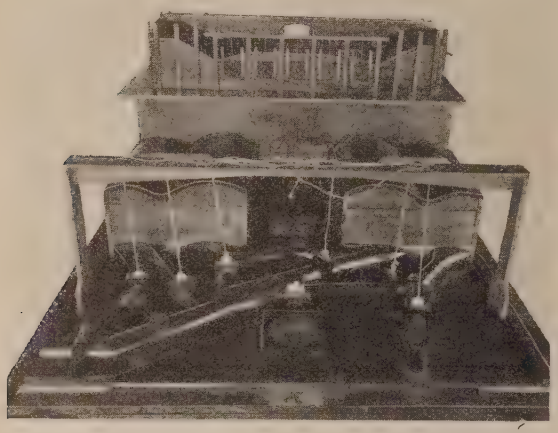
Improves Efficiency of Entire Plant

Results have been gratifying, even if hard to measure in dollars. The principal object was achieved, in that the change from gas fuel at 2-in. pressure to oil at 100-lb. was made without difficulty of any sort. Of course the oil was put on one furnace at a time, after the superintendent could be sure that the melters were handling the situation properly. But the whole operation of the department took on a different tone. Minor troubles were less frequent, the average time per heat was materially less, the consumption of ore and pig iron at the finish was cut down, and the maintenance charges lowered.

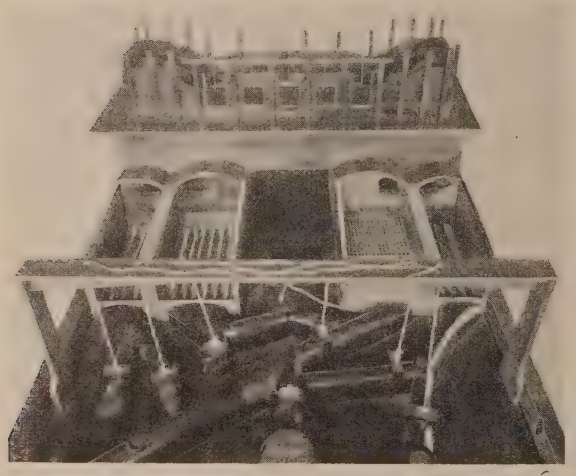
Summing up, the expected economies of oil-firing were realized, even exceeded. As a result it was decided to continue the course of instruction, and this has been done

*Fuel engineer, Lukens Steel Co., Coatesville, Pa.

at intervals of six months. The broad outline of the course remains unchanged, in order to care for new employees, but emphasis is placed on phases which the plant records show need attention. For instance, in the last course, particular attention was given to bad bottoms, to



WOODEN Model of Open-Hearth Furnace Is Sectionalized so Interior Form and Construction Can Be Studied



accidental alloy in skelp steel, to proper manipulation of ingot iron heats, and to the economies of melting to the correct carbon, neither high nor low.

Outline of Original Course

Lesson I—Furnace Construction:
1. Furnace buckstays and bindings
2. Construction of hearth; importance of tap hole
3. Walls and doors
4. Roof
5. Blocks; bulkheads, ports (gas vs. oil), slag pockets
6. Rearrangement of downtakes for oil firing
7. Regenerators; function, size, construction
8. Flues and valves

Lesson II—Furnace Operation:
1. Starting a cold furnace
2. Making bottom
3. Duties of first and second helpers
4. Qualifications of first class melter foreman, first helper, second helper
5. Repair of furnace between heats
6. Order of charging
7. Working period
8. Judgment of temperature
9. Tapping the heat

Lesson III—Making the Most Steel with the Least Fuel:
1. Low fuel efficiency of the open-hearth process
2. Improving efficiency by
   a. Improving quality of fuel
   b. Increasing furnace output
   c. Burning fuel completely and cutting down stack temperature
3. Discussion of principles of combustion
4. Nature of producer gas and fuel oil
5. Atomizing fuel oil
6. Factors for success in use of fuel oil
7. Influence of checkers:
   a. Cleanliness
   b. Period of reversal

Lesson IV—Reactions and Temperature:
1. Oxidation during melting stage
2. Slag formation with lime, magnesia and silica
3. Manganese and sulphur
4. Fixing phosphorus in the slag
5. Ore and lime boil
6. Carbon elimination and its effect on slag
7. Function of addition; efficiency or recovery.

Slight Adjustment to Coupling Causes Failure in Crankshaft

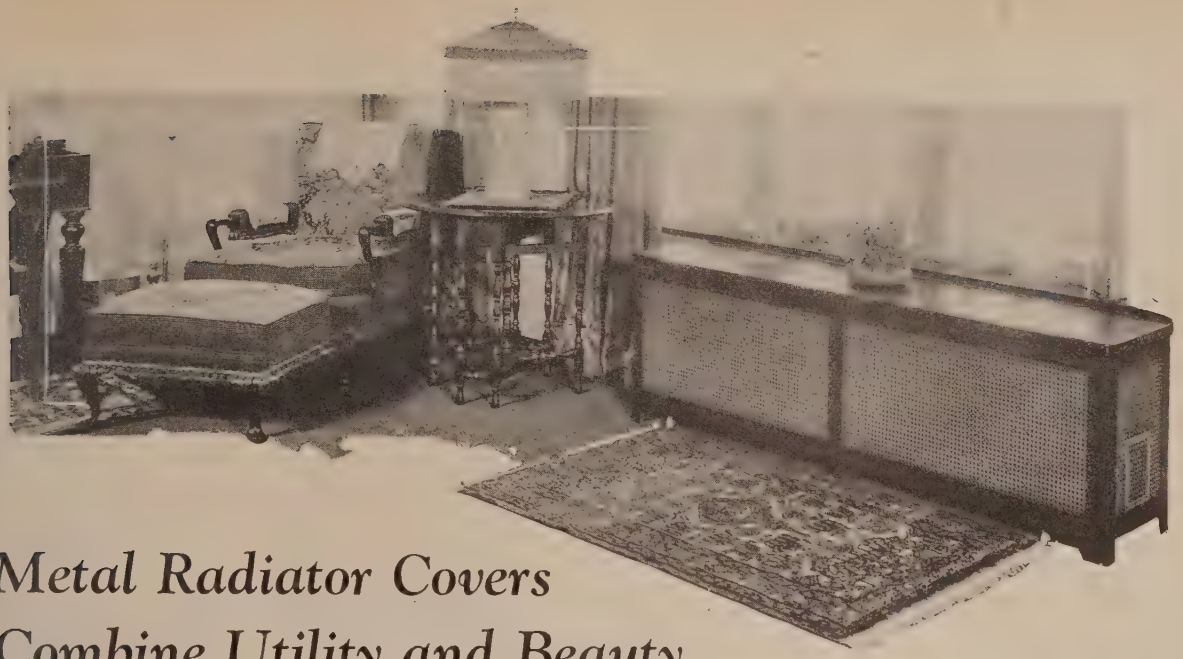
It will be recalled that the second flight of Graf Zeppelin toward America nearly resulted in disaster through crankshaft failures in two of the engines. At the time the trouble was attributed to the fact that superchargers were installed after the first successful transatlantic flight. Tests have been made on these engines at the German Testing Institute for Aircraft at Berlin and, with the assistance of a Geiger torsiograph, it was discovered that, when the rigidity of the crankshaft coupling was adjusted to a certain value, torsional oscillation of the crankshaft occurred at the regular working speed of the engine. It was demonstrated that a relatively small alteration in the rigidity of the coupling made previous to the second flight had been sufficient to bring the critical speed within the range of the working speed.

Bending Tests on Concrete Reinforcing Bars

A bend test machine has been developed at the Bureau of Standards, in which bars of various sizes and shapes appear to undergo approximately the same strain when bent through the same angle. With it tests were made on concrete reinforcing bars.

Unusual tests for this class of material consist in bending the bars, without heating, through 90 to 180 deg. with a radius of bend equal to 1, 2 or 3 diameters of the bar. The angle and radius of the bend depend generally upon the size and hardness of the bar. It seems that the tendency is to suit the specification to what the bars of different grade will meet successfully rather than to the service demanded of the bars in bending for use as reinforcement.

In the tests made on bars purchased in the open market at the bureau, those which did not break in the cold-bend test were not seriously affected as to strength by the bending. The apparent yield point in the bending test was much higher than the yield point determined in direct tension test. The impact test used gave an approximate measure of the yield point of the bar, but none of the bars broke in the impact test except a few which had been quenched in water from a high temperature.



Metal Radiator Covers Combine Utility and Beauty

BY J. B. NEALEY

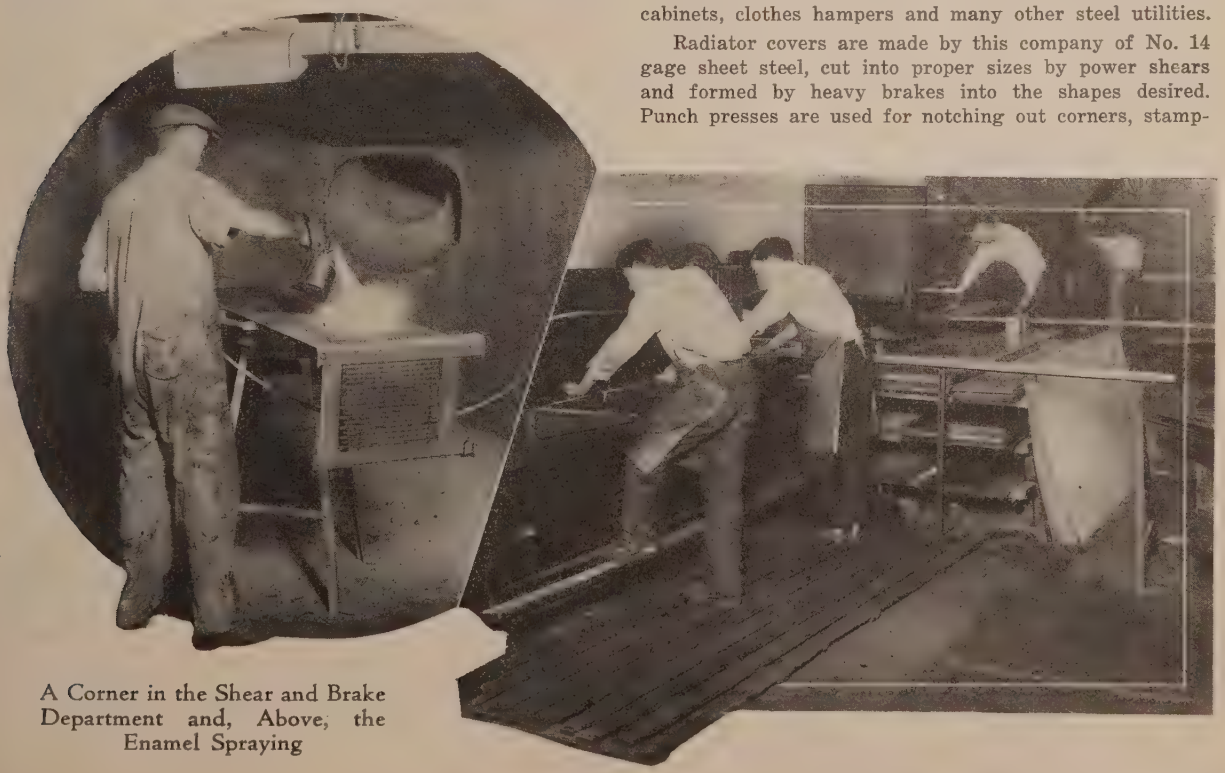
WHILE steel is essentially utilitarian, many markets have been won and there are others that could be won by combining the utilitarian with the beautiful.

The manufacture of metal radiator covers is an example of a large market that has been created by combining the practical with the merchandising factor of attractiveness.

At the outset, as well as now, these covers were designed to conceal the obtruding radiator, and sometimes to include a humidifier for the air and to eliminate wall smudge, but it was necessary to beautify them in order to sell them. So far has this idea been carried out that the schemes of interior decoration, woodwork finish and wall color treatments of individual homes and buildings comprehend harmonious designs and colors in the radiator covers.

While today there are many manufacturers of metal radiator covers, the industry is only 10 years old. One of the pioneers is the Art Metal Radiator Cover Co., Chicago, which, in addition to holding a major place in this field, is prominent in the manufacture of bathroom cabinets, clothes hampers and many other steel utilities.

Radiator covers are made by this company of No. 14 gage sheet steel, cut into proper sizes by power shears and formed by heavy brakes into the shapes desired. Punch presses are used for notching out corners, stamp-



A Corner in the Shear and Brake Department and, Above, the Enamel Spraying

ing out small sections, flanging, etc. Parts are welded by spot and oxy-acetylene processes.

All orders are grouped into schedules according to finish, wood grain, marble, plain color, inlays, etc., and any one of these schedules may carry from 50 to 250 different kinds of finishes. Any one unit may have as many as 12 coats of enamel.

As rust is detrimental to finishes, all steel is covered with oil, which must be completely removed before the finish is applied. Washing in naphtha removes most of the oil, the remainder being taken off by mechanical sanders. The prime coat must be elastic enough to absorb any oil that may be left. The cost of cleaning some of the grilled panels, it is stated, ofttimes amounts to 10 per cent of the total cost.

The prime coat and succeeding coats and enamel are sprayed on, a long line of booths being provided for this purpose. Each coat is then baked in specially constructed gas ovens, after which the coat is hand rubbed and smoothed. The baking process is one of the most intricate in the entire process as the colors will vary with heat and time. When the proper heat cycle is determined for the work in hand, it is carefully noted and faithfully followed for the rest of that order.

Seven gas-fired ovens are employed, each 15 ft. long, 12 ft. wide and 8 ft. high. Swinging doors are provided in front, and the work is charged on racks mounted on trucks. Temperatures used vary from 250 to 800 deg. Fahr., and there is also a wide range of heating periods.

A machine shop is maintained for the making of all tools, dies, jigs, etc. In preparing for the manufacture of a recent model, it was necessary for the shop to make more than 50 dies, which is indicative of the important part such a shop plays in work of this kind.

Superheating Cast Irons Shows Varying Improvement

A SERIES of tests has recently been reported in which the physical properties of a number of cast irons were compared after each iron had been subjected to three different degrees of superheat. The original article was entitled "Die Überhitzung von Gusseisen," by Peter Bardenheuer and K. L. Zeyen, and was published in *Mitteilung Kaiser Wilhelm Institute für Eisenforschung*, No. 130, Düsseldorf, Germany.

Higher Carbon Irons Are Improved

In general it was found that, with normal silicon content, the higher carbon irons showed an improvement in properties as the superheat was raised from 1365 to 1480 deg. C. and finally to 1605 deg. C. Irons with less than 3 per cent carbon showed no improvement or a definite impairing of these values.

Low-carbon irons may, however, be made susceptible to superheating by using high-silicon contents, or by adding part of the silicon as powder in the ladle. Addition of alloying elements such as chromium also increases the tendency towards improvement on superheating.

High-Frequency Furnace Used

In making the tests, a high-frequency induction furnace was used to melt and superheat the metals. For each sample a period of 15 min. was allowed at the superheating temperature, after which it was poured into a ladle and cast at about 1350 deg. C. into rods for test bars. All the bars were cast in dry sand molds. A few of the many reported results are here reproduced.

Melts No. 1, 2, and 7 illustrate the difference between the high and low-carbon irons. No. 10 brings out the effects of adding half the total silicon in the ladle and No. 14 shows a melt of very high-silicon iron. Both improve on superheating. In melt No. 18, 0.39 per cent Cr. was added, replacing Mn. In spite of the low silicon, this iron is considerably bettered by the high temperature.

Results of Superheating Cast Iron

Melt No.	Superheat, Deg. C.	Bending Strength, Lb. per Sq. In.	Deflection, In.	Tensile Strength, Lb. per Sq. In.	Analysis, Per Cent C	Si	Mn
1	1365	58,700	0.57	33,400	3.44	1.10	0.87
	1480	65,300	0.61	34,400	3.34	1.21	0.88
	1605	67,500	0.38	40,900	2.79	1.82	1.05
2	1365	76,700	0.59	44,300	3.03	1.33	0.87
	1480	68,500	0.50	37,700	2.97	1.41	0.92
	1605	63,500	0.35	39,100	2.80	1.60	0.89
7	1365	82,500	0.45	40,900	2.59	2.28	0.93
	1480	73,000	0.35	43,000	2.57	2.29	0.97
	1605	70,500	0.36	46,600	2.61	2.28	1.01
10	1365	60,400	0.41	35,500	2.79	2.38	1.05
	1480	60,000	0.37	35,000	2.73	2.37	1.04
	1605	78,500	0.43	43,600	2.81	2.54	0.91
14	1365	57,100	0.28	39,400	2.52	3.85	0.94
	1480	60,600	0.35	39,200	2.54	3.84	0.96
	1605	72,500	0.35	38,200	2.57	3.72	0.93
18	1365	55,400	0.41	34,500	3.22	1.84	0.55
	1480	60,200	0.43	34,800	3.17	1.77	0.51
	1605	69,500	0.47	40,700	3.16	1.81	0.57

Promoting a Dendritic Structure Harmful

In explanation of the findings, the theory is advanced that anything which tends to promote a dendritic structure is harmful. Presumably, at the high temperature employed, all of the graphite will be dissolved. Consequently when the iron cools, there is more of a tendency for undercooling than would be the case were there a few graphite nuclei present in the liquid. Opportunity is thus given for the sudden formation of fairly large dendrites with an interstitial network of finely divided graphite and ferrite. The purpose of adding silicon or of raising the silicon content with low-carbon irons is to increase the tendency for the regular precipitation of graphite on solidification.

Great Britain Controls the Chromium Supply

The source of all commercial chromium is the mineral chromite. Commercial chromite, however, contains from 35 to 55 per cent Cr_2O_3, the lower grades being used for refractories and the higher grades for steel making and in the chemical industries.

In the early part of the nineteenth century Maryland was the world's most important source of chromium. From 1860 until 1903 Turkish ore dominated the world market. Turkey was supplanted by New Caledonia in the period from 1903 to 1913, and, since the war, Southern Rhodesia has been the principal producer. The rapid development of the deposits in the Transvaal in the past two years provoke some speculation as to whether or not the Union of South Africa will some day surpass Rhodesia. Irrespective of the relative positions occupied by Rhodesia and the Union of South Africa, the British Empire will control the world market for many years, says "Mineral Industry, 1928."

BUILDING THE PHILADELPHIA AND CAMDEN BRIDGE

Etched by F. Townsend Morgan, President, Morgan Steel Co., Philadelphia. Reproduced in The Iron Age by Courtesy of Albert Catterall, Secretary, Oliver Brothers, Inc., New York.

Roller Bearings Put Old Mill Motors

Use of Oxy-Acetylene Cutting and Arc Welding in Altering Motors for Standard Bearings

BY J. L. BROWN*

SOME more or less successful attempts have been made to put roller bearings in existing mill motors without conforming to the "300 series" adopted as standard by agreement between the Association of Iron and Steel Electrical Engineers and the roller bearing manufacturers. This standardization, intended to apply primarily to future motor designs, has the obvious advantages of interchangeability as between various makes of roller bearings, simplification of manufacture and reduction in the number of spare parts, but its greatest efficiency cannot be realized unless it can be made to apply to existing designs and bearing change-overs in existing motors. The following paragraphs with accompanying cuts show clearly and in detail how this may be accomplished with a minimum of effort by the use of oxy-acetylene cutting and arc-welding. Fig. 1 shows the end of one half of a mill motor frame of average size opened to display the interior form of the bearing housings. By comparing Fig. 2 with Fig. 1, it will be seen that the central support or web has been cut away. This web is used in the sleeve bearing design to support the inner end of the bearing. This cutting is done to each of the four half-housings by means of the oxy-acetylene flame. The total cutting time per frame to remove the webs and other irregular projections which might interfere with the roller bearing cartridge was 2.5 hr.

The necessary welding additions to the housings were made in 14 hr. The frame interior with welding additions in place is illustrated in Fig. 3. The comparatively thin inside web of the original housing has been built up to form a substantial support for the inner end of the roller bearing cartridge.

After the final machining, which required 3 hr., the interior of the frame appeared as in Fig. 4, permitting assembly of the roller bearing cartridges as they appear in the complete motor assembly, Fig. 5.

Only a few years ago the modifications described and illustrated here would have seemed very difficult, but with the rapid development that has taken place in recent years in steel fabrication by the electric arc and oxy-acetylene flame, the necessary modification becomes only an average job when adequate working drawings are available.

Fig. 1

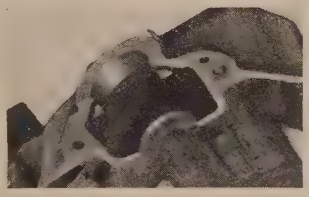


Fig. 2

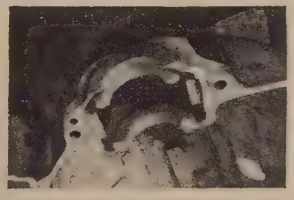


Fig. 3

Fig. 4

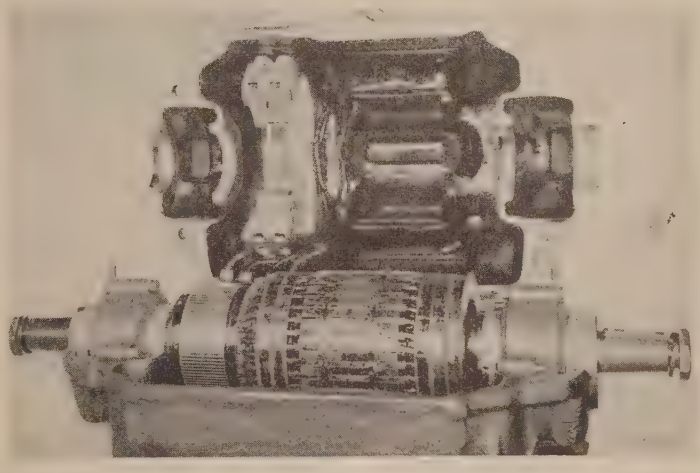


Fig. 5

Fig. 1.—Old-Type Housing with Central Web
Fig. 2.—Central Web Cut Away
Fig. 3.—Extra Metal Welded On
Fig. 4.—Housing Machined
Fig. 5.—Motor Reassembled with Its Roller Bearings

*Industrial motor engineering department, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

Lewis-Shepard Co. Acquires Plant in Indiana

The Lewis-Shepard Co. announces the purchase of a brick manufacturing building containing approximately 60,000 sq. ft. of floor space at Crawfordsville, Ind. Instead of putting up additional buildings at Watertown, Mass., the company has decided to operate the branch factory at Crawfordsville, to serve customers west of Cleveland. It is expected that production will be well organized at Crawfordsville by Oct. 1.

The Lewis-Shepard Co. was incorporated in 1915, and since that time has expanded its manufacturing area six different times. At the outset the Crawfordsville plant will manufacture chiefly skid platforms for lift trucks and storage racks for use with portable elevators. The production of lift trucks and stackers will probably be added to the Crawfordsville production schedule as soon as possible.

Blaw-Knox Co. Announces Personnel Changes

Following the acquisition by the Blaw-Knox Co., Blawnox, Pa., of the Lewis Foundry & Machine Co., Groveton, Pa.; the Union Steel Casting Co., Pittsburgh; the National Alloy Steel Co., Blawnox, and the Pittsburgh Rolls Corporation, Pittsburgh, a number of changes in the executive personnels and boards of directors of all the companies have been announced.

The membership of the board of directors of the Blaw-Knox Co. has been increased from 16 to 22 and the following members added: J. P. Allen, president, Union Steel Casting Co.; Frank Cordes, president, Lewis Foundry & Machine Co.; J. R. Dunsford, vice-president of the Lewis company; D. L. Eynon, president, Pittsburgh Rolls Corporation; Samuel Harden Church, director in the Union company, and C. M. Thorp, Pittsburgh attorney.

Mr. Cordes has also been made a vice-president of the parent company. He continues as president of the Lewis company and also becomes vice-chairman of the board and a director of the Union company and the Rolls corporation as well as vice-president and a director of the National Alloy Steel Co.

Albert C. Lehman, president, Blaw-Knox Co., becomes chairman of the board of each subsidiary company. In addition to those mentioned above, the subsidiaries include A. W. French & Co., Chicago, manufacturers of road building machinery, acquired by Blaw-Knox early this year. Present officers of the parent company are A. C. Lehman, president; I. F. Lehman, F. M. Bowman, Frank Cordes and Wayne Rawley, vice-presidents; Benjamin L. Hirshfield, treasurer, and Chester H. Lehman, secretary.

Merger of British Steel Companies Imminent

A merger of leading steel producers of Great Britain involving between £20,000,000 and £30,000,000 ($97,000,000 and $145,500,000) is reported imminent. Outstanding in the new corporation would be the combination of Dorman, Long & Co., Ltd., with £12,000,000 ($58,200,000) capital stock, and Bolckow, Vaughan & Co., with £8,000,000 ($38,800,000) capital stock. Negotiations between these leading companies in the iron and steel industry have continued for some months and agreement in principle was reached some time ago.

Dorman, Long & Co. in 1923 acquired control of the plant and properties of Bell Brothers, Ltd., North Eastern Steel Co., Ltd., Sir E. Samuelson & Co., Ltd., and the Carlton Iron Co., Ltd. In addition to its own bridge and construction plants, mines and collieries and by-product coke operations, the company controls the Redcar Iron & Steel Works, Clarence Iron & Steel Works, Acklam Iron & Steel Works, Newport Iron Works, Carlton Iron Works, Ayrton Sheet Mills and Cleveland Wire Mills, all in the Middlesborough district. It is a producer of pig iron, semi-finished steel, plates, shapes, bars, sheets, rails and accessories.

Bolckow, Vaughan & Co., Ltd., also of Middlesborough, produces ferromanganese, spiegeleisen, pig iron, semi-finished steel, bars, shapes, plates and rails and accessories. The rated production capacity of the company is 15,000 tons of pig iron and 8000 tons of steel products a week.

Production and Stocks of Petroleum and Gasoline (a), Coal (a) and Electric Power Output (c)

	July, 1929	June, 1929	July, 1928
Crude petroleum produced, light, bbl.	82,878,000 [b]	75,390,000	.....
Crude petroleum produced, heavy, bbl.	8,449,000	8,013,000	.....
Crude petroleum produced, daily average.	2,946,000 [b]	2,780,100	.....
Crude petroleum produced, seven months.	579,442,000	.....	511,816,000
Gasoline produced, bbl.	37,855,000 [b]	35,606,000	32,959,000
Gasoline produced, bbl., seven months.	244,433,000	.....	.....
Electric power output [d]	8,011,077	7,768,400	7,142,000
Electric power by water-power [d]	3,059,561	3,065,967	3,071,000
	August, 1929	July, 1929	August, 1928
Bituminous coal mined, net tons	43,560,000	40,635,000	41,108,000
Anthracite, net tons	5,970,000	4,993,000	6,759,000
Beehive coke made, net tons	556,000	600,200	295,300

[a] United States Bureau of Mines.
[b] Largest ever recorded.
[c] United States Geological Survey.
[d] Thousands of kwhr.

Appointed Sales Agent for Rustless Iron

The Superior Steel Corporation, Pittsburgh, has been appointed sales agent for the Rustless Iron Corporation of America for hot and cold rolled rustless iron strip. Future sales for the Rustless Iron Corporation of America in the Detroit district will be handled through the Superior office at 10252 General Motors Building, Detroit, in charge of Earl Park. Mr. Park will have associated with him J. Abbott as metallurgical salesman.

The office of the Rustless Iron Corporation of America at 731 Fisher Building, Detroit, will be maintained by A. L. Grinnell, as development engineer, to continue effort in the development of new uses of rustless iron.

Armco Stack at Ashland Makes Record

A world's record for production by a blast furnace with a 13-ft. 9-in. hearth is being claimed for No. 1 furnace at the Sixth Street plant of the Ashland, Ky., division of the American Rolling Mill Co. This furnace has just completed seven years of continuous operation, which record, we are informed, has been equaled or surpassed by only one other furnace.

While it has been surpassed in endurance it has achieved a better production record than any other furnace with a 13-ft. 9-in. hearth. The old lining contained 224,000 9-in. brick. During the seven years of continuous operation with this lining there were 809,951 tons of pig iron produced, or an average of 3.6158 tons per 9-in. brick equivalent.

The No. 1 has made other creditable output records as follows: Day, 454.82 tons; week, 2844.82 tons; month, 12,083.52 tons; daily average, 393.10 tons; pounds of coke per ton of pig iron, March, 1926, 1538.

Reed-Prentice Expansion

The Reed - Prentice Corporation, Worcester, Mass., manufacturer of machine tools, has let contracts for an addition, 60 x 150 ft. in size, to take care of expansion in business and to secure additional space on the assembly floor.

The Young Radiator Co., manufacturer of radiators, cooling systems and heating units, Racine, Wis., has been operating in the last two months 12 hr. a day in most departments, and day and night in the tool shop.

An X-ray study of firebrick is reported in bulletin 193 of the Engineering Experiment Station, University of Illinois, Urbana. The pamphlet is of 13 pages and copies may be obtained from the experiment station for 15c.

Presents Argument for Steel Roofing

Building Code Committee Told That Flat Steel Roof Made of Ribbed Alloy Steel Sheets Is Economical and Will Serve Every Purpose

HERETOFORE in the preparation of building codes for congested cities, roofing consisting of steel sheets has not been given consideration except for shed buildings and temporary construction. This is due to the fact that the steel roofing available in the past was not of a quality or design that merited consideration in first class construction, other than for mill buildings.

During the past ten years, however, there have been improvements and new developments in steel roofs. Many are being produced today that have all the qualities required in the better types of buildings.

These improved "steeldeck" roofs differ from the old corrugated form of steel roofs in that they are not merely a flat sheet rolled in a wave formation. On the contrary, they consist of special alloy or otherwise specially prepared steel sheets formed so that when laid in place they present a smooth, flat outer surface stiffened by ribs formed into the sheets themselves or welded to them. On account of this flat rather than a corrugated surface steeldeck roofs are capable of being properly insulated and waterproofed to form a permanent, indestructible structure.

Definite Advantages of Steeldeck Roofs

Any new construction to deserve consideration, should have some definite quality that constitutes an improvement. These qualities of improved steeldeck roofing are a decrease in fire hazard, when compared with wood, economy when compared with other incombustible roof materials, and permanency when compared with steel roofing as used in the past.

It is not necessary to present argument that there should be a definite place in a building code for a construction which may be used at a cost little in excess of a two-inch plank roof and at the same time consists of incombustible material which prevents the spread of fire either from the inside or outside. Steeldeck roofing does exactly this. It is permanent, is designed to have strength equal to that required for any other material used for roof construction, and has insulating qualities equal to, or better than, other materials now used.

The modern tendency of building codes, of which the proposed building code prepared by the United States Department of Commerce is an outstanding example, is to specify two grades of fireproof construction: (a) fully fireproof and (b) fire protected construction. Fully fireproof construction applies to tall buildings and those in which the contents constitute a serious fire hazard. Fire protected construction is applied to buildings of lesser height and having contents that represent a less severe fire hazard. The latter includes hotels, hospitals, theaters, schools, and other buildings principally for human occupancy.

ROBERT D. SNODGRASS, Consulting Engineer for Truscon Steel Co., Youngstown, Ohio, Presented This Brief for Steel Roofing to a Special Committee Devising a New Building Code for New York. This revision of the code is sponsored by the Merchants' Association, and takes recognition of the fact that a building code written many years ago cannot adequately recognize new building methods or materials developed meanwhile, nor permit economies arising from a higher quality in steel or other constructional material

In these classes of building the floors and roofs represent two very different types of fire risks. A floor having combustible materials both above and below must have fire resisting qualities that will confine the hottest fire of which the contents are capable to the area in which the fire has started. The roof, on the other hand, must only prevent the spread of fire by being composed of materials that will not contribute to the fire, that will prevent the hazard of flying brands, and that will protect the building from fires on the outside.

If roofs are required to have the same fire resisting qualities as the floors, the owner is being required to go to an unnecessary expense. Therefore the use of steel roofing should be permitted on both fully fireproof and fire-protected buildings, provided the roof and supporting members be separated from the floors below by fireproof ceilings.

Requirements for Permanency

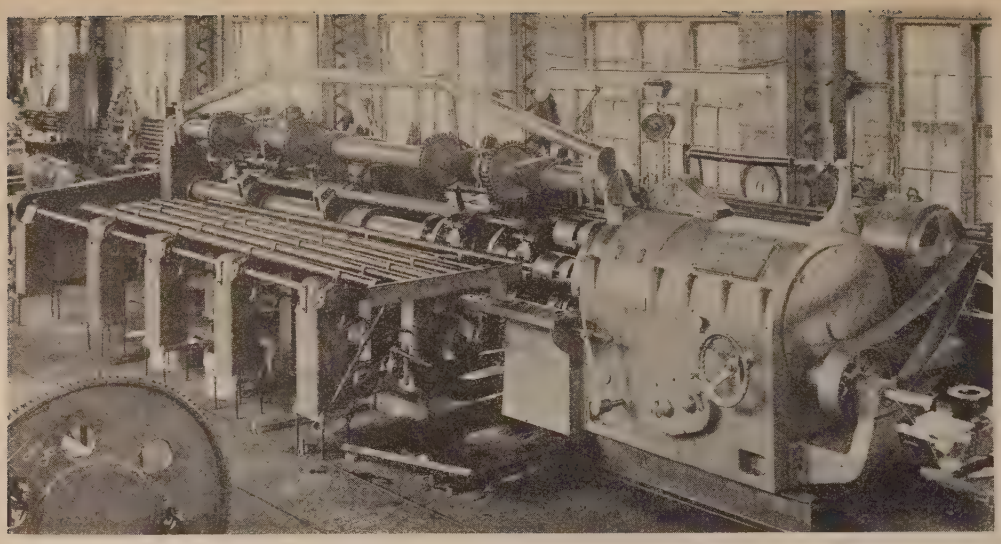
If they are to provide a permanent construction, steel roof sheets should be of not less than 20-gage steel rolled from a copper-steel alloy or other steel or iron sheets of equal corrosive resistance. Experiments conducted by the American Society for Testing Materials have demonstrated that steel containing 0.25 per cent copper or more is permanent when used as required in roof construction.

Steeldeck roofing of improved quality is now being manufactured by a number of well-known building material companies. All of them provide a deeply ribbed sheet designed in such a manner that the carrying capacity may be easily computed by ordinary methods. Depth of the sheets is variable to provide proper stiffness from the maximum to the minimum spans required in roof construction, and several gages are supplied to provide the required strength for supporting any desired live load.

To provide the needed thermal insulating qualities, the outside surface may be covered with any of the well known special insulating materials. As much or little insulation as required may be obtained by varying the thickness of this insulation. This insulation should be required only for fireproof building; in other types its use should be optional. Waterproofing should be used as required elsewhere.

Such a specification will provide a roof amply safe and fireproof for the fireproof classes of buildings and will result in a substantial saving in cost on all structures where steel roofing is used; and in other classifications this specification will tend to reduce the quantity of wood roofing used.

Scott-Weiss Steel Co., 110 South Dearborn Street, Chicago, has been appointed distributor for the products of the Una Welding & Bonding Co., Cleveland, and will sell its welding machinery to all industrial users except electric railroads.



A CRANE Places 5 to 7 Tons of Pipe on Skids Which Feed to the Conveyor That Is Part of the Pipe Threading Machine

Continuous Threading of Pipe

Machine Automatically Takes Pipe Lengths One After the Other and Discharges Them After Threading

CONTINUOUS threading machines for pipe up to 4 in. in diameter are now being manufactured by the Davis & Thompson Co., Fifty-seventh Avenue and Mitchell Street, Milwaukee.

Lengths of pipe are rolled down to a conveyor which is part of the machine. Stops are arranged so that the fingers which pick up the pipe will take only one pipe at a time, and rolls beside each conveyor chain press the pipe against a side channel-iron stop.

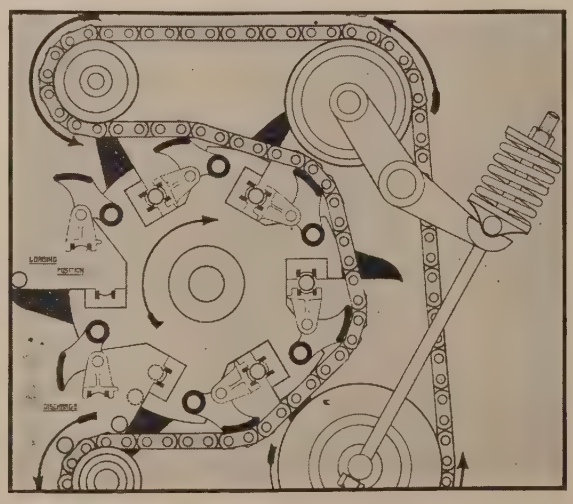
The rotating member of the machine is fitted with fingers which project out within reach of the conveyor and between the chains of this conveyor. These fingers pick up the pipe and as the machine rotates the pipe rolls on the fingers into jaws. Each jaw is equipped with a toggle and as the patented chain clamping arrangement wraps around the pipe carrier, pressure is brought on the toggle jaws, which clamp the pipe.

The dies then come forward. The dies are operated by cam and spring which force them on the pipe with proper tension. The pipe is threaded during rotation of the work carrier. When the pipe is threaded the proper length the die automatically opens and the spindle is withdrawn. As the toggle passes beyond the clamping action of the chain it automatically opens and releases the pipe which drops to a cast iron way.

There are six spindles in this threading machine and each spindle carries a die. Spindles are so arranged that they will thread the pipe concentric. Lubricant is forced through the fixture at a high velocity and the dies are constructed so that particles of grit, scale and dirt are washed out.

The machines are generally equipped with variable speed motors. Power is transmitted by a silent chain to the main drive shaft and from this shaft power is transmitted through silent chain to a friction disk clutch. The clutch is operated by a handle in front of the machine. This clutch controls the revolving pipe carrier and the travel of the spindles.

Sliding gears in the head provide speed changes beyond the variable speed motor range so that the machine can be used for threading pipe as small as 1 in. by the use of adaptors for small dies. Attached to and part of this machine is a gib crane which is used in removing die heads should one wish to do so without tying up the large traveling crane above the machine. The die heads weigh 400 lb. each. Chasers or segments can be changed readily without removing the die head from the machine. The machine is automatic in its action. Safety devices are provided to assure protection against breakage due to carelessness of operators in handling the machine.



PIPES Are Clamped in Jaws Which Are Closed by Toggles. The dies then come forward and the pipe is threaded during rotation of the work carrier

Machine Tool Subjects for Cleveland Meetings

The Machine Shop Practice Division of the American Society of Mechanical Engineers, in cooperation with the Machine Tool Congress, will hold two sessions in Cleveland during the Machine Tool Builders Exposition.

The first session will be on Monday evening, Sept. 30, with a discussion on "What information does the machine-tool buyer need when purchasing new equipment?" Another session will be on Tuesday evening, Oct. 1, the subject of which will be a discussion of "Present status of tungsten carbide as a cutting material."

A cargo of 16,158 tons of iron ore, said to have been the largest ever brought to South Chicago, Ill., was recently unloaded by the steamer Colonel James Pickands. Less than three weeks prior to the establishment of this record the steamer Samuel Mather broke the record of five years' standing when she brought in a load of 16,037 tons of ore.

New Multiple-Spindle Chucking Machine

Work Spindles Are Set Radially in Horizontal Turret, Presenting Work to Three Sets of Tools for Simultaneous Operation

A WORK - ROTATING multiple-spindle chucking machine that is a departure from usual designs has been brought out by the Goss & De Leeuw Machine Co., New Britain, Conn. In this machine the four work spindles are set radially, 90 deg. apart, in a horizontal turret and present the work to three sets of tools for simultaneous operation. The work is loaded and unloaded at the front position, the chuck being started and stopped by means of the lever just above it. This lever, which controls the driving gear in the work spindle, has three positions: a neutral position, which stops the spindle, an upper position, which engages a metal cone friction for picking up the load, and a lower position, which engages a dog clutch that furnishes a positive spindle drive.

Work spindles are driven by the main motor shown at the left in Fig. 1, and the mechanism is designed to transmit 25 hp. The power is transmitted through silent chain, back gears, quick-change gears and a pair of bevel gears to a vertical shaft in the center of the turret. From the vertical shaft the drive is through heavy spur bevel gears on the respective spindles. The four work-spindles revolve at the same speed. A two-to-one back gear furnishes a fast or slow speed for each combination of the quick-change gears, which are accessibly located (at the extreme right in Fig. 2). Spindle speeds ranging from 16 to 525 r.p.m. are obtainable.

A 5-hp. motor furnishes the drive for the turret indexing and all the feeds on the main tool-slides and the cross-slides. The third motor shown in Fig. 1, in the rear tool position, is part of the special revolving tool spindle attachment. This unit, which can be placed in any or all of the three main tool-slides, is noteworthy for its heavy spindle. It can be revolved at different speeds and, in conjunction with the revolving work spindle, a wide range of cutting speeds are obtainable, dependent upon the relative speeds of the two spindles. It is also said to furnish the ideal condition for drilling a true and straight hole, namely, revolving both the work and the tool. All three motors are connected to one control box and have conveniently located push-button control.

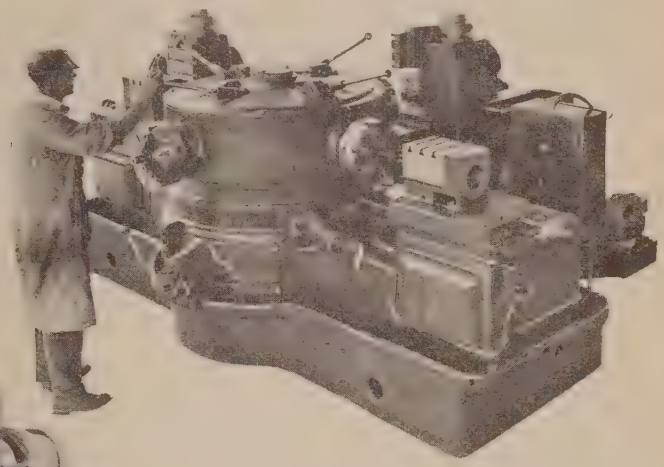
Threading, both internal and external, is accomplished by the lead screw method with a reversing electric motor, and can be done at any one of the three tool positions. Both inside and outside threads of different pitches can be cut simultaneously.

Placing the spindles radially provides room for any type of bearing. The machine illustrated has double-row ball bearings at the front and single floating ball bearings at the rear, both being of radial thrust type and pre-loaded to 4000 lb. With ball or roller bearings the forged alloy-steel hardened and ground spindles are made 4¾ in. in diameter; with plain bearings a 5¼-in. diameter spindle is used. The machine will swing chucks up to 20 in. in diameter.

The problem of indexing the heavy turret was solved by an unusual adaptation of the Geneva motion, double movement being used. Two rollers enter the Geneva slots one after the other, each moving the turret 45 deg. The turret is located in its indexed position by a heavy hardened and ground bolt that is tapered on one side, the bolt being operated by a compressed air cylinder with differential pistons that produces pressure of 2500 lb. The valve for these pistons is controlled by a cam on the outside edge of the Geneva wheel and therefore cannot get out of time. Operation of the bolt is without jar and is practically silent. After the locating bolt is in place the turret is locked in position by means of a large clamping ring bearing on two opposite 45-deg. sections.

Both the main tool and the cross slides are actuated by solid barrel track cams. These slides are of unusual weight and size and, by combining two motions, permit heavy taper turning and forming cuts to be taken. The standard plain slide carries a tool block having T-slots on its upper face. The block is also bored to take large boring bars or tool holders, while the side faces can be drilled and tapped for bolting special tool heads. The cross-slides also have T-slots.

Control is centralized. Coolant is



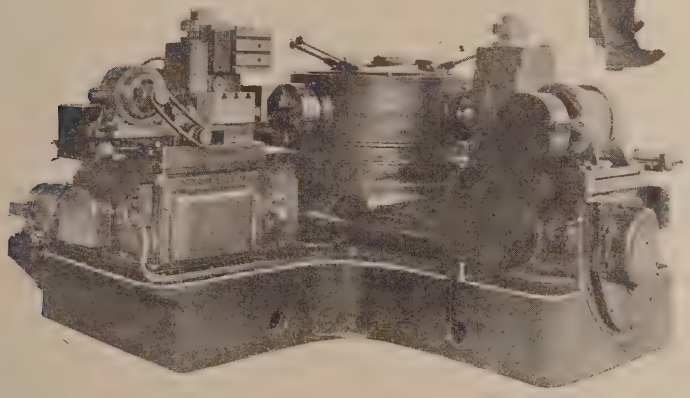


FIG. 1 (above)—Work Is Loaded and Unloaded at the Front Position, the Clutch Being Started and Stopped by the Lever Just Above It

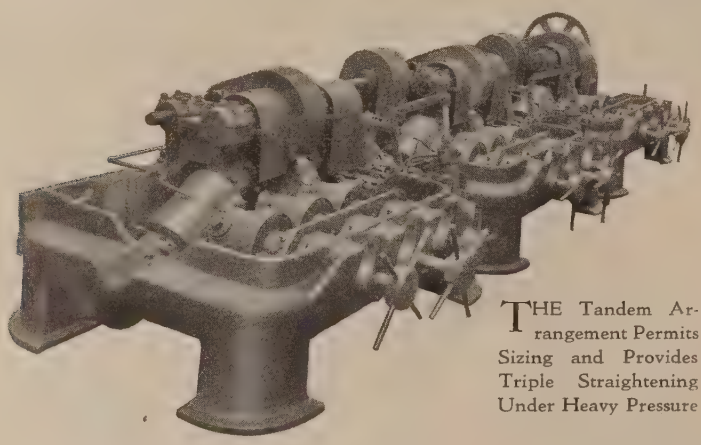
FIG. 2 (at left)—Work Spindles Are Driven by the Motor at the Right, Turret Indexing and Main Tool and Cross-Slide Feeds Being Actuated by the Motor at the Left. The third motor, in the rear tool position, is part of the special revolving tool spindle attachment

pumped from a 2-bbl. capacity reservoir located in the base. Thorough attention has been given to lubrication. All spindles and working parts within the turret are oiled by a separate wick-feed system that indexes with the turret. Lubrication of parts outside of the turret is by means of a mechanical oiler, oil being delivered to each bearing by a separate pipe.

This machine, designated as the No. 6, weighs 13 tons. It will be exhibited at the Machine Tool Show to be held in Cleveland Sept. 30-Oct. 4.

Machine Straightens, Sizes and Descales Steel Bars

A TANDEM arrangement to a straightening machine has just been brought out by the Sutton Engineering Co., Park Building, Pittsburgh, which, in addition to straightening, accomplishes the rounding up and sizing of hot rolled or cold drawn steel bars. The machine also eliminates the scale on bars in the operation.



THE Tandem Arrangement Permits Sizing and Provides Triple Straightening Under Heavy Pressure

The company's ordinary straightening machine as a unit consists of two drive rolls and three idler rolls, whereas this rounding-up machine consists of six drive rolls and nine idler rolls. By introducing the tandem arrangement, sizing takes place and the bar also obtains a triple straightening under heavy pressure. The rolls on the machine are of file hardness, assuring a long life, and, in addition to descaling and rounding up and straightening, give the bar a smooth finish. The tandem arrangement is necessary to make possible the rounding-up features, on the score that sizing is not easily accomplished by repeated passes through a single machine.

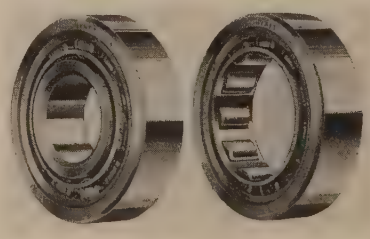
The operation is performed at the rate of 150 to 300 ft. per min., and the work is done cold without reheating. The operation is also continuous, as the bars automatically roll away from the leaving end of the machine without manual labor. The unit can be operated by one man. The machine will make possible the production of hot bars of straightness and accuracy not found in ordinary bars and where scale is objectionable on account of the wear on tools.

Single-Row Radial Roller Bearing

SINGLE-ROW radial bearings made up of solid rollers and designed to interchange with standard S.A.E. single-row ball bearings are being manufactured by the Hyatt Roller Bearing Co., Newark, N. J. This new line is not intended to replace the standard Hyatt roller bearing, which uses spirally wound rollers, but is offered as a supplement to it, for positions in which space limitations exist and loads beyond the capacity of ball bearings must nevertheless be sustained.

In this design the rollers are permanently retained in the outer race, the inner race being separable. A separator that floats on the rollers spaces them properly, and heat-treated rings retain them endwise within the outer races. The end rings and separator function to keep the rollers in proper alinement, assuring positive contact along their full length.

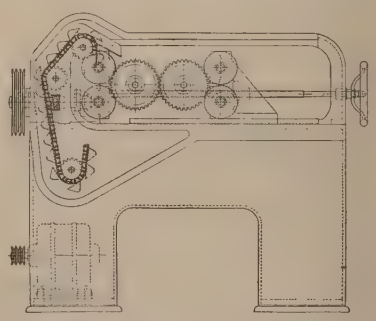
Rollers and races are made of chrome-nickel steel and end rings are made of vanadium steel to eliminate wear. Roller ends are rounded to facilitate assembly where the inner race is not used, and both outer and inner races are chamfered at one end.



Gear Lapping Machine

THE Lehmann Machine Co., St. Louis, has placed on the market a machine for lapping the teeth of gears, especially hardened gears, to the shape necessary for smooth running.

The functions of the machine are based on corrective abrasion governed by the restraining movements of round disks under pressure contact. It consists primarily of two spindles upon the outer ends of which are secured the mating gears to be lapped. These spindles carry hardened friction rolls of the pitch diameter of the gears being lapped, and are driven by contact with rolls on the driving spindles. Two of these driving spindles are journaled in a head which can be adjusted to bring the gear-carrying spindles together until their hardened rolls are under pressure contact, and the position of the mating gears is limited to the correct center distance. The pressure on the disks, necessary for the desired effect, reacts on eight large ball bearings in which the friction rolls are journaled. While the gears govern the general relative movement, the disks resist any departure from their normal movement. Oil and abrasive are fed to the gears being lapped.



Gears Are Lapped to the Shape Necessary for Smooth Running

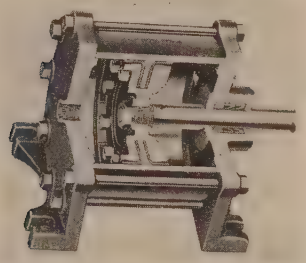
Absolute exactness in the diameter of the disks is always lacking to a degree sufficient to cause a slight departure from the correct relative general movements. This difference results in a continuous pressure on one side of the gear teeth, at first effective only on such irregularities as project beyond the correct tooth curves. Under the abrasive action the projecting irregularities become less and less pronounced until the desired smoothness of action is developed. A reversal in the direction of rotation brings the other sides of the teeth in contact with the same results.

The machine will be demonstrated at the Machine Tool Exposition to be held in Cleveland, Sept. 30--Oct. 4.

Self-Adjusting Non-Rotating Air Cylinders

NON-ROTATING double-acting air cylinders that are self-adjusting by air packing, thus eliminating the necessity for making hand adjustments, are being offered by the Logansport Machine Co., Logansport, Ind.

Air entering a recess in the packing serves to expand the packing against the cylinder wall, the gland packing being similarly expanded

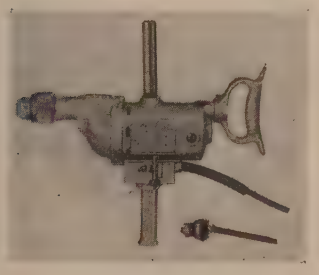


The Cylinders Are Self-Adjusted by Air Packing, Eliminating Hand Adjustments

against the piston rod. In addition, the new cylinders, while retaining the design and principal dimensions of the original Logan cylinder, are made heavier to permit higher air pressures, and have an enlarged air inlet and outlet, which provides for more rapid operation. For use in operating jigs and fixtures, raising platforms, etc, these cylinders are made in five standard models and in 11 sizes having bore diameters ranging from 1½ to 6 in. and with any length of stroke.

Light-Weight 5/8-In. Portable Drill

THE Wodak Electric Tool Corporation, 4627 West Huron Street, Chicago, has brought out a new portable electric drill which has capacity for



A Bench Stand Is Made for Use With the Drill

drilling up to ⅝ in. in steel and 2 in. in wood.

The machine is equipped with a General Electric motor and a conveniently located oversize double-pole switch. Shafts are mounted on ball bearings and heavy thrust loads are carried by Timken roller bearings. Other features include hardened steel gears, grease compartments designed for long periods of operation without refilling, and oversize ventilating fan.

To Demonstrate Milling of Airplane Engine Parts

THE entire exhibit of the Kearney & Trecker Corporation, Milwaukee, at the Machine Tool Builders Exposition, to be held at the Public Auditorium, Cleveland, Sept. 30 to Oct. 4, will be devoted to applications of milling machines in the airplane engine industry. In addition, a Curtiss amphibian plane has been engaged for transporting customers to and from the exposition, and for sightseeing trips over Cleveland.

Full-size airplanes, including the Wright nine-cylinder Whirlwind, will be on view. The Wright engine will be cut away and sectioned and driven by an electric motor to show operation of the master and baby rods and the movement of the pistons. A 525-hp. Pratt & Whitney Wasp engine and a Curtiss Challenger, a duplicate of the one used in Curtiss-Robin plane that recently established the endurance record at St. Louis, will also be displayed. A full-size General Electric airport beacon light with its beams revolving toward the ceiling will add emphasis to the aviation keynote of the exhibit.

Four milling machines, including a new bridge-type Mil-Waukee-Mil tooled for milling Wright engine crankcases, will be in operation. A 1404 Mil-Waukee-Mil equipped with a rise-and-fall fixture will mill the contour of Curtiss master rods, and a No. 2 standard vertical miller with "skip stop" rotary table will be in operation on the ends of Pratt & Whitney Wasp articulator rods. Small connecting rods for Harley-Davidson engines will be machined on a No. 2 standard horizontal miller. A large number of samples of other milled airplane engine parts will be displayed in two showcases, and display boards showing photographs of over 300 applications of the company's machines to airplane engine work will be on view.

Some 17,000 special invitations to visit the company's exhibit are being sent by air mail. Arrangements have been made to have an air mail post box in the company's booth, and air mail post cards and postage will be supplied to visitors.

The amphibian plane, chartered from the Curtiss Flying Service, Inc., will operate from the water front airport at the foot of Ninth Street, making flights over Cleveland every 20 min.

Demco Drilling Machine Co., division of Merit Equipment Corporation, Cleveland, has appointed Commercial Tool Co., Cleveland, exclusive agent in Cleveland territory for Demco high-speed sensitive drilling machines.

Releasing Die Holder for B. & S. Screw Machines

THE Brown & Sharpe Mfg. Co., Providence, has developed a releasing die holder for use with acorn dies on its No. 00 and No. 00G automatic screw machines. In holding the thread within a definite length the device is of advantage when threading close to a shoulder. The length of thread is governed by the adjustable screw on the front of the holder, which comes in contact with the chuck

The Device Holds Threads to a Definite Length

guard over the nose of the spindle. The body of the tool is 1 7/16 in. long. The shank is ⅝ in. in diameter and 1⅛ in. long.

Furnace for Bright Annealing Small Parts

A SMALL continuous furnace for bright annealing and soldering small parts made of precious and semi-precious metals has been placed on the market by Brandt Engineering Corporation, 71 West Forty-fifth Street, New York. It has a long muffle with doors at each end, set in a furnace casing and heated with city gas. A slightly reducing atmosphere is maintained inside the muffle and the gases of combustion are excluded therefrom. The work is placed on trays and pushed through the furnace, going through a definite heating and cooling cycle, and eventually removed at a low temperature. Parts having a light tarnish, or blackened by a blow torch, emerge bright and free from oxide.

It is said that heat treating in such a controlled atmosphere eliminates the necessity for the customary "bright dip" into some acid, and effects a corresponding reduction in cost. Furthermore it is possible to do hard soldering on a mass-production scale by merely placing the parts in proper position, placing a little hard solder on the joint and passing them through the furnace, heated to a temperature slightly above the melting point of the solder. The reducing gases inside the muffle remove any oxide which exists, thus avoiding the necessity for flux, and the solder melts and spreads itself into the joint and fine adjoining crevices.

Holds Manganese Meeting in Washington

Association of Producers Devotes Annual Convention Largely to Tariff Question

WASHINGTON, Sept. 10.—With an attendance of about 50 members, the second annual convention of the American Manganese Producers' Association was held here at the Hotel Mayflower, starting yesterday and coming to an end today.

The tariff was the main theme of discussion at the meeting. "On the question of tariff hangs the destiny of the manganese industry," declared J. Carson Adkerson, who, as president of the American Manganese Producers' Association, declared the address of welcome. He took occasion to express thanks to Senator Oddie, of Nevada, and Representative Williamson, of South Dakota, for leading the fight to provide protection for the domestic industry. At the same time there were spirited attacks made on those who opposed making manganese ore dutiable and a sense of deep disappointment that the Senate Finance Committee had transferred manganese ore to the free list. It was evident that the association proposes to do all in its power to have it restored to the dutiable list.

In the course of reports from manganese districts, Dr. J. S. Grasty mentioned manganese deposits in different sections of Virginia, and in speaking of the Mineral Ridge occurrence, said: "At the present time the Hon. James W. Gerard, former ambassador to Germany, is also interested in the property. His thought regarding it, as he expressed it to me, was not a question of tonnage, as that had been convincingly demonstrated. He was concerned, however, with the question of how to market this, or any other American manganese ore, in view of the attitude of the steel companies."

President K. M. Leute, General Manganese Corporation, Detroit, said that his company is in possession of a process that "enables us to beneficiate this low grade ore to a product containing approximately 70 per cent manganese, 29 per cent oxygen and less than 0.01 per cent phosphorus. "With any assurance of a price of around 65c. a unit at the furnaces, which can be expected under Senator Oddie's amendment, we expect our property to shortly become an important producer of this raw material," he added.

"The Use of Manganese in Agriculture" was the subject of a paper presented by Dr. Oswald Schreiner, chief, division of soil fertility, Bureau of Chemistry and Soils, Department of Agriculture.

At an informal dinner last evening, Senator Henry F. Ashurst, of Arizona, presided as toastmaster, while William B. Daly, manager of mines, Anaconda Copper Mining Co., was the principal speaker. Among those present were seven United States Senators.

Technical papers, describing different processes of beneficiation, made up the program this morning, while the afternoon session was devoted to economic phases of the manganese industry and an address by Senator Oddie.

Board of Directors Enlarged

Officers were reelected as follows: President, J. Carson Adkerson, Hy-Grade Manganese Co., Woodstock, Va.; first vice-president, John H. Cole, president, Domestic Manganese & Development Co., Butte, Mont.; treasurer, A. J. Seligman, president, Butte Copper & Zinc Co., New York; secretary, H. A. Pumpelly, vice-president, Domestic Manganese & Development Co., Owego, N. Y.

The executive committee also was reelected, and consists of Mr. Adkerson, chairman; Richard H. Brown, president, Manhattan Electrical Supply Co., New York; Mr. Pumpelly; Mr. Seligman, and D. H. McCloskey, Jersey City, N. J.

The board of directors was reelected and nine members added, the new members being K. M. Leute, president, General Manganese Corporation, Detroit; Leslie L. Savaga, president, U. & S. Mining & Development Co., New York; James W. Gerard, New York; Col. George W. Steele, president, Brunswick Terminal & Railway Securities Co., New York; Wilson Bradley, president, Bradley-Fitch Co., Deerwood, Minn.; C. L. Berrien, general superintendent of mines, Anaconda Copper Mining Co.; G. P. Goodier, president, New Mexico Copper & Mining Co.; Homer C. Chapin, Chapin Exploration Co., and M. C. Lake, geologist, Duluth, Minn.

Open Meeting on Steel Metallurgy

Program of Metallurgical and Mining Advisory Board's Conference at Pittsburgh, Oct. 18

PROGRESS being made in metallurgical research and problems vital to the steel industry will be discussed at the third open meeting of the Metallurgical and Mining Advisory Boards to the Carnegie Institute of Technology and the United States Bureau of Mines to be held on Oct. 18 in the auditorium of the United States Bureau of Mines, 4800 Forbes Street, Pittsburgh.

Leading metallurgists and steel research engineers from all over the country will attend the all-day meeting which will be open to all persons interested. Illustrated progress reports will be given by research engineers of the Carnegie Institute of Technology and the Bureau of Mines.

At the morning session, 10 a.m., Dr. V. N. Krivobok, associate of the Bureau of Metallurgical Research, Carnegie Institute of Technology, and Dr. G. H. Herty, Jr., physical chemist of the Bureau of Mines, will offer an illustrated report on "Case Carburizing Research."

Dr. F. M. Walters, Jr., director of the Bureau of Metallurgical Research, Carnegie Institute of Technology, will deliver a report on the preparation of iron-carbon-manganese alloys. Dr. J. B. Friuf, a third member of the Carnegie research workers, will deliver a talk on the preparation of pure manganese, a process which was worked out in the Carnegie laboratory.

"The Physical Chemistry of Steel Making" will be the topic during the afternoon meeting. Doctor Herty will give an illustrated report on the fundamental studies carried on in the bureau's laboratory. Later in the meeting he will offer another report on plant research in open-hearth treatment.

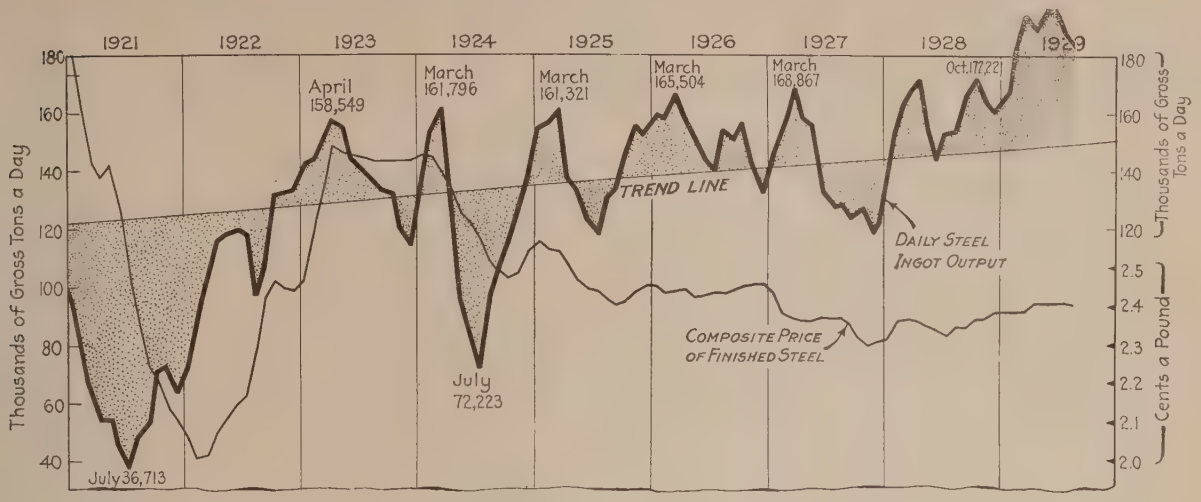
F. N. Speller, director, department of metallurgy and research, National Tube Co., who was elected chairman of the board last year, will preside at the day sessions. A. C. Fieldner, chief engineer, Experiment Stations Division, Bureau of Mines, Washington, will make the introductory address at the afternoon session.

The various reports will be interspersed with discussions. Among the speakers included in these discussions will be: O. E. Harder, director, department of metallurgy, University of Minnesota; W. J. Merten, metallurgical engineer, Westinghouse Electric & Mfg. Co., Pittsburgh; Louis Jordan, chief, section of chemical metallurgy, Bureau of Standards; Dr. H. W. Gillett, director of the Battelle Memorial Foundation; P. H. Brace, section engineer, metallurgical research department, Westinghouse Electric & Mfg. Co.; John A. Mathews, vice-president, Crucible Steel Co. of America.

The afternoon discussion group will include Dr. John Johnston, director, department of research and technology, United States Steel Corporation; R. J. Wysor, general manager, Jones & Laughlin Steel Corporation; A. L. Field, Simonds Saw & Steel Co.; Dr. George B. Waterhouse, director, department of metallurgy, Massachusetts Institute of Technology; H. B. Hubbard, superintendent, open-hearth department, Inland Steel Co.; V. B. Browne, assistant to the president, Allegheny Steel Co., and G. D. Tranter, superintendent, open-hearth department, American Rolling Mill Co.

The advisory boards were organized in 1923 by Doctor Baker "for the purpose of bringing the department of metallurgy at the Carnegie Institute of Technology in closer touch with the industries and to help the department to increase its usefulness and service."

Ingot Production in August Was 6.6 Per Cent Below the Record-Breaking Daily Rate of May. The trend line shows a normal growth of about 1,013,000 tons a year. Prices in August were 2 per cent better than at midyear of 1928



Largest August Steel Ingot Production

Greatest Ever Made in Any Second-Half Month—Daily Rate Lowest Since February—Eight Months 18 Per Cent Above 1928

PRODUCTION of steel ingots in August exceeded the July output by nearly 2 per cent, but there was a reduction of about 2 per cent in the daily rate, as there were 27 working days in August, against 26 in July, according to returns to the American Iron and Steel Institute. The total, calculated on returns from companies which made 94.51 per cent of the 1928 output, was 4,925,802 gross tons of open-hearth and Bessemer ingots. This total has been exceeded by only three months in all the history of the steel industry of the United States—March, April and May of this year. The daily average, at 182,437 tons, was smaller than those of the five preceding months, but otherwise the highest ever made.

Both open-hearth and Bessemer tonnage showed gains in August compared with July. These gains were greater in the Bessemer column than in open-hearth, having been almost 3 per cent against less than 2 per cent. The August open-hearth tonnage, in fact, was slightly less than that in June, whereas the August Bessemer tonnage was 7 per cent above that of June, and ranked highest for any month since March, 1924, with the exception of last May.

Aggregate output of Bessemer and open-hearth ingots in the eight months is calculated at 38,731,069 tons. This is 18.1 per cent ahead of last year's eight-month total, which was the largest ever reported previously. Incidentally, the eight-month tonnage of 1929 is greater than was ever before made in the first nine months of any year and is greater than was ever before made in the first 10 months of any year preceding 1926.

Electric and crucible ingots are not included in the above totals. Production of those two types of steel last year averaged about 1480 tons a day. Some such amount would have to be added to the daily figures in the table to obtain the total ingot output of the country.

Particulars for the past 20 months are shown in the table. The diagram traces the course of ingot production and finished steel prices over the period from the beginning of 1921.

PRODUCTION OF OPEN-HEARTH AND BESSEMER STEEL INGOTS
(GROSS TONS)

1928 Months	Reported by Companies Which Made 94.51 Per Cent of the Steel Ingots in 1928		Calculated Monthly Output All Companies	No. of Working Days	Approximate Daily Output All Companies
	Open-Hearth	Bessemer			
January	3,273,294	498,691	3,990,902	26	153,496
February	3,300,407	521,250	4,043,457	25	161,738
March	3,692,648	567,330	4,507,217	27	166,934
April	3,505,104	564,110	4,305,382	25	172,215
May	3,394,301	582,128	4,207,212	27	155,823
June	3,010,341	528,193	3,743,903	26	143,996
July	3,063,257	528,588	3,805,598	25	152,224
August	3,379,625	569,771	4,178,610	27	154,763
Eight months...	26,623,977	4,360,061	32,782,281	208	157,607
September	3,375,654	544,710	4,147,893	25	165,916
October	3,795,800	599,098	4,649,968	27	172,221
November	3,442,112	590,669	4,266,335	26	164,109
December	3,301,114	496,679	4,018,208	25	160,728
Total	40,538,657	6,591,217	49,865,185	311	160,338
1929					
January	3,694,218	549,616	4,490,354	27	166,309
February	3,599,224	489,279	4,326,000	24	180,250
March	4,133,869	596,691	5,058,258	26	194,548
April	4,026,576	640,351	4,938,025	26	189,924
May	4,276,186	707,484	5,273,167	27	195,302
June	3,990,798	622,585	4,881,370	25	195,255
July	3,922,532	649,950	4,838,093	26	186,080
August	3,987,352	668,023	4,925,802	27	182,437
Eight months...	31,680,755	4,923,979	38,731,069	208	186,207

Orders were placed in July for 2052 steel boilers, with 2,081,199 sq. ft. of surface, against 1685, with 1,822,799 sq. ft., in June, according to reports received by the Department of Commerce from 80 manufacturers. For the first seven months of the current year orders were placed for 10,777 boilers, with 11,825,051 sq. ft., as compared with 11,099, with 10,272,539 sq. ft., for the corresponding period of last year.

BOOK REVIEWS

The Revolution in Industry

Industrial Economics. By Dexter S. Kimball, professor of industrial engineering and dean of the College of Engineering, Cornell University. 312 pages, 6 x 9¼ in. McGraw-Hill Book Co., Inc., New York. Price $3.

Intelligence consists in taking into account all the elements in a situation, and the industrial scene has been steadily advancing in complexity since, at the end of the 18th century, seven basic mechanical inventions—five in England and two in the United States—started the long drawn-out change called the Industrial Revolution. Not, however, until the opening of the 20th century was a real attempt made to study this phenomenon in all of its manifestations, scientifically to isolate, measure and relate its elements, and by generalizing about them to lay the foundations of an industrial economy.

Doctor Kimball's book is an up-to-date account of the result, four chapters or about one-fifth of its 300 pages being devoted to a preliminary sketch of the historical background of modern industry. The five chapters that follow are a fine example of logical development and deal with the basic principles of scientific method in industry, with specialization, modern division of labor, classification of costs, production factors and standardization. The examples are naturally drawn, chiefly from the machine shop industries which pioneered in these matters; but the book is not too technical for the general reader, while a valuable adjunct to the teacher and student.

The second half of the book deals adequately with the growth of American industry and with the problems arising out of its enormous scale, increasing mechanization, mass production, mass management and mass organization and progressing integration.

Finally, there is an up-to-date discussion of the measures of management—financial, budgeting, labor saving, and production quality and quantity. We are pleased to note on page 255 the warning that the Taylor system is subject to the law of diminishing returns, like any other economic mechanism, and also that the author lays squarely on the shoulders of employers their responsibility for the unpleasant consequences to the worker of sudden technological changes. While capital and management are very fully studied in their relation to industrial economics, we note the absence of any such recognition of the other side of the payroll; of labor's reservation of the right to make its own mistakes, of its insistence upon status, and of the serious consequences on industrial economics of refusal.

JOHN CALDER.

Continental Wire Making

Draht-Welt-Buch. Edited and published by Martin Boerner, Halle (Salle), Germany. Second edition, 1000 pages, 6 x 9 in.

The reviewer approached this book in the spirit in which one would go to see the performing sea lions, that is, not expecting to see a thing well done, but prepared to be amazed at seeing it done at all. The reviewer was in this case pleasantly disappointed. The thing is well done. Herr Boerner has, with enormous industry, amassed a great volume of data on wire drawing and the manufacture of the commoner wire products, has arranged it logically, illustrated it copiously and summarized it in numerous well-arranged and clearly understandable tables. If its accuracy is of the same order as the patience and industry expended in the collection and arrangement of the material, the book is a notable achievement and should be highly appreciated throughout Germany and Continental Europe.

It is doubtless vulnerable to the usual criticism that it tells all the things you know and fails to explain those you don't know. It must be remembered, however, that wire drawing is just now emerging from the jungle of mystery and secrecy, and that it is at best an art of infinite detail and one which makes greater demands on its raw material than any other of the metal-working arts. Wire drawing itself is a continuous and searching test of all properties of metal and is undoubtedly the most difficult art to reduce to formula and to standard practice. Granting that the present book may be inaccurate in some detail, granting that it may explain the obvious and neglect the obscure, it still stands as a real achievement. It will, at the very least, serve as a sort of lay figure which may in later years be more completely and becomingly draped. As a matter of fact, the American wire industry lacks such an outline.

The book opens with a brief historical review and a description of rod mills of all types. Pickling data follow, with notes on inhibitors and much detailed information on the recovery of ferrous sulphate. Baking receives adequate notice, although it is a "fancy touch" in Europe rather than a necessity, as in American practice. Dies and general wire drawing practice are described in detail with tables setting forth drawing practice for many grades of wire both common and special, as well as block speeds and diameters, horsepower, and production per man under various conditions. Low-carbon wire, together with annealing, takes 170 pages. Galvanizing receives 40 pages, and is followed by a section on galvanized strand. Nails, tacks, wood screws and other cold headed products receive detailed treatment. Barbed wire gets 25 pages. Netting, hexagon mesh and other loom products are reviewed in much detail in 70 pages. Chain and general hardware fill 40 pages. All these sections are profusely illustrated, and all information carefully tabulated. Even building layout and spacing of machines and aisles are covered.

Thirty pages are devoted to the theoretical side of cold working as an introduction to a section on patenting and the manufacture of rope and other high-carbon wire products. The last 200 pages are devoted to the non-ferrous metals and to such special subjects as plating with brass, nickel, cadmium and chromium. There is a good general index and 17 pages of the most complete bibliography the present writer has ever seen.

A word of warning is necessary at this point. Interesting as the book is, it contains little or nothing of practical value to the American wire producer. This is because of the fundamental difference between wire-drawing practice in Germany and in America. America and Great Britain follow the dry practice, resorting to wet drawing only in special cases; Europe, on the other hand, reserves the dry process for special cases. Typical European practice is to reduce a lightly limed and unbaked number 6 gage rod two drafts to 10 gage. At this point it is passed to the "middle man" who draws it wet to 14 or 15 and passes it on. The middle man uses more cosmetics than a Hollywood beauty. He has a special dope for removing the dry drawn coat; a special liquor for establishing the copper coat and a third liquor for

lubricant. These liquids differ in composition for various grades of wire, as do also the corresponding baths used by the 15 frame men and the fine wire drawers. Details of their composition and preparation are faithfully recorded in the book.

These various treatments are hand operations. They cramp the production of the wire drawer, and they restrict him to small bundles, which further cripples his productivity. Wet drawing restricts him to relatively light drafts. Output per man ranges 50 to 60 per cent of the American output in single-hole work, and 25 to 30 per cent of the American continuous machine output. The handicap imposed by small bundles carries over into the nail and fence mills, where for this and other reasons production lags far behind the American figure. Nail wire is usually drawn dry, even abroad, because dry wire is much easier on the cutting dies.

American readers will note many interesting differences in practice, apart from those imposed by the wet process. Card wire seems to be produced from low-carbon as well as from high-carbon steel, a drawing practice being indicated for each. Furniture springs are described as drawn from low-carbon rods which have been stiffened by coiling under water at the rod mill. In this country low-carbon springs are believed to be obsolete. Rope wire and similar grades appear to be nearly always drawn one draft from the green rod before the first heat treatment. There is some pot annealing in these grades and a sort of non-continuous patenting, secured by dumping bundles from a muffle furnace into a lead pot. There is a tendency to reserve continuous patenting as a final treatment before the last series of drafts. In general, labor is wasted and fuel scrupulously saved.

Any American wire mill executive who has a reading knowledge of German will find this book entertaining. It is well written, so far as a foreigner can judge, and entirely free from the involved structure characteristic of much technical and literary German. As technical German goes, it is very easy reading. The book is well edited and practically free from typographical errors.

It is a relief to find one detail deserving of criticism. The binding is flimsy, scarcely likely to survive one thorough reading.

—K. B. Lewis.

A Source Book on Industrial Economics

History of Manufactures in the United States. Vol I, 1607 to 1860. By Victor S. Clark. 607 pages, 6¾ x 10 in. Published for the Carnegie Institution of Washington by McGraw-Hill Book Co., Inc., New York. Price $7.50.

Emphasis should be laid on the fact that the important work by Mr. Clark is neither a technological, a mechanical nor a biographical book, but an economic history in the strictest sense of the word; it is a new and enlarged edition, based on original material, the fruit of researches since 1904. As a history, it commences with the influence of natural resources, transportation, markets, and the European background on colonial manufactures; it describes the relations of capital and labor to the progress of early manufacturing and its technology and organization. Political propaganda concerning home industry and manufactures during our Revolution, and subsequent foreign influences, are thoroughly treated. Chapter XV, on Capital, Profits and Wages in Manufactures, naturally treats on the early commercial conditions affecting manufacturers, the sources of industrial capital, manufacturing profits and commercial crises such as those from 1815 to 1826, 1837 to 1840, and 1857 to 1861.

The flood of imported goods after the War of 1812 suspended many local industries, especially in textile lines. Mention is made of the irretrievable ruin of those mill-owners who held on in an advancing market in the hope of still higher prices, hope blasted by the declaration of peace. That in 1822 many typical Philadelphia four-story houses with marble steps were sold for a dollar apiece (being on leased ground) will be news to many.

The 1857 crisis paled before the general upset caused by our Civil War, at which time, however, our manufacturers had not only accumulations of resources, but no debts to Government for duties, as in 1837.

The introduction of the factory system makes an interesting chapter; and in subsequent sections there are grouped a consideration of wood-using manufacturers, agricultural implements, and industries using farm products as raw materials; while the manufacture of metals and the textile industries are given separate chapters.

In all these pages there is interesting and profitable reading for those who wish to reason from cause to effect and on to after-effect.

Each reader had best make his own review and application of this valuable compilation, as best throwing light upon his own economic problems.

Robert Grimshaw.

Steels for High Temperatures and Pressures

Creep of Steel at High Temperatures. By F. H. Norton. 83 pages, 6 x 9¼ in., illustrated. McGraw-Hill Book Co., Inc., New York. Price $3.

This book is really a treatise covering the results obtained in testing a number of steels at elevated temperatures for the Babcock & Wilcox Co. The author is a Research Fellow at the Massachusetts Institute of Technology, the work having been carried out in the Department of Physics of that Institute. The steels tested were of three types: (1) austenitic nickel-chromium; (2) chromium steels of the stainless type; and (3) plain carbon and pearlitic alloy steels.

Generally speaking, the method used by the author for determining the deformation of steel under constant load for long periods of time at elevated temperatures is essentially the same as that in current use in tests of this kind, but differs somewhat in detail—as is usually the case. The amount of laboratory space required for furnaces and controls of long-time creep testing at elevated temperatures is considerable, and depends on the number of temperatures at which the material is to be tested and the number of loads applied at each of the temperatures. The author has cut down the usual number of furnaces by an arrangement in which as many as six specimens may be heated at once in the same furnace and different loads applied to each one. As a rule, other investigators have used a furnace for each load. For practical purposes the method used by Norton has a very strong appeal from the point of view of both economy of space and of funds. For very precise work it may be that the method is questionable. Measurements of elongation were taken with an accuracy of 0.0001 in., which, for long-time testing, seems amply accurate.

The results appear to be as accurate as any long-time test results the reviewer has seen published. The author gives several pages to the results of others with which he finds himself generally in fair agreement. It is not to be expected that different investigators will find close agreement in all their work, particularly when the initial condition of the material tested is unknown. This is one point which may be criticized in the present case, the initial condition of the material being given in only very general terms, excepting perhaps in the carbon and structural pearlitic alloy steels.

The material in the book is well, although perhaps too concisely, presented. Nevertheless, it is a valuable addition to the literature and data on the subject. One chapter is given over to a well selected bibliography bearing on the flow of metals.

F. B. Foley.

Guide Posts for Association Activities

Trade Associations. The Legal Aspects. By Benjamin S. Kirsh. 271 pages, 6 x 9 in., including references and index. Central Book Co., New York. Price, $5.

Mr. Kirsh takes a surprisingly friendly and liberal attitude toward trade associations in this book, when it is remembered that he was at one time special assistant to the United States attorney in New York. In this capacity he actively prosecuted many cases under the anti-trust laws, wherein trade associations have been defendants almost as often as single companies. One gains an impression from the book that trade associations of today are quite different from their predecessors, the pools, trusts, communities of interest, and holding companies, and that within the law there is a very definite place for them in the industrial structure. And he has clearly interpreted the laws governing organized cooperative industrial effort.

By means of decisions made by the courts, Mr. Kirsh points out the legal limitations of trade associations in the collection and dissemination of statistics; of uniform cost accounting methods; of credit bureau functions; of patent interchange; of uniform basing point systems; of collective purchasing functions and of standardization. He also has devoted chapters to trade relations and to the restrictions of channels of distribution.

In view of the prolonged action by the Federal Trade Commission seeking to abolish Pittsburgh Plus quotations on steel products, the chapter on uniform basing point systems will be interesting to steel manufacturers, although the author has derived most of his data from decisions in cases relating to other industries.

"Where the purpose of such a plan" (uniform basing point), says Mr. Kirsh, "is to present in simplified, convenient and readily available form, the costs of transportation to various points of consumption, such a function, and the means reasonably adopted to accomplish that end, have received the stamp of judicial approval. * * * The inquiry by law, as to possible violations of anti-trust statutes by the operation of uniform basing points systems, relates to their use as instrumentalities in agreements among the members of the association to fix a deliberate price of commodity at a minimum figure."

Viewed as a whole, the volume is a welcome addition to the rather scant literature of trade association activities. It not only epitomizes the important cases brought under anti-trust laws, but from the decisions the author has established several channel markers for safe legal sailing. The book is likely to find liberal use as a reference, because it has so completely covered the legal phases of trade associations.

G. F. Tegan.

An Elementary Text on Iron Founding

Foundry Practice. A Text Book for Executives, Molders, Students and Apprentices. By R. H. Palmer. Pages 450, 5½ x 8¼ in., illustrated. John Wiley & Sons, Inc., New York. Price, $3.50.

The fourth edition of this work dealing with the fundamentals of the foundry art is a very satisfactory volume to place in the hands of beginners, due to clarity of the description of the basic principles and the absence of involved technicalities. The scope of the text is limited, in that it deals chiefly with only one division of the foundry trade classified as heavy gray iron jobbing work. Steel, malleable and brass foundry practice is covered in 17 pages, with little information of practical value.

Methods of mass production requiring highly mechanized equipment for materials handling are not discussed. Cost methods, programs for the improvement in production of the quantity and quality of castings, as well as methods of technical control of materials and processes are also omitted. As the development of the foundry art in the future will depend on these factors, it may be regretted that this and other texts do not inspire the student by some appreciation of them.

The author has approached the problem of developing a method of instruction with a sure and firm hand. There is no lost motion in the presentation of facts regarding molding and cupola operation. Neither has he surrounded the metallurgy with a halo of mystery and quack chemical terms. Such treatment is a relief from that of the average writer who may approach the subject from the practical side.

W. F. Graham.

Notes on New Books

Ninth Year Book of the American Bureau of Metal Statistics has been issued at 33 Rector Street, New York. It contains tabulations (often in great detail) of the source and destination of copper, lead, zinc, gold and silver throughout the world since 1917. The 112-page book, whose price is $2, is compiled from reports issued by the bureau monthly and quarterly, much of the data being derived from original sources. The American Bureau of Metal Statistics is maintained by American non-ferrous metal producers, but the statistics are available to any interested person upon payment of moderate subscription.

A Visitors' Manual of the National Bureau of Standards has been issued by that organization in the shape of a 16-page pamphlet of pocket size, concerning the activities of the bureau, showing its location in the city of Washington and the location of the numerous buildings in the group. The main points of interest for a visitor are brought out in convenient form for reference.

Some of the conditions under which a conveyor system might be made a profitable investment are outlined in a book under the title "Conveyor Facts," published by Mechanical Handling Systems, Inc., Detroit, and written by Norman H. Preble of that organization. Two elementary principles are brought out as follows: (1) "In handling materials perform only those handling operations which are absolutely necessary; and (2) perform these operations in the way that secures the lowest cost." Both of these principles are subject to analysis and each application of them are subject to careful study of the situation at hand, one may then determine what constitutes the handling problem, and how the lowest cost may be achieved.

Value of a special safety campaign is realized in reducing the number of industrial accidents, and usually the money expended in propaganda is recovered by the saving in compensation and medical expense. The effect upon employees is also good. The spirit of competition, which is always made use of, stimulates the employee's loyalty to the company and builds up an excellent plant spirit. These beneficial results are discussed in pamphlet No. 51, "Planning an Industrial Safety Campaign," issued by the National Safety Council, Washington.

New Books Received

Handbook of Corporate Management and Procedure. By Earl A. Saliers. 1237 pages, 6 x 8½ in. McGraw-Hill Book Co., Inc., New York. Price, $7.50.

Transactions of the American Institute of Mining and Metallurgical Engineers, Institute of Metals Division. 1929 pages, 6 x 9¼ in., illustrated. Published by the Institute, 29 West Thirty-ninth Street, New York.

Vielschnittbänke. By Max Kurrein. 114 pages, 7 x 10 in., illustrated. Guido Hackebeil, Stallschreiberstrasse 34, Berlin, S 14, Germany. Price, 15 m.

This Issue in Brief

Cuts heat-treating costs by connecting furnaces and quenching tank in an automatic unit. Two men do work formerly done by 12. Three large furnaces are set in straight line, joined by conveying system. By altering time cycles and temperatures any kind of material can be treated.—Page 663.

* * *

Handy stacking rack makes it possible for one man to pick up and store a carload of tubing in a half-day. Tubes are hand-loaded into rack, consisting of two U-shaped bars. The loaded rack is lifted by hoist mounted on overhead tramrail and set down in storeroom. Aisles between loads are not needed.—Page 666.

* * *

Production increased from 10 to 25 per cent and spoiled goods reduced by adequate lighting. Investigations reveal that good light is a powerful aid to economical production and a positive reducer of industrial accidents.—Page 670.

* * *

Marked savings made by using oil instead of gas as open-hearth fuel. Steel mill cuts costs by buying residual heavy oil from refinery. Special class instruction of furnacemen avoids greater refractory expense upon changing over to oil fuel.—Page 671.

* * *

Cast irons of less than 3 per cent carbon show no improvement in physical properties when superheated, unless silicon content is high. Higher carbon irons have improved properties as superheat is raised from 1365 to 1480 deg. C., and then up to 1605 deg. C.—Page 674.

Cleaning cost is big item in manufacturing enameled parts. In some kinds of metal radiator cover work cleaning cost is sometimes 10 per cent of the total.—Page 673.

* * *

Welding is employed to alter old mill motors so that roller bearings may be installed. Total welding time per frame, to remove projections which might interfere with roller bearing cartridge, is 2.5 hr.—Page 677.

* * *

Unnecessary expense saddled on to building owners if roof is required to be as fire-resistant as the floor. Engineer contends that improved steel roof, having flat surface stiffened by ribs, provides adequate protection for any type of building.—Page 679.

* * *

Cheap foreign labor gives way to material-handling equipment. Chilean nitrate plant reduces costs sharply by installing labor-saving equipment and pays for the entire installation out of savings.—Page 668.

* * *

Working model proves an important factor in success of employee instruction class. Manufacturer gets such good results from course introduced temporarily, for an emergency purpose, that he is continuing it. Working model claims close attention of class members.—Page 671.

* * *

Labor wants most of all a good plant manager. Professional labor leader is usually ignorant of good management methods. Prosperous condition of American manual worker is due largely to what has been done for, not by, organized labor.—Page 690.

New August high ingot production record made with average daily output of 182,437 tons. Eight months' total is 18 per cent above same period of 1928.—Page 685.

* * *

Babson's faux pas reveals unsoundness of economists' prophecies. Statistics adequate for sound prognostication do not exist. Some business economists fail to recognize this fact, and are prone to confuse theory and hypothesis.—Page 690.

* * *

Doubles production, cuts labor costs 15 per cent, and reduces rejections 25 per cent by conveyorizing the lacquering operation. Conveyor seven-eighths of a mile long carries stamped parts through series of spray booths and drying ovens.—Page 659.

* * *

Achieves proper heat gradient in heat treating by dividing furnace into three zones: preheating, heating and soaking. Each zone has its automatic temperature control. Hot gases pass along toward charging end, giving their heat to the cold, incoming work. Page 664.

* * *

Heat-treated parts dumped into quench chute by unusual method. Trays of work, with a trunnion at each end, are mounted on three steel rails, and are supported by rails underneath. Supporting rails end at quench chute, so that the tray upsets, and trunnions ride on rails over-passing quench tank, to receive work at discharge end of tank.—Page 665.

* * *

Lighting costs should be about 2 to 4c. a sq. ft. a year for steel works buildings. Installation cost ranges from 5 to 10c. a sq. ft., depending upon class of work done.—Page 670.

A. I. FINDLEY
Editor

THE IRON AGE

W. W. MACON
Managing Editor

ESTABLISHED 1855

The Babson Episode

THERE were amusing features—notwithstanding a section of Wall Street grew indignant—in the direful prophecy of Mr. Babson, though unfortunate persons who unloaded stocks on his advice may not have the same appreciation of its humor as a disinterested bystander. The very next day came a contradictory prophecy from the mouth of Professor Irving Fisher, and there was something humorous in that also.

Mr. Babson and Professor Fisher both may be called eccentric economists. Professor Fisher is known for his extravagant conception of the quantitative theory of money and his well-advertised nostrum of a stabilized dollar. Mr. Babson, who has shown himself an extraordinary salesman, has made a great commercial success in capitalizing the principle that action and reaction are equal, in economics as well as in physics.

During the last two or three years, however, it has appeared that in our American economy action and reaction have not been equal—certainly not as measured on the babsonchart—and that has worried, we might say peeved, Mr. Babson. Nevertheless, if he continues long enough to preach the approach of a recession he may eventually find himself right.

Rather curiously in his last prognostication he naively refuted himself in drawing attention to the fact that the majority of stocks listed on the New York Stock Exchange are even now selling for less than at the beginning of this year, pointing out that the extraordinary advance has occurred in but relatively few. Hard-headed Wall Street, as soon as it caught its breath, promptly arrived at the conclusion that this indicated the absence of bubble-blowing and demonstrated that the stocks that had made great advances had done so for good reasons; in other words, that this has been a selective market, just as many authorities have been describing it all along.

There is a real lesson in the recent Babson episode, to the effect that economists ought not to essay to be prophets. Science leads properly to prophecy. Indeed the final test of a theory is the ability to prophesy according to it. We should not, however, fall into confusion between theory and hypothesis, which economists appear to be especially prone to do. Economic science in its everyday contact with affairs does not know enough of facts. Adequate statistics, as we have said before, do not exist. It is unfortunate that the new profession of business economists is unwilling to recognize this and in some instances seems to tend toward charlatanry. Giving advice to the public either to buy stocks or to sell them certainly assumes a great responsibility.

Labor Day, 1929

IN its Labor Day speeches this year organized labor was complacent. It had good reason to be. In the whole history of the world the manual worker was never so well to do as he is in the United States of America at the present time. No one begrudges this. On the contrary every one rejoices that our toilers, who comprise about 99.9 per cent of us, are so comfortable and happy. But a word must be said, as one hears organized labor appropriating to itself the credit for this and talking of how it aims to extend the vogue of the five-day week (at six days' pay) and achieve other things.

The beneficence of the present American economy is the result of what has been done for labor, not by it. Indeed, the attitude of organized labor has been a good deal of a clog tied to our feet. The men who have done the thing are the scientists who have studied the laws of nature; the inventors who have utilized them in ingenious, often astounding, ways; the engineers who have practicalized the inventions and built works in which to exploit them; the executives who have organized the operation of the works; and the financiers who have furnished the resources. No labor leader ever did any of those things, but often they have joggled the elbows of the men who were doing them.

The men who have done these things and are continuing to do them are the very ones whom the politicians revile and have tried to cripple with restrictive legislation and have punished with surtaxing of their income, all reflecting jealousy of the failure of nature to create all men equal. The men who toil in our mines, mills and factories have a far better appreciation of this than do their professional leaders. Above all things they want a good manager of the plant in which it is their lot to work. The professional labor leader scarcely knows what a manager does.

Labor unions have never been creative. They operate rather in the division of the proceeds of industry, exacting for their members all that they can get. If they maintain a monopoly by agreement among themselves, as do the building mechanics of the Atlantic seaboard, they get a good deal both in the matters of wages and privileges. We may not blame them for such accomplishments, although they bear hardly upon persons who want to build houses and they raise the cost of rent in general. However, few of us are

altruistic. It is human nature for each to do the best for himself that he can. The labor leaders might be frank as to this and not claim virtues that they do not possess any more than other persons.

Steel Records Higher and Higher

JULY added over 1,000,000 tons to the record of steel ingot production in 12 consecutive months and now August has added 750,000 tons more, exceeding by approximately that amount the production of August, 1928. An impressive comparison is made with recent calendar year totals:

Total Steel Ingot Production

Calendar Years	Gross Tons
1926	46,936,205 (new record)
1927	43,776,717
1928	50,325,393 (new record)
12 months through:	
June, 1929	54,675,000 (new record)
July	55,570,000 " "
August	56,300,000 " "

It took two years, from 1926 to 1928, to raise the record by 3,400,000 tons. Now it has taken only two months to raise the record more than half as much.

Commentators in the financial columns of the daily press, noting that up to the end of August steel ingot production this year was about 6,000,000 tons more than in the first eight months of 1928, have predicted that the steel output of 1929 will exceed that of last year by 9,000,000 tons. That estimate is probably over-optimistic. It happens that the ingot production of the last four months of 1928 was about 52 per cent of that of the first eight months. But taking the average for the six years 1923-1928, inclusive, the last third provided only 48 per cent as much tonnage as the first two-thirds. If that proportion holds this year, open-hearth and Bessemer ingots should approximate 57,350,000 tons. Adding 550,000 tons for electric and crucible steel ingots, the total for the year would work out at about 57,900,000 tons, or 1,400,000 tons less than the 59,300,000 tons of the daily paper writers. That is, the output of this year would be approximately 15 per cent greater than that of 1928.

OVER-PRODUCTION, inflated prices and labor disputes do not appear in today's industrial picture; so it is commonly assumed that there is little to worry about in respect to business of the immediate future. But the doubting analyst now comes along and says, in effect: "Admitted, that manufacturers' inventories are not large, but is there not the same effect from the large volume of commodities in the hands of consumers buying on installments? Agreed, that prices have not followed upward the remarkable expansion in demand; but is not this the result of greatly enlarged capacity and does not the product of quantity and price really show inflation? To be sure, strikes are almost non-existent, but would not labor seek for more did not mechanization prevent a labor shortage?" The argument is faulty in several respects: It presupposes that installment buying extends over the whole gamut of production; it overlooks the checking influence of hand-to-mouth buying on price buoyancy; it ignores the fact that labor has a wider participation than ever in industrial enterprise and is not without the enjoyment of today's as well as yesterday's luxuries. The three items specified above by the skeptical analyst have ordinarily spelled recession and of course they need watching, especially if any one of them be disguised in the way suggested.

Automobile Consumption of Steel

PERHAPS the automobile industry's consumption of steel this year has been overestimated. From the successive annual findings of THE IRON AGE as to where steel went in the year it was long ago made clear that many popular impressions were erroneous, since our figures showed 10 per cent for 1922, increasing irregularly to a maximum of 18 per cent in 1928. There were many notions of much higher proportions —particularly in the city of Detroit.

The interesting point now is this year's proportion, which may be estimated roughly from last year's. The method naturally suggested is to compare automobile "production" last year and this with steel ingot production; but that provides only an approximation. A considerable proportion of last year's automobile steel did not go into the cars and trucks reported as produced, there being parts for replacement here and abroad, parts for foreign assembly, and accessories. Probably there was not so much growth in this consumption, outside the units produced, as there was in the number of units.

A comparison of the steel assigned to the automobile industry and the "production" of automobiles shows a steady and marked increase in the quantity of steel per unit. That is largely or wholly due to recent increases in the weight of many models, for when engines are made more powerful the car must be strengthened all around. Also there was the disappearance of the lightest car after May, 1927, with no large reappearance last year. In the first half of this year the Ford proportion was a trifle over 30 per cent, while at the present time it is close to 40 per cent. The average weight of the total car and truck production now is no doubt somewhat lower than last year's average.

For arithmetical excursions we have data as follows: In 1928, steel ingot production in the United States, 50,325,393 tons; assigned to the automobile industry by the manufacturers in reply to questionnaires, 18 per cent; car and truck production, United States and Canada, 4,601,141. First half of 1929: Ingot production 29,225,000 tons; automobile production, 3,411,753. By a simple pro-rating with these figures we obtain precisely 23 per cent as the automobile proportion of the steel in the first half of this year.

For automobile production in the last two months we have the official report of 517,792 for July and the National Automobile Chamber of Commerce statement of 516,522 for August. By a similar computation we obtain 20.7 per cent as the automobile proportion for July and August. Allowing for the increasing propor-

tion of Ford production one may take 20 per cent as the closest approximation available.

Relative to the total tonnage of steel the difference between 20 per cent and 23 per cent is not large. The 23 per cent is an average, and the peak in April was probably a trifle above 25 per cent.

There is no reason to suppose the percentages here computed are too low and they may be a trifle high. By an average of the last five years, automobile production has been substantially uniform in the four months July to October inclusive. In the last two months of the year it falls off, but the steel trade is accustomed to lighter demand all around at that time.

The Vogue of Lighter Cast Iron Pipe

IN an important foundry product the substitution of lighter material for heavier, without sacrifice of strength, is a development of the past three years. In 1926 the American Iron and Steel Institute reported 2,005,184 net tons as the production of cast iron pipe and fittings. At 1,872,000 tons in 1928 the decline in two years has been 6.5 per cent. An increase would reasonably be expected with the growth of the country and the extension of municipal gas and water lines. Imports have not increased. At 60,793 tons they were over 25 per cent less in 1928 than in 1926.

One explanation is that centrifugal pipe, which is much lighter per foot than sand cast, has displaced the latter to such an extent as to turn an apparent loss into an increase, so far as miles of pipe laid are concerned. There was more than twice as much centrifugal pipe cast in 1928 as in 1926, or about 425,000 tons against 200,000 tons, both figures being estimates. That is, the centrifugal pipe made in 1928 was 22.5 per cent of the total output of pipe, whereas in 1926 it was only 10 per cent. Thus, much the same change is gradually taking place in this field that has been so great a factor in steel, as represented in the case of the latter by the displacement of products long regarded as standard by light, strong alloy steels and aluminum alloys, all carefully heat treated.

To All These Add Courage

WITH the heading "Help Wanted—Male" the first editorial page of the Aug. 31 issue of the *Engineering and Mining Journal*, New York, is given up to a text-letter advertisement for a new staff man. The specifications, which the editor says are "meant to indicate a definite philosophy of occupation and not to serve as a description of the virtues of a paragon," are these:

> The qualifications of an engineer who seeks a career in technical journalism—beyond those that are obvious—are not easy to define, being complex and intangible. But such qualifications may be said to include the scientist's love for truth and accuracy; the engineer's ideal of efficiency and the avoidance of waste; the writer's respect for brevity and clarity; an evenness of temper that suffers, perhaps not gladly but without visible or expressed irritation, the actions and comments of those who bear out the truth of the saying that a little learning in any one subject, not excluding the business of publishing, may be dangerous; an intolerance of mediocre performance—not of mediocrity—without prejudice to a sense of personal humility; the journalist's recognition of the value of timeliness and an appreciation of the loss, moral as well as material, occasioned by procrastination; and the sane man's respect for the voluntary observance of those decent manners that lie midway between selfishly taking advantage of a liberty of opinion in expression, on the one hand, and having to submit to supervisory control or prohibition, on the other.

We do not remember to have seen any like exacting specification for the mental and moral outfit of one who might aspire to a career on the business rather than the editorial side of a technical publication. The absence of such a schedule does not argue for any indifference in respect to the equipment of those who promote the business interests of specialized journals. But when it does take form on the printed page we wonder just how far its author could venture were he to attempt to parallel this tribute of the *Engineering and Mining Journal* to the work of the technical journalist:

> No other field of human endeavor affords greater opportunities for that personal service and contribution to the social and industrial well-being of humanity, without which professional work lacks ethical appeal and justification.

CONGRATULATIONS to the *Ironmonger*, our British contemporary, which is now along with THE IRON AGE in its eighth decade. It was founded in 1859, four years after this journal, and has had a virile career, with an enviable record of reliability and helpfulness as well as robust independence.

CORRESPONDENCE

Return and Continuous Tumbling Barrels

To the Editor: We wish to call your attention to an error in the description of the tumbling barrels (in the plant of the Transue & Williams Steel Forging Corporation, THE IRON AGE, Sept. 5, page 601). You describe these as continuous tumbling barrels. These are very definitely not continuous, but are Ideal Star return tumbling barrels.

These barrels are so arranged that, when running in the tumbling direction, the work and stars are held in the tumbling compartment. When rotating in the discharge direction, the work is separated from the stars and discharged automatically. Rotating the drum again in the tumbling direction, returns the stars automatically to the tumbling compartment.

This is an entirely different machine from the continuous tumbling barrels, since it enables the work to be tumbled with an excess of stars. This causes the work to float in the stars, resulting in a more thorough and rapid cleaning and in preserving the corners of the parts from excessive rounding.

N. RANSOHOFF.
N. RANSOHOFF, INC.
Cincinnati.

Acquire Control of Donner Steel Co.

Cyrus S. Eaton and Associates of Cleveland Buy 60 Per Cent of Stock—May Mean Merger With Republic

CLEVELAND, Sept. 10.—Cyrus S. Eaton and associates of Otis & Co., Cleveland investment bankers, have acquired control of the Donner Steel Co., Buffalo, by the purchase of 60 per cent of the stock. No statement is obtainable here as to the future of the Donner company, but officials of the Republic Iron & Steel Co. are known to have looked the plant over with a view to a possible merger with Republic.

The Donner company recently purchased ground adjacent to its plant for the building of a mill addition. Equipment to be installed is to round out the range of bar sizes produced by the company, especially alloy steel bars.

Negotiations for the purchase of the Union Drawn Steel Co. by the Republic Iron & Steel Co. are still in progress. It is stated that the merger will be effected by an exchange of stock, but no official statement has been issued as to the terms.

National Metal Congress Heavily Attended

Sessions of Four National Societies and Metal Exposition Attract Many, Including Prominent Foreigners

CLEVELAND, Sept. 10.—After a welcome by W. H. White, chairman of the Cleveland chapter of the American Society for Steel Treating, the eleventh National Metal Congress and Metal Exposition was formally opened yesterday morning by Dr. Zay Jeffries, Cleveland, president of the A. S. S. T. He, in turn, welcomed the other cooperating technical societies, four in all, and declared that this year's assemblage will be the greatest meeting on metals ever held.

Technical sessions of the American Society for Steel Treating, the American Welding Society and the iron and steel divisions of the American Institute of Mining and Metallurgical Engineers and the American Society of Mechanical Engineers are in full swing and very well attended. Nearly 100 papers are scheduled for the sessions.

The exposition occupies 60,000 sq. ft. in the annex and 20,000 sq. ft. in the main part of the public auditorium. Unusual attractiveness is a feature of the displays. Prominence is given to exhibitions of rustless iron, tungsten - carbide tools and nitriding. A large number of metallurgists from abroad are present, including Dr. Adolph Fry, Krupp Laboratories, Essen, Germany; P. F. M. Aubert, of Duval & Aubert, Paris; Otto Piteasen, president German Iron and Steel Institute; Dr. E. H. Schulz, director of the research institute of the United Steel Works Corporation, Germany; Dr. F. Koerber, director, Kaiser Wilhelm Institute, Germany; Cesare Pavone, Milan, Italy; Fernand Turretini, director - general, Société Genevoise D'Instruments de Physique, Geneva, Switzerland, and C. K. Everitt, managing director and works manager, Edgar Allen & Co., Ltd., Sheffield, England. There are also one or two prominent Japanese expected. Some of the foreign visitors are on their way to the world engineering conference in Japan.

The semi-annual meeting of the American Society for Steel Treating will be held under the auspices of the New York chapter in New York, in February, the Friday and Saturday preceding the annual February meeting of the American Institute of Mining and Metallurgical Engineers. Chicago has been selected as the place for the next national metal congress, the week of Sept. 22, 1930. The congress and exposition will be at the Stevens Hotel.

New officers for the calendar year 1930 were nominated yesterday as follows: President, Robert G. Guthrie, Peoples Gas, Light & Coke Co., Chicago; vice-president, J. M. Watson, metallurgist, Hupp Motor Co., Detroit; treasurer, O. A. Fulton, Wheelock, Lovejoy & Co., Boston; directors, W. B. Coleman, W. B. Coleman Co., Philadelphia, and Roy O. E. Harder, University of Minnesota.

Dr. Albert Sauveur, Harvard University, will deliver the annual Campbell memorial lecture tomorrow morning. President Wickenden, the new head of Case School of Applied Science, Cleveland, will be the chief speaker at the banquet Thursday evening. At the joint dinner tonight of the Institute of Metals and iron and steel division of the Mining Engineers the speakers are Floyd T. Taylor, vice-president, Hanson Van Winkle, Munning Co., and Dr. H. W. Gillett, director Battelle Memorial Institute, Columbus, Ohio.

Wide interest was aroused by statement in the local papers this morning credited to G. M. Eaton, metallurgist, Molybdenum Corporation of America, Pittsburgh, that manganese-molybdenum steel is the alloy for future rails and the solution of some present track problems. A session on steel metallurgy this morning, attended by about 500, was presided over by Radcliffe Furness, Midvale Steel Co., Philadelphia, and by Dr. C. H. Herty, Jr., Pittsburgh. Some excellent papers on steel castings, on slags in open-hearth and electric furnace practice, on electric furnace steels and on locomotive forgings were presented and discussed. A report of this session will appear in THE IRON AGE Sept. 19.

Registration to date is very large for all societies, and a large majority of the prominent metallurgists from the United States is present, as well as from Canada and abroad.

To Hold Production Meeting in Cleveland

The annual national production meeting of the Society of Automotive Engineers, Inc., will be held at Cleveland, Oct. 2 and 3, in cooperation with the National Machine Tool Congress and the American Society of Mechanical Engineers. The sessions will be held in the evening and are under the general charge of E. P. Blanchard, Bullard Co., Bridgeport, Conn., who is chairman of the S. A. E. production committee.

Prof. F. E. Raymond, Massachusetts Institute of Technology, will present a paper on "Economic Production Quantities" on Wednesday evening, Oct. 2. It is anticipated that Professor Raymond's paper will be a presentation of the results of a survey he has recently completed by personal visits to a large number of the more important automobile manufacturing plants.

The Thursday evening session will be in the nature of a forum of production executives and production engineers for discussion of the following four subjects:

1. Application of standard machine tools to automobile manufacture.

2. Results in production due to new features of machine tool construction.

3. Synchronizing automobile parts at the assembling line.

4. Basis of replacing machine equipment.

On Friday evening the Cleveland sections of the Society of Automotive Engineers and the American Society of Mechanical Engineers will act jointly as hosts for the annual production dinner at the Hotel Cleveland.

Makes Tanks to Hold Helium Gas

A battery of 96 storage tanks, having a total capacity of 1,000,000 cu. ft. of helium gas, is to be furnished the Goodyear Zeppelin Corporation, Akron, Ohio, by the A. O. Smith Corporation, Milwaukee. Each tank will be 80 ft. long and 2 ft. in diameter. Two lengths of Smithweld gas line pipe are to be joined and heads welded to the ends to form each tank. The tanks will be buried under ground and suitably manifolded in groups. A similar contract, calling for 50 tanks, for installation at the Lakehurst, N. J., field, has been awarded to the A. O. Smith Corporation by the United States Navy Department.

Iron and Steel Markets

Railroad Demand Sets In

Fall Rail Buying Gets Under Way and Equipment Orders Impend, But Steel Output Declines—Heavy Steel Scrap Off 50c. at Pittsburgh

EVIDENCES of a revival in railroad buying, a slight gain in the requirements of the automotive industry and prospects for a recovery in farm machinery output are favorable straws in a steel market that is still without a well defined trend.

These developments have come too late to prevent a further decline in steel works output, but they at least indicate that the low point in demand may have been passed.

Following the placing of 30,000 tons of rails by the Reading, 75,000 tons of new inquiry has appeared, including 54,000 tons for the Chesapeake & Ohio, and fully 400,000 tons is expected to come into the market before the end of the month.

The railroad equipment outlook is also beginning to show more promise. Although buying for the week was limited to 1000 gondola cars for the St. Paul, requiring 15,000 tons of steel, new inquiries include 2000 hopper cars for the Norfolk & Western and 500 gondola car bodies for the Chicago & Easern Illinois.

While a betterment in steel demand from these and other sources is clearly in prospect, the extent of the increase cannot yet be estimated. Meanwhile mill backlogs have continued to shrink and extended deliveries have become a thing of the past.

With no incentive for forward buying, there is no rush on the part of steel consumers to place fourth quarter contracts. Although mills have actually opened their books at unchanged prices or have indicated a willingness, in many cases, to extend present quotations into the next quarter, their customers prefer to await developments. Both sellers and buyers are apparently fencing for advantage pending a test of the market.

The decline of 429,966 tons in the unfilled orders of the Steel Corporation in August was not unexpected in view of unusually large production and the steady falling off in forward commitments. While total unfilled business on Aug. 31, at 3,658,211 tons, was only 34,000 tons larger than a year previous, output for the month was much heavier than in 1928. Steel ingot output for all producers in August totaled 4,925,802 tons, or nearly 750,000 tons more than in the corresponding month one year ago, and in terms of daily average was less than 7 per cent short of the all-time record of last May.

With business back on a hand-to-mouth basis, production can still be large, as has been amply proved in recent years. For the current week steel ingot output ranges from 85 to 95 per cent, with some of the smaller mills running at as low as 80 per cent. Virtually all producers except the leading independent, which expects to maintain a 95 per cent operation through September, have curtailed output. The average for Steel Corporation subsidiaries is estimated at 91 per cent of capacity. Among the producing centers, the Chicago district has shown the sharpest drop, with operations now at 92 per cent compared with close to a capacity rate a week ago. Pittsburgh and Buffalo plants are running at 90 per cent.

Pig iron users, like steel buyers, are conservative in their purchases, although many of them have covered for at least a substantial part of their fourth quarter needs. The threat of Southern competition has not disappeared, and offerings of steel company iron may become more of a market factor if ingot production continues to decline.

Scrap is dull or definitely weaker in most centers, reflecting the uncertainty of steel company operations. Heavy melting steel at Pittsburgh has declined for the second week to $18.25 a ton.

A recession in plate demand at Chicago is the result of a temporary suspension of pipe line work at Milwaukee. The Wisconsin fabricator, however, has just booked 106 miles of 16-in. pipe (15,000 tons) for utilities operating in Nebraska and Oklahoma. Contracts for two pipe lines at Vancouver, British Columbia, and another at Bremerton, Wash., call for 8000 tons of plates.

Structural steel lettings, at 44,000 tons, showed a substantial gain over the previous week. Fresh inquiries call for 26,000 tons, including 9300 tons for a New York subway section.

Bars, plates and shapes at Birmingham have been reduced $2 a ton to 2.10c. a lb., cutting the differential over the Pittsburgh base from $5 to $3 a ton. Galvanized sheets at Birmingham have been marked down from 3.75c. to 3.70c. In other districts quotations announced show no change except on galvanized sheets and cold-rolled strip, on which some mills are asking an advance of $2 a ton over recent minimum prices.

Copper sales last week, at 100,000 tons, were the largest on record, with bookings about evenly divided between foreign and domestic users. The leading producer has abandoned its efforts to advance prices, which are firm at 18c., delivered Connecticut Valley, for electrolytic metal.

THE IRON AGE composite prices are unchanged at $18.25 for pig iron and 2.398c. a lb. for finished steel.

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A Comparison of Prices

Market Prices at Date, and One Week, One Month and One Year Previous, Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron,	Sept. 10, 1929	Sept. 3, 1929	Aug. 13, 1929	Sept. 11, 1928
No. 2 foundry, Philadelphia	$21.26	$21.26	$21.26	$20.26
No. 2, Valley furnace	18.50	18.50	18.50	17.00
No. 2 Southern, Cin'ti	17.19	17.19	17.69	19.94
No. 2, Birmingham	14.50	14.50	14.50	16.25
No. 2 foundry, Chicago*	20.00	20.00	20.00	18.00
Basic, del'd eastern Pa.	19.75	19.75	19.75	19.00
Basic, Valley furnace	18.50	18.50	18.50	16.25
Valley Bessemer, del'd P'gh.	20.76	20.76	20.76	19.01
Malleable, Chicago*	20.00	20.00	20.00	18.00
Malleable, Valley	19.00	19.00	19.00	17.25
Grav forge, Pittsburgh	19.76	19.76	19.76	18.26
L. S. charcoal, Chicago	27.04	27.04	27.04	27.04
Ferromanganese, furnace	105.00	105.00	105.00	105.00
Rails, Billets, Etc., Per Gross Ton:				
Rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Light rails at mill	36.00	36.00	36.00	36.00
Rerolling billets, Pittsburgh	35.00	35.00	35.00	32.00
Sheet bars, Pittsburgh	35.00	35.00	35.00	32.00
Slabs, Pittsburgh	35.00	35.00	35.00	32.00
Forging billets, Pittsburgh	40.00	40.00	40.00	38.00
Wire rods, Pittsburgh	42.00	42.00	42.00	42.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.85	1.85	1.85	1.90
Finished Steel, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Bars, Pittsburgh	1.95	1.95	1.95	1.90
Bars, Chicago	2.05	2.05	2.05	2.00
Bars, Cleveland	1.95	1.95	1.95	1.85
Bars, New York	2.29	2.29	2.29	2.24
Tank plates, Pittsburgh	1.95	1.95	1.95	1.90
Tank plates, Chicago	2.05	2.05	2.05	2.00
Tank plates, New York	2.22½	2.22½	2.22½	2.17½
Structural shapes, Pittsburgh	1.95	1.95	1.95	1.90
Structural shapes, Chicago	2.05	2.05	2.05	2.00
Structural shapes, New York	2.19½	2.19½	2.19½	2.14½
Cold-finished bars, Pittsburgh	2.30	2.30	2.30	2.10
Hot-rolled strips, Pittsburgh	1.90	1.90	1.90	1.75
Cold-rolled strips, Pittsburgh	2.75	2.75	2.75	2.75

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

Finished Steel, *Per Lb. to Large Buyers:*	Sept. 10, 1929 Cents	Sept. 3, 1929 Cents	Aug. 13, 1929 Cents	Sept. 11, 1928 Cents
Sheets, black, No. 24, P'gh	2.85	2.85	2.85	2.65
Sheets, black, No. 24, Chicago dist. mill	2.95	2.95	2.95	2.75
Sheets, galv., No. 24, P'gh	3.50	3.50	3.50	3.40
Sheets, galv., No. 24, Chicago dist. mill	3.60	3.60	3.60	3.60
Sheets, blue, No. 13, P'gh	2.35	2.35	2.35	2.00
Sheets, blue, No. 13, Chicago dist. mill	2.45	2.45	2.45	2.10
Wire nails, Pittsburgh	2.55	2.55	2.55	2.55
Wire nails, Chicago dist. mill	2.60	2.60	2.60	2.60
Plain wire, Pittsburgh	2.40	2.40	2.40	2.40
Plain wire, Chicago dist. mill	2.45	2.45	2.45	2.45
Barbed wire, galv., Pittsburgh	3.20	3.20	3.20	3.20
Barbed wire, galv., Chicago dist. mill	3.30	3.30	3.30	3.25
Tin plate, 100 lb. box, P'gh	$5.35	$5.35	$5.35	$5.25
Old Material, Per Gross Ton:				
Heavy melting steel, P'gh	$18.25	$18.75	$19.25	$16.75
Heavy melting steel, Phila	16.50	16.50	16.50	15.00
Heavy melting steel, Ch'go	15.25	15.25	15.00	13.00
Carwheels, Chicago	14.00	14.00	14.00	13.50
Carwheels, Philadelphia	16.50	16.50	16.50	15.50
No. 1 cast, Pittsburgh	15.50	15.50	15.50	15.00
No. 1 cast, Philadelphia	16.50	16.50	16.50	16.00
No. 1 cast, Ch'go (net ton)	14.50	14.50	14.50	15.00
No. 1 RR. wrot., Phila	16.00	16.00	16.00	14.00
No. 1 RR. wrot., Ch'go (net)	14.00	14.00	14.00	12.00
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$2.65	$2.65	$2.75	$2.75
Foundry coke, prompt	3.75	3.75	3.75	3.75
Metals, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Lake copper, New York	18.12½	18.12½	18.12½	14.75
Electrolytic copper, refinery	17.75	17.75	17.75	14.50
Tin (Straits), New York	45.37½	45.50	46.37½	47.12½
Zinc, East St. Louis	6.80	6.80	6.80	6.25
Zinc, New York	7.15	7.15	7.15	6.60
Lead, St. Louis	6.70	6.55	6.55	6.25
Lead, New York	6.90	6.75	6.75	6.40
Antimony (Asiatic), N. Y.	8.75	8.62½	8.75	10.62½

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Pittsburgh

Ingot Output Above 90 Per Cent, But Orders Are Needed—Scrap Declines 50c. a Ton

PITTSBURGH, Sept. 10.—Following a slight dip last week brought about by the holiday and the extremely hot weather, steel ingot production in this district is again above 90 per cent of capacity, with the Steel Corporation subsidiaries closer to 95 per cent. Youngstown district companies are at a slightly lower rate, while plants down the Ohio River have not curtailed their steel output. In many cases, however, operations are rapidly approaching a hand-to-mouth basis and nearly all of the large independent companies are badly in need of tonnage for their finishing mills.

Reserve supplies of semi-finished steel have again reached normal levels and immediate deliveries may be had on this material as well as on all finished products, with the exception of sheets. In the face of declining demand, buyers are again taking an interest in prices, and with fourth quarter figures yet to be officially announced on leading products, steel makers are making strong efforts to hold present quotations for the final three months of the year. Thus far they have apparently been successful. No pronounced weakness has developed in the last week.

Independent makers of sheets have refused to make fourth quarter contracts at less than 2.85c. on black and 3.60c. on galvanized. In the East, concessions of $1 a ton are occasionally reported on bars, but the price is holding in the natural Pittsburgh territory. Nail prices are still soft at points down the Ohio River, but the $2.55 minimum is holding in this district. The $35 quotation on billets and slabs has not yet been tested on fourth quarter business.

Prospects for heavier buying of steel next month have not improved. Schedules of the Ford Motor Co. for October call for an operation of only five days a week, as compared with six days in the last few months, and its steel requirements will be correspondingly reduced. The other large maker of low-priced cars is expected to take less steel than it is taking this month. Declines from these sources will hardly be offset by increased production of cars in the medium-priced field.

Heavier demand from other large steel consuming industries is still a matter of conjecture. Under such circumstances, sentiment in the steel market no longer carries the optimism of a month ago. While there is no expectation of any pronounced falling off in business this fall, there is a growing belief that a gradual tapering off may continue well into the last quarter of the year.

Reflecting the uncertainty of steel plant operations, the scrap market is definitely weaker. Heavy melting steel is off 50c. a ton, with buying by mills at a standstill and dealers extremely eager to obtain orders. Other grades of scrap are correspondingly soft.

Pig Iron.—Fourth quarter buying has not begun to develop to any large extent, but a fair volume of small orders is coming to local furnace agents, and the aggregate sold during the last week was the highest in some time. Large inquiries seem to be few, although a radiator manufacturer at Uniontown, Pa., is inquiring for 4400

tons of No. 2 plain, and 900 tons of No. 2 X. Other sizable inquiries, if they exist, are not general. In the Valleys, prices are reported to be holding at $18.50, furnace, for basic and foundry iron and at $19 for malleable and Bessemer. Recent sales in that territory have fully justified these quotations, but there is question as to the strength of Pittsburgh delivered prices. A recent transaction in this market is said to have brought out a lower figure than the Neville furnace base plus the freight rate to the point of delivery. The position of merchant furnaces is rather favorable, as stocks are low and order books still are large in some instances. Steel company iron has not become a factor in the market, although there are reports that tonnages will soon be offered if ingot production in the district is curtailed much further.

Prices per gross ton, f.o.b. Valley furnace:

Basic	$18.50
Bessemer	19.00
Gray forge	18.00
No. 2 foundry	18.50
No. 3 foundry	18.00
Malleable	19.00
Low phos., copper free	27.00

Freight rate to Pittsburgh or Cleveland district, $1.76.

Prices per gross ton, f.o.b. Pittsburgh district furnace:

Basic	$19.00
No. 2 foundry	19.00
No. 3 foundry	18.50
Malleable	19.50

Freight rates to points in Pittsburgh district range from 63c. to $1.13.

Semi-Finished Steel.—Buyers of crude steel are not yet showing any interest in their fourth quarter needs, as they are at present very much in doubt as to how large these will be. They have plenty of steel on hand, as in many cases production of finished products was curtailed more rapidly during the last month than shipments of billets and slabs. Sellers are at present taking a firmer price stand on spot shipments and say that the price for the closing months of the year on contract tonnage will be at $35 for billets, slabs and sheet bars, and $40 for forging billets. These prices, representing as they do an advance over the first half of the year, on billets and slabs, are not satisfactory to consumers who are getting no more for their finished products. Under the circumstances, the price situation bears elements of uncertainty. Wire rods are not moving as actively as they were in the summer, but there is still a fair demand and apparently no question about the $42, Pittsburgh or Cleveland, quotation.

Bars, Plates and Shapes.—Deliveries on the heavy hot-rolled products are still improving, and the tight situation in plates, which has existed for several months, is beginning to ease. Pittsburgh mills are no longer receiving plate tonnage from the Chicago district, and, although the demand of local consumers has not been curtailed much, production is fully equal to the present demand. Structural awards in this district have been rather light for several weeks, and backlogs of fabricating shops are gradually dwindling. Only the larger interests are able to see ahead more than a month, and a few of the smaller units are quite anxious for business. Barge shop operations are still high, but in another six or eight weeks present commitments will be about worked off, with a consequent diminishing demand for steel. Merchant bars are quiet and business is now largely on a hand-to-mouth basis. There is more activity in reinforcing bars, although makers are now able to divert tonnage to this use which ordinarily went to other departments and are gradually improving deliveries. Fourth quarter prices have not been announced, but it is generally expected that there will be no change from the present quotation of 1.95c., Pittsburgh, on bars, plates and shapes.

Rails and Track Accessories.—This is ordinarily one of the dull periods of the year. Considering this, specifications are coming in at a satisfactory rate and shipments are holding up fairly well. The Reading Railroad has placed 30,000 tons of rails, of which 24,000 tons went to the Bethlehem Steel Co. and 6000 tons to the local mill. Rail inquiries have not yet begun to appear, but a number of roads are said to be preparing their requirements and are expected to come into the market earlier than usual.

Wire Products.—Local producers of wire have not yet definitely determined fourth quarter quotations, and the present instability in prices has apparently held up buying in many cases. Shipments of manufacturing wire are sustained, and there has been no marked curtailment in specifications. Jobber business is very quiet in both wire and nails. Present quotations range from $2.55 to $2.65 a keg on nails and 2.40c. to 2.50c. base a lb. on wire.

Tubular Goods.—The pipe market is rather dull from a standpoint of unusual developments, although business in both lap-welded and seamless tubing is coming in at a steady rate, and mill operations are comparatively high. On butt-weld pipe demand is quiet, and local makers can see no signs of definite improvement in the near future. Production of mechanical tubing has been curtailed on account of the reduced requirements of the automobile industry, but improved demand is expected within a month.

Sheets.—Sheet manufacturers have not officially opened their books for fourth quarter, but most of them have assumed a willingness to take business at present maximum quotations. The 2.85c., Pittsburgh, price on black sheets has been fairly well established for several weeks, but a quotation of 3.60c. on galvanized sheets will represent an advance to some consumers who have been able to buy during the present quarter at 3.50c. On light plates, blue annealed, the fourth quarter quotation will be 2.20c., Pittsburgh, for the No. 10 gage, while blue annealel sheets, No. 13 gage, will be unchanged at 2.35c. Local makers have maintained these quotations rather firmly during the present quarter, although concessions of $2 a ton have been reported from other districts. A few large users have recently been able to buy automobile body sheets at as low as 4c., Pittsburgh, but this concession represents the usual preferential offered to very large buyers and does not represent any marked weakness. Quotations of less than 3c., Pittsburgh, on tin mill black plate have never been admitted as representative of the market by some makers, and this price will be quoted on fourth quarter busi-

The Iron Age Composite Prices

Finished Steel

Sept. 10, 1929, 2.398c. a Lb.

One week ago	2.398c.
One month ago	2.398c.
One year ago	2.348c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products make 87 per cent of the United States output of finished steel.

	High		Low	
1929	2.412c.,	April 2;	2.391c.,	Jan. 8
1928	2.391c.,	Dec. 11;	2.314c.,	Jan. 3
1927	2.453c.,	Jan. 4;	2.293c.,	Oct. 25
1926	2.453c.,	Jan. 5;	2.403c.,	May 18
1925	2.560c.,	Jan. 6;	2.396c.,	Aug. 18

Pig Iron

Sept. 10, 1929, $18.25 a Gross Ton

One week ago	$18.25
One month ago	18.42
One year ago	17.46
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low	
1929	$18.71,	May 14;	$18.25,	Aug. 27
1928	18.59,	Nov. 27;	17.04,	July 24
1927	19.71,	Jan. 4;	17.54,	Nov. 1
1926	21.54,	Jan. 5;	19.46,	July 13
1925	22.50,	Jan. 13;	18.96,	July 7

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base per Lb.
F.o.b. Pittsburgh mill	1.95c.
F.o.b. Chicago	2.05c.
Del'd Philadelphia	2.27c.
Del'd New York	2.29c.
Del'd Cleveland	1.92½c. to 1.95c.
F.o.b. Cleveland	1.90c. to 1.95c.
F.o.b. Lackawanna	2.05c.
F.o.b. Birmingham	2.10c.
C.i.f. Pacific ports	2.35c.
F.o.b. San Francisco mills	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills, 40, 50, 60-ft.	2.05c.
F.o.b. Pittsburgh mills, cut lengths	2.30c.
F.o.b. Birmingham, mill lengths	2.10c.

Rail Steel

F.o.b. mills, east of Chicago dist.	1.85c. to 1.90c.
F.o.b. Chicago Heights mill	1.95c.
Del'd Philadelphia	2.27c.

Iron

Common iron, f.o.b. Chicago	2.05c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	2.12c.
Common iron, del'd New York	2.14c.

Tank Plates

	Base per Lb.
F.o.b. Pittsburgh mill	1.95c.
F.o.b. Chicago	2.05c.
F.o.b. Birmingham	2.10c.
Del'd Cleveland	2.14c.
Del'd Philadelphia	2.15c.
F.o.b. Coatesville	2.05c.
F.o.b. Sparrows Point	2.05c.
F.o.b. Lackawanna	2.05c.
Del'd New York	2.22½c.
C.i.f. Pacific ports	2.35c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh mill	1.95c.
F.o.b. Chicago	2.05c.
F.o.b. Birmingham	2.10c.
F.o.b. Lackawanna	2.05c.
F.o.b. Bethlehem	2.05c.
Del'd Cleveland	2.14c.
Del'd Philadelphia	2.01c. to 2.06c.
Del'd New York	2.14½c.
C.i.f. Pacific ports	2.35c.

Hot-Rolled Hoops, Bands and Strips

	Base per Lb.
6 in. and narrower, P'gh	2.00c.
Wider than 6 in., P'gh	1.90c.
6 in. and narrower, Chicago	2.20c.
Wider than 6 in., Chicago	2.10c.
Cooperage stock, P'gh	2.20c.
Cooperage stock, Chicago	2.30c.

Cold-Finished Steel

	Base per Lb.
Bars, f.o.b. Pittsburgh mill	2.30c.
Bars, f.o.b. Chicago	2.30c.
Bars, Cleveland	2.35c.
Shafting, ground, f.o.b. mill	*2.65c. to 3.60c.
Strips, P'gh	2.75c. to 2.85c.
Strips, Cleveland	2.75c. to 2.85c.
Strips, del'd Chicago	3.05c. to 3.15c.
Strips, Worcester	2.90c. to 3.00c.
Fender stock, No. 20 gage, Pittsburgh or Cleveland	4.25c.

*According to size.

Wire Products

(Carload lots, f.o.b. Pittsburgh and Cleveland, to jobbers and retailers.)

	Base per Keg
Wire nails	$2.55 to $2.65
Galvanized nails	4.55 to 4.65
Galvanized staples	3.25 to 3.35
Polished staples	3c. to 3.10c.
Cement coated nails	$2.55 to $2.65

	Base per 100 Lb.
Bright plain wire, No. 6 to No. 9 gage	$2.40 to $2.50
Annealed fence wire	2.55 to 2.65
Spring wire	3.50 to 3.60
Galv'd wire, No. 9	3.00 to 3.10
Barbed wire, galv'd	3.20 to 3.30
Barbed wire, painted	2.95 to 3.05
Woven wire fence (per net ton to retailers)	65.00

Chicago district mill and delivered Chicago prices are $1 per ton above the foregoing. Birmingham mill prices $3 a ton higher; Worcester, Mass. (wire), mill $3 a ton higher on production of that plant; Duluth, Minn., mill $2 a ton higher; Anderson, Ind., $1 higher.

Cut Nails

	Per 100 Lb.
Carloads, Wheeling, Reading or Northumberland, Pa.	$2.70
Less carloads, Wheeling or Reading	2.80

Light Plates

No. 10, blue annealed, f.o.b. P'gh.	2.10c. to 2.20c.
No. 10, blue annealed, f.o.b. Chicago dist.	2.30c.
No. 10, blue annealed, del'd Phila.	2.42c. to 2.52c.
No. 10, blue annealed, B'ham	2.35c.

Sheets

Blue Annealed

	Base per Lb.
No. 13, f.o.b. P'gh	2.25c. to 2.35c.
No. 13, f.o.b. Chicago dist	2.45c.
No. 13, del'd Philadelphia	2.67c.
No. 13, blue annealed, B'ham	2.50c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh	2.85c.
No. 24, f.o.b. Chicago dist. mill	2.95c. to 3.00c.
No. 24, del'd Philadelphia	3.17c. to 3.27c.
No. 24, f.o.b. Birmingham	3.10c.

Metal Furniture Sheets

No. 24, f.o.b. P'gh	4.10c. to 4.20c.

Galvanized

No. 24, f.o.b. Pittsburgh	3.50c. to 3.60c.
No. 24, f.o.b. Chicago dist. mill	3.60c. to 3.70c.
No. 24, del'd Cleveland	3.59c. to 3.69c.
No. 24, del'd Philadelphia	3.92c. to 4.02c.
No. 24, f.o.b. Birmingham	3.70c.

Tin Mill Black Plate

No 28, f.o.b. Pittsburgh	2.90c. to 3.00c.
No. 28, f.o.b. Chicago dist. mill	3.00c. to 3.10c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh	4.00c. to 4.10c.

Long Ternes

No. 24, 8-lb. coating, f.o.b. mill	4.00c. to 4.10c.

Vitreous Enameling Stock

No. 24, f.o.b. Pittsburgh	3.90c.

Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills	$5.35
Standard cokes, f.o.b. Gary	5.45

Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)
(Per Package, 20 x 28 in.)

8-lb. coating I.C.	$11.20
15-lb. coating I.C.	14.00
20-lb. coating I.C.	15.30
25-lb. coating I.C.	$16.70
30-lb. coating I.C.	17.75
40-lb. coating I.C.	19.85

Alloy Steel Bars

(F.o.b. makers' mill)

Alloy Quality Bar Base, 2.65c. to 2.75c. per Lb.

S.A.E. Series Numbers		Alloy Differential
2000	(1½% Nickel)	$0.25
2100	(1½% Nickel)	0.55
2300	(3½% Nickel)	1.50
2500	(5% Nickel)	2.25
3100	Nickel Chromium	0.55
3200	Nickel Chromium	1.35
3300	Nickel Chromium	3.80
3400	Nickel Chromium	3.20
4100	Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50
4100	Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600	Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel)	1.05
5100	Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100	Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100	Chromium Spring Steel	0.20
6100	Chromium Vanadium Bars	1.20
6100	Chromium Vanadium Spring Steel	0.95
9250	Silicon Manganese Spring Steel (flats)	0.25
	Rounds and squares	0.50
Chromium Nickel Vanadium		1.50
Carbon Vanadium		0.95

Above prices are for hot rolled steel bars, forging quality. The differential for cold-drawn bars is 3/16c. a lb. higher, with standard classification for cold-finished alloy steel bars applying. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis.

Billets under 4 x 4 in. carry the steel bar base. Slabs with a sectional area of 16 in. or over carry the billet price. Slabs with sectional area of less than 16 in. or less than 2½ in. thick, regardless of sectional area, take the bar price.

Rails

	Per Gross Ton
Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	36.00
Light (from rail steel), f.o.b. mill	34.00
Light (from billets), f.o.b. Ch'go mill	36.00

Track Equipment

	Base per 100 Lb.
Spikes, 5/16 in. and larger	$2.80
Spikes, ½ in. and smaller	2.80
Spikes, boat and barge	3.00
Tie plate, steel	2.15
Angle bars	$2.75
Track bolts, to steam railroads	$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel Inches	Black	Galv.	*Iron* Inches	Black	Galv.
⅛	45	19½	¼ and ⅜	+11	+36
¼ to ⅜	51	25½	½	23	5
½	56	42½	¾	28	11
¾	60	48½	1 and 1¼	31	15
1 to 3	62	50½	1½ and 2	35	18

Lap Weld

2	55	43¼	2	23	9
2½ to 6	59	47½	2½ to 3½	28	13
7 and 8	56	43½	4 to 6	30	17
9 and 10	54	42½	7 and 8	29	16
11 and 12	53	40½	9 to 12	26	11

Butt Weld, extra strong, plain ends

⅛	41	24½	¼ and ⅜	+13	+48
¼ to ⅜	47	30½	½	23	7
½	53	42½	¾	28	12
¾	58	47⅞	1 to 2	34	18
1 to 1½	60	49½			
2 to 3	61	50½			

Lap Weld, extra strong, plain ends

2	53	42½	½	29	13
2½ to 4	57	46½	2½ to 4	34	20
4½ to 6	56	45½	4½ to 6	33	19
7 to 8	52	39½	7 and 8	31	17
9 and 10	45	32½	9 to 12	21	8
11 and 12	44	31½			

On carloads the above discounts on steel pipe are increased on block by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased 7½ to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Steel		*Charcoal Iron*	
2 in. and 2¼ in.	40	1½ in.	1
2½ in.—2¾ in.	48	1⅞ in.	8
3 in.	54	2 in.—2¼ in.	13
3¼ in.—3¾ in.	56	2½ in.—2⅞ in.	16
4 in.	59	3 in.	17
4½ in. to 6 in.	48	3¼ in. to 3½ in.	18
		4 in.	20
		4½ in.	21

On lots of a carload or more, the above base discounts are subject to a preferential of two fives on steel and of 10 per cent on charcoal iron tubes. Smaller quantities are subject to the following modifications from the base discounts:

Lap Welded Steel—Under 10,000 lb., 6 points under base and one five; 10,000 lb. to carload, 4 points under base and two fives. Charcoal Iron—Under 10,000 lb., 2 points under base; 10,000 lb. to carload, base and one five.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	63	3 in.	48
1¼ to 1½ in.	55	3¼ to 3½ in.	50
1⅝ in.	39	4 in.	53
2 to 2¼ in.	34	4½, 5 and 6 in.	42
2½ to 2¾ in.	42		

Hot Rolled

2 and 2¼ in.	40	3¼ to 3½ in.	56
2½ and 2¾ in.	48	4 in.	59
3 in.	54	4½, 5 and 6 in.	48

Beyond the above base discounts a preferential discount of 5 per cent is allowed on carload lots. On less than carloads to 10,000 lb., base discounts are reduced 4 points with 5 per cent preferential; on less than 10,000 lb., base discounts are reduced 6 points, with no preferential. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage take mechanical tube list and discounts. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30%, base (carloads)	55
Carbon, 0.30% to 0.40%, base	50

Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

ness. Specifications on sheets are somewhat lighter and deliveries on nearly all the common finishes, except occasionally blue annealed, can be had in three to four weeks. Backlogs are still declining, although hot weather seriously curtailed operations last week. For the present week the leading interest has scheduled its mills at just under 100 per cent of capacity.

Tin Plate.—Operations of all the leading independent companies have fallen under 75 per cent and some are closer to 50 per cent. The largest producer, however, plans to run its mills at better than 85 per cent this week. This figure includes the Chicago district, where curtailment has not been as marked as around here. During the corresponding dull period in other years some companies have been able to roll considerable export tonnage, but this year's exports are smaller than usual on account of the low-priced competition of foreign makers.

Strip Steel.—Demand has shown no further decline since the first of the month, and some makers report a beginning improvement in the specifications of automobile makers. Nevertheless any important increase in demand from this source before October would be a surprise to local mills which expect a quiet month. Strip mill operations are not higher than 75 per cent of capacity in this and nearby districts. Prices seem to be holding and makers are anxious to maintain present schedules on fourth quarter contract tonnage.

Cold-Finished Steel Bars.—No new activity has developed in this market, but business has shown little decline from recent levels and conditions are generally satisfactory. Makers are beginning to make fourth quarter contracts at unchanged prices, although the new extras announced last July will apply on this business.

Cotton Ties.—Buying of cotton ties has been practically concluded for the season, and total tonnage to be shipped will be approximately the same as last year. However, Pittsburgh mills took a comparatively smaller tonnage, the bulk of the business having gone to makers at Atlanta, Ga., and Birmingham and to foreign producers. The price this year was established by the importers at $1.05 per 45-lb. bundle, f.o.b. Gulf ports. Southern and Pittsburgh mills met this figure on most of the business. In future, Pittsburgh district producers expect to reduce their tonnage still further as they cannot compete profitably with the Southern or imported product at present price levels.

Old Material.—The scrap market has taken a definitely weaker turn and prices have declined at least 50c. a ton on all the principal grades. The Pennsylvania Railroad list, which was sold last week, is said to have brought figures ranging from $18.75 to slightly over $19 for steel scrap, while the Baltimore & Ohio list, which closed yesterday, did not bring more than $18.75. As heavy melting steel is offered freely at $18.50 and less, and may be picked up by local dealers at $18, the market is now quotable at $18 to $18.75, with an average tending toward the lower figure. In the absence of mill buying, it is difficult to quote the market with any certainty, although eagerness to sell on the part of the dealers is undoubtedly responsible for the weakness which has become accentuated in the last two days. Hydraulic compressed sheets are nominally quoted at $18 to $18.50, a decline of 25c. from recent levels, and lighter steel works grades, such as short shoveling steel turnings and machine shop turnings, are off 50c. and 75c.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$18.00 to $18.75
No. 2 heavy melting steel	16.00 to 16.50
Scrap rails	17.50 to 18.00
Compressed sheet steel	18.00 to 18.50
Bundled sheets, sides and ends	16.50 to 17.00
Cast iron carwheels	16.50 to 17.00
Sheet bar crops, ordinary	19.50 to 20.00
Heavy breakable cast	12.50 to 13.00
No. 2 railroad wrought	18.00 to 18.50
Hvy. steel axle turnings	16.50 to 17.00
Machine shop turnings	11.75 to 12.25
Acid Open-Hearth Grades:	
Railr. knuckles and couplers	21.50 to 22.00
Railr. coil and leaf springs	21.50 to 22.00
Rolled steel wheels	21.50 to 22.00
Low phos. billet and bloom ends	22.00 to 22.50
Low phos., mill plates	22.00 to 22.50
Low phos., light grades	20.50 to 21.50
Low phos., sheet bar crops	20.50 to 21.50
Heavy steel axle turnings	16.50 to 17.00
Electric Furnace Grades:	
Low phos., punchings	20.00 to 21.00
Hvy. steel axle turnings	16.50 to 17.00
Blast Furnace Grades:	
Short shoveling steel turnings	12.50 to 13.00
Short mixed borings and turnings	12.00 to 12.50
Cast iron borings	12.00 to 12.50
Rolling Mill Grades:	
Steel car axles	21.50 to 22.00
Cupola Grades:	
No. 1 cast	15.00 to 16.00
Rails 3 ft. and under	20.00 to 21.00

Warehouse Business. — Sales of many products have shown a slight improvement since Labor Day, and further increase in volume of business is expected this month. Prices on sheets and wire products are rather soft, reflecting weakness in mill quotations, but many distributers are still quoting recent maximum prices on the usual run of business. Bolt and nut prices are firm and demand is fair. Sales of roofing are improving.

Coal and Coke.—Weakness in the furnace coke market is gradually being corrected by curtailment of production, more than 500 ovens having been put out in the Connellsville district last week. The market is still quotable at $2.65 to $2.75, Connellsville, although the higher figure is being done on very little business and $2.60 has been done on some occasions. Foundry coke prices are also weak, but there are occasional reports of improved demand. The premium brands are holding at $4.85, ovens. Fall demand for coal is increasing, but the market has shown little price strength.

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.25c.
Hoops	4.25c.
Black sheets (No. 24), 25 or more bundles	3.80c. to 3.90c.
Galv. sheets (No. 24), 25 or more bundles	4.45c. to 4.55c.
Light plates, blue annealed (No. 10), 1 to 24 plates	3.35c. to 3.45c.
Blue annealed sheets (No. 13), 1 to 24 sheets	3.50c. to 3.60c.
Galv. corrug. sheets (No. 28), per square	$4.43
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count,	60 per cent off list
Machine bolts, 100 count,	60 per cent off list
Carriage bolts, 100 count,	60 per cent off list
Nuts, all styles, 100 count,	60 per cent off list
Large rivets, base per 100 lb.	$3.50
Wire, black soft, ann'l'd, base per 100 lb.	$3.00 to 3.10
Wire, galv. soft, base per 100 lb.	3.00 to 3.10
Common wire nails, per keg	2.90 to 3.00
Cement coated nails, per keg	3.05

Wire Mesh Prices Reduced Sharply

On Sept. 5 the John M. Hart Co., 435 Lexington Avenue, New York, distributer of Hanover wire cloth, announced new opening prices for the season of 1930 on copper and bronze mesh. The new prices are not only reductions from the former f.o.b. mill quotations, but include freight allowances on carload lots to all points on and east of the Mississippi River, including Duluth, St. Louis and New Orleans.

On less than carload lots the new prices include a freight allowance not exceeding 80c. per 100 lb. from Hanover, Pa. On shipments to consumers west of the Mississippi River the freight allowance in the new prices on both carload and less than carload lots is $1.07 per 100 lb., which is the carload freight rate from Hanover, Pa., to St. Louis. As about 75 per cent of the business in copper and bronze wire screen cloth is in the freight allowance territory, the new basis of quoting represents a considerable reduction to consumers.

The terms are net payment in 60 days, or 2 per cent discount for cash in 10 days, with all business dated March 1, 1930. Where prepayment is made the prepayment discount is 6 per cent per annum.

The new prices, which include freight allowance, are on copper mesh, $5 per 100 sq. ft. for No. 14, $5.40 per 100 sq. ft. for No. 16 and $5.65 per 100 sq. ft. for No. 18.

On bronze mesh the quotations are $5.35 per 100 sq. ft. for No. 14, $5.70 for No. 16 and $6 for No. 18. An allowance of 5c. per 100 sq. ft. is given on large rolls of about 300 lin. ft. and 7c. per 100 sq. ft. is allowed on cloth which is not boxed.

A two-year research program in lubrication is planned by a special research committee on lubrication of the American Society of Mechanical Engineers. It calls for an expenditure of $20,000.

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and under 10 in., Pittsburgh	$35.00
Rerolling, 4-in. and under 10 in., Youngstown	35.00
Rerolling, 4-in. and under 10 in., Cleveland	35.00
Rerolling, 4-in. and under 10 in., Chicago	37.00
Forging quality, Pittsburgh	$40.00 to 41.00

Sheet Bars

(Open Hearth or Bessemer)

	Per Gross Ton
Pittsburgh	$35.00
Youngstown	35.00
Cleveland	35.00

Slabs

(8 in. x 2 in. and under 10 in. x 10 in.)

	Per Gross Ton
Pittsburgh	$35.00
Youngstown	35.00
Cleveland	35.00

Skelp

(F.o.b. Pittsburgh or Youngstown)

	Per Lb.
Grooved	1.85c. to 1.90c.
Universal	1.85c. to 1.90c.
Sheared	1.85c. to 1.90c.

Wire Rods

(Common soft, base)

	Per Gross Ton
Pittsburgh	$42.00
Cleveland	42.00
Chicago	43.00

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.80
Old range non-Bessemer, 51.50% iron	4.65
Mesabi Bessemer, 51.50% iron	4.65
Mesabi non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.40

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algerian	12.00c.
Iron ore, low phos., Swedish, average 68% iron	12.50c.
Iron ore, basis Swedish, average 65% iron	11.00c.
Manganese ore, washed, 52% manganese, from the Caucasus	32.00c. to 33.00c.
Manganese ore, Brazilian, African or Indian, basic 50%	33.00c.
Tungsten ore, high grade, per unit, in 60% concentrates	$16.25 to $16.50

	Per Gross Ton
Chrome ore, 45 to 50% Cr_2O_3, crude, c.i.f. Atlantic seaboard	$22.00 to $24.00

	Per Lb.
Molybdenum ore, 85% concentrates of MoS_2, delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$2.65 to $2.75
Foundry, f.o.b. Connellsville prompt	3.75 to 4.75
Foundry, by-product, Ch'go ovens	8.00
Foundry, by-product, New England, del'd	11.00
Foundry, by-product, Newark or Jersey City, delivered	9.00 to 9.40
Foundry, by-product, Phila.	9.00
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry by-prod., del'd St. Louis	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.25 to $1.75
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, ¾-in. f.o.b. Pa. mines	1.90 to 2.00
Mine run gas coal, f.o.b. Pa. mines	1.65 to 1.75
Steam slack, f.o.b. W. Pa. mines	80c. to 90c.
Gas slack, f.o.b. W. Pa. mines	1.00 to 1.10

Ferromanganese

	Per Gross Ton
Domestic, 80%, seaboard	$105.00
Foreign, 80%, Atlantic or Gulf port, duty paid	105.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$31.00 to $34.00
Domestic, 16 to 19%	29.00 to 32.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$83.50
75%	130.00

	Per Gross Ton Furnace		Per Gross Ton Furnace
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	45.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		Per Gross Ton
10%	$30.00	12%	$34.00
11%	32.00		

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		Per Gross Ton
6%	$23.00	10%	$27.00 to $28.00
7%	24.00	11%	29.00 to 30.00
8%	25.00	12%	31.00 to 32.00
9%	26.00		

Other Ferroalloys

Ferrotungsten, per lb. contained metal del'd	$1.40 to $1.50
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.15 to $3.65
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	$160.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton	$91.00
Ferrophosphorus, electric 24%, f.o.b. Anniston, Ala., per gross ton	$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silicon, gravel, f.o.b. Illinois and Kentucky mines	$18.00
No. 2 lump, Illinois and Kentucky mines	20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	$18.25 to $18.75
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines	32.50

Fire Clay Brick

	Per 1000 f.o.b. Works	
	High-Heat Duty Brick	Intermediate Heavy Duty Brick
Pennsylvania	$43.00 to $46.00	$35.00 to $38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	.....
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00
Standard size	45.00

Chrome Brick

	Per Net Ton
Standard size	$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts, blank or tapped, hexagons	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	7.00c. to 6.75c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled thread up to and including ⅛ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagons nuts	70
Semi-finished hexagons castellated nuts, S.A.E.	70
Stove bolts in packages, P'gh	75, 20, 10 and 5
Stove bolts in packages, Chicago	75, 20, 10 and 5
Stove bolts in packages, Cleveland	75, 20, 10 and 5
Stove bolts in bulk, P'gh	75, 20, 10, 5 and 2½
Stove bolts in bulk, Chicago	75, 20, 10, 5 and 2½
Stove bolts in bulk, Cleveland	75, 20, 10, 5 and 2½
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55, 60 per cent apply.

Large Rivets

(½-In. and Larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$3.10
F.o.b. Chicago	3.20

Small Rivets

(⅞-In. and Smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70 and 10
F.o.b. Cleveland	70 and 10
F.o.b. Chicago	70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10 and 5
Milled standard set screws, case hardened	80 and 5
Milled headless set screws, cut thread	75 and 10
Upset hex. head cap screws, U.S.S. thread	85
Upset hex. cap screws, S.A.E. thread	85
Upset set screws	80, 10 and 5
Milled studs	70

Chicago

Railroads Feature Week's Business—Ingot Capacity at 92 Per Cent—Light Manufacturing Continues Active

CHICAGO, Sept. 10.—The feature of this market is the activity shown by railroads. The St. Paul has ordered 1000 70-ft. gondola cars from two Western builders, who soon will place the 15,000 tons of steel needed. Inquiry for rails, which is out fully three weeks earlier than usual, totals 75,000 tons, and fresh requests are taking shape that may double the amount in the next week or ten days.

Inflow of railroad business has not come early enough to check shrinking backlogs and halt a revision downward in steel mill operations. The leading producer has taken out No. 9 furnace at South Works for relining, and No. 4 stack at Gary has been banked for needed repairs, which will require about two weeks' time. This means a loss of two steel works furnaces in the week, bringing the total count of active stacks to 27 out of 36.

With curtailment of pig iron production makers of steel have been forced to cut ingot capacity, the average in this district now being 92 per cent.

Glancing over the situation as a whole, it is found that light manufacturing of a general character is still very active. Some improvement is noted in demand from automobile and parts makers. Agricultural machinery builders find no encouragement in larger orders, but they are planning heavier production schedules to go into effect this fall. Road machinery manufacturers are cutting output and still further revision downward seems at hand. Temporary suspension of several line pipe contracts has eased the immediate demand for plates, because the maker of this commodity is not desirous of putting steel on the ground.

Prices for most steel mill products are well established at present levels and there seems to be little thought given by buyers to changes for the fourth quarter. Sellers of heavy tonnage products have not announced prices for the final period. Although no formal announcement has been made regarding future prices for wire and wire products, it is known that some contracts for delivery after Oct. 1 have already been signed.

Ferroalloys.—From the viewpoint of shipments, this market is active but sales are small.

Prices delivered Chicago: 80 per cent ferromanganese, $112.56; 50 per cent ferrosilicon, $83.50 to $88.50; spiegeleisen, 19 to 21 per cent, $39.76 to $41.76.

Sheets.—Announcement of fourth quarter prices has started a buying movement. Demand for roofing sheets is heavy. Output in this district ranges from 85 to 90 per cent.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 3c. to 3.05c.; No. 24 galv., 3.65c. to 3.75c.; No. 10 blue ann'l'd, 2.35c. Deliv'd prices at other Western points are equal to the freight from Gary, plus the mill prices, which are 5c. per 100 lb. lower than Chicago delivered prices.

Pig Iron.—With the bulk of fourth-quarter needs covered, foundries in this district continue buying at a uniform rate. Prices for Northern iron remain firmly fixed at $20 a ton, f.o.b. local furnace, and there seems no anxiety among buyers that this level will be changed. Delays have set ahead the relighting of the third Iroquois furnace. In the meantime five merchant stacks are producing. This week has seen the closing of several old Southern iron quotations at $13 a ton, Birmingham. There is a general feeling that Southern iron interests' bid for business in this district has spent its force and announcements are to the effect that prices are to be pegged at $13.50 to $14.50 a ton, Birmingham. Two cargoes of Lake Erie iron arrived at Chicago docks late last week.

Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	$20.00
N'th'n No. 1 fdy., sil. 2.25 to 2.75	20.50
Malleable, not over 2.25 sil.	20.00
High phosphorus	20.00
Lake Super. charcoal, sil. 1.50	27.04
So'th'n No. 2 fdy. (all rail)	$18.51 to 19.01
Low phos., sil. 1 to 2, copper free	29.50
Silvery, sil. 8 per cent	29.79
Bess. ferrosilicon, 14-15 per cent	46.29

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Rails and Track Supplies.—Buying of heavy-section rails for fall rolling has got under way fully three weeks earlier than usual. The Chesapeake & Ohio will buy 56,000 tons of rails and 14,000 tons of track fastenings. Other needs by Western railroads bring total pending inquiry to not less than 75,000 tons. Inquiry that is expected to come before the trade in a few days totals 100,000 tons. Local sellers estimate that fully 400,000 tons will have been asked for by the end of this month. Last year more than half of the Chesapeake & Ohio order was placed with Western mills. The Colorado rail mills, which have been down since early in August, are expected to resume operations before the end of this month. One Chicago rail mill has about two weeks' work ahead, whereas another producer continues to operate at 75 per cent and will hold to this rate until order books have grown. Orders for light rails are of car lot size. An inquiry is out for a round tonnage of iron tie plates to be delivered in the spring.

Prices f.o.b. mill, per gross ton: Standard section open-hearth and Bess. rails, $43; light rails, rolled from billets, $36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.15c.; angle bars, 2.75c.

Cast Iron Pipe.—This market remains spotty, with little to indicate that improvement is near at hand. For the most part, public utilities have specified in full against spring delivery orders and it will be several months before they make known their 1930 needs. Railroads are taking a larger aggregate tonnage, but individual orders are of car lot size. Other small users, including industrials, are more active in taking minor tonnages. Northfield, Ill., has ordered 3000 tons of cast iron pipe through a contractor. James B. Clow & Sons have taken 1000 tons of 20 and 24-in. pipe for Columbus, Ohio, and the Lynchburg Foundry Co. has been awarded 2500 tons of 36-in. pipe by Detroit. The McWane Cast Iron Pipe Co. will furnish 15,000 ft. of 4 and 8-in. pipe for Franklin, Ohio, and 15,000 ft. of 6-in. pipe for Newark, Ohio. Chaffee, Mo., is in the market for 22,000 ft. of 4-in.

Prices per net ton, del'd Chicago: Water pipe, 6-in. and over, $45.20 to $46.20; 4-in., $49.20 to $50.20; Class A and gas pipe, $3 extra.

Structural Material.—The local building situation is at low ebb, and competition is unusually severe on going jobs. Although bids have been entered on a number of heavy tonnage projects, these move slowly. Small tonnage projects, which are numerous, are being eagerly sought after by many fabricators, with the result that small shops, to which this class of work usually goes, are having trouble in holding organizations together. Several medium-sized shops have only a few weeks of work on their books. Some of the large shops are eating heavily into backlogs, while others with substantial books are having difficulty in meeting delivery promises. The Phillips High School, Chicago, which will take 3700 tons, will be delayed because bids have been thrown out and new figures must be taken. Deliveries are still further improved, with two to three weeks being promised on heavy shapes and three to four weeks on light sections. Structural shapes, shipped by boat to Chicago, can be had in two to three weeks. This is the first time in many months that a Chicago producer can match delivery dates with water shipments of steel. Sellers have not announced fourth quarter prices, but it is generally believed in the trade that quotations will be unchanged from those of this quarter.

Mill prices on plain material, per lb.: 2.05c. base, Chicago.

Reinforcing Bars.—Marked increase in general activity in this market is shown as the vacation season comes to a close. New contracts total over 1000 tons and fresh inquiry exceeds this figure. It is interesting to note, however, in contrast with a year ago, that the bulk of current business is for schools, industrial buildings and institutions, whereas last year apartment buildings were most prominent. Highway departments in Illinois and neighboring States are busy with new plans, and the trade is looking in that direction for a substantial volume of business. Efforts to clarify the price situation have so far been fruitless. Billet steel reinforcing bars in attrac-

tive tonnages are commonly priced at 2.10c. a lb. and similar business in rail steel bars is at 1.95c. a lb.

Plates.—The stress for deliveries of plates in this district is at least momentarily relieved, following the holding up of several pipe line contracts with resultant lighter tonnages of plates needed by pipe makers. The temporary suspension of this work, together with a general slackening in the market as a whole, has resulted in improvement in delivery dates to the range of three to four weeks in the case of local producers, while steel makers on Lake Erie will promise deliveries by boat at Chicago in two to three weeks. A Southwestern oil refiner has ordered 1000 tons of plates for tank construction, and 3000 tons will be needed for similar work in Texas. Total inquiry for large tank programs is for not less than 16,000 tons of plates. The Chicago & Eastern Illinois denies a report that it has ordered 500 cars from a Western builder. It has, however, before the trade an inquiry for 500 steel gondola car bodies, but at this time there is no assurance that a contract will be placed, as the road may build these bodies in its own shops. An order for 50 refrigerator cars has been taken by the Pullman Car & Mfg. Corporation. Car builders continue to view the outlook with anxiety. Old contracts are running out and, even if shop schedules are curtailed, it may be difficult to hold organizations together until new orders, if placed, can be started on. The argument is being advanced to railroads that the cost of cars will be favorably reflected in quotations if building programs can go forward with only slight interruption.

Bars.—The slackening demand for mild steel bars is resulting in improvement in deliveries. Some sizes can now be had promptly, while the average, taking into consideration all sizes, is now not over four weeks. New sales are in small volume in the absence of announcements of fourth quarter prices. Specifications lag behind shipments. Demand from the agricultural machinery manufacturers continues to taper, though there are indications that production will swing upward in the early weeks of October. One tractor plant has little domestic business on hand, operations being sustained by sizable orders from Russia. Road machinery builders are experiencing the first period of slackening operations in many months. Automobile parts manufacturers are taking larger quantities of steel, and this is viewed by the trade as an omen that the industry as a whole will soon reach higher levels of output. Use of alloy steel bars by the automobile trade is fully one-third above the low point of mid-August. Production schedules are being revised upward, and deliveries on many sizes are no longer prompt. Books have been opened for fourth quarter at unchanged prices. New buying is in fair volume and inquiry is brisk. Fourth quarter prices for iron bars are being named at 2.05c. a lb., Chicago. Several railroads have inquired for their fourth quarter needs. Little interest is being shown by buyers in fourth quarter tonnages of rail steel bars, prices of which are unchanged at 1.95c. a lb., Chicago Heights mill.

Wire Products.—Producers have opened fourth quarter books at current quotations. Inquiry from the manufacturing trade is brisk and several contracts for the final three months have been closed. The jobbing trade, on the other hand, is reluctant to make forward commitments and continues to take needs on a hand-to-mouth basis. Demand for woven wire fencing is forging ahead slowly, with the railroads taking normal quantities for this time of the year. There is no snap to the country trade, and the outlook for improvement is less favorable now than it was a week ago. The cause of this situation is drought, which is affecting many parts of the country. Nail demand is light and prices are still unsettled. It is not uncommon here to find common wire nails quoted at $2.50, base, a keg.

Bolts, Nuts and Rivets.—Last quarter contracting is progressing steadily and prices remain steady. Demand is lighter than at midsummer, due in large measure to smaller output by makers of agricultural machinery.

Coke. — Shipments of by-product foundry coke are moving forward at local oven capacity. Prices are well fixed at $8 a net ton, local furnace.

Old Material.—The Chicago scrap market is marking time. A small tonnage of heavy melting steel has been taken by a user at $16 a gross ton, delivered, and several carloads of cast iron borings have commanded a price of $11.25 a ton, delivered. On the whole, large users are holding out of the market against pressure by sellers. One steel mill has made a sharp cut in shipments of heavy melting steel. Prices for hydraulic bundles are soft. Mills are closely differentiating between dealers' bundles and those prepared by factories. The former will not bring over $13.50 a ton in the present market. A large user of mallable scrap is expected to come into the market this week, and brokers are talking of an advance of 50c. a ton. Users of low phosphorus and electric furnace grades are insistent takers of scrap.

Prices deliv'd Chicago district consumers:

	Per Gross Ton
Basic Open-Hearth Grades:	
Heavy melting steel	$15.25 to $15.75
Shoveling steel	15.25 to 15.75
Frogs, switches and guards, cut apart, and misc. rails	16.75 to 17.25
Hydraul. compressed sheets	13.75 to 14.25
Drop forge flashings	10.75 to 11.25
No. 1 busheling	13.25 to 13.75
Forg'd cast and r'l'd steel carwheels	18.75 to 19.25
Railroad tires, charg. box size	18.75 to 19.25
Railroad leaf springs cut apart	18.75 to 19.25
Acid Open-Hearth Grades:	
Steel couplers and knuckles	17.00 to 17.50
Coil springs	19.00 to 19.50
Electric Furnace Grades:	
Axle turnings	14.50 to 15.00
Low phos. punchings	17.00 to 17.50
Low phos. plates, 12 in. and under	17.00 to 17.50
Blast Furnace Grades:	
Axle turnings	13.00 to 13.50
Cast iron borings	10.50 to 11.00
Short shoveling turnings	10.50 to 11.00
Machine shop turnings	7.50 to 8.00
Rolling Mill Grades:	
Iron rails	16.00 to 16.50
Rerolling rails	18.00 to 18.50
Cupola Grades:	
Steel rails less than 3 ft.	17.50 to 18.50
Steel rails less than 2 ft.	20.00 to 20.50
Angle bars, steel	17.00 to 17.50
Cast iron carwheels	14.00 to 14.50
Malleable Grades:	
Railroad	17.00 to 17.50
Agricultural	15.50 to 16.00
Miscellaneous:	
*Relaying rails, 56 to 60 lb.	23.00 to 25.00
*Relaying rails, 65 lb. and heav.	26.00 to 31.00
	Per Net Ton
Rolling Mill Grades:	
Iron angle and splice bars	15.00 to 15.50
Iron arch bars and transoms	21.50 to 22.00
Iron car axles	26.50 to 27.00
Steel car axles	17.50 to 18.00
No. 1 railroad wrought	14.00 to 14.50
No. 2 railroad wrought	13.75 to 14.25
No. 1 busheling	9.00 to 9.50
No. 2 busheling	7.00 to 7.50
Locomotive tires, smooth	14.50 to 15.00
Pipes and flues	10.00 to 10.50
Cupola Grades:	
No. 1 machinery cast	14.50 to 15.00
No. 1 railroad cast	14.00 to 14.50
No. 1 agricultural cast	13.25 to 13.75
Stove plates	12.25 to 12.75
Grate bars	11.75 to 12.25
Brake shoes	11.50 to 12.00

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars	3.00c.
Reinforc'g bars, billet steel	2.10c. to 2.35c.
Reinforc'g bars, rail steel	1.85c. to 1.95c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Bands (¼ in. in Nos. 10 and 12 gages)	3.20c.
Hoops (No. 14 gage and lighter)	3.75c.
Black sheets (No. 24)	4.05c.
Galv. sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.35c.
Spikes, ⅜ in. and larger	3.55c.
Track bolts	4.55c.
Rivets, structural	4.00c.
Rivets, boiler	4.00c.
	Per Cent Off List
Machine bolts	60
Carriage bolts	60
Coach or lag screws	60
Hot-pressed nuts, sq., tap. or blank	60
Hot-pressed nuts, hex., tap. or blank	60
No. 8 black ann'l'd wire, per 100 lb.	$3.45
Com. wire nails, base per keg	3.20
Cement c't'd nails, base per keg	3.20

Lower Rail-Water Rates from East Suspended

WASHINGTON, Sept. 10.—The Interstate Commerce Commission has suspended until Sept. 5 tariffs proposing reductions of 7.5c. a 100 lb. on iron and steel products in carloads over rail-ocean-rail routes from Atlantic seaboard territory to destinations in Texas. A hearing will be held on Sept. 30 at the Sherman Hotel, Chicago, before Examiner Ketler. Illustrative of the schedule are proposed rates of 73.5c. and 75c. a 100 lb. to Dallas from Reading, Pa., Bethlehem, Pa., respectively, the present rates being 81c. and 82.5c.

New York

Pig Iron Situation Highly Competitive—September Steel Demand Shows No Upward Tendency

NEW YORK, Sept. 10.—With Southern pig iron still setting the pace, the price situation in this district remains highly competitive. Alabama foundry iron continues to be quoted at $12.50, base Birmingham, which means delivered prices on water shipments of $19.50 a ton or less at nearby New Jersey points. Eastern Pennsylvania producers have gone as low as $18.50, furnace, to meet this competition. Other Northern furnaces have been able to quote favorable delivered quotations on barge shipments, although they have failed to meet competitive prices in a number of recent transactions. The barge rate from Buffalo is about $2 a ton and the transfer charge to railroad cars at New Jersey ports is 15c. a ton. Buffalo producers are not so aggressive as some time ago, and in many cases will not quote below $17.50 a ton, furnace, for all-rail delivery. Sales in this district during the week were of fair proportions, totaling 12,000 tons. The Bridgeport, Conn., consumer which was in the market for 10,000 tons of basic has bought several thousand tons of Northern iron and to date has not ordered any Alabama material. The low manganese and high phosphorus content of Southern iron is objectionable to many melters in this district, with the result that they are frequently willing to pay a premium of 50c. a ton or more to obtain Northern metal. Pending inquiries total 4000 tons, of which the largest is 2000 tons of foundry for fourth quarter shipment. Most buyers have bought conservatively for the last quarter, but will undoubtedly make supplementary purchases if business remains as active as at present.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	$22.41 to $22.91
*Buf. No. 2, del'd east. N. J.	20.78 to 21.28
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	19.89 to 21.02
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	20.39 to 21.52

Freight rates: $4.91 from Buffalo, $1.39 to $2.52 from eastern Pennsylvania.
*Prices delivered to New Jersey cities having rate of $3.28 a ton from Buffalo.

Cast Iron Pipe.—Some makers believe that recent dry weather may result in buying of pipe by certain municipalities which have been obtaining part of their water from private companies. Buying in the past week has been confined to small orders from private users. Prices are substantially unchanged. About 2000 tons of water pipe included in contractors' bids to the Department of Water Supply, Gas and Electricity, New York, has been awarded by the contractor to the United States Pipe & Foundry Co. About 200 tons of 6-in., Class C, water pipe will be required in a contract at Tarrytown, N. Y. The American Construction & Securities Co., New York, is inquiring for 800 tons of 12-in. and smaller pipe for export to Havana, Cuba.

Prices per net ton deliv'd New York: Water pipe, 6-in. and larger, $33.60 to $34.60; 4-in. and 5-in., $36.60 to $37.60; 3-in., $43.60 to $44.60. Class A and gas pipe, $3 extra.

Warehouse Business.—Buying from stock has improved. Black sheets are still being shaded about $1 a ton, and concessions on galvanized sheets range from $1 to $3 a ton. Blue annealed sheets, which are being sold by jobbers in this district on the former base of No. 10 gage for all sizes, are shaded from $3 to $5 a ton.

Reinforcing Bars.—The Truscon Steel Co. will furnish 1500 tons of bars for a warehouse of the Pennsylvania Railroad in Jersey City. Bids are now being taken on 300 tons of bars for section 9, route 101, of the New York subway. The State of New Jersey is expected to award 300 tons shortly for bridge work. The volume of small orders ranging from 25 to 75 tons has been fairly good. Prices are unchanged.

Billet steel reinforcing bars in 40, 50 and 60-ft. lengths, 2.05c. per lb., Pittsburgh, and 2.30c. per lb., Pittsburgh warehouse, for cut lengths. Out of New York warehouse, 2.90c. per lb. for lots of 5 tons or more, 3.05c. for lots of 2 to 5 tons and 3.30c. for less than 2 tons, all delivered at job.

Finished Steel.—Local sales offices of steel companies are unable to detect an upward trend in the volume of orders and specifications since Sept. 1. Available figures, however, indicate that there has been no further decline, present orders holding at about the rate of the latter half of August. Here and there some sign of improvement has been noticed, but it has not been of sufficient importance to mark any general tendency. Insofar as the outlook for the remainder of the year may be gaged, the willingness of steel consumers to make fourth quarter contracts is perhaps the most significant development of the past week. No large amount of contracting has been done, but a considerable number of buyers of steel bars and sheets have signed up for the last three months. No change of prices is indicated on any product, with the possible exception of galvanized sheets and cold-rolled strip steel, on which some producers are trying to get $2 a ton above recent minimum quotations. The only new sign of price weakness is in structural shapes, which some Eastern fabricators have been able to buy at delivered prices which figure back to 1.80c., Pittsburgh. This has also meant a concession from Eastern base prices. There is a lull, believed by fabricators to be temporary, in building construction awards, although a vast amount of New York work is in prospect. The outstanding award of the week was 24,000 tons for the new Waldorf-Astoria Hotel, to be erected on Park Avenue, New York. For subway work, an inquiry has been issued for 9300 tons. Railroad equipment buying lags. A pipe line project, involving 191,000 tons of welded pipe, which was tentatively awarded in July to the Milwaukee fabricator has been held up pending the completion of contracts for other equipment required for the project. This line is to be built by the Central States

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.30c.
Soft steel bars, small shapes	3.25c.
Iron bars	3.24c.
Iron bars, Swed. charcoal	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Cold-roll. strip, soft and quarter hard	5.15c. to 5.40c.
Hoops	4.25c.
Bands	3.75c.
Blue ann'l'd sheets (No. 10)	3.80c. to 3.90c.
Long terne sheets (No. 24)	5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galv. annealed	5.15c.
Tire steel, 1½ x ½ in. and larger	3.30c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.65c.
Open-hearth spring steel, bases	4.50c. to 7.00c.

	Per Cent Off List
Machine bolts, cut thread:	
¾ x 6 in. and smaller	60
1 x 30 in. and smaller	50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	60
¾ x 20 in. and smaller	50 to 50 and 10
Coach screws:	
½ x 6 in. and smaller	60
1 x 6 in. and smaller	50 to 50 and 10

Boiler Tubes—	Per 100 Ft.
Lap welded, 2-in.	$17.33
Seamless steel, 2-in.	20.24
Charcoal iron, 2-in.	25.00
Charcoal iron, 4-in.	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
½-in. butt	46	29
¾-in. butt	51	37
1-3-in. butt	53	39
2½-6-in. lap	48	35
7 and 8-in. lap	44	17
11 and 12-in. lap	37	12
Wrought Iron—		
½-in. butt	5	+19
¾-in. butt	11	+ 9
1-1½-in. butt	14	+ 6
2-in. lap	5	+14
3-6-in. lap	11	+ 6
7-12-in. lap	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box	$6.45	$6.20
Charcoal, per Box—	A	AAA
IC	$9.70	$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating	$10.00 to $11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets, Box Annealed—Black, C. R. One Pass

	Per Lb.
Nos. 18 to 20	3.75c. to 3.80c.
No. 22	3.90c. to 3.95c.
No. 24	3.95c. to 4.00c.
No. 26	4.05c. to 4.10c.
No. 28*	4.20c. to 4.25c.
No. 30	4.45c. to 4.50c.

Sheets, Galvanized

	Per Lb.
No. 14	4.20c. to 4.40c.
No. 16	4.15c. to 4.25c.
No. 18	4.20c. to 4.40c.
No. 20	4.30c. to 4.50c.
No. 22	4.40c. to 4.60c.
No. 24	4.65c. to 4.75c.
No. 26	4.90c. to 5.00c.
No. 28*	5.15c. to 5.25c.
No. 30	5.55c. to 5.65c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

Natural Gas Co., in which a number of prominent oil companies are interested. The A. O. Smith Corporation, Milwaukee, has booked 106 miles of 16-in. electrically welded pipe for utilities operating in Nebraska and Oklahoma. Structural steel lettings in the New York metropolitan district during August amounted to 74,566 tons, not including subway work, bridge construction, etc. This compares with 57,659 tons in July and 43,305 tons in August, 1928.

Mill prices per lb., deliv'd New York: Soft steel bars, 2.29c.; plates, 2.22½c.; structural shapes, 2.19½c.; bar iron, 2.14c.

Coke.—Operations are being curtailed in the Connellsville district, but standard furnace coke is unchanged at $2.75 to $2.80 a net ton, ovens. Special brands of beehive foundry coke are quoted at $4.85 a net ton, ovens, or $8.56, delivered to northern New Jersey, Jersey City and Newark, and $9.44 to New York and Brooklyn. By-product coke is quoted at $9 to $9.40 a net ton, Newark or Jersey City, and $10.06, New York or Brooklyn.

Old Material.—Brokers with eastern Pennsylvania contracts on No. 1 heavy melting steel are offering $16 a ton, delivered, but mills are fairly well supplied and shipments permitted are small. A consumer at Harrisburg, Pa., has bought heavy breakable cast at $14.50 a ton, delivered, and brokers are offering $14 a ton on this order. Short shoveling turnings are being bought at $12 a ton, delivered eastern Pennsylvania.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel	$12.50 to $13.25
Heavy melting steel (yard)	8.00 to 10.00
No. 1 hvy. breakable cast.	10.25 to 11.50
Stove plate (steel works).	8.00 to 8.25
Locomotive grate bars....	8.25 to 8.75
Machine shop turnings....	7.75 to 8.00
Short shoveling turnings..	8.00 to 8.50
Cast borings (blast furn. or steel works).....	7.00 to 7.75
Mixed borings and turnings	6.75 to 7.75
Steel car axles	19.50 to 20.00
Iron car axles	24.00 to 25.00
Iron and steel pipe (1 in. dia., not under 2 ft. long)	10.75
Forge fire	9.75 to 10.25
No. 1 railroad wrought...	12.00 to 12.50
No. 1 yard wrought, long..	11.00 to 11.50
Rails for rolling.....	13.25 to 13.75
Cast iron carwheels.....	12.50 to 13.00
Stove plate (foundry)....	8.00 to 8.50
Malleable cast (railroad).	14.00 to 14.50
Cast borings (chemical)..	10.00 to 10.50

Prices per gross ton, deliv'd local foundries:

No. 1 machry. cast.....	$17.00
No. 1 hvy. cast (columns, bldg. materials, etc.), cupola size.....	15.00
No. 2 cast (radiators, cast boilers, etc.)	14.50

Production of chrome ore in the Nuevitas district of Cuba rose in 1928 to 28,650 gross tons, compared with 16,027 tons in 1927. All of this output is in the hands of American firms and is exported to the United States. The production of chrome ore has been steadily increasing for the past several years.

Atlantic Steel & Pipe Corporation, Stewart Avenue and Meadow Street, Brooklyn, has been formed by a consolidation of the Watkins Structural Steel Co. and Schreer & Poster, Inc.

Cleveland

Present Prices Reestablished on Nearly All Products for Fourth Quarter—Orders Gain Slightly

CLEVELAND, Sept. 10.—With additional price announcements during the week, third quarter quotations have been reestablished by most producers for the fourth quarter on about all products. Several outside mills have reaffirmed the 1.95c., Pittsburgh and Cleveland, price on steel bars and 1.95c., Pittsburgh, on plates and structural shapes. Present prices have been reestablished on cold-finished steel bars and bolts, nuts and rivets. Galvanized sheets are being quoted for the last quarter at 3.60c., Pittsburgh, the more common prevailing price, and tin mill black plate at 3c., Pittsburgh. While a few steel bar contracts have been placed for the coming quarter, consumers are not yet showing much interest in making commitments for that delivery, and mills are making little effort to close contracts.

Specifications for steel bars, plates and structural material were fair during the past week, business in these lines so far this month showing a gain over the corresponding period of August. Sheets and hot and cold-rolled strip steel are quiet.

While the demand for steel from the automotive industry continues rather light, it shows a slight gain and is expected to increase moderately during the next few weeks. With only two or three exceptions, motor car companies have not yet got under production on their new models. The Fisher Body Corporation is expected to place in a few days a round tonnage of automobile body sheets for the last quarter for Chevrolet cars. Most recent purchases by the automotive industry have been limited to October requirements.

Mills in this territory continue to operate at close to capacity.

Steel Bars, Plates and Shapes.—Orders for steel bars show a little improvement over those of August, but deliveries have continued to gain and most mills can make shipments in two weeks. Some mills are still promising three to four weeks' delivery on structural material and four to six weeks on plates. While 1.95c., Cleveland, is the regular quotation on steel bars, 1.90c. is being named in some cases by a local mill. Plates and shapes are firm at 1.95c., Pittsburgh. Structural inquiry is light, but a good volume of business is in prospect, including considerable bridge work for railroad grade eliminations. Detroit has an inquiry out for 2200 tons of sheet steel piling for its water works intake.

Pig Iron.—Producers continue to enter a fair volume of business in foundry and malleable iron for the last quarter. Sales by Cleveland interests during the week were 18,500 tons, this business having been well distributed in various territories. New releases indicate that the automotive industry will take a little more iron this month than last, although most consumers in that field are taking iron on the same shipping schedules as last month. The agricultural implement industry is taking iron in good volume. One manufacturer in this field has purchased 2000 to 3000 tons for its Springfield, Ohio, and Richmond, Ind., plants. Some of the stove and warm air furnace manufacturers are very busy and are taking iron in good quantities, while others are doing only fairly well. The Southern foundry iron market has a firmer tone, and $13.50, Birmingham, appears to be the lowest price quoted in this territory. There is little interest in the price situation respecting Northern iron, as the market is firm at quotations that have prevailed for some time. Cleveland furnaces quote foundry and malleable iron at $18.50, furnace, for outside shipment and at $19 for local delivery. For Michigan delivery both grades are selling at $20.

Prices per gross ton at Cleveland:

N'th'n fdy., sil. 1.75 to 2.25	$19.50
S'th'n fdy., 1.75 to 2.25	$19.50 to 20.00
Malleable	19.50
Ohio silvery, 8 per cent...	28.00
Basic Valley furnace.....	18.50
Stand. low phos., Valley..	26.50 to 27.00

Prices except on basic and low phosphorus are delivered Cleveland. Freight rates: 50c. from local furnaces; $3 from Jackson, Ohio; $6 from Birmingham.

Semi-Finished Steel.—While the leading local producer has not yet named prices for the fourth quarter, it is expected that the present $35, Cleveland, Youngstown and Pittsburgh, price will be reaffirmed for that delivery. Specifications fell off the past week, and a local mill, while still operating at 100 per cent capacity, has reduced its commitments to seven days' operations.

Bolts, Nuts and Rivets.—The present discount of 70 per cent has been reaffirmed for the fourth quarter on bolts and nuts. Stove bolts are also unchanged for that delivery. While

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and struc. shapes.....	3.00c.
Soft steel bars.....	3.00c.
Reinforc. steel bars.....2.25c. to	2.50c.
Cold-fin. rounds and hex.....	3.65c.
Cold-fin. flats and sq.....	4.15c.
Hoops and bands, No. 12 to ¼ in., inclusive	3.25c.
Hoops and bands, No. 13 and lighter	3.65c.
Cold-finished strip.....*5.95c.	
Black sheets (No. 24).....3.70c. to	3.90c.
Galvanized sheets (No. 24)..4.60c. to	4.75c.
Blue ann'l'd sheets (No. 10).....	3.25c.
No. 9 ann'l'd wire, per 100 lb.....	$2.90
No. 9 gal. wire, per 100 lb.....	3.35
Com. wire nails, base per keg.....	2.90

*Net base, including boxing and cutting to length.

makers are feeling the effect of the slump in the automotive industry, the demand shows a slight gain over that of the latter part of August. Rivet manufacturers expect to reestablish the present price of $3.10 a 100 lb. for large rivets and 70 and 10 per cent off list for small rivets for the fourth quarter. Formal announcement to that effect probably will be made late in the week.

Iron Ore.—While shipments will not be so heavy this month as during the record-breaking month of August, there will not be a marked slowing down, and the movement is expected to be about 10,000,000 tons. The balance of ore on docks Sept. 1 was 5,110,516 tons, compared with 5,718,482 tons on the same date last year. Receipts at Lake Erie ports up to Sept. 1 were 29,956,346 tons, compared with 21,514,980 tons during the corresponding period last year. Shipments from these docks were 22,395,864 tons, against 15,595,692 tons up to Sept. 1 last year.

Sheets.—Specifications have been very light the past week. Mills need business in automobile body sheets, but most producers are well filled with tonnage for four to six weeks on other grades. Continuous mills can make quite prompt deliveries. Curtailment in production has been slight. Nearly all producers have announced the reestablishment of the present prices of 2.85c., Pittsburgh, for black, 2.35c. for blue annealed and 3.60c. for galvanized for the last quarter. However, one Ohio mill has named 2.95c. for black sheets, which was the price announced for the present quarter, but this did not hold. A leading producer has announced that it will discontinue the $2 a ton differential on galvanized sheets to jobbers. Prices for current orders are being well maintained, although an occasional concession to 3.55c. is being made to consumers on galvanized sheets. There has not been much fourth quarter contracting as yet, although some of the mills have taken fair-sized lots of automobile body sheets for that delivery.

Cold-Finished Steel Bars.—The present price of 2.30c., Pittsburgh, and 2.35c., Cleveland, has been reestablished for the fourth quarter and mills will start shortly to close contracts. Specifications continue light as a result of the slowing down of the automotive industry.

Strip Steel.—Specifications for hot and cold-rolled strip are light, and most of the mills need orders. Some automotive business is in prospect, which will place some of the mills in a better position. Consumers are taking no interest in fourth quarter contracts, although several mills have opened their books for that delivery at the present prices of 1.90c., Pittsburgh, for wide strip and 2c. for narrow and at 2.85c., Cleveland and Pittsburgh, for cold-rolled strip. While no test has been made of the proposed advance in cold strip prices, there are indications that the larger consumers will be given the 2.75c. price that has prevailed in this quarter.

Coke.—Producers have advanced by-product coke for domestic use 25c. a ton to $4.25, Ohio ovens, for nut size and to $4.75 for egg. Dealers are stocking up, and this is causing a brisk demand. Some activity has developed in heating coke, which is quoted at $2.75 to $3, but there is talk of an advance. Ohio by-product foundry coke continues to move fairly well and is quoted at $8.25, ovens. Connellsville foundry coke is unchanged.

Old Material.—The supply of scrap is more plentiful than it has been for some time and the market has a weak tone. Dealers are able to buy car lots of selected No. 1 heavy melting steel for a Cleveland mill at $16.50, or 50c. a ton less than recently. For lighter material for another mill they are still paying $15.50. Prices also show a softening tendency in the Valley district, where $17.50 to $18 is being paid by dealers for selected heavy melting steel scrap. While $10.75 has not disappeared for blast furnace scrap, $10.50 has become more common. Mills are taking scrap in about the same volume as recently but are not buying additional supplies.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$15.25 to $15.50
No. 2 heavy melting steel	14.75 to 15.00
Compressed sheet steel	15.50 to 16.00
Light bundled sheet stampings	12.00 to 12.50
Drop forge flashings	13.00 to 13.25
Machine shop turnings	9.75 to 10.25
Short shoveling turnings	11.75 to 12.25
No. 1 railroad wrought	13.50 to 14.00
No. 2 railroad wrought	16.00 to 16.50
No. 1 busheling	13.25 to 13.75
Pipes and flues	9.00 to 9.50
Steel axle turnings	12.50 to 13.00
Acid Open-Hearth Grades:	
Low phos., forging crops	17.75 to 18.00
Low phos., billet, bloom and slab crops	18.50 to 18.75
Low phos., sheet bar crops	18.00 to 18.50
Low phos., plate scrap	18.00 to 18.50
Blast Furnace Grades:	
Cast iron borings	10.50 to 10.75
Mixed borings and short turnings	10.50 to 10.75
No. 2 busheling	10.50 to 10.75
Cupola Grades:	
No. 1 cast	17.50 to 18.00
Railroad grate bars	11.00 to 12.00
Stove plate	12.00 to 12.50
Rails under 3 ft.	18.50 to 19.00
Miscellaneous:	
Railroad malleable	18.00 to 18.50
Rails for rolling	16.25 to 16.50

Philadelphia

Steel Mill Operations Lower—Shipments In Excess Of New Orders—Pig Iron Quiet

PHILADELPHIA, Sept. 10.—With most mills shipping steel in excess of new orders, operating rates have shown further recession, but in most cases mills are at 80 per cent or more of capacity. Plate producers are particularly well engaged, but new business is generally in small tonnages. Bar and sheet buying is limited and sellers are awaiting renewed activity in the automotive field and increased railroad buying as factors in maintaining operating rates.

The Reading Railroad has closed for 30,000 tons of 100 and 130-lb. sections, of which 24,000 tons went to the Bethlehem Steel Co. and 6000 tons to the Carnegie Steel Co. The Chesapeake & Ohio Railroad is inquiring for about 54,000 tons of 100 and 130-lb. sections for delivery next year.

Pig Iron.—Foundry iron buying is confined to small lots for early shipment. Sellers are inclined to believe that many consumers will limit their buying to immediate needs for the rest of this year. Southern foundry iron is still being offered to consumers in this district, but sellers are showing slightly more firmness and are not offering the former concessions of $1 and more a ton from $14, base Birmingham. Eastern Pennsylvania furnaces have also adopted a firmer position and buyers are said to have been unable to obtain less than $21, base, although producers have quoted $19 a ton, base, and lower in outside competitive districts. Basic iron is quiet following the purchase of about 500 tons of special analysis for prompt shipment to an eastern Pennsylvania mill at about $20, base furnace. Two large users in this district are expected to inquire for their last quarter basic requirements in the next fortnight.

Bars.—Mills are maintaining a high rate of operation, but in most cases are shipping in excess of new business. Smaller production is expected unless increased buying by the railroads and automobile manufacturers develops early this fall. The price is unchanged at 1.95c., Pittsburgh, or 2.27c. a lb., delivered Philadelphia.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil.	$21.26 to $21.76
East. Pa. No. 2X, 2.25 to 2.75 sil.	21.76 to 22.26
East. Pa. No. 1X	22.26 to 22.76
Basic (del'd east. Pa.)	19.75 to 20.25
Gray forge	20.00 to 20.50
Malleable	21.25 to 21.75
Stand. low phos. (f.o.b. N. Y. State furnace)	22.00 to 23.00
Cop. br'g low phos. (f.o.b. furnace)	23.50 to 24.00
Va. No. 2 plain, 1.75 to 2.25 sil.	24.04
Va. No. 2X, 2.25 to 2.75 sil.	24.54

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces; $4.54 from Virginia furnaces.

Reinforcing Bars.—Some sizable projects requiring reinforcing bars are pending award, including a Philadelphia warehouse for the Alamar Stores, 800 tons of bars, and a film exchange building for the Stanley Co., 300 tons of bars. Construction of a factory building for the Atwater Kent Mfg. Co., Philadelphia, has been postponed. Competition between billet

steel and rail steel bar sellers continues keen, and distributers are still accepting billet steel bar business at concessions down to 1.95c. a lb., Pittsburgh, or 2.27c., delivered Philadelphia, with no extra for cutting to length. Rail steel bar sellers are quoting 1.95c., Tonawanda, N. Y., or Franklin, Pa., or 2.27c., delivered Philadelphia, with no extra for cutting to length, but when contracts are secured they are usually at a concession. Rail steel bar mills have suggested that unless billet steel bar prices are maintained at a higher level, it will be necessary to reduce their prices several dollars a ton to establish a sufficient differential.

Shapes.—Demand for small shapes is good and most mills are well engaged on sizes 12-in. and smaller, on which there are slight delays in delivery. Prices continue irregular, especially on the larger specifications, ranging from 1.95c., f.o.b. nearest mill to consumer, or 2.01c., Philadelphia, to 2.05c., f.o.b. mill, or 2.11c., delivered Philadelphia.

Plates.—Tonnages being bought at present are small, but the total volume of orders is sizable and mills are able to maintain a high rate of operation, although bookings are not in excess of shipments. Universal plate mills are being operated better, and deliveries extend to a week or more on universal plates. The price is firm at 2.05c., Coatesville, Pa., or 2.15c., delivered Philadelphia.

Sheets.—With buying by automobile manufacturers still rather limited, most sheet mills are seeking tonnage. Some shading of galvanized sheet prices continues, with quotations from 3.50c. to 3.60c., Pittsburgh, or 3.82c. to 3.92c., delivered Philadelphia. Black sheets are quiet, and the price is fairly stable at 2.85c., Pittsburgh, or 3.17c., delivered Philadelphia. Blue annealed sheets are quoted at 2.35c., Pittsburgh, or 2.67c., delivered Philadelphia, for No. 13 gage and light plates, blue annealed are 2.20c., Pittsburgh, or 2.52c., Philadelphia, for No. 10 gage. Occasionally, when competition from continuous sheets is encountered, some blue annealed sheet sellers have granted concessions of $1 to $2 a ton from these prices.

Imports.—In the week ended Sept. 7, 4048 tons of pig iron arrived at this port, of which 2300 tons was from the United Kingdom and 1748 tons from British India. Ore arrivals consisted of 4791 tons of manganese ore from British West Africa, 2700 tons of chrome ore from Portuguese Africa and 15 tons of tungsten ore from Germany. Steel imports were 28 tons of steel bands, 44 tons of steel bars and 15 tons of structural shapes from Germany, 20 tons of steel bands from France, 9 tons of steel rods from Sweden and 5 tons of steel scrap from the United Kingdom.

Old Material.—Except for the recent purchase by a Coatesville, Pa., mill of upward of 10,000 tons of No. 1 heavy melting steel for shipment by barge and rail from Baltimore, the market is quiet. A consumer at Harrisburg, Pa., has bought heavy breakable cast at $14.50 a ton, delivered, although brokers are in some instances still paying $14.50 a ton to fill old contracts. Machine shop turnings are being shipped to Phoenixville, Pa., and one broker has been paying $12 a ton for short shoveling turnings on this delivery.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	$16.50 to $17.00
Scrap T rails	16.00 to 16.50
No. 2 heavy melting steel	12.50 to 14.50
No. 1 railroad wrought	16.00 to 16.50
Bundled sheets (for steel works)	11.50
Hydraulic compressed, new	14.50 to 15.50
Hydraulic compressed, old	12.00 to 12.50
Machine shop turnings (for steel works)	12.00
Heavy axle turnings (or equiv.)	14.00 to 14.50
Cast borings (for steel works and roll. mill)	11.00 to 11.75
Heavy breakable cast (for steel works)	14.50 to 15.00
Railroad grate bars	12.00 to 12.50
Stove plate (for steel works)	12.00 to 12.50
No. 1 low phos., hvy., 0.04% and under	22.00 to 23.00
Couplers and knuckles	19.50 to 20.50
Rolled steel wheels	19.50 to 20.50
No. 1 blast f'nace scrap	10.50 to 11.00
Wrot. iron and soft steel pipes and tubes (new specific.)	15.00
Shafting	19.00 to 20.00
Steel axles	23.00 to 23.50
No. 1 forge fire	14.00
Cast iron carwheels	16.50 to 17.00
No. 1 cast	16.50 to 17.00
Cast borings (for chem. plant)	14.50
Steel rails for rolling	16.50 to 17.00

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.70c.
Plates, ⅜-in.	2.90c.
Structural shapes	2.70c.
Soft steel bars, small shapes, iron bars (except bands)	2.80c
Round-edge iron	3.50c.
Round-edge steel, iron finished 1½ x 1½ in.	3.50c.
Round-edge steel planished	4.30c.
Reinforc. steel bars, sq. twisted and deform.	2.60c. to 2.80c.
Cold-fin. steel, rounds and hex	3.60c.
Cold-fin. steel, sq. and flats	4.10c.
Steel hoops	3.55c.
Steel bands, No. 12 to ⅛-in. inclus.	3.30c.
Spring steel	5.00c.
*Black sheets (No. 24)	4.10c.
†Galvanized sheets (No. 24)	4.85c.
Light plates, blue annealed (No. 10)	3.25c.
Blue ann'l'd sheets (No. 13)	3.40c.
Diam. pat. floor plates—	
¼-in.	5.30c.
⅛-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

*For 50 bundles or more: 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.
†For 50 bundles or more: 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

Reinforcing Steel

Awards Total 6200 Tons and Inquiries 2500 Tons

REINFORCING steel awards the past week totaled 6200 tons, as against 1700 tons the previous week. Twenty-three hundred tons will be required for a wharf at Oakland, Cal., and 1500 tons for a Pennsylvania Railroad warehouse at Jersey City. Inquiries, amounting to 2500 tons, consisted of miscellaneous jobs ranging from 100 to 300 tons each. Awards follow:

BLOOMFIELD, N. J., 100 tons, addition to lamp works of Westinghouse Electric & Mfg. Co., to Truscon Steel Co.

PENNSYLVANIA RAILROAD, 1500 tons, warehouse at Jersey City, to Truscon Steel Co.

CLEVELAND, 500 tons, work for Cleveland Union Terminals Co., to Bourne-Fuller Co.

CINCINNATI, 650 tons, Christ Hospital, to Pollack Steel Co.

CHICAGO, 450 tons, Wilbur Wright Public School, to Calumet Steel Co.

CHICAGO, 385 tons, Lying-in Hospital, to Inland Steel Co.

CHICAGO, 100 tons, Bethany Hospital, to Olney J. Dean & Co.

CHICAGO, 160 tons, factory addition for Eugene Dietzgen Co., to Inland Steel Co.

METALINE FALLS, WASH., 100 tons, hotel, to Pacific Coast Steel Co.

OAKLAND, CAL., 2300 tons, wharf, to Pacific Coast Steel Co.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

NEW YORK, 300 tons, section 9, route 101, of subway at Sixth Avenue and Forty-first Sttreet.

STATE OF NEW JERSEY, 300 tons, highway bridges.

CLEVELAND, 140 tons, jail-courts building.

CLEVELAND, 150 tons, Cleveland Union Terminals Co.

CINCINNATI, 200 tons, building for Cincinnati & Suburban Bell Telephone Co.

NORTH CHICAGO, 275 tons, Government Hospital, B-W Construction Co., general contractor.

CHICAGO, 285 tons, DuPont Warehouse.

CHICAGO, tonnage not stated, addition to Michael Reese Hospital.

CHICAGO, 255 tons, apartment building, 1530 North State Street.

CHICAGO, 200 tons, apartment building; Levy & Klein, architects.

CHICAGO, 300 tons, Whittier Public School.

Railroad Equipment

St. Paul Places Orders for 1000 Gondola Cars

THE placing of orders for 1000 70-ft. gondola cars by the Chicago, Milwaukee, St. Paul & Pacific featured the railroad equipment market the past week. The Chicago & Eastern Illinois is taking bids on 500 steel gondola car bodies. The Norfolk & Western may buy 2000 hopper cars and is asking for prices on the rebuilding of 1000 steel hopper cars. Details of the past week's business follow:

Norfolk & Western may buy 2000 hopper cars, instead of 1000 mentioned a week ago, and is also asking for bids for rebuilding 1000 steel hopper cars.

Southern Pacific, Texas lines, is in the market for parts for use in rebuilding 380 box cars.

Wabash will build 100 hopper car bodies for its subsidiary, the Ann Arbor, in its own shops.

Safety Car Heating & Lighting Co. has ordered 50 refrigerator cars from Pullman Car & Mfg. Corporation.

Chicago & Eastern Illinois is in the market for 500 steel gondola car bodies.

Chicago, Milwaukee, St. Paul & Pacific has ordered 500 70-ft. gondola cars from Pressed Steel Car Co. and a like number from Bettendorf Co.

New York, New Haven & Hartford has changed its inquiry for 75 coke car bodies to 75 complete coke cars.

Pacific Coast

Two Pipe Lines Take 4750 Tons of Plates—Bids Opened on 10,000-Ton Project

SAN FRANCISCO, Sept. 7 (*By Air Mail*).—Demand for iron and steel products on the Pacific Coast has shown little sign of improvement during the past few weeks. Two pipe line projects in Vancouver, B. C., involving 4750 tons of plates, were placed and bids were opened on a 10,000-ton pipe line at Everett, Wash., on which the Western Pipe & Steel Co. was low bidder. The Pacific Coast Steel Co. took 2300 tons for a wharf in Oakland and the East Bay Municipal Utility District, Oakland, placed over 1000 tons of cast iron pipe.

Pig Iron.—Pig iron inquiries and sales are confined to small lots. Foundry operations continue on a restricted basis. No change in quotations has occurred.

Prices per gross ton at San Francisco:

*Utah basic	$25.00 to $26.00
*Utah fdy., sil. 2.75 to 3.25	25.00 to 26.00
**Indian fdy., sil. 2.75 to 3.25	25.00 to 26.00

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Bars.—Awards this week exceeded 2400 tons. In addition to the 2300-ton wharf project, mentioned above, the Pacific Coast Steel Co. took 100 tons for a hotel at Metaline Falls, Wash. Pending business is not large. Out-of-stock prices in the San Francisco district continue on a fairly firm basis at 2.30c., base, on carload quantities and at 2.60c. on smaller tonnages. Los Angeles prices are $2 a ton higher. Demand for mild steel bars has shown little improvement and movement continues to be confined to small lots of numerous sizes. Prices on this class of material are firm at 2.35c., c.i.f. coast ports.

Plates. — Vancouver, B. C., has awarded two pipe lines. One project called for 4000 tons and was placed with Harrison & Lamond Construction Co. and the other, amounting to 750 tons, was placed with the Vancouver Engineering Works. James Coyne, Portland, was awarded the general contract for a pipe line at Bremerton, Wash., involving 3000 tons of plates. The subcontract for the fabrication of the pipe has not been let. Other business was confined to lots of less than 100 tons. Prices remain firm at 2.35c., c.i.f.

Shapes.—Structural shape bookings included a boiler shop at Hillyard, Wash., for the Great Northern Railroad Co., calling for 180 tons, and placed with the Hofius Steel & Equipment Co. The St. John's River bridge, Portland, will require 8300 tons instead of 7000 tons, as previously reported. The Wallace Bridge & Structural Steel Co. will fabricate 6000 tons and the United States Steel Products Co. 2000 tons; 300 tons for approaches has been placed with the Gilpin Construction Co. Pending business calls for more than 7000 tons. Plain material is firm at 2.35c., c.i.f. coast ports. Foreign material is quoted around 1.70c., c.i.f., duty paid.

Cast Iron Pipe.—Among cast iron pipe awards of the week was 1343 tons of 4 to 12-in. Classes C and D pipe for Vancouver, B. C., of which 850 tons was placed with Evans, Colman & Evans and 493 tons with Gordon & Belyea. The East Bay Municipal Utility District, Oakland, placed 818 tons of 6 to 12-in. Class 150 pipe with the American Cast Iron Pipe Co., 127 tons of 6-in. Class 150 pipe with the Pacific States Cast Iron Pipe Co., and 109 tons of 8-in. Class 150 pipe with the United States Pipe & Foundry Co. The Spring Valley Water Co., San Francisco, has awarded to an unnamed company 182 tons of 8-in. Class 150 pipe. All bids were rejected on 112 tons of 4 to 8-in. Class B pipe for Estelle Street, San Diego. No action has yet been taken on 377 tons of 6 to 10-in. Class B pipe for Anaheim, Cal., the low bidder being the United States Pipe & Foundry Co. New inquiries include 460 tons of 4 to 8-in. Class B pipe for Chesterton Street, San Diego, and 230 tons of 4 and 6-in. Class C pipe for Cable Street, San Diego, bids on both to be opened Sept. 23.

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and struc. shapes	3.15c.
Soft steel bars	3.15c.
Small angles, ⅞-in. and over	3.15c.
Small angles, under ⅞-in.	3.55c.
Small channels and tees, ¾-in. to 2¾-in.	3.75c.
Spring steel, ¼-in. and thicker	5.00c.
Black sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.80c.
Galv. sheets (No. 24)	5.30c.
Struct. rivets, ½-in. and larger	5.65c.
Com. wire nails, base per keg	$3.40
Cement c't'd nails, 100 lb. keg	3.40

Birmingham

Pig Iron Books Opened for Fourth Quarter—Plates, Shapes and Bars Reduced $2 a Ton

BIRMINGHAM, Sept. 10. — Books were opened last week for fourth quarter pig iron at the base price of $14.50 for No. 2 foundry. Sales to district consumers have been active since the books were opened for the last quarter, although the buying movement cannot be called heavy. Inquiries and private negotiations for tonnages point to heavier covering than has been the case in the preceding quarters this year. Most of the fourth quarter business booked so far has been for shipment to points outside the Southern territory. Prices on outside sales have been reduced from the $14.50 base to meet competition in other territories, but in general they are firmer than two weeks ago. On the larger tonnages, sales at $13.50 have been reported in competitive territories. Shipments remain active, and the margin over output is gradually being increased. There have been no changes in furnace operations during the past two weeks. Of the 14 active furnaces, five are on basic and nine on foundry iron.

Prices per gross ton, f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil.	$14.50
No. 1 fdy., 2.25 to 2.75 sil.	15.00
Basic	14.50

Finished Steel.—Effective last week, quotations on bars, plates and structural shapes were reduced from 2.20c. to 2.10c. At the same time galvanized sheets were reduced from 3.75c. to 3.70c. Prices on other grades of sheets are unchanged. These prices are announced as minimum; on small tonnages there is a range upward of $1 to $2 a ton. The volume of new business in all important lines of finished steel, with the exception of rails, has been larger in the past three weeks than in the similar period just preceding. Prospects are reported good for important rail tonnages. Further curtailment of operations of structural steel fabricators is reported. Orders last week for structural steel were in small lots. Reinforcing bar manufacturers continue to rely on small orders to maintain operations. The Tennessee company has four open-hearths in operation at Ensley, one more than last week. Seven are active at Fairfield, and the Gulf States Steel Co. is still working all six at Alabama City.

Old Material.—Steel scrap, particularly rails, continues to show strength. Cast iron grades are slow. All prices are the same as a week ago.

Prices per gross ton, deliv'd Birmingham dist. consumers' yards:

Heavy melting steel	$13.00 to $13.50
Scrap steel rails	14.00
Short shoveling turnings	9.00
Cast iron borings	9.00
Stove plate	11.50 to 12.00
Steel axles	21.00
Iron axles	23.00
No. 1 railroad wrought	10.00 to 10.50
Rails for rolling	15.50
No. 1 cast	13.50
Tramcar wheels	13.50
Cast iron carwheels	13.00 to 13.50
Cast iron borings, chem.	13.50 to 14.00

Cast Iron Pipe.—No definite improvement is reported by pressure pipe manufacturers, as new business continues at a rate a little less than the output of the foundries. Nearly all the present buying is in small orders. Included in the pending tonnage is 3700 ft. of 6 and 8-in. pipe for Brooklet, Ga., to be awarded Sept. 16; 11,600 ft. of 4-in. and 3700 ft. of 6-in. to be awarded at St. Joseph, La., Sept. 17, and nine miles of 16 to 20-in. pipe for Griffith, Ga., to be awarded about Oct. 1. Shipments are steady at a

rate equaling output. Price remain at $37 to $38 a net ton, base Birmingham.

Coke.—Demand for foundry coke is stronger, and the movement has improved slightly over that of the previous week. Prices remain at $5 a net ton, Birmingham.

Boston

Pig Iron Prices Appear Firmer—Fourth Quarter Needs Not Fully Covered—Scrap Trend Mixed

BOSTON, Sept. 10.—Pig iron prices appear firmer, although they have not actually changed. Sales the past week approximated 7000 tons, but the only sizable one was 2000 tons of Southern iron to a Massachusetts textile machinery maker. Other sales were in small lots, mostly for fourth quarter delivery. The only sizable open inquiry is for 500 tons from a Connecticut melter. One foundry may soon come into the market for 2000 tons and another for 1000 tons. It is clear that the New England foundry industry is not fully covered for fourth quarter, and continued buying is expected this month.

Foundry iron prices per gross ton deliv'd to most New England points:

†Buffalo, sil. 1.75 to 2.25		$21.28 to $22.28
†Buffalo, sil. 2.25 to 2.75	21.78 to	22.78
*Buffalo, sil. 1.75 to 2.25	21.91 to	22.91
*Buffalo, sil. 2.25 to 2.75	22.41 to	23.41
East. Penn., sil. 1.75 to 2.25	22.65 to	23.15
East. Penn., sil. 2.25 to 2.75	23.15 to	23.65
Va., sil. 1.75 to 2.25		25.21
Va., sil. 2.25 to 2.75		25.71
*Ala., sil. 1.75 to 2.25		23.61
*Ala., sil. 2.25 to 2.75		24.11
†Ala., sil. 1.75 to 2.25	19.75 to	20.25
†Ala., sil. 2.25 to 2.75	20.25 to	20.75

Freight rates: $4.91 all rail from Buffalo, and $4.28 rail and water; $3.65 all rail from eastern Pennsylvania; $5.21 all rail from Virginia; $9.61 all rail from Alabama and $5.75 rail and water from Alabama to New England seaboard.

*All rail rate.

†Rail and water rate.

Cast Iron Pipe.—R. D. Wood & Co. were awarded the pipe, fittings, valves and hydrants required for the Gray, Me., water system, totaling about 250 tons. North Kingston, R. I., has plans for a water system. Domestic pipe makers, owing to their sold-up condition, have not been active bidders for the small amount of business available lately. French makers, on the other hand, have taken several hundred tons recently at prices reported to be slightly under domestic quotations. So far this month, 7072 pieces of French cast iron pipe have been landed at Boston. Open prices on domestic pipe are: 4 in., $46.10 to $47.10 a ton, delivered common Boston freight rate points; 6 to 12 in., $40.10 to $41.10; 16 to 20 in., $39.10. A $3 differential is asked on Class A and gas pipe.

Imports and Exports.—Imports of pig iron at Boston in August totaled 1943 tons, of which 1443 tons was Indian and the remainder Dutch. Imports in July, this year, were 950 tons, and in August, last year, 1095 tons. Imports in August were the largest in several months. Imports of ores consisted of 6750 tons of Bona, 11,380 tons of Newfoundland and 7950 tons of Bizerta, a total of 26,080 tons, as compared with 23,260 tons in July, this year, and 16,084 tons in August, 1928. During August about 3500 tons of scrap was exported to Danzig.

Coke.—By-product foundry coke consumption in New England is running somewhat ahead of that of a year ago. The price of such fuel holds firmly at $11 a ton, delivered within a $3.10 freight rate zone. Notwithstanding that New England's coke producing capacity will be greatly increased during the next six months, it is certain that ovens will be pushed to the limit to supply wants in that period.

Reinforcing Steel.—Business placed with local mill representatives the past week totaled about 200 tons of billet steel bars. About 2000 tons is still pending. On the general run of bookings the price is 2.66½c. a lb., base, from stock, but that price has been shaded on recent round lots. The rail steel bar market is inactive, with 2.26½c. a lb., base, delivered common Boston freight rate points, the open quotation.

Old Material.—Some local brokers report that heavy melting steel shipments are held up, but others continue to make liberal shipments into the Pittsburgh district, particularly to Weirton. Brokers are paying $12.50 to $12.75 a ton on cars, shipping point, for outside shipment and around $12 for Worcester, Mass., delivery. Shipments of T and girder rails also are held up, and in such cases brokers offer only $10.50 a ton for girders, against $11 and $11.25 by those making shipments. A wide spread is also noted in forge flashing quotations, some buyers offering $10 to $10.50 a ton and others $10.75 to $11. Lighter demand for axles and shafting is reflected in easier prices. New England foundries are taking machinery cast rather freely at steady prices. The export market apparently has gone stale, one report says because of labor troubles and another report because of a lack of vessel space.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$12.00 to $12.75
Scrap T rails	11.50 to 12.00
Scrap girder rails	10.50 to 11.25
No. 1 railroad wrought	11.00 to 11.50
No. 1 yard wrought	9.00 to 9.50
Machine shop turnings	7.00 to 7.50
Cast iron borings (steel works and rolling mill)	6.50 to 7.00
Bundled skeleton, long	10.00 to 10.25
Forge flashings	10.25 to 10.50
Blast furnace borings and turnings	6.00 to 6.25
Forge scrap	9.00 to 9.50
Shafting	14.00 to 14.50
Steel car axles	17.50 to 18.00
Wrought pipe 1 in. in diameter (over 2 ft. long)	9.75 to 10.00
Rails for rolling	12.50 to 13.00
Cast iron borings, chemical	9.75 to 10.00

Prices per gross ton deliv'd consumers' yards:

Textile cast	$14.00 to $14.50
No. 1 machinery cast	15.00 to 15.50
No. 2 machinery cast	13.00 to 13.25
Stove plate	11.00 to 11.50
Railroad malleable	18.00 to 18.50

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars, small shapes	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway rounds	6.60c.
Norway squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tie steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold-rolled steel—	
Rounds and hex	*3.55c. to 5.55c.
Squares and flats	*4.05c. to 7.05c.
Toe calk steel	6.00c.
Rivets, structural or boiler	4.50c.

	Per Cent Off List
Machine bolts	50 and 5
Carriage bolts	50 and 5
Lag screws	50 and 5
Hot-pressed nuts	50 and 5
Cold-punched nuts	50 and 5
Stove bolts	70 and 10

*Including quantity differentials.

Buffalo

Pig Iron Inquiry Totals 20,000 Tons—Steel Mills Operating at 90 Per Cent

BUFFALO, Sept. 10.—The pig iron inquiry reported this week totals 10,000 tons, of which the largest is a 1500-ton lot of foundry for an Eastern melter. From Eastern sources comes also a 500-ton inquiry for malleable. Considerable iron in small lots has been placed, and this includes two orders, one of 800 tons of foundry and one of 900 tons. The $18 base appears to be prevailing in the East, though the differentials for silicon have been ignored in some instances. The base price in the district remains at $19.50.

Prices per gross ton, f.o.b. furnace:

No. 2 fdy., sil. 1.75 to 2.25	$19.50
No. 2X fdy., sil. 2.25 to 2.75	20.00
No. 1 fdy., sil. 2.75 to 3.25	21.00
Malleable, sil. up to 2.25	20.00
Basic	18.50
Lake Superior charcoal	27.28

Finished Iron and Steel.—There has been a slight tapering of mill operations in this district, but scarcely enough to make a difference in the general average, which is 90 per cent.

Inquiries for fabrication of structural steel have not been so heavy as heretofore, and the only job of size in immediate prospect is an apartment house in Buffalo which calls for 300 tons. A good volume of small reinforcing bar orders has been placed. The Lackawanna plant of the Bethlehem Steel Co., which in August broke a plant record with 170,000 tons of ingots, expects to equal this production this month.

Old Material.—One of the large interests is expected into the market some time this week for a considerable tonnage of No. 1 heavy melting steel. Mill operation is tapering slightly, but the demand for shipment of scrap is continuing. Little scrap is coming here from outside districts, most of it being shipped to Pittsburgh and to Weirton. A sale of cast iron borings is reported here at $12.50 and this has made a more or less active market for the blast furnace material. Dealers are reported to be paying $14.50 to $14.75 for No. 2 steel against an old order, though this condition may soften somewhat, as one of the larger users of No. 2 steel is reported to be loaded up. Some sales of short rails are reported at $19.50 and some sales of No. 1 machinery cast at $16.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$17.50 to $18.00
No. 2 heavy melting steel	14.75 to 15.00
Scrap rails	16.50 to 17.00
Hydraul. comp. sheets	14.50 to 14.75
Hand bundled sheets	12.00 to 12.50
Drop forge flashings	14.25 to 14.50
No. 1 busheling	15.50 to 16.50
Hvy. steel axle turnings	14.00 to 14.50
Machine shop turnings	9.00 to 9.50
No. 1 railroad wrought	13.00 to 13.50
Acid Open-Hearth Grades:	
Knuckles and couplers	19.50 to 19.75
Coil and leaf springs	19.00 to 19.50
Rolled steel wheels	19.00 to 19.50
Low phos. billet and bloom ends	20.00 to 20 50
Electric Furnace Grades:	
Short shov. steel turnings	12.50 to 13.00
Blast Furnace Grades:	
Short mixed borings and turnings	11.50 to 12.25
Cast iron borings	11.50 to 12.25
No. 2 busheling	10.00 to 10.50
Rolling Mill Grades:	
Steel car axles	18.75 to 19.25
Iron axles	21.00 to 22.00
Cupola Grades:	
No. 1 machinery cast	16.00 to 17.00
Stove plate	13.00 to 13.50
Locomotive grate bars	12.50 to 13.00
Steel rails, 3 ft. and under	19.50 to 19.75
Cast iron carwheels	14.00 to 14.50
Malleable Grades:	
Industrial	18.00 to 18.50
Railroad	18.00 to 18.50
Agricultural	18.00 to 18.50
Special Grades:	
Chemical borings	12.50 to 13.50

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and struc. shapes	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.95c.
Cold-fin. flats, sq. and hex.	4.45c.
Rounds	3.95c.
Cold-rolled strip steel	5.85c.
Black sheets (No. 24)	4.20c.
Galv. sheets (No. 24)	4.85c.
Blue ann'l'd sheets (No. 10)	3.50c.
Com. wire nails, base per keg	$3.60
Black wire, base per 100 lb.	3.75

St. Louis

Pig Iron Buying Improves and Price Situation Is Firmer—Steel Orders Expand Slightly

ST. LOUIS, Sept. 10.—A further improvement in buying, as well as in the general tone of the pig iron market, is reported. Sales of the St. Louis Gas & Coke Corporation, which showed a substantial gain over those of the previous week, were approximately 6000 tons, while an additional 1000 tons was sold by Southern makers. The market is firmer because of a strengthening in the Southern situation. The makers in that section are said to have taken all the business they care for at the recent low levels. Melters are buying conservatively, some still having a feeling of uncertainty as to the future course of prices. The Granite City maker's sales included two lots of 1000 tons each to northern Illinois melters, 600 tons to a local machinery manufacturer, 300 tons to a northern Iowa jobbing foundry, 270 tons to a local engine builder and 200 tons to a Kansas machinery manufacturer, all for the remainder of the year. The Granite City furnace shipped 31,000 tons in August, compared with 20,000 in August, 1928.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill.	$19.50 to $20.00
Malleable, f.o.b. Granite City	20.00
N'th'n No. 2 fdy., deliv'd St. Louis	22.16
Southern No. 2 fdy., deliv'd	$16.92 to 18.92
Northern malleable, deliv'd	22.16
Northern basic, deliv'd	22.16

Freight rates: 75c. (average) Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

Coke.—An improvement in buying of domestic grades of coke by dealers is reported, especially by dealers in St. Louis. With the melt well maintained, there is a good demand for foundry coke, and shipments of furnace grades in the district continue heavy.

Finished Iron and Steel.—The Granite City Steel Co. has opened its books for fourth quarter business on sheets and plates at the prices which prevailed for third quarter, as follows: Galvanized, 3.70c.; black, 3.05c.; blue annealed, 13-gage, 2.45c.; blue annealed light plate, 10-gage, 2.30c.; plates, 2.05c., all f.o.b. Gary. The company is now operating on 100 per cent schedules in all departments except plates, where operations are on an 85 to 90 per cent basis. While there has been a let-up in incoming business, an improvement was noted during the past week. Warehouse business during August was said to be about equal to that of August, 1928, but slightly less than July of this year. The structural trade is quiet.

Old Material—The market for old material is a bit easier than a week ago, with dealers paying $14.50 to $15 for No. 1 heavy melting or shoveling steel and $14 to $14.50 for No. 2 heavy melting or shoveling steel. The movement of old material to this market, especially from country dealers, is said to be on the increase. On the other hand, buying by consumers is light. Railroad lists: Baltimore & Ohio, 19,070 tons; Atchison, Topeka & Santa Fe, 7860 tons; Wabash, 3980 tons; International-Great Northern, 900 tons; Ann Arbor, 397 tons; New Orleans Great Northern, 105 tons; St. Louis-San Francisco, 22 carloads; Nashville, Chattanooga & St. Louis, 17 carloads.

Dealers' buying prices per gross ton, f.o.b. St. Louis district:

No. 1 heavy melting or shoveling steel	$14.50 to $15.00
No. 2 heavy melting or shoveling steel	14.00 to 14.50
No. 1 locomotive tires	15.50 to 16.00
Miscel. stand.-sec. rails including frogs, switches and guards, cut apart	17.00 to 17.50
Railroad springs	19.50 to 20.00
Bundled sheets	10.50 to 11.00
No. 2 railroad wrought	14.50 to 15.00
No. 1 busheling	10.00 to 10.50
Cast iron borings and shoveling turnings	9.50 to 10.00
Iron rails	13.00 to 13.50
Rails for rolling	17.25 to 17.75
Machine shop turnings	7.50 to 8.00
Heavy turnings	10.00 to 10.50
Steel car axles	19.50 to 20.00
Iron car axles	26.50 to 27.00
Wrot. iron bars and trans.	21.50 to 22.00
No. 1 railroad wrought	13.75 to 14.25
Steel rails, less than 3 ft.	18.00 to 18.50
Steel angle bars	15.25 to 15.75
Cast iron carwheels	15.00 to 15.50
No. 1 machinery cast	15.25 to 15.75
Railroad malleable	16.00 to 16.50
No. 1 railroad cast	14.75 to 15.25
Stove plate	13.00 to 13.50
Agricult. malleable	15.25 to 15.75
Relay. rails, 60 lb. and under	20.50 to 23.50
Relay. rails, 70 lb. and over	26.50 to 29.00

The Republic Iron & Steel Co., Youngstown, will install three Rust zone-control triple-fired continuous slab heating furnaces in its plate mill. Each furnace will have an output of 25 tons an hour and will be fired with producer gas. The triple-fired design embodies a soaking chamber as well as a heating chamber.

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-fin. rounds, shaftings, screw stock	3.75c.
Black sheets (No. 24)	4.25c.
Galv. sheets (No. 24)	5.10c.
Blue ann'l'd sheets (No. 10)	3.45c.
Black corrug. sheets (No. 24)	4.30c.
Galv. corrug. sheets	5.15c.
Structural rivets	3.95c.
Boiler rivets	3.95c.
	Per Cent Off List
Tank rivets, ⅞-in. and smaller, 100 lb. or more	65
Less than 100 lb.	60
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-pressed nuts, sq., blank or tapped, 200 lb. or more	60
Less than 200 lb.	50
Hot-pressed nuts, hex., blank or tapped, 200 lb. or more	60
Less than 200 lb.	50

Cincinnati

Pig Iron Sales Total 12,000 Tons—Southern Prices Stiffen —Sheet Sales Increase—Scrap Easier

CINCINNATI, Sept. 10.—Sales of pig iron the past week totaled approximately 12,000 tons. Many district consumers entered the market to cover for the remainder of the third quarter and in many instances for the fourth quarter. Of the tonnage placed, about half went to Northern furnaces and the remainder to Southern producers. The Northern iron was sold on present schedules without concessions, but the Southern iron went at prices which figure back to $13.50 and $14, base Birmingham. Although this price variance still indicates softness in the Southern market, the tendency is toward higher quotations, causing the Southern market here to have the appearance of greater firmness. Southern furnaces, which about a month ago were reported to be accepting orders at $13, are now maintaining quotations at $13.50. Even at this price, selling agents are writing orders subject to acceptance of the furnace, because in a few instances such orders were rejected and $14 was authorized as the lowest quotation. Among the week's orders was one from a Springfield, Ohio, consumer for 500 tons of Northern iron and another from a Sidney, Ohio, buyer for 200 tons of Northern, 200 tons of Southern and 100 tons of silvery. Except for an inquiry for 300 to 400 tons of Southern iron from a Louisville, Ky., consumer, there is no sizable business before the trade.

Prices per gross ton, deliv'd Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25	$19.89 to $20.39
Ala. fdy., sil. 1.75 to 2.25	17.19 to 18.19
Ala. fdy., sil. 2.25 to 2.75	17.69 to 18.69
Tenn. fdy., sil. 1.75 to 2.25	17.19 to 18.19
S'th'n Ohio silvery, 8 per cent	26.89

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

Finished Material.—New tonnage placed with district sheet mills last week exceeded production, adding still further to present backlogs. The entry of automotive manufacturers for fourth quarter sheet requirements, combined with the steady demand from the electrical equipment, highway and roofing fields, have added to orders. With mills promising three to four weeks as the earliest shipments, buyers are anticipating their needs at least 30 to 40 days. Prices continue firm in all grades of sheets except galvanized. Conflicting reports of concessions in the Southeast have contributed an undertone of uncertainty to this product.

Coke.—Specifications for beehive and by-product foundry coke are a trifle better than last month, although in a few instances a slight recession is noticed. The only new business reported during the week was an order from a southern Ohio consumer for 5000 tons of beehive foundry coke to cover requirements for the next eight months.

Old Material. — Although price schedules have not been changed during the past week, continued reluctance of mills to pay higher prices for old material has forced dealers to lean toward the bottom of price spreads in bidding for scrap. Accordingly, while the market appears firm on the surface, there is a slight undertone of softness, with buyers taking only what they need and dealers covering for old commitments and marking time. The supply of the better grades of scrap has increased somewhat, bringing a little relief from the tight situation that has prevailed in the last two months. The Southern Railway is offering its usual list of old material. The Chesapeake & Ohio has published a list of 6800 tons and the Norfolk & Western is offering 7500 tons.

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel	$14.25 to $14.75
Scrap rails for melting	14.25 to 14.75
Loose sheet clippings	9.00 to 9.50
Bundled sheets	11.00 to 11.50
Cast iron borings	9.25 to 9.75
Machine shop turnings	8.50 to 8.75
No. 1 busheling	10.50 to 11.00
No. 2 busheling	7.00 to 7.50
Rails for rolling	14.50 to 15.00
No. 1 locomotive tires	14.25 to 14.75
No. 2 railroad wrought	14.25 to 14.75
Short rails	18.50 to 19.00
Cast iron carwheels	12.75 to 13.25
No. 1 machinery cast	19.00 to 19.50
No. 1 railroad cast	15.25 to 15.75
Burnt cast	10.25 to 10.75
Stove plate	10.25 to 10.75
Brake shoes	10.25 to 10.75
Agricultural malleable	14.25 to 14.75
Railroad malleable	15.25 to 15.75

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and struc. shapes	3.40c.
Bars, soft steel or iron	3.30c.
New billet reinforc. bars	3.15c.
Rail steel reinforc. bars	3.00c.
Hoops	4.05c.
Bands	3.50c.
Cold-fin. rounds and hex.	3.85c.
Squares	4.35c.
Black sheets (No. 24)	4.05c.
Galvanized sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.45c.
Structural rivets	3.85c.
Small rivets	65 per cent off list
No. 9 ann'l'd wire, per 100 lb.	$3.00
Com. wire nails, base per keg	2.85
Cement c't'd nails, base 100 lb. keg	2.85
Chain, per 100 lb.	8.75
	Net per 100 Ft.
Lap-weld steel boiler tubes, 2-in.	$16.00
4-in.	33.00
Seamless steel boiler tubes, 2-in.	17.00
4-in.	34.00

Canada

Pig Iron Buying Gains Moderately

TORONTO, ONT., Sept. 10.—Sales of merchant iron were at a good level throughout the week, the total showing an improvement over that of previous weeks. While some future buying is being done, most of this business is being held up until producers formally open their books, which probably will be in about a week. The daily melt continues at a high level. Prices are unchanged.

Prices per gross ton:

Delivered Toronto

No. 1 fdy., sil. 2.25 to 2.75	$24.60
No. 2 fdy., sil. 1.75 to 2.25	24.10
Malleable	24.60

Delivered Montreal

No. 1 fdy., sil. 2.25 to 2.75	$26.00
No. 2 fdy., sil. 1.75 to 2.25	25.50
Malleable	26.00
Basic	24.50

Imported Iron, Montreal Warehouse

Summerlee	$33.50
Carron	33.00

Structural Steel. — Awards during the past week were small in number and tonnage. Most of the buying was in lots under 200 tons each. Prospective structural steel business is large.

Old Material.—Buying is becoming more general, and tonnages moving are individually larger than those of recent weeks. Prices are firm but unchanged.

Dealers' buying prices:

	Per Gross Ton	
	Toronto	Montreal
Heavy melting steel	$10.00	$8.50
Rails, scrap	11.00	9.00
No. 1 wrought	10.00	12.00
Machine shop turnings	7.50	5.00
Boiler plate	7.50	6.00
Heavy axle turnings	8.00	7.50
Cast borings	7.50	5.00
Steel turnings	7.50	6.50
Wrought pipe	6.00	6.00
Steel axles	15.00	20.00
Axles, wrought iron	17.00	22.00
No. 1 machinery cast	....	17.00
Stove plate	....	13.00
Standard carwheels	....	16.00
Malleable	....	13.00
	Per Net Ton	
No. 1 mach'ry cast	$16.00	....
Stove plate	12.00	....
Standard carwheels	15.00	....
Malleable scrap	14.00	....

Detroit

Automobile Industry's Activity Up Slightly

DETROIT, Sept. 10.—Production activity in the automotive industry as a whole has shown some improvement in the last two weeks. In August several of the automobile companies exceeded their July production. These include Buick, Ford, Graham-Paige, Hupp and Packard.

The accompanying table gives the

	July	August	September Estimate
Auburn	2,026	2,509	3,900
Buick	26,279	28,971	26,550
Chevrolet	137,831	109,968	100,000
Ford	180,804	205,634	200,000
Franklin	1,325	1,150	1,000
Graham-Paige	4,849	6,576	5,500
Hudson and Essex	23,707	17,316	15,000
Hupp	2,494	5,255	5,000
Packard	4,600	5,336	5,000
Nash	6,672	3,624	3,000

available August production figures.

The Murray Body Corporation of America is producing 1250 bodies a day, increased from 400 a day three months ago. Full capacity production will extend through the current month on bodies for Chrysler, Dodge, Hupp and Ford cars. A further increase in facilities will be available in about 90 days, which will bring the total daily capacity to approximately 1750 units.

The Fleetwood Body Corporation has recently established a Detroit plant for Cadillac and La Salle chassis. The new unit, when under full production, will employ about 200 men and occupy 635,000 sq. ft. of floor space.

Steel Corporation's Orders Drop 429,966 Tons

The United States Steel Corporation on Tuesday reported the largest drop in its unfilled orders since the spring of 1928. The decline was 429,966 tons, leaving the total as of Aug. 31 at 3,658,211 tons, which was 34,168 tons above that of Aug. 31, 1928.

It was the fourth consecutive monthly decrease, but the three which preceded were much smaller. At the end of May the orders declined 123,602 tons; in June there was a further reduction of 47,257 tons, and in July the decrease was 168,733 tons.

Unfilled tonnage at the end of each month for the past three years follows:

	1929	1928	1927
August ...	3,658,211	3,624,043	3,196,037
July	4,088,177	3,570,927	3,142,014
June	4,256,910	3,637,000	3,058,246
May	4,304,167	3,416,822	3,050,941
April	4,427,563	3,872,133	3,456,132
March ...	4,410,718	4,335,206	3,553,140
February..	4,141,341	4,398,189	3,597,119
January ..	4,109,487	4,275,947	3,800,177
	1928	1927	1926
December.	3,976,712	3,972,974	3,960,696
November.	3,673,000	3,454,441	3,807,447
October ..	3,751,030	3,341,000	3,683,661
September.	3,698,368	3,148,113	3,593,500

Use of Business Statistics Proves a Stabilizer

WASHINGTON, Sept. 10.—Discussing business stability at a conference with the press yesterday, Secretary of Commerce R. P. Lamont said that an examination of the monthly statistics of industrial activity in the United States since the war shows a reduction in range of those variations which are of a seasonal character. Not only has there been, since 1921, an unusually prolonged period substantially free from so-called crises or ups and downs in economic activity representing the so-called business cycle, but even those variations from month to month of the year, which are the result of seasonal influences and which were formerly considered inevitable, have been cut down in extent, the Secretary declared.

"This result must be attributed largely to greater foresight on the part of business men producing and selling commodities as well as on the part of buyers of goods," he continued. "An important factor in making possible the exercise of such foresight is the great and growing volume of current statistical information furnished to the public by the government and by private organizations. Moreover, business men, and in fact all people, have learned to make more constant and more intelligent use of such statistics in the guidance of their affairs."

Republic to Build New Conduit Department

The Republic Iron & Steel Co. on Tuesday announced plans for a new mechanical tubing and conduit department to be built at Warren, Ohio, involving an expenditure of $1,000,000. Plans have been prepared by the company's engineering department, according to President E. T. McCleary, and will be submitted to directors at their next meeting.

The plant will employ about 500 men, and will represent additional capacity. The Republic company now operates a conduit department in Brooklyn, which commenced operations a month ago.

Shipping Board to Sell 22 Vessels for Scrap

WASHINGTON, Sept. 10.—Bids will be received up to Oct. 8 by the Shipping Board for the purchase for scrapping of 22 steel cargo vessels, 12 of which are laid up at Norfolk, Va., eight at New York and one each at Mobile, Ala., and New Orleans. In addition to bids contemplating scrapping, the board will also consider propositions for the purchase and conversion to Diesel propelled vessels, or to barges. It will also be provided in the advertisement that bids contemplating scrapping of steamers abroad will be given consideration.

Chromium Plating Now a Well Recognized Industry

From very small and modest beginnings, dating back only a few years, the chromium plating industry has had a phenomenal growth. Starting with the small installation at Columbia University, which demonstrated the far-reaching industrial applications and the adaptability of chrome plating to commercial practice, there are today some 500 plants located in all parts of the world.

At the coming meeting of the American Electrochemical Society to be held at Pittsburgh, Sept. 19 to 21, Prof. Frank C. Mathers and Chester M. Alter of the University of Indiana, Robert J. Piersol, of Pittsburgh, Lawrence E. Stout and A. W. Petchaft, of St. Louis, and H. H. Willard and R. Schneidewind, of Ann Harbor, Mich., will be among the contributors on their experiences in the chromium electroplating art.

COMING MEETINGS

SEPTEMBER

American Electrochemical Society, Sept. 19 to 21. Fall meeting, William Penn Hotel, Pittsburgh. Colin G. Fink, Columbia University, New York, secretary.

American Refractories Institute. Sept. 24 and 25. Fall meeting with Refractories Division of the American Ceramic Society, Deshler-Wallick Hotel, Columbus, Ohio. Dorothy A. Texter, Oliver Building, Pittsburgh, secretary.

American Drop Forging Institute. Sept. 25 to 27. Fall meeting, Buckwood Inn, Shawnee-on-Delaware, Pa. C. H. Smith, president, Steel Improvement & Forge Co., Cleveland, chairman of convention committee.

Concrete Reinforcing Steel Institute. Sept. 30 to Oct. 2. Semi-annual meeting, Wawasee Hotel, Wawasee, Ind. M. A. Beeman, 2112 Tribune Tower, Chicago, secretary.

National Industrial Advertisers' Association. Sept. 30 to Oct. 2. Eighth annual convention, Gibson Hotel, Cincinnati. Benjamin H. Miller, 420 Lexington Avenue, New York, secretary.

National Machine Tool Builders' Association. Sept. 30 to Oct. 4. Second machine tool exposition, Public Auditorium, Cleveland. E. F. DuBrul, 617 Vine Street, Cleveland, manager.

National Safety Council. Sept. 30 to Oct. 4. Eighteenth annual congress, Stevens Hotel, Chicago. W. H. Cameron, 108 East Ohio Street, Chicago, managing director.

OCTOBER

Society of Automotive Engineers. Oct. 2 and 3. Production meeting, Hotel Cleveland, Cleveland. Coker F. Clarkson, 29 West Thirty-ninth Street, New York, secretary.

American Society of Mechanical Engineers. Oct. 7 to 10. Third national fuels meeting, Bellevue-Stratford Hotel, Philadelphia. Calvin W. Rice, 29 West Thirty-ninth Street, New York, secretary.

Metallurgical and Mining Advisory Boards (Carnegie Institute and Bureau of Mines). Oct. 18. Third open meeting, 4800 Forbes Street, Pittsburgh. John D. Beatty, Carnegie Institute of Technology, Pittsburgh, secretary.

American Society of Mechanical Engineers. Oct 21 to 23. Sectional meeting, Portage Hotel, Akron, Ohio. Calvin W. Rice, 29 West Thirty-ninth Street, New York, secretary.

Society of Industrial Engineers. Oct. 23 to 25. Sixteenth national convention, Hotel Statler, Cleveland. George C. Dent, 205 West Wacker Drive, Chicago, secretary.

American Gear Manufacturers Association. Oct. 24 to 26. Fall meeting, Benjamin Franklin Hotel, Philadelphia. T. W. Owen, 3608 Euclid Avenue, Cleveland, secretary.

American Iron and Steel Institute. Oct. 25. Thirty-sixth general meeting, Hotel Commodore, New York. E. A. S. Clarke, 75 West Street, New York, secretary.

Non-Ferrous Metal Markets

Copper Sales Are Largest on Record—Lead Active—Tin and Zinc Dull

New York, Sept. 10.

Copper.—Sales in the week ended Saturday, Sept. 7, amounted to more than 100,000 tons, thereby setting a new record for the industry. Demand from both domestic and foreign buyers was unusually heavy and was stimulated by a threatened advance in prices. With the exception of a few orders for early December delivery, users are asking for shipment in the next three months and the fact that they apparently are not anticipating their requirements further ahead shows to what a low point they had permitted stocks to dwindle during the summer. With its competitors refusing to follow its lead in raising quotations on electrolytic copper ¼c. a lb., the leading producer has abandoned its attempt to secure business at 18.25c., delivered in the Connecticut Valley, and the market again is steady at 18c. Buying yesterday and today dropped off sharply as a natural consequence of the abnormal activities of the past two weeks and of the disappearance of the likelihood of higher prices. Late this week the August figures on copper stocks will appear. Some producers are of the opinion that they will reveal a further slight increase in the total blister and refined stocks, although the effects of the curtailment of output were reflected in the June and July statistics and therefore the stocks on Aug. 31 may have been approximately the same as at the end of July. Whatever the figures may be, they are not likely to affect prices, which producers believe will stay at the present level for an indefinite period. Lake copper has been showing strength and is steady at 18c. to 18½c., delivered.

Lead.—The volume of business in the past week was on a par with that of the previous week, with the result that sales in the past fortnight were the largest of the year. It is only natural, under the circumstances, for producers to expect an easing off in buying this week. Practically all orders call for delivery in September, October and the early part of November. On Thursday, Sept. 5, the American Smelting & Refining Co. increased its price to 6.90c., New York, and the leading interest in the West advanced its quotations a corresponding amount to 6.70c., St. Louis. The market is now firm at these figures.

THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY

	Sept. 10	Sept. 9	Sept. 7	Sept. 6	Sept. 5	Sept. 4
Lake copper, New York	18.12½	18.12½	18.12½	18.12½	18.12½	18.12½
Electrolytic copper, N. Y.*	17.75	17.75	17.75	17.75	17.75	17.75
Straits tin, spot, N. Y.	45.37½	45.50	....	45.50	45.75	45.75
Zinc, East St. Louis	6.80	6.80	6.80	6.80	6.80	6.80
Zinc, New York	7.15	7.15	7.15	7.15	7.15	7.15
Lead, St. Louis	6.70	6.70	6.70	6.70	6.70	6.55
Lead, New York	6.90	6.90	6.90	6.90	6.90	6.75

*Refinery quotation; price ¼c. higher delivered in the Connecticut Valley.

Rolled Products

Prices on rolled non-ferrous products are unchanged from those prevailing one week ago.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—
- High brass ..... 23.25c.
- Copper, hot rolled ..... 26.75c.
- Zinc ..... 10.25c.
- Lead (full sheets) ..... 11.00c. to 11.25c.

Seamless Tubes—
- High brass ..... 28.25c.
- Copper ..... 29.25c.

Rods—
- High brass ..... 21.25c.
- Naval brass ..... 24.00c.

Wire—
- Copper ..... 19.87½c.
- High brass ..... 23.75c.

Copper in Rolls ..... 26.75c.

Brazed Brass Tubing ..... 30.87½c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also to St. Louis on shipments to points west of that river.

- Sheets, 0 to 10 gage, 3 to 30 in. wide ..... 33.00c.
- Tubes, base ..... 42.00c.
- Machine rods ..... 34.00c.

Chicago Warehouse

(Prices Cover Trucking to Customers' Doors in City Limits)

Sheets—	Base per Lb.
High brass	23.25c.
Copper, hot rolled	27.75c.
Copper, cold rolled, 14 oz. and heavier	30.00c.
Zinc	10.75c.
Lead, wide	11.35c.
Seamless Tubes—	
Brass	28.25c.
Copper	29.25c.
Brass Rods	21.25c.
Brazed Brass Tubes	31.00c.

New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass	21.12½c. to 22.12½c.
Copper, hot rolled, base sizes	27.75c. to 28.75c.
Copper, cold rolled, 14 oz. and heavier, base sizes	30.00c. to 31.00c.
Seamless Tubes—	
Brass	26.00c. to 27.00c.
Copper	29.12½c. to 30.12½c.
Brazed Brass Tubes	29.12½c. to 30.12½c.
Brass Rods	18.87½c. to 19.87½c.

New York Warehouse

Delivered Prices, Base Per Lb.

- *Zinc sheets (No. 9), casks* ..... 10.50c. to 11.00c.
- *Zinc sheets, open* ..... 11.50c. to 12.00c.

Metals from New York Warehouse

Delivered Prices, Per Lb.

- Tin, Straits pig ..... 47.50c. to 48.50c.
- Tin, bar ..... 50.00c. to 51.00c.
- Copper, Lake ..... 19.50c.
- Copper, electrolytic ..... 19.25c.
- Copper, casting ..... 19.00c.
- Zinc, slab ..... 7.75c. to 8.25c.
- Lead, American pig ..... 7.62½c. to 8.12½c.
- Lead, bar ..... 9.62½c. to 10.12½c.
- Antimony, Asiatic ..... 11.00c. to 11.50c.
- Aluminum No. 1 ingots for remelting (guaranteed over 99% pure) ..... 25.00c. to 26.00c.
- Alum. ingots, No. 12 alloy ..... 24.00c. to 25.00c.
- Babbitt metal, commercial grade ..... 25.00c. to 35.00c.
- Solder, ½ and ½ ..... 30.00c. to 31.00c.

Metals from Cleveland Warehouse

Delivered Prices, Per Lb.

- Tin, Straits pig ..... 50.75c.
- Tin, bar ..... 52.75c.
- Copper, Lake ..... 19.50c.
- Copper, electrolytic ..... 19.25c.
- Copper, casting ..... 18.75c.
- Zinc, slab ..... 7.75c. to 8.00c.
- Lead, American pig ..... 7.40c. to 7.65c.
- Lead, bar ..... 9.75c.
- Antimony, Asiatic ..... 16.00c.
- Babbitt metal, medium grade ..... 18.75c.
- Babbitt metal, high grade ..... 55.00c.
- Solder, ½ and ½ ..... 31.75c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged customers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	14.75c.	16.25c.
Copper, hvy. and wire	14.50c.	15.75c.
Copper, light and bottoms	12.50c.	13.75c.
Brass, heavy	8.50c.	9.50c.
Brass, light	7.50c.	8.50c.
Hvy. machine composition	12.00c.	13.00c.
No. 1 yel. brass turnings	9.75c.	10.50c.
No. 1 red brass or compos. turnings	11.25c.	12.25c.
Lead, heavy	5.25c.	5.75c.
Lead, tea	4.25c.	5.25c.
Zinc	3.50c.	4.25c.
Sheet aluminum	14.00c.	16.00c.
Cast aluminum	12.25c.	14.25c.

Tin.—Dullness continues in spot Straits tin. In fact, buying the past week was in such negligible volume that the market was virtually at a standstill. The few sales made were for delivery in the next two months. There is a more plentiful supply of spot tin than a few weeks ago. The quietness has not materially affected quotations, which have declined only slightly during the week. Spot Straits tin was quoted today at 45.37½c., New York. At London, the downward movement of prices has halted. Spot standard is quoted at £204 5s., futures standard at £208 7s. 6d. and spot Straits at £208 5s. The Singapore market today was £213 5s.

Zinc.—With consumers trying to break prices by refraining from buying their usual requirements and with producers determined to maintain the present schedule of 6.80c., East St. Louis, for prime Western zinc, little business has been transacted in the past week. Meanwhile, stocks in the hands of users are far less than normal and sellers are confident that customers cannot long hold off replenishing their supplies.

Antimony.—The market is sluggish and consumers are manifesting little or no interest. Spot material is quoted at 8.75c. a lb., New York, duty paid. No improvement in the immediate future is expected.

Nickel.—In wholesale lots, ingot nickel is priced at 35c. a lb., shot nickel at 36c. and cathode electrolytic nickel at 35c.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at 23.90c. a lb., delivered.

Non-Ferrous Metals at Chicago

Sept. 10.—This market is strong and active. Shipments against old orders are larger. Lead prices have advanced. The old metal market is quiet and prices are unchanged.

Prices per lb., in carload lots: Lake copper, 18.50c.; tin, 47.25c.; lead, 6.80c.; zinc, 6.90c.; in less-than-carload lots, antimony, 9.85c. On old metals we quote copper wire, crucible shapes and copper clips, 14c.; copper bottoms, 11.50c.; red brass, 11.50c.; yellow brass, 8c.; lead pipe, 4.50c.; zinc, 3.25c.; pewter, No. 1, 24.50c.; tin foil, 26c.; block tin, 36c.; aluminum, 12.87½c.; all being dealers' prices for less-than-carload lots.

Fabricated Structural Steel

Awards Total 44,000 Tons—Major Part of Tonnage Is For Non-Industrial Structures

STRUCTURAL steel lettings, at 44,000 tons, showed a substantial gain over those of the previous week. About 70 per cent of the tonnage will go into hotels, educational buildings, apartment houses and other non-industrial structures. Outstanding among awards was 24,000 tons for the new Waldorf-Astoria Hotel in New York. Electrification work on the Pennsylvania Railroad will require 2400 tons.

Inquiries, totaling 26,000 tons, include 9300 tons for a New York subway section, 3000 tons for a telephone building at Pittsburgh and 2400 tons for an office building at Des Moines, Iowa. Awards follow:

WATERVILLE, ME., 165 tons, indoor field cage and gymnasium, to Lyons Iron Works.

KEENE, N. H., 125 tons, publishing plant, to New England Structural Co.

HANOVER, N. H., 107 tons, Dartmouth School, to Palmer Steel Co.

INWOOD, VT., 500 tons, substation for Connecticut River Development Co., to American Bridge Co.

BOSTON, 400 tons, school of arts, to A. L. Smith Iron Works.

BOSTON, 320 tons, dance hall and stores in Dorchester district, to New England Structural Co.

TEWKSBURY, MASS., 200 tons, substation for New England Power Co., to American Bridge Co.

WALTHAM, MASS., 300 tons, hospital, to Eastern Bridge & Structural Co.

BEVERLY, MASS., 100 tons, indoor tennis court, to New England Structural Co.

HARTFORD, CONN., 235 tons, First National Stores unit, to Lehigh Structural Steel Co.

RYE, N. Y., 150 tons, Church of the Resurrection, to Guibert Steel Co.

PORT CHESTER, N. Y., 400 tons, United Hospital, to Porcupine Boiler Works, Bridgeport, Conn.

STATE OF NEW YORK, 150 tons, highway bridge, to American Bridge Co.

NEW YORK, 24,000 tons, Waldorf-Astoria Hotel, to McClintic-Marshall Co.

NEW YORK CENTRAL RAILROAD, 1700 tons, viaduct at 241st Street, New York, to Harris Structural Steel Co.

NEW YORK CENTRAL RAILROAD, 500 tons, fabricated steel and sheet piling, docks at Toledo, Ohio, to Bethlehem Steel Co.

PENNSYLVANIA RAILROAD, 2400 tons, electrification work; 2000 tons to Bethlehem Steel Co. and 400 tons to American Bridge Co.

CAMDEN, N. J., 800 tons, City Athletic Club, to unnamed fabricator.

GRASSELLI, N. J., 200 tons, Grasselli Chemical Co., to Guibert Steel Co.

CHARLOTTE, N. C., 100 tons, Walsh Motor Co., to McClintic-Marshall Co.

HAVANA, CUBA, 2000 tons, National Hotel, to American Steel Corporation.

DETROIT, 107 tons, River Rouge bridge, to McClintic-Marshall Co.

CANTON, OHIO, 550 tons, Onesto Hotel, to Hiner Structural Steel Co.

CALION, ARK, 500 tons, bridge, to Illinois Steel Bridge Co., Jacksonville, Ill.

TACOMA, WASH., 100 tons, redecking Eleventh Street bridge, to Star Iron Works.

HILLYARD, WASH., 180 tons, boiler shop for Great Northern Railroad Co., to Hofius Steel & Equipment Co.

VANCOUVER, B. C., 4000 tons, plates, pipe line for city, to Harrison & Lamond.

VANCOUVER, 750 tons, plates, pipe line, to Vancouver Engineering Works.

PORTLAND, ORE., 1000 tons additional, St. John's River bridge, to Wallace Bridge & Structural Steel Co.

PORTLAND, 300 tons, approaches to St. John's River bridge, to Gilpin Construction Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

LYNN, MASS., 300 tons, theater.

WEST SPRINGFIELD, MASS., 200 tons, engine house.

ATTLEBORO, MASS., 150 tons, Masonic Temple.

WOBURN, MASS., 130 tons, electric lighting plant.

NEW YORK, 9300 tons, section 9, route 101, of subway at Sixth Avenue and Forty-first Street.

NEW YORK, 500 tons, tennis court building for Thompson-Starrett Co. on East Sixty-fourth Street.

BROOKLYN, 400 tons, addition to Brooklyn Edison Co.

BUFFALO, 300 tons, apartment building, 1290 Delaware Avenue for Lasser-Preyer Co.

PITTSBURGH, 3000 tons, addition to Bell Telephone Building.

NICKEL PLATE RAILROAD, 600 tons, bridge at Cleveland.

SAGINAW, MICH., 1900 tons, telephone building.

DES MOINES, IOWA, 2400 tons, office building.

DENVER, 2100 tons, viaduct.

DOUGLAS, ARIZ., 850 tons, oil treating plant for Phelps Dodge Corporation.

BREMERTON, WASH., 3000 tons, plates, pipe line; general contract to James Coyne, Portland.

EVERETT, WASH., 10,000 tons, plates, riveted pipe line; Western Pipe & Steel Co., low bidder.

Farm Implement Exports to Canada

An increase of $1,281,321 in exports of farm implements to Canada was noted for the first six months of 1929, as compared with a similar period of last year, according to George Bell, chief of the agricultural implements division of the Department of Commerce. It is believed that approximately three-fourths of this equipment will be used in the prairie provinces of Manitoba, Saskatchewan and Alberta. For the half-year period of 1929, out of a world total of $72,068,572, Canada received machinery amounting to $24,699,919, as compared with $23,418,598 for a like period in 1928, out of a world total of $54,011,857. The entire amount shipped to Canada for the whole of 1928 is placed at $46,131,912, out of a world total of $116,524,084.

Tractor engines, gas or gasoline, formed the bulk of the exports, with threshing machines, plows and harvesters following in order named.

The combined deliveries of brass and bronze ingots and billets by the members of the Non-Ferrous Ingot Metal Institute for July amounted to 7698 tons.

PERSONAL

JAMES. A. CAMPBELL, president, Youngstown Sheet & Tube Co., Youngstown, will observe his seventy-fifth birthday on Sept. 11, and will be tendered a testimonial dinner by friends and business associates in that city on the evening of that day. No formal program has been arranged. Mr. Campbell has been president of the Sheet & Tube company for 25 years and his identification with the organization began some years before. The Youngstown Rotary Club will have Mr. Campbell as its guest of honor at its weekly luncheon on his birthday.

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JOHN GOETZ, who recently retired as vice-president and works manager of the Kempsmith Mfg. Co., Milwaukee, has organized the Goetz-Voss Corporation, Wauwatosa, a suburb of Milwaukee, to engage in the practice of consulting engineering in the designing and production of special machinery, fixtures, etc., for the metal-working industries. With him is associated Arthur E. Voss. Work has been completed on the first unit of the machine shop, tool room, experimental laboratory and office, at 430 State Street, Wauwatosa.

—

S. C. POHLMAN, vice-president and general manager, California Wire Cloth Co., is making a tour of some of the wire fabricating plants in the East.

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FRED R. SEGHERS, formerly associated with the Chicago office of the Toledo Machine & Tool Co., Toledo, Ohio, has been appointed district sales representative for the Ferracute Machine Co., Bridgeton, N. J.

—

J. GAFFNEY has been appointed to the newly created position of assistant superintendent of the Moline Malleable Iron Co., Moline, Ill.

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W. D. MOORE, president, American Cast Iron Pipe Co., Birmingham, and an officer of the Sand Spun Patents Corporation, the licensing company for sand spun centrifugal pipe, sailed for England last week to negotiate with British foundries on licenses for the sand spun process.

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VIRGIL JORDAN has resigned as chief economist of the National Industrial Conference Board, New York, and has become associated with the McGraw-Hill Publishing Co. as economist and associate editor of the *Business Week*.

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IRVING P. CHURCH, professor emeritus of applied mechanics and hydraulics at Cornell University, has been awarded the Lamme medal by the Society for the Promotion of Engineering Education.

H. F. HAWORTH and C. T. SKIPPER, of the Leyland Motor Co., England, arrived in New York on Sept. 9 and will make a tour of inspection of American automobile and machine tool plants with a view to purchasing new equipment for the modernization of the Leyland plant. They will make their headquarters at the office of Morison, Pollexfen, Blair, Ltd., 115 Broad Street, New York.

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DR. W. S. CARNES, Canton, Ohio, president of the Car-Van Steel Products Co., spoke on "The Rediscovery of the Lost Art of the Old Damascus Sword Blade," at two luncheon clubs in Indianapolis recently.

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OSCAR ERICSSON, Copenhagen, Denmark, general European representative of the Heald Machine Co., Worcester, Mass., is on his way to the United States to attend the National Machine Tool Exposition in Cleveland.

—

ERIK LINDHOLM, of the Aktiebolaget Servus, Stockholm, Sweden, will attend the National Machine Tool Exposition in Cleveland.

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C. SCHINZ, Schinz & Co., Zurich, Switzerland, European representatives of a number of American machine tool manufacturers, will arrive in New York this week and will stop at the Roosevelt Hotel. He will attend the National Machine Tool Exposition in Cleveland.

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CHARLES D. MOORE, formerly assistant open-hearth superintendent at the Johnstown Plant of the Bethlehem Steel Co., is now the superintendent of open-hearth at the Worth Steel Co., Claymont, Del.

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A. D. EVANS, formerly in charge of development work of the American Sheet & Tin Plate Co., Shenango Works, New Castle, Pa., has joined the Wean Engineering Co., Inc., as chief engineer and takes charge of development work and all engineering. The Wean company specializes in sheet and tin mill equipment, including pack heating furnaces, automatic tinning equipment, doublers and other labor-saving devices.

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J. B. HOLSTON has been appointed manager of the St. Louis sales office of the Wagner Electric Corporation. He was graduated from the University of Illinois and has been with the company in Chicago.

—

WILLIAM H. INSLEY, president and general manager, Insley Mfg. Co., Indianapolis, fabricator of steel, has been selected by the Indianapolis city manager league to be one of its candidates for election as city commissioner.

ARTHUR L. WHITESIDE has been put in charge of an office opened at 30 Church Street, New York, by the Hill Clutch, Machine & Foundry Co., Cleveland.

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FRANK CARTER, former United States Government metallurgical inspector, has taken charge of the metallurgical department for James H. Knapp, industrial furnace manufacturer, Los Angeles.

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GEORGE S. DAVISON, president Davison Coke & Iron Co., Pittsburgh, has resigned as vice-president of the Gulf Oil Corporation and the Gulf Refining Co., Pittsburgh, to devote more time to the active management of the Davison company. On Oct. 10 he will leave for Japan, where he will act as one of the delegates of the American Society of Civil Engineers to the World's Engineering Congress.

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A. J. HENSELER has been appointed sales manager for the Whitney Metal Tool Co., Rockford, Ill.

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E. H. WHITTEMORE has been made manager of the newly opened Boston office of the Westinghouse Electric Elevator Co. at 10 High Street, a subsidiary of the Westinghouse Electric & Mfg. Co.

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W. A. FORBES, assistant to the president of the United States Steel Corporation, is sailing on the steamer Bremen, Sept. 12, for a two months' business trip in various industrial centers of Europe.

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Nitriding Expert to Speak at New York Meeting

A special joint meeting of the New Jersey and New York chapters of the American Society for Steel Treating has been arranged for Thursday evening, Sept. 19, at which Dr. Adolph Fry, of Krupp's, Essen, Germany, will be the speaker. He is one of the original developers of the new nitriding process for hardening steel.

The meeting will be held in the assembly room of the Merchants' Association, Woolworth Building, New York, and preceded by a dinner in the Post Keller Restaurant in the basement of that building.

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Ohio Founders at Toledo

The first sectional meeting of the Ohio Foundries Association, Inc., will be held at Toledo, Oct. 10. This will also be the annual meeting for the election of board members and the transaction of business. This sectional meeting will be held under the new schedule of four meetings a year, each to take place in a different part of the State.

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A. H. Cohn & Sons, Butler, Pa., old material dealers, are constructing a yard at cost of $200,000, to handle iron and steel scrap.

Mileage Scale for Pig Iron in New England

Commerce Commission Examiner Recommends Distance Tariffs in Mystic Iron Works Case

WASHINGTON, Sept. 10.—Holding that rates on pig iron from the plant of the Mystic Iron Works, Everett, Mass., to points in New England are unreasonable, Examiner C. E. Simmons in a report made public last Saturday recommended that the Interstate Commerce Commission set up a distance scale applicable for joint line and single line rates.

The joint line rates would range from $1.85 a gross ton for 30 miles and under up to a maximum of $3.65 for 320 miles and over 280 miles. The single line rates would run from $1.65 to $3.45.

While pig iron is rated sixth class in Official Classification territory, the rates from the Mystic blast furnace range from 65 to 73 per cent of sixth class and in some instances carry a switching charge of $5 a car.

The examiner also recommended that the complainant be awarded reparation.

The report is interpreted as a victory for the Mystic furnace from the fact that the examiner held that the rates are unreasonable. The proposed scale, however, does not reduce rates to the level sought by the complainant. In this respect, it may be construed as being only a partial victory. Reference to present rates and the proposed scale shows that the latter would provide both decreased and increased rates. However, as the examiner said that the most important market for pig iron in New England is in Connecticut, the readjustment proposed would be favorable to the Mystic plant by bringing about reductions to important points in Connecticut along with other reductions.

The present rate from Everett to Hartford is $2.90 a ton, while the proposed single line rate would be $2.45 and the joint line rate $2.35. The rate to Waterbury and Bridgeport now is $3.20, while the proposed single line rate would be $2.65 and the joint line rate $2.85. Moreover, deliveries to Connecticut points carry a switching charge of $5 a car. To nearby points the proposed scale would carry slight increases and to some of the more distant points also it would carry increases. For example, the present rate of $2.65 to Rutland, Vt., would be increased to $2.85 for single line hauls and to $3.05 for joint line hauls.

The Hudson Valley Coke & Products Corporation, Troy, N. Y., intervened in the case and held that the present relationship in rates from Everett and Troy to the destinations involved, points in Massachusetts, Rhode Island, Connecticut, Maine, New Hampshire and Vermont should be continued and that any relief granted Everett, located in the Boston switching district, should also be reflected in the rates from Troy.

The Mystic furnace is served by the Boston & Albany and the Boston & Maine. Shipments destined to points on the New York, New Haven & Hartford are switched by connecting carriers to an interchange point in Boston with the New Haven. The furnace also is served by boat through Boston harbor.

The furnace receives no allowance out of line-haul rates for weighing, loading and unloading services, but the railroads absorb a loading charge of 60c. on imported pig iron shipped from Boston.

The complaint alleged that the Mystic furnace was unable to compete in New England with pig iron producers at Buffalo and Port Henry, N. Y., Erie, Hokendauqua, Reading, Bethlehem and Swedeland, Pa. The principal competition was said to come from Buffalo. From Buffalo the rate is $4.91 for distances ranging from 397 to 620 miles.

The examiner said that the Mystic plant has been compelled to seek markets at Baltimore, Philadelphia, Brooklyn and Jersey City. Shipments to the latter points, approximating 20 per cent of the complainant's output, were said to move by water. At present, the report said, the complainant has a large quantity of pig iron on hand which it is unable to sell. The cost of assembling raw materials at Everett was shown to be materially higher than that of its competitors, according to the report. The greater portion of the raw materials received at Everett, it was pointed out, is obtained from distant points while the raw materials of competitors are received from points nearer and more adjacent to their plants.

Bethlehem to Issue 800,000 New Shares of Common

E. G. Grace, president, Bethlehem Steel Corporation, announced on Tuesday (Sept. 10) that the directors had authorized the issuance of 800,000 new shares of common stock in the ratio of one share for each three shares held on Sept. 20. The price of the new shares is to be $110.

Funds derived from the sale of these shares, amounting to $88,000,000, will be used for the retirement of bonds. It is the corporation's intention to call for redemption on the next interest date, Feb. 1, 1930, all of its consolidated mortgage 30-year sinking fund 6 per cent gold bonds, series A. At 105, the callable price, and accrued interest this will require $50,166,000. The remainder will be used to retire or purchase other funded obligations of the corporation or its subsidiary companies.

New common stock will be issued as of Oct. 21, and will be entitled to share in dividends payable after Nov. 15. The increase will raise the number of common shares to 3,200,000. A few months ago Bethlehem issued 600,000 new shares, an increase from 1,800,000 to 2,400,000.

President Grace in an oral statement said that Bethlehem, in common with other steel companies, had experienced a falling off in new business in August, but that it was not serious and that operations are being continued at 95 per cent. He expected that output would remain on this basis throughout the month. He looked for increased buying, particularly from the railroads. Much of Bethlehem's high rate of operation is due, it was said, to heavy orders for structural material and plates, and it also has a good rail backlog. Mr. Grace was optimistic as to fall business prospects.

Obituary

ROSWELL M. BOUTWELL, treasurer Standard Horseshoe Co., Boston, died Sept. 4 at a private hospital in Brookline, Mass. He was born in Lyndeboro, N. H., May 22, 1855. He served as president of the New England Iron & Hardware Association and was a director of that organization for approximately 20 years.

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JOHN DAVID HURLEY, president and founder of the Independent Pneumatic Tool Co., who died suddenly Aug. 15, as mentioned in this column Aug. 22, organized, about 1898, with his brother Edward N. Hurley, Sr., the Standard Pneumatic Tool Co., which was one of the first concerns to introduce air tools in railroad shops and other industries. On March 1, 1902, this company was absorbed by the Schwab interests and Mr. Hurley became identified with the Rand Drill Co., of New York. In 1905 he returned to Chicago and organized the Independent Pneumatic Tool Co.

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WALTER CLARK FISH, former manager of the Lynn, Mass., works of the General Electric Co., died Sept. 8 at his home in Boston. He was born at Taunton, Mass., Aug. 25, 1864, studied two years at Harvard University, and was graduated from Massachusetts Institute of Technology in 1887.

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JOHN S. WOOLFORD, president G. Woolford Wood Tank Mfg. Co., Philadelphia, died at his country home, Newfield, N. J., Sept. 7, in his eighty-sixth year, after a brief illness. Upon the death of his older brother, George Woolford, in 1911, he was elected president of the company, and has been its active head since that time.

Automobiles "junked" in the United States in 1928 numbered 2,213,000, according to the American Motorists' Association, Washington. As domestic sales are reported at 3,220,000, it follows that the net increase in consumers' hands was 1,007,000.

Some Improvement in European Markets

British Mills Active—Tin Plate Prices Firm—Pig Iron Demand Better—American Purchases of Manganese Ore from Russia

(*By Cable*)

LONDON, ENGLAND, Sept. 9.

CLEVELAND pig iron demand has improved, but furnaces are as yet unable to accept new orders for prompt shipment. Coke prices are firmer and supplies continue limited, so that further increase in the number of active blast furnaces seems improbable.

Hematite producers are asking increased prices, but consumers, especially those overseas, are not hastening to commit themselves beyond immediate needs.

Inquiry for finished steel is fair in the domestic and export markets, and mills expect to reap the benefit of active conditions prevailing on the North East coast. Most shape mills are fully employed, and plate mills are generally moderately busy.

British users of Continental sheet bars are displaying increased interest in buying, and with demand good prices have been advanced and may go higher. The market is otherwise dull.

Tin plate prices are firm with costs increasing and inquiry good, although actual business is not yet brisk. Several works sold well ahead prior to the latest price advance and now are not pressing for orders.

Galvanized sheets are in moderate demand, especially for South Africa, but India is still quiet, although demand from that market is expected to revive before the end of the current month. Black sheets continue quiet.

The British Government is setting up a committee under Lord Weir to examine the economic and other aspects of electrification of British railroads.

British Steel Mills Are Still Busy

Inquiry Increasing—Employment Smaller in Steel Plants But Better at Blast Furnaces—Ship Workers Strike

LONDON, ENGLAND, Aug. 29.—A favorable feature of the market is the fact that certain iron and steel plants in the Cleveland district have been so busy that they have operated through the usual vacation week. Cleveland pig iron for prompt delivery is still scarce, but there is not much difficulty in securing supplies for future shipment. Meanwhile arrivals of Indian pig iron have been increasing and further shipments are expected.

Employment at blast furnaces improved in July, returns from 79 companies showing an increase of 1.3 per cent compared with June and 16.8 per cent compared with July, 1928. The number of furnaces in blast at the end of July was 167, compared with 165 at the end of June and 131 at the end of July, 1928. In steel mills, employment decreased 0.4 per cent in July, but was 5.6 per cent better than in July of last year.

While the steel industry has been experiencing a period of quiet, some branches of it are feeling an increase in inquiry, which may be the beginning of a fall buying movement. British manufacturers of railroad rolling stock have recently secured good contracts from Argentina, Peru, Rhodesia and India.

Although shipbuilding is not satisfactory, a number of orders for vessels have been and are being placed. Among recent contracts are an 8000-ton cargo ship awarded to Palmers Shipbuilding & Iron Co., Ltd., and a 9000-ton, motor-driven tank vessel placed with Swan, Hunter & Wigham Richardson, Ltd. At Belfast, shipyard joiners have been on strike for 19 weeks for a wage increase of 3s. (73c.) a week. More than 1000 joiners are affected by the strike, and a number of other employees have been thrown out of work in consequence.

British and Continental European Export prices per gross ton, f.o.b. United Kingdom Ports, Hamburg and Antwerp with the £ at $4.85

British Prices, f.o.b. United Kingdom Ports

Cleveland No. 3 foundry	£3	12½s.	to £3	13½s.	$17.58	to	$17.82
East Coast Hematite	3	16	to 3	16½	18.39	to	18.51
Ferromanganese, export	13	10	to 14	0	65.47	to	67.90
Billets, open-hearth	6	7½	to 6	10	30.92	to	31.52
Sheets bars, open-hearth	6	5	to 6	10	30.31	to	31.52
Black sheets, Japanese specifications	13	0			63.05		
Tin plate, per base box	0	18½	to 0	18¾	4.48	to	4.54
Rails, 60 lb. and heavier	7	15	to 8	15	37.59	to	42.43
					Cents per Lb.		
Steel bars, open-hearth	7	15	to 8	10	1.67	to	1.84
Beams, open-hearth	7	2½	to 7	12½	1.55	to	1.65
Channels, open-hearth	7	7½	to 7	17½	1.60	to	1.71
Angles, open-hearth	8	2½	to 8	12½	1.76	to	1.86
Ship plates, open-hearth	7	12½	to 8	2½	1.66	to	1.76
Black sheets, No. 24 gage	10	5	to 10	10	2.21	to	2.27
Galvanized sheets, No. 24 gage	13	7½	to 13	10	2.89	to	2.92

Continental Prices f.o.b. Antwerp or Hamburg

Foundry iron, 2.50 to 3.00 per cent sil., 0.50 to 0.90 per cent phos.	£3	8s.	to £3	11½s.	$16.49	to	$17.33
Foundry iron, 2.50 to 3.00 per cent sil. 1.00 per cent and more phos.	3	11			17.21		
Billets, Thomas	4	14			22.79		
Sheet bars, Thomas	4	16	to 4	18	23.28	to	23.76
Wire rods low C., No. 5 B.W.G.	6	5	to 6	6¼	30.30	to	30.61
Black sheets, No. 31 gage, Japanese	12	7½			60.02		
Rails, 60 lb. and heavier	6	10*			31.52		
Rails, light	6	1½			29.46		
					Cents per Lb.		
Steel bars, merchant	5	12	to 5	13½	1.21	to	1.23
Steel bars, deformed	5	11½	to 5	12	1.20	to	1.21
Beams, Thomas, British standard	5	2	to 5	6½	1.12	to	1.17
Channels, Thomas, American sections	5	14	to 5	18	1.24	to	1.27
Angles, Thomas, 4-in. and larger, over ⅝-in. thick	5	6			1.16		
Angles, Thomas, 3-in.	5	13½			1.23		
Ship plates, open-hearth inspected	7	8			1.63		
Hoop and strip steel over 6-in. base	5	15	to 5	16	1.24	to	1.27
Wire, plain, No. 8 gage	7	7			1.62		
Wire, galvanized, No. 8 gage	9	7½			2.03		
Wire, barbed, 4-pt. No. 12 B.W.G.	11	12½			2.58		
Wire nails, base	7	10½			$1.63 per keg		
Wire nails, assortments, 1 to 6-in., keg	10	6½			2.23		

*Open-hearth steel, 10s. ($2.42) per ton extra.

Welded Merchant Ship to Be Launched Next Year

HAMBURG, GERMANY, Aug. 26.—Electrically welded ships are officially recognized as in the highest registered class by the Germanische Lloyd in its publication No. 556-1-1929. The Hamburg agency of Lloyds of London confirms the report that they also place electrically welded ships in the highest registry. German insurance companies generally have taken similar action.

In addition to the electrically welded German battleship, Panzerkreuzer A, now under construction at Kiel, a merchant vessel is being electric-welded and will be launched by Deschimag at Hamburg in January or February of next year. Built for the North German Lloyd line, this ship of 11,000 tons will be in the company's river name class, with such vessels as the Isar and the Elbe, and is expected to be operated in the Far Eastern trade.

German Industry Opposes Shipping Subsidy

HAMBURG, GERMANY, Aug. 26.—The German hardware industry has followed the example of steel and machinery producers in definitely denying that it has in any way recommended that the Government pay subsidies to industry. The entire metal industry in Germany has declared that "subventions paid directly or indirectly to shipping or shipbuilding enterprises must be refused" and points to the examples of Canada, Australia and England, where, it is claimed, the State suffers loss and the industry no advantage.

Polish Government Buys Cars

WARSAW, POLAND, Aug. 26.—The Government has placed a large order for railroad rolling stock with Polish builders, which will doubtless result in a considerable curtailment of the export expansion program of the industry. The contract includes 140 locomotives, 170 passenger, 1800 freight and 300 miscellaneous cars, and 80,000 tons of rails and track equipment.

Active Automobile Parts Exports to Germany

HAMBURG, GERMANY, Aug. 19.—An analysis of the imports of steel from the United States shows that the largest volume is in parts and accessories for automobile manufacture, shipped by American motor car builders to their German assembling plants. In the first half of this year, 84.6 per cent of the total imports from the United States was parts and accessories, 2.8 per cent special steels not intended for use in motor car construction, 2.9 per cent black and galvanized sheets, 3.1 per cent tin plate, 3.1 per cent accessories and parts used in machinery building and 3.5 per cent all other steel products. German exports to the United States consisted principally of tubes, hoops and wire.

Acid Open-Hearth Output Lower

HAMBURG, GERMANY, Aug. 26.—While the production of basic open-hearth steel is steadily increasing in Germany, output of acid open-hearth is rapidly diminishing. Of the record post-war production of steel in July, which reached a total of 1,466,072 metric tons, 740,893 tons was basic open-hearth steel. The output of acid open-hearth steel has declined from 22,871 tons in July, 1928, to 13,005 tons in July, 1929.

European Lock Cartel in Prospect

HAMBURG, GERMANY, Aug. 26.—Following the Yale & Towne Mfg. Co.'s acquisition of one of the largest British manufacturers of locks, it is reported that two more German lock manufacturers are negotiating with the American company. It is understood that British and German manufacturers will confer with officers of the American corporation at Berlin, Oct. 25, and it is expected that the meeting will result in the establishment of a closely controlled cartel or a merger of all companies into a single corporation. At its Velbert plant the Yale & Towne company is now employing about 10,000 workmen.

Germans Control Foreign Mannesmann Works

HAMBURG, GERMANY, Aug. 26.—The Mannesmann Tube Co., which recently acquired a heavy interest in the British Mannesmann Tube Works, now owns about £1,444,000 ($7,003,400) of the British company's £2,000,000 ($9,700,000) capital, about 65 per cent of the stock in the French company, Acieries et Usines de la Saar, and about 90 per cent of the stock of the Mannesmann works in Czechoslovakia.

To Stock Steel at Shanghai

HAMBURG, GERMANY, Aug. 19.—Steel exporters are endeavoring to organize the trade with China in plate cuttings, bar crop ends and other forms of second-hand steel. Thus far only moderate quantities of such material have been supplied to China by Germany, but exporters expect to establish permanent stocks in Shanghai.

Higher Rates to Africa

HAMBURG, GERMANY, Aug. 26.—Ocean freight rates on practically all hardware products from Continental ports to South Africa, which have been low in the past, in some instances only 10s. ($2.42) per ton, have been increased 200 to 300 per cent. Exporters to South Africa are pessimistic and believe that the higher rates will mean considerable loss of business to American and Japanese hardware manufacturers, especially to the Japanese, who have been unusually active lately in pressing for larger markets.

Steel Corporation Purchases Russian Manganese Ore

An Associated Press cablegram from Tiflis gives the following statement, evidently based on information from official sources there, concerning the United States Steel Corporation's recent purchase of manganese ore to be mined in the Chiatouri district and shipped from the port of Batum:

"The Georgian Government manganese trust today signed an agreement with the Carnegie Steel Co. for delivery from Chiatouri of large quantities of manganese over a period of five years. During the first year the Carnegie company will take from 60,000 to 75,000 tons of ore and, during the remaining four years, 50,000 tons annually. It was stated that the Carnegie company bought its manganese to improve Brazilian manganese, which it obtains from its own mines. The Georgian Government is continuing negotiations for the sale of quantities of ore to other large American corporations."

British May Make "Widia"

HAMBURG, GERMANY, Aug. 26.—The Friedrich Krupp A. G., Essen, is understood to have entered into negotiations with Sheffield producers of special steels to license one or more for the production of "Widia" cutting metal.

Mail from Japan in 9 Days

A letter mailed by B. P. Sweeny of Osaka, representative in Japan of the Cleveland Twist Drill Co., for transmission by the Graf Zeppelin, reached the Cleveland office in nine days. Even this might have been shortened by at least one day, for if the Graf had been a regular mail carrier, in all probability it would have dropped the Cleveland mail as it passed over that city.

As mail from Japan reaches Cleveland under ordinary circumstances in approximately four weeks, the experience indicates the startling possibilities of the airship of the Zeppelin type as a mail carrier.

Plans for the immediate construction of a new mineral industries building at the Pennsylvania State College have been announced by President Ralph D. Hetzel and Edward Steidle, dean of the School of Mines and Metallurgy. Two hundred feet in length, the building will have wings at both ends, 135 ft. deep. The four floors will contain laboratories, classrooms and offices to care for all instruction and research work in geology, mineralogy, geography, oil and gas production, mining, quarrying, metallurgy and ceramics, or clay and sand products.

Machinery Markets and News of the Works

Tool Market Remains Active

Large Order Placed for Delivery to Russia—Sales in New York District Surprisingly Good

DESPITE the tendency of some machine tool users to hold off action on pending inquiries until after the Cleveland exposition, sales have been fairly well sustained.

An Eastern seller reports that its volume of business in August was the largest of the year and other companies state that the past month compares favorably wth the best previous months of 1929. Moreover, orders in the New York district are continuing to come in steadily and the amount of buying in prospect indicates that September totals will be high.

This unusually favorable condition, however, does not exist in some other machine tool centers, although the flow of orders has been satisfactory.

A Connecticut airplane maker has added $80,000 worth of tools to previous purchases. The Western Electric Co. has placed some sizable orders and the Continental Motors Corporation has been an active buyer. The International Harvester Co. still has some standard tools to purchase for its Farmall plant.

The Amtorg Trading Corporation has contracted for 50 lathes with two American builders and is inquiring for a like number of automatic screw machines for an automobile plant to be built in Soviet Russia. This organization also is ordering equipment for a tractor manufacturing plant to be erected near Leningrad. A Cleveland maker of automatic screw machines has sold six machines for delivery to a Japanese arsenal.

New York

NEW YORK, Sept. 10.—A leading Eastern seller of machine tools did the largest business in August of any month this year. While this record was exceptional, other machine tool sellers also did a large volume, and the month as a whole in this district compared favorably with the best previous peak months. Orders so far this month, although affected slightly by the Labor Day holidays last week, are coming in steadily, and the amount of buying in prospect indicates that September totals will be high. The Western Electric Co. is one of the principal buyers. Orders are being placed by the Amtorg Trading Corporation, 165 Broadway, New York, for a new tractor manufacturing plant in Soviet Russia.

Board of Education, Flatbush Avenue Extension and Concord Street, Brooklyn, and Park Avenue and Fifty-ninth Street, New York, will soon take bids for an eight-story technical high school for boys at Fort Greene Place and DeKalb Avenue, Brooklyn, to cost about $5,500,000. W. C. Martin, address first noted, is architect.

Westinghouse Lamp Works, Inc., Bloomfield, N. J., subsidiary of Westinghouse Electric & Mfg. Co., 150 Broadway, New York, has work under way on five-story addition, 80 x 200 ft., with L-extension, 60 x 175 ft., to be equipped as a wire products plant, to cost about $700,000 with equipment.

New York & Queens Electric Co., 40 Lawrence Street, Flushing, L. I., has awarded general contract to Stamarith Construction Corporation, 444 Jackson Avenue, Long Island City, for one-story automobile service, repair and garage building at Elmhurst, L. I., for company motor trucks and cars, to cost about $100,000 with equipment.

Anaconda Wire & Cable Co., operated by Anaconda Copper Mining Co., 25 Broadway, New York, has acquired Marion Insulated Wire & Rubber Co., Marion, Ind., and will consolidate with organization. Marion plant will be developed for increased capacity as Middle West unit.

Board of Public Works, Mount Vernon, N. Y., has filed plans for a municipal automobile service, repair and garage building, to cost $105,000 with equipment.

Port of New York Authority, 75 West Street, New York, has plans for fourteen-story central freight terminal, 200 x 800 ft., in West Side district, for which site is being acquired, to include elevating, conveying and other mechanical-handling equipment, entire project to cost $9,000,000.

Eagle Bronze Works, Inc., North Bleecker Street, Mount Vernon, N. Y., has work under way on expansion at three-story plant, to cost about $60,000. George M. Bartlett, 103 Park Avenue, New York, is architect.

C. B. Meyers, 31 Union Square, New York, architect, will take bids on general contract for one-story automobile service, repair and garage building, to cost $170,000 with equipment.

Truscon Steel Co., 31 Union Square, New York, with main plant at Youngstown, has work under way on a factory branch, storage and distributing plant at Harrison, N. J., where 3-acre tract recently was acquired, to cost $100,000 with equipment. Charles D. Loveland, formerly manager of company at Pittsburgh, will be district manager of northern New Jersey, with headquarters at Newark.

Schnell Penselpen Corporation, 11 Franklin Street, New York, manufacturer of combination metal pencils and pens, has begun construction of first unit of new plant, 75 x 125 ft., at Arlington, N. J., to cost about $50,000. Present factory will be removed to new location and capacity increased.

Officials of Schultz Machine Co., Inc., Hoboken, N. J., have organized Radio Products Corporation, with capital of 200,000 shares of stock, no par value, to take over and expand Vacuum Tube Products, Inc., 219 Bloomfield Street, Hoboken, heretofore operated as an interest of Schultz company. New organization will also take over and occupy a three-story plant at 548-52 South Eleventh Street, Newark, N. J., equipped for production of radio tube parts, high-testing vacuum gages and other precision apparatus. Company has arranged for sale of block of common stock to total $1,825,000, to be used in part for expansion. Frank Schultz is president; D. R. Donovan is vice-president.

Transit Mixed Concrete Co., Hanover Avenue, Morris Plains, N. J., has plans for a central proportioning and distributing plant for concrete production, to operate under automatic mechanical system for loading motor trucks, etc., these to be equipped to mix material while en route to point of delivery. Initial plant will cost more than $50,000 with equipment.

Following completion of one-story addition now under way, to total about 13,725 sq. ft. of floor space, Otis Elevator Co., Harrison, N. J., plans removal of plant of Graham & Norton Co., 126 Eleventh Avenue, New York, manufacturer of elevator door devices and accessories, to this location, with installation of additional equipment. Graham & Norton organization was recently acquired and is now operated as a division of Otis company, which is developing Harrison works as self-contained unit for production of complete elevator cars and accessories. C. C. Campbell is manager of plant. Headquarters are at Eleventh Avenue and Twenty-sixth Street, New York.

Alfred Hofmann, Inc., 635 Fifteenth Street, West New York, N. J., manufac-

turer of knitting machinery for hosiery mills, electric lamp machinery, etc., has awarded general contract to Auf Der Heide Contracting Co., 443 Sixteenth Street, West New York, for two-story addition, 100 x 125 ft., to cost about $75,000 with equipment. Lockwood Greene Engineers, Inc., 1 Pershing Square, New York, is architect and engineer.

Philadelphia

PHILADELPHIA, Sept. 9.—Contract has been let by Schuch Machine Co., 235 New Street, Philadelphia, to Adolph Korn, 1420 Walnut Street, for two-story plant unit, 50 x 150 ft., to cost about $45,000 with equipment. Charles E. Oelschlager, 1615 Walnut Street, is architect. C. F. Schuch is head.

Woodward-Wanger Co., 1106 Spring Garden Street, Philadelphia, plumbing equipment and supplies, has filed plans for addition for storage and distributing service, with pipe department, etc., to cost $45,000 with equipment. It will replace structure destroyed by fire a few months ago. F. B. Davis & Son, Inc., 240 North Sixteenth Street, is general contractor.

Gulf Refining Co., Sydenham and Locust Streets, Philadelphia, with main offices at Pittsburgh, has awarded general contract to Cramp & Co., Denkla Building, for group of buildings at Girard Point, comprising four-story unit, 48 x 112 ft.; one-story, 40 x 83 ft., 39 x 42 ft., and 32 x 63 ft., entire project to cost more than $100,000 with equipment. Edward B. Lee, Chamber of Commerce Building, Pittsburgh, is architect.

Ballinger Co., 105 South Twelfth Street, Philadelphia, architect and engineer, has plans for three-story baking plant to include traveling ovens, power equipment, conveying machinery and other equipment, entire project to cost about $500,000.

National Umbrella Frame Co., Belfield Avenue, Philadelphia, has awarded contract to George H. Whitner, 403 East Penn Street, for second story addition and improvements in existing building.

Farman Aircraft Corporation, Philadelphia, care of N. S. Ludington, 123 South Broad Street, has awarded contract to Airport Development & Construction Co., Mitten Building, for three-story plant at Camden, N. J., for parts and assembling service, to cost more than $100,000 with equipment.

William M. Stanton, Land Title Building, Philadelphia, architect, has plans for five-story automobile service, repair and garage building at Atlantic City, N. J., to cost about $200,000 with equipment.

Abraham Shapiro, Hotel Jermyn, Scranton, Pa., and associates have organized United States Textile Machine Co., with capital of $25,000, and plan operation of local plant to manufacture machinery for silk and cotton mills. R. C. Shepherd and A. W. Thomas, both of Scranton, are interested in new company.

Board of Education, Mechanicsburg, Pa., plans installation of manual training equipment in addition to high school, to cost $180,000, for which bids have been asked on general contract. C. J. Lappley, Front and Harris Streets, Harrisburg, Pa., is architect.

Individual Drinking Cup Co., Easton, Pa., manufacturer of pressed paper drinking cups, etc., has awarded general contract to R. T. & C. D. Stewart, Easton, for three-story addition, 80 x 100 ft., to cost about $100,000 with equipment. Ballinger Co., Philadelphia, is architect and engineer.

Capital Landing Field Co., Harrisburg, Pa., recently organized by Frank A. Robbins, Jr., Daniel N. Casey and other officials of Harrisburg Chamber of Commerce, has plans by Austin Co., Cleveland, for airport on Harrisburg-York Highway, about 5 miles from city, to include hangar, 100 x 120 ft., machine and repair shops, oil storage and other units, to cost more than $100,000 with equipment.

New England

BOSTON, Sept. 9.— Buying by a Connecticut manufacturer of aircraft since Sept. 3 has enlivened an otherwise quiet machine tool market. Purchases included $50,000 worth of equipment from one local dealer and about $30,000 worth from other Boston firms, for delivery during the first quarter of 1930.

Considerable used equipment was sold the past week. Sales unquestionably would be larger if dealers had equipment wanted. Good used tools, in some instances, bring higher prices than during the war.

Small tool makers are booked ahead for the remainder of 1929, and well into the first quarter of 1930 on certain types of tools.

Hawie Mfg. Co., 729 Washington Avenue, Bridgeport, Conn., is building a two-story addition, 50 x 89 ft., and making plant alterations. Motors and other equipment will be needed.

Heil Co., Milwaukee, manufacturer of automobile bodies, has closed bids on a group of plant units to be erected at Cambridge, Mass., including a warehouse calling for a three-ton overhead traveling crane.

West Springfield, Mass., contemplates a one-story pumping station, 30 x 46 ft., for its Bear Hole reservoir, to cost $10,000 without equipment.

Lee Electric Co., Lee, Mass., has purchased Thistle Wire Works Co. local property, and plans mechanical improvements.

L. G. Balfour Co., County Street., Attleboro, Mass., has plans for a three-story, 40 x 350 ft. and one-story, 40 x 60 ft. jewelry manufacturing plant and a power plant, to cost $200,000 with equipment.

M. J. Whittall Associates, Worcester, Mass., have awarded contract to Morton C. Tuttle Co., Boston, for power house, 80 x 110 ft., to contain four boilers. Estimated cost is $200,000. Francis J. Sill, Westboro, Mass., is consulting engineer.

Virginius J. Mayo, New Haven, Conn., formerly president of Mayo Radiator Co., with local plant for manufacture of automobile radiators, is at head of project to erect a plant to manufacture metal airplanes and seaplanes, including parts and assembling departments, under a special metal process perfected by Mr. Mayo. Plant is reported to cost more than $75,000.

Providence Insulated Wire Co., 65 Wadsworth Street, Providence, has awarded general contract to Henry M. Soule, 110 Brook Street, Pawtucket, R. I., for two-story addition, 40 x 72 ft., to cost about $25,000 with equipment.

Curtis Flying Service, Inc., Boston, has filed plans for hangar with repair and reconditioning shop facilities at 9 Airport Road North, to cost about $65,000 with equipment. Headquarters are at 27-29 West Fifty-seventh Street, New York.

Almac Yacht Corporation, Mystic, Conn., is planning one-story shop, 50 x 150 ft., at Pistol Point, to cost about $35,000 with equipment.

Simplex Wire & Cable Co., 201 Devonshire Street, Boston, has awarded general contract to Chase & Gilbert, Park Square Building, for extensions in plant at Cambridge, to cost about $50,000.

Noma Electric Corporation, 340 Hudson Street, New York, manufacturer of radio tubes and equipment, has purchased plant of Everett Mills, Inc., Lawrence, Mass., totaling 1,500,000 sq. ft. floor space. Purchasing company will take possession soon and will concentrate production here, including manufacturing of its subsidiary, Pilot Radio & Tube Co., removing plants now at New York, Brooklyn, Poughkeepsie and Buffalo; Newark, N. J.; and Detroit, to new location. Joseph Block is president of Noma company.

Pease & Curran, 104 Point Street, Providence, operating a fine metals refining plant, have awarded a general contract to Charles B. Maguire Co., 507 Grosvenor Street, for one-story addition, 55 x 100 ft., to cost about $35,000 with equipment. Francis Chiaverini, 32 Broadway, is architect.

South Atlantic

BALTIMORE, Sept. 9.—Bids will soon be asked by Public Improvement Commission, City Hall, Baltimore, for addition to polytechnic high school, to cost about $1,000,000 with equipment. Charles M. Anderson, 9 East Pleasant Street, is architect; Henry Adams, Calvert Building, is mechanical engineer.

Firestone Tire & Rubber Co., Akron, Ohio, has plans for a three-story factory branch, storage and distributing plant, 85 x 230 ft., at Baltimore, to cost about $200,000 with equipment.

Simpson & Morgan Ice & Coal Co., Rockmart, Ga., is planning one-story, electrically-operated ice-manufacturing plant, to cost about $50,000 with equipment.

Sonoco Products Co., Hartsville, S. C., manufacturer of cones and other paper products, has awarded general contract to A. K. Adams Co., 542 Plum Street, N. W., for three-story and basement addition, to cost about $75,000 with equipment.

American Manganese Fertilizer Corporation, care of Albert S. Dulin, 1422 F Street, N. W., Washington, recently formed by Mr. Dulin and associates with capital of $500,000, is said to have plans for new plant near Alexander, Va., to cost more than $150,000 with equipment.

Georgia Power Co., Atlanta, Ga., has preliminary work in progress on new steam-operated electric power plant on Chattahoochee River, about 15 miles from city. Station will be equipped for initial output of 100,000 hp., and will cost more than $2,000,000 with transmission lines. Later, three additional units will be provided, making total rating of 400,000 hp. for project.

Officials of Certain-Teed Products Corporation, 100 East Forty-second Street, New York, manufacturer of roofing, paperboard products, etc., are organizing Southern Building Products Corporation, Savannah, Ga., represented by Remer L. Denmark, Savannah Fire Insurance Building, to construct local plant for manufacture of roofing products and other building specialties. Parent company recently acquired local site. Project will cost more than $80,000.

County Aviation Committee, County Supervisors, Wilmington, N. C., has plans for new buildings at Bluementhal air-

port, including hangars, repair and reconditioning shops, oil storage and other units, to cost more than $70,000 with equipment. Louis L. Merritt is designer, in charge of project.

Home Service Co., 3 Page Avenue, Asheville, N. C., D. D. Smith, president, is considering installation of steam power plant for central heating service in business district, to cost more than $500,000 including distributing system.

Detroit

DETROIT, Sept. 9.—Bids will soon be asked by Hayes Body Corporation, Seventh Street, N. W., Grand Rapids, Mich., manufacturer of automobile bodies, for a three-story addition to cost over $70,000 with equipment. A. A. Anderson is secretary and treasurer.

Hancock Iron Works, Inc., Pontiac, Mich., has asked bids on general contract for a one-story plant unit, to cost about $40,000 with equipment. Robert O. Derrick, Inc., Union Trust Building, Detroit, is architect.

Detroit Aircraft Corporation, Detroit, has taken title to 30-acre tract at Long Beach, Cal., for a new plant for parts production and assembling, to cost over $100,000 with equipment.

Wayne County Board of Supervisors, Barium Tower Building, Cadillac Square, Detroit, is planning construction of power house at County airport, to cost over $85,000 with equipment. Giffels & Vallet, Marquette Building, are engineers.

Venton Steel Sash Co., Sixth Street, Muskegon, Mich., is contemplating a one-story addition, 50 x 130 ft., to cost about $65,000 with equipment.

Clark Equipment Co., Dewey Street, Buchanan, Mich., manufacturer of automotive parts and equipment, has secured additional interest in Frost Gear & Forge Co., Jackson, Mich., with holdings totaling 90 per cent of outstanding stock, and expects to secure complete ownership for a wholly controlled subsidiary. Expansion is planned, including one-story addition at Buchanan to cost over $50,000, for which plans will be drawn by F. L. Shoemaker, Masonic Block, Sturgis, Mich., architect.

Central Machine Co., 6320 East Fort Street, Detroit, has awarded general contract to Stibbard Construction Co., 3000 Grand River Boulevard, for two-story addition to machine shop, 60 x 100 ft., to cost about $45,000 with equipment.

Paper Makers' Chemical Corporation, Kalamazoo, Mich., manufacturer of industrial chemicals, has selected 7-acre tract in Guilds Lake district, Portland, Ore., as site for new branch plant, to cost about $275,000 with equipment. Plans will be drawn at once.

Midland Steel Products Co., 6660 Mount Elliott Avenue, Detroit, has awarded general contract to Wisconsin Bridge & Iron Co., Penobscot Building, for one-story addition for storage and distribution, to cost $60,000. Company is planning to develop large increase in output of four-wheel brakes for automobiles at local plant. Main offices are at Cleveland.

Monroe Auto Equipment Co., Monroe, Mich., has perfected a two-way hydraulic shock absorber for automobile service, and is planning plant expansion to develop large output of new specialty. Production of one-way shock absorber will continue as heretofore, on basis of about 50,000 sets per month.

The Crane Market

SALES of overhead traveling cranes have not been large in the past week, but there is a substantial volume of inquiry. In the New York district a single order for overhead cranes placed last week totaled about $100,000. The United Dry Docks, Inc., Port Richmond, S. I., New York, is inquiring for a number of overhead cranes. The Wood Newspaper Machine Corporation, Plainfield, N. J., has closed on several small cranes. The New York Central Railroad is reported to have closed on a used locomotive crane with a dealer and is still in the market for two 25-ton locomotive cranes and a 20-ton, 40-ft. span stationary gantry crane.

Among recent purchases are:

Buda Co., Harvey, Ill., 7½-ton, 60-ft. span electric traveling crane from unnamed builder.

Pittsburgh

PITTSBURGH, Sept. 9.—Machine tool buying so far this month has not been in large volume and local dealers expect a rather quiet month pending the machine tool show the first week in October. Considerable interest in the proposed exhibits is being manifested in this district and important buying is expected. Several small orders have recently been placed, but no new lists of consequence have come out the past few days. A considerable number of tools is still pending.

The Westinghouse Electric & Mfg. Co. has practically completed purchases against its third quarter requirements. The United States Aluminum Co., New Kensington, Pa., has not yet placed any tools for its new machine shop, but is understood to have come to decisions on the majority of equipment, with awards expected to be made soon.

Contract has been let by Standard Steel Specialty Co., Beaver Falls, Pa., manufacturer of machine keys and kindred products, to Penn Bridge Co., College Hill, Pa., for one-story addition, 60 x 120 ft., to West Mayfield plant, to cost $75,000 with equipment.

United Aircraft & Transport Corporation, operating Standard Steel Propeller Corporation, 221 West Seventh Avenue, Pittsburgh, and other organizations, has acquired plant and business of Hamilton Aero Mfg. Co., Keefe Avenue, Milwaukee, manufacturer of steel propellers and other aircraft equipment, and will operate as a division of Standard company.

E. J. Henggi, 138 View Street, Oakmont, Pa., and associates have organized Henggi Rail Appliance Co., to establish plant for manufacture of railroad equipment and appliances. D. S. Thomas, 117 Lexington Street, Aspinwall, Pa., will be an official of new company.

Champion Switch Co., Kenova, W. Va., manufacturer of electric switches and equipment, has plans for one-story addition, to cost about $30,000 with equipment.

Airways & Aircraft Co., Farmers' Bank Building, Pittsburgh, has plans for airport development at Dravosburg, Pa., including hangars and other mechanical field units, to cost more than $85,000 with equipment. Kenneth Franzheim, 345 Madison Avenue, New York, is architect; Stone & Webster Engineering Co., Union Trust Building, Pittsburgh, is engineer.

Board of Education, Donora, Pa., is contemplating installation of manual training equipment in two-story high school to cost about $275,000, for which bids have been asked on general contract. C. C. Compton, Thompson Avenue and Fourth Street, is architect.

Cleveland

CLEVELAND, Sept. 9.—Local machine tool dealers report light sales the past week and a falling off in inquiry. Some prospective business is being held back until after the National Machine Tool Builders' Exposition in Cleveland. Business with builders of turret lathes and automatic machines is holding close to recent volume. A local manufacturer of automatic screw machines is now promising next spring delivery on some sizes. This company took an order the past week for six machines for the Japanese arsenal.

Export demand continues good for turret lathes. The Amtorg Trading Corporation is understood to have placed an order for about 50 lathes with two American machine tool manufacturers and is about to purchase a like number of automatic screw machines for an automobile plant to be built by the Soviet Government at Nishni Novgorod, Russia. This business has been pending for some time. Another Russian automotive project requiring a large amount of machinery will be a truck manufacturing plant to be built at Leningrad. It is stated that this project is being handled by the Brandt Co., engineer, Detroit.

Globe Steel Barrel Co., Cleveland, which recently acquired former Cleveland Railway power house on Washington Avenue, N. W., will remodel building and add considerable equipment to manufacture steel drums, barrels and other containers.

Toledo Steel Products Co., Toledo, Ohio, manufacturer of automobile valves, has purchased a controlling interest in Fostoria Screw Co., Fostoria, Ohio, manufacturer of bolts and bushings. It is stated that both plants will be operated as separate units but sales organizations will be combined.

Elyria Mfg. Corporation, Elyria, Ohio, maker of screw machine products, has enlarged its plant by a one-story addition, 50 x 120 ft.

Lindsay Wire Weaving Co., 14025 Aspinwall Avenue, Cleveland, has awarded general contract to J. E. Christian Co., 1307 St. Clair Avenue, for two-story addition, 50 x 120 ft., to cost about $65,000 with equipment. Bohnard & Parson, Euclid Building, are architects.

Eaton Axle & Spring Co., East Sixty-fifth Street, Cleveland, has awarded general contract to H. K. Building Co., 1319 West 103rd. Street, for one-story assembling unit, to cost over $70,000 with equipment. George S. Rider Co., Century Building, is architect and engineer.

Briggs Mfg. Co., 12825 Taft Avenue, Cleveland, manufacturer of automobile bodies, has leased adjoining property, 200 x 400 ft., formerly used by Walker Motor Co., for expansion. Headquarters are at 11631 Mack Avenue, Detroit.

John Harsch Bronze & Foundry Co., 11612 Madison Avenue, Cleveland, is contemplating a one-story plant unit on

West 121st Street, to cost about $65,000 with equipment.

B. F. Goodrich Co., Akron, Ohio, manufacturer of automobile tires, tubes, mechanical rubber goods, etc., has purchased plant and business of Hood Rubber Co., Watertown, Mass., and will consolidate. Hood company will maintain present name and will be operated as division of purchasing company.

Cream Cone Machine Co., 1874 East Fifty-ninth Street, Cleveland, has awarded general contract to Leslie Lapp, 2020 Brunswick Road, East Cleveland, for three-story addition, 60 x 65 ft., to cost about $60,000 with equipment. Jack Mohler is company architect.

Chicago

CHICAGO, Sept. 9.—Sales of machine tools easily measure up to the average week in August and fresh inquiry is more active than for some time. Gaged by requests for preliminary figures for budget preparation, the Santa Fe has in mind a large list for spring purchase. Among other railroads which are well along with future plans are the Northern Pacific and the Union Pacific. The Burlington has ordered two axle turning lathes, the Chicago, North Shore & Milwaukee has purchased several machine tools and the Chicago Rapid Transit has placed a boring mill.

Farmall division of the International Harvester Co. has closed that part of its list which called for special machinery and items on which deliveries were farthest extended. There still are a number of standard tools to be ordered. Continental Motors Corporation's list, which includes much special turning equipment and drills, is active. A local automobile parts maker has ordered two large special machines for turning rear axle housings. This order may be duplicated at an early date. Supplies of used tools are large.

Peoria Malleable Casting Co., Peoria, Ill., plans expenditure of $30,000 for an addition in which it will make malleable chain.

Kansas City Steel Foundry Corporation, Kansas City, Mo., will start operations in former plant of Kansas City Malleable Castings Corporation. Officers of company are John C. Smith, president; M. S. Murray, vice-president and treasurer, and E. Byron Gray, secretary.

Victor Products Corporation, 2633 Belmont Avenue, Chicago, will build a two-story addition, 50 x 125 ft. Cobb & Eisenberg, 123 West Madison Street, are architects.

Triner Scale & Mfg. Co., corner of Twenty-third Street and Fairfield Avenue, Chicago, has under construction a four-story and basement factory which will cost $250,000.

Variety Fire Door Co., Sacramento Avenue and Carroll Street, Chicago, has purchased former plant of Elgin Motor Co., Argo, Ill. Production will be underway in about thirty days in new plant.

H. Severin Mfg. Co., makers of special tools and dies, 4607 Ravenswood Avenue, Chicago, has purchased one-story factory of Holmes Electric Co., at 5116 Ravenswood Avenue, Chicago.

Solar-Sturges Mfg. Co., Bellwood, Ill., manufacturer of metal cans and containers, has awarded a general contract to Austin Co., Chicago, for one-story addition to plant at Melrose Park, Ill., to cost about $35,000 with equipment.

Chicago Air Service, Inc., operating Sky Harbor flying field, Glencoe district, Chicago, has leased six-story building at Eighteenth Street and South Michigan Avenue, for aircraft manufacturing plant and aviation school.

North Shore Foundry Co., North Chicago, Ill., care of John Rause, Jr., 442 North Butrick Street, Waukegan, Ill., recently formed by Mr. Rause and associates, is planning one-story foundry to cost close to $50,000, of which about $30,000 will be expended for equipment.

Standard Parts Corporation, 1020 La Salle Avenue, Minneapolis, Minn., has awarded general contract to James Leck Co., 211 South Eleventh Street, for one-story plant to manufacture automobile parts, to cost about $30,000 with equipment. Vanderbilt & Dege, 1645 Hennepin Avenue, are architects.

Iowa Railway & Light Co., Dows Building, Cedar Rapids, Iowa, has plans for a hydroelectric power house, near Rochester, Iowa, to cost about $125,000. Extensions will be made in transmission lines. Fargo Engineering Co., 226 West Main Street, Jackson, Mich., is engineer.

Ogden Phonograph Co., 3425 Ogden Avenue, Chicago, manufacturer of talking machines and parts, has plans for new one-story plant to cost about $50,000 with equipment. Joseph Cohen & Co., 160 North La Salle Street, are architects.

Otter Tail Power Co., Fergus Falls, Minn., plans extensions and improvements in steam-operated electric power plant at Langdon, N. D., including installation of additional equipment, to cost more than $70,000, including transmission line extensions.

Cincinnati

CINCINNATI, Sept. 9.—As a result of the Labor Day holiday, fresh bookings of district manufacturers of machine tools, the past week, were slightly below the level of the preceding week. Buyers show reluctance to close for new tools until after they have seen new models to be shown at the Cleveland exposition. Inquiry, however, is in good volume and indicates a steady flow of orders for one or two machines for some time.

Contract has been let by Inland Mfg. Co., Coleman Avenue, Dayton, Ohio, manufacturer of automobile equipment and accessories, to Hillsmith Co., Dayton, for one-story addition to cost about $500,000 with equipment.

Randall Co., West Court Street, Cincinnati, manufacturer of leather-working machinery, parts, etc., has disposed of a stock issue to total $780,000, part of proceeds to be used for expansion. Company is considering removing plant to another site where increase in output will be arranged.

Liberty Range Works, Inc., Nashville, Tenn., manufacturer of stoves, ranges, etc., will erect a new plant, consisting of one-story units to total 50 x 640 ft., to cost more than $230,000 with equipment.

Hauser-Stander Tank Co., Spring Grove and Ammenn Avenues, Cincinnati, is contemplating erection of new plant, to cost about $100,000 with equipment.

Gartland, Hoswell & Rentschler Foundry Co., East Herman Avenues, Dayton, Ohio, has awarded general contract to H. R. Bragg Co., Third Street, for extensions and improvements, including new cupola, to cost about $23,000.

Stumb Motor Co., 1408 Broad Street, Nashville, Tenn., has awarded general contract to Foster & Creighton, Fourth and First Bank Building, for three-story service, repair and garage building, 102 x 170 ft., to cost about $100,000 with equipment. Warfield & Keeble, Nashville Trust Building, are architects.

Edward Koehl, Sr., Reading, Ohio, will build one-story machine shop, to cost about $22,000 with equipment.

Hartzell Industries, Inc., Piqua, Ohio, manufacturer of propellers and kindred products, has awarded general contract to V. A. Pence, Piqua, for two one-story additions, 45 x 145 ft., and 30 x 250 ft., to cost about $70,000. First-noted will be used for manufacturing, and other for storage and distributing service.

Remley Boiler & Machine Works, 263 East Short Street, Lexington, Ky., has been organized and is operating plant making small boilers and doing a general machine jobbing business.

Deveny Tool Co., Dayton, Ohio, manufacturer of tools, dies, etc., recently organized, is operating in Norwood Power Building.

Milwaukee

MILWAUKEE, Sept. 9.—Pending business and inquiries indicate a volume of business this month as large as that in early summer. Improvement in deliveries has been slight, and sales of used equipment have greatly increased to fill gaps left by delayed shipments.

Jobbing shops and tool and die makers are as busy as at any time this year. Automobile manufacture has fallen off but truck manufacture is more than fair for the season, and makers of automotive parts have not felt any decline. Demand is opening strong for agricultural implements and power production and transmission machinery.

Milwaukee Electric Railway & Light Co., Milwaukee, will soon start construction of $4,200,000 addition to Lakeside steam generating plant at Cudahy. Boiler house unit costing $1,500,000 is nearing completion, and will be six stories.

E. P. Olsen Machine & Tool Works, 1437 Main Street, Marinette, Wis., will add equipment to manufacture an electric heater for warming automobile crank cases in cold garages, invented by J. L. LaVoy, Marinette.

Milwaukee Reliance Boiler Works, 1102 Thirty-second Street, Milwaukee, will remodel a building, 35 x 95 ft., for an addition. Selzer-Ornst Co., 192 Fourth Street, Milwaukee, are contractors.

Appleton Steel Tube Co., Appleton, Wis., contemplates purchase of additional heating and piercing equipment following an increase of capital stock from $100,000 to $250,000.

Moto-Meter Garage & Equipment Co., Long Island City, N. Y., is beginning construction of several additional buildings for recently acquired plant of National Gauge & Equipment Co., LaCrosse, and will remodel existing structure.

Northwestern Motor Co., Starr Avenue, Eau Claire, Wis., has let contract for one-story foundry addition, 42 x 125 ft., to Olson & Walker Co., Eau Claire.

Conrad Monroe Gear Co., 5125 Thirty-second Street, Milwaukee, has let contract to Charles F. Monroe Construction Co., local, for machine shop to cost about $20,000 with equipment.

Board of Vocational Education, Manitowoc, Wis., has let general contracts to Kasper Construction Co., Manitowoc, for two-story addition, 46 x 84 ft., to Washington Vocational School, to cost about $117,000 without equipment. R. F. Theke is secretary of board and William J. Raeuber, Manitowoc, is in charge.

E. Brielmaier & Sons Co., 425 East Water Street, Milwaukee, architect, has plans for four-story factory, 40 x 150 ft. Owner's name is withheld.

Wisconsin Axle Co., Oshkosh, Wis., is starting erection of an addition to its machine shop department which will enlarge its floor space about 25 per cent. Building will be used to house additional machine equipment and to increase assembly facilities.

Buffalo

BUFFALO, Sept. 9.—Contract has been let by Gaylord Brothers, 155 Gifford Street, Syracuse, N. Y., manufacturers of library equipment and supplies, magazine binders, etc., to Fellows & McGrath, 207 Fellows Avenue, for one-story addition to cost about $35,000 with equipment.

Trico Products Corporation, 817 Washington Street, Buffalo, manufacturer of windshield wipers and other automobile accessories, has plans for one-story branch plant, totaling about 20,000 sq. ft. floor space at Bridgeburg, Ont., to cost about $55,000 with equipment. It is understood that company will remove present assembling plant on Courtwright Street, Bridgeburg, to new location.

Empire Air Transport Co., Loew Building, Syracuse, N. Y., has awarded general contract to O'Brien Construction Co., 104 Madison Street, for aircraft school, with shop for mechanical work, two-stories, at Syracuse municipal airport at Amboy, to cost $60,000 with equipment. Gorland Latta is one of heads of company in charge.

Joseph G. Dickerson, 169 Vestal Avenue, Binghamton, N. Y., and associates have organized Kolb, Dickerson & Smith and plan early operation of local factory to manufacture and repair electrical machinery. Philip W. Smith, 6 Westerly Way, will be an official of new company.

Bresee Chevrolet Co., 300 West Willow Street, Syracuse, N. Y., representative for Chevrolet automobile, has plans drawn for two-story service, repair and garage building, to cost about $180,000 with equipment. M. J. DeAngelis, 49 East Avenue, Rochester, N. Y., is architect.

St. Louis

ST. LOUIS, Sept. 9.—Kansas City Car Co., Tenth and Cherry Streets, North Kansas City, Mo., has acquired local plant of Deckard Steel & Iron Co., for expansion for tank car repair works. Two or more one-story buildings will be erected and additional equipment installed, to cost more than $100,000. Company is a subsidiary of American Steel Car Co., Chicago. M. R. Groenwald is general manager.

Multiplex Faucet Co., 4325 Duncan Avenue, St. Louis, has awarded general contract to Wendel Shasserre, 5973 Wells Avenue, for one-story top addition to plant, 80 x 80 ft., to cost about $30,000 with equipment. William P. McMahon, Buder Building, is architect. J. J. Fitzgibbon is treasurer.

City Council, Columbia, Mo., has awarded general contract to Simon Construction Co., Guitar Building, for addition to municipal electric light and power plant, including improvements in present unit, to cost $70,000 with equipment. Burns & McDonnell Engineering Co., Interstate Building, Kansas City, Mo., is engineer.

Missouri Boiler & Sheet Iron Works, Inc., 908 South Twenty-third Street, St. Louis, has acquired property in immediate vicinity improved with one-story building, and will remodel for expansion.

Mitchell & Mitchell Mfg. Co., Fort Smith, Ark., manufacturer of metal hospital bedsteads, springs, metal stampings, etc., will rebuild part of plant recently destroyed by fire.

National Pigment & Chemical Co., 1 Sidney Street, St. Louis, has awarded general contract to Fruin-Colnon Contracting Co., Merchants-Laclede Building, for rebuilding mechanical dryer plant, one-story, 40 x 160 ft., at Cadet, Mo., recently destroyed by fire, to cost about $45,000.

American Smelting & Refining Co., Omaha, Neb., J. A. Betterton, president, has awarded general contract to Busk Construction Co., Sunderland Building, for two-story and basement storage and distributing plant, 40 x 115 ft., to cost about $50,000 with mechanical handling and other equipment. John and Allan McDonald, Standard Oil Building, are architects.

Home Fertilizer Co., Texarkana, Ark., manufacturer of commercial fertilizers, will merge with Farmers' Fertilizer Co., Conway, Ark., under first noted name. Plans are under way for plant near Conway, one-story, to cost about $65,000 with equipment. Company is also planning establishment of at least five additional such plants in different parts of State.

Gulf States

BIRMINGHAM, Sept. 9.—Peden Iron & Steel Co., Houston, Tex., has acquired assets of E. L. Wilson Hardware Co., Beaumont, Tex., with exception of real estate, and will consolidate. Mill supply and hardware business of Wilson company will be continued by new owner, and storage and distributing plants will be maintained at Houston and Beaumont. E. G. Edson, formerly president and general manager of Wilson company, and Virgil Keith, formerly vice-president, will become identified with Peden company, of which E. A. Peden is president, and D. D. Peden, vice-president and treasurer.

Continental Gin Co., Fourth Avenue South and Forty-sixth Street, Birmingham, manufacturer of cotton-ginning machinery and parts, has asked bids for a three-story addition for storage and distribution, to cost about $100,000 with equipment.

J. W. Ross, Jacksonville, Fla., operating eight ice-manufacturing and refrigerating plants in different parts of State, is planning erection of new electrically operated plant at Lake Wales, Fla., to cost about $175,000 with machinery.

Common Council, Farmersville, Tex., has approved plans for a municipal electric light and power plant, to cost about $40,000 with equipment.

Hardicke-Etter Co., Sherman, Tex., manufacturer of cotton-ginning machinery, mill supplies, etc., has plans for a one-story addition, to cost more than $30,000 with equipment.

City Council, Lafayette, La., Wilson J. Peck, trustee of public property, will receive bids until Sept. 20 for waterworks equipment, including deep-well with pump, wash water pump, pipe line extensions, 1,500,000-gal. filter plant and other equipment. J. B. McCrary Engineering Co., Atlanta, Ga., is engineer.

City Council, Abilene, Tex., has plans for municipal airport, to include hangar, repair shops and other units, to cost $100,000 with equipment. B. Russell Shaw Co., Inc., 810 Olive Street, St. Louis, is engineer.

Atkinson & Co., Inc., 823 Perdido Street, New Orleans, has approved construction of cotton compress plant at Southport, to cost about $200,000 with presses and other equipment.

A. C. Blount, Pensacola, Fla., is at head of project to construct a paper mill in this vicinity. A fund of $40,000 is being raised to purchase 70-acre tract on Bayou Chico for plant, to cost more than $1,500,000 with equipment.

Tidal Refining Co., Houston, Tex., operated by Tide Water Oil Co., 11 Broadway, New York, has plans for new oil refinery on 700-acre tract at Ingleside, to cost more than $2,000,000 with machinery. Edward Ellsberg is chief engineer.

Agee Corporation, Dallas, Tex., C. D. Agee, president and general manager, operating Acme Screen Co., 915 South Peak Street, Dallas, and Agee Screen Co., Fort Worth, Tex., is planning establishment of several branch plants for similar production in different parts of State. Company has recently increased capital to $100,000.

Board of Education, Hamlin, Tex., is considering installation of manual training equipment in two-story high school to cost about $125,000, for which bids are being received on general contract. Voelcker & Dixon, Perkins-Snider Building, Wichita Falls, Tex., are architects.

Hydraulic Equipment Corporation, Houston, Tex., has been organized to manufacture hydraulic pumps, hydraulic brake devices and other hydraulic equipment. Company is considering having products made by outside factory on contract basis. M. A. Beurlot is secretary-treasurer.

Indiana

INDIANAPOLIS, Sept. 9.—Northwestern Terminals Co., 226 Water Street, Evansville, has plans for new coal-handling and distributing plant, to cost about $100,000 with equipment. Installation will include screens, belt-conveyors, hoppers, chutes, motors and mechanical unloaders. Vonnegut, Bohn & Mueller, Indiana Trust Building, Indianapolis, are architects.

Board of Education, Indianapolis, has authorized a bond issue of $800,000 for new Irvington High School, to include manual training department. Bids will soon be asked on general contract. Charles W. Kern is president of board.

Capehart Automatic Phonograph Co., East Pontiac Street, Fort Wayne, manufacturer of talking machines and parts, will soon take bids for one-story addition, to cost about $35,000 with equipment. Charles R. Weatherhogg, 250 West Wayne Street, is architect.

City Airport Commission, Terre Haute, headed by Robert Prox and Dr. F. H. Jett, is arranging bond issue of $125,000 for municipal airport at Dresser field, which is to be purchased for such purpose. Plans will soon be drawn for hangars, repair shops, oil storage and other field units.

Tokheim Oil Tank & Pump Co., 1602

Wabash Avenue, Fort Wayne, Ind., manufacturer of gasoline pumps and equipment, has awarded general contract to Rump-Kintz Co., Medical Arts Building, for one-story addition, to cost about $100,000 with equipment. Pohlmeyer & Pohlmeyer, Central Building, are architects.

Removal of Columbia Metal Products Co. from Chicago to La Porte, following its purchase by Great Western Mfg. Co. of latter city, is being completed.

Madison Machine Co., Madison, has recently been taken over by William E. Clark.

Plant of Davis Foundry Co., Newcastle, recently damaged by fire with loss of $60,000, will be rebuilt and new equipment installed.

Canada

TORONTO, Sept. 9.—Machine tool sales developed more strength the past week and the interest shown by buyers indicates more extensive purchases. Small lists are appearing for replacement needs from automotive and railroad companies. Single tool buying is active and builders and dealers report a steady flow of orders.

Dominion Wheel & Foundry Co., Toronto, has applied for a permit to build a $60,000 machine shop. Company is erecting a large foundry.

General Motors Corporation of Canada, Oshawa, Ont., has awarded general contract to W. J. Trick Co. for an addition to McKinnon Industries plant at St. Catharines, Ont., to cost $175,000. Building, on which construction started Sept. 5, will be 136 x 425 ft., and is expected to be completed within 60 days. Plant will be used exclusively for manufacture of Delco-Remy starting and lighting equipment.

Superior Alloys, Ltd., has leased a site from Algoma Steel Corporation, Sault Ste. Marie, Ont., for erection of a plant to cost $75,000.

Steel Co. of Canada, Ltd., 525 Dominion Street, Lachine, Que., is receiving bids, no closing date set, for erection of an addition.

Western Canada

Plans are under way for rebuilding sodium sulphate plant of Bishopric & Lent Co., Cincinnati, at Mossbank, Sask., recently destroyed by fire.

Work will be started early next spring on improvements to Fort Rouge yards of Canadian National Railways at Winnipeg, Man. Plans call for new shops, roundhouse and extension of yards, to cost between $3,000,000 and $4,000,000.

Barry Sheet Metals Works, 10171 Seventeenth Avenue, Calgary, Alberta, has let contract to J. J. Doyle for an addition.

Pacific Coast

SAN FRANCISCO, Sept. 5.—Bids will be asked at once by S. & W. Lawn Sprinkler Co., 2308 West Washington Street, Los Angeles, for one-story addition, to cost about $24,000 with equipment. Edward L. DiVall Co., 3406 West Washington Street, is architect.

Pickwick Corporation, Los Angeles, has work under way on a new plant in El Segundo district for manufacture of automobile buses, known as nitecoaches, used by its subsidiary, Nitecoach Co., including departments for parts production and assembling, to cost $150,000 with equipment.

Board of Education, Long Beach, Cal., has authorized purchase of 67 lots in Willow Park district as site for new senior and junior vocational high school, to cost more than $500,000 with equipment.

Universal Engineering Co., Los Angeles, manufacturer of mechanical specialties, has plans by Austin Co. for one-story addition to plant at 2369 East Fifty-first Street, to cost about $30,000 with equipment.

United States Metal Products Co., 330 Tenth Street, San Francisco, will erect a new one and two-story plant, 200 x 380 ft., to cost about $120,000 with equipment. Ellison & Russell, Pacific Building, are architects and engineers.

Port of Portland Commission, Spalding Building, Portland, will soon begin construction of two hangars at Swan Island airport, with machine and repair shop facilities, to cost more than $90,000 with equipment. Other field structures will also be erected. James H. Polhemus is manager.

Willapa Pulp & Paper Mills, Inc., Pacific Building, Portland, is contemplating construction of a new mill near present works at South Bend, Wash., to cost more than $1,000,000 with equipment.

Aircraft Plywood, Inc., First National Bank Building, Seattle, will soon break ground for new one-story plant, 60 x 560 ft., to manufacture aircraft specialties, for which general contract recently was let to Austin Co. A steam power plant also will be built. Entire project will cost about $125,000 with equipment.

Allison Steel Mfg. Co., Phoenix, Ariz., is planning erection of a one-story plant to cost over $125,000 with equipment.

Foreign

OFFICIALS of Bucyrus-Erie Co., South Milwaukee, Wis., manufacturer of excavating and other construction machinery, and Ruston & Hornsby, Ltd., Lincoln, England, manufacturer of oil engines and kindred equipment, have organized Ruston-Bucyrus, Ltd., to establish a plant in England for manufacture of excavating machinery, etc. It is understood that works will be ready for production by close of year.

Southwestern Power Co., a subsidiary of Mexican Light & Power Co., Gante Street, Mexico City, is completing construction of power dam on Lerma River, near Tepuxtepec, State of Michoacan, to impound 500,000,000 cu. meters of water for hydroelectric power service. Work will proceed on initial power station to develop a capacity of 60,000 hp. Later another unit will be installed to increase output to 90,000 hp. Project will include construction of transmission lines and is part of proposed hydroelectric power development of company, for which an appropriation of about 20,000,000 pesos (approximately $10,000,000) has been made. Headquarters of parent organization are at 357 Bay Street, Toronto, Ont.

Government of Mexico, Mexico City, has concluded arrangements with Mexican Aviation Commission for central airport for city, to include construction of metal hangar, 120 x 120 ft., repair and reconditioning shop, 20 x 120 ft., and other field units, to cost 400,000 pesos (about $200,000).

Goodyear Tire & Rubber Co., Akron, Ohio, is arranging for purchase of site in Argentina for plant to manufacture automobile tires, tubes and other rubber goods, initial unit to cost more than $400,000. P. W. Litchfield, president, has left for trip to South America to arrange for project.

New Trade Publications

Tools for Hardware and Marine Trades. Leetonia Tool Co., Leetonia, Ohio. Catalog No. 928 consists of 18 pages describing the company's tools manufactured for the hardware and marine trades. On the last page is a comprehensive index of products.

Centrifugal Pump. Duriron Co., Inc., Dayton, Ohio. Duriron centrifugal pump No. 614 is described in bulletin No. 153, which shows the assembly drawing and gives a list of parts. The last page is devoted to reproductions of three rating charts telling of the performance of the pumps.

Oil Circuit Breakers. Westinghouse Electric & Mfg. Co., East Pittsburgh. A new four-page booklet describes types F-24 and F-24-R oil circuit breakers for medium interrupting capacity usage. Different methods of mounting the breakers and their construction are outlined. Tables are provided covering the closing and tripping currents for solenoid and motor mechanism, interrupting capacities, shipping weights, mounting details and the various accessories and attachments.

Electric, Oil and Salt Baths. Despatch Oven Co., Minneapolis, Minn. A bulletin featuring a new line of electric, oil and salt baths.

Alloy Cast Iron.—International Nickel Co., New York: Bulletins No. 201-a and No. 207, which are both illustrated, are entitled "An Introduction to Nickel Cast Iron" and "Properties and Applications of Nickel and Nickel-Chromium Cast Iron," respectively. The first is a leaflet of four pages and the second, one of 12. The former discusses the metallurgy of the production of nickel cast iron and the second treats of the applications of this alloy product in the aeronautical, the automotive, the general machinery and the machine tool industries, as well as their use in power plants by railroads and general users.

Electric Furnaces.—Hevi Duty Electric Co., Milwaukee. Bulletin 629, of four pages, illustrated, is entitled "The Electric Furnace in St. Louis." It describes some installations in various plants in that city.

Alloy Steel.—Joseph T. Ryerson & Son, Inc., Chicago. A four-page illustrated bulletin, entitled "Nikrome," describes a heat-treated alloy steel of guaranteed physical properties. It is said to be especially suited for the more difficult and heavy-duty industrial uses, particularly by such companies as do not maintain a heat-treating department of their own because this product comes already heat-treated to guaranteed physical properties.

Steel Castings.—Sivyer Steel Casting Co., Milwaukee. Bulletin No. 11 of four pages, illustrated, describes "New Economics of Buying Castings." It discusses in particular a sand mill pinion made of Sivyer chrome-nickel steel, and an Ingersoll milling machine in which Sivyer alloy and special carbon steel castings are incorporated.

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THE IRON AGE

New York, September 19, 1929

ESTABLISHED 1855 VOL. 124, No.12

Variety No Bar to Mass Production

Flexibility of Operations Enables Waukesha Motor Co. to Make Many Types of Gas Engines at Prices Reflecting Quantity Output

"HENRY FORD is properly recognized as the world's greatest manufacturer. By making his overhead carry a tremendous volume of output, he has outdistanced all rivals in reducing unit costs," said Harry L. Horning, president and general manager of the Waukesha Motor Co., Waukesha, Wis., when interviewed by a representative of THE IRON AGE.

"Yet it is equally true that other manufacturers are performing certain operations more efficiently. This fact is not altered by a comparison of costs, since a much larger volume of repetitive work still throws the advantage in Ford's favor.

"The principle of making a given overhead carry a maximum amount of production, developed in such an impressive manner in the automobile field, is a standing challenge to all American manufacturers. It is not surprising that some industrial executives have succeeded in making up, in part, for restricted volume by developing more efficient methods of doing specific things.

"Every manufacturer now realizes the importance of volume to cost reduction and the equal importance, paradoxical as it may seem, of cost reduction as a prerequisite to greater volume. He is also well aware that the difficulties of obtaining an economical operation increase in direct proportion to the variety of products he makes. The greatest problem of the Waukesha Motor Co. is to achieve a flexibility that will permit it to serve many different classes of customers with numerous types of gas engines in small and large quantities—and at a price that reflects mass production.

"That we have succeeded in a measure is indicated by the fact that in our busiest season we are able to deliver within two days to six weeks after the receipt of an order for a specialized product. While we build 30 different models of engines and the specifications of our customers may call for numerous accessories and adaptations to meet their particular requirements, there is a sufficiently even flow of business in certain types of motors to permit the scheduling of 35 to 45 per cent of our production three to four months in advance. Around this nucleus the rest of our manufacturing program is built as actual orders are received.

"The nature of our business does not permit us to duplicate the automobile industry's straight-line flow of materials, with assembly of parts at fixed time intervals in step with continuous conveyors. Our scheme of assembling engines is designed to give us the best possible results considering the variety of models we make. Our

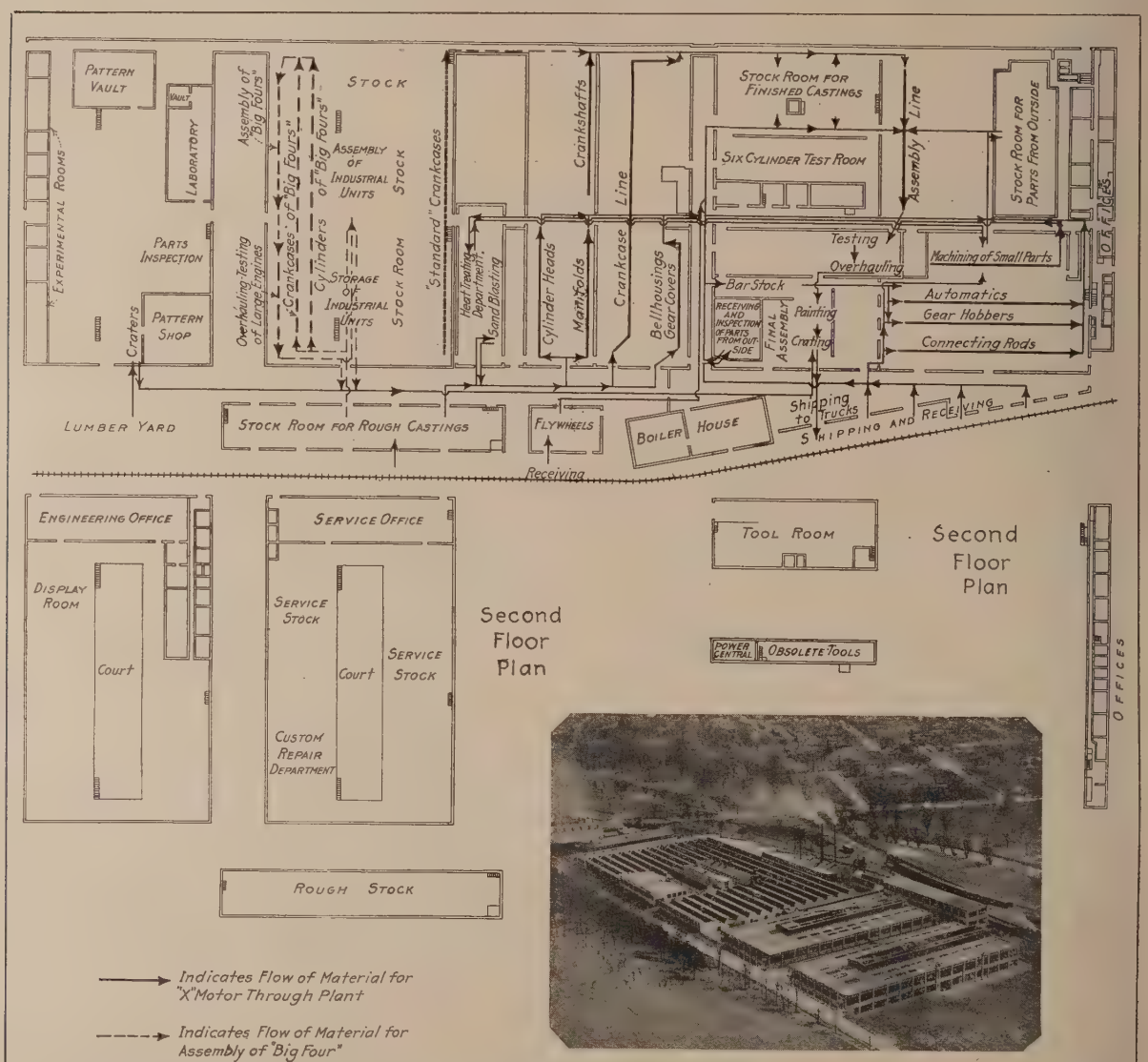
HARRY L. HORNING has long been a leading figure in the automotive industry. He was elected first vice-president of the Society of Automotive Engineers at the 1921 annual meeting, and in 1925 was elected president. He has also been president of the Motor and Accessory Manufacturers Association, serving in 1926 and 1927. During the war he was chairman of the automotive production section of the War Industries Board. Mr. Horning's first business connection, after attending Carroll College, Waukesha, Wis., was in the chemical laboratory and operating department of the Milwaukee Gas Light Co. in 1901. Later he spent two years in the steam engineering department of the Crane Co. From 1904 to 1906 he was head of the mechanical engineering department of the Modern Structural Steel Co., Waukesha. In 1906 he established the Waukesha Motor Co.

operations are departmentalized both as to parts and size of completed product.

"One end of the plant is devoted to building engines of more than 70 hp. Here four-cylinder engines ranging from 80 to 120 hp. are produced in uninterrupted progression, from the machining, drilling and honing of parts to their assembly into completed units, and six-cylinder

ping room. This method has been found most efficient and flexible for handling the varying requirements of our trade.

"Just as we have had to work out our own problems as to the flow of work, we have likewise had to develop our own methods of handling materials. The pieces going into our engines are heavier than the ordinary automotive



PLAN and Airplane View of Waukesha Motor Co. Plant. To obtain a flexibility in operation that will permit it to produce 30 different models of gas engines at prices that reflect mass production, the company has departmentalized its operations both as to parts and size of completed product. In building smaller engines, of which "X" motor is typical, the flow of material makes a complete circle from the unloading platforms through the various departments to the shipping room. On the other hand, a straight-line flow of materials characterizes the building of the "Big Four," one of the larger models

motors ranging from 200 to 300 hp. are built up individually on a single assembly stand.

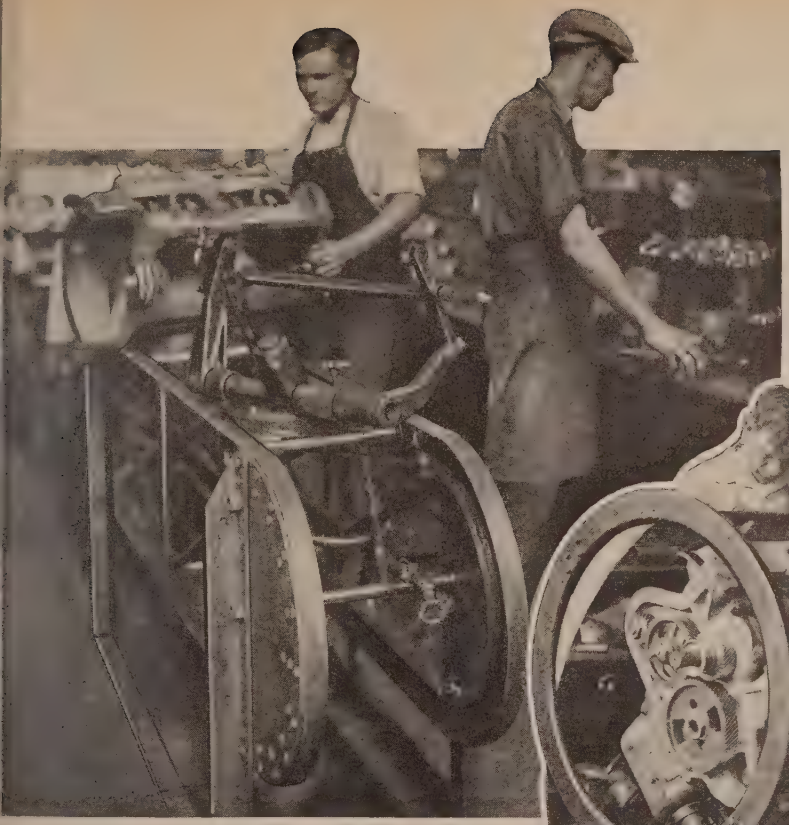
Flow of Work Makes Complete Circle

"The other end of the works is devoted to building engines of less than 70 hp. In this section of the plant there are separate departments for the machine work on different parts. The flow of material makes a complete circle from the unloading platforms through the various machine shops and back through the assembly department, testing department, painting room and shipping room. This method has been found most efficient and flexible for handling the varying requirements of our trade.

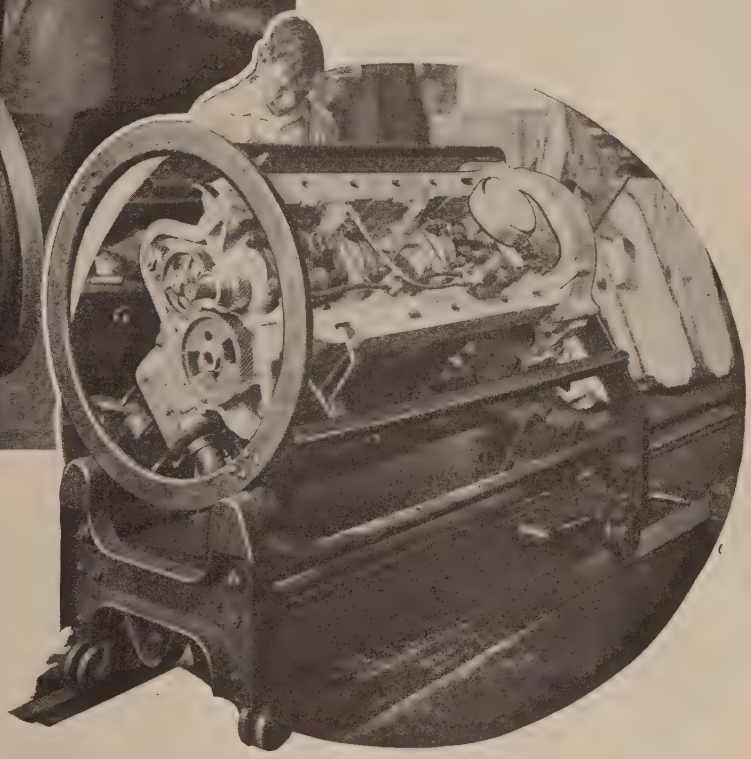
"Just as we have had to work out our own problems as to the flow of work, we have likewise had to develop our own methods of handling materials. The pieces going into our engines are heavier than the ordinary automotive sizes and are difficult to handle in a mass production way. We have made it a point, therefore, to relieve the workman of lifting wherever possible. We are convinced that the greatest opportunity for further economy lies in reducing the time of putting a piece in a machine and taking it out.

Material Handling Problem Given Special Study

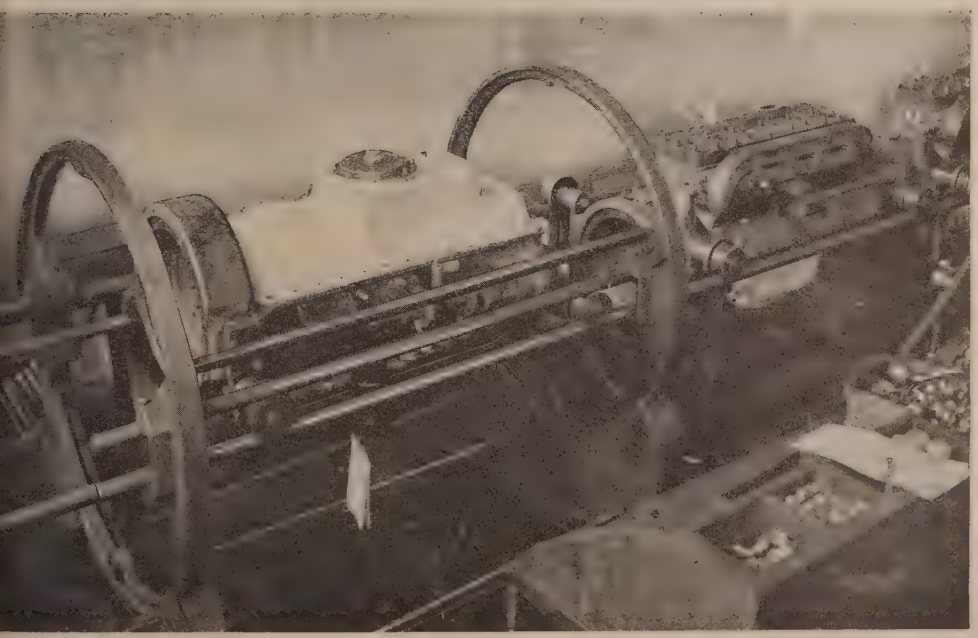
"We have not adopted any one method of handling materials. Each operation is studied by itself and the most suitable device is provided. The plant is equipped with



THE Smallest Motors Are Assembled on Carriages Running on a Continuous Track (Left). The working frame of the carriage is hinged and swiveled to allow movement 180 deg. through a vertical arc and 360 deg. through a horizontal circle



FOR Assembling Larger Engines a Portable Rollover Frame (Right) Is Used. The crankcase casting with its flywheel housing is the first part to be attached to the rollover. Others are added as the frame is moved along the assembly line, the rollover being rotated as required



ENGINES of Intermediate Weight Are Assembled on Carriages Running on Tracks Waist High (Left). Where it is necessary to turn the work over, rollover stations like the one shown are provided

gasoline and storage battery trucks of the lift type, overhead electric and hand-operated traveling cranes, monorail systems, pneumatic and electric hoists, chain blocks and gravity roller conveyors. For our assembly departments we use conveying equipment of our own design, adapted to our particular needs.

"While study of material handling is important to cost reduction, the maintenance of uniform quality in our product is also highly essential, both as a means of holding and of expanding our markets. Each step in operations is followed by an inspection, and there is a final general inspection before shipment is made. Nine per cent of all the labor in the plant is employed in inspection.

"All engines, after assembly, are tested, overhauled, reassembled and final-tested. Four-cylinder motors are run on their own power for 6 to 10 hr. Six-cylinder engines, as well as the larger four-cylinder units when requested, are given horsepower rating tests on dynamometers or testing fans. The plant is equipped with 14 laboratory-type cradle dynamometers.

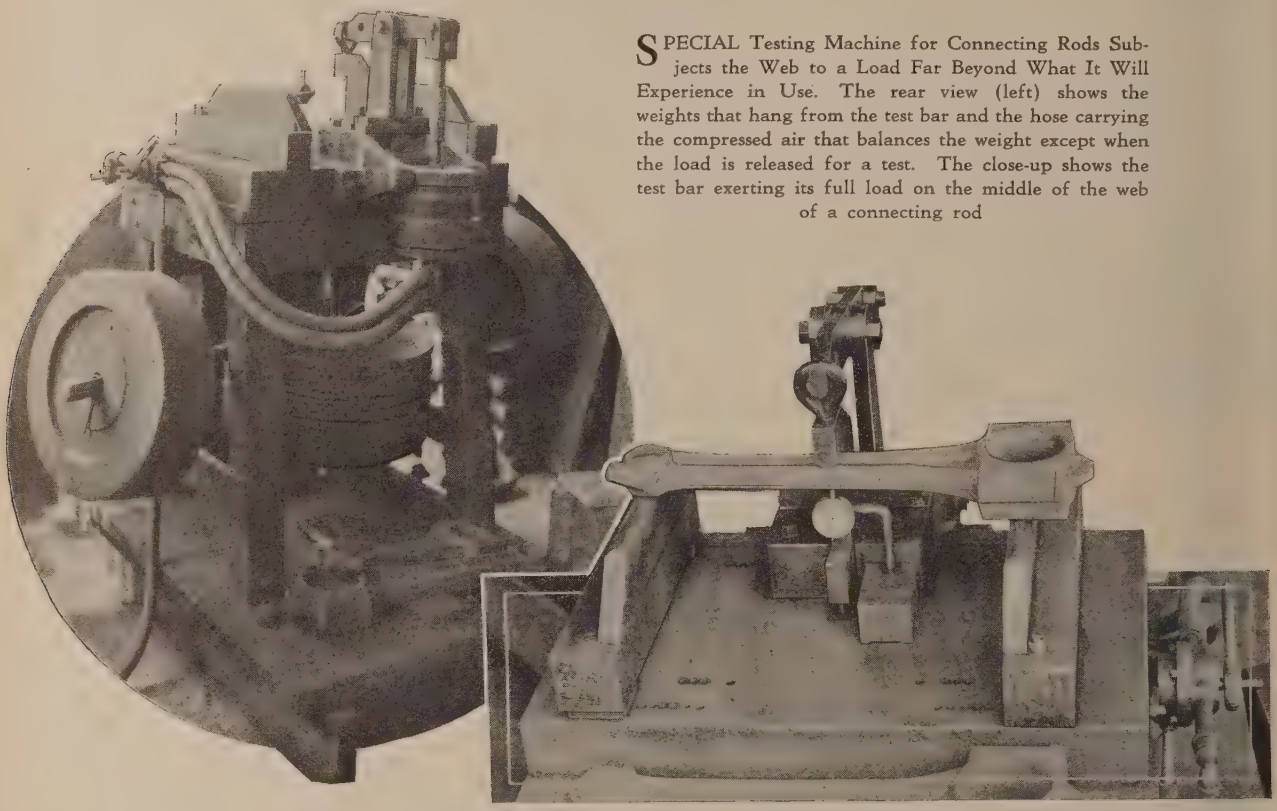
"Testing, overhauling, material handling, flow of work and scheduling of orders do not tell the whole story in this highly competitive era. Organized research is also necessary to develop new methods and new products. The Waukesha Motor Co. has an engineering department with a personnel of 57, one-third of whom devote all of their time to research. Our engineers, in cooperation with the United States Bureau of Standards, the Petroleum Institute and the Society of Automotive Engineers, have designed and built a gas engine for testing and measuring the knocks developed by different kinds of fuel.

"One of our most important undertakings, now in an experimental stage, is the development of a Diesel engine of one-half the customary weight, which now runs from 60 to 70 lb. per horsepower.

"In our efforts to improve our manufacturing methods and to better our products, we recognize the need for keeping in close touch with developments throughout the field of industry both here and abroad. An excellent means to that end is our library, in which we keep 59 technical and trade magazines, including THE IRON AGE and English and Continental periodicals. As an indication of how strenuously these papers are used, we have frequently put improvements into practice within one week after the receipt of the publications from which the ideas were obtained.

"We also have a circulating library of 1143 volumes of technical reference books."

The Waukesha Motor Co., of which Mr. Horning has been president since its founding in 1906, originally made automobile motors. Subsequently it went into the production of truck engines and then industrial engines. Today it is one of the largest makers of industrial automotive-type gas engines in the world, making 70,000 motors a year.



SPECIAL Testing Machine for Connecting Rods Subjects the Web to a Load Far Beyond What It Will Experience in Use. The rear view (left) shows the weights that hang from the test bar and the hose carrying the compressed air that balances the weight except when the load is released for a test. The close-up shows the test bar exerting its full load on the middle of the web of a connecting rod

In terms of value 50 per cent of its output goes into motor trucks, buses and other large units, such as engines for gas-electric railroad coaches. Another 10 per cent is in gas engines for the oil fields, both in this and foreign countries. The remainder is in motors for a wide range of industrial uses.

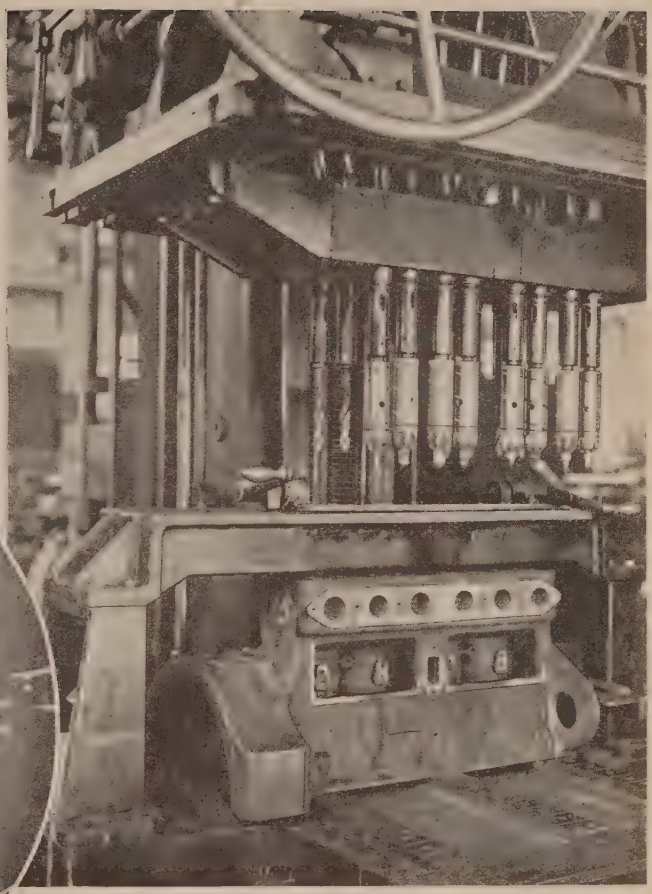
The company uses 25,000 tons of alloy gray iron castings annually, representing 25 per cent of the value of its product. Another 12 per cent is accounted for by steel forgings, and a large quantity of steel stampings is used. No malleable or steel castings are employed, however.

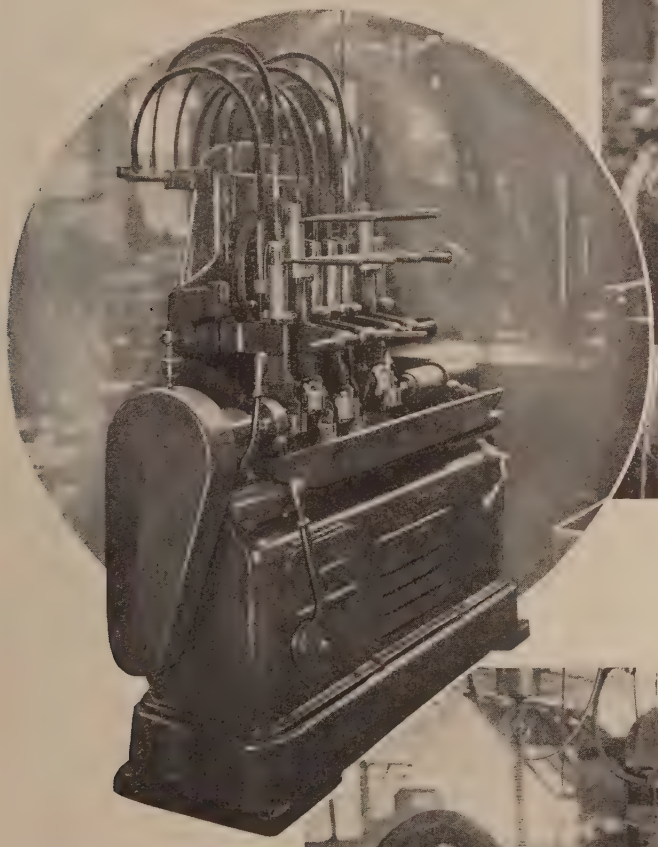
Heat treating, done in gas furnaces, constitutes an important stage of the manufacturing operations. From 5000 to 7000 pieces are heat treated daily.

Special Testing Machine Devised for Connecting Rods

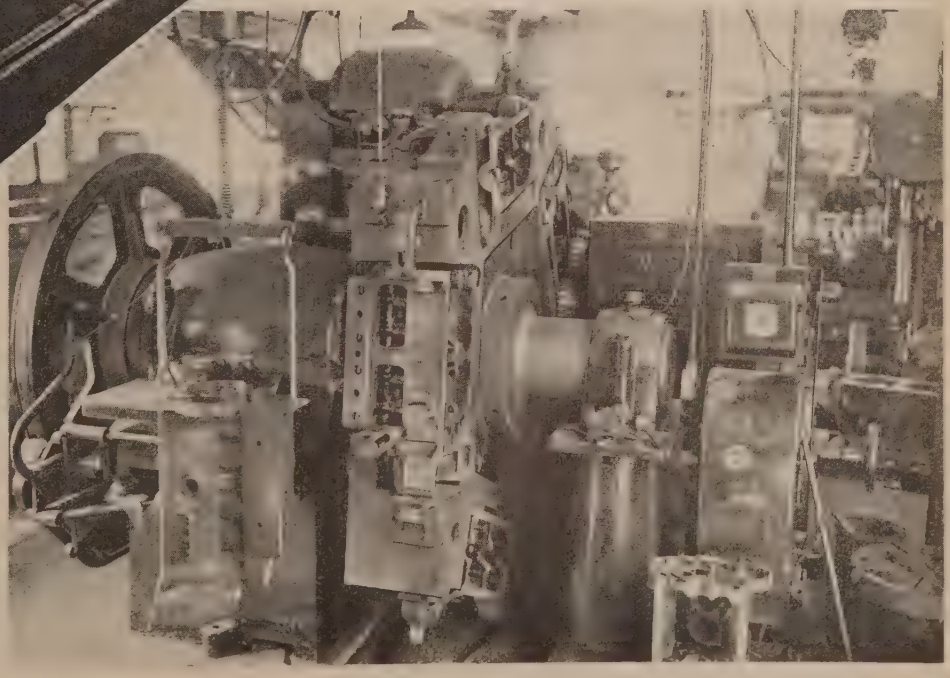
Important pieces are tested after heat treating. Satisfactory equipment for testing connecting rods was lacking; so the company devised its own. It had been found that testing the large end of the rod for hardness was no sure index of the strength of the web, frequently failing

THE Main and Throw Bearings of Crankshafts Are Simultaneously Honed in an Automatic Machine Built by A. P. Schraner & Co., Cleveland. Each honing head has six carborundum stones, and each bearing is continuously flushed with kerosene during operation. The crankshaft is driven by a lug in the headstock spindle, the lug being engaged by the headstock handle. The front end of the shaft is carried by a quick-acting tailstock with a live center. The platen in which head and tailstocks are mounted is given a reciprocating motion of ⅛ in., moving the shaft laterally as it rotates and thereby facilitating honing. To permit this the stones are ⅛ in. shorter than the length of the bearings. When the machine stops the throwheads are clamped in the position they are left by the shaft. The operator then opens the heads by turning a handwheel, lifting the entire head assembly, which is carried by a slide, away from the shaft. The same handwheel lowers the heads over the next crankshaft. The time of operation is about 3½ min. floor to floor





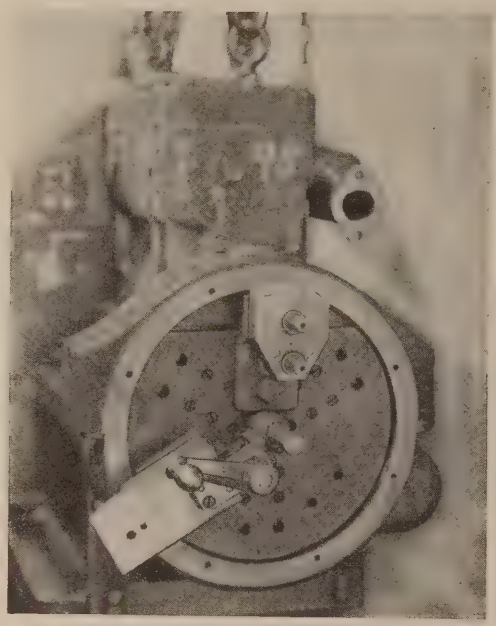
CLUSTER Plates (above) Drilled for Specific Operations Conserve Time. Accurate alinement of the drills is assured by the holes in the plate. Adjustable screw bushings in the holes permit the tools to be accurately set for depth



EQUIPMENT Includes Production Tools of the Largest Type Used in Automotive Plants, Such as the Continuous No. 3 Davis Milling Machine (Right) Built by the Davis & Thompson Co., Milwaukee. The machine weighs 28,000 lb. and its rotating drum carries five cylinder blocks. It takes 16-in. face mills and is capable of feeding 20 in. a minute past the cutters. As in the case of all other heavy equipment, special attention has been given to material handling. Cylinder blocks are suspended from air hoists by springs, so that they may be loaded on to the drum without requiring precise adjustment through the pendant control

to disclose flaws or cracks not discovered under inspection. A machine was therefore developed which subjects the web to a load far beyond what it will experience in use.

The ends of the connecting rod are placed on V-blocks, with the middle of the web suspended underneath a notched bar to which given weights are attached. Compressed air is used to balance this weight, keeping the testing bar free from the web of the connecting rod while it is being placed preparatory to the test. By means of a valve on the side of the machine the air pressure is exhausted and the testing bar is dropped on the connecting rod. The rod shown in the illustration, resting on 18-in. centers, is being subjected to a load of 1100 lb. The deflection permissible is 0.08 in., with a return to zero after the load is lifted. A D. C. Ames dial indicator is used to measure the deflection. All connecting rods are given this kind of test, and failures have been practically eliminated.



USING the Crankshaft as a Spindle with Drive by a 1-Hp. Motor, and Using the Flywheel as a Tool Holder, the Circle of the Flywheel Housing Is Bored and the Flange Is Faced. This rectifies any slight misplacement of the crankshaft as a result of the insertion and scraping of bearings

Different Types of Equipment Used in Assembly Lines

Equipment used in assembling varies according to the size of the engines made. For the larger engines, exclusive of those built on a stationary stand, a portable rollover frame is used. The crankcase casting with its flywheel housing is first attached to the assembly rollover and then the frame is rolled forward and crankshaft, camshaft and cylinder blocks, with valves, are added. Later timing gears and flywheel are fitted in. Subsequently pistons and rods, timing gear cover, manifold, cylinder heads, water pump and final trimmings are put on. The rollover permits the workman to turn the work completely over so that he can operate without stooping, stretching or straining. The rollover frame is supported on casters. These run on tracks in the assembly line, but can be operated on ordinary floor surface likewise.

Engines of intermediate weight are assembled on carriages running on tracks waist high extending the length of the assembly line. The carriages are equipped with flanged wheels which fit the cold-rolled rounds that serve as the tracks. At different points in the line, where it is necessary to turn the work over, rollover stations have been provided. These consist of concave supporting bearings for the hoop-like frame ends, which are connected on opposite sides by double tracks of steel rounds. When the work is in the frame the carriage wheels rest between the tracks. Either track can be made to coincide with the adjoining stationary tracks by rolling the frame.

The smallest motors are assembled on a continuous track—the carriages passing from one end to the other and then being returned underneath to the beginning of the line. The working frame is hinged to permit movement 180 deg. through a vertical arc and is swiveled on the carriage to allow movement 360 deg. through a horizontal circle. Bolts, nuts, gears and other small parts and fittings are distributed every morning in the benches in front of the assembly line by a stock boy. Whenever a work order is issued the proper number of parts for a day's operations are requisitioned from the stock room.

The three different types of assembly equipment are covered by Waukesha Motor Co. patents.

Squaring Up Flange of Flywheel Housing with Crankshaft

The final operation in the assembly of the smaller motors is an ingenious one. The insertion and scraping of bearings in the crankcase sometimes throws the crankshaft slightly out of square with the flange of the flywheel housing. To rectify such a condition the crankshaft is used as a spindle, being driven through reduction gears from a 1-hp. motor, and the flywheel is used as a tool holder. As the flywheel rotates the flange is faced and the flywheel housing circle is bored. An operator feeds the tools manually through bevel gears operated by a handle.

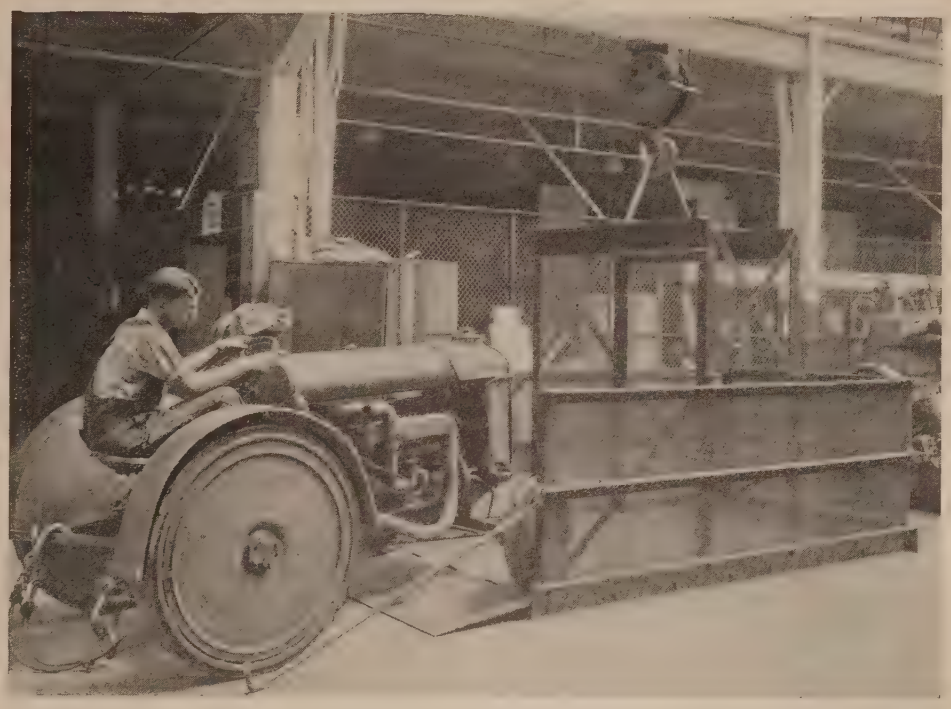
The machining of parts going into Waukesha engines is on a highly developed production basis. For example, five engine block castings are milled in one set-up on a rotary No. 3 Davis milling machine, the work rotating past the milling cutters. Similarly, multiple boring machines are used to bore the cylinder chambers of an engine block simultaneously. Other notable equipment includes a bank of three two-way multiple tapping machines and a bank of three two-way multiple drilling machines.

Cluster Plates Cut Down Set-Up Time

For other multiple drilling operations cluster plates, designed by A. Herzberg, factory superintendent, are used on standard upright multiple drilling machines. Accurate alinement of the tools for particular operations is insured by the holes in the cluster plate. By means of screw bushings in the holes, adjustable by screw driver, the tools are accurately set for depth. An ordinary set-up on a multiple drill formerly took 3 to 8 hr. Now it takes 20 min. to 1 hr. Moreover, the bushings and jigs are virtually everlasting. In the illustration the set-up is for boring and reaming for bushings for the engine valves and then drilling the valve stem guide holes. All machine work is done to very close limits.

Another multiple production operation that is outstanding is the honing of crankshafts. For this purpose a machine built by A. P. Schraner & Co., Cleveland, is used. The bearings and throws of the shaft are honed simultaneously. The honing heads are adjustable vertically and horizontally and need only be set once for a given size of crankshaft. The honing heads reciprocate with the throws of the shaft. Honing is by flat carburundum stones, the surfaces of which are at right angles to the radius of the bearing. Both crankshafts and flywheels are balanced both dynamically and statically.

An addition to the plant, increasing the area 50 per cent, was completed in May this year. The present di-



A CRANE Basket Has Been Provided for Hoisting Industrial Truckloads of Material from Main Floor to Service Stockroom on Balcony

mensions are 400 x 1400 ft. The older part of the plant is of saw-tooth roof construction. The addition consists of two monitor-type buildings, with central bays extending to the roof and balconies located on each side.

The balcony floor of one of these buildings is occupied by a custom repair shop and replacement parts department. Here replacement parts are got ready for shipment and engines of clients are reconditioned. This department now accounts for 10 per cent of the company's business. On the main floor of the central bay is the completed unit department. Here engines requiring special transmission, special mounting or specialized trucks are assembled for shipment. This class of business also represents 10 per cent of the company's total.

The bay of this building, as well as the other monitor-type structure, is served by a 5-ton overhead electric traveling crane. To facilitate the movement of small parts from the central bay to the balcony a crane basket is used, the crane hook attaching to an eye on top of the basket. Trucks run on to the basket on the main floor are run off on projections under the crane runway from the balconies.

The second monitor-type building is devoted to engineering and experimental purposes, and also contains a pattern shop. All of the buildings are connected on the side opposite the receiving and shipping platform by a wide aisle, facilitating communication between departments by gasoline and storage battery trucks.

The shipping and receiving side is served by tracks from the Chicago, Milwaukee, St. Paul & Pacific and Chicago & North Western railroads.

The Waukesha Motor Co., under normal operations, employs 1800 people, all but 200 of whom are engaged in production.

Utility of Cadmium Rapidly Expanding

PRACTICALLY all of the world's production of cadmium comes from the treatment of the impure zinc solutions used for preparing electrolytic zinc, so that the potential output of cadmium bears a very direct relation to the amount of electrolytic zinc produced, writes C. P. Linville in "Mineral Industry, 1928." In 1928 there was a greatly increased production; prices also increased to 85 to 90c. a pound.

There are four uses recently developed which account for the rapidly increasing demand for cadmium. It is being used in increasing amounts in making cadmium solders. The Udylite process is a rust-proofing process, in which iron articles such as locks, small hardware, and automobile parts are electroplated with the metal, after which the work is heated in an oven for several hours at a temperature of from 150 to 200 deg. C.

The Cadalyte process, which is an electroplating process giving a bright silver-like finish, is also being extensively used. Cadmium plating is also used in connection with chromium plating, the work being first given a cadmium coat, then the final chromium plate.

A small amount added to silver alloys makes the silver whiter and more resistant to tarnish. Cadmium has also other uses in jewelry, giving with gold a green alloy. When added to aluminum which is to be used in making powder it improves the color and luster of the powder and makes it more resistant to corrosion.

Cadmium still continues to be extensively used in making fusible alloys. When added in small amounts to copper, the wire drawn from the alloy has greater strength for use in transmission lines without having its conductivity appreciably reduced.

Record Speed Made in Steel Erection

Steel Framework of Bank of Manhattan Building, 71 Stories, Will Be Completed in Less Than Four Months—Special Drilling Equipment Expedites Fabrication

The New Bank of Manhattan Building, 71 Stories, Will Top the 792 Ft. of the Woolworth Building by More Than 100 Ft. and Will Be 11 Floors Higher

FOR speed of steel fabrication and erection, the 71-story Bank of Manhattan Building, now in course of construction at 40 Wall Street, New York, probably will break all known records.

Although the first slabs for column supports were not delivered on the ground until the third week of June, the final piece of steel in the tower will have been set in place and the last rivet will have been driven by Oct. 15, or within a few days of that date.

So far as known, no steel frame of this size has ever before been completed in so short a time—less than four months—even in New York, where high ground values and idle investment make speed more of an essential than in less crowded communities.

When the decision was reached by the Bank of the Manhattan Co. and the Starrett Corporation to build the tallest building in the world, it was realized that fast work would have to be done to complete the structure in time for occupancy on May 1, 1930, May Day being the customary moving day for New York business, all leases expiring on that date.

Coordination of Work Made Record Possible

That the building will be completed within schedule time, probably eclipsing by several months any construction record achieved in the United States for so large a structure, will be due, it is stated, to the complete coordination of all who were factors in its construction—the architects, engineers, owners, contractors and the steel fabricator.

Speed being an essential part of the building program, there was no waiting for finished plans before work was begun. The foundations were started, in fact, before the work of demolishing the old buildings had been completed. Demolition was rushed by three shifts of workmen.

Ordinarily, an architect has his plans prepared three or four months before a building is started, but in this case architects, engineers and contractors all started at about the same time, and plans were so dovetailed that the building has gone up floor by floor without a serious hitch.

As rapidly as Craig Severance, architect, and Yasuo Matsui, consulting architect, could prepare preliminary plans, Starrett Brothers, the general contractors, let the sub-contracts. The contract for the steel was placed with the Levering & Garrigues Co., New York, whose fabricating plant is at Dunellen, N. J. This contract was unusual, even apart from the time element involved for the completion of the work, in that it gave to the steel fabricator the engineering work and detailing in connection with the job, as well as the fabrication and erection. The steel totaled more than 17,000 tons.

Steel Deliveries Anticipated Contract Requirement

This contract was received by the Levering & Garrigues Co. on March 20, this year, and it provided that the first steel should be on the ground not later than June 26 and the last steel by Oct. 15. The initial delivery of steel anticipated the contract date by several days.

An example of the speed attained is that only six weeks elapsed from the time the steel contract was let to the completion of the detail plans from which the steel could be ordered from the mill for fabrication.

Favored by weather almost devoid of rain, the fabricator has been able to keep ahead of schedule, sometimes by three or four days.

To accomplish this record, the Levering & Garrigues Co. augmented its own organization with that of the structural engineering firm of Purdy & Henderson, New York, who handled much of the steel planning. In the production work it obtained the cooperation of the Bethlehem Steel Corporation, which devoted its fabricating shops to the initial part of the structural work in addition to providing definite rolling schedules for the plain material that would fit in closely with actual requirements of the shops.

Steel Work Half Done Before Foundations Were Completed

It has been possible for the steel erection to go ahead at an unusually fast pace partly because of the fact that the erection of the framework was started before the foundation work had been completed. Temporary foundations were put in to save time, and as the steel work progressed the permanent foundations were built. The steel work was about half erected, however, before the foundation work was all done.

How this has worked out as a time-saver is shown by the fact that foundation work is still in progress and no steel erection has been started on a building of comparable size in the downtown New York district, although the contract for the latter structure was let at about the same time as that for the Bank of Manhattan Building.

The steel work on the bottom floors of the Bank of Manhattan Building was in progress long before the steel design for the upper floors had been finished. The steel designing and detailing went along with the architectural development. This helped the fabricator to rush the steel erection, there being no waiting for the complete steel design before proceeding, as is the case with most steel structures.

Column Slabs of Unusual Size Used

The design of the bank building, from a structural steel standpoint, does not differ materially from that of other tower buildings. However, the heavy load that is to be carried called for extremely rugged construction,

which began with the slabs under the tower column. These slabs are said to be the largest ever used in a building of this type. The largest were 14 in. thick, 84 in. wide and 7 ft. 10 in. long, weighing 31,000 lb. each. They were rolled on the large plate mill of the Lukens Steel Co., Coatesville, Pa.

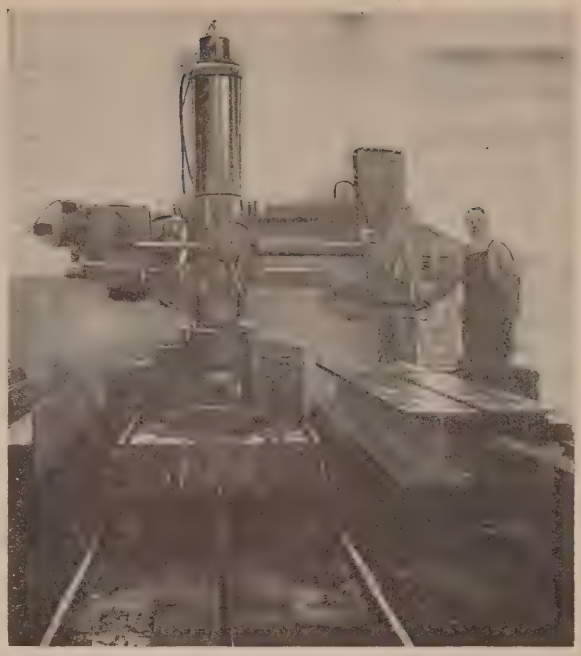
Special Drilling Equipment Speeds Fabrication

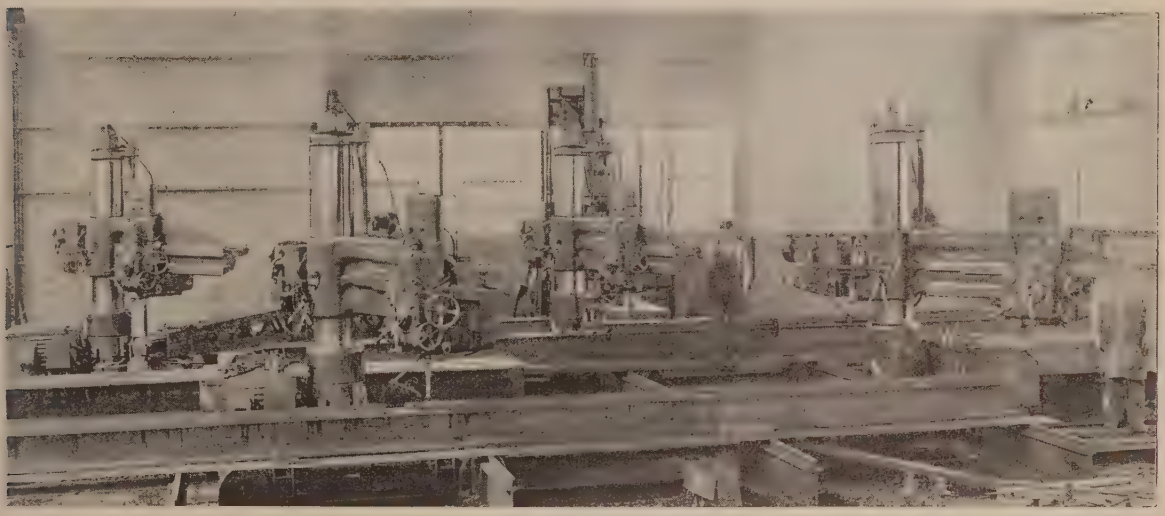
One of the important factors in expediting fabricating work was the installation by the Levering & Garrigues Co. of four special Carlton radial drills, which in actual operation have doubled the tonnage which the fabricator would have been able to turn out without them.

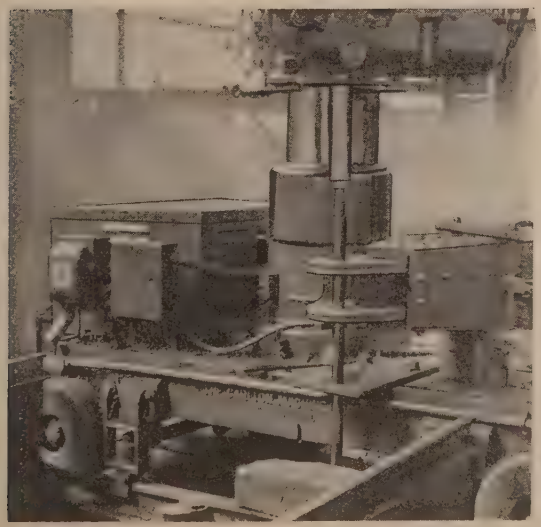
This equipment was bought after the company had received its Bank of Manhattan contract, and it was installed and in operation within six weeks from the date of the order.

These radial drilling machines are mounted on wheels which run on T-head rails and permit the machine to be moved along the work. Material, such as long I-beams, is supported on I-beams that are mounted on a concrete base and have a T-rail at the top. These work supports, at right angles to the base of the machines, are spaced on 4-ft. centers. They are, of course, carefully leveled so that the drilled hole will be straight.

The machines have 6-ft. arms. After drilling all the







A BATTERY of Four Special Radial Drills, Shown in the Center Illustration, Have Greatly Expedited Work in the Levering & Garrigues Co. Shop. These machines are mounted on wheels which run on T-head rails and permit the machines to be moved along the work

* * *

WIRES Suspended in the Compound Trough in the Floor Between the Rails Carry the Current for the Machines, a Collector Arm Passing in the Slot Taking the Current. These wires are suspended in the trough so as to be clear of the coolant, which can be taken up at any point along the rails. The arrangement of this trough is shown in the top illustration

* * *

SEPARATE Push Buttons at the Operator's Position Control the Locking, Unlocking and Traveling of the Machine Along the Rails. The lower illustration shows the rail clamp in position

holes within the 6-ft. radius, the portable base is unlocked, moved along the tracks under its own power, locked again and the drilling is continued as before. Drilling of much of the work is to templates. Centralized control of all motions is a feature that permits high-production drilling. Speed and feed changes are made at the head (through selective sliding gears), column clamping, elevating and lowering also being controlled from the head. Separate push-button control is provided at the operator's position for locking, unlocking and moving the machine along the rails.

These machines are capable of drilling up to 3-in. holes in steel. Speeds range from 12 to 1200, the number of speeds being 24. Twelve feeds, ranging from 0.009 to 0.0125 in., are obtainable. The spindle drive is by a 10-hp., 1200 r.p.m. motor mounted on the arm, and the drive of the portable base along the rails is by means of a fractional horsepower motor mounted on the base. The base is the usual T-slotted arrangement that permits clamping miscellaneous work.

Work supports, which are mounted at right angles to the runway rails, are on both sides of the runway, which makes it possible for the operator to be drilling on one side while the material is being loaded and set on the opposite side, as the arm can be moved in a complete circle. The operator thereby can obtain continuous drilling as he is not held up for the loading and unloading and turnover or for crane service.

At the top of the columns are special rotary contactors which deliver the current to all of the motors, the main feed cable coming up through the center of the column. This permits the arm to be revolved in a full circle in either direction.

Coolant Runs in Covered Trough in Floor

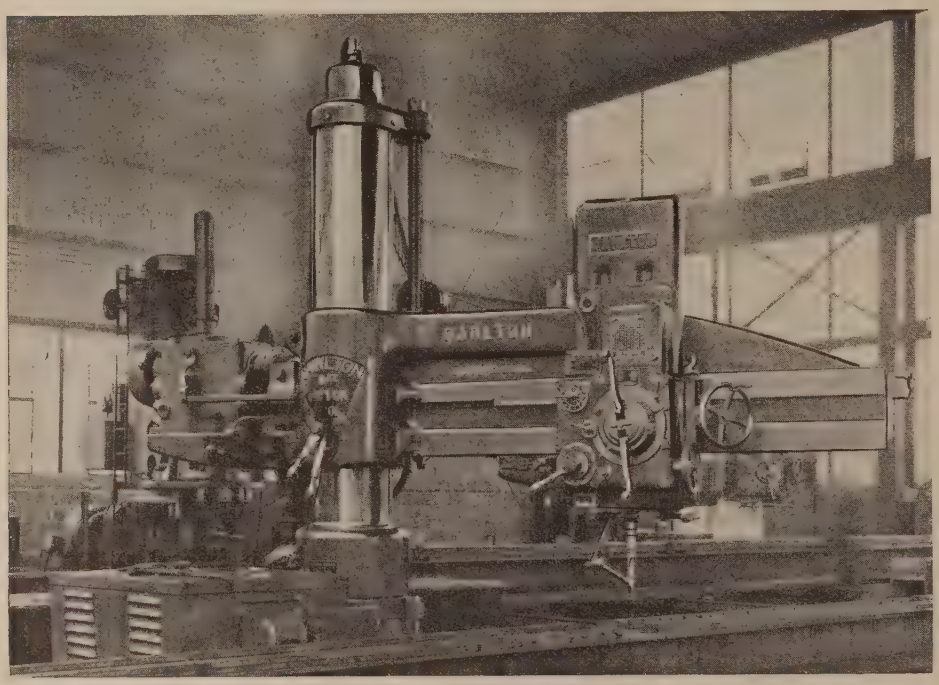
Between the rails is the compound trough, which is covered by cover plates, and there is a slot the full length of the runway which permits coolant to be taken up at any position along the rails and the return flow to find its way back to the trough after being strained.

There is also a collector arm which passes in the same slot and takes the current from wires suspended in the trough, but clear of the coolant. There is an overflow in the trough which prevents the coolant from rising above a certain height.

All bearings are ball bearings, fully inclosed, running in oil, thereby requiring lubrication attention only about every six months.

In actual practice, each machine has averaged about 1600 in. penetration a day, and this could be increased probably to 2000 in. except that the additional speed wears down the drill steel too rapidly to be economical.

Engineering work in connection with the installation of the drilling equipment was done by Wilson-Brown, Inc., 30 Church Street.



WHILE the Machine Is Drilling on One Side, Material Is Being Loaded and Set on the Opposite Side, as the Arm Can Be Swung to Either Side. Continuous drilling can be done as the operator is not held up for loading or unloading or for crane service

Various Uses for Nickel

Robert C. Stanley, president International Nickel Co., estimates the various uses in which nickel is employed, as follows, based on an output of 40,000 tons a year:

	Tons
Nickel silver	6,000
Coinage	800
Nickel plating	2,000
Structural nickel steel	14,000
Copper-nickel alloys	800
Nickel catalyzers	400
Edison storage battery	800
Monel metal	8,000
Heat-resisting electrical alloys	2,000
Malleable nickel	2,000
Nickel steel castings	800
Nickel bronze	400
Corrosion-resistant steels	400
Ferro nickel alloys	800
Nickel cast iron	400
Miscellaneous alloys	400

There is not likely to be much decline in the use of nickel for armor plate or ordnance equipment, according to "Mineral Industry, 1928," the estimate for which use is now 4000 tons per annum. New naval cruisers are not likely to cause a marked increase, since the trend of naval construction is toward the elimination of heavy protective armor in order to increase speed. The use of monel metal is firmly established, while nickel steel and nickel steel castings in railroad equipment are coming more and more into favor. In fact, the use of nickel for improving cast iron is likely to take its place as a standard practice.

Comprehensive Congress on Metals

Steel Treaters Gather Together Five Technical Organizations in National Metal Congress and Exposition—Wealth of Papers and a Diversified Exhibition

"GREATEST meeting of metal men ever held"—these were the words of Dr. Zay Jeffries, president of the American Society for Steel Treating, at the annual banquet of the National Metal Congress held in Cleveland, Sept. 9 to 13, inclusive. Facts seem to bear out this statement.

In numbers the total registration of members and guests showed 5840, the largest enrollment in some years, due perhaps to the general acceptance by industries at large of the national metal congress idea. In technical contributions, again, almost every phase was covered and their high grade was generally acknowledged. In enthusiasm, one could hardly ask for more. In smoothness of operation and handling, the congress was eminently successful. In displays at the exposition—while not larger than previous ones, in diversity, scope and attractiveness the exhibits left little to be desired.

Thomas A. Edison was made an honorary member of the steel treaters. In his enforced absence by illness acceptance was expressed in his behalf by Harvey Firestone, Sr., a lifelong friend.

A symposium on nitriding and a session on steel metallurgy were impressive features. At the exhibit late developments in rustless iron, tungsten-carbide tools, and nitrided steels were most prominent. Attendance at the National Metal Exposition was reported by Secretary Eisenman as 53,121.

Technical Features of the Congress

COMMENT was heard on every side regarding the unusual excellence of the technical papers this year. This was particularly true of the 35 papers scheduled for the ten sessions of the A. S. S. T. Besides these there were 20 papers contributed to programs for the American Welding Society, 18 for the Institute of Metals Division and 10 for the Iron and Steel Division of the American Institute of Mining and Metallurgical Engineers as well as 11 for the Iron and Steel Division of the American Society of Mechanical Engineers—94 in all for the week.

A climax was reached on the last day of the A. S. S. T. sessions. This was devoted to a symposium on nitriding. The society has never held so important a meeting nor one so largely attended—evidence of the keen interest in this new development. Dr. Adolph Fry of Germany, who originated the process, and Dr. Paul Aubert of Paris, the commercial developer, were present and spoke. Eight papers and an address by Doctor Fry were presented and briefly discussed. These are reviewed on other pages.

Another splendid A. S. S. T. session was devoted to steel

Foreign Visitors at the Congress Numbered Nearly Twenty

Dr. F. Koerber, director of the Kaiser-Wilhelm Institute, Germany.
Dr. E. H. Schulz, director of the research institute of the Vereinigte Stahlwerke, A-G., Germany.
Dr. Otto Petersen, president of the German Iron and Steel Institute.
Dr. Adolph Fry, Krupp Laboratories, Essen, Germany.
Dr. Paul Aubert, Aubert Frères et Duval, Paris, France.
Ernest Hoessrich, engineer, Gunther & Co., Frankfurt-am-Main, Germany.
J. D. Volckman, sales engineer, James W. Pyke, Montreal, Canada.
W. E. Siler, inspector of tools, Canadian National Railways, Winnipeg, Manitoba.
W. D. Pugh, research assistant, English Steel Corporation, Sheffield, England.
C. K. Everitt, managing director and works manager, Edgar Allen & Co., Ltd., Sheffield, England.
Waldemar O. Freyberg, professor, Polytechnical Institute, Harbin, Manchuria, China.
Moses M. Yaskolka, mechanical engineer, tractor department, Krasug Putilovetz plant, Leningrad, Russia.
Dr. M. Suzuki, chief of materials section, Japanese Government Railways, Tokio, Japan.
M. Sakata, Japanese Navy.
T. Nagao, Japanese Army.
Fernand Turretini, director general, Société Genevoise d'Instruments de Physique, Geneva, Switzerland.
Cesare Parone, Milan, Italy.

manufacture. A review of the four excellent papers and discussions will be printed next week.

Besides these there were over 20 papers on a variety of subjects. In so vast a program it is impossible to dwell on all the papers. Many of them will be abstracted, some with their discussions, in future issues of THE IRON AGE.

Campbell Memorial Lecture on Steels at High Temperatures

IN the Campbell memorial lecture, which attracted some 500 listeners, Dr. Albert Sauveur, professor of metallurgy, Harvard University, discussed the "Strength of Steels at High Temperatures."

A novel method of testing was utilized. The test piece was a 15-in. length of square bar, turned to ½-in. diameter for ½ in. at its center. This necked portion was placed in the middle of a tube furnace, one end of the bar clamped in a vise, the other fixed by a coupling to a shaft resting in a bearing and carrying a sheave on its overhanging end. By means of a rope and a pail of shot, a gradually increasing load was added at the rim of the sheave, thus inducing torsion in the heated test piece. Relations between twist and time were recorded on a chart.

Significant data were said by the lecturer to be the torsional strength of the hot metal, the number of twists before fracture (related to the ductility), the twisting acceleration, and the "factor of stiffness" (a relation between stress and strain).

When such data were plotted against temperature for various carbon steels the "blue brittleness" range at 300 deg. C. was strongly marked by a peak in the factor of stiffness curve. The curve showing number of twists also shows jogs at the transformation points. The curves show that at 900 deg. C. all steels (which are then austenitic) have the same torsional strength, although the angles of twist vary widely and unaccountably. "Red shortness" is believed by Doctor Sauveur to be a property of gamma iron, and to be greatest at the lowest temperature at which gamma iron can exist, namely, just above the transformation on cooling.

A few of the time-twist diagrams, instead of being a regular curve like a sine curve, looked like a series of irregular steps. That is, the piece would twist rapidly, almost instantaneously, then as suddenly stop and hold fast for several seconds. This is characteristic of the failure of ferrite when breaking in the blue brittle range, or of severely cold-worked low-carbon steel.

The lecturer did not attempt to explain this effect, but controverted the idea that blue brittleness is due to nitrogen in metal by saying that the German steel Izett, which is free from the phenomenon, analyzes 0.017 per cent nitrogen, while an American soft steel containing only 0.008 per cent nitrogen is very brittle at 300 deg. C.

Many of the alloy steels tested were similar to those examined by F. H. Norton in time-consuming creep tests (see his book reviewed in THE IRON AGE, Sept. 12, page 687). A slide was shown comparing the creep stress as determined by Norton and the torsional strength as determined quickly by Sauveur; substantial parallelism and correct mutual relationships were apparent.

An interesting atmosphere was lent to the lecture in the fact that the presiding officer was Prof. H. M. Boylston, head of the department of metallurgy, Case School of Applied Science, Cleveland, and a lifelong associate of Doctor Sauveur in their work at Harvard in earlier years.

News Items of the Congress and Exposition

DURING the week the board of directors of the A. S. S. T. held sessions, and reports of officers were made at the society's annual meeting. At the banquet several honors and awards of medals were announced. These events were as follows:

Edison Made Honorary Member

Honorary membership was bestowed this year on Thomas Alva Edison, and in an impressive manner. At the banquet President Jeffries called on Harvey Firestone, Sr., president, Firestone Tire & Rubber Co., Akron, Ohio, who accepted the honor for Mr. Edison, whose recent illness prevented his presence. Mr. Firestone, in an intimate manner, gave some account of the life in camp of Mr. Edison, Mr. Burroughs, Mr. Ford and himself.

THOMAS A. EDISON
Honorary Member

ALBERT SAUVEUR
Campbell Lecturer

Howe Medalist for 1929

Award of the Howe medal for 1929 was made to Dr. C. R. Wohrman for his paper "Inclusions in Iron and Steel" published in the *Transactions*. The medal is awarded each year for the best paper during the year, July 1 to June 30. Dr. Albert Sauveur, who was a teacher of Doctor Wohrman, accepted the medal for the medalist, giving a sketch of Doctor Wohrman's career. He could not be present, but a cable of appreciation from him was read. He is in Switzerland, where he was located by his company, Bell Telephone Laboratories, New York, so that he could be with Mrs. Wohrman in her unsuccessful struggle with illness. He is doing special optical work in Geneva.

To Frederick G. Hughes, vice-president, New Departure Mfg. Co., Bristol, Conn., the past-president's medal was presented by Doctor Jeffries.

These honors were all announced at the banquet in the ballroom of the Hotel Cleveland. Representatives of all of the participating societies sat at the head table, except those of welding society, which held its own banquet the same evening.

"An Epoch in the Making" was the subject of the chief speaker at the banquet, Dr. William E. Wickenden, who has just assumed the presidency of Case School of Applied

Science, in Cleveland. It was a splendid effort—a plea for coordinated systematic research—"the price of progress and survival is research." It is hoped to publish an abstract later.

Twenty Visitors from Abroad

At no former congress has the attendance of foreign metallurgists been so large. Nearly 20 registered during the week, some of them prominent in their fields. A list of leading ones is found elsewhere.

In testimony of the cooperation and efficiency of the management of the Cleveland Public Auditorium, Col. H. J. Twelvetree, the manager, was presented by Secretary Eisenman at the banquet with a silver loving cup.

Future Conventions

Conventions of the future have been decided upon as follows:

Semi-annual convention, New York, February, 1930, auspices New York chapter.

Annual Congress and Exposition for 1930, week of Sept. 22, 1930, at Stevens Hotel, Chicago.

Semi-annual convention, 1931: San Francisco, as the Western Metal Congress and Exposition.

Officers Report on Society's Condition

THE society is in excellent condition both from the standpoint of growth and of financial status, according to the annual reports of W. H. Eisenman, secretary, and J. M. Watson, treasurer, submitted at the annual meeting. The membership increased 16 per cent during the year and now numbers 5615, including 4844 regular members, 522 sustaining members and 228 junior members. The treasurer's report showed that the receipts during the year were considerably over expenses.

President Zay Jeffries in his annual address stressed the hearty cooperation of other technical organizations with the society for a common purpose and said that the National Metal Congress held in connection with the technical sessions could not have been possible without the cooperation of the other technical societies. He also referred to the service rendered to the metal industry by the Steel Treaters' society and other technical organizations and declared that continued growth is inevitable. He also commended the officers and members of local chapters on the policy of holding joint meetings of local societies. He characterized the personnel as a happy family working for the same purpose. Doctor Jeffries also expressed appreciation of the fine quality and high character of the exhibits at the exposition congress. He said in part:

> While the primary object of the exposition is educational, it is essentially a sales institution. Up to two years ago certain restrictions were put on salesman members of the society. The removal of these restrictions was a recognition by the society that industry is endeavoring to operate all departments with one code of ethics. A corporation cannot escape the responsibility of an employee's untrue statement with the excuse that he is a salesman. Every employee is urged and expected to reflect the integrity of the organization which he represents.
>
> And so we find this year, to an extent never before realized, presidents and others in responsible positions in attendance at the booths. In many cases, the individuals who present papers and enter into discussions at the technical sessions are also in attendance at the booths. The information given out at the booths will in most cases stand the spotlight of scientific criticism. Thus, the latest technical developments are getting from the scienists to the public with a minimum of distortion.

Los Angeles Chapter Honored

Following the usual custom of presenting the president's bell to the chapter that has won particular distinction during the year, Doctor Jeffries announced that the custody of the bell had been awarded to the Los Angeles chapter for the coming year in recognition of its activities in connection with the Los Angeles meeting. He said that the Western States Metal and Machinery Exhibition and Western Metal Congress at Los Angeles in January was a marked achievement of the year.

The nominating committee reported the list of new officers as announced in THE IRON AGE last week and these were formally elected. President-elect R. G. Guthrie occupied the president's chair during Doctor Jeffries' address. New officers are listed in another column.

National Metal Exposition Very Comprehensive

NOTABLE advances made in the iron and steel industry during the past year in processes and equipment were brought to the attention of visitors at the National Metal Exposition. The exhibit, while not larger than some of the previous shows, was unusually interesting because of its attractiveness due to the arrangement of the individual exhibits and the wide variety of products and equipment shown. There was more equipment in operation than at previous shows. The attendance was unusually good and the exhibit brought out a great deal of favorable comment. As a reflection of the interest shown, considerable of the operating equipment was sold during the week.

Rustless Iron Products a Feature

Outstanding features included a number of exhibits of rustless iron and stainless steel, the nitriding process, nitrided products and the operation of tungsten-carbide cuttings tools. Conspicuous were the numerous showings of special steels, including various rolled and cast alloy steels. Among these were non-corrosive and heat-resisting alloys and alloys having other important qualities. These exhibits made an impressive picture of what has been accomplished in developing and turning to commercial application to serve industry rolled steel and castings of numerous alloys. Among materials not heretofore shown were attractive displays of table cutlery of stainless steel. Cooking utensils of rustless iron were also shown in several exhibits.

That rustless iron has broad commercial possibilities which manufacturers are rapidly developing was indicated by the wide range of this material shown in various rolled forms as well as in finished products for the auto-

New Officers for 1930

President: Robert G. Guthrie, metallurgist, Peoples Gas, Light & Coke Co., Chicago. He is now vice-president.

Vice-President: J. M. Watson, metallurgist, Hupp Motor Car Co., Detroit; he is now treasurer.

Treasurer: O. A. Fulton, Wheelock, Lovejoy & Co., Boston.

Director: W. B. Coleman of W. B. Coleman & Co., Philadelphia.

Director: Dr. O. E. Harder, professor of metallurgy, University of Minnesota, Minneapolis.

Secretary: W. H. Eisenman was reelected secretary for two years at the Philadelphia convention in 1928. The treasurer and the two directors are elected for two years; the others for one year.

motive and other fields. In the automotive field rustless iron stampings are finding a place as radiator and hub caps and for other bright finished parts. One exhibit that attracted considerable attention was the model of a window of rustless iron to be used on the Chrysler Building in New York. Aircraft steel was shown by several exhibitors, indicating the increasing commercial importance of that field. A foreign built automobile having 25 parts of nitrided nitralloy steel attracted much interest.

Tungsten-Carbide Tools in Action

The efficiency of tungsten-carbide cutting tools was demonstrated on two lathes equipped with these tools and remarkable speed records were attained during the tests, which attracted a great amount of interest. Carboloy tools were used on a Warner & Swasey turret lathe and Widia metal on a Monarch lathe.

Furnace Equipment Liberally Shown

The display of furnace equipment, both electric and gas, emphasized the importance of heat treatment in the metal-working industries. Many of the furnaces shown were under heat. These indicated that furnace manufacturers are constantly improving their equipment in the direction of closer temperature control and more efficient operation. The equipment included two electric furnaces for heating high-speed steel, which were provided with atmospheric control, a current of combusted gases being maintained across the furnace opening to prevent air from entering the work chamber and preventing scaling and pitting of the work. One nitriding furnace of the vertical cylindrical type was shown but this was not in operation.

In a space reserved for the American Gas Association there were 12 operating exhibits of gas-heating furnaces of various types and improved models. Furnace control and temperature recording equipment in the latest types were shown by a number of manufacturers. Various furnace accessories such as sheet metal carburizing boxes with welded joints, furnace trays, conveyor chain and belts, and furnace parts of different heat-resisting metals helped to make up a very complete and interesting display. About 7000 sq. ft. was devoted to gas furnaces.

Foundry Industry Represented

The progress that is being made by the foundry industry to broaden its field of usefulness was indicated in exhibits of iron, steel and non-ferrous castings. Castings were selected for exhibit by the Gray Iron Institute to show new uses and a wide range of uses for castings as well as the machinability of small castings. One exhibit that attracted particular interest was a headstone for a grave made of a light, hollow section of cast iron and enameled to give it the appearance of granite. This had a brass inset at the top which served as a name plate.

Developments in the electric furnace steel industry were well illustrated in a group exhibit by foundries of the Electric Steel Foundries Research Group. This included exhibits by several foundries of castings in both alloy and plain carbon steel for gears, fabricated and other work and physical test specimens. Among these were heat-treated chrome steel castings for teeth for an excavating dipper.

Aluminum and Zinc Products Displayed

Advances that have been made in the aluminum industry, particularly in finding new uses for its products, were indicated by a very comprehensive exhibit of aluminum castings, made in sand, dies and permanent molds. This exhibit also included products made of rolled and forged aluminum. That this industry is reaching into the building field is indicated by a display of spandrels and sills for buildings and radiator grills. A fabricated structural

Convention Items, "Quenched and Drawn"

GETTING the most out of conventions has certainly been developed by a plan of the International Harvester Co. It is the experience of some companies that the group of men which goes to such a gathering as that of last week does not get the most out of it in view of the expense involved—"too much visiting," "too many parties," "too little attendance of technical sessions," etc. This year the chief metallurgist of the Harvester organization designated a group of his men to attend. Each morning at a breakfast they assigned certain parts of the technical program and certain phases of the exposition for certain men to see. At the end of the day they assembled and talked over the entire experience—with evident mutual profit. Could not this plan be followed profitably by some other companies?

* * * * *

TOMBSTONES of cast iron—yes, this is a late development. In the booth of the Gray Iron Institute there was a small tombstone of gray iron enameled to imitate granite. Unless one knew how it was made, the disguise was good. A new industry?

* * * * *

OFFICERS of other technical societies not participating in the congress were seen here and there. C. E. Hoyt, executive secretary, and R. E. Kennedy, technical secretary, of the American Foundrymen's Association were present. The foundrymen will hold their annual convention and exposition in the same place the week of May 12, 1930. Most of the board of directors were in Cleveland for a meeting Sept. 12 and 13.

* * * * *

COMMITTEE meetings of two other technical organizations were held during the week. Several committees and subcommittees of the A. S. T. M. held routine sessions. There were also conferences of one or two committees of the A. F. A.

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HAS the A. S. S. T. a "main spring"? It certainly has in the person of its efficient secretary, William H. Eisenman. For 11 years he has been indefatigable in developing an organization having one chapter with 200 members to one of over 35 chapters with about 5900 members in units operating from coast to coast.

* * * * *

SOON after entering the main part of the Public Auditorium, where most of the steel company exhibits were located, the impressive figure of a portly and gaily decorated Indian effectively called attention to the exhibits of J. B. Ford & Co., Wyandotte, Mich.

THOSE in charge of technical sessions are to be commended on the manner and smoothness with which they were conducted. Excellent chairmen were provided, insuring the success of any such meeting. Liberal written discussions of most of the papers helped to keep the wheels turning and the interest keen.

* * * * *

A NOVELTY in distributing favors was the presentation of a card entitling the one whose name appeared on the card to an airplane ride over Cleveland and vicinity in one of two planes owned by the General Alloys Co., Boston. The airplanes are six-passenger Stinson cabin monoplanes powered with Wright whirlwind engines, 220 and 300 hp. respectively. All flying was under the supervision of "Dal" Speer, assistant sales manager, G. A. Co.; he is a captain in the United States Air Service, has had 12 years flying experience and over 6000 air hours.

* * * * *

MANY a steel treater thought he saw a distinguished American diplomat in the corridors of the Hotel Cleveland. It was none other than the genial "Doc" Langenburg, whose resemblance to General Dawes is striking—particularly when he has that pipe (not underslung however) in action and his Fedora hat at the proper angle.

member for the Goodyear Zeppelin dirigible also attracted interest, as did a large ornamental street light bracket of cast aluminum.

Another field into which the aluminum industry has entered, as was shown by exhibits, is the manufacture of furniture. What can be accomplished in decorative work was shown by a spandrel made of an aluminum casting with enamel design baked on in colors. Another non-ferrous metal exhibit showed zinc products in die-castings and rolled form.

Welding machines of numerous types for various forms of welding were exhibited and indicated the carrying on of important development work in this field. Several were working units that attracted much attention. Numerous samples of welded joints were shown and these, with the welding machines and numerous exhibits of welding accessories, indicate the important place that welding has taken in the metal-working industry.

Welding and Other Machinery

Working exhibits included an automatic welding machine for pipe seam welding. Another operating unit was an automatic arc welder for welding circular joints, this being operated in adjoining pipe sections. Among interesting examples of welding was an airplane fuselage made of chrome-molybdenum tubing with welded joints, the welding of Ford car parts and the arc welding of thin sheets of steel and of aluminum and copper alloys. Displays of welding and cutting torches and accessories were numerous.

Machinery of various types was exhibited by a number of makers. These included die making machines, jig borers, punches and shears, drilling machines, sawing machines and polishing and grinding machines.

Many Steel Companies There

Many other important displays cannot be referred to in this necessarily brief report. It should be mentioned, however, that the exhibits of steel companies, both American and foreign, were more numerous and comprehensive than ever before.

Total space devoted to the National Metal Exposition was about 80,000 sq. ft. of which 20,000 sq. ft. mostly steel companies was in the main auditorium and 60,000 sq. ft. in the annex where the working exhibits were located.

Commercial Steel Treaters Organize

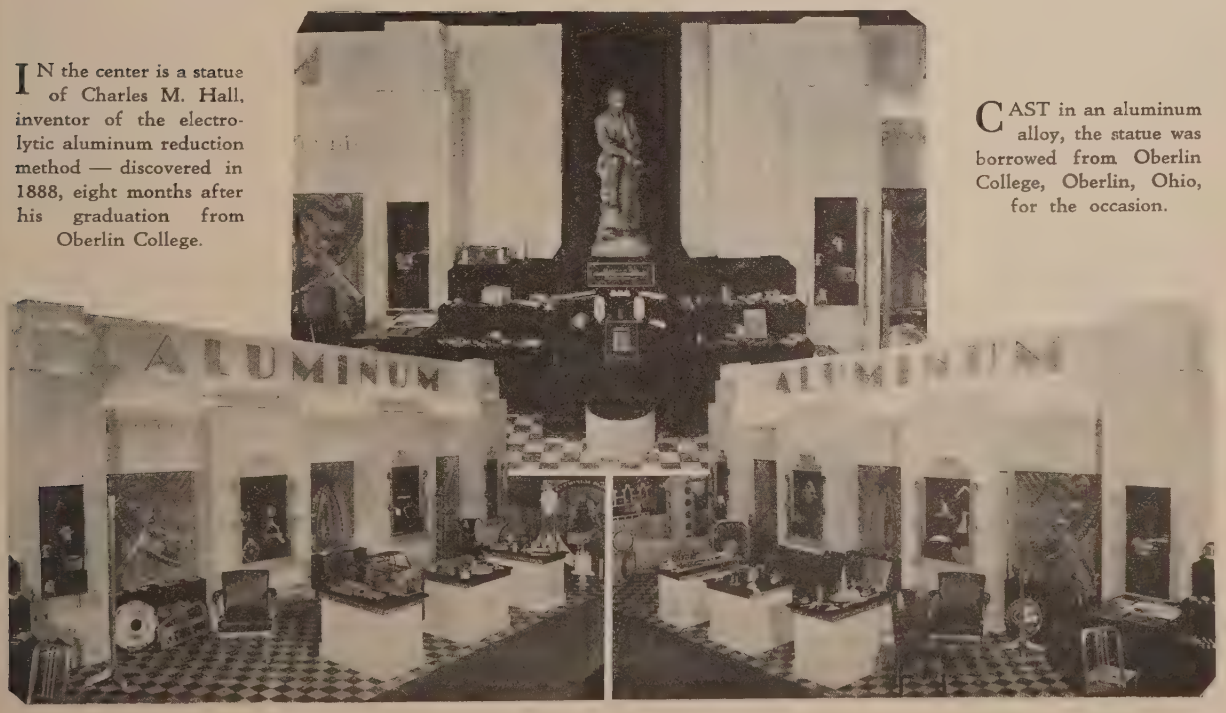
Several commercial heat treaters held a meeting in Cleveland last week during the Steel Treaters' Convention to discuss plans for a permanent organization with a view to cooperating in publicity and other work that would tend to serve their industry. Those present were Theodore Barker, president Accurate Steel Treating Co., Chicago; O. T. Muelemeyer, O. T. Muelemeyer Co., Rockford, Ill.; President Lindberg of the Lindberg Steel Treating Co., Chicago; A. D. Bach, president New England Metallurgical Corporation, South Boston, Mass.; C. W. Derhammer, Lakeside Steel Improvement Co., Cleveland; N. M. Salkover, vice-president, Queen City Steel Treating Co., Cincinnati, and Stanley P. Rockwell, S. P. Rockwell Co., Hartford, Conn. Other commercial steel treaters who might be interested in joining an association are invited to get in touch with any of the men who attended the Cleveland meeting.

British Researches In Metals

Important metallurgical researches under way at the National Physical Laboratory, Teddington, England, include a search for a stainless iron-nickel-chromium suitable for castings; a microscopic examination of specimens in a vacuum under high temperature and load (creep); a study of the effect of gases on the solidification of steel ingots; the determination of the equilibrium systems iron-silicon and iron-manganese; and the effect of considerable quantities of phosphorus, arsenic, bismuth and antimony upon copper.

Impressive Display of Progress in Aluminum

IN the center is a statue of Charles M. Hall, inventor of the electrolytic aluminum reduction method — discovered in 1888, eight months after his graduation from Oberlin College.



CAST in an aluminum alloy, the statue was borrowed from Oberlin College, Oberlin, Ohio, for the occasion.

Notable Symposium on Nitriding

Dr. Fry, German Originator of Process, Discusses Recent Developments, and Eight Americans Contribute Results at Valuable Session of Steel Treaters

HARDENING steel with ammonia gas, or nitriding, was given special prominence at the National Metal Congress last week at Cleveland. With the German originator of the new process and the French promoter of its commercial use outside of Germany both present, unusual color was lent to the symposium on the subject that was held Sept. 13. It was a rare one-topic technical program even for the American Society for Steel Treating. Besides eight papers by Americans who have been working on the process, there was an address by Dr. Adolph Fry, Krupp Laboratories, Essen, Germany, and brief remarks by Dr. Paul Aubert, Aubert Frères & Duval, Paris, France.

That there is keen interest in this subject is evident from the attendance—at least 600 at the morning session in the ballroom of the Hotel Cleveland and over 400 at the afternoon session in a special room in the Public Auditorium. Contributing materially to the success was the efficient guidance of the sessions by the two chairmen, Dr. George B. Waterhouse, professor of metallurgy, Massachusetts Institute of Technology, Cambridge, Mass., and H. J. French, metallurgist, International Nickel Co., Bayonne, N. J. In this report it is possible to touch only on a few of the chief points brought out by the papers and the many discussions. The entire proceedings are to be issued by the A. S. S. T. as a special edition of the *Transactions* within the next six weeks; no papers were preprinted.

Nature of the White Layer in Gun Tubes

Not until nitriding was studied was it really known what causes the hard layer inside of large guns after firing, said Dr. H. H. Lester, Watertown Arsenal, Watertown, Mass., in opening the program with his paper "The White Layer in Gun Tubes." This hardness is caused partly by solution of the nitrogen in the steel. It is possible to have an austenitic nitride case. This case has possibilities of superior characteristics; it is tougher and more adherent. The austenitic case may be obtained with other than aluminum steels. Dr. Lester expresses the opinion that by proper cooling the case may be martensitic and that it may be subsequently tempered to give desired characteristics. Many slides were shown of the layer and structure in gun tubes.

Both Dr. V. O. Homerberg and Dr. John P. Walsted of the Massachusetts Institute of Technology said that Dr. Lester's views are confirmed by their own laboratory work and that the white layer is due to a solution of the nitrogen.

Besides a paper by Dr. Fry, not scheduled, three contributions were read and all were discussed together. The three papers were: "Observations in the Iron-Nitrogen System" by Samuel Epstein, Illinois Steel Co., South Chicago, Ill.; "A Study of the Nitriding Process" by Prof. V. O. Homerberg, and Dr. John P. Walsted, Massachusetts Institute of Technology; and "Researches in Nitriding Steels" by Prof. O. E. Harder, J. T. Gow and L. A. Willey, University of Minnesota.

Dr. Fry Offers Latest Developments

All results of investigations here thus far are in agreement with those in Europe, said Dr. Fry in his interesting address. When nitriding is properly carried out, certain hardness with no distortion is achieved. The physical properties of the core are not changed and the hardness and wear-resistance are higher than by any other process. Hardness is not injured by drawing to even above 950 deg. Fahr., and nitrided parts are free from internal stresses and aging effects, and are rustless. The process is adopted to various applications having varying requirements—select the nitralloy of proper composition. Best results are obtained by quenching and tempering the raw material, then by machining and nitriding.

Conditions which should be avoided, continued Dr.

ADOLPH FRY

PAUL AUBERT

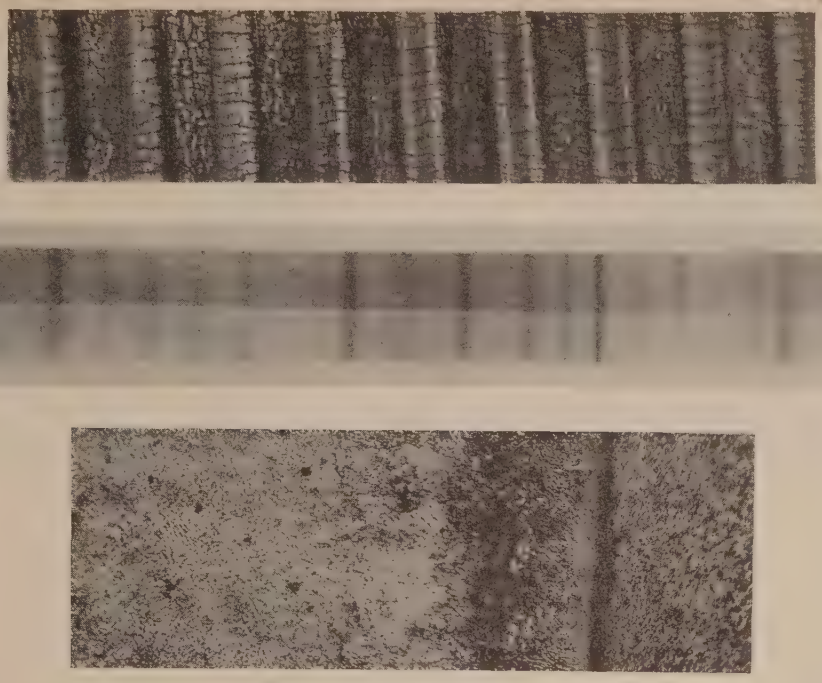
C. K. EVERITT

Three Visitors from Abroad to the Symposium

Dr. Fry of Germany Is the Originator of the Nitriding Process

Paul Aubert of France Is the Commercial Developer of the Method

C. K. Everitt of England, Producer of Special Alloy Steels, Addressed the Symposium



Section of Trepanned Ring (Upper) Taken from Bore of 12-In. Gun, Photographed at Natural Size
X-Ray Diffraction Spectrum (Center of the White Layer of a 12-In. Gun Tube Nitride Case from Outer Surface (Lower) of 50-Calibre Rifle Barrel, x 100.
(All from Doctor Lester's Paper)

Fry, are: Surface oxidation; foreign metals touching the nitralloy, such as nickel not saturated with nitrogen; and foreign substances in the ammonia, such as air or water.

Some points not yet in agreement, said Dr. Fry, are: Experiments with higher pressures must be carried out in more detail; higher nitriding temperatures shorten the time of nitriding but will entail disadvantages and may even be dangerous.

Nitriding Not Yet Fully Explained

There is not yet a complete and well substantiated explanation for nitriding hardness, said Dr. Fry, who advocated the use of all researchers of the Vickers or Firth figures. Continuing to discuss the theory, he said that the hardness of the nitrided layer is not to be attributed to the hardness of the alloy nitrides themselves. It may be suggested with some assurance that the mechanism of the nitrogen hardening bears some resemblance to quenching and hardening steels in so far as both seem to be caused by space lattice distortion.

Practical Problems Outlined

Among practical problems of nitriding, the German inventor enumerated the following: Getting more experience in choosing the best nitralloy for each purpose. Machining of nitralloy with even higher core strength without leaving machining stresses. Making drop forgings and hot-pressed pieces free of surface oxidation which would otherwise cause inferior quality of the nitrided layer. Research on nitriding cast iron. Catalysts as nitriding agents.

Abstracts which would do justice to the three authors enumerated above are not possible here. They will be printed in an early issue. In Mr. Epstein's paper a tentative diagram of the Fe-Ni system has been drawn in which modifications of the two existing diagrams by Fry and Sawyer are proposed. Dr. Homerberg's splendid contribution is mainly a study of four steels selected for investigation of the influence of nitriding on the core properties. It is shown that the reduction of impact value is not due to the presence of nickel and that molybdenum as an alloying element is valuable in preventing the reduction of impact resistance. Some fine slides of photomicrographs of case and cores with superior structures were shown, resulting from various heat treatments. Dr. Harder's excellent paper presents a comprehensive study of the availability of a long series of steels, alloy and non-alloy, for nitriding.

Prominent British Metallurgist Speaks

Before the close of the morning session Dr. Waterhouse called to the platform a prominent English metallurgist visiting the National Metal Exposition—C. K. Everitt, managing director and works manager, Edgar Allen & Co., Ltd., Sheffield, England.

Apart from the advantages of hardening by nitriding with the elimination of distortion, Mr. Everitt said he was not sure that the older processes did not possess some advantages in the fact that rolling and wearing parts require grinding.

High-Frequency Furnace Commended

The call for alloy steels is tremendous and in this field the high-frequency electric furnace is to be a large factor. The Edgar Allen company was one of the first to install this unit on a commercial scale, he said, and it has been found very valuable commercially and experimentally. It is extremely useful for higher alloy steels. A 600-lb. furnace is making 30 to 40 tons of high-grade steels per week at Sheffield and the ingots range in size from 3 in. to 6 in. square. It is economical; about 830 kwhr. is the experience per ton of steel. "I want to

American Sontributors on Nitriding of Steel

HORACE H. LESTER | A. B. KINZEL | ROBERT SERGESON | JOHN P. WALSTED | O. E. HARDER

testify to the practical usefulness of such a convention and exposition as this and am glad to be present. After my last visit of six years ago, I note great progress in your wonderful country."

Other Phases of Nitriding

INTRODUCING the afternoon session two of the four papers were presented first: "Investigations in Nitriding" by Robert Sergeson, Central Alloy Steel Corporation, Canton, Ohio, and "A Few Practical Fundamentals of the Nitriding Process" by H. W. McQuaid, Timken-Detroit Axle Co., Detroit.

New data are offered by Mr. Sergeson as to the effect of (1) increased flow of ammonia gas, (3) effect of increase of nitriding temperature in lowering hardness of the case, (3) effect of varying aluminum content, (4) effect of nickel, and (5) duplex methods of nitriding. A method of removing brittleness is made public. Nitrided and carburized cases are compared in respect to hardness penetration and effect of reheating temperatures on the hardness of the case.

Nitriding Plain Carbon Steels Possible

Plain carbon steels can be nitrided just as hard as nitralloy steels was the surprising statement of Mr. McQuaid. Desiring materials better than the case-hardened, Mr. McQuaid said his company approached the subject from the users' standpoint. Nitralloy steels can be nitrided commercially so that they are superior to carburized steels, except in machinability. They are all white hard, resist corrosion, do not distort and possess high impact values. Stainless steels cost 20c. to 30c. per lb. while nitrided are 7c. to 12c. per lb. There is no loss due to grinding cracks. His plant is operating night and day on nitriding plain carbon and other steels. The steel must be put in the sorbitic condition but nitriding steels require higher temperatures and a severer quench. Mr. McQuaid said he was an advocate of duplex nitriding—at high, then low temperatures.

New Etching Solution Explained

A new etching medium which he claims brings out better the constituents of nitrided steels was mentioned by A. B. Kinzel, Union Carbide & Carbon Research Laboratories, Long Island City, N. Y. It is, briefly, absolute alcohol with enough water to hold copper sulphate and copper chloride in solution. It is slightly acidulated.

Pointing out the remarkable parallelism of effort revealed by the papers, G. H. Eaton, Molybdenum Corporation of America, Pittsburgh, made a plea for the parcelling out of various lines of work and recommended careful check of all work by duplicate tests, suspecting that this had not always been the case. It was announced that a committee, with Dr. Homerberg as chairman, had been appointed with the aim of systematizing all investigation.

Some interesting observations were made by Sam Tour, New York. In his war and post-war experience it had fallen to his lot to try to find a steel that would stand up in the reaction chambers of synthetic ammonia plants—evidently the nitride case breaks down after heat treating following nitriding. Also impurities in the ammonia should be guarded against.

That nitrided steels containing inclusions result in pitting was the experience of V. T. Malcolm, Chapman Valve Mfg. Co., Indian Orchard, Mass., as well as their corrosion in ordinary tap water. Suitable nitralloy steel properly nitrided, he testified to as very valuable in high temperature, high pressure steam valve applications, and showed on the screen many views of nitrided products and their long life.

Short-Time Nitriding in Molten Salts

SPEEDING up the nitriding of steel was dwelt upon by A. B. Kinzel and J. J. Eagen, Union Carbide & Carbon Research Laboratories, in a paper "Short-Time Nitriding of Steels in Molten Cyanides." The authors claim good results in much less time than the 90 hr. for ammonia nitriding by nitrogen concentration and close contact. Liquid media were investigated and a mixture of sodium and potassium (53 per cent) used. Very satisfactory results are claimed with a case of 0.005 in. obtained in one to two hours. In wear tests some of his products under corrosive conditions have exceeded 66,000,000 revolutions as compared with failures of carbon steels at 17,000,000 revolutions. The authors claim the case obtainable to be three times as hard as that by the ammonia hardening.

The last claim was taken exception to by Dr. Homerberg who pointed out that with a Brinell hardness of 1000 with ammonia, it was impossible to increase this threefold. To this Mr. Kinzel replied that everything depends on the method of testing the hardness. As to a criticism that the same results would not be obtained with commercial salts as contrasted with the pure salts used by

the authors, Mr. Kinzel stated that equally good results had been secured with regular products.

Practical Use of Nitrided Products

Some important practical applications of nitrided products were described by V. T. Malcolm, Chapman Valve Mfg. Co., in a paper which closed the symposium—"Using Nitrided Steels in High Temperature, High Pressure Service." The author's experience with these steels has evidently been broad. He threw on the screen numerous views of the successful use of nitrided valve rings and other parts which had outlasted some other materials such as rustless iron. He declared that nitrided steels do resist corrosion at high temperatures and high pressures and are very hard. Their chemical stability is a property and their resistance to wear, abrasion and erosion is unquestioned in his experience. These steels combine hardness and toughness with extreme hardness on the outside and are suitable for valve rings and disks. Such steel is machined before treatment and not ground.

Welders Devise Non-Destructive Tests

Methods Described Whereby Strength of Joint May Be Investigated Without Pulling It Apart—Welding of Pressure Drums and Thin Sheets Also Discussed

TWO features of the fall meeting of the American Welding Society are of note. One is the evident progress toward the solution of the problem of non-destructive tests, and the second is the number of contributions from university laboratories and research students. Beyond these were the many technical and committee meetings, the exhibit (held in conjunction with the Steel Treaters), and the usual social functions. Perhaps the two features mentioned above are evidences of one main line of progress toward reliable joints by welding. At any rate, time was not so long ago that the welding fraternity discouraged and discounted heavily any work done in academic circles because of the suspicion that the joints made by unknown welders might not be representative of what could be expected in standardized practice.

Portable Testing Machine for Pipe Joints

F. G. Tatnall, Southwark Foundry & Machine Co., Philadelphia, read a paper on "How to Test Welds," in which he discussed the tensile test as made by a hydraulic testing machine and recorded electrically on a Leeds & Northrup potentiometer and the bend extensometer described in THE IRON AGE, Sept. 6, 1928, page 575. Other devices for recording at a distance by telemeter were described in detail. But it was pointed out from the floor that tests of completed structures, whether welded or made by any other means, are properly the function of the designing engineer or the architect representing the owner. Furthermore, such details as the speed of testing should be resigned to the materials testing specialist. Welding engineers should be primarily interested in testing the qualities of the welded joint, and these tests should simulate as nearly as possible the strains which must be resisted by the weld metal in service. In other words, pipe joints should be tested in tension, structural joints ordinarily in shear and so on.

A tension testing machine, portable enough to be taken into the field, and rugged enough to stand rough treatment, has been developed by Mr. Tatnall's firm in conjunction with Union Carbide & Carbon Research Laboratories. It is contained in a shortened oxygen cylinder. One end contains a hydraulic pump, hand operated, which exerts stress on the specimen by means of suitable spherical clamps. A hinged door is cut into the side of the cylinder, permitting the test specimen to be inserted in the grips. Stress is read from a removable pressure gage. The whole machine weighs about 200 lb., and has an accuracy of about 2 per cent even after having been dropped 5 ft. on a concrete floor. It is designed to be taken into the oil fields and test coupons cut from steel pipe joints by a portable milling machine. (The slots in the pipe are later welded shut.) In this way any suspicious joint can be checked immediately, and if necessary the welder's work corrected. It was noted, however, that the welding of slots in closed pipes was liable to introduce strains of greater moment than the defect which might be discovered, and consequently the use of field testing should be confined to the occasional task of checking, at irregular intervals, the work of qualified welders and inspectors.

Detecting Flaws With Heavy Electrical Currents

Elmer A. Sperry, president American Society of Mechanical Engineers, wrote a paper for this meeting entitled "Non-Destructive Testing of Welds," in which he described a machine built along the lines of the one for detecting rail fissures* but adopted for boiler drums. Reference to the citations will show that the machine includes a powerful direct current generator, which by means of suitable contact brushes passes several thousand amperes of low voltage current through the metal to be tested. Three lighter contacts set fairly close together by-pass a little of this current if deflected by an internal flaw, and these variable currents are magnified by familiar vacuum tubes until they are powerful enough to throw aside a stylus on a recording chart.

While the machine is still in experimental development for welded joints in steel plates, it has great possibilities as proved by its success when mounted in an inspection car and used for detecting internal fissures in railroad rails. It can detect openings of microscopic width; thus, the surfaces of contact between a pair of Johannsen blocks, held together with 5000 lb. pressure, gave a resistance per unit length 175 times that of the sound metal.

"Listening-In" on Defects

A simple scheme for testing welds without destroying them was described by C. O. Burgess, A. B. Kinzel and A. R. Lytle, Union Carbide & Carbon Research Laboratories, Long Island City, N. Y. ("Non-Destructive Testing of Welds with the Stethoscope and X-Ray"). It merely consists of a physician's stethoscope and a peen hammer. The observer taps the plate or joint, systematically covering the area, and listening to the tone emitted through the stethoscope. According to the authors, the quality of tone is such that fairly small internal defects may be spotted, and is so definite in nature that various laboratory men with no previous experience with the method were able to duplicate each

*See THE IRON AGE, Oct. 11, 1928, page 907; Nov. 1, 1928, page 1089; Nov. 15, 1928, page 1214.

other's operations. A number of plates welded by student members were explored in this way, and then the joints X-rayed at the suspected spots. In all cases flaws were shown on the films, either when the rays penetrated parallel to the scarf or perpendicular to the plate Sufficient experience has been had with the combined method—stethoscope and X-ray—so that the authors are able to predict the strength of a welded joint containing slight defects within an accuracy of 3000 lb. per sq. in.

Boiler Code to Be Liberalized

This progress toward the non-destructive testing of welds was pronounced by C. W. Obert, secretary of the American Society of Mechanical Engineers' Boiler Code Committee, to be one impressive factor which will enable welding to rise above its present limitations as a joint for pressure vessels. This remark was made in discussing a brief paper on "Foreign Practice in Welding of Boiler Tubes and Drums" by G. A. Orrok. Mr. Orrok reports that high pressure shells are usually hammer welded up to 2 in. wall thickness. Boiler drums with forged ends welded with the oxy-acetylene process are quite common.

Both gas and electric welding are used for penstocks, which are welded as a rule. European boiler makers are apparently adopting welding and cutting as production tools at a rapid rate, and Mr. Orrok mentions particularly that the two objections commonly heard of late years, namely, the lack of resiliency in weld metal and the variation in welder's skill, are heard less and less often, due to improved methods of welding, proper inspection, accumulated experience and the large amount of test data.

Further in commenting upon these European conditions, Mr. Obert said that the Boiler Code Committee is about ready to promulgate a revision of the unfired pressure vessel code, allowing all-welded drums up to 60 in. diameter, 200 lb. pressure, and stress on butt welds a maximum of 8000 lb. per sq. in. These revisions have been made after receiving the cooperation of a committee from the American Welding Society. The latter was able to submit recommended procedures for manual welding by both gas and arc process which, if followed, would in all probability produce an eminently satisfactory joint.

At the present time, however, welding seems to have 1½ in. plate as a maximum limit; forged drums are very expensive, consequently the field is open for fusion welding. In Mr. Obert's opinion, automatic arc welded drums would be admitted within the provisions of the code as soon as the Welding Society could propose a recommended procedure. This has been hampered so far by the secrecy of the firms who have been successful in this line.

Correcting Magnetic Blow When Welding Thin Sheets

W. L. Warner, General Electric Co., Schenectady, N. Y., presented an interesting discussion of "Automatic Arc Welding of Thin Sheets." It is known that a good butt joint is difficult to make by arc welding in sheets of 12 to 14 gage, because the arc burns holes in the metal if the travel is slow enough to give sufficient time to melt and alloy the abutting edges. In order to keep the work in line and prevent distortion, rigid clamps and a backing bar are required. These necessary adjuncts introduce serious magnetic field, induced by the welding current, which cause marked instability in the flame, pulling it forward at the beginning of the seam, and blowing it backward at the end.

Mr. Warner described a device to correct this in the form of an insulated conductor loop placed close up to the under side of the copper backing bar. The operator sends a certain portion of the welding current through this loop, regulating its intensity sufficiently to counteract the "blow" mentioned below. By this device, clean steel sheet with carbon less than 0.25 per cent can be welded commercially into a joint of 85 per cent efficiency. Fourteen gage has thus been welded at a speed of 29 in. per minute (speed on 14 gage range boilers is about 16 in. per minute). Sixteen gage butt welding is about the mimimum limit for butt welds, although 4-ply edge welds on 18 gage stampings for automatic mufflers are being welded at 50 in. per minute.

It is not always necessary to weld clear through to the bottom of the seam. For instance, banjo rear axle housings for light cars are made from 3/16-in. stampings. Welds at the rate of 22 in. per min. are made, with only two-thirds penetration, since it is found that such a joint is oil tight and sufficiently strong. Galvanized iron may also be welded at high speed and partial penetration in order to avoid volatilizing all the protective zinc on the inside of the seam.

Manually, this magnetic blow may be corrected in several ways, as noted by different commentators. The simplest is to hold the electrode in such a way that it points in the direction of blow. Magnetic blow does not exist in fillet welds; in butt welds it can also be minimized by tack-welding the joint at the ends, thus closing the magnetic circuit, or by running a light bead on the back side of the joint. Or, as other speakers remarked, it might be avoided altogether by the use of atomic hydrogen or oxy-acetylene welding.

Corrosion of Steels and Irons in Sea Water

Five years ago the British Institution of Civil Engineers caused to be exposed in four marine locations several concrete frames containing bars and assemblies of commercial construction materials. Three identical frames were in each exposure, one to be examined after five years, the next after 10, and the last after 15. A report has now been issued in which Dr. J. Newton Friend discusses the results of the five-year tests.

In detail many differences in the behavior of the metal have been observed. Thus at Colombo the completely submerged bars corroded about 10 per cent more than at Plymouth, but in alternate wet and dry exposures the ratio of corrosion was anything from three to six times, and the air exposures 10 times as great.

The most resistant alloy tried was the 36 per cent nickel steel; next is usually the 13.5 per cent chromium steel (although in wet and dry exposure at Colombo this was virtually destroyed by localized corrosion). Cast iron is nearly as good as these two in most exposures. Additions of ½ and 2 per cent copper were also very effective.

Data on Chains and Belts for Conveyors

A comprehensive general catalog, No. 330, has been issued by the Chain Belt Co., Milwaukee, in a book of more than 800 pages measuring 7½ x 10½ in. This gives a great amount of information, with illustrations, pertaining to the products manufactured by both the Chain Belt Co. and its subsidiary, Stearns Conveyor Co. Many of the illustrations show installations of the equipment manufactured, and the list of industries served is impressive. Other illustrations, and they are numerous, show parts of the equipment in conjunction with tables of dimensions, prices, code numbers and other pertinent data.

Nearly 250 pages are taken up with the description and information regarding chains and sprocket wheels. Belt power transmission, gearing of various types, shafting, clutches, bearings, elevator buckets and bucket elevators, skip hoists, hoppers and feeders, apron and pan conveyors, belt conveyors, screw conveyors, slat conveyors and many auxiliary features follow. Overhead suspended conveyors are given a section, while those specially devoted to foundry use are handled separately. A 14-page index completes the work.

Second Machine Tool Exposition Will Have Many New Developments

WITH the machines and other products of some 240 companies on display in almost 100,000 sq. ft. of floor space, and with many new developments, amounting in some cases to innovations, the second National Machine Tool Builders' Exposition to be held in the Public Auditorium, Cleveland, Sept. 30-Oct. 4 should prove even more interesting and profitable to metal-working executives than the 1927 exposition.

Floor space occupied, both gross and net, and the number of exhibitors are larger than previously by some 30 per cent. The gross floor space this year totals more than 136,000 sq. ft. At the first show more than 500 machines were in operation and there were extensive displays of small tools, gages and other equipment; this year's show will be larger in both respects. Machinery will be tooled for production work on automobile, airplane engine, locomotive and other parts, and machine tool executives, designers, and others in attendance will exceed 3000.

Although the past two years have been a busy period for most machine tool builders, it will be evident that development work has not been neglected. On the whole, equipment is heavier, more powerful and faster, has more automatic features and is handier to operate than even a few years ago. Flexibility, enabling convenient change-over for mass production of different pieces, is notable in many lines. Hydraulic feeds are increasingly applied, and their use extended to at least one automatic lathe. Ball and roller bearings are even more widely used than heretofore, and automatic lubrication is applied wherever possible.

Then there is the tungsten carbide cutting tool, with its full production possibilities still a matter of investigation. Comprehensive data regarding application of this material may be had at the Show, not only from manufacturers who will display and demonstrate these tools in turning and other operations, but from makers of small tools and from a number of machine tool builders who have experimented with these tools in connection with their own machines.

The Machine Tool Congress, the production group of the Society of Automotive Engineers, and the machine-shop practice division of the American Society of Mechanical Engineers will hold technical sessions in Cleveland during the week of the exposition.

Some of the equipment to be exhibited is briefly described and illustrated in following pages. A list of companies exhibiting, with enumeration of products to be shown and names of representatives in attendance, is also given. Other new developments seen at the Show will be included in forthcoming issues of THE IRON AGE.

Exhibitors and Products to be Shown at Machine Tool Exposition

A

Abrasive Machine Tool Co., East Providence, R. I. Booth 2W 5.
No. 3 surface grinder, 22 x 8 x 12 in.; No. 33 surface grinder, vertical spindle, 22 x 7 x 12 in.; No. 5 surface grinder, 48 x 14 x 14 in.; dust exhaust attachment; wet grinding attachment; magnetic chucks; self-contained d. c. generator; dial test indicator; 8 in. index centers; 8 in. semi-direct index centers. Represented by: F. N. MacLeod, N. D. MacLeod, C. G. MacLeod, K. B. MacLeod, W. Sceeles, E. S. Cornell.

Acme Machinery Co., Cleveland. Booth 2D 5.
Acme all-steel bolt heading, upsetting and forging machine; bolt threading machine, cutting standard style of thread; semi-automatic nut threading machine; nutting-up machine. Represented by: H. N. Anderson, sales manager; R. D. Davies, secretary and treasurer; K. F. Bruch, vice-president.

Acme Machine Tool Co., Cincinnati. Booth 2B 14.
17 and 4½ in. Cincinnati Acme full universal hexagon turret lathe: No. 1 Cincinnati Acme semi-universal hexagon turret lathe. Represented by: Charles Meier, Fred Winkelman, W. Behrens, H. V. Myers, Lee G. Leon.

Ahlberg Bearing Co., 317 East Twenty-ninth Street, Chicago. Booth 4W 10.
"CJB" Master ball bearings; Ahlberg ground bearings. Represented by: C. J. Bender, president; G. L. McGregor, assistant sales manager; B. B. Clark and R. H. Kelly, district sales managers; B. S. Okner, chief engineer.

Charles G. Allen Co., Barre, Mass. Booth 1W 11.
Sensitive ball bearing drilling and tapping machines. Represented by Charles G. Allen, Charles G. Allen, Jr.; John S. Wecks.

Allis-Chalmers Mfg. Co., Milwaukee. Booth 5C 11.
"Texrope" speed reduction unit in operation; totally inclosed fan cooled motor; squirrel case induction motor; d. c. machine tool motor. Represented by: A. H. Wyman, district manager; V. E. Walters, W. F. Sheriff, M. V. Bailliere; F. A. Miller, salesman, Cleveland district; L. E. Grothaus, assistant manager, electrical department, Milwaukee; J. C. Rattermann, assistant manager, electrical department, Norwood, Ohio; Walter Geist, assistant manager, milling department, Milwaukee.

American Broach & Machine Co., Ann Arbor, Mich. Booth 1W 22.
Hydraulic, vertical and horizontal broaching machines; broaching tools; hydraulic presses. Represented by: Francis J. Lapointe, president; David A. DeLong, secretary; J. A. Livingstone, sales representative; William Pfeil, tool designer; J. E. Jones, engineer.

American Tool Works Co., Cincinnati. Booth 2D 3.
Lathes, radial drills, shapers—all motor driven. Represented by: J. B. Doan, president and general manager; A. E. Robinson, works manager; R. S. Alter, vice-president and foreign manager; L. W. Scott Alter, assistant to president; J. C. Hussey, sales manager; H. W. Schatz, Eastern sales manager; D. M. Bartlett, C. H. Cormany.

Armstrong-Blum Mfg. Co., Chicago. Booth 4A 5.
Marvel metal band sawing machine; automatic high-speed saw; hack sawing machines; high-speed edge hack saw blades. Represented by: Harry J. Blum, George J. Blum, Fred J. Blum, Stanley A. Woleben, H. Conrad, Walter S. Ryan, J. E. Van Doren.

Armstrong Brothers Tool Co., 317 North Francisco Avenue, Chicago. Booth 4C 2.
Lathe, planer and shaper tools; lathe dogs; clamps; ratchet drills; drop forged wrenches; pipe vises; pipe cutters; stocks and dies; pipe wrenches; machine shop specialties. Represented by: Horace Armstrong, A. Arbogast, S. W. Welter, George Nufer.

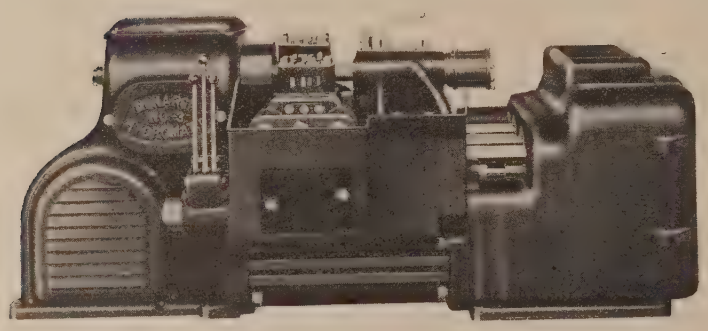
Arter Grinding Machine Co., Worcester, Mass. Booth 1W 8.
12-in. rotary surface grinder with magnetic chuck, wet grinding equipment, including pump and tank, arranged for motor drive complete with motor; No. 132 automatic cylindrical grinder with wet grinding equipment including pump and tank, with complete tooling for grinding valve stem guides, arranged for motor drive complete with motor. Represented by: William Arter, president; Warren F. Fraser, works manager; Albert B. O'Donnell, sales manager.

Associated Machine Tool Dealers, 551 Washington Boulevard, Chicago. Booth 2W 0.

E. C. Atkins & Co., Indianapolis. Booth 5C 6.
No. 18 "Kwik-Kut" power hacksaw; No. 7 Kwik-Kut power hacksaw; No. 4 metal cutting bandsaw; Silver-Steel hack-

Continued on Page 807

Automatic Lathe with Hydraulic Feeds



AN automatic lathe featuring hydraulically-actuated carriages and tool slides and simplified mechanical construction, resulting in increased production and lower unit cost, will be introduced by the Monarch Machine Tool Co., Sidney, Ohio. Cams and feed gears are eliminated and the carriages and tool slides travel on round steel bars instead of the usual cast iron ways.

The feed cycle, consisting of rapid approach to the work, feed at a predetermined rate or rates, and rapid return to the starting position, is automatically controlled. Positive adjustable diameter and length stops facilitate accurate duplication of cuts.

The headstock unit is a separate casting and houses the motor, which drives the spindle through silent chain or belt, multiple-disk clutch, worm gearing and pick-off change gears at the front of the headstock. Timken roller bearings are used throughout, and all revolving parts dip in oil. In the headstock is an 80-gal. per min. coolant pump, driven from the main motor. One lever starts and stops the spindle, coolant pump and hydraulic feed of both carriages. The middle section of the machine contains a large cast iron chip pan and coolant reservoir and is keyed and bolted to the head stock and tail-end housing. The latter houses the hydraulic mechanism, including two Oilgear hydraulic pumps, driven by a single 2-hp. motor, which is readily accessible through large doors at the end.

Each carriage is mounted on a 5-in. and a 6-in. diameter steel bar, the former on the outside and the latter on the inside. The 6-in. bars are anchored in the head and tail housings, while the 5-in. bars are slidably mounted in bushings in the same housings, the carriages being clamped to them. This provides wide area of support and prevents cocking or twisting of the carriage under heavy cuts.

Tool slides are supported on two round hardened steel bars and have split adjustable taper bushings to compensate for wear. The cross-feed hydraulic cylinder is located between the two tool slide supporting bars. Either tool slide can be reversed instantly and returned to the starting position from any point in the cycle. The tailstock clamps on the two inside 6-in. diameter bars on which the carriages slide.

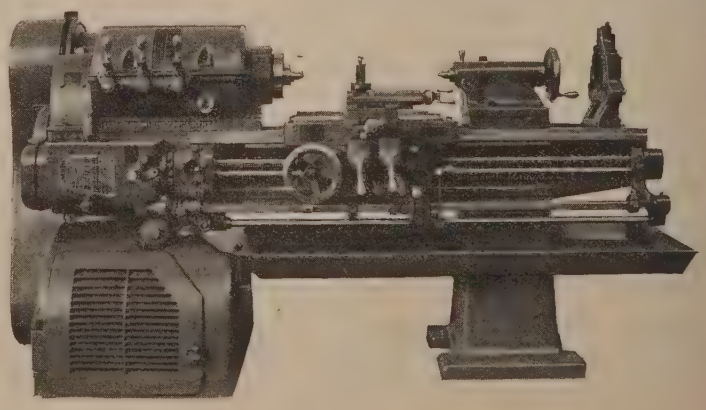
The hydraulic feeds provide unusual flexibility, and because of their cushioning effect more pieces are produced between tool grinds. Quicker set-up and change from one job to another permits the machine to be used economically for short runs. It is also stated that heavier cuts can be taken than usual on a machine of this type, and the high spindle speeds and rugged construction adapt the machine for tungsten-carbide cutting tools.

Improved 14-In. Selective-Head Engine Lathe

IMPROVEMENTS intended to facilitate operation, both in manufacturing and tool room work, have been incorporated in a new 14-in. selective-head engine lathe of the Lodge & Shipley Machine Tool Co., Cincinnati. The machine is of generous size, the swing over the bed being 16½ in. and over the carriage, 10½ in.

Twelve spindle speeds are obtainable through gears sliding on splined shafts. There are only 12 gears, all of which are hardened. In addition to the spindle, there are only two shafts in the headstock, and these are carried on ball bearings. All of the mechanism is located in the lower section of the headstock. Gears run in oil, the splash system being supplemented by a pump that drenches the entire interior of the headstock, including the white-metal spindle bearings. The headstock pulley has an improved type of disk clutch, which is operated by levers at the apron and at the headstock. A new feature is the reverse to the lead-screw operated by a lever at the right of the apron. The lead-screw and feed rod can be thrown out of use through a clutch at the feed box end so that only one of these members is operating at one time.

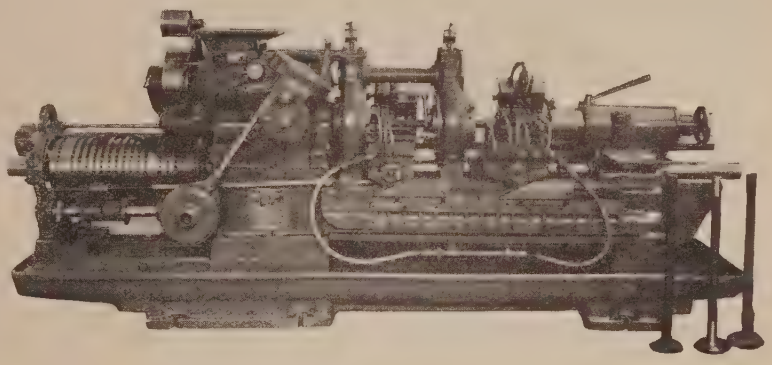
The motor base of the machine houses the motor at the rear, and a compartment, reached through a large door at the front, incloses the starting equipment. An automatic belt tightener of weighted idler pulley type is provided for the flat belt that connects the motor and drive pulleys.



Fay Automatic Lathe with Center Drive

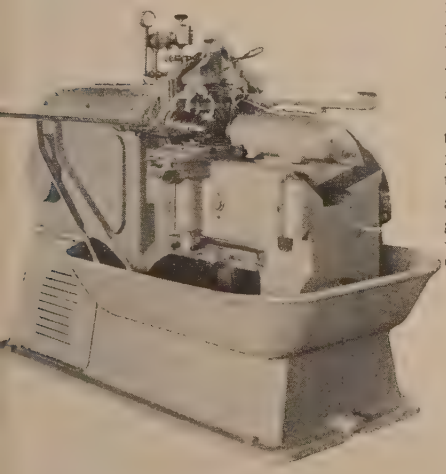
A 14 x 50-in. Fay automatic lathe equipped with center drive, as illustrated, and tooled to machine both ends of a rear axle shaft simultaneously, will be demonstrated by the Jones & Lamson Machine Co., Springfield, Vt.

Two of the new 24-in. Fay automatics, described at length in THE IRON AGE of May 2, will also be shown for the first time. They will be tooled for roughing and finishing operations, respectively, on a large tractor shaft, and will show the possibilities both in removing a large amount of metal and in holding the work closely to size. A new 2½-in. turret lathe that is similar to the company's 2-in. machine but is for larger work will also be under power. A 15-in. turret lathe will be tooled for first operation work on forged steel gears and a 14-in. Fay automatic will be shown in second operation work on the same gear. Another 14-in. Fay automatic will be tooled for finning airplane cylinders.



Lathe Machines Pistons at High Rate without Operator

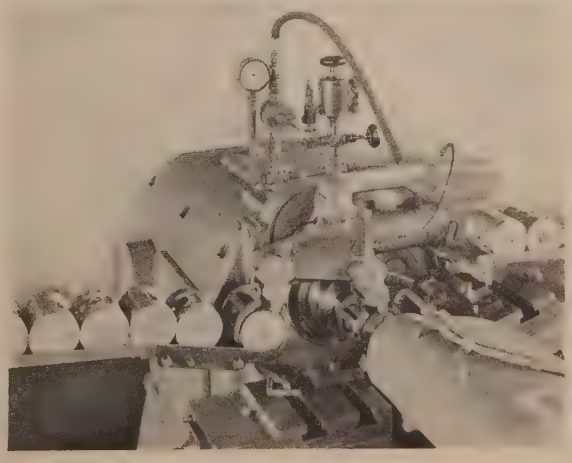
ROUGH turning, grooving and facing of aluminum automobile engine pistons at a high rate and without an operator will be demonstrated by the Seneca Falls Machine Co., Seneca Falls, N.Y., with its new model U Lo-Swing automatic lathe. This machine without the automatic devices was described briefly in THE IRON AGE of June 20.



All operations, including loading and unloading, are completely automatic, the machine when started continuing to perform until stopped. The piston is picked up from the runway by a "hand" and placed between an air-operated tail center and a dowel center that fits into the open end of the piston. The tool-holding slides then move into position, and the tools in the front slide or carriage perform the turning operation, while those in the rear slide groove, face and form. Upon completion of these operations the piston is removed and deposited by another "hand" on the runway on the opposite side of the machine, and is carried to the machine that performs the next operation. Simultaneously with the removal of one piston another is taken from the runway and placed in the machining position.

The loading and unloading mechanism, as well as the tailstock center, is pneumatically operated and controlled by adjustable cams that operate the air valves. The two sets of gripping fingers are designed to simuate the action of the human hand. The time for removing and loading the pistons is approximately 3½ sec., and the tools withdraw and begin the next cut simultaneously with loading.

As outlined in the previous description, this lathe is self-contained, the entire drive, including motor, and the feeding mechanism being inclosed within the machine. All shafts are mounted on ball or roller bearings and careful attention has been given to lubrication and coolant supply. Floor space occupied is only 3½ x 6 ft., and the rigidity and weight of the machine, 5000 lb., is intended to permit use of tungsten carbide or other high-production alloys. Although developed for turning and machining pistons, the lathe is adapted for a wide range of cylindrical work up to 5 in. in diameter.



High-Speed Short-Bed Production Lathe

A NEW 12 x 18-in. production lathe, designed to use tungsten-carbide as well as high-speed steel tools, will be demonstrated by the Porter-Cable Machine Co., Syracuse, N. Y.

In general design, this machine, named the "Carbo-Lathe," is similar to the short bed lathe previously built by the company, but is heavier, has a Timken roller bearing spindle, ball-bearing shafts and a No. 3 Morse taper high-speed steel tailstock center. It is designed for high production turning and facing operations on pieces up to 7 in. in diameter. Spindle speeds depend upon the speed of the motor, the diameter of motor and drive-shaft pulleys and the speed change gears used, the range being 42 to 1500 r.p.m.

The machine is made up of but four major parts. The bed and headstock are in one piece, this casting being of chrome-nickel high-test iron. The tailstock, also in one piece, weighs approximately 100 lb., and it is clamped rigidly to the bed by two draw bolts. The ways are relieved in the center to provide two-point contact.

When furnished for motor drive, a 3 or 5 hp. motor is mounted on a hinged plate in the one-piece cabinet base, the mounting being such that the weight of the motor automatically takes up belt slack. Two-speed motors may be used on the machine. From the motor, the drive is by 3-in. belt to a ball-bearing disk clutch pulley on the drive-shaft; from the drive-shaft the power is transmitted to the spindle through helical and worm gearing, and to the carriage, through spur and worm gearing. Carriage pick-off gears provide five feeds, ranging from 0.005 to 0.030 in. A brake, controlled by the lever that operates the clutch, is provided for stopping the spindle.

Chips and lubricant fall through the center of the bed, and as there are no flat spots on the bed ways, piling up of chips under the carriage is eliminated. Zerk lubrication is provided, and the coolant system is arranged so that the flow is shut off automatically as the spindle stops. The machine occupies 34 x 48 in. floor space and is 48 in. high overall. The height to center of spindle is 42 in. A complete line of attachments can be furnished.

Grooves and Slits 300 Ball Yokes an Hour

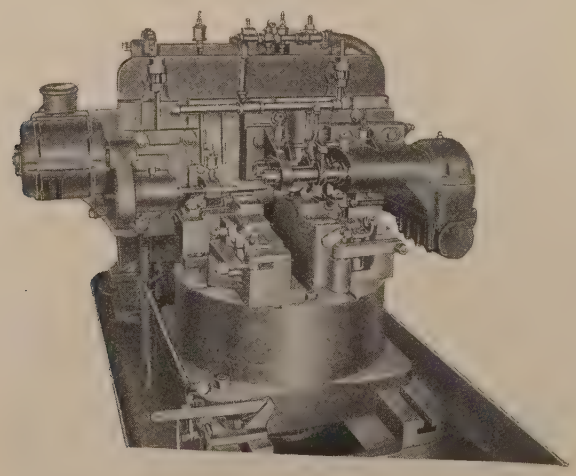
SLITTING and grooving of ball yokes for automobile universal joints at the rate of 300 pieces an hour will be demonstrated by the Producto Machine Co., Bridgeport, Conn., on its No. 50 Producto-Matic milling machine. The machine is arranged for motor drive and with vertical as well as horizontal travel of the cutter. The two operations, at right angles to each other, are done simultaneously.

The machine has a built-in four-station flat-turret type work-holding fixture, and when in operation two stations are in the milling position and two in the loading and unloading position. In the first milling position the slitting operation is performed by a double-spindle cutter block in tandem, having two saws on each cutter spindle. For the second operation the table indexes 90 deg. and the piece then grooved by means of an auxiliary cutter spindle mounted on the cross-slide of the machine and is driven by a separate 1 hp. motor. This miller is intended to eliminate the necessity of two machines and with it rehandling of the work, without any sacrifice in production. It is adapted for a wide range of pieces that require two milling operations at right angles to each other.

Cam Miller Adapted for Variety of Contour Work

A new motor-driven automatic cam milling machine, designated as the No. 12, will also be shown by the Producto company, in milling the contour of a cam used in an automobile four-wheel type expanding brake. Production is at the rate of 60 pieces an hour. Under usual conditions one man should operate three machines.

This is a single-spindle machine with the work-slide and the cutter-slide operating independently by means of two master cams. New features include flat box-type work and cutter slides, as well as the arrangement for bringing the work slide and the cutter slide together automatically at the beginning of the cut and allowing both slides to feed in opposite directions at the end of the cut so that the work may be removed easily. A new type of air cylinder for holding the work is used. The machine is adapted for milling radial airplane engines, timing cams, and other contour work that can be revolved in relation to the cutters.



New Large Turret Lathes

THE Warner & Swasey Co., Cleveland, will have in operation at the Cleveland Show a No. 5-A universal hollow hexagon turret lathe and a No. 5 universal all-geared head turret lathe. Both machines incorporate new features.

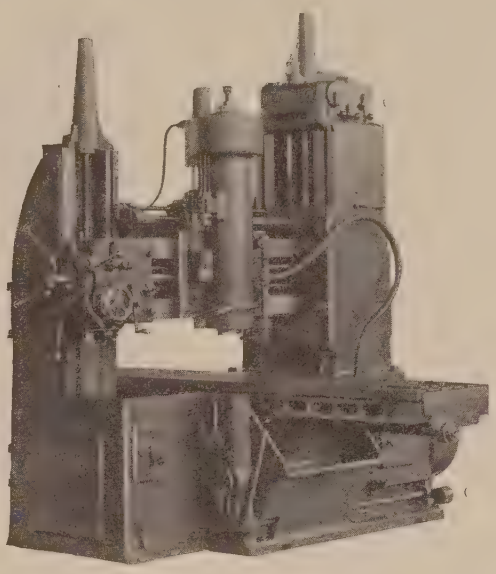
The No. 5-A lathe, the largest machine ever built by the company differs somewhat in construction from other Warner & Swasey heavy-duty "A" type turret lathes. The No. 5 universal is a ram-type machine of 2-in. bar capacity, and was designed to fill the gap between the No. 4 universal and the No. 1-A. A new hexagon turret saddle construction adds rigidity and tends to prolong the accurate life of this unit. The 5-A turret lathe will be demonstrated in machining flywheels, while the No. 5 machine will be in operation on shafts.

Bridge Type Vertical Milling Machine

THE Kearney & Trecker Corporation, Milwaukee, will have in operation a new bridge type vertical Mil-Waukee-Mil machining crankcases for Wright airplane engines. The machine is intended for face milling, die sinking, routing, profile milling and other operations on work having surfaces to be milled at various planes and levels. Saving in machining costs is claimed.

The company's 2200 series Simplex bed is used. The table is 22 in. wide and can be furnished for any length of feed from 3 to 11 ft. Housings are spaced to accommodate work up to 46 in. in width. The bridge or rail is arranged for power operation at the rate of 25 in. per min., and when adjusted can be rigidly locked in position. It has a total movement of 17 in.

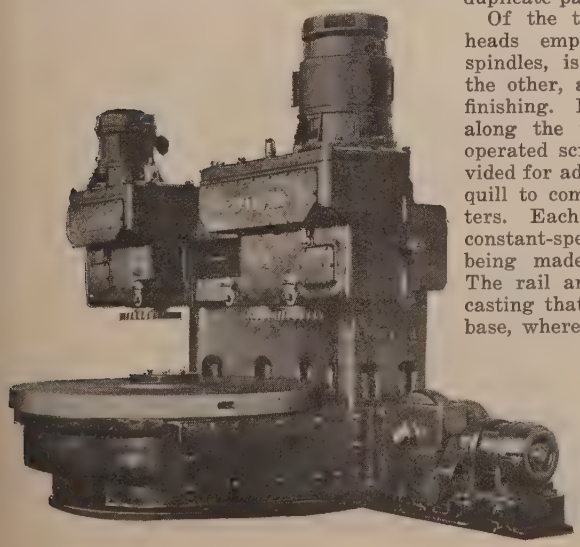
The saddle that carries the vertical ram and spindle can be traversed a distance of 24 in. across the rail, by power feed or rapid traverse, and means are provided for making close hand adjustments of the saddle. The power feed for the saddle is through the standard feed box furnished with all Mil-Waukee-Mils and is the same at all settings as the table feed. Both the saddle cross feed and the table feed may be engaged at the same time for diagonal milling. Trip dogs stop the feed or rapid traverse at any point along the bridge.



Power down feed of 7 in. is provided for the spindle ram, in addition to means for both quick and slow hand movement. Four-position micrometer stops and indicator dial can be furnished for the ram. Spindle drive is through a standard Mil-Waukee-Mil speed box on the top of the main upright, and may be through pick-off gears or quick-change gear box. Hand crank adjustment of the table through stationary screw and revolving nut is provided. The bridge can be securely locked to both uprights and the saddle to the bridge and, as a further facility for accurate boring, a lock is provided for the table. The spindle is driven by a large herringbone gear and anti-friction bearings are used throughout this drive. Lubrication of the machine is automatic.

Large Rotary Miller for Production Operations

MANNING, Maxwell & Moore, Inc., New York, will have in operation a 72-in. Putnam rotary continuous milling machine, equipped for production milling in automobile and other plants having large numbers of duplicate parts to be machined.



Of the two Putnam unit milling heads employed, one, having two spindles, is used for roughing, and the other, a single-spindle head, for finishing. Both heads are adjustable along the rail by means of hand-operated screws, and means are provided for adjusting the position of the quill to compensate for wear of cutters. Each head is equipped with a constant-speed motor, speed changes being made through change gears. The rail and column is an integral casting that is unusually wide at the base, where it is attached to the bed casting. The rotary table has angular bearings and two flat bearings. It is driven by a worm wheel located inside of the outer flat bearing, the worm wheel being cut so that the pressure is always down on the bearings. The table feed is actuated by a separate motor and may be varied by means of change gears. Motor controls are so arranged that the failure of either spindle motor will automatically stop the table feed. Power loss from the motor to cuttter is minimized by locating the motor on the head and by the use of roller bearings and heat-treated helical gears in the drive.

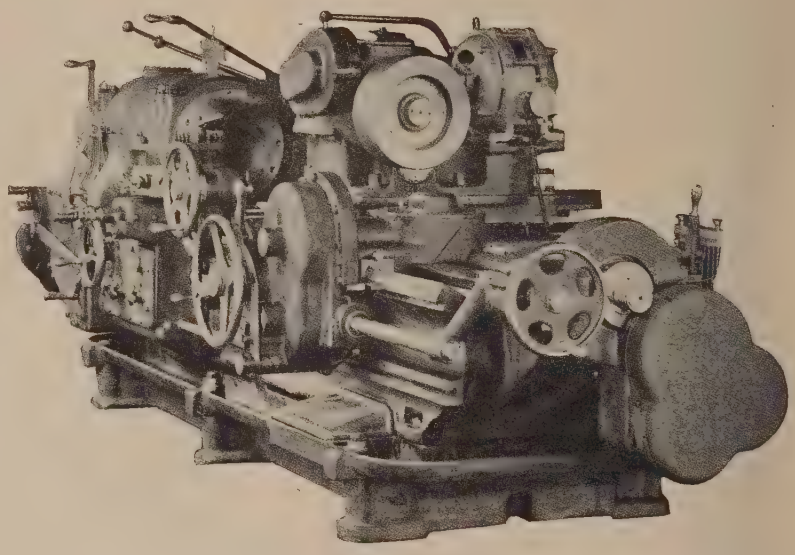
The unit milling head developed by the Putnam organization is also made with a multiplicity of speeds to meet the requirements of a more general service machine. It may also be furnished with a multiplicity of feeds, both for moving the quill in and out of the head and feeding the head along the rail, as well as with rapid traverse for both the quill movement and the heads.

Thread Miller for Oil Well Tools

THREADS are milled on oil well drilling tools, tool joints, drill pipe, etc., in a little more than one revolution of the work on the new thread milling machine that will be exhibited by the Lees-Bradner Co., Cleveland.

For work requiring faces and shoulders that are concentric with the threads provision is made so that these turning and facing operations may be performed at the one chucking. The machine is equipped with a selective-speed headstock, apron and cross-slide, square turret tool post and with selective power feeds. The hollow spindle takes bars or tubes up to 10½ in. in diameter, and the chucks, both front and rear, may be air or manually operated.

The cutter head unit is of rigid construction to prevent vibration and is provided with power rapid approach to and from the headstock to facilitate loading and unloading. The cutter spindle is worm-wheel driven and is carried in bronze bearings having take-up for wear. Headstock and cutter head units are individually motor driven, the drive being through pick-off gears that give a wide range of speeds. A taper attachment permits both straight and taper internal and external threads to be milled rapidly and accurately.

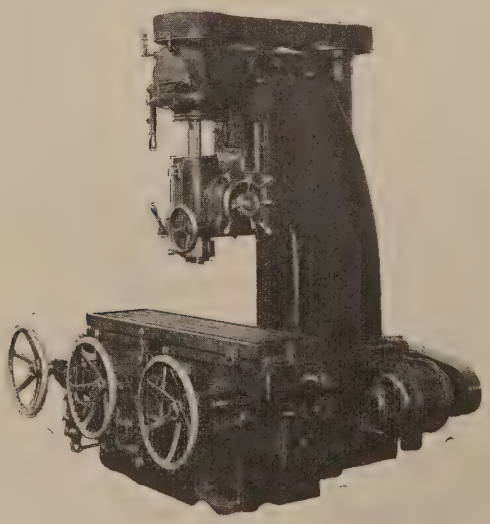


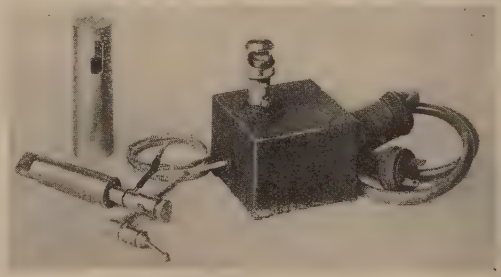
The company will also demonstrate a new heavy-duty worm and thread miller having a two-speed cutter head with reduction in the head and a quick change lever that permit making roughing and finishing cuts at one setting of the work. Another feature includes a quick-change cutter reverse mechanism between the drive shaft and cutter head, facilitating changing the direction of cutter rotation.

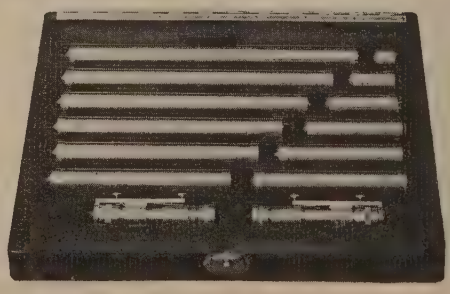
Vertical Milling Machine and Jig Borer

FOR milling die shoe bases and the recesses that take the die-block, boring out leader pin holes, and milling, drilling, reaming and boring holes in jigs and fixtures and similar work, the Reed-Prentice Corporation, Worcester, Mass., will offer a new model jig borer and vertical milling machine.

To procure accuracy in jigs and fixtures, work-brackets having V-blocks are provided for holding measuring bars and micrometer heads, shown in lower illustration, placed between the adjustable stops and the dial gages which are attached to the saddle and table. The two micrometer heads with 12 measuring bars provide







adjustments ranging from 1 to 12 in. by 0.0001 in. Holes are located accurately in either direction, cross or horizontal, with direct readings. Positioning of the table and work is controlled accurately by end measures, inside micrometers and dial indicators. A locking device is provided for fastening the table to the bed of the machine. An electrically-operated indicator, illustrated, facilitates setting the work accurately in line with spindle. This mechanism consists of an electric bulb operated from a light circuit with transformer connection.

The table working surface is 16 by 60 in. The machine has a longitudinal power feed of 48 in. and cross-power feed of 16 in. The vertical adjustment of the head on the column is 15 in. and the vertical feed of the spindle 9 in. The maximum distance from the end of the spindle to the table is 20 in. The depth of throat is 20 in., while the distance from center line of the table to the face of the column is 11¼ in.

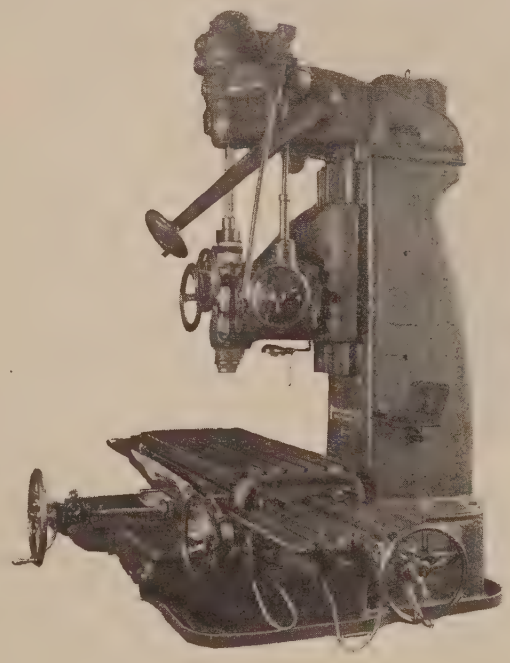
Eighteen spindle speeds, ranging from 17 to 600 r.p.m., are obtainable. Each speed has eight feeds, giving a range of feeds from 0.002 to 0.297 in. Longitudinal and cross-feed rapid power traverse in either direction is at the rate of 100 in. per min. Timken roller bearings are employed.

Adds Large Machine to Jig Borer Line

LARGE jig borers, designated as the Nos. 3 and 3A, will be among the new equipment shown by the Pratt & Whitney Co., Hartford.

The machine is similar to the company's smaller jig borers and embodies the same fundamental system of locating, using end measures, inside micrometers and dial indicators. It is also the same in locating to tenths, boring where it locates, and then checking to tenths without changing the work setup. Deviations from true accuracy are shown instantly on the dials.

The table is of increased size, and the open side construction gives a still greater size range. The machine is heavy, and means are provided for moving the table and work smoothly and quickly. A linear scale has been added so the larger dimensions can be rough set rapidly. Electrical improvements include lights over each dial indicator and above the work. The motor itself has four speeds, giving eight spindle speeds with the back gears. Shift from high speed to low is made in one movement of a single lever. A wide range of both hand and power feeds is provided, and the speed and feed combinations adapting the machine for rapid drilling, boring and reaming operations. Other features include force feed oiling throughout, Maag gearing and broad bearing surfaces.



Inserted-Blade Milling Cutters

GODDARD & Goddard Co., Detroit, will introduce a line of inserted-blade cutters that includes small facing cutters (shell end mills, etc.) from 3 to 7 in. in diameter; right and left-hand spiral facing cutters, from 8 to 20 in. in diameter; right and left-hand spiral straddle mills from 4 to 20 in. in diameter, and alternate-tooth cutters ranging from 4 to 8 in. in diameter, and from ½ to 1 in. in width.

Only 11 sizes of blades are required for the maintenance of the entire line so far developed. The blades have machined serrations on the backs which mate with corresponding serrations in the body tooth slot, which arrangement is intended to prevent tipping of the blade in service. It is also stated that the blade cannot slip radially because the serrations more than double the frictional contact area in the back of the tooth, this being further enhanced by the flat wedge used in front of the blade, the area of which is approximately the whole of that available on the tooth.

The serrations which run longitudinally are spaced on a 1/16 in. pitch, so that the blade, as peripheral chip clearance necessitates, may be projected radially in multiples of that unit. Blades may be moved out longitudinally as the face chip clearance decreases.

Develops 3-In. Spiral Bevel Gear Generator

NEW machines to be exhibited by the Gleason Works, Rochester, N. Y., include a 3-in. spiral bevel gear generator, a small straight bevel gear generator and a spiral cutter angle testing device.

The small spiral bevel gear machine has capacity for gears of 3⅜-in. pitch diameter, ½-in. face, 1¾-in. cone distance at 4 to 1 ratio, the largest pitch angle that can be cut for gears mounted at right angles being 75 deg., 58 min. and the smallest, 14 deg., 2 min. The fineness of pitch is limited only by the point width of the cutter.

This machine, which employs the generating principle of other Gleason bevel gear generators, is illustrated herewith, and will be described at greater length in a forthcoming issue. Cutters are of face-mill type with the blades integral with the head, and are made in four standard diameters, from ½ to 2 in. The smallest cutter has two blades, and the others have four. The cutters are made with alternate inside and outside cutting blades so that both sides of a tooth slot are cut simultaneously and the gears finished from the solid. The cutters are set up to the proper cutting position by a gage. An improved feature is a lever actuated quick throw-out mechanism which enables the cutter slide to be moved instantaneously to or from the cutting position for loading.

The straight bevel gear generator, to be described later, is a companion machine to that briefly described above. It differs from the spiral generator chiefly in that it employs two reciprocating tools instead of the circular type cutters.

Spiral Cutter Angle Testing Device

The new testing device, also illustrated, is used as a comparator to insure that the blades, in the circular cutters used on Gleason spiral bevel and hypoid gear-cutting machines, are mounted so as to have identical cutting pressure angles. The blades now being sold separately from the cutter heads, it is essential that they be carefully checked after being assembled in the head, because a slight variation in the angle of blades will cause flats to be cut on the teeth.

The device includes an indicator, a cutterhead carrier against which the cutter is held by spring pressure, and a dovetail slide on which the carrier is angularly adjustable. The motion of the slide on the base of the fixture is such that the blades in the cutter can be moved back and forth under the indicator finger. The cutter to be checked is placed on the carrier, which is then adjusted so that the indicator shows zero when the slide carries one of the blades to its full working depth. The next blade is then rotated into position under the indicator and moved back and forth.

If correct, the indicator will read zero for the full working depth of this blade; if not, the cutter is locked against rotation and the blade readjusted. A reading is thus taken on each blade and any adjustment necessary made so that all the blades will cut alike.

Both inside and outside blades can be checked, and the cutter-head carrier has a wide range of angular adjustment for covering the full range of pressure angles. The device is built in two sizes, one for 9-in. and the other for 12-in. cutters.

Cutter For Milling Large Castings or Forgings

HEAVY-DUTY face milling cutters taking facing cuts of ¼-in. deep and 9-in. wide at a feed of 30 a min., pulling 35 hp., will be demonstrated at the Cleveland Show by the O.K. Tool Co., Inc., Shelton, Conn. This tool incorporates the O.K. cutter blade of the tapered serration type, thicker than heretofore, and is designed for use in milling large castings or forgings where considerable finish or variation of cuts is encountered. The blade is of drop forged high-speed steel, inserted into a forged and heat treated chrome-nickel steel body.

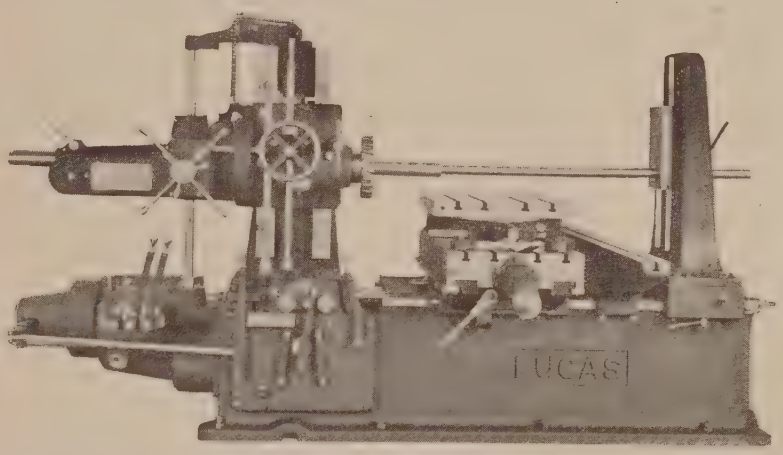
A new development in single point tool design with a holder that uses the O.K. cutter blade will be shown. This holder, available in plain, offset, straight, angular boring and other types, is said to be practically a solid tool, so far as overhang and rigidity are concerned, but retains the renewable cutting bit and is adjustable. A new offset side lock holder, developed to permit use of an O.K. tool holder for multiple tool operations in the turret tool post, may also be seen.

In addition to the above items, the company will exhibit its entire line of lathe, planer, shaper and boring mill tools, milling cutters, boring and facing heads and hollow mills, including multiple-operations tools.

New Model Horizontal Boring Machine

THE Lucas Machine Tool Co., Cleveland, will demonstrate its new model No. 41 "Precision" 3-in. spindle horizontal boring, drilling and milling machine.

Compared with its predecessor, the No. 31, this machine is heavier, more rigid and more powerful. Its bed is wider and has leveling screws in the lower flange to facilitate accurate setting up. The saddle has been made longer and has automatically equalized clamps that are operated simultaneously by a ratchet wrench at the front of the machine. More efficient means of clamping the spindle head has also been provided, and cramping of the platen is minimized by a long narrow guide with taper gib.



The speed range of the machine has been widened and the number of changes increased 50 per cent, providing smaller increments of speed. Automatic lubrication is by means of a pump in the driving gear box and oil rings on the spindle. Controls are located more conveniently, and safety features, such as additional limit trips, have been added.

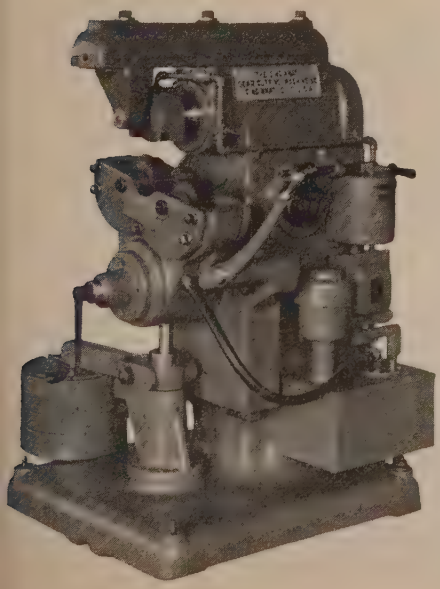
Larger machines in the "40" series, namely the No. 42, having a 4-in. spindle, which will also be exhibited, and the No. 43 with 5-in. spindle, have the features noted above, and, in addition, are arranged so that cross adjustments of the table may be made from both the left and right-hand sides of the front of the saddle.

A new self-contained square swiveling table, designed to provide greater clamping surface and to support the work better on its edges, has been developed for these machines. It is mounted on a baseplate and may be used interchangeably on different machines. Graduations are in half degrees, and a lock bolt for four positions, 90 deg. apart, is provided. Swiveling is facilitated by an elevating ball thrust bearing that lifts the table slightly off the baseplate during the swiveling operation.

Gear Burnisher with Extended Range

A NEW gear burnisher with standard range extended to handle gears up to 12 in. in diameter, but which may be arranged to take even larger gears, will be shown by the Cincinnati Shaper Co., Cincinnati.

The method of counterweighting is a feature. The pressure with which the burnishing gears engage the "green" gear is fixed by means of these counterweights which permit sufficient movement of the carriage slide to compensate for any small variation in the pitch diameter of a run of gears.

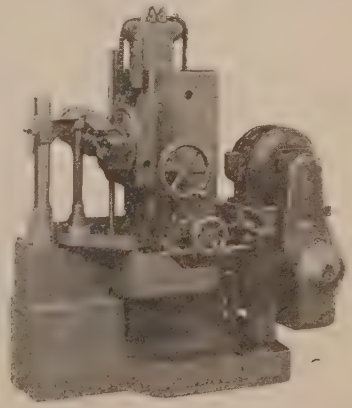


Operation is entirely automatic. After placing the "green" gear between the master gears, the operator pushes a lever to bring the "green" and master gears into engagement, and then throws the starting switch. The spindle makes a predetermined number of revolutions in one direction, the same number in the reverse direction and then stops automatically. The burnishing time can be varied from 5 to 6 sec. up to 30 sec. or more.

Small Manufacturing Type Gear Hobber

IN addition to a new 36-in. manufacturing shaper, and a new 48-HS and 48-HL manufacturing gear hobber, Gould & Eberhardt, Newark, N. J., will show a new small hobbing machine designated as the 9-H manufacturing type. It is designed for generating fine pitch and small diameter spur, helical, herringbone and worm gears, producing gears up to 9 in. in diameter with the arbor support in place, and gears up to 12 in. in diameter with the support removed, and is rated for 10 D.P. in steel. The weight of the machine is approximately 2800 lb.

The cutter slide is adjustable for depth and diameter of gears to be cut, and may be swiveled 180 deg. for either right or left-hand helical gears of any angle. The cutter arbor is portable to permit using arbors of different diameters and to accommo-



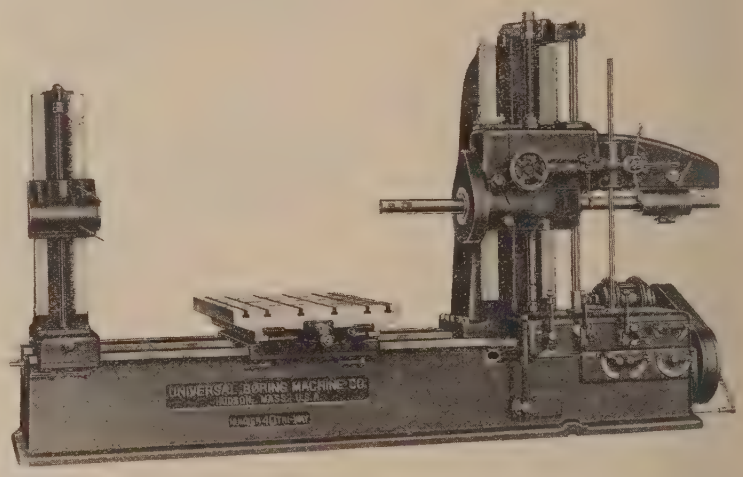
date small diameter solid-shank hobs. The work table is fixedly located and mounted on anti-friction bearings directly in the base casting. The hardened and ground indexing worm engages with a chilled cast iron wheel. The work arbor is of single post type with an adjustable arm that can be locked in any position. Lubrication is by both pressure and gravity systems.

The new 48-HS and 48-HL manufacturing type gear hobbers, also to be shown, are rated for 2 D.P. in steel and have capacity up to 32 in. diameter with the arbor support, and 57 in. diameter without the arbor support.

Improved Horizontal Boring Machine

THE Universal Boring Machine Co., Hudson, Mass., will exhibit an improved No. 40 Tri-Way, universal (horizontal) boring machine. The Tri-Way bed has been retained, but gear boxes have been redesigned, and now incorporate ball bearings throughout the speed-box mechanism, as well as multiple splined-shafts. The head assembly is also a new design, having ball bearings throughout the drive mechanism, the spindle itself being mounted on Timken roller bearings. A six-splined ball-bearing vertical drive shaft transfers the power from the gear box to the head. Motor drive, but without motor, is standard equipment.

Specifications are as follows: Main Boring bar, 4 in. diameter, No. 6 Morse taper; distance between face-plate and outer support, 96 in.; vertical travel of head on column, 40 in.; and maximum distance from top of table to center of bar, 42½ in.

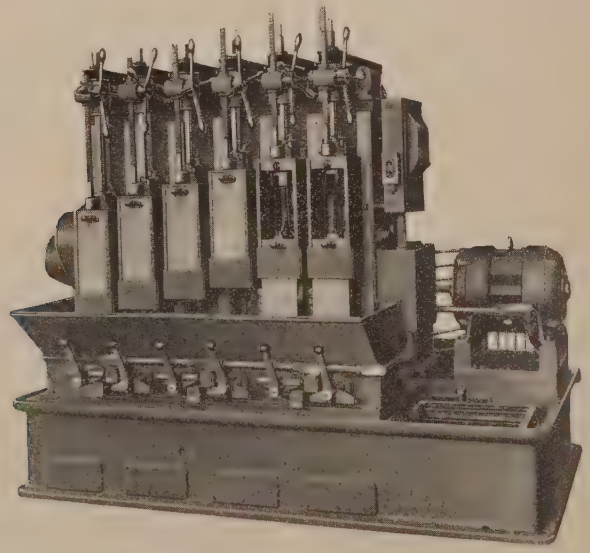


The table is 40 x 63 in., and has 48 in. power cross feed. The spindle speed range is 8 to 300 r.p.m., the milling feed range is 0.53 to 11 in. per min., and the boring feed range from 0.13 to 2.7 in. per min. The approximate shipping weight is 28,000 lb.

Multiple-Spindle Vertical Deep-Hole Driller

THE Pratt & Whitney Co., Hartford, Conn., will exhibit, among other new machines, a six-spindle vertical deep-hole driller using the rifle-barrel method of drilling. Accuracy and rapid production are features, and being of vertical design, floor space is saved. The machine has been employed to advantage in the automotive industry in drilling deep holes the length of a connecting rod to the wristpin, and is adaptable also for drilling the tell-tale holes in stay-bolts for locomotive boilers and for other deep-hole jobs.

The heavy cast iron bed, containing an oil reservoir, has a rigid column mounted on it. This column carries the six work spindles and slides and their individual driving mechanisms.



The six drills, which remain stationary, are mounted vertically on the bed beneath the spindles. At rear of the bed are six high-pressure oil pumps, one for each drill, and all driven from one 15-hp. separate motor.

Slides carrying the work fixtures are counterweighted and are scraped to ways on the front of column. Their spindles rotate the work in the fixtures at proper speed for drilling. The six slides thus feed down independently under power and carry the rotating work to the stationary drills. Each spindle may be operated without relation to the others. Each spindle unit has six ball bearings, two on the upper part of the spindle, two on the upper work-holding fixture attached to the spindle and two in the lower work-holding fixture.

Each drill consists of a hollow shank to which is brazed a short high-speed steel drill tip. Oil is forced to the drill tip under 500-lb. pressure, inside the shank, and returns outside through a groove in the shank. This method of handling is economical of drills, as oiling keeps them cool; the shank is inexpensive and sustains all twisting damage in case the drill meets a hard spot or becomes jammed. The expensive tip can be re-brazed to a new shank and reground as necessary until it is used up.

New Multiple-Spindle Drills Equipped Either with Mechanical or Hydraulic Feeds

TWO new vertical multiple-spindle drilling machines, both designated as the No. 16, one with mechanical feed and the other with hydraulic feed, have been developed by the Foote-Burt Co., Cleveland, for work that is too heavy for its former machines.

The No. 16 drill with mechanical feed has 16-in. ways, while the No. 16 hydraulic machine has 20-in. ways, as well as a wider column, to accommodate the cylinder. While adapted for a wide range of application, each machine is built around the particular job on which it is to be used. The base, upright and drive bracket are standard units, but the table, head, drive and feed and speed arrangements are varied to suit requirements.

Although designed to slide on the ways of the upright, the standard table is usually held in one position by spacer blocks between it and the base. All spindles have ball thrust bearings, and can be equipped with adjustable collets so that vertical adjustment can be made on individual spindles. The head is lubricated by force feed system, the oil being carried in the head and circulated by a pump on the head. The motor drive includes a device that protects both the motor and the machine in case the latter should be stalled. The motor is geared to the horizontal shaft in the upper housing, from which the drive is through a pair of spiral bevel gears to the head drive shaft.

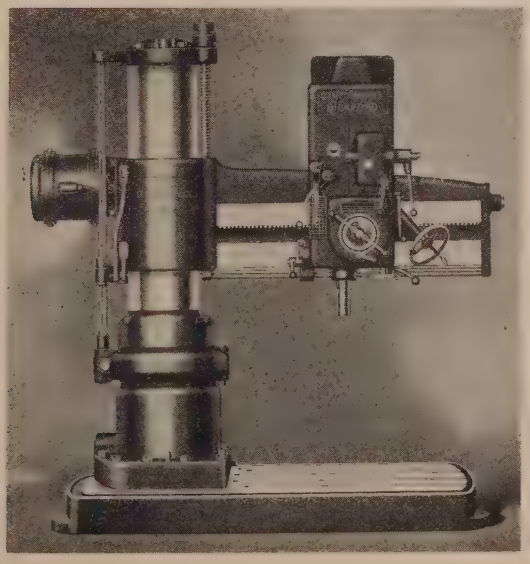
Feed for the No. 16 mechanical is taken from the main horizontal shaft through a pair of small pulleys to a worm and worm gear set, then carried through the vertical feed shaft to a large worm and worm gear set mounted on the feed pinion shaft. The pinion is in mesh with a steel rack on the slide. The standard length of travel is 16 in. Hand fast travel in either direction is provided.

Hydraulic feed mechanism includes an Oilgear pump and a 5 1/8-in. cylinder with 16-in. stroke. The following feeds are available: Fast traverse forward at 175 in. per min.; No. 1 and No. 2 slow feeds forward at 1 to 13-in. per min., each; Neutral; No. 1 and No. 2 slow feed return at 1 to 13 in. per min. each; and fast traverse return at 250 in. per min. Feed is engaged by hand lever on the side of the machine, and feeds are automatically controlled throughout the cycle by dogs on the head slide. Delayed reverse action can be obtained if desired.

Radial Drill Features Centralized Control

COMPLETELY centralized control is a feature of a new 11-in. column Super-Service radial drill to be shown by the Cincinnati Bickford Tool Co., Oakley, Cincinnati. The machine is built with 3 and 4-ft. arms and with 24 speeds, ranging from 29 to 1850 r.p.m., in the head.

All speed and feed changes are made in the head through selective sliding gears, tumbler gears, loose keys, and dive key mechanisms having been eliminated. Column clamping is also controlled from the head, and the arm is raised or lowered and clamped or unclamped by means of levers near the spindle. An interlocking arrangement prevents raising or lowering the arm while it is clamped, but when unclamped the arm may be elevated or lowered easily through multiple disk clutches which run in oil.



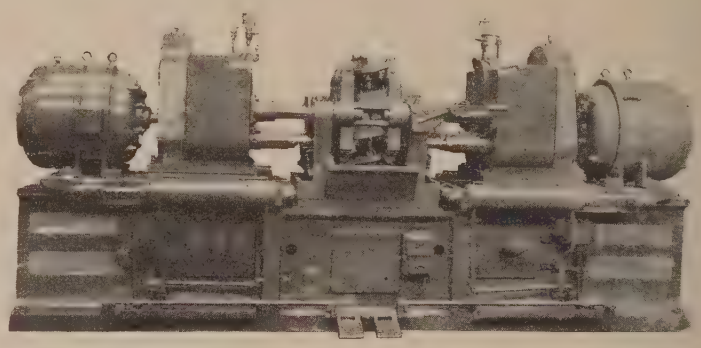
To most effectively resist combined bending and torsional stresses due to feed pressure, the arm is of full box section and has no openings in the front or rear wall, such as were formerly regarded as a foundry necessity. All rotating parts such as arm shaft and clutches are entirely inclosed. Lubrication has been designed so that the machine operates over a long period without oiling. Clutches run in oil and gears and bearings are flooded with filtered oil. The entire drive from motor to spindle nose is mounted on ball or roller bearings.

A rapid hand traverse for the head has been developed. The head is supported by an adjustable roller bearing gib, or a hardened steel arm-way, this being a patented feature which permits the head to be moved rapidly and easily. All shafts are ground and multiple splined with integral keys. Only one motor, of constant-speed type, is required for the machine.

Hydraulic Feed Machine Drills Steering Knuckles

DRILLING of two steering knuckles simultaneously will be demonstrated by Baker Brothers, Inc., Toledo, Ohio, on a horizontal machine having separate hydraulic feed for each head and individual motor drive for each spindle.

The base, built on the unit plan, is in three sections, the middle one of which may be made in various lengths to accommodate fixtures for various sizes of work to be drilled or bored. Each of the base end sections carries a head that is fed toward the work by separate Oilgear pumps and cylinders, the traverse engagement of each head being controlled by foot pedals. The feed has the characteristic rapid advance and return of the Oilgear device, and also infinite number of adjustments of feed rate. Use of separate hydraulic pumps for each end of the machine simplifies the piping and eliminates use of an equalizing mechanism. The spindle drive motors may be mounted on the saddles, as shown, or on the heads.



This machine, designated as the No. 25 H. H., may also be equipped with one spindle for each head for work requiring boring, counterboring and other operations.

Modernized Drilling and Tapping Machine

ANTI - FRICTION bearings are used throughout the sliding-head all-geared drilling and tapping machine illustrated, which will be introduced by the Barnes Drill Co., Rockford, Ill.

This machine, designated as the No. 262, handles high-speed twist drills up to 2½ in. and will bore an 8-in. hole in cast iron. It is suitable for cylinder boring, deep hole work and tool room service. There are eight quick-change geared speeds, with lever controls extended to the front of the machine, and eight quick-change geared feeds. Speeds and feeds are clearly indicated for each setting of the control levers.

The spindle is 2 in. in diameter, is of six-spline construction and is provided with roller thrust bearing. The spindle sleeve is fitted with the company's patented dovetail rack, and use of a split bearing for the spindle sleeve, with take-up for wear, is a new feature. The cap is of Gunite material and has laminated shims. The spindle travel at any setting of the head is 15½ in., but other lengths of travel can be furnished. The regular travel of the sliding head is 19½ in. Levers for raising and lowering and clamping the head are conveniently located.

Either silent chain motor drive, or single pulley drive can be furnished. Spiral crown gears of heat-treated steel are used, and may be furnished in three different ratios. Transmission bearings are of Timken tapered roller type, and spindle thrust is taken by a roller bearing having a double set of rollers. All bearings are lubricated automatically. The distance from the face of the square column to the center of the table is 13 1/16 in. The net weight of the machine with 5-hp. motor is 3500 lb.

Heavy-Duty Turret Lathes

FEATURES that adapt the Libby type H heavy-duty turret lathe for machining modern alloy steels and for the use of high-speed cutting tools, including tungsten carbide, will be pointed out by the International Machine Tool Co., Indianapolis, at the Cleveland Show.

This machine is equipped with alloy steel heat-treated Maag gears of wide face and coarse pitch. Ball and roller bearings are used on the spindle, shafts and studs and on all machines up to and including the 10¼-in. bore, the spindle is mounted on roller bearings, two sets on each end opposed. Each machine has 77 sets of ball and roller bearings. With the present gear box changes in feed are made by lifting a lever and shifting a cone of gears. This enables the operator not only to change feeds quickly, but also to cut threads of different pitches without having to change gears. The rapid traverse mechanism has been improved by increasing the number and size of the disks and clutches, and the mechanism is now inclosed and runs in oil. The turret and tool post aprons are also inclosed, and the parts run in oil. The ways of the machine are hardened steel strips dovetailed and driven in from the end of the bed way and ground. Lubrication of the machines is entirely automatic.

New Hydraulic-Feed Multiple-Spindle Drill

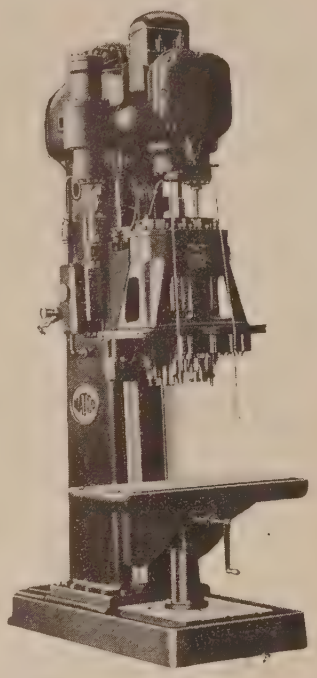
THE National Automatic Tool Co., Richmond, Ind., will show a new medium sized adjustable multiple-spindle hydraulic feed driller designed for a wide variety of work.

Base, column and other members are of rigid and heavy design, and ease of control is a feature. The hydraulic feed mechanism includes two 5-in. low-pressure oil cylinders mounted in the heavy brackets at the top of the column. The pressure in these cylinders is supplied by a constant-speed pump located on top of the column and driven from a gear on the main drive shaft; the maximum combined pressure is 8000 lb., and is applied directly to the lugs cast on the head slide. A by-pass in the pump returns excess oil to the reservoir when a predetermined pressure is reached. This arrangement protects the drills should an unusually hard spot be encountered. The feed ranges from 0 to 15 in. per min., and rapid traverse is at the rate of 90 in. per min.

Control of the feed is by means of two pendant handles, one of which is used to start the operating cycle, consisting of rapid approach to the work, feed, rapid return and stopping of the head at the starting position, all of which are controlled automatically by adjustable trip dogs. The other control handle is used to stop the head in an emergency; it causes the head to stop and return automatically to the starting position.

Three sizes of heads have been designed for the machine, a 12 x 18-in. rectangular head bored for 24 spindles, a 16 x 24-in. head with either 22 or 12 spindles, and an 18-in. diameter head bored for 12 spindles. These heads may be arranged for independent change of speed for each spindle or for a single speed for all spindles; both types have a neutral position for spindles not in use. All gears are hardened and run in oil. Drill spindles range from 1⅝ to 2⅛ in. in diameter and have vertical adjustment of 2 in.

The machine is powered with a 10-hp. 1200-r.p.m. direct-connected motor, which drives the head through heat-treated alloy-steel change gears and a set of heat-treated bevel gears. Spindle speeds range from 331 to 1940 r.p.m. on the 12 x 18 in. head and from 185 to 1019 r.p.m. on the 18-in. round and the 16 x 24 in. 12-spindle head. The machine will drive eight ⅝-in. or 24 ¼-in. drills in cast iron or six ½-in. and 14 ¼-in. drills in steel at maximum feeds of 0.004 and 0.003 in., respectively.

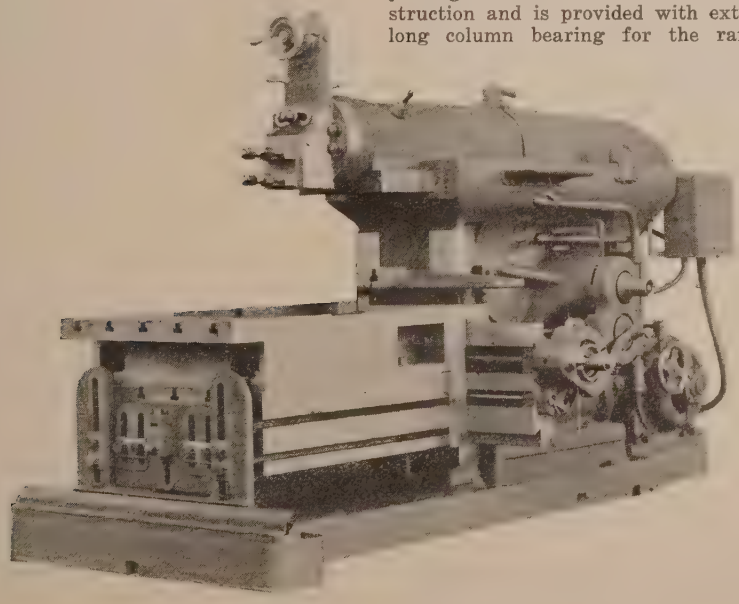


Floor space occupied by the machine is 34 x 85 in. and the net weight is 11,500 lb.

Shaper with Table for Unusually Large Pieces

FEATURING the exhibit of the Ohio Machine Tool Co., Kenton, Ohio, will be a new 36-in. "Super-Dreadnaught" crank shaper having a 48⅞-in. x 30-in. table that accommodates unusually large work and large irregular pieces that otherwise would have to be machined on a planer.

The machine is intended for use on die blocks, fixtures and all types of jobbing work. It is of massive construction and is provided with extra long column bearing for the ram, which is of double-wall box section type and is designed so that even with fully extended stroke there is 56 in. of contact between the column and the ram. The ram gibbing takes care of both lateral and vertical thrust. The large head on the ram has 13 in. diameter swivel and a 5-in. micrometer with handwheel control. The machine is equipped with a substantial table support and a jack which equalizes the weight between the table support and rail, so that alinement is preserved and the rail protected from undue wear. The bull gear and steel pinion are of herringbone type. The bull gear is of semi-steel and is in one piece. The crank arm is of steel.



All control levers are within a radius of 12 in. Automatic force feed lubrication, quick-change gears and instantaneous feed are regular features, and power rapid traverse and power elevating attachments can be furnished. A box table having top surface of 36 x 20 in., including saddle, is also made, and also a drop table that increases the maximum distance between the table and ram to 30½ in. A filler block can be utilized to fill in the drop table when the surface of a regular table is required.

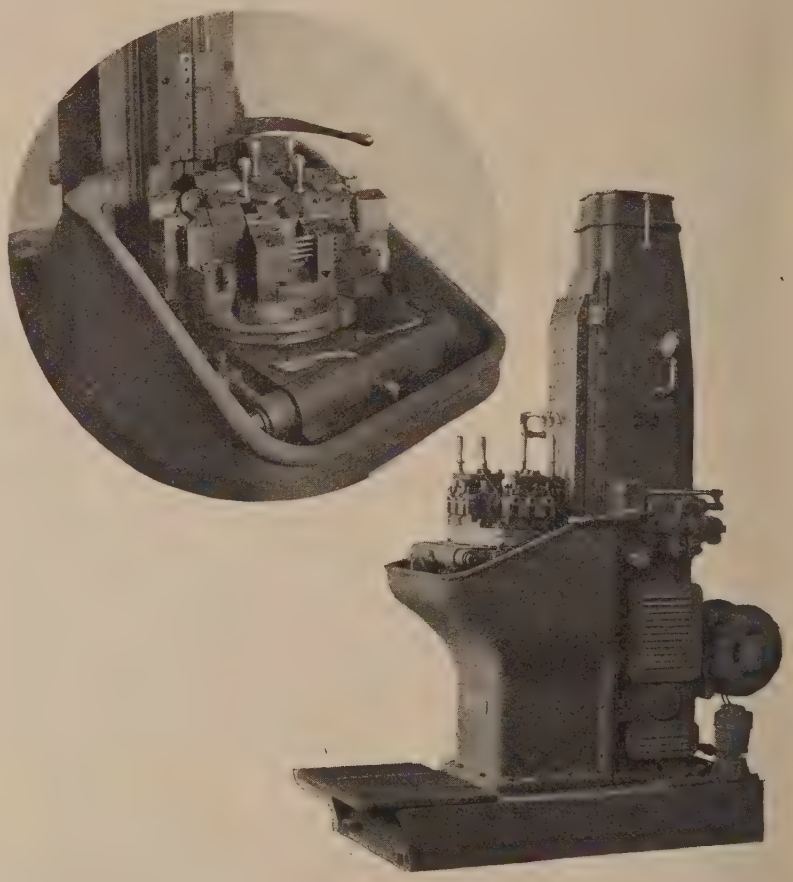
Surface Broaching Machine Roughs and Finishes in One Operation

PIECES having one of more flat or irregular surfaces may be rough and finish machined in one pass of the tool on the improved No. 1 surface broaching machine illustrated, which will be shown by the Foote-Burt Co., Cleveland. In addition to high production, minimum tool maintenance expense is emphasized.

Fixtures and broaches are designed special for each job. Four-station automatic indexing tables are usually employed, and production is set at the speed at which the operator can load and unload the work. Tiering of work, where possible, and use of one-movement clamping levers enable the operator to handle a large number of pieces.

Reciprocating movement of the broach is accomplished by means of a motor-driven hydraulic pump. Slow cutting speeds, averaging 10 to 40 ft. per min., and solid support of the broach minimize tool maintenance expense, the tool being used continuously for several days, in most cases, without regrinding. The broach has a large number of teeth and the depth of cut is evenly distributed, so that individual teeth are not burdened and dulled. The lower teeth are roughers and remove the major portion of the metal; the upper teeth do the final finishing and are never used for roughing. This arrangement makes for close accuracy, as well as for long tool life. The broach may be removed conveniently for sharpening; in sharpening, only the edges are touched up.

The broach holder is securely fastened to the broach slide, which, in turn, is bolted to the lower end of the hydraulic plunger or piston rod. The hydraulic pump develops a pressure of 1000 lb. per sq. in. Direction of oil flow in the cylinder is controlled by a three-way valve operated by dogs on the slide. The speed of the down, or cutting, stroke is set to suit the work by adjusting a screw on the pump. The up or return stroke is at fast rate. The slide may be stopped or started at any point of the stroke by means of a convenient lever, or may be reversed by turning a small handwheel.



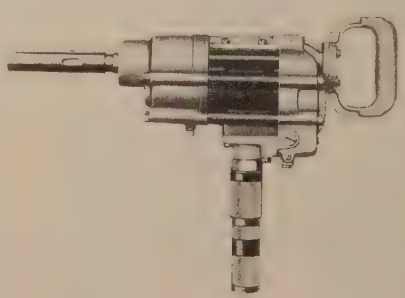
Pump, cylinder and piping are inclosed in the column, but are accessible through a door in the side. The oil reservoir is open to the atmosphere at the highest point above the cylinder, thereby eliminating possibility of air accumulation. The base of the machine forms the coolant tank. A 7½-hp. 1800-r.p.m. motor is usually recommended for the machine.

Soft steel forged 6 and 8-in. plier jaws, such as illustrated, are broached at the rate of 1200 per hour. The broach speed is 26 ft. per min. and about ⅛ in. of stock is removed. The finish is smooth and the serrations sharp.

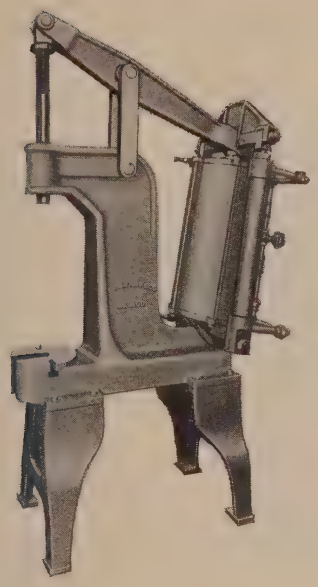
Air Tools For Production Drilling

THE Rotor Air Tool Co., Cleveland, has put on the market type E-4-C and E-40-C drills for production drilling, reaming, stud-setting and nut-setting. The E-40-C differs from the E-4-C in having a longer cylinder and hence giving more power. Speeds ranging from 200 to 600 r.p.m. are provided, covering drilling from 1 to ½ in., reaming from 11/16 to ⅝ in. and tapping from ¾ to ⅝ in. The E-4-C weighs 16 lb. and the E-40-C 17 lb.

These drills have compound gears made of heat-treated nickel steel and extra heavy ball bearings. The quick-acting governor prevents racing of the motor while running free, giving the spindle a uniform speed, prevents excessive wear and reduces air consumption. The standard Rotor motor, with only three moving parts, is used. The drills are furnished with side handle and with the usual optional equipment of breast-plate, spade-handle, eye-bolt, etc.



In addition, the company will show its new Rotor type D-0 grinder for 4 x 1-in. grinding wheels, handy for light grinding on a bench or in close quarters; its E-0 drill for high-speed production work; and its E-1-C and E-2-C drills for heavy-duty drilling, reaming and nut-setting.



Hydro-Pneumatic Broaching Press

TWO types of machine exhibited by the Hannifin Mfg. Co., 621 South Kolmar Avenue, Chicago, include a hydro-pneumatic broaching press and an air-operated rivet press. The latter will be described separately later.

Broaching operations in an air-operated press are made in this new machine by means of an application of hydraulic speed control. This avoids plunging the broach smartly into the hole, with resultant breakage. The control consists of two small cylinders, one on each side of the air-operated power cylinder.

Piston rods of the hydraulic cylinders are connected through a cast steel cross-arm to the piston of the air cylinder. Speed control is accomplished by the regulated transfer of oil from top to bottom of the oil control cylinders. During the power stroke the oil passes through a needle valve, which can be regulated to any desired speed. During the return or idle stroke the oil passes through a swing check, permitting the ram to return to top position at full speed.

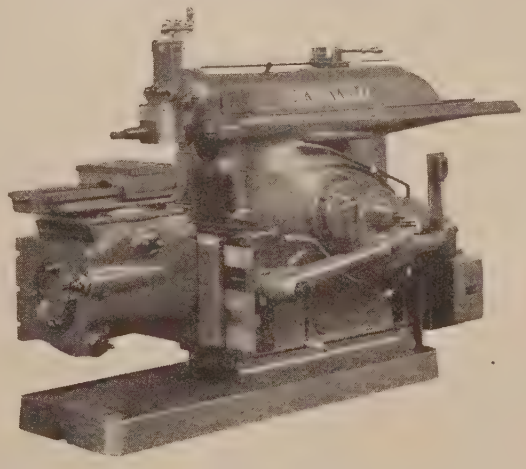
This oil-cylinder speed control results in smooth, uniform travel of the ram at any pre-determined speed without, it is said, any loss of power. The machine is not designed for broaching operations requiring broaches longer than 1 ft., but on work within its range, production is rapid.

On hydraulic shock absorbers, the hole, which must be straight, smooth, and held to close limits, output ranging from 625 to 850 an hour is claimed. The broaches used are about 6 in. long and are said to be producing 20,000 broached holes each.

Heavy-Duty Shapers with Increased Cutting Speeds

TWO new heavy-duty shapers, one 16-in. and one 24-in., with built-in power rapid traverse to the table, will be exhibited by the Cincinnati Shaper Co., Cincinnati. Cutting speeds have been increased, giving these machines the highest number of strokes of any shaper built by the company. A feature is the construction of the ram bearings: these now extend to the end of the ram and reduce overhang from the cutting tool to the ram bearing by 2 5/8 in.

The 16-in. machine will be equipped with the company's universal table, which is a revolving table with a tilting top, without hinges, jacks or table support. A new combination tool tray and cross-rail guard will be shown. Timken thrust bearings used on each end of the cross-feed screw in place of the usual bearings, are said to make the table as light as a feather to hand feed. The 24-in.



shaper, incorporating the features noted above, will be equipped with a full box table, and demonstrated in heavy, accurate cutting.

General-Purpose Marking Machines

MARKING equipment to be exhibited by the Noble & Westbrook Mfg. Co., Hartford, Conn., will include a new model No. 15 general-purpose power-operated machine, which, with suitable dies and work holders, may be used for marking a variety of round, flat, and uneven surfaces. A new No. 4 hand-operated marking machine and a No. 19 power-operated rapid production unit for marking drills and other parts of short rod construction, will also be shown.

Another new model included in the company's exhibit is the No. 41 graduating machine for graduating micrometer collars. Accuracy is secured by specially designed gears. By turning the handle a couple of revolutions, the operator can graduate the piece and mark the numbers. Specially engraved marking dies are used for rolling the graduations and figures.

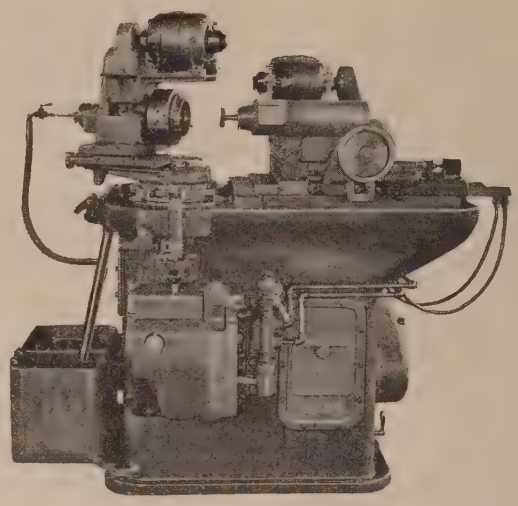
5-In. Semi-Automatic Hydraulic Ball Race Grinder

INTERNAL or external raceways or face raceways for end thrust bearings may be ground on a high production basis, on the new 5-in. self-contained semi-automatic grinder to be shown by the Landis Tool Co., Waynesboro, Pa. The machine is also adapted for other forms of radial grinding.

Hydraulic power is used for oscillating the work-head, feeding the wheel-head, and traversing the wheel-head slide. The operator merely loads the work and throws the main control lever. Work rotation, work-head oscillation and wheel carriage traversal start simultaneously. About the end of the wheel carriage movement, the wheel-head feeds in rapidly, slowing down as the wheel nears the work, and as the wheel comes in contact with the work the grinding feed is engaged. From that point on the grinding feed controls the speed of the feeding-in movement which ceases when the feed comes against a positive stop indicating that the work has been ground to size.

Throwing the main control lever in the opposite direction reverses all the movements, causing the wheel and work heads to return to their starting positions, at which point work rotation and work-head oscillation automatically stop with the head in its back position. This facilitates changing the work. One operator can run two machines.

Three specially balanced electric motors are employed. The grinding



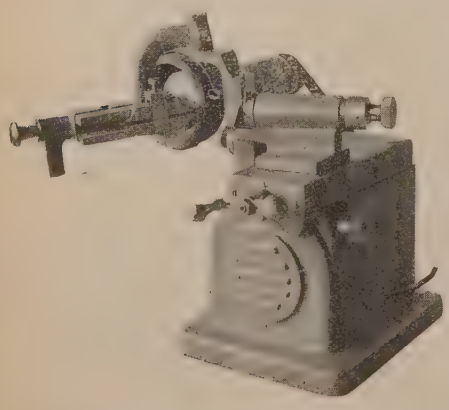
wheel spindle is mounted in adjustable steel back babbitt bearings and runs at 7750 r.p.m. The hydraulic feed movement is easily regulated, and to compensate for wear, the wheel may be fed by hand. The wheel-head slide hydraulic piston is so connected with the wheel-head piston that the movements cannot get out of time, and a hydraulic cushioning device causes both movements to come to a stop slowly, thus eliminating shock.

The grinding wheel truing fixture is attached to the front of the wheel-head only when in use. It is adjustable for different radii and is fed to the grinding wheel by means of screw with graduated dial. The vertical oscillating spindle is mounted on heavy pre-loaded ball bearings, and oscillated by a double-blade type oil motor. Adjustable reversing dogs on a ring at the top of the spindle regulate the length of arc of oscillation. The work-head may be adjusted toward the center of oscillation or at right angles to it. Work-holding fixtures may be of various designs, but the cam-operated three-finger spring-loaded type is typical.

A new 6-in. type C plain hydraulic production grinder, to be described in a later issue, will also be demonstrated by the company.

Special Grinder for 3/32 to ½-In. Drills

FOUR new machines, including a special type grinder for drills from 3/32 to ½-in., will be introduced by the Oliver Instrument Co., Adrian, Mich. The other machines, namely a face mill grinder for face mills up to 26 in. in diameter, a tap grinder, and a heavy-duty die making machine, with capacity for both filing and sawing work up to 3 in. thick, will be illustrated in a later issue.

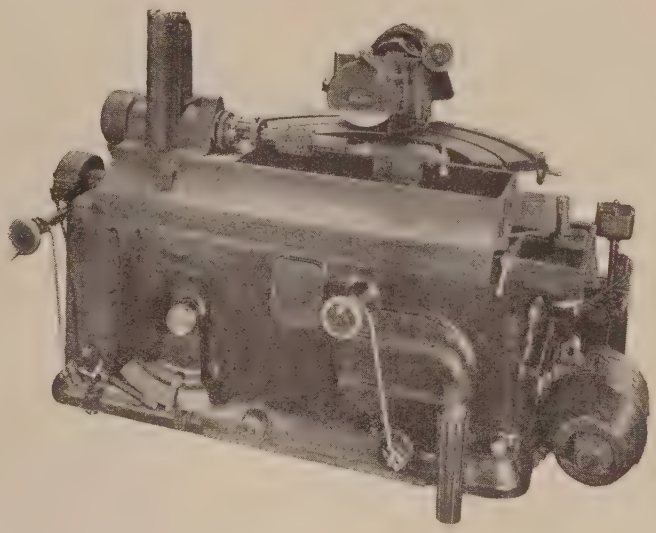


The drill grinder is designed not only for producing the Oliver type point, but also points adapted for countersinking, counterboring, chamfering, etc. Thick web oil hole drills and chamfering or nut drills can also be ground, the latter type being ground on the point and shoulder. In addition to grinding the cutting edge, the heel is backed off to give more clearance to the chips, which results in smoother holes. The point angle may be varied from 60 to 180 deg.

The drill is located in a jig or fixture which drops into position in a holding mechanism on the machine. In the bench type illustrated, the ¼-hp. driving motor is inclosed in the base and drives the spindle through a flat canvas belt, an idler providing the driving tension. The spindle is mounted on ball bearings in a swinging frame, and is adjusted horizontally by means of a knurled knob, this horizontal adjustment being for the purpose of obtaining the amount of center clearance or undercut desired so that any type of point may be ground. It also provides for grinding shoulder drills, the point being ground in the usual way and reset for the shoulder. The wheel is then moved sidewise sufficiently to come in contact with the shoulder, which is ground in the same manner as the point.

Automatic Hob and Cutter Grinder Has Wide Range

STRAIGHT and spiral hobs, milling cutters, reamers, taps and other tools are ground automatically on the new hob and cutter grinder to be exhibited by William Sellers & Co., Philadelphia. The machine will grind work up to 12 in. in diameter and 12 in. long; in addition to wide range, ease of set-up, extreme accuracy and rapid operation are features.



Indexing gears have been eliminated so that no backlash or lost motion is present, which makes it possible to grind on both the cutting and return strokes. Spiral leads to be ground on hobs or cutters are controlled by a sine bar, and by means of a patented arrangement, the machine is said to generate greater helix angles than usual. The carriage has a two-piece bottom plate so that one end may be raised if desired. It is carried on one vee and one flat way and is driven through a crank and elliptical gear, which provides uniform speed during the cut and increased speed on the reversal. The length of stroke may be varied to suit the work. Two speeds are provided for the carriage.

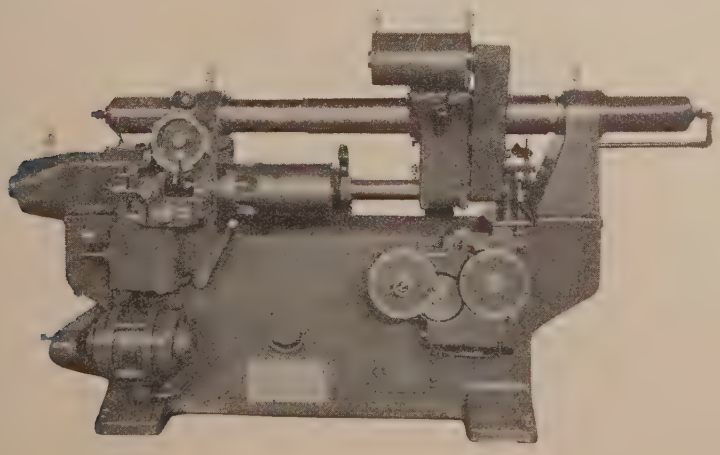
The 10-in. diameter dish-shaped emery wheel employed is driven by independent motor; it is located above the work and is carried on a series of slides attached to the main bed. The wheel spindle is mounted in ball bearings that are made to compensate for expansion due to heating. The up and down adjustment of the grinding wheel is made along a slide at the back of the bed, which is inclined at the same angle as the face of the wheel. When the stone is set at the center of the axis of the work, any vertical motion will carry the wheel radially. The grinding head is also arranged to swivel 45 deg. on either slide to accommodate helical work, and can be moved in and out so that any angle of clearance can be obtained, as well as compensation made for wheel wear.

Automatic feed includes the vertical feed as well as feeding into the wheel in a circular direction. Two 1-hp. constant-speed motors are employed, one for the wheel spindle and the other for driving the carriage and the feed and indexing mechanism. The machine is arranged to permit wet as well as dry grinding. Because of the ease of control one operator can attend several machines.

Heavy-Duty Deep Hole Automatic Sizing Grinder

FOR the production grinding of long and large bores in work that can be revolved in a fixture, the Bryant Chucking Grinder Co., Springfield, Vt., will introduce a motor-driven deep hole grinder designated as the No. 24.

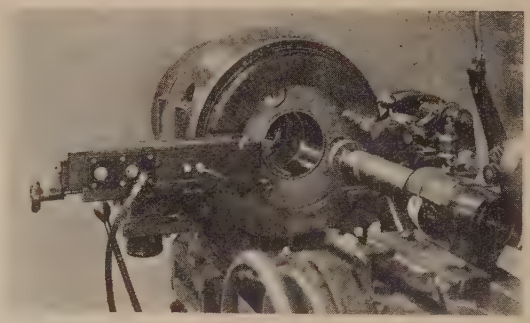
Holding to the same fundamental single slide control of previous Bryant grinders, hydraulic control, automatic sizing and massive design adapt the machine for unusually rapid and accurate production. Three sizes, having 21, 31 and 41-in. swing, respectively, and weighing 7000, 7500 and 8000 lb., net are built. The machine has a stroke of 16 in. and a grinding length of 14 in. The work spindle, of massive design, is 5¼ in. in diameter, measures more than 3 ft. between its Timken tapered roller bearings, and has a speed of 100 and 200 r.p.m. The wheel has a 2-in. face. The wheel-head is driven by a 10-hp., 3600-r.p.m. motor through a 6-in. belt. The work spindle, hydraulic pump, water pump and other parts of the machine are operated by a 5-hp. 1200-r.p.m. motor. The wheel and other driving shafts are mounted in either ball or roller bearings. The length of the machine over all is 11½ ft. and the width, 4 ft.

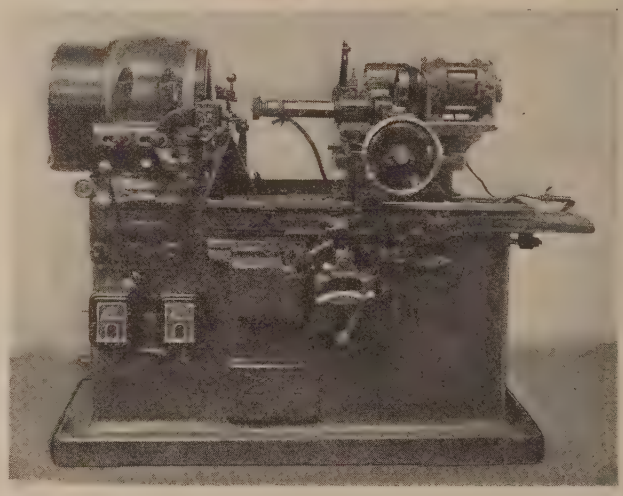


Special Grinder for Airplane Cylinders

GRINDING the bore of the single cylinders used on airplanes and motor-cycles will be among the operating exhibits of the Heald Machine Co., Worcester.

The hole is ground square with the flange and concentric with the skirt of the cylinder on a machine made up of the company's style 72-A internal grinder base, standard hydraulic table drive unit, table dogs and cross-slide, and a special workhead. The cross-slide is elevated 6 in. to give proper height, and has a dovetail way that provides unusually wide bearing surface for a special heavy-duty sleeve-type wheelhead. The workhead carries a spindle mounted on two precision ball bearings, and is driven either by a double-end motor or by belt from a pulley on the rear shaft. The machine is furnished plain or equipped for semi or full-automatic operation.





A major feature is the holding of the cylinder within the workhead, an arrangement that permits use of a short base machine and eliminates the overhang that would be present if the work were chucked in a fixture extending from the spindle nose. Before the cylinder is put into the workhead an adapter ring is bolted to its flange and a bracket with a stud is fastened to its rear. The cylinder with adapter ring is then loaded into the workhead from the left-hand end, and is centralized by five locating pins and guided into position by suitable guide bars. Next, the adapter ring is clamped against five positive stops, hook bolts that are operated from the front of the workhead being used for this purpose. A strap with self-alining end-support is then slipped over the stud on the bracket at the rear and clamped to the workhead spindle; this serves as a support and steadyrest against pressure of the wheel but does not affect the alinement or location. The operator prepares one cylinder while the other is being ground.

Automatic Milling Machine with Hydraulic Feed

AN automatic hydraulic-feed bed-type milling machine designated as the No. 36 Mil-O-Matic will be introduced by the Oesterlein Machine Co., Cincinnati.

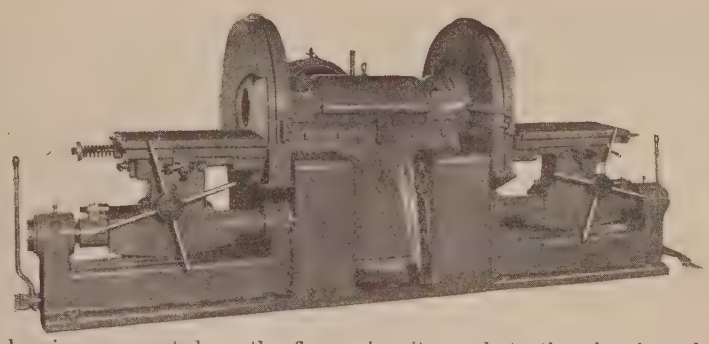
The machine may be equipped with either a plain reciprocating table having a working surface of 21 x 48 in. and 36 in. feed, or with an automatic indexing table of 14 x 24 in. working surface mounted on a slide having 24-in. feed. As an indexing machine the table makes a half turn at the end of its return stroke and advances again to the cut. Single-spindle, duplex, vertical and multiple-spindle types of the machine will be built. Several bed and table lengths will be available and special heads may be applied. Some of the features of the machine and its operation are outlined below; a more complete description, with illustrations, will be included in a later issue.

The spindle head carries its own motor; starting, stopping and reversing mechanism and control lever; pick-off gears; and all adjustable controls. Being self-contained, the head can be mounted at any angle to suit requirements. Spindle head gears are of alloy steel, heat treated, are multiple splined and inclosed in grease-tight cases. Anti-friction bearings are used throughout the drive, including the spindle which runs on two 12½ in. and two 5½-in. Timken roller bearings. The starting lever has forward, reverse and neutral positions. In and out adjustment of 8 in. is provided for the spindle, and vertical adjustment of 14 in. for the spindle head.

The direct-motor-driven Oilgear hydraulic unit that actuates the table feed is mounted in the column base. The column and outboard bearing support are interlocked by a heavy tie piece, but where the work is light or on duplex machines the outboard support and tie piece may be omitted and a "vee flat" overarm mounted on the spindle head.

Operation of the machine is automatic after the work has been clamped in the fixture and the quick-advance lever thrown. From quick advance the table slows down to the predetermined feeding rate and at the end of the cut is returned to the starting point automatically at the rate of 180 in. per min. As the table nears the end of the return stroke, a Geneva mechanism unlocks the index table, returns the ratchet and withdraws the table locating plunger. At the extreme end of the return stroke, if set to repeat, the forward quick travel begins again and in the first 2½ in. of forward motion the table is indexed automatically by means of a ratchet. Spindle speeds range from 20 to 242 r.p.m. and feeds, 0 to 30 in. per min.

Semi-Automatic Grinder Handles Heavy Work



DESIGNED to handle large or heavy work at a rapid rate, the new No. 9 40-in. heavy-duty super disk grinder, made by the Gardner Machine Co., Beloit, Wis., and exhibited at the show, operates semi-automatically, eliminating most of the manual labor ordinarily performed by an operator. Its grinding members consist of two 40-in. steel wheels faced with heavy-type Gardner G. I. A. disks, each rigidly supported by a wheel flange 29 in. in diameter mounted on a large spindle measuring 5-7/8 in. in diameter at the bearings. The spindle is carried in Timken bearings and is driven by spiral bevel gears inclosed in a grease tight housing.

The two work tables are adjustably supported on a reinforced box section cast-iron shaft, 3½ in. in diameter at its ends, with outboard bearing housings supported on the floor for their full length. Oscillation of the tables is regulated by hand and foot levers and the work is fed into the cutting member by spring tension. On many jobs one operator can serve both ends of the machine, loading one table while the other is presenting its work to the abrasive wheel. In such cases, production is materially increased, because both the machine and the operator are constantly at work. The machine weighs approximately 16,000 lb. Either belt or direct-connected 25 to 40-hp. motor drive arrangement can be furnished.

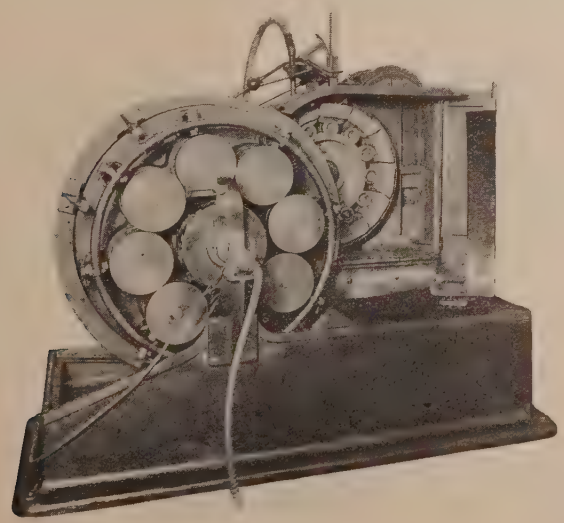
Continuous Grinding Machine

BOTH a continuous grinding machine and a surface grinder having a universal head will be exhibited by the Diamond Machine Co., Providence, R. I. The continuous machine was designed for the use of plants having to finish large quantities of pieces of one kind.

Mounted in place of the reciprocating table, of the standard machines, the continuous machine has a large circular fixture (work-head), which revolves across the abrasive wheel. Each chuck mounted on this revolving fixture is rotated by its individual motor. While the work-head is thus revolving across the abrasive wheel some of the chucks are exposed, so that finished work may be removed and rough pieces may be placed in the chuck. Turning of the work-head may be constant or intermittent as required. In either case, the motors rotating individual chucks are started and stopped automatically as the work-head revolves. To care for wear in the abrasive wheel, this is fed forward slightly from time to time.

The photograph illustrates a machine designed for grinding clutch disks. It is intended to finish three a minute and the limiting factor is the speed with which the operator can load and remove the work. The work-head revolves continuously and has eight stations. The machine was equipped with automatic air-operated chucks, but can be had with magnetic chucks when desired.

In another case, with a heavier machine and much larger pieces to be finished, the grinding time averaged about 11 min. to each casting. As there was thus ample time for unloading and re-loading, only two chucks were fitted, being standard, four-jaw, hand-operated units.



Improved Motor-Operated Oscillating Grinder

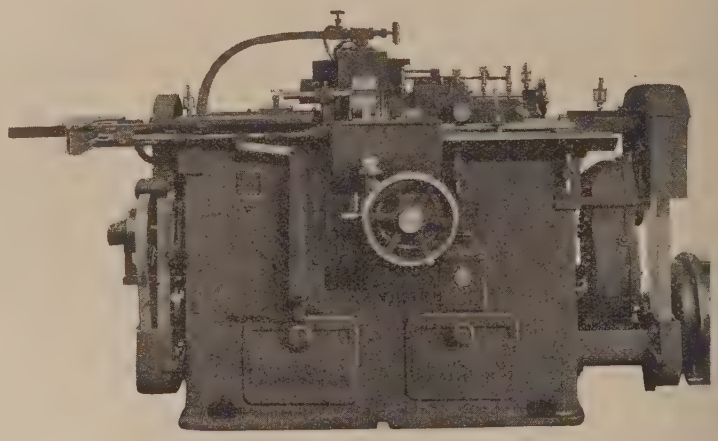
NEW features incorporated by the Van Norman Machine Tool Co., Springfield, Mass., in its new No. 25 type oscillating grinder, to be exhibited at the Cleveland Show, are said to virtually double the production obtained from the older type machines made by the company.

Two motors are employed, one driving the wheel-head and the other the work-head and oscillating mechanism. Full control of the oscillation and rotation of the work head is maintained by means of a lever shift, making it possible for the operator to start the operating part of the machine with only one motion. Ball bearings to the number of 32 are used in the construction of the grinder, bronze bearings for high-speed shafts having been eliminated. Both the work-head and wheel-head have four bearings each.

Improved Automatic Cylindrical Grinder

PRECISION grinders with improved features will be exhibited by the Arter Grinding Machine Co., Worcester, Mass. The No. 132 automatic cylindrical grinder, illustrated, will be in operation on the valve-stem guides, the outside diameter of which must be ground closely concentric with the bore.

The machine grinds by the straight-in feed method and has low angle centers, which enter rather deeply into the bore of the piece, thus providing arbor-like control. Except for loading the work-drum, all operations are automatic. Grinding is done with the full width of the wheel, which is slightly oscillated. Shoulders may be ground, using a special air-operated attachment which provides longitudinal feed of the wheel spindle.



Improvements include longer wheel-slide ways, increased diameter of the hand-wheel through which compensation is made for wheel wear, with means of making adjustments to 0.0001. Texrope type belts are now used to drive the wheel spindle, and the spindle bearing construction has been changed so that adjustments may be more readily made and properly maintained.

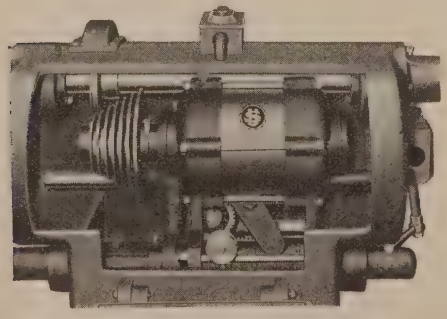
An improved rotary surface grinder, also to be shown, will have a new magnetic chuck with a separable top plate which may be replaced when worn. The working surface of the chuck is broken up into polar faces so that small washers, as well as large rings and disks are held equally well. The diameter of the chuck has been increased to 14½ in. Only one coil is used to energize the chuck. A brake mounted on the chuck-spindle is operated by the same lever as the clutch. The main shaft, its loose pulley and the main spindle idler run on ball bearings.

Buffer and Polisher with Four Wheel Speeds

FOUR different wheel speeds, ranging from 2000 to 3000 r.p.m., are obtainable on the new buffer and polisher designated as the Multi-Speed, that will be operated by the United States Electrical Tool Co., Cincinnati.

Speed changes are obtained through a Gibbs V-disk transmission of graphitized Micarta. A cone, or series of different size disks, is attached to the motor shaft as shown, the motor, in turn, being mounted on a rocker arm that permits it and its driving cone, to be swung forward and to be moved parallel with the wheel spindle. The Micarta disks drive a sationary metal V-disk or sheave on the wheel spindle; for speed changing they are brought into driving contact with the spindle sheave simply by releasing the motor and cone by means of a foot pedal and moving the cone to the proper position by means of the lever at the front of the machine. Speed changes may be made only when the motor and spindle is not in motion.

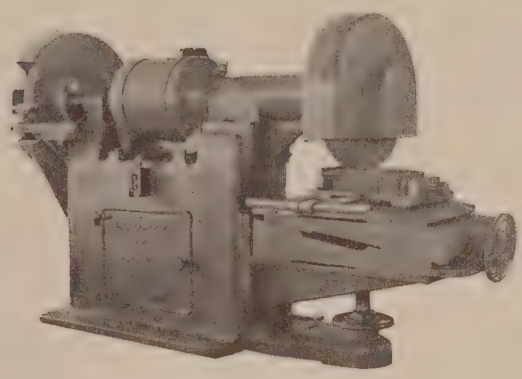
The chrome-manganese steel wheel spindle is mounted in four heavy-duty ball bearings which are inclosed in labyrinth seals in dust-tight grease compartments. The motor operates at 3600 r.p.m. and is controlled by push button, overload protection and no-voltage release being provided. The machine is built in four sizes, equipped with 1, 2, 3 and 5-hp. motors respectively.



Machine Grinds Radius on Journal Wedges

FOR grinding the radius on both new and worn journal wedges the Hill-Curtis Co., Kalamazoo, Mich., will exhibit an F-B journal wedge reclaiming machine operated by a 5-hp. motor. The tool consists of a profile block and machined surface to the machine surface of which is fitted a chuck that holds all standard A. I. A. wedges. This chuck, with journal wedge locked arm, projects toward the front of the machine and is guided under the wheel by means of a feather key which fits in guiding slots planed in the top of the profile block. After one section of the wedge radius is ground, the chuck is moved over on the profile block until the feather key in the chuck slides in the next slot. This operation is repeated until as much of the surface of the wedge as necessary is ground to reclaim the proper radius.

The amount to be ground from the wedge is controlled by the hand wheel at the extreme right of the machine which operates the screw that moves the adjusting block between the profile block and the base of the machine on an inclined way, thereby raising and lowering the wedge in relation to the grinding wheel. The wedge reclaiming end of the machine can be raised and lowered to compensate the wear by means of a vertical screw and hand wheel. The straight-faced wheel on the left-hand end of the reclaimer can be used for general purpose grinding. The right-hand side grinding wheel for grinding journal wedges is concave, but the left-hand wheel, 3 x 18 ft., is straight-faced for tool and production grinding.

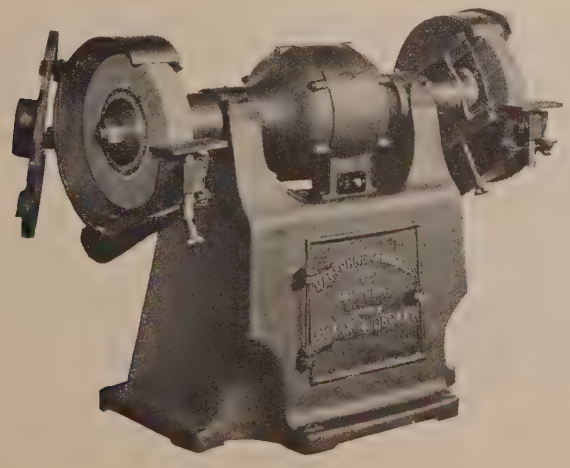


Floor Stand Grinder Operates at 9400 Ft. per Min.

THE new high-speed floor stand grinder illustrated, developed primarily for economical rough grinding of aluminum, brass and bronze castings, will be displayed by the Marschke Mfg. Co., Grinder and Buffer Division of the Black & Decker Mfg. Co., Towson, Md.

Grinding wheels are 20-in. in diameter, have a 10-in. center hole and operate at a surface speed of 9400 ft. per min. The drive is by a 5 or a 7½-hp. inclosed a. c. or d. c. motor. The spindle is carried on ball bearings located on each side of the motor and also at the extreme ends of the spindle, and labyrinth seals protect each bearing from abrasive dust and leakage of grease.

Features of the base include its weight, 1700 lb. for the 5-hp. 20-in. machine, rounded out corners to provide more ready access to the wheels; and a deep flare to provide maximum stability. The rugged and symmetrical design, together with the method of spindle mounting, is emphasized as eliminating vibration and increasing wheel life. Wheel guards are electric steel castings and have hinged inclosing covers. The work rests, mounted on the wheel guards, are adjustable by means of hand screws and lock to compensate for wheel wear. The guards have a sliding adjustment at an angle which assures that the front top of the wheel guard maintains the same distance from the work-rest, thus providing automatic spark protection. The guards being universal, the openings can be brought to any position and locked by means of a lever.



Browne & Sharpe Milling Machines

IN addition to its latest No. 30 and No. 32 plain grinders, the Brown & Sharpe Mfg. Co., Providence, will have in operation the new No. 2A universal, the No. 2 vertical and the No. 4B plain milling machines of its "standard" line, which has been described at length in recent issues of THE IRON AGE.

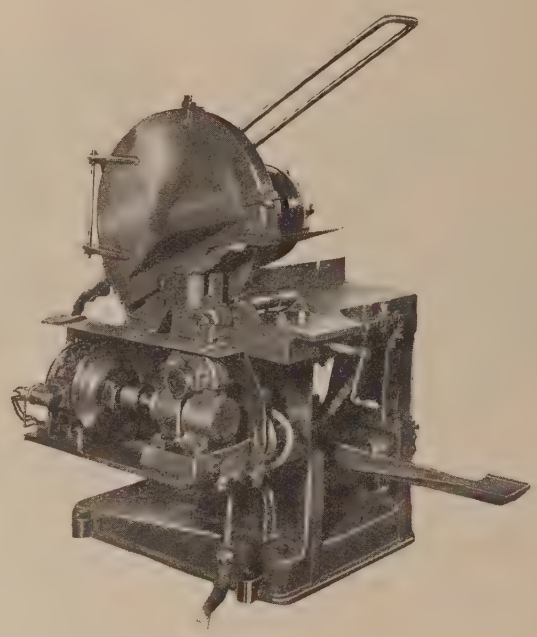
The No. 00G high-speed automatic screw machine equipped with automatic rod magazine will be a feature of the company's screw machine exhibit. A comprehensive line of small tools will be on display.

Friction Saw Attachment Eliminates Burr

A NEW rotating attachment that eliminates the burr in cutting round tubing, pipe and bar stock will be shown by Joseph T. Ryerson & Son, Chicago, in connection with its No. 0 friction saw which was designed for high production in cutting the smaller sizes of materials.

The rotating attachment increases the capacity and reduces the load on the motor. It consists of a special work-table on which supporting rollers are mounted, for holding the stock in position while being cut. One set of rollers is driven through a speed-reduction unit and gearing from a small motor. A second set is mounted on an adjustable bracket, which may be moved in or out to accommodate the stock.

By means of an air cylinder arrangement a third roller is brought down on top of the stock, holding it firmly in position while it is being rotated. This attachment provides rotation at constant peripheral velocity for any size of round stock. It eliminates necessity for chucking and for change-speed gears. The machine may easily be adjusted for cutting structural shapes by dropping off the drive rollers and replacing the adjustable bracket with a work-table plate. The drive is by 10-hp. 3600-r.p.m. motor. A 24½-in. saw blade is employed.

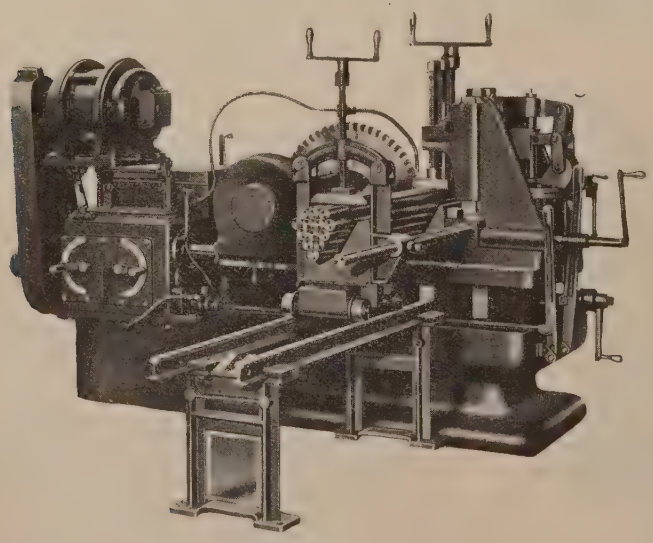


Other new equipment, to be illustrated in a later issue, includes a flue cutting and polishing machine and a flue roller.

Sawing Machines for Steel and Non-Ferrous Metals

MULTIPLE cutting of round steel bars will be demonstrated by the Cochrane-Bly Co., Rochester, N. Y., on its new No. 55 motor-driven metal sawing machine equipped with single compound toggle air clamp and multiple cutting fixtures.

The machine features roller-bearing driveshafts and hardened nickel steel driving gears that run in oil. Cutting speeds of 42, 60, 75 and 90 ft. per min., and 16 geared feeds ranging from ½ to 10 in. per min., are obtainable. The feed has a safety clutch to guard against breakage due to jamming of the carriage or other parts. A 7½ hp., 1200-r.p.m. motor is employed. With 24-in. saw blade the machine will cut 7½-in. round and 6½-in. square bars; the capacity of 60-deg. fixtures for multiple cutting ranges from 76 ½-in. bars to 4 3-in. bars. The machine weighs 4500 lb. net.



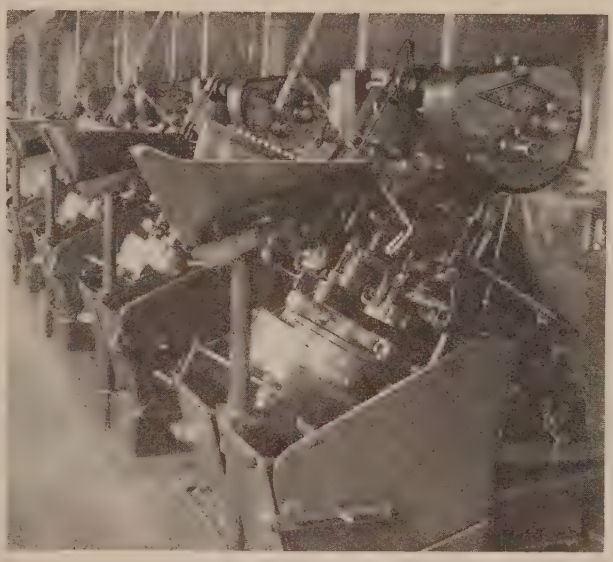
A 10-in. metal sawing machine, designated as the No. 66, with Oilgear hydraulic feed, duplex compound toggle air clamp and flood lubrication of blade will also be in operation, as well as a No. 21 automatic saw for cutting non-ferrous metals. The latter is equipped with multi-speed motor drive to the spindle, individual motor drive to the gear box and an automatic bar feed device. The latter is separately driven, and will feed 4 in. with the machine operating at 50 strokes per min.

Improved Automatic Forming and Threading Machine

AN escapement attachment for use in connection with long hexagon and square-head bolts, and bolts and screws having off-shaped heads, such as rim, plow and step bolts has been designed by the Landis Machine Co., Waynesboro, Pa., for its automatic forming and threading machine.

This attachment, built into the magazine, releases one bolt at a time at the end of the magazine, thereby relieving the bolt to be transferred to the chuck turret of the weight of the bolts in the magazine and preventing interference of bolt heads. It covers the entire range of machines from 5/16 to 3/4 in. in diameter and 1 to 6 in. in length.

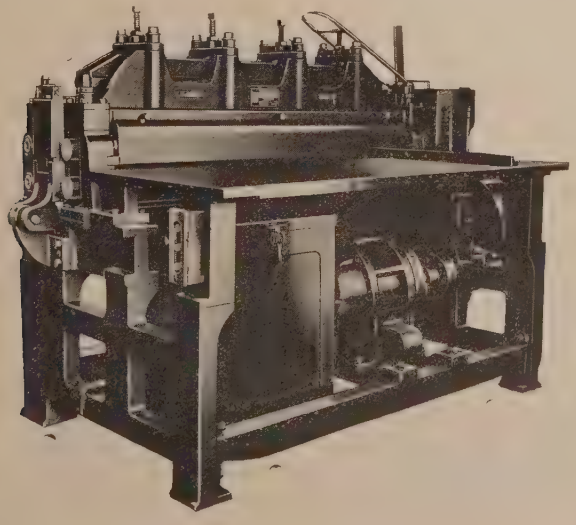
The machine to be exhibited will also be equipped with a new conveyor to deliver the bolts to the handling boxes. The conveyor is perforated and has an oscillating motion to move the bolts slowly towards the handling boxes, allowing most of the coolant to drain off of the bolts. The coolant is collected in the trough under the conveyor and returns to the sump in the bed. Small chips are also separated from the bolts, the chips dropping through the perforations in the conveyor as the bolts move along. The conveyor can be arranged to deliver the bolts either at the front or rear of the machine.



Improved Rotary Gang Slitting Machines

IMPROVED Putnam "type K" slitting machines, the heaviest type of the three types manufactured, will be exhibited by Manning, Maxwell & Moore, Inc., New York. An important feature is the method of mounting the cutter shafts and cutters to eliminate bending strains, and thus assure accurate cutting of the sheets into strips.

The cutter frame is interposed between two sets of feed rolls and carries two cutter shafts. It is arranged to swing out from between the rolls, thus providing accessibility for setting up and adjusting the cutters. The solid cutter frames, which are standard, are designed to use chair type cutters fitted into chair shaped bearings that are clamped rigidly to the cutter frame. The cutter frame, in turn, is fitted to the bed and clamped in position from above by means of a "strong back" between the uprights of the main frame. The chair type cutter bearings are bronze bushed and are fitted with flush type grease cups for pressure gun lubrication. This type of cutter must be ground on the side because the center distance between the cutter shafts in the solid type frame is fixed.



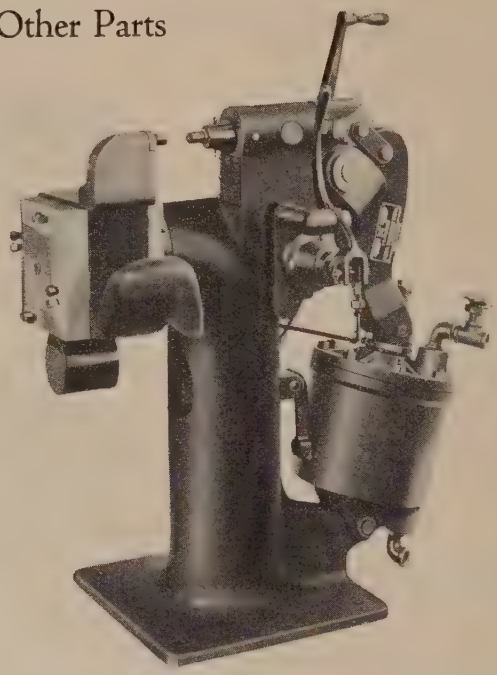
Adjustable cutter frames with block type cutters can be furnished special for cuts that are narrower than the minimum width with chair type cutters. The top cutter shaft is adjustable in a vertical plane, parallel with the lower cutter shaft, which permits grinding the block cutters on the periphery and to the exact width of cut required.

Intake and discharge rolls have adjustments by which they may be set apart slightly less than the thickness of the stock to be cut. A tension mechanism is provided to permit passing of stock that is thicker than the space between the feed rolls. The discharge rolls are hardened and ground to resist cutting of the rolls by the edges of the cut strips. Both sets of rolls are positively driven by gears.

Cold Rivets Chassis Frames and Other Parts

COLD riveting of automobile chassis frames and sub-assemblies will be demonstrated by the Hanna Engineering Works, Chicago, on a group of its "Rapid" type riveters which are built in a range of types and sizes and in capacities from 6 to 20 tons, for driving 3/16 to 3/8-in. rivets cold.

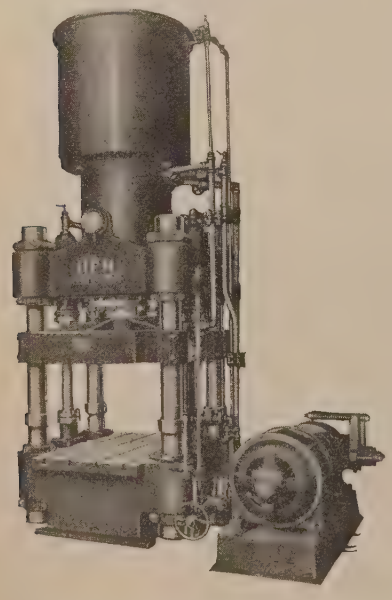
The machines will include the turret riveter illustrated. The rotating head mounts four horns or noses, any one of which, with its stationary die, may be indexed into alignment with the movable die on the plunger or ram. These noses enter the inside of the chassis frame, and because the clearance conditions at one rivet are frequently quite different from those at another rivet, the noses or horns are made in various shapes. From the standpoint of the variety of horn or nose clearance conditions met with, this machine combines in one unit four riveters of like reach, gap and tonnage. Production depends upon the number or frequency of indexes, but averages approximately 500 rivets an hour. A similar machine mounted on a swiveling base is also built.



A basic feature of these riveters is the simple lever and toggle mechanism which provides a long die stroke with wide range of uniform pressure, thus eliminating the necessity of screw adjustment of the die. The initial movement of the die is rapid, the speed gradually decreasing until the die enters the uniform pressure portion of the stroke. As the rivet head forms, the pressure increases to maximum, where it remains during several inches of piston travel. This dwell takes care of ordinary variations in rivet lengths and plate thicknesses.

Hydraulic Forming Press Completes 10 Cycles per Min.

RAPID operation, ease of control, variable working stroke and low power consumption are features of a new hydraulic forming press that will be shown by the Hydraulic Press Mfg. Co., Mt. Gilead, Ohio. The maximum pressure capacity of the machine, which is intended for forming and drawing in heavy gage metal, is 500 tons.



The machine is self-contained and is powered by an electric motor which drives a radial-type hydraulic pump. Operating pressure is adjustable over a wide range and the hydraulic control mechanisms may be set either for semi automatic or full automatic operation.

The semi-automatic cycle is started by tripping the starting lever or pedal, which causes the platen to travel rapidly downward. As the platen closes on the work it automatically slows down to full load rate, the pressure building up to a predetermined limit. The motion of the press is then reversed automatically and the platen returns at fast speed to an adjustable upper position, at which it stops. The full automatic cycle is the same except that operation is continuous until stopped by the operator. An operating speed of 10 cycles per min. on a 6-in. working stroke is readily maintained.

The machine is made in several standard sizes and pressure capacities, the operating speed of each of the different sizes being inversely proportional to the total pressure capacity.

Ball-Bearing Motor-Driven Trolley

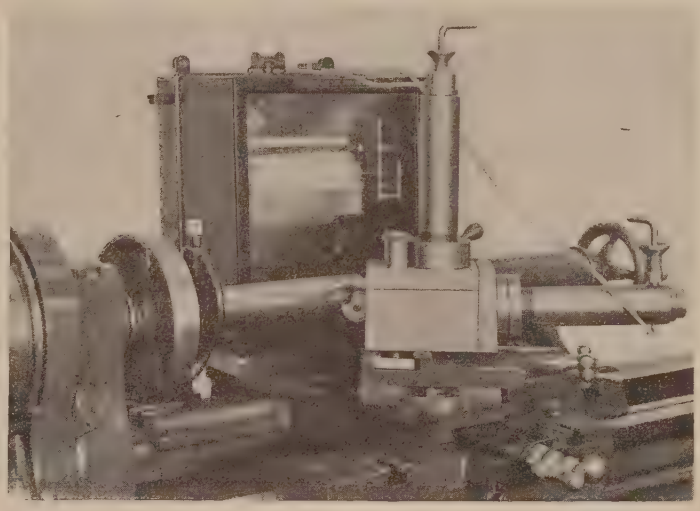
A NEW motor-driven trolley that operates at an average speed of 150 ft. a min. when loaded will be among the new equipment shown by the Yale & Towne Mfg. Co., Stamford, Conn. A ¾-hp. ball-bearing compound-wound direct current motor or a high torque, squirrel cage polyphase alternating current motor is used. The controller is of single-speed drum type, manually operated, but push-button contactor type can be furnished. Power is supplied either by a flexible cable for short runs or by overhead conductor wire and adjustable wheel type collectors.

Designed to provide the shortest headroom from the underside of the I-beam to the highest point of travel of the hoist hook, the trolley is adjustable on six sizes of I-beams from 8 to 18 in. Four roller bearing wheels provide smooth operation. Remote push-button control can be arranged. Heavy steel suspension plates provide for attaching hoist or chain block.

Determines Machinability of Metals and Efficiency of Tools

AN instrument known as the Machinabilimeter, uses for which include testing the machinability of metals, determining the best form of tool edge and cutting speeds and feeds, and the proper kind and amount of cutting compound for different materials and heat treatments, will be introduced by the Hall Planetary Co., Philadelphia.

The device, illustrated herewith, records the power consumed at the cutting edge of the tool; it is simple to operate and may be used in connections with lathes, planers, milling machines or grinders. Machinability tests are most readily made on a lathe, the piece to be tested being held between centers and the instrument mounted on the cross-slide. The cutter of the instrument is then brought in contact with the piece to be tested, and a cut of predetermined depth and feed taken. Thus the machinability of the metal is tested under actual working conditions, and the piece as a whole shown to be up to standard, or defective in that it contains hard and soft spots. Several short pieces of different material, or of the same material but different heat treatments, may be held on an arbor and tested.



Tools of button type with several cutting edges, these edges having different rake angles, etc., may be used to find the most economical form of tool edge for given conditions. Likewise, for a given tool and material the most economical feed and depth of cut can be determined; also whether a rough finished cutting edge or a polished edge is most suitable, and the effects of wear of tools on the economy of operation. The effect of different cutting oils and compounds on the cutting ability of tools may also be studied.

On a grinder, the device may be used to determine the pressure necessary to hold the grinding wheel against the work; on a milling machine, to determine the pressure required to drive the work into the cutter and vice versa.

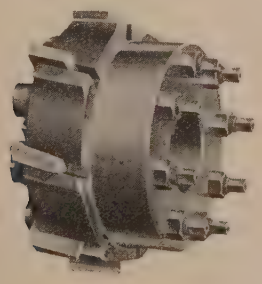
Boring Head Permitting Several Operations at One Set-Up

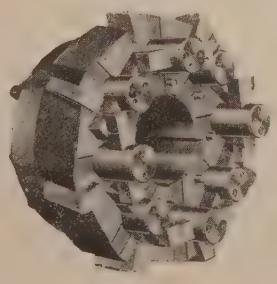
EXHIBITS by the Gairing Tool Co., Detroit, will include a boring head having tools that swing to and from the cutting position and may be very accurately set. The arrangement permits cutting large diameters, then reducing to smaller, passing through the job and again cutting the large diameters on the opposite end; it also permits finishing of various diameters on the return stroke. The tool is said to relieve the operator of responsibility for accuracy, because all blades are ground in position in one set-up, assuring concentricity of all cutting edges in relation to the axis of the boring head.

Inserting of reground and of new tools is simple. The blade is put in position, and calipers used to determine the dimension from the point of the blade to the opposite side of the boring bar; half the diameter of the bar is subtracted, the result being the radii on which the point of the tool will travel.

Swinging the tool to and from the working position is also simple. Set screws, shown in the front view illustration, hold each blade in position in its draw bar. The latter has a square end at the rear and a nut for drawing the blade snugly into the location slot at the front of the head. When this nut is loosened, a spring lifts the cutting tool free of the locating slot. The tool is then turned in or out of work position by means of a wrench applied to the square end of the draw bar.

Six sizes of this boring head are made. The head illustrated, equipped with inserted blades on its periphery, is designed for completing all boring operations on dual locomotive valve chambers in one set-up.





Electrically Power-Operated Lathe Chucks

INTERNAL and externally-operated chucks for both inside and outside work actuated by electric motor will be shown by the Union Mfg. Co., New Britain, Conn. Uniform pressure with minimum distortion of the work are advantages claimed, as well as rapid operation and minimum effort on the part of the operator. Power consumption is said to be small and use of the chuck frequently enables one operator to attend several machines.

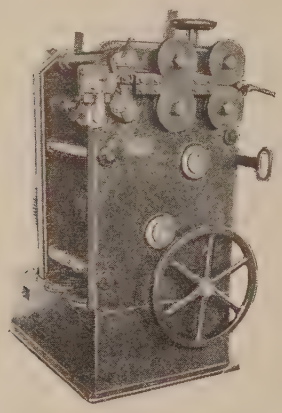
The externally-operated chuck is for both chucking and bar work, the internally-operated is for chucking work only and is provided with bushings for pilot bar. Pressure, ranging from 500 to 6000 lb., may be

varied to suit requirements. Control may be either by hand or foot. Push-button control is provided for the internal-jaw chuck, the external-jaw chuck being operated by a lever that opens and closes the jaws automatically. Solid and reversible top and special jaws can be furnished. The jaws are so made that when top jaws are removed bottom jaws are suitable for bar work.

Five sizes of the chuck, ranging from 10 to 22 in. are manufactured. All parts are of steel, working parts being of chrome-nickel steel and heat-treated.

Improved Spring Coiling Machine

THE spring coiling machine to be exhibited by Sleeper & Hartley, Inc., Worcester, Mass., while not entirely new, is of improved design.



The wire is gripped between feed rolls and is fed forward against the coiling tools, being rolled by deflection into the helical form.

A pre-determined length of wire is put into each spring. The cutting mechanism is automatic, each spring, as produced, being cut off at once. The machine will handle either round or square wire. Changes from one form of spring to another are made in from 10 sec. to 20 min., the time depending upon the complexity of the form. Springs may be wound either right or left hand, open or close coiled, of various diameters, coned with any degree of taper, with variable pitch, barrelled with any desired crowning, to almost any variable contour, tapered at one or both ends, and with one or more coils closed at one or both ends of the spring.

In operation the driving shaft pinion meshes into a crank gear, which drives an oscillating segment geared to a ratchet. The ratchet shaft drives the wire-feeding devices. Each stroke of the segment gear moving in one direction feeds a definite amount of wire. On the return stroke the feeding mechanism is stopped, giving the cutting mechanism time to cut off the spring just produced.

Eleven sizes of the machine, with capacities ranging from wire of 0.004 in. to ⅝ in. diameter, are built.

Small Electric Lift Truck for Congested Quarters

TO turn corners of 4-ft. aisles and to work in congested quarters, a light-duty small electric lift truck has been developed by the Elwell-Parker Electric Co., Cleveland. The machine is rated at 3000 lb. capacity; it handles skids now used with hand lift trucks.

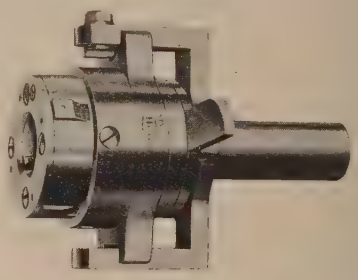
This truck is only 28½ in. wide and 83 in. long, and is low over the battery compartment, although the controls are retained at the usual height for the comfort of the operator. The lift platform is a single ⅜-in. plate bent and welded into a rigid, nosed skid support. It is nosed so that it may be eased under a loaded skid from an angle, such as a pick-up from the side of the aisle. The platform is backed at the rear with a heavy skid bumper angle surmounted by a ⅜-in. bumper plate with guide pin in ⅜-in. load dash extending the full width of the power end of the truck. The standard size of platform is 18 x 41 in. and 7 in. high, while the lift is 3½ in.

The ball-bearing, steerable trail wheels are fitted with 6½ x 4-in. rubber tires. Practically all steering connections are of the ball and socket type. The steering handle is on the operator's left and is of the vertical or pump-handle type, being pushed down to steer in the direction in which the operator leans when making a turn.

Travel controller is mounted on bent plate dash in front of operator and is actuated by a removable handle when the operator stands on the two pedals or on the divided platform. One pedal locks or unlocks this controller as the operator steps on or off, and the other pedal actuates the brake.

New 5/16 In. Die Head for Small Machines

FOR use on B & S No. 00 screw machines and other small automatics the Eastern Machine Screw Corporation, New Haven, Conn., will offer a new 5/16-in. die head, designated as the style D. This head has stronger and heavier chasers than the ¼-in. size, and is intended to enlarge the threading range of the small machines for which it is intended.



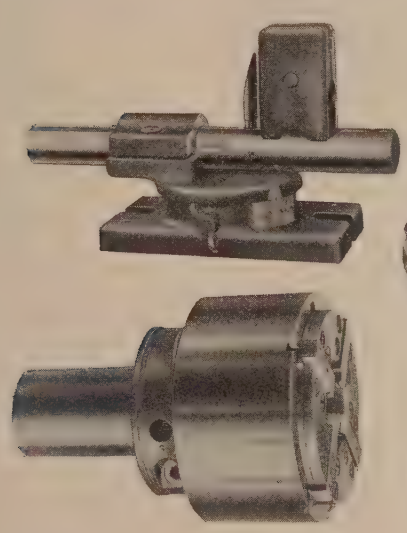
Among other styles of die heads, the new style EE sleeve-operated head for rotary spindles will be shown. Improvements in the H & G line include ground chaser cam holes in the body of the heads to provide maximum support for the chaser cams.

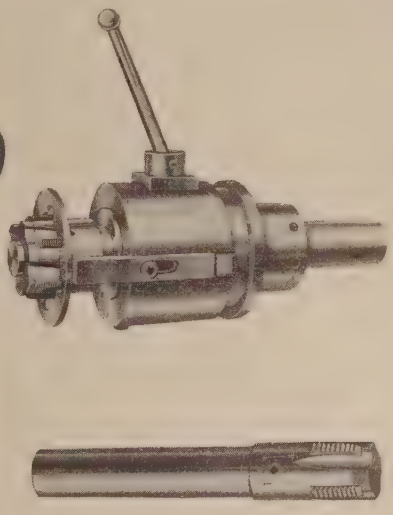
An improved chaser grinder with driving motor contained within the pedestal base, as shown in the illustration, will also be featured.

New Threading Tools

FOUR entirely new products will be exhibited by the Geometric Tool Co., New Haven, Conn. These include a class SJ solid adjustable tap, a class R receding chaser tap, a style KJ solid adjustable die-head and a universal chaser grinding fixture.

All working parts of the solid adjustable tap, even the size adjustment mechanism, are in the nose or front end. Thus, that portion of the tool carrying the chasers is the largest diameter of the tap, allowing it to cut threads to any required depth. This tap has simply a body, a plunger to hold the chasers in place, a couple of adjusting screws working on the plunger and a cap supporting the chasers.





The receding chaser tap was designed for taper threads of great depth and steep taper, cut in tough materials. All working parts are fully inclosed. The taper advances on the work as a jam cut tool. After the chasers have taken hold, an adjustable taper bar, working through a pawl on to the chaser plunger, causes the chasers to recede as they advance into the work. At a predetermined point the chasers collapse and the tool may be backed out.

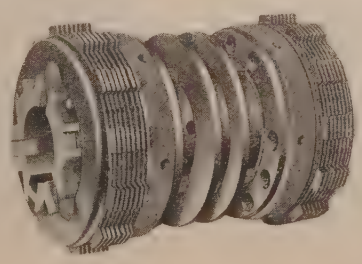
An important feature of the adjustable die-head is the accessibility of the size adjustment mechanism, permitting adjustment to be made without removing the tool from its holder. This mechanism is securely locked in place so that the die-head will not change its size, even when suddenly and repeatedly reversed at high speeds. Chasers may be quickly replaced by means of a thumb release on the back of the tool.

The universal grinding fixture can be used to grind chasers on both the cutting face and the chamfer. Milled chasers, tapped or hobbed die-head chasers and collapsing tap chasers may be re-ground with equal facility, though these chamfers are flat, concave or convex. The cutting faces of these different chasers may be given the required angle of hook or snub for the work to be done.

Multiple-Disk Clutches That Run in Oil

A MULTIPLE - DISK clutch designed to run in a spray or bath of oil will be introduced by the Twin-Disc Clutch Co., Racine, Wis. Designated as the type CC, it is made in a number of sizes from 3½ to 6 in. effective diameter of friction disks, in steps of ½ in., and also in 7, 8, 9, 10 and 12 in. effective disk diameter.

All parts of the smaller clutches, except the hard rolled phosphor bronze driving plates, are machined from the bars and steel frictional surfaces are hardened and ground. Centrifugal force operates to release the pressure levers, which are housed in the hub itself and are operated by sliding wedges that are also guided and housed in the hub. No cotters or similar devices are used in the assembly, and it is said to be impossible for any part of the clutch to become detached without deliberate disassembly. Compactness is a feature, and when installed there are no projecting parts. The method of adjustment employed in other clutches made by the company is retained in the larger sizes, and is applied in a modified form to the small models of the CC clutch. The construction lends itself to duplex operation.



⅞-In. Sensitive Drill Capable of High Speeds

RESERVE capacity to permit driving four ⅞-in., or equivalent, tungsten carbide, as well as the same number of high-speed steel tools, is claimed for a new four-spindle "Hi-Power" sensitive drilling machine to be exhibited by the Henry & Wright Mfg. Co., Hartford.

Although intended for production operations, the machine has long bearing surfaces dynamically-balanced rotating parts, and other features that adapt it for toolroom work. As exhibited, it will have three spindles driven by belt from a motor in the base and one spindle driven from a 1½-hp. motor on the rear of the column. Of three hand-feeding spindles, one will be equipped with ball-bearing back gear attachment; the fourth spindle will be furnished with a new full-automatic power feeding mechanism.

The base of the machine houses the motor, and contains the coolant reservoir. The spindle sleeve has an inserted nickel-steel rack mounted so that all load is transmitted directly to the sleeve instead of to dowels. The alloy steel spindle is ground to size and dynamically balanced. At its upper end it has six splines, which are said not only to provide sufficient surface to drive ⅞-in. drills under heaviest cuts, but also to give low unit bearing pressure on those driving surfaces so that the drill has the sensitiveness necessary for drilling very small holes.

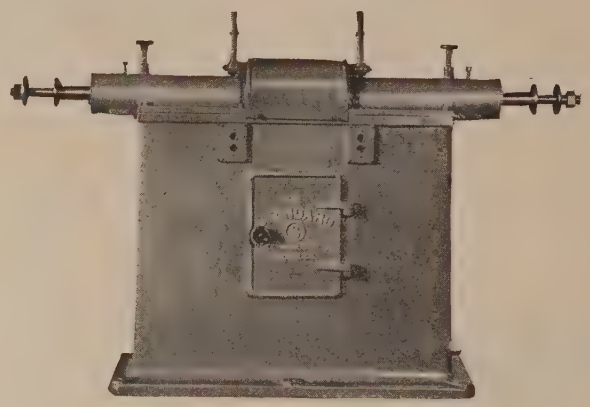
One large double row ball bearing is used at the lower end of the sleeve, and a single row ball bearing on the upper end. Lubrication of these bearings is by means of a wick in the cap on the upper end of the spindle sleeve. This cap holds sufficient lubricant for 10-hr. continuous operation, and the height of the oil is visible through a sight glass. It is stated that when the machine is in operation the upper ball bearing operates in a fog or mist; when it is stopped, most of the oil collects in a groove in a deflecting collar, but enough escapes to lubricate the lower bearing. When the machine is started, the oil in the deflector collar is thrown into the upper bearing, so that at no time is this bearing without proper lubrication.

Four spindle speeds, from 620 to 1000 r.p.m., are obtainable and four more, from 150 to 450 r.p.m., by means of the backgear attachment.

Two-Motor Buffing and Polishing Machine

TWO driving motors, one for each wheel, are used on the buffer and polisher illustrated, which will be shown by the Standard Electrical Tool Co., Cincinnati. Each motor is mounted on a hinged plate in the base of the machine, and each plate has an adjustable screw to take up belt slack. The Dayton cog belts used, run in V-grooved cast iron pulleys. Speeds ranging from 2000 to 3000 r.p.m. are obtainable by changing pulleys on the motor shaft. The machine is made in 3, 5 and 7½-hp. sizes.

Spindles are of nickel steel and are mounted in ball bearings which are inclosed in dust proof chambers and run in oil. Each spindle is fitted with a hand brake for quick stopping and also a shaft lock for use when changing wheels. Spindles of various lengths can be furnished. The motors are ball-bearing equipped and have independent push button control. The back of the machine is of sheet metal and is hinged so it may be raised, permitting full access to all parts.

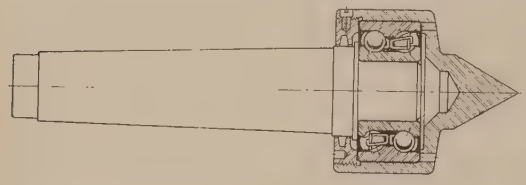


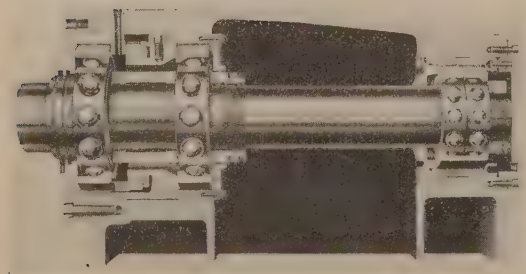
Ball Bearing Spindles and Live Centers

EXHIBITS by the New Departure Mfg. Co., Bristol, Conn., will include a heavy-duty spindle mounted on four ball bearings and a live center having double-row angular contact ball bearings.

The spindles also have bearings of the angular contact type, capable of resisting in thrust twice their rated radial capacity. The pair at each end are set up opposed to each other, with the bearings pre-loaded so that all radial and end play is eliminated. This spindle is so designed that it may be assembled and the bearings pre-loaded before being placed in the machine frame. It is capable of operation at the highest machine speeds and, when properly installed, requires no adjustment and practically no lubrication attention. It is said that it virtually eliminates chatter, and prolongs the life of cutting tools.

The live centers are assembled also in a pre-loaded condition. This feature, being built in during manufacture, is a permanent characteristic and not subject to change in use. This center is said to reduce chatter and to permit working at the highest speeds of which the lathe and other tools are capable. The work is brought very close to the supporting bearing. The seal is on the side opposite the work, thus reducing probability of cutting compound or chips getting into the bearing. The center is non-adjustable.

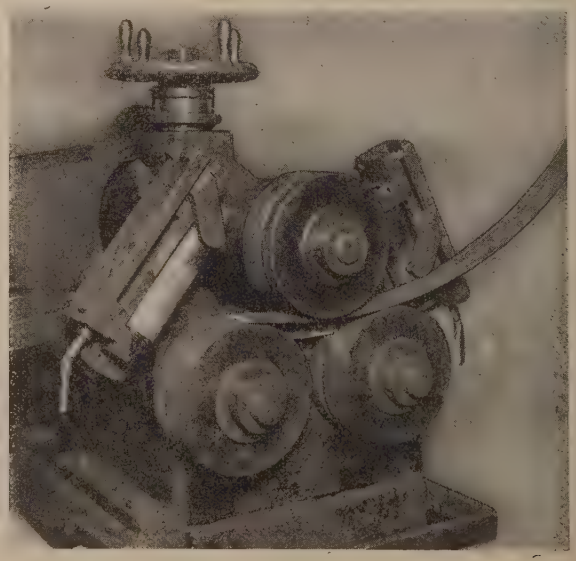




Bends Angle Iron Rings with the Leg In

BENDING rolls shown by the Buffalo Forge Co., Buffalo, will be equipped with a new device that permits bending angle iron rings with the leg in, in a single pass through the machine and without the necessity of a preliminary bend.

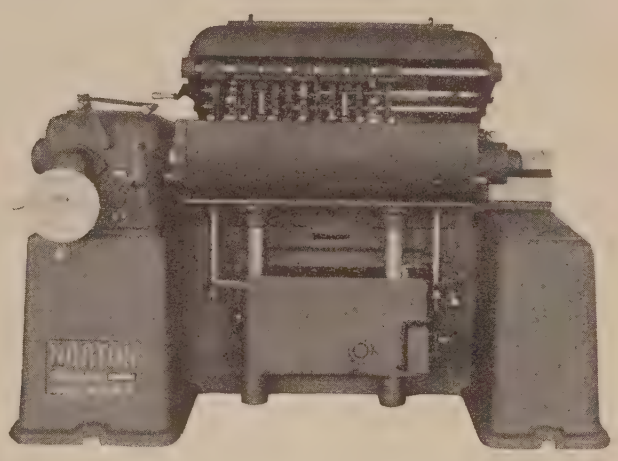
Heretofore in bending angle legs in, it has been necessary to stretch the outer leg by a preliminary bend, thus compensating for the material which is compressed when bending a ring with the leg in. The device also serves as a gage, and is useful for opening up rings bent to too small diameters. It can be applied to Buffalo benders now in use.

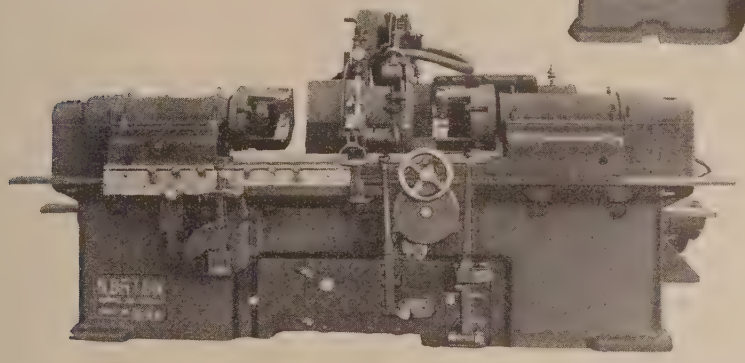


Crankpin Grinder with Features That Facilitate Operation

THE Norton Co., Worcester, Mass., will have in operation a new double-head crankpin grinder with features intended to minimize the operating hazard and the manual effort in its operation. Action of the work-holders, table and wheel-slide are hydraulically controlled and, by means of an interlocking device, these units are interdependent. One cannot be moved while either of the others is in operation.

Arrangement of the steadyrest, another feature, is such that when the rest is unclamped from the table it moves upward, affording easy access to the work. The upward movement





also stops the flow of lubricant, although this may be renewed if desired by manual control. Attached to the rest are splash guards and a Pratt gage, which also move with it in or out of the operating position. This mechanism facilitates operation and makes unnecessary the lifting of work over the steadyrest in loading or unloading the grinder.

The base of the machine has been designed so that work is supported much closer to the operator and somewhat lower than usual, permitting crankshafts to be handled without the assistance of an overhead hoist. Workholder spindles are synchronized and driven by two silent chains controlled by idler sprockets. The right-hand head is stationary, while the left has lateral adjustment to permit maintaining proper alinement of the crankshaft. The work is gripped in hydraulically-operated clamps and failure of the hydraulic mechanism does not release them. Locators on the workholders control the angular and endwise location of the pins in relation to a prescribed indexing position on the crankshaft.

The machine may be set for a crankshaft with four, six or eight crankpins, a spacing bar and dogs, with positioning slots, locating the lengthwise position of the work-table for grinding each pin. Slow movement of the table is provided for truing the grinding wheel. The wheel-slide has four adjustments: Fast motion to the shoulder of the pin; controllable feed down the shoulder to the body; fast return to the extreme rear position of the slide; and slow motion in both directions for truing the sides of the wheel. In this operation hand feed is employed.

One motor drives the machine. The swing is 17 in. and six sizes are built.

Improved Crankshaft Lapper Also to be Demonstrated

An improved crankshaft lapping machine with mechanical elevating table for raising and lowering the work will also be shown. The crankshaft is placed on supporting blocks on a table 28 in. from the floor and raised mechanically into alinement with the headstock and tailstock. It is instantly located with the driving-pin. No great amount of lifting is left for the operator. When the lapping operation is completed the shaft is mechanically lowered clear of the lapping arms for inspection.

Lapping time is also mechanically controlled, the mechanism being set to lap for a given time, at the expiration of which the work stops. By this method each shaft is lapped an exact predetermined time. Greater ease of operation and a greater degree of uniformity of finish is claimed.

Design of the lapping arms, which are now counterbalanced and suspended from a vertical position so that the weight of the mechanism has no influence on the lapping action, is another improved feature. The arms, with minor adjustments, may be adapted to any crankshaft.

This machine, intended for lapping all main bearings and crankpins at the same time, has a capacity for crankshafts up to 42 in. long. Abrasive paper, cast iron laps with loose abrasive or abrasive sticks, may be used.

Widia Tungsten-Carbide Tools Will Be Demonstrated

IN addition to tungsten-carbide lathe tools, Widia tools for boring and rock drilling operations, drills for hard and highly abrasive materials and reamers will be shown by Thomas Prosser & Son, New York. Wear resisting bushings and grinder centers will also be displayed.

High-speed cutting of chilled cast iron, manganese steel and other materials difficult to machine, as well as interrupted or jump cuts in a cast-iron slotted shaft having a Brinell hardness of over 200, will be featured. Cutting of the slotted shaft will be at a speed in excess of 650 ft. per min., a feed of 0.036 in. and depth of cut of $\frac{5}{8}$ in. The slots in the shaft cause about 400 blows per min. on the edge of the tool.

The present status of cemented tungsten-carbide tools and dies will be discussed by Dr. Zay Jeffries, consulting engineer, General Electric Co., at a meeting to be held by the machine-shop practice division of the American Society of Mechanical Engineers at the Hotel Cleveland, Cleveland, Oct. 1. This session is one of several arranged for the week of the National Machine Tool Exposition.

Steel Floor Plates Used for Diesel "Yarders"

A new use for non-skid floor plates has been found by the Central Iron & Steel Co., Harrisburg, Pa., which has supplied this product for the platforms of Diesel engines used in the lumbering district of the Pacific Northwest. These Diesel engines, called "yarders," are used in all kinds of weather, and as the operators on the platforms work 8 ft. above ground the danger of accident is present when there is snow, sleet or rain. The use of floor plates, it is stated, will remove this danger.

In producing floor plates for this purpose, the Central Iron & Steel Co. flanged them without distortion to an angle of 45 deg. while cold, said to be an unusual accomplishment with floor plates of this character.

Electric Furnace Used to Study the Stars

At the coming convention of the American Electrochemical Society to be held at the William Penn Hotel, Pittsburgh, Sept. 19 to 21, Dr. Arthur S. King of the Mount Wilson Observatory, Pasadena, Cal., will describe the results of his years of painstaking investigations on the spectra of the stars.

A special electric vacuum furnace was developed by Dr. King for this purpose, which rendered metallic vapors luminous. High temperatures alone appeared to be necessary to produce the large variety of spectroscopic phenomena observed. No definite type of chemical action has appeared to be necessary. Metallic vapors near the melting point produce a spectrum consisting of a few lines. At higher temperature stages, other groups of lines successively appear, till at the highest temperatures practically the whole spectrum of the neutral atom, and many of the more sensitive lines of the singly ionized atoms are in evidence. Dr. King's new method permits an extension of temperature classification far into the ultra violet.

Expects to Eliminate Hysteresis Losses

That electrical machinery to be built in years to come will be far more efficient than the best machines of the present day is the contention of Dr. T. D. Yensen, engineer in charge of the magnetic section, Westinghouse Electric & Mfg. Co., of East Pittsburgh, who will discuss the subject at the convention of the American Electrochemical Society, Hotel William Penn, Pittsburgh, Sept. 19 to 21. Starting out with iron electrolytically produced as a basis, Dr. Yensen further purifies this in an electric vacuum furnace and obtains a metal which analyzes almost 100 per cent pure iron. Dr. Yensen believes that hysteresis losses will eventually be entirely eliminated.

Standardization of Brass Pipe Nipples

Commercial standard C.S.10-29, of the United States Department of Commerce, deals with brass pipe nipples of three grades of brass, and covers both the iron pipe size and the extra strong size. Tables show standard weights and dimensions for the 17 sizes, from ⅛-in. iron pipe size to 10-in., which have been adopted as standard by the trade. Taper pipe thread dimensions are given and a list of stock sizes of standard weights, including both right-hand threads and left-hand threads.

This is part of the waste- elimination work which the Division of Simplified Practice has been carrying on.

Oxygen Regulator Has Double Diaphragm

Harris Calorific Co., Cleveland, has introduced an oxygen regulator which reduces the cylinder pressure to a pressure suitable for cutting and welding equipment in two stages. Two diaphragms are provided, each with its separate seat, properly proportioned of correct materials for the duty intended. It is claimed that this gives a much better control than a single-diaphragm regulator, where the one valve seat is depended upon for the dual purpose of holding the 2000-lb. cylinder pressure, and of regulating the flow to a torch needing anything from 1 lb. to 50 lb. pressure.

Conveyor Molding Unit Cuts Cost of Casting Babbitt Metal

ONE man can do in 19 min. what formerly took four men an hour in the casting of babbitt metal pigs in the plant of the Federal Mogul Corporation, Detroit, through the installation of the mold conveyor shown in the accompanying illustrations. The Federal Mogul Corporation, a large manufacturer of bearings, installed this equipment recently. Before the installation four molders were required; now one man does the same work in less than a third of the time.

The saving in wages amounts to $15 a day, and the mold conveying and casting unit takes half of the floor space that was used for the same work before the new installation was put in.

The equipment, which was provided by the Palmer-Bee Co., Detroit, consists of a reversible conveyor which carries the molds for the casting of the babbitt metal. A 2-hp. drive at 1200 r.p.m. operates the conveyor. The power unit includes Reeves variable speed transmission, which permits a travel of the conveyor belt ranging from 2 to 5 ft. a minute, as desired.

Placed alongside the melting furnaces, the molds on the conveyor belt can be filled by one operator, who pours from a dipper as shown in one of the illustrations. The pigs drop at either end of the conveyor into pits. With this equipment, 50,000 lb. of babbitt metal in 35-lb. pigs is cast in one day.

Not More Than a Minor Reaction Ahead

Business Not Yet Seriously Handicapped by Credit Stringency, But Possible Overreaching of Activity in Steel and Automobiles May Bring Recession

BY DR. CHARLES O. HARDY

THE record of the summer of 1929 will make cheerful reading for future students of the annals of American business. When the summer season opened, business and industry of almost every description were running at a high level; indeed to many a reaction seemed to be overdue. That the summer would bring at least the usual hot weather letdown seemed to be almost a certainty. Moreover, weather conditions turned out to be unusually trying.

Yet there has been little sign of the usual hot-weather recession, and the autumn opens with every indication of a continuance of such a high level of business activity as would have to be considered abnormal by the standards of a few years ago. Statistical barometers that reflect the condition of a wide variety of businesses, such as railroad car loadings, factory employment, payments through banks, consumption of electrical power and newspaper advertising, have all been running at high levels. Individual industries, notably iron and steel and automobile manufacture, have broken all records. Moreover, industries which have been backward during recent years, such as coal and certain textiles, have shown improvement.

Is such widespread activity in what is normally a dull season a favorable or unfavorable sign? Should we congratulate ourselves that the bugbear of summer inactivity has been vanquished, or should we apprehend that production is outrunning its market and setting the stage for the old spectacle of sudden business collapse, to be followed by a period of stagnation?

Production Matched by Consumption

In attempting to answer this question we may profitably consider several distinct sets of factors. First, what are the indications from the side of consumption and the state of inventories? On this side our data are very incomplete, but so far as they tell us anything they give no ground for alarm. Indexes of consumption indicate that in most lines the high level of productive activity is matched by a high level of consumer buying, and presumably of consumption. Department store sales are running at about the level of a year ago, while mail-order sales have increased by leaps and bounds. (The mail-order figures are, of course, swelled by the entry of prominent mail-order houses into the department store field, sales at their retail establishments being reported as mail-order and not as department store transactions.)

Stocks of goods on hand reported by department stores and also by wholesalers indicate that there has been no dangerous piling up of goods in the hands of middlemen, though there is some evidence of an unusual accumulation of stocks of raw materials in the hands of manufacturers. Moreover, retail collections have been running better than a year ago, so that the expansion of retail trade appears to be on a sound financial basis.

¶ Security market operations have not curtailed new financing, but have caused a shift from bonds to stocks.

¶ Industrial building, financed through the stock market, is active, contrasted with residential and public construction, which have been checked by the cost of long-time money.

¶ Interest cost of financing actual turnover of goods is of minor consequence, especially under hand-to-mouth buying.

¶ Inventories of middlemen not excessive, though there are indications of accumulated raw material stocks in hands of manufacturers.

¶ Transportation, productive capacity and labor supply show no symptoms of such strain as to portend business collapse.

Current Business Basis is Notably Favorable

A second line of inquiry as to the soundness of the current business program relates to the cost of doing business. Here also the indications, on the whole, are very favorable. In spite of the large volume of business there have not yet appeared the familiar symptoms of strain on the productive apparatus of society which have so often indicated the approach of business collapse. The most conspicuous illustration of the favorable situation in which business finds itself is afforded by transportation. In spite of a record-breaking volume of business, the railroads are maintaining the high record of efficiency and satisfactory service that has been characteristic of the past five or six years. Without marked expansion of the amount of rolling stock, the unprecedented volume of business is handled without complaints of car shortage or terminal congestion.

Likewise the labor situation gives, so far, no evidence that the pace of production is too rapid to be maintained. Until we begin to hear numerous reports of excessive overtime, strikes, rapid wage increases and complaints of diminished efficiency and a high rate of turnover, the labor situation must be adjudged favorable to continued prosperity.

High Money Not Hampering Turnover of Goods

A third point at which the stress and strain of excessive business activity has typically shown itself in the past is in the money market. Just as a boom which over-taxes the transportation facilities and the labor resources of the community inevitably undermines itself through pyramiding costs, so an attempt to expand business beyond the financial resources of the community may involve such pressure on the money market as to make its own continuance impossible. Here the case is now less favorable. Money rates by the standard of recent years are high, and show no signs of falling. Under the leadership of the New York call loan market, commercial paper rates, bond yields and acceptance rates have been advancing for nearly two years and now stand at the highest level since the crisis months of 1920-1921.

It does not appear, however, that business as yet has been seriously handicapped by a shortage of money. The experience of 1928 has gone far

to convince the thinking public that the influence of money rates on stock markets has, as a rule, in the past been greatly exaggerated by market analysts. The experience of 1929 is teaching the same lesson with regard to the influence of money rates on general business activity. What cramps business is not so much a difference of 1 per cent or 2 per cent in the price paid for short-time money as actual inability to get funds, and so far there has been little complaint that legitimate business has been handicapped by an actual shortage of credit.

With orders on the books, or with a firm market for products at profitable prices, the interest cost of financing the actual turnover of goods in manufacture or in wholesale trade has always been of minor consequence, and with the spread of hand-to-mouth buying it has become a less important element than ever before. It is in the speculative carrying of inventories beyond the normal needs of business that the price of money becomes a major factor, and all the available evidence indicates that the present business boom has been marked by a minimum of such speculative accumulation.

Credit Situation No Bar to Industrial Construction

The cost of long-time money is a more serious element in the business situation. The interest cost of the construction of a building, to be paid over a long term of years, cannot be ignored as readily as can the interest cost on a turnover of merchandise. Continued high rates for long-time capital can hardly fail to have a repressive influence on construction activities and a serious check to construction carries with it the threat of a genuine curtailment of business activity all along the line.

Building construction and permits (in spite of a bulge in July) have, for some months, been showing a downward trend, and this may well be a result of the relatively high cost of money. Two facts must be noted, however. First, rates have been high only for capital secured through bond issues; for firms that can secure their funds through stock issues the market has been and continues extremely favorable. The result of the extraordinary security market operations of the last year has been not a curtailment of new financing but a shift from bonds to stocks. This has handicapped those types of construction activity which cannot readily be financed through the stock market—such as residential building and public construction—but it has greatly stimulated industrial building activity. In the second place it must be noted that, while bond yields are high in comparison with stock yields and in comparison with the level of the past three years, they are no higher than they were in 1923 and 1924, when the post-depression building boom was in full swing.

No Business Depression in Prospect

Our conclusion is that in most lines of business the rapid tempo of the last six months has not produced such pressure on either the transportation equipment, the labor resources or the money markets of the country as to undermine seriously the capacity of well-managed industries to make satisfactory profits. This conclusion is confirmed both by the statistics of the failures and by the extremely favorable reports of corporation profits.

In summary, there seem to be no grounds for predicting the appearance of a major business reaction within the visible future. This is not to say, of course, that there are no lines of business in which production has run to excess and must be compensated for by a period of slackness. As Dr. Haney has pointed out in these columns in several recent articles, the indications are that steel production in the last few months has been much greater than seems to be required by the activity and prospects of the principal steel consuming industries. Likewise, there seems to be little prospect that the automobile industry can for an indefinite period find buyers for as many cars as it has been turning out in recent months. But such readjustments, at the worst, threaten a minor recession like that of 1927. They do not indicate the approach of a business depression.

Car Needs Expected to Gain in Last Quarter

An increase of 6.3 per cent in the number of freight cars required for the movement of iron and steel products in Pittsburgh and tributary districts in the fourth quarter of this year, as compared to the corresponding period of 1928, is predicted in the quarterly report of the Allegheny Regional Advisory Board. This figure is based upon replies to a questionnaire submitted by the board to shippers in western Pennsylvania, eastern Ohio, northern West Virginia and western Maryland and was formally announced at a meeting of the board in Canton, Ohio, on Sept. 12.

The estimate is particularly significant in view of the fact that the fourth quarter of last year was the best of the year in steel production. The figure does not include tin plate, on which a 0.4 per cent increase in car requirements is expected, or iron and steel scrap, on which a decrease of 1 per cent is looked for.

The large expected increase in steel shipments is partially explained by even heavier expansion in the car needs for commodities into the manufacture of which iron and steel enter in a large way. On agricultural implements and vehicles, the prospective increase in the last quarter over the corresponding 1928 period is 17.6 per cent; on castings, 26.4 per cent; on machinery, 11.5 per cent, and on electrical goods, 1.2 per cent. Decreases of 4.2 per cent on boilers and 5.1 per cent on sanitary ware are expected. Heavy increase in coal shipments is expected, the eastern Ohio region predicting a 51.4 per cent upturn in car requirements. An increase of 6.1 per cent in coke car requirements is also predicted.

DR. CHARLES O. HARDY of the Brookings Institution, Washington, will be a regular contributor to THE IRON AGE on the business situation. Born in Missouri in 1884 and educated in the public schools of Kansas and at Ottawa University, Ottawa, Kan., he took graduate work in history and economics, chiefly at the University of Chicago, where in 1916 he obtained the degree of Doctor of Philosophy. He was assistant professor of finance at that college from 1918 to 1922 and was professor of economics at the University of Iowa from 1922 to 1924. Dr. Hardy then joined the research staff of the Institute of Economics, now a subsidiary of the Brookings Institution. In 1927 he was joint author with G. U. Cox of "Forecasting Business Conditions." In 1925, in collaboration with R. N. Owens, he published "Interest Rates and Stock Speculation." He has contributed articles to *Annalist, New Republic, American Economic Review, Journal of Political Economy, Bulletin* of National Tax Association and *Proceedings* of American Statistical Association.

How Scrap Is Handled in Germany

Cooperative Methods in Vogue in That Country for 25 Years Said to Have Solved Many Problems

WITH uniform specifications for scrap iron and steel, with neutral inspection service on rejected cars, and with standard contracts, the steel mills and scrap iron dealers of Germany protect each other against the losses and the risks of the business and have found that over a period of 25 years cooperation is the best solution of their mutual problems. This was revealed in a conference in New York between Benjamin Schwartz, director general of the Institute of Scrap Iron & Steel, Inc., and Dr. Max Gerber, secretary of the Scrap Iron Association of Germany.

Mr. Schwartz has issued the following statement regarding the scrap purchasing methods in vogue in Germany:

"Doctor Gerber was commissioned by his organization to visit the American institute, to study the scrap iron situation in this country and to prepare a report for European organizations. It is expected that an exchange of information and facilities will be worked out between the American institute and the German association.

"The situation in Germany presents a sharp contrast to conditions in America, where each mill has its own specifications for scrap, every consumer determining for itself what are good shipments against its specifications, and where the competition among both consumers and dealers for scrap is unchecked, and in many cases unprofitable. In Germany, the steel mills and the scrap iron dealers each have their own organizations. The mills have created a central purchasing bureau and the dealers sell their scrap through a separate selling agency. The mills and dealers recognize each other's organization.

"The German mill men meet monthly, discuss their requirements for the month, and a quota is assigned to each mill for that period. Similarly, the dealers, through their organization, are given a quota of scrap, which they contract to deliver. The purchasing bureau of the mills buys the scrap and distributes it wherever it is needed, in accordance with the quotas assigned.

"The Iron and Steel Institute of Germany, representing the mills, publishes figures of scrap consumption, scrap produced at mills, stock on hand and market requirements, and both parties enter into contracts with full knowledge of the facts.

"All relations between dealers and mills are governed by a contract which has been running for the last three years. The dealers in turn have contracts with their selling agency. The contracts provide that the price for heavy melting steel is the standard and all other scrap commodities are on a fixed differential below heavy melting steel, the price for scrap, although fixed for every dealer, fluctuates in accordance with supply and demand. The price to every dealer is f.o.b. Essen, in West Germany, minus the freight from Essen to the point of shipment.

"The contract further provides for an accounting to the mills and dealers once a month. The mills are charged the average price of scrap shipped from all sources, plus the average freight, plus a share of the expenses of the purchasing bureau. The dealers are paid three times a month, or within 30 days. This plan has been found satisfactory in solving the problems of the scrap iron industry in Germany, after 25 years of organization and experience.

"Except for the war period, when the Government had an official commission to regulate the price and distribution of scrap, the mills and the dealers have been cooperating during this period to assure their supply and to eliminate the losses and risks of the business. The scope of the business, under the uniform contract, can be seen from the fact that the selling agency for the scrap iron dealers employs approximately 200 persons, while the purchasing agency of the mills employs approximately 60. The total consumption of scrap by the German steel industry amounts to approximately 7,500,000 tons annually, of which 3,500,000 tons is purchased in the open market, the balance being 'home' scrap."

Gulf States Steel Co. to Roll Coninuous Sheets

Gulf States Steel Co. has been granted a license for the construction of a sheet mill using the American Rolling Mill Co. continuous process. Plans for new plant capacity at Alabama City, Ala., which call for four to six hot mills, are now being revised. Preliminary work on the building of blooming and plate mills has begun.

$35 a Share Offered For Donner Common Stock

The Marine Trust Co. of Buffalo, acting as agent for the purchase of shares of common stock of the Donner Steel Co., Buffalo, has announced that it is prepared to purchase at $35 a share all or any part of the outstanding shares of common stock which may be tendered at its trust department, 237 Main Street, Buffalo, on or before the close of business Sept. 27, 1929.

This offer is accompanied by the following statement under the signature of William H. Donner, president of the company:

"During the past summer negotiations were undertaken for the sale of a substantial block controlled by my interests of outstanding common stock of Donner Steel Co., Inc. These negotiations resulted in an agreement for the sale of the said stock at $35 a share. One of the conditions of the sale required the purchaser to offer to purchase the remaining outstanding shares of common stock of the company at the same price. The inclosed offer of the Marine Trust Co. of Buffalo, acting as agent on behalf of the purchaser, dated Sept. 13, 1929, is made in accordance with that agreement."

The foregoing is the only formal statement that has been made by the Donner interests so far in the development of negotiations by which controlling interest of this plant was transferred to Cyrus S. Eaton of Cleveland.

Starts Movement for Tax Reduction

A movement has been launched by the Illinois Manufacturers Association to obtain a reduction of the Federal corporation income tax from 12 to 10 per cent. A resolution urging such action has been adopted and copies will be sent to members of Congress. It declares that this action would stimulate industrial activity and furnish additional employment at a time when most needed and increase corporation earnings so that individual gains would be available for personal income taxes.

Allis-Chalmers Mfg. Co. May Buy Plow Works

Complete purchase of the La Crosse Plow Works, La Crosse, Wis., by the Allis-Chalmers Mfg. Co., Milwaukee, is expected to be completed at a reported cash price of approximately $1,000,000 before the end of September, according to recent announcements. The La Crosse plant, it is also announced, will be enlarged and production stepped up to an annual sales volume of about $1,000,000, as against the present total of about $600,000 annually.

Negotiations for the deal have been going on for the last four weeks. The Allis-Chalmers Mfg. Co. had determined that the acquisition of the La Crosse plant would fit in with its program of tractor development in which the United Tractor & Equipment Co. has served as a sales medium.

Officials of the Allis-Chalmers Co., while conceding the correctness of reports regarding the purchase of the La Crosse plant, refused to confirm or deny other reports that the plant of the Falk Co., Milwaukee, manufacturer of gears, speed reducers and Diesel engines, was to be absorbed.

The La Crosse concern makes plows, harrows, disks, drills and cultivators. It was founded in 1898 and its plant comprises 10 factory buildings, with about eight acres of floor space.

Gray Iron Castings Listed for More Than 2000 Uses

More than 2000 uses of gray iron castings are listed in a book issued by the Gray Iron Institute and distributed among the members. The publication is expected to be helpful to foundrymen in checking the outlet for their products and expanding uses for castings.

A. J. Tuscany, manager of the institute, announces that arrangements have been completed for presenting, to users of castings and others interested, information on the proper uses as well as properties of gray iron for different conditions. One phase of this educational work will consist of addresses before groups of manufacturers, engineering societies, technical bodies and other organizations. Prominent metallurgists will work with the institute in this activity.

Committees of various organizations desirous of having addresses on gray iron presented to their groups are invited to communicate with the institute, Terminal Tower Building, Cleveland, and speakers will be made available who have had particular experience along the line of each organization's special interest.

Shortens Annealing Time in Malleableizing

A new short-cycle annealing process for the production of malleable iron castings is announced by the General Electric Co. A number of advantages have resulted from the use of the new malleableizing process, particularly a saving of many days.

Details of the new method were worked out in the Erie foundry of the General Electric Co. Three electric annealing furnaces are used for this purpose at the Erie plant, each rated 325 kw. and using nickel-chromium ribbon resistor heating elements. The connections are arranged to allow a power input of 52, 170 or 325 kw. as desired. The capacity of the installation is 100 tons of castings per week.

In operation the hard castings, of commercial composition, are packed on the car bottoms or without iron plates or boxes, depending on the nature of the load. It was found that best results were obtained by stacking the charge directly on the floor of the car.

The charge is then placed in a furnace and heated to a sufficiently high temperature to effect solid solution of free cementite, whereupon the charge is transferred without removing from the car, to another furnace for cooling. In this furnace the castings are brought to a temperature below 750 deg. C., which is held for approximately 4 hr., after which the temperature is suddenly lowered a few degrees and maintained at this lower temperature for another 4 hr., when this step is repeated. The castings are then transferred either to a cooling furnace or into the air, or they may be quenched immediately with increased strength and without brittleness. The average time for a 6-ton anneal is between 28 and 30 hr.

Tests taken by the General Electric Co. show that the tensile strength, yield point and other characteristics are practically the same with the short-cycle anneal as with the older methods. It was found that the short-cycle malleable iron machines better than the long-cycle product, and shows no signs of framing or reversion. Very little skin is found and the castings clean somewhat easier than the old type of product. The castings may be galvanized without embrittlement and without previous or subsequent treatments. Warpage is also found to be reduced.

Shipments Through Sault Ste. Marie Canals

Iron ore passing east-bound through the United States canal at Sault Ste. Marie, Mich., in August totaled 10,547,401 net tons. Pig iron passing through east-bound totaled 5627 net tons, while the Canadian canal carried an additional 4876 tons of pig iron. Iron ore passing west-bound through the American canal amounted to 14,560 tons. Manufactured iron and steel moving west-bound was 7477 net tons through the American canal and 7448 tons through the Canadian canal.

The iron ore moving east-bound constituted almost 94 per cent of the total east-bound freight through the American canal and about 92 per cent of the total east-bound freight through both canals. The Canadian canal passed less than 3 per cent of the total freight, but 55 per cent of the number of passengers.

Chemical Show in Germany in 1930

The sixth general exhibition of the German chemical industry (*Achema*) will be held at Frankfort-on-Main June 10 to 22, 1930. The show will occupy 20,000 sq. m. (215,200 sq. ft.) of floor space, as compared with 562 sq. m. (6047 sq. ft.) in the first exhibition, which was held in 1920 at Hanover. Fully one-half of the space at Frankfort has already been taken by German companies, and English and American manufacturers are also expected to participate in the exposition. Corrosion resistant materials developed for chemical purposes will be among the features of the exhibits.

Concurrently with the show the following organizations will hold meetings: the Association of German Chemists, the Combustion Society, the Associated German Equipment Builders' Societies, the German Society for the Chemical Equipment Industry, the German Rubber Association, the Association of Rubber Chemists and Engineers. Full particulars regarding the exhibition may be obtained from the Deutsche Gesellschaft für chemisches Apparatewesen, Seelze, near Hanover, Germany.

Aluminum Production Increasing

All indications seem to show that the world's production of aluminum is steadily increasing, according to C. L. Mantell, writing for "Mineral Industry, 1928." The last year has witnessed the opening of several new plants, as well as extensions and enlargements of older ones. It is difficult to state how much of the world's production is controlled by the Aluminum Co. of America and Aluminium Ltd., and how much by the organizations affiliated with the Cartel. It is believed, however, that the first group now controls more than half of the production of the world.

The value of new aluminum produced in 1928 in the United States was $47,899,000, an increase of 22 per cent as compared with 1927. As in previous years, the principal producing plant was the Massena, N. Y., works, the remainder coming from Niagara Falls, Alcoa, Tenn., and Badin, N. C. No new production capacity was under construction in the United States in 1928, although there had been considerable extension of fabricating facilities, particularly for sheets and strong alloys.

The secondary production is becoming of greater and greater importance. It is now the usual thing that for every two pounds of virgin metal production somewhat more than a pound finds its way back as scrap for reworking as remelt aluminum or its alloys. The secondary-metal business has been constantly developing in its technology, and raising the quality standards of its products.

Imports of metal during 1928 markedly decreased, from 68,389,641 lb. in 1927 to 37,895,832 lb. in 1928. As in previous years, the metal imported is chiefly ingot, scrap or alloy. The exports of aluminum show a considerable increase, particularly in fabricated products such as plate. The total amounted to 16,732,238 lb., valued at $6,891,490.

Philadelphia Meeting Will Cover Industrial Heating

Included among the papers scheduled for the third national fuels meeting of the American Society of Mechanical Engineers are the following on industrial heating:

"Economics of Industrial Heating Practice," by J. A. Doyle, vice-president, W. R. Rockwell Co., New York.

"Electricity for Industrial Heating Furnaces," by W. S. Scott.

"Gas for Industrial Heating Furnaces," by H. O. Loebell.

"Oil for Industrial Heating Furnaces," by Leod D. Becker.

Arrangements are being made for a meeting of unusual size and of prime importance. The dates are Oct. 7 to 10, inclusive, and the place, Philadelphia, at the Bellevue-Stratford Hotel. Besides the industrial sessions, there will be meetings for stoker, power plant, smoke abatement and domestic heating topics.

To Head Bureau of Foreign and Domestic Commerce

WASHINGTON, Sept. 17.—The name of William L. Cooper, commercial attaché at London, was sent to the Senate yesterday by President Hoover to be director of the Bureau of Foreign and Domestic Commerce, Department of Commerce, to succeed Dr. Julius Klein, who has been made Assistant Secretary of Commerce.

Mr. Cooper, born in Saginaw, Mich., in 1878, is a graduate mechanical engineer from the University of Michigan. In 1901 he was associated with Robert W. Hunt & Co., Chicago, as assistant mechanical engineer, with headquarters in London. From 1902 to 1917 he was European manager and principal engineer for that company, with headquarters in London. In the latter year he established his own offices in New York, serving as engineer and purchasing agent for clients in foreign countries. He reorganized the technical inspection of the supply division of the Emergency Fleet Corporation in 1918 for one of its districts and later was made district manager.

He formed a partnership in 1919 with R. D. McCarter, and was engaged as consulting engineer, purchasing and shipping agent in America for clients abroad. In 1926 he was appointed commercial attaché, London.

Lower Earnings in New York Factories

Average weekly earnings in representative factories in New York State are reported by the State Industrial Commissioner to have been $29.80 in July. This is the lowest figure since last January. It compares with $30.02 in June, with $30.35 in March, the highest peak ever reached, and with $29.15 in July, 1928.

Making Rustless Iron Wire, Sheets and Strips

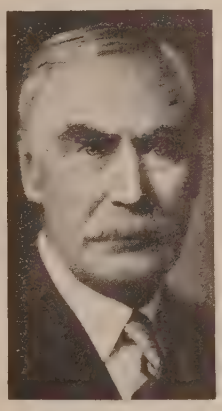
The Superior Steel Corporation, Pittsburgh, which, as mentioned in THE IRON AGE last week, has been appointed sales agent for the Rustless Iron Corporation of America, Baltimore, is also now in production on cold rolled strip steel made from ingots supplied by the Rustless Iron Company. The American Sheet & Tin Plate Co., Pittsburgh, is also utilizing the Baltimore company's rustless iron for the rolling of sheets, and it is reported that the Copperweld Steel Co., Glassport, Pa., will soon begin the manufacture of cold drawn wire from the product.

The Rustless Iron Corporation is the operating subsidiary in this country of the International Rustless Iron Corporation, and produces at its Baltimore plant rustless iron under a process covered by the Wild patents, which are owned by the International company. These patents use chrome ore as a base material.

Two grades of rustless iron are now being made. The company contemplates the building of a larger electric furnaces at Baltimore, and it is reported that a plant location in the Pittsburgh district is being sought.

James A. Campbell Honored on 75th Birthday

JAMES A. CAMPBELL, president of the Youngstown Sheet & Tube Co., celebrated his seventy-fifth birthday by entertaining a group of friends in the steel industry over the week-end at his home, Loganbrook, north of Youngstown. Included in the group were Charles M. Schwab, chairman, and Eugene G. Grace, president, of



JAMES A. CAMPBELL

the Bethlehem Steel Corporation; Samuel Mather, John L. Severance, H. G. Dalton, Harris Creech, John Chandler, Elton Hoyt II, and J. P. Williams, Cleveland; E. A. S. Clarke, Arthur J. Singer and L. J. Campbell, New York; C. D. Caldwell and E. H. Stillman, Chicago; and from Youngstown, A. E. Adams, John W. Ford, T. J. Bray, Richard Garlick, William B. Gillies, E. T. McCleary, L. A. Manchester, Walter E. Meub, W. J. Morris, Frank Purnell, W. C. Reilly, C. S. Robinson, John Tod, W. E. Watson and R. M. Welch.

Wednesday evening, Sept. 11, the date of his birthday, Mr. Campbell was tendered a testimonial dinner at the Ohio Hotel in Youngstown, attended by 400 representative citizens of the Mahoning Valley. A. E. Adams, president, First National Bank, and a director of the Sheet & Tube company, presided. Addresses were delivered by Mayor Joseph L. Heffernan, Dr. I. E. Philo, John T. Harrington, E. T. McCleary and L. A. Manchester.

At the conclusion of the program, Mr. Adams read a testimonial, applauding President Campbell's achievements and his untiring efforts in behalf of Youngstown. The latter responded briefly.

President Hoover sent to Mr. Campbell the following telegram:

"Permit me to join with your other friends in extending to you heartiest congratulations upon your seventy-fifth birthday."

At 75, President Campbell, apparently in the prime of life, has no thought of retiring and intends to "carry on" so long as his health permits. He is at his office virtually every day except when he is in New York on business, and keeps in active touch with all the affairs of his corporation.

United States Uses 41 Per Cent of World's Tin

During 1928 the United States consumed 73,270 tons of virgin or primary tin, representing 41 per cent of the world's production of approximately 178,000 tons, according to a report of the United States Bureau of Mines. The consumption for tin plate and terne plate manufacture, accounting for 37 per cent of the total, represents the principal single use for tin in this country. Last year the tonnage for this purpose showed a gain of 10 per cent over the previous year, the increase having been caused by general industrial expansion and by larger manufacture of canned goods. The growing practice of lap-welding and die stamping tin cans has lessened the demand for solder in canning operations and consequently for much tin. Further data in regard to this subject are contained in circular 6165, "Consumption of Tin in the United States During 1928," published by the United States Bureau of Mines, Department of Commerce, Washington.

Diamond Chain & Manufacturing Co., Indianapolis, has completed a four-story office and administration building, the two lower floors of which will be used for manufacturing purposes. The space formerly occupied by the office, engineering and drafting departments has been converted into a manufacturing department. A new one and a half story addition is being used for steel storage. These changes have added 40,000 sq. ft. to existing manufacturing space.

Inland Steel Co. has painted an airport marker on the roof of its Milwaukee plant, carrying the name "Milwaukee" in high visibility yellow paint on black background. The sign is 80 ft. long, 20 ft. wide and will be lighted at night. An arrow, 60 x 20 ft., yellow on black background, points southeast toward the municipal airport.

Oil Transfer Corporation, 17 Battery Place, New York, has placed a contract with Ingersoll-Rand Co. for an 800-hp. direct reversible marine oil engine for installation in its new tugboat which is being built by the Spedden Shipbuilding Co.

Metal Supplants Wood in New Cabin Plane

The tendency to supplant wood with metal in the manufacture of airplanes is indicated in a statement of engineers of the Ryan Aircraft Corporation, St. Louis, that only 298 lb. of wood is used in the new six-place Ryan Brougham cabin plane. This includes all the wood used in the construction of the wing, fuselage, fairing and other parts. The ship weighs 2250 lb., less gasoline, oil, passengers and pilot. Thus in this plane only 17 per cent of the entire construction is of wood, and, with the exception of the wing, there is no strain on any of the wood parts.

"This tendency to eliminate wood from airplane construction has resulted in much safer, stronger and lighter construction," the engineers state. In a Ryan plane the pilot and passengers are now surrounded by a steel tubing structure which protects them from injury, even in a crash.

Steel propellers have been substituted for the old wooden ones. Instrument boards are made of micarta, cabin frame work is largely of aluminum, and wood is used only for the wings, fairing and as a frame work for upholstering the cabin.

August Construction 25 Per Cent Less Than July

Construction contracts awarded in August in the 37 States east of the Rocky Mountains totaled $488,882,400, according to the F. W. Dodge Corporation. This represents a drop of about 25 per cent from July and is 5 per cent lower than in August, 1928. Only two of the eight districts show increases over July. In contemplated new work, however, seven of the eight districts show increases, the total having been $657,832,000, or 37 per cent more than in July.

Residential building contracts continue to lead, but with a considerably lower percentage of the total than has prevailed for several years. In August this type of construction accounted for $146,088,200, or 30 per cent of all, compared with 35 to 40 per cent or more, which has prevailed monthly for a long period. Public works and utilities in August accounted for $119,287,800, or 24 per cent. Industrial buildings called for $75,265,000; commercial buildings, $71,955,400; educational buildings, $32,349,400.

Totals for eight months have aggregated $4,156,865,000, compared with $4,545,270,000 for the corresponding period of last year.

Peden Iron & Steel Co. Buys Wilson Hardware Co.

The Peden Iron & Steel Co., Houston, Tex., wholesale hardware and mill supplies, has purchased the E. L. Wilson Hardware Co., Beaumont, Tex., engaged in a similar line of business. E. G. Edson, formerly president and general manager of the Wilson company, and Virgil Keith, a former vice-president, whose father for 25 years was president of the Wilson company, have been added to the board of directors of the Peden company and will continue in active capacities with the organization. The stores of the Wilson company will be continued.

New Laclede Tube Mill to Be Ready in January

Standard merchant pipe from ⅜ in. to 4 in. in diameter and mechanical tubing and electrical conduit, both enameled and galvanized, will be manufactured in the tube mill of the Laclede Steel Co., St. Louis, being erected at Alton, Ill. This mill, which is the first pipe plant in the St. Louis district, will begin production in January and will employ over 200 men. Complete finishing equipment for galvanizing will be a feature of the plant.

Link-Belt Co., Chicago, has appointed the following district sales agents for its line of cranes, shovels and draglines: James Van Buskirk, 911 Martin Building, Birmingham, for Alabama; Clyde Co., 309 Magazine Street, New Orleans, for Louisiana and most of southern Mississippi; Holloran Tractor Co., 188 Butler Street, Memphis, Tenn.; Ensminger & Co., 181 South Washington Street, Wilkes-Barre, Pa.; United Hoisting Co., 136th and Locust Streets, New York; Charles L. Miller, Denver and Salt Lake City.

Employment and Payroll Totals in Identical Plants in July and June (a)

	Establishments	Number on Payroll		Weekly Payroll (b)	
		July	June	July	June
Iron and steel	208	285,362	287,502	$8,867	$9,440
Foundry and machine shop	1,054	284,932	285,539	8,579	8,876
Machine tools	147	41,150	40,878	1,322	1,358
Hardware makers	70	32,148	32,576	796	853
Steam and hot-water appliances	108	30,225	31,768	859	927
Stoves	114	18,618	20,017	508	562
Structural ironwork	175	29,984	29,414	886	889
Cast iron pipe	43	12,767	12,477	306	293
Automobiles	228	455,682	466,670	13,247	15,739

[a] United States Bureau of Labor Statistics.
[b] Thousands of dollars.

Aircraft Makers Bought by Allied Motor Industries

Allied Motor Industries, Inc., operating American Cirrus Engines, Inc., Belleville, N. J., maker of aircraft motors, and the Great Lakes Aircraft Corporation, Cleveland, manufacturer of airplanes and parts, has acquired a controlling interest in the American Aeronautical Corporation, 730 Fifth Avenue, New York, maker of seaplanes and amphibians of the Savoia-Marchetti type.

The last-named company has a plant at Whitestone, L. I., but will soon transfer its operations to Port Washington, L. I., where it is now constructing a factory. One section of the building is nearing completion and the entire plant, of U-shape, will have 24,000 sq. ft. of floor space, and will cost $100,000 with equipment. The main floor will be devoted to manufacturing, while a second floor will be used for classrooms for a seaplane school. A seaplane terminal is also being built.

Foundrymen's Board Holds Annual Meeting

The annual meeting of the board of directors of the American Foundrymen's Association was held at the Hotel Statler, Cleveland, Sept. 12, and the new officers elected at the Chicago convention were installed. These are: President, Fred Erb, president, Erb-Joyce Foundry Co., Detroit; vice-president, N. K. B. Patch, secretary, Lumen Bearing Co., Buffalo; directors: F. J. Lanahan, president, Fort Pitt Malleable Iron Co., Pittsburgh; Harold F. Falk, vice-president and works manager the Falk Corporation, Milwaukee; Arnold Lenz, manager of the Gray Iron Foundry of the Chevrolet Motor Co., Saginaw, Mich., and Delos H. Wray, Henry Wray & Son, Inc., Rochester, N. Y.

Plans were made for the next annual convention and exhibition, which will be held in Cleveland, May 12-16. It was decided to have as an added feature of the exhibit a large technical and educational exhibit.

138 Steel Ships Under Way

WASHINGTON, Sept. 17.—On Aug. 1, American shipyards were building or under contract to build for private owners 138 steel vessels of 141,552 gross tons, as compared with 174 steel vessels of 150,782 tons on July 1, according to the Bureau of Navigation, Department of Commerce.

More than 300,000 commercial users of tin and copper are now in business in the United States, according to a preliminary survey by the National Metal Exchange. This figure includes only individuals or corporations fabricating or purchasing articles made of these metals in sufficient quantities to be materially affected by price fluctuations.

Little Movement in European Markets

High Production Costs for British Pig Iron—German Steel Plants Use Much Power—Japan to Expand Rolling Mills

(*By Cable*)

LONDON, ENGLAND, Sept. 16.

INCREASED production costs are hampering expansion of pig iron output and Cleveland makers are generally sold out to the end of October. Most of this business is for domestic delivery, as export buyers are unwilling to pay the advanced prices.

Hematite iron prices are gradually rising, but as a higher market will jeopardize increased export business it is believed that some furnaces may suspend.

Finished steel business is generally quiet, but inquiries are in moderate volume. Most mills rolling light weight material are well occupied, but plate mills are still in need of orders, especially for shipbuilding.

British exports in August were 38,000 tons of pig iron, of which the United States received 3000 tons. Total iron and steel exports were 358,000 tons.

British consumers of Continental sheet bars have bought heavily of late, but otherwise the market is quiet with transactions delayed until after the Cartel meeting. Tin plate prices are strong as a result of good buying and 18s. 7½d. ($4.51) per base box f.o.b. works port has been paid, with 19s. ($4.60) per base box now asked by mills which are well engaged. Works are well sold up to the end of the year and recent inquiries are for delivery into the first quarter.

Galvanized sheets are quiet but prices are steady, although Indian demand has not improved. Black sheet business is dull and mills rolling Japanese light gage specifications have reduced prices.

Ashmore, Benson, Pease & Co., Stockton-on-Tees, will build a blast furnace with a weekly capacity of 3500 tons of pig iron for the new Ford works at Dagenham. The new furnace will be the largest in the United Kingdom. The Albion Motor Co., Glasgow, has secured a £200,000 ($970,000) contract for 190 6-wheel motor cars from the Indian Government.

German Contracts Omit "Force Majeur" Clause

HAMBURG, GERMANY, Sept. 3.—A feature of the steel market is the willingness of domestic and export buyers to pay premiums of 1s. 6d. to 2s. 6d. (36c. to 60c.) a ton for prompt shipment. This has been due to the fact that sellers are now guaranteeing compensation to the buyer for delays and are waiving the "force majeur" clause in their contracts. Omission of the "force majeur" clause is unusual, and Belgian and Luxemburg steel mills, in most cases, have been disinclined to take such action. Consequently, German sellers have been booking a considerable tonnage for delivery in 25 to 26 days after acceptance of the order. Business on this basis has included bars, beams, and other heavy material.

Japanese Rails May Go to American Mills

NEW YORK, Sept. 17.—Exporters to Japan have been obtaining bids from American mills on about 10 miles of 75 and 100-lb. rails for the Nankai Electric Railroad. Although these sections are obtainable in Japan from the Government Steel Works, which has a large capacity for rail production, exporters believe that the early shipment specified by the railroad may bring the order to the United States, as deliveries from both the Japanese and the European mills are delayed.

Bids received by the Nippon Oil Co. in Japan on its recent inquiry for about 50,000 base boxes of oil sizes of tin plate were unsatisfactory and, as the material was for next year's requirements, purchase has been postponed. On its previous quarterly purchase of tin plate, quotations by British mills were low and American bids were high, so that the order went to the British. On the

British and Continental European Export prices per gross ton, f.o.b. United Kingdom Ports, Hamburg and Antwerp with the £ at $4.85

British Prices, f.o.b. United Kingdom Ports

Cleveland No. 3 foundry	£3	12½s.	to	£3	13½s.	$17.58	to	$17.82
East Coast Hematite	3	16	to	3	16½	18.39	to	18.51
Ferromanganese, export	13	10	to	14	0	65.47	to	67.90
Billets, open-hearth	6	7½	to	6	10	30.92	to	31.52
Sheet bars, open-hearth	6	5	to	6	10	30.31	to	31.52
Black sheets, Japanese specifications	12	17½				62.31		
Tin plate, per base box	0	18⅝	to	0	19	4.51	to	4.60
Rails, 60 lb. and heavier	7	15	to	8	15	37.59	to	42.43
						Cents per Lb.		
Steel bars, open-hearth	7	15	to	8	10	1.67	to	1.84
Beams, open-hearth	7	2½	to	7	12½	1.55	to	1.65
Channels, open-hearth	7	7½	to	7	17½	1.60	to	1.71
Angles, open-hearth	8	2½	to	8	12½	1.76	to	1.86
Ship plates, open-hearth	7	12½	to	8	2½	1.66	to	1.76
Black sheets, No. 24 gage	10	5	to	10	10	2.21	to	2.27
Galvanized sheets, No. 24 gage	13	7½	to	13	10	2.89	to	2.92

Continental Prices, f.o.b. Antwerp or Hamburg

Foundry iron, 2.50 to 3.00 per cent sil., 0.50 to 0.90 per cent phos.	£3	7s.	to	£3	10½s.	$16.24	to	$17.09
Foundry iron, 2.50 to 3.00 per cent sil. 1.00 per cent and more phos.	3	10				16.97		
Billets, Thomas	4	14	to	4	14½	22.79	to	22.91
Sheet bars, Thomas	4	16	to	4	18	23.28	to	23.76
Wire rods low C., No. 5 B.W.G.	6	5	to	6	6¼	30.30	to	30.61
Black sheets, No. 31 gage, Japanese	12	7½				60.02		
Rails, 60 lb and heavier	6	10*				31.52		
Rails, light	6	1½				29.46		
						Cents per Lb.		
Steel bars, merchant	5	10½	to	5	11	1.19	to	1.20
Steel bars, deformed	5	10	to	5	11	1.19	to	1.20
Beams, Thomas, British standard	5	2	to	5	6½	1.12	to	1.17
Channels, Thomas, American sections	5	14	to	5	18	1.24	to	1.27
Angles, Thomas, 4-in. and larger, over ⅜-in. thick	5	5				1.14		
Angles, Thomas, 3-in.	5	13				1.22		
Ship plates, open-hearth inspected	7	8				1.63		
Hoop and strip steel over 6-in. base	5	15	to	5	16	1.24	to	1.27
Wire, plain, No. 8 gage	7	5				1.57		
Wire, galvanized, No. 8 gage	9	5				2.00		
Wire, barbed, 4-pt. No. 12 B.W.G.	11	12½				2.58		
Wire nails, base	7	10½				$1.63 per keg		
Wire nails, assortments, 1 to 6-in., keg	10	6½				2.23		

*Open-hearth steel, 10s. ($2.42) per ton extra.

recent inquiry the positions of American and Welsh mills were reversed, mills in the United States being the low bidders for the business.

To Make Concrete Products from Slag

DUSSELDORF, GERMANY, Sept. 2.—The Vereinigte Stahlwerke A. G. is constructing a plant near Duisburg, which will use blast furnace slag in the production of concrete paving stones, brick and pipe. It is to be the largest plant of its kind in Germany, with a capacity of 1500 to 1700 tons. Most of the output will go to Dutch contractors.

German Steel Industry Leads in Power

HAMBURG, GERMANY, Sept. 3.—An investigation of horsepower per employee used in German, British and American industries made by the Reichscreditgesellschaft, Berlin, and the German Business Research Institute, shows Germany leading slightly in the iron and steel plants and in coal mining. In blast furnaces and steel mills the per capita use in 1928 was 17.5 hp. in the United States, 18.7 in Germany and 11.1 in Great Britain. In coal mining per capita horsepower was 4.9 in the United States, 7.7 in Germany and 5.4 in Great Britain.

In shipbuilding, however, Germany lagged with only 3.4 hp. per capita, compared with 3.9 per capita in Great Britain and 6.2 in the United States. In the automobile industry per capita use was 2.8 hp. in the United States, 1.4 in Germany and 1.3 in Great Britain. In the investigation, all plants employing 50 or more men were included.

Japan to Expand Mills

HAMBURG, GERMANY, Sept. 3.—Machinery builders are negotiating for some substantial contracts with Japanese steel mills, which are planning increased production of wire rods, sheets and plates. Representatives of the Japanese works have arrived in Germany to inspect German equipment, and a large share of the business is expected to be placed here.

Oppose Copper Rebate

HAMBURG, GERMANY, Sept. 3.—Copper smelters have requested the railroads to consider gradual abolition of the special freight rates from ports on imports of copper, pointing out that German production during the next year will be considerably increased. At present a refund of 40 per cent of the freight rate is granted to large copper consumers.

Bethlehem Steel Co. has purchased from H. A. Brassert & Co., Chicago, three disintegrators for the fine cleaning of blast furnace gas.

Manganese Producers Say 1½c. Duty Is Essential

WASHINGTON, Sept. 17. — The American Manganese Producers' Association at its second annual convention here last week adopted a resolution "that a tariff of 1½c. a lb. on the metallic manganese content of all ores containing more than 25 per cent manganese with protection for low grade ores is absolutely essential and nothing less will provide adequate protection for the domestic industry. The association stands solidly behind the tariff provisions as contained in Senator Oddie's amendment."

The Oddie amendment provides for a duty of ½c. a lb. on the manganese contained in ores running from 10 to 20 per cent manganese, 1c. a lb. on ores running from 20 to 25 per cent, and 1½c. a lb. on ores containing manganese in excess of 25 per cent, ores containing less than 10 per cent remaining on the free list.

New Mileage Freight Rates Postponed to Dec. 20

WASHINGTON, Sept. 17.—An order made public last Thursday by the Interstate Commerce Commission postponing from Oct. 20 to Dec. 20 the effective date of the general Eastern steel rate case decision has aroused interest as to whether the proceeding will be reopened for further consideration. The order provides, however, only for postponement of the effective date. At the same time it is recalled that reopening and reargument were requested of the commission not only by the railroads but by a number of shipper organizations.

The railroads, as pointed out in THE IRON AGE of Aug. 29, page 553, particularly objected to the so-called fourth section (long-and-short-haul) order in the decision and declared that they could not publish any mileage scale of rates, which were set up in the decision, without having adequate fourth section relief. Because of this situation agents for the railroads said they were preparing a new fourth section application "in order to make the relief adaptable to and consistent with the distance scales."

Among shipper organizations asking for a postponement of the effective date and a rehearing of the case were those in northern New Jersey cities. Removal of these points from the New York City rate group on traffic afforded rail service only was sought. The Port of New York also asked for reopening of the case in order that a number of points might be "cleared up."

The decision covered all rates on manufactured iron and steel products throughout Official Classification territory. It follows a prolonged investigation under the Hoch-Smith resolution and was the most sweeping iron and steel rate case ever passed upon by the commission.

New Steel Plant Safety Record Made by Armco

A new safety record for a steel plant is thought to have been established by the East works of the Middletown, Ohio, division of the American Rolling Mill Co. when it completed at midnight, Sept. 8, 1,158,000 man-hours without a lost-time accident. This is equivalent to 45 consecutive days for over 3700 men. The new record supplants that made on June 29 by the Butler, Pa., works of the Columbia division of Armco, which had finished 66 consecutive days, but only 1,006,135 man-hours, without a lost-time accident.

Aluminum Plant in Hungary

HAMBURG, GERMANY, Sept. 3.—The interests controlling most of the Continental bauxite deposits are preparing to establish an aluminum plant near Budapest, Hungary, with a capacity of about 1500 tons a year. This will be the first aluminum plant in Hungary, which heretofore has imported its requirements of about 2000 tons of aluminum annually from Switzerland and Germany.

Production and Shipment of Raw Materials and Finished Products

	August, 1929	July, 1929	August, 1928
Trackwork for T-rail track (a) net tons...	14,818	13,844	11,040
Trackwork for T-rail track, first 8 months...	114,099	.....	99,945
Portland cement, production (b) bbl. (c)....	18,594(d)	17,281	18,759
Portland cement, production first 8 months...	110,951	.....	113,294
Portland cement, shipments (b) bbl. (c).....	23,019(e)	20,295	21,970
Portland cement, shipments, first 8 months...	113,562	.....	115,824
Portland cement, stocks, end of month.....	20,101	7,525	19,374
Mechanical stokers sold, hp. (f).....	54,929	65,197	51,572
Mechanical stokers sold, first 8 months....	413,347	.....	336,259
Sheet-metal ware (f):	**July, 1929**	**June, 1929**	**July, 1928**
Galvanized, shipments, dozens.....	153,958	140,096	169,271
Galvanized, value.....	$628,545	$609,487	$677,451
Enameled, shipments, dozens.....	291,332	337,375	277,684
Enameled, value.....	$1,097,956	$1,210,568	$1,058,547

(a) American Iron and Steel Institute.
(b) United States Bureau of Mines.
(c) Thousands.
(d) Largest since August, 1928.
(e) Largest volume ever reached.
(f) United States Department of Commerce.

This Issue in Brief

Multiple drill set-up time reduced more than two-thirds by use of cluster plates. Screw bushings in the holes in plates permit the tools to be set accurately for depth.—Page 728.

* * *

Machinability of "short-cycle" malleable iron is better than that of "long-cycle" product, says maker of new equipment. The 28 to 30-hr. anneal is said to produce a casting with very little skin and with reduced warpage. —Page 776.

* * *

High level of business activity to continue, economist judges from indications. No signs yet that high money rates have handicapped business.—Page 774.

* * *

Butt welds thin sheets automatically with a joint 85 per cent efficient. Insulated conductor loop, placed close up under copper backing bar, counteracts the "blow" caused by clamps and backing bar.—Page 742.

* * *

Nitriding in molten salts cuts nitriding time sharply, say metallurgists. Very satisfactory results are claimed, with a case of 0.005 in. obtained in one to two hours. Case is said to be three times as hard as that by ammonia hardening.—Page 740.

* * *

Tests coupons cut from welds in the field. Portable testing machine contains a hand-operated hydraulic pump, which subjects the weld to a tension test.—Page 741.

* * *

All steels have same torsional strength at 900 deg. C., tests reveal. But the angles of twist, in novel test conducted by engineer, vary widely and unaccountably.—Page 734.

Cadmium demand rapidly increasing. Growth in consumption of cadmium for plating, solders and alloying has greatly increased production. Practically all cadmium comes from treatment of impure zinc solutions used for preparing electrolytic zinc.—Page 729.

* * *

Failures practically eliminated by subjecting connecting rods to deflection test. Rod is placed on V-blocks with middle of web underneath a notched bar, to which weights are attached. Compressed air keeps bar free of rod until load is to be applied.—Page 728.

* * *

Structural steel fabrication and erection record is aided by use of radial drills mounted on wheels which run on T-head rails, permitting the machines to be moved along the work. Framework of 71-story bank building will be completed in less than four months.—Page 730.

* * *

Hones bearings and throws of crankshafts simultaneously. Honing heads on special machine are adjustable vertically and horizontally. They need to be set only once for a given size of crankshaft.—Page 728.

* * *

Plain carbon steels can be nitrided just as hard as nitralloy steels, metallurgist declares. The steels must be put in the sorbitic condition, but nitriding steels require higher temperatures and a severer quench. Advocates duplex nitriding—at high, then low, temperatures.—Page 740.

Cast iron not far behind alloy steels in resistance to sea-water corrosion. Five-year test proves 36 per cent nickel steel to be most resistant of all metals tested. Next is 13.5 per cent chromium, although cast iron is nearly as good.—Page 742.

* * *

Electric flaw detector may solve problem of non-destructive weld testing. An attempt is being made to adapt to this purpose the machine now satisfactorily used for rail tests. It detects openings of microscopic widths. —Page 741.

* * *

What causes nitriding hardness? No adequate explanation has been made as yet, although it seems to be caused by space lattice distortion.—Page 739.

* * *

Blue brittleness not due to nitrogen, says metallurgist. As proof, he cites that Izett steel, with 0.017 per cent nitrogen, is free from this phenomenon, while soft steel containing only 0.008 per cent nitrogen is very brittle at 300 deg. C.—Page 734.

* * *

Gets maximum value out of convention by assigning certain men to "cover" certain sessions. The men meet at the end of each day to compare notes.—Page 736.

* * *

"Delivery premiums" absent in period of record steel demand. Steel industry, though crowded to make deliveries, did not attempt to advance prices on that account. Whether or not a decline in demand will bring with it lower prices depends largely on sellers, as the natural tendency of the buyer is to be on the lookout for price reductions.—Page 782.

A. I. FINDLEY
Editor

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W. W. MACON
Managing Editor

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Steel Output and Prices

EVERY time steel prices have weakened the criticism has been made, and rightly, that some producers were trying to sell a greater tonnage than the state of demand warranted. It will now be in point, therefore, for sales executives to reflect that the steel trade has been in a period of altogether exceptional demand. There is a wide gap between averages and the records recently made. It is human nature to think of records rather than averages and we bring too much of the sporting idea into business. It is quite proper to think of the record high jump in athletics rather than the average of all the jumps that men have made. But athletics is purely competition and steel is something else.

Reference should be made to the graph on page 685 of last week's IRON AGE, depicting the course of steel ingot production since the beginning of 1921 and the general trend line of the period. A big bulge in steel production began at the middle of last year. The graph shows for several years the familiar course of production declining somewhat from the first half to the second half, and last year is conspicuous by not having that decrease. June, the low month of last year, was simply on the general trend line; subsequent months were well above it, while all of this year has been far above.

The trend line in the graph is mathematically accurate, having been computed. One might say that these are new times and we ought to be above the general line; but as a matter of fact the comparison really runs a little bit the other way, in that the computation includes the very poor year 1921. That pulls down the first point in the trend line, while the heavy production of last year pushes the last point up. The trend line in the graph probably has a greater slope upward than a trend line would have if computed by omitting 1921 and 1928. Even the trend line given, however, crosses the end of this year at 150,000 tons daily steel ingot production. That would be nearly one-fourth under the peak rate of last May and one-fifth under the average rate this year to Sept. 1.

Will sales executives conduct themselves during the next few months in the light of these facts? In the long run the total of demand will conform to the general trend. It cannot always run along at the peak. In the past every peak has been followed by a trough, the only variation having been as to when the trough came and how deep it was. We are now speaking only of the trend line, not suggesting a dip in future below the line.

So far as we are aware the buyers of steel are not asking for lower prices. They certainly must feel that the industry treated them well this year, when for the first time in six years it was really crowded to make deliveries and fell behindhand, yet did not attempt to advance prices on that account; and there were none of the "delivery premiums" that were often so marked before the war.

By no means does it follow that the individual buyer will not be on the lookout for lower prices. His position is entirely natural. Without having any wish that the market price of a finished steel product should decline, he certainly wants to get the benefit of any concession and his only course is to try the thing out for himself. Granting that it is to the advantage of buyers as a class to have steady prices, the individual buyers cannot be expected to cooperate to that end. They are as suspicious of each other as are steel sellers. It is more the function of sellers than of buyers to hold prices.

Greater Future for Material Handling

"YOUR labor-saving equipment is wonderful, but in Europe it would not pay. Wages are too low."

So often has the remark been made by visitors to the United States that it is widely accepted as a statement of fact. It remained for Americans operating in a foreign country to prove the contrary. How the Guggenheim interests successfully replaced labor where it is cheap was told in an article in THE IRON AGE of Sept. 12, on the methods introduced in their Chilean nitrate operations. Not merely justifying its cost, but revolutionizing the entire nitrate industry in the South American republic, the achievement of the Guggenheim company is fairly epoch-making.

While the specific application of handling mechanism to the production of nitrate may not be of direct interest to metal-working companies, the broad lesson it teaches is far-reaching. Aside from demonstrating that cheap labor can be replaced, the Chilean operation makes it clear that such a result requires more than the purchase of material-handling machines —it rather means the solution of a difficult engineering problem through the correlation of methods and equipment in a smoothly working, integrated system.

As the conception of mechanical handling as a distinct branch of engineering gains ground the list of possible economies will multiply. In an interview in this issue of THE IRON AGE, Harry L. Horning, president of the Waukesha Motor Co., explains that each operation in his plant is given special study from a material handling point of view; but he adds: "We are convinced that the greatest opportunity for

further economy lies in reducing the time of putting a piece in a machine and taking it out."

With the perfection of mechanical handling, more will be heard of technological unemployment. In some aspects it may be regrettable that men have been displaced by machines ever since the industrial revolution, but it cannot be gainsaid that in the long run all classes of the population have benefited. Moreover, so far as the individual manufacturer is concerned, he has no alternative. As Mr. Horning says, cost reduction is prerequisite to greater volume and volume is essential to cost reduction.

Robbing East to Pay West

ONCE on a time Colorado was a great mining State and Telluride, in the San Juan region, was one of its bright centers. Mines are exhaustible, however, and rather long ago the mining industry of the State had seriously waned, including mining at Telluride. The Smuggler-Union mine at that place was one of the longest survivors, but recently its owner, a Boston company, bowed to the inevitable. The officers of the little Bank of Telluride did not appreciate that mines die, even as did Methuselah, and allowed that local institution to become insolvent.

In order to avert loss to his creditors and depositors, C. D. Waggoner, president of the bank, devised and executed a plan to get contributions aggregating half a million dollars out of six New York banks. In bankers' code, which as a banker he possessed, he telegraphed instructions in the name of several Denver banks to their New York correspondents to transfer sums to the Chase bank to the credit of the Bank of Telluride. Then, as president of the latter, he presented himself at the Chase bank, satisfactorily identified himself, and obtained payment from it, which he used to settle New York indebtedness of his own bank, remitting the remainder for the benefit of its depositors and keeping nothing for himself.

There have been editorial remarks on the gullibility of the six New York banks that were robbed. Apparently, however, the whole procedure was in regular banking order. The only surprising feature in this respect is that the bankers while using a code among themselves do not have a system of identifying indicators such as are employed in cable communication, unerringly establishing the authority for sending a dispatch. Mr. Waggoner as a banker might properly have the bankers' code, just as many commercial houses possess the Bentley code, but he should not have known the identification of any Denver bank any more than the combination of its safe. This simple system is, of course, an adaptation of the insolvable book cipher. We are aware that the rules of our telegraph companies do not permit the use of indicators in domestic correspondence, but they do not prohibit keyed signatures.

Mr. Waggoner, when apprehended, readily admitted that he was guilty of criminal acts, but justified them on the ground that Wall Street had shut down the mines of his district, wherefore it ought to pay damages, even if vicariously. Moreover, he thought it essentially right to take money from rich persons in the East and give it to poor people in the West. Finally, the six big New York institutions would not greatly miss $500,000, anyhow.

Most of our readers will immediately agree that this reflects insanity and will expect that Mr. Waggoner will become a subject for the alienists. Yet is it not true that he is but making a raw, naive expression of the idea that is in the heads of many persons in the West, and in the heads of their exponents in the Senate of the United States, whom we miscall progressives and otherwise characterize as agrarians or the mental heirs of the populists?

More and More Art in Metal Display

AN editor who goes to many meetings and expositions is liable to acquire the idea that one exposition in the metal trades is like another, perhaps more so. But even a casual glance at the Eleventh National Metal Exposition held last week in Cleveland impressed him that here was one that was different—notably better looking than any predecessor. Analyzing the situation, discounting the imposing surroundings in the Public Auditorium and the quiet, restful illumination, he concluded that the effect was due to a very liberal use of bright metal.

Manufacturers seem at last to have taken to heart the facts that architects, artists and decorators have known for long and are using to a growing extent; namely, that beautiful effects can be created with stainless steel, silvery aluminum, red copper and yellow brass, and that bright metal of all sorts has a pleasing luster that is obtainable in no other medium. As time goes on and the booth designers become more skilled in developing the possibilities of metal they will undoubtedly learn how to balance correctly the bright metal against a velvety background and harmonize the lighting effects into an ensemble which delights the eye. Without making invidious comparisons, it is worthy of note that the Aluminum Co. of America, in most discouraging surroundings in the annex, was able to erect an exhibit of great artistic merit, one which will stand out as a leader in the movement toward the adequate and beautiful displays of metal products we shall see in the future.

Scrap Supply and Prices

DEALERS in scrap iron and steel have wondered why their market in the past 60 days has not been stronger, in view of the fact that steel ingot production has been 90 per cent or more of capacity, and that the supply of steel works grades, particularly of good heavy melting steel scrap, has not seemed overplentiful. One explanation is that the governing factor in prices is how quickly steel manufacturers must have shipments on their purchases. If there is strong pressure for deliveries of finished steel products, the method commonly used in meeting such a condition is to speed up steel-making operations, and that is often accomplished by increasing the ratio of scrap to pig iron in the charge. The scrap metal having been once refined does not require nearly so long a time in the bath as does pig iron.

It is only necessary to go back to the early part of the year to find that scrap prices showed greatest strength coincident with the heavy advance orders in

steel products and an insistent demand for prompt shipments. When the mills began to catch up with their obligations the need of forced steel production abated, and with it the demand for scrap.

The supply of scrap naturally has an influence on prices, but it is to be questioned if it is as much of a factor as the manner in which steel makers want deliveries. Technically scrap is scarce on a rising market, because those who produce it not only want to get as much for it as possible, but are encouraged to hold it by active and widespread competition, usually an accompaniment of a strong market. Conversely, supplies are always plentiful in a declining market. There is probably less variation in the actual supply than is indicated by the fluctuation in prices.

In stock market operations the ordinary impulse is to sell when prices are weak and to buy when the trend is strongly upward. The reverse is the method followed by those who have made fortunes in stocks. Next to the securities market comes the scrap market in its response to human impulses. This is due to the fact that since the beginning scrap dealers have been taking orders for something they had to buy and the business has evolved into one of matching wits. In the past two years the melter, rather than the dealer, has had the better of the contest.

Should there be any easing of scrap prices in the next 60 days, it would be due chiefly to more orderly purchases, since it is well established that the steel trade is back on a "purchase for requirement" basis. That suggests a like mode of steel raw materials purchases, and indifference on the part of steel makers invariably stimulates sales activity on the part of scrap dealers.

Circles and Spirals in Business

TRADE in the United States in the last seven years has been marked by a steadiness unparalleled by anything in the past, or, to put it in another way, we have had a period of activity unprecedented in length. That is the general and long-range view; but since the middle of last year we have had a period within a period, one of activity above the general rate of the seven years. The prolongation of prosperity had come to be an accepted fact, but now with this extra movement there is much discussion as to where we stand today.

It is largely a question of economics, or let us say a matter of circles or spirals. We recall the ascending and descending spirals of the past. But whatever language may have been used of late in describing the course of affairs over the seven years the meaning is the same, that we have been having a circle instead of a spiral. The essence of the problem is to determine whether our circle is developing into a spiral. In other words, is there a balance or are there elements in the activity which will produce still greater activity or will themselves fail?

It appears from the record to date that one suspected element has not worked out unfavorably. A couple of years ago there was much talk of "technological unemployment." Improvements had been made to preserve or increase profits, giving an appearance of prosperity, but men were being released from employment and the result might be decreased buying power. The mass production associated with these improvements required large buying power, and there appeared to be an element working for a descending spiral. The showing would be cumulative; but instead we now have less, not more, appearance of this technological unemployment.

A later fear has been in connection with the stock market. Profits, paper or otherwise, increased the volume of buying and produced better earnings for the corporations, raising their shares again, and thus making an element for an ascending spiral which could not keep going, for necessarily there would not always be a supply of fresh buyers or bidders in the stock market. This fear is still with us; but there are some who assert that buying of shares has become so selective that the menace is at least greatly reduced.

From another angle, the influence of the automobile industry needs to be scrutinized. A rise in the volume of automobile buying began last year and this year has reached spectacular proportions, statistically speaking. With such a new industry it is impossible to gage closely its influence upon general trade activity, but most observers insist that the influence is large. There can be no doubt that the buying of automobiles is particularly sensitive to changes in buying power, made by trade activity and what occurs in the stock market. Here we have an element plainly marked as capable of making a spiral, the influence in the recent past being upward, while there will be much doubt whether further increase in the influence can be expected.

Sees Danger in Growing Bigness of Big Business

The only "fly in the ointment" is the continued expansion of big business. And it is possible that the time may come when there will be only one corporation for each particular trade or industry. Such a possibility is suggested by the combination of a number of wholesale dry goods concerns recently effected in an effort to meet the competition of the chain store systems.

Such a combination is entirely logical, but it foreshadows the time when all dry goods stores will be under one management and competition will be ended. It is a development which leads directly to socialism or the passage of anti-trust laws far more drastic than those now on the statute books. Probably sleeping dogs will be allowed to sleep while times are good; but the bigness of big business is certain to be a political issue when the tide turns and prosperity begins to wane.—Theodore H. Price in *Commerce and Finance.*

Practically the whole of the scrap material from the ex-German battleships and cruisers raised by Cox & Danks, Ltd., at Scapa Flow, Scotland, has, according to *Engineer* (London), "found its way to America, Germany and Scandinavia, in which countries there appears to be a keen demand for the alloy steels and other special metals employed in naval construction."

Authorizes Steel Mill Bearings Research

Division of Mechanical Engineers Would Set Up Fellowship on Heavy-Duty Roller Bearings

SPECIAL investigation of roller bearings applied to the roll necks of rolling mills was authorized by a meeting of the iron and steel division of the American Society of Mechanical Engineers at Cleveland, Sept. 13. The report of a special research committee of the division, having to do with heavy-duty anti-friction bearings, recommended the establishment of a research fund of $4,000 for the use of a fellowship at the Carnegie Institute of Technology, Pittsburgh, under the direction of Prof. W. Trinks. The plan looks to a two-year program of study and tests, and, in accepting the report, the committee will probably canvass the industry in the immediate future to get together the money needed. Presumably bearing makers, builders of rolling mills and the steel mills themselves will be approached for support.

The committee, which is expected to have oversight in respect to procedure, is composed as follows: Prof. W. Trinks, Carnegie Institute of Technology, chairman; Bryant Bannister, National Tube Co., Pittsburgh; H. E. Brunner, chief engineer, S-K-F Industries, New York; George C. Farkell, superintendent of rolling mills, National Tube Co., Lorain, Ohio; S. G. Koon, associate editor, THE IRON AGE, New York; R. C. Stiefel, Ellwood City, Pa.; H. H. Talbot, chief engineer, United Engineering & Foundry Co., Pittsburgh; S. M. Weckstein, Timken Roller Bearing Co., Canton, Ohio.

The scope of the investigation as outlined in a preliminary way by the committee covers both hot and cold rolling. The classes in hot rolling are to include four-high strip mills and two-high merchant, billet and strip mills. In cold rolling both two-high and four-high strip mills are to come under the investigation. At the outset the committee expects particular attention will be paid to the methods to be used in determining neck pressure, such as hydraulic jacks under the housing screws or extensometer under the screws, or Brinell plates under the screws.

Among the data expected to come out of the research are pressures between rolls for different sections rolled, also the temperatures, reductions, speeds and power consumption with either plain or roller bearings.

195,000 Lb. of Tin Plate Scrap Detinned a Year

About 195,000 tons of tin plate scrap are treated annually at detinning plants, according to information obtained by Horace W. Johnson, examiner for the Interstate Commerce Commission and submitted to that body in a freight rate matter.

During the past few years, the report points out, improved methods of tinning metal sheets have greatly reduced the amount of surface tin, which has rendered tin plate scrap less valuable and less profitable to handle. The examiner declared that at present the recoverable quantity of tin from tin plate scrap does not exceed 1.4 per cent. In 1925, the report stated, the recovery of tin by the Vulcan Detinning Co. was 36.7 lb. per gross ton of tin plate scrap, while in 1928 it amounted only to 29.7 lb.

Since 1928, it was said in the report, the detinning plants have furnished an outlet for tin plate scrap and have created a movement of considerable tonnage, not only of the tin plate scrap itself but also the recovered sheet steel scrap, the tetrachloride of tin, tin oxide, metallic tin and other materials entering into the process or resulting from the process of detinning tin plate scrap.

Recovered scrap steel, usually compressed into bundles, and shipped to steel mills for remelting purposes was said to sell for about 90 per cent of the market value of heavy melting steel scrap. It was said that the prices paid for tin plate scrap vary, but the average is $9.21, shipping point, when consigned to Sewaren, N. J., $5.25 to Neville Island, Pittsburgh, and $5.80 to East Chicago. The higher price paid for tin plate scrap for delivery to Sewaren, N. J., where the Vulcan Detinning Co. has a large plant, was said to be due to keen competition in the seaboard territory for such supplies for shipment to Germany and Italy.

Plants of the Vulcan Detinning Co. are located at Neville Island, Pittsburgh, and Streator, Ill., in addition to the one at Sewaren, N. J. Other companies which use the detinning process are the Metal & Thermit Corporation, New York, and the Continental Can Co., New York. These companies complained to the Interstate Commerce Commission of existing freight rates on tin plate scrap. The report of the examiner was that existing rates are not unreasonable or unlawful.

British Foreign Trade in Iron and Steel Products

(In Gross Tons)

Item	Imports July	Imports August	Exports July	Exports August
Pig iron and ferroalloys	9,121	9,992	42,289	45,078
Ingots, blooms, billets and slabs	88,173	93,466	2,178	847
Iron bars, rods, angles	15,485	14,404	2,561	1,465
Steel bars, rods, angles	46,590	52,849	31,384	28,580
Structural steel	12,075	15,234	7,979	7,113
Hoops and strips	11,912	18,699	5,650	5,772
Plates and sheets	16,945	16,694	45,078	42,330
Galvanized sheets	.....	.....	53,896	56,785
Tin plate	.....	.....	50,251	43,403
Cast tubes, pipe and fittings	3,622	2,857	11,601	10,869
Wrought tubes, pipe and fittings	6,886	6,076	32,094	34,658
Rails	1,275	826	23,872	29,639
Other railroad material	429	581	13,934	13,902
Wire	6,600	5,834	7,420	8,378
Wire cable and rope	.....	.....	2,547	2,012
Wire nails, including staples	5,605	5,574	295	196
Other wire manufactures	617	275	1,835	2,092
Nails, tacks, rivets and washers	1,345	987	2,138	1,713
Bolts, nuts, screws for metal	1,269	943	2,751	2,228
Iron and steel castings	1,085	1,477	385	295
Iron and steel forgings	1,071	717	198	160
Other manufactures of iron and steel	7,115	7,707	35,468	20,677
Total	237,220	255,192	375,804	358,192

From cablegram of William L. Cooper, commercial attaché, London, to the United States Department of Commerce.

More British Iron and Less Steel in August

LONDON, ENGLAND, Sept. 12. (*By Cable*).—Production of pig iron in August was 682,000 gross tons and that of steel ingots and castings was 753,300 tons. The August pig iron output was the largest this year. That for steel was the sixth largest, with the peak at 859,900 tons in March.

Comparisons of recent output with other periods is as follows:

	Pig Iron, Gross Tons	Steel Ingots and Castings, Gross Tons
1913—Av. monthly	855,000	638,600
1920—Av. monthly	669,500	755,600
1922—Av. monthly	408,500	490,100
1923—Av. monthly	620,000	706,800
1924—Av. monthly	609,900	685,100
1925—Av. monthly	519,700	616,400
1926—Av. monthly	203,500	296,700
1927—Av. monthly	607,800	758,200
1928—Av. monthly	550,900	710,400
1929—Av. first quar.	558,000	801,400
1929—April	611,300	808,600
1929—May	654,800	840,400
1929—June	657,800	830,900
1929—July	671,900	803,800
1929—August	682,000	753,300

The August output of pig iron compares with a monthly average of 599,600 tons for the first half. The steel production last month compares with 814,000 tons a month for the first half.

Hannibal Green's Son & Co., Inc., Troy, N. Y., agent for the Burden Iron Co., has been acquired by a new company of the same name, of which F. J. Keeler is president and M. H. Fitzpatrick treasurer.

Iron and Steel Markets

Railroad Equipment Demand Develops

Central of Georgia Buys 1000 Cars and Santa Fe Inquires for 5700—Structural Lettings Heavy—Steel Output Down to 85 Per Cent

RAILROAD buying and construction work are auspicious factors in a steel market still characterized by uncertainty.

The expected upswing in railroad equipment demand is materializing and the customary fall rail buying movement is gathering momentum. The Central of Georgia has bought 1000 freight cars and the Norfolk & Western has placed 1000 car bodies. The Santa Fe is inquiring for 5754 cars and the Southern for 2000, while the Chesapeake & Ohio is named as a probable buyer.

An order for 50,000 tons of rails and 12,000 tons of track supplies has been placed by a Western railroad, and two new rail inquiries at Chicago total 100,000 tons. The Pennsylvania and New York Central are expected to come into the market for about 200,000 tons each before the close of the month.

Construction taking steel promises to keep up at the high rate of August. Structural steel lettings for the week totaled 50,000 tons, and pending work was augmented by fresh inquiries for 57,000 tons, including 40,000 tons for the Empire State Building, New York.

Steel demand, although getting support from two important consuming industries, lacks the widespread buoyancy of previous months. The possibility that the unusually active summer months reflected an overreaching of industrial operations is still taken into account.

Of interest in this connection is a downturn in automobile production, following a short-lived recovery. The change in trend is attributable to curtailed output of low-priced cars, which is more than offsetting increases by companies bringing out new models. Ford output in September, according to present estimates, will decline to 170,000 cars, compared with 205,000 in August.

Plans of farm machinery makers to expand output in October, as they swing into production of spring equipment, are tempered by the unfavorable turn of agriculture, following disastrous droughts in wide areas. Lessened farmer buying power is also affecting the demand for wire products.

Steel mill backlogs are still shrinking and steel production has undergone further reduction. Operations in terms of steel ingot output now range from 80 to 90 per cent. The Steel Corporation's average is 85 per cent, which is also a liberal estimate for the industry as a whole.

Further announcements of the opening of fourth quarter books, usually at unchanged quotations, have resulted in little contracting. Since the market is not advancing, consumers have no price incentive either to specify beyond their immediate needs or to obligate themselves ahead. On the contrary, they are watching for signs of price weakness. Mills, in turn, are not pushing sales lest the stability of prices might suffer.

Pending a real test of prices, few significant changes have occurred. Concessions on shapes, bars and plates, although by no means general, are reported more frequently. On the other hand, sellers of galvanized sheets are taking a firmer stand at 3.60c. a lb., an advance of $2 a ton over the recent market.

Chronic instability in wire products is giving way to open recognition of reduced prices. Most mills are now quoting wire nails at $2.55 and plain wire at $2.40, except to small users. On nails as low as $2.45 is being done in some instances.

Leading makers of steel pipe have notified jobbers that failure to maintain resale prices may result in discontinuing sales to the offenders.

The New York Shipbuilding Corporation has placed 18,000 tons of steel for two vessels to be built for the Export Steamship Co.

Tin plate production is undergoing a seasonal recession, now ranging from 75 to 90 per cent.

Scrap is inactive and weak, but pig iron, temporarily at least, is stronger. Southern producers of merchant iron have accumulated substantial backlogs in the past 30 days, booking 125,000 tons in the St. Louis district alone, and their output has been further reduced by the blowing out of another furnace. The lowest price now current in the North on Alabama foundry iron is $13, Birmingham, or 50c. a ton above the low point, and $13.50 is rapidly becoming the minimum.

Pig iron buyers are cautious, well aware that surplus steel company iron may soon be more of a market factor, but purchases are in fair volume, indicating sustained requirements. Sales in New York, totaling 26,000 tons, included 15,000 tons for a radiator plant. Cleveland reported bookings of 24,000 tons. The Ford company has bought 5000 tons of high-silicon malleable from an Ontario furnace and may buy 5000 tons additional.

Fabricated structural steel lettings in August (computed) were 365,750 tons, a new monthly record.

THE IRON AGE composite price for pig iron has advanced from $18.25 to $18.29 a gross ton and is 66c. higher than a year ago. Finished steel remains for the sixth week at 2.398c. a lb., which is $1 a net ton above the figure of 12 months ago.

A Comparison of Prices

Market Prices at Date, and One Week, One Month and One Year Previous, Advances Over Past Week in Heavy Type, Declines in Italics

	Sept. 17, 1929	Sept. 10, 1929	Aug. 20, 1929	Sept. 18, 1928
Pig Iron, Per Gross Ton:				
No. 2 foundry, Philadelphia	$21.26	$21.26	$21.26	$20.76
No. 2, Valley furnace	18.50	18.50	18.50	17.00
No. 2 Southern, Cin'ti	17.19	17.19	17.69	19.94
No. 2, Birmingham	14.50	14.50	14.50	16.25
No. 2 foundry, Chicago*	20.00	20.00	20.00	18.50
Basic, del'd eastern Pa.	19.75	19.75	19.75	19.00
Basic, Valley furnace	18.50	18.50	18.50	16.25
Valley Bessemer, del'd P'gh.	20.76	20.76	20.76	19.01
Malleable, Chicago*	20.00	20.00	20.00	18.50
Malleable, Valley	19.00	19.00	19.00	17.25
Gray forge, Pittsburgh	19.76	19.76	19.76	18.26
L. S. charcoal, Chicago	27.04	27.04	27.04	27.04
Ferromanganese, furnace	105.00	105.00	105.00	105.00
Rails, Billets, Etc., Per Gross Ton:				
Rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Light rails at mill	36.00	36.00	36.00	36.00
Rerolling billets, Pittsburgh	35.00	35.00	35.00	32.00
Sheet bars, Pittsburgh	35.00	35.00	35.00	32.00
Slabs, Pittsburgh	35.00	35.00	35.00	32.00
Forging billets, Pittsburgh	40.00	40.00	40.00	38.00
Wire rods, Pittsburgh	42.00	42.00	42.00	42.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.85	1.85	1.85	1.90
Finished Steel, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Bars, Pittsburgh	1.95	1.95	1.95	1.90
Bars, Chicago	2.05	2.05	2.05	2.00
Bars, Cleveland	1.95	1.95	1.95	1.90
Bars, New York	2.29	2.29	2.29	2.24
Tank plates, Pittsburgh	1.95	1.95	1.95	1.90
Tank plates, Chicago	2.05	2.05	2.05	2.00
Tank plates, New York	2.22½	2.22½	2.22½	2.17½
Structural shapes, Pittsburgh	1.95	1.95	1.95	1.90
Structural shapes, Chicago	2.05	2.05	2.05	2.00
Structural shapes, New York	2.19½	2.19½	2.19½	2.14½
Cold-finished bars, Pittsburgh	2.30	2.30	2.30	2.10
Hot-rolled strips, P'gh	1.90	1.90	1.90	1.85
Cold-rolled strips, P'gh	2.75	2.75	2.75	2.75

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

	Sept. 17, 1929	Sept. 10, 1929	Aug. 20, 1929	Sept. 18, 1928
Finished Steel, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Sheets, black, No. 24, P'gh	2.85	2.85	2.85	2.65
Sheets, black, No. 24, Chicago dist. mill	2.95	2.95	2.95	2.75
Sheets, galv., No. 24, P'gh	3.50	3.50	3.50	3.40
Sheets, galv., No. 24, Chicago dist. mill	3.60	3.60	3.60	3.60
Sheets, blue, No. 13, P'gh	2.35	2.35	2.35	2.00
Sheets, blue, No. 13, Chicago dist. mill	2.45	2.45	2.45	2.10
Wire nails, Pittsburgh	*2.45*	2.55	2.55	2.55
Wire nails, Chicago dist. mill	*2.50*	2.60	2.60	2.60
Plain wire, Pittsburgh	2.40	2.40	2.40	2.40
Plain wire, Chicago dist. mill	2.45	2.45	2.45	2.45
Barbed wire, galv., P'gh	3.20	3.20	3.20	3.20
Barbed wire, galv., Chicago dist. mill	3.30	3.30	3.30	3.25
Tin plate, 100 lb. box, P'gh	$5.35	$5.35	$5.35	$5.25
Old Material, Per Gross Ton:				
Heavy melting steel, P'gh	$18.25	$18.25	$19.00	$16.75
Heavy melting steel, Phila	16.50	16.50	16.50	15.50
Heavy melting steel, Ch'go	*15.00*	15.25	15.25	13.00
Carwheels, Chicago	14.00	14.00	14.00	13.50
Carwheels, Philadelphia	16.50	16.50	16.50	16.00
No. 1 cast, Pittsburgh	15.50	15.50	15.50	15.00
No. 1 cast, Philadelphia	16.50	16.50	16.50	16.50
No. 1 cast, Ch'go (net ton)	14.50	14.50	14.50	15.00
No. 1 RR. wrot., Phila	16.00	16.00	16.00	15.00
No. 1 RR. wrot., Ch'go (net)	14.00	14.00	14.00	12.00
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$2.65	$2.65	$2.75	$2.75
Foundry coke, prompt	3.75	3.75	3.75	3.75
Metals, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Lake copper, New York	18.12½	18.12½	18.12½	15.00
Electrolytic copper, refinery	17.75	17.75	17.75	14.75
Tin (Straits), New York	*45.00*	45.37½	46.50	48.00
Zinc, East St. Louis	6.80	6.80	6.80	6.25
Zinc, New York	7.15	7.15	7.15	6.60
Lead, St. Louis	6.70	6.70	6.55	6.32½
Lead, New York	6.90	6.90	6.75	6.50
Antimony (Asiatic), N. Y.	8.75	8.75	9.00	10.87½

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Pittsburgh

Steel Mill Operations Lowest in Several Months—New Business Not in Large Volume

PITTSBURGH, Sept. 17.—Steel works operations have eased off slightly in the last week and are probably under 90 per cent of capacity in this district for the first time in several months. This is due largely to gradual curtailment by the larger producers which have reduced their backlogs considerably in the last few weeks. In the meantime, specifications have been far from sufficient to sustain such a high operating rate and heavier fall demand has not developed.

At this time tonnage releases of large steel consuming industries are reaching the mills steadily, but not in large volume, indicating that users of steel are watching the turn of the market very closely with a view to ascertaining future trends. With most mills in a position to make deliveries on steel in about the time required for rolling, it is no longer necessary to place orders in advance as was the case in the spring and early summer when mill facilities were taxed to the utmost. Consequently the present declining tendency in operating schedules is interpreted by some as merely the adjustment of current production to current demand, an adjustment which would have taken place several weeks earlier had it not been for the heavy backlogs accumulated during the height of spring demand.

It is also pointed out that specifications are satisfactory for this season of the year and compare favorably with those of previous similar periods. The impression of dullness is merely accentuated by the abnormally heavy summer demand for steel.

The past week has brought out little which might indicate the trend of fall business. Consumers generally are cautious in placing their fourth quarter contracts and sellers are not anxious to push sales in view of the weakening effect this might have on prices. In the case of sheets it will still be several weeks before shipments against present specifications are fully completed, and makers with comfortable backlogs are not failing to take advantage of their situation by firmer stand on prices, particularly on galvanized material. The extent of buying in the next month will decide whether or not they will be successful.

At present, prices on nearly all products have a rather uneasy tone, but, if concessions are being made, they are being well concealed. Shading is reported occasionally from competitive districts where buyers are making the most of advantages which they have enjoyed to a greater or less extent for some time.

Third quarter prices have generally been reaffirmed, although in the case of some grades of sheets such quotations have been the maximum and represent an advance to some buyers. Makers of nails and wire have recognized recent weakness in announcing fourth quarter prices, although they are still quoting $2.65 a keg for nails and 2.50c. a lb. for wire to small buyers, prices which were recently disappearing on most transactions.

The pig iron market retains its price strength, but fourth quarter buy-

ing is still being delayed by the majority of consumers. Inquiry is improving and two round tonnages of basic are reported to be actively pending in the Valleys.

The tone of the scrap market is still very weak, but mill buying is lacking and lower quotations are not justified either by sales to mills or purchases by dealers.

Pig Iron.—This week has been another of comparative quiet so far as large purchases are concerned, and one important seller estimates that considerably less than half of the iron which will be bought for fourth quarter delivery has been placed thus far. The radiator maker at Uniontown, Pa., has not yet closed in full against its recent inquiry, and other large tonnages are said to be pending. In the Valley district at least two large lots of basic iron are soon to be closed, and merchant furnaces in that district are gradually building up their order books. Stocks of iron are low, and September shipments, while hardly equal to the August rate, are generally thought to be satisfactory. Some buying will be delayed until early in October on account of the uncertainty of the steel industry, but, with pig iron consumers operating with very low stocks, it is practically certain that nearly all of them will have to cover within the next 30 days. The price situation is unchanged and seems to be very steady in the Valley territory. Reports of shading in the immediate Pittsburgh district are heard, but recent sales at the full quoted schedules of the Pittsburgh furnace seem to justify present quotations.

Prices per gross ton, f.o.b. Valley furnace:

Basic	$18.50
Bessemer	19.00
Gray forge	18.00
No. 2 foundry	18.50
No. 3 foundry	18.00
Malleable	19.00
Low phos., copper free	27.00

Freight rate to Pittsburgh or Cleveland district, $1.76.

Prices per gross ton, f.o.b. Pittsburgh district furnace:

Basic	$19.00
No. 2 foundry	19.00
No. 3 foundry	18.50
Malleable	19.50

Freight rates to points in Pittsburgh district range from 63c. to $1.13.

Semi-Finished Steel.—Shipments to non-integrated companies have declined in September, as compared with the previous month, and buying for fourth quarter has not yet developed to any appreciable extent. Consumers apparently feel that there will certainly be no advance over the present $35 quotations on billets, slabs and sheet bars, and are also probably anxious to get a better idea of their requirements over the last three months of the year before making commitments. There is also objection to the quoted prices on billets and slabs, as strict adherence to this quotation would mean an advance of $1 a ton to large buyers. Shipments of wire rods are steady and show little reduction from the rate in August. Fourth quarter contracts are being taken at $42 a ton, Pittsburgh or Cleveland, and there seems to be no question as to the firmness of the price.

Bars, Shapes and Plates.—Mill backlogs on the heavy hot-rolled products are at the lowest point in several months, and, although tonnage releases are still coming in rather steadily, their volume has declined considerably since Labor Day. Pittsburgh mills are now in a position to ship plates in about three weeks, and deliveries on bars and shapes may be had in a shorter time. Considering the fact that plate backlogs averaged about six weeks on Aug. 1, the extent to which mill operations have been maintained on the strength of backlogs in the last month is clearly indicated. Structural business is not particularly active, but the volume of awards is fairly steady and fabricating shops in the district are not badly in need of business. Barge builders are also taking large shipments of plates and shapes, but their backlogs are dwindling and a few recent barge orders have been filled from stock. Mills in this district are interested in the inquiry of the Norfolk & Western for 2000 hopper cars, and it is quite likely that steel for at least half of this order will come from Pittsburgh makers. Prices have not developed definite weakness, although the tone of the market is not so firm as it was a short time ago. Occasional reports of shading the price of bars in the East are reported, although this situation has existed intermittently all summer and does not represent a new market tendency. Prices on structural shapes are also questioned in Eastern territory, although this situation is brought about by the competition of the Eastern producers, and has not yet been felt in the natural territory of Pittsburgh mills.

Rails and Track Accessories.—Following its inquiry for 54,000 tons of rails, the Chesapeake & Ohio is also inquiring for 10,000 tons of tie plates and will probably place this business before the end of the month. The Norfolk & Western recently divided an order for 1500 tons of tie plates between the Bethlehem Steel Co. and the Wheeling Steel Corporation. Otherwise no definite inquiries for rails and track accessories have come out in this district, although it is believed that additional tonnage will come before the trade before the end of the month.

Bolts, Nuts and Rivets.—Makers of bolts and nuts have reaffirmed third quarter prices for the last three months of the year, the general quotation being 70 per cent off list. Prices on rivets are also unchanged, the ruling figure on the large size being $3.10 a 100 lb., while 7/16 in. and smaller are offered at 70 and 10 per cent off list. Makers are still maintaining a comparatively high rate of operation, the general average for the industry being somewhere between 70 and 75 per cent.

Wire Products.—Makers of wire and nails will quote the present range of prices on both products for the fourth quarter. On small tonnages of nails, the $2.65 per keg, Pittsburgh, price will rule, while larger buyers will be given the $2 a ton advantage. On wire, the quotations are 2.40c. and 2.50c. a lb. Business in September is about equal to August on manufacturers' wire, while the jobbing trade seems to be less active than before. These buyers are taking very small tonnages in an effort to keep stocks at a minimum.

Tubular Goods.—The pipe market is rather quiet, although business is generally considered satisfactory, and operations are good. One estimate places lap-weld mills at 80 per cent of capacity, although this figure may be about five points too high. Opera-

The Iron Age Composite Prices

Finished Steel

Sept. 17, 1929, 2.398c. a Lb.

One week ago	2.398c.
One month ago	2.398c.
One year ago	2.348c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products make 87 per cent of the United States output of finished steel.

	High		Low	
1929	2.412c.,	April 2;	2.391c.,	Jan. 8
1928	2.391c.,	Dec. 11;	2.314c.,	Jan. 3
1927	2.453c.,	Jan. 4;	2.293c.,	Oct. 25
1926	2.453c.,	Jan. 5;	2.403c.,	May 18
1925	2.560c.,	Jan. 6;	2.396c.,	Aug. 18

Pig Iron

Sept. 17, 1929, $18.29 a Gross Ton

One week ago	$18.25
One month ago	18.42
One year ago	17.63
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low	
1929	$18.71,	May 14;	$18.25,	Aug. 27
1928	18.59,	Nov. 27;	17.04,	July 24
1927	19.71,	Jan. 4;	17.54,	Nov. 1
1926	21.54,	Jan. 5;	19.46,	July 13
1925	22.50,	Jan. 13;	18.96,	July 7

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base per Lb.
F.o.b. Pittsburgh mill	1.95c.
F.o.b. Chicago	2.05c.
Del'd Philadelphia	2.27c.
Del'd New York	2.29c.
Del'd Cleveland	1.92½c. to 1.95c.
F.o.b. Cleveland	1.90c. to 1.95c.
F.o.b. Lackawanna	2.05c.
F.o.b. Birmingham	2.10c.
C.i.f. Pacific ports	2.35c.
F.o.b. San Francisco mills	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills, 40, 50, 60-ft.	2.05c.
F.o.b. Pittsburgh mills, cut lengths	2.30c.
F.o.b. Birmingham, mill lengths	2.10c.

Rail Steel

F.o.b. mills, east of Chicago dist.	1.85c. to 1.90c.
F.o.b. Chicago Heights mill	1.95c.
Del'd Philadelphia	2.27c.

Iron

Common iron, f.o.b. Chicago	2.05c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	2.12c.
Common iron, del'd New York	2.14c.

Tank Plates

	Base per Lb.
F.o.b. Pittsburgh mill	1.95c.
F.o.b. Chicago	2.05c.
F.o.b. Birmingham	2.10c.
Del'd Cleveland	2.14c.
Del'd Philadelphia	2.15c.
F.o.b. Coatesville	2.05c.
F.o.b. Sparrows Point	2.05c.
F.o.b. Lackawanna	2.05c.
Del'd New York	2.22½c.
C.i.f. Pacific ports	2.35c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh mill	1.95c.
F.o.b. Chicago	2.05c.
F.o.b. Birmingham	2.10c.
F.o.b. Lackawanna	2.05c.
F.o.b. Bethlehem	2.05c.
Del'd Cleveland	2.14c.
Del'd Philadelphia	2.01c. to 2.06c.
Del'd New York	2.14½c. to 2.19½c.
C.i.f. Pacific ports	2.35c.

Hot-Rolled Hoops, Bands and Strips

	Base per Lb.
6 in. and narrower, P'gh	2.00c.
Wider than 6 in., P'gh	1.90c.
6 in. and narrower, Chicago	2.20c.
Wider than 6 in., Chicago	2.10c.
Cooperage stock, P'gh	2.20c.
Cooperage stock, Chicago	2.30c.

Cold-Finished Steel

	Base per Lb.
Bars, f.o.b. Pittsburgh mill	2.30c.
Bars, f.o.b. Chicago	2.30c.
Bars, Cleveland	2.35c.
Shafting, ground, f.o.b. mill	*2.65c. to 3.60c.
Strips, P'gh	2.75c. to 2.85c.
Strips, Cleveland	2.75c. to 2.85c.
Strips, del'd Chicago	3.05c. to 3.15c.
Strips, Worcester	2.90c. to 3.00c.
Fender stock, No. 20 gage, Pittsburgh or Cleveland	4.25c.

*According to size.

Wire Products

(Carload lots, f.o.b. Pittsburgh and Cleveland, to jobbers and retailers.)

	Base per Keg
Wire nails	$2.45 to $2.55
Galvanized nails	4.45 to 4.55
Galvanized staples	3.15 to 3.25
Polished staples	2.90c. to 3.00c.
Cement coated nails	$2.45 to $2.55

	Base per 100 Lb.
Bright plain wire, No. 6 to No. 9 gage	$2.40 to $2.50
Annealed fence wire	2.55 to 2.65
Spring wire	3.50 to 3.60
Galv'd wire, No. 9	3.00 to 3.10
Barbed wire, galv'd	3.20 to 3.30
Barbed wire, painted	2.95 to 3.05
Woven wire fence (per net ton to retailers)	65.00

Chicago district mill and delivered Chicago prices are $1 per ton above the foregoing. Birmingham mill prices $3 a ton higher; Worcester, Mass. (wire), mill $3 a ton higher on production of that plant; Duluth, Minn., mill $2 a ton higher; Anderson, Ind., $1 higher.

Cut Nails

	Per 100 Lb.
Carloads, Wheeling, Reading or Northumberland, Pa.	$2.70
Less carloads, Wheeling or Reading	2.80

Light Plates

No. 10, blue annealed, f.o.b. P'gh.	2.10c. to 2.20c.
No. 10, blue annealed, f.o.b. Chicago dist.	2.30c.
No. 10, blue annealed, del'd Phila.	2.42c. to 2.52c.
No. 10, blue annealed, B'ham	2.35c.

Sheets

Blue Annealed

	Base per Lb.
No. 13, f.o.b. P'gh	2.25c. to 2.35c.
No. 13, f.o.b. Chicago dist.	2.45c.
No. 13, del'd Philadelphia	2.67c.
No. 13, blue annealed, B'ham	2.50c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh	2.85c.
No. 24, f.o.b. Chicago dist. mill	2.95c. to 3.00c.
No. 24, del'd Philadelphia	3.17c. to 3.27c.
No. 24, f.o.b. Birmingham	3.10c.

Metal Furniture Sheets

No. 24, f.o.b. P'gh	4.10c. to 4.20c.

Galvanized

No. 24, f.o.b. Pittsburgh	3.50c. to 3.60c.
No. 24, f.o.b. Chicago dist. mill	3.60c. to 3.70c.
No. 24, del'd Cleveland	3.69c. to 3.79c.
No. 24, del'd Philadelphia	3.92c. to 4.02c.
No. 24, f.o.b. Birmingham	3.70c.

Tin Mill Black Plate

No 28, f.o.b. Pittsburgh	2.90c. to 3.00c.
No. 28, f.o.b. Chicago dist. mill	3.00c. to 3.10c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh	4.00c. to 4.10c.

Long Ternes

No. 24, 8-lb. coating, f.o.b. mill	4.00c. to 4.10c.

Vitreous Enameling Stock

No. 24, f.o.b. Pittsburgh	3.90c.

Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills	$5.35
Standard cokes, f.o.b. Gary	5.45

Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)
(Per Package, 20 x 28 in.)

8-lb. coating I.C.	$11.20
15-lb. coating I.C.	14.00
20-lb. coating I.C.	15.30
25-lb. coating I.C.	$16.70
30-lb. coating I.C.	17.75
40-lb. coating I.C.	19.85

Alloy Steel Bars

(F.o.b. makers' mill)

Alloy Quality Bar Base, 2.65c. to 2.75c. per Lb.

S.A.E. Series Numbers		Alloy Differential
2000	(1¼% Nickel)	$0.25
2100	(1½% Nickel)	0.55
2300	(3½% Nickel)	1.50
2500	(5% Nickel)	2.25
3100	Nickel Chromium	0.55
3200	Nickel Chromium	1.35
3300	Nickel Chromium	3.80
3400	Nickel Chromium	3.20
4100	Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50
4100	Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600	Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel)	1.05
5100	Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100	Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100	Chromium Spring Steel	0.20
6100	Chromium Vanadium Bars	1.20
6100	Chromium Vanadium Spring Steel	0.95
9250	Silicon Manganese Spring Steel (flats)	0.25
	Rounds and squares	0.50
	Chromium Nickel Vanadium	1.50
	Carbon Vanadium	0.95

Above prices are for hot rolled steel bars, forging quality. The differential for cold-drawn bars is ¾c. a lb. higher, with standard classification for cold-finished alloy steel bars applying. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis.

Billets under 4 x 4 in. carry the steel bar base. Slabs with a sectional area of 16 in. or over carry the billet price. Slabs with sectional area of less than 16 in. or less than 2½ in. thick, regardless of sectional area, take the bar price.

Rails

	Per Gross Ton
Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	36.00
Light (from rail steel), f.o.b. mill	34.00
Light (from billets), f.o.b. Ch'go mill	36.00

Track Equipment

	Base per 100 Lb.
Spikes, ⅝ in. and larger	$2.80
Spikes, ½ in. and smaller	2.80
Spikes, boat and barge	3.00
Tie plate, steel	2.15
Angle bars	$2.75
Track bolts, to steam railroads	$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel Inches	Black	Galv.	Iron Inches	Black	Galv.
⅛	45	19½	¼ and ⅜	+11	+36
¼ to ⅜	51	25½	½	23	5
½	56	42½	¾	28	11
¾	60	48½	1 and 1¼	31	15
1 to 3	62	50½	1½ and 2	35	18

Lap Weld

2	55	43½	2	23	9
2½ to 6	59	47½	2½ to 3½	28	13
7 and 8	56	43½	4 to 6	30	17
9 and 10	54	42½	7 and 8	29	16
11 and 12	53	40½	9 to 12	26	11

Butt Weld, extra strong, plain ends

⅛	41	24½	¼ and ⅜	+13	+48
¼ to ⅜	47	30½	½	23	7
½	53	42½	¾	28	12
¾	58	47⅞	1 to 2	34	18
1 to 1¼	60	49½			
2 to 3	61	50½			

Lap Weld, extra strong, plain ends

2	53	42½	½	29	13
2½ to 4	57	46½	2½ to 4	34	20
4½ to 6	56	45½	4½ to 6	33	19
7 to 8	52	39½	7 and 8	31	17
9 and 10	45	32½	9 to 12	21	8
11 and 12	44	31½			

On carloads the above discounts on steel pipe are increased on block by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Steel		Charcoal Iron	
2 in. and 2¼ in.	40	1½ in.	1
2½ in.—2¾ in.	48	1¾ in.	8
3 in.	54	2 in.—2¼ in.	13
3¼ in.—3¾ in.	56	2½ in.—2¾ in.	16
4 in.	59	3 in.	17
4½ in. to 6 in.	48	3¼ in. to 3½ in.	18
		4 in.	20
		4½ in.	21

On lots of a carload or more, the above base discounts are subject to a preferential of two fives on steel and of 10 per cent on charcoal iron tubes. Smaller quantities are subject to the following modifications from the base discounts:

Lap Welded Steel—Under 10,000 lb., 6 points under base and one five; 10,000 lb. to carload, 4 points under base and two fives. Charcoal Iron—Under 10,000 lb., 2 points under base; 10,000 lb. to carload, base and one five.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	63	3 in.	48
1¼ to 1½ in.	55	3¼ to 3½ in.	50
1¾ in.	39	4 in.	53
2 to 2¼ in.	34	4½, 5 and 6 in.	42
2½ to 2¾ in.	42		

Hot Rolled

2 and 2¼ in.	40	3¼ to 3½ in.	56
2½ and 2¾ in.	48	4 in.	59
3 in.	54	4½, 5 and 6 in.	48

Beyond the above base discounts a preferential discount of 5 per cent is allowed on carload lots. On less than carloads to 10,000 lb., base discounts are reduced 4 points with 5 per cent preferential; on less than 10,000 lb., base discounts are reduced 6 points, with no preferential. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage take mechanical tube list and discounts. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30%, base (carloads)	55
Carbon, 0.30% to 0.40%, base	50

Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

tions of butt-weld mills are not so good, the average for the industry probably holding at about 60 per cent. No further increase is expected in this department before spring. Seamless mills are scheduled as well or better than lap-weld units, although oil country business has developed no marked activity during the entire year. Mechanical and boiler tubing is quiet, but heavier specifying from the automobile industry may improve the situation in the former product within the next 30 days.

Sheets.—Shipments during September are going to compare favorably with those of August, at least from the standpoint of daily rate, but the month will see a sharp reduction in backlogs. Recent specifications have fallen far short of production and consumers are slow in placing their fourth quarter tonnage. This is partially explained by the fact that many large buyers still have material coming to them which was specified several weeks ago, and mills are not anxious to solicit business when deliveries yet to be made on old commitments will occupy them until well into October. However, most makers will now take orders for delivery in three to four weeks on all the common finishes of sheets, while automobile body material may be accommodated more quickly. The leading interest ran its mills last week at better than 95 per cent of capacity and is scheduled for the present week at slightly under 100 per cent. Independent sheet mill operations in Pittsburgh and nearby district average at least 90 per cent. Fourth quarter prices have not been officially announced in this district, although nearly all makers are prepared to take contracts at 2.85c., Pittsburgh, on black sheets, 3.60c. on galvanized, 2.20c. on light plates blue annealed, 2.35c. on blue annealed sheets and 4.10c. on auto body sheets. In the case of galvanized sheets and light plates, this represents an advance of $2 a ton over recent minimums which many makers refused to recognize. Special efforts are being made to hold the price on galvanized material, and no fourth quarter tonnage has been reported placed at less than 3.60c. Concessions of $2 a ton still occur on tin mill black plate, on which the quoted price is 3c., Pittsburgh.

Tin Plate.—The tin plate business is feeling the full effects of the usual dull season at this time of the year, although the leading interest operated its mills last week at 90 per cent of capacity and has scheduled a similar rate for this week. Operations of independents average 75 per cent or less and further curtailment will probably be necessary before improvement develops.

Strip Steel.—Some makers report that the majority of their larger customers have placed their fourth quarter tonnages at the full quoted prices on both hot and cold-rolled strip, although many consumers serving the automobile industry are slow in estimating their requirements. Makers of parts and accessories for the General Motors subsidiaries have been given a close approximation of their requirements over the last three months of the year and the tonnages needed are somewhat larger than expectations in some cases. Strip mills in the district are running at 70 to 75 per cent of rated capacity, a rate which is just about supported by current specifications. On hot-rolled strip, fourth quarter quotations are unchanged at 2c., Pittsburgh, for 6-in. and narrower, and 1.90c. for the wider sizes. Cold-rolled is holding at 2.75c. to 2.85c., Pittsburgh or Cleveland.

Coal and Coke.—The coke market is developing a firmer tone, although the furnace grade is still quotable at $2.65 to $2.75 a ton, Connellsville. Merchant interests have disposed of most of their surplus tonnage at prices within this range or lower, and are now preparing to ask higher figures on fourth quarter contract business. One large furnace interest which is asking for prices on its requirements over the remainder of the year will probably have to pay at least $2.75. The market on foundry coke is still dull, but prices are gaining strength and less material is being offered at sacrifices. As cold weather approaches domestic fuel is more active and quotations are higher. The coal market has a stronger undertone, but prices have not improved appreciably.

Old Material.—Weakness in the scrap market has continued over the past week, but a few dealers believe that a stronger tendency has made itself felt in the last two days. In other words, efforts are being made to stabilize the market, and no dealer would be willing to sell heavy melting steel at less than $18, even though there were buyers. Small sales at $18.25 and $18.50 have been reported during the last week, and occasional distress tonnages have gone at lower figures. Mills show no disposition to buy steel scrap, and hold-ups at one or two important consuming points are largely responsible for the weakness of the market. Other grades of scrap are about the same, although machine shop turnings are now quotable at $11.50 to $12. Sentiment in the scrap market has not improved, but weakness is based on technical conditions and not on actual sales. In view of this, lower quoted prices are hardly justified and may not come out when mill buying does begin.

Prices per gross ton delivered consumers yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$18.00 to $18.50
No. 2 heavy melting steel	16.00 to 16.50
Scrap rails	17.50 to 18.00
Compressed sheet steel	18.00 to 18.50
Bundled sheets, sides and ends	16.50 to 17.00
Cast iron carwheels	16.50 to 17.00
Sheet bar crops, ordinary	19.50 to 20.00
Heavy breakable cast	12.50 to 13.00
No. 2 railroad wrought	18.00 to 18.50
Hvy. steel axle turnings	16.50 to 17.00
Machine shop turnings	11.50 to 12.00
Acid Open-Hearth Grades:	
Railr. knuckles and couplers	21.50 to 22.00
Railr. coil and leaf springs	21.50 to 22.00
Rolled steel wheels	21.50 to 22.00
Low phos. billet and bloom ends	22.00 to 22.50
Low phos., mill plates	22.00 to 22.50
Low phos., light grades	20.50 to 21.50
Low phos., sheet bar crops	21.50 to 22.00
Heavy steel axle turnings	16.50 to 17.00
Electric Furnace Grades:	
Low phos., punchings	20.00 to 21.00
Hvy. steel axle turnings	16.50 to 17.00
Blast Furnace Grades:	
Short shoveling steel turnings	12.50 to 13.00
Short mixed borings and turnings	12.00 to 12.50
Cast iron borings	12.00 to 12.50
Rolling Mill Grades:	
Steel car axles	21.50 to 22.00
Cupola Grades:	
No. 1 cast	15.00 to 16.00
Rails 3 ft. and under	20.00 to 21.00

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.25c.
Hoops	4.25c.
Black sheets (No. 24), 25 or more bundles	3.80c. to 3.90c.
Galv. sheets (No. 24), 25 or more bundles	4.45c. to 4.55c.
Light plates, blue annealed (No. 10), 1 to 24 plates	3.35c. to 3.45c.
Blue annealed sheets (No. 13), 1 to 24 sheets	3.50c. to 3.60c.
Galv. corrug. sheets (No. 28), per square	$4.43
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count,	60 per cent off list
Machine bolts, 100 count,	60 per cent off list
Carriage bolts, 100 count,	60 per cent off list
Nuts, all styles, 100 count,	60 per cent off list
Large rivets, base per 100 lb.	$3.50
Wire, black soft, ann'l'd, base per 100 lb.	$3.00 to 3.10
Wire, galv. soft, base per 100 lb.	3.00 to 3.10
Common wire nails, per keg	2.90 to 3.00
Cement coated nails, per keg	3.05

More money was spent in Canada in 1928 on agricultural implements and machinery than in 1927, according to the Dominion Bureau of Statistics, Ottawa. This increase was largely supplied by imported goods, as Canadian production dropped in 1928 to $41,199,841, from $42,996,288, the high record in 1927. Exports, including re-exports, declined to $14,560,412 from $16,559,806, while imports advanced to $39,893,490, from $26,101,338. Deducting exports from the sum of production and imports shows apparent consumption of $66,532,919 in 1928, compared with $52,537,820 in 1927.

The Army Ordnance Association expects an attendance of approximately 10,000 at its eleventh annual meeting to be held on Oct. 10 at Aberdeen, Md., proving ground. Extensive munition and aviation demonstrations have been arranged and among organizations participating will be the National Metal Trades Association and the National Aeronautic Association. Dinner will be followed by the presentation of technical papers and addresses by prominent guests.

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and under 10 in., Pittsburgh	$35.00
Rerolling, 4-in. and under 10 in., Youngstown	35.00
Rerolling, 4-in. and under 10 in., Cleveland	35.00
Rerolling, 4-in. and under 10 in., Chicago	37.00
Forging quality, Pittsburgh	$40.00 to 41.00

Sheet Bars

(Open Hearth or Bessemer)

	Per Gross Ton
Pittsburgh	$35.00
Youngstown	35.00
Cleveland	35.00

Slabs

(8 in. x 2 in. and under 10 in. x 10 in.)

	Per Gross Ton
Pittsburgh	$35.00
Youngstown	35.00
Cleveland	35.00

Skelp

(F.o.b. Pittsburgh or Youngstown)

	Per Lb.
Grooved	1.85c. to 1.90c.
Universal	1.85c. to 1.90c.
Sheared	1.85c. to 1.90c.

Wire Rods

(Common soft, base)

	Per Gross Ton
Pittsburgh	$42.00
Cleveland	42.00
Chicago	43.00

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.80
Old range non-Bessemer, 51.50% iron	4.65
Mesabi Bessemer, 51.50% iron	4.65
Mesabi non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.40

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algerian	12.00c.
Iron ore, low phos., Swedish, average 68% iron	12.50c.
Iron ore, basis Swedish, average 65% iron	11.00c.
Manganese ore, washed, 52% manganese, from the Caucasus	32.00c. to 33.00c.
Manganese ore, Brazilian, African or Indian, basic 50%	33.00c.
Tungsten ore, high grade, per unit, in 60% concentrates	$16.25 to $16.50

	Per Gross Ton
Chrome ore, 45 to 50% Cr_2O_3, crude, c.i.f. Atlantic seaboard	$22.00 to $24.00

	Per Lb.
Molybdenum ore, 85% concentrates of MoS_2, delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$2.65 to $2.75
Foundry, f.o.b. Connellsville prompt	3.75 to 4.75
Foundry, by-product, Ch'go ovens	8.00
Foundry, by-product, New England, del'd	11.00
Foundry, by-product, Newark or Jersey City, delivered	9.00 to 9.40
Foundry, by-product, Phila.	9.00
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry by-prod., del'd St. Louis	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.25 to $1.75
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, ¾-in. f.o.b. Pa. mines	1.90 to 2.00
Mine run gas coal, f.o.b. Pa. mines	1.65 to 1.75
Steam slack, f.o.b. W. Pa. mines	80c. to 90c.
Gas slack, f.o.b. W. Pa. mines	1.00 to 1.10

Ferromanganese

	Per Gross Ton
Domestic, 80%, seaboard	$105.00
Foreign, 80%, Atlantic or Gulf port, duty paid	105.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$31.00 to $34.00
Domestic, 16 to 19%	29.00 to 32.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$83.50
75%	130.00

	Per Gross Ton Furnace		Per Gross Ton Furnace
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	45.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		Per Gross Ton
10%	$30.00	12%	$34.00
11%	32.00		

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		Per Gross Ton
6%	$23.00	10%	$27.00 to $28.00
7%	24.00	11%	29.00 to 30.00
8%	25.00	12%	31.00 to 32.00
9%	26.00		

Other Ferroalloys

Ferrotungsten, per lb. contained metal del'd	$1.40 to $1.50
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.15 to $3.65
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	$160.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton	$91.00
Ferrophosphorus, electric 24%, f.o.b. Anniston, Ala., per gross ton	$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silicon, gravel, f.o.b. Illinois and Kentucky mines	$18.00
No. 2 lump, Illinois and Kentucky mines	20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	$18.25 to $18.75
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines	32.50

Fire Clay Brick

	Per 1000 f.o.b. Works: High-Heat Duty Brick	Intermediate Heavy Duty Brick
Pennsylvania	$43.00 to $46.00	$35.00 to $38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	.....
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00
Standard size	45.00

Chrome Brick

	Per Net Ton
Standard size	$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts, blank or tapped, hexagons	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	7.00c. to 6.75c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled thread up to and including ⅛ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagons nuts	70
Semi-finished hexagons castellated nuts, S.A.E.	70
Stove bolts in packages, P'gh	75, 20, 10 and 5
Stove bolts in packages, Chicago	75, 20, 10 and 5
Stove bolts in packages, Cleveland	75, 20, 10 and 5
Stove bolts in bulk, P'gh	75, 20, 10, 5 and 2½
Stove bolts in bulk, Chicago	75, 20, 10, 5 and 2½
Stove bolts in bulk, Cleveland	75, 20, 10, 5 and 2½
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55, 60 per cent apply.

Large Rivets

(½-In. and Larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$3.10
F.o.b. Chicago	3.20

Small Rivets

(⅞-In. and Smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70 and 10
F.o.b. Cleveland	70 and 10
F.o.b. Chicago	70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10 and 5
Milled standard set screws, case hardened	80 and 5
Milled headless set screws, cut thread	75 and 10
Upset hex. head cap screws, U.S.S. thread	85
Upset hex. cap screws, S.A.E. thread	85
Upset set screws	80, 10 and 5
Milled studs	70

Chicago

Steel Production Down to 88 Per Cent—Freight Car and Rail Inquiries Lead in Prospective Business

CHICAGO, Sept. 17.—Interest in this market continues to center in rapid moves being made by the railroads. The Santa Fe is making known that it will buy 5754 freight cars and the Southern will purchase 2000 cars. The superstructures for these cars will take close to 115,000 tons of steel. No less impressive is the standard-section rail market, which this week has brought 50,000 tons additional to Western makers' books, and fresh inquiry for 100,000 tons.

Concurrent with this brighter side of the steel trade comes the announcement of the banking of No. 3 furnace at South Chicago Works. The leading producer now is using 17 of 27 stacks, a loss of three in two weeks, and ingot output for the district as a whole is not above 88 per cent of capacity.

New buying in finished steel is dragging, not so much because of absence of interest on the part of buyers but because of lack of accord among producers as to the proper time for announcing fourth quarter prices. The Inland Steel Co. has taken the lead and has named 2.05c. a lb. for plates, shapes and bars.

Forward contracting in wire is making progress at current prices, but quotations for wire nails are weak and new business is dull. Attempts to bolster sheet prices are not meeting with full success, especially when delivery points are to the south and west of Chicago.

The suspension of a large pipe contract is still in effect. Deliveries on most sizes of plates range from three to four weeks, or better if orders match rolling schedules.

There is no evidence here that semi-finished steel is being accumulated at mills, which at the moment are closely balancing output with shipments.

Ferroalloys. — Several carloads of ferromanganese have been sold at $105 a ton, seaboard. The spiegeleisen market is quiet except from the viewpoint of shipments, which are being maintained at a uniform rate.

Prices delivered Chicago: 80 per cent ferromanganese, $112.56; 50 per cent ferrosilicon, $83.50 to $88.50; spiegeleisen, 19 to 21 per cent, $39.76 to $41.76.

Pig Iron. — Prices for Northern foundry iron are firm at $20 a ton, local furnace, as buying mounts to sizable tonnages for delivery in the fourth quarter. All merchant furnaces but one, Iroquois No. 5, are lighted, and its operators plan to put this one in service about the first of next month. Reports received here are to the effect that several light car manufacturers are curtailing output. On the other hand, one builder, just now swinging into production on new models, is ordering much larger quantities of pig iron. Southern iron is quotable at $13 to $13.50 a ton, Birmingham. Efforts are being made to establish the market at the upper figure, but outstanding quotations at $13 are delaying this move. The silvery market is drifting slowly in the matter of sales, but shipping orders are fully equal to the average in recent weeks. Shipments of Northern iron are running 10 per cent heavier than in the corresponding period of last year.

Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	$20.00
N'th'n No. 1 fdy., sil. 2.25 to 2.75	20.50
Malleable, not over 2.25 sil.	20.00
High phosphorus	20.00
Lake Super. charcoal, sil. 1.50	27.04
So'th'n No. 2 fdy. (all rail)	$18.51 to 19.01
Low phos., sil. 1 to 2, copper free	29.50
Silvery, sil. 8 per cent	29.79
Bess. ferrosilicon, 14-15 per cent	46.29

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Sheets.—New business is moderately active, and Western makers' backlogs are growing slowly. Irregularities are still noted in prices, though one local producer is attempting to hold rigidly to 3.05c. a lb., Chicago, for black sheets, 3.75c. for the galvanized product, and 2.35c. for No. 10 gage blue annealed sheets. Lower prices than these prevail on tonnages bought for shipment south of Chicago. Deliveries of heavy gages of blue annealed sheets are extended beyond 12 weeks, and much business in this grade is being diverted to other producing centers. Galvanized sheets may be had in four to five weeks, and the tendency of deliveries is to be still further deferred. Several large inquiries are now before the trade from jobbers. Output has reached 95 per cept of capacity following a free supply of sheet bars.

Base Prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 3c. to 3.05.; No. 24 galv., 3.65c. to 3.75c.; No. 10 blue ann'l'd, 2.35c. Deliv'd prices at other Western points are equal to the freight from Gary, plus the mill prices, which are 5c. per 100 lb. lower than Chicago delivered prices.

Rails and Track Supplies.—A Western railroad has ordered 50,000 tons of standard-section rails with which there will be required close to 12,000 tons of track supplies. This order is for rolling this fall and the sellers expect that releases will be forthcoming in two to three weeks. In the meantime, Chicago rail mills continue to operate at unchanged schedules on past orders. No word has been received here as to the disposition of the rails for the Chesapeake & Ohio. Fresh inquiry before Chicago mills by two Western railroads totals 100,000 tons. Shipping schedules now being arranged against new orders show that the railroads are willing to take fall deliveries at a faster rate than has been their custom in recent years. Local track accessory departments are engaged at 75 per cent of capacity. Miscellaneous orders for light rails aggregate only a few hundred tons.

Prices f.o.b. mill, per gross ton: Standard section open-hearth and Bess. rails, $43; light rails, rolled from billets, $36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.15c.; angle bars, 2.75c.

Cast Iron Pipe.—This cast iron pipe market continues to mark time, with few indications that an improvement can be expected at an early date. Milwaukee will open bids Sept. 24 on 200 tons of 8-in. and 300 tons of 12-in. pipe. Several inquiries are taking shape, each of about 200 tons, and several contractors give promise of having pipe to buy before the end of the month. A few odd tonnages are being sought by railroads and industrial plants. Deliveries are prompt on most sizes, and prices are stable at $45.20 to $46.20 a ton, delivered, Chicago, for diameters 6 in. and larger.

Prices per net ton, del'd Chicago: Water pipe, 6-in. and over, $45.20 to $46.20; 4-in., $49.20 to $50.20; Class A and gas pipe, $3 extra.

Reinforcing Bars. — Awards total more than 1000 tons, about equal to the lettings of the preceding week. The character of recent buying is well diversified, representing new industrial activity, a large apartment building and business structures. Litigation now threatens to hold in check Illinois road work, which was to have been financed by the new gasoline tax. Fresh inquiry is in moderate volume, the bulk of it, however, for small projects. Prices remain in the unstable condition of recent months. Some sellers of rail steel reinforcing bars are making another attempt to establish 1.95c. a lb., Chicago Heights, as the minimum. Mill deliveries are improved.

Wire Products.—New contracting in these products is in fair volume, especially from jobbing and retail buyers. Stocks at mills are in good condition for the fall trade, and wire mill output has been cut to 60 per cent of capacity, which conforms with current shipments. The price situation is unaltered from that of a week ago, with quotations steady on wire but weak on nails. Wire nails are commonly quoted at $2.50 to $2.60, base, per 100-lb. keg, delivered Chicago. Demand for woven wire fencing is slowly expanding.

Cold-Rolled Strips. — Specifications are shrinking in volume as several manufacturers of low-priced motor cars continue to whittle down production programs. Output for the country as a whole averages close to 50 per cent of capacity.

Plates.—New orders for oil storage tanks call for 8000 tons of steel plates, 6500 tons of which will be supplied by makers east of Chicago. The 1500 tons purchased from local mills will be sent to Oklahoma, where it will be fabricated. These orders were placed by five oil refiners, and the bulk of the tonnage is for erection in Texas. Fresh inquiry comes in one lot from

the Southwest and is for 4000 tons, which added to old inquiry makes a total of about 14,000 tons of tankage plates that is now before the trade. Also of interest this week is an inquiry for 4000 tons of steel by a Lake Michigan shipbuilder. Part suspension in the output of welded steel pipe is still in effect. The contract covering a large new project is still valid and it is generally thought here that output as originally planned will be resumed at an early date. The outlook in the railroad equipment market seems to be improved since a week ago. Plans are rapidly taking shape to put into shops 1000 cars recently ordered by the St. Paul. Releases for steel are expected in about three weeks. These cars are of unusually heavy construction and each superstructure will take 16 tons of steel. The Chicago & Eastern Illinois is still undecided whether it will build in its own shops or will award a contract for 500 gondola bodies. The Southern is in the market for 1000 box cars and 1000 gondolas. Information gathered by sellers of steel indicates that Western railroads will seek prices in the next week on 5000 cars. New buying in plates is quiet in the absence of general accord among producers as to the proper time for the announcement of fourth quarter prices. The Inland Steel Co. is today reaffirming the present quotations, but no announcement has come from the leading producer.

Structural Material. — Structural awards for the week totaled more than 10,000 tons, of which 5000 tons is for 1929 and 1930 bridge construction work for the Great Northern. A garage in Chicago calls for 2500 tons, and highway bridge work in Oklahoma accounts for 2000 tons. Fresh inquiries total close to 5000 tons. Plans will soon be ready for a 1600-ton office building in Milwaukee. A packing plant in St. Louis will take 900 tons, and highway bridges in Lake County, Ind., will require a like tonnage. A theater at Fort Wayne, Ind., swells the list by 700 tons. New bids are being submitted on the 4800 tons needed for the Phillips School, Chicago. It is reported that bids will be opened Sept. 24. Lettings during the week have been decidedly in favor of large fabricators. Although there is a fair amount of light tonnage work before small shops, it is not coming out rapidly enough to check the shrinkage of order books. The Inland Steel Co. has named 2.05c. a lb., Chicago, as its fourth quarter contract price.

Mill prices on plain material, per lb.: 2.05c. base, Chicago.

Bars. — Current specifications for mild steel bars reflect steady consumption. Activity among manufacturers of road machinery is spotty, with several plants at Milwaukee having made recent sharp reductions in output. Farm implement makers have hit an even stride except in production of heavy tractors and combines. Improvement, however, is said to be in sight as farm machinery manufacturers lay plans for heavier consumption of steel during the fall months for the production of equipment that will be needed for spring delivery. Further improvement is noted in demand from automobile parts makers. The change, however, is slight. Announcements as to fourth quarter prices are slow in being made. The Inland Steel Co. alone is making known to its trade that mild steel bars for delivery in the next three months will be priced at 2.05c. a lb., Chicago. Contracting for alloy steel bars is progressing satisfactorily, and backlogs are growing. Specifications are expanding, and deliveries are tending to go beyond the two weeks' point. The iron bar market is quiet, except for scattered spot sales of small individual tonnages. Specifications for rail steel bars are measurably larger from the bed manufacturing trade and makers of barn equipment. A fair part of fourth quarter contracts is under cover, and prices are well established at 1.95c. a lb., Chicago Heights. Specifications are larger than shipments, and hours of rolling have been extended.

Bolts, Nuts and Rivets.—Forward contracting is making rapid strides. Prices are well established. Current specifications continue to run only in fair volume, but indications are at hand that shipments will grow in October.

Coke. — Shipments of by-product foundry coke are well sustained at the rate of the opening week in September. Spot sales at $8 a ton, local ovens, are few in number and widely scattered.

Old Material.—The Chicago scrap market is dull. Heavy melting steel is nominally quoted at $15 to $15.50 a gross ton, delivered. Although some users are taking this grade in excess of immediate needs, this being an effort to expand reserves on hand. Supplies are more than ample as gaged by mill operations at 88 per cent of capacity. Brokers are covering orders at 25c. lower than a week ago. Demand for hydraulic bundles is unusually quiet, and one broker, who is usually very active in this grade, is without a large order for the first time in many months. Rerolling rails are in light demand, and prices have dropped 25c. a ton. Among lists offered this week are 4000 tons by the Rock Island, 2000 tons by the Grand Trunk, a small extra list by the St. Paul and lists from various plants of the General Motors Corporation.

Prices deliv'd Chicago district consumers:

Per Gross Ton

Basic Open-Hearth Grades:	
Heavy melting steel	$15.00 to $15.50
Shoveling steel	15.00 to 15.50
Frogs, switches and guards, cut apart, and misc. rails	16.75 to 17.25
Hydraul. compressed sheets	13.50 to 14.00
Drop forge flashings	10.75 to 11.25
No. 1 busheling	13.25 to 13.75
Forg'd cast and r'l'd steel carwheels	18.75 to 19.25
Railroad tires, charg. box size	18.75 to 19.25
Railroad leaf springs cut apart	18.75 to 19.25
Acid Open-Hearth Grades:	
Steel couplers and knuckles	17.00 to 17.50
Coil springs	19.00 to 19.50
Electric Furnace Grades:	
Axle turnings	14.50 to 15.00
Low phos. punchings	17.00 to 17.50
Low phos. plates, 12 in. and under	17.00 to 17.50
Blast Furnace Grades:	
Axle turnings	13.00 to 13.50
Cast iron borings	10.50 to 11.00
Short shoveling turnings	10.50 to 11.00
Machine shop turnings	7.50 to 8.00
Rolling Mill Grades:	
Iron rails	16.00 to 16.50
Rerolling rails	17.75 to 18.25
Cupola Grades:	
Steel rails less than 3 ft.	17.50 to 18.50
Steel rails less than 2 ft.	20.00 to 20.50
Angle bars, steel	17.00 to 17.50
Cast iron carwheels	14.00 to 14.50
Malleable Grades:	
*Railroad	17.00 to 17.50
Agricultural	15.50 to 16.00
Miscellaneous:	
*Relaying rails, 56 to 60 lb.	23.00 to 25.00
*Relaying rails, 65 lb. and heav.	26.00 to 31.00

Per Net Ton

Rolling Mill Grades:	
Iron angle and splice bars	15.00 to 15.50
Iron arch bars and transoms	21.00 to 21.50
Iron car axles	26.50 to 27.00
Steel car axles	17.50 to 18.00
No. 1 railroad wrought	14.00 to 14.50
No. 2 railroad wrought	13.50 to 14.00
No. 1 busheling	9.00 to 9.50
No. 2 busheling	7.00 to 7.50
Locomotive tires, smooth	14.50 to 15.00
Pipes and flues	10.00 to 10.50
Cupola Grades:	
No. 1 machinery cast	14.50 to 15.00
No. 1 railroad cast	14.00 to 14.50
No. 1 agricultural cast	13.25 to 13.75
Stove plates	12.25 to 12.75
Grate bars	11.75 to 12.25
Brake shoes	11.50 to 12.00

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars	3.00c.
Reinforc'g bars, billet steel	2.10c. to 2.35c.
Reinforc'g bars, rail steel	1.85c. to 1.95c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Bands (¾ in. in Nos. 10 and 12 gages)	3.20c.
Hoops (No. 14 gage and lighter)	3.75c.
Black sheets (No. 24)	4.05c.
Galv. sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.35c.
Spikes, ⅜ in. and larger	3.55c.
Track bolts	4.55c.
Rivets, structural	4.00c.
Rivets, boiler	4.00c.
	Per Cent Off List
Machine bolts	60
Carriage bolts	60
Coach or lag screws	60
Hot-pressed nuts, sq., tap. or blank	60
Hot-pressed nuts, hex., tap. or blank	60
No. 8 black ann'l'd wire, per 100 lb.	$3.45
Com. wire nails, base per keg	3.20
Cement c't'd nails, base per keg	3.20

Pheoll Mfg. Co. of Minnesota, a subsidiary of the Pheoll Mfg. Co., Chicago, will take over and operate as a direct warehouse and sales office the bolt, nut and screw business formerly conducted by the Irvine Brass & Copper Co., Minneapolis. This office and warehouse will be situated in the Winston-Harper-Fisher Building, 405 Second Avenue North.

Improvements to be made at the Rankin Works of the American Steel & Wire Co., Rankin, Pa., include the installation of eight 300-hp. 167-r.p.m. motors and two 1000-kva. transformers. An order for this equipment, together with an outdoor substation, has been placed with the General Electric Co.

New York

Pig Iron Sales 26,000 Tons—Building Will Take 40,000 Tons of Structural Steel

NEW YORK, Sept. 17.—Pig iron sales last week were heavy, totaling 26,000 tons. The largest individual purchase was 15,000 tons, representing the fourth quarter requirements of the Bayonne, N. J., radiator plant. The Richmond Radiator Co. has partly closed against its inquiry for 5000 tons for Uniontown, Pa., but has postponed action on most of the tonnage. A large part of current business is made of relatively small lots placed quietly. Most melters are conservative in buying, but are covering, or have covered, for part of their fourth quarter needs. Foundry operations are reported as increasingly spotty in nearby New England, but are well sustained on the average, although the outlook for the remainder of the year is somewhat uncertain. Some makers of heating equipment are experiencing a seasonal pickup in activity, but most of them still have large inventories to work off. Judging by business booked thus far in the current week, with one seller reporting orders for 1500 tons and another for 1000 tons, pig iron demand is keeping up at a fair rate. Developments in prices are in the direction of greater stability. Alabama furnaces are now quoting $13.50, base, Birmingham, on foundry iron, and the lowest price reported in the past week was $13. Buffalo furnaces are less aggressive and are more generally holding at $18, base, although quotations of $17.50, furnace, have not disappeared. Eastern Pennsylvania producers have been most active in soliciting recent business in northern New Jersey and have quoted $18.50, base, furnace, on attractive tonnages. The Port Henry, N. Y., furnace is still out for repairs and the Mystic furnace at Everett, Mass., may also be put out for relining.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	$22.41 to $22.91
*Buf. No. 2, del'd east. N. J.	20.78 to 21.28
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	19.89 to 21.02
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	20.39 to 21.52

Freight rates: $4.91 from Buffalo, $1.39 to $2.52 from eastern Pennsylvania.
*Prices delivered to New Jersey cities having rate of $3.28 a ton from Buffalo.

Warehouse Business.—Buying is limited to small lots. Demand for structural steel has not yet developed to the usual fall proportions. Black, galvanized and blue annealed sheets are quiet and prices are still subject to concessions of $1 to $2 on black and galvanized and $2 and more on blue annealed.

Cast Iron Pipe.—Inquiries for pressure pipe are almost entirely for carload lots or less, and quotations are unchanged, with Northern foundries quoting $31 to $33, base, f.o.b. plant, and Southern makers quoting $35 to $37 a ton, f.o.b. Birmingham. About 180 tons of 12-in. and 24-in. pipe for Hartford, Conn., was awarded to a Southern maker. A steam company making an installation at the Chevrolet Motor Co. assembly plant in Tarrytown, N. Y., has bought about 200 tons of pipe from the National Cast Iron Pipe Co.

Prices per net ton deliv'd New York: Water pipe, 6-in. and larger, $33.60 to $34.60; 4-in. and 5-in., $36.60 to $37.60; 3-in., $43.60 to $44.60. Class A and gas pipe, $3 extra.

Reinforcing Bars.—Three hundred tons of bars for highway bridges in New Jersey will be supplied by Igoe Brothers. Considerable tonnage for subway work is pending, but no awards will be made until the last week of September or possibly early in October. The volume of small jobs has fallen off somewhat, but mills are reported to be well engaged. Prices are steady and unchanged.

Billet steel reinforcing bars in 40, 50 and 60-ft. lengths, 2.05c. per lb., Pittsburgh, and 2.30c. per lb., Pittsburgh warehouse, for cut lengths. Out of New York warehouse, 2.90c. per lb. for lots of 5 tons or more, 3.05c. for lots of 2 to 5 tons and 3.30c. for less than 2 tons, all delivered at job.

Finished Steel.—A definite trend in steel business is still lacking in the New York territory. Orders received by some companies so far this month are about equal to those booked during the same number of days in August, but, as last month was comparatively light in new buying, steel business is barely holding its own, considering the continued high rate of operations. The leading Eastern producer, which started out the month at a 95 per cent operation, has dropped to around 90 per cent. Output of other Eastern companies has also tapered somewhat, though in some cases production is still running ahead of the volume of incoming business. The week's most significant development is a revival in buying of railroad equipment, with somewhat more promising prospects in the form of inquiries. The Central of Georgia has ordered 1000 cars, but these will be built in the Birmingham district. The Norfolk & Western has contracted with a Virginia company for 1000 steel car bodies. The most important inquiry in the East comes from the Southern Railway, which asks for bids on 2000 cars, but is expected to buy more than that number. In structural steel, the outlook is still good. An outstanding project is the building to be erected on the site of the old Waldorf-Astoria Hotel, Fifth Avenue and Thirty-fourth Street, New York, which will require 40,000 tons of steel. The City of New York has announced preliminary plans for about 100 miles of new subway construction in New York, but it will be some time before the work has got to a point that steel will be called for. In the price situation, the stand that some makers of galvanized sheets have taken for a firm 3.60c., Pittsburgh price, is the principal development. The $2 differential to the jobber is wiped out in many cases. No marked price weakness has appeared other than that in structural steel brought about by keen competition between Eastern and Middle district producers.

Mill prices per lb., deliv'd New York: Soft steel bars, 2.29c.; plates, 2.22½c.; structural shapes, 2.19½c.; bar iron, 2.14c.

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.30c.
Soft steel bars, small shapes	3.25c.
Iron bars	3.24c.
Iron bars, Swed. charcoal	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Cold-roll. strip, soft and quarter hard	5.15c. to 5.40c.
Hoops	4.25c.
Bands	3.75c.
Blue ann'l'd sheets (No. 10)	3.80c. to 3.90c.
Long terne sheets (No. 24)	5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galv. annealed	5.15c.
Tire steel, 1½ x ½ in. and larger	3.40c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.75c.
Open-hearth spring steel, bases	4.50c. to 7.00c.

	Per Cent Off List
Machine bolts, cut thread:	
¾ x 6 in. and smaller	60
1 x 30 in. and smaller	50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	60
¾ x 20 in. and smaller	50 to 50 and 10
Coach screws:	
½ x 6 in. and smaller	60
1 x 6 in. and smaller	50 to 50 and 10

	Per 100 Ft.
Boiler Tubes—	
Lap welded, 2-in.	$17.33
Seamless steel, 2-in.	20.24
Charcoal iron, 2-in.	25.00
Charcoal iron, 4-in.	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
½-in. butt	46	29
¾-in. butt	51	37
1-3-in. butt	53	39
2½-6-in. lap	48	35
7 and 8-in. lap	44	17
11 and 12-in. lap	37	12
Wrought Iron—		
½-in. butt	5	+19
¾-in. butt	11	+ 9
1-1½-in. butt	14	+ 6
2-in. lap	5	+14
3-6-in. lap	11	+ 6
7-12-in. lap	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box	$6.45	$6.20
Charcoal, per Box	A	AAA
IC	$9.70	$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating	$10.00 to $11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets, Box Annealed—Black, C. R. One Pass

	Per Lb.
Nos. 18 to 20	3.75c. to 3.80c.
No. 22	3.90c. to 3.95c.
No. 24	3.95c. to 4.00c.
No. 26	4.05c. to 4.10c.
No. 28*	4.20c. to 4.25c.
No. 30	4.45c. to 4.50c.

Sheets, Galvanized

	Per Lb.
No. 14	4.20c. to 4.40c.
No. 16	4.15c. to 4.25c.
No. 18	4.20c. to 4.40c.
No. 20	4.30c. to 4.50c.
No. 22	4.40c. to 4.60c.
No. 24	4.65c. to 4.75c.
No. 26	4.90c. to 5.00c.
No. 28*	5.15c. to 5.25c.
No. 30	5.55c. to 5.65c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

Pipe.—At least three of the leading producers of steel pipe have notified jobbers in New York, as well as in the remainder of the country, that failure to maintain resale prices hereafter may result in the cutting off of sales to such offenders. Other pipe makers will send similar notices to their customers within a few days. Such action follows in tenor that taken several months ago by the two leading makers of wrought iron pipe, the A. M. Byers Co. and the Reading Iron Co. While the announcement by the steel pipe producers applies to the entire country, it is the situation in New York particularly which has brought it about. It is stated that the failure of some pipe jobbers, including a number who receive consigned stocks, to maintain any semblance of price stability has unsettled the entire market to such an extent that none can obtain profitable prices. The action of the mills is said to have been urged by some of the jobbers whose business success is threatened by inability to obtain a profit on the pipe they sell.

Coke.—All grades are quiet. Furnace coke is unchanged at $2.75 to $2.80 a net ton, Connellsville. Special brands of beehive foundry coke are quoted at $4.85 a net ton, ovens, or $8.56, delivered to northern New Jersey, Jersey City and Newark, and $9.44 to New York and Brooklyn. By-product coke is quoted at $9 to $9.40 a net ton, Newark or Jersey City, and $10.06, New York or Brooklyn.

Old Material. — Supplies of all grades of scrap are plentiful and, with eastern Pennsylvania consumers in some instances asking delays in deliveries on contracts, brokers are able to buy No. 1 heavy melting steel at $16 a ton, delivered, and No. 2 steel at $13.50 to $14.25 a ton, delivered. Sizable tonnages of No. 2 heavy melting steel are still moving to the consumer at Bethlehem, Pa. Cast scrap is inactive and prices depressed.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel	$12.50 to $13.25
Heavy melting steel (yard)	8.00 to 10.00
No. 1 hvy. breakable cast.	10.25 to 11.50
Stove plate (steel works).	8.00 to 8.25
Locomotive grate bars....	8.25 to 8.75
Machine shop turnings....	7.75 to 8.00
Short shoveling turnings..	8.00 to 8.50
Cast borings (blast furn. or steel works).....	7.00 to 7.75
Mixed borings and turnings	6.75 to 7.75
Steel car axles.....	19.50 to 20.00
Iron car axles.....	23.00 to 24.00
Iron and steel pipe (1 in. dia., not under 2 ft. long)	10.75
Forge fire	9.75 to 10.25
No. 1 railroad wrought...	12.00 to 12.50
No. 1 yard wrought, long..	11.00 to 11.50
Rails for rolling.....	13.25 to 13.75
Stove plate (foundry)....	8.00 to 8.50
Malleable cast (railroad).	14.00 to 14.50
Cast borings (chemical)..	10.00 to 10.50

Prices per gross ton, deliv'd local foundries:

No. 1 machry. cast.....	$16.50
No. 1 hvy. cast (columns, bldg. materials, etc.), cupola size.....	14.50
No. 2 cast (radiators, cast boilers, etc.)	14.00

U. S. Metal Products Co., sheet metal jobber, specializing in mill surpluses and seconds, has moved to a new warehouse at 2300 West Fifty-eighth Street, Chicago, where 40,000 sq. ft. of floor space will be utilized for steel storage.

Cleveland

Orders for Finished Steel Decline—Mills Need Business in Some Lines—Automotive Demand Unimproved

CLEVELAND, Sept. 17.—The demand for finished steel declined the past week and backlogs were further reduced. The slackening is due to the restricted demand from the automotive industry. The trend of production in that industry still appears to be downward, the increase in schedules by some motor car manufacturers on new models being more than offset by curtailment by others. It is reported that the Ford Motor Co. has reduced its production schedules considerably and that its September output will be much below its August peak of 205,000 cars. Some of the motor car builders that brought out new models are getting under production slower than had been expected, evidently waiting until their stocks of old cars have been cleaned up or until they can make some gage of the extent of fall buying.

With additional announcements of reestablishment of third quarter prices made during the week, practically all current prices have been named for the last quarter. Alloy steel bars will remain at the present 2.65c. base. Wire nails have been reestablished at the current prices which represent a decline from those ruling at the start of the present quarter. Wire rods have been reaffirmed at $42, Cleveland and Pittsburgh, at which a few contracts have been closed. Some mills are quoting cold-rolled strip at 2.75c. to the larger buyers for the last quarter, which indicates that attempts to get the price back to 2.85c. will not succeed except possibly on small-lot business. Practically no interest in last quarter contracts is being shown by consumers and few mills are soliciting contracts. The automotive industry is following a hand-to-mouth policy in buying for current needs. Products for which some of the mills now are in need of orders include steel bars, hot and cold-rolled strip and sheets.

Semi-Finished Steel.—A local mill is naming for the fourth quarter its present price of $35, Cleveland, Youngstown and Pittsburgh, for sheet bars, billets and slabs and expects to close some of its trade this week at the reaffirmed prices. Specifications are holding up well, and this mill is operating 13 of its 14 open-hearth furnaces. Wire rods have been reestablished for the fourth quarter at $42, Cleveland and Pittsburgh, and some business has been taken for that delivery.

Pig Iron.—Buying for the fourth quarter continues at a moderate rate. Sales totaling 23,600 tons in foundry and malleable iron were made by Cleveland interests during the week, or slightly more than during the previous week. Shipments during the first half of September show a slight gain over the corresponding period of August. The automotive industry is taking a little more iron than last month. Consumers as yet are showing no interest in first quarter contracts, although some furnaces probably would be willing to sell for that delivery at current prices. The market is firm and producers see no possibility of lower prices unless steel plant operations should slow down to an extent that steel plants will have surplus iron for sale. One local producer is still out of the market because of the heavy demands of its steel plant. Prices are unchanged at $18.50, Cleveland, for outside shipment, and $19, furnace, for local delivery. In Michigan, the market is firm at $20 for both foundry and malleable grades. Southern foundry iron is holding in this territory at the recent advance in prices. A few small lots were sold during the week at $14, Birmingham.

Prices per gross ton at Cleveland:

N'th'n fdy., sil. 1.75 to 2.25	$19.50
S'th'n fdy., 1.75 to 2.25	$19.50 to 20.00
Malleable	19.50
Ohio silvery, 8 per cent...	28.00
Basic Valley furnace.....	18.50
Stand. low phos., Valley..	26.50 to 27.00

Prices except on basic and low phosphorus are delivered Cleveland. Freight rates: 50c. from local furnaces; $3 from Jackson, Ohio; $6 from Birmingham.

Bars, Plates and Shapes.—Demand for steel bars is rather slow, owing to curtailment of the automotive industry, and some of the mills now need orders. Plates are moving fairly well in small lots. Structural inquiry is fair. Inquiries are out for an Akron, Ohio, department store requiring 3000 tons and for grade crossing work in Cleveland that will take 1000 tons. Although present quoted prices have been named for the last quarter, few contracts have been written. Steel bars are quoted at 1.90c. to 1.95c., Cleveland, outside mills holding to the higher price. Plates and structural shapes are quoted at 1.95c., Pittsburgh.

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and struc. shapes.....	3.00c.
Soft steel bars	3.00c.
Reinforc. steel bars.....	2.25c. to 2.50c.
Cold-fin. rounds and hex.....	3.65c.
Cold-fin. flats and sq.....	4.15c.
Hoops and bands, No. 12 to ¼ in., inclusive	3.25c.
Hoops and bands, No. 13 and lighter	3.65c.
Cold-finished strip.....	*5.95c.
Black sheets (No. 24).....	3.70c. to 3.90c.
Galvanized sheets (No. 24).	4.60c. to 4.75c.
Blue ann'l'd sheets (No. 10).....	3.25c.
No. 9 ann'l'd wire, per 100 lb.....	$2.90
No. 9 gal. wire, per 100 lb.....	3.35
Com. wire nails, base per keg.....	2.90

*Net base, including boxing and cutting to length.

Sheets.—Practically all producers have reaffirmed present prices for the fourth quarter, but few consumers are showing interest in contracts. Specifications showed a further tapering tendency the past week and most mills need tonnage on some grades, although two or three are still well booked for five or six weeks. The expected pickup in the demand for the automotive industry has not yet developed. Prices appear to be well maintained at 2.85c., Pittsburgh, for black, 2.35c. for blue annealed, 2.20c. for light blue annealed plates and 3.60c. for galvanized, although there are occasional reports of a shading of the latter. Wire products' manufacturers will continue present prices through the fourth quarter, but do not expect to close many contracts in the near future because consumers still have considerable wire tonnage due on present contracts and also because of the existing price irregularity on nails. Wire is firm at 2.40c. to 2.50c., Cleveland, and a few contracts for manufacturers' wire have been closed at the higher figure. The rather common range on wire nails is $2.45 to $2.55 a keg, Cleveland.

Old Material. — The market is weaker. The supply has become more plentiful and the demand is light. Some dealers having outstanding mill contracts have temporarily withdrawn from the market with the expectation that prices will go lower. Shoveling steel turnings have declined 50c. a ton and blast furnace scrap 25c. a ton, $10.50 now being the maximum price for the latter and at which some sales are reported. Hydraulic bundles brought $17.75 late in the week for a 1000-ton lot in a transaction between dealers for Youngstown delivery, but probably not above $17.50 would now be paid.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$15.25 to $15.50
No. 2 heavy melting steel	14.75 to 15.00
Compressed sheet steel	15.50 to 16.00
Light bundled sheet stampings	12.00 to 12.50
Drop forge flashings	13.00 to 13.25
Machine shop turnings	9.75 to 10.25
Short shoveling turnings	11.25 to 11.75
No. 1 railroad wrought	13.50 to 14.00
No. 2 railroad wrought	16.00 to 16.50
No. 1 busheling	13.25 to 13.75
Pipes and flues	9.00 to 9.50
Steel axle turnings	12.50 to 13.00
Acid Open-Hearth Grades:	
Low phos., forging crops	17.75 to 18.00
Low phos., billet, bloom and slab crops	18.50 to 18.75
Low phos., sheet bar crops	18.00 to 18.50
Low phos., plate scrap	18.00 to 18.50
Blast Furnace Grades:	
Cast iron borings	10.25 to 10.50
Mixed borings and short turnings	10.25 to 10.50
No. 2 busheling	10.25 to 10.50
Cupola Grades:	
No. 1 cast	17.50 to 18.00
Railroad grate bars	11.00 to 12.00
Stove plate	12.00 to 12.50
Rails under 3 ft	18.50 to 19.00
Miscellaneous:	
Railroad malleable	18.00 to 18.50
Rails for rolling	16.25 to 16.50

Strip Steel.—The demand is rather light, particularly for cold-rolled strip, but probably was as good the past week as during several previous weeks. However, most mills have nearly wiped out their backlogs, and there has been considerable curtailment in operation of cold mills. The automotive industry is ordering strip only for early needs. Some pressure is being exerted against hot-rolled strip prices, but there is no evidence of a weakening. Little interest is being taken in fourth quarter contracts, and as yet there has been no real test of the attempt of mills to get 2.85c., Cleveland, for cold-rolled strip from large consumers.

Coke.—Demand for by-product coke for domestic use has fallen off since the recent 25c. a ton price advance, previous to which dealers had bought fairly heavily. Foundry coke is not active, but is firm at $4.85, ovens, for the better grades of Connellsville fuel. Ohio by-product coke is unchanged at $8.25, ovens.

Philadelphia

Mill Output Lower But Still Exceeds New Orders—Shipyard Buys 18,000 Tons of Steel

PHILADELPHIA, Sept. 17.—Steel mill operations show a further recession, output at present ranging from 75 to 90 per cent of capacity. Deliveries are less extended, and ordinary specifications for plates, shapes, bars or sheets are shipped in one to two weeks. Plate mills continue better occupied than other mills, but even plate producers are shipping slightly in excess of new business, although some improvement in buying in the past week is reported. Railroad demand is fair, and some large rail inquiries for next year are expected soon from the Pennsylvania and the New York Central. The Pennsylvania is inquiring for 8000 kegs of spikes. Plate and shape tonnage for new ships continues to be placed, the latest contract covering upward of 18,000 tons for two ships for the Export Steamship Co., being built by the New York Shipbuilding Co., Camden, N. J.

Pig Iron.—Competition of Southern pig iron has lessened, as most Birmingham sellers are endeavoring to maintain a minimum of $14 a ton, f.o.b. furnace. About 2000 tons of floor iron for the Baldwin Locomotive Works is expected to be placed with an Alabama producer or an eastern Pennsylvania steel company furnace. Eastern Pennsylvania sellers are maintaining $21 a ton, furnace, on most current business, but buyers claim that slight concessions are obtainable when Southern pig iron is a competitor. The American Engineering Co. has not yet closed on 1000 tons of foundry iron, but bought a carload of Bessemer last week. Basic iron is quiet and purchases by consumers in this district covering their requirements to the end of the year are not expected until early next month. Low phosphorus iron prices are firm, but business is small.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil.	$21.26 to $21.76
East. Pa. No. 2X, 2.25 to 2.75 sil.	21.76 to 22.26
East. Pa. No. 1X	22.26 to 22.76
Basic (del'd east. Pa.)	19.75 to 20.25
Gray forge	20.00 to 20.50
Malleable	21.25 to 21.75
Stand. low phos. (f.o.b. N. Y. State furnace)	22.00 to 23.00
Cop. br'g low phos. (f.o.b. furnace)	23.50 to 24.00
Va. No. 2 plain, 1.75 to 2.25 sil.	24.04
Va. No. 2X, 2.25 to 2.75 sil.	24.54

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces; $4.54 from Virginia furnaces.

Bars.—Mill operations have been steadily curtailed in an effort to balance output with the volume of new business being booked, but, although production is now 75 to 80 per cent of capacity, it is still slightly in excess of new orders. The price is unchanged at 1.95c., Pittsburgh, or 2.27c., delivered Philadelphia.

Reinforcing Bars.—Competition between sellers of billet steel and rail steel bars is still a factor in maintaining prices at a low level, quotations ranging from 1.95c. to 2c., Pittsburgh, or 2.27c. to 2.32c., delivered Philadelphia, on billet steel bars, with the extra of $5 for cutting to length usually omitted. Rail steel bar sellers quote 1.95c., Franklin, Pa., or Tonawanda, N. Y., or 2.27c., Philadelphia, with no extra for cutting to length, but to obtain orders concessions are generally necessary to provide the buyer with a saving from the billet steel price. Recent awards of reinforcing bars have included 100 tons for a school at Chew and Upsal Streets, Philadelphia, to the Truscon Steel Co., and 280 tons for a laboratory for the Gulf Refining Co. to the Roslyn-Gilmore Steel Co.

Shapes.—Mills have a fair backlog of business on their books, but current buying is light. Fabricators are bidding on a substantial tonnage of new construction, however, and increased buying is expected. Prices are unchanged at 1.95c. to 2.05c., f.o.b. nearest mill to consumer, or 2.01c. to 2.11c. delivered Philadelphia.

Plates.—Fabricators of tanks and railroad cars have provided a substantial part of the tonnage on mill books at present, and shipbuilding promises to contribute some heavy contracts before the end of the year. In the past week the New York Ship Building Corporation, Camden, N. J., has placed about 15,000 tons of plates and 3000 tons of shapes for two ships. Operating rates of mills are slightly reduced, but still are from 80 to 90 per cent of capacity. The quotation is unchanged at 2.05c.,

Coatesville, Pa., or 2.15c., delivered Philadelphia.

Old Material.—With the exception of recent purchases totaling about 40,000 tons of No. 1 heavy melting steel by the leading eastern Pennsylvania consumer in the past two weeks, the market has been unusually quiet. No. 2 heavy melting steel is being shipped to Harrisburg, Phoenixville, Conshohocken and Bethlehem, Pa., but consumers of No. 1 steel at Coatesville, Pa., and Claymont, Del., have sizable stocks on their yards. Heavy breakable cast continues quiet, and consumers are not inclined to pay more than $14.50 a ton, delivered, although some brokers are paying up to $14.50 a ton to fill old orders.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel.	$16.50
Scrap T rails	16.00
No. 2 heavy melting steel.	12.50 to 14.50
No. 1 railroad wrought	16.00 to 16.50
Bundled sheets (for steel works)	11.50
Hydraulic compressed, new	14.50 to 15.00
Hydraulic compressed, old.	12.00 to 12.50
Machine shop turnings (for steel works)	12.00
Heavy axle turnings (or equiv.)	14.00 to 14.50
Cast borings (for steel works and roll. mill)	11.00 to 11.75
Heavy breakable cast (for steel works)	14.50 to 15.00
Railroad grate bars	12.00 to 12.50
Stove plate (for steel works)	12.00 to 12.50
No. 1 low phos., hvy., 0.04% and under	22.00 to 23.00
Couplers and knuckles	19.50 to 20.50
Rolled steel wheels	19.50 to 20.50
No. 1 blast f'nace scrap	10.50 to 11.00
Wrot. iron and soft steel pipes and tubes (new specific.)	15.00
Shafting	19.00 to 20.00
Steel axles	23.00 to 23.50
No. 1 forge fire	14.00
Cast iron carwheels	16.50 to 17.00
No. 1 cast	16.50 to 17.00
Cast borings (for chem. plant)	14.50
Steel rails for rolling	16.50 to 17.00

Sheets.—Automobile body builders in this district are operating better than for some weeks, but not much change is apparent in radio production, which is off slightly with the exception of one plant. Blue annealed sheets, No. 13 gage, are quoted at 2.25c. to 2.35c., Pittsburgh, or 2.57c. to 2.67c., delivered Philadelphia, and light plates, blue annealed, are 2.10c. to 2.20c., Pittsburgh, or 2.42c. to 2.52c., delivered Philadelphia, the lower quotation usually applying when competition is encountered from continuous sheets. A recent purchase of upward of 800 tons of blue annealed sheets by a railroad was on a basis of 2.20c., f.o.b. mill for No. 10 gage. Black sheet prices are fairly stable at 2.85c., Pittsburgh, or 3.17c., delivered Philadelphia, but galvanized sheet prices range from 3.50c. to 3.60c., Pittsburgh, or 3.82c. to 3.92c., delivered Philadelphia.

Imports.—In the week ended Sept. 14, 1020 tons of pig iron arrived at this port, of which 600 tons was from the United Kingdom and 420 tons from Norway. Iron ore imports consisted of 5370 tons from Algeria and 492 tons from Spain. Steel arrivals were 138 tons of steel bars from Germany, 4 tons of structural shapes from the United Kingdom, 5 tons of iron bars from Sweden and 15 tons of steel scrap from the United Kingdom. A shipment of 25 tons of ferrochrome was received from Switzerland.

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.70c.
Plates, ⅜-in.	2.90c.
Structural shapes	2.70c.
Soft steel bars, small shapes, iron bars (except bands)	2.80c.
Round-edge iron	3.50c.
Round-edge steel, iron finished 1½ x 1½ in.	3.50c.
Round-edge steel planished	4.30c.
Reinforc. steel bars, sq. twisted and deform. 2.60c. to	2.80c.
Cold-fin. steel, rounds and hex.	3.60c.
Cold-fin. steel, sq. and flats	4.10c.
Steel hoops	3.55c.
Steel bands, No. 12 to ⅜-in. inclus.	3.30c.
Spring steel	5.00c.
*Black sheets (No. 24)	4.10c.
†Galvanized sheets (No. 24)	4.85c.
Light plates, blue annealed (No. 10)	3.25c.
Blue ann'l'd sheets (No. 13)	3.40c.
Diam. pat. floor plates—	
¼-in.	5.30c.
⅜-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

*For 50 bundles or more: 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.
†For 50 bundles or more: 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

Labor Turnover Now On a Monthly Basis

About a month ago the United States Bureau of Labor Statistics took over from the Metropolitan Life Insurance Co., New York, the task of collecting and publishing each month rates of labor turnover. The figures are being put out now on the monthly basis, in addition to the equivalent annual basis which heretofore has prevailed.

Expressed as a percentage of the number of employees on the payroll, the net turnover rate in July is given as 3.8, which is the lowest since last February. It compares with 4.2 in June and with a maximum in the past 20 months of 4.6 in April. The latest figure, however, is higher than any of 1928 with the exception of September, comparing with 3.2 in July and with an average of 3.1 through the whole year.

The accession rate is given as 5.2 in July, the highest since April and comparing with 5.0 in June and with 4.0 in July, 1928. Except for April no month of the last 20 shows a higher accession rate than that for July.

Turnover rate is defined by the bureau as the rate necessary to keep the plant going, on the volume of business it has at any moment. A growing plant, or one in which the business is growing at any moment, has an accession rate higher than the separation rate. A plant in which business is declining has a separation rate greater than the accession rate. Consequently, the net turnover rate with the force increasing is the same as the separation rate; with a declining force it is the same as the accession rate.

For the past 20 months, over which the current figures are shown, the accession rates have been consistently month by month higher than the separation rates, indicating that there has been a steady increment in employment. These figures are from more than 300 factories with more than 600,000 employees.

High Record in Fabricated Steel Orders

WASHINGTON, Sept. 17.—Fabricated structural steel orders in August totaled 289,326 net tons, according to reports received by the Department of Commerce from 195 firms with a capacity of 306,005 tons, bookings representing 90 per cent of their capacity. Computed bookings were 365,750 tons, while computed shipments were 338,800 tons, or 88 per cent of capacity.

August orders reported were the highest since March of the present year, when producers reported bookings of 296,343 tons. Computed tonnages booked and shipped in August were both the highest on record, but the fact that only 195 concerns reported left a large capacity for computing bookings and shipments of firms from which no reports were received.

July bookings of 288,801 tons were reported by 223 firms and represented 91 per cent of their capacity of 316,095 tons. Computed bookings for July were 350,350 tons and computed shipments were 304,150 tons, or 79 per cent of capacity. The greatest number of reporting firms for the current year was in February, with a total of 236, or 41 more than the number reporting for August.

Next to August the highest computed bookings total was 358,050 tons for March, while the next highest computed shipments were in May, with a total of 311,850 tons.

Computed bookings for the first eight months of the current year totaled 2,637,258 tons, against 2,221,450 tons for the corresponding period of last year, while computed shipments were 2,344,658 tons, compared with 1,978,900 tons.

Automobile stocks continue to be a major problem with manufacturers, says *Automotive Industries*. Dealer passenger stocks showed a sharp increase from August, 1928, to August, 1929. In the face of this and considering the fact that low-priced automobile manufacturers, notably Ford and Chevrolet, have indicated continued heavy production, sharp curtailment can be expected in the industry, unless the estimate of 5,500,000 units for the year is exceeded. Thus far September production has held up, according to factory executives. The totals are slightly higher than those for the first two weeks of last month, it is reported from Detroit. Therefore, any recession of production would become effective soon unless it were to take the form of a complete shut-down in several factories.

Pacific Coast

Heavy Plate Bookings Include 10,000 Tons for Everett, Wash., Pipe Line—Price Situation Steady

SAN FRANCISCO, Sept. 14.—(*By Air Mail.*)—Some improvement was noticeable in the demand for iron and steel products on the Pacific Coast during the past week, the plate and structural shape markets having been the most active. Plate bookings, at more than 12,000 tons, were the heaviest of any week so far this year and included 10,000 tons which the Steel Tank & Pipe Co. of Oregon will furnish for a pipe line at Everett, Wash. Movement of cast iron pipe and reinforcing steel bar tonnages was confined to lots under 100 tons. Prices continue on a fairly even basis, with little or no shading.

Considerable interest was shown in the opening of the new bolt, nut and rivet plant of the Pacific Coast Steel Co. at South San Francisco on Sept. 12. More than 1000 steel mill representatives, manufacturers and buyers attended the opening ceremonies and luncheon served in one of the bays of the new building. The plant has a capacity of 1200 tons a month.

Pig Iron.—Demand for foundry pig iron has shown little signs of improvement during the past few weeks, sales and inquiries continuing to involve unimportant tonnages. Prices are unchanged.

Prices per gross ton at San Francisco:

*Utah basic	$25.00 to $26.00
*Utah fdy., sil. 2.75 to 3.25	25.00 to 26.00
**Indian fdy., sil. 2.75 to 3.25	25.00 to 26.00

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Bars.—Reinforcing steel bar awards were confined to lots of less than 100 tons. Out-of-stock distributers in the San Francisco district report few important projects pending and say that the week's business was the poorest for any week so far this year. Bids were opened on 127 tons for the west approach of the St. John's River bridge at Portland and on 285 tons for highway work in Sonoma County, Cal. Prices appear to be firm at 2.30c., base, on carload lots and 2.60c. on smaller tonnages in the San Francisco district, with $2 a ton higher prevailing in the Los Angeles section. Merchant bar steel is quoted at 2.35c., c.i.f., and demand continues to call for small lots composed of numerous sizes.

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and struc. shapes	3.15c.
Soft steel bars	3.15c.
Small angles, ⅞-in. and over	3.15c.
Small angles, under ⅞-in.	3.55c.
Small channels and tees, ¾-in. to 2¾-in.	3.75c.
Spring steel, ¼-in. and thicker	5.00c.
Black sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.80c.
Galv. sheets (No. 24)	5.30c.
Struct. rivets, ½-in. and larger	5.65c.
Com. wire nails, base per keg	$3.40
Cement c'td' nails, 100 lb. keg	3.40

Plates.—Several important pipe line tonnages were placed during the week. The Steel Tank & Pipe Co. took 10,000 tons of plates for the Everett, Wash., pipe line, 2200 tons of 36 and 48-in. pipe for Spokane, Wash., and 330 tons for two 30-in. siphons at Manson, Wash. The Willamette Iron & Steel Works secured 200 tons for gates for the Mount Diablo dam, Seattle. Pending business includes 360 tons of 18-in. welded steel pipe for Montecito, Cal., bids on which have been opened. Prices are firm at 2.35c., c.i.f.

Shapes.—More than 2000 tons of structural shapes were let this week. The largest award called for 400 tons for the West Garfield Street bridge, Seattle, and went to the Pacific Car & Foundry Co. The Consolidated Steel Corporation took 350 tons for a grandstand at Agua Caliente, the United States Steel Products Co. booked 120 tons for a bridge over the San Lucas River, Salinas, Cal., and the Judson-Pacific Co. took 325 tons for a warehouse for the American Can Co. and 150 tons for an apartment house on Sacramento Street, both in San Francisco. Bids have been opened on 335 tons for the west approach of the St. John's River bridge, Portland, and on 136 tons for a grandstand at Riverside, Cal. Bids were also opened on 738 tons for a bridge over the Shasta River near Yreka, Cal. Plain shapes remain firm at 2.35c., c.i.f.

Cast Iron Pipe.—Demand for cast iron pipe is unusually quiet, and tonnages placed this week were confined to lots of less than 100 tons. Only a few small awards were reported. Pending business involves less than 1500 tons. Anaheim, Cal., will place 377 tons of 6 to 10-in. Class B pipe next week. No new inquiries of importance came up for figures this week.

Track Material.—The United States Steel Products Co. took 550 tons of girder rails, 450 tons involving 105-lb. rail, 21,000 tie plates, 13,000 brace tie plates, 30 kegs of track bolts, 130 kegs of track spikes and 82 special layouts for the municipal railroad, San Francisco. It was also low bidder on 40 tons of 128-lb. girder rails and other specialties for the Port Commission, Oakland.

Birmingham

Southern Pig Iron Buying Gains—Another Blast Furnace Goes Out—Steel Backlogs Still Large

BIRMINGHAM, Sept. 17.—Sales of pig iron to district consumers are at an undiminished rate. Apparently confident that the volume of business will hold up for the remainder of the year, some of the larger consumers are covering their entire fourth quarter requirements. A feature of the market last week was a notable increase in requisitions followed closely by urgent tracers. With increased foundry melt in prospect and with the blowing out of another furnace, the market is in a stronger position as regards prices, though there has been no intimation of price advances. Sales to outside points have slumped considerably in the past few days, possibly because of higher prices quoted. The district price for No. 2 foundry remains at $14.50. Concessions from this price on Eastern and Middle West sales are less than they were 10 days ago. Shipments are at the highest point of the year. The No. 4 North Birmingham furnace of the Sloss-Sheffield Steel & Iron Co. has been blown out, leaving a total of 13 active furnaces. Of this number, eight are on foundry and five on basic iron.

Prices per gross ton, f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil.	$14.50
No. 1 fdy., 2.25 to 2.75 sil.	15.00
Basic	14.50

Finished Steel.—Indications are that there will be no material decrease in new business in plates, bars, structural shapes and sheets before the arrival of the fall buying period. Backlogs in these lines have been well maintained during the past few weeks. There has been no further reduction in operations since the rail mill at Ensley was shut down about the middle of August. Orders on books are sufficient for three to four weeks' operations. Wire product demand is improving. Structural steel fabricating shops are working off backlogs. The majority of the plants report both demand and new business at the low point of the year so far. The Virginia Bridge & Iron Co. has booked 400 tons for airplane hangars in Brazil and 200 tons for a hangar at Atlanta, Ga. Reinforcing bar demand has declined since August and can hardly be considered up to normal. All finished steel prices are the same. Seventeen open-hearths are active, the same as last week.

Cast Iron Pipe.—Pressure pipe plants continue to work off backlogs as new business falls short of output. Operations at individual plants vary from 65 to 80 per cent of capacity. The bulk of new business in the past week was in small lots, occasionally supplemented by fair-sized tonnages from the West and Middle West. Several municipalities in the Southern territory that have construction programs prepared are still holding off because of an unsatisfactory market for their bonds. Nashville, Tenn., is taking bids this week for 3400 ft. of 6-in. pipe. About the same amount is to be bought a little later. Other

projects to be awarded this week include 11,600 ft. of 4-in. and 3700 ft. of 6-in. pipe for St. Joseph, La., and 3700 ft. of 6 and 8-in. pipe for Brooklet, Ga. Prices remain steady at $37 to $38 a net ton, base Birmingham.

Coke.—The movement of foundry coke is better than the August average. Prospects are reported brighter for further increase in demand. Prices remain at $5 a net ton, Birmingham.

Old Material.—One of the larger users of steel scrap has withdrawn from the market on account of reduced open-hearth operations. Purchases by other users of steel grades are in undiminished volume. Cast iron grades improved slightly during the past week. Prices are unchanged.

Prices per gross ton, deliv'd Birmingham dist. consumers' yards:

Heavy melting steel	$13.00 to $13.50
Scrap steel rails	14.00
Short shoveling turnings	9.00
Cast iron borings	9.00
Stove plate	11.50 to 12.00
Steel axles	21.00
Iron axles	23.00
No. 1 railroad wrought	10.00 to 10.50
Rails for rolling	15.50
No. 1 cast	13.50
Tramcar wheels	13.50
Cast iron carwheels	13.00 to 13.50
Cast iron borings, chem	13.50 to 14.00

Cincinnati

Southern Pig Iron Firmer But Sales Decline—Sheet Steel Sales Gain—Scrap Weaker

CINCINNATI, Sept. 17.—With district consumers of pig iron well covered for the remainder of this quarter and reluctant to close for the fourth quarter, sales of pig iron declined last week. The total amount placed was about 8800 tons, of which 1800 tons was Southern iron in 100 and 200-ton lots. Increased firmness in Southern iron is reflected in reports that all Southern furnaces except one are now quoting $14.50, base Birmingham, in this district and the lowest price at which this iron is obtainable here is $13.50. Although part of the business last week went at $13.50 and $14, selling agents are without authority to quote less than formal schedules, but concessions of about 50c. on tonnage orders are likely. The largest order during the week was from a central Ohio consumer, which took 2500 tons of Northern foundry iron for fourth quarter at a price which figures back to $18.50, base Lake furnace. A Cincinnati buyer bought 750 tons of Northern foundry iron and two Southern Indiana consumers each took 600 tons of the same grade. A Dayton, Ohio, consumer is inquiring for 350 tons of Northern foundry iron, and the Louisville & Nashville Railroad is in the market for 351 tons, of which 25 tons is charcoal iron.

Prices per gross ton, deliv'd Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25	$19.89 to $20.39
Ala. fdy., sil. 1.75 to 2.25	17.19 to 18.19
Ala. fdy., sil. 2.25 to 2.75	17.69 to 18.69
Tenn. fdy., sil. 1.75 to 2.25	17.19 to 18.19
S'th'n Ohio silvery, 8 per cent	26.89

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

Finished Material. — Continued liberal specifications from users of sheets brought new tonnage of district sheet mills well ahead of output during the last week, adding to backlogs. This demand, however, is due in a large degree to the desire of consumers to assure a steady supply of material, and, accordingly, they are specifying in larger quantities in anticipation of their needs for 40 to 90 days. The situation on galvanized sheets in the Southern market is reported to have become somewhat steadier and more in line with the continued adherence to price schedules in other lines. Wire products and wire nails, however, are still weak and sluggish, because of uncertainty of prices. Nails are reported to be obtainable at substantial price concessions.

Coke. — Shipments of by-product foundry coke are going forward at fair rate, although specifications are slightly under the August level. Beehive coke also is showing some activity, one oven representative reporting that 32 spot carloads were shipped last week. The Louisville & Nashville Railroad is in the market for 470 tons of foundry coke for fourth quarter.

Old Material.—Continued reluctance of the mills to take scrap at increased prices has forced dealers' schedules down for the first time in three months. Dealers, however, are still bidding strongly for heavy melting steel, cast iron borings, machine shop turnings and No. 2 wrought, but are offering 25c. a ton less than a week ago. It is reported that recent railroad lists brought prices equal to those paid a month ago, and in a few instances dealers are said to have paid higher prices. Accordingly, with good scrap none too plentiful, it is the opinion in the trade that the present softness of the market is only temporary.

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel	$14.00 to $14.50
Scrap rails for melting	14.25 to 14.75
Loose sheet clippings	9.00 to 9.50
Bundled sheets	11.00 to 11.50
Cast iron borings	9.00 to 9.50
Machine shop turnings	8.25 to 8.50
No. 1 busheling	10.50 to 11.00
No. 2 busheling	7.00 to 7.50
Rails for rolling	14.50 to 15.00
No. 1 locomotive tires	14.25 to 14.75
No. 2 railroad wrought	14.00 to 14.50
Short rails	18.50 to 19.00
Cast iron carwheels	12.75 to 13.25
No. 1 machinery cast	19.00 to 19.50
No. 1 railroad cast	15.25 to 15.75
Burnt cast	10.25 to 10.75
Stove plate	10.25 to 10.75
Brake shoes	10.25 to 10.75
Agricultural malleable	14.25 to 14.75
Railroad malleable	15.25 to 15.75

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and struc. shapes	3.40c.
Bars, soft steel or iron	3.30c.
New billet reinforc. bars	3.15c.
Rail steel reinforc. bars	3.00c.
Hoops	4.05c.
Bands	3.50c.
Cold-fin. rounds and hex	3.85c.
Squares	4.35c.
Black sheets (No. 24)	4.05c.
Galvanized sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.45c.
Structural rivets	3.85c.
Small rivets	65 per cent off list
No. 9 ann'l'd wire, per 100 lb.	$3.00
Com. wire nails, base per keg	2.85
Cement c't'd nails, base 100 lb. keg	2.85
Chain, per 100 lb.	3.75
	Net per 100 Ft.
Lap-weld steel boiler tubes, 2-in.	$16.00
4-in.	33.00
Seamless steel boiler tubes, 2-in.	17.00
4-in.	34.00

Canada

Pig Iron Buying for Last Quarter Begins

TORONTO, ONT., Sept. 17.—Canadian blast furnace representatives have opened books for pig iron for last quarter delivery. Forward buying has become fairly active and a number of contracts have been closed. About 5000 tons is pending for early closing. Sales in the past week for spot delivery were upward of 2000 tons. Prices are unchanged.

Prices per gross ton:

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75	$24.60
No. 2 fdy., sil. 1.75 to 2.25	24.10
Malleable	24.60
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75	$26.00
No. 2 fdy., sil. 1.75 to 2.25	25.50
Malleable	26.00
Basic	24.50
Imported Iron, Montreal Warehouse	
Summerlee	$33.50
Carron	33.00

Structural Steel.—A stronger demand has developed for building steel. Contracts placed during the week exceeded 10,000 tons, most of which was in orders for lots under 500 tons. Upward of 20,000 tons is pending for early closing and other large tonnages are in prospect.

Old Material.—Business in this market is developing on a larger scale. Orders run strongly to the iron grades, In steel scrap, the demand is most active in the Montreal market, where buying is reported for domestic consumption as well as for export. Prices are firm but unchanged.

Dealers' buying prices:

	Per Gross Ton	
	Toronto	Montreal
Heavy melting steel	$10.00	$8.50
Rails, scrap	11.00	9.00
No. 1 wrought	10.00	12.00
Machine shop turnings	7.50	5.00
Boiler plate	7.50	6.00
Heavy axle turnings	8.00	7.50
Cast borings	7.50	5.00
Steel borings	7.50	6.50
Wrought pipe	6.00	6.00
Steel axles	16.00	20.00
Axles, wrought iron	17.00	22.00
No. 1 machinery cast	....	17.00
Stove plate	....	13.00
Standard carwheels	....	16.00
Malleable	....	13.00
	Per Net Ton	
No. 1 mach'ry cast	$16.00	....
Stove plate	12.00	....
Standard carwheels	15.00	....
Malleable scrap	14.00	....

St. Louis

Southern Pig Iron Sales in District Totalled 125,000 Tons —Scrap Prices Decline

ST. LOUIS, Sept. 17.—The heavy buying movement in Southern pig iron, which began about 30 days ago and which resulted in the sale of more than 125,000 tons to melters in this district, according to trade estimates, is said to have subsided. Because of the placing of this large tonnage, it is not expected that there will be much buying during the remainder of the year. The three leading pig iron producers in the South are now regarded as being well booked, and the market is firmer. The drive of Southern makers was to find an outlet for their surplus iron, and prices naturally have varied, ranging from $12.50 to $13.50. Included in the Southern sales was a good tonnage of basic, some new users being developed as a result of the campaign. One of the Southern makers, Republic Iron & Steel Co., is now out of the market. Sales of the St. Louis Gas & Coke Corporation in the past week totaled about 1800 tons, of which 400 tons was malleable. A St. Louis jobbing foundry took 500 tons, a Diesel engine builder took 270 tons, a jobbing foundry in Kansas and an Alabama pipe foundry bought 100 tons each, all foundry. All sales, excepting a few spot carloads, were for shipment over the remainder of the year.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill.	$19.50 to $20.00
Malleable, f.o.b. Granite City	20.00
N'th'n No. 2 fdy., deliv'd St. Louis	22.16
Southern No. 2 fdy., deliv'd	16.92 to 18.92
Northern malleable, deliv'd	22.16
Northern basic, deliv'd	22.16

Freight rates: 75c. (average) Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

Finished Iron and Steel.—Railroads centering in St. Louis have issued requests for prices on fourth quarter requirements of plates, shapes, bars and sheets, with no quantities specified. Both new business and specifications in the items named are light. Structural business is light.

Old Material.—The market for steel works scrap is weaker because of large purchases of basic iron to replace scrap, heavier movement of material to this market from the railroads and country dealers and smaller buying by mills. An improvement is expected within the next 30 days. No. 1 heavy melting is down 25c. a ton and No. 2 grade is off 50c. Railroad lists include: Chesapeake & Ohio, 7481 tons; Louisville & Nashville, 3075 tons; Missouri-Kansas-Texas, 1500 tons; Chicago, Indianapolis & Louisville, 1125 tons; Chicago & Alton, 1200 tons; Chicago, Rock Island & Pacific, 100 tons; Great Northern, 65 carloads; Nickel Plate, 54 carloads.

Dealers' buying prices per gross ton, f.o.b. St. Louis district:

No. 1 heavy melting or shoveling steel	$14.25 to $14.75
No. 2 heavy melting or shoveling steel	13.50 to 14.00
No. 1 locomotive tires	15.50 to 16.00
Miscel. stand-sec. rails including frogs, switches and guards, cut apart	16.75 to 17.25
Railroad springs	19.00 to 19.50
Bundled sheets	10.50 to 11.00
No. 2 railroad wrought	14.25 to 14.75
No. 1 busheling	10.00 to 10.50
Cast iron borings and shoveling turnings	9.50 to 10.00
Iron rails	13.00 to 13.50
Rails for rolling	17.00 to 17.50
Machine shop turnings	7.50 to 8.00
Heavy turnings	10.00 to 10.50
Steel car axles	19.50 to 20.00
Iron car axles	26.50 to 27.00
Wrot. iron bars and trans.	21.50 to 22.00
No. 1 railroad wrought	13.75 to 14.25
Steel rails, less than 3 ft.	18.00 to 18.50
Steel angle bars	15.25 to 15.75
Cast iron carwheels	15.00 to 15.50
No. 1 machinery cast	15.25 to 15.75
Railroad malleable	16.00 to 16.50
No. 1 railroad cast	14.75 to 15.25
Stove plate	13.00 to 13.50
Agricult. malleable	15.25 to 15.75
Relay. rails, 60 lb. and under	20.50 to 23.50
Relay. rails, 70 lb. and over	26.50 to 29.00

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-fin. rounds, shaftings, screw stock	3.75c.
Black sheets (No. 24)	4.25c.
Galv. sheets (No. 24)	5.10c.
Blue ann'l'd sheets (No. 10)	3.45c.
Black corrug. sheets (No. 24)	4.30c.
Galv. corrug. sheets	5.15c.
Structural rivets	3.95c.
Boiler rivets	3.95c.
	Per Cent Off List
Tank rivets, 7/8-in. and smaller, 100 lb. or more	65
Less than 100 lb	60
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-pressed nuts, sq., blank or tapped, 200 lb. or more	60
Less than 200 lb	50
Hot-pressed nuts, hex., blank or tapped, 200 lb. or more	60
Less than 200 lb	50

Youngstown

Demand for Sheets and Pipe Sustains Operations in Valley District at 85 to 90 Per Cent

YOUNGSTOWN, Sept. 17.—Definite indications of the trend of steel demand in this district during the last quarter are still lacking, but Valley steel makers are firm in the opinion that improvement in both new orders and specifications may be expected in the next 30 days. With fourth quarter contract buying imminent, considerable expansion of order books is practically certain, but it is not yet known whether this expansion will be as large as usual, or whether large steel consumers will immediately issue rolling authorizations in greater volume than they have in the last month.

No price changes are being made for the next quarter, so steel users have no price incentive for specifying beyond their immediate needs. They may even go so far as to defer the placing of fourth quarter contracts, as considerable steel is still owed them on present contracts in some cases.

Operations in the Valley district average from 85 to 90 per cent and are being sustained principally by the large demands upon the sheet and pipe mills. Sheet mills are still operating at above 90 per cent, and backlogs of some large makers insure the continuance of this rate for another month. Others will have to curtail sharply by Oct. 1, unless specifications increase. Pipe units are at the best rate of the year and makers are optimistic for the remainder of the period. Tin plate production has dropped to 75 per cent and will go lower before fall buying develops. Bar mills have also curtailed sharply, the operations of the Steel Corporation units alone keeping up the general average for the district.

The Youngstown area can expect little benefit from developing rail and rail equipment purchases, and, aside from large local consumers of its principal products, must look to the automobile industry as the principal outlet for its surplus steel.

In placing its October requirements, this industry has given Valley mills little encouragement. The Ford Motor Co. will require less steel than it took in September on account of its decline from a six-day to a five-day week operation, and other large users of Youngstown steel in the Michigan district are releasing specifications slowly. At no time in the recent past has the automobile industry conformed its steel buying so closely to the probable market for cars. This year, however, the heavy automobile production during the first eight months has focused attention sharply on the possible limits of car purchasing.

Prices of both finished and semi-finished steel seem to be holding in this district. In fact, large producers direct attention to the price structure as the most favorable factor in a rather uncertain market. At least three large makers say that they will take no fourth quarter business on galvanized sheets at less than 3.60c., Pittsburgh, and intend to limit the number of jobbers to whom they will give the usual $2 preferential. Third quarter prices on black, blue annealed and automobile body sheets will be continued, and considerable fourth quarter tonnage has been placed at those figures. However, the bulk of such business is yet to come to mill order books. Strip prices apparently are holding at 2.75c. to 2.85c., Pittsburgh, for cold-rolled and 1.90c. and 2c. on hot-rolled. Production has been sharply cut down, however, and this is

pointed out as an evidence of price strength. Some makers presumably would rather close down a mill for a week or even longer rather than take business at concessions. In the case of hot-rolled strip such a policy is declared to be justified on account of the narrow margin of profit possible.

On billets, slabs and sheet bars, makers are quoting $35, Youngstown, on fourth quarter business. The price has not been adequately tested except in the case of sheet bars. Fourth quarter pig iron buying is not yet in evidence, although a few fair-sized inquiries have appeared. Prices will be unchanged at $18.50, Valley, for foundry and basic, and $19 for malleable and Bessemer. Furnaces in this district have been too well supplied with orders this summer to feel the competition of the Pittsburgh merchant furnace, but have recently had to shade their prices 50c. or more a ton to take business in the Pittsburgh district. Such shading has not affected the price on iron going to points where Pittsburgh furnace competition is not met.

The scrap market has softened in the last week, but not as decidedly as has been the case in Pittsburgh, where the competition between dealers has had an unusually depressing effect.

Boston

Pig Iron Prices Firmer—Scrap Market Unsettled as Demands From Steel Mills Fall Off

BOSTON, Sept. 17.—Buffalo iron at $17 a ton, base furnace, has disappeared from this market. Attractive tonnages of No. 2X Buffalo iron can be purchased at $18 a ton, and No. 1X at $18.50, but on the general run of current bookings $18.50 and $19 respectively are being obtained. The firmer Buffalo prices are the result of smaller offerings of Buffalo and New York iron, and lessened competition from Southern iron due to an advance in prices for the latter. The Mystic Iron Works also is securing slightly higher prices for its product. The firmer prices, however, come at a time when little actual business is in view. The Sullivan Machinery Co., Claremont, N. H., is in the market for 400 tons of prompt shipment iron, the only open inquiry. Sales the past week did not run much above 3000 tons, mostly Mystic and Buffalo. The largest individual sale was 500 tons to a Connecticut foundry.

Foundry iron prices per gross ton deliv'd to most New England points:

†Buffalo, sil. 1.75 to 2.25	$21.78 to $22.28
†Buffalo, sil. 2.25 to 2.75	22.28 to 22.78
*Buffalo, sil. 1.75 to 2.25	21.91 to 22.91
*Buffalo, sil. 2.25 to 2.75	22.41 to 23.41
East. Penn., sil. 1.75 to 2.25	22.65 to 23.15
East. Penn., sil. 2.25 to 2.75	23.15 to 23.65
Va., sil. 1.75 to 2.25	25.21
Va., sil. 2.25 to 2.75	25.71
*Ala., sil. 1.75 to 2.25	24.11
*Ala., sil. 2.25 to 2.75	24.61
†Ala., sil. 1.75 to 2.25	20.25
†Ala., sil. 2.25 to 2.75	20.75

Freight rates: $4.91 all rail from Buffalo, and $4.28 rail and water; $3.65 all rail from eastern Pennsylvania; $5.21 all rail from Virginia; $9.61 all rail from Alabama and $5.75 rail and water from Alabama to New England seaboard.

*All rail rate.

†Rail and water rate.

Coke.—It is now safe to predict that consumption of foundry coke in New England in 1929 will run ahead of that of 1928, possibly by 15 per cent. Current shipments are in good volume. The price of by-product fuel remains at $11 a ton, delivered within a $3.10 freight rate zone. Production and shipments of domestic coke by New England manufacturers continues on an increasing scale.

Fabricated Steel.—The market is more active than appears on the surface. Most fabricators report prospects more encouraging than a week ago, with competition keener than ever. To illustrate this point a Providence, R. I., fabricator, rarely taking business in Massachusetts, will fabricate 30 tons for a Cambridge, Mass., job. Some fabricators are figuring on a large tonnage of steel on a pound cost basis, present negotiations involving more than 5000 tons, with prospects of large additional tonnages by early October. Boston is endeavoring to secure lower prices on its Congress Street bridge, but fabricators are holding to bids submitted.

Reinforcing Steel.—Business in billet steel bars is slow in closing, sales the past week totaling 300 tons in dribbling lots, at 2.66½c., a lb., base, from stock. Several attractive tonnages are pending. Not much life is shown in the rail steel bar market, but there has been less shading of the open price, 2.26½c. a lb., base, delivered common Boston freight rate points.

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars, small shapes	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway rounds	6.60c.
Norway squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tie steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold-rolled steel—	
Rounds and hex	*3.55c. to 5.55c.
Squares and flats	*4.05c. to 7.05c.
Toe calk steel	6.00c.
Rivets, structural or boiler	4.50c.
	Per Cent Off List
Machine bolts	50 and 5
Carriage bolts	50 and 5
Lag screws	50 and 5
Hot-pressed nuts	50 and 5
Cold-punched nuts	50 and 5
Stove bolts	70 and 10

*Including quantity differentials.

Old Material.—The scrap market is decidedly unsettled owing to weakness of prices in the Pittsburgh district and to the holding up of shipments by steel mills. Demand for No. 1 heavy melting steel is practically flat, a condition not existing in months. A few lots of steel turnings were bought on old contracts the past week at $7.50 a ton, on cars shipping point, but on new business $6.60 is the best price obtainable. There is some demand for pipe, but a limited supply, and prices are relatively firmer than for most other kinds of scrap. The Boston & Maine Railroad on Sept. 13 closed bids on approximately 80 cars of miscellaneous material. Prices obtained were lower than realized at the company's August sale. New England consumption of machinery cast holds up well and prices are steady. The German steamer Cronshagen has been chartered to load 4500 tons of scrap here for Danzig delivery, the rate being $6 a ton.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$11.75 to $12.25
Scrap T rails	11.00 to 11.25
Scrap girder rails	10.00 to 11.00
No. 1 railroad wrought	11.00 to 11.50
No. 1 yard wrought	9.00 to 9.50
Machine shop turnings	6.60 to 7.50
Cast iron borings (steel works and rolling mill)	6.50 to 6.75
Bundled skeleton, long	10.00 to 10.25
Forge flashings	10.00 to 10.50
Blast furnace borings and turnings	6.00 to 6.25
Forge scrap	9.00 to 9.50
Shafting	14.00 to 14.50
Steel car axles	17.50 to 18.00
Wrought pipe 1 in. in diameter (over 2 ft. long)	9.75 to 10.00
Rails for rolling	12.00 to 12.50
Cast iron borings, chemical	9.75 to 10.00

Prices per gross ton deliv'd consumers' yards:

Textile cast	$14.00 to $14.50
No. 1 machinery cast	15.00 to 15.50
No. 2 machinery cast	13.00 to 13.25
Stove plate	11.00 to 11.50
Railroad malleable	18.00 to 18.50

Heavy Melting Steel Scrap Off 25c. at Detroit

DETROIT, Sept. 17.—Heavy melting and shoveling steel have declined 25c. a ton. There have been very few sales involving tonnage. Prices generally are on the low side of the quoted range.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Hvy. melting and shov. steel	$14.00 to $14.50
Borings and short turnings	9.00 to 9.50
Long turnings	8.50 to 9.00
No. 1 machinery cast	12.50 to 13.00
Automobile cast	13.00 to 13.50
Hydraul. comp. sheets	14.00 to 14.50
Stove plate	9.00 to 9.50
New No. 1 busheling	12.50 to 13.00
Old No. 1 busheling	11.00 to 11.50
Sheet clippings	8.75 to 9.25
Flashings	13.00 to 13.50

Big Rivet Job

It was estimated that the Merchandise Mart now under construction at Chicago, would require some 50,000 tons of structural steel. The latest information is that it will reach 58,000 tons, not including reinforcing steel and the ornamental iron part of the contract. There are on an average 12 rivets to a ton for this particular type of building, or 700,000 rivets all told.

Buffalo

Pig Iron Sales Upward of 12,000 Tons—8000 Tons of Structural Steel Awarded for City Hall

BUFFALO, Sept. 17.—Between 12,000 and 15,000 tons of pig iron was sold by Buffalo furnaces during the past week. It is now believed that most of the large buyers are covered for the remainder of the year except for emergency requirements. Included in the aggregate tonnage sold were several lots of 200 tons of foundry and malleable, several of 500 tons, one of 1200 tons and one of 1800 tons. An eastern purchaser bought 2500 tons of foundry and malleable, about half of each. The Ingersoll-Rand Co. is understood to have bought 700 tons of malleable. The Baldwin Locomotive Co. has an inquiry pending for 1500 tons of malleable. Most of the past week's business was taken on an $18 Buffalo, base, all-rail delivery. In some cases differentials were waived. Nothing under $19.50, Buffalo, has been taken for district delivery, it is stated, and the Buffalo price in the East has now strengthened to the point where $18.50 is being more freely quoted than $18.

Prices per gross ton, f.o.b. furnace:

No. 2 fdy., sil. 1.75 to 2.25	$19.50
No. 2X fdy., sil. 2.25 to 2.75	20.00
No. 1 fdy., sil. 2.75 to 3.25	21.00
Malleable, sil. up to 2.25	20.00
Basic	18.50
Lake Superior charcoal	27.28

Finished Iron and Steel.—The most important development in the fabricated structural field in the last week was the awarding of 8000 tons for the New City Hall of Buffalo to the McClintic-Marshall Co. Several other smaller fabricated structural lots were closed, all less than 100 tons. The reinforcing bar market has been brisk, with one lot of 500 to 600 tons for the Buffalo General Electric Co. and some smaller lots placed. Operations of local mills continue at the same rate as recently, about 90 per cent average or better. Sheet business in particular is good.

Old Material.—A sale of a comparatively small tonnage of No. 1 heavy melting steel was made during the past week at a price reported to be $17.50 to $17.75, indicating a slight weakening in this commodity. Some sales of short rails were reported at $19.50, but there appears to have been very little other buying. Business from foundries has dropped off considerably. Three of the local blast furnace interests continue to take in blast furnace scrap on old orders, but there has been no new buying. There has been quite a reduction in the production of scrap, several of the automobile plants being on lower schedules than heretofore.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$17.50 to $17.75
No. 2 heavy melting steel	14.75 to 15.00
Scrap rails	16.50 to 17.00
Hydraul. comp. sheets	14.50 to 14.75
Hand bundled sheets	12.00 to 12.50
Drop forge flashings	14.25 to 14.50
No. 1 busheling	15.50 to 16.50
Hvy. steel axle turnings	14.00 to 14.50
Machine shop turnings	9.00 to 9.50
No. 1 railroad wrought	13.00 to 13.50
Acid Open-Hearth Grades:	
Knuckles and couplers	19.50 to 19.75
Coil and leaf springs	19.00 to 19.50
Rolled steel wheels	19.00 to 19.50
Low phos. billet and bloom ends	20.00 to 20.50
Electric Furnace Grades:	
Short shov. steel turnings	12.50 to 13.00
Blast Furnace Grades:	
Short mixed borings and turnings	11.50 to 12.25
Cast iron borings	11.50 to 12.25
No. 2 busheling	10.00 to 10.50
Rolling Mill Grades:	
Steel car axles	18.75 to 19.25
Iron axles	21.00 to 22.00
Cupola Grades:	
No. 1 machinery cast	16.00 to 17.00
Stove plate	13.00 to 13.50
Locomotive grate bars	12.50 to 13.00
Steel rails, 3 ft. and under	19.50 to 19.75
Cast iron carwheels	14.00 to 14.50
Malleable Grades:	
Industrial	18.00 to 18.50
Railroad	18.00 to 18.50
Agricultural	18.00 to 18.50
Special Grades:	
Chemical borings	12.50 to 13.50

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and struc. shapes	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.95c.
Cold-fin. flats, sq. and hex. Rounds	4.45c. 3.95c.
Cold-rolled strip steel	5.85c.
Black sheets (No. 24)	4.20c.
Galv. sheets (No. 24)	4.85c.
Blue ann'l'd sheets (No. 10)	3.50c.
Com. wire nails, base per keg	$3.60
Black wire, base per 100 lb	3.75

Railroad Equipment

Santa Fe To Buy 5754 Cars, Southern 2000 or More—Outlook Improved

WITH the announcement that the Atchison, Topeka & Santa Fe will buy 5754 freight cars and that the Chesapeake & Ohio will shortly come into the market for a large number of cars, together with an inquiry from the Southern for 2000 cars and the possibility that double this number may be purchased, the outlook for railroad equipment buying over the remainder of the year is more promising.

Orders so far this year placed with car builders total about 61,700, including 1000 just placed by the Central of Georgia, but not including 1000 car bodies ordered a few days ago by the Norfolk & Western. In addition to orders placed with car builders, railroads have arranged this year for the building of 9000 cars in their own shops.

Deliveries of cars so far this year by car companies total about 10,000 above those completed during the same period of 1928.

Details of the week's business follow:

Atchison, Topeka & Santa Fe is asking for prices on 3500 box cars, 500 automobile cars, 500 refrigerator and 200 stock cars, 300 mill type gondola cars, 150 flat and 100 tank cars, 104 cabooses, 200 ballast and 200 gondola cars.

Akron & Barberton Belt Railway is in the market for three 6-wheel switching locomotives.

Chicago & North Western is in the market for 500 flat cars.

Chesapeake & Ohio is expected to come into the market shortly for a large number of cars.

Central of Georgia has ordered 500 gondola cars and 500 flat cars from Pullman Car & Mfg. Corporation to be built at the latter's new shop at Birmingham.

Norfolk & Western has ordered 1000 steel hopper car bodies from Virginia Bridge & Iron Co. Action has not yet been taken on the 2000 hopper cars for which this road is in the market.

Southern Railway has inquired for 1000 box cars and 1000 hopper cars, but may buy twice this number.

Dupont Co. is inquiring for 45 alcohol cars.

South African Railways are in the market for 150 50-ton freight cars.

Reinforcing Steel

Awards and Inquiries Are Unusually Light

OF the 2400 tons of reinforcing steel lettings in the past week, 500 tons will be required for an industrial plant at Buffalo. New jobs for which bids are being asked total less than 1000 tons. Four hundred tons will be used for a stadium at Notre Dame, Ind. Awards follow:

STATE OF NEW JERSEY, 300 tons, highway bridges, to Igoe Brothers.

PHILADELPHIA, 100 tons, school.

BUFFALO, 500 tons, Buffalo General Electric plant, to local producer.

CLEVELAND, 100 tons, Flora Mather House for Western University, to Bourne-Fuller Co.

FINDLAY, OHIO, 100 tons, Ohio Oil Co., to Bourne-Fuller Co.

CHICAGO, 350 tons, department store for A. E. Anderson, to Olney J. Dean & Co.

CHICAGO, 150 tons, factory for Oscar Wolff, to an unnamed bidder.

CHICAGO, 100 tons, garage on Crosby Street, to Calumet Steel Co.

CHICAGO, 275 tons, apartment building at 1530 North State Street, to Concrete Steel Co.

NILES CENTER, ILL., 100 tons, paving, to Concrete Steel Co.

HENRYETTA, OKLA., 105 tons, project for Rust Engineering Co., to Truscon Steel Co.

JUNEAU, ALASKA, 350 tons, post office, to Concrete Steel Co.

JUNEAU, ALASKA, 200 tons, United States territorial building, to Concrete Steel Co.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

NEW YORK CENTRAL RAILROAD, 150 tons, viaduct at 241st Street, New York.

BUFFALO, tonnage unstated, building for *Buffalo Courier Express*.

NOTRE DAME, IND., 400 tons, stadium for University of Notre Dame.

PORTLAND, ORE., 127 tons, west approach, St. John's River bridge; bids opened.

SACRAMENTO, CAL., 285 tons, paving work in Sonoma and Marin Counties; bids opened.

The number of electric hoists ordered in August dropped 13.3 per cent from the July number, but the value increased 6.2 per cent.

Non-Ferrous Metal Markets

Copper Quiet But Firm—Tin Inactive and Weak—Lead and Zinc Firm

NEW YORK, Sept. 17.

Copper.—Following the heavy sales of more than 100,000 tons to domestic consumers for the week ended Sept. 7, noted in this column a week ago, the market has turned quiet. Sales to domestic consumers the past week have been made practically every day in fair tonnages. Consumers are reported to be well covered into November and, as indications seem to point to a stabilized price of copper for some time to come, some are buying only what their needs justify. Foreign consumers are purchasing more liberally and sales have been in good volume almost every day. They are not covered far ahead and still have considerable to buy for September and October. After the impending prospect of higher prices a week ago which did not materialize, the market has continued at the steadfast price of 18c. for electrolytic copper, delivered in the Connecticut Valley. The quotation of Copper Exporters, Inc., is maintained at 18.30c., c.i.f. usual European points. In accordance with the expectations of some well-posted on conditions, the statistics for August showed an increase in copper above ground of about 9000 tons; of this 7000 tons was refined metal and 2000 tons was blister copper. Output at the mines changed very little in August from July. Lake copper is also strong and steady at 18c. to 18.12½c., delivered.

Tin.—Conditions noted a week ago continue. Dullness is pronounced and business is at a standstill. Something less than 500 tons of spot Straits tin was sold during the week ended Sept. 14. The only metal being sold is for spot delivery, prices for which have hardly varied during the last week. Yesterday and today there has been no activity and spot Straits tin is quoted very weak at 45c., New York. Prices at London are a little higher this week than last, with spot standard quoted at £205 7s. 6d., future standard at £209 5s. and spot Straits at £209 7s. 6d. The Singapore market today was £214 7s.

Lead.—After the heavy buying of two weeks ago the market has been quiet, but demand has been fairly good. Purchasing has not extended beyond October, although there is some inquiry for November. Prices are very firm at 6.70c., St. Louis. The

THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY

	Sept. 17	Sept. 16	Sept. 14	Sept. 13	Sept. 12	Sept. 11
Lake copper, New York	18.12½	18.12½	18.12½	18.12½	18.12½	18.12½
Electrolytic copper, N. Y.*	17.75	17.75	17.75	17.75	17.75	17.75
Straits tin, spot, N. Y.	45.00	45.42½	45.37½	45.37½	45.25	45.37½
Zinc, East St. Louis	6.80	6.80	6.80	6.80	6.80	6.80
Zinc, New York	7.15	7.15	7.15	7.15	7.15	7.15
Lead, St. Louis	6.70	6.70	6.70	6.70	6.70	6.70
Lead, New York	6.90	6.90	6.90	6.90	6.90	6.90

*Refinery quotation; price ¼c. higher delivered in the Connecticut Valley.

Rolled Products

Prices on rolled non-ferrous products are unchanged from those prevailing one week ago.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—
- High brass ..... 23.25c.
- Copper, hot rolled ..... 26.75c.
- Zinc ..... 10.25c.
- Lead (full sheets) .. 11.00c. to 11.25c.

Seamless Tubes—
- High brass ..... 28.25c.
- Copper ..... 29.25c.

Rods—
- High brass ..... 21.25c.
- Naval brass ..... 24.00c.

Wire—
- Copper ..... 19.87½c.
- High brass ..... 23.75c.

Copper in Rolls ..... 26.75c.
Brazed Brass Tubing ..... 30.87½c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also to St. Louis on shipments to points west of that river.

- Sheets, 0 to 10 gage, 3 to 30 in. wide ..... 33.00c.
- Tubes, base ..... 42.00c.
- Machine rods ..... 34.00c.

Chicago Warehouse

(Prices Cover Trucking to Customers' Doors in City Limits)

Sheets—	Base per Lb.
High brass	23.25c.
Copper, hot rolled	27.75c.
Copper, cold rolled, 14 oz. and heavier	30.00c.
Zinc	10.75c.
Lead, wide	11.35c.
Seamless Tubes—	
Brass	28.25c.
Copper	29.25c.
Brass Rods	21.25c.
Brazed Brass Tubes	31.00c.

New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—		
High brass	21.12½c.	to 22.12½c.
Copper, hot rolled, base sizes	27.75c.	to 28.75c.
Copper, cold rolled, 14 oz. and heavier, base sizes	30.00c.	to 31.00c.
Seamless Tubes—		
Brass	26.00c.	to 27.00c.
Copper	29.12½c.	to 30.12½c.
Brazed Brass Tubes	29.12½c.	to 30.12½c.
Brass Rods	18.87½c.	to 19.87½c.

New York Warehouse

Delivered Prices, Base Per Lb.

- *Zinc sheets (No. 9), casks* ..... 10.50c. to 11.00c.
- *Zinc sheets, open* ..... 11.50c. to 12.00c.

Metals from New York Warehouse

Delivered Prices, Per Lb.

- Tin, Straights pig ..... 47.50c. to 48.50c.
- Tin, bar ..... 50.00c. to 51.00c.
- Copper, Lake ..... 19.50c.
- Copper, electrolytic ..... 19.25c.
- Copper, casting ..... 19.00c.
- Zinc, slab ..... 7.75c. to 8.25c.
- Lead, American pig ... 7.62½c. to 8.12½c.
- Lead, bar ..... 9.62½c. to 10.12½c.
- Antimony, Asiatic ..... 11.00c. to 11.50c.
- Aluminum No. 1 ingots for remelting (guaranteed over 99% pure) ... 25.00c. to 26.00c.
- Alum. ingots, No. 12 alloy ..... 24.00c. to 25.00c.
- Babbitt metal, commercial grade ..... 25.00c. to 35.00c.
- Solder, ½ and ½ ..... 30.00c. to 31.00c.

Metals from Cleveland Warehouse

Delivered Prices, Per Lb.

- Tin, Straits pig ..... 50.50c.
- Tin, bar ..... 52.50c.
- Copper, Lake ..... 19.50c.
- Copper, electrolytic ..... 19.25c.
- Copper, casting ..... 18.75c.
- Zinc, slab ..... 7.75c. to 8.00c.
- Lead, American pig ..... 7.55c. to 7.75c.
- Lead, bar ..... 9.75c.
- Antimony, Asiatic ..... 16.00c.
- Babbitt metal, medium grade ..... 18.75c.
- Babbitt metal, high grade ..... 54.00c.
- Solder, ½ and ½ ..... 31.25c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged customers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	14.75c.	16.25c.
Copper, hvy. and wire	14.50c.	15.75c.
Copper, light and bottoms	12.50c.	13.75c.
Brass, heavy	8.50c.	9.50c.
Brass, light	7.50c.	8.50c.
Hvy. machine composition	12.00c.	13.00c.
No. 1 yel. brass turnings	9.75c.	10.50c.
No. 1 red brass or compos. turnings	11.25c.	12.25c.
Lead, heavy	5.25c.	5.75c.
Lead, tea	4.25c.	5.25c.
Zinc	3.50c.	4.25c.
Sheet aluminum	14.00c.	16.00c.
Cast aluminum	12.25c.	14.25c.

quotation of the leading interest is unchanged at 6.90c., New York.

Zinc.—Consumers still refrain from covering their needs even for fairly early shipments, and producers decline to lower prices which continue at 6.80c., East St. Louis, or 7.15c., New York, for prime Western zinc. It is confidently expected that, if this stand-off continues long enough, there will be a rush to buy similar to that in copper two weeks ago, but of course not so spectacular as to volume.

Antimony.—Demand is very light and Chinese metal is quoted at 8.75c., per lb., New York, duty paid, for all positions.

Nickel.—Wholesale lots of ingot nickel are quoted at 35c. per lb. with shot nickel at 36c. and electrolytic nickel in cathodes at 35c.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at 23.90c. per lb., delivered, as the published price.

Non-Ferrous Metals at Chicago

CHICAGO, Sept. 17.—This market is quieter than a week ago. Prices, with the exception of tin, which is quoted lower, are unchanged. Demand for old metals is light and prices are not being tested.

Prices per lb., in carload lots: Lake copper, 18.50c.; tin, 46.10c.; lead, 6.80c.; zinc, 6.90c.; in less-than-carload lots, antimony, 9.85c. On old metals we quote copper wire, crucible shapes and copper clips, 14c.; copper bottoms, 11.50c.; red brass, 11.50c.; yellow brass, 8c.; lead pipe, 4.50c.; zinc, 3.25c.; pewter, No. 1, 24.50c.; tin foil, 26c.; block tin, 36c.; aluminum, 12.87½c.; all being dealers' prices for less-than-carload lots.

Fabricated Structural Steel

With Awards of 50,000 Tons and Inquiries of 57,000 Tons, Demand Has Been Well Maintained

WITH total awards of 50,000 tons and with 57,000 tons added to pending work in the past week, demand for structural steel has been well maintained. Most of the jobs let recently and the bulk of fresh inquiries are for office buildings, hotels, educational structures and other non-industrial projects. Outstanding among awards were 8000 tons for a city hall at Buffalo and 5000 tons for bridges on the Great Northern Railway. Much interest has centered on the tonnage required for the Empire State Building, New York. Forty thousand tons is the present estimate, but it is possible that as much as 45,000 tons will be needed. Awards follow:

BOSTON, 350 tons, apartment house on Newbury Street, to New England Structural Co.

LYNN, MASS., 300 tons, theater, to New England Structural Co.

WOBURN, MASS., 180 tons, lighting company substation, to unnamed fabricator.

PROVIDENCE, R. I., 120 tons, United States Rubber Co. plant, to Providence Steel & Iron Co.

NEW YORK, 300 tons, three seaplane hangars for delivery to Brazil, let by Dwight P. Robinson & Co., to Belmont Iron Works.

NEW YORK, 4000 tons, revised estimate for Waldorf-Astoria Hotel above tonnage reported last week, to McClintic-Marshall Co.

NEW YORK, 350 tons, motion picture theater at 151 East Fiftieth Street and passenger station at Tremont Street and Park Avenue for New York Central Railroad, to McClintic-Marshall Co.

VALLEY STREAM, N. Y., 270 tons, airplane hangars, to Jones & Laughlin Steel Corporation.

PALISADES PARK, N. J., 1000 tons, highway bridges, to American Bridge Co.

PHILADELPHIA, 2500 tons, office building and garage, to McClintic-Marshall Co.

PHILADELPHIA, 1400 tons, Architects' Building, to McClintic-Marshall Co.

ATLANTIC CITY, N. J., 2400 tons, Hotel Brighton, to McClintic-Marshall Co.

ATLANTA, GA., 200 tons, hangar for Pitcairn Aviation, Inc., to Virginia Bridge & Iron Co.

TORONTO, 150 tons, community hall at Church and Shuter Streets, to Dominion Bridge Co.

OSHAWA, ONT., 500 tons, factory for Skinner Co., Ltd., to Disher Steel Construction Co., Toronto.

DONNACONA, QUE., 1000 tons, mill for Price Brothers, to Dominion Bridge Co.

BUFFALO, 8000 tons, Buffalo City Hall, to McClintic-Marshall Co.

PITTSBURGH, 300 tons, Maple Terrace viaduct, to McClintic-Marshall Co.

HAMILTON, OHIO, 900 tons, bank building, to Wheeling Structural Steel Co.

NICKEL PLATE RAILROAD, 600 tons, bridge at Cleveland, to Mount Vernon Bridge Co.

PAINESVILLE, OHIO, 300 tons, trestle for Diamond Alkali Co., to American Bridge Co.

BARBERTON, OHIO, 460 tons, Babcock & Wilcox Co., to American Bridge Co.

CHICAGO, 250 tons, Gateway Theater for Balaban & Katz, to Midland Structural Steel Co.

CHICAGO, 150 tons, building for M. Clamitz Co., to Calumet Structural Steel Co., local.

CHICAGO, 2500 tons, garage on Quincy Street, to American Bridge Co.

GREAT NORTHERN, 5000 tons, bridges, to American Bridge Co.

CHICAGO, ROCK ISLAND & PACIFIC, 135 tons, bridge, to American Bridge Co.

MILWAUKEE, 1000 tons, hotel, reported to have been taken by Lakeside Bridge & Steel Co.

STATE OF OKLAHOMA, 2000 tons, highway bridge work, to J. B. Klein Iron & Foundry Co.

REGINA, SASK., 450 tons, technical school, to Manitoba Bridge & Iron Works.

MANSON, WASH., 330 tons, plates, two siphons, to Steel Tank & Pipe Co. of Oregon.

SEATTLE, 400 tons, plates and shapes, taintor gates for Mount Diablo Dam, to Willamette Iron & Steel Co.

SEATTLE, 400 tons, West Garfield Street bridge, to Pacific Car & Foundry Co.

EVERETT, WASH., 10,000 tons, plates, pipe line, to Steel Tank & Pipe Co. of Oregon.

SAN FRANCISCO, 150 tons, apartment building addition, Sacramento and Mason Streets, to Judson-Pacific Co.

SAN FRANCISCO, 325 tons, warehouse for American Can Co., to Judson-Pacific Co.

SAN FRANCISCO, 200 tons, apartment building, Van Ness and Greenwich Streets, to Golden Gate Iron Works.

BERKELEY, CAL., 110 tons, dormitory for University of California, to Pacific Coast Engineering Co.

SALINAS, CAL., 120 tons, bridge over San Lucas River, to United States Steel Products Co.

SAN DIEGO, 200 tons, Herbert Hoover High School, to National Iron Works.

AGUA CALIENTE, MEXICO, 350 tons, grandstand, to Consolidated Steel Corporation, Los Angeles.

OGDEN, UTAH, 145 tons, two bridges in Zion National Park, to Reynolds Ely Construction Co., general contractors.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

LOWELL, MASS., 350 tons, hocky rink.

CONCORD, N. H., 200 tons, State hospital unit.

NEW HAVEN, CONN., 1000 tons, building at Yale University.

STATE OF NEW YORK, 1000 tons, highway bridges.

NEW YORK, 2000 tons, building for American Museum of Natural History.

NEW YORK, 40,000 tons, Empire State Building at Thirty-third Street and Fifth Avenue.

NEW YORK, 1000 tons, highway bridge in Richmond Borough.

HAMILTON, ONT., 1000 tons for McMaster University.

LONDON, ONT., 1000 tons, office building for Huron & Erie Mortgage Corporation.

FLINT, MICH., 2000 tons, bank building.

FLINT, 400 tons, building for Checker Cab Co.

STATE OF OHIO, 100 tons, bridge at Elyria for Highway Department.

CLEVELAND, 150 tons, building for Champion Machine & Forging Co.

CLEVELAND, 300 tons, club house for Catholic Ladies' Slovak Union.

AKRON, OHIO, 3000 tons, Polsky department store.

CLEVELAND, 1000 tons, grade elimination work for Big Four Railroad and Cuyahoga County.

LAKE COUNTY, IND., 850 tons, highway bridges.

ST. LOUIS, 900 tons, for Krey Packing Co.

RIVERSIDE, CAL., 136 tons, grandstand; bids opened.

MONTECITO, CAL., 360 tons, plates, 18-in. welded steel pipe line; bids opened.

PORTLAND, ORE., 335 tons, west approach, St. John's River bridge; bids opened.

VICTORIA, B. C., 500 tons, Thompson River bridge for Provincial Government.

Ludlum Steel Co. announces that all business in the Cleveland district will hereafter be handled from its office at 1593 East Forty-first Street. T. C. Sherman is local manager of the alloy division and W. H. White local manager of the tool steel division, at that address.

PERSONAL

RALPH H. SWEETSER, assistant to the first vice-president of the American Rolling Mill Co., Columbus, Ohio, will read a paper on "Personality in Pig Iron" at the World Engineering Congress in Japan in October. Mr. Sweetser is an authority on pig iron and many present-day practices originated at his furnaces, most important of which are in connection with control and elimination of waste.

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C. E. SMITH, vice-president, New York, New Haven & Hartford Railroad, has been placed in charge of the department of purchases and stores, succeeding N. M. RICE, who died recently. He will continue to assist the president in engineering matters.

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JAMES G. PATTILLO, JR., has been appointed manager of the Pittsburgh sales office of the Wagner Electric Corporation, St. Louis. He is a graduate of the University of Pittsburgh and received further electrical engineering training as a student engineer at the Wagner plant in St. Louis. Later he was transferred to Pittsburgh as a salesman, from which position he was promoted to branch manager.

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F. G. HOUSMAN, superintendent of the machinery division of Peck, Stow & Wilcox, Southington, Conn., is to serve on the advisory committee of the Connecticut board of education in matters pertaining to foundry training in State trade schools and in industrial companies.

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H. PAUL CLEAVER has been appointed superintendent of the J. G. Brill Co.'s Philadelphia plant, succeeding O. C. KAHLER who recently resigned for reasons of health. Graduating as a mechanical engineer from the University of Delaware in 1918, Mr. Cleaver became connected with the Harlan plant of the Bethlehem Shipbuilding Corporation, Wilmington, Del. In 1920 he was made general foreman of the car department, and the following year assistant superintendent. In 1926 he joined the engineering staff of the J. G. Brill Co. and later was appointed general foreman. Early this year he became asistant superintendent.

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G. B. SHEERS, for some time associated with the Moltrup Steel Products Co., Beaver Falls, Pa., manufacturer of cold drawn steel, is now identified with the Reliance Mfg. Co., Massillon, Ohio, where he is engaged in special development work.

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ARTHUR T. MOREY, General Steel Castings Corporation, Commonwealth Plant, Granite City, Ill., has been appointed to the Department of Manufactures Committee of the Chamber of Commerce of the United States.

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ALFRED B. EMRICK, for two years branch manager at Pittsburgh for the Wagner Electric Corporation, St. Louis, has been put in charge of a new branch office at 734 Allen Building, Dallas, Tex., with sales jurisdiction over Texas and parts of Louisiana and Arkansas.

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C. L. MILLER, Pittsburgh, formerly vice-president and general superintendent of the American Steel & Wire Co., sailed for Europe on the Bremen last week.

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HARRY E. GROSS, formerly associated with the A. M. Byers Co., Pittsburgh, has joined the sales organization of Thomas J. Llewelyn & Co., 911 Oliver Building, Pittsburgh. This company is engaged in consulting engineering work for steel plants and pipe mills and is also sales representative for the Falls Electric Furnace Corporation, Buffalo; the Harold E. Trent Co., Philadelphia, maker of electric melting pots, and the R. S. Newbold & Sons Co., Norristown, Pa., manufacturer of steel plant equipment.

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W. S. RUGG, vice-president, Westinghouse Electric & Mfg. Co., East Pittsburgh, has been appointed on the committee for the award during the next five years of the Edison medal of the American Institute of Electrical Engineers. The medal, established by the institute of 1909, is awarded for "meritorious achievements in electrical sciences, engineering or arts."

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H. O. K. MEISTER has been appointed assistant general manager of the Hyatt Roller Bearing Co., Newark, N. J. He has been associated with the company for 15 years, first as manager of its Western division at Chicago, then as assistant general sales manager at Newark and later as general sales manager, having held the latter position since 1925.

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W. S. RAWLEY has been appointed sales representative in Indiana and Kentucky for the Oliver Machinery Co., Grand Rapids, Mich.

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W. H. BASSETT, technical superintendent, American Brass Co., Waterbury, Conn., will address the New Haven, Conn., chapter of the American Society for Steel Treating on "Copper and Copper Alloys" at its regular meeting on Sept. 19.

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RUMSEY W. SCOTT, president, American Cable Co., has resigned to become vice-president of the Commercial Investment Trust Corporation, New York. Previous to his connection with the American Cable Co., Mr. Scott was vice-president of the Chemical National Bank of New York and for 17 years was with the Otis Elevator Co.

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E. E. BAKER has been appointed sales manager of the Thomas Laughlin Co., Portland, Me., manufacturer of heavy hardware for marine and industrial uses. He has had wide experience in the marine and hardware fields, including marine design and construction, for the last 16 years. During the war he was with the purchasing division of the Emergency Fleet Corporation, handling the purchase of machinery, boilers and mechanical equipment. For the past seven years he has been engaged in industrial heavy hardware sales activities.

—

O. G. NEUMANN has become associated with the sales department of the Inland Steel Co. and will cover parts of Indiana and Michigan, making his headquarters in Chicago. For the past 10 years he has been with the Jones & Laughlin Steel Corporation, at one time as assistant manager of the Cincinnati warehouse and more recently handling both mill and warehouse sales in Indiana.

—

CARL E. SOMMER has been elected president of the Majestic Stove Mfg. Co., St. Louis. He has been connected with the company for 34 years. For 16 years he was in the sales department and later successively was secretary and vice-president.

—

D. C. TRAVIS, general superintendent, Simmons Co., Kenosha, Wis., metal bed and bed spring manufacturer, has resigned after 27 years of service in the company's mechanical departments and will be succeeded by G. A. SMITH, now general production superintendent. FRANK B. HARMON will be promoted to general production superintendent and PHILLIP HARMON, JR., to assistant superintendent.

—

A. M. LEVERICH, Milwaukee, for the past 8 years representative in Wisconsin of Abrasive Co., Philadelphia, manufacturer of grinding wheels, has resigned to become general manager of the new Camden, N. J., plant of the Rundle Mfg. Co., Milwaukee, maker of plumbing supplies and enameled sanitary ware. He was formerly with Dodge Motor Co., Detroit. J. D. BUCKLEY, Birmingham, will succeed Mr. Leverich.

—

F. B. CALDWELL, vice-president, Link-Belt Co., Chicago, has resigned on account of ill health. W. C. CARTER, formerly vice-president in charge of production of all the company's plants, will succeed Mr. Caldwell. E.

J. BURNELL, manager of the company's Pittsburgh office, has been appointed sales manager of the Western division with headquarters at Chicago. He has been succeeded at Pittsburgh by NELS DAVIS, formerly of the Chicago sales organization.

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A. W. THOMPSON, formerly president of the Philadelphia Co. and later of the United Gas Improvement Co., both of Philadelphia, has been elected chairman of the board of the McKinney Mfg. Co., Pittsburgh, maker of builders' hardware. J. P. MCKINNEY, JR., who has been vice-president, has been elected president of the company, succeeding W. C. FARR, who remains as treasurer and has also been elected secretary.

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CHARLES E. HILDRETH, formerly of the Whitcomb & Blaisdell Machine Tool Co., Worcester, Mass., and prominent in national machine tool circles until a few years ago, has been made supervisor for the decennial census next year.

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G. GUY JETER, connected for the past 16 years with the transformer division of the General Electric Co., has been transferred from the Pittsfield, Mass., plant to Bridgeport, Conn., where he will be manager of power apparatus sales.

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PERRY W. OLLIVER has been appointed manager of the San Francisco office of the Sullivan Machinery Co., Chicago. He has been with the company since 1914 and for the past eight years has been connected with the El Paso, Tex., office.

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J. F. WULFETANG, for the last ten years manager of raw materials for the Jones & Laughlin Steel Corporation, Pittsburgh, and previously assistant purchasing agent for that company, has become associated with the Hausman & Wimmer Co., Clark building, Pittsburgh, dealer in scrap iron and steel. Before going with the Jones & Laughlin company, Mr. Wulfetang for twenty years was purchasing agent of the Riter-Conley Co., Pittsburgh.

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DR. CARL KOETTGEN, president Verein Deutscher Ingenieure and general director Siemens-Schuckert Works, Berlin, Germany; DR. CONRAD MATSCHOSS, director Verein Deutscher Ingenieure, Berlin, Germany; DR. EMIL PROBST, Karlsruhe, Germany, and MAJOR H. C. E. CHERRY, a British engineer, were guests of honor at a dinner attended by about 50 New York engineers at the Engineers' Club, Thursday evening, Sept. 12. DR. ELMER A. SPERRY, president, American Society of Mechanical Engineers, acting chairman of the American committee for the World Engineering Congress at Tokio, presided and responses were made by several of the guests, who are on their way to Japan. A number of other European delegates to the World Engineering Congress who have arrived this month have been entertained by groups of New York engineers. Most of the visitors will stop off at various industrial centers on their way across the continent to take steamer for Tokio.

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F. W. STICKLES, recently a member of the sales force of H. H. Adams & Co., pig iron brokers, New York, has leased plant at Mystic, Conn., which he will operate as the Capitol Foundry, making special gray iron castings. He formerly operated a foundry under the same name at Hartford, Conn.

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HIBBARD S. GREENE, formerly vice-president in charge of sales of the Barber-Greene Co., Aurora, Ill., has become assistant to the president of the Chain-Belt Co., Milwaukee.

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J. F. SPELLACY, for two years general superintendent of the Steubenville, Ohio, works of the Wheeling Steel Corporation, has resigned and has been succeeded by C. A. KRAL, recently assistant general manager. Before going with the Wheeling Company, Mr. Spellacy was identified with the National Tube Co.

Obituary

GARDNER A. MURFEY, who recently resigned as treasurer of the Browning Co., Cleveland, because of poor health, died suddenly Sept. 13 at Fredonia, N. Y., while returning home from a vacation trip. He was 44 years of age.

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RAY P. MCGRATH, since 1914 manager of the San Francisco office of the Sullivan Machinery Co., Chicago, died on Aug. 25. He had been connected with the company for 22 years, having been associated with the Boston sales office from 1906 to 1914.

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GEORGE M. JOHNSTON, formerly superintendent of the Clinton, Mass., plant of the Wickwire Spencer Steel Co., and recently in the sales department of the company, died Sept. 13 at his home in Clinton at the age of 36. In 1907 he entered the employ of the Clinton Wire Cloth Co., which subsequently was absorbed by the Wickwire interests.

—

EDWIN LEWIS EDES, president, Edes Mfg. Co., Plymouth, Mass., died at his home in Plymouth on Sept. 3 at the age of 76. He was born in Plymouth and early in life became associated in business with his father, who had set up one of the first zinc rolling mills in this country. After his father's death he became sole proprietor and in 1893 organized the Edes Mfg. Co., which continued the zinc business, the principal product being zinc engraving plates.

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RICHARD H. VERIAN, for 44 years president of the Enterprise Foundry Co., Rochester, N. Y., died at his home Sept. 9 at the age of 74. Born in Rochester, he entered the foundry business as a boy and in 1884 organized the firm of which he was the head until his death.

Consider Weirton Merging With Detroit Companies

Executives of the Weirton Steel Co., Weirton, W. Va., the Michigan Steel Corporation and the Great Lakes Steel Corporation of Detroit and the M. A. Hanna Co., Cleveland, recently held a meeting in Cleveland at which a consolidation of the companies was discussed.

The new plant of the Great Lakes Steel Corporation at Ecorse, a suburb of Detroit, is now under construction. It will have an annual capacity of about 400,000 to 500,000 tons of steel ingots and its finished products will be hot and cold-rolled strip steel. The plant is expected to be ready for operation in the fall of 1930.

The Great Lakes Steel Corporation was organized by a syndicate headed by George R. Fink, president of the Michigan Steel Corporation, who is also president of Great Lakes. Authorized capital was $50,000,000, of which $20,000,000 was privately subscribed. The M. A. Hanna Co., became financially interested in the venture and also contracted to supply the plant with hot metal from one of its blast furnaces near Ecorse, Mich.

Capacity operations throughout the remainder of the year are indicated, according to a report from Aluminum Industries, Inc., Cincinnati. Consolidation of the company's two branches in San Francisco into one warehouse in the center of the automobile district in the Golden Gate city has been effected.

The profits showing of this year has been examined for 916 companies by the National City Bank, New York. For the first six months the profits amounted to $2,449,907,000, or 27.4 per cent more than the $1,924,264,000 for the first six months of 1928. One group, leather, reported a deficit. Shipping made the best showing, 179 per cent increase, and the next was iron and steel, 102 per cent for 35 companies ($189,209,000 in 1929 and $93,450,000 in 1928). The increase for 21 automobile companies was 4.1 per cent but for 40 automobile accessory companies, 62.4 per cent.

Acme Equipment Co., Inc., Detroit, has removed to its new offices and warehouse at 3352 Michigan Avenue.

Exhibitors and Products to be Shown at Machine Tool Exposition

(*Continued from Page* 743)

saw blades; Atkins hacksaw frames. Represented by: E. C. Atkins, production manager; W. A. Atkins, works manager; Edward S. Norvell, manager metal saw department; W. R. Chapin, metallurgist; M. M. Poole, purchasing agent; D. M. Condit and A. Mertz, salesmen.

Automatic Nut-Thread Corporation, 3617 North Eighth Street, Philadelphia, Pa. Booth 3W 2.

No. 2 and No. 3 Threadnut full automatic nut tapping machines; No. 1 single spindle tapping machine, full automatic; No. 1 hand tapping machine, single spindle; No. 7 single spindle semi-automatic. Represented by: Eric M. deSherbinin, president; Christian S. Sorenson, general manager; Robert B. Webster, secretary-treasurer; Edward H. Ingram, engineer; LeRoy J. Mickle, superintendent.

Avey Drilling Machine Co., Cincinnati. Booth 1A 6.

High-speed sensitive drilling and tapping equipment; drilling units; metal cutting saws; compensating jaw vises. Represented by: L. B. Patterson, president; J. G. Hey, vice-president and general manager; D. A. Patterson, secretary; J. F. Mirrielees, superintendent; F. L. Hazledine and G. M. Galt, factory representatives.

B

Baker Brothers, Inc., Toledo, Ohio. Booth 2B 13.

No. 121 Baker heavy-duty vertical drilling machine with Tex-Rope motor drive; No. 25 H Baker vertical hydraulic feed five spindle six station indexing table drilling and boring machine; No. 25 HH Baker two way hydraulic feed drilling and boring machine; No. 10 H Baker vertical hydraulic feed drilling machine with adaptation for multiple heads; individual motor-driven collant pump outfit. Represented by: H. L. Tigges, W. W. Elliott, William Baker, G. E. Hallenbeck, M. Fischer, G. Temple.

Baker-Raulang Co., 2168 West Twenty-fifth Street, Cleveland. Booth 4W 6.

Model E3 3-ton elevating truck equipped with 1-ton swivel hoist; Model H3 3-ton Hy-lift truck. Represented by: Glen E. Guy, C. H. Reinde, B. C. Hooper, C. H. Warren.

Barber-Colman Co., Rockford, Ill. Booth 1C 2.

Type B production hobbing machine—a new high production gear generator; No. 3 hob sharpening machine—an automatic mechanically controlled hob and form cutter grinder; reamer sharpener—an automatic machine for highly accurate work under positive mechanical control; small tools; hobs, milling cutters, reamers. Represented by: F. G. Hoffman, G. A. DeVlieg, A. B. Brand, J. P. Breuer, R. P. Dewey, M. N. Hough, C. C. Seyfferle, W. W. Dickover, J. E. Wood, F. R. Ridgley, W. M. Hoey.

Barnes Drill Co., Rockford, Ill. Booth 2D 4.

No. 214 multiple cylinder honing machine with hydraulically reciprocated spindles, all geared, self-oiling, all ball bearing; No. 249 self-oiling all geared honing machine with Timken roller bearings and eight quick changes of speeds; No. 242 self-oiling all geared drill and tapper with Timken roller bearings; two spindle No. 242 self-oiling all geared gang drill with Timken roller bearings; No. 221½ self-oiling all geared drill and tapper; No. 262 self-oiling all geared drill and tapper. Represented by: J. E. Andress, president; A. G. Block, secretary; A. M. Johnson, chief engineer; W. M. Fairbairn, production manager; R. M. Andress, purchasing agent; W. G. Nichol and M. C. Hogard, sales department; F. A. Swanson, designing engineer.

W. F. & John Barnes Co., Rockford, Ill. Booth 2B 9.

Horizontal duplex long hole drilling machine; vertical motor-driven Oilgear feed drilling machines; vertical motor-driven Oilgear feed reaming machine with automatic indexing fixture. Represented by: John S. Barnes, V. A. Root, Ralph Billingham, Paul Guirl, William J. Mix, F. G. Vosler.

Leon J. Barrett Co., Worcester, Mass. Booth 1W 13.

Barrett centrifugal oil extractor, model 1200; centrifugal dryer, model 502; centrifugal washer, model 251; Stockbridge heavy-duty back-geared shaper with patented two-piece crank. Represented by: Leon J. Barrett, R. A. Johnson, H. G. Kilbourne, C. B. Laing, N. F. Holter.

John Bath & Co., Inc., Worcester, Mass. Booth 5W 1.

Ground taps; thread gages; ground thread rolling dies; Bath internal micrometers; adjustable plain plug gages. Represented by: John Bath, president; J. Chester Bath, vice-president; Stanley W. Bath, secretary; R. E. Lamb, advertising manager.

Bausch & Lomb Optical Co., Rochester, N. Y. Booth 6A 5.

Metallographic microscope; contour measuring projector; optical comparator; toolmakers' microscope; optical drill gage; internal and external profile gage; optical protractor; optical indexing device; (all precision optical instruments for production control). Represented by: I. L. Nixon, manager projection sales; E. G. Koch, projection sales department; George Gallasch, technical bureau; A. Farmer, salesman.

Charles H. Besly & Co., 118 North Clinton Street, Chicago. Booth 2D 6.

No. 6-20-in. double-spindle motor-driven wet disk grinder with power-driven oscillating fixture, four station indexing drum equipped with cam clamping V-blocks for grinding exhaust and inlet valves on both ends simultaneously; No. 309-30-in. vertical spindle motor-driven wet disk grinder with power-driven rotary and semi-automatic feeding fixture for grinding face of universal joint housings; No. 141-20-in.-L type motor-driven disk grinder with Timken bearing rocker-shaft supports; No. 5-18-in.-F type motor-driven disk grinder; Besly Titan bakelite abrasive disks and steel-back abrasive disks. Represented by: Edward P. Welles, L. R. Capes, L. E. Jacobs, C. H. Munch, F. D. Baker, E. W. Hutchinson, J. F. Curns, George Klemp, R. J. Curns, R. W. Young, John Miller, Jr., John Neilson, Frank Lane, E. O. Powers, Clarence Stephenson, Albert J. Doerman.

Biax Flexible Shaft Co., Inc., 20 East Seventeenth Street, New York. Booth 5A 6.

Screw driving machine; drilling machines; portable flexible shaft grinders; rotary filing machines; rotary files; high-speed grinders for die work; portable sanding and polishing machines; portable track grinders. Represented by: R. Wezel, F. I. VanderBeek.

Black & Decker Mfg. Co., Towson, Md. Booth 4B 1.

Universal portable electric tools; high cycle portable electric tools; Marschke grinders and Marschke swing frame grinders. Represented by: W. C. Allen, R. D. Black, R. E. Mizener, G. M. Buchanan, A. M. York, Lee H. Hind, Gus Fischer, Ralph Herrick, J. A. Fairfield, Luke Boyd, W. J. Fenwick, W. T. Johnston, Guy J. Coffey, C. C. Watts, W. S. Talbott.

G. S. Blakeslee & Co., Chicago. Booth 4C 3.

Blakeslee pump type parts washing machine; Niagara type parts washing machine. Represented by: John Dammers, secretary; H. A. Sparrow, G. W. Anderson and A. S. Reichel, sales engineers.

Blanchard Machine Co., Cambridge, Mass. Booth 1W 5.

Blanchard automatic surface grinder No. 16-A; 18-in. segment wheel; silicate wheels and segments; samples of Blanchard grinding. Represented by: Harold F. Skillings, Harold C. Donovan, Leon S. Kinsman, William H. Cannon.

J. G. Blount Co., Everett, Mass. Booth 1W 2.

Motor grinders—regular and high speed—tool or snagging; combination motor grinder and disk sander for pattern shops; wet tool grinders; motor buffers; pattern maker's lathe—eight speeds, motor drive. Represented by: H. N. Blount, sales manager; J. G. Blount, production manager; F. G. Koppenburg, factory superintendent.

Bowen Products Corporation, Auburn, N. Y. Booth 5A 7.

Bowen system of lubrication for industrial machinery. Represented by: George W. Severson, Willis S. Meeks, Fred Whipple, E. Heilbron.

Boye & Emmes Machine Tool Co., Cincinnati. Booth 3W 7.

16 in. x 6 ft. coneless geared-head lathe; 16 in. head only. Represented by: F. W. Boye, Jr., F. C. Reif, George A. Mohr, shop superintendent.

Bradford Machine Tool Co., Cincinnati. Booth 2A 4.

18-in. Bradford all geared patented Lo-Drive motor-driven engine lathe, with taper turning attachment and oil pan; single spindle automatic unit type Bradford drilling machine for high-speed automatic production. Represented by: Samuel S. Williams, president; Charles J. Smith, secretary; Henry Swift, engineer; Charles Stiefvater, demonstrater; Fred Kropf, superintendent.

Bridgeport Safety Emery Wheel Co., Bridgeport, Conn. Booth 1A 5.

86-in. type No. 94 heavy-duty face grinder, 42-in. sectional grinding wheel, hydraulic table drive; 20-in. steel chuck and sectional grinding wheel. Represented by: H. H. Peck,

secretary; L. I. Burritt, sales manager; F. C. Penny, chief engineer; H. E. Smith, sales engineer.

Brown & Sharpe Mfg. Co., Providence, R. I. Booth 2C 8.
No. 2A standard universal milling machine; No. 4B standard plain milling machine; No. 2 standard vertical spindle milling machine; No. OY plain milling machine; No. 21 automatic milling machine; No. 2 universal grinding machine; No. 13 universal and tool grinding machine; Nos. 11, 30 and 32 plain grinding machines; No. 2 surface grinding machine; No. OOG automatic screw machine (high speed); No. 2 automatic screw machine (high speed); machinists' tools, cutters and hobs. Represented by: J. G. Swinburne, L. Goff, R. W. Blakey, H. R. Johnson, R. Martines, E. S. Thurston, S. H. Sloan, J. H. Devlin, F. L. Pritchard, P. A. Topel, E. H. Anthony.

Bryant Chucking Grinder Co., Springfield, Vt. Booth 2B 12.
No. 24 deep hole grinder with hydraulic slide traverse and automatic sizing; No. 12-A hole-face grinder; No. 3 heavy duty hole grinder; No. 3 standard hole grinder. Represented by: L. C. Gilchrist, W. L. Bryant, M. H. Arms, J. B. Johnson, R. O. Perry, W. M. Smith, G. M. Green, H. G. Nourse, A. G. Fairbanks.

Buckeye Portable Tool Co., Dayton, Ohio. Booth 4A 1.
Portable pneumatic grinders, buffers, drills, sanders, screwdrivers, nut drivers. Represented by: W. W. Price, president; H. O. Gummere, special representative; C. W. Overly, Cleveland district manager; W. R. Gummere, special representative.

Buffalo Forge Co., Buffalo. Booth 1A 4.
Power drills; power bending rolls; combination punches and shears, fans and exhausters, all in operation. Represented by: H. W. Wendt, Jr., vice-president; E. G. Leonard, sales manager tool division; G. H. Zimmer, design engineer; T. A. Weager, manager Cleveland office; A. T. Yates, service engineer; H. H. Weber, J. E. Mossell, R. L. Pope, W. J. McDowell and A. T. Lamb, sales representative.

Buhr Machine Tool Co., Ann Arbor, Mich. Booth 2D 7.
Buhr multihead automatic drilling machines and automatic index tables; Buhr automatic piston drillers; Buhr drilling and tapping heads; Buhr universal adapters and drivers for drill presses. Represented by: Joseph F. Buhr, president; C. A. Birkebak, chief engineer; Glenn D. Evans, sales manager; Robert S. Gott, works manager; William H. Nicholls and Raymond Zoll, sales engineers.

Bullard Co., Bridgeport, Conn. Booth 1B 1.
8-in. Mult-Au-Matic center lathe; 6-in. four-spindle Mult-Au-Matic chucking lathe with hopper feed; 20-in. Auto-Matic vertical turret lathe; 36-in. "Spiral Drive" type vertical turret lathe. Represented by: E. P. Bullard, president; John W. Bray, sales manager; E. P. Blanchard, assistant sales manager; John R. Tillman, executive sales engineer; Charles H. Keller, F. S. Lincoln, Frank E. Hatch, Jr., James M. Welch, George F. Kolb, F. A. Thompson, Robert Newman, William A. Conner, sales representatives.

C

Canedy-Otto Mfg. Co., Chicago Heights, Ill. Booth 5C 10.
Multiple spindle floor drill, motor driven; high-speed motor driven drill press; 21-in., 17-in., 14-in., 15-in. sliding head motor-driven drill presses (all floor drills). Represented by: C. H. Thomas, president; J. E. Thomas, secretary and treasurer; C. L. Hughes, sales manager; G. F. Werth, chief engineer; F. L. Cole, factory manager; R. D. Thomas, W. F. Wendel, L. H. Howard.

Carboloy Co., Inc., 350 Madison Ave., New York. Booth 4A 2.
Carboloy cutting tools for high production machining of ferrous, non-ferrous and abrasive metals and materials; dies for wire drawing and extrusion work for routine high tonnage production in wire mills. Represented by: P. R. Mallory, president; E. H. Wilkinson, vice-president; A. R. Howell, sales manager; G. V. Rockey, advertising manager; G. N. Sieger, metallurgist; A. A. Merry, W. G. Robbins, W. W. Fullager, W. J. Lindner, P. Petroff, W. H. Martin, W. S. Huson, W. G. Lane, W. E. Smith, S. C. Lawson.

Carlton Machine Tool Co., Cincinnati. Booth 2B 2.
3-ft. 11-in. column Carlton all ball bearing, heavy-duty radial drilling machine arranged for constant speed motor drive on arm, with plain box table and cutting lubricant outfit; 6-ft. 19-in. column Carlton all ball bearing heavy-duty radial drilling machine arranged for adjustable speed motor drive on arm, with plain box table, electric hydraulic column binder, motor-driven cutting lubricant outfit, power rapid traverse of head. Represented by: Jack C. Carlton, Harry J. Westmeyer, Herbert D. Keeling, Frank Moran, W. A. Dermody, Albert C. Spangenberg, A. F. Medecke.

Chicago Belting Co., 113 North Green Street, Chicago. Booth 5W 7.
Motor drive belts; flexible idler belts; line and counter shaft belts; charts on belt ratings and belt properties; leather belting; hydraulic and pneumatic leathers; leather packings; leather tannages; motion picture illustration of how leather belt is made. Represented by: J. R. Hopkins, Floyd Hance, Charles Allis Ball, A. J. Weis.

Chisholm-Moore Hoist Corporation, Tonawanda, N. Y. Booth 6B 6.
Electric hoists and trolleys; chain hoists and trolleys. Represented by: F. W. Shaw, assistant sales manager; J. G. Parker, plant engineer; E. N. Turner, sales engineer.

Cincinnati Bickford Tool Co., Cincinnati. Booth 2A 1.
Radial and upright drills including 6-ft. Super-Service radial with 19-in. column; 3-ft. Super-Service radial with 11-in. column; 21-in. direct drive upright; Super-Service production drill. Represented by: A. H. Tuechter, president; G. P. Gradolf, D. C. Klausmeyer, N. C. Shaver, O. E. Shaver, S. K. Wallace, L. D. Quackenbush, R. N. Piper.

Cincinnati Grinders, Inc. Booth 2C 7.
Plain hydromatic miller; Duplex hydromatic miller; No. 3 Universal miller; No. 3 plain miller; Cincinnati cutter grinder; Cincinnati No. 2 centerless valve tappet grinder; No. 2 centerless piston pin grinder; No. 4 centerless bearing race grinder; 14 x 48 plain cylindrical grinder. Represented by: F. A. Geier, F. V. Geier, P. O. Geier, W. W. Tangeman, F. B. Heitkamp, R. E. W. Harrison, G. W. Binns, J. E. Caster, L. Nenninger, Hans Ernst, M. R. Romaine, E. G. Roehm, R. L. Morrissey, Nelson Caldwell, S. E. Bergstrom, E. Reiniger, S. R. Howells, R. E. Fields, Howard Pope, W. F. Stegner, Carl Mueller.

Cincinnati Lathe & Tool Co., Cincinnati. Booth 2W 18.
16-in. x 6-ft. Cincinnati geared-head lathe for tool room work; 24-in. x 10-ft. geared-head lathe, motor drive, with square turret attachment for severe duty work. Represented by: W. C. Heindel, W. J. Anderson, E. C. Cummings, K. I. Clisby, A. C. Meier, George Doll, William Fisgus.

Cincinnati Milling Machine Co., Cincinnati. Booth 2C 7.
Plain hydromatic miller; Duplex hydromatic miller; No. 3 Universal miller; No. 3 plain miller; Cincinnati cutter grinder; Cincinnati No. 2 centerless valve tappet grinder; No. 2 centerless piston pin grinder; No. 4 centerless bearing race grinder; 14 x 48 plain cylindrical grinder. Represented by: F. A. Geier, F. V. Geier, P. O. Geier, W. W. Tangeman, F. B. Heitkamp, R. E. W. Harrison, G. W. Binns, J. E. Caster, L. Nenninger, Hans Ernst, M. R. Romaine, E. G. Roehm, R. L. Morrissey, Nelson Caldwell, S. E. Bergstrom, E. Reiniger, S. R. Howells, R. E. Fields, Howard Pope, W. F. Stegner, Carl Mueller.

Cincinnati Shaper Co., Cincinnati. Booth 2W 17.
16-in. heavy-duty Cincinnati rapid traverse shaper equipped with universal table; 24-in. heavy-duty Cincinnati rapid traverse shaper; Cincinnati gear burnisher; shaper parts and assemblies. Represented by: H. S. Robinson, R. T. Hazelton, T. H. Schebrat, M. A. Spraley, George Diehl, Frank T. Goetz, F. G. Swain.

Cleveland Automatic Machine Co., 2269 Ashland Road, Cleveland. Booth 2C 5.
½-in. model M five spindle bar machine with independent feed control for all tools; ⅞-in. model M four spindle multiple drilling, forming and cut-off machine, blanking four nuts simultaneously from the bar; 7-in. model M five spindle chucking machine for castings, forgings or stampings. Represented by: A. L. Garford, president; H. W. Rupples, general manager; H. M. Rich, secretary-treasurer; C. W. Cowdrey, sales department; Herbert E. Nunn, B. C. Young, A. W. Schafer, W. Steinbrenner, G. W. Samstag, Arthur Jackson.

Cleveland Hobbing Machine Co., 1170 East 152nd Street, Cleveland. Booth 1A 10a.
Eight spindle rotary hobbing machine. Represented by: C. W. Blossom, president; W. H. Staples, vice-president and general manager; F. H. Adams, vice-president.

Cleveland Planer Co., 3148 Superior Avenue, Cleveland. Booth 1C 3.
Cleveland open side planers. Represented by: E. L. Essley, president; E. P. Essley, secretary; L. H. Mesker, sales manager; J. Jenne, works manager.

Cleveland Twist Drill Co., 1242 East Forty-ninth Street, Cleveland. Booth 4W 11.
Drills; reamers. Represented by: W. E. Caldwell, H. P. Jenson, J. B. Dillard, T. M. Skove, D. D. Burdett, H. J. Baier, R. G. Berrington, H. G. Smith, F. M. Hoelzle, A. J. Ireland, O. B. Hansen, R. D. Boltey.

Cochrane-Bly Co., Rochester, N. Y. Booth 2C 12.
No. 66 metal sawing machine with hydraulic feed and air clamp; No. 55 metal sawing machine with air clamp and multiple cutting fixtures; No. 21 automatic high-speed saw with power stock feed; No. 2 filing machine; No. 11 saw sharpening machine; No. 14 duplex shaper-miller. Represented by: W. H. Welch, vice-president; T. M. Crandall, secretary-treasurer; Bracket Clark.

Colonial Tool Co., 8432 Butler Ave., Detroit, Mich. Booth 5A 4.
Michigan Tool Co. milling cutters, hobs, gear-shaper cutters, special tools; Colonial Tool Co. round, spline, and combination round-and-spline broaches; spline gages. Represented by: Otto Lundell, president and general manager, Michigan Tool Co.; O. L. Bard, secretary, Michigan Tool Co.; J. W. Mull, Jr., sales manager, Michigan Tool Co.; C. J. Halborg, general manager, Colonial Tool Co.; E. H. Kurtz, sales manager, Colonial Tool Co.

Columbia Machine Tool Co., Hamilton, Ohio. Booth 2W 15.
Columbia 24-in. superior heavy-duty back geared crank shaper with speed box, friction clutch and brake and constant speed motor drive; vertical chucking machine of complete new design. Represented by: F. B. Yingling, E. S. Rich, F. Fiesselmann, O. G. Tweddell.

Conradson Tool Corporation, 2116 Indiana Avenue, Chicago. Booth 4A 3.
Shell reamers; expansion reamers; arbors; milling cutters. Represented by: W. J. Denning, Stephen Carboy, F. J. McHugh.

Consolidated Machine Tool Corporation of America, Rochester, N. Y. Booth 2C 4.
Heavy-duty boring mill; cold saw; milling machine; small tools for threading. Represented by: A. H. Ingle, Alfred Trosch, W. C. Ingle, H. M. Bowman, R. R. Roberts, W. J. Forward, H. A. Merrill, R. S. Laird, A. Myers, L. T. Jefferis, C. E. McArthur, C. R. Williams, S. A. Harding, P. I. Johnston, G. C. Bailey.

Covel-Hanchett Co., Big Rapids, Mich. Booth 2A 9.
Two-spindle horizontal grinding machine; face grinding machine, 20-in. wheel; large size double-spindle machine with special fixtures; combination face grinding and locomotive guide bar grinder; vertical spindle machine; automatic surface grinder; universal cutter and tool grinder; small size surface grinder; twist drill grinders; small size metal saw sharpening machine; large size metal saw sharpening machine. Represented by: E. B. Gardner, A. M. Johnson, W. S. Paden, Ed. Ellefson, L. H. Benjamin.

Cushman Chuck Co., Hartford, Conn. Booth 5B 2.
Collet chucks; dust-proof chucks; new pattern lathe chucks; boring mill jaws. Represented by: Harry E. Sloan, president; Harry W. Hultgren, sales department; James Jordan, superintendent; George Highberg, assistant superintendent.

Cutler-Hammer, Inc., Milwaukee. Booth 6A 1.
A. c. and d. c. automatic motor control; planer control; a. c. and d. c. manual motor control; Across-the-line "X" automatic starters; safety switches; push buttons; accessories. Represented by: A. G. Pierce, Cleveland district manager; F. U. Webster, advertising manager.

D

Danly Machine Specialties, Inc., 2104 South Fifty-second Street, Chicago. Booth 4B 6.
Die makers' supplies: die sets; guide posts; guide bushings; dowel pins; automatic gages; die springs; shoulder screws; socket head cap and set screws. Represented by: R. C. Danly, president; R. H. Danly, vice-president and general manager; J. R. Fitzsimons, manager Cleveland branch; A. L. Miller, manager Long Island City branch; George T. Danly, chief engineer; W. L. Rankin, manager Detroit branch; A. F. Wallace, manager Rochester branch.

DeVlieg Machine Tool Co., Jackson, Mich. Booth 2A 2.
High-powered precision simplified production type milling machine. Represented by: Charles B. DeVlieg, president and general manager; N. S. Lundberg, chief engineer.

DeWalt Products Corporation, Leola, Pa. Booth 6B 5.
DeWalt Wonder Metal Worker for cutting steel tubing; DeWalt Wonder Worker, a combination woodworker; DeWalt jointer; DeWalt mortiser. Represented by: Paul Gardner, president; Robert H. Mulch, general sales manager; Walter Knapp, engineer; L. J. McLaughlin.

Diamond Machine Co., Providence, R. I. Booth 2A 8.
Diamond face grinding machine; Type H surface grinding machine, universal head; continuous grinding machine. Represented by: D. K. Bartlett, A. A. Wood, L. L. Lorey, Morris Slepkow, G. W. Clausson.

Henry Disston & Sons, Inc., Philadelphia. Booth 4B 8.
Metal cutting saws, files and tool steel; a fast running cut-off machine in operation; band saw machine in operation; hack saw machine in operation. Represented by: S. Horace Disston, vice-president; George Satterthwaite, vice-president; H. A. Baxter, general sales manager for steel and metal cutting saws; J. C. Forrest, sales manager for metal saws; Charles Thompson, experimental engineer; H. Allen, chief metallurgist; Normal Bye, chief engineer.

Dreses Machine Tool Co., Cincinnati, Ohio. Booth 2W 12.
3-ft. 11-in. column Multi-duty radial drill. Represented by: C. E. Gilbert, J. Wiebell, superintendent; J. Disser, chief engineer; A. Schlachta, demonstrator.

E

Eastern Machine Screw Corporation, New Haven, Conn. Booth 1W 3.
"H & G" self-opening die heads; high-speed hob chasers; "H & G" threading machine, chaser grinder and feed pushers. Represented by: C. W. Bettcher, sales manager and secretary; O. H. Hoelzel, A. E. Chadwick, H. F. Wieler, B. DePolo, G. E. Mager, J. E. Jennings, F. J. O'Rourke, A. Jackson, J. C. Fletcher, Victor Larson, H. Dobson.

Eclipse Interchangeable Counterbore Co., Detroit. Booth 5B 4.
Counterbores; countersinks; core drills; multi-diameter cutters and special production tools for automotive and airplane motor manufacturers; operating demonstration of production tools. Represented by: R. G. Michell, general manager; A. C. Warn, assistant general manager; J. H. Smith, sales manager; U. G. Thomas, factory superintendent; L. N. Hall, Cleveland district manager; O. W. Dawson, G. Sealander and C. M. Bigger, sales representatives.

Economy Engineering Co., Willoughby, Ohio. Booth 1W 15.
¾-in. Economy automatic shaving machine, type S; ⅜-in. combined automatic pointing and threading machine; ¾-in. four-spindle semi-automatic threading machine. Represented by: F. O. Andrews, president; F. S. Andrews, assistant president; Louis Steinfurth, chief engineer.

Elwell-Parker Electric Co., 4205 St. Clair Avenue, Cleveland. Booth 6B 1 & 2.
Electric industrial trucks; electric tiering trucks; new Swiss model electric lift trucks; portable electric cranes. Represented by: J. P. Lyons, C. B. Cook, R. F. Crawford.

Ex-Cell-O Aircraft & Tool Corporation, 1200 Oakman Boulevard, Detroit. Booth 5A 9.
Tool steel drill jig bushings; internal grinding spindles; Diesel fuel pump parts; tool detail parts; aircraft engine precision parts. Represented by: N. A. Woodworth, president and general manager; W. F. Wise, sales manager; J. E. Wells, J. F. Hanlon, H. E. Henry.

F

Fafnir Bearing Co., New Britain, Conn. Booth 5W 10.
Line of ball bearings. Represented by: E. R. Carter, H. R. Reynolds, E. B. Hand, W. L. Rager.

Fairbanks, Morse & Co., 900 South Wabash Avenue, Chicago. Booth 5C 9
Sectionalized 25 H. P. squirrel-cage motor; sectionalized clean-air-jacket motor; clean-air-jacketed ball-bearing motor in operation; direct-current ball-bearing motor, a range of various sizes of ball-bearing motors. Represented by: K. W. Jones, J. R. Kindig, H. C. White, J. R. Patterson, Glen H. Corlette, G. J. Podlesak, C. E. McLaughlin, F. M. Gardner, R. L. Johnson.

Farrell-Birmingham Co., Inc., 344 Vulcan Street, Buffalo. Booth 3W 5.
No. 2-A Sykes gear generator; No. 1-A Sykes gear generator; one-tooth pinion stand; gear box of selective type with 40 deg. angle Sykes herringbone gears constantly in mesh; range of Sykes gear tooth comparators. Represented by A. G. Kessler, W. E. Sykes, Austin Kuhns, T. Holloway, H. E. Kitchen, J. Leahy, Paul Manager, John Brandt.

Fellows Gear Shaper Co., Springfield, Vt. Booth 2B 8.
Machines for cutting gears for four-speed transmission gear boxes, including No. 712 high-speed gear shapers for roughing and No. 77 side trimming high-speed gear shaper for finishing; No. 7A drop apron high-speed gear shaper; No. 7A standard high-speed gear shaper for cutting steel gear blanks having a 2-in. face; No. 75 high-speed gear shaper for cutting helical gears; a high-speed gear shaper with a kickoff and reversing attachment for cutting segment gears for a cash register; No. 612A gear shaper for cutting steel gear blanks of 5-in. face width; a thread generator in operation "Red Liner" automatic gear inspection machines; an involute testing machine for inspecting gear shaper cutters. Represented by: E. R. Fellows, president and general manager; E. J. Fullam, secretary and treasurer; R. M. Fellows, purchasing agent; W. F. Slomer, general sales manager; E. W. Miller, chief engineer; E. Stubbs, factory manager; C. C. Bankes, J. B. Strong, C. J. Nagel, F. P. McGrath; Douglas T. Hamilton, advertising manager.

Flather Co., Nashua, N. H. Booth 1W 4.
20 in. x 10 ft. motor driven geared head engine lathe. Represented by: H. L. Flather, president and treasurer; J. H. Flather, vice-president; H. H. Flather, assistant treasurer; J. H. Connor, superintendent.

Foley Mfg. Co., Inc., 11 North East Main Street, Minneapolis, Minn. Booth 6B 3.
Foley automatic saw filers; automatic hack saw grinders;

circular saw grinders; hand saw retoothers; automatic saw setting equipment. Represented by: W. M. Ringer, president; W. F. Rehbock, sales manager; C. H. Carlson, director of production; F. E. Collier, superintendent; G. O. Steen, service manager; W. P. Tobey, Jr., New England sales representative.

Foote-Burt Co., 13000 St. Clair Avenue, Cleveland. Booth 1A 12.
No. 1 surface broaching machine; No. 15½-F six-spindle drilling machine; No. 16 hydraulic feed drilling machine; No. 15½-D drilling machine; No. 22½ high duty drilling machine; BW-23 two-spindle sensitive drilling machine; No. 1¼ two-spindle sensitive drilling machine; DE-1 single-spindle sensitive drilling machine; No. 4½ independent feed drilling machine. Represented by: G. E. Randles, president; T. H. Doan, Jr., vice-president; R. E. Delamater, Ira D. Grove; W. F. Babcock, Detroit representative; David F. Noble, Chicago representative; Herbert Kennedy, Eastern representative.

Fosdick Machine Tool Co., Cincinnati. Booth 1A 3.
No. 2 two spindle sensitive drill, 13 in.; No. 4 two spindle sensitive drill, 24 in.; No. 5 three spindle sensitive drill, 16 in.; 6 ft. 19 in. column Economax radial drill. Represented by: N. B. Chace, William C. DeRoo, A. Kuehn.

Foster Machine Co., Elkhart, Ind. Booth 2C 2.
No. 5 all geared head universal turret lathe; 1-F turret type Fastermatic; 3-F platen type Fastermatic; 3-F turret type Fastermatic; 4-F platen type Fastermatic. Represented by: W. H. Foster, president; H. A. Moore, general sales manager; Carl Moser, Jr., Harry Lyon, O. B. Clemens.

Fredericksen Co., Saginaw, Mich. Booth 5W 6.
Spindle bearings; lead screw nuts; miscellaneous machine tool bearings and bushings of Sabeco bearing metal; worm gear castings. Represented by: Arthur A. Schupp, general manager; Henry C. Limbach, sales manager; C. D. Proctor, Ralph H. Sherry, Karl A. Agricola; William L. Agricola, superintendent.

Frew Machine Co., 124 West Venango Street, Philadelphia. Booth 3W 16.
No. 1 automatic tapper; No. 4 hand milling machine; No. 0 Duplex drill; No. 2 automatic tapper. Represented by: George H. Frew, H. Edwards.

G

Gairing Tool Co., Detroit. Booth 4B 2.
Small tools; swing tool boring and facing heads; full floating holders; quick-change floating tap holders; multiple boring and facing cutters; multiple operation core drilling, counterboring and chamfering tools, inserted blade and solid type; Gairing nose drive reamers, inserted blade and solid; inserted blade hollow mills; inverted counterbores; standard counterbore sets for tool room machine shop use; chucking reamers; off-set spot facing heads; grinding fixtures. Standard type A, B and C counterbores and core drills, multiple operation cutters, Gairing full floating holders and nose drive reamers in operation. Represented by: E. Gairing, president; C. E. Wyrick, general manager; B. O'Meara, assistant manager of sales; D. G. Hawksworth, assistant chief engineer; William B. McClellan.

Gallmeyer & Livingston Co., Grand Rapids, Mich. Booth 2B 15.
Grand Rapids hydraulic feed surface grinders, hand feed surface grinders, universal cutter and tool grinders, twist drill grinders, tap grinders, combination twist drill and tap grinders. Represented by: C. H. Gallmeyer, treasurer; S. Owen Livingston, vice-president; B. C. Saunders, secretary; J. DeKoning, engineer.

Gardner Machine Co., Beloit, Wis. Booth 1W 20.
No. 9 40 in. super disk grinder in operation, grinding coils springs; No. 84 special automatic hexagon nut grinder in operation, grinding hex nuts; No. 86, 30 in. horizontal grinder with hand operated swinging work table; No. 3-CB Speed-U-Need polishing lathe; No. 3-DA double spindle Speed-U-Need polishing lathe. Represented by: L. W. Thompson, president; F. E. Gardner, vice-president; W. B. Leishman, treasurer and sales manager; B. H. Pratt, superintendent of service; F. M. Risler, Detroit manager; Harold Prigoff, Eastern manager; H. J. Gaumond, P. L. Watson, W. L. Townsend, H. C. Steinbuck and A. B. Davenport, Jr., sales engineers.

Gaterman Mfg. Co., W., Manitowoc, Wis. Booth 5C 2a.
Pneumatic oscillating tapping machines. Represented by: W. Gaterman, president; E. Gaterman, secretary and treasurer; F. H. Kind, master mechanic.

Gears & Forgings, Inc., 3010 Woodhill Road, Cleveland. Booth 3W 15.
Gears; forgings; reduction units; machine tool parts; transmissions. Represented by: R. B. Tripp, general sales manager; R. K. Plummer, assistant sales manager; C. E. Broome, district sales manager; H. J. Awig, engineer.

General Electric Co., Schenectady, N. Y. Booth 4A 2.
Motors and control applicable to machine tools.

General Radial Drilling Machine Co., 1767 Elmore Street, Cincinnati. Booth 2W 14.
5 ft. 15 in. column hydraulic radial drill; 3 ft. 9 in. column sensitive radial drill. Represented by: R. B. Busch, president; J. Schaffner, chief engineer.

Geometric Tool Co., New Haven, Conn. Booth 1W 21.
Self opening die heads; style D for hand machines; KH for hand machines; DS for Brown & Sharpe automatics; KD rotary heads for live spindles; special purpose tools; collapsing taps receding chaser taps; solid adjustable die heads; solid adjustable taps; threading machines; chaser grinder; chaser grinding fixture. Represented by: James W. Sneyd, vice-president; G. A. Denison, sales manager; P. A. Pritchard, sales engineer; L. G. Spealman, production engineer.

Giddings & Lewis Machine Tool Co., Fond du Lac, Wis. Booth 2C 11.
No. 50 extra heavy table type high pressure power precision horizontal boring, drilling and milling machine. Represented by: C. Gebuhr, R. H. McCormick, A. E. Ulrich, A. L. Carlson, E. E. Wagner.

Gisholt Machine Co., Madison, Wis. Booth 1C 4.
Turret lathes; automatic chucking machines; balancing machines; tool grinder. Represented by: W. J. Hannum, George M. Class, F. M. Long, L. E. Godfriaux, W. I. Senger, C. B. Carr, G. E. Thomas, R. D. Heflin, H. G. Hall, R. E. MacCartney, J. H. Nebel, A. S. Beckman, U. S. James.

Gits Bros. Mfg. Co., Chicago. Booth 5A 8.
Oil cups; oil hole covers; sight feed lubricators; high pressure grease cups; multiple feed oilers; high pressure grease gun and fittings. Represented by: R. J. Gits, president; Frank Zeman, sales manager; J. A. Gits, general superintendent.

Gleason Works, Rochester, N. Y. Booth 1B 4.
3 in. spiral bevel gear generator; 10 in. manufacturing spiral bevel gear generator; 15 in. spiral bevel gear generator; 30 in. spiral bevel and hypoid generator; 4 in. spiral bevel cutter sharpener; 12 in. spiral bevel cutter sharpener; cutter angle testing device; 3 in. straight bevel gear generator; Universal manufacturing bevel gear generator; 12 in. straight bevel gear generator; generator tool grinder; four spindle manufacturing rougher; multiple spindle rougher cutter sharpener; 18 in. combination testing and lapping machine. Represented by: A. L. Stewart, chief engineer; S. H. Earl, works manager; B. H. Bickle, sales manager; F. E. McMullen, chief engineer, gear division.

Goddard & Goddard, Inc., Detroit. Booth 3W 13.
Milling cutters, including special and standard classes in both form and profile type; demonstration of cutting in alloy steel. Represented by: A. N. Goddard, president; E. E. Anderson, works manager; C. S. Goddard, sales manager; William Fritz, superintendent; K. W. Legg and C. H. Wallace, sales engineers; E. E. Guntert, J. Murray, Henry Boggis, E. D. Rummins and Frank Willbrant.

Goss & De Leeuw Machine Co., New Britain, Conn. Booth 1B 3.
6 in. and 11 in. G & DL tool revolving multiple spindle automatic chucking machine; No. 6 work revolving multiple spindle automatic chucking machine. Represented by: Stanley T. Goss, president; Val. C. Hart and J. J. Spring, sales engineers; H. J. Hauck, engineer.

Gould & Eberhardt, Newark, N. J. Booth 1B 6.
No. 9H universal manufacturing gear hobbing machine; 12HS manufacturing gear hobbing machine; 48HS manufacturing gear hobbing machine; 24 in. manufacturing shaper with universal table; 36 in. manufacturing shaper. Represented by: F. L. Eberhardt, president and general manager; H. Ezra Eberhardt, secretary; William F. Zimmerman, chief engineer; Gustave Spies, sales engineer; F. G. Eberhardt, John Duffy, John Allwood, James Craig and Albert Miller, sales representatives.

Greenfield Tap & Die Corporation, Greenfield, Mass. Booth 3W 9.
No. 12 Greenfield high speed internal grinder; No. 1 hydraulic plain grinder; No. 3 motor-in-head cutter and reamer grinder; No. 734 threading machine with automatic opening die head; snap, plain and thread gages; acorn and button dies; ground and cut thread taps; twist drills; screw slotting cutters; reamers; pipe tools. Represented by: W. B. duMont, vice-president in charge of sales; R. B. Hubbell, manager, machine tool department; E. J. Bryant, manager, gage and reamer department; Louis Battey, manager, small tool department; A. M. Drake, chief engineer; F. Judge, general superintendent; C. C. Ziegler, C. H. Coe, B. G. Munyan, A. T. Ritchie, J. K. Penny, A. J. Kiehne, B. F. Butterfield and G. W. Demarest.

Greenlee Brothers & Co., Rockford, Ill. Booth 1B 2.
Four spindle automatic screw machine; multiple spindle

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drilling machine. Represented by: G. C. Purdy, president; J. H. Mansfield, chief engineer; A. H. Eggers, sales manager; L. H. Geddes, F. J. Hollem, J. C. Beers.

Gurney Ball Bearing Division, Marlin-Rockwell Corporation, Jamestown, N. Y. Booth 4W 14.
Radial, radio-thrust and thrust ball bearings; head stocks, a valve grinder, vertical electric motors and a reduction unit, all equipped with Gurney ball bearings. Represented by: H. A. Johnston, sales manager; Coleman Darnell, assistant sales manager; A. A. McGowen, advertising manager; O. H. Koelker, D. K. Hatch, sales representatives.

H

Hall Planetary Co., Fox Street and Abbotsford Avenue, Philadelphia. Booth 2W 11.
Type B Planetary full automatic; type A Planetary illustrating various types of threads and bores; type D Planetary in production as internal milling; machinabilameter—a new instrument for testing the machineability of metals. Represented by: P. Hall, G. Stafford, H. C. Sheaffer, H. Leisner.

Hammond Mfg. Co., 7808 Kinsman Road, Cleveland. Booth 5A 2.
Radial drilling and tapping machine; pedestal automatic tapping machine; cabinet base polishing and buffing machine; six spindle hydraulic drilling machine. Represented by: William D. Buss, J. J. Stephens, C. M. Allen, Glenn M. Hood.

Hanna Engineering Works, 1765 Elston Avenue, Chicago. Booth 3W 10.
Hanna rapid riveter—capacity ¼ in. rivets cold; Hanna yoke riveter—capacity ⅝ in. rivets cold; Hanna closed yoke riveter for automobile chassis frame riveting; Hanna turret riveter for automobile chassis frame riveting. Represented by: A. F. Jensen, president; J. C. Hanna, chief engineer; L. F. Weldon, O. F. Weiss, G. B. Lytle and E. J. Charron, sales representatives.

Hannifin Mfg. Co., 621 South Kolmar Avenue, Chicago. Booth 5B 9.
Air operated chucks; air operated arbor presses; air operated rivet presses; air operated work holding fixtures; air operated vises; air control valves; air pressure regulating valves; air operated expanding mandrels; air clutch countershafts; stationary double-acting air cylinders; hydropneumatic broaching presses; boring bars; air-operated devices. Represented by: V. W. Peterson, president; J. H. Sipson, assistant general manager; R. A. Bean, H. H. Mercer and E. D. Thompson, sales engineers.

Hanson-Whitney Machine Co., Hartford, Conn. Booth 2B 6.
Universal semi-automatic thread milling machine; universal vertical tool and die shaping machine; rapid precision centering machine; taps, gages, hobs and screws, finished after hardening by the Hanson process. Represented by: J. W. Johnson, C. A. Lauridsen, H. C. Chellman; E. A. Hanson, president; L. B. Reed, general manager; George McPherson, A. G. Brice, H. B. Morrison, E. H. Huntington.

Hardinge Brothers, Inc., Chicago. Booth 2W 7.
Bench lathes and attachments; bench millers; quick-change precision lathe. Represented by: J. F. Griswold, president; Henri E. Nelson, general manager, machine tool division; Henry C. Sharp, director of engineering; Edward A. Iverson, representative.

Heald Machine Co., 10 New Bond Street, Worcester, Mass. Booth 2A 7.
No. 72A-3 Size-Matic internal grinding machine; No. 72A-3 Gage-Matic internal grinding machine; No. 72A-5 airplane cylinder grinding machine; No. 25A rotary surface grinder with 30 in. chuck. Represented by: J. N. Heald, Richard A. Heald, Roger N. Heald, S. T. Massey, W. Guild, R. A. St. John, J. R. Carlson.

Hendey Machine Co., Torrington, Conn. Booth 1D 2.
12 in. x 5 ft. high-speed ball bearing lathe; 12 in. x 5 ft. geared head lathe, taper attachment, oil pan, No. 3 drawing-in attachment; 18 in. x 10 ft. geared head lathe, ball bearing spindle, taper attachment, sub headstock; 16 in. heavy-duty crank shaper; 32 in. heavy-duty crank shaper; No. 12 hydraulic broaching machine. Represented by: S. H. Childs, vice-president and general manager; W. A. Reynolds, assistant to vice-president; A. H. Hall, sales manager; P. H. Buxton, superintendent; C. Bouillon, George Knight, H. Blakeslee and R. J. Peterick, assistant superintendents; W. F. Henly, New York branch manager; F. C. Parman, Rochester branch manager; E. B. Barker, Detroit branch manager; P. W. Rice, Chicago branch manager; R. B. Shaw, Dayton branch manager; F. J. McCarty, special representative.

Henry & Wright Mfg. Co., Hartford, Conn. Booth 2W 4.
Henry & Wright dieing machines (high-speed automatic punch presses); multiple station progressive dies; high-speed multiple spindle sensitive drilling machines. Represented by: J. F. Funk, general manager; C. F. Sherman, chief engineer; J. J. Dale, Western sales manager; R. B. Weeks, C. H. Hamilton, F. H. Spiegel, W. J. Henry.

Higley Machine Co., South Norwalk, Conn. Booth 2W 9.
Higley 8 in. capacity Coldcut sawing machine equipped with screw feed table for feeding heavy bars up to cutting position and swivel type front table with gage stop to handle pieces being cut off and to gage length of pieces. Represented by: L. M. Waite, general manager; I. S. Smith, sales manager; M. H. Waite, service manager.

Hill-Curtis Co., Kalamazoo, Mich. Booth 2W 8.
Electric grinders, bench and pedestal type; belted grinders, bench and pedestal type; electrically driven railroad journal wedge reclaimer; selective speed tool and productive grinders, electric; Rite Speed electric polishing lathe; belted polishing lathe; disk grinders, electric. Represented by: W. C. Hammond, president; W. J. Holtmeier, sales manager; H. J. Kingsbury, chief engineer.

Hisey-Wolf Machine Co., Cincinnati. Booth 2W 22.
Electric drills, grinders, buffers. Represented by: John W. Friedlander, J. E. Hauser, Roy D. Haworth, C. J. Henefelt, Albert Kiefer, George Moerlein, P. A. Rebok, E. Ritz, Jr., T. R. Sanders, H. W. Wallace.

Hoefer Mfg. Co., Freeport, Ill. Booth 2W 1.
5-7½ h.p. production drillers; auxiliary heads. Represented by: Chester A. Hoefer, secretary; Paul Andree, general manager; Ernest Kracht.

E. F. Houghton & Co., Philadelphia. Booth 6B 4.
Microstructure of steels after Society of Automotive Engineers' recommended heat treatment; Houghtoclean for metal cleaning; Hocut for metal cutting; Vim leather belting and leather packings; lubricating oils.

Hyatt Roller Bearing Co., Newark, N. J. Booth 5A 5.
Hyatt bearings for machine tool application; photographic illustration of bearing applications to machine tools ranging from board drop hammers to finishing tools of every kind. Represented by: F. S. Darke, L. L. Hill, W. T. Long, L. F. Stuebe, sales engineers; C. L. Newby, manager, industrial division, Chicago; J. M. Kelly, manager, Pittsburgh sales district; H. M. Carroll, advertising manager.

Hydraulic Press Mfg. Co., Columbus, Ohio. Booth 3W 4.
H-P-M hydro-power press; H.P.M. hi-speed Hydraulic shop press. Represented by: F. B. MacMillin, H. F. MacMillin, P. A. Harlamert, W. Ernst.

I

Illinois Tool Works, 2501 North Keeler Avenue, Chicago. Booth 5C 1.
Milling cutters; hobs; reamers; broaches; ground form tools; die filing machines; tool testing fixtures, Wedgelock tool holders. Represented by: S. O. Bjornberg, P. J. Nelson, A. W. Swanson.

Ingersoll Milling Machine Co., Rockford, Ill. Booth 1C 1.
Ingersoll 4-head adjustable rail heavy pattern milling machine openside milling, boring and drilling machine; face milling cutter grinder; line of Ingersoll standard and special milling cutters. Represented by: Amos A. Braid, Robert M. Gaylord, W. C. Sproul, J. R. Johnson, A. H. Lyon, E. K. Morgan, H. C. Rose, F. J. Malone, J. M. B. Scheele, W. M. Grove, J. M. Macrae, G. L. Bradley, S. W. Fish, Walter Hangartner, Parnell Divine.

International Machine Tool Co., Indianapolis. Booth 1W 16.
1-H 24 x 5¼ in. Libby-International turret lathe with power feed cross slide turret; 3-H 29 x 8¼ in. Libby-International turret lathe with rigid turret. Represented by: O. B. Iles, T. P. Dickinson, Harry Heidergott, Alfred Ruwe.

THE IRON AGE. Booth 5W 6a.
Represented by: F. J. Frank, president; C. S. Baur, general advertising manager; Emerson Findley, Central Western representative; B. L. Herman, western N. Y. State representative; Peirce Lewis, Detroit and Cincinnati representative; C. H. Ober, New York representative; W. B. Robinson, Pittsburgh representative; W. C. Sweetser, New Jersey representative; D. C. Warren, New England representative; F. S. Wayne, Western representative; C. E. La Chaussee, St. Louis representative; H. E. Leonard, O. Johnson and B. H. Hayes, assistants to general advertising manager; W. W. Macon, managing editor; F. L. Prentiss, Cleveland editor; R. A. Fiske, Chicago editor; R. E. Miller and B. Finney, editorial staff; A. H. Dix, manager reader service department.

J

Jones & Lamson Machine Co., Springfield, Vt. Booth 1A 10.
Hartness automatic dies and chasers, screw thread comparator, Hartometer; Flanders ground thread taps; chaser

grinder. Represented by: R. E. Flanders, manager; H. S. Bael, assistant general manager; E. T. Bysshe, chief engineer, die division; E. F. Lockwood, H. G. Taylor, H. A. Trimble.

Jones & Lamson Machine Co., Springfield, Vt. Booth 2C 6.
2¼ x 24 Hartness flat turret lathe for bar work; 3 x 36 Hartness flat turret lathe for chucking work; 14 in. standard Fay automatic lathe for second operation on clutch gear; 14 in. standard Fay automatic lathe for finning operation on airplane cylinders; 14 x 50 in. Fay automatic lathe with center drive tooled to machine large truck rear axle in one operation; 24 x 42 in. Fay automatic lathes for machining large flange shaft. Represented by: R. E. Flanders, manager; H. S. Beal, assistant general manager; J. E. Lovely, chief engineer, Fay department; W. F. Howard, F. W. Dodge, C. A. Erskine, B. L. Billings, A. L. Currie, H. C. Miller, F. A. Parker, G. J. Keller, F. L. Watkins, A. V. Wiggins, J. C. Price, C. H. Seaver, J. C. Hebert, J. L. Reilly.

K

Kane & Roach, Inc., Syracuse, N. Y. Booth 3W 14.
Literature and motion picture display of Kane & Roach equipment. Represented by: W. E. Kane, president; R. C. P. Kane, vice-president; H. W. Kane, secretary; H. Wier, engineer.

Kearney & Trecker Corporation, Milwaukee. Booth 2B 7.
No. 2 standard universal Milwaukee milling machine; No. 2 rotary vertical Milwaukee milling machine with skip-stock rotary table; No. 1402 Mil-waukee-Mill Simplex; No. 2207 bridge type Mil-waukee-Mill. Represented by: Theodore Trecker, president; E. J. Kearney, secretary and treasurer; George L. Erwin, Jr., sales manager; M. J. Schmitt, assistant sales manager; C. M. Cheadle, Jr., advertising manager; C. R. Hochmuth, William K. Andrew.

Keller Mechanical Engineering Corporation, 70 Washington Street, Brooklyn. Booth 2C 3.
Type BL-2416 Keller full automatic tool room machine equipped with two-template rigging and attachment for locating and jig boring; No. R6 cutter and radius grinder; a Kellocater complete unit with over-arm and spindle equipped with power feed; Kellerflex flexible shaft machines including a 1 h.p. outfit. Represented by: J. F. Keller, president; Henry Schreiber, Charles Bitter, Paul Renno, W. L. MacRae, E. D. Ashley, Arthur Jenner.

Kelly Reamer Co., Cleveland, Ohio. Booth 5W 12-13.
Boring and reaming tools, including special production tools for boring and reaming and multiple cutting; turret lathe; drill press; horizontal boring mill; vertical turret lathe equipment for all types of work, particularly for cylinder crankcase and multiple cutting operations. Represented by: H. C. Putnam, president; E. W. Putnam, vice-president and general manager; D. E. Van Deusen, sales manager; A. H. Howard, sales engineer.

Kempsmith Mfg. Co., Milwaukee. Booth 1B 7.
Milling machines. Represented by: Robert J. Wilson, Frank Wollaeger, L. J. Radermacher, H. L. Livesay, Charles Watson, A. E. Nieman, Walter Mickelson, Hugo E. Czerwonky, R. F. Shaw.

Kent Machine Co., Cuyahoga Falls, Ohio. Booth 5A 1a.
Six spindle horizontal driller; double head countersinker; bar pointer; stud threader. Represented by: A. B. Babbitt, secretary and sales manager; A. F. Sinclair, factory manager.

Keystone Lubricating Co., Twenty-first and Clearfield Streets, Philadelphia. Booth 6A 2.
Keystone safety lubricators; Poneuma-Lectric lubricating system; grease cups; greases (solid, semi-solid cup greases, liquid greases for ring oil bearings). Represented by: H. A. Buzby, president; George W. Hall, Peter Cassady, C. O. Norstrum, Philip King, H. M. Ludwick, Vic Berguson, R. C. McDaniels, G. W. Quinn, M. C. Schwenk.

King Machine Tool Co., Cincinnati. Booth 1A 2.
Heavy duty vertical boring and turning mills. Represented by E. A. Muller, C. F. Muller, I. Herbst, H. Glensman.

Kingsbury Machine Tool Corporation, Keene, N. H. Booth 2W 10.
Automatic multi-spindle indexing machine for drilling, reaming and tapping with pneumatic synchronization of spindle stroke and index, automatic two spindle vertical drilling and burring machine; automatic three spindle dial feed tapping machine; type AC opposed spindle drilling and tapping machine; model 30 drilling head; model 30 T. tapping head. Represented by: E. J. Kingsbury, president and treasurer; G. Swahnberg, chief engineer; J. E. Anderson, factory manager; H. B. Jones and G. G. Hathaway, sales engineers.

W. B. Knight Machinery Co., St. Louis. Booth 1W 10.
No. 4 and No. 2 Knight millers; set of dial indicators mounted on No. 4 miller for jig boring; high speed, horizontal, shaping, circular milling and index attachments for use on either No. 4 or 2 millers. Represented by: H. E. Knight, vice-president; Robert Smith.

L

William Laidlaw, Inc., Belmont, N. Y. Booth 5B 3.
Type CM 30 in. metal cutting band saw; type JM 20 in. metal cutting band saw; type SM 20 in. metal cutting band saw. Represented by: William Laidlaw, president; E. O. Jenkins, sales manager.

Landis Machine Co., Waynesboro, Pa. Booth 1B 8.
¾ in. Landis automatic forming and threading machine; 6 in. Landis pipe threading and cutting-off machine, motor driven, Lanco heads for automatic, semi-automatic and hand operated threading machines; Landmatic heads for turret lathes and hand operated screw machines; Victor collapsible taps for internal threading; Victor receding chaser collapsible taps for internal threading; Victor adjustable taps. Represented by: C. N. Kirkpatrick, sales manager; G. M. Stickell, assistant sales manager; R. G. Mumma, manager, Victor plant; S. W. Mathias, engineer; J. T. Benchoff, M. B. Henneberger, J. I. Davis.

Landis Tool Co., Waynesboro, Pa. Booth 1W 18.
Hydraulic cam grinder; hydraulic oscillating grinder; plain hydraulic grinder; hydraulic crank grinder. Represented by: R. F. Ingram, sales manager; Paul Stoner, sales engineer; F. W. Pensinger, advertising manager; A. P. Steiner, chief engineer; C. M. Talhem, F. M. Gertiser and William Ibsen.

La Salle Tool Co., Ottawa, Ill. Booth 3W 12.
No. 824 full electric automatic surface grinder; No. 3 electric surface grinder; No. 1 electric plain and surface grinder. Represented by: F. S. Knowles, president; John C. Kopf, general manager.

R. K. LeBlond Machine Tool Co., Cincinnati. Booth 2C 1.
No. 12 LeBlond heavy duty automatic lathe, texrope motor drive; No. 16 heavy duty automatic lathe; texrope motor drive; 11 in. x 4 ft. rapid production lathe with facing attachment, pan, pump, belted motor drive; 25 in. x 12 ft. heavy duty geared head engine lathe with geared motor drive; 15 in. x 8 ft. heavy duty geared head tool room with relieving attachment, draw-in attachment, taper attachment, pan, pump and texrope motor drive; 16 in. x 5 ft. rapid production lathe with plain rests, rapid power traverse, pan, pump, belted motor drive; No. 1 cutter grinder complete with all attachments, with power feed to table, and completely motor driven. Represented by: H. C. Pierle, sales manager; William F. Groene, vice-president; B. N. Brockman, William E. Groene, C. C. Carr, Dave Mills; William E. Strauss, works manager; W. L. Rybolt, advertising manager.

Lees-Bradner Co., Cleveland. Booth 3W 1.
Thread millers and gear cutters. Represented by: E. J. Lees, H. C. Young, T. E. Lord, R. A. Zilm, C. H. Eden.

Lehmann Machine Co., 3560 Chouteau Avenue, St. Louis. Booth 2W 24.
Geared head, motor driven engine lathe; gear lapping machine. Represented by: Paul Lehmann, A. H. Lehmann.

Leland-Gifford Co., Worcester, Mass. Booth 2B 1.
12 in. one spindle belt and motor spindle sensitive drill; 14 in. two spindle belt and motor spindle sensitive drill; 24 in. two spindle belted spindle drill. Represented by: S. B. Dowd, sales manager; H. P. Sawtell, D. H. Boothby, C. H. James, E. D. Baldwin, E. A. Heidlinger, T. A. Poutter, W. E. Fors, E. F. McCaffery.

Lincoln Electric Co., Colt Road and Kirby Avenue, Cleveland. Booth 5A 3.
Electronic tornado automatic welder in action; stable arc welder in action; Linc-Weld motors and welders supplies, samples, etc. Represented by: A. F. Davis, vice-president; R. P. Tarbell, O. P. Hanchette, F. W. Kessler, R. B. Tuhey, Morris R. Taylor, E. H. Bergstrom.

Link-Belt Co., Indianapolis. Booth 4C 1.
Link-Belt silent, roller and malleable chains and sprocket wheels; automatic idler for use with Link-Belt silent chain drives applied to main and integral shaft of machine tools; Link-Belt Paradox showing detailed action of silent chain on wheels; herringbone speed reducer in operation showing complete anti-friction reducer and full herringbone gears. Represented by: J. S. Watson, vice-president; R. S. Dyson, special engineer; E. H. Smedley, sales engineer; F. H. Dalrymple, R. Wainright, H. R. Cunning, L. Spillan.

Lodge & Shipley Machine Tool Co., Cincinnati. Booth 2B 11.
New 14-in. x 6-ft. Selective head tool room lathe and other lathes. Represented by: J. W. Carrel, H. J. Breitenbach, T. C. Stephens, W. L. Dollo, L. E. Eberts, H. M. Kordenbrock, J. E. Kordenbrock.

Logansport Machine Co., Logansport, Ind. Booth 1W 9.
Air operated work holding devices, including air operated chucks; chucking devices; rotating and non-rotating cylinders; arbor presses; milling and drilling vises; control valves. Represented by: F. B. Wilkinson, president; Frank G. Payson, general manager; J. C. Cotner, sales engineer; Andrew Michael, assistant superintendent.

Lucas Machine Tool Co., 523 East Ninety-ninth Street, Cleveland. Booth 1W 17.
No. 42 horizontal boring, drilling and milling machine; No. 41 horizontal boring, drilling and milling machine with dial indicator indexing device; 30-ton Lucas power forcing press. Represented by: H. M. Lucas, president; G. A. Yost, secretary; J. A. Leighton, sales manager; F. P. Sprague, R. L. Glaser, R. G. Goring, L. Reulbach.

Ludlum Steel Co., Watervleit, N. Y. Booth 6A 4.
Steel and tungsten carbide; mill and fabricated forms; Enduro Nirosto steel; Nitralloy; tool steels; forgings; Strauss metal. Represented by: H. G. Batcheller and F. B. Lounsberry, vice-presidents; A. F. Dohn, sales manager; C. B. Templeton, assistant to president; H. A. DeFries, metallurgist; W. Westover, advertising manager; H. I. Askew, J. C. Gearhardt, H. Hardwicke, G. Peterson.

M

Madison-Kipp Corporation, Madison, Wis. Booth 5W 11.
Fresh oil systems automatic centralized lubrication devices; automatic die casting machine films. Represented by: A. T. Lilligren, sales manager; J. A. Coleman, vice-president; J. A. Courter, eastern sales manager; T. E. Coleman, president; W. G. Coles, chief engineer; T. C. Korsmo, chief engineer of die casting division.

Manning, Maxwell & Moore, Inc., Putnam Machine Works, Fitchburg, Mass. Booth 2B 5.
Putnam 72-in. rotary continuous milling machine and 36-in. type K rotary slitting machine. Represented by: F. H. Walsh, E. L. Fickett, R. G. Holmes, J. H. Welch, W. A. Deems, F. P. Scott, O. B. Schmeltz.

Marschke Mfg. Co., Indianapolis, Ind. Booth 4B 1.
Universal portable electric tools; high cycle portable electric tools; Marschke grinders and Marschke swing frame grinders. Represented by: W. C. Allen, R. D. Black, R. E. Mizener, G. M. Buchanan, A. M. York, Lee H. Hind, Gus Fischer, Ralph Herrick, J. A. Fairfield, Luke Boyd, W. J. Fenwick, W. T. Johnston, Guy J. Coffey, C. C. Watts, W. S. Talbott.

McCrosky Tool Corporation, Meadville, Pa. Booth 5W 14.
McCrosky super-adjustable reamers and reaming bars; boring heads; Wizard quick-change chucks and collets; friction-drive tapping collets; safety tap holders; McCrosky turret tool posts for lathes; self-centering steady-rests; "Neva-Stop" face plates; tungsten-carbide turning tools. Represented by: F. P. Miller, president; R. W. Thomas, general manager; C. M. Sutton, sales manager; Frank Walster, shop superintendent; S. P. Miller, treasurer; Louis Skeel, engineer; W. J. Greenleaf, I. F. Belknap, A. J. Moore, Fred Fisher, I. C. Cameron, Arthur Fell, Frank Findlay.

Michigan Tool Co., 147 Joseph Campau Avenue, Detroit. Booth 5A 4.
Michigan Tool Co. milling cutters, hobs, gear shaper cutters, special tools; Colonial Tool Co. round, spline, and combination round-and-spline broaches; spline gages. Represented by: Otto Lundell, president and general manager; Michigan Tool Co.; O. L. Bard, secretary, Michigan Tool Co.; J. W. Mull, Jr., sales manager, Michigan Tool Co.; C. J. Halborg, general manager, Colonial Tool Co.; E. H. Kurtz, sales manager, Colonial Tool Co.

Modern Machine Tool Co., Jackson, Mich. Booth 5B 6.
Combination drill table and vise as applied to standard drill presses, electric drill presses and radial drills. Represented by: H. G. Walker, manager.

Moline Tool Co., Moline, Ill. Booth 2C 9.
No. 115-D hydraulic feed driller equipped with twelve standard BV type heads; No. 114-U driller equipped with 12 universal joint heads. Represented by: Wilson P. Hunt, C. R. Rosborough, Franklin Johnston, A. E. Lindberg, O. R. Reller, Willis C. Kuschmann, S. L. Brandenburg, R. H. Brandenburg, Louis Hallene, C. W. Hallene, C. E. Parkhurst, A. L. Sackett, Floyd Brown.

Monarch Machine Tool Co., Sidney, Ohio. Booth 2W 21.
16 in. x 6 ft. Monarch Model AA heavy-duty helical geared Timkenized high-speed lathe; 16 in. x 30 in. model C 16-speed helical geared completely Timkenized tool room lathe with full equipment; 24 in. x 10 ft. model N 16-speed extra heavy-duty helical geared Timkenized lathe; hydraulic automatic lathe. Represented by: W. E. Whipp, vice-president and general manager; F. C. Dull, secretary and assistant general manager; P. A. Abe, general superintendent; C. A. Bickel, chief engineer; C. L. Cameron, J. W. Dunn, Stanley Brandenburg.

Morse Chain Co., Ithaca, N. Y. Booth 5W 10a.
Morse silent chain drive; flexible couplings; speed reducer; device showing action of rocker joint; methods of lubrication. Represented by: A. B. Wray, sales manager; D. B. Perry, works manager; R. L. Phillips, R. J. Koch.

Morton Mfg. Co., Muskegon Heights, Mich. Booth 3W 19.
Morton 48 in. stroke high-duty draw-cut shaper with variable speed transmission; 18 in. stationary keyway cutter with direct connected reversing drive unit; Hi-pro keys; Robinson air hose couplings. Represented by: Henry E. Morton, president; G. F. Goble, mechanical engineer; F. Frank Bliss, H. Earl Morton, general superintendent; M. H. Morton, assistant to president.

Murchey Machine & Tool Co., 951 Porter Street, Detroit. Booth 2W 23.
Collapsible taps; self-opening die heads. Represented by: W. C. Beechner, sales manager; P. F. Zerkle, J. H. Coyle.

N

National Acme Co., Cleveland. Booth 1B 5.
4 in. Gridley automatic four spindle chucking machine; 1¼ in. Gridley automatic four spindle bar machine; 9/16 in. Acme automatic five spindle bar machine; centrifugal oil clarifying and separating machine; self-opening dies; collapsing taps. Represented by: A. E. Drissner, chief engineer; A. E. Henn, manager, machinery sales department; H. F. Fussner, manager, die and tap sales department; A. O. Bredemere, W. A. Johnson, R. J. Preston, W. G. Furlong, E. C. Lange.

National Automatic Tool Co., Richmond, Ind. Booth 1D 1.
Multiple spindle way driller; multiple spindle way tapper; vertical hydraulic single spindle heavy-duty driller; vertical hydraulic multiple adjustable spindle driller; vertical single spindle Hi-duty gear feed driller; small multiple spindle driller; universal joints. Represented by: H. W. Bockhoff, president; H. C. Hunt, secretary; E. D. Frank, sales manager; E. A. Herrcke, assistant sales manager; R. M. Galloway, chief engineer; M. L. Strawn, C. G. Dvorak, G. E. Moote, W. F. Hart, C. H. Briggs, G. W. Schepman, T. C. McDonald, E. H. Flook.

National Machinery Co., Tiffin, Ohio. Booth 1A 8.
National 1½ in. high-duty heading and forging machine; ⅛ in. automatic nut tapper; ⅞ in. automatic nut tapper.

National Twist Drill & Tool Co., Detroit. Booth 4B 5.
Interlocking slab milling cutters, heavy-duty parabolic type; staggered tooth side milling cutters; inserted blade high-duty face milling cutters; twist drills; reamers; milling cutters; hobs; special tools; taps; dies; screw plates. Represented by: Harry Butler, assistant manager of sales; George Ringstad, advertising manager; C. J. Oxford, chief engineer; W. R. Crook, H. C. Toomey, C. Cornwall, H. W. Springer, H. L. McGregor, president; C. E. Smith, vice-president and sales manager.

New Britain-Gridley Machine Co., New Britain, Conn. Booths 2A 3 and 2W 26.
No. 38 New Britain single-spindle, hydraulically operated work rotating chucking machines. Represented by: H. H. Pease, president; Edward L. Steinle, vice-president and sales manager; George O. Gridley, E. H. Wheeler and D. H. Montgomery, vice-presidents; R. S. Brown, secretary; Frank Rau; T. C. Stirling, G. K. Atkinson, L. E. Jolls, James W. Barr.

New Departure Mfg. Co., Bristol, Conn. Booth 5W 5.
New Departure bearing equipped spindle for vertical multiple spindle automatic; ball bearing equipped spindle and cylinder for large six spindle automatic; ball bearing equipped small high-speed internal grinder spindle; bearing equipped tailstock live centers of various sizes; various types of ball bearings used in machine tools. Represented by: F. G. Hughes, vice-president; T. C. D. Crow, chief engineer; J. H. Beninger, assistant chief engineer; F. W. Marschner, G. W. Fowler, L. H. Gaylord.

Niagara Machine & Tool Works, Buffalo. Booth 3W 20.
Niagara No. 68-B double crank power press, geared, four piece tie rod frame; No. 56 straight side single crank press, geared, four piece tie rod frame; No. 696 power gap squaring shear; No. 4½ inclinable power press, plain, flywheel type; new type No. 340 slip roll former; No. 172 electric combination machine with interchangeable rolls for beading, crimping, turning, wiring, burring, edging and slitting. Represented by: Russell J. Caplin, Dolph F. Lindgren.

Niles Tool Works Co., Hamilton, Ohio. Booth 2D 1.
36 in. and 44 in. side-head boring mill; Time Saver lathe; 62 in. boring and turning mill. Represented by: G. A. Rentschler, O. S. Ackley, L. C. Cole, A. C. Wais, A. T. Kuehner, J. E. Peterson, G. R. Shields, Harry Evans, Walter Brown, Carl Stomps.

Noble & Westbrook Mfg. Co., East Hartford, Conn. Booth 5W 3.

Power and hand operated marking machine for general purposes; rapid production single purpose marking machines; steel marking dies; steel stamps; automatic numbering heads for marking on metal. Represented by R. H. Noble, works manager; H. B. Knoble, superintendent, F. Berthold Helander, sales engineer; George Westbrook, president.

Norma-Hoffmann Bearings Corporation, Stamford, Conn. Booth 4W 4.

Ball, roller and thrust bearings; machine tools of the smaller sizes with sectioned bearing mountings; photographs of machine tool applications; Norma minimeter (a precision measuring instrument); Hoffmann bearing pedestals. Represented by: O. P. Wilson, vice-president; G. R. Bott, engineering manager; D. E. Batesole, assistant engineering manager; Harry L. Day, factory superintendent; C. A. Baden, plant engineer; H. J. Ritter, assistant secretary; R. E. Hecker, Cleveland district manager; C. D. Kilham, sales engineer; T. J. Harley, Chicago district manager.

Norton Company, Worcester, Mass. Booth 2A 10.

Crankpin grinding machine, hydraulic drive; crankshaft bearing grinding machine, hydraulic drive; plain cylindrical grinding machine, hydraulic drive, 10 x 48-in. size; open side surface grinding machine, hydraulic drive, 6 x 10 x 48-in. size; type A cylindrical grinding machine equipped with hydraulic wheel slide movement; type No. 50 crankshaft lapping machine; type No. 15-C cylindrical lapping machine. Represented by: W. L. C. Neilson, vice-president and general sales manager; G. N. Jeppson, vice-president in charge of manufacture; H. W. Dunbar, works manager; C. H. Norton, consulting engineer; A. G. Belden, chief engineer; S. Player, R. A. Cole, W. T. Montague, H. J. Griffing, H. P. Chace, H. Wickstrom, H. N. Harding, A. R. Sandine, John Cook, C. H. Hill, O. A. Knight, M. E. Mattson, G. C. Montague, O. E. Nordstrom, F. W. Smith, C. W. Atwood, H. S. Bowler, W. D. Briggs, H. O. Hedlund, E. W. Hellstrom, H. L. Swainey, G. B. Taft, G. E. Hulbert.

O

Oakite Products, Inc., 22 Thames Street, New York. Booth 4W 1.

Literature and data pertaining to the cleaning of metals, cutting, grinding, rust prevention and stripping finishes, and describing cleaning in industry generally. Represented by: H. L. Gray, A. W. Perry, L. B. Johnson.

Osterlein Machine Co., Cincinnati. Booth 1A 13.

No. 36 Milomatic (an automatic hydraulic reciprocating and indexing bed type milling machine); 28-in. tilted offset miller; 48-in. tilted offset miller; No. 2 Universal standard miller; No. 2 grinder. Represented by: C. D. Oesterlein, Charles Freudenthaler, A. H. Merschel, David F. Noble, G. A. Richey, Carl Kline.

Ohio Machine Tool Co., Kenton, Ohio. Booth 2D 8.

36-in. Super-Dreadnaught shaper; 24-in. shaper; Swift No. 35 flue welder; No. 6 combination copper and steel welder; No. 12 automatic welder; No. 16 projection welder. Represented by: Charles C. Swift, Cecil J. Davis, F. E. Taylor, H. A. Woofter.

Oilgear Company, 647 Park Street, Milwaukee. Booth 2A 5.

Oilgear 25-ton Gooseneck type straightening press; twin-12 horizontal broaching machine; automatic variable delivery machine tool feed equipment. Represented by: H. M. Swigart, president; W. D. Creider, general manager; G. H. Fobian, sales manager; J. P. Ferris, chief engineer; Ernst Weidman, mechanical engineer; E. C. Wollaeger, Donald Clute, W. G. Prasse, E. H. H. Graf, M. E. Engebretson, Frank Kuhagen, A. Hoffman, J. O'Rourke, L. M. Gross.

O. K. Tool Co., Inc., Shelton, Conn. Booth 4B 7.

O. K. metal cutting tools, lathe planer, boring mill and boring tools and holders; including inserted blade milling cutters; boring and facing heads, hollow mills and multiple operation tools. Represented by: R. R. Weddell, chief engineer; F. S. Schroeder, J. W. Costello, L. F. King.

Oliver Instrument Co., Adrian, Mich. Booth 1W 6.

No. 51 Oliver drill grinder; Arc face mill grinder No. 2; drill point thinner; tap grinder; No. 21 drill grinder; S-4 die making machine; heavy duty die making machine. Represented by: E. C. Oliver, Robert J. Sack.

Oster Mfg. Co., 2057 East Sixty-first Place, Cleveland. Booth 3W 17.

Pipe and bolt threading and cutting-off tools and machines. Represented by: A. S. Gould, secretary; R. E. Hyde, chief engineer; R. E. Willis, R. J. Oster.

P

Peerless Machine Co., Racine, Wis. Booth 1A 11.

Metal sawing machines of 6 x 6 in. and 9 x 9 in. capacity. Peerless universal type; metal sawing machines of 14 x 16-in. capacity for heavy-duty work, and billets and large diameters of metal; Chicago No. 2 power pipe threading machine ¼-in. to 2-in. capacity; universal No. 2 portable pipe cutting and threading machine of ¼-in. to 2-in. capacity. Represented by: Charles Rasmussen, president; I. M. Ward, vice-president; R. T. Ingalls, secretary-treasurer; O. M. Jensen, superintendent; A. H. Goetz, sales manager.

Porter-Cable Machine Co., Syracuse, N. Y. Booth 1W 19.

Manufacturing lathe; universal milling machine attachments; portable electric hand belt grinders; portable electric hand saws; two-way belt grinder; flexible belt grinder; spindle sander; disk grinders and sanders; horizontal disk grinder. Represented by: D. J. Ridings, sales manager; A. N. Emmons, chief engineer; E. A. Herrig, F. P. Morrow, G. H. Potts.

Potter & Johnston Machine Co., Pawtucket, R. I. Booth 3W 6.

Automatic chucking machines; automatic chucking or turning machine. Represented by Norman R. Earle, manager of sales.

Pratt & Whitney Co., Hartford, Conn. Booth 2D 1.

13 x 30-in. model B lathe with full relieving attachments; 16 x 36-in. model B lathe; 20 x 48-in. model B lathe; bench machine tool equipment including a P & W bench lathe, No. 3 Universal bench miller, No. 0 Sigourney drill; 14-in. vertical surface grinder; 6-in. vertical shaper, model B; 12-in. vertical shaper, model B; No. 1A and 3A jig borers with regular equipment and full attachments, including indexing table; No. 2 vertical automatic; six-spindle vertical deep-hole driller; complete line of gages; small tools; taps, dies, reamers, milling cutters, punches, etc. Represented by: C. R. Burt, vice-president and general manager; W. P. Kirk, general sales manager; Charles M. Pon, manager small tool and gage divisions; David Ayr, manager machinery division; Frank Hoagland, master mechanic; A. H. d'Arcambal, sales manager small tools and gages; E. C. Shultz, advertising manager; William Law, Harold Welch, M. S. Bradley, William Hunter, P. C. McBeth, H. William Kopf, R. W. Henke, J. D. Allan, Frank Schreiner, D. S. Woods, B. A. Donahue, L. A. Quinn, D. D. Brumbaugh.

Producto Machine Co., Bridgeport, Conn. Booth 1W 14.

No. 50 Producto-Matic milling machine equipped with a four-station flat turret type of work holding fixture; No. 12 automatic single-spindle cam milling machine. Represented by: N. M. Marsilius, president; E. A. Harper and A. J. Cummings, vice-presidents; M. E. Gombar, engineer.

Thomas Prosser & Son, 15 Gold Street, New York. Booth 4C 6.

Widia tungsten carbide lathe tools; planer tools; shaper tools; drills; reamers; milling cutters; boring tools; special tools. Represented by: R. D. Prosser, general manager; W. E. Guild, sales manager; E. R. S. Reeder, J. A. Deakin.

Q

Q-C Engineering & Tool Sales, Inc., 7 East Grand Avenue, Detroit. Booth 4A 6.

Airflex riveting hammers; Roto live centers; Q-C drill bushings and locating pins; quick-clamp standardized fixture units. Represented by: A. H. Pearson, president; A. M. Sargent, assistant general manager; R. E. Bloye, R. W. Burgess, G. D. Scott.

R

Racine Tool & Machine Co., Racine, Wis. Booth 2W 20.

10 x 10-in. Racine shear cut production saw; 6 x 6-in. shear cut production saw, screw feed; 6 x 6-in. gravity feed high-speed saw; 4 x 4-in. junior saw; duplex band saw. Represented by: M. E. Erskine, president; E. R. Larson, J. S. Toohey, William Reinhardt, P. F. Schatzman, S. P. Schafer, P. O. Ott, R. Fuller.

Ramsey Chain Co., Albany, N. Y. Booth 4W 3.

A tachometer exhibit showing lack of friction in chain; panel exhibit showing three Ramsey silent chains operating on small sprockets. Represented by: D. I. Wheeler, sales manager; H. N. Davis, manager Cleveland branch; Daniel Kessler, manager Chicago branch; F. H. Trombley, sales engineer Cleveland branch.

Reed-Prentice Corporation, Worcester, Mass. Booth 2W 2-3.

No. 3 Reed-Prentice new model high-speed ball bearing vertical milling and die sinking machine; 16-in. new model Reed-Prentice sliding geared head lathe; No. 5 Reed-Prentice new model vertical milling and jig boring machine. Represented by: R. C. Blackinton, chief engineer; F. W. McIntyre, vice-president; D. C. Forsman, A. W. Schneider, works manager; G. W. McIntyre, J. A. Benson.

Reliance Electric & Engineering Co., 1088 Ivanhoe Road, Cleveland. Booth 6A 6.

Reliance type T heavy-duty d. c. motors and fully enclosed

fan-cooled motors. Represented by: R. O. Herbig, R. A. McDowell, J. W. Corey, C. L. Peterson, H. H. Howard.

Rickert-Shafer Co., Erie, Pa. Booth 2C 10.
Automatic single purpose threading machines; self-opening die heads; collapsible taps; automatic and semi-automatic tapping machines; chaser grinders; boring heads; chasers. Represented by: George E. Shafer, president; August A. Rickert, treasurer; Arthur A. Shafer, secretary; C. W. Howard, sales manager and representative; J. W. Shea, service manager and assistant representative.

Rivett Lathe & Grinder Corporation, Brighton, Boston, Mass. Booth 5B 5.
Blanchard pulsating system for automatic oil lubrication for machinery; Forkup, Forkans, Forkguns for controlled oil lubrication, pressure grease appliances and systems. Represented by: Frederick C. Blanchard, chief engineer; Thorvald S. Ross, president.

Rockford Drilling Machine Co., Rockford, Ill. Booth 2W 25.
Rockford Two-Way production boring machine; Pullmore industrial clutches. Represented by: E. C. Traner, W. W. Blomberg, J. L. Peterson.

Rockford Machine Tool Co., Rockford, Ill. Booth 2B 3.
Rockford shaper-planer, 42-in. hydraulic driven; 24-in. Rockford Hy-service shaper. Represented by: Morris Monson, production manager; H. B. Newton, vice-president and general manager; R. C. Lind, president; A. B. Leet, chief engineer; J. G. Anderson, superintendent.

Ross Mfg. Co., Cleveland. Booth 4W 9.
Mechanical emery wheel dressing and truing tools; machine cooling fluid pumps. Represented by: M. L. Climo, W. C. Weslow, H. Joslin, D. Kelleher, H. P. Meyer, F. A. Centner.

Rotor Air Tool Co., 5704 Carnegie Avenue, Cleveland. Booth 5B 8.
Portable air drills, grinders, sanders and buffers. Represented by: H. P. Bailey, president; K. L. Pohlman, vice-president; R. J. Cook, factory representative; W. G. Baily, Cleveland district manager; F. B. Engeln, sales department.

Joseph T. Ryerson & Son, Inc., Sixteenth and Rockwell Streets, Chicago, Booth 2D 2.
No. 3, 4 and 7 Ryerson combination shear punch and coper for punching, shearing, coping and notching structural shapes, plates, bars, etc.; 300-ampere Wilson arc welder in operation in a glass booth; No. 2 Ryerson serpentine shear for cutting irregular shapes from sheet steel; Ryerson flue cutter and polisher and Ryerson flue roller; Ryerson No. 0 high-speed friction saw for cutting light metal shapes, moldings, etc.; Ryerson No. 0 high-speed friction saw with rotating attachment for cutting tubes, bars, etc. Represented by: A. G. Bryant, manager; A. P. Schumann, assistant sales manager; R. S. Armstrong, assistant sales manager; I. B. Yates, V. N. Towers, Chicago; H. J. Aagaard, J. M. Lewis, F. J. Clark, F. G. Grosse, R. C. Page, D. MacArthur, J. C. Buckels, W. R. Sprague, T. W. Delanty, I. J. Vyduna, H. D. Broxon, E. J. Burki, E. N. Carlson, A. L. G. Gentles, G. H. Merriell, H. L. Robinson, O. A. Bloomquist, J. A. Egbert, J. M. Eckes, S. J. Johnson, M. C. Fidgeon, A. L. Nacke, R. H. Happersett, E. A. Lynch, H. M. Shaw, D. B. Parker, D. S. Mair, C. J. Harter. P. H. Petersen.

S

Safety Grinding Wheel & Machine Co., Springfield, Ohio. Booth 2B 10.
Heavy portable grinder, Rite Speed floor grinders, grinding wheels for every purpose. Represented by: Charles W. Gwyn, president and manager; H. G. Weinland, secretary; H. G. Bennett, W. H. Vance, C. A. Wampfler, R. S. Dilliard.

Sebastian Lathe Co., Covington, Ky. Booth 1W 24.
20-in. semi-automatic production lathe; 15-in. motor-driven lathes; 11-in. motor-driven lathe; 11-in. high-speed production lathe. Represented by: E. E. Stokes, president; C. R. Cooper, purchasing agent; William Schroeder, superintendent; Ray Rece.

Wm. Sellers & Co., Inc., Philadelphia. Booth 2A 6.
No. 2A drill grinder, capacity 5/16 in. to 3 in. in diameter; drill point thinning machine, capacity ½ in. to 3 in.; No. 1A tool grinding and shaping machine, capacity up to 3 x 3 in.; No. 2 tool grinding and shaping machine, capacity up to 1½ x 2 in.; No. 1 hob and cutter grinder for sharpening straight and spiral gashed hobs up to 12 in. long 12 in. diameter, reamers, taps, spiral milling cutters, etc. Represented by Alexander Sellers, George H. Benzon, John D. McClintic, E. L. Holljes, Coleman Sellers, 3rd, J. C. Hinton, William Sellers, D. F. Robinson, A. Sellers, Jr.

Seneca Falls Machine Co., Seneca Falls, N. Y. Booth 1A 9.
Seneca Falls turning equipment; Lo-Swing lathes; semi-automatic lathe; full automatic lathes; Short-Cut production lathes. Represented by: E. R. Smith, vice-president and general manager; J. A. Fyfe, secretary; P. Branigan, A. Schinkez, F. E. Joel, F. C. Herbert, F. E. Webb, M. C. Day, W. H. Nettle, G. E. Fogarty.

Sidney Machine Tool Co., Sidney, Ohio. Booth 2W 6.
22-in. x 12-ft. Monotrol engine lathe; 16-in. x 6-ft. Monotrol toolroom lathe; 18-in. x 8-ft. Tritrol lathe; open Monotrol geared headstock. Represented by: A. C. Getz, general manager; B. A. Getz, sales manager; F. H. Dickas, chief engineer; A. L. Jennings, superintendent; L. S. Kirdy, W. A. McClure.

Siewek Tool & Die Co., 10233 Woodward Avenue, Detroit. Booth 6A 3.
Represented by O. H. Siewek.

Simonds Saw & Steel Co., Fitchburg, Mass. Booth 4B 4.
Circular and band saws for cutting metal; files; Red Streak hack saws; abrasive grinding wheels. Represented by: George T. Curtis, Harry P. Baumann.

S K F Industries, Inc., 40 East Thirty-fourth Street, New York. Booth 4W 12.
Ball and roller bearings for machine tools. Represented by: P. T. Hopper, W. F. Temple, R. Smith, P. R. Payson, F. E. Ericson, R. H. DeMott, W. Jetter, R. R. Zisette.

Skinner Chuck Co., New Britain, Conn. Booth 4W 13.
Lathe chucks of various sizes and weights; face plate jaws; drill press vises; milling machine vises; drill chuck; air chucks. Represented by: A. E. Thornton, assistant treasurer; D. M. Stevenson.

Sleeper & Hartley, Inc., Worcester, Mass. Booth 5A 1.
No. 2 Universal spring coiling machine with wire reel. Represented by W. H. Blount.

Smith & Mills Co., Cincinnati, Ohio. Booth 2W 19.
One 25-in. back-geared heavy-duty crank shaper constant speed motor drive complete with 7½-hp. motor; One 12-in. single-geared crank shaper constant speed motor drive complete with 2-hp. motor. Represented by: J. E. Mills, president, and W. J. Struewing, superintendent.

Springfield Machine Tool Co., Springfield, Ohio. Booth 1W 7.
14-in. x 6-ft. quick-change geared-head engine lathe; belted motor drive in leg, with taper attachment, Timken bearings, draw-in collet attachment with collets; 18-in. x 8-ft. quick-change geared-head engine lathe, belted motor drive in leg, taper attachment, oil pan, Timken bearings and turret tool post; machine for removing gear teeth from flywheels. Represented by: Edward S. Montanus, secretary, and Paul A. Montanus, vice-president.

Standard Electrical Tool Co., 1938 West Eighth Street, Cincinnati, Ohio. Booth 4C 4.
Portable electric drills; electric-driven grinders; electric-driven buffers; electric-driven polishing machines. Represented by G. H. Feltes, president.

Standard Steel Specialty Co., Beaver Falls, Pa. Booth 5C 5.
Machine keys; Woodruff keys; machine rack; taper pins; elevator guides; special milled sections. Represented by: E. J. Wagner, president, and J. B. Jamison, secretary and sales manager.

Standard Tool Co., 6918 Central Avenue, Cleveland. Booth 5W 2.
Twist drills; reamers; taps; milling cutters; drill chucks. Represented by: H. C. McKean, general manager; W. P. Ross, manager of sales; R. R. Higgins, assistant sales manager; H. R. Hanson, C. C. Buck, T. D. Bascom and J. G. Green.

Stark Tool Co., Waltham, Mass. Booth 1W 23.
Stark Precision lathes; bench milling machine; motor drive unit. Represented by: Frederick T. Potter, factory manager, and E. Clifford Potter, president.

L. S. Starrett Co., Athol, Mass. Booth 5W 8.
Mechanical tools; gages; micrometers; indicators; rules; squares; hack saws; steel tapes. Represented by: H. E. Masters, W. D. Starrett, J. G. Sisson, D. Findlay, sales manager A. H. Starrett and O. J. Rogers.

Stockbridge Machine Co., Abbott Street, P. O. Box 44, Worcester, Mass. Booth 1W 13.
Barrett centrifugal oil extractor, model 1200; centrifugal dryer, model 502; centrifugal washer, model 251; Stockbridge heavy-duty back-geared shaper with patented two-piece crank. Represented by: Leon J. Barrett, R. A. Johnson, H. G. Kilbourne, C. B. Laing and N. F. Holter.

D. A. Stuart Oil Co., 2733 South Troy Street, Chicago. Booth 4W 5.
Stuart's Thread-Kut alloy steel cutting oil; Super-Kool light-colored heavy sulphur base oil; Codol liquid grinding compound; Kleen-Kut soluble oil; Drawsol deep drawing compound; No. 34 soluble quenching oil. Represented by: T. B. Langdon, W. H. Oldacre, C. H. Baker, G. A. Dudley, J. W. Beaver, C. I. Grierson and A. S. Hull.

Sunstrand Machine Tool Co., Rockford, Ill. Booth 1A 7.
No. 40 Rigidmil; No. 33 Rigidmil; No. 22 Rigidmil; No. 3 Rigidmil; 8-in. brake drum lathe; 15-in. automatic stub lathe; 4 x 24-in. centering machine. Represented by: Hugo

L. Olson, president and general manager; G. D. Sundstrand, chief engineer; D. B. Burleigh, general sales manager; L. A. Dumser, assistant chief engineer; Gust H. Ekstrom, works manager; G. A. Markuson, T. B. Buell and A. E. Gutzwiller.

Sun Oil Co., Philadelphia. Booth 4A 4.
Emulsifying and straight cutting oils; machines demonstrating cutting oils; machined parts. Represented by: R. S. Drysdale, C. K. Hague and C. B. Harding.

Superior Machine Tool Co., Kokomo, Ind. Booth 3W 18.
Superior type M-10-in. bench drill, motor-driven; type B-20-in. floor drill, motor-driven; type HD-25-in. floor drill, motor-driven. Represented by: E. A. Simmons, president; C. E. Hansell, secretary; O. L. Ham and M. L. Hensley.

Swift Welder Co., Kenton, Ohio. Booth 2D 8.
36-in. Super-Dreadnaught shaper; 24-in. dreadnaught shaper; Swift No. 35 flue welder; No. 6 combination copper and steel welder; No. 12 automatic welder; No. 16 projection welder. Represented by: Charles C. Swift, Cecil J. Davis, F. E. Taylor and H. A. Woofter.

T

Taft-Peirce Mfg. Co., Woonsocket, R. I. Booth 3W 11.
Adjustable reamers; angle irons; box parallels; boring tool holders; contract service; plug, ring, snap and thread gages; parallels; production and inspection tools; sine bars; Superpower magnetic chucks; surface plates; thread milling machine; toolmakers' knees; V blocks. Represented by: F. S. Blackall, Jr., P. V. Miller, W. E. Rogers and E. D. Wolf.

Taylor & Fenn Co., Hartford, Conn. Booth 2A 3a.
Two-spindle horizontal spline milling machine; high-speed vertical milling machine; two-spindle drilling machine with built-in motors on the head; four-spindle drilling machine; No. 0 spring press; No. 00 spring press; No. 12 motor-driven spring press. Represented by: George S. DeLany and Nels Carlson.

Thompson Grinder Co., Springfield, Ohio. Booth 2W 13.
Thompson 12 x 36-in. self-contained motor-driven Universal grinding machine. Represented by: C. Baldenhofer, president and general manager; H. J. Warrick, vice-president and secretary; W. G. Baldenhofer and J. A. Martin.

Timken Roller Bearing Co., Canton, Ohio. Booth 4W 2.
Timken tapered roller bearings. Represented by: L. M. Klinedinst, W. B. Moore, R. P. Kelley, J. W. Weir, G. D. Thewlis and S. M. Weckstein.

Titeflex Metal Hose Co., 500 Frelinghuysen Avenue, Newark, N. J. Booth 5B 7.
Titeflex all-metal flexible tubing, for the carrying of lubricants and cutting compounds. Represented by: Elbert E. Husted, sales manager, and R. R. Hazel.

Torrington Co., Torrington, Conn. Booth 1W 1.
Three sizes of Dayton-Torrington swaging machines; Torrington ball bearings. Represented by: F. T. Case, G. H. Schneider and M. W. Maine.

Tuthill Pump Co., 131 West Sixty-third Street, Chicago. Booth 5C 3.
No. 1R reversing pump for handling coolant; No. 6M motor-driven pump for handling coolant; No. 2M motor-driven pump for handling coolant; OB motor-driven pump for lubricating or hydraulic service; No. 6C tight and loose pulley drive pump for handling quenching oil; No. 2MS pump unmounted; No. 2CS pump unmounted; Tuthill high-pressure pump for hydraulic service, unmounted. Represented by: G. B. Tuthill, H. E. Kempton, W. C. Croft and H. C. Osborne.

Twin Disc Clutch Co., Racine, Wis. Booth 4W 15.
Dry plate type clutches; multiple disc clutches designed to operate in bath of oil. Represented by: P. H. Balten, president; W. C. Gewalt, vice-president; G. M. Guilbert, secretary and sales manager; R. H. Smith, W. L. Dixon, G. L. Williams.

U

Union Mfg. Co., New Britain, Conn. Booth 5C 8.
Lathe chucks; boring mill chucks; planer chucks; drill chucks; face plate jaws; boring mill jaws; chain hoists. Represented by: C. S. Neumann, president; F. J. Wachter, vice-president and sales manager; A. E. Church, E. I. Stevens.

United States Electrical Tool Co., 2488 West Sixth Street, Cincinnati. Booth 1A 15.
Electric direct-connected grinders and buffers; electric lathe grinders; portable grinders; electric drills. Represented by: G. M. Lawrence, sales manager; G. E. Smith, treasurer; J. A. Smith, president; H. O. Coe, J. C. Goodman, R. H. Clore, F. Franklin, W. B. DaSilva, R. N. Brayer, H. B. Griner, H. N. Kelsey and J. R. Miller.

Universal Boring Machine Co., Hudson, Mass. Booth 2B 4.
No. 40 Triway Universal horizontal boring machine; Hanson measuring attachment. Represented by: John C. Spence, works manager; Leon F. Marsh, Warren B. Robbins and Walter H. Chapman.

V

Van Dorn Electric Tool Co., 3000 Woodhill Road, Cleveland. Booth 4B 3.
Portable electric drills; screw drivers; tappers; nut setters; reamers; portable and stationary polishers; grinders; buffers; drilling and grinding stands, bench type; portable electric hammers; portable automatic heat control glue heaters; electric valve refacers; valve reseating cutters; portable disc sanders; portable electric socket wrench; high frequency portable high production tools. Represented by: F. Schneider, president; F. H. Zulauf, vice-president and general manager; R. W. Proctor, sales manager; E. W. Waechter, assistant sales manager; E. L. Connell, chief engineer; S. S. Waters, L. L. Charnicky, F. R. DuGuay.

Van Norman Machine Tool Co., 150 Wilbraham Avenue, Springfield, Mass. Booth 1A 14.
No. 10 Van Norman Duplex miller, motor-driven, with worm index centers and high-speed spindle; No. 3 Duplex miller, motor-driven, with 10-in. full Universal centers, sub-head, and Universal slotting attachment; No. 25 oscillating grinder, motor-driven, with full ball bearing work heads, special chucking device and water equipment. Represented by: C. E. Van Norman, president; F. D. Van Norman, vice-president; J. Y. Scott, general sales manager; L. H. Campbell, vice-president; William M. Edes, Roger Pyne, H. Bordeaux.

W

O. S. Walker Co., Inc., Worcester, Mass. Booth 2W 8a.
Single-stroke surface grinding machine; magnetic chucks. Represented by: George F. Shirley, Elzcar Laporte, Clayton O. Smith, Howard E. Tracy.

Warner & Swasey Co., Cleveland. Booth 1A 1.
No. 5-A and 1-A Universal hollow hexagon turret lathes in operation on actual work; No. 5 and No. 4 Universal all geared-head turret lathes in operation on actual work. Represented by: P. E. Bliss, president; A. C. Cook, vice-president; C. J. Stilwell, vice-president and general sales manager; E. R. Gardner, H. R. Ward, L. K. Berry, A. H. Keetch, W. K. Bailey, W. L. Loegler, C. S. Stilwell, G. Kochenderfer, F. J. Pelich, L. M. Cole, L. R. Hawkins.

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. Booth 5B 1.
Motor starters; motors; gears; belt drive (cog belt); controllers for motors; electric welders. Represented by: Bernard Lester, C. B. Stainback, H. L. Wilson, P. McShane, W. W. Reddie, J. M. Wetzig.

Whitney Mfg. Co., 237 Hamilton Street, Hartford, Conn. Booth 2B 6.
Chains and sprockets for power transmission. Represented by: R. A. Glass, R. A. Follensby and S. C. Smith.

Whitney Metal Tool Co., Rockford, Ill. Booth 2W 16.
Ball bearing metal punches; lever type metal punches; deep throat metal punches; angle iron machinery; notcher; benders; shears; awls; hammers; rivet sets. Represented by: John Jensen, secretary and manager, and August Jensen.

Williams Tool Corporation, Erie, Pa. Booth 3W 3.
6-in. Williams Rapiduction pipe threading machine; 2-in. double spindle bolt threader; 2-in. portable pipe threading machine; 4-in. Wilco pipe threading machine. Represented by: E. P. Poole, vice-president; D. Moreinis, C. Tankred and H. VanOsten.

Wisconsin Electric Co., Racine, Wis. Booth 5C 4.
No. 5 grinder with attachments A, B and C; No. 3 grinder, tool shop utility tool; No. 2-AG grinder drills; No. 1 grinder motors. Represented by: C. A. Pope, W. B. O'Neill, W. E. Pomeroy.

Y

Yale & Towne Mfg. Co., Stamford, Conn. Booth 4C 5.
Yale chain blocks, trolleys, cranes, electric hoists, motor-driven trolleys, electrical industrial trucks, hardware, locks. Represented by: J. C. Morgan, E. H. Fairchild, H. S. Pierson, R. H. Irwin, F. A. Dewey, M. G. Peck, R. L. Higgins, C. O. Hedner.

Machinery Markets and News of the Works

Tool Demand Drops Slightly

Sales of Heavy Machines, However, Have Been Considerably Better Than in August

ALTHOUGH a decrease in machine tool sales is reported from some centers, business the past week was in fairly substantial volume. Many buyers are refraining from making further major purchases until after the National Machine Tool Exposition in Cleveland, but this tendency is not pronounced in the demand for planers, boring mills and other heavy tools, orders for which have been considerably better than in August.

The General Electric Co. has not yet closed for a number of lathes for its Schenectady, N. Y., works and has postponed placing orders for its Lynn, Mass., plant until next month. The Westinghouse Electric & Mfg. Co. is continuing to order tools for its electric refrigerating manufacturing division at Springfield, Mass., and Pullman Co. is expected to close soon for 18 motor-driven tools for delivery to Buffalo. The United States Aluminum Co., New Kensington, Pa., has begun contracting for equipment for its new machine shop. Union Drydocks, Inc., Port Richmond, N. Y., is inquiring for a list of tools.

The Amtorg Trading Corporation, which was reported a week ago as having closed for a large number of lathes, is negotiating for further equipment, including turret lathes, punches and shears, for shipment to Soviet Russia.

Despite a falling off in fresh bookings this month, unfilled orders of machine tool builders are sufficient to insure production at full capacity during the remainder of the year and in some cases well into 1930.

The National Machine Tool Builders' Association states that the volume of orders booked by members during August recovered considerably from the July recession and was 23 per cent greater than in August, 1928. The association's index shows the three months' average of gross orders at 286.1 for August, a 30 per cent gain over the same month of last year. Unfilled orders at 692.5 were approximately the same as in July. Machine tool plants, declares the association, have been operating overtime to catch up on unfilled orders, still two and a half times current shipments.

New York

NEW YORK, Sept. 17.—Inquiry for machine tools is considerably smaller than in August, but this is attributed by sellers to the desire of buyers to wait until after the National Machine Tool Exposition in Cleveland. Meanwhile, the Amtorg Trading Corporation, New York, which has closed on engine lathes and automatic screw machines for export to Russia, is still negotiating for a list of tools, including turret lathes and punches and shears. The General Electric Co. has not yet closed on lathes for Schenectady, and has postponed purchases for Lynn, Mass., until next month. Recent buying by this company has been for divisions other than the refrigerator manufacturing plant. The Westinghouse Electric & Mfg. Co., however, continues to buy tools for its refrigerator plant at Springfield, Mass., and last week closed for equipment including five engine lathes. Union Drydocks, Inc., Port Richmond, Staten Island, N. Y., is in the market for a number of machine tools and has bought some used equipment. Builders are fully engaged, and deliveries on most tools range from early December to late January or early February.

Murcott & Campbell, 298 Union Avenue, Brooklyn, manufacturers of files, rasps, etc., have awarded general contract to Polito Construction Co., 1601 Avenue P, for one-story plant to cost about $40,000 with equipment. Tillion & Tillion, 415 Lexington Avenue, New York, are architects.

Union Railway Co., 2396 Third Avenue, New York, will build a one-story car repair and equipment works, 34 x 192 ft., to cost about $40,000 with equipment. E. H. Faile is company architect.

Frank S. Parker, 119 West Fifty-seventh Street, New York, architect, has filed plans for a six-story automobile service, repair and garage building, 197 x 200 ft., to cost about $500,000 with equipment.

Dictograph Products Corporation, 220 West Forty-second Street, New York, manufacturer of sound equipment and devices, has awarded general contract to Barney Ahlers Construction Co., 110 West Fortieth Street, for new one-story plant, 100 x 100 ft., at Long Island City, to cost more than $80,000 with equipment.

Union Carbide & Carbon Corporation, 30 East Forty-second Street, New York, is arranging for new stock issue of about $53,000,000, considerable part of which will be used for expansion. Work will include a hydroelectric power project near Glen Ferris, W. Va., to cost about $20,000,000. Construction of power dam has been started and it is understood plant is scheduled for completion in 1930.

Metropolitan Refining Co., 570 Seventh Avenue, New York, manufacturer of oils, colors, paints, etc., is planning new one-story plant, 60 x 175 ft., to cost about $65,000 with equipment.

Thompson Interstate Airways Corporation, operating Pioneer Aero Training School, Flushing, N. Y., is arranging for construction of airport on 280-acre tract in Northvale and Rockleigh Boroughs, Bergen County, N. J., consisting of hangars, repair shops, oil storage and other units, to cost more than $500,000 with equipment.

Certain-Teed Products Corporation, 100 East Forty-second Street, New York, manufacturer of roofing, etc., has leased one-story building at Irvington, Newark, 70 x 228 ft., for new factory branch, storage and distributing plant.

Swan-Finch Oil Corporation, 205 East Forty-second Street, New York, will rebuild part of oil refinery at Linden, N. J., destroyed by fire Sept. 14.

Western Electric Co., 195 Broadway, New York, has filed plans for three new six-story units adjoining works at Kearny, N. J., to cost more than $500,000. Largest structure will be equipped for manufacture of telephone equipment and parts.

Sipp-Eastwood Co., Paterson, N. J., has been organized with capital of 14,500 shares of stock, no par value, to take over and consolidate Sipp Machine Co., and Benjamin Eastwood Co., both manufacturers of textile machinery and parts. Officers of former companies will continue with merged organization, and will carry out expansion.

L. P. Croce Bottling Works, Inc., 930 Summerfield Avenue, Asbury Park, N. J., will soon take bids on general contract for three-story addition, to cost about $65,000 with equipment. C. B. Cook, Asbury Park Trust Building, is architect.

Karl Krause United States Corporation, 114 East Thirteenth Street, New York, American distributor for Karl Krause, Leipzig, Germany, manufacturer of automatic paper cutters, embossing presses, bookbinding and box-making machinery,

is in market for motors for its machines. R. Sunderhauf is secretary.

Alfred Hofmann, West New York, N. J., through Lockwood Greene Engineers, Inc., New York, has awarded general contract to Auf-der-Heide Contracting Co. for machine shop, 100 x 125 ft., for servicing knitting machinery and manufacturing electric lamp and radio tube machinery.

Modern Machine Works, Inc., recently formed, has leased a building at 7 Market Street, Paterson, N. J., to manufacture silk dyeing, finishing, printing and special machinery.

Sound Equipment Corporation, 16 East Fortieth Street, New York, has been organized to manufacture talking picture equipment on contract.

Eureka Metal Finishing Co., Inc., has opened a plant at 1465 Long Avenue, Hillside, N. J.

Philadelphia

PHILADELPHIA, Sept. 16.—Contract has been let by Griffith Tool Works, Second and Duncannon Streets, Philadelphia, to Albert F. Forster, 5440 North Mascher Street, for two-story addition, to cost about $25,000 with equipment.

United States Gypsum Co., 1500 Walnut Street, Philadelphia, with headquarters at Chicago, manufacturer of building products, has plans for an addition to local works, to cost about $150,000 with equipment.

Chester Auto Parts & Machine Co., Chester Pike, Ridley Park, Pa., has awarded general contract to M. Chester Campbell, 111 Market Avenue, for one-story addition, to cost about $30,000 with equipment.

Crane Co., 1301 Locust Street, Philadelphia, has plans for one-story factory branch and distributing plant, to cost about $85,000 with equipment. Headquarters are at Chicago. M. D. Robinson is manager at Philadelphia.

Pennsylvania Railroad Co., Philadelphia, will install elevating, conveying and other mechanical-handling equipment in three-story central freight terminal at Harrisburg, Pa., to cost about $100,000. T. J. Skillman is chief engineer.

Florence Pipe Foundry & Machine Co., Florence, N. J., has asked bids on general contract for one-story addition, to cost over $35,000 with equipment.

General Aero Corporation, operating Holmes Airport, Astoria, L. I., has purchased Amatol Speedway, Hammonton, near Atlantic City, N. J., totaling 500 acres, and plans airport and flying field at that location, including hangars, repair shop and other field units, to cost more than $300,000 with equipment. Clarence B. Chamberlain is consulting aeronautical engineer for company.

Board of Trustees, Pennsylvania State College, State College, Pa., will soon call for bids for new power plant, to cost more than $80,000 with equipment. Charles Z. Klauder, 1429 Walnut Street, Philadelphia, is architect; J. G. White Engineering Corporation, 43 Exchange Place, New York, is engineer.

Pusey & Jones Corporation, Wilmington, Del., has authorized an expansion and improvement program in shipbuilding department to cost about $250,000, including new building equipped with electric cranes and other machinery. Clement C. Smith is president.

New England

BOSTON, Sept. 16.—The past week was quiet with the majority of local machine tool dealers. Sales of new tools were mostly in lathes. Dealers state, however, that some promising inquiries have developed, but details are withheld. A few presses, lathes, milling machines and bench equipment were sold by used tool houses. Many machine tool builders have sufficient business booked to keep plants operating at capacity during the remainder of 1929 and some are booked well ahead into 1930.

F. S. Payne Co., 30 Richdale Avenue, Cambridge, Mass., has closed bids on a two-story, 50 x 100 ft., machine shop addition.

Martin Trailer Co., Westfield, Mass., has plans for a one-story factory, 80 x 100 ft., to cost $40,000 without equipment.

Chicopee, Mass., is taking bids for repairs and alterations to its electric lighting plant. Equipment will be purchased.

Bridgeport Boiler Works Co., 202 Housatonic Avenue, Bridgeport, Conn., has filed plans for a one-story addition, 100 x 146 ft., to cost $21,000 without equipment.

National Blank Book Co., Water Street, Holyoke, Mass., has plans for a five-story addition, 60 x 150 ft. Motors and miscellaneous equipment will be purchased.

Hartford Bearings Co., 603 Franklin Avenue, Hartford, Conn., has been organized to manufacture press metal bearings and sheet stampings.

Wilbert J. Nichols, 24 Center St., North Adams, Mass., has filed plans for a coal elevator to replace one recently destroyed by fire. Coal handling equipment will be purchased.

Chapman Valve Mfg. Co., Indian Orchard, Mass., is contemplating a foundry addition.

Following recent purchase of Everett Mills at Lawrence, Mass., for radio tube and equipment manufacture, Noma Electric Corporation, 340 Hudson Street, New York, affiliated with Pilot Radio & Tube Co., has acquired plant and business of New England Wire Co., Westfield, Mass., and will continue operations as a subsidiary. Plant has output of 200,000,000 ft. wire per annum, and large part of production will be used by purchasing company at new plant at Lawrence.

United States Rubber Co., Providence, R. I., will soon begin superstructure for one-story addition to local mill, 100 x 300 ft., to cost about $100,000 with equipment. General contract has been let to Cruise Construction Co., Pawtucket, R. I. Headquarters of company are at Broadway and Fifty-eighth Street, New York.

Warren Telechron Co., Ashland, Mass., manufacturer of bells, clocks, etc., a subsidiary of General Electric Co., is planning call for bids on general contract for one-story addition, to cost more than $50,000 with equipment. Fay, Spofford & Thorndike, 44 School Street, Boston, are engineers.

City Council, Bristol, Conn., is planning purchase of 84-acre tract at East Bristol as site for municipal airport, to include hangars, and mechanical field units, to cost about $100,000 with equuipment.

Eastern Massachusetts Electric Co., Washington Street, Salem, Mass., has plans for a superpower steam-operated electric generating station near local pier of Philadelphia & Reading Railway, to cost more than $10,000,000 with transmission lines. Property is operated under direction of Charles H. Tenney & Co., 200 Devonshire Street, Boston, Mass., engineers, and plans will be prepared at offices of that organization. Work is scheduled to begin early next year.

Pittsburgh

PITTSBURGH, Sept. 16.—Machine tool business has been fairly good this month, despite the fact that a number of purchases are definitely deferred until after the machine tool exhibit in Cleveland. It is reported that the largest buyer of tools in this district will send nearly 100 representatives to the show to check up on new developments before issuing inquiries for tools. The United States Aluminum Co., New Kensington, Pa., is placing tools for its new machine shop and will probably complete purchases before the end of the month. The Westinghouse Electric & Mfg. Co. will soon issue its fourth quarter list. Railroad buying has been lacking in the past few weeks, but is expected to improve as the carriers begin purchasing rails and other materials.

The extremely large backlogs of the heavy machinery makers in this district continue a feature of the market and at least two large manufacturers of steel mill equipment are reported to have enough orders for a year's operation. Additional business is being booked regularly and the problem of delivery is becoming more serious. Many steel companies will buy considerable more equipment than usual for replacement purposes as the high operations over the greater part of the year have tested facilities to the utmost.

Bradford Transit Co., Bradford, Pa., has been formed by officials of Tidewater Pipe Line Co. and South Penn Oil Co., 545 William Penn Way, Pittsburgh, and will be operated as subsidiary. Company will take over pipe lines of both organizations, totaling about 898 miles, and refinery of Emery Mfg. Co., Bradford, manufacturer of lubricating oils, etc. Expansion is planned including refinery extensions and additional pipe lines.

General Motors Corporation, Detroit, has plans by Albert Kahn, Inc., Marquette Building, architect and engineer, for one and two-story parts and service building, 145 x 215 ft., at Pittsburgh, to cost about $150,000 with equipment.

Carnegie Forge & Tool Co., Pittsburgh, care of Allen H. Kerr, 1108 Commonwealth Building, treasurer, recently formed by Mr. Kerr and associates with capital of $25,000, is said to be planning operation of local factory to manufacture tools and kindred products.

Board of Education, Beaver Falls, Pa., is contemplating manual training equipment in two and three-story high school to cost $230,000, for which plans are being completed by Carlisle & Sharrer, Martin Building, Pittsburgh, architects.

Katona Mining Co., 1241 Charleston Avenue, Huntington, W. Va., Samuel W. Perry, president, recently organized by Mr. Perry and associates, has acquired coal properties near East Lynn, W. Va., and plan construction of tipple, power house and other units, and installation of mining equipment. A 1½ mile standard gage railroad will be built. Entire project is reported to cost more than $125,000.

Air-Way Electric Appliance Corporation, Toledo, Ohio, manufacturer of electric heating and kindred equipment, has

purchased plant and business of Erie Heating System, Inc., Erie, Pa., and will consolidate. Plant will be removed to Toledo works, which will be expanded, and products of acquired company will be manufactured under name of Air-Way heating system.

Chicago

CHICAGO, Sept. 16.—The curve of machine tool sales for the past week is upward following a substantial volume of business of a widely diversified character. Farm implement manufacturers are signifying their need for miscellaneous items. The list of the International Harvester Co. for its Farmall works is reported to have been completed except for a few tool room machines, on which deliveries were not an important factor in making early purchases. Fresh inquiry is widespread and for the most part for single tools. The Pullman Company's list for Buffalo is holding the attention of dealers as it is the only list of size that is now before the local trade.

Additional requests for prices for budgets have been made by the railroads, which at the moment have almost wholly withdrawn from the market in the matter of placing orders.

Prices and deliveries remain stationary. The used tool market is active, the number and variety of machines sought being in excess of the available supply.

Scully Steel & Iron Co., 2364 South Ashland Avenue, Chicago, will build a one-story warehouse, 105 x 221 ft., to cost $30,000. G. Barry, 180 North Michigan Avenue, is architect.

Gary Screw & Bolt Co., 2217 West Forty-third Street, Chicago, will erect a one-story shop, 40 x 50 ft. John Boeringer, 53 West Jackson Boulevard, is architect.

Faith Mfg. Co., 2531 North Ashland Avenue, Chicago, manufacturer of radiator caps and kindred metal products, has asked bids on general contract for two-story plant unit, to cost about $45,000 with equipment.

Barco Mfg. Co., 1777 Winnemac Avenue, Chicago, manufacturer of railroad supplies and equipment, has plans for a three-story addition, 50 x 225 ft., to cost about $140,000 with equipment. R. E. Pingrey & Co., 134 South La Salle Street, are architects.

Carlson, Holmes & Bromstad, Inc., 3231 West Thirtieth Street, Chicago, manufacturer of cabinets, etc., has acquired for expansion one and two-story plant at Thirty-first Street and Kedzie Avenue, on site, 598 x 600 ft.

Modern Handy Button Machine Co., 2407 West Ohio Street, Chicago, has awarded general contract to Louis Padorr & Son, 33 North La Salle Street, for one-story addition to cost about $40,000 with equipment. Harry Glube, 360 North Michigan Avenue, is architect.

City Council, Muscatine, Iowa, is considering extensions and improvements in municipal electric light and power plant, to cost about $80,000 with equipment. Burns & McDonnell Engineering Co., Interstate Building, Kansas City, Mo., is engineer.

Davenport Airways, Inc., Davenport, Iowa, care of N. H. Tunnicliff, Citizens Building, representative, has plans for an airport and flying field at Cramfield, near city limits, including hangars, and mechanical field units, to cost about $100,000 with equipment.

The Crane Market

INQUIRY for overhead traveling cranes has been small since the first of the month, but there is a substantial number of inquiries pending award. The Amtorg Trading Corporation, New York, is inquiring for a 20-ton hand power crane for export to Russia. The Union Drydocks, Inc., Port Richmond, S. I., New York, which recently inquired for two small capacity overhead cranes, has postponed purchase until after Jan. 1.

Bowman Dairy Co., River Forest, Ill., has plans drawn for a two-story bottling plant and power house, 200 x 320 ft., to cost about $500,000 with equipment. Frank B. Gray, 73 South La Salle Street, Chicago, is architect.

Board of Education, Emmettsburg, Iowa, is considering installation of manual training equipment in two and three-story senior and junior high school, to cost $170,000, for which plans will be drawn by Keffer & Jones, Masonic Temple, Des Moines, Iowa.

Gardner-Denver Co., Quincy, Ill., manufacturer of slush pumps, air compressors, pneumatic tools, drill sharpeners and high-pressure drill steel forges, has let general contract for an addition to increase production facilities 50 per cent.

South Atlantic

BALTIMORE, Sept. 16.—Aviation Corporation of the Americas, Inc., 100 East Forty-second Street, New York, operating Fairchild Airplane Mfg. Co., 270 West Thirty-eighth Street, and other aircraft units, has taken option on 500-acre tract on Back River, near Todd's Point, Baltimore, as site for new plant to manufacture all-metal flying boats and other combination sea and aircraft. Initial works will comprise units for parts production and assembling, to cost about $750,000 with equipment. Graham B. Grosvenor is president.

Horace E. Dodge Boat & Plane Corporation, care of J. Gilmore Fletcher, 511 Fifth Avenue, New York, vice-president and managing director, has purchased 100-acre tract at Newport News, Va., as site for new plant to manufacture motorboats, flying boats, amphibian airplanes and kindred seacraft. Works will include buildings for parts manufacture and assembling, and will cost about $1,000,000 with equipment. Horace E. Dodge, Jr., is president.

General Gas & Electric Corporation, 50 Pine Street, New York, operating Lexington Water Power Co., Lexington, S. C., and other utilities, has arranged for a preferred stock issue to total $14,850,000, part of proceeds to be used for expansion, including hydroelectric power development in South Carolina. Work is under way on hydroelectric generating station near Columbia, S. C., to have initial capacity of 130,000 kw. Project will include transmission system.

Interstate Milling Co., West Tenth Street, Charlotte, N. C., has plans for addition to feed milling plant to cost about $70,000, including elevating, conveying, screening and other equipment.

McClaren Rubber Co., Charlotte, N. C., has plans for expansion, including installation of additional equipment, to cost over $40,000.

Walter Dobbins, Aiken, S. C., is at head of project to construct an ice-manufacturing plant at Spartanburg, S. C., to cost about $65,000 with machinery.

Kraft-Phenix Cheese Corporation, 400 Rush Street, Chicago, plans installation of conveying equipment and other machinery at milk condensing plant at West Jefferson, N. C.; a power house is proposed. Entire project will cost about $100,000.

City Council, Kinston, N. C., is considering extensions and improvements in municipal electric light and power plant, to cost about $100,000 including equipment.

Old Dominion Manganese Corporation, Crimora, Va., will make extensions and improvements in local manganese properties and install additional mining equipment.

Detroit

DETROIT, Sept. 16.—Contract has been let by Grand Trunk Railway System, 400 East Jefferson Avenue, Detroit, to Ellington Miller Co., 417 South Dearborn Street, for engine house, machine shops and power house at Pontiac, Mich., to cost about $100,000 with equipment.

Wayne County Board of Commissioners, Barlum Tower, Detroit, is asking bids until Sept. 23 for pumping plant to cost more than $400,000. F. S. Slater, 16134 Princeton Avenue, is architect; Hubbell, Hartgering & Roth, Buhl Building, are engineers.

Michigan Brass & Iron Works, Lansing, Mich., has resumed production following recent fire. New units have been built and capacity will be increased. Company is considering erection of a one-story addition on adjoining site for its brass division, which is now operated as a separate unit elsewhere, to cost more than $60,000.

Bull Dog Electric Products Co., 7610 Joseph Campau Avenue, Detroit, manufacturer of electric switches and kindred products, is said to be planning new one-story machine shop, to cost about $45,000 with equipment.

Battle Creek Gas Co., Battle Creek, Mich., has awarded general contract to S. B. Cole & Son, Inc., local, for three-story and basement equipment storage and distributing plant, 95 x 100 ft., with repair division, to cost about $140,000 with equipment.

State of Michigan Boys' Vocational School, 400 North Pennsylvania Avenue, Lansing, will soon take bids for two-story vocational school, to cost about $200,000 with equipment. Bowd & Munson, Wilson Building, are architects; McColl, Snyder & McLean, Penobscot Building, are mechanical engineers.

Wolverine Bolt Co., 9660 French Road, Detroit, has asked bids on general contract for one-story plant unit, to cost about $70,000 with equipment. D. B. Ireland is secretary and treasurer.

Detroit Stoker Co., General Motors Building, Detroit, is said to be planning a two-story addition to plant at Monroe, Mich., to cost about $30,000 with equipment.

Department of Public Lighting, 174 East Atwater Street, Detroit, has awarded general contract to Gallagher & Fleming Co., 6500 Epworth Boulevard, for one-story equipment storage and distributing plant, to cost about $34,000 with equipment. Smith, Hinchman & Grylls, Marquette Building, are architects.

Buffalo

BUFFALO, Sept. 16.—National Lime & Cement & By-Products Corporation, Stock Exchange Building, Buffalo, will soon break ground for new plant near Tuscumbia, Ala., for lime production. Project will include large crushing plant, and will cost more than $200,000 with machinery. Soule & Zepp, 507 North Charles Street, Baltimore, are consulting engineers. Thomas K. Morris is vice-president.

North American Lloyd Aircraft Corporation, 535 Fifth Avenue, New York, has plans for airport at Jamestown, N. Y., including hangar, with repair facilities and other buildings, to cost about $100,000 with equipment. F. D. Amory, Jr., 551 Fifth Avenue, New York, is architect.

Brewer-Tichenor Corporation, Cortland, N. Y., manufacturer of automobile equipment and accessories, has awarded general contract to Austin Co. for one-story addition, to cost about $50,000 with equipment.

American LaFrance-Foamite Corporation, Elmira, N. Y., manufacturer of fire engines, trucks, etc., has asked bids on general contract for one-story addition, to cost about $55,000 with equipment. Haskell & Considine, Hulett Building, are architects.

Department of Public Works, Municipal Building, Buffalo, will soon begin construction of municipal marine airport, including shops for repair and reconditioning, to cost about $150,000 with equipment. Col. Howard Beck, Huyler Building, is city architect.

Cleveland

CLEVELAND, Sept. 16.—The machine tool market was rather quiet the past week, in both orders and inquiries. There is increasing evidence that prospective business is being held back until after the Machine Tool Builders' Exhibition to be held in Cleveland the week of Sept. 30, and a further tapering off is looked for during the remainder of the month. Machine tools and other equipment shown here last week at the National Metal Congress attracted much interest and resulted in the placing of a number of orders.

Champion Machine & Forging Co., Cleveland, has awarded a contract for a boiler house which is first unit of a large addition. A 1000-hp. boiler and auxiliary equipment will be installed.

National Screw & Mfg. Co., Cleveland, will erect an addition to its Grant Avenue plant.

Contract has been let by Gluntz Brass Foundry Co., East 108th and Harvard Avenues, Cleveland, to J. H. O'Grady, 2008 Rosamer Road, for one-story machine shop, to cost about $35,000 with equipment.

Firestone Tire & Rubber Co., Akron, Ohio, has awarded general contract to Burger Iron Co., Akron, for seven-story addition, 110 x 180 ft., to cost about $750,000, of which about $350,000 will be expended for equipment.

Electric Products Co., 1725 Clarkstone Road, Cleveland, has awarded general contract to A. M. Higley Co., Plymouth Building, for two-story addition, 80 x 100 ft., to cost about $60,000 with equipment. H. M. Morse Co., 750 Prospect Street, is architect and engineer.

City Council, Painesville, Ohio, has plans for extensions and improvements in municipal electric light and power house, including installation of 2500-kw. turbo-generator and auxiliary equipment, to cost about $75,000. Hadlow, Hughes, Hick & Conrad, Inc., 850 Euclid Avenue, Cleveland, is engineer.

Colonial Iron Works Co., 17643 St. Clair Avenue, Cleveland, has plans for one-story addition, 100 x 150 ft., to cost about $55,000 with equipment.

Westinghouse Electric & Mfg. Co., East Pittsburgh, has purchased Bissell Electric Co., Toledo, Ohio, and will operate as unit, primarily for storage and distribution.

Sands Mfg. Co., 5407 Sweeney Avenue, Cleveland, manufacturer of water heaters, etc., has awarded general contract to Bolton-Pratt Construction Co., Columbia Building, for one-story addition, 65 x 70 ft., to cost about $45,000 with equipment.

Indiana

INDIANAPOLIS, Sept. 16.—Contract has been let by American Coating Mills Co., Division Street, Elkhart, to George C. Kistner, 514 South Main Street, for one-story addition to paper mill, to cost about $40,000 with equipment.

Indianapolis Cage Corporation, Indianapolis, recently organized with capital of $50 000 to manufacture bird cages and stands and other metal products, will operate a factory at Seventeenth Street and Kent Avenue. Benjamin D. Aufderheide is one of heads of company.

Board of Education, Terre Haute, is considering installation of manual training equipment in two-story and basement addition to McLean Junior High School, to cost $200,000. George J. Stoner & Co., Chamber of Commerce Building, are architects.

Northern Indiana Public Service Co., Hammond, has arranged for a bond issue of $15,500,000, part of fund to be used for extensions and improvements in plants and system.

Bendix Brake Co., South Bend, manufacturer of four-wheel brakes for automobiles, has awarded general contract to H. G. Christman Co., 306 South Notre Dame Street, for two-story and basement addition, 42 x 150 ft., to cost about $45,000 with equipment.

Traveling ovens, power equipment, conveying and other machinery will be installed in one-story and basement plant, 135 x 158 ft., to be built by General Baking Co., 420 Lexington Avenue, New York, at Indianapolis, for which contract for superstructure has been let to W. B. Bellows Construction Co., Oklahoma City, Okla., to cost about $200,000. Archer & Gloyd, Inc., Pioneer Trust Building, Kansas City, Mo., are architects.

Firestone Tire & Rubber Co., Akron, Ohio, has plans for multi-story factory branch, storage and distributing plant at Kokomo, to cost about $80,000 with equipment. Bishop, Knowlton & Carson, 312 North Meridian Street, Indianapolis, are architects.

International Fork & Hoe Co., Fort Wayne, has leased buildings and equipment of Sperry Mfg. Co., New Haven, Ind., and will manufacture farm and garden implements and tools. H. E. Frame, formerly with National Handle Co., Fort Wayne, will be in charge.

Haynes Stellite Co., Kokomo, Ind., is taking bids for a new foundry and expects to be in production about Jan. 1. A warehouse will also be erected.

Quaker Maid Co., Terre Haute, has broken ground for group of buildings to cost $750,000. General contract has been awarded to Thomas A. Moynahan Co., Indianapolis.

Gulf States

BIRMINGHAM, Sept. 16.—Work will soon begin by Kansas City Southern Railway Co., Kansas City, Mo., on shops for new terminal at Beaumont, Tex., to include engine house, locomotive repair shops, machine shops and other units, entire project to cost about $1,000,000 with equipment.

Texas Machine & Foundry Co., Rigsby Street, San Antonio, Tex., has plans for two one-story machine shops, to cost about $30,000 with equipment.

E. G. Beaumont, formerly president and general manager of H. L. Wilson Hardware Co., Beaumont, lately acquired by Peden Iron & Steel Co., Houston, Tex., has awarded general contract to Christy-Dolph Construction Co., Beaumont, for one-story automobile service, repair and garage building, to cost about $100,000 with equipment.

Orient Petroleum, Harvey-Snider Building, Wichita Falls, Tex., will soon begin extensions and improvements in local oil refinery, including installation of equipment for gasoline production, to cost about $500,000. Company is a subsidiary of Atlantic-Pacific & Gulf Oil Co., Kansas City, Mo.

Swift & Co., Chicago, have plans for three-story meat-packing plant at Paris, Tex., with installation of refrigerating equipment, conveying and other equipment, to cost about $150,000.

Aero & Auto Engineering Co., Tampa, Fla., F. L. Ludwig, general manager, has leased 40-acre tract in Hillsborough Bay district, for establishment of flying school and airport, including hangars, repair shops, oil storage and other units, to cost about $100,000 with equipment.

Board of Education, San Antonio, Tex., is considering installation of manual training equipment in new three-story high school, to cost $160,000, for which plans have been completed by Harvey P. Smith, National Bank of Commerce Building, architect; W. E. Simpson Co., Milam Building, is engineer.

Texas & Pacific Railroad Co., Dallas, Tex., has begun grading site for engine terminal at Big Spring, Tex., and will start work on group of 13 one-story buildings in about 90 days, including engine house, machine shop, forge shop, locomotive boiler and plate shop, power house and other units, entire project to cost more than $400,000 with equipment. E. F. Mitchell is chief engineer.

American Cast Iron Pipe Co., 2930 North Sixteenth Street, Birmingham, has filed plans for two one-story additions, to cost about $45,000 with equipment.

Louisiana Ice & Utilities Co., Inc., Alexandria, La., has plans for three-story ice-manufacturing and refrigerating plant, including car-icing division, to cost about $100,000 with equipment. Samuel Stone, Jr., & Co., Masonic Temple, New Orleans, are architects.

Bent Concrete Pipe Co., Grosse Building, Los Angeles, manufacturer of reinforced concrete pipe, has begun initial building for new plant at West Dallas, Tex., where 10-acre tract was recently acquired, to cost $100,000 with equipment. Other units

will be built later, entire project to cost over $500,000.

Rio Grande Oil Co., 525 East Seventh Street, El Paso, Tex., has plans for new refinery adjoining present plant, to cost more than $500,000 with machinery.

Cincinnati

CINCINNATI, Sept. 16.—Although demand for heavy machines continues fairly brisk, district manufacturers report a slight recession in the call for light tools. In fact, one leading maker of lathes indicates that fresh bookings the past week declined noticeably. Builders of planers, boring mills and similar tools, however, report that orders so far this month are in greater number than in the same period last month and in some instances total more than the entire month of August. Nevertheless, the number of unfilled orders is still large, some manufacturers having sufficient business booked to maintain present rate of production the remainder of the year.

American Bridge Co., Pittsburgh, is in the market for four planers and the Niagara Machine Tool Co., Niagara Falls, N. Y., is inquiring for one large planer. The Big Four Railroad has placed an order with a local manufacturer for a 16-in. and a 36-in. lathe for its Louisville shops. Westinghouse Electric & Mfg. Co., and Edward G. Budd Mfg. Co., of Philadelphia, have each closed for one 60-in. planer. Hershey Lumber Co., Hershey, Pa., has ordered a 24-in. planer and United Fruit Co. has purchased a 36-in. planer for shipment to Cuba. A German company has placed an order with a local manufacturer for two 16-in. automatic lathes.

Delco Products Co., Dayton, Ohio, manufacturer of isolated electric lighting plants, electric lighting and starting equipment for automobiles, etc., is planning expansion, including five-story factory unit to cost about $200,000 with equipment.

Burkett Closed Body Corporation, 541 Master Avenue, Dayton, Ohio, manufacturer of automobile bodies, is contemplating erection of new plant, to cost more than $100,000 with equipment.

Standard-Coosa-Thatcher Co., Chattanooga, Tenn., manufacturer of textile products, has begun work on one-story machine shop for repair work and parts replacements, to cost about $45,000 with equipment.

Plough, Inc., 121 South Third Street, Memphis, Tenn., manufacturer of industrial chemicals, etc., has asked bids on general contract for five-story plant to cost about $1,000,000 with machinery. Hanker & Cairns, Court Square Building, are architects.

International Derrick & Equipment Co., Columbus, Ohio, has purchased Boykin Machinery & Supply Co., Beaumont, Tex., and will expand and operate as unit of organization. B. Boykin, Jr., will be vice-president and general manager.

Model Milling Co., Johnson City, Tenn., is contemplating erection of new grain elevator and feed milling plant, including installation of elevating, conveying, screening and other equipment, to cost more than $250,000. George L. Carter is head.

Master Electric Co., Linden Avenue, Dayton, Ohio, manufacturer of electrical equipment, is clearing site for additions, one unit to be used for foundry, entire project to cost about $200,000 with equipment. E. A. Hart, Third National Bank Building, is architect.

Ideal Foundry & Machine Co., recently organized, is operating a foundry at 900 Albany Street, Dayton, manufacturing light gray iron and semi-steel castings. J. M. Conroy is president.

St. Louis

ST. LOUIS, Sept. 16.—Plans are under way by Glasco Electric Co., Kansas City, Mo., care of Victor J. DeFoe, 114 West Tenth Street, architect, for one-story plant, 100 x 110 ft., to manufacture electrical equipment, to cost more than $40,000 with equipment.

Ace Automatic Machine Corporation, Kansas City, Mo., care of James W. Johnson, 5421 Montgall Street, recently formed by Mr. Johnson and associates, plans operation of factory to manufacture coin-operated machines, including patented moving target machines, parts, etc.

Board of Education, East St. Louis, Ill., has plans for two and three-story junior high school and has authorized group of shops for manual training, to cost more than $300,000. W. J. Kennedy, First National Bank, East St. Louis, is architect; N. S. Spencer & Son, 180 North Michigan Avenue, Chicago, are associate architects.

Western Air Express, Inc., 117 West Ninth Street, Los Angeles, will carry out expansion at airport at Alva, Okla., to include construction of hangar, 100 x 120 ft., with repair and reconditioning shop facilities and other structures, to cost over $70,000.

Packard Motor Car Co., East Grand Boulevard, Detroit, has plans for three-story service, repair and garage building at Kansas City, Mo., to cost over $175,000 with equipment.

Shaffer Specialty Co., 113 South Denver Street, Tulsa, Okla., manufacturer of mechanical equipment, has awarded general contract to Oklahoma Building & Investment Co., Boston Building, for one-story machine shop, 50 x 100 ft., to cost about $28,000 with equipment.

City Council, Seminole, Okla., is planning a municipal electric light and power plant, using Diesel engine-generator unit, to cost $65,000 with equipment. R. N. Green, Seminole, is engineer.

De Camp Consolidated Glass Casket Co., Muskogee National Bank Building, Muskogee, Okla., is planning three-story addition, 75 x 150 ft., to cost about $50,000 with equipment.

Nebraska Power Co., Electric Building, Omaha, Neb., is planning addition to local steam-operated electric power plant, to cost about $100,000 with equipment.

Northwestern Iron & Metal Co., 910 T Street, Lincoln, Neb., has awarded general contract to W. J. Assenmacher Co., 625 North Seventh Street, for one-story and basement storage and distributing plant, 50 x 140 ft., to cost about $25,000 with equipment.

Oklahoma Gas & Electric Co., Insurance Building, Oklahoma City, Okla., has plans for a steam-operated electric generating plant unit at Belle Isle Park, near city, to cost about $800,000. Byllesby Engineering Co., 231 South La Salle Street, Chicago, is engineer.

Multiplex Faucet Co., 4325 Duncan Avenue, St. Louis, manufacturer of special beverage dispensing equipment, is erecting a third story on its two-story plant, with investment of $18,000 in building and equipment.

Central Brass & Aluminum Foundry Co., Twenty-first and Randolph Streets, St. Louis, is erecting a one-story addition, 33 x 59 ft., to cost $4,000.

Universal Vapor Spray Mfg. Co., Inc., 308 North Robinson Street, Oklahoma City, Okla., has awarded contract to Morris Mfg. Co., El Reno, Okla., for manufacture of metal vegetable display racks to be sold by former.

Milwaukee

MILWAUKEE, Sept. 16.—A slight decrease in the volume of machine tool sales is noted, notwithstanding peak production in almost all metal-working industries. Inquiries are larger compared with recent weeks. Employment figures show an increase of about 15 per cent over last year's totals and no decrease from the July high mark.

Demand is steady from manufacturers of power producing and transmission equipment, agricultural implements and automobile parts and accessories, but automobile manufacturers have not yet entered this market to any great extent. Sale of used tools is increasing.

Rundle Mfg. Co., Milwaukee, manufacturer of plumbing supplies and enameled sanitary ware, has begun work on new storage yard to cost about $75,000, including conveyors and other equipment. A. A. Wickland & Co., Chicago, are consulting engineers.

United Iron & Metal Co., Milwaukee, will have a new plant, office and shop built by Paul Realty Co., local, to cost about $40,000 complete.

Board of Vocational Education, Racine, Wis., is asking bids on plans by Frank J. Hoffman, architect, James Block, local, for new vocational school, three stories, 68 x 128 ft. T. S. Rees is director.

Board of Regents, University of Wisconsin, Madison, has let contracts for mechanical engineering building to J. H. Findorff & Son, local. It will be three stories, 230 x 230 ft., irregular. Plans are by Arthur Peabody, Madison, State architect.

Pacific Coast

SAN FRANCISCO, Sept. 12.—Contract has been awarded by Port Stockton Cement Co., Claus Spreckels Building, San Francisco, to MacDonald Engineering Co., 149 California Street, for new mill at Stockton, Cal., to cost over $1,000,000 with equipment. E. A. Roberts and W. C. Stevenson are company engineers.

Fresno Auto Body & Fender Works, Inc., 1919 Calaveras Street, Fresno, Cal., has plans for new one-story plant, to cost about $50,000 with equipment. E. J. Kump Co., Rowell Building, is architect.

Warman Steel Casting Co., 6100 South Boyle Avenue, Vernon, Cal., has filed plans for a one-story foundry addition, including crane runway.

Anderson Barngrover Mfg. Co., West Julian Street, San Jose, Cal., manufacturer of fruit-handling and kindred machinery, has plans for a one-story unit, 85 x 215 ft., for assembling, to cost about $50,000. Charles McKenzie, Towhy Building, is architect.

Crown Willamette Paper Co., 248 Battery Street, San Francisco, has plans for new unit for production of bleached pulp at Camas, Wash., in connection with an

expansion program at plant, to cost more than $3,000,000 with equipment.

Paper Makers' Chemical Co., Kalamazoo, Mich., manufacturer of industrial chemicals, has engaged Austin Co., Portland, Ore., to prepare plans for new plant on 7-acre tract, recently acquired in Guilds Lake district, Portland, to cost about $275,000 with equipment. W. J. Lawrence is president.

Salinas Cold Storage Co., Monterey, Cal., has plans for new cold storage and refrigerating plant at Castroville, Cal., to cost about $200,000 with machinery. Engineering department of company is in charge.

Durant Motor Co. of California, Inc., East Fourteenth Street, Oakland, Cal., has filed plans for a one-story addition, to cost about $60,000 with equipment.

Aircraft Industries, Inc., San Francisco, recently organized by G. L. Bush, president of Bush Electric Co., San Francisco, and W. F. Beard, Modesto, Cal., is planning construction of new aircraft manufacturing plant near Waterford Road, Modesto, with units for parts production and assembling, to cost about $65,000 with equipment.

Spring Street Iron Works, Klamath Falls, Ore., will erect a new plant, 99 x 154 ft., to replace a structure recently destroyed by fire. Completion is scheduled within two months.

Pacific Rockwood Co., Central Building, Seattle, Wash., has been incorporated to acquire local business of Rockwood Sprinkler Co. and to conduct a general fire protection equipment contracting business. Company is in market for all classes and types of iron pipe and fittings, valves, etc. B. H. Lewis is president.

Canada

TORONTO, Sept. 16.—General Motors of Canada, Oshawa, Ont., will start work within two weeks on erection of a parts and service building three stories and basement, with floor space of about 87,000 square feet.

Skinner Co., Ltd., Gananoque, Ont., manufacturers of automobile bumpers, etc., has awarded general contract to Ferguson Contracting Co., Ltd., Confederation Life Building, Toronto, for plant at Oshawa, Ont. Equipment has not yet been purchased.

Standard Brick Co., Ltd., Toronto, has purchased seven acres near Oshawa, and expects to start work at once on erection of a plant.

Steel Equipment Co., Ltd., 360 Steel Street, Pembroke, Ont., has awarded contract to Walter Beatty Esate, 125 Pembroke Street, for an addition to cost $30,000. J. A. Ewart, Jackson Building, Ottawa, is architect.

United Mfg. Co., 1470 Peel Street, Montreal, has plans for a three-story manufacturing building at Cap de la Madeleine, Que., to cost $50,000.

Construction has been started on a beaver board plant at Donnaconia, Que., for Price Brothers Co., Ltd., to cost $1,000,000. Main building will be two stories, 150 x 400 ft.

Western Canada

Western Foundries, Ltd., has purchased a four-acre site at Lethbridge, Alberta, and is erecting a plant to manufacture highway machinery, oil and mine drilling equipment, cast iron water pipe, brass and bronze castings, etc.

Contracts will be awarded soon by Dominion Bridge Co. for construction of its structural steel fabricating plant on 38-acre site at Burrard Inlet, Vancouver, B. C. It will be electrically operated and will cost $1,500,000.

Foreign

EXPANSION in manufacturing is planned by Columbia Graphophone Co., Ltd., London, England, covering production of radio equipment and sets. Investment for manufacturing facilities during next 12 months is estimated at more than £500,000 (about $2,500,000). L. S. Sterling is managing director.

Soviet Precision Machinery Trust, Soviet Russian Government, Moscow, represented by Amtorg Trading Corporation, 261 Fifth Avenue, New York, will build a plant at Moscow to manufacture American type dollar watches and alarm clocks. Negotiations have been completed for purchase of machinery at plants of Dueber-Hampden Watch Co., Canton, Ohio, and Ansonia Clock Co., 397 Seventh Avenue, Brooklyn, N. Y., which will be shipped to new plant site at once; additional equipment will be provided for large capacity.

C. E. Matens, head of Mejia, Ray & Co., Bogota, Colombia, importers of mechanical equipment, etc., is planning expansion and is desirous of getting in touch with American manufacturers of road-building machinery, agricultural and woodworking machinery, hardware products, electrical fixtures, etc.

Burmeister & Wain Shipyard, Copenhagen, Denmark, has arranged for increase in capital from 30,000,000 to 35,000,000 kroner (about $8,350,000) part of proceeds to be used for expansion.

Credito Nacional Peninsular y Americano, Madrid, Spain, operating oil properties, has purchased plants and oil lands of Falcon Oil Corporation in Lake Maracaibo district, Venezuela, including concessions for 293,000 acres in section noted, as well as 93,000 acres in State of Monagas, eastern Venezuela. Acquired company has output of about 4000 bbl. daily, and increase in output is planned.

Reynaldo Yruegas, Hidalgo 108, Lampazos, N. L., Mexico, is in the market for 1 and 2-hp. motors of American manufacture, also for an isolated electric-lighting plant.

New Trade Publications

Crawler Equipment.—Northwest Engineering Company, 28 East Jackson Boulevard, Chicago. Catalog of 100 pages with many illustrations in color of the use of shovels, drag lines, pull shovels and skimmer-scoops. Also contains details of construction and assembly of the various types of machines and describes gasoline and electric power plants used in this equipment. Complete tables are included, giving operating ranges, crane lifting capacities and clearance diagrams.

Compression Resistors and Controllers.—Allen - Bradley Co., Milwaukee. Eight - page leaflet describing the organization and development of this company, the manufacture of graphite disks, descriptions of mechanical and electrical departments, as well as the research division and an outline of employee welfare activities.

Steel Castings.—Farrell-Cheek Steel Foundry Co., Sandusky, Ohio. A very attractive 16-page bulletin describes "Farrell's 85 Cast Steel." It is profusely illustrated, showing different types of castings, in which this special steel of high tensile strength and yield point in five different grades, is incorporated. The products include digger teeth; bucket parts; tooth gears and pinions, as well as wheels; sprockets, sheaves and rollers; crawler and accessory parts, and miscellaneous castings. The superior properties claimed for this steel in the various parts mentioned are discussed.

Steel Castings.—Sivyer Steel Casting Co., Milwaukee. A four-page illustrated leaflet describes in particular electric alloy trusswheels, known as Athey, for the use of transporting large trees in the Redwood forests of California.

Perforated Metals.—Hendrick Mfg. Co., Carbondale, Pa. A catalog of 60 illustrated pages describes elevator buckets, troughs, flights and other perforated articles made by the company from light and heavy steel plate. A mass of technical data relating to the methods of measuring perforations, as well as tables of sheet and plate steel gages, weights of sheet metals and other measurements, is given. The catalog is well indexed.

Recording Psychrometers. — Bristol Co., Waterbury, Conn. The recording psychrometers described in a 16-page catalog consist of two complete recording thermometer systems, including two sensitive bulbs and two penarms mounted together in one case and arranged to record on one chart. The catalog also contains a number of chart ranges with specimen scale for use with type instruments. A relative humidity table is published.

Power Plant Construction.—Morton C. Tuttle Co., Boston. Four-page folder illustrating work being done on the Kennebec River in Maine, adding 100,000 hp. to the power lines of the Central Maine Power Co.

Centralized Lubrication. — Lubrication Devices, Inc., Battle Creek, Mich. Booklet of 16 pages illustrating and describing the Farval positive centralized system of lubrication. Many of the illustrations are from applications in industry, and the showing is impressive as to diversity and also as to the sizes of some of the units served. Stress is laid upon the saving in labor of attendance.

Firebrick. — Laclede-Christy Clay Products Co., St. Louis. Four-page folder devoted to refractories and their production and handling in the plant of the manufacturer.

Flood Lights. — Crouse-Hinds Co., Syracuse, N. Y. Four-page folder on flood lights for a wide variety of uses. The housing is of cast aluminum alloy, said to be unaffected by salt atmospheres and incorrodible.

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Development More Urgent Than Research

Small Concern Can Perfect Applications of Facts Made Known by Another's Research If Engineer of Sufficient Inventive Ability Is Available

BY L. A. TROFIMOV*

At the time when engineering became a recognized profession it had but two divisions, namely, military and civil engineering. Civil engineering included all that was known about engineering. But the scope of engineering soon became so large that it was forced to subdivide. At the end of the eighteenth century machine inventions and uses gave rise to mechanical engineering. The rapid development in the manufacture of iron and other metals led to the differentiation of metallurgical and mining engineering. More recent developments in electricity brought forth electrical engineering, and wide application of chemistry produced chemical engineering.

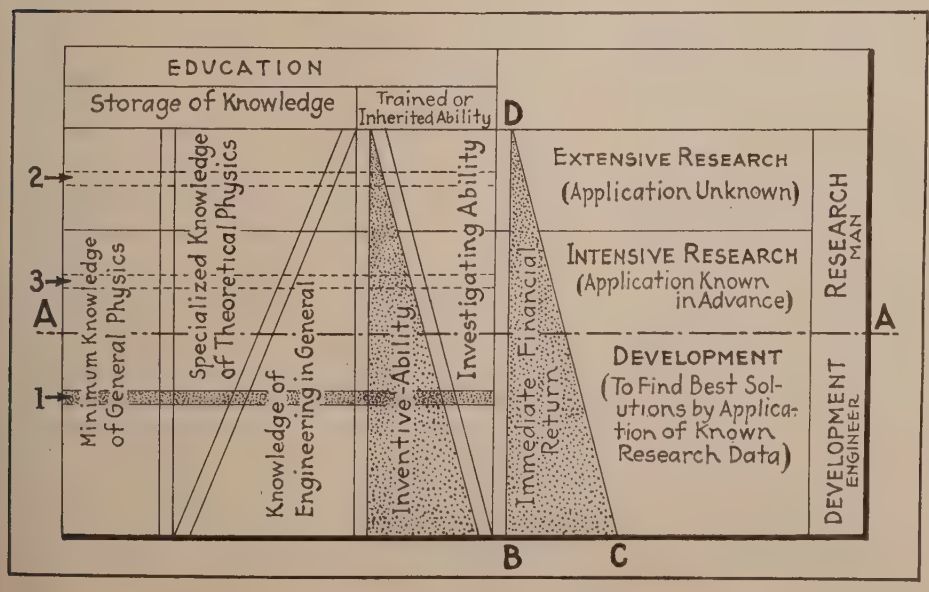
During the last decade another differentiation in an entirely different plane may also be observed. It is based on the *kind* of ability required in engineering work. The results of this differentiation are the occupations of "research men" and "development engineers." These men obtain or apply information from any or all the above mentioned branches of knowledge.

*Development engineer, Electric Controller & Mfg. Co., Cleveland.

Development Has Made Research Popular

Research and development are closely associated in practice but differ fundamentally in their nature. Due to the fact that these two activities are new, there are divergent views regarding their nature and proper place in industry. For instance, it is not clearly understood that *development* is responsible for the popularity of research. As a matter of fact, research data have no value in industry unless they can be profitably applied to manufacturing. Obtaining research data and applying the facts are two fundamentally different functions requiring different technique, different education and different types of mind.

Judging by the numerous articles about research, the presence and importance of the so-called research engineer is quite established; the presence of the development engineer and the development department has passed al-



IN the Upper Reaches of the Diagram Are the Qualities of the Research Man, While in the Lower Are Those of the Development Engineer

most unnoticed, owing to the fact that research and development are closely associated, and functions of development are frequently misnamed research. Some have, therefore, assumed that industry needs more research men while actually it needs development engineers. As will be seen later, there are no difficulties in supplying the former if industry wants more, while there are as yet no sources for the supply of the latter.

Research Differentiated From Development

THE word research was introduced into industry from the realm of science and simply means search again. Research, obviously, has been supplying working material for science. When the manufacturer found it profitable to undertake some research in his factories, he distinguished it from the work that had previously been conducted in colleges and governmental institutions by the term "industrial research." There is no marked difference between industrial and scientific research except in restriction and purpose. Thus, scientific research is the process of collecting facts on phenomena of nature and on relations between them, with no immediate practical application in view; on the other hand, industrial research is a similar search in a specified field with definite practical application in view.

The *nature* of research is best characterized by the word discovery, that is, to find something that always existed but was not known. The *function* of research is to search nature for something new. It may be a new element or combination of elements, a new substance, or an unknown law, or better information on laws of nature and relations between them. Therefore the functions of the research man are similar to those of an explorer, investigator or true scientist.

The best research mind is of the single-track type, capable of persistent and deep efforts for exploring the unknown. A detailed and profound knowledge of the field under investigation is necessary. The training of research men must be the same as that of the physicist who specializes in one of the branches of his science and has a general knowledge of research technique. The present system of college education is capable of producing as many research men as industry needs.

There is a greater need of capable men for applying research to industry. This does not mean that the research man is incapable of applying his findings—of course he does so if he happens to possess such an ability. But in doing so he performs an act which in itself is fundamentally different from research, and may be correctly described by the word invention. The distinction between discovery and invention lies in the fact that the first always existed, while the second comes into existence by the creative faculty of the mind. Therefore, we may define the development engineer as an "industrial inventor."

Now and then one person may possess both investigating and inventing ability and perform the functions of both the research man and the development engineer. But with the growth of industry the scope of each activity broadens to such an extent that it becomes difficult and inefficient to assign both functions to one person. Both research and development departments may therefore be found in some industries. As mentioned above, the writer has the opinion that there is no difficulty in producing research men in our present colleges.

But in producing development engineers, we deal chiefly with inventive ability, which, it is assumed, is beyond our control. Experience seems to show that a man with good knowledge of general physics makes a better development man than a physicist specialized in one branch. Furthermore, a man who knows the fundamentals of several engineering branches is better than an expert. If we add to this a knowledge of development technique, we have the outline of the kind of education he must have. The present educational systems do not produce engineers of this kind and there is no source of obtaining them except by accidental selection.

Mental Equipment of Specialized Workers

THE diagram may help in understanding the subject we are discussing. It represents graphically the general mental characteristics of the typical research man at the top of the diagram; note how they gradually change into those of the ideal development engineer at the bottom.

In this diagram the amount of knowledge of general physics is assumed to be the same, and is the minimum that any man engaged in research or development must have. The distribution of the balance varies with the level on the diagram. Horizontal strip 2 taken in the upper quarter will represent a research man, highly specialized perhaps in one branch of physics, with very little engineering knowledge, possessed by little inventive ability but with highly developed faculties of investigating and generalizing. This type of man is best fitted to do research into fields of science, with no immediate practical application in view but with the purpose of expanding the knowledge on which the industry is based, expecting that proper application will be found in the future.

Strip 3, taken in the second quarter from the top, may represent a somewhat different type of research man. His knowledge of theoretical physics is not so extensive; instead he knows more about engineering and he possesses some degree of inventive and investigating ability. He is best fitted to do intensive research, where the application of his findings is known in advance. His work should best be confined to a definite field, for the immediate object of improving, cheapening, or extending the application of process or products. A man engaged in such work must know enough engineering to guide his research in the proper direction, and must possess some inventive ability to apply in the best way the results of his research.

Development Engineers Are Inventors

The lower half of the diagram represents development engineers. They solve industrial problems by applying known research data. They do some research themselves, but their chief effort is exerted through their inventive ability. The diagram should have no precise demarkation between the research man and development engineer, but we may assume it to be somewhere about line *AA*. The stores of knowledge and the qualities of mind are distinctly different.

Triangle *BCD* approximately represents the immediate financial returns from investment in research and development. This triangle is similar to the one representing inventive ability. It illustrates the fact that research is of value to industry only as it is applied.

Small Concerns Can Do Development Work

TO show the proper place of development departments, take two examples, one of large industry with a considerable variety of products, and the other of small industry with only one or two products.

The former can afford to maintain research departments where both scientific and industrial research are done, because such industry, covering a wide field and a variety of products, can usually get direct financial return on the research budget. There must also be a development department whose chief function is to find the best applications of the findings of research. This includes conceiving ideas of solutions or applications, experimenting, designing, constructing, testing and advising production.

The small industry cannot afford to maintain research

departments and has to be content with published data. This cannot be properly considered as a great handicap, because, as we know, all new findings of research become known after their first practical application, which is never the best. Proper development departments of any small industry may and usually do find better use of another's discoveries. If this were not true, small industries with no research departments would pass out of existence; as a matter of fact, they do not.

Therefore, small industries with a limited variety of products should have development departments for the purpose of enlarging their sales, through the best application of published research data. The functions of these departments should be the same as those in the large industry. There will even be a little research carried on in a small plant because existing and available information on a certain narrow branch of physics is not always sufficient.

Even a superficial observation of various industrial organizations strongly indicates the tendency toward definite separation of development departments from research departments, assigning functions to each of them as indicated above. In other words, we are observing a further differentiation in the engineering profession; development engineering is now at the place where it is waiting for attention from the colleges. Before the colleges can help industry, however, the functions characteristic of development engineering must be clearly set forth, and the technique of development work must crystallize itself. Then the colleges will be enabled to select and train men for the profession of development engineering.

Electrochemists Meet in Pittsburgh

Annealing Brass and Copper—Symposium on Electrochemistry in Aeronautics—New High-Frequency Furnace Described

AMONG its many successful general conventions, the annual fall meeting of the American Electrochemical Society at Pittsburgh last week, Sept. 19 to 21, was one of the most important and most largely attended. It was the fifty-sixth general meeting, held under the auspices of the Pittsburgh section at the William Penn Hotel. Registration was over 250 with actual attendance at least 350, many not registering.

This society has an enviable reputation for the symposiums it has arranged. This fall the feature was one on "Contributions of Electrochemistry to Aeronautics." Nine papers were presented and the discussion was ample. Many new developments were brought out and future trends outlined. The symposium is reviewed on other pages.

Round table discussions of live electrochemical topics are also a feature of this society's work. It originated the first meeting of this nature at its Dayton, Ohio, spring meeting in 1924. Another one, devoted to "Recent Developments in the Annealing of Non-Ferrous Metals," was on last week's program. There were also for the first time parallel sessions on two days at which many miscellaneous papers were scheduled. In all 36 papers were delivered and discussed at five sessions. Several were on the subject of chromium plating.

Furnaces for Melting and Annealing

SOME important subjects were discussed at the informal session devoted to electric annealing of non-ferrous metals. One was the description of a new high-frequency electric melting furnace and the other some data, offered as a printed paper. on vacuum furnaces with carbon resistor tubes.

New High-Frequency Furnace

A FURNACE was described for the first time by Dr. P. H. Brace of the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. The smallest unit practicable for commercial size which can be used with 60-cycle current is 750 lb., said Dr. Brace. In this new furnace as low as 125 lb. of steel has been melted at 60 cycles. Electrical efficiency is 75 to 80 per cent. It is possible to melt 400 lb. per hr. of chrome alloys poured as ingots with a power consumption of 650 kw.hr. per ton. In general, consumption will average 600 to 700 kw.hr. per ton.

Due to the stirring action in this furnace, melted alloys are nearly carbon free; there are no disseminated oxides and no inclusions. Crucible life with care can be 50 to 150 heats on a single lining. Practically no slag is necessary. The furnace is as nearly airtight as possible and ingots are poured straight from the furnace.

In cost and power consumption the furnace is approximately equal to a 3-ton arc furnace. Size for size, says the author, it will compete in cost and produce metal of better quality. The crucible is magnesite with clay bond.

In melting brass, the power costs are not so low as for the Ajax furnace. It has been used at the Westinghouse plant for 2½ years and has melted 1,000,000 lb. of brass on a graphite lining. Highest temperature is 1600 deg. C. It has melted pure iron and is ideal for refining with slags.

Electric Vacuum Furnace

AS the result of years of study on rendering metallic vapors luminous by "temperature radiation," two types of electric vacuum furnaces have been developed. These were described by Arthur S. King, head of the physical laboratory, Mt. Wilson Observatory, Pasadena, Cal., in a paper "The Design and Operation of Vacuum Furnaces with Carbon Resistor Tubes." High temperatures alone appear to be necessary to produce the large variety of spectroscopic phenomena observed. No definite type of chemical action has appeared to be necessary. The cylindrical and the hooded types of graphite resistor-tube furnaces each have a temperature range up to 3500 deg. C. Steady conditions of temperature and pressure are quickly reached, after which the light is permitted to pass to the spectrograph. An image of the interior of the tube is projected on the slit, light from the incandescent wall of the tube being excluded. The charge in the tube is vaporized, and the characteristic radiations of the vapor excited under close control of conditions. A long column of uniformly heated vapor is obtained. Various spectroscopic studies are described by the author.

Fuels for Annealing Brass and Copper

TO open the informal discussion on electric annealing of non-ferrous metals, Robert M. Keeney, Connecticut Electric Light & Power Co., Hartford, Conn., was selected. Mr. Keeney presented a valuable resumé of developments in annealing brass and copper with gas, oil, wood, electricity and so on.

In the order of their relative use, fuels for annealing

brass and copper are as follows: Oil, natural gas, wood, electricity, producer and city gas mixed. Oil and wood are largely used by Eastern brass and copper mills. For finishing stages, electricity is extending but at a slow rate in brass rolling mills—15,000 kw. are now used against only 3000 kw. last year. In many cases producer gas has been displaced by city gas.

Fuels for Bright Annealing

For bright annealing, electricity has been installed up to 7000 kw. recently. The two most important developments in the last two months have been (1) Replacing wood with city gas for annealing coiled sheets and so on; (2) Annealing with half natural gas and half city gas. In many cases electricity has not been adopted because a better finish in bright annealing is possible with gas, and rolling mill departments do not favor it without recuperation. Control of atmosphere with gas is claimed better than in the electric muffle, but a better product in bright annealing brass is possible with electricity, all things considered, said Mr. Keeney.

In bright annealing of copper, oil is used mostly in the East. For the bright annealing of tubing 4500 kw. are now used, and 12 to 13 lb. per kw.hr. is possible. In a pit type of electric furnace, filled with steam, 20 lb. per kw.hr. is done.

In nickel-silver for stampings or shells, electricity is replacing oil but gas is being introduced. In an electric hydrogen-filled furnace, the product is absolutely bright. For nickel-silver shells, gas has the upper hand. Gas is widely used in nickel rolling mills. For annealing aluminum, electricity is ideal, due to close temperature control.

In concluding Mr. Keeney declared that annealing in the non-ferrous industry is now more important than ever.

Bestowal of the Acheson Medal

AT an informal dinner, attended by about 150, the first presentation of the Acheson gold medal was made by President Frary of the society. Recently Edward G. Acheson established with the society a fund of $25,000 with which to present at suitable intervals a gold medal to the person who had contributed some outstanding achievement in electrochemistry. After careful deliberation, the board of directors of the society decided that the first medal could most appropriately be bestowed upon Mr. Acheson himself. It was recognized that his discovery some years ago of not only Acheson graphite but carborundum, both of which have resulted in large industries, merited some unusual recognition.

After considerable persuasion Mr. Acheson agreed to accept the first medal. Because of a recent minor operation, he could not be present in Pittsburgh to receive in person the medal. Dr. Frary announced, however, that he had appointed a committee to present the medal to Mr. Acheson at a suitable time and place in the near future. The committee consists of F. N. Becket, vice-president Union Carbide Co. and Electro Metallurgical Co., New York; Stanislaus Skowronski, research chemist, Anaconda Copper Mining Co., Perth Amboy, N. J., and Lawrence Addicks, consulting engineer, New York.

It is understood that the gold medal will be given by Mr. Acheson to the Smithsonian Institute to be placed among other medals of his with samples of original graphite and carborundum. He will retain a bronze replica. A telegram was received from Mr. Acheson expressing his regret at not being able to be present and declaring how difficult it was to record his appreciation of the honor.

A resolution of appreciation was offered by F. A. J. FitzGerald, president, FitzGerald Laboratories, Niagara Falls, N. Y., in respect to the cordial and efficient cooperation of the local section under the chairmanship of Charles A. Styer.

Seeing Tungsten Carbide Made

PLANT visitations were a feature of the convention. The Westinghouse Electric & Mfg. Co., East Pittsburgh, received a large delegation at luncheon and conducted the party through many of its departments. About 35 members made the trip to the Firth-Sterling Steel Co., McKeesport, Pa., and were received by the president, Lewis Firth, in his office. In the plant they saw in operation one of two Ajax-Northrup high-frequency furnaces, making a heat of high-carbon tool steel; a large 3-ton Heroult furnace, producing special tool steels, and a 5-ton circular tilting open-hearth furnace. The Heroult furnace is located on the site of the second furnace of this type which was built in the United States in 1908. The rolling mills were also visited.

One of the most interesting departments was the one where the company produces Dimondite, a tungsten-carbide cutting metal. Carbon, tungsten powder and cobalt are ground in special revolving cylinders to the finest possible powder. This mixture is then pressed into small bricks of suitable size and is sintered in special refractory furnaces in an atmosphere of hydrogen. The material is finally in shape for grinding to the proper form. Mr. Firth told some of his visitors that the tungsten-carbide industry was still in the experimental stage, similar to that of high-speed steel during the early days after the announcement of Taylor and White of their sensational discovery.

Next Convention

The next convention of the society will be held in St. Louis in the latter part of May, 1930, under the auspices of several prominent electrochemists in that city. This will be the annual meeting of the society. The next fall meeting will be in Birmingham, Ala.

Heat Treatment of Cast Iron

In a lecture delivered at Lille, Manager Godefroid of the Citroën laboratories gave the results of a series of experiments on the heat treatment of gray cast iron. The lecture has been reproduced in *La Révue de Fonderie Moderne* of July 25.

The experiments were carried out with cast iron of several analyses. Two of the more important are as follows:

Carbon, per cent	3.41	3.36
Silicon, per cent	2.17	1.78
Manganese, per cent	0.75	0.72
Nickel, per cent	0.38	0.30
Chromium per cent	0.12	0.07
Phosphorus, per cent	0.286	0.187
Sulphur, per cent	0.082	0.040

When reheated to between 700 and 750 deg. C., followed by air or water cooling, the Brinell hardness of such iron fell from 228 to 130, whereas when heated to above 800 deg. C. and cooled similarly the hardness increased with the temperature of the treatment to about 270 Brinell. A pearlitic structure was then evident. A troostitic structure appeared after a quench from 825 deg. C., and at 850 deg. and above the structure was martensitic with a hardness of 477 Brinell.

Further experiments with cast iron of other compositions showed equally important constructional and mechanical changes. It was emphasized that temperatures too high or too prolonged must be avoided as well as slow cooling, as these conditions encourage the development of graphite, while if the re-heating is greatly prolonged some of the graphite may be burned and replaced by oxides which give a very fragile structure. To soften cast iron, low temperature heatings are therefore recommended.

Steel Treaters Study Steel Melting

Slag Conditions, Electric Steel Castings and Melting Practice and Locomotive Forgings Covered by Four Notable Contributions

IN both quality and attendance the special session on Sept. 10 on steel metallurgy of the American Society for Steel Treating was highly noteworthy. It was four years ago in the same room in Cleveland that the first session of this scope was held, instituting a departure in the programs of the society. The eleventh annual National Metal Congress conducted by the society included this metallurgical session, which brought an audience of nearly 500 to the ball room of the Hotel Cleveland.

A brief summary of the papers and the many discussions are given in the following paragraphs:

Slags Govern Steel-Making Processes

A PAPER which was pronounced by several commentators as an outstanding contribution to the metallurgy of steel making was entitled, "Slags Produced in Steel Making, Their Effects on the Product and on the Process Itself," by George A. Dornin, Gathmann Engineering Co., Baltimore.

Particular attention was called by the author to the inevitable flaws and lack of uniformity that must follow in steel made by processes that attempt to finish and refine under slags carrying iron oxides. Slags, he contended, govern what the basic open-hearth process is capable of in making clean steel. Iron oxides are present in all finishing slags of all processes today, except the basic electric with its reducing calcium carbide slag. This is available only for high-cost operations. Acid slags are less oxidizing than basic but they have a limited field.

Reducing slags are not necessary, Mr. Dornin insisted, but the finishing slag must carry no oxides. He pointed out that the reduction of FeO in the bath can be accomplished more cheaply in a large way by the addition of deoxidizers. This must be done so that FeO is not fluxed out with the slag. The aim is the reduction of FeO to solid or gaseous non-metallics, the formation of self-fluxing non-metallics, with the probable result of speeding up the process and hence cutting down costs. "Give the basic open-hearth a chance—it makes about 85 per cent of the steel made."

Vacuum Melting Advocated

Slag changes suggested by the author are logical, said Dr. H. W. Gillett, director Battelle Memorial Institute, Columbus, Ohio. The removal of FeO dissolved in steel is analogous to the removal by ether of certain substances from a mixture. To avoid the necessity of self-fluxing or agglomeration, "let us consider how far we can go toward eliminating FeO by carbon, favoring that by vacuum. The best possible reduction product of FeO is CO, for this is a gas and it wants to come out. If we favor formation and elimination of CO by evacuation in the finishing furnace or ladle, we will be acting along the line of least resistance." Because one is not accustomed to vacuum finishing, the operation seems strange. Vacuum melting ought to be tried.

Making Two Slags Suggested

Final slags of an open-hearth furnace should be reducing, a condition impossible to achieve with the average slag in a basic furnace, said C. H. Elliott, Republic Iron & Steel Co., Warren (Ohio) Works. The author suggests the removal of the slag by emptying the furnace, probably into a ladle, and transferring the steel to a second furnace with the formation of a new reducing slag for finishing the heat. The main objection to this is the cost. Deoxidizers, to be allowed to function properly, should by all means be added in the furnace.

That basic open-hearth steel cannot be properly refined under normal operating conditions may seem rather a wide, sweeping statement to open-hearth operators, said Harry P. Evans, but "I shall leave it for them to discuss." A distinct advance in the art of steel making will result, if some auxiliary furnace or equipment can be obtained in connection with the open-hearth furnace that will produce economically a steel refined and deoxidized to the extent that is possible with the basic electric furnace, intelligently operated.

A heat of steel, in condition for final additions, is practically clean steel, in the opinion of Dr. R. H. Patch, E. F. Houghton & Co., Philadelphia. It is final additions, the tapping, pouring and pit conditions, which frequently are the cause of the verdict, "dirty steel."

Double Slags Advocated and Rejected

From a quality standpoint, one of the greatest advantages of the basic electric furnace is the ability to maintain a reducing slag which greatly facilitates the deoxidation and degasification of the metal during refining. This is the opinion of H. M. German, metallurgist, Universal Steel Co., Bridgeville, Pa., who said also that a different condition exists in basic open-hearth practice, as the slag after oreing is not removed and replaced with a refining slag. The basic open-hearth plan of practice, as suggested by Mr. Dornin, to separate the metal and slag after the oreing operation and to finish under a reducing refining slag, is feasible and would result in better quality steel, but it is not clear how he proposes to separate slag and metal.

That the direction of improvement of present practice

FOR Chairman of the Steel Session, the A.S.S.T. Secured the Services of Radclyffe Furness, Midvale Steel Co., Philadelphia, Who Has Had Wide Experience in Steel Making

is toward double slags, rehandling of steel, etc., was not agreed to by J. H. Flaherty. For special purposes and to meet special conditions, there may always be some advantage in double or triple slags, but because of operating costs the application will be limited. For real progress we must rather look, in large tonnages of basic open-hearth steel, to developments from fundamental researches in deoxidation which correlate laboratory findings with actual plant practices and results. Typical of this is the work of Dr. C. H. Herty, Jr., and his associates.

In the opinion of Prof. D. F. McFarland, Pennsylvania State College, State College, Pa., the author does not state what he considers the best composition for the non-oxidizing, non-reducing slag. Even if this were initially free from iron oxide, it is likely that FeO would be formed by oxidation of the bath during the change of slags and would be a factor in the situation. This FeO and that already dissolved in the bath would be subject to reaction both with the deoxidizing agent Si, Mn or Al, and with the oxides corresponding to these, and it is difficult to see how the latter relations can be avoided as is required in the author's last suggestion.

Double-Furnace Process Not Justified Always

Dr. C. H. Herty, Jr., vice-chairman of the steel session, declared that it is easy to skim slag from a small furnace but very hard from a large one. A double-furnace process will justify itself in many cases; there is such practice in Europe. But certain grades of steel do not need this extra refinement.

Electric Steel for Castings

BECAUSE a casting cannot be better than the metal from which it is produced, the methods applied in melting and finishing a heat of steel for castings must be considered as of primary importance. This is the contention of George Batty, research director, Steel Castings Development Bureau, Philadelphia, in his paper "Production of Electric Steel for Castings."

A definite boil in the bath of any heat is declared by Mr. Batty as essential—in the ordinary conditions in a steel foundry, where scrap contaminated with adherent sand is used as a part of the charge—in order that finely divided non-metallics be cleansed from the bath. There will be some inevitable elimination of carbon. To kill off the final traces of free and active oxide of iron in the bath with ferrosilicon is neither sound nor desirable practice.

A Gentle Boil Advocated

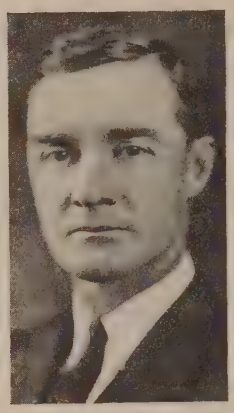
Most open-hearth and electric melters believe in a boil in the bath. A gentle boil, rather than an excessive one, was advocated by R. A. Bull, director, Electric Furnace Research Group. Iron ore is often added too late—how long it should be added before tapping is a question. In acid electric melting no ore should be added later than 45 minutes before tapping. Porosity in castings comes more often from mold conditions than metal.

Alumina is often pointed to as the main culprit in poor castings, said C. J. Comstock, metallurgist, Titanium Alloy Mfg. Co., Niagara Falls, N. Y. Frequently it is the case that differences in ductility are due to deficient arrangement of sulphide inclusions, according to careful microscopic analysis of many specimens. A plea is made for more careful inclusions—all inclusions are not alumina, nor all sulphides, nor all silicates.

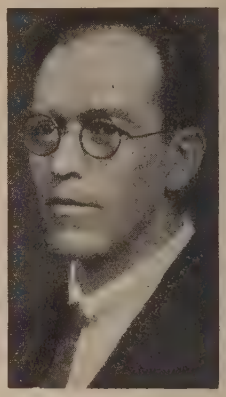
Low Carbon Favors Elimination of Inclusions

In reply to some of the views expressed, Mr. Batty said that the average melter will know when to use ore. Inclusions are usually eliminated earlier when carbon is low. A boil in the bath is essential but should not be excessive. Agreement with Major Bull was expressed as to late additions of iron ore or limestone, except in over-reduction. Pin holes are due to immigrant gases from the mold.

Authors of Papers on Steel Making



G. A. DORNIN



GEORGE BATTY

How to Make Good Locomotive Forgings

A NOTABLE contribution to the subject of locomotive forgings was the one on that subject by Lawford H. Fry, metallurgical engineer, Standard Steel Works Co., Burnham, Pa.

Making locomotive forgings which will give good results in service necessitates the employment of correct methods from the melting to the forging of the steel. Mr. Fry spoke of the various methods and precautions for accomplishing this, various steel making processes, and importance of ingot structure. The forging press and the resulting structures of steel forgings, and various types of forging steels were discussed, as well as the necessity for heat treatment. Physical properties which may be expected of steels were outlined.

Problems of producing and handling forgings so as to give constantly better and more reliable results in locomotive service concern both metallurgical and mechanical engineers and it is only by the fullest cooperation between producers and users that progress can be made. In choosing any of the special steels in an attempt to correct a definite type of trouble, as for example, axle failures occurring in the journal, all phases of the problem must be considered. If the failed axles show thermal cracks, it is evident that lubrication has been faulty, and it will be for engineering to correct this service condition by mechanical methods rather than to attempt to find some special steel which will operate successfully under unnecessarily difficult conditions.

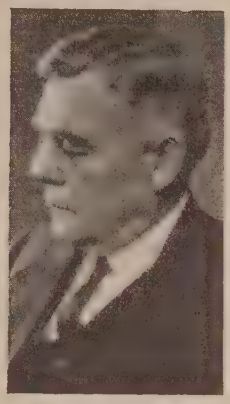
Locomotive forgings must encounter rough service and occasional abuse. It is to meet such conditions that the special normalized and tempered steels are being developed. It is now a question whether it is better to use a steel with high tensile strength or with high ductility. Both types are being tried. Time will bring further information.

Accidental Loads Serious

Discussion of Mr. Fry's paper was prolific. W. M. Barr, consulting chemist, Union Pacific Railroad, Omaha, Neb., said that discussion was not necessary, only emphasis on some points. Accidental loads on modern forgings become enormous—caused frequently by sudden shocks due to the breaking of parts. There is need for the highest quality of steel obtainable. The finest forg-

Presented Metallurgical Papers

H. P. RASSBACH



LAWFORD W. FRY

ings can, however, be ruined in machining. "Select your steel maker as you would your physician."

Vanadium increases strength and high yield ratio as well as other properties, claimed G. L. Norris, Vanadium Corporation of America, New York, as controverting the author's statement that a certain steel owes its high properties to the manganese content.

Effect of Banded Structures

There was considerable difference of opinion as to the effect of banded structures. Mr. Fry said that 75 per cent of plain carbon forgings have this structure and that a high-temperature anneal will remove it. Robert Job, Montreal, Canada, declared that such structures should not be present.

Macro tests are best suited to determine quality of alloy steels and others, in the opinion of E. L. Edwards, chief metallurgist, American Locomotive Co., Schenectady, N. Y. Most forging blooms are satisfactory and acid steel is not always the best. Penetration of the heat is equally important with the temperature in heating forgings. Epidemics of axle failures are due to improper fillets and lack of lubrication.

Electric Steel Melting Practice

AN excellent paper on electric steel melting practice was that by H. P. Rassbach, Midvale Steel Co., Philadelphia, entitled "Melting Practice for Three Types of Electric Steel."

From the practical standpoint the melting practice for plain carbon, simple alloy or complex alloy steels is discussed in concrete examples. In plain carbon steels the carbon content of the charge should be fairly close to the desired carbon; in a chrome-vanadium or similar heat, the charge should contain as much of the desired alloys as are available from the scrap on hand, much of which can be recovered by proper slag control; in a high-speed steel heat the same is true. In spite of the high alloy content, the slag in this case can be deoxidized to a high degree. Melting practice and logs of the three types of heats are thoroughly discussed. In general, bath temperatures should be hot; cold heats often give trouble. It is good practice to tap hot and hold the heats in the ladle for a sufficient length of time to cool to the proper temperature.

Modifications of practice necessitated by change from low to high voltage were called to attention by H. M. German, Universal Steel Co., Bridgeville, Pa. Some of his experiences in this phase of electric furnace practice were interestingly outlined.

Those in attendance at this steel metallurgy session, about 500 in all, were fortunate in having as chairman Radclyffe Furness, of the Midvale Steel Co., Philadelphia, a pioneer authority on steel melting. The meeting was fittingly brought to a close by a few remarks by him.

Mr. Furness said he could never feel that the basic open-hearth can produce as good steel as the acid. Slag changes do not take place at once. The electric furnace is a wonderful tool; with it one can do things that seem almost impossible.

Fissures and Other Flaws Found in Rails by Exploration

BY C. W. GENNET, JR.*

MODERN rails consist of a hard and almost brittle steel rolled into a peculiar, unsymmetrical section. The steel lends itself easily to heat treatment, meaning that widely different physical characteristics can be easily produced by simple means. The unsymmetrical section, comprising the large mass of head metal and the thin web and base, is such as easily to acquire internal strains of an unusual extent. This combination is unique in rolled steel products, and it must not be surprising or disappointing if metallurgists and physicists fail to solve quickly all of the problems raised concerning rails.

Any discussion of the cause of fissures amounts to mulling over the evidence collected, first, by those who regard the cause as due to a defect inherent in the rails when they leave the mill, and, second, by those who stand by the metal, but allege that the traffic over the rails is really the actuating cause for an interior rupture, or crack, which grows into a fissure. The only thing that apparently every one agrees on is that fissures develop or enlarge in size, under continued traffic.

Defect Probably Originates in Mill

It appears to me likely that the mill is fundamentally, but quite unintentionally, to blame; for seemingly some condition must occur during the fabrication of rails that introduces certain peculiarities in various rails from which fissures later develop. Exactly what that evil condition may be is a highly speculative matter, for, after all, comparatively little is known of the actual causes for various effects that occur in rails.

For instance, just why should two or three blows of a spike maul on the ⅝-in. web of a rail be apt to start a crack in the web as service continues? Why is a small nick in a piece of steel invariably a bid for a break later on? These may be trivial questions, but I mention them by way of showing that not only may fractures come from trivial causes, but that the attempt to locate the definite cause of some fractures may often be com-

*Vice-president, Sperry Rail Service Corporation, Chicago. This is taken from a paper read before convention of the Roadmasters' and Maintenance of Way Association of America.

plicated, because both the manufacture and the use of modern high-carbon rails is so involved.

Of much greater interest than the cause of fissures is an account of how we are finding them and what we are finding. A description of the detector car would be mostly repetition of what has been published before.† The three cars now operated by us have tested practically 5000 miles of track. The number of miles tested each day varies widely, depending on the condition of the surface of the rail under test, the traffic conditions encountered, and the time lost for making repairs; this latter item can now be virtually ignored.

We have tested over 30 miles on a number of different days, and then we have run on to long stretches of the well known corrugated, or wash-board, rails and operations have been terribly upset. Traffic is always a disturbing factor to the speed of testing. As a rule from 15 to 20 per cent of the time out may be used in getting the equipment out of the way of trains. This loss can be considerably decreased on double-tracked lines by cooperation from the dispatchers.

Other Types of Defects Now Located

One of the most interesting and perhaps surprising incidents of operating the detector cars has been the fact that many other defects in addition to fissures are so easily located and recorded. Primarily developed as a means for locating and recording fissures, the car was hardly expected to detect much of anything else. One of the early principles appeared to be that defects could be located only when they were transverse to the direction of the electric current. The complete change in the design of the detector first used at Beacon has greatly enlarged the scope, or field, of the car's utility, for we are now actually "picking up" quite as many defects of other types as we are of fissures. The value of the detector car has, therefore, been greatly enhanced.

These defects include split heads and sometimes what are probably real pipes, cracked webs, cracks at the junction of the head and web, and the commonly called horizontal fissures. One of the best arguments our men have had while testing was caused by a split head in the very early stage of formation. The operator claimed that the rail contained an interior defect, but not a fissure; the railroad man was skeptical because no exterior sign of the split head could be found. Breaking the rail easily proved the accuracy of the detector and the admiration of the skeptic was won.

Another interesting case was found at a highway crossing, where planking quite shielded the complete rail section from view. There the detector car told of what proved to be a serious crack several feet in length at the junction of the head and web, and which I think it will be conceded was nearly as hazardous as a fissure might sometimes be.

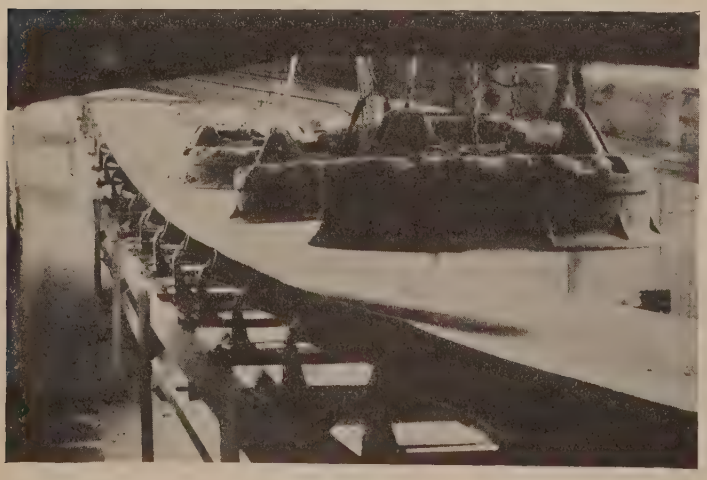
Quantitative Results on "Bad" Track

Generally the detector car has been assigned to test suspicious track, meaning track presumably containing fissures because of experience and records. Results for practically 1000 miles of tested track occurring on different lines, with different kinds and ages of rail laid under different track conditions, showed 116 transverse fissures, 66 horizontal fissures and 234 other defective rails. Thus there was one transverse fissure in every 9 miles, one horizontal in every 15 miles and one other bad rail in every 4 miles, totaling a defective rail every 2.4 miles.

To me the alarming phase of the whole situation is not with respect to the number of fissures and other defects found, but especially with respect to the size of some of the transverse fissures located. A great many rails are taken from track and broken immediately that the detector locates a fissure. Thus the awful naked truth is often revealed, and hence the frequent surprise that the defective rail gave safe passage to the last train. Many of the fissures found are bright and shiny, "air-tight," as they are called, and lack only a little from coming to the surface, yet they are often larger than a silver dollar in area and unquestionably must reduce the strength of the rail most seriously. We have found them chiefly during the warm or hot weather, and whether a rail containing a large fissure would have carried the last train safely in the cold winter weather is indeed a problem.

This naturally raises the question of how fast fissures grow. On that there is no reliable data at all, but we know that under ordinary conditions of traffic the growth may be faster than supposed. We have reason, from a few sporadic cases, to think that fissures may readily double in size within 60 days of normal traffic, but that is purely a random statement easily subject to change. Dr. James E. Howard, whose statements must always be given the greatest respect, made an air-tight fissure grow to the surface by comparatively few blows of a light hammer. Tests are badly needed so that a rule of thumb formula can be established and, based on the number of tons of traffic, some idea obtained of the probable rate of growth.

†See THE IRON AGE, Nov. 15, 1928, page 1214.



Removing Magnetic Material from Conveyor

THREE 45-in. electro-magnets specially wound for continuous operation are shown in the illustration. They are suspended over a conveyor belt at one of the Montana plants of the Anaconda Copper Mining Co. They were furnished by the Ohio Electric & Controller Co., Cleveland, to pick out all iron and steel particles from the material moving along the conveyor. By so doing they save the machinery from injury.

Should Scrap Brass Be Used or Sold?

Institute of Metals Discusses Economics of Reclamation of Copper, Brass, and Mixtures of Babbitt and Bronze

A GROUP of papers on secondary metals featured the program of the Institute of Metals Division of the American Institute of Mining and Metallurgical Engineers, held in Cleveland during the week of Sept. 9. Such concentrated attention in warranted by the increasing tonnage of used but still usable alloys which are circulating in the metallurgical industries, and by the greatly increased amount of trained technical skill which is being employed in the reclamation process,—both factors having been frequently commented upon in past issues of THE IRON AGE.

However, not all the problems have been solved, by any means, as was developed in the discussion of the die casting program directed by a committee of the American Society for Testing Materials. Tests reported to them indicate that small traces of tin, lead, and cadmium affect the permanency of zinc-base die castings to a wholly disproportionate degree. The result is that a considerable tonnage of scrap castings is now available but is without buyers, even though the selling price may be but 10 per cent of the original cost of the component metals.

D. L. Colwell, metallurgist Stewart Die Casting Corporation, Chicago, is of the opinion that the market for die castings can be expanded four fold when the industry thoroughly appreciates the effect of minor impurities on the properties of die castings, and learns how to eliminate or counteract the danger of salting.

Wire Bars from Secondary Copper

A similar problem has been solved at the Western Electric Co., where wire bars of good drawing qualities and standard electrical conductivity are made from copper wire reclaimed from obsolete telephone equipment, old line wire, and wire-mill scrap. The operation was described by W. A. Scheuch and J. Walter Scott, metallurgical engineers, Hawthorne Works, Western Electric Co., Chicago, in a paper entitled "Manufacture of Wire Bars from Secondary Copper."

Lead is the principal impurity to be contended with; it enters through wire ends covered with solder not discarded by the sorters. Every effort is made to keep it out of the charge, but melts will commonly analyze 0.015 per cent lead, and at times even as high as 0.1 per cent. This must be removed to 0.005 per cent or less, because more than this retards the necessary annealing operations on the fine gage wire to be produced. Lead is eliminated by oxidizing the furnace charge thoroughly, making up a slag with equal parts of lime rock and sand, and blowing the bath with air. This is repeated at hourly intervals until the lead is shown by chemical analysis to be reduced to the minimum. Nine hours is required to reduce 0.030 per cent lead to 0.003.

Success is ascribed by the authors to several factors, each indispensable. First, the scrap is carefully sorted and only *clean* scrap copper is charged. Second, the furnace is solidly built with magnesite walls which prevent salting. Third, ample burner capacity is available to oxidize the charge thoroughly during melting. Fourth, the bath is manipulated according to the indications of frequent chemical analyses, and the entire operation is always under close technical supervision. About 90,000 lb. of copper wire bars are made daily.

Should Scrap Be Used or Sold?

H. M. St. John, chief metallurgist Detroit Lubricator Co., Detroit, in a paper entitled "Utilization of Secondary Metals in the Red Brass Foundry" advanced the opinion that it would be equally possible for an intelligent foundryman to make high grade pressure castings from reclaimed metal, even bought in the open market. Such a practice forces him, however, to examine his raw materials with scrupulous care—a duty which is unnecessary when he uses virgin metal or composition ingot from a reputable metal company. In Mr. St. John's opinion the proportion of virgin copper which would ordinarily be put into mixes to "give the metal life," functions primarily to enhance fluidity, and there are other and cheaper ways of doing this.

A foundry which gets scrap for melting outside its affiliated operations should buy it in the raw state; some knowledge of its history is necessary, and melting destroys all evidence of its source. This means that miscellaneous scrap would be unsuitable for direct foundry use, and must be absorbed by a smelter of secondary metals. V. Skillman, metallurgist Bohn Aluminum & Brass Corporation, Detroit, pointed out that such a plan, extensively followed, might easily turn out to be uneconomic, since if foundries skimmed the cream from the scrap metal supply, the complex residues could only be reclaimed into usable shape for a disproportionately increased cost.

The chairman of the meeting, T. A. Wright, chief chemist Lucius Pitkin, Inc., New York, said that this effect was being felt already, for the manufacturer of composition ingot is now forced to send to a smelter many carloads of fairly good scrap because it contains an unmanageable content of some minor metal. W. F. Graham, Ohio Brass Co., Mansfield, Ohio, also doubted whether foundries should attempt to make their own ingot from scrap metal and thus compete with an established industry, one which was an essential adjunct to the foundry trade (since in his opinion all red brass melting should be from the ingot). He was ready to admit that a good foundry could do what Mr. St. John was recommending, but thought the over all cost would in nearly every case be higher than though it bought its ingot from firms who are equipped to melt, mix and refine the metal properly.

Mixed Scrap May Be Smelted in a Cupola

In a paper entitled "Reclaiming Non-Ferrous Scrap Metals at Manufacturing Plants", Francis N. Flynn, metallurgist, Milwaukee, also supported the idea that intelligent segregation and re-use of the process scrap would show profits over the usual procedure of selling it all, good and bad, to a dealer. Mr. Flynn took the attitude that any salvage department worthy of the name would take every reasonable precaution to keep the scrap clean, and prepare it for sale or for use in such a manner as to

secure the maximum credit. He presented a table of 14 major classifications and 51 sub-classes of manufacturing scrap, indicating those which in his opinion could be substituted for virgin metal in the foundry, those which could be cast into composition ingot before remelting for casting, and those which should be sold to custom smelters.

One feature of Mr. Flynn's paper which was discussed in detail was the section describing the smelting of concentrated foundry cleanings, ladle shells, skimmings and mixed borings in a small foundry cupola with a high tuyere zone, using limerock, fluorspar and iron scale as fluxes. Advantages for a brick-lined cupola over a water-jacketed smelting furnace are that the equipment is available in most foundries, the furnace can be started on short order and the bottom dropped whenever the available metal is used, and the metal produced is lower in iron. E. R. Darby, metallurgist Bunting Brass & Bronze Co., Toleo, Ohio, agreed that the brick lined cupola would produce a cleaner metal, but to do so must carry slags which attacked the linings rapidly, and the repair cost would be large.

Separating Babbitt From Bronze

The problem of mixed babbitt and bronze is a difficult one to handle. P. J. Potter, metallurgist Federal Mogul Corporation, Detroit, treated this matter in a general way in a brief paper "Recovery of Waste from Tin-Base Babbitting Operation." In general the skimmings, borings and other metallic wastes are "sweated" or heated at low temperature in a reverberatory furnace and the resulting high-tin alloy cleaned of zinc by agitating with steam. To the remaining tin-copper alloy is added at least an equal quantity of virgin metal to bring it to specification, when it is ready to cast into bearings.

Residues from sweating operations and other drosses are smelted with carbon in a reverberatory furnace, the zinc steamed out and the remainder freed from oxides, iron and non-metallic inclusions by fluxing with sulphur and rosin. High lead is reduced by dilution. Borings and turnings of mixed babbitt and bronze from finish machining may be segregated usefully by screening—the babbitt particles are generally coarser than the bronze, and the coarse screenings may be treated as above while the fine screenings may be absorbed by the bronze foundry or sold as such on a favorable market.

R. W. Drier, Michigan College of Mining and Technology, Houghton, reported that a fairly good separation of babbitt and bronze or brass could be made as follows: Grind the mixture to a uniform fine size and make a babbitt concentrate by an electrostatic concentrator, using current at about 30,000 volts. The brass tailing can then be cleaned very well in a small flotation cell, and the residue dried and returned to the head of the circuit for retreatment.

Electrochemistry in Aeronautics

Notable Symposium Emphasizes Application of Aluminum and Magnesium and Their Alloys—Bright Future for Beryllium

THAT electrochemists have been responsible to a large degree for the growth of the aeronautical industry was prominently emphasized last week at Pittsburgh. The American Electrochemical Society held another of its successful and important symposiums during its annual fall convention, Sept. 19 to 21, at the William Penn Hotel. Under the title, "Contributions of Electrochemistry to Aeronautics," nine papers were presented and discussed before an audience of nearly 300, on Thursday morning, Sept. 19. Light alloys of aluminum and of magnesium were authoritatively dealt with and beryllium came in for its share of attention. Some of the chief points emphasized and discussed follow:

Three Important Aluminum Alloys

THREE leading alloys of aluminum have gained a vital place in aeronautics, said T. W. Bossert, assistant metallurgist, Aluminum Co. of America, in introducing the symposium,—duralumin or 17ST, a forging alloy, 25ST, and a modified form of the latter, or 51ST, which, because of its excellent workability, finds many applications where the higher strength of 25ST is not so necessary. Both 17ST and 25SE have a tensile strength of 55,000 to 60,000 lb. per sq. in. with an elastic limit of 30,000 to 35,000 lb., and an elongation of 18 to 20 per cent. The alloy 51ST has a tensile strength of 45,000 to 50,000 lb. per sq. in., with an elastic limit about the same as the other two alloys. One use to which it is put is forged propellers.

Wide application of aluminum alloys as castings has been attained, continued Mr. Bossert, both as cast and heat treated—particularly in aircraft engines. About 50 to 60 per cent of such castings go into such engines. Their ductility and shock resistance is pronounced. "Were it not for the aluminum alloys, the very low-weight, horsepower ratio obtainable in aircraft engines would not be possible." All modern dirigibles—the Los Angeles, Graf Zeppelin, the ZMC2, and the two mammoth ones now under construction for the Navy—depend on this duralumin wrought alloy. And aluminum bronze powder is decidedly important to aircraft because of the protection it affords against sunlight, moisture and salt water.

Prominent Aeronautical Men Speak

BEFORE calling on Mr. Bossert, Dr. J. D. Edwards, assistant director of research, Aluminum Co. of America, as chairman, emphasized the appropriateness of such a symposium in Pittsburgh, where the aluminum industry had its birth in 1888 as the Pittsburgh Reduction Co., and where, in 41 years, great progress has been made. He said the society was honored by the presence of men prominent in aeronautics—E. P. Warner, formerly assistant secretary of commerce for aviation, now editor of *Aviation*, and Dr. Lewis, director of aeronautical research, National Advisory Council of Aeronautics. Both were called on.

Trends of late have been from wood to metal in aircraft construction, said Mr. Warner. In the 5000 airplanes at present licensed in this country, only 2 per cent are using aluminum alloys in wing or fuselage construction. In military planes aluminum wing spars predominate. In engines, however, 3500 tons of aluminum alloys is used. Factors which really dictate are economic saving in weight and cost of fabrication. When metals are cheap enough, all other things considered, the really serious economic dilemma confronting the industry may be solved—increased production is one solution.

Devotion of one session of this society to such a sub-

ject was a great gratification to Dr. Lewis. Weight is the most important factor now facing the industry—the aim is the greatest carrying power per unit of weight. Corrosion problems are serious. An engine now has a life of about 1000 hr.—it should have more. The usual load is about 20 to 30 per cent of the weight of the craft. A lighter, stronger material is sorely needed.

Magnesium Mainly Used in Fabricated Form

ONE-THIRD lighter than aluminum, magnesium is used mainly in fabricated forms in aircraft. If an aluminum casting weighs 30 lb., one of magnesium has a weight of 20 lb. By alloying, as in the case of aluminum, magnesium has been greatly improved. The alloying elements are aluminum (about 7 per cent), zinc (about 3 per cent) with some manganese and cadmium. Such alloys as castings possess mechanical properties substantially equal to the best of the high-strength aluminum alloys. Alloyed with manganese, remarkable resistance to corrosion is obtained. Machinability of magnesium alloys in general is an outstanding property. Magnesium forgings are no longer experimental as they possess comparatively high mechanical strength. Propeller blades, differing very little from wood in weight, are now made of magnesium alloys. These facts were presented by W. G. Harvey, Aluminum Co. of America, Cleveland, in a paper, "Magnesium and Its Alloys."

Magnesium alloy propeller blades look very promising, said F. W. Caldwell, McCook Field, Dayton, Ohio. The relatively high fatigue values look good—there has been trouble with aluminum alloys. An advantage for magnesium is a stiffer blade with less weight. Comparative cost was stated by Mr. Harvey to be at about 1 to 2½. He also said, in reply to an inquiry, that magnesium sheets are hot-rolled first from billets, and then cold-rolled to a finish with frequent annealing because hardening during cold work is a property.

Beryllium Has Remarkable Properties

Beryllium's outstanding property is its high modulus of elasticity, about equal to steel, declared Dr. H. W. Gillett, director, Battelle Memorial Institute, Columbus, Ohio, in a paper, "Possible Use of Beryllium in Aircraft Construction." This metal will some day be an important factor in aircraft construction. The factor of ignorance is high compared with the 40 years of aluminum development and 20 years of magnesium. Its specific gravity is of the order of the specific gravities of aluminum and magnesium, its melting point is very high. Alloys high in beryllium have a tensile strength of 100,000 lb. per sq. in. in the direction of rolling, and 70,000 lb. across the direction of rolling. The metal is very hard to work and requires hot working all the way down. As castings, pure beryllium and its alloys are hard to handle; they usually contain blow holes. At $200 per lb. it is out of reach, and yet the metal is more abundant in the earth's crust than either lead or zinc. Cost can come down to $25 to $50. Dr. Zay Jeffries has said that it is worth $40 to cut the weight of aircraft one pound. "Many are pessimistic on beryllium; I am among the many optimists," said Dr. Gillett.

An entering wedge abroad has been made by beryllium said Dr. Engle. The German firm, Siemens & Halske, is making 8 lb. per day at $100 per lb., and a beryllium bronze (2 per cent Be.) is now used by German railroads. It has high fatigue resistance.

Solution Potentials of Aluminum and Corrosion

PURE aluminum is electro negative to many of its alloys and particularly to 17S or duralumin. This fact is of importance in connection with the protection of exposed edges on duplex metal products, such as Alclad sheet, said J. D. Edwards, assistant director of research, and Cyril S. Taylor, physical chemist, Aluminum Co. of America, in their paper, "Solution Potentials of Aluminum Alloys in Relation to Corrosion." The potential differences arising from contacts between aluminum and its alloys, as well as other metals, in the presence of an electrolyte, are of theoretical interest and practical importance. Although these potential measurements show such wide variations that their quantitative significance is limited, qualitatively they are important in explaining the behavior of the metals in contact under corrosion conditions.

The factor of ignorance in this field was large in 1917, said Starr Truscott, assistant to Dr. Lewis, who spoke earlier; today it is much less. The aim has been and is the hunting for a strong metal with which to build dirigibles. Tendency is now away from wood to metals. Plating aluminum alloys with chromium has not been entirely successful, but it should be considered—it does not protect as does zinc on steel. "I appreciate the great work that electrochemists have done for aeronautics."

Electroplating Aluminum on Steel

Calling attention to the following sentence from the author's paper: "In general aluminum can be safely used in contact with iron and steel, and the tendency is for aluminum to protect partially the iron and steel against corrosion." Edwin F. Cone, associate editor, THE IRON AGE, New York, related an experience. Some months ago, Mr. Cone said, his attention was called to the claims of a company that it was plating aluminum, or an alloy of aluminum, on steel sheets,—offering a substitute for tin plate for many uses.

Samples of the coated sheet were sent to research laboratories. Reports are not complete but are conflicting. A majority state that a very thin layer of aluminum is present, while one reports an entirely different metal. Mr. Cone raised the question—can aluminum be electrolytically plated on steel?

Dr. F. C. Frary, president of the society, said that aluminum cannot be plated on steel, although there are many patents for plating from aqueous solution. The aluminum decomposes water, hydrogen is evolved, preventing successful plating. Dr. William Blum, Bureau of Standards, states that about 25 years ago a man took a contract to plate the dome of the City Hall tower, at Philadelphia, with aluminum—the result was a coating of zinc from the alloy evidently used.

Attention was called to the fact by Dr. Colin G. Fink, Columbia University, New York, to the fact that large amounts of sodium are electrolytically plated or deposited in an aqueous solution, and he added that there is no more action than in the case of aluminum. The sodium is deposited on or with mercury and then recovered from this amalgam. Dr. H. W. Gillett offered the suggestion that the coating be examined with the X-ray, which would reveal whether it is a covering of metal or oxide, etc. Mr. Cone said further examination would be attempted with a piece which has a heavier coating. In Germany, he added, thin sheets of aluminum are now rolled or sweated on steel. American chemists have plated the metal from expensive organic salts of aluminum.

Other Papers in the Symposium

ALUMINUM can be given a pleasing dead-white finish by boiling it in a mixture of lime and calcium sulphate. The process and a few uses for the product were discussed in a paper, "Lime Process for Coating Aluminum" by Leon McCulloch, research department, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

Two other papers presented at the symposium were "The Effect of Iron on the Magnetic Susceptibility of Aluminum" by Ralph B. Mason, physical chemist, research bureau, Aluminum Co. of America, and "Thermo-Electric Tests for Aluminum, Manganese and Other Alloys," by Cyril S. Taylor and J. D. Edwards, research bureau, Aluminum Co. of America.

Automatic Thin-Sheet Arc Welding

Electro-Magnetic Control Necessary for Good Results—How the Flux Operates and How It Is Handled

BY W. L. WARNER*

FUSION welding requires that the parts to be joined be brought up to a molten condition over a certain portion of their extent. The temperature of this molten condition varies with different metals, and the temperature limits between which the fusion operation must be performed are narrower with some metals than with others.

To accomplish a thorough fusion between parts to be welded a certain time is required, depending on the nature of the material and the effective heating power of the welding flame. Probably more radical changes take place during this brief time interval than in any other equivalent cycle of metal handling. The change from room temperature to the molten condition is almost instantaneous and the cooling cycle is necessarily short, owing to the very local extent of the molten zone. This means that the metal is heated to above the melting point and returned again to a solid condition in the space of a few seconds.

Obviously the resulting joint must be something different from the material it joins; the metallurgist will confirm this. For many years we have been accustomed to see sheet edges lapped and held together by a row of rivets. Thus there has been a feeling that the butt joint which has been made so smoothly and quickly must be only a substitute and not to be relied upon. As a matter of fact, the welded joint will develop at least 85 per cent of the strength of the sheets joined, and usually the sheet will yield before the joint.

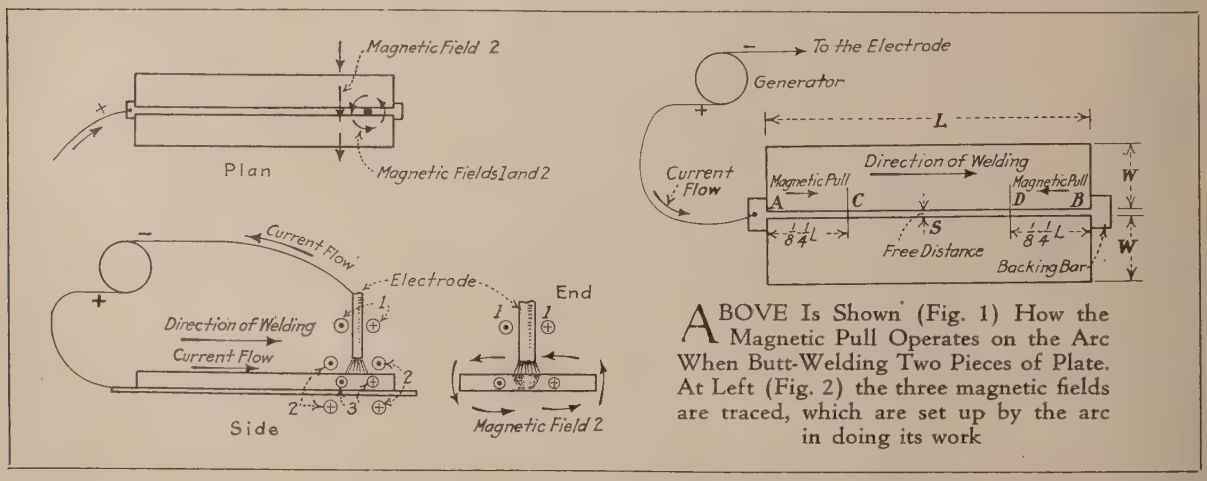
Parts or sheets to be joined are placed in the same plane, with edges butted together where the weld is to be made, and usually clamped on to a suitable backing device for the weld. An arc is struck and maintained, between a metal electrode and the joint edges. This arc is moved continuously at the proper speed from one end of the joint to the other, fusing the two edges together.

It is essential that the joint be backed up tightly by some means to prevent the molten metal from running through forming protrusions on the back of the joint and also leaving holes in the joint. This backing up device must fulfill several requirements. The material must be of such a nature that it will not melt and fuse to the back of the joint.

Copper bar stock or strip is generally used for this backing, due to its high heat-conducting properties and durability for this service. The backing up device must be somewhat flexible, and yet exert sufficient force to clamp and hold the joint edges evenly together. In some cases it may be possible to butt-weld thin sheets without a backing, but usually variations in preparation of the joint edges on a production basis prevent a successful job.

When heat is applied to steel or iron, a distortion or displacement occurs in three directions. As the heat is removed the material tends to return to normal. The amount of this expansion and contraction depends upon the rate of application of the heat and the length of time over which it is applied.

In welding, an intense heat is applied at a point on the metal surface and is then moved rapidly along, causing a small part of the metal to come to the melting point and solidify in a fraction of a second as the arc passes over it. As the melted metal does not return to the original temperature as quickly as the heat was applied, there is a cumulative effect. This effect produces a net expansion in three directions with respect to the weld—longitudinal, lateral and vertical.



ABOVE Is Shown (Fig. 1) How the Magnetic Pull Operates on the Arc When Butt-Welding Two Pieces of Plate. At Left (Fig. 2) the three magnetic fields are traced, which are set up by the arc in doing its work

*Industrial Heating and Welding Engineering Department, General Electric Co., Schenectady, N. Y. From a paper read before a joint meeting of the American Welding Society and the American Society of Mechanical Engineers, Cleveland, Sept. 12.

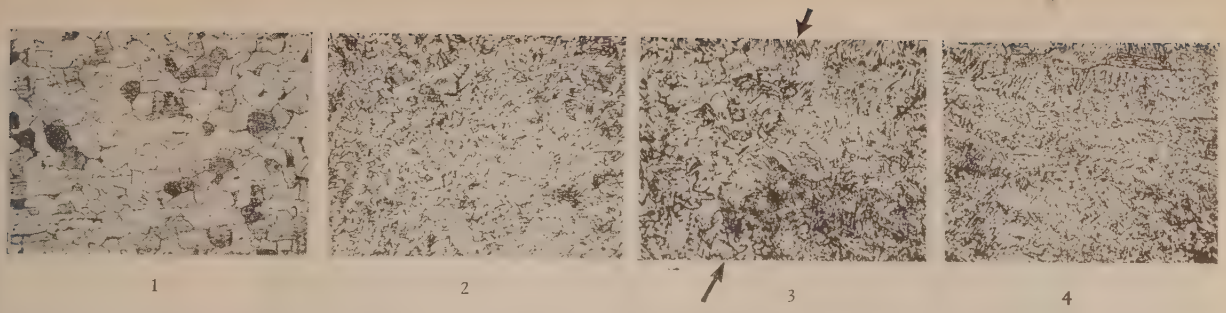
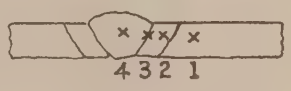


FIG. 3—Photomicrographs Taken from Bright, Deep-Drawing Steel, Magnification 100 Diameters. (In reproducing, a reduction of 22 per cent was made.) The diagram at right shows locations of (1) base metal; (2) center, heated zone; (3) fusion zone; (4) weld metal



If two flat strips are placed together and a weld is started at one end, the joint edges begin to separate after the arc has traveled about a third of the way down the seam. This separation will continue until the joint edges are apart a distance greater than the electrode diameter, if the welding is continued. To prevent this separation when welding flat strips, a tack weld is usually placed at each end of the joint. This separation or moving apart of the plates is caused by the combined longitudinal and lateral expansion; its amount depends upon the lateral width of the pieces being welded, the amount of welding heat and the welding speed. This separation does not occur to the same degree in plates above ¼ in. thick,

Assuming that two strips have been tack welded and the weld made; if the welded piece is taken from the machine immediately, it will be curved longitudinally and flat laterally. If, however, the welded piece is left in the clamp until cold, a portion of this distortion will be eliminated. Welds of this type made on cylindrical drums or rectangular box structures do not show this distortion, because of the vertical and lateral stiffening effect of the shape of the piece.

With these conditions in mind one can readily see the importance of suitable clamping apparatus and procedure for welding thin sheet metal successfully.

Electro-Magnetic Control

ANOTHER condition which is likely to cause trouble unless controlled is the magnetic effect produced by the electric current passing through the arc. It is generally understood that, when an electric current passes through a conductor, a magnetic field of a certain intensity is set up in a certain direction around the conductor. This magnetic field tends to travel in the path of least resistance and resists deflection from this path in proportion to its intensity.

It is neither possible nor desirable to discuss these electro-magnetic conditions in detail, except in so far as to try to explain certain methods now used to control these conditions.

Fig. 1 shows in plan a weld being made between two pieces of plate, the joint extending from *A* to *B*. The weld progresses from *A* to *B* with the ground connection from the generator made to the copper backing bar at end *A*. In practice this is generally the situation for magnetic control purposes.

As the weld progresses from *A* to *B* a careful observation of the arc and arc flame will show a decidedly forward pull of both arc stream and flame for approximately one-eighth to one-quarter of the length of the seam. This forward pull is a maximum at the start of the weld and becomes almost zero at about *C*. From this point to *D* the pull of the arc is gradually changing from a slight forward pull to a slight backward pull, and it is most stable between these points. From *D* to the end of the joint at *B* the backward pull increases rapidly until, within an inch or so from the end, this tendency to pull back may be sufficient to extinguish the arc.

This varying condition obviously tends toward instability of the arc. It may be responsible for lack of fusion, porosity and an unevenly welded joint. In general it may be said that with a copper backing bar the arc will have a tendency to pull away from the ground connection. The amount of pull, which depends upon the strength of the magnetic field causing it, will vary with the amount of welding current, size of pieces being welded, free distance between joint edges *S*, and position of the electrode on the joint.

A magnetic field is set up in the plane of the pieces being joined, in addition to that circumferentially around the electrode and the plates being joined. Fig. 2 shows the location and direction of the magnetic fields set up by the welding current of the arc in welding two pieces of

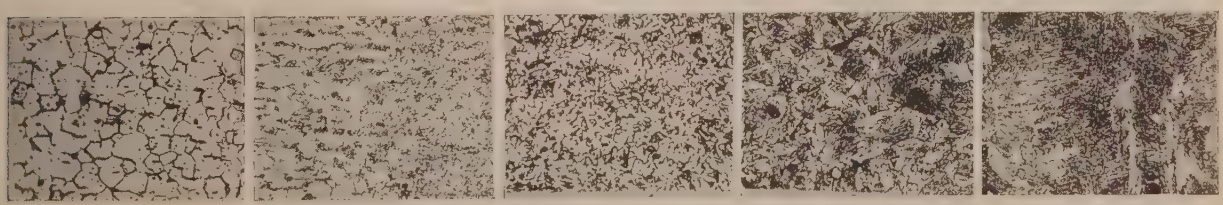
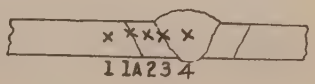
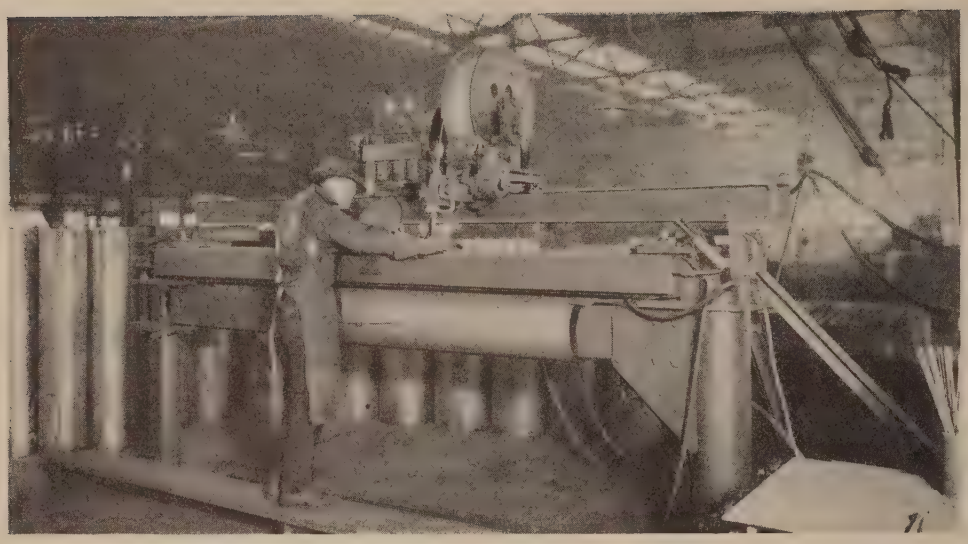


FIG. 4—Photomicrographs Taken from Blue Annealed Steel, Magnification 100 Diameters. (In reproducing, a reduction of 32 per cent was made.) The diagram at right shows locations of (1) base metal; (1a) edge, heated zone; (2) center, heated zone; (3) fusion zone; (4) weld metal





SIDE View of an Automatic Arc Welder Employed in Welding the Side Seams of Kitchen Range Boilers. This is in the plant of William B. Scaife Co., Oakmont, Pa.

plate. Field (1) is set up around the electrode, field (2) around the plates being welded, and field (3) in the plates adjacent to the arc and in direction similar to field (1). Apparently field (3), which tends to maintain itself in the plates, is what causes the arc to draw away from either end of the weld.

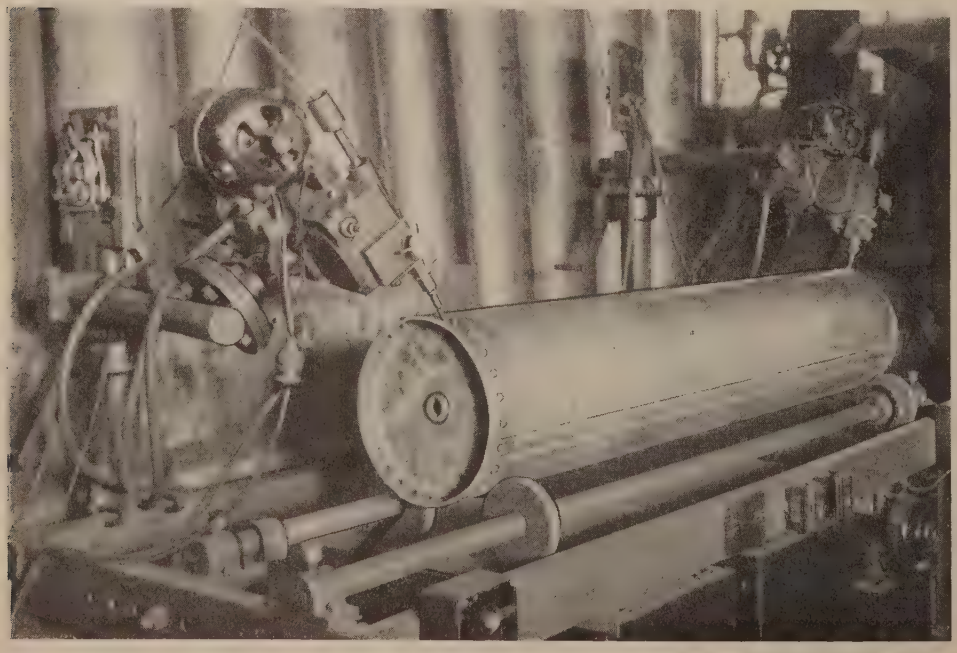
Owing to this constriction of this field between the arc and the starting or finishing ends of the plates, a drawing effect is produced which usually is less noticeable at the start than that near the finish of the weld. As it obviously is not possible to remove these fields from the welding operation, it is necessary to use external control means to overcome these magnetic effects.

Such a control scheme as developed by the General Electric Co. consists of imposing a magnetic field of proper direction and intensity to cause the arc to become least affected by magnetic fields (1) and (3) and any others which may be set up in the clamping device. Field (2) tends to cause the arc to draw slightly ahead, which is desirable.

The pieces to be welded are held in place by a pair of copper jaws, a copper chill bar and corners of steel strips used in building up the complete backing bar. Beneath the copper chill bar is an insulated conductor so connected that part of the welding current may be shunted through it.

When the current flows through the insulated conductor under the chill bar in the direction of welding, a magnetic field is set up, in the plates being welded, in the direction parallel to field (2). It is essential that the work and the steel edges of the backing bar make contact; otherwise, the high reluctance of the air gap, when there is no contact, will reduce the amount of flux through the work and render the magnetic control ineffective.

The magnetic flux in the work and across the seam at the joint being welded acts upon the arc in the same manner as the field of a direct-current motor acts on an armature conductor. Applying the same magnetic laws, this field will tend to blow the arc in the direction in



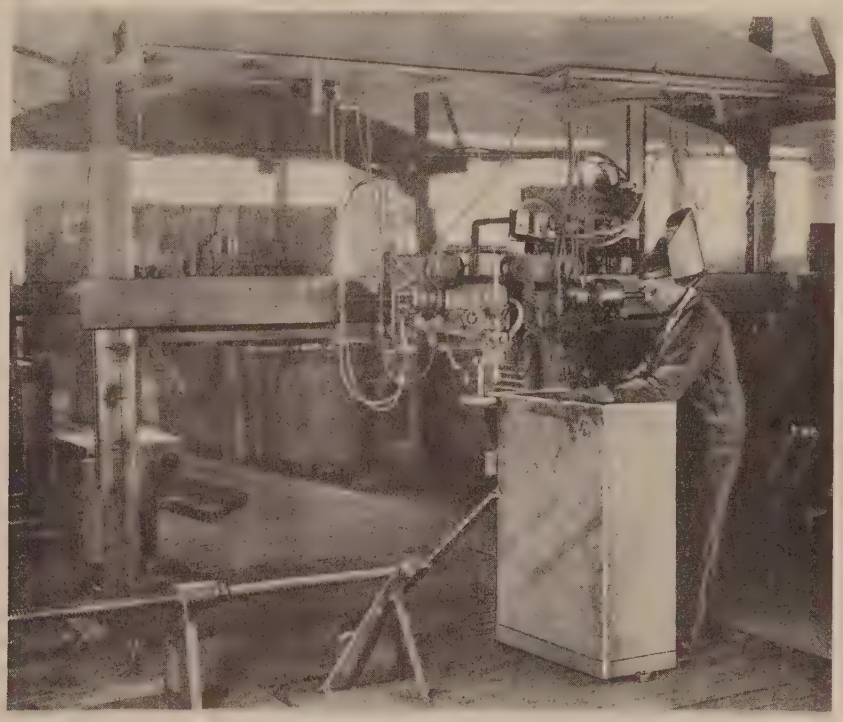
TWO Circular Seam Welders at Work Automatically Welding Head and Bottom, Simultaneously, of a Kitchen Range Boiler in the William B. Scaife Co. Plant, Oakmont, Pa.

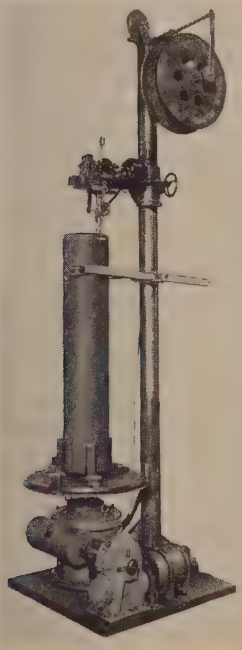
which it is traveling. To render this control effective it is necessary that the insulated conductor be so placed that the magnetic controlling field is caused to travel, during part of its path, through the work and across the seam being welded.

Microscopic sections in Figs. 3 and 4 were taken from welds made on No. 14 gage sheet at 29 in. a minute, and show the structures at four different points from the base metal to the deposited metal. In these welds the total width of weld and heat zones was not over one-quarter inch. Figure 3 is a weld on bright, deep-drawing, low-carbon steel. The photomicrograph taken at the fusion zone indicates quite a definite line of fusion, marked by the small arrows.

Fig. 4 is a weld on blue annealed sheet of slightly higher carbon content than the deep-drawing steel. It will be noted that the photomicrograph of the fusion zone in Fig. 4 does not indicate a definite line of fusion. In contrast with this comparison, one photomicrograph of Fig. 4 shows the edge of the heat zone, which is more distinct than the edge of the heat zone occurring in the welds of the deep-drawing steel, Fig. 3.

AUTOMATICALLY Arc Welding Two Bottom Seams in Wayside Oil-Vending Tank (Right) in Plant of Fry Equipment Corporation, Rochester, Pa.





VERTICAL, Circular Tank-Welding Machine (Left) with Welding Head, Pilot and Guide Rollers

Applications of Automatic Arc Welding

USE of welding for manufacturing household range boilers is practised extensively. One view shows the side seam being automatically welded at a speed of about 16 in. a minute for a butt weld on No. 14 gage sheet. The joint edges are clamped pneumatically and the magnetic control switch is shown on the right end of the machine.

After the shell is completed and the dished heads are inserted the circular welds are made usually by a vertical machine such as shown in another view. Or these seams may be welded with the tank in a horizontal position as shown in view with two welds being made simultaneously, one at each end.

The choice between horizontal and vertical is largely a question of design of tank, user's preference, and space available. The horizontal type is easier to load. The vertical type gives a better position to make the weld, where the thickness of the head is appreciably greater than that of the shell.

Wayside station oil vending tank bottoms are shown in another view, being welded at a speed of approximately 30 in. a minute. The welding heads are fixed in position and the tanks travel on a conveyor. The tank material is No. 15 gage and the electrode nozzles are fitted with guide rolls which keep the arc on the seam at the corner, so that a combination corner-edge weld is made. This operation requires very sensitive control and accurate fit of the heads into the shells.

Welding of galvanized iron is performed at welding speeds somewhat higher than those used for the plain material. It is desirable to avoid full weld penetration of the joint, on account of porosity caused by gas from the melted under-coating. If full penetration is required, then best results are obtained without backing. Under such conditions accuracy in the alinement of the joint edges is imperative.

In general the application of machine welding methods to thin sheets requires accurate preparation of the joint for welding, suitable methods of clamping, proper welding materials, both electrode and plate, intelligent supervision and correct design. Beveling is usually not necessary or desirable for thicknesses below one-quarter inch.

Support sidewise to prevent buckling of a compression flange in a structural beam is the subject of technical data Bulletin No. 2 issued by the American Institute of Steel Construction, 285 Madison Avenue, New York. Conditions which cause such a flange to buckle are either unintentional crookedness in the flange itself or unintentional eccentricity in the application of the load.

Influences Affecting Wire Rope

Survey Being Made to Determine What Materials and Manufacturing Methods Will Give Long Life and Safety

WIRE rope studies and means of coordinating efforts along that line of research formed the subject before a meeting of the American Society of Mechanical Engineers in the Engineering Societies Building, New York, on Sept. 13. The discussion was started by Dr. Elmer A. Sperry, president of the society, by a brief reference to the progress he is making in extending, to an exploration of conditions within wire rope in service, the methods he has been using for some time in studying steel rails. He spoke particularly of some of the disturbing elements in elevator cables, such as grease and "whiskers," which have made necessary some changes in the method of approach. It was found difficult, against this handicap, to induce his small exploratory current to travel along the cable.

American-German Cooperation in Wire Rope Research

COOPERATION between American and German engineers engaged in wire rope research was reported by Prof. Dr. Conrad Matschoss, director, Verein deutscher Ingenieure, Berlin, as greeted with great enthusiasm by German engineers and leading research experts. Under the leadership of Professor Woernle of Stuttgart there has been an intimate exchange of ideas and experiences among the German experts. Some of the formerly disputable wire rope problems have been clarified on a scientific basis by the researches, already conducted. Such are:

Influence on the shape of the pulley groove on the life of wire rope.

Influence of wire diameter and the number of wires per strand on the life of wire rope.

Influence of wire strength on the life of wire rope.

Influence of the rope loading, of the rope twist, of the Trulay preliminary shaping of the wires, etc., on the life of wire rope.

So far the researches have been carried on essentially with elevator and crane ropes. Further investigations have been started relating to the influence and effect of galvanization and also to the chemical composition of the wire.

The quality of a wire rope is determined by its life, which is measured by the number of times the rope can be bent before rupture. These investigations include not only elevator and crane ropes, but also those for mining conveyor systems. Furthermore, the endurance limit of the wire rope is being investigated by means of bending tests.

British Wire-Rope Research

IN Great Britain the Wire Rope Research Committee of the Institution of Mechanical Engineers is studying the repeated bending of wire ropes over pulleys. Its first report, published in 1920, surveyed the literature of the subject, said W. A. Scoble, Woolwich, England. The search was discouraging, most of the papers and articles on wire ropes up to that date being useless or misleading. Many writers had little knowledge of the subject or gave little or incomplete data and wrong conclusions.

In the second report, in 1924, results were given of tests. The ropes used were small, 1 in. in circumference, to allow simple machines to be used and eight tests to proceed simultaneously. Briefly, a test rope, under tension, reciprocated on and off a test pulley. A set of ropes was made of similar wire of 80 to 90 gross tons per sq. in. tensile strength, 6 x 12 on hemp core, 6 x 19 and 6 x 7 construction, each in ordinary and Lang's lay.

Each rope was tested thus: a sample was used over a pulley, say 6 in. in diameter, under a definite tension, and was run until the rope failed and the number of bends to failure was noted. A million bends was taken as a maximum but this was reduced to half a million for subsequent tests. The same rope was next tested on the same pulley under a different tension and so on, until a curve could be drawn to connect rope tension and bends to failure for that particular rope on the 6-in. pulley. The same rope was tested similarly on pulleys of other diameters. The other specimens were treated similarly. Thus it was possible to show separately the effect on the rope life of tension, pulley diameter, rope construction, and in each construction to compare ordinary and Lang's lay.

Tests recorded in the third report (1928) related to a set of ropes of similar constructions to the above but made of 100 to 110-ton wire. The results provided a general check on those obtained earlier and showed the effect of the wire strength.

It is important to know when to scrap a rope. The increase of the rate of stretch appears to be the most useful indication.

Wire Rope Life on Building Elevators

DATA reported by C. T. Coley, building manager, Equitable Office Building Corporation, New York, showed great variation in rope life under the same conditions on the same elevators in office buildings. As one example, he compared 48 passenger elevators, one to one traction, 36 inch sheaves, in one tall building, as shown in table. Each of six banks had eight elevators. The records show variations within each bank as follows:

		Mileage per Set of Cables		
Bank	Rise, Ft.	Low	High	Ratio
1	131	5,288	26,013	1 to 4.92
2	244	5,474	32,477	1 to 5.92
3	317	6,630	37,568	1 to 5.50
4	403	6,738	43,124	1 to 6.39
5	499½	6,672	41,730	1 to 6.25
6	499½	8,896	60,313	1 to 6.77

Records from another building, 25 stories high, with 13 elevators, show a variation in mileage of useful life on the express elevator cables of from a low of 2628 to a high of 70830 miles which is in the ratio of from 1 to 26.9. Similarly, the local elevator cable mileage varies from 3064 to 28,796 miles, which is in the ratio of from 1 to 9.4.

An old building, with hydraulic passenger elevator, uses rope ⅝ in. diameter, 6 strands, 19 wires, over 32-in.

sheaves. This rope is 315 ft. long. The length of life, in time, was as follows:

1892 to 1895	30 months	
1895 to 1896	19 months	(Leson ropes)
1896 to 1902	25 months	(Leson ropes)
1902 to 1906	52 months	(Leson ropes)
1906 to 1909	42 months	(Leson ropes)
1909 to 1913	46 months	(Leson ropes)
1913 to 1920	76 months	(Leson ropes)
1920 to 1922	33 months	(Roebling cables)
1922 to 1926	48 months	(Roebling cables)
1926 to 1929	30 months	(Roebling cables)

These data show clearly that there are unknown factors influencing the life of elevator cables working under practically identical operating conditions. The future study of the Research Committee may determine what these factors are and what corrections should be introduced in the manufacture and use of cables to increase their efficient life.

Speaking on the safety aspect of wire-rope use, W. S. Paine, research engineer, Aetna Life Insurance Co., Hartford, Conn., welcomed the research contemplated by the A.S.M.E.: "An investigation which will give the real metallurgy of the cables needed for a specific use, and at the same time provide a high-grade standard of manufacture, a research that will give the best method of installing elevator cables over the most efficient type of sheaves, and at the same time provide data covering the actual destruction which occurs from cables kinking, creeping, bending and whipping. These data will also reveal the most efficient method of lubrication, the effect of irregularity of the lay of the wire strands and also the effect of vibrations or whipping of a cable when it nears a position off the vertical."

Wire-rope problems of the elevator manufacturers were discussed by David L. Lindquist, chief engineer, Otis Elevator Co., New York. He expressed the opinion that elongation of the rope gives no definite indication of its condition.

G. P. Boomsliter, professor of mechanics, West Virginia University, Morgantown, referred to the "second stretch." One company which he cited has established the "practice to discard a hoisting rope (a) when the rope has shown the second stretch (pulling into core, or overlapping strands changing the diameter about 3/16 in., which is due to the second stretch) which indicates that the safety limit has been reached, due to the second stretch being caused by the actual weakening of the rope; (b) when there are a number of broken wires in each strand; (c) when there are a considerable number of broken wires in a short space."

This definite line of action was contrasted with the haphazard practice of many companies, whereby ropes were condemned only when they broke, or showed distress. For study, Professor Boomsliter recommended particularly wire ropes to be used in coal-mine hoisting.

Acceleration stresses.
Proper diameter of sheave and drum for size of rope.
How to eliminate starting shocks and shocks due to sudden braking.
A study of the effect of various grooves.
Methods of keeping rope tight at all times.
A study of the "second stretch," referred to in one of the above quotations, as a safe criterion for discarding hoisting rope.
New types of rope, especially:
(a) with respect to form of center core.
(b) with respect to material.

This last study seems of highest importance. If, as one engineer says, some wires wear to paper thinness before failure, while others break because of brittleness, it would seem that, if an alloy steel of high ductility and of high strength and endurance limit could be used, longer life of ropes could be attained.

Other Papers on the program were:

"Wire Rope Problems in the Construction Field," by M. M. Liebeskind.

"Use of Wire Rope on Cranes, Derricks and Hoists," by L. W. Hopkins, materials engineer, American Chain Co.

"Wire Rope Use by Steam Electric Generating Plants," by J. R. McCausland, superintendent of Coal Bureau, Philadelphia Electric Co.

"Wire Rope Problems Relating to Marine Use," by A. V. Bouillon, secretary, American Marine Standards Committee, Washington.

"Wire Rope Data Needed by Bridge Engineers," by O. E. Hovey, assistant chief engineer, American Bridge Co., New York.

"Use of Wire Rope in the Logging Industry," by Emanuel Fritz, professor, division of forestry, University of California, Berkeley.

"Wire Rope Problems Relating to Excavating Machinery," by W. M. Bager, vice-president, Bucyrus-Erie Co., South Milwaukee, Wis.

"Wire Rope Problems Relating to Cableways," by D. C. Sherman, Sherman & Reilly, Inc., Chicago.

Recommends Wire-Rope Research

At the close of the meeting the 50 engineers present adopted the following resolutions:

WHEREAS the discussion at this conference has revealed:
1. That wire rope is subjected to many and varied conditions of service;
2. That there is great variation in the life of wire rope; and
3. That there seems to be no accurate method of predicting wire rope life or of determining when its useful life is up

Be it resolved that

A cooperative research committee be organized under the auspices of Engineering Foundation and the American Society of Mechanical Engineers, and with the cooperation of other interested technical organizations, to make a study of the factors affecting wire rope life for the purpose of:
1. Formulating rules of recommended practice for the use and inspection of wire rope;
2. Emphasizing the factors to be considered in applying wire rope to its various uses; and
3. Pointing out possible improvements that might be made in the design, materials and fabrication of wire rope and wire-rope-using machinery.

Be it further resolved that

The research program adopted be developed according to the present research procedure of the American Society of Mechanical Engineers.

Welds Galvanized Steel With Bronze Rod

Welding of galvanized metal—sheet, pipe, or fittings—is not only possible, according to *Oxy-Acetylene Tips* for August, but experience proves it to be highly satisfactory. The heat of the welding flame burns off the zinc coating for a certain distance adjacent to the weld, but the zinc oxide from burning coating, or the underlying iron-zinc alloys, do not appreciably affect the strength of a weld, even when made with steel rod. A preferred welding material is a high strength bronze; this, used with a proper flux, is placed rapidly, at a lower heat, and consequently less of the original zinc coating is volatilized. The bare iron is apparently protected from corrosion by the adjoining zinc; at least long experience with welded galvanized pipe in air conditioning systems shows no perforations at the pipe-joint from the inside, where it is obviously impossible to paint the joint.

The article describes the manufacture of the floating bell for small acetylene generators from 18-gage galvanized steel. Formerly this joint was made with double-lock seams with solder sweated into the seam. Twenty-gage steel was the heaviest which could be used satisfactorily with this type of joint. Final inspection showed slight seam leaks in 24 per cent of the finished bells. Welding the 18-gage steel reduced the extra labor to repair leaky parts to the vanishing point; costs were further saved by substitution of pipe nipples welded on for flanged connections riveted and soldered on. Total costs were smaller, even after the heavier steel was paid for, and the joint is over three times as strong in direct tension.

Wreck Railroad Car to Test Helium Tank Mounted on It

A STAGED train wreck and a hydrostatic pressure test were recently applied to a type of spherical vessel built for the transportation of helium gas by the A. O. Smith Corporation, Milwaukee. The tests were witnessed by the tank car committee of the American Railway Association and representatives of the Bureau of Aeronautics, U.S.N., Corps of Engineers, U.S.A., the Bureau of Explosives, the Goodyear-Zeppelin Corporation, and the Wisconsin State Industrial Commission, as well as a number of railroad officials, consulting engineers and insurance inspectors.

The vessel was a steel sphere, 72 in. in inside diameter, formed of two halves of 1½-in. plate, welded together by the Smith process. It ultimately failed under a hydrostatic pressure of 4500 lb. per sq. in., after undergoing virtually 80 hours of severe battering, as for three days previous it had been continuously hammered by pneumatic hammers while under 1250 lb. hydrostatic pressure.

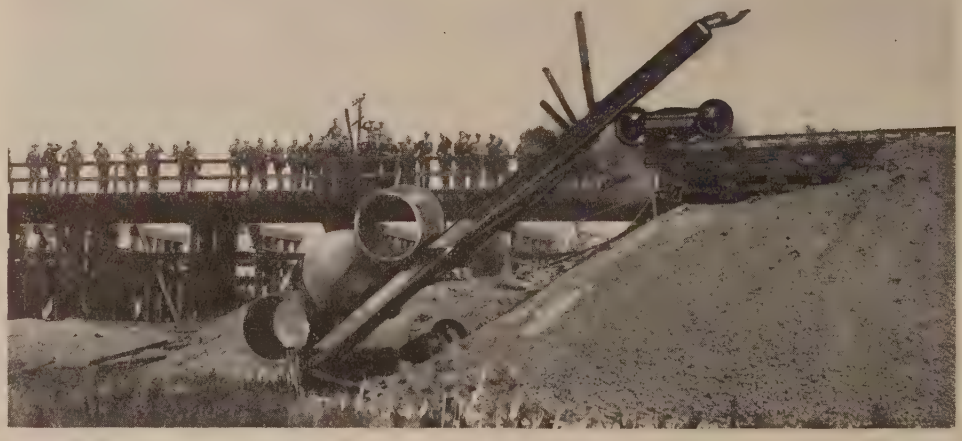
In the finished design, six of these tanks of slightly larger diameter, and designed for the transportation of helium gas at a pressure of 2000 lb. a sq. in., are to be mounted on specially designed gondolas.

To simulate the conditions that would arise, should such a car be wrecked, an actual derailment was arranged. The sphere then under 1250 lb. air pressure was lashed to a flat car and cylindrical steel sections weighing 14,500 lb. were lashed before and behind it. The car traveling at a high rate of speed was run off the end of a 25-ft. embankment. The car was completely wrecked, but the sphere was undamaged.

Following this test, the air was let out of the vessel and it was filled with water for the final tests. After undergoing repeated stress tests, hammer tests and tests to the elastic limit of the steel—with results that were checked by the tank car committee—the pressure was rapidly raised. The big steel sphere began to swell like a rubber ball after the elastic limit was passed. At the last measurement that could be taken, after a pressure of 4000 lb. had been reached, the sphere had increased 17 in. in circumference.

Under a steady hydrostatic pressure of 4500 lb. a sq. in. the vessel finally failed. The manner in which it fractured was also unusual and seemingly testified to the great ability of the spherical shape to resist pressure for this type of service.

The vessel broke into nine pieces, ripping from end to end much as an orange would be peeled. All the fractured sections were fairly large with the weld across the widest part of each one. In no place did the break follow the weld. The steel in the formed heads at the axis perpendicular to the weld section was thinned down to a minimum measured thickness of 1.05 in.



THE Sphere, Under 1250 Lb. Air-Pressure Was Lashed to a Flat Car Which Was Run Off the End of a 25-ft. Embankment (Above)
(Lower Left) Examination of the Sphere After the Wreck Disclosed It Was Undamaged. A hydrostatic test to destruction was run after the wreck
(Lower Right) Preparations Were Then Made for the Pressure Test to Destruction. The vessel failed at a pressure of 4500 lb. a sq. in.

Present Status of Nitrided Steels

Manufacture and Properties of Nitralloy, Preliminary Heat Treatment, Hardening Practice, Applications and Expected Developments

FIVE different grades of chromium-molybdenum-aluminum steel are now produced by Krupp in Germany for nitriding, according to Henry A. DeFries, metallurgist Ludlum Steel Co., Watervliet, N. Y., in an address before the New York Chapter of the American Society for Steel Treating, Sept. 19. These range in carbon from 0.12 up to 0.55, but the highest carbon is gradually being abandoned because the long heat at nitriding temperature will lower the hardness of the core to that obtainable in the 0.30 to 0.40 carbon grade. American uses seem to be well served by three grades, carbon 0.15 per cent maximum, 0.20 to 0.30 per cent carbon and 0.30 to 0.40 per cent carbon, all containing normal amounts of sulphur, phosphorus, silicon, and manganese. Other alloys are constant for the three grades: 0.80 to 1.30 per cent chromium; 0.15 to 0.20 per cent molybdenum, and 0.70 to 1.10 per cent aluminum.

These steels are made by the basic process: steel foundries trying to make acid nitralloy castings have consistently failed because much silicon is reduced from the lining and the hardness becomes so high the metal cannot be machined. Even by the basic process it has been so far impossible to make an ingot or bloom larger than 12 in. square sound and free of pipe. Massive parts which would profit by the excessively hard surface induced by nitrogen must therefore be made of some of the other steels, like chromium-vanadium, which may be nitrided, though not so readily.

Harden and Draw Before Machining

The lower carbon varieties of nitralloy in the annealed condition have Brinell hardness of 150 to 160, too soft to machine rapidly. This is corrected by giving a preliminary quench and draw to a hardness of 190 to 220 Brinell. One favorable point argued for the new method of hardening is that it causes no warpage. Mr. DeFries said that this would be true only if the metal had previously been carefully annealed (at a temperature slightly higher than the nitrogen hardening temperature) one or more times to remove all internal strains from previous quenching, machining, grinding and other causes. Such final annealing must be done in an atmosphere which is strictly non-decarburizing—any nitrided decarburized surfaces will flake off easily after final cooling.

Steels of the above mentioned analysis have suitable physical properties for many uses. However, they are not sufficiently strong for service as punches, dies for cutting, stamping or pressing, and other parts where the unit pressure is extremely high. The relatively soft aluminum alloy will flow sufficiently to crack the hard surface and ruin the accuracy of the die. (An exception was noted for mandrels, where the pressure is simultaneous in all directions.) For severe service, 3 per cent chromium steel with low molybdenum, with or without about 0.4 per cent vanadium would be much more suitable. These steels nitride easily and satisfactorily.

Dr. Adolph Fry, the inventor of the aluminum steel, believes that the patented nitralloy steel (with aluminum) gives the maximum surface hardness for a given thickness of case. Other investigators have questioned this, but as A. F. Kinzel of Union Carbide and Carbide Research Laboratories pointed out, this is in many instances due to inaccurate or non-comparable hardness determinations. The ordinary Brinell ball test, even with light loading, breaks through the hard surface, and its indications are valueless other than for judging ductility by the way the cracks spread out. The smaller ball or cone used by the Rockwell machine gives a roughly integrated value of the hardness and depth, and may be useful for production work.

For research work Mr. Kinzel first tried the Herbert pendulum, but discarded it on account of the fact that its indications are not easily converted into other measurements. He favors the microcharacter, which makes a delicate scratch about 0.001 in. deep and requires microscopic observation at 1000 diameters to evaluate. Mr. DeFries noted that the Vickers hardness tester* is much used abroad, and gives figures comparable to Brinell numbers. Timken-Detroit Axle Co., Detroit, tests by file and peen hammer; hardened edges if they possess even a slight radius, should not flake when pounded with a hammer, and flat surfaces should resist the peen end without cracking. Depth of case is most easily determined on round parts by taper grinding and testing with a file.

Simple Equipment Required

Nitriding operation is so simple that Mr. De Fries recommended intending users to make their own experiments to determine the heat treatment cycle best suited for the work in question. According to Dr. Fry a eutectic transformation point occurs at 1200 deg. Fahr., which causes lamination in the nitrided case, and consequently marks the upper limit. Usual working temperature is 950 to 1100 deg. Fahr., and any good furnace can be closely regulated in that range. Merely place the parts to be hardened in a gas tight container, with inlet and outlet pipe, and start a slow uniform flow of commercial ammonia gas through at a pressure of about 1 in. water gage. Exhaust gas (partly dissociated ammonia) should be run into a water stream. Cases of varying hardness and depths can be had by adjusting properly the time, temperature and concentration of ammonia. For instance light, very hard surfaces can be produced in six hours on gages where wear resistance only is needed. A wrist pin, taking alternately stress and wear at heavy unit load, requires 18 hr. or more.†

If some of the part is to be left soft, tin is a good stop-off. First paint the parts to be hardened with Bakelite varnish, then tin the rest of the surface in an electrolytic cell, finally remove the Bakelite film and nitride.

Outlets in Automotive and Steam Industries

Since the nitriding alloys were exploited in Europe several years before the idea was imported to America, the applications over there are more various than are to be found here. For instance, French automobiles commonly used nitrided crank shafts, pinion, and ring gears. Cylinder liners are put into high grade gas en-

(*Concluded on page* 874)

*See THE IRON AGE, March 1, 1928, page 602.

†Many operating details are given in "Working Rules for Nitrogen Hardening," by H. W. McQuaid. THE IRON AGE, May 9, page 1272.

New Metal Forming Mill

Individually-Driven Stands Provide Flexibility—Increased Production Claimed

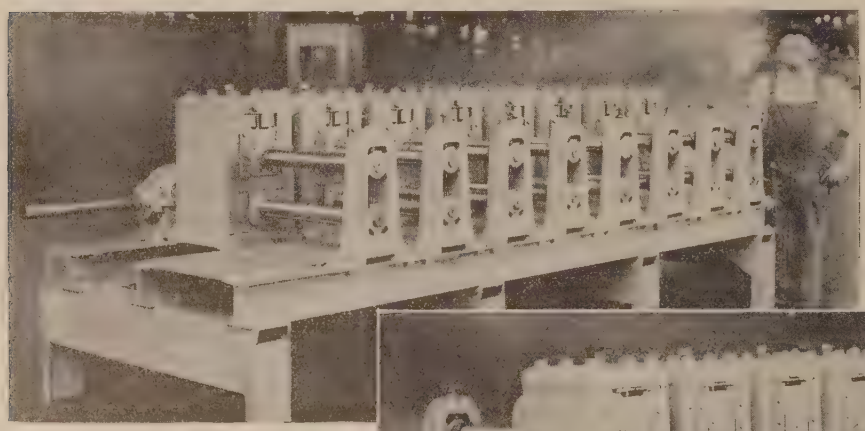
INCREASED production, with more accurate sections and better finish, are claimed for a new type of forming mill that has been brought out by the Farrel-Birmingham Co., Buffalo.

Each stand is an individual unit, and is driven through bevel gears in a cast iron housing, the gears receiving power from a single backshaft driven by one motor. The individual stand houses the spindle bearings, the connecting gears and the mechanism for adjusting the roll centers. Anti-friction bearings, lubricated automatically, are used throughout to assure efficient and smooth transmission of power. The stands are made heavier and stronger than usual in order to provide a solid and stable installation, to improve the quality and finish of the product.

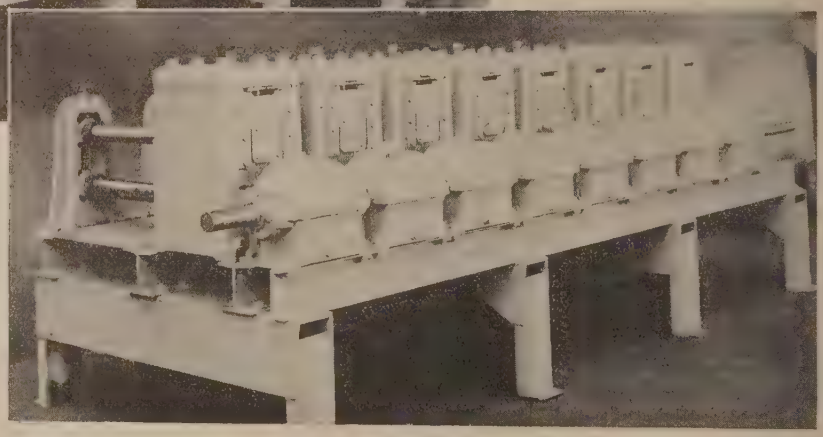
The method of adjusting the top roll spindle is a feature. Both top and bottom spindles are held rigidly to the roll housing during the rolling operation and there is therefore no backlash or wear. The top roll spindle is carried in anti-friction bearings in a single saddle and is placed against the cap by heavy springs and held in place laterally by guide plates. The wedge, which is free to move in and out, is inserted between the top roll spindle saddle and the housing cap, this movement being controlled by a horizontal screw, with a hexagon head, on the outside. To elevate or depress the top roll spindle it is only necessary to turn the hex head of the screw to the right or left. By means of two cap bolts, which pass through the cap of the roll stand and the wedge and are threaded into the top roll spindle saddle itself, the saddle and the wedge can be clamped tightly against the cap when the mill is at work.

Heat-treated alloy steels are used in the construction of this forming mill. Semi-steel is used instead of cast iron for the housing.

With the individually-driven stand, it is possible to add or subtract from the mill from time to time as different shapes of metal are formed. On heavy-production operations a duplicate set of stands can be made ready so that at the finish of one production job the change-over can be effected immediately.



THE Individually-Driven Stand Permits Adding or Subtracting from the Mill as Different Shapes Are to Be Formed. In addition to flexibility, high-production of accurately formed sections is claimed



EACH Stand Is Driven by Bevel Gears Which Receive Power from the Backshaft Driven by One Motor. Anti-friction bearings are used throughout. The method of adjusting the roll spindle is also a feature

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Simple Optical Pyrometer

A SIMPLE and compact pyrometer, called the Pyroversum, has been designed by Maco Template & Engineering Co., London, (Charles Mitchell, New York, American representative).

The instrument consists of an eye piece and a frame 8½ in. long by 1 in. wide, which carries a special glass throughout its length. One end of the glass is clear; the rest is gradually darkened throughout its length until at the other end it is practically opaque. On one side of the frame is a scale registering from 550 deg. to 1200 deg. C. (or if desired it may be calibrated for Fahrenheit readings). On the frame is mounted a slide having a circular hole in the centre through which the hot body may be seen through the shaded glass. At any convenient distance the user, looking at the object through the hole in the slide, moves the frame along until the glow can no longer be seen. The temperature may then be read on the scale at the left hand side of the slide.

The function of the eyepiece is merely a hood to exclude all other light from the observer than that which comes through the darkened glass. The manufacturers claim that it will measure readily and accurately temperatures of glowing tools, and of melted alloys. The Pyroversum can be carried about in the pocket as easily as a rule, its weight being half a pound. It requires no adjustments, being always ready for instant use.

Foundry Equipment Orders Largest in 12 Months

The index of gross orders for foundry equipment in August was 229.5, the highest figure reached since August, 1928, according to the monthly report of the Foundry Equipment Manufacturers Association. The index for July, 1929, was 219.3. Shipments in August, at 150.8, were the smallest since September, 1928. Unfilled orders on Aug. 31, at 441.1, were the largest since Oct. 31, last year. Average monthly shipments for 1922-23-24 are taken as 100 in computing the indexes.

Improved Société Genevoise Jig Borers

NEW models of the Nos. 4 and 5 jig boring machines built by the Société Genevoise d'Instrument de Physique, Geneva, Switzerland, are being placed on the market in the United States and Canada, by the R. Y. Ferner Co., Investment Building, Washington.

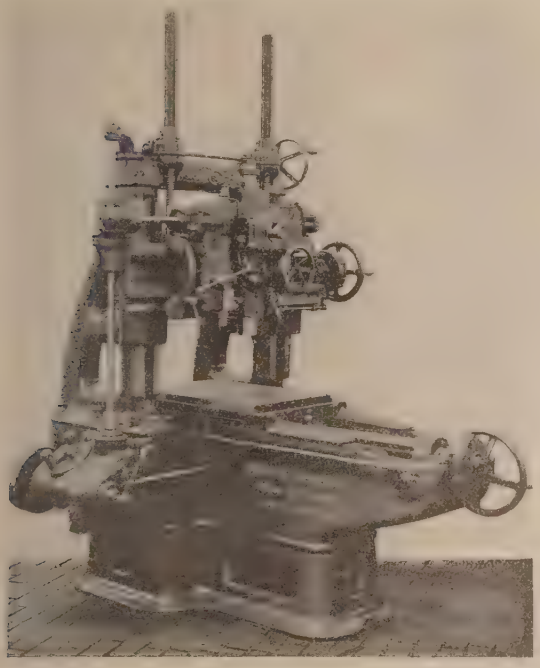
Although the fundamental principles of these machines, which are designated as the MP 4B and the MP 5B, are the same as in the previous models, a number of improvements have been added. Various parts have been strengthened to permit use of greater power and thus increase the speed and the drilling and boring capacity. The vertical housings, tool slide and boring heads are heavier, and a new ribbed design has been adopted for the cross-rail. The diameter of the quill in the main boring head in both machines has been increased and is machined to receive No. 4 Morse taper shanks. Feed of the spindle is now 7 in. A pump for lubricating the main spindle, with sight drip feed controlled by a needle valve, is provided, and a sight feed oiler is used on the high-speed spindle.

The size of the high-speed spindle has been increased to permit use of No. 1 Morse taper shanks, which avoids the necessity of using collets for straight shank tools. The drilling and boring capacity of the high-speed spindle now ranges from 3/64 to ½ in., and the nine speeds range from 212 to 1870 r.p.m. The nine-speed range of the main spindle has also been increased, being from 45 to 400 r.p.m. The drilling capacity of the main spindle is now 1¾ in. in cast iron and 1¼ in. in soft steel, while the boring capacity is 6 in.

With the elimination of collets in the high-speed spindle, a new form of holder has been designed for the guide bushings, to keep the ends of the drills from vibrating. This holder permits convenient insertion of the guide bushing and the tool. Bushings up to 5/16 in. are supplied for holding small straight shank tools, as well as a ¼ in. capacity drill chuck. New accessories include an adjustable boring tool with capacity up to ¾ in., and an extra boring tool of 4 to 6 in. capacity. An adapter is provided for the main spindle so that drills and end mills from ½ to ¾ in. may be used.

The distance between the housings and the width of the table of both machines have been increased to permit handling larger pieces. The method of attaching the rectangular table to the nut of the leadscrew has been simplified, to facilitate installation of the machine. Circular tables furnished with the machines are made higher to permit sliding them to any point on the rectangular table or on a work bench without interference from the handle of the worm-screw. The shaft of the worm-screw is designed to permit quick attachment of any of a set of three indexing disks, which makes it possible to lay out in a circle any number of holes from 2 to 200 without making calculations for the successive settings. These index plates can be attached without removing the micrometer head, and the latter may be used for any setting while the index plate is in place.

Other improvements include a releasing clutch on the handwheel for moving the table; a prismatic microscope and a vertical indicator device for checking the parallelism of the work with the table, measuring the depth of counterboring, or checking two surfaces at different heights, and for a variety of other measurements. A micrometer drum on the hand-feed shaft of both spindles permit exact measurement of the depth of blind holes or counterbores.



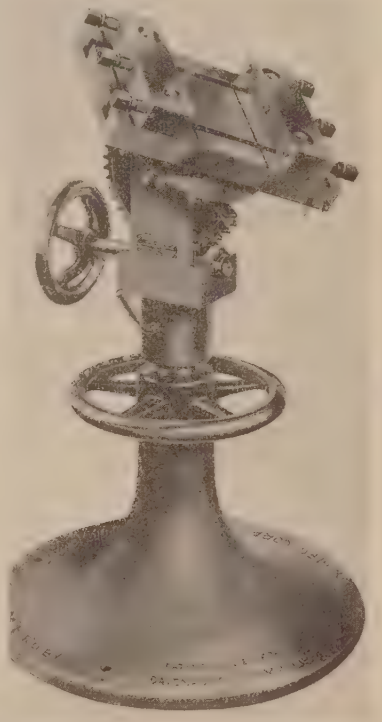
(At Left) Parts Have Been Strengthened and Power and Capacity Increased. Other improvements facilitate operation

* * *

(At Right) The Die in Process May Be Tilted to Any Desired Angle and Adjusted to Any Height

Universal Stand Facilitates Die Making

MAKING of dies is facilitated and floor space is saved by means of the die holding stand illustrated, which has been placed on the market by the Davenport Locomotive & Mfg. Co., Davenport, Ia. The die in process is held firmly in the fixture until completed, and physical handling, and the accident hazard connected with it, are eliminated. Height and angle adjustments may be made conveniently. Two standard sizes, to accommodate blocks weighing up to 1500 and 3000 lb. respectively, are built.



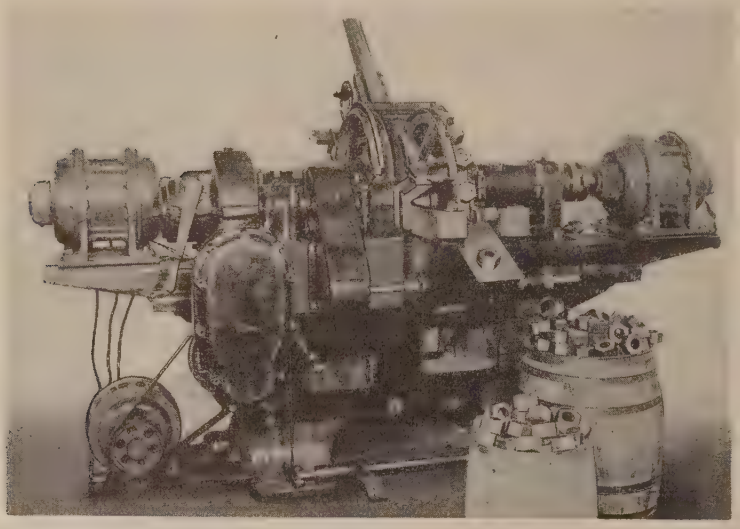
The die holding fixture is made of steel, and has adjustable clamps, one on each side, which slide in accurately machined T-slots. The die is held firmly in place by six machine screws which project through these clamps and engage the groove in the die block. The head fixture is positioned by means of a worm and segment gear and handwheel; it may be set quickly to any position simply by turning the handwheel until the desired angle is reached, and then swinging the entire top assembly, which is pivoted. The work is then locked in this position.

Special Hexagon Nut Grinder

HEXAGON nuts are ground rapidly on the equipment illustrated, which is being introduced by Gardner Machine Co., Beloit, Wis. The machine consists of a No. 84 Gardner grinder to the front of which is secured a rotary attachment with special work-carrier and timing device. On the end of the rotor shaft is mounted a cast-steel disk with a series of studs suitable for the work to be handled. Two side guides are provided to keep the nuts from turning and present them to the grinding wheels in the proper position. On the upper side guide is mounted an indexing device which turns each nut one-sixth of a revolution as it passes, thus presenting two new surfaces to be ground.

After the nut has been ground on all six surfaces, it is ejected automatically from the stud by two vertical arms. These arms, one on each side of the nut, are actuated by a cam arrangement so that the nut passes between the wheels three times before being ejected. In the operation of this device, the attendant is only required to reload the empty stud as it comes around to the loading position.

The unit is equipped with both a hand and a foot-lever which are connected with the friction clutch for stopping and starting the feeding mechanism. This enables the operator to stop the carrier instantly, should it be necessary, simply by stepping on the foot lever. The machine will be demonstrated at the Machine Tool Show in Cleveland next week.



The Attendant Merely Reloads the Empty Stud as It Comes to the Operating Position

6-In. Plain Hydraulic Grinder

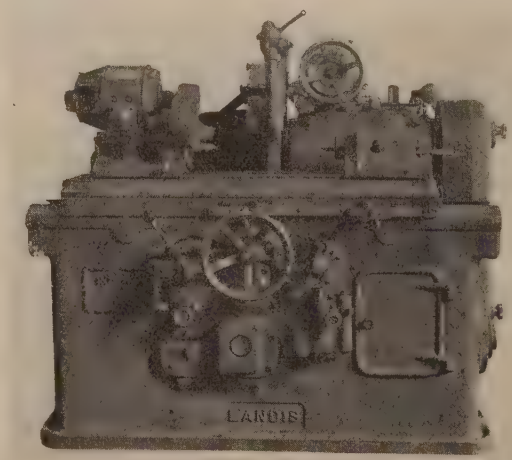
A SIX-INCH plain hydraulic grinder for the rapid production of pistons, axle, stub and pump shafts; small motor armatures and armature shafts; bearings; twist drills; and many other similar small parts, has been added to the line of the Landis Tool Co., Waynesboro, Pa.

A distinctive feature is the hydraulic work carriage traverse with quickly available traversing speeds ranging from 12 to 360 in. per min. A 24-in. diameter grinding wheel is employed. With both electric motors attached to the machine and the water tank made integral with the bed, the machine is completely self-contained.

The base of the bed forms a reservoir for the oil used by the hydraulic traversing system. The work carriage traverses on a V and a flat guide with chilled surfaces thoroughly protected, and spaced to give solid support. Tarry, which is adjustable, is regulated by a needle valve; the usual method of swiveling is utilized.

Steel backed babbitted wheel spindle bearings which are adjustable for wear are used. Continuous spindle bearing lubrication is provided by means of a pump driven by the spindle itself. The oil is filtered before it enters the bearings and the oil gage always visible from front of machine. The spindle is of heat-treated alloy steel and is driven from end by multiple-V belts. An extra spindle pulley is furnished for use after the wheel wears down.

A low-pressure anti-friction bearing traversing oil pump, all parts of which run in oil, is used. The traversing oil motor is of the four impulse, two-chamber continuous type, with all parts running in oil. A throttle valve controls the speed of the motor; a balanced piston-type reversing valve governs the reversal. Grinding wheel cross feed is either automatic or hand operated, in each case through a long feed screw and bronze half nut. Hydraulic pressure working through a small rotary motor actuates the automatic feed. The headstock is driven by an individual dynamically-balanced variable-speed motor, and speed reduction is through a compact double chain arrangement with automatic adjustment. Provision has been made for mounting and driving a d.c. generator at the rear of the machine. The machine designated as the type C, will be demonstrated at the Machine Tool Show in Cleveland next week.



HYDRAULIC Work Carriage Traverse with Quickly Available Speeds, Ranging from 12 to 360 In. per Min., Is a Feature

New Transmission for Trucks

New in the automotive field is a four-speed transmission for 1-ton trucks that is being manufactured by the Clark Equipment Co. at its plant in Berrien Springs, Mich. This new product already is standard equipment on light trucks made by three large manufacturers.

The Clark Equipment Co. also has plants in Battle Creek and Buchanan, Mich. It controls the Frost Gear & Forge Co. at Jackson, Mich. It manufactures front and rear axles, drills, industrial tractors, and trailers, single and dual wheels, and rear axle housings.

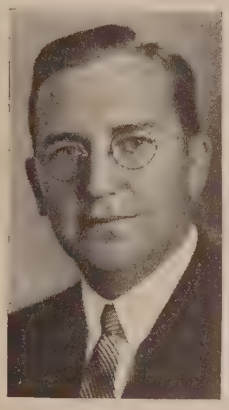
Weirton Group Merger Decided Upon

West Virginia Company Will Be Coupled With Great Lakes Steel and M. A. Hanna Co. Subsidiaries

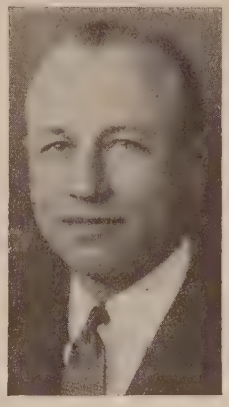
MERGER of the Weirton Steel Co., Weirton, W. Va., Great Lakes Steel Corporation, Detroit, and some of the subsidiaries of the M. A. Hanna Co., Cleveland, now in process of completion, will result in the formation of a completely integrated steel producing organization occupying sixth or seventh place in steel making capacity in the United States.

The Hanna Company owns and operates extensive ore properties and seven blast furnaces, the Weirton company has two blast furnaces, by-product coke plant, semi-finished and finished steel mills at Weirton and mills at Clarksburg, W. Va., and Steubenville, Ohio, while the Great Lakes Corporation has under construction a steel plant at Ecorse, Mich., which will include open-hearth furnaces and steel mills.

ERNEST T. WEIR



GEORGE R. FINK



GEORGE M. HUMPHREY

The financial set-up of the new organization is to be handled by the formation of a holding corporation that will take over the stock of the Weirton and Great Lakes companies and the Hanna subsidiaries in exchange for no par common stock of the new corporation. The name of the holding company and the amount of stock it will issue have not yet been decided upon.

E. T. Weir Slated for Chairman

E. T. Weir, president Weirton Steel Co., is slated to become chairman of the board; George M. Humphrey, president M. A. Hanna Co., chairman of the executive committee, and George R. Fink, president of the Great Lakes Steel Corporation and also of the Michigan Steel Corporation, Detroit, president of the holding company. No specific mention has been made that Michigan Steel will be included in the merger.

The holding company will be a Delaware corporation with headquarters in Wilmington, Del., and offices in Cleveland, Detroit and Pittsburgh. It will have no bonded indebtedness, no prior or preferred stock and no debts aside from the subsidiary obligations. No change in the financial structure of any of the merged companies is contemplated. No new financing will be done. The exchange of common stock of the participating companies for that of the holding corporation will be the basis for consolidation. Assets and security for the prior issues such as the bonds of the Buffalo subsidiary and debentures and preference stock of M. A. Hanna Co. will not be disturbed by the merger. Each merging company will continue to be operated by its own personnel and will retain its present identity.

Physical properties involved in the merger include all the blast furnaces, mines and vessel interests of the Hanna company, the Weirton furnaces and mills and 7000 acres of coal lands in West Virginia and Pennsylvania and the steel plant of the Great Lakes organization. It is stated that the ore reserves of the new company will be exceeded only by those of the United States Steel Corporation and the Bethlehem Steel Corporation. The Hanna interests and their seven subsidiaries form one of the largest producers of iron ore, operating mines on the Mesaba and Cuyuna ranges in Minnesota and on the Marquette, Gogebic and Menominee ranges in Michigan. With its coal lands Weirton has an estimated fuel reserve sufficient for 40 or 50 years. Consequently the holding company is well situated in respect to supplies of ore and fuel.

The nine blast furnaces to be owned by the holding company include five in Buffalo of the Buffalo Union Furnace Co., two in Detroit of the Hanna Furnace Co. and the two Weirton furnaces. The total annual pig iron capacity of these stacks is rated at over 1,500,000 tons. By-product coke for the blast furnaces will be supplied through ownership of one-half interest in 150 Koppers ovens of the Donner-Hanna Coke Corporation, Buffalo, with an annual capacity of 700,000 net tons and 86 Koppers ovens at Weirton having an annual capacity of 550,000 tons.

The total ingot capacity will be approximately 1,800,000 tons, of which Weirton will supply 1,200,000 tons and Great Lakes 600,000 tons. This will place the holding corporation slightly under the Republic Iron & Steel Co. in ingot capacity. Products of the semi-finished mills will be slabs, sheet bars and billets. Finishing mills will produce sheets, strip, continuous strip, hoops and bands and black plate for tinning. Weirton has a capacity for producing annually 360,000 tons of hot strip, 120,000 tons of cold-rolled strip, over 100,000 tons of sheet products, over 400,000 tons of wide strip and light plate products covering a wide range, and an annual capacity of 5,550,000 base boxes of tin plate, it being the second largest producer of the latter product. The plant of the Great Lakes Steel Corporation will have hot and cold-rolled strip mills with an annual capacity of 400,000 tons.

New Company Favorably Situated

The new company with its own ore mines, vessels, blast furnaces and mills will be favorably situated in respect to both raw materials and consuming markets. The Weirton company is already an important factor in the Michigan steel market, which is constantly being expanded by the demands of the automotive industry. Weirton, being situated on the Ohio River, receives its coal by water and can ship its products by barge to Cincinnati, St. Louis and other Ohio and Mississippi River points, and can enter the South and Southwest with a saving of $2 to $3 a ton as compared with the all-rail transportation costs.

The M. A. Hanna Co. by the merger will expand its outlet for ore, coal and pig iron. The Hanna furnaces in Buffalo have for some time been shipping considerable pig iron by water to Detroit and other Michigan ports and reaching the eastern seaboard by the Erie Canal. The Great Lakes plant at Ecorse is only about one mile from the Hanna Detroit blast furnaces and some time ago the Hanna company entered into an agreement to supply the Great Lakes plant with hot metal from its Detroit furnaces. C. A. Collins, president, Hanna Furnace Co. and vice-president of the M. A. Hanna Co., is a director of the Great Lakes Steel Corporation.

Ernest T. Weir, president, Weirton Steel Co., who will become chairman of the board of the new steel holding company which is to absorb the Weirton company, the Great Lakes Steel

Corporation and subsidiaries of the M. A. Hanna Co., started his steel career as a clerk with the Braddock Wire Co., later going with the Oliver Wire Co. In 1898 he became assistant to the district manager of the American Tin Plate Co., Pittsburgh, advancing to manager of the works in 1900, and three years later he was appointed manager of the Monessen works of that company. In 1905, with James R. Phillips of Pittsburgh, he organized the Phillips Sheet & Tin Plate Co., serving as secretary and general manager until 1908, when he became president. He built the town of Weirton, W. Va., and erected a 20-mill tin plate plant there in 1909-1910. At about the time of the change of name to the Weirton Steel Co. the company acquired the plants of the Jackson Iron & Tin Plate Co., Clarksburg, W. Va., and the Pope Tin Plate Co., Steubenville, Ohio.

George R. Fink, who will be president of the holding company, is president of the Michigan Steel Corporation and the new Great Lakes Steel Corporation. He organized the Michigan Steel Corporation several years ago and built a sheet mill near Detroit, and his success in this venture encouraged him to undertake the organization of the Great Lakes Steel Corporation, which he financed to the extent of $20,000,000 by his own efforts without any bank underwriting. Automobile manufacturers, bankers and others, including the M. A. Hanna Co., took stock in the new corporation, the purchasers numbering about 300. Mr. Fink, prior to his organization of the Michigan Steel Corporation, was for several years general sales manager of the West Penn Steel Co., which is now a part of the Allegheny Steel Co. He started his work in the steel business in the West Penn mills and came up from the ranks. During the war he was a captain in the Ordinance Department and was stationed in Washington. His promotion to general sales manager of the West Penn Steel Co. came after his return to his active duties after the Armistice. Mr. Fink is a director of the Union Trust Co., Detroit.

George M. Humphrey, president, M. A. Hanna Co., Cleveland, who will become chairman of the executive committee of the new holding company, used the legal profession as a stepping stone to a conspicuous place in the iron and steel industry, which he has attained at an early age—he is still under 40. Born in Saginaw, Mich., in 1890 and graduated from the University of Michigan in 1912, Mr. Humphrey was admitted to the bar in the latter year and took up the practice of law in Saginaw, following in the footsteps of his father, who was a prominent member of the Michigan bar. He joined the M. A. Hanna Co. on Jan. 1, 1918, as general attorney. In 1924 he was made vice-president and director of the company including all of its subsidiaries. He became president of the Hanna company in January, 1929. He is also a director and member of the executive committee of the Republic Iron & Steel Co.

Program Announced For Concrete Steel Meeting

The Concrete Reinforcing Steel Institute, which will hold its semi-annual meeting at the Hotel Wawasee, Wawasee, Ind., Sept. 30 to Oct. 2, inclusive, has announced a program which includes the following addresses: "Market Extension," by George E. Routh, Jr., vice-president Kalman Steel Co., Chicago; "Inspection of Reinforcing Steel," by James F. Curley, vice-president, Concrete Steel Co., New York; "Pacific Coast Market Conditions," by Charles M. Gunn, president, Gunn, Carle & Co., San Francisco; "The Meaning of Modernism," by Harvey Wiley Curbett, New York, chairman of architectural commission of Chicago World's Fair to be held in 1933; "The Road to Real Profits," by Arthur Fisher of firm of Butler, Lamb, Foster & Pope, Chicago.

General Motors Buys North East Electric Co.

General Motors Corporation has purchased the North East Electric Co., Rochester, N. Y., manufacturer of automobile electrical parts. Alfred P. Sloan, Jr., president of General Motors Corporation, announced that the purpose of the acquisition is to expand the manufacturing facilities of General Motors in the electrical field. Payment for the Rochester company was made in stock of the General Motors Corporation aggregating $13,000,000 at recent market.

The Week in Business

Drift of Current Financial and Economic Opinion

THE nervous tone of the stock market has again focused attention on the credit situation, which has been the only fly in the prosperity ointment.

It can still be said, in the words of the September bulletin of the National City Bank of New York, that tight money has not yet harmed any major business activity except building. But, according to D. W. Ellsworth of the *Annalist*, ordinary business enterprise faces a dilemma. If the securities market declines, business will suffer a sentimental reaction; if the flotation of securities goes on much longer at its present rate of increase there is danger of credit scarcity.

"Outside" Call Loans Not Exhausted

Such a shortage is not imminent, in the opinion of the Alexander Hamilton Institute, which believes that "outside" call loans are far from exhausted. Brokers' loans, despite the Federal Reserve's consistent efforts to curb them ever since February, have reached a most unprecedented total at $6,569,000,000, compared with $4,470,000,000 one year ago. Loans from non-banking sources account for $3,626,000,000 and the institute estimates that this amount could even be tripled, dividing the funds available as follows:

$2,000,000,000	available from investment trusts.
5,652,000,000	available from working cash of domestic corporations.
3,000,000,000	available from domestic and foreign private investors, foreign corporations, brokerage houses direct.
$10,652,000,000	

Still further increases in outside loans can be expected, in the opinion of the Alexander Hamilton Institute, until a turn in business results in less use of credit and less attractive rates.

So long as the high cost of credit is not replaced by actual credit scarcity, prosperity is likely to continue, according to Col. Leonard P. Ayres, Cleveland. He sees no shortage near and looks for a record volume of autumn industrial output.

Stocks Selective, Industrial Profits Large

THE upward surge of brokers' loans, while doubtless making for tight money, has not caused a sweeping rise in securities prices. On the contrary, more stocks have gone down than up since the beginning of the year. The selective character of the market doubtless accounts for persistent faith in its soundness. Illustrative of this undisturbed confidence are reports from Europe to the New York *Times* reflecting a feeling that the recent reaction in the New York exchange is only of a passing na-

Contest On Over Southern Pig Iron Rates

Northern Producers and Railroads Oppose Proposed Reductions—Appeals Considered

WASHINGTON, Sept. 24.—Briefs have been filed with the Interstate Commerce Commission in connection with the proposal of Southern carriers to reduce rates on pig iron from Birmingham and other Southern producing points to the St. Louis district and intermediate destinations in Indiana, Illinois, Missouri, Iowa, etc. Typical of the tariffs now under suspension is one which would reduce the rate from Birmingham to St. Louis from $4.42 to $3.69 a ton, a cut of 73c.

Opposing the efforts of the Southern lines and producers to reduce the rates are Central Freight Association carriers and Northern producers. One of the arguments made for the proposed reductions is that they are necessary to meet competition with Chicago, Milwaukee, Duluth, Minn., and Granite City, Ill. Among claims made by Northern producers is that the proposed adjustment is a deliberate attempt to permit long distance competition at their expense as well as that of Northern carriers. It also is contended by the Northern railroads that the adjustment would upset the pig iron rate structure of Central territory because Northern producers would insist upon reduced rates if rates from Southern furnaces were lowered.

Further, the Central territory carriers said the adjustment would upset relationships as between origin points as well as at destination points and would result in very little if any increase in the movement of pig iron from the South. These carriers also protested that by reason of the failure of the southern lines to propose reductions to Ohio River points and Central Freight territory an unduly preferential situation would result.

In contending for the reductions, the position of Southern lines and producers was outlined by J. G. Kerr, assistant to the traffic vice-president of the Louisville & Nashville, who said that with the gradual but sure elimination of Southern iron from Northern markets and the relatively small demand for pig iron in the South, the Southern pig iron industry has got "into a very distressed condition." He declared that on July 1, 1929, 468,136 tons of pig iron was stored at Alabama furnaces, comparing with 237,793 tons on July 1, 1928; 164,589 tons on July 1, 1927 and 105,984 tons on July 11, 1926. The carriers were declared to have established low rates to South Atlantic and Gulf ports in an effort to relieve the situation "but at best such relief can not be very great."

The consumption of pig iron in the St. Louis district was said to be approximately 300,000 tons annually. In the five-year period 1910-1914, according to Mr. Kerr, the all-rail movement from Southern producing points to the St. Louis district was 33,772 tons annually, or about 11 per cent of the consumption, "assuming that it has not increased since that time." During the five-year period 1924-1928, the all-rail movement from Southern producing points to the St. Louis district was said to have been an average of 5807 tons annually, representing less than 2 per cent of the total consumption.

The rate on pig iron from Chicago to St. Louis is $2.16, leaving a spread of $2.26 under the present rate from Birmingham. It would be reduced to $1.53 if the proposed rate of $3.69 went into effect. The rates from Milwaukee and Duluth to St. Louis are $2.87 and $4.26 respectively.

Screw Machine Products Association Meeting

A joint meeting of the Screw Machine Products Association and the Screw Machine Products Institute will be held at the Hollenden Hotel, Cleveland, Tuesday, Oct. 1.

Accomplishments of the Institute, which is directed by Dr. A. E. Swanson, since its formation last January, will be reviewed at the morning session, and standard cost classifications, uniform estimate sheets and other subjects will be discussed during the afternoon. Malcolm Baird, 232 Delaware Avenue, Buffalo, is field secretary of the Screw Machine Association.

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ture, out of keeping with the "extremely favorable" American industrial outlook.

Business prospects cannot be appraised without mentioning industry's highly satisfactory profits, bespeaking greatly expanded purchasing power. The first-half net earnings for over 900 corporations, tabulated by the National City Bank of New York, showed a gain of 27 per cent over those of the first six months of 1928.

Expanding Investments in Foreign Industries

THE foreign trade outlook, especially now that the tariff is being debated, remains a baffling uncertainty. The dire prophecies that followed the armistice have failed to materialize. With Europe heavily in debt to us and with apparently no alternative but to flood us with goods, our favorable foreign trade balance nevertheless continues.

One explanation of this apparently anomalous situation is the lending of funds to foreign buyers. Curiously, long-term loans on foreign account thus far in 1929 are only about one-half as large as in the same period last year. It takes time for such curtailment to affect trade and some adverse results may soon become manifest; then again this development may be offset by other factors in the complex ramifications of our world economic relationships.

The flow of interest to foreign lenders on the New York call money market is by no means inconsiderable. E. C. Harwood, writing in the *Annalist*, says that France has three-quarters of a billion dollars invested in the American short-term money market, and that the amount held for all Europe probably exceeds a billion. In addition, American industry's increasing acquisition of stock in European companies is transferring huge funds to foreign account.

Stock Market Is Vulnerable

IN a business situation that has so much to commend it, especially in the high level of employment and the absence of commodity speculation and swollen inventories, a note of warning is sounded by the conservative *Commercial and Financial Chronicle*. "The prevention of money panics is not an insurance against sudden and widespread credit depression when loans are wanting because of general want of confidence," it says, in commenting on the strong position which the banks now enjoy under the Federal Reserve System.

"And it is a long road that has no turning. Nor can anyone predict when the turn will come . . . When, however, the millions of investors, owners, projectors, workers, businesses large and small, *realize* that the end is coming or has come to a fictitious 'prosperity' and change from prodigality to curtailment, from spending to saving, from gratifying wants to nursing needs, *then* the word finis will be written not only on the 'longest bull market in history,' but on a dream of 'perpetual' prosperity that has never had its equal in the annals of any people."

Institute Visits North East Coast

Important British Steel Producing, Shipbuilding and Machinery Making Plants Act as Hosts to Ironmasters

NEWCASTLE-UPON-TYNE, ENGLAND, Sept. 12.—It is 52 years since the Iron and Steel Institute held its first meeting in the North East of England. The successful meeting held this week in the same area closed with only one regret —the illness of Sir Hugh Bell, whose father was one of the founders of the institute.

The meeting was held at the North East Coast Exhibition, where the basic industries are well represented. This is the birthplace of hydraulic power, large ordnance, and the steam turbine; many of the largest contracts for this class of machinery continue to be placed in this area. The district is also a center for coal mining, the manufacture of iron and steel, and for shipbuilding.

Leading engineering and metallurgical companies acted as hosts at a luncheon given on each day of the meeting; the afternoons were devoted to visits to local works.

The manufacture of plant for the dry cleaning of coal was witnessed at the works of the Birtley Iron Co., which holds the English rights for the Sutton, Steele & Steele Process. The Birtley company, it may be mentioned, pioneered in the manufacture of vertical cast iron pipe.

Vickers-Armstrong Busy on Heavy Work

In spite of the general reduction in armaments, the Elswick works of Vickers-Armstrong at Newcastle still remains, to a large extent, an armament producing works. Steel castings up to 25 tons are being produced; modern facilities for machine molding are in evidence for railroad wheels and other items where multiple production is possible. An extruding press of modern design, and three electric furnaces, capable of producing 100 tons of ingots per week, have been installed. The Elswick works includes one of the largest drop forging plants in Great Britain, and this department has recently become part of the English Steel Corporation, Ltd., a new company which has been formed to embrace the steelmaking and forging works of Vickers-Armstrong, Cammell Laird & Taylor Brothers of Manchester.

Foundries of the North Eastern Marine Engineering Co., at Wallsend have an annual capacity of 6000 tons. The plant includes seven cupolas, the largest of which melts 8 tons an hour. This company was the first British licensee of the Lanz process for the production of Perlit iron and also manufactures, under license, another high duty iron called Emmel iron.

Equipment for Annealing and Galvanizing Large Plates

Consett Iron Co. was also visited. Its plant contains eight blast furnaces, six 75-ton acid and three 65-ton basic open-hearths, arranged for either producer or coke oven gas and equipped with waste heat boilers. Plate mills have capacity for making 2-in. plates, 9 ft. wide, and have such labor saving devices as turn-over gears and Ennis plate manipulating tables. An annealing furnace with charging machine capable of dealing with plates up to 44 ft. long by 9 ft. wide, to be fired with coke oven gas, is being erected.

At Palmers Shipbuilding & Iron Co., Jarrow, steel manufacture is carried on by the open-hearth basic process, while the galvanizing plant is one of the largest in the United Kingdom, being capable of an output of 10,000 tons per annum. Plates up to 45 ft. long and bars up to 60 ft. can be handled.

South Durham Steel & Iron Co., of which Benjamin Talbot, past president of the institute, is managing director, has works at West Hartlepool and steel plate mills at Stockton. There is also a plant turning out hammer-welded steel pipes 12-in to 100-in. diameter, 30 ft. long and up to 2 in. thick.

The Redcar Works of Dorman Long & Co. are a self-contained unit consisting of coke ovens with by-product recovery, blast furnaces, basic open-hearth melting shop and plate mills. From the time raw materials are delivered to the final dispatch of plates, the material progresses in a straight line, through blast furnaces, steel furnaces, soaking pits, cogging mill, reheating furnace, plate mills, cooling banks, and stock bays to the railroad sidings or the company's deep water wharf.

Bolckow, Vaughan & Co. have 13 blast furnaces in commission, in four separate groups, having a yearly output of approximately 750,000 tons of pig iron. Steel is produced by 15 60-ton open-hearth furnaces, with an annual capacity of 500,000 tons of ingots.

Freight Burden on Scrap Called Too Heavy

Institute of Scrap Iron and Steel Says Old Material Pays More Than Pig Iron or Iron Ore

SCRAP iron and steel, although waste material, carries a greater freight burden than pig iron, iron ore and some manufactured products, according to a report issued by Benjamin Schwartz, director general of the Institute of Scrap Iron and Steel, which emphasizes the increasing part played by scrap iron and steel in the steel industry and its importance as a source of revenue to the railroads of the United States.

In 1928, Class 1 railroads of the United States carried 11,746,937 tons of scrap, earning $24,863,015 in freight revenue, the report says. This total of freight revenue, equalling 14.37 per cent of the value of all scrap at destination, represented approximately 15c. of every dollar paid for the purchase of scrap. The report adds:

"The freight burden carried by scrap is higher than pig iron, represented by 9.37 per cent; passenger automobiles, represented by 4.21 per cent; manufactured iron and steel articles, represented by 4.19 per cent, and is greater than many other essential commodities and manufactured articles. Scrap iron and steel carried more than double the freight burden of all commodities transported on the railroads of the United States, the proportion of the value for all commodities being 7.08 per cent.

"The average freight revenue per ton of scrap iron amounted to $2.12, a higher revenue than iron ore, which averaged $1.15 a ton, or pig iron, which averaged $1.76. The total tonnage of scrap was greater by 32 per cent than the total tonnage of pig iron carried by the railroads, or 3,713,421 tons more than pig iron.

"The total of approximately 12,000,000 tons of scrap iron and steel carried by the railroads in 1928 is not only evidence of the tremendous growth of the scrap iron industry as one of the country's essential businesses, but attests to the increasing use and importance of scrap to the steel industry. In 1913, the scrap industry, as a steel making factor, was small, in view of the fact that steel production exceeded pig iron production by only about 1 per cent. In 1928, however, ingot production exceeded pig iron production by 36 per cent, the difference being made up by scrap."

The report also indicates to the railroads the desirability of increasing the revenue from scrap transportation, by reconsidering the freight rate structure, so that a freer movement may result, with longer hauls. It is stated that the rates applicable to scrap iron today have erected tariff walls which have restricted markets and the free movement of scrap.

Wisconsin Steel Co., Chicago, has had no lost-time accidents in the stores department since Jan. 31, 1924, and none in the office department since Feb. 16, 1927.

This Issue in Brief

To avoid flaking after nitriding, the annealing operation prior to nitriding must be done in a strictly non-decarburizing atmosphere, for any nitrided, decarburized surface will flake off easily after final cooling.—Page 841.

* * *

Cast iron reheated to between 700 and 750 deg. C., followed by air or water cooling, causes Brinnell hardness to fall from 228 to 130. But if heated to above 800 deg. C., and cooled similarly, increased hardness to above 270 Brinell results, and a pearlitic structure is evident.—Page 826.

* * *

Nitrided tools to stand severe service, such as punches and dies, should be made of steels with about 3 per cent chromium and a low molybdenum content. These steels nitride easily and satisfactorily.—Page 841.

* * *

Staged railroad wreck fails to damage welded steel vessel of 1½-in. plate, under 1250 lb. air pressure. Bursts finally under hydrostatic pressure of 4500 lb. per sq. in., but in no case did the break follow the weld. — Page 840.

* * *

To weld thin sheets successfully suitable clamping apparatus is necessary. For when heat is applied a distortion or displacement occurs in three directions. The backing device must be somewhat flexible and yet exert sufficient force to clamp and hold the joint edges evenly together.—Page 834.

* * *

Harmful effect on zinc-base die castings of small traces of tin, lead and cadmium has resulted in a considerable unwanted tonnage of scrap castings. Though the selling price may be but 10 per cent of the original cost of the component metals, there are no buyers.—Page 831.

Reduction of weight one pound is worth $40 to aircraft builders, says Dr. Jeffries. Beryllium is lighter than aluminum, and alloyed with aluminum it has a tensile strength of at least 70,000 lb. per sq. in. But it costs $200 a lb. When and if it gets cheaper it will be an important factor in aircraft construction.—Page 833.

* * *

Harmful lead removed from copper scrap remelted for wire making by oxidizing the furnace charge thoroughly. A slag with equal parts of lime rock and sand is made up, and the bath is blown with air.—Page 831.

* * *

For cleaner basic open-hearth steel, engineer suggests separating the metal and slag after the oreing operating and finishing under a reducing refining slag. But whether or not this would be economical and just how the metal and slag can be separated are not known.—Page 827.

* * *

Poor ductility of steel castings is often due to deficient arrangement of sulphide inclusions, analyses reveal. Alumina is not always to blame. The inclusions may be alumina, sulphides or silicates.—Page 828.

* * *

"Accidental selection" is source of obtaining capable development engineers. Present educational systems do not produce men of type required. Engineers with good knowledge of general physics are preferred to physicists specializing in one branch.—Page 824.

* * *

When should a wire rope be scrapped? The increase of the rate of stretch appears to be the most useful indication. — Page 833.

Vacuum melting may improve quality of basic open-hearth steel. The best possible reduction product of FeO is CO. Favoring the formation and elimination of CO by evacuation will be along the line of least resistance. — Page 827.

* * *

Nitriding for 6 hr. will produce a satisfactory surface where wear resistance only is needed, as in the case of gages. Parts taking alternately stress and wear at heavy unit loads, such as wrist pins, require as much as 18 hr. or more.—Page 841.

* * *

Welds in galvanized metal are not weakened by the zinc oxide from the burning coating, even when made with a steel rod. However, high-strength bronze is the preferred welding material.—Page 839.

* * *

High-grade brass pressure castings can be made from reclaimed metal, manufacturer believes. Raw materials should be examined with scrupulous care and molten metal must be properly "cleaned."—Page 831.

* * *

Forgings of plain carbon steel have banded structures in 75 per cent of the cases, says manufacturer. Structures can be removed by a high-temperature anneal. But metallurgist declares that such structures should not be present. —Page 829.

* * *

Finds 416 fissures in 1000 miles of track tested. Though cause of fissures is unknown, engineer believes some condition occurs during fabrication that introduces peculiarities from which fissures later develop.—Page 829.

A. I. FINDLEY
Editor

THE IRON AGE

W. W. MACON
Managing Editor

ESTABLISHED 1855

And Now Beryllium

SOME among us who are not yet old men remember when aluminum was a rare metal. The dentist who used a little aluminum mallet in plugging teeth was a very up-to-date artisan. In 1928 the world produced 225,000 tons of aluminum, which in terms of weight was 50,000 tons more than the production of tin, and in terms of volume was more than half the production of lead.

It is an intriguing speculation whether some of the other metals that are newly coming into use—cadmium, chromium, magnesium, beryllium and tantalum —will in 50 years repeat the extraordinary development we have seen in aluminum.

Among those we have mentioned, cadmium—the little sister of zinc—is by no means new. It is of common occurrence in zinc ore and a little of it has been produced commercially during 50 years back; but on the whole it has been a nuisance to zinc metallurgists and they have not known what to do with it. A few years ago they were thinking that if they could see their way clear to produce it for sale at about 25 cents per pound they might find a market for it in quantity for pigment purposes, its sulphide making fine yellows. During the last year or two, however, it has come into insatiable demand at a price rising toward $1 per pound. The reason is electroplating with it, for which purpose its silvery, untarnishing luster is far more agreeable than that of zinc, and some say is superior to that of chromium.

The chromium-plated fittings of automobiles are becoming familiar to everybody. Chromium plating is now done in local shops. It is still pretty expensive, especially for local repair or refinishing jobs, but we may foresee that in the course of time it will go a long way toward displacing nickeling.

Among the very new metals none are more fascinating than tantalum and beryllium. The former has properties that approach those of platinum. The latter is lighter even than aluminum, having a specific gravity of only 1.84. Yet it has a modulus of elasticity of 27,500,000 pounds per square inch, almost up to that of steel, and the alloy of 70 per cent beryllium and 30 per cent aluminum has a tensile strength of 70,000 to 100,000 pounds per square inch. Obviously this metal and its alloys may play a part in aircraft construction. At Pittsburgh last week it had a leading place in the discussions of the electrochemists there gathered.

On account of its high cost at present—about $200 per pound—there has not been much technical study of it as yet. It is suggested, however, that with a quantity demand for it the cost might be reduced to somewhere between $25 and $50 per pound. It is said, moreover, that the aircraft builder can afford to spend $40 to reduce the weight of an airplane one pound.

The ore of beryllium is the mineral beryl, which contains only about 5 per cent Be, wherefore the cost of extraction of its metal will inevitably be high as compared with other metals. Apart from that unfavorable condition there is the surprising estimate by geologists that there is as much beryllium by weight in the earth's crust as there is lead or zinc, and a whole lot more by volume.

Changes in New Construction

FABRICATED steel orders in August, as our news columns have shown, were the highest on record. Similarly, for the first eight months of the year there was the greatest total ever reported, a 19 per cent increase upon 1928. Coincidently, residential construction has dropped to 30 per cent of the total, against 40 to 47 per cent in monthly reports for several years. Home and apartment building in the first eight months of 1929 declined no less than 26 per cent from last year, whereas industrial building in the same period gained 40 per cent and commercial building gained 5 per cent.

Sustained activity in general trade and manufacturing have made it possible to continue commercial and industrial construction on a large scale, in spite of the high cost of borrowed money. Important industrial companies have not only had their own funds for new construction but have been lenders in the call money market. At the same time the combination of dear money and curtailed demand for long-term mortgages has sharply cut down the building of houses and apartments. The same influence has brought declining activity in the real estate market, with the expectation that this condition will continue and may be accentuated.

Expanding operations in public works and utilities have been a factor, the former being covered by current taxation—notoriously high—and the latter in some cases by new issues of stock by utility corporations.

Thus the whole situation ties back to the problem of money supply. And now the coming of better days for the real estate market and of renewed activity in the building of homes will depend in large measure on the return to their accustomed uses of funds long diverted to speculation. That again will be determined by the time required to bring stock prices to a basis more nearly representing normal earning capacity.

A German View of Social Insurance

SOCIAL insurance in its broader aspects, compulsory under the statutes, has many advocates in America, chiefly among certain representatives of union labor and among social reformers, who find a panacea for industrial ills in such measures as insurance against sickness and other disabilities, unemployment insurance and old age pensions, all at public expense. Great Britain has given the plan a long and thorough test and many of the best minds call it a failure. Germany, too, has social insurance, and here in brief is the estimate of its results given by Dr. E. Lick of Danzig:

> The sickness insurance has needlessly made invalids of large numbers of our fellow citizens, has raised to the rank of a profession the condition of being sick. The invalidity insurance has deprived many men prematurely, first of the desire to work and finally of the ability to work; and the accident insurance law has created pension mania, the struggles for pensions with the emotional disturbances and the scandal of simulations. The tremors of war neuroses stopped instantly with the Armistice. Similarly, but with greater intensity and persistency, a wave of cures would sweep through the German people if the social insurance could be suppressed.

Dr. Lick's arraignment, whether or no exaggerated, voices the opinion held by many Americans as to what would happen were the United States to take on European methods of dealing with industrial workers in the effort to improve the conditions under which they live.

Social insurance has made some progress in this country. Its proponents are tireless and insistent, as is demonstrated by the mass of petitions and bills with which Congress and the State legislatures are besieged each year. In a few States these efforts have had some measure of success, particularly in the matter of old age pensions. But the practical operation of these statutes has not been satisfactory. A prime objective, to remove the stigma of pauperism from financial assistance to needy persons, has not been attained. Nor can it be, unless the system provide that the persons later to be aided share in the cost of establishing the necessary funds. Yet at its best social insurance in industry savors of something that does not appeal to the make-up of the great majority of the American people.

APROPOS of the near-proverb that one can prove anything by statistics: The editor of *Engineering* bemoans the fatality rate in British passenger traffic, observing that "the toll was much heavier than usual, and certainly more than we would like to see." Out of 1,670,000,000 passengers carried on the railroads, 48 were killed. Analysis of the report, however, shows that two bad accidents were responsible for 41 of the 48 deaths, and that both of these were caused by the failure of engineers to obey signals. We, on the other hand, would use these statistics to congratulate our cousins overseas on an extraordinary degree of safety. Or, interpreting them in another way, to congratulate the steel makers and railroad engineers upon the almost absolute reliability of the mechanical equipment. In fact, the six accidents classed as most important in the list for 1928 were all due to failure of the human element. "True as steel, strong as iron" means something to British railroad patrons.

Decline in Automobile Output

AUTOMOBILE production decreased a trifle from July to August, which is contrary to the more common experience, since the offering of new models usually stimulates August business. Together the two months ran 9.3 per cent under the average rate for the first half of the year. Production in both months was greatly helped by the good rate of Ford operations, Ford having been behindhand in deliveries. Accordingly the augury is that the last four months of the year will not hold up to the average relation with July-August production.

Automobile trade conditions have fluctuated so widely that nothing like a standard of seasonal variation has been set up. In the last six years the decrease in production from the first half to the second half has varied as follows:

	Per Cent
1923	3.3
1924	22.2
1925	2.7
1926	18.5
1927	37.3
1928	2.2

Here were three large decreases and three small decreases. The average of all six is 14.4 per cent, which has some suggestiveness, but as an augury for the future there is the weakness that those six years witnessed almost the entire swing from open cars to closed cars, which had a strong tendency to stimulate purchases in the late months of a year. For the future one may fully expect that there will be a smaller autumn buying season relative to the spring season, or none at all.

Observing the most recent trend, it is doubtful now whether the last four months of this year will record as heavy production as there was in the last four months of last year. That is, while this year to Sept. 1 accumulated a lead of 1,207,086 over last year, in the total number of cars and trucks produced in the United States and Canada, there are chances that the remaining four months will cut down the lead instead of adding anything. Total production last year was 4,601,141, and this year's total may easily be under 5,800,000.

The human element is a strong factor in determining automobile purchases. By no means is it a mere question whether one can afford a new car or whether the old car is too nearly worn out. Sometimes it is the style to buy a new car, sometimes not. In his latest Cleveland Trust Co. circular Col. Leonard P. Ayres presents diagrams showing how rapidly automobile styles have changed, whereby new buying has been induced, there being the swing from open to closed cars, from high-pressure to balloon tires and from two wheel brakes to four, and he suggests that the automobile industry "has not lost its ability to make us feel that the old car ought to be traded in and a new one bought to take its place." Also he says, "The industry still thrives on dissatisfied customers." It is a question, however, whether the makers can propose sufficiently radical changes in

future. We must remember, too, that recent production has included a large proportion by Ford, and Ford is altogether unlikely to make any sweeping change.

Need of a Sense of Proportion

COUNTLESS blunders have been made in trade through failure to appreciate the need of eventual proportion, and sometimes the correction of the false idea has involved hardship to those who made the blunders. There was the deservedly famous "rule of doubling" in pig iron. Six decennial totals of pig iron production, through 1913, showed a virtually perfect adherence to the rule both decade by decade and in the whole range, for production in the ten years through 1913 was 33.6 times production in the ten years through 1863, when the rule would call for 32. The performance was out only 5 per cent and that was on the good side. But what would you have for the future? In substantially the same half century, 1860 to 1910, population was multiplied by 2.92. In essence, per capita consumption was multiplied by 11.5. But carry any of the figures out for a century more. Population would be 785,000,000, which may seem absurd; but grant it for what is to follow. Per capita consumption would be multiplied by 132. Production would be multiplied more than a thousandfold, to about 25 billion tons a year.

The point is simply that there are other things to do than beget children, receive immigrants, produce pig iron and consume pig iron. Our activities must be in proportion. Putting it mathematically, geometric increases must break down, while successive decrements may be all right. By mechanization of industry we may reduce laboring time and increase leisure time. We may increase leisure by 10 per cent successively for a few quinquenniums, but for ten, or only a half century, that would be multiplying by 2.6. Quite conceivably we may reduce working time by successive decrements of 10 per cent. There would always be more laboring time left, but we cannot increase leisure to more than 24 hours.

In the last 20 years many foolish predictions have been made about railroad expansion and railroad buying. There has been disappointment and motor vehicles have been the alleged cause of the breakdown of a supposed "rule." Not at all. For a long time railroad freight ton-mileage doubled quite regularly every 12 years. That could not keep up. Some of our requirements, as for food, do not increase per capita and when things are carried long distances at the outset we are apt to develop nearer sources or we ourselves may move.

Today there is a host of trends in individual trade activities that cannot continue indefinitely at their present pace, however plainly marked one may think he sees them in the statistics. The man with a sense of proportion recognizes the natural limitations, whereby he is likely to prosper, and he contributes to our happiness by not trying to force us to believe in rules that will not work out.

Impending Revolution in Rolling Mill Equipment

The steel mill engineer has evolved a heavy complex. His problems have always been big problems and his solution of them, big machinery of heavy proportions, large bed plates, large bearings, large shafts, large factors of safety. The tendency now is to replace heavy, complicated castings by lighter, cheaper and stronger units. The development of light material handling equipment has been toward the use of steel of high tensile strength in order to reduce weight and the effect of impact of heavy electrically propelled loads. The same development of light high tensile strength equipment permits flexibility of installation.

A nationally known industrial economist believes the profits of the next five years will be largely those resulting from improved material handling in the minor jobs, which have heretofore been considered as relatively unimportant.

The industry seems to be on the eve of still greater scientific developments. *Iron and Steel Engineer*, [Official publication of the Association of Iron and Steel Electrical Engineers] says that in ten years the modern rolling mill of today will be rendered obsolete. It foresees the human element behind screens, servicing mechanisms that will obey the wave of the hand, the call of the voice. In view of recent electrical developments, this picture is by no means visionary. . . . The late Judge Gary, seated in his office at 71 Broadway, New York, merely by passing his hand over a glass sphere set in operation the gigantic electrified Homestead steel plant near Pittsburgh. A rolling mill is now being developed in which huge bars of steel are moved and controlled by throwing bars of light upon them. What marvels will the future unfold?—C. W. Steffner in *Commerce and Finance*.

Automobiles and Cooking Utensils Consume Most Aluminum

C. L. Mantel, in a chapter on aluminum in "Mineral Industry, 1928," says that more aluminum is consumed by the automobile industry than by any other. The year has brought a large increase in the use of aluminum pistons for automotive engines. It is estimated that in 1928 over 20,000,000 lb. of aluminum pistons, both as original equipment and as replacements, were produced. Other applications such as engine castings, forgings, connecting rods, and crank cases found wide use.

The second highest consumer of aluminum metal was the cooking-utensil and household-appliance manufacturing industry. The third largest was that of electrical conductors, including steel-reinforced high-tension transmission-line cable, as well as all-aluminum cable and bus bars. The jobbing foundries, serving a wide field of many different industries, were the fourth largest consumer. The steel industry, consuming a large tonnage of metal in the form of granulated aluminum ingot, grained ingot, notch bar and rod, stood fifth.

Certain special applications of aluminum have continued to show increasing tonnages. One of these is aluminum powder for paint purposes; another is aluminum foil, of which it is estimated that 6,000,000 lb. was employed in 1928 for wrapping yeast cakes, chocolates, candies, and chewing gum, in the manufacture of electrical and radio condensers, as well as other miscellaneous uses, including aluminum collapsible tubes.

CORRESPONDENCE

Fatigue Tests on Drums and Shells

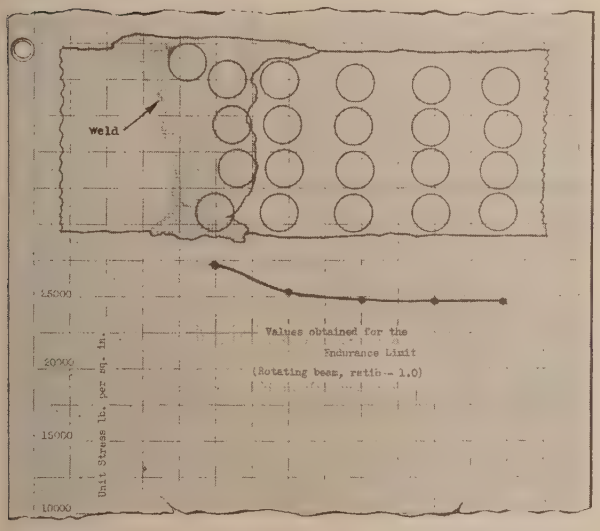
To the Editor: It is with considerable interest that we have read of the work of the Babcock & Wilcox Co. on full-size boiler drums reported by Prof. H. F. Moore in the Sept. 5 issue of THE IRON AGE. Tests of this kind are valuable in giving stability to the various methods of making boiler drums for service. Three points brought out by these tests which should not be overlooked are as follows:

1. The failure of a drum head.
2. The failure adjacent to the weld of a boiler welded with a bare wire.
3. The failure of the drums welded with covered wire and the forged drums due to a ½-in. tapped hole for pressure outlet.

Up to three years ago little thought had been given in this country to the question of design of vessels for pressure service. Although a considerable number of failures had been encountered, and some of them very serious, there seemed to be little energy exerted by boiler makers to go thoroughly into the question of the best materials for boilers, the question of the effect of shape and also the question of improved fabrication methods.

Three years ago the company which the writer represents went very thoroughly into these questions and demonstrated that boilers could be made of far superior quality to those then available and in use. On the subject of shape, for example, the seriousness was demonstrated of out of roundness, of the wrong shape of heads and of the lack of reinforcing of openings. Since that time we have reinforced all openings, our vessels have been made round and straight to a degree not before thought necessary, and all openings, even temperature measuring holes, and gage or pressure holes, have been religiously reinforced. The degree of reinforcing necessary to produce a design of 100 per cent, for the particular type of construction, has been discovered and applied to the particular method of fabrication used.

WELDED Pressure Vessel Withdrawn From Service on Account of Excessive Corrosion Burst By Static Pressure Test. Fracture occurred in corroded plate at approximately ultimate tensile test of plate as rolled



SPECIMENS Cut from Heavy Weld Made by Special Process Have Higher Endurance Limit Than Adjoining Boiler Plate

It has been demonstrated that today vessels can be made which will not fail other than in the steel of the plates and at stresses represented by the ultimate strength of the plate if tested statically and at stresses represented by the fatigue strength of the plates if tested under repeated stress.

As a supplement to the above statement the writer would like to present two illustrations. One represents the endurance limit of the steel in the weld and adjacent to the weld in a plate 2½ in. thick. It tells its own story. Fatigue specimens taken at right angles to that shown in the sketch, with the center of the specimen at the weld junction, and at other points, reproduce the indicated value.

The other is a photograph of a vessel which has been in service for 3½ years which was withdrawn and tested to failure. This vessel had been in a service in which corrosion plays a very important part. Its original thickness in the zone where the gas of the process was in contact with the metal was 2½ in. and had corroded to a thickness of 1.6 in. in the plate. (The welds had not corroded to the same degree.) This vessel failed under test pressure when the stress in the steel was 56,900 lb. per sq. in., which is the full strength of the steel before it was used. Failure avoided the welds completely.

One other point of importance should be hinted at and that is the question of the cleanness of steel. There is no question in the writer's mind that the cleanness of steel plays an important part in corrosion and also in fatigue. This is being recognized by the makers and users of boiler steel to a greater degree than ever before.

T. McLEAN JASPER,
Director of Research,
A. O. Smith Corporation.
Milwaukee.

Iron and Steel Markets

Weakness Develops in Steel Prices

Bars and Shapes Down $1 a Ton and Wire Rods $2— Further Reductions in Scrap—Railroad Demand Looms Larger

EVIDENCES of price weakness have accumulated as steel production has declined. Railroad demand, the most favorable factor in the market, looms larger, but will not have an immediate effect on mill schedules. Much rail and rolling stock business is still prospective and even on orders actually placed it will take time for the specifications to reach steel producers.

Unquestionably the sentimental effect of expanding railroad needs is salutary and may stiffen the resistance of the mills to price pressure. At Chicago new inquiries for finished steel, including rails and track supplies, are the second largest for any week so far this year.

Rail orders include 50,000 tons for the St. Paul and 59,000 tons for the Chesapeake & Ohio, Pere Marquette and Hocking Valley. The Pennsylvania's inquiry, which is expected tomorrow, will probably call for a larger total than last year, when 272,000 tons was bought. The Chicago & North Western's needs, which will be made known Thursday, are estimated at 50,000 tons, while the requirements of the Santa Fe and New York Central are placed at 90,000 and 200,000 tons respectively.

Railroad freight equipment in the market or in early prospect totals close to 25,000 cars. The Burlington will buy 2000, and an inquiry for a like number is expected from the Virginian. The Pere Marquette and Illinois Central have been added to the list of probable purchasers.

Steel ingot production is now slightly under the 85 per cent average of 12 months ago and signs point to some further recession, in contrast with the rising trend of 1928. Operations in the Valleys, Pittsburgh and Chicago range from 80 to 85 per cent, while the Buffalo rate remains at 90 per cent.

Price developments, although not of a sweeping character, all point to a growing need for new business. Bars and shapes have declined $1 a ton to 1.90c., Pittsburgh. Wire nails, which recently receded to $2.45, Cleveland or Pittsburgh, lack firmness at that level, and mills are meeting increasing resistance in their efforts to hold plain wire at $2.40. Galvanized sheets have returned to 3.50c., Pittsburgh, after an unsuccessful effort to raise the market to 3.60c. Wire rods at Cleveland have been sold at $40, a concession of $2 a ton.

In the South black sheets have been reduced $2 a ton to 3c., Birmingham, and on the Pacific Coast the long standing price of 2.35c., c.i.f., on plates has been shaded $2 a ton on desirable specifications.

Scrap, in keeping with declining steel works operations, continues to weaken. In eastern Pennsylvania heavy melting steel has gone down 50c. a ton on purchases of 10,000 tons each by two steel producers. The same grade has receded 25c. a ton at Pittsburgh, Chicago and St. Louis.

Pig iron demand, although lacking the characteristics of a broad buying movement, has been consistent, indicating conservative coverage for known requirements. In some cases Southern iron, recently available at bargain prices, has been bought for deliveries extending well into the first quarter. Considerable iron is still to be purchased for the final three months of the year, however, and buyers are prone to delay purchases in territories where offerings of steel company iron are likely to increase.

The Ford Motor Co., which last week bought 5000 tons of high silicon malleable iron from a Canadian furnace, is in the market for 10,000 tons additional. Ford's purchases of pig iron in the open market are expected to increase, since the blast furnace capacity at River Rouge is inadequate. A large stock pile built up some years ago in preference to erecting a third stack has been reduced to the point where it no longer makes up for the deficiency in pig iron production.

The diminishing steel requirements of the automobile industry were reflected in the August report of independent sheet mills, which showed declines of 55,000 tons in sales and 87,000 tons in unfilled orders. Steel specifications from the motor car builders are still receding, but at least a temporary reversal of the trend is now looked for in October. Curtailment by Ford is attributed to slight changes in the present model.

Fabricated structural steel awards totaled 33,000 tons, compared with 50,000 tons last week. Fresh inquiries call for 32,000 tons.

Two ships to be built by the Sun Shipbuilding Co. call for 10,000 tons of plates, which will be supplied by the leading interest. Five towboats placed at Pittsburgh and 50 barges in the market there account for 7500 tons of steel.

The setting up of a local base price on cold-finished steel bars by a new Buffalo mill will force Pittsburgh makers to lower their quotations to meet competition in western New York and northern Pennsylvania.

For the second time this year THE IRON AGE composite price for finished steel has declined. At 2.384c. a lb., the year's low, it compares with 2.398c. last week and 2.412c. from April 1 into August. The pig iron composite is unchanged at $18.29 a ton.

A Comparison of Prices

Market Prices at Date, and One Week, One Month and One Year Previous, Advances Over Past Week in Heavy Type, Declines in *Italics*

Pig Iron, Per Gross Ton:	Sept. 24, 1929	Sept. 17, 1929	Aug. 27, 1929	Sept. 25, 1928
No. 2 fdy., Philadelphia	$21.26	$21.26	$21.26	$20.76
No. 2, Valley furnace	18.50	18.50	18.50	17.00
No. 2 Southern, Cin'ti	17.19	17.19	17.19	19.94
No. 2, Birmingham	14.50	14.50	14.50	16.25
No. 2 foundry, Chicago*	20.00	20.00	20.00	18.50
Basic, del'd eastern Pa.	19.75	19.75	19.75	19.00
Basic, Valley furnace	18.50	18.50	18.50	16.25
Valley Bessemer, del'd P'gh.	20.76	20.76	20.76	19.01
Malleable, Chicago*	20.00	20.00	20.00	18.50
Malleable, Valley	19.00	19.00	19.00	17.25
Gray forge, Pittsburgh	19.76	19.76	19.76	18.26
L. S. charcoal, Chicago	27.04	27.04	27.04	27.04
Ferromanganese, furnace	105.00	105.00	105.00	105.00
Rails, Billets, Etc., Per Gross Ton:				
Rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Light rails at mill	36.00	36.00	36.00	36.00
Rerolling billets, Pittsburgh	35.00	35.00	35.00	32.00
Sheet bars, Pittsburgh	35.00	35.00	35.00	32.00
Slabs, Pittsburgh	35.00	35.00	35.00	32.00
Forging billets, Pittsburgh	40.00	40.00	40.00	38.00
Wire rods, Pittsburgh	42.00	42.00	42.00	42.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.85	1.85	1.85	1.90
Finished Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Bars, Pittsburgh	*1.90*	1.95	1.95	1.90
Bars, Chicago	2.05	2.05	2.05	2.00
Bars, Cleveland	1.95	1.95	1.95	1.90
Bars, New York	*2.24*	2.29	2.29	2.24
Tank plates, Pittsburgh	1.95	1.95	1.95	1.90
Tank plates, Chicago	2.05	2.05	2.05	2.00
Tank plates, New York	2.22½	2.22½	2.22½	2.17½
Structural shapes, Pittsburgh	*1.90*	1.95	1.95	1.90
Structural shapes, Chicago	2.05	2.05	2.05	2.00
Structural shapes, New York	2.19½	2.19½	2.19½	2.14½
Cold-finished bars, Pittsburgh	2.30	2.30	2.30	2.10
Hot-rolled strips, Pittsburgh	1.90	1.90	1.90	1.75
Cold-rolled strips, Pittsburgh	2.75	2.75	2.75	2.75

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

Finished Steel,	Sept. 24, 1929	Sept. 17, 1929	Aug. 27, 1929	Sept. 25, 1928
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 24, P'gh.	2.85	2.85	2.85	2.65
Sheets, black, No. 24, Chicago dist. mill	2.95	2.95	2.95	2.75
Sheets, galv., No. 24, P'gh.	3.50	3.50	3.50	3.40
Sheets, galv., No. 24, Chicago dist. mill	3.60	3.60	3.60	3.60
Sheets, blue, No. 13, P'gh.	2.35	2.35	2.35	2.10
Sheets, blue, No. 13, Chicago dist. mill	2.45	2.45	2.45	2.20
Wire nails, Pittsburgh	2.45	2.45	2.55	2.55
Wire nails, Chicago dist. mill	2.50	2.50	2.60	2.60
Plain wire, Pittsburgh	2.40	2.40	2.40	2.40
Plain wire, Chicago dist. mill	2.45	2.45	2.45	2.45
Barbed wire, galv., Pittsburgh	3.20	3.20	3.20	3.20
Barbed wire, galv., Chicago, dist. mill	3.30	3.30	3.30	3.25
Tin plate, 100 lb. box, P'gh.	$5.35	$5.35	$5.35	$5.25
Old Material, Per Gross Ton:				
Heavy melting steel, P'gh.	*$18.00*	$18.25	$19.00	$16.75
Heavy melting steel, Phila.	*16.00*	16.50	16.50	15.50
Heavy melting steel, Ch'go.	15.00	15.00	15.25	13.00
Carwheels, Chicago	14.00	14.00	14.00	13.50
Carwheels, Philadelphia	16.50	16.50	16.50	16.50
No. 1 cast, Pittsburgh	15.50	15.50	15.50	15.00
No. 1 cast, Philadelphia	*16.00*	16.50	16.50	17.00
No. 1 cast, Ch'go (net ton)	14.50	14.50	14.50	15.00
No. 1 RR. wrot., Phila.	16.00	16.00	16.00	15.50
No. 1 RR. wrot., Ch'go (net)	14.00	14.00	14.00	12.00
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$2.65	$2.65	$2.65	$2.75
Foundry coke, prompt	3.75	3.75	3.75	3.75
Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	18.12½	18.12½	18.12½	13.25
Electrolytic copper, refinery	17.75	17.75	17.75	15.00
Tin (Straits), New York	**45.25**	45.00	46.12½	48.62½
Zinc, East St. Louis	6.80	6.80	6.80	6.25
Zinc, New York	7.15	7.15	7.15	6.60
Lead, St. Louis	6.70	6.70	6.55	6.32½
Lead, New York	6.90	6.90	6.75	6.50
Antimony (Asiatic), N. Y.	*8.62½*	8.75	9.00	11.00

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Pittsburgh

Price Weakness Develops in Steel as Mills Seek Business More Aggressively—Bars and Shapes Off $1

PITTSBURGH, Sept. 24.—As the third quarter comes to a close it is interesting to compare the condition of the steel industry in the Pittsburgh district with its status one year ago. The average operating rate is about the same. There the similarity ends. A year ago the industry was entering a period of strong demand, which lasted with but one slight interruption for an entire year. The peak of this buying movement was reached last spring and gradual recession followed during the summer.

In view of the more rapid decline in business during September it is difficult to predict how much lower steel production must go. It does seem certain, however, that any marked improvement in demand during the fourth quarter would be almost too much to expect after the very striking performance of the past year. It would not be surprising if steel operations declined a bit further in the next month or two in order to bring about a better adjustment of production to demand.

In the Pittsburgh district operations now average about 85 per cent of capacity, while the rate in the Youngstown and Wheeling districts is somewhat lower. Sheet mills are still running at close to 90 per cent of capacity, but other finishing departments are at a lower rate, with strip mills probably at the bottom with about a 70 per cent rate. The latter have felt most sharply the decline in demand for automobile steel.

With the automobile industry no longer counted upon to provide the wide outlet for steel which it afforded in the first three quarters, the railroads seem to offer the brightest outlook for the last three months. The rail buying movement ordinarily expected at this time of the year is beginning and promises to be of slightly larger proportions than usual.

Car inquiries are large, and, although the bulk of this business may come from Western roads whose buying would not materially benefit the Pittsburgh district, Southern and Eastern carriers are also coming into the market. Car builders in this vicinity are now in need of orders.

The plate business in this district has been given impetus during the week by a prospective inquiry for 50 barges, which will require from 4000 to 5000 tons of steel and by the purchase of five tow-boats calling for a total of 2500 tons.

The price structure is finally showing definite weakness. Bars and shapes are off $1 a ton on the basis of open solicitation for bar business at 1.90c., Pittsburgh or Cleveland, while the Pittsburgh base on shapes has been forced down by competition in the East. Plates appear to be holding in this territory at 1.95c., Pittsburgh, apparently because most producers still have fairly large backlogs. Wire nails have declined $2 a ton, and the $2.45 price lacks firmness. Mills are meeting with resistance in holding the price of plain wire at 2.40c., although concessions have not appeared in this territory. Attempts to hold galvanized sheets at 3.60c., Pittsburgh, have not met with success, as several makers are taking fourth quarter business at 3.50c. Prices on the other finishes of sheets are not strong and large users of strip steel are delaying the placing of business. A good percentage of the

smaller buyers have closed on third and fourth quarter requirements at full quoted scales.

The scrap market continues to weaken as mill buying is further delayed. Heavy melting steel has declined 25c. a ton.

Pig Iron.—Sellers of pig iron in this district, who had anticipated the placing of rather heavy fourth quarter tonnages by large buyers, have now altered their opinion somewhat and are inclined to believe that buying is more likely to continue on the hand-to-mouth basis which has existed for several months. With spot shipments of small tonnages available from nearly all the merchant furnaces in the Pittsburgh and Valley districts, and with the promise of ample supplies of steel company iron in the next few weeks, buyers are willing to delay making commitments. The threat of steel company iron is growing more serious in this district as steel production has been curtailed rather sharply during September, while no blast furnaces have been blown out recently. The effect of this condition on the price structure has not yet been felt, and the full quoted schedules are said to apply on all current transactions. American Steel Foundries is inquiring for 5000 tons of basic iron for fourth quarter delivery at Alliance, Ohio. The Westinghouse Electric & Mfg. Co. is inquiring for the fourth quarter requirements of foundry iron for its Cleveland plant. The Richmond Radiator Co. is understood not to have closed as yet in full on the requirements of its Uniontown, Pa., plant. No other large general inquiries are before the trade, but a few large buyers of iron are said to be quietly negotiating for their fall requirements. Shipments have held up rather steadily during September, and furnace stocks are still low. No merchant interest in the Valley is prepared to furnish all grades of iron at this time, and one has enough business on its books to assure a steady operation for the remainder of the year. Prices appear to be holding at $18.50, Valley, for basic and foundry iron, and at $19 for Bessemer and malleable, while the local merchant interest is quoting prices 50c. a ton higher.

Prices per gross ton, f.o.b. Valley furnace:

Basic	$18.50
Bessemer	19.00
Gray forge	18.00
No. 2 foundry	18.50
No. 3 foundry	18.00
Malleable	19.00
Low phos., copper free	27.00

Freight rate to Pittsburgh or Cleveland district, $1.76.

Prices per gross ton, f.o.b. Pittsburgh district furnace:

Basic	$19.00
No. 2 foundry	19.00
No. 3 foundry	18.50
Malleable	19.50

Freight rates to points in Pittsburgh district range from 63c. to $1.13.

Semi-Finished Steel.—Non integrated companies are requiring less and less semi-finished steel as the month goes on, but the total curtailment during September could hardly be considered drastic. In the case of a few makers of strip steel and sheets, the falling off has been much more pronounced than in the manufacture of other products. Very little fourth quarter contracting has been reported, and the decline in shipments during the month will enable buyers to postpone negotiations still further. So far as can be learned, such business as has been placed has commanded the full $35, Pittsburgh or Youngstown, price on billets, slabs and sheet bars, and makers are firm in naming this price on fourth quarter contract business. On forging billets, the common quotation is $40, Pittsburgh, and the price is fairly well established. Shipments of wire rods are holding up fairly well.

Bars, Shapes and Plates.—Specifications continue very light on these products, although some makers report a slight improvement in the demand for bars. Operations are on a hand-to-mouth basis on bars and shapes, although some companies have a three to four weeks' backlog of plates. Prospects for fall business are not particularly good, but, on the other hand, large consuming industries have done nothing to indicate any decided falling off in their requirements. They are buying more closely and the total tonnage is somewhat reduced, but this does not necessarily mean that there will be any marked drop in the aggregate demand. Prospects for plate tonnage have been improved by the placing of five all-steel tow boats by the Standard Unit Navigation Co., three of which will be built by a Pittsburgh company. These boats will require approximately 2500 tons of plates. The Standard company is expected soon to inquire for 50 barges requiring between 4000 and 5000 tons of steel. Otherwise, barge business is rather quiet, but there is some work in prospect, and the official opening of the canalized Ohio River next month may give impetus to barge buying. Structural awards in this district are not heavy, and the backlogs of fabricating shops have been materially reduced in the last six weeks. Demand for reinforcing bars is steady and seasonally stronger, with no falling off expected before at least another month. Keener competition for business in bars and shapes has brought a recession of $1 a ton on these products, though some sellers are still holding for 1.95c. A Pittsburgh district maker of bars began the soliciting of business in the East at 1.90c., and this concession has been met by some other producers. Concessions on structural shapes have resulted almost entirely from competition with makers in the East. These concessions have been given for some weeks on Eastern business, but have now extended to some buyers in the Pittsburgh district.

Rails and Track Accessories.—The Pennsylvania Railroad is inquiring for its third quarter requirements of track accessories, but has not yet made known its annual rail requirements. Its accessory needs will be about the same as in previous years for this period. The Chesapeake & Ohio has not yet closed on the rails and tie plates inquired for earlier in the month. Definite rail inquiries are still lacking, although a number of roads are expected to make their requirements known in the immediate future.

Wire Products.—Shipments of manufacturers' wire in September will show little decline from those of

The Iron Age Composite Prices

Finished Steel

Sept. 24, 1929, 2.384c. a Lb.

One week ago	2.398c.
One month ago	2.398c.
One year ago	2.348c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products make 87 per cent of the United States output of finished steel.

	High		Low	
1929	2.412c.,	April 2;	2.384c.,	Sept. 24
1928	2.391c.,	Dec. 11;	2.314c.,	Jan. 3
1927	2.453c.,	Jan. 4;	2.293c.,	Oct. 25
1926	2.453c.,	Jan. 5;	2.403c.,	May 18
1925	2.560c.,	Jan. 6;	2.396c.,	Aug. 18

Pig Iron

Sept. 24, 1929, $18.29 a Gross Ton

One week ago	$18.29
One month ago	18.25
One year ago	17.71
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low	
1929	$18.71,	May 14;	$18.25,	Aug. 27
1928	18.59,	Nov. 27;	17.04,	July 24
1927	19.71,	Jan. 4;	17.54,	Nov. 1
1926	21.54,	Jan. 5;	19.46,	July 13
1925	22.50,	Jan. 13;	18.96,	July 7

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base per Lb.
F.o.b. Pittsburgh mill	1.90c. to 1.95c.
F.o.b. Chicago	2.05c.
Del'd Philadelphia	2.22c. to 2.27c.
Del'd New York	2.24c. to 2.29c.
Del'd Cleveland	1.92½c. to 1.95c.
F.o.b. Cleveland	1.90c. to 1.95c.
F.o.b. Lackawanna	2.05c.
F.o.b. Birmingham	2.05c.
C.i.f. Pacific ports	2.35c.
F.o.b. San Francisco mills	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills, 40, 50, 60-ft.	2.05c.
F.o.b. Pittsburgh mills, cut lengths	2.30c.
F.o.b. Birmingham, mill lengths	2.10c.

Rail Steel

F.o.b. mills, east of Chicago dist.	1.85c. to 1.90c.
F.o.b. Chicago Heights mill	1.95c.
Del'd Philadelphia	2.27c.

Iron

Common iron, f.o.b. Chicago	2.05c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	2.12c.
Common iron, del'd New York	2.14c.

Tank Plates

	Base per Lb.
F.o.b. Pittsburgh mill	1.95c.
F.o.b. Chicago	2.05c.
F.o.b. Birmingham	2.10c.
Del'd Cleveland	2.14c.
Del'd Philadelphia	2.15c.
F.o.b. Coatesville	2.05c.
F.o.b. Sparrows Point	2.05c.
F.o.b. Lackawanna	2.05c.
Del'd New York	2.22½c.
C.i.f. Pacific ports	2.35c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh mill	1.90c. to 1.95c.
F.o.b. Chicago	2.05c.
F.o.b. Birmingham	2.10c.
F.o.b. Lackawanna	2.05c.
F.o.b. Bethlehem	2.05c.
Del'd Cleveland	2.14c.
Del'd Philadelphia	2.01c. to 2.06c.
Del'd New York	2.14½c. to 2.19½c.
C.i.f. Pacific ports	2.35c.

Hot-Rolled Hoops, Bands and Strips

	Base per Lb.
6 in. and narrower, P'gh	2.00c.
Wider than 6 in., P'gh	1.90c.
6 in. and narrower, Chicago	2.20c.
Wider than 6 in., Chicago	2.10c.
Cooperage stock, P'gh	2.20c.
Cooperage stock, Chicago	2.30c.

Cold-Finished Steel

	Base per Lb.
Bars, f.o.b. Pittsburgh mill	2.30c.
Bars, f.o.b. Chicago	2.30c.
Bars, Cleveland	2.35c.
Bars, Buffalo	2.30c.
Shafting, ground, f.o.b. mill	*2.65c. to 3.60c.
Strips, P'gh	2.75c. to 2.85c.
Strips, Cleveland	2.75c. to 2.85c.
Strips, del'd Chicago	3.05c. to 3.15c.
Strips, Worcester	2.90c. to 3.00c.
Fender stock, No. 20 gage, Pittsburgh or Cleveland	4.25c.

*According to size.

Wire Products

(Carload lots, f.o.b. Pittsburgh and Cleveland, to jobbers and retailers.)

	Base per Keg
Wire nails	$2.45 to $2.55
Galvanized nails	4.45 to 4.55
Galvanized staples	3.15 to 3.25
Polished staples	2.90c. to 3.00c.
Cement coated nails	$2.45 to $2.55

	Base per 100 Lb.
Bright plain wire, No. 6 to No. 9 gage	$2.40 to $2.50
Annealed fence wire	2.55 to 2.65
Spring wire	3.50 to 3.60
Galv'd wire, No. 9	3.00 to 3.10
Barbed wire, galv'd	3.20 to 3.30
Barbed wire, painted	2.95 to 3.05
Woven wire fence (per net ton to retailers)	65.00

Chicago district mill and delivered Chicago prices are $1 per ton above the foregoing. Birmingham mill prices $3 a ton higher; Worcester, Mass. (wire), mill $3 a ton higher on production of that plant; Duluth, Minn., mill $2 a ton higher; Anderson, Ind., $1 higher.

Cut Nails

	Per 100 Lb.
Carloads, Wheeling, Reading or Northumberland, Pa.	$2.70
Less carloads, Wheeling or Reading	2.80

Light Plates

No. 10, blue annealed, f.o.b. P'gh	2.10c. to 2.20c.
No. 10, blue annealed, f.o.b. Chicago dist.	2.30c.
No. 10, blue annealed, del'd Phila.	2.42c. to 2.52c.
No. 10, blue annealed, B'ham	2.35c.

Sheets

Blue Annealed

	Base per Lb.
No. 18, f.o.b. P'gh	2.25c. to 2.35c.
No. 18, f.o.b. Chicago dist.	2.45c.
No. 18, del'd Philadelphia	2.67c.
No. 18, blue annealed, B'ham	2.50c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh	2.85c.
No. 24, f.o.b. Chicago dist. mill	2.95c. to 3.00c.
No. 24, del'd Philadelphia	3.17c. to 3.27c.
No. 24, f.o.b. Birmingham	3.00c. to 3.10c.

Metal Furniture Sheets

No. 24, f.o.b. P'gh	4.10c. to 4.20c.

Galvanized

No. 24, f.o.b. Pittsburgh	3.50c. to 3.60c.
No. 24, f.o.b. Chicago dist. mill	3.60c. to 3.70c.
No. 24, del'd Cleveland	3.69c. to 3.79c.
No. 24, del'd Philadelphia	3.92c. to 4.02c.
No. 24, f.o.b. Birmingham	3.70c.

Tin Mill Black Plate

No 28, f.o.b. Pittsburgh	2.90c. to 3.00c.
No. 28, f.o.b. Chicago dist. mill	3.00c. to 3.10c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh	4.00c. to 4.10c.

Long Ternes

No. 24, 8-lb. coating, f.o.b. mill	4.00c. to 4.10c.

Vitreous Enameling Stock

No. 24, f.o.b. Pittsburgh	3.90c.

Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills	$5.35
Standard cokes, f.o.b. Gary	5.45

Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)
(Per Package, 20 x 28 in.)

8-lb. coating I.C.	$11.20
15-lb. coating I.C.	14.00
20-lb. coating I.C.	15.30
25-lb. coating I.C.	$16.70
30-lb. coating I.C.	17.75
40-lb. coating I.C.	19.85

Alloy Steel Bars

(F.o.b. makers' mill)

Alloy Quality Bar Base, 2.65c. to 2.75c. per Lb.

S.A.E. Series Numbers		Alloy Differential
2000	(1½% Nickel)	$0.25
2100	(1½% Nickel)	0.55
2300	(3½% Nickel)	1.50
2500	(5% Nickel)	2.25
3100	Nickel Chromium	0.55
3200	Nickel Chromium	1.35
3300	Nickel Chromium	3.80
3400	Nickel Chromium	3.20
4100	Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50
4100	Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600	Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel)	1.05
5100	Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100	Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100	Chromium Spring Steel	0.20
6100	Chromium Vanadium Bars	1.20
6100	Chromium Vanadium Spring Steel	0.95
9250	Silicon Manganese Spring Steel (flats)	0.25
	Rounds and squares	0.50
	Chromium Nickel Vanadium	1.50
	Carbon Vanadium	0.95

Above prices are for hot rolled steel bars, forging quality. The differential for cold-drawn bars is ¾c. a lb. higher, with standard classification for cold-finished alloy steel bars applying. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis.

Billets under 4 x 4 in. carry the steel bar base. Slabs with a sectional area of 16 in. or over carry the billet price. Slabs with sectional area of less than 16 in. or less than 2½ in. thick, regardless of sectional area, take the bar price.

Rails

	Per Gross Ton
Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	36.00
Light (from rail steel), f.o.b. mill	34.00
Light (from billets), f.o.b. Ch'go mill	36.00

Track Equipment

	Base per 100 Lb.
Spikes, ⅝ in. and larger	$2.80
Spikes, ½ in. and smaller	2.80
Spikes, boat and barge	3.00
Tie plate, steel	2.15
Angle bars	$2.75
Track bolts, to steam railroads	$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel Inches	Black	Galv.	Iron Inches	Black	Galv.
⅛	45	19½	¼ and ⅜	−11	+36
¼ to ⅜	51	25½	½	23	5
½	56	42½	¾	28	11
¾	60	48½	1 and 1¼	31	15
1 to 3	62	50½	1½ and 2	35	18

Lap Weld

2	55	43½	2	23	9
2½ to 6	59	47½	2½ to 3½	28	13
7 and 8	56	43½	4 to 6	30	17
9 and 10	54	42½	7 and 8	29	16
11 and 12	53	40½	9 to 12	26	11

Butt Weld, extra strong, plain ends

⅛	41	24½	¼ and ⅜	+13	+48
¼ to ⅜	47	30½	½	23	7
½	53	42½	¾	28	12
¾	58	47½	1 to 2	34	18
1 to 1½	60	49½			
2 to 3	61	50½			

Lap Weld, extra strong, plain ends

2	53	42½	½	29	13
2½ to 4	57	46½	2½ to 4	34	20
4½ to 6	56	45½	4½ to 6	33	19
7 to 8	52	39½	7 and 8	31	17
9 and 10	45	32½	9 to 12	21	8
11 and 12	44	31½			

On carloads the above discounts on steel pipe are increased on block by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Steel		Charcoal Iron	
2 in. and 2¼ in.	40	1½ in.	1
2½ in.—2¾ in.	48	1¾ in.	8
3 in.	54	2 in.—2¼ in.	13
3¼ in.—3¾ in.	56	2½ in.—2¾ in.	16
4 in.	59	3 in.	17
4½ in. to 6 in.	48	3¼ in. to 3½ in.	15
		4 in.	20
		4½ in.	21

On lots of a carload or more, the above base discounts are subject to a preferential of two fives on steel and of 10 per cent on charcoal iron tubes. Smaller quantities are subject to the following modifications from the base discounts:

Lap Welded Steel—Under 10,000 lb., 6 points under base and one five; 10,000 lb. to carload, 4 points under base and two fives. Charcoal Iron—Under 10,000 lb., 2 points under base; 10,000 lb. to carload, base and one five.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	63	3 in.	48
1¼ to 1½ in.	55	3¼ to 3½ in.	50
1¾ in.	39	4 in.	53
2 to 2¼ in.	44	4½, 5 and 6 in.	42
2½ to 2¾ in.	42		

Hot Rolled

2 and 2¼ in.	40	3¼ to 3½ in.	56
2½ and 2¾ in.	48	4 in.	59
3 in.	54	4½, 5 and 6 in.	48

Beyond the above base discounts a preferential discount of 5 per cent is allowed on carload lots. On less than carloads to 10,000 lb., base discounts are reduced 4 points with 5 per cent preferential; on less than 10,000 lb., base discounts are reduced 6 points, with no preferential. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage take mechanical tube list and discounts. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30%, base (carloads)	55
Carbon, 0.30% to 0.40%, base	50

Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

August, and present specifications are not far below recent levels. Fourth quarter contracts are being closed at 2.40c. to 2.50c. a lb., Pittsburgh, and efforts are being made to hold these prices in the face of further weakness in the nail market. Nail prices have settled to $2.45 a keg, Pittsburgh, on orders of fair size, and considerably lower prices have come out in competitive territory down the Ohio River. It is believed, however, that $2.45 a keg, Pittsburgh, represents the minimum in this immediate territory.

Tubular Goods.—Pipe mills in this district are continuing the recent high operating rate, and the average for the industry as a whole is certainly not below 75 per cent of capacity. Lap weld and seamless units are most active, and, although mill backlogs are not heavy, the prospect for fall business looks very good. Jobbers in this territory have maintained resale prices on pipe very satisfactorily, and Pittsburgh mills now have the assurance that shading in other districts will be discontinued. Shipments of mechanical tubing reflect the dullness in the automobile trade, and the September movement will fall considerably behind August.

Sheets.—Specifications continue to decline, largely because of the reduced requirements of the automobile industry. September shipments, however, are going to compare favorably with those of August, as most mills entered the month with fairly large backlogs, which have since been reduced considerably. One or two of the larger mills have enough business on their books to assure a fairly heavy operating rate during October, but a number of companies, principally makers of automobile body sheets are now operating on a hand-to-mouth basis. Mills are not actively soliciting fourth quarter contracts and few are being placed. The Ford Motor Co., which recently cut one day a week from its operating schedule, is taking a correspondingly smaller tonnage of sheets and is instructing its sources of supply to keep their shipments in close alinement with its production schedules. This is not interpreted by the trade as a sign of probable curtailment of operations, but rather indicates that the company contemplates slight model changes which will not seriously cut down output. The other large maker of low-priced cars is continuing to reduce its steel shipments, and it now seems certain that drastic model changes will be made which will eliminate the company as a large user of steel for the remainder of the year. A few makers of cars in the medium-priced field are very busy, but the industry as a whole is not now expected to increase its steel consumption to any noticeable extent before the end of the year. Other large consumers of sheets promise to keep up present requirements over the last quarter. Prices are holding fairly well, except in the case of galvanized material. At least four large makers are adhering to a 3.60c., Pittsburgh, minimum on fourth quarter business, but others are taking contracts at 3.50c., and it now seems that efforts to establish the market at a higher level are to be of no avail.

Tin Plate.—Operations have shown no decline in the last week and one independent producer is running at a slightly higher rate. The leading interest is still operating at about 90 per cent of capacity and the average for the district is certainly not more than 10 points under this rate. Business is strictly of a hand-to-mouth nature, with specifications one week deciding the operating rate of the next. Next month, however, sufficient 1930 commitments will have come to some makers to allow them to begin rolling such tonnage.

Strip Steel.—Specifications are still very light, and the industry as a whole is not operating at higher than 70 per cent of capacity. The automobile industry is responsible for this slackening, as other users of strip have not curtailed their requirements and demand from these sources is well diversified. A few fourth quarter contracts of size have been closed, but larger users are hesitant in their commitments, largely because their requirements are rather uncertain. Prices are fairly stable and makers in this district have had no difficulty in obtaining 1.90c. and 2c., Pittsburgh, on hot-rolled material. On cold-rolled, 2.75c., Pittsburgh or Cleveland, seems to be the minimum; on small tonnages a $2 premium is sometimes paid.

Cold-Finished Steel Bars.—The new maker of cold-finished bars at Buffalo has established a Buffalo base price of 2.30c. a lb., and will have a distinct advantage over Pittsburgh mills in western New York and northern Pennsylvania. Local makers whose base price is the same, will meet this competition at most points. In New York City and New England the difference in freight rate amounts only to a few cents a 100 lb. Specifications this month have run slightly under those of August, and no upward tendency in demand is reported. Fourth quarter contracts are being taken at 2.30c., Pittsburgh, and the new extras announced last summer will apply on all fourth quarter shipments.

Coke.—The leading steel company interest in the Connellsville region plans to put out a large number of ovens in that district in the near future. Heretofore, curtailment of production has resulted in a stronger price situation, but definite signs of lower blast furnace requirements during the fall are certain to have an unfavorable influence. However, one large steel company in the Valleys, which ordinarily makes sufficient coke for its own use, has contracted for a large monthly tonnage during the fourth quarter. Furnace coke is still quotable at $2.65 to $2.75 a net ton, Connellsville.

Old Material.—It has now been about six weeks since dealers in this district have received any substantial orders for scrap, and, in the face of protracted hold-ups at many points and a constantly increasing supply of material, prices have held fairly well. No. 1 heavy melting steel has declined 25c. a ton, and is now quotable at $17.50 to $18.50. The lower figure represents dealers' buying prices, while the wide spread is necessary to include small sales during the week at $18 to $18.50. Hydraulic compressed sheets are also lower on the strength of purchases by dealers at $17.50 and less, this grade now being quotable at $17.50 to $18. The supply of compressed sheets in the district is not large, but no sizable sales have been made for several weeks, and one consumer has held up shipments at both its mills. Specialties are also weaker, and declines have been registered in other groups.

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.25c.
Hoops	4.25c.
Black sheets (No. 24), 25 or more bundles	3.80c. to 3.90c.
Galv. sheets (No. 24), 25 or more bundles	4.45c. to 4.55c.
Light plates, blue annealed (No. 10), 1 to 24 plates	3.35c. to 3.45c.
Blue annealed sheets (No. 13), 1 to 24 sheets	3.50c. to 3.60c.
Galv. corrug. sheets (No. 28), per square	$4.43
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count,	60 per cent off list
Machine bolts, 100 count,	60 per cent off list
Carriage bolts, 100 count,	60 per cent off list
Nuts, all styles, 100 count,	60 per cent off list
Large rivets, base per 100 lb.	$3.50
Wire, black soft, ann'l'd, base per 100 lb.	$3.00 to 3.10
Wire, galv. soft, base per 100 lb.	3.00 to 3.10
Common wire nails, per keg	2.90 to 3.00
Cement coated nails, per keg	3.05

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$17.50 to $18.50
No. 2 heavy melting steel	15.50 to 16.00
Scrap rails	17.00 to 17.50
Compressed sheet steel	17.50 to 18.00
Bundled sheets, sides and ends	16.00 to 16.50
Cast iron carwheels	16.00 to 16.50
Sheet bar crops, ordinary	19.00 to 19.50
Heavy breakable cast	12.50 to 13.00
No. 2 railroad wrought	17.50 to 18.50
Hvy. steel axle turnings	16.50 to 17.00
Machine shop turnings	11.50 to 12.00
Acid Open-Hearth Grades:	
Railr. knuckles and couplers	21.00 to 21.50
Railr. coil and leaf springs	21.00 to 21.50
Rolled steel wheels	21.00 to 21.50
Low phos. billet and bloom ends	22.00 to 22.50
Low phos., mill plates	22.00 to 22.50
Low phos., light grades	20.50 to 21.50
Low phos., sheet bar crops	21.50 to 22.00
Heavy steel axle turnings	16.50 to 17.00
Electric Furnace Grades:	
Low phos., punchings	20.00 to 21.00
Hvy. steel axle turnings	16.50 to 17.00
Blast Furnace Grades:	
Short shoveling steel turnings	12.50 to 13.00
Short mixed borings and turnings	12.00 to 12.50
Cast iron borings	12.00 to 12.50
Rolling Mill Grades:	
Steel car axles	21.50 to 22.00
Cupola Grades:	
No. 1 cast	15.00 to 16.00
Rails 3 ft. and under	20.00 to 21.00

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and under 10 in., Pittsburgh	$35.00
Rerolling, 4-in. and under 10 in., Youngstown	35.00
Rerolling, 4-in. and under 10 in., Cleveland	35.00
Rerolling, 4-in. and under 10 in., Chicago	37.00
Forging quality, Pittsburgh	$40.00 to 41.00

Sheet Bars

(Open Hearth or Bessemer)

	Per Gross Ton
Pittsburgh	$35.00
Youngstown	35.00
Cleveland	35.00

Slabs

(8 in. x 2 in. and under 10 in. x 10 in.)

	Per Gross Ton
Pittsburgh	$35.00
Youngstown	35.00
Cleveland	35.00

Skelp

(F.o.b. Pittsburgh or Youngstown)

	Per Lb.
Grooved	1.85c. to 1.90c.
Universal	1.85c. to 1.90c.
Sheared	1.85c. to 1.90c.

Wire Rods

(Common soft, base)

	Per Gross Ton
Pittsburgh	$42.00
Cleveland	$40.00 to 42.00
Chicago	43.00

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.80
Old range non-Bessemer, 51.50% iron	4.65
Mesabi Bessemer, 51.50% iron	4.65
Mesabi non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.40

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algerian	12.00c.
Iron ore, low phos., Swedish, average 68% iron	12.00c.
Iron ore, basic Swedish, average 65% iron	10.00c.
Manganese ore, washed, 52% manganese, from the Caucasus	30.00c.
Manganese ore, Brazilian, African or Indian, basic 50%	30.00c.
Tungsten ore, high grade, per unit, in 60% concentrates	$16.25 to $16.50

	Per Gross Ton
Chrome ore, 45 to 50% Cr_2O_3, crude, c.i.f. Atlantic seaboard	$22.00 to $24.00

	Per Lb.
Molybdenum ore, 85% concentrates of MoS_2, delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$2.65 to $2.75
Foundry, f.o.b. Connellsville prompt	3.75 to 4.75
Foundry, by-product, Ch'go ovens	8.00
Foundry, by-product, New England, del'd	11.00
Foundry, by-product, Newark or Jersey City, delivered	9.00 to 9.40
Foundry, by-product, Phila.	9.00
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry by-prod., del'd St. Louis	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.25 to $1.75
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, ¾-in. f.o.b. Pa. mines	1.90 to 2.00
Mine run gas coal, f.o.b. Pa. mines	1.65 to 1.75
Steam slack, f.o.b. W. Pa. mines	80c. to 90c.
Gas slack, f.o.b. W. Pa. mines	1.00 to 1.10

Ferromanganese

	Per Gross Ton
Domestic, 80%, seaboard	$105.00
Foreign, 80%, Atlantic or Gulf port, duty paid	105.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$31.00 to $34.00
Domestic, 16 to 19%	29.00 to 32.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$83.50
75%	130.00

	Per Gross Ton Furnace		Per Gross Ton Furnace
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	45.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		Per Gross Ton
10%	$30.00	12%	$34.00
11%	32.00		

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		Per Gross Ton
6%	$23.00	10%	$27.00 to $28.00
7%	24.00	11%	29.00 to 30.00
8%	25.00	12%	31.00 to 32.00
9%	26.00		

Other Ferroalloys

Ferrotungsten, per lb. contained metal del'd	$1.40 to $1.50
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.15 to $3.65
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	$160.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton	$91.00
Ferrophosphorus, electric 24%, f.o.b. Anniston, Ala., per gross ton	$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silicon, gravel, f.o.b. Illinois and Kentucky mines	$18.00
No. 2 lump, Illinois and Kentucky mines	20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	$18.25 to $18.75
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines	32.50

Fire Clay Brick

	Per 1000 f.o.b. Works: High-Heat Duty Brick	Intermediate Heavy Duty Brick
Pennsylvania	$43.00 to $46.00	$35.00 to $38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	.....
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00
Standard size	45.00

Chrome Brick

	Per Net Ton
Standard size	$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts, blank or tapped, hexagons	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	7.00c. to 6.75c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled thread up to and including ⅛ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagons nuts	70
Semi-finished hexagons castellated nuts, S.A.E.	70
Stove bolts in packages, P'gh	75, 20, 10 and 5
Stove bolts in packages, Chicago	75, 20, 10 and 5
Stove bolts in packages, Cleveland	75, 20, 10 and 5
Stove bolts in bulk, P'gh	75, 20, 10, 5 and 2½
Stove bolts in bulk, Chicago	75, 20, 10, 5 and 2½
Stove bolts in bulk, Cleveland	75, 20, 10, 5 and 2½
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55, 60 per cent apply.

Large Rivets

(½-In. and Larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$3.10
F.o.b. Chicago	3.20

Small Rivets

(7/16-In. and Smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70 and 10
F.o.b. Cleveland	70 and 10
F.o.b. Chicago	70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10 and 5
Milled standard set screws, case hardened	80 and 5
Milled headless set screws, cut thread	75 and 10
Upset hex. head cap screws, U.S.S. thread	85
Upset hex. cap screws, S.A.E. thread	85
Upset set screws	80, 10 and 5
Milled studs	70

Chicago

Steel Orders in Prospect Make Large Total—Current Business Moderately Improved—Railroads Center of Interest

CHICAGO, Sept. 24.—Consumers' interest in forward needs of steel products is indicated in the number and size of inquiries rather than in actual purchases. Including a liberal tonnage of rails and track supplies, inquiries this week make one of the largest totals so far this year. Specifications, like new business, show improvement over those of the previous week, but the gain here is not so impressive as in prospective business.

The leading producer is still holding two blast furnaces banked. Steel mill output is being closely gaged to actual requirements and no evidence is at hand to indicate accumulations either of pig iron or of semi-finished steel.

All producers of plates, shapes and bars are meeting on common ground in the matter of prices, which have been named at 2.05c. a lb., Chicago, for delivery in the coming three months.

Interest is increasing locally in the railroad equipment and rail markets. The Burlington budget, which provides for the purchase of not less than 2000 cars, has been approved, and several other Western railroads are rapidly rounding out car buying programs.

The St. Paul has placed 50,000 tons of rails with two Chicago mills, and rail inquiry which will come into the market shortly is imposing. Preliminary estimates made here place the Santa Fe inquiry at 90,000 tons and that of the New York Central at 200,000 tons. Western rail mills are now assured of continuous operations throughout the remainder of the year. The Colorado Fuel & Iron Co. is said to have started its rail mill on a double turn basis.

The structural market, though quiet at the moment, seems to have an undercurrent of strength as a result of greater activity among architects and engineers. Efforts are being made to lift prices for reinforcing bars. Moves of this kind usually result in sizable awards just prior to the time that old prices are withdrawn.

Pig Iron.—Northern iron remains firm at $20 a ton, local furnace, on contracts for the fourth quarter. Five merchant furnaces are in blast and shipments are fully equal to output. Needs for the next three months, and in some cases also the first month in the new year, are being covered at a steady rate. Scattered and small sales of silvery are reported at prices which indicate lack of stability. Shipments of this commodity are at a high rate. Close to 1000 tons of Southern iron has been sold in this district in the last week. Prices ranged from $13 to $13.50 a ton, Birmingham. The charcoal iron market is steady from the viewpoint of shipments.

Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	$20.00
N'th'n No. 1 fdy., sil. 2.25 to 2.75	20.50
Malleable, not over 2.25 sil	20.00
High phosphorus	20.00
Lake Super. charcoal, sil. 1.50	27.04
So'th'n No. 2 fdy. (all rail)	$19.01 to 19.51
Low phos., sil. 1 to 2, copper free	29.50
Silvery, sil. 8 per cent	29.79
Bess. ferrosilicon, 14-15 per cent	46.29

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Ferroalloys.—Several spot carloads of 50 per cent ferrosilicon are before the trade. This commodity is being quoted in small lots at $88.50 a ton, delivered. Two car lots of spiegeleisen have been taken by consumers at $34 a ton, Hazard, Pa. On the whole, this market is more active in small purchases, many of which are fill-in tonnages to meet extra requirements in the last quarter.

Prices delivered Chicago: 80 per cent ferromanganese, $112.56; 50 per cent ferrosilicon, $83.50 to $88.50; spiegeleisen, 19 to 21 per cent, $39.76 to $41.76.

Sheets.—New buying except for immediate needs is sluggish, and prices are no more settled than a week ago. Consumption in this district is at a high rate and output is supported at 90 per cent of capacity. Shipments and new releases for heavy gage blue annealed sheets still run high and deliveries from local mills cannot be counted on before late in November. Other grades may be had in three to four weeks. The roofing trade is still drawing heavily against commitments, while, on the other hand, manufacturers of lockers and shelving are experiencing a lull in orders and are taking smaller quantities of sheets from mills. Builders of light tanks are finding outlets for their products, and jobbers continue to distribute sheets in liberal quantities over a wide territory. Taken as a whole, this market is in a satisfactory state except as to prices. The aggregate of incoming business is fully equal to shipments.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 3c. to 3.05c.; No. 24 galv., 3.65c. to 3.75c.; No. 10 blue ann'l'd, 2.35c. Deliv'd prices at other Western points are equal to the freight from Gary, plus the mill prices, which are 5c. per 100 lb. lower than Chicago delivered prices.

Rails and Track Supplies.—The Chicago, Milwaukee, St. Paul & Pacific has ordered 50,000 tons of standard-section rails, of which 40,000 tons was taken by the Illinois Steel Co. and 10,000 tons by the Inland Steel Co. The distribution of the Union Pacific Rails, purchase of which was announced last week, was 21,000 tons each to the Illinois Steel Co. and the Colorado Fuel & Iron Co. and 6000 tons to the Inland Steel Co. Neither of these railroads has definitely entered the market for track fastenings, the aggregate of which will be close to 25,000. The Pennsylvania is taking bids on 8000 kegs of spikes and the Chesapeake & Ohio will buy 10,000 tons of tie plates. Sellers here estimate that the New York Central's rail needs will be about 200,000 tons and that the Santa Fe will take not less than 90,000 tons. Although no actual specifications for rails have been received against recent orders, it is generally understood that releases will reach mills in time for rolling about the first week in October. As gaged by rolling schedules now in force, there seems little reason to believe that the current rate of output at 75 per cent capacity will drop. In fact, it seems entirely probable that this rate will be fully sustained until November, when heavier output is expected. Orders this week for track accessories represent only the ordinary run of tonnage for immediate use. An ordinance now being drawn in Chicago will authorize a larger expansion in surface line and elevated trackage.

Prices f.o.b. mill, per gross ton: Standard section open-hearth and Bess. rails, $43; light rails, rolled from billets, $36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.15c.; angle bars, 2.75c.

Cast Iron Pipe.—Activity in this market is not growing except that contractors are taking deliveries faster in an effort to complete work at hand before cold weather. Buyers, both private and public, are showing little interest. Several sizable municipal inquiries, which the trade had expected to receive this fall, may be held over until spring. Milwaukee will close bids this week on 500 tons of 8 and 12-in. pipe. Holland, Mich., will soon buy 400 tons of 16-in. pipe. Other inquiries now before the trade are 200 tons of 2 to 8-in. pipe for Bridgeman, Mich.; 200 tons of 4 to 8-in. pipe for Carmel, Ind., and 100 tons of 2 to 6-in. pipe for Kempton, Ill. Prices for cast iron pipe are well stabilized, and deliveries on most sizes are prompt.

Prices per net ton, del'd Chicago: Water pipe, 6-in. and over, $45.20 to $46.20; 4-in., $49.20 to $50.20; Class A and gas pipe, $3 extra.

Plates.—Orders for tank plates, at 600 tons, are the smallest in several weeks. Inquiries, on the other hand, are impressive at 3500 tons, 1000 tons of which will be exported to South America after fabrication in a Chicago shop. Tank programs now before the trade call for not less than 20,000 tons of plates. The railroad car market remains active, with a fresh inquiry near at hand for 2000 cars for the Burlington.

Structural Material.—Numerous railroad inquiries, though small in the aggregate, are holding the center of interest in a market that otherwise is unusually quiet. On the brighter side of the structural market is the fact that architects are busy and the list of projects is constantly growing. An order has been placed at Milwaukee for 1350 tons, and a Chicago steel mill has ordered 1000 tons for a sintering

plant. The 42-story Northwestern Life Insurance Building at Milwaukee is again an active project.

Mill prices on plain material, per lb.: 2.05c. base, Chicago.

Bars.—Some improvement is noticed in sales and specifications for mild steel bars. All producers are now naming two 2.05c. a lb., Chicago, as the fourth quarter price. Inquiry for immediate and future needs is brisk and forecasts a substantial buying movement at an early date. Deliveries average close to 30 days. Both inquiry and new buying in rail steel bars are light. Specifications, however, are above production and deliveries are lengthening.

Bolts, Nuts and Rivets.—Specifications for these commodities are measurably heavier, and release schedules indicate further growth near the end of the month. Western manufacturers of automobiles and farm implements are taking larger quantities. Jobbers are finding business more brisk and turnover of stocks is faster. Fourth quarter contracting is nearing completion. Prices remain steady.

Old Material.—Heavy melting steel, after having been purchased by consumers last week at $15.50 a gross ton, delivered, dropped 25c. a ton on consumers' orders. About 20,000 tons changed hands in the week. Demand for hydraulic bundles continues dull, and this grade is accumulating in the hands of producers as brokers are forced to hold back orders. A sizable sale of cast iron borings is reported at $11 a gross ton, delivered. Lower prices for scrap are confined almost wholly to the heavy tonnage grades. Consumption of specialties is larger, and supplies of most grades are not always available on the short notice given by users. Supplies of rerolling rails are more than ample for current needs, and prices have receded 25c. a ton to $18 a gross ton, delivered. Large consumers of scrap are bent on rounding out reserves, as shown by the fact brokers generally report that September shipments of most grades of scrap are close to the average rate in August despite reduced steel operations this month. General Motors Corporation is offering 16 cars of cast iron borings from its Muncie, Ind., plant. The St. Paul will sell 5000 tons of railroad scrap, and the Burlington is offering 2500 tons.

Prices deliv'd Chicago district consumers:

	Per Gross Ton	
Basic Open-Hearth Grades:		
Heavy melting steel	$15.00 to	$15.25
Shoveling steel	14.75 to	15.25
Frogs, switches and guards, cut apart, and misc. rails	16.25 to	16.75
Hydraul. compressed sheets	13.25 to	13.75
Drop forge flashings	10.75 to	11.25
No. 1 busheling	12.75 to	13.25
Forg'd cast and r'l'd steel carwheels	18.75 to	19.25
Railroad tires, charg. box size	18.75 to	19.25
Railroad leaf springs cut apart	18.75 to	19.25
Acid Open-Hearth Grades:		
Steel couplers and knuckles	17.00 to	17.50
Coil springs	19.00 to	19.50
Electric Furnace Grades:		
Axle turnings	14.25 to	14.75
Low phos. punchings	17.00 to	17.50
Low phos. plates, 12 in. and under	17.00 to	17.50
Blast Furnace Grades:		
Axle turnings	12.00 to	12.50
Cast iron borings	10.50 to	11.00
Short shoveling turnings	10.50 to	11.00
Machine shop turnings	7.50 to	8.00
Rolling Mill Grades:		
Iron rails	16.00 to	16.50
Rerolling rails	17.50 to	18.00
Cupola Grades:		
Steel rails less than 3 ft.	17.50 to	18.50
Steel rails less than 2 ft.	20.00 to	20.50
Angle bars, steel	17.00 to	17.50
Cast iron carwheels	14.00 to	14.50
Malleable Grades:		
Railroad	17.00 to	17.50
Agricultural	15.50 to	16.00
Miscellaneous:		
*Relaying rails, 56 to 60 lb.	23.00 to	25.00
*Relaying rails, 65 lb. and heav.	26.00 to	31.00
	Per Net Ton	
Rolling Mill Grades:		
Iron angle and splice bars	15.00 to	15.50
Iron arch bars and transoms	21.00 to	21.50
Iron car axles	26.00 to	26.50
Steel car axles	17.50 to	18.00
No. 1 railroad wrought	14.00 to	14.50
No. 2 railroad wrought	13.25 to	13.75
No. 1 busheling	9.00 to	9.50
No. 2 busheling	7.00 to	7.50
Locomotive tires, smooth	14.50 to	15.00
Pipes and flues	10.00 to	10.50
Cupola Grades:		
No. 1 machinery cast	14.50 to	15.00
No. 1 railroad cast	14.00 to	14.50
No. 1 agricultural cast	13.25 to	13.75
Stove plates	12.25 to	12.75
Grate bars	11.75 to	12.25
Brake shoes	11.50 to	12.00

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Reinforcing Bars.— Producers of rail steel reinforcing bars are naming 2c. a lb., mill, as the minimum price for roadwork steel and 2.10c. a lb. for bridge reinforcing steel. The trucking charge from the mills to Chicago is $3 a ton. New business is lighter than a week ago and the volume of fresh inquiries lends no support to the hope of larger sales as the fall season advances. Two Government hospitals, one at North Chicago and the other at Maywood, Ill., account for 400 tons of new business. Quotations on billet steel reinforcing bars remain weak, the range being 2.10c. to 2.35c. a lb. out of Chicago warehouse.

Cold-Rolled Strips. — This week brings a further slight decline in specifications for cold-rolled strips. New buying, both for immediate needs and for the fourth quarter, is dragging. Backlogs continue to grow lighter, and mills are being forced to make schedules on a hand-to-mouth basis. Further reduction in output is reported by makers of low-priced automobiles. Several automobile plants are now getting under way with new models, but their requirements are not sufficiently large to offset the drop in the industry as a whole.

Wire Products.—Spring terms, now open in the South on woven wire fencing, have failed to stimulate business except to a moderate degree. Demand for fencing over the country as a whole is in good volume, so that shipments in the first three weeks in September may be said to be satisfactory for this time of the year. Specifications from the manufacturing trade are a trifle lighter; otherwise this phase of the wire market is featureless. Fourth quarter buying by all classes of users is sluggish, and the fall trade is slow in getting under way. It is thought by some that drought in the Central Western States accounts for lack of interest by buyers. Specifications from jobbers are being received at mills at a fair rate. Shipments of nails are light and prices remain unstable. Demand for wire products in the third quarter has been only fair in comparison with the first two quarters of the year. The slower pace of the automotive industry is largely accountable for the falling off in demand in the last three months.

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars	3.00c.
Reinforc'g bars, billet steel	2.10c. to 2.35c.
Reinforc'g bars, rail steel	1.85c. to 1.95c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Bands (¼ in. in Nos. 10 and 12 gages)	3.20c.
Hoops (No. 14 gage and lighter)	3.75c.
Black sheets (No. 24)	4.05c.
Galv. sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.35c.
Spikes, ⅜ in. and larger	3.55c.
Track bolts	4.55c.
Rivets, structural	4.00c.
Rivets, boiler	4.00c.
	Per Cent Off List
Machine bolts	60
Carriage bolts	60
Coach or lag screws	60
Hot-pressed nuts, sq., tap. or blank	60
Hot-pressed nuts, hex., tap. or blank	60
No. 8 black ann'l'd wire, per 100 lb.	$3.45
Com. wire nails, base per keg	3.20
Cement c't'd nails, base per keg	3.20

Low Tonnage of Malleable Castings Made

WASHINGTON, Sept. 24.—Orders for malleable castings in August totaled 61,982 net tons, against 61,401 tons in July, according to reports received from the principal manufacturers by the Department of Commerce. Production was 68,651 tons, or 70 per cent of the reporting capacity of 98,073 tons, against 70,625 tons, or 73.5 per cent of the reporting capacity of 96,089 tons in July. August shipments were 69,240 tons, against 69,665 tons in July.

For the first eight months of the current year orders aggregated 587,872 tons, against 511,101 tons for the corresponding period of last year. Production was 607,392 tons, or 79.1 per cent of capacity, against 523,770 tons, or 68 per cent of capacity. Shipments were 602,203 tons, compared with 512,274 tons.

Production and shipments in August were the lowest for any month this year; orders, the lowest except for July. In August, 1928, production was 68,606 tons, shipments were 66,962 tons and orders booked totaled 66,128 tons.

New York

Southern Pig Iron Sold for Delivery in First Quarter—Railroad Equipment Outlook More Promising

NEW YORK, Sept. 24.—The pig iron market still lacks the characteristics of a broad buying movement, but active canvassing on the part of sellers continues to result in substantial bookings. It is also becoming evident that considerable quiet buying has been going on, in some cases for deliveries reaching well into the first quarter. Purchases for such extended shipment have been largely confined to Alabama iron, which astute buyers have regarded as a bargain at recent low prices. It is now estimated that more than 150,000 tons of Southern iron has been sold in the New York, Philadelphia and New England markets since mid-year, when Alabama furnaces became aggressive in their campaign for Northern business. The large stocks of unsold iron on Alabama furnace yards, which at that time totaled nearly 500,000 tons, have been reduced and merchant iron production in the South has been cut down by the recent blowing out of two furnaces. Prices on Alabama foundry iron are stiffening. The general quotation is now $13.50, base furnace, with $13 occasionally named on attractive tonnages. It is conceded, however, that there may still be some outstanding quotations as low as $12.50. Sales in this district during the week totaled 20,000 tons, of which more than one-half was Southern iron. Northern prices are still flexible. For delivery in this territory, eastern Pennsylvania foundry iron is still available at $18.50, base furnace, while Buffalo iron is quoted at $17.50 to $18, base furnace. Buffalo producers have had a little more leeway in making delivered prices as a result of a decline in barge rates from Buffalo. As against a former rate of $2 a ton to New York harbor, $1.50 is now generally available and $1.25 has been done in at least one instance. The Foran Foundry & Mfg. Co., Flemington, N. J., has closed for 1000 tons of No. 2 plain and No. 2X Northern iron for fourth quarter delivery. Operations of jobbing plants are increasingly spotty, but foundries affiliated with manufacturing plants are melting iron at an unchanged rate. In fact, September deliveries of iron by one important seller are running larger than those for August, which was a leading month of the year in point of shipments.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	$22.41 to $22.91
*Buf. No. 2, del'd east. N. J.	20.78 to 21.28
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	19.89 to 21.02
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	20.39 to 21.52

Freight rates: $4.91 from Buffalo, $1.39 to $2.52 from eastern Pennsylvania.
*Prices delivered to New Jersey cities having rate of $3.28 a ton from Buffalo.

Warehouse Business.—Buying has improved in the past week, especially in galvanized sheets and structural steel. Orders for structural material are individually larger and prices quoted by jobbers are firmer than for some months. Quotations on galvanized sheets are still subject to some shading.

Cast Iron Pipe. — Quotations on pressure pipe are still irregular. Northern foundries are well filled with tonnage on the larger sizes, but are seeking orders for small diameter pipe. Ossining, N. Y., is about to close a contract involving about 250 tons of water pipe. Westfield, N. J., opens bids Oct. 10, on a contract requiring about 300 tons of 36-in. water pipe. Baltimore opened bids Sept. 25 on 53,500 ft. of 4 to 20-in. pipe and 396 tons of fittings.

Prices per net ton deliv'd New York: Water pipe, 6-in. and larger, $33.60 to $34.60; 4-in. and 5-in., $36.60 to $37.60; 3-in., $43.60 to $44.60. Class A and gas pipe, $3 extra.

Finished Steel.—Such change as there has been in the volume of steel business in the past week has been toward improvement, but the gain has been slight. Most of the steel buyers in this territory have renewed or extended contracts to cover the fourth quarter. In the price situation there is nothing new except for a more general abandonment of efforts to obtain 3.60c., Pittsburgh, for galvanized sheets. The fact that some fourth quarter contracts were entered at 3.50c., together with the offering of such sheets for prompt shipment at this price, has discouraged efforts of other mills to get $2 a ton higher. Wire nails are being sold at $2.45 to $2.55 a keg. Nearly all pipe makers have now notified local distributers of their intention to insist on the maintenance of resale prices for out-of-stock material. Railroad equipment companies are encouraged by the prospect of increased buying of cars this fall. The Southern Railway, which inquired for 2000 cars, may buy as many as 5000. The Virginian Railway is expected to come into the market shortly for 2000 cars. The largest structural steel letting of the week was 6000 tons for a hotel on West Fifty-ninth Street, New York, awarded to A. E. Norton, Inc.

The New York Central and New York, New Haven & Hartford railroads have asked for prices on their fourth quarter steel requirements. Bids are to be in by Sept. 30 for both roads.

Mill prices per lb., deliv'd New York: Soft steel bars, 2.24c. to 2.29c.; plates, 2.22½c.; structural shapes, 2.19½c.; bar iron, 2.14c.

Ferroalloys. — An inquiry by the Ford Motor Co. for 800 tons of ferromanganese for fourth quarter delivery has appeared. Otherwise sales and inquiries are limited to carload and small lots. In spiegeleisen there have been frequent sales of small lots for early delivery, some of it being the imported product. One importer states that his receipts so far this year have amounted to about 3000 tons and it is interesting to note that about 2000 tons of this was delivered by water shipment in the Chicago territory. Prices as published on other pages continue unchanged.

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.30c.
Soft steel bars, small shapes	3.25c.
Iron bars	3.24c.
Iron bars, Swed. charcoal	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Cold-roll. strip, soft and quarter hard	5.15c. to 5.40c.
Hoops	4.25c.
Bands	3.75c.
Blue ann'l'd sheets (No. 10)	3.80c. to 3.90c.
Long terne sheets (No. 24)	5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galv. annealed	5.15c.
Tire steel, 1½ x ½ in. and larger	3.40c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.75c.
Open-hearth spring steel, bases	4.50c. to 7.00c.

	Per Cent Off List
Machine bolts, cut thread:	
¾ x 6 in. and smaller	60
1 x 30 in. and smaller	50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	60
¾ x 20 in. and smaller	50 to 50 and 10
Coach screws:	
½ x 6 in. and smaller	60
1 x 6 in. and smaller	50 to 50 and 10

Boiler Tubes—	Per 100 Ft.
Lap welded, 2-in.	$17.33
Seamless steel, 2-in.	20.24
Charcoal iron, 2-in.	25.00
Charcoal iron, 4-in.	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
½-in. butt	46	29
¾-in. butt	51	37
1-3-in. butt	53	39
2½-6-in. lap	48	35
7 and 8-in. lap	44	17
11 and 12-in. lap	37	12
Wrought Iron—		
½-in. butt	5	+19
¾-in. butt	11	+ 9
1-1½-in. butt	14	+ 6
2-in. lap	5	+14
3-6-in. lap	11	+ 6
7-12-in. lap	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box	$6.45	$6.20
Charcoal, per Box	A	AAA
IC	$9.70	$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating	$10.00 to $11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets, Box Annealed—Black, C. R. One Pass

	Per Lb.
Nos. 18 to 20	3.75c. to 3.80c.
No. 22	3.90c. to 3.95c.
No. 24	3.95c. to 4.00c.
No. 26	4.05c. to 4.10c.
No. 28*	4.20c. to 4.25c.
No. 30	4.45c. to 4.50c.

Sheets, Galvanized

	Per Lb.
No. 14	4.20c. to 4.40c.
No. 16	4.15c. to 4.25c.
No. 18	4.20c. to 4.40c.
No. 20	4.30c. to 4.50c.
No. 22	4.40c. to 4.60c.
No. 24	4.65c. to 4.75c.
No. 26	4.90c. to 5.00c.
No. 28*	5.15c. to 5.25c.
No. 30	5.55c. to 5.65c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

Reinforcing Bars.—Important awards and inquiries are scarce. However, mills are booking a fair amount of work requiring small tonnages. Despite the dullness of the market, prices are holding.

Billet steel reinforcing bars in 40, 50 and 60-ft. lengths, 2.05c. per lb., Pittsburgh, and 2.30c. per lb., Pittsburgh warehouse, for cut lengths. Out of New York warehouse, 2.90c. per lb. for lots of 5 tons or more, 3.05c. for lots of 2 to 5 tons and 3.30c. for less than 2 tons, all delivered at job.

Coke.—Demand for heating coke has improved. One contract has been closed in this district for about 65,000 tons. Furnace coke continues quiet at $2.65 to $2.75 per net ton, Connellsville. Special brands of beehive foundry coke are $4.85 a net ton, ovens, or $8.56, delivered to northern New Jersey, Jersey City and Newark, and $9.44 to New York and Brooklyn. By-product coke is quoted at $9 to $9.40 a net ton, Newark or Jersey City, and $10.06, New York or Brooklyn.

Old Material.—No. 1 heavy melting steel is moderately active, with brokers paying $16 a ton, delivered eastern Pennsylvania. A Coatesville, Pa., consumer is reported to have closed for upward of 10,000 tons of No. 1 heavy melting steel at $16.50, delivered. Most grades of scrap are rather inactive. Heavy breakable cast is quoted at $14 a ton by brokers filling contracts at $14.50 a ton, delivered. A recent purchase of heavy breakable cast was by a consumer at Florence, N. J.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel	$12.50 to $13.25
Heavy melting steel (yard)	8.00 to 10.00
No. 1 hvy. breakable cast.	10.25 to 11.00
Stove plate (steel works).	8.00 to 8.25
Locomotive grate bars....	8.25 to 8.75
Machine shop turnings....	7.75 to 8.00
Short shoveling turnings..	8.00 to 8.50
Cast borings (blast furn. or steel works).....	7.00 to 7.75
Mixed borings and turnings	6.75 to 7.75
Steel car axles.....	19.50 to 20.00
Iron car axles.....	23.00 to 24.00
Iron and steel pipe (1 in. dia., not under 2 ft. long)	10.75
Forge fire	9.75 to 10.25
No. 1 railroad wrought...	12.00 to 12.50
No. 1 yard wrought, long..	11.00 to 11.50
Rails for rolling.....	13.25 to 13.75
Stove plate (foundry)....	8.00 to 8.50
Malleable cast (railroad).	14.00 to 14.50
Cast borings (chemical)..	10.00 to 10.50

Prices per gross ton, deliv'd local foundries:

No. 1 machry. cast.....	$16.50
No. 1 hvy. cast (columns, bldg. materials, etc.), cupola size.....	14.50
No. 2 cast (radiators, cast boilers, etc.)	14.00

Pig Iron.—Sales gained somewhat the past week, during which Cleveland interests entered orders for 32,000 tons of foundry and malleable iron for last quarter delivery. This business was well distributed as to districts and industries. Consumers have not yet shown interest in first quarter contracts. No price change for that delivery is expected. Shipments for September probably will show a slight increase over those of August, as producers, with one exception, have shipped a little more iron so far this month than during the corresponding period of August. The market is firm at recent prices. Cleveland furnaces quote foundry and malleable iron at $18.50, furnace, for outside shipment and at $19, for local delivery. Both grades are quoted at $20, furnace, for Michigan delivery. The M. A. Hanna Co., announces that its status as a producer of merchant pig iron will in no way be affected by the merger of its five Buffalo furnaces and two Detroit furnaces in the holding company that will also include the Weirton Steel Co.. and the Great Lakes Steel Corporation.

Prices per gross ton at Cleveland:

N'th'n fdy., sil. 1.75 to 2.25	$19.50
S'th'n fdy., 1.75 to 2.25	$19.50 to 20.00
Malleable	19.50
Ohio silvery, 8 per cent...	23.00
Basic Valley furnace.....	18.50
Stand. low phos., Valley..	26.50 to 27.00

Prices except on basic and low phosphorus are delivered Cleveland. Freight rates: 50c. from local furnaces; $3 from Jackson, Ohio; $6 from Birmingham.

Cleveland

September Steel Orders Fall Below Those of August—Wire Rods Decline $2 a Ton

CLEVELAND, Sept. 24.—The automotive industry is slow in getting back in production, and this is reflected in a decreased demand for steel. The seasonal slowing down of motor car manufacturing came later in the summer than was expected, and the revival is being deferred longer than looked for. While there is still a great deal of uncertainty as to the amount of activity the automotive industry will regain during the closing months of the year, it is generally expected that there will be much improvement in the demand for steel from this source during October.

Mills are getting a fair volume of miscellaneous orders, mostly from consumers outside of the automotive field. However, the September volume will run somewhat below that of August. Automobile manufacturers are making commitments rather sparingly for early requirements.

The slowing down of the Ford Motor Co. is attributed to some changes that will be made in the present model designs. The Chevrolet Motor Co., which is gradually curtailing operation, will also make changes in models. This company is now placing contracts with jobbing plants for stamped parts for new models, but it is stated that sheets for Chevrolet bodies will not be bought until some time in October. Mills having orders for steel for the present Chevrolet models have been instructed to complete shipments on old contracts by Oct. 8.

There has been considerable curtailment of operations by sheet and strip mills in this territory.

The attempted reestablishment of $42 on wire rods has been made uncertain by concessions to $40 for the last quarter. Prices on hot-rolled strip for the fourth quarter are still uncertain. While the present prices of 1.90c. for wide strip and 2c. for narrow material have been reaffirmed for that delivery, mills are encountering strong price resistance from the automotive industry and from makers of cold-rolled strip. It is rather strongly suggested that some of the mills needing business made concessions recently to cold-rolled strip mills and that the latter are now resisting the restoration of the regular quotations.

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and struc. shapes.....	3.00c.
Soft steel bars	3.00c.
Reinforc. steel bars.....	2.25c. to 2.50c.
Cold-fin. rounds and hex.....	3.65c.
Cold-fin. flats and sq.....	4.15c.
Hoops and bands, No. 12 to ¼ in., inclusive	3.25c.
Hoops and bands, No. 13 and lighter	3.65c.
Cold-finished strip.....	*5.95c.
Black sheets (No. 24).....	3.70c. to 3.90c.
Galvanized sheets (No. 24).	4.60c. to 4.75c.
Blue ann'l'd sheets (No. 10).....	3.25c.
No. 9 ann'l'd wire, per 100 lb.....	$2.90
No. 9 gal. wire, per 100 lb.....	3.35
Com. wire nails, base per keg.....	2.90

*Net base, including boxing and cutting to length.

Iron Ore.—With record-breaking shipments of Lake Superior ore this year, furnaces have been able to build up their furnace stocks somewhat. The amount of Lake Superior ore at furnaces and Lake Erie docks Sept. 1 was 33,830,946 gross tons, compared with 31,754,179 tons on the same date a year ago. Furnaces consumed 5,779,-137 tons of Lake ore during August, a decrease of 29,336 tons as compared with July. The amount used in August, last year, was 4,760,974 tons. Furnace stocks Sept. 1 were 28,720,-430 tons. Furnaces in the Central district during August consumed 2,912,-944 tons, an increase of 11,712 tons for the month. Lake front furnaces used 2,580,074 tons, a decrease of 5337 tons. Eastern furnaces melted 125,-221 tons, a decrease of 26,227 tons, and all-rail furnaces used 160,898 tons, a decrease of 9484 tons. There were 192 furnaces in blast using Lake ore Aug. 31, a decrease of four for the month.

Rails.—Orders for 59,000 tons of rails, of which 53,500 tons are for the Chesapeake & Ohio and Pere Marquette and 5500 tons for the Hocking Valley Railroad are being placed here today. The distribution of this tonnage will be concluded tomorrow.

Bars, Plates and Shapes.—A moderate amount of business has been taken for the fourth quarter, mostly by the extension of third quarter contracts with added tonnages. Mills are getting a fair volume of specifications from various consuming in-

dustries, although the demand for steel bars is almost wholly outside the automotive field. Fairly prompt deliveries can be made on steel bars. Cleveland mill competition is an important factor in eastern Michigan. Plates continue in fair demand for small lots. There is a fair amount of activity in the structural field. In Cleveland, 960 tons has been placed for the County Courts-Jail Building. In Detroit, the Grand Trunk Railroad will require 2000 tons for grade crossing elimination work. The project of this road for electrification and the building of an elevated automobile roadway above the tracks from Detroit to Pontiac, 25 miles, if carried out, will require 40,000 tons of structural steel.

Semi-Finished Steel.—Weakness has developed in wire rods, sales of which have been made at $40, Cleveland, for the fourth quarter, or a concession of $2 a ton from the current price, although the lower price has not been formally named for the quarter. Before the development of this weakness, some of the mills announced the reestablishment of the $42 price. The reduction is a reflection of the prices prevailing on wire, which are lower than at the start of the current quarter. The leading local producer, which recently opened its books for the fourth quarter at the current price of $35, Cleveland and Youngstown, for sheet bars, billets and slabs, closed contracts during the week with a number of consumers and expects to enter contracts with the remainder of its customers during the present week. Specifications, while fair, are not up to recent volume.

Sheets.—Orders from the automotive industry, which have been light for some time, show no improvement. The volume of business has further tapered off, and there was a reduction also in production during the week. Common black sheets are still in good demand and most mills have fair backlogs of that grade. Nearly all producers need orders for automobile body sheets. Some specifications for this grade have been issued for November and December shipment. Weakness has again developed in galvanized sheets, with quotations of 3.50c., Pittsburgh, and there are reports of shading to 2.75c. on black sheets.

Wire Products.—Demand for wire has slowed down and nails are dull. One producer, which has been asking 2.50c. for wire for Cleveland delivery, has reduced its price to 2.40c. While there is still a spread from 2.40c. to 2.50c., the lower price is more common. On nails, apparently little effort is being made to get above $2.45 per keg.

Cold-Finished Steel Bars.—Most consumers have covered for the fourth quarter at 2.35c., Cleveland, but mills are getting few specifications owing to the reduced demand for screw machine products from the automotive industry. Orders are as numerous as recently, but they are for smaller lots, and, while the aggregate volume will fall somewhat below that of August, business is regarded as fair.

Strip Steel.—Demand for both hot and cold strip is still rather light, as the automotive industry is not specifying any more liberally than it has been during the past few weeks. A moderate amount of contracting has been done for the fourth quarter. Hot-rolled strip appears firm at 1.90c. Pittsburgh, for wide material and 2c. for narrow in spite of pressure by some buyers to secure concessions. Contracts for cold-rolled strip have been closed at 2.75c., Cleveland and Pittsburgh. Efforts of mills to get 2.85c. for small lots have not met with much success. Hot-rolled strip mills have their backlogs well cleaned up and need orders, particularly for wide material. Production of cold-rolled strip has been curtailed by some of the mills for lack of orders, and others are running from hand to mouth.

Bolts, Nuts and Rivets.—Makers of these products have closed contracts for the fourth quarter with many of their customers at present prices, which were reaffirmed for that delivery. Bolt and nut specifications are still rather light. The industry is operating at about 70 per cent of capacity. Rivet orders have improved since the first of the month.

Coke.—Ohio by-product furnace coke has been reestablished at $8 25, Painesville, for October shipment. The demand is moderate. Connellsville foundry coke is quiet and prices are unchanged. Producers have booked a good volume of early fall business in by-product coke for domestic use and there is a lull in the market at present.

Old Material.—A Cleveland mill has purchased a small tonnage of No. 1 railroad heavy melting steel at $16.90 but otherwise business was confined to transactions between dealers. Locally, the market has shown fewer indications of weakness than in the surrounding districts. Dealers continue to pay up to $15.50 for the light grades of heavy melting steel used by one Cleveland mill. Blast furnace scrap is bringing $11.25 to $11.50 from dealers. A slight spurt in the demand has resulted in a 25c. a ton advance on machine shop turnings and short shoveling turnings. For delivery in the Youngstown district, No. 1 heavy melting steel is bringing $17.75 from dealers and compressed sheet steel $17.50.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$15.25 to $15.50
No. 2 heavy melting steel	14.75 to 15.00
Compressed sheet steel	15.50 to 16.00
Light bundled sheet stampings	12.00 to 12.50
Drop forge flashings	13.00 to 13.25
Machine shop turnings	10.00 to 10.50
Short shoveling turnings	11.50 to 12.00
No. 1 railroad wrought	13.50 to 14.00
No. 2 railroad wrought	16.00 to 16.50
No. 1 busheling	13.25 to 13.75
Pipes and flues	9.00 to 9.50
Steel axle turnings	12.50 to 13.00
Acid Open-Hearth Grades:	
Low phos., forging crops	17.75 to 18.00
Low phos., billet, bloom and slab crops	18.50 to 18.75
Low phos., sheet bar crops	18.00 to 18.50
Low phos., plate scrap	18.00 to 18.50
Blast Furnace Grades:	
Cast iron borings	10.25 to 10.50
Mixed borings and short turnings	10.25 to 10.50
No. 2 busheling	10.25 to 10.50
Cupola Grades:	
No. 1 cast	17.50 to 18.00
Railroad grate bars	11.00 to 12.00
Stove plate	12.00 to 12.50
Rails under 3 ft	18.50 to 19.00
Miscellaneous:	
Railroad malleable	18.00 to 18.50
Rails for rolling	16.25 to 16.50

Philadelphia

Two Mills Buy Heavy Melting Scrap—Third of Chesapeake & Ohio Rails to Eastern Producer

PHILADELPHIA, Sept. 24.—Operating rates of eastern Pennsylvania steel mills are at 90 per cent or less, with new orders still limited in number and tonnage. Demand for structural steel is active and shape mills are fairly well engaged, at the same time quoting fabricators on an increasing tonnage of new projects. Railroad buying is moderately active. The Chesapeake & Ohio has closed on 59,000 tons of rails, of which 18,000 tons, including 1700 tons for the Pere Marquette, was placed with the Bethlehem Steel Co. Further purchases by this railroad include about 3000 tons of plates, shapes and bars and a tonnage of bolts and nuts. Bids will be opened Sept. 27 on 6942 kegs of spikes in addition to a previous inquiry for this material. The Pennsylvania Railroad opens bids this week on 8000 kegs of spikes and 340 tons of steel pipe.

Pig iron is quiet, but the iron and steel scrap market is featured by the purchase of 10,000 tons of heavy melting steel by each of two leading eastern Pennsylvania consumers.

Pig Iron.—Southern iron is still a competitor for eastern Pennsylvania business, but sellers are maintaining a slightly firmer position on prices, with quotations at $13.50 a ton, Birmingham, for foundry iron. Inquiry from eastern Pennsylvania consumers is mostly for lots of 100 to 300 tons of foundry grade and buyers are apparently in no haste to contract for the last quarter. About 2000 tons of floor iron for the Baldwin Locomotive Works, Eddystone, Pa., is reported to have been placed with an Alabama furnace. The American Engineering Co., Philadelphia, has not yet closed

on 1000 tons of foundry iron. Low phosphorus iron is inactive in eastern Pennsylvania, but the Standard Steel Works Co. has bought about 300 tons. The Pulaski furnace in Virginia is scheduled to blow in soon after Oct. 15. With lower production costs following improvements at the furnace, an effort will be made to compete in the Cumberland Valley and other districts.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil.	$21.26 to $21.76
East. Pa. No. 2X, 2.25 to 2.75 sil.	21.76 to 22.26
East. Pa. No. 1X	22.26 to 22.76
Basic (del'd east. Pa.)	19.75 to 20.25
Gray forge	20.00 to 20.50
Malleable	21.25 to 21.75
Stand. low phos. (f.o.b. N. Y. State furnace)	22.00 to 23.00
Cop. br'g low phos. (f.o.b. furnace)	23.50 to 24.00
Va. No. 2 plain, 1.75 to 2.25 sil.	24.04
Va. No. 2X, 2.25 to 2.75 sil.	24.54

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces; $4.54 from Virginia furnaces.

Reinforcing Bars.—Reinforced concrete projects include several hundred tons in each of two bridges on Henry Avenue, Philadelphia. A building for Girard College, Philadelphia, will require about 500 tons of bars and the Temple Medical School, on which bids were submitted for both structural steel and reinforced concrete, is reported about to be awarded for the latter type of construction. Prices are still irregular, with billet steel bars quoted at 1.95c. to 2c., Pittsburgh, or 2.27c. to 2.32c., delivered Philadelphia, with the $5 extra for cutting to length often disregarded by distributers, and 1.95c., Franklin, Pa., or Tonawanda, N. Y., or 2.27c., delivered Philadelphia, is quoted on rail steel bars, with no extra for cutting to length. Prices are at times shaded considerably on rail steel bars.

Plates.—Mills are maintaining a fair rate of operation, but new business is limited to small tonnages. A Harrisburg mill is reported to have received 5000 tons of plates for Norfolk & Western car bodies. The Sun Shipbuilding Co., Chester, Pa., has awarded about 10,000 tons of plates for two South African Steamship Co. liners to the leading interest. The plate price is unchanged at 2.05c., Coatesville, Pa., or 2.15c., delivered Philadelphia.

Shapes.—In addition to a fair tonnage on their books, mills are quoting on some substantial tonnages of shapes required by fabricators bidding on new projects. Building and bridge business in this district are active, but tonnages are small. Shape prices are unchanged at 1.95c. to 2.05c., f.o.b. nearest mill to consumer, or 2.01c. to 2.11c., delivered Philadelphia.

Sheets.—Galvanized sheets are fairly active, but orders are in small tonnages. Prices range from 3.50c. to 3.60c., Pittsburgh, or 3.82c. to 3.92c., delivered Philadelphia. Black sheets are quiet at 2.85c., Pittsburgh, or 3.17c., Philadelphia. Blue annealed sheet producers are well engaged and maintaining prices at 2.25c. to 2.35c., Pittsburgh, or 3.57c. to 3.67c., Philadelphia, for No. 13 gage, and at 2.10c. to 2.20c., Pittsburgh, or 2.42c. to 2.52c., Philadelphia, for No. 10 gage light plates, blue annealed. The lower range represents prices on desirable business when competition is encountered from continuous sheets.

Old Material.—No. 1 heavy melting steel is quotable at $16 to $16.50 a ton, delivered eastern Pennsylvania, based on purchases last week of 10,000 tons at $16 a ton, delivered, by a Bethlehem, Pa., consumer, and about 10,000 tons at $16.50 a ton, delivered, by a Coatesville, Pa., mill. A Pencoyd, Pa., mill recently closed on a small tonnage of No. 2 heavy melting steel at $14.50 a ton delivered. Heavy breakable cast is quotable at $14.50 to $14.75 a ton, delivered, on the basis of sales of upward of 500 tons in the past week to a Florence, N. J., foundry.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	$16.00 to $16.50
Scrap T rails	15.50 to 16.00
No. 2 heavy melting steel	12.50 to 14.50
No. 1 railroad wrought	16.00 to 16.50
Bundled sheets (for steel works)	11.50
Hydraulic compressed, new	14.50 to 15.00
Hydraulic compressed, old	12.00 to 12.50
Machine shop turnings (for steel works)	12.00
Heavy axle turnings (or equiv.)	14.00 to 14.50
Cast borings (for steel works and roll. mill)	11.00 to 11.75
Heavy breakable cast (for steel works)	14.50 to 14.75
Railroad grate bars	12.00 to 12.50
Stove plate (for steel works)	12.00 to 12.50
No. 1 low phos., hvy., 0.04% and under	22.00 to 23.00
Couplers and knuckles	19.50 to 20.50
Rolled steel wheels	19.50 to 20.50
No. 1 blast f'nace scrap	10.50 to 11.00
Wrot. iron and soft steel pipes and tubes (new specific.)	15.00
Shafting	19.00 to 20.00
Steel axles	23.00 to 23.50
No. 1 forge fire	14.00
Cast iron carwheels	16.50 to 17.00
No. 1 cast	16.00 to 16.50
Cast borings (for chem. plant)	14.50
Steel rails for rolling	16.50 to 17.00

Imports.—In the week ended Sept. 21, 1100 tons of chrome ore arrived at this port from Brazil. Steel imports consisted of 222 tons of steel bars (of which 199 tons was from Belgium, 17 tons from France and 6 tons from the United Kingdom), 24 tons of steel bands from Belgium and 20 tons from France, 117 tons of structural shapes from Belgium, 51 tons from Germany and 15 tons from France, 30 tons of steel scrap from the United Kingdom and 26 tons from Germany.

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.70c.
Plates, $\frac{3}{16}$-in.	2.90c.
Structural shapes	2.70c.
Soft steel bars, small shapes, iron bars (except bands)	2.80c.
Round-edge iron	3.50c.
Round-edge steel, iron finished 1½ x 1½ in.	3.50c.
Round-edge steel planished	4.30c.
Reinforc. steel bars, sq. twisted and deform.	2.60c. to 2.80c.
Cold-fin. steel, rounds and hex	3.60c.
Cold-fin. steel, sq. and flats	4.10c.
Steel hoops	3.55c.
Steel bands, No. 12 to $\frac{1}{16}$-in. inclus.	3.30c.
Spring steel	5.00c.
*Black sheets (No. 24)	4.10c.
†Galvanized sheets (No. 24)	4.85c.
Light plates, blue annealed (No. 10)	3.25c.
Blue ann'l'd sheets (No. 13)	3.40c.
Diam. pat. floor plates—	
¼-in.	5.30c.
$\frac{3}{16}$-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

*For 50 bundles or more: 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.
†For 50 bundles or more: 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

Automobile Slowing Down Affects Sales of Sheets

A slowing down of the automotive industry is reflected in a falling off in the sale of steel sheets, as shown in the monthly report of the National Association of Flat Rolled Steel Manufacturers.

Sales by independent mills during August were 282,107 net tons, a decline of 55,000 tons as compared with July. However, both production and shipments increased. The production, 366,734 tons was a gain of 43,000 tons over the previous month and shipments amounting to 365,649 tons showed a gain of 21,000 tons over July. With the decrease in sales and the increase in production and shipments, unfilled orders declined materially, having been 570,613 tons on Sept. 1, or about 87,000 tons less than on Aug. 1. The August report and comparisons, in net tons, follow:

	August	July	June
Total number of mills.	722	723	722
Capacity per month	492,765	486,430	451,125
Percentage reporting	67.9	67.9	67.8
Sales	282,107	337,222	307,911
Production	366,734	323,905	337,841
Shipments	365,649	344,676	347,989
Unfilled orders	570,613	658,155	676,568
Unshipped orders	108,887	107,751	111,333
Unsold stocks	34,436	47,103	52,274
Percentages of Capacity			
Sales	84.4	102.2	100.6
Production	109.7	98.1	110.4
Shipments	109.4	104.4	113.7
Unfilled orders	170.7	199.4	221.1
Unshipped orders	32.6	32.6	36.4
Unsold stocks	10.3	14.3	17.1

Antwerp Leading Port for Steel Exports

HAMBURG, GERMANY, Sept. 9.—Recent statistics on iron and steel and machinery shipments through Continental ports show that Antwerp is the most important outlet for European exports. Shippers in Hamburg, Brussels and other Continental markets route a considerable tonnage of iron and steel through Antwerp, as appears in the following statistics on the average monthly shipments through five ports in the first half of this year: Stettin, Germany, 48,371 tons; Hamburg, 59,808 tons; Bremen, 5159 tons; Rotterdam, 73,089 tons, and Antwerp, 270,883 tons.

Of the machinery shipments through the five ports, Stettin handled 2887 tons; Hamburg, 12,961 tons; Bremen, 1824 tons; Rotterdam, 4880 tons, and Antwerp, 25,693 tons.

The first of the electrically-driven car ferries being built at Manitowoc, Wis., for the Pere Marquette Railway, was launched into Lake Michigan on Aug. 6. The new ferry represents the first application of turbine-electric drive to car ferries.

Pacific Coast

Demand for Steel Products Shows Gains—2200 Tons for Spokane Pipe Line Awarded

SAN FRANCISCO, Sept. 21 (*By Air Mail*).—Activity in the Pacific Coast markets for iron and steel products continues to gain, and a better volume of inquiries and sales is reported. The plate market has been exceptionally active during the past month, more than 15,000 tons having been booked. Improvement in demand for cast iron pipe is also noted, and pending business now exceeds 8000 tons. Long Beach, Cal., came into the market this week for more than 5500 tons. Among the larger tonnages awarded were 850 tons of reinforcing steel bars for fenders for the Carquinez Straits bridge, Martinez, Cal., and 2200 tons of plates for a pipe line at Spokane, Wash.

Pig Iron.—Foundry pig iron sales and inquiries have called for small tonnages for prompt shipment. Specialty shops, such as stove and sanitary ware units, are working on slightly increased schedules.

Prices per gross ton at San Francisco:

*Utah basic	$25.00 to $26.00
*Utah fdy., sil. 2.75 to 3.25	25.00 to 26.00
**Indian fdy., sil. 2.75 to 3.25	25.00 to 26.00

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Bars. — Movement of reinforcing steel bars shows a noticeable improvement, especially in the number of projects placed. While many of the lettings involved lots of less than 100 tons, several good-sized tonnages were placed. The 850 tons for the Carquinez Straits bridge fenders went to Gunn, Carle & Co. The Pacific Coast Steel Co. secured 250 tons for log intake locks at Longview, Wash., for the Long Bell Lumber Co., and 600 tons for a loft building in San Francisco was taken by the Soule Steel Co. In the San Francisco district 2.30c., base, is being quoted on carload lots and 2.60c. on smaller tonnages, while the Los Angeles prices are 2.40c. and 2.70c. respectively. Mild steel bars continue firm at 2.35c., c.i.f., but movement is restricted to carload quantities as a rule.

Plates.—Bookings this week were fairly heavy, and in addition to the 2200 tons for the Spokane pipe line, mentioned above, and placed with the Steel Tank & Pipe Co., 360 tons for a welded pipe line at Montecito, Cal., was let to the Western Pipe & Steel Co. The Southern Pacific Co., San Francisco, awarded 100 tons to the Chicago Bridge & Iron Co. for a steel tank and tower at Hachita, N. Mex., and 100 tons for a 30,000 bbl. tank in Los Angeles to the Consolidated Steel Corporation. Bids will be opened Oct. 7 for 140 tons for two siphons at La Mesa, Cal. Despite the fact that a fair tonnage of plate material has been in the market recently, the 2.35c., c.i.f., price is not by any means firm, and large users have been able to shade this figure by $2 or more a ton on desirable specifications.

Shapes. — Bookings of structural material exceed 1500 tons. The largest letting went to Herrick Iron Works for an 850-ton hotel in Oakland. The Minneapolis Steel & Machinery Co. took 125 tons for a bridge at Rio Oso, Cal., and the Judson-Pacific Co. secured 150 tons for an apartment in Burlingame, Cal. Several fair-sized projects are about ready for figures. Shapes remain firm at 2.35c., c.i.f.

Cast Iron Pipe. — The American Cast Iron Pipe Co. has booked 377 tons of 6 to 10-in. Class B pipe for Anaheim, Cal. Other lettings were small. Long Beach, Cal., will open bids on Sept. 24 for 5585 tons of 4 to 12-in. Class B pipe. Whittier, Cal., will open bids on Sept. 23 for 109 tons of 10-in. Class B or Class 150 pipe. On Oct. 1, Compton, Cal., will receive bids on 352 tons of various sizes for sewer work on Long Beach Boulevard. Pleasanton, Cal., will open bids Sept. 30 for 185 tons of 4-in. Class B pipe.

Steel Pipe.—A fair movement of standard steel pipe is reported by pipe mill representatives. Oil country goods, and especially well casing, continues in fair demand. No large pipe line inquiries are current.

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and struc. shapes	3.15c.
Soft steel bars	3.15c.
Small angles, ¾-in. and over	3.15c.
Small angles, under ⅞-in.	3.55c.
Small channels and tees, ¾-in. to 2¾-in.	3.75c.
Spring steel, ¼-in. and thicker	5.00c.
Black sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.80c.
Galv. sheets (No. 24)	5.30c.
Struct. rivets, ½-in. and larger	5.65c.
Com. wire nails, base per keg	$3.40
Cement c't'd nails, 100 lb. keg	3.40

Birmingham

Pig Iron Shipments Heavy and Prices Are Steadier—Steel Sales Holding Up

BIRMINGHAM, Sept. 24.—Pig iron shipments are continuing at the rate that made August the best month of the year so far, and prospects are that September shipments will equal, if not exceed, those of August. There has been very little increase in stocks in consumers' yards, and the numerous urgent requests for shipments are taken as evidence of an increase in the melt. Fairly satisfactory buying has been going on, and it is estimated by some that slightly over half of the fourth quarter requirements of district consumers are under contract. One company's sales approximate its probable fourth quarter production, so present stocks and recent sales have been confined to regular customers. Some furnaces are continuing aggressive selling policies in competitive territories, although price concessions are less of a factor in securing tonnage than in past weeks. District prices remain firm at $14.50 for No. 2 foundry, and reports are that this is the minimum figure quoted in some of the competitive territories. Thirteen furnaces remain active, of which eight are on foundry and five on basic iron.

Prices per gross ton, f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil.	$14.50
No. 1 fdy., 2.25 to 2.75 sil.	15.00
Basic	14.50

Finished Steel.—New business in bars, plates and shapes is well up to the average of the past three or four weeks. Rail demand is much stronger, and it is expected that the Ensley rail mill will be placed in operation again before the end of October. Improved buying is also expected in rail accessories. Prices on box annealed sheets, beginning Oct. 1, will be 3c., a reduction of $2 a ton. All other prices are unchanged. The Bessemer plant of the Pullman Car & Mfg. Corporation, which is to be opened on Oct. 1, has received an order from the Central of Georgia Railroad for 500 gondolas and 500 flat cars. Other orders on hand total more than 1000 cars. The Columbus & Greenville Railway, Winona, Miss., has placed an order with the American Car & Foundry Co. for 300 box cars. The recent recession in demand for fabricated structural steel from both the industrial and public construction fields has reduced the aggregate awards, although shops are well engaged and have substantial backlogs. The Virginia Bridge & Iron Co. has secured an order for 1000 tons for a Government project near New Orleans. The Ingalls Iron Works has booked 275 tons more for the United States Phosphoric Products Corporation plant at Tampa, Fla. Seventeen open-hearths are active of a total of 23, the same as last week.

Cast Iron Pipe.—The United States Pipe & Foundry Co. has booked an order for about nine miles of 16 to 20-in. pipe for Griffin, Ga. New orders of the National Cast Iron Pipe Co. include 3700 ft. of 6-in. and 11,600 ft. of 4-in. pipe for St. Joseph, La. Contracts are pending for 7000 ft. of 6-in. pipe for Nashville, Tenn., and 3700 ft. of 6 and 8-in. pipe for Brooklet, Ga., on which bids were opened last week. Fresh inquiries are light and pending tonnage smaller than two weeks ago. It is the usual lull that precedes the winter buying by municipalities, due to begin in late Oc-

tober. The rush to finish construction projects before cold weather is keeping shipments active. Prices remain at $37 to $38, a net ton Birmingham.

Coke.—With fourth quarter requirements well covered, the movement of foundry coke continues at a rate considered fair for this season. Prices are unchanged from the $5 base for both spot and contract coke.

Old Material.—Demand for steel grades has improved and the market for these lines is approaching normal conditions. The slight interest that developed in cast iron grades last week has subsided. Quotations are unchanged, but prices are stronger for the steel grades.

Prices per gross ton, deliv'd Birmingham dist. consumers' yards:

Heavy melting steel	$13.00 to $13.50
Scrap steel rails	14.00
Short shoveling turnings	9.00
Cast iron borings	9.00
Stove plate	11.50 to 12.00
Steel axles	21.00
Iron axles	23.00
No. 1 railroad wrought	10.00 to 10.50
Rails for rolling	15.50
No. 1 cast	13.50
Tramcar wheels	13.50
Cast iron carwheels	13.00 to 13.50
Cast iron borings, chem	13.50 to 14.00

St. Louis

Pig Iron Consumers Well Covered for Remainder of Year —New Steel Business Light

ST. LOUIS, Sept. 24.—Following a month of heavy sales of pig iron, particularly Southern, the market is quiet, most melters having committed themselves for their requirements for the remainder of the year. There is a much firmer tone to the market, because makers now have large backlogs of orders and are taking business at higher prices than prevailed recently. Some sales were made around $14 to $14.50, f.o.b. Birmingham, it is understood. The St. Louis Gas & Coke Corporation sold about 4500 tons, including 4000 tons to a heating appliance manufacturer; 200 tons of low phosphorus iron to a Louisville melter, 200 tons to a St. Louis stove manufacturer and 150 tons to an Illinois car builder, all for shipment during the remainder of the year.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill.	$19.50 to $20.00
Malleable, f.o.b. Granite City	20.00
N'th'n No. 2 fdy., deliv'd St. Louis	22.16
Southern No. 2 fdy., deliv'd	16.92 to 18.92
Northern malleable, deliv'd	22.16
Northern basic, deliv'd	22.16

Freight rates: 75c. (average) Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

Finished Iron and Steel.—While the volume of new business is light, specifications against contracts for sheets are reported in good volume, with plates, shapes and bars dull. Not much buying is expected until after the turn of the quarter. Structural trade is very quiet, and fabricators with large plants need business badly; the smaller shops are in better shape. The Missouri Highway Commission will let contracts this week, which will require about 1500 tons of reinforcing bars and 200 tons of structural steel.

Old Material.—The market for old material continues weak, and No. 1 and No. 2 heavy melting or shoveling steel are off 25c. No. 2 wrought is 25c. down, and rails and springs are 50c. lower. Railroad offerings have been heavier, and there still is some scrap being shipped in from the country, although this is being cut down because of lower prices. Consumers are willing to buy only at prices which dealers think are too low. Railroad lists: Chicago, Burlington & Quincy, 5625 tons; St. Louis-San Francisco, 18 carloads, and Nashville, Chattanooga & St. Louis, 19 carloads.

Dealers' buying prices per gross ton, f.o.b. St. Louis district:

No. 1 heavy melting or shoveling steel	$14.00 to $14.50
No. 2 heavy melting or shoveling steel	13.25 to 13.75
No. 1 locomotive tires	15.50 to 16.00
Miscel. stand-sec. rails including frogs, switches and guards, cut apart	16.25 to 16.75
Railroad springs	18.00 to 18.50
Bundled sheets	10.50 to 11.00
No. 2 railroad wrought	14.00 to 14.50
No. 1 busheling	10.00 to 10.50
Cast iron borings and shoveling turnings	9.50 to 10.00
Iron rails	13.00 to 13.50
Rails for rolling	16.75 to 17.25
Machine shop turnings	7.50 to 8.00
Heavy turnings	10.00 to 10.50
Steel car axles	19.50 to 20.00
Iron car axles	26.50 to 27.00
Wrot. iron bars and trans.	21.50 to 22.00
No. 1 railroad wrought	13.75 to 14.25
Steel rails, less than 3 ft.	18.00 to 18.50
Steel angle bars	15.25 to 15.75
Cast iron carwheels	15.00 to 15.50
No. 1 machinery cast	15.25 to 15.75
Railroad malleable	16.00 to 16.50
No. 1 railroad cast	14.75 to 15.25
Stove plate	13.00 to 13.50
Agricult. malleable	15.25 to 15.75
Relay. rails, 60 lb. and under	20.50 to 23.50
Relay. rails, 70 lb. and over	26.50 to 29.00

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-fin. rounds, shaftings, screw stock	3.75c.
Black sheets (No. 24)	4.25c.
Galv. sheets (No. 24)	5.10c.
Blue ann'l'd sheets (No. 10)	3.45c.
Black corrug. sheets (No. 24)	4.30c.
Galv. corrug. sheets	5.15c.
Structural rivets	3.95c.
Boiler rivets	3.95c.
	Per Cent Off List
Tank rivets, 7/8-in. and smaller, 100 lb. or more	65
Less than 100 lb	60
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-pressed nuts, sq., blank or tapped, 200 lb. or more	60
Less than 200 lb	50
Hot-pressed nuts, hex., blank or tapped, 200 lb. or more	60
Less than 200 lb	50

Boston

Weakness Again Develops in Buffalo Pig Iron Prices— Scrap Values Also Lower

BOSTON, Sept. 24.—A New Hampshire foundry last week purchased 400 tons of No. 2X high manganese iron from two furnaces. On this small tonnage fresh weakness developed in Buffalo iron prices. That sale was the largest reported. Furnace representatives say that a considerable tonnage of iron must be bought for last quarter, but foundries apparently are in no hurry to cover. The only open inquiry is for 500 tons of No. 1X from the Westinghouse Electric & Mfg. Co., Springfield, Mass. Last week the Mystic Iron Works passed 500,000 tons in shipments since the stack was blown in Sept. 27, 1926.

Foundry iron prices per gross ton deliv'd to most New England points:

†Buffalo, sil. 1.75 to 2.25	$21.78 to $22.28
†Buffalo, sil. 2.25 to 2.75	22.28 to 22.78
*Buffalo, sil. 1.75 to 2.25	22.41 to 22.91
*Buffalo, sil. 2.25 to 2.75	22.91 to 23.41
East. Penn., sil. 1.75 to 2.25	22.65 to 23.15
East. Penn., sil. 2.25 to 2.75	23.15 to 23.65
Va., sil. 1.75 to 2.25	25.21
Va., sil. 2.25 to 2.75	25.71
*Ala., sil. 1.75 to 2.25	24.11
*Ala., sil. 2.25 to 2.75	24.61
†Ala., sil. 1.75 to 2.25	20.25
†Ala., sil. 2.25 to 2.75	20.75

Freight rates: $4.91 all rail from Buffalo, and $4.28 rail and water; $3.65 all rail from eastern Pennsylvania; $5.21 all rail from Virginia; $9.61 all rail from Alabama and $5.75 rail and water from Alabama to New England seaboard.

*All rail rate.

†Rail and water rate.

Fabricated Steel.—No sizable tonnages were booked the past week by fabricators, but many small jobs were taken, which in the aggregate made a good showing. The Warren Foundry & Pipe Co. is negotiating with a fabricator for the erection of a foundry at Everett, Mass., which will require several hundred tons, but it is doubtful if work will be started much before Jan. 1. About 2000 tons of steel is pending.

Reinforcing Steel.—The billet steel bar situation is unchanged. Contractors in the market for more than 1000 tons of material are still shopping among mill representatives in the hope of obtaining lower prices. Current bookings are confined to small amounts of steel, with the total for the past week not more than 300 tons, at 2.66½c. a lb., base, from stock. Rail steel bars are quiet at 2.26½c. a lb., delivered common Boston freight rate points.

Old Material.—With shipments to two Pittsburgh district points held up and with prices in that district unsettled, there is less activity here. Prices offered by brokers for heavy melting steel range from $11 a ton on cars, shipping point, to $11.75, but

the lowest price at which sales have actually been made is $11.25. The market for T and girder rails, steel turnings, steel mill borings and long bundled skeleton is easier. New England foundries are buying textile and No. 1 machinery cast quite freely through local or nearby yards. Local exports of scrap from Jan. 1 to Sept. 1 aggregated 22,290 tons. The American steamer Manta, recently sold to Hans Hansen, Oslo, Norway, and her name changed to Ring, is at the local army base loading 2600 tons of scrap for Danzig.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$11.25 to $11.75
Scrap T rails	10.50 to 11.00
Scrap girder rails	10.00 to 10.50
No. 1 railroad wrought	11.00 to 11.50
No. 1 yard wrought	9.00 to 9.50
Machine shop turnings	6.60 to 7.25
Cast iron borings (steel works and rolling mill)	6.50 to 6.75
Bundled skeleton, long	9.50 to 10.00
Forge flashings	10.00 to 10.50
Blast furnace borings and turnings	6.00 to 6.25
Forge scrap	9.00 to 9.50
Shafting	14.00 to 14.50
Steel car axles	17.50 to 18.00
Wrought pipe 1 in. in diameter (over 2 ft. long)	9.75 to 10.00
Rails for rolling	12.50 to 13.00
Cast iron borings, chemical	9.75 to 10.00

Prices per gross ton deliv'd consumers' yards:

Textile cast	$14.00 to $14.50
No. 1 machinery cast	15.00 to 15.25
No. 2 machinery cast	13.00 to 13.25
Stove plate	11.00 to 11.50
Railroad malleable	18.00 to 18.50

Cast Iron Pipe.—Providence, R. I., has closed bids on 250 tons of 12-in. pipe, and Foxboro, Mass., is calling for bids on approximately 100 tons of 6-in. Southwick, Mass., has closed bids on 16,524 ft. of 10-in., 13,668 ft. of 8-in., and 1944 ft. of 6-in., but has made no award. Cumberland, R. I., may buy 6200 ft. of 6-in. and 7300 ft. of 4 in. Westwood, Mass., is considering a water project to cost $175,000, and Swansea, Mass., has preliminary plans for a water system to cost $300,000. Foundries are now well sold up on large pipe and the lowest price accepted recently was $39.60 a ton, delivered common Boston freight rate points, as against $39.10 heretofore. Prices quoted openly on domestic pipe are: 4 in., $44.10 to $45.10 a ton, delivered; 6 to 12 in., $40.10 to $41.10; 16 to 20 in., $39.60. The differential on Class A and gas pipe has been raised to $4 a ton, from $3.

Coke.—Producers say there will be no change in the price of by-product foundry coke on Oct. 1. It is now $11 a ton, delivered within a $3.10 freight rate zone. Shipments on last half contracts are holding up well. Demand for domestic coke has improved with cooler weather.

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars, small shapes	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway rounds	6.60c.
Norway squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tie steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold-rolled steel—	
Rounds and hex	*3.55c. to 5.55c.
Squares and flats	*4.05c. to 7.05c.
Toe calk steel	6.00c.
Rivets, structural or boiler	4.50c.

	Per Cent Off List
Machine bolts	50 and 5
Carriage bolts	50 and 5
Lag screws	50 and 5
Hot-pressed nuts	50 and 5
Cold-punched nuts	50 and 5
Stove bolts	70 and 10

*Including quantity differentials.

Cincinnati

Pig Iron Demand Subsides—Sheet Sales Decline—Scrap Market Quiet and Prices Are Easier

CINCINNATI, Sept. 24.—Sales of pig iron in this district declined last week, consumers entering the market only for about 6240 tons, which, of course, was for fourth quarter. This is about 2000 tons less than the business placed during the preceding week, and was for the most part in small quantities. An order from a central Ohio consumer for 500 tons of Northern foundry iron was the largest reported. Buyers are still indifferent toward covering for all of the fourth quarter and are content generally to anticipate their needs for about 30 days. Furnace representatives report that many melters are carrying over fairly large surpluses of iron. With one furnace still reported to be quoting from $1 to $1.50 under the present Southern iron schedule, other furnaces, which are maintaining prices at about $14.50, base Birmingham, are not doing a great deal of business. Northern furnaces are maintaining prices.

Prices per gross ton, deliv'd Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25	$19.89 to $20.39
Ala. fdy., sil. 1.75 to 2.25	17.19 to 18.19
Ala. fdy., sil. 2.25 to 2.75	17.69 to 18.69
Tenn. fdy., sil. 1.75 to 2.25	17.19 to 18.19
S'th'n Ohio silvery, 8 per cent	26.89

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

Coke.—While specifications for by-product foundry coke have been received at a steady rate so far this month, the total of coke moved on contract is still under the amount shipped during the same period in August.

Finished Material.—A delayed seasonal recession in sheet demand is being experienced by district sheet mills. While the automobile manufacturers are again in the market, their initial specifications are in smaller quantities than usual. A slackening of demand from other consumers, except metal furniture manufacturers, also has contributed to the decline in fresh bookings in this district. Although backlogs have been reduced in some instances, the leading mill interest reports that decrease of unfilled tonnage has not been great because a substantial amount of new business is for forward delivery. Production has been curtailed to about 72 per cent.

Old Material.—While the better grades of old materials are still none too plentiful, the slackening of mill operations with the consequent reduction in scrap requirements has narrowed the price spread on heavy melting steel and No. 2 wrought to $14 to $14.25. Dealers are not accumulating scrap in large amount, being content to cover on contracts. But they are also careful not to place themselves in a short position.

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel	$14.00 to $14.25
Scrap rails for melting	14.25 to 14.75
Loose sheet clippings	9.00 to 9.50
Bundled sheets	11.00 to 11.50
Cast iron borings	9.00 to 9.50
Machine shop turnings	8.25 to 8.50
No. 1 busheling	10.50 to 11.00
No. 2 busheling	7.00 to 7.50
Rails for rolling	14.50 to 15.00
No. 1 locomotive tires	14.25 to 14.75
No. 2 railroad wrought	14.00 to 14.25
Short rails	18.50 to 19.00
Cast iron carwheels	12.75 to 13.25
No. 1 machinery cast	19.00 to 19.50
No. 1 railroad cast	15.25 to 15.75
Burnt cast	10.25 to 10.75
Stove plate	10.25 to 10.75
Brake shoes	10.25 to 10.75
Agricultural malleable	14.25 to 14.75
Railroad malleable	15.25 to 15.75

Detroit Scrap Weak

DETROIT, Sept. 24.—There have been no changes in scrap prices during the past week in this district, but the market is very weak.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Hvy. melting and shov. steel	$14.00 to $14.50
Borings and short turnings	9.00 to 9.50
Long turnings	8.50 to 9.00
No. 1 machinery cast	12.50 to 13.00
Automobile cast	13.00 to 13.50
Hydraul. comp. sheets	14.00 to 14.50
Stove plate	9.00 to 9.50
New No. 1 busheling	12.50 to 13.00
Old No. 1 busheling	11.00 to 11.50
Sheet clippings	8.75 to 9.25
Flashings	13.00 to 13.50

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and struc. shapes	3.40c.
Bars, soft steel or iron	3.30c.
New billet reinforc. bars	3.15c.
Rail steel reinforc. bars	3.00c.
Hoops	4.05c.
Bands	3.50c.
Cold-fin. rounds and hex	3.85c.
Squares	4.35c.
Black sheets (No. 24)	4.05c.
Galvanized sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.45c.
Structural rivets	3.85c.
Small rivets	65 per cent off list
No. 9 ann'l'd wire, per 100 lb	$3.00
Com. wire nails, base per keg	2.85
Cement c't'd nails, base 100 lb. keg	2.85
Chain, per 100 lb	8.75

	Net per 100 Ft.
Lap-weld steel boiler tubes, 2-in.	$16.00
4-in.	33.00
Seamless steel boiler tubes, 2-in.	17.00
4-in.	34.00

Buffalo

Pig Iron Inquiries Include Several Large Tonnages—Steel Mill Operations at 90 Per Cent—Scrap Easier

BUFFALO, Sept. 24.—An Eastern melter is seeking 4000 to 5000 tons of malleable pig iron, and also from the East are two inquiries, one for 1000 to 2000 tons of malleable and the other for 1000 to 2000 tons of foundry. Buying has been in moderate volume.

Prices per gross ton, f.o.b. furnace:

No. 2 fdy., sil. 1.75 to 2.25	$19.50
No. 2X fdy., sil. 2.25 to 2.75	20.00
No. 1 fdy., sil. 2.75 to 3.25	21.00
Malleable, sil. up to 2.25	20.00
Basic	18.50
Lake Superior charcoal	27.28

Old Material.—The market seems to be a little softer, and buyers are apparently not actively seeking material. There have been no recent sales of No. 1 heavy melting steel. The market for No. 1 machinery cast and stove plate is extremely dull.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades:		
No. 1 heavy melting steel	$17.50 to	$17.75
No. 2 heavy melting steel	14.75 to	15.00
Scrap rails	16.50 to	17.00
Hydraul. comp. sheets	14.50 to	14.75
Hand bundled sheets	12.00 to	12.50
Drop forge flashings	14.25 to	14.50
No. 1 busheling	15.50 to	16.50
Hvy. steel axle turnings	14.00 to	14.50
Machine shop turnings	8.50 to	9.00
No. 1 railroad wrought	13.00 to	13.50
Acid Open-Hearth Grades:		
Knuckles and couplers	19.50 to	19.75
Coil and leaf springs	19.00 to	19.50
Rolled steel wheels	19.00 to	19.50
Low phos. billet and bloom ends	20.00 to	20.50
Electric Furnace Grades:		
Short shov. steel turnings	12.50 to	13.00
Blast Furnace Grades:		
Short mixed borings and turnings	11.50 to	12.25
Cast iron borings	11.50 to	12.25
No. 2 busheling	10.00 to	10.50
Rolling Mill Grades:		
Steel car axles	18.75 to	19.25
Iron axles	21.00 to	22.00
Cupola Grades:		
No. 1 machinery cast	16.00 to	17.00
Stove plate	13.00 to	13.50
Locomotive grate bars	12.50 to	13.00
Steel rails, 3 ft. and under	19.50 to	19.75
Cast iron carwheels	14.00 to	14.50
Malleable Grades:		
Industrial	18.00 to	18.50
Railroad	18.00 to	18.50
Agricultural	18.00 to	18.50
Special Grades:		
Chemical borings	12.50 to	13.50

Finished Iron and Steel.—While operations of local mills continue at approximately 90 per cent, backlogs are tapering. The largest mill in this section continues to keep 22 out of 24 open-hearths in operation and six of its seven blast furnaces, but has reduced two of its larger mills to single turns. Reinforcing bar distributors are interested in the 600-ton job for the new City Hall, and the 1000-ton job for the Hertel Avenue sewer.

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and struc. shapes	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.95c.
Cold-fin. flats, sq. and hex	4.45c.
Rounds	3.95c.
Cold-rolled strip steel	5.85c.
Black sheets (No. 24)	4.20c.
Galv. sheets (No. 24)	4.85c.
Blue ann'l'd sheets (No. 10)	3.50c.
Com. wire nails, base per keg	$3.60
Black wire, base per 100 lb	3.75

Canada

Large Buying of Pig Iron for Fourth Quarter

TORONTO, ONT., Sept. 24.—Business in the Canadian pig iron markets has expanded, following the opening of books for fourth quarter contracts. The demand is more extensive than it was just before the beginning of the second or third quarters, and local blast furnace representatives are of the opinion that commitments for the last three months of the year will be heavy. A number of melters have made known their requirements, and in most cases the amounts involved are in excess of that bought for the third quarter. Carryover tonnages from third quarter are comparatively small, which in itself will mean a larger buying movement as production by foundries and other iron consuming plants has not slackened, but on the contrary some operations have been speeded up. The demand for merchant iron for spot delivery is also in better volume. The production of pig iron in Canada has increased considerably since the end of July. The Algoma Steel Corporation will shut down a portion of its plant at Sault Ste. Marie about Oct. 1 to begin an enlargement program, but is piling iron against future delivery requirements. Producers have made no revision in pig iron prices either for spot or forward delivery.

Prices per gross ton:

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75	$24.60
No. 2 fdy., sil. 1.75 to 2.25	24.10
Malleable	24.60
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75	$26.00
No. 2 fdy., sil. 1.75 to 2.25	25.50
Malleable	26.00
Basic	24.50
Imported Iron, Montreal Warehouse	
Summerlee	$33.50
Carron	33.00

Structural Steel.—In some sections of the country a stronger demand has developed for structural steel and sales in the past week were somewhat better than those in any of the few weeks previous. Fabrication plants are busy and practically all are carrying large unfilled tonnages. Some large orders are pending for early closing.

Old Material.—Little actual change has developed in this market aside from some improvement in demand. Inquiries are in good number and indicate a strong last quarter trade in both iron and steel grades. Dealers are acquiring substantial tonnages against fall and winter requirements. Prices are unchanged.

Dealers' buying prices:

	Per Gross Ton	
	Toronto	Montreal
Heavy melting steel	$10.00	$8.50
Rails, scrap	11.00	9.00
No. 1 wrought	10.00	12.00
Machine shop turnings	7.50	5.00
Boiler plate	7.50	6.00
Heavy axle turnings	8.00	7.50
Cast borings	7.50	5.00
Steel borings	7.50	6.50
Wrought pipe	6.00	6.00
Steel axles	15.00	20.00
Axles, wrought iron	17.00	22.00
No. 1 machinery cast	....	17.00
Stove plate	....	13.00
Standard carwheels	....	16.00
Malleable	....	13.00
	Per Net Ton	
No. 1 mach'ry cast	$16.00	....
Stove plate	12.00	....
Standard carwheels	15.00	....
Malleable scrap	14.00	....

Receiver Is Appointed for United Iron Works Co.

Judge John S. Farrington, a Springfield, Mo., attorney, has been appointed by the Federal Court at Kansas City, Mo., receiver for the United Iron Works Co., which operates four plants in Kansas, Missouri and Oklahoma. Headquarters of the company now is at Tulsa, Okla., and J. H. Campbell is president.

This company formerly had plants at Iola and Joplin, Mo., but both plants were sold some time ago and a seventh plant at Aurora, Mo., was discontinued several years ago.

Fabricated Steel Plate Bookings Light

WASHINGTON, Sept. 24.—Bookings of fabricated steel plate in August were 37,304 tons, or 47.1 per cent of the capacity of the 48 firms reporting to the Department of Commerce and the lowest month's total since January. Orders in July were 48,968 tons or 61.5 per cent of capacity. August orders were distributed as follows: Oil storage tanks, 10,924 tons; refinery materials and equipment, 4254 tons; tank cars, 718 tons; gas holders, 3317 tons; blast furnaces, 365 tons; stacks and miscellaneous, 17,726 tons.

Bookings for the first eight months of the present year aggregated 369,886 tons, or 58 per cent of capacity, against 343,687 tons, or 54.1 per cent of capacity for the corresponding period of last year.

New Republic Tube Plant

The Republic Iron & Steel Co., Youngstown, has approved plans for a new mechanical tubing plant at Warren, Ohio. Construction will be begun at once. The expenditure will amount to $1,000,000. Electrically welded tubing in small sizes will be made from strip steel.

Steel Fabricators to Hold Trade Practice Conference

WASHINGTON, Sept. 24.—Announcement was made yesterday that Commissioner William E. Humphrey of the Federal Trade Commission will preside at the trade practice conference with the structural steel fabricating industry at Biloxi, Miss., on Nov. 11. The conference was called at the request of the American Institute of Steel Construction, which, through a committee, has drafted a code of practices which will be submitted at the Biloxi meeting. The committee is headed by R. T. Brooks. Other members are A. M. Conneen, Jr., H. E. Detwiler, T. J. Foster, R. L. Kift and R. B. Thomas, counsel. The committee was appointed last December by the board of directors of the institute to draft the code.

Not only members of the institute but all other interests engaged in the fabrication and distribution of structural steel will be requested to attend the trade practice conference, the institute has announced.

The code of trade practice for the fabricating industry is intended to do away with unfair practices and deals with misrepresentation, substitution of material, dumping, commercial bribery, selling below cost, and covers also plans and prices, redesigns, unethical bidding, "loading" designs, unenforced contracts and quotations, price discrimination by manufacturers, direct sales, standard contract, standardization of shapes, and enforcement.

Greater Output from Fewer Blast Furnace Men

Data from 37 blast furnace plants employing 12,222 men last March have been compared with similar data from the same number of plants employing 15,329 men in March, 1926.

Of the 37 plants 32 were the same individual establishments. In 1926 the 32 establishments operated 114 stacks and employed 13,888 men, an average of 122 men for each stack. In 1929 the same plants operated 108 stacks and employed 11,095 men or an average of 103 men to each stack.

In spite of the smaller number of men to the stack, output of pig iron for each active stack in March, 1929, was 17,730 tons, compared with 14,900 tons for the corresponding period in 1926. These output figures are those of THE IRON AGE, whereas the figures of employment, etc., came from the United States Bureau of Labor Statistics.

There was a slight increase in the average number of full-time hours in the week's work, which advanced from 59.8 in 1926 to 60.7 in 1929, both comparing with 76.9 in 1913. Hourly earnings increased from 51.7c. in 1926 to 52.8c. in 1929, both comparing with 20.5c. in 1913. Full-time weekly earnings averaged $30.92 in 1926, advancing to $32.05 in 1925, which was more than twice the $15.76 in 1913.

Bethlehem to Increase Sparrows Point Capacity

The Bethlehem Steel Corporation announces that six new open-hearth furnaces will be built at its plant at Sparrows Point, Md. This will increase capacity there about 350,000 to 400,000 tons a year. Expansion of railroad yards at this plant is also planned. These developments are part of the program decided upon by the Bethlehem company in connection with the raising of $51,000,000 last spring by the sale of 600,000 new shares of common stock.

Simplification Experiences with Roller Bearings

WASHINGTON, Sept. 24.—Replies to a questionnaire received from three manufacturers of roller bearings in connection with a survey made for 1928 by the Division of Simplified Practice, Department of Commerce, expressed the view that further standardization is necessary. The concerns reporting were the Bower Roller Bearing Co., Detroit; the Timken Roller Bearing Co., Canton, Ohio, and the Norma-Hoffman Bearings Corporation, Stamford, Conn.

An average of 58 per cent of the production in 1928 conformed to the items listed in the recommendation. One manufacturer listed six non-simplified items for which he thought there exists a sufficient demand to warrant including them in the recommendation. Two of the manufacturers reported that consumer demand does not indicate that further eliminations can be made.

One manufacturer reported that "Some benefits have been experienced from the operation of simplified practice recommendations, although we find it necessary to continue with the large number of sizes we previously made for service requirements. New equipment is almost universally selected from simplified practice recommendation No. 67." Another manufacturer said that the simplified line idea has distinct advantages and should be further promoted from the standpoint of informing the public or users as to how they may cooperate toward securing simplified lines and lower prices. Still another maker reported no benefits had been received. One reported that manufacturers are adhering almost 100 per cent and only require special sizes when absolutely necessary. Another expressed the belief that manufacturers favor the practice of simplification, but that they would not turn down any orders for non-simplified lines.

Automobiles Take First Place in Exports

A new leader in America's export trade appeared during the first half of 1929 when the automobile took first place from cotton, the undisputed leader since the Civil War. This is shown in a review, "Our World Trade," issued by the Chamber of Commerce of the United States.

Exports of automobiles, parts and accessories for the first half of the year totaled $339,160,000, an increase of 36.4 per cent over the same period a year ago. At the same time, exports of raw cotton, amounting to $319,821,000, declined 13.9 per cent in value as compared with the same period a year ago.

Transportation for Chicago

Approximately 150 miles of track can be added to Chicago's surface car lines under a proposed new traction ordinance which permits expenditure of $200,000,000 in a 10-year period. Consideration also is being given to extensions of elevated structures.

Ohio Foundrymen to Meet

Speakers at the annual meeting of the Ohio Foundries Association, Inc., to be held at Toledo on Oct. 10, will be E. J. Lowry, Detroit, consulting metallurgist, who will present a paper on "Advances in Foundry Practice," and L. P. Robinson, Werner G. Smith Co., Cleveland, who will talk on "What Has Become of the Foundrymen's Share of the American Dollar?" The meeting will be held at the Toledo Yacht Club.

Watson Brothers Steel Co., Youngstown, has begun operating its new Detroit warehouse at 17385 Ryan Road, handling steel sheets and hot-rolled and cold-rolled strip steel. R. J. Alton is in charge of the district office there.

Production of Pig Iron and Steel in Canada

	August, 1929	July, 1929	August, 1928
Pig iron, gross tons	112,528(a)	99,786	91,522
Pig iron, gross tons, eight months	730,871	.....	654,957
Ferroalloys, gross tons	7,178	7,030	.....
Ferroalloys, gross tons, eight months	50,801	.....	31,406
Steel ingots, gross tons	113,422	123,248	.....
Steel ingots, gross tons, eight months	940,270	.....	790,764
Steel castings, gross tons	6,860	6,579	.....
Steel castings, gross tons, eight months	48,681	.....	29,058

Figures from Dominion Bureau of Statistics, Ottawa.
(a) New high record; there were only four previous months with over 100,000 tons: December, 1918, with 106,000 tons; October, 1920, with 105,000; May, 1923, with 101,533 tons; December, 1928, with 103,450 tons.

Non-Ferrous Metal Markets

Foreign Sales of Copper 55,000 Tons This Month; Lead and Zinc Buying Improved; Tin Inactive

NEW YORK, Sept. 24.

Copper.—Foreign sales are fairly heavy but buying by domestic consumers is light. Thus far in September sales abroad have totaled about 55,000 gross tons, which is large compared with August and other recent months. Each day such sales amount to considerable and involve principally September and October delivery. Little November metal has been purchased. Domestic consumers are placing small orders each day, principally for October and November delivery. The leading users are well covered for October, but still have considerable to buy for November. Under present conditions they do not need to purchase far ahead. One authority places total September shipments at about 150,000 tons, which is about 8000 tons more than in August. This would leave about 100,000 tons for domestic consumers. Prices are unchanged and firm at 18c. for electrolytic copper, delivered in the Connecticut Valley. The official quotation of Copper Exporters, Inc., is 18.30c. c.i.f., usual European points. Lake copper is moderately active and steady at 18c. to 18.12½c., delivered.

Tin.—Buying is again very light after two days of moderate activity. On Sept. 19 and 20, about 300 tons changed hands and the sales of spot Straits tin for the week ended Saturday, Sept. 21, were about 750 tons as a liberal estimate. The spurt of buying was started by a report that Straits shipments from the East would be only about 6500 tons for September instead of 8000 tons as the estimate early this month. This report caused a good demand on the National Metal Exchange for standard tin and the result was that those who sold bought back Straits tin. The deliveries involved are mostly November and December and the buying was done by dealers. Consumers are purchasing very little metal. Yesterday and today the market was exceedingly quiet but steady. The Hatry episode on the London Stock Exchange had its effect on the tin market and prices have fallen since. Today spot standard tin is quoted at £205 7s. 6d., future standard at £209 5s. and spot Straits at £209 12s. 6d., all lower than a week ago. The Singapore market today was £213 5s. Today in this market spot Straits tin is quoted at 45.25c., New York. For several weeks the price

THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY

	Sept. 24	Sept. 23	Sept. 21	Sept. 20	Sept. 19	Sept. 18
Lake copper, New York	18.12½	18.12½	18.12½	18.12½	18.12½	18.12½
Electrolytic copper, N. Y.*	17.75	17.75	17.75	17.75	17.75	17.75
Straits tin, spot, N. Y.	45.25	45.37½	...	45.50	45.25	45.12½
Zinc, East St. Louis	6.80	6.80	6.80	6.80	6.80	6.80
Zinc, New York	7.15	7.15	7.15	7.15	7.15	7.15
Lead, St. Louis	6.70	6.70	6.70	6.70	6.70	6.70
Lead, New York	6.90	6.90	6.90	6.90	6.90	6.90

*Refinery quotation; price ¼c. higher delivered in the Connecticut Valley.

Rolled Products

Prices on rolled non-ferrous products are unchanged from those prevailing one week ago.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—
- High brass ..... 23.25c.
- Copper, hot rolled ..... 26.75c.
- Zinc ..... 10.25c.
- Lead (full sheets) .. 11.00c. to 11.25c.

Seamless Tubes—
- High brass ..... 28.25c.
- Copper ..... 29.25c.

Rods—
- High brass ..... 21.25c.
- Naval brass ..... 24.00c.

Wire—
- Copper ..... 19.87½c.
- High brass ..... 23.75c.

Copper in Rolls ..... 26.75c.
Brazed Brass Tubing ..... 30.87½c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also to St. Louis on shipments to points west of that river.

- Sheets, 0 to 10 gage, 3 to 30 in. wide ..... 33.00c.
- Tubes, base ..... 42.00c.
- Machine rods ..... 34.00c.

Chicago Warehouse

(Prices Cover Trucking to Customers' Doors in City Limits)

	Base per Lb.
Sheets—	
High brass	23.25c.
Copper, hot rolled	27.75c.
Copper, cold rolled, 14 oz. and heavier	30.00c.
Zinc	10.75c.
Lead, wide	11.35c.
Seamless Tubes—	
Brass	28.25c.
Copper	29.25c.
Brass Rods	21.25c.
Brazed Brass Tubes	31.00c.

New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—		
High brass	21.12½c.	to 22.12½c.
Copper, hot rolled, base sizes	27.75c.	to 28.75c.
Copper, cold rolled, 14 oz. and heavier, base sizes	30.00c.	to 31.00c.
Seamless Tubes—		
Brass	26.00c.	to 27.00c.
Copper	29.12½c.	to 30.12½c.
Brazed Brass Tubes	29.12½c.	to 30.12½c.
Brass Rods	18.87½c.	to 19.87½c.

New York Warehouse

Delivered Prices, Base Per Lb.

- *Zinc sheets (No. 9), casks* ..... 10.50c. to 11.00c.
- *Zinc sheets, open* ..... 11.50c. to 12.00c.

Metals from New York Warehouse

Delivered Prices, Per Lb.

- Tin, Straits pig ..... 47.50c. to 48.50c.
- Tin, bar ..... 50.00c. to 51.00c.
- Copper, Lake ..... 19.50c.
- Copper, electrolytic ..... 19.25c.
- Copper, casting ..... 19.00c.
- Zinc, slab ..... 7.75c. to 8.25c.
- Lead, American pig ... 7.62½c. to 8.12½c.
- Lead, bar ..... 9.62½c. to 10.12½c.
- Antimony, Asiatic ..... 11.00c. to 11.50c.
- Aluminum No. 1 ingots for remelting (guaranteed over 99% pure) ... 25.00c. to 26.00c.
- Alum. ingots, No. 12 alloy ..... 24.00c. to 25.00c.
- Babbitt metal, commercial grade ..... 25.00c. to 35.00c.
- Solder, ½ and ½ ..... 30.00c. to 31.00c.

Metals from Cleveland Warehouse

Delivered Prices, Per Lb.

- Tin, Straits pig ..... 50.50c.
- Tin, bar ..... 52.50c.
- Copper, Lake ..... 19.50c.
- Copper, electrolytic ..... 19.25c.
- Copper, casting ..... 18.75c.
- Zinc, slab ..... 7.75c. to 8.00c.
- Lead, American pig ..... 7.55c. to 7.75c.
- Lead, bar ..... 9.75c.
- Antimony, Asiatic ..... 16.00c.
- Babbitt metal, medium grade ..... 18.75c.
- Babbitt metal, high grade ..... 54.00c.
- Solder, ½ and ½ ..... 31.25c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged customers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	15.00c.	16.50c.
Copper, hvy. and wire	14.75c.	16.00c.
Copper, light and bottoms	12.75c.	14.00c.
Brass, heavy	8.50c.	9.50c.
Brass, light	7.50c.	8.50c.
Hvy. machine composition	12.00c.	13.00c.
No. 1 yel. brass turnings	9.75c.	10.50c.
No. 1 red brass or compos. turnings	11.25c.	12.25c.
Lead, heavy	5.50c.	6.00c.
Lead, tea	4.25c.	5.25c.
Zinc	3.50c.	4.25c.
Sheet aluminum	14.00c.	16.00c.
Cast aluminum	12.25c.	14.25c.

has hovered between 45c. and 46c. and this unusual stability is explained partly by the efforts of the London group to stabilize the market.

Lead.—Buying is more active than a week ago and is confined largely to nearby and October delivery. A limited amount is being sold for November. A more active market is expected when all November books are opened. The quotation at St. Louis is firm at 6.70c. and the contract price of the leading interest is unchanged at 6.90c., New York.

Zinc.—Transactions are in larger volume the past week than earlier in the month, but activity is not yet pronounced. Most producers are still holding at 6.80c., East St. Louis, but a limited amount of metal is said to be available for at least prompt shipment at a few points under this. There is no pressure to sell October metal. Conditions are such that a more active market is expected in the very near future. Ore is unchanged at $44, Joplin. Last week's production, estimated at 13,500 tons, was slightly larger than that of the previous week. There was also a slight increase in sales at 10,500 tons, but shipments decreased to 10,882 tons. Surplus is now estimated at 45,465 tons, which contrasts with the peak for the year at 46,610 tons in August.

Antimony.—The market is dull and prices are a little easier, Chinese metal being quoted at 8.62½c. for spot and 8.75c., New York, duty paid, for futures.

Nickel.—In wholesale lots ingot nickel is quoted at 35c. per lb., with shot nickel at 36c. and electrolytic nickel in cathodes at 35c.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at 23.90c. per lb., delivered, at the published price.

Non-Ferrous Metals at Chicago

CHICAGO, Sept. 24.—Prices for all non-ferrous metals are firm. Individual sales are small, but in the aggregate the tonnage is of fair size. The old metal market is quiet.

Prices per lb., in carload lots: Lake copper, 18.50c.; tin, 46.10c.; lead, 6.80c.; zinc, 6.90c.; in less-than-carload lots, antimony, 9.85c. On old metals we quote copper wire, crucible shapes and copper clips, 14c.; copper bottoms, 11.50c.; red brass, 11.50c.; yellow brass, 8c.; lead pipe, 4.50c.; zinc, 3.25c.; pewter, No. 1, 24.50c.; tin foil, 26c.; block tin, 36c.; aluminum, 12.87½c.; all being dealers' prices for less-than-carload lots.

Railroad Equipment

Fully 25,000 Cars Expected to Be Purchased This Fall

THE Burlington road has approved a budget which provides for the purchase of 2000 freight cars, but it is believed in the equipment trade that it may buy considerably more than this number. The Virginian Railway is expected to inquire soon for 2000 cars. A number of other roads are also preparing to send out inquiries. If the inquiries that are expected should materialize, fully 25,000 cars may be purchased within the next month or two, as business now pending totals upward of 10,000 cars. News of the week is given in detail as follows:

Boston & Albany is in the market for 300 gondola car bodies.

Great Northern is building 300 ore cars at its Superior, Wis., shops.

Southern Railway, which inquired for 2000 cars, will, it is believed in the equipment trade, buy about 5000.

Nashville, Chattanooga & St. Louis has ordered 450 center sills for cars from Pullman Car & Mfg. Corporation.

Dupont Co. has ordered 49 tank cars from General American Tank Car Corporation.

Virginian Railway is expected to come into the market soon for about 2000 cars.

Directors of Chicago, Burlington & Quincy have authorized an expenditure of $15,250,000 for equipment, terminal improvements and new trackage. Included in this figure is equipment budget of $8,250,000 for 1930. Equipment orders, it is said, will include 20 passenger and freight locomotives and about 2000 freight cars, the latter including automobile, box, hopper and flat types.

Kansas City Terminal Railway expects to come into the market for a number of 8-wheel switching locomotives.

Nashville, Chattanooga & St. Louis will buy five 4-8-4 locomotives.

Richmond, Fredericksburg & Potomac is figuring on several 4-8-4 type locomotives.

River Steel Shipments Set Record

Movement of steel products on the Ohio River in the Pittsburgh district during August amounted to 137,734 net tons, a new high record. The movement in July was 102,963 tons, while in August, 1928, it was 124,751 tons. The nearest approach to the August total this year was 137,019 tons in November, 1928. Steel traffic on the Monongahela River last month totaled 134,426 tons, as compared with 109,051 tons in July and 109,738 in August, 1928.

Heavy Stocks of By-Product Coke

Stocks of by-product coke at producer's plants Sept. 1 were 2,100,118 tons, according to figures gathered by the United States Bureau of Mines. This is the largest total in many months, comparing with 1,848,920 tons on Aug. 1 and with 1,993,101 tons a year ago. The last named figure was the highest, previously for the past two years.

Reinforcing Steel

With Lettings of 2700 Tons, Market Is Still Quiet

THE reinforcing steel market continues quiet with lettings in the past week having totaled only 2700 tons. Forty-seven hundred tons was added to pending work. The largest inquiries were 1500 tons for bridges and culverts in Missouri and 1000 tons for a sewer in Buffalo. Awards follow:

CLEVELAND, 175 tons, Cedar Point road bridge for Cuyahoga County, to Bourne-Fuller Co.

CLEVELAND, 150 tons, Jail Courts Building, to Patterson Leitch Co.

CLEVELAND, 130 tons, Cleveland Union Terminal work, to Bourne-Fuller Co.

GREENCASTLE, IND., 100 tons, building for DePauw University, to Concrete Engineering Co.

NORTH CHICAGO, ILL., 300 tons, Veterans' Hospital, to American System of Reinforcing.

MAYWOOD, ILL., 105 tons, Veterans' Hospital, to Concrete Enginering Co.

GREEN BAY, WIS., 175 tons, office building, to Concrete Engineering Co.

SHEBOYGAN, WIS., 500 tons, water works and filtration plant, to an unnamed bidder.

SAN FRANCISCO, 850 tons, fenders for Carquinez Straits bridge, to Gunn, Carle & Co.

SAN FRANCISCO, 600 tons, printing plant, First and Tehama Streets, to Soule Steel Co.

SACRAMENTO, CAL., 285 tons, paving in Sonoma and Marin Counties, to unnamed bidder.

LONGVIEW, WASH., 250 tons, intake log locks, Long Bell Lumber Co., to Pacific Coast Steel Co.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

NEW YORK, 250 tons, hospital.

NEW YORK, 100 tons, bridge on Staten Island.

BUFFALO, 1000 tons, Hertel Avenue sewer.

PHILADELPHIA, 500 tons, building for Girard College; Day & Zimmermann, Inc., engineers.

PHILADELPHIA, 500 tons, Temple Medical School; bids originally submitted on structural steel construction.

PHILADELPHIA, 150 tons, second bridge on Henry Avenue over Wissahickon Creek.

CHICAGO, 300 tons, Chicago River straightening project.

CHICAGO, 300 tons, for city bridges.

CHICAGO, 235 tons, St. Elizabeth Hospital.

CHICAGO, 400 tons, apartment building at Fifty-second Street and Blackstone Avenue.

CHICAGO, 200 tons, warehouse for Kroger Grocery Co.

CHICAGO, 150 tons, Fine Arts Building; R. C. Wieboldt & Co., general contractors.

MOLINE, ILL., 200 tons, building for Fifti Avenue Realty Co.

JEFFERSON CITY, MO., 1500 tons, bridges and culverts for Missouri Highway Commission.

PERSONAL

RALPH S. COOPER, vice-president and general manager of the Independent Pneumatic Tool Co., Chicago, has been elected president to succeed John D. Hurley, deceased. Mr. Cooper has been identified with the company successively as manager of the New York office, Eastern manager and vice-president in charge of Eastern sales, since his graduation from Cornell University in 1903. NEIL C. HURLEY has been elected a member of the executive committee and RAYMOND J. HURLEY has been elected a director.

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CHARLES M. SCHWAB, chairman of the Bethlehem Steel Corporation, will be the principal speaker at a house warming to be held in the new quarters of the Chamber of Commerce of Pittsburgh on Sept. 26. T. M. GIRDLER, president, Jones & Laughlin Steel Corporation, Pittsburgh, is to be toastmaster at the meeting.

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L. WEIMER MURRAY, for the past 15 years with the General Refractories Co., Philadelphia, has resigned as district sales manager of the Chicago office of the company. He is being succeeded by PHIL C. LEONARD.

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E. A. PERRY has been appointed purchasing agent at Johnstown, Pa., for the National Radiator Corporation, succeeding R. D. FELTON.

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RICHARD M. EGAN, president, Egan, Webster & Co., Oliver Building, Pittsburgh, producers of fire clay and silica clay, with plants at Birmingham, West Darlington and Claytonia, Pa., has been made assistant to the president of the General Refractories Co., Philadelphia, but will continue as head of the former company and will retain his headquarters at Pittsburgh.

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PRICE M. DAVIS has been elected president and general manager of Shadboldt & Boyd Co., Milwaukee, jobbers in machinists' and mill supplies, to succeed FRANK ELLIS, who retired after 55 years with the company, with which he started as office boy. Mr. Davis has been with the company 35 years and has held the position of general manager for some years.

—

J. C. TAYLOR, JR., has been appointed vice-president in charge of sales of the Taylor-Wharton Iron & Steel Co., High Bridge, N. J., effective Sept. 20.

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DR. CARL KOETTGEN, president of the Verein Deutscher Ingenieure and general director Siemens-Schuckert Works, Berlin, tendered a luncheon Sept. 18 at the Railroad Club, New York, to American engineers who, as members of a reception committee, have been welcoming engineers from abroad en route to the World Engineering Congress in Japan. Associated with him in the luncheon were DR. CONRAD MATSCHOSS, the general executive officer of the Verein Deutscher Ingenieure, DR. EMIL PROBST, of Baden, PROF. D. THOMA, of Munich, and DR. KARL G. FRANK, New York representative of the Siemens-Schuckert Works.

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O. A. FULTON, of Wheelock, Lovejoy & Co., Boston, was nominated treasurer of the American Society for Steel Treating at the annual convention of the society, Sept. 9 to 13.

O. A. FULTON

Through his influence considerable money was raised for the 1922 annual convention in Boston, which helped to make that meeting a pronounced success, and his counsel and advice have been of decided value to those interested in the management of the organization. The nomination of Mr. Fulton insures his election and he takes office Jan. 1, 1930, succeeding J. M. WATSON, metallurgist, Hupp Motor Corporation, Detroit, who has been made vice-president. Mr. Fulton is elected for a term of two years.

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OTTO ABRAHAMSEN, formerly in charge of sales of power hammers for the Beaudry Co., Inc., Boston, has become identified with the Moloch Foundry & Machine Co., Kaukauna, Wis., and will handle sales of Moloch hammers. The company plans to add a line of pneumatic forge hammers for heavy work and board drop hammers.

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JORDON KORP, in charge of the service department of the furnace division of the Leeds & Northrup Co., Philadelphia, spoke on practical heat treating at the first fall meeting, Sept. 18, of the Worcester, Mass., chapter of the American Society for Steel Treating.

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JOSEPH W. ESHELMAN has been appointed representative in the Birmingham, Ala., district, with offices in the American Traders Bank Building, Birmingham, by the Pennsylvania Pump & Compressor Co., Easton, Pa.

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HOWARD BUTT, formerly sales manager of the Air Preheater Corporation, Wellsville, N. Y., has joined the staff of the Hahn Engineering Co., New York, a division of the Lancaster Iron Works, Lancaster, Pa.

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ALEXANDER L. FEILD, heretofore with the Union Carbide & Carbon Research Laboratories, New York, has become associated with the Simonds Saw & Steel Co., Boston, in the capacity of research engineer. His headquarters will be at the Simonds mills at Lockport, N. Y., where he will be in charge of experimental and development work on electrometallurgical processes and particularly on the electric furnace production of alloy steels.

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GEORGE P. HULST, for many years superintendent of the American Smelting & Refining Co. plant at Omaha, Neb., has been appointed superintendent of the plant at Indianapolis of the American Lead Co.

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JAMES BRYDEN, works manager of Smith & McLean, Ltd., sheet and bar makers and galvanizers, Glasgow, Scotland, arrived in the United States Sept. 20 for a visit of industrial plants over a stay of several weeks.

Prize Awarded for Paper on Price Stabilization

A prize of $100 for the best suggestions on price stabilization, offered by Dixon C. Williams, president, Chicago Nipple Mfg. Co., Chicago, has been awarded to Dr. C. Copeland Smith, president of the League of Reconciliation, Chicago, who offered his recommendations under the title, "Stabilization versus Suicide." His paper, together with one by Hon. Felix Levy, attorney, New York, is being distributed in a bulletin by the Chicago Nipple Mfg. Co. Mr. Levy, feeling that his professional contacts with the subject might give him some advantage, made his contribution with with the understanding that it would not be considered as an entry in the contest. Judges were J. C. McEwen, R. C. Mead and Herman Hoelscher.

Price Iron & Steel Co., Chicago, dealer in scrap iron and steel, announces the closing of its Milwaukee office. The Wisconsin territory will be in charge of H. S. Lewis, who will make his headquarters at the Chicago office.

OBITUARY

FREDERIC R. WICKWIRE, vice-president and purchasing agent of Wickwire Brothers, Cortland, N. Y., died at his home in Cortland, Sept. 17, aged 46 years. He was a son of the late Chester F. Wickwire, who was

F. R. WICKWIRE

a pioneer in the wire industry. After graduation from Sheffield Scientific School, Yale University, with a Ph.B. degree in 1905, he entered the employ of Wickwire Brothers. In 1910 he became secretary of the company and in 1924 he was made vice-president, which position he held at the time of his death.

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GEORGE T. ROWLAND, JR., engineer associated with William & Harvey Rowland, Inc., Philadelphia, died Sept. 16.

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JACOB TYRAKOWSKI, superintendent of the McCarthy Foundry Co., Chicago, died Sept. 12 of pneumonia. He was a director of the Metropolitan State Bank and an executive of several building and loan associations.

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HARRY F. BAYLEY, until recently president of the Bayley Structural Iron Co., Milwaukee, Wis., and a manufacturer of iron and steel products for many years in that city, died Sept. 17, aged 62 years. Previous to the organization of the structural iron concern he had been president of the William Bayley & Sons foundry, established by his father. Illness forced his retirement from business two years ago.

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JAMES A. ROSS, retired boiler manufacturer, died Sept. 16, at his home at Summit, Ill., aged 81 years. He was born in Ballblair, Scotland, and went to Chicago 41 years ago, founding the Ross Boiler Co., of which he was president until his retirement several years ago.

THOMAS F. HOWE, who was identified for 20 years with the Interstate Iron & Steel Co., Chicago, died Sept. 18, aged 69 years. He retired from active service with the company about two years ago.

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CHARLES J. MOORE, retired automobile manufacturer, and since 1927 vice-president of the National Safety Council, died Sept. 19 at his home in Longmeadow, Mass. At one time he manufactured bicycles at Westfield, Mass., and in 1901 became associated with a group that made the Packard automobile. He retired from business nine years ago.

Present Status of Nitrided Steel

(*Concluded from page* 841)

gines, especially aircraft engines; the wear is almost nil, and keeps consumption of lubricating oil at a minimum.

In the American automobile industry the commonest application is probably water pump shafts, where the corrosion resistant properties of the hard case enables it to replace the more expensive monel metal or stainless steel. Steering segments and worms, and timing gears are being more widely adopted; the extra cost of the steel is more than overbalanced by the losses in carbonized products due to soft spots and warpage. A most promising field is opening up in connection with aluminum alloy pistons and connecting rods, since it has been found that nitrided piston pins and crankshafts can run against aluminum alloys without the usual bronze or babbitt bushing. Transmission gears and worms of nitralloy have not yet been commercialized in America.

One very notable success has been achieved in the manufacture of stems and seats for high temperature steam valves. Nitrided steel resists the type of abrasion known as wire cutting; the strength of the alloy at high steam superheat is good, and the coefficient of thermal expansion is the same as the alloy steel valve body used. Nitralloy also makes very satisfactory liners for high-pressure pumps handling hot liquids. Piston rods for this service have also been satisfactory when graphite packing has been avoided; flakes of graphite remaining on the rods at the end of the running length cause excessive pitting. German State railroads have standardized on nitrided liners for crosshead guides. Many experiments are under way on the utility of nitrided blades for steam turbines, especially in the low-pressure stages where erosion of the ordinarily used 3-per cent chromium steel causes expensive replacements.

In the machine tool field, Mr. De Fries said that shafts, spindles and ways on grinders will last many times as long as usual equipment when they possess the hard nitrogen case.

Production and Shipments Balanced, Say Statisticians

New production records were made during August in many lines of activity, according to the September report on business conditions of the Conference of Statisticians in Industry, operating under the auspices of the National Industrial Conference Board, New York. But while the high rate of industrial operation, in contrast with summer a year ago, continued to be reflected in the August reports, the slight recession noted in July as compared with June continued into August, although it did not spread to all divisions.

Noteworthy is the continued consumer demand for automobiles. Although production of passenger cars and trucks during August surpassed that of corresponding months of all previous years, and was only slightly below July output, purchases evidently are keeping pace with this record production. July registrations and foreign sales reached 581,893 units, as compared with the July output of 517,792 cars.

Wholesale and retail demand generally gives many indications of being greater than last year and fairly well sustained. Stocks on hand in general showed no undue accumulation and, with the possible exception of steel and copper, shipments and orders continued to be fairly well balanced with production.

Mileage Rate Decision Is Protested by New York

WASHINGTON, Sept. 24.—Treatment accorded Philadelphia and Baltimore in the mileage scale set up in the Eastern steel rate decision is held by the New York Chamber of Commerce to be unfair and prejudicial to New York and is cited as one reason in a petition filed by the chamber asking that the Interstate Commerce Commission reopen the case for further hearing. The commission recently announced postponement of the effective date of the decision to Dec. 20 from Oct. 20. The railroads asked that the date be postponed to give them time to prepare the tariffs.

A civil service examination for senior engineer for welding has been announced. Applications must be on file not later than Oct. 16. A vacancy is to be filled in the Bureau of Construction and Repair, Navy Department, Washington. The entrance salary is $4,600 a year.

Fabricated Structural Steel

Forty Per Cent of Awards, Totaling 35,000 Tons, Are for Work in New York Metropolitan Area

CONTRACTS placed for structural steel in the past week totaled 35,000 tons, a rather sharp decline from the 50,000 tons of the previous week. Close to 40 per cent of the tonnage will be required for work in the New York metropolitan district. Most of the steel is continuing to go into non-industrial structures. The largest jobs were 6000 tons for a New York hotel and 2500 tons each for a New York office building and for five river barges at Pittsburgh.

Inquiries which appeared during the week amounted to 37,000 tons and from the standpoint of tonnage were about equally divided among industrial buildings, non-industrial projects and bridge and grade crossing elimination work. Five thousand tons will be needed for an office building in Milwaukee and 4500 tons for 50 barges at Pittsburgh. Awards follow:

FAIRFAX FALLS, VT., 100 tons, State bridge, to unnamed fabricator.

BOSTON & MAINE RAILROAD, 275 tons, five bridges, to Boston Bridge Works, Inc.

LITTLE FALLS, N. Y., 315 tons, high school, to Jones & Laughlin Steel Corporation.

PEEKSKILL, N. Y., 181 tons, Paramount Theater, to Levine Iron Works.

NEW ROCHELLE, N. Y., 103 tons, bank and office building, to Grand Iron Works.

SCARSDALE, N. Y., 213 tons, telephone building, to Steel Fabricators Corporation, 11 West Forty-second Street, New York.

HEMPSTEAD, N. Y., 1450 tons, telephone building, to Hay Foundry & Iron Works.

LONG ISLAND RAILROAD, 200 tons, bridge repair work, to American Bridge Co.

NEW YORK, 800 tons, building at 409 East Sixtieth Street for Knickerbocker Ice Co., to McClintic-Marshall Co.

NEW YORK, 6000 tons, 40-story hotel at 160-170 West Fifty-ninth Street for Lefcourt interests, to A. E. Norton, Inc.

NEW YORK, 1100 tons, addition to Western Hotel at 30 East Fiftieth Street, to Paterson Bridge Co.

NEW YORK, 481 tons, public schools Nos. 230 and 5, to Harris Structural Steel Co.

NEW YORK, 173 tons, sanitarium at 1425 Zerega Street in the Bronx, to B. Schacht & Sons.

NEW YORK, 2500 tons, office building at 66-68 Cedar Street, to Harris Structural Steel Co.

NEW YORK, 198 tons, addition to 10-story building at 236-250 West Thirty-seventh Street, to Dreier Iron Works, Inc.

BROOKLYN, 151 tons, building at Fifth Avenue and Twelfth Street, to Steel Fabricators Corporation, 11 West Forty-second Street, New York.

ELIZABETH, N. J., 608 tons, telephone building, to Hinkle Iron Co.

JERSEY CITY, N. J., 393 tons, Brunswick Laundry on Liberty Street, to F. G. Shaefer Iron Works.

LAKE DENMARK, N. J., 215 tons, ammunition buildings for United States Navy, to Penn Bridge Co.

ATLANTIC CITY, N. J., 400 tons, Hotel Denis, to Kallman Steel Co.

TRENTON, N. J., 600 tons, building for John T. Roebling & Sons, to Belmont Iron Works.

WILMINGTON, DEL., 900 tons, building for Pusey & Jones Co., to Belmont Iron Works.

BALTIMORE, 300 tons, airplane hangars for Stone & Webster Co., to Dietrich Brothers.

BALTIMORE & OHIO RAILROAD, 665 tons, 215 tons for bridge at St. Denis, Md., to Mount Vernon Bridge Co., and 450 tons for bridge at Kensington, Ind., to American Bridge Co.

ANN ARBOR, MICH., 700 tons, two buildings for University of Michigan, to Massillon Bridge & Structural Co.

SAGINAW, MICH., 1500 tons, telephone exchange building, to American Bridge Co.

MIDLAND, MICH., 1000 tons, power house for Dow Chemical Co., to R. C. Mahon Structural Steel Co.

ADA, MICH., 120 tons, State highway bridge, to American Bridge Co.

DETROIT, 170 tons, Michigan State highway bridge, to McClintic-Marshall Co.

PITTSBURGH, 2500 tons, five tow boats for Standard Unit Navigation Co.; three to Dravo Contracting Co., and two to Charles Wood Engineering Works.

BEAVER FALLS, PA., 1084 tons, building for Babcock & Wilcox Co., to McClintic-Marshall Co.

CLEVELAND, 900 tons, County jail-courts building, to Massillon Bridge & Structural Co.

CLEVELAND, 500 tons, convent, Home of Good Shepherd, to Pittsburgh Bridge & Iron Co.

NEW ORLEANS, 1000 tons, Federal Government project, to Virginia Bridge & Iron Co.

TAMPA, FLA., 275 tons, United States Phosphorus Products Co., plant, to Ingalls Iron Works.

CHICAGO, 1000 tons, sintering plant for Inland Steel Co., to Lakeside Bridge & Steel Co.

NORTHERN PACIFIC, 100 tons, girder span, to American Bridge Co.

MILWAUKEE, 1350 tons, Mariner Tower building, to American Bridge Co.

BURLINGAME, CAL., 150 tons, apartment building on Bellevue Avenue, to Judson-Pacific Co.

RIO OSO, CAL., 125 tons, bridge, to Minneapolis Steel & Machinery Co.

OAKLAND, CAL., 850 tons, hotel, Fourteenth and Jackson Streets, to Herrick Iron Works.

MONTECITO, CAL., 360 tons, plates, 18-in. welded steel pipe line, Montecito County Water District, to Western Pipe & Steel Co.

LOS ANGELES, 100 tons, plates and shapes, 30,000 bbl. tank for Southern Pacific Co., to Consolidated Steel Corporation.

SAN FRANCISCO, 100 tons, plates and shapes, steel tank and tower, Southern Pacific Co., for erection at Hatchita, N. M., to Chicago Bridge & Iron Works.

SPOKANE, WASH., 220 tons, 36 and 48-in. pipe line, to Steel Tank & Pipe Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

BOSTON, 300 tons, fire station, Bowdoin Square, refigured.

NEEDHAM, MASS., 100 tons, high school.

STATE OF NEW YORK, 1400 tons, six highway bridges.

NEW YORK, 2650 tons, apartment building on West Eighty-first Street.

NEW YORK, 40,000 tons, Empire State Building; general contract to Starrett Brothers, Inc.

NEW YORK, 9300 tons, section 9, route 101, of subway; bids rejected and revised bids to be taken later.

NEW YORK, 1100 tons, store addition for Bloomingdale Brothers, Inc., on Fifty-ninth Street.

NEW YORK, 250 tons, housing station on West Farms Road for New York Department of Plants and Structures.

NEWARK, N. J., 2500 tons, Kent garage.

NEW HAVEN, CONN., 1500 tons, Sterling Law School Building at Yale University.

NEW HAVEN, 800 tons, Institute of Human Relations Building at Yale University.

BALTIMORE & OHIO RAILROAD, 160 tons, bridge on Staten Island, N. Y.

PENNSYLVANIA RAILROAD, 1000 tons, five bridges.

PHILADELPHIA, 500 tons, Warner Brothers Film Exchange building.

MEDIA, PA., 750 tons, County Court House; Ayrie-Houser & Co., general contractors.

PHILADELPHIA, 1400 tons, office building for I. Fischman & Co.; Turner Construction Co., general contractor.

PHILADELPHIA, 1100 tons, bridge over Wissahickon Creek on Henry Avenue.

PHILADELPHIA, 1600 tons, building for Girard College; Day & Zimmermann, Inc., engineers.

BALTIMORE, 500 tons, Young Men's and Women's Hebrew Association building.

LEHIGH VALLEY RAILROAD, 200 tons, two bridges at Amherst, N. Y.

BALTIMORE, 800 tons, Forty-first Street bridge.

BEDFORD COUNTY, PA., 115 tons, highway bridge.

PITTSBURGH, 4500 tons, 50 barges for Standard Unit Navigation Co.

BARBERTON, OHIO, 500 tons, evaporator building for Columbia Chemical Division of Pittsburgh Plate Glass Co.

GRAND TRUNK RAILROAD, 2000 tons, grade crossing elimination work at Detroit.

JANESVILLE, WIS., 700 tons, highway bridge.

KEWAUNEE, WIS., 500 tons, highway bridge.

MILWAUKEE, 5000 tons, 42-story building for Northwestern Life Insurance Co.

CHICAGO & NORTH WESTERN, 400 tons, movable bridge.

POWERTON, ILL., 3500 tons, power plant for Super-Power Co.

JEFFERSON CITY, MO., 200 tons, bridges and culverts for Missouri Highway Commission.

LA MESA, CAL., 140 tons, plates, two siphons for La Mesa, Lemon Grove and Spring Valley Irrigation District; bids Oct. 7.

OAKLAND, CAL., 100 tons, apartment building in Lake Merritt District. Bids being taken.

Better Feeling in European Markets

British Pig Iron Demand Heavier and German Steel Orders Result in Large Production—Cartels Again in Evidence—1100-Ton Furnace Blown In

(*By Cable*)

LONDON, ENGLAND, Sept. 23.

PIG IRON demand is improving steadily, as Cleveland furnaces are now able to give early delivery. Midland producers are considering advancing quotations because of increasing costs.

Hematite iron producers are asking advanced prices, which are still insufficiently remunerative. Increased sales have been effected, however, and hopes are expressed of advancing quotations still further.

Finished steel demand is spasmodic as releases from shipyards are irregular and some plate mills are well situated while others are in need of orders. Increased prices are being considered, but at a meeting of the Steel Association last week it was decided to make no revisions at present.

British consumers of foreign sheet bars are still buying, but demand for billets and other material is very light. Merchant bar mills need orders and are reported to have accepted business at £5 9s. per ton (1.18c. per lb.) f.o.b., although current quotations are £5 11s. to £5 11s. 6d. per ton (1.20c. to 1.21c. per lb.)

There is a strong demand for tin plate with rising prices. Inquiry from overseas users is good and further substantial business is expected. Makers are well engaged, but are faced with a possible increase in costs as a result of the uncertain Welsh coal situation, as the coal wage agreement is shortly due for revision.

Galvanized sheets are quiet. English mills have reduced prices on Japanese light gage black sheets to attract business and inquiry is improving.

The North British Locomotive Co. has secured contracts for six locomotives from the Rhodesia Railway and six from the Sao Paulo Railway in Brazil. Sir W. G. Armstrong, Whitworth & Co. will build 30 locomotive boilers and R. & W. Hawthorn, Leslie & Co., 15 boilers for the Argentine Railways.

German steel ingot output in August was 1,401,000 metric tons and rolled steel production was 1,013,000 tons.

Steel Cartel to Be Renewed

Provisional Extension Expected, Pending Decision to Adopt New Quotas for Home and Export Trade

BERLIN, GERMANY, Sept. 10.—The approaching meeting of the International Steel Cartel on Sept. 26 has influenced buyers to delay placing orders except for immediate needs. Renewal of the cartel for a long period is not possible at the coming meeting, since the special committee on exports has not completed its investigation, but provisional renewal is expected. The committee on exports was appointed at the previous meeting in Brussels to collect data on exports of iron and steel as related to production and rated capacity in member countries. The investigation followed a French suggestion that separate domestic and export quotas be fixed for all member countries and that penalties for excess exports be applied just as excess production is penalized under the present agreement. This, it is believed, would prevent undue expansion of export trade and consequent excessive competition. German members of the cartel point out that separate quotas would be unnecessary if the German suggestion of separate selling syndicates for various products were adopted.

Germany is still objecting to the present quotas and will doubtless make further protests at the coming meeting. Since Jan. 1, 1927, the quotas have been 43.18 per cent for Germany, 5.78 per cent for the Saar, 31.18 per cent for France, 11.56 per cent for Belgium and 8.3 per cent for

British and Continental European Export Prices per gross ton, f.o.b. United Kingdom Ports, Hamburg and Antwerp with the £ at $4.85

British Prices, f.o.b. United Kingdom Ports

Cleveland No. 3 foundry	£3	12½s.	to	£3	13½s.	$17.58	to	$17.82
East Coast Hematite	3	16½	to	3	17	18.51	to	18.63
Ferromanganese, export	13	10	to	14	0	65.47	to	67.90
Billets, open-hearth	6	5	to	6	7½	30.31	to	30.92
Sheet bars, open-hearth	6	5	to	6	10	30.31	to	31.52
Black sheets, Japanese specifications	12	12½				61.22		
Tin plate, per base box	0	18¾	to	0	19	4.53	to	4.60
Rails, 60 lb. and heavier	7	15	to	8	15	37.59	to	42.43
						Cents per Lb.		
Steel bars, open-hearth	7	15	to	8	10	1.67	to	1.84
Beams, open-hearth	7	2½	to	7	12½	1.55	to	1.65
Channels, open-hearth	7	7½	to	7	17½	1.60	to	1.71
Angles, open-hearth	8	2½	to	8	12½	1.76	to	1.86
Ship plates, open-hearth	7	12½	to	8	2½	1.66	to	1.76
Black sheets, No. 24 gage	10	5	to	10	10	2.21	to	2.27
Galvanized sheets, No. 24 gage	13	7½	to	13	10	2.89	to	2.92

Continental Prices, f.o.b. Antwerp or Hamburg

Foundry iron, 2.50 to 3.00 per cent sil., 0.50 to 0.90 per cent phos.	£3	7s.	to	£3	10½s.	$16.24	to	$17.09
Foundry iron, 2.50 to 3.00 per cent sil. 1.00 per cent and more phos.	3	10				16.97		
Billets, Thomas	4	14	to	4	14½	22.79	to	22.91
Sheet bars, Thomas	4	18	to	4	18½	23.76	to	23.88
Wire rods, low C., No. 5 B.W.G.	6	5	to	6	6¼	30.30	to	30.61
Black sheets, No. 31 gage, Japanese	12	7½				60.02		
Rails, 60 lb. and heavier	6	10*				31.52		
Rails, light	6	1½				29.46		
						Cents per Lb.		
Steel bars, merchant	5	10	to	5	12	1.19	to	1.21
Steel bars, deformed	5	9½	to	5	11	1.18	to	1.20
Beams, Thomas, British standard	5	1	to	5	5½	1.11	to	1.16
Channels, Thomas, American sections	5	14	to	5	18	1.24	to	1.27
Angles, Thomas, 4-in. and larger, over ⅜-in. thick	5	4				1.13		
Angles, Thomas, 3-in.	5	13				1.22		
Ship plates, open-hearth inspected	7	8				1.63		
Hoop and strip steel over 6-in. base	5	13	to	5	15	1.22	to	1.24
Wire, plain, No. 8 gage	7	5				1.57		
Wire, galvanized, No. 8 gage	9	4				1.99		
Wire, barbed, 4-pt. No. 12 B.W.G.	11	12½				2.58		
Wire nails, base	7	10½				$1.63 per keg		
Wire nails, assortments, 1 to 6-in., keg	10	6½				2.23		

*Open-hearth steel, 10s. ($2.42) per ton extra.

Luxemburg. It is pointed out that these quotas permit Germany to produce only 79 per cent of its largest month's output while France is allowed 99.6 per cent of its largest month's production and Belgium 87.1 per cent.

British producers have not been invited to attend the coming meeting of the cartel, but the recent mergers of British Northeast Coast steel producers and the opinions expressed by Sir William Larke of the National Federation of Iron and Steel Manufacturers are cited as factors favoring an early British entry. Although Polish membership in the cartel is foreshadowed by the negotiation of an agreement with Germany, this understanding does not become effective until a general commercial treaty has been made between the two countries.

German Steel Business in Good Volume

Refunds to Exporting Manufacturers Increased—Wire Exports Satisfactory, But Cartel Reduces Prices

BERLIN, GERMANY, Sept. 10.—The wire syndicate has reduced domestic prices 0.50 m. to 2.50 m. (12c. to 60c.) per 100 kg., having been unable to obtain its official prices for some time, because of outside competition. Price reductions to dealers have been increased and the syndicate is making a further effort to make dealers buy exclusively from its members.

Following a recent decline in Continental prices, the ingot steel syndicate has increased its refunds on material bought by manufacturers for export. The new refunds, representing the difference between the German domestic prices and the "world market" prices are: Ingots, 27 m. ($6.43); billets, blooms and slabs, 17 m. ($4.05); structural shapes, 32.50 m. ($7.74); steel bars, 27 m. ($6.43); bands, 42 m. ($10), and heavy-gage sheets, 27 m. ($6.43).

Recently the *Frankfurter Zeitung* has complained of American "dumping" of steel products and has published figures intended to show that American export quotations are from 21 to 51 per cent less than American domestic prices for important items. It is claimed that the American export price for open-hearth steel rivets is 71 per cent less than the American domestic price. It is admitted, however, that these prices are not necessarily lower than European quotations.

The outlook for steel business continues good and recent weakness in Continental market prices is attributed to the high rate of production rather than to any definite decline in demand. Railroad car builders are booking more orders, and substantial rail orders are expected soon as a result of plans announced by the Railroads Corporation, which is increasingly replacing existing track with 30-meter rails. Wooden ties are also being replaced with steel.

Export trade is satisfactory, especially in wire rods and wire products. Total exports of wire rods, wire and wire products in the first half of the year were 372,497 metric tons, compared with 607,724 tons in all of 1928. Sales to Argentina, Brazil and Chile have been larger this year, Brazil alone taking about 10,000 tons of barbed wire in the first half.

The Netherlands Railroads have ordered 1700 freight cars from the Westdeutsche Waggonfabriken A. G., the Mainz-Castl-Werk and the Hannoversche Waggonfabrik. A number of small reparations contracts have been concluded with France, and recently the Deutsche Werft at Hamburg received an order on reparations account for a 7000-ton floating dock for Jugoslavia.

German Thin-Gage Sheet Cartel Being Formed

BERLIN, GERMANY, Sept. 10.—Progress is being made toward the establishment of a thin-gage sheet syndicate including all German producers. The Feinblechkontor G.m.b.H., formed early this year, provides a nucleus, but does not include all makers. Formerly the Hoesch works opposed membership in a syndicate, objecting to any export control. This company does not wish to enter the export markets, since it is able to dispose of its entire output domestically. However, it is understood to have agreed to join a syndicate operating only in the German domestic market.

The original thin-sheet syndicate in Germany was formed in 1902 and included 45 mills, with a total production quota of 372,100 tons. It was dissolved in 1904 because of competition by non-members, which were making 30 per cent of the total production of Germany at that time.

German Mills Plan Further Modernization

HAMBURG, GERMANY, Sept. 9.—Expenditures of German steel works for plant modernization and improvements have been much smaller this year than in 1927 and 1928, but as most mills are in a favorable financial position now, further expansion is expected next year. The Vereinigte Stahlwerke A. G., Düsseldorf, has completed its program of blast furnace construction, blowing in the eighth furnace at Duisburg-Hamborn, a stack with a daily capacity of 1100 metric tons. The expansion program of the corporation this year has also affected coke and by-products plants and the manufacture of hardware.

Plans are now being made by the Vereinigte Stahlwerke A. G., Mannesmann Rohrenwerke, Hoesch Eisen und Stahlwerk and the Klockner Werke A. G. for the construction of new rolling mills and the concentration of output in fewer plants. No additional blast furnaces have been proposed. It is now believed unlikely that Friedrich Krupp A. G., Essen, will build a tube mill.

To Compete with Steel and Wire Rod Cartels

HAMBURG, GERMANY, Sept. 9.—The Stahlwerk Becker A. G., Willich near Krefeld, will shortly be in a position to book orders for certain semi-finished steel products. As it is not a member of the German Steel Cartel, the Becker company is expected in some quarters to undercut the prices of cartel members. The company has completed its new wire rod mill, which will have an annual capacity of 40,000 tons, and will probably sell the entire output to non-members of the German wire syndicate. This development should have an important effect on the wire market, as, in the past, wire makers not included in the wire syndicate have been charged an extra of 17.50 m. ($4.02) a ton for wire rods and have been largely dependent upon importers for their supplies.

Another domestic move against cartel control is apparent in the announcement that the Rheinmetall A. G., which is controlled by the German Dye Stuff Corporation, will get its new bar mill into operation in October. Bars and shapes will be sold by this company in competition with the German Steel Syndicate, as the Rheinmetall A. G. is not a member.

General Electric Officers on German Board

BERLIN, GERMANY, Sept. 10.—At a meeting of stockholders of the Allgemeine Electricitäts Gesellschaft a recent agreement, under which part of the company's stock was acquired by the General Electric Co., was unanimously approved. Four American members have been elected to the board of supervision: Owen D. Young, chairman of the board, and Gerard Swope, president, General Electric Co., and Clark H. Minor, president, and E. Arthur Baldwin, vice-president, International General Electric Co. A fifth seat on the board will also be occupied by an American.

The Gray Iron Institute will hold its annual meeting Oct. 16 at the Hotel Cleveland, Cleveland. A. J. Tuscany, Terminal Tower Building, Cleveland, is manager.

Machinery Markets and News of the Works

Tool Sales Are Lighter

September Volume, Though Large, Is Below That of August —Prospects Encouraging

WITH numerous buyers postponing the placing of orders until they have had an opportunity to inspect the new equipment to be displayed at the National Machine Tool Exposition in Cleveland next week, sales have tapered somewhat in all machine tool markets.

Even in the New York district, where business has been sustained at an unusually brisk pace, September bookings have been less than those in August. However, the machine tool industry is looking to the immediate future with confidence and is of the opinion that sales during the fall months will be in satisfactory volume. In fact, the temporary pause in activities has been welcomed by builders as an opportunity to catch up somewhat on unfilled orders.

The General Electric Co., Western Electric Co., United States Aluminum Co. and Westinghouse Electric & Mfg. Co. have been substantial buyers in the past week. The General Electric Co., however, is expected to purchase only about one-fourth of the list of 80 tools which it recently sent out. The Westinghouse company has been contracting for equipment in addition to that for its regular quarterly requirements.

The Houdaille-Hershey Corporation, Buffalo, manufacturer of shock absorbers, has appropriated $200,000 for the purchase of machine tools.

Business from the automobile industry has been noticeably light. Most orders have been for one or two machines each from widely diversified sources.

New York

NEW YORK, Sept. 24.—Machine tool business in this district so far this month continues at a good pace, although the volume is less than in August. Included in the week's business were 11 radial drills bought by one company. The General Electric Co. and the Western Electric Co. have been substantial purchasers during the week, although General Electric, it is stated, will buy only about one-fourth of the recent list of 80 tools it sent out. The Ingersoll-Rand Co. has bought a few tools. Some buying that has been in prospect has been postponed until after the National Machine Tool Exposition, which is to be held in Cleveland next week. The Houdaille-Hershey Corporation, Buffalo, manufacturer of shock absorbers, has appropriated $200,000 for additional machine tool equipment.

Board of Trustees, New York Trade School, First Avenue and Sixty-seventh Street, New York, has plans for two and one-half story addition at 303 East Sixty-sixth Street, 200 x 225 ft., to cost about $500,000 with equipment. W. Miltenberger is architect for board; Robert F. Cutting is president.

Shell Eastern Petroleum Products Co., affiliated with Shell Union Oil Corporation, 65 Broadway, New York, and 141 Milk Street, Boston, has plans for four one-story units, a storage and distributing plant at Schenectady, N. Y., to cost about $100,000 with equipment. Jackson & Moreland, 31 St. James Avenue, Boston, are architects.

Shampan & Shampan, 188 Montague Street, Brooklyn, architects, have plans for a three-story automobile service, repair and garage building, 100 x 253 ft., to cost about $350,000 with equipment.

William C. Durant, 250 West Fifty-seventh Street, New York, formerly head of Durant Motors, Inc., and associates have organized American Cotton Picker Corporation, to establish a plant for manufacture of a cotton-picking machine, including parts and assembling departments.

Central Hudson Gas & Electric Co., 50 Market Street, Poughkeepsie, N. Y., has plans for two-story addition to generating plant on Dutchess Avenue, to cost over $85,000.

Albany Corrugated Container Corporation, Albany, N. Y., has leased about 40,000 sq. ft. floor space at Menands, near Albany, for establishment of main works. Present factory will be removed in October and additional machinery installed. C. C. Nuckols is president.

H. Baudler and P. Schneider, New York, have leased one-story building at Ninth Avenue and 207th Street, 100 x 100 ft., for an automobile body building and repair shop.

Excell Garage Co., 1227 Lexington Avenue, New York, has plans for four-story addition to automobile service, repair and garage building, to cost $100,000 with equipment. William Shary, 22 East Seventh Street, is architect and engineer.

Traveling ovens, power equipment, conveying and other machinery will be installed in four-story plant to be constructed by Gottfried Baking Co., Inc., 534 East Seventy-second Street, to cost about $400,000.

Jersey Central Power & Light Co., 20 South Street, Asbury Park, N. J., will issue bonds for $3,200,000, and preferred stock for $701,200, proceeds to be used for new steam-operated electric generating plant at South Amboy, N. J., for which foundations are under way. It will be one story, 160 x 160 ft., and will cost $5,000,000 with transmission lines. Electric Management & Engineering Corporation, 57 William Street, New York, is engineer.

R. J. Letcher & Son, Fourth Avenue, Asbury Park, N. J., plumbing equipment and supplies, sheet metal work, etc., are planning new shop, including storage and distributing plant, 75 x 150 ft., to cost about $40,000 with equipment.

Bakelite Corporation, 247 Park Avenue, New York, manufacturer of insulating materials, hard composition rubber goods, etc., has engaged Franciso & Jacobus, 511 Fifth Avenue, architects and engineers, to prepare plans for plant at Bound Brook, N. J., to cost about $500,000 with equipment.

Hyvac Radio Tube Co., 36 Spring Street, Newark, has arranged for stock issue to total $427,500, part of proceeds to be used for expansion. Negotiations are being concluded for purchase of Lido Mfg. Co., Inc., 267 Douglass Street, Brooklyn, manufacturer of kindred specialties, which will be consolidated with organization.

Department of Institutions and Agencies, State Office Building, Trenton, N. J., is arranging for early construction of two-story power plant at Hillsdale State Hospital, Hillsdale, to cost about $50,000 with equipment. Guilbert & Betelle, 20 Branford Place, Newark, are architects.

Mayfair Service Station, Lake and Monroe Avenues, Asbury Park, N. J., operated by J. B. Davison and Zimel Resnick, has acquired site now occupied, 263 x 327 ft., and will have plans drawn soon for new automobile service, repair and garage building, with capacity of 1000 cars, to cost over $150,000.

Foster-Wheeler Corporation, 165 Broadway, New York, manufacturer of superheaters, centrifugal pumps and other power plant equipment, is carrying out an expansion and improvement program at plants at Carteret, N. J., and Dansville, N. Y.

Premier Foundry Co. has moved from North Bergen, N. J., to 316 Bergen Turnpike, Little Ferry, N. J. Company op-

erates non-ferrous foundry, 40 x 100 ft., and gray iron foundry, 25 x 100 ft. It also does plating.

New England

BOSTON, Sept. 23.—The machine tool market the past week was quiet. The most important sale was a Massachusetts made boring mill for delivery in 20 weeks. A feature of the market was the large number of quotations made on one, two and three tools. Inquiries indicate active fall business, virtually every inquiry received by dealers since Sept. 1 calling for equipment costing from $1,800 up.

The used tool market is lifeless. There is a fairly good demand for various types of shop equipment, but dealers are handicapped by the lack of supply.

New England aircraft builders and accessory makers are operating at capacity. One of the latest established plants in Lowell, Mass., a subsidiary of Moth Aircraft Corporation, is turning out six completed planes a week, and has reduced its employees 10 per cent the past month, due to the introduction of modern machinery. Reports from other small New England plants are encouraging, and production in the Hartford district has been so rapid that manufacturers are falling behind on deliveries. New England manufacturers are booked ahead until Jan. 1, and some well into the first quarter.

W. D. Bigelow, Amherst, Mass., is organizing a company to manufacture automobile jacks and airplane devices under firm name of Bigelow-Springfield Engineering & Mfg. Co., at Springfield, Mass.

Athol Mfg. Co., Athol, Mass., has awarded contract for an addition to its coating unit. Motors, drying ovens and miscellaneous equipment will be purchased.

Lever Brothers Co., Cambridge, Mass., soap manufacturer, has revised plans for a coal hopper.

C. B. Cottrell Co., Stonington, Conn., printing presses, has started work on a one-story and basement machine shop addition, 40 x 40 ft.

United Aircraft & Transport Co., Inc., East Hartford, Conn., closed bids Sept. 20 on a power house, 50 x 120 ft. Equipment will be placed later.

Whittall Associates, Worcester, Mass., has awarded general contract for power plant, to cost $500,000 with equipment.

Baird Machinery Co., 1700 Stratford Avenue, Stratford, Conn., will close bids Sept. 25 for a one-story plant, 120 x 180 ft., to cost $100,000 without machine tool requirements.

Plainville Casting Co., Plainville, Conn., has awarded general contract to Torrington Building Co., Torrington, Conn., for one-story foundry, to cost about $20,000 with equipment.

Pitney-Bowes Postage Meter Co., Stamford, Conn., manufacturer of postage affixing machines, parts, etc., has awarded general contract to E. & F. Construction Co., 94 Wells Street, Bridgeport, Conn., for two-story addition, 60 x 300 ft., including improvements in present factory, to cost about $85,000 with equipment. Fletcher-Thompson, Inc., 542 Fairfield Avenue, Bridgeport, is architect and engineer.

Seymour Products Co., Seymour, Conn., and its affiliated organization, H. A. Matthews Mfg. Co., same place, manufacturers of pressed metal stampings, sheet steel products, etc., have acquired luggage hardware manufacturing division of Bassett Metal Goods Co., Shelton, Conn., and will consolidate. Bassett company will be operated as subsidiary, continuing present line of production.

Chance Vought Corporation, Long Island City, N. Y., manufacturer of aircraft, a unit of United Aircraft Transportation Co., New York, has taken bids on general contract for new plant at East Hartford, Conn., adjoining works under construction for Pratt & Whitney Aircraft Corporation, an affiliated organization. It will consist of one-story parts and assembling unit, 241 x 545 ft., with L-extension, 80 x 225 ft., and three-story and basement administration and engineering building, 51 x 185 ft., to cost over $1,000,000. Albert Kahn, Inc., Marquette Building, Detroit, is architect and engineer.

Welte Organ Co., recently organized to take over pipe organ division of Welte-Mignon Corporation, 665 Fifth Avenue, New York, has purchased former plant of Magazine Repeating Razor Co., Sound Beach, Conn., consisting of main one-story unit of 40,000 sq. ft. floor space. New owner will equip for manufacture of pipe organs and pipe organs mechanisms.

State Board of Finance, State House, Hartford, Conn., has plans for a power plant at Mansfield, Conn., to cost about $50,000 with equipment. Towner & Sellow, 363 Main Street, Middletown, Conn., are architects.

Philadelphia

PHILADELPHIA, Sept. 23.—Contract has been let by Philadelphia Electric Co., Tenth and Chestnut Streets, Philadelphia, to Truscon Steel Co. for one-story machine shop, to cost about $20,000 with equipment.

United Motors Service, Inc., 342 North Broad Street, Philadelphia, has asked bids on general contract for two-story service, repair and sales building, to cost about $150,000 with equipment. Albert Kahn, Inc., Marquette Building, Detroit, is architect and engineer.

William F. Ruwell, 719 Noble Street, Philadelphia, operating a machine shop, will remove to 493 North Orianna Street and install additional equipment.

Fayette R. Plumb, Inc., 4837 James Street, Philadelphia, manufacturer of tools, has awarded general contract to William F. Lotz, Oxford Bank Building, for one-story addition, to cost about $21,000 with equipment.

Acorn Metal Products Co., Philadelphia, recently organized by Louis D. Shiplee, has leased building at 819 North Lawrence Street, for establishment of a plant.

I. Fischman & Sons, Inc., Tenth Street and Allegheny Avenue, Philadelphia, manufacturer of soda fountain equipment, fixtures, etc., has awarded general contract to Turner Construction Co., 1700 Walnut Street, for two and three-story plant, to cost about $1,500,000 with machinery. Clarence E. Wunder, 1520 Locust Street, is architect. Fischman company has organized a subsidiary, Consolidated Marble Co., to represent Societe de Merbes Sprimont, Brussels, Belgium, and will establish marble-working plant.

National Machine Works, Inc., 210 Illinois Avenue, Atlantic City, N. J., has awarded contract to Charles D. Thompson, Pleasantville, N. J., for two-story machine shop to cost about $26,000 with equipment.

Nucar Forwarding Corporation, Whitehead Road, Trenton, N. J., manufacturer of motor trucks and trailers, parts, etc., is planning construction of new plant, to cost over $75,000 with equipment.

Metalcraft Products Co., Philadelphia, manufacturer of radiator covers, etc., has leased space in building at 414 Arch Street, for local works and headquarters.

Board of Education, Brookline, Pa., is considering installation of manual training equipment in two-story addition to high school, to cost $200,000, for which plans will be drawn by Boyd, Abel & Gugert, Otis Building, Philadelphia, architects.

Pittsburgh

PITTSBURGH, Sept. 23.—The machine tool business has been active the past week, largely due to purchases by the Westinghouse Electric & Mfg. Co. and the United States Aluminum Co. The latter company still has tools to close, but has now covered most of the requirements for its new machine shop at New Kensington, Pa. Equipment purchased recently by the Westinghouse company has been in addition to its regular third quarter list, most of which had been closed previously. This company will issue its fourth quarter list next week.

Railroad inquiry is still lacking in this district, but most of the roads coming into to Pittsburgh are expected to be heavy buyers this fall. General inquiry is good, but little buying is expected until after the machine tool show in Cleveland next week.

Orders for steel mill equipment continue to come to Pittsburgh builders. It is understood that the Illinois Steel Co. has placed the new blooming mill for its Gary expansion with the United Engineering & Foundry Co. The new "H" structural and universal mill which the blooming mill will serve will be built by the Mesta Machine Co.

Starlight Refining Co., Karns City, Pa., is said to be planning to rebuild oil refinery recently destroyed by fire.

Fokker Aircraft Corporation of America, Inc., Glendale, W. Va., has acquired a 30-acre tract at Alhambra, Cal., for a Pacific Coast plant, for which plans will be prepared at once, to cost $300,000 with equipment. Harris M. Hanshue is president.

City Council, Charleston, W. Va., has purchased about 200 acre tract at Institute, about six miles from city, for hangars, repair shops and other mechanical units, to cost more than $85,000 with equipment. Project will be carried out in cooperation with West Virginia Airways, Inc., recently formed by Harold B. Shadle, Edgewood Drive, Charleston, and associates.

General Electric Co., Erie, Pa., has plans for one-story addition to local plant, for production of alloy steel castings, to cost more than $60,000.

Firestone Tire & Rubber Co., Main Street, Akron, Ohio, has plans for a three-story factory branch, storage and distributing plant at Pittsburgh, to cost more than $200,000 with equipment, Lockwood Greene Engineers, Inc., Hanna Building, Cleveland, is architect and engineer.

Evans-Wallower Lead Co., Charleston, W. Va., is planning new electrolytic smelting plant at East St. Louis, Ill., to cost more than $500,000 with machinery. A plant for production of white lead is also being projected at Charleston, to

cost more than $200,000. Work on latter plant will probably be placed under way on completion of East St. Louis plant.

Buffalo

BUFFALO, Sept. 23.—Bids have been asked by Stewart Motor Corporation, 93 Dewey Avenue, Buffalo, manufacturer of motor trucks, for one-story addition, 100 x 250 ft., for parts production and service, to cost about $55,000 with equipment. North & Shelgren, Crosby Building, are architects. R. P. Lentz is treasurer.

Spicer Mfg. Co., Toledo, Ohio, manufacturer of automobile axles, universal joints, etc., is arranging for removal of plant of Salisbury Axle Co., Jamestown, N. Y., manufacturer of rear axles, recently acquired, to Toledo where it will be consolidated with differential department of purchasing company. A division devoted to front axle manufacture will be continued at Jamestown for time being.

National Paper Products Co., Carthage, N. Y., a subsidiary of Crown-Zellerbach Corporation, San Francisco, has acquired local mill of West End Paper Co. and will operate as branch. Plant will be converted for another line of paper production and extensions carried out, to cost over $75,000. E. B. Eddy is manager of National company, and will be in charge of new unit.

Consolidated Aircraft Corporation, 2050 Elmwood Avenue, Buffalo, has purchased 20 acre tract in Montana Land Tract, Los Angeles, for new Pacific Coast plant to manufacture airplanes. Initial works will include departments for parts production and assembling and will cost about $100,000 with equipment.

Doyle Gasoline & Oil Co., 336 State Street, Rochester, N. Y., is planning new storage and distributing plant on Sparrow Street Extension, to cost about $100,000 with equipment. Frank H. Falls, secretary and treasurer, is in charge.

Detroit

DETROIT, Sept. 23.—Timken-Detroit Axle Co., Clark Avenue, Detroit, has plans for two three-story additions, 75 x 120 ft., and one-story, 80 x 360 ft., to cost more than $150,000 with equipment.

Jaxon Steel Products Co., Chapin and Horton Streets, Jackson, has awarded a general contract to Austin Co. for addition to power plant, to cost about $40,000 with equipment.

Detroit Aircraft Corporation, Detroit, is planning extensions in landing field on Grosse Ile, to include construction of hangar, 120 x 140 ft., for seaplanes, with repair and reconditioning facilities. Company is arranging for large production of parts at local plant of Studebaker Co., recently leased. Plans are under way for plant on 30-acre tract at Long Beach, Cal., to cost more than $200,000 with equipment. E. S. Evans, head of Evans Auto-Loading Co., Union Trust Building, is president.

Board of Water and Electric Light Commissioners, City Hall, Lansing, is asking bids until Oct. 7 for equipment for extensions in Moores Park municipal power plant, including boilers, superheaters, stokers, economizers, ash hoppers, coal-handling equipment and other apparatus.

Michigan Bell Telephone Co., 1365 Cass Avenue, Detroit, has awarded general contract to Bryant & Detwiler, Union Trust Building, for seven-story equipment storage and distributing plant, including repair divisions, and automobile service, repair and garage unit, to cost about $1,000,000 with equipment. Smith, Hinchman & Grylls, Marquette Building, are architects and engineers.

City Council, Marine City, has arranged with a paper-manufacturing company, name temporarily withheld, to take over former local plant of Independent Sugar Co., for new mill. Structures will be remodeled and machinery installed at an early date.

Allied Motor Industries, Inc., operating American Cirrus Engines, Inc., 740 Washington Avenue, Belleville, N. J., and Great Lakes Aircraft Corporation, 16800 St. Clair Avenue, Cleveland, is making extensions and improvements in former automobile works of Wills-St. Claire Co., Marysville, Mich., including reconditioning for manufacture of aircraft engines and parts by American Cirrus division. Company will also build an addition to plant at Cleveland, primarily for production of twin-motored amphibians, to cost more than $75,000 with equipment.

White Star Refining Co., 903 West Grand Boulevard, Detroit, producer of refined oils, gasoline, etc., will soon take bids for two-story plant, to cost about $70,000 with equipment. Stratton & Hyde, Marquette Building, are architects.

The Crane Market

INQUIRY for overhead traveling cranes is rather limited and unless a considerable volume of buying develops in the next week, September is expected by most sellers to be a smaller month than either July or August. The Amtorg Trading Corporation has not yet closed on a 20-ton hand power crane for export to Russia. The Standard Oil Co. of New Jersey has purchased two 150-ton overhead cranes from an Illinois builder. Locomotive crane buying is small, but a number of orders are pending award, including two for the New York Central Railroad.

Recent overhead crane sales of H. D. Conkey & Co., Mendota, Ill., have included one 5-ton, 11-ft. 8-in. and one 2-ton, 8-ft. span single I-beam cranes to Nash Engineering Co., Norwalk, Conn.; 3-ton, 12-ft. span, single I-beam crane to Southern Indiana Gas & Electric Co., Evansville, Ind.; 6-ton, 26-ft. span, single I-beam crane to Gogan Machine Co., Cleveland; 2-ton special wall crane to St. Mary's Oil Engine Co., St. Charles, Mo.; 5-ton, 32-ft. 11-in. span, single I-beam crane to the Superior Tool Works, Chicago; 10-ton, 37-ft. 6-in. span, single I-beam crane to South Penn Oil Co., Madison, W. Va.; two 1-ton and one 2-ton, 37-ft. 6-in. spans and one 3-ton, 30-ft. span cranes to Bethlehem Shipbuilding Corporation, Baltimore; 1-ton, 29-ft. 9-in. span crane to Mechanics Universal Joint Co., Rockford, Ill.; 10-ton, 27-ft. 11-in. crane to Nekoosa Edwards Paper Co., Port Edwards, Wis.; 1½-ton crane to Missouri Pacific Railroad Co., Sedalia, Mo.; 3-ton crane to E. C. Holladay & Co., Ensley, Ala.; 2-ton crane to Harbison-Walker Refractories Co., Clearfield, Pa.; ½-ton transfer crane to International Harvester Co., Chicago; 5-ton, 3-motor, cab controlled crane to Standard Brake Shoe & Foundry Co., Pine Bluff, Ark.

Capacity of Silent Automatic Corporation, Detroit, will be increased five times on completion of new plant now under construction. Building will be seven stories, 100 x 120 ft.

Independent Pipe Co., Dearborn, Mich., is planning erection of a new factory to cost about $50,000.

Cincinnati

CINCINNATI, Sept. 23.—Manufacturers of machine tools in this district are maintaining capacity operations. Fresh bookings, however, are less that in the preceding week. The market, generally, is marking time, buyers waiting to appraise new equipment to be displayed at the coming machine tool show at Cleveland. Business placed was small and from scattered sources, the largest order being for two machines. Inquiry is fairly brisk, but is mostly for one or two machines at a time.

Wabash Portland Cement Co., Osborn, near Dayton, Ohio, has plans for a one-story addition, 60 x 340 ft., for kiln department and turbine room, to cost about $100,000 with equipment.

Exact Weight Scale Co., 265 West Spring Street, Columbus, Ohio, has asked bids on general contract for one-story plant, totaling about 35,000 sq. ft. floor space, to cost more than $65,000 with equipment. Carmichael & Milspaugh, 8 East Long Street, are architects.

William S. Merrell Co., Fifth and Pike Streets, Cincinnati, manufacturer of chemicals, etc., has plans for a two-story and basement plant, to cost about $450,000 with equipment. Tietig & Lee, 34 West Sixth Street, are architects.

Board of Education, Jackson, Ohio, is considering installation of manual training equipment in two-story high school to cost $240,000. Granville Scott, Citizens' Bank Building, Norwalk, Ohio, is architect.

Allen Mfg. Co., Nashville, Tenn., manufacturer of stoves, ranges, etc., is contemplating construction of new plant at Franklin, Tenn., to cost more than $200,000 with equipment. A site, 150 x 1200 ft., is under consideration. Kiwanis Club, Franklin, is interested in project.

Reynolds Metals Co., Thirtieth and Grand Streets, Louisville, will soon award contract for new plant on Camp Ground Road, near Louisville, to manufacture aluminum powder, etc., to cost about $100,000 with equipment. Arthur Tafel, 140 South Third Street, is architect.

Buckeye Cotton Oil Co., Gwynne Building, Cincinnati, a subsidiary of Procter & Gamble Co., same address, will soon begin work on three-story mill, 85 x 400 ft., at Memphis, Tenn., to cost about $200,000 with equipment. Robert & Co., Bona Allen Building, Atlanta, Ga., are architects and engineers.

Chicago

CHICAGO, Sept. 23.—Machine tool sales are widely scattered and possibly fewer than a week ago. The undercurrent of the market, however, is good and the feeling perists among dealers that October business will be good. Continental Motors Corporation, Muskegon, Mich., has placed some of the tools shown on its list. Bids have been sub-

mitted to the Pullman Co. but purchase orders have not yet been issued.

Recent scattered and small lot inquiry from manufacturers of farm machinery has given rise to reports of more extensive purchases to be made by this industry. However, one implement maker is said to have a surplus of standard tools as the result of recent installations of special machinery. Dealers are still on the hunt for good used machine tools, prices for which are relatively high.

Foster Bolt & Nut Mfg. Co., has plans for erection of another unit to its plant at 6300 West Sixty-fifth Street, Chicago. Foltz & Co., are architects.

H. D. Conkey & Co., manufacturers of the overhead traveling cranes and crawler cranes, are building an addition to their Mendota, Ill., plant which will double its capacity. Addition will be used for fabrication of materials only, and will be equipped with latest tools.

Peoria Casket Co., 209 Hamilton Street, Peoria, Ill., has plans for two-story addition to cost about $70,000 with equipment. Jameson & Harrison, Peoria Life Building, are architects.

P. J. Vollman, 5635 North Sacramento Avenue, Chicago, is considering one-story machine shop, to cost about $25,000 with equipment.

Norton Co., 11 North Jefferson Street, Chicago, manufacturer of grinding wheels and other abrasive materials, with main plant at Worcester, Mass., has plans for one-story factory branch and distributing plant, 120 x 240 ft., on site recently acquired in central manufacturing district, to cost about $90,000 with equipment. Mundie & Jensen, 39 South La Salle Street, are architects.

Monarch Aircraft Co., Rockford, Ill., is erecting one-story airplane manufacturing plant, 120 x 140 ft., near city limits, with departments for parts production and assembling, to cost about $75,000 with equipment. H. L. Millington is superintendent.

Peoples' Gas & Electric Co., Mason City, Iowa, has plans for one-story addition to local steam-operated electric power plant, with installation of 10,000 kw. turbo-generator unit and auxiliary equipment, to cost about $650,000 with equipment. Frank J. Hanlon is president and general manager.

Louden Machinery Co., Burlington, Iowa, manufacturer of conveying machinery, farm equipment, etc., has plans for one-story addition, 130 x 150 ft., to cost about $60,000 with equipment.

Inter-State Aviation Corporation, Chicago, care of Godfrey E. Larson, 5154 North Clark Street, architect, is planning establishment of new airport on 170-acre tract near Irving Park Boulevard. Two hangars, each 100 x 300 ft., with repair and reconditioning shops, and other field units, will be built, and for which plans are being completed. Company is also planning establishment of flying school. Entire project will cost about $200,000 with equipment.

C. H. Will Motors Corporation, 60 Eleventh Avenue, N. E., Minneapolis, Minn., manufacturer of commercial automobiles, parts, etc., has plans for one-story addition, to cost about $150,000 with equipment.

Eugene Dietzen Co., 166 West Monroe Street, Chicago, manufacturer of drawing instruments and supplies, has awarded general contract to T. P. Jorgenson, Chicago, for four-story and basement addition, 116 x 140 ft., to cost $250,000 with equipment. It will be used in part for storage and distribution. Albert S. Lowe is company engineer.

Cleveland

CLEVELAND, Sept. 23.—Machine tool inquiry, which has been light recently, improved the past week. The betterment is confined to Cleveland and immediate vicinity. A fair number of inquiries came out for one or two machines from scattered sources, mostly outside of the automotive field. Orders were light. Considerable business is being held up until after the machine tool show. The market in Detroit is unusually dull, as very little business is being placed by the automotive industry. Deliveries on most lines show little improvement.

Hill Clutch, Machine & Foundry Co., 6400 Breakwater Avenue, Cleveland, manufacturer of power transmission equipment, has plans for one-story addition, 50 x 90 ft., to cost about $35,000 with equipment. George S. Rider Co., Century Building, is architect and engineer.

City Machine & Tool Co., Toledo, Ohio, has purchased plant and business of S. M. Jones Co., manufacturer of forgings, etc., and will operate as a subsidiary. New company has been formed under name of City Forge Co., and expansion in output will be arranged. Amos Lint, head of parent organization, will be president of subsidiary.

Thompson Products, Inc., 2196 Clarkwood Road, Cleveland, manufacturer of valves, pistons, brake rod assemblies and other automotive products, has acquired property at West St. Catharines, Ont., for Canadian branch plant. Units will be one story, covering site, 546 x 1000 ft., and will cost more than $350,000 with equipment.

Fostoria Pressed Steel Corporation, Fostoria, Ohio, recently organized, will take over plant and business of Fostoria Pressed Steel Co., North Main Street, manufacturer of automobile fenders and kindred products. New organization has arranged for sale of stock to total $418,500, part of proceeds to be used for expansion. A new enameling plant has recently been completed and work is under way on additional one-story unit. C. D. Pifer is president of new organization.

Pennsylvania Railroad Co., Philadelphia, has awarded general contract to Albert M. Higley Co., Plymouth Building, Cleveland, for one-story machine shop, 35 x 75 ft., at Cleveland yards, to cost about $35,000 with equipment.

White Motor Co., East Seventieth Street and St. Clair Avenue, Cleveland, manufacturer of motor trucks, has awarded general contract to George A. Rutherford Co., 2725 Prospect Avenue, for one-story service, repair and sales building, to cost about $175,000 with equipment. Hadlow, Hughes, Hicks & Conrad, 806 Euclid Avenue, are architects.

Reliance Mfg. Co., Massillon, Ohio, manufacturer of lock nuts, washers, etc., will soon call for bids for one-story addition, to cost about $45,000 with equipment.

Danly Machine Specialties, Inc., Chicago, maker of standardized die sets, has opened warehouse and assembly plant at 1444 East Forty-ninth Street, Cleveland, in charge of J. R. Fitzsimmons. Complete stock of die sets and die makers' supplies is carried.

Milwaukee

MILWAUKEE, Sept. 23.—Operations of metal-working plants continue at the level established earlier in the year. There has been some recession in machine tool sales, although inquiries indicate that this let-up is only temporary, one cause of delay in closing orders being attributed to the desire of buyers to examine new equipment at the Cleveland show. Improvement in deliveries is slight and only on some of the smaller items.

Crucible Steel Casting Co., Milwaukee, is completing erection of two foundry additions, 31 x 81 ft. and 31 x 128 ft. A. C. Lange is president of company.

Filer & Stowell Co., 219 Becher Street, Milwaukee, manufacturer of sawmill and logging machinery, is erecting a new boiler house and coal bunker, two stories, 31 x 64 ft.

Line Material Co., South Milwaukee, manufacturer of metal and composition materials for electric transmission lines, will close bids shortly for new building, three stories, 60 x 120 ft.

Appleton Car Mover Co., 715 East Eldorado Street, manufacturer of devices for manual spotting of railroad cars, will build a two-story addition.

Fort Howard Paper Co., R. 7, Green Bay, Wis., has let contracts for a new warehouse and paper converting building, three stories, 100 x 200 ft., to Selmer Co., 310 West Walnut Street, local, and for boilers, stokers and superheaters to unnamed companies. It plans to erect a $75,000 bleaching plant, two stories, 65 x 125 ft. Austin E. Coffrin is president.

Wisconsin Axle Co., Oshkosh, Wis., is excavating for one-story, 100 x 200 ft., addition to machine shop, to cost about $100,000 with equipment. An addition to heat treating department is nearing completion.

South Atlantic

BALTIMORE, Sept. 23.—Bids will soon be asked on general contract by Levering Brothers, Inc., 200 Key Highway, Baltimore, manufacturer of sash weights, etc., for one and two-story branch plant at Hanover, Pa., to cost about $100,000 with equipment.

Julien P. Friez & Sons, Inc., 4 North Cathedral Street, Baltimore, manufacturer of scientific instruments, subsidiary of Consolidated Instrument Co. of America, Inc., New York, is contemplating new plant for manufacture of meteorological instruments and parts, to cost over $50,000 with equipment.

Water Department, Municipal Office Building, Baltimore, is planning call for bids in 30 to 60 days for new central pumping plant in Druid Hill Park section, to cost more than $450,000 with machinery. A smaller pumping plant is also planned to cost about $45,000. Edward G. Rost is engineer.

I. J. Marcuse, vice-president, Bedford Pulp & Paper Co., Mutual Building, Richmond, Va., and associates have organized Craig Hydro-Electric Corporation to construct a hydroelectric generating plant. It is understood that unit will be located near Bedford company mill at Big Island, Va. Mr. Marcuse is president of new organization.

A. L. Dorsey, Cleveland, Ga., is planning to purchase a rock crusher or stone pulverizer for local installation, to develop daily capacity of about 10 tons.

William Hellbach & Co., 409 Aisquith Street, Baltimore, plumbing equipment and supplies, are taking bids on general contract for two-story storage and distributing plant, to cost about $30,000 with pipe and fitting shop, etc. Kubitz & Koenig, Emerson Tower Building, are architects.

Standard Oil Co. of New Jersey, 26 Broadway, New York, has acquired property, 300 x 356 ft., at Asheville, N. C., as site for new storage and distributing plant, to cost about $200,000 with equipment. A similar plant is planned at Columbia, S. C., to cost about $300,000 with equipment.

City Council, Sumter, S. C., has leased tract about two miles from city for a municipal airport and will soon begin construction of hangars, repair shop and other mechanical units, to cost more than $60,000.

Union Bleachery, Inc., Greenville, S. C., plans construction of steam power plant for mill service to cost about $100,000, in connection with a general expansion program, entire project to cost about $350,000. J. E. Sirrine & Co., Greenville, are architects and engineers.

H. Harvey Warwick, 1116 Vermont Avenue, Washington, architect, has revised plans for three-story automobile service, repair and garage building, to cost about $100,000 with equipment.

B. F. Goodrich Co., Akron, Ohio, expects to ask bids on general contract in October for initial unit of automobile tire and tube mill at Atlanta, Ga., to cost about $250,000 with equipment. Entire plant will cost more than $1,000,000. McDonald & Co., Southeastern Trust Building, are engineers; and Robert S. Fiske, Healey Building, consulting engineer, both Atlanta.

W. M. Bassett Furniture Corporation, Martinsville, Va., is planning expansion to cost more than $250,000, including two two-story units, 100 x 140 ft. and 60 x 160 ft., for manufacturing.

Indiana

INDIANAPOLIS, Sept. 23.—Plans are under way by Fries Tool & Machine Works, Inc., 1918 East Wayne Street, Fort Wayne, for one-story addition, 35 x 125 ft., to cost about $50,000 with equipment. Guy Mahurin, Standard Building, is architect.

United States Corrugated Fibre Box Co., 1315 Martindale Avenue, Indianapolis, has awarded general contract to B. H. Bass, 1240 West Ray Street, for two-story mill, to cost about $200,000 with equipment. Charles E. Bacon, Odd Fellows Building, is architect.

Automotive Electric Co., Evansville, manufacturer of electrical equipment for automobiles, is planning to rebuild part of plant destroyed by fire Sept. 13.

Eaglesfield-Link Co., 1454 East Nineteenth Street, Indianapolis, manufacturer of woodworking machinery, parts, etc., has leased additional space at present location, making a total of 35,000 sq. ft. floor space, for increased output.

Evansville Malleable Castings Co., East Colm Street, Evansville, will soon call for bids for one-story foundry addition, 150 x 200 ft., to cost about $60,000 with equipment.

Arthur Chevrolet Aviation Motors Corporation, 410 West Tenth Street, Indianapolis, organized by Arthur Chevrolet, designer of automobile engines, and associates is arranging for new plant to manufacture an aircraft engine of special design, including departments for parts and assembling. Initial units will cost about $75,000 with equipment.

Charles R. Weatherhogg, 250 West Wayne Street, Fort Wayne, architect, has plans for one-story automobile service, repair and garage building, to cost about $100,000 with equipment.

Gulf States

BIRMINGHAM, Sept. 23.—Following recent acquisition of Boykin Machinery & Supply Co., Beaumont, Tex., by International Derrick & Equipment Co., Columbus, Ohio, International Derrick & Equipment Co. of Texas, Inc., a subsidiary, has been formed to operate Boykin plant, devoted to manufacture of rotary drilling equipment and other oil-well machinery. Expansion is planned, including foundry for steel castings, machine shop and other buildings, to cost more than $85,000. Houston Galvanizing & Plating Co., Houston, Tex., another subsidiary of International company, has acquired 10-acre tract on local ship canal and plans construction of structural steel and iron works and galvanizing plant, to cost about $100,000.

Montevallo Coal Mining Co., American Trust Building, Birmingham, is carrying out expansion at coal-mining properties near Aldrich, Ala., including new haulage and mechanical-handling system, electric power equipment, etc., to cost about $60,000. Darius Thomas is head.

Huey & Philip Hardware Co., 1029 Elm Street, Dallas, Tex., will remodel a three-story building, 100 x 100 ft., for manufacturing, storage and distribution, to cost more than $50,000 with equipment. Lang & Witchell, American Exchange Bank Building, are architects.

Newport Co., South Milwaukee, industrial chemicals, etc., and Armstrong Cork Co., Twenty-fourth Street, Pittsburgh, have organized Armstrong-Newport Co., a joint subsidiary, to erect a mill near Pensacola, Fla., to manufacture insulating board under special process. Several units will be built, to cost over $750,000 with machinery. A. A. Schlesinger is president of subsidiary company.

Texas Co., 546 East Third Street, Jacksonville, Fla., has filed plans for one-story machine works, 60 x 80 ft., for oil tank and other equipment repairs, to cost about $22,000 with machinery.

Atlas Metal Works, Inc., Dallas, Tex., is building one-story plant at West Dallas, 200 x 210 ft., to cost about $100,000 with equipment.

Hidalgo Cotton Oil Co., Hidalgo, Tex., recently organized by Marvin and H. A. Evans, Hidalgo, has plans for a new cotton oil mill, to cost more than $45,000 with equipment.

City Council, Center, Tex., is considering installation of municipal electric light and power plant, to cost about $100,000 with equipment.

Greif Brothers Cooperage Co., 1937 Willey Avenue, Cleveland, has plans for two stave mills at Goodman and Balden, Miss., respectively, to operate under new mechanical system, each to cost more than $45,000 with equipment.

Mountain Lake Corporation, Mountain Lake, Lake Wales, Fla., plans installation of power and pumping machinery, with auxiliary equipment, for municipal water system, to cost more than $55,000 with equipment. Weideman & Singleton, Candler Building, Atlanta, Ga., are engineers.

Common Council, Seguin, Tex., is planning establishment of municipal airport, including hangar, repair shop and other field units, to cost more than $65,000.

Alabama Power Co., Birmingham, has acquired electric light and power plants of Alabama Water Service Co., at Fort Payne and Greensboro, Tex., and will consolidate. Extensions are planned, including transmission lines.

Dallas Airport Utilities Corporation, Dallas, Tex., is asking bids on general contract until Sept. 30 for construction of hangar, machine shop and administration building at Love Field, to cost over $60,000. Charles W. Davis is secretary and treasurer.

St. Louis

ST. LOUIS, Sept. 23.—General contract has been let by St. Louis Truck & Mfg. Co., 3200 North Hall Street, St. Louis, manufacturer of steel factory trucks, to Gillespie-Daly, Inc., International Life Building, for one-story addition, 60 x 120 ft., to cost about $45,000 with equipment. C. G. Schoelch, Syndicate Trust Building, is architect.

East Side Packing Co., 1214 North Second Street, East St. Louis, Ill., has plans for two three-story additions to meat-packing plant, 50 x 80 ft., and 40 x 60 ft., to cost about $65,000 with equipment.

Pet Milk Co., Arcade Building, St. Louis, has awarded general contract to Hug Construction Co., Highland, Ill., for one-story can factory addition at Neosho, Mo., to cost about $25,000 with equipment. Hirsch & Watson, Chemical Building, St. Louis, are architects.

Century Aircraft Co., 2525 Penn Way, Kansas City, Mo., will carry out expansion at airplane manufacturing plant, including installation of additional equipment. A stock issue of 100,000 shares has been arranged, part of fund to be used for purpose noted.

Board of Trustees, Creighton University, Twenty-fifth and California Streets, Omaha, Neb., has awarded general contract to Borchman & Sons, 4002 Lake Street, for new power plant, to cost about $140,000 with equipment. Leo A. Daly, Peters Trust Building, is architect.

Transcontinental Air Transport, Inc., Syndicate Trust Building, St. Louis, affiliated with Curtiss Flying Service, same address, with headquarters at 27 West Fifty-seventh Street, New York, has work under way on air terminal on Highway No. 3, East St. Louis, Ill., to include three hangars, 120 x 145 ft., repair shop, oil storage and other units, to cost more than $100,000. Kenneth Franzheim, 345 Madison Avenue, New York, is architect; Love-Sultan, Inc., 6625 Delmar Boulevard, St. Louis, is consulting engineer.

E. W. Tanner, Meyer Boulevard, Kansas City, Mo., architect, has plans for a three-story automobile service, repair and garage building, 100 x 150 ft., to cost about $130,000 with equipment.

Deere & Co., Moline, Ill., manufacturer of agricultural implements and machinery, have awarded general contract to George Plein, Sidney, Neb., for four-story factory branch and distributing plant at Sidney, to cost $80,000 with equipment.

Hesse Carriage Co., 311 East Seventeenth Street, Kansas City, Mo., has filed plans for two-story top addition to automobile body works, 85 x 100 ft., to cost about $45,000 with equipment.

Pacific Coast

SAN FRANCISCO, Sept. 19.—City Council, Santa Cruz, Cal., has plans for municipal airport near city limits, including two hangars, one-story repair and reconditioning shop, oil storage and other units, to cost more than $80,000 with equipment. Airport Engineering Corporation, Russ Building, San Francisco, is engineer.

Northrup Co., Los Angeles, manufacturer of aircraft and parts, has awarded general contract to Austin Co. of California, Inc., for one-story plant at United Airport, Burbank, to cost about $50,000 with equipment.

California Water Service Co., Port Costa, Cal., a subsidiary of Federal Water Service Corporation, 27 William Street, New York, plans installation of power and pumping machinery, filtering equipment, transmission lines, etc., for local reservoir, to cost $1,000,000 with equipment.

Aircraft Industries, Inc., Modesto, Cal., care of G. L. Bush, president, Bush Electric Co., San Francisco, recently organized by Mr. Bush and associates to manufacture aircraft and parts, is considering construction of one-story plant, to cost about $65,000 with equipment. E. R. Hawke, Modesto, will be an official of new organization.

Coast Specialty Co., 73 East Sixth Street, Portland, Ore., has purchased local property and plans new two-story factory to manufacture steel cabinets, tools and kindred products, to cost about $40,000 with equipment. Frank J. Stark is secretary and treasurer.

Pend O'reille Mines & Metals Co., Old National Bank Building, Spokane, Wash., has plans for construction of new zinc mill at Metaline Falls, Wash., with main one-story unit, 125 x 700 ft., power house, machine shop and auxiliary units, to cost about $1,000,000 with equipment.

W. B. Foshay Co., Minneapolis, Minn., operating electric light and power properties, has purchased plants and system of Dixie Power Co., Cedar City, Utah, operating in Washington and Iron Counties, with four hydroelectric power plants and transmission lines. Purchasing company will consolidate with organization and plans expansion, including transmission line to connect with other properties in Arizona, about 100 miles.

Officials of Joseph Kreutzer, Inc., Los Angeles, manufacturer of airplanes and parts, are organizing Kreutzer Aircraft Corporation, Inc., to take over and expand present company. Increase will be arranged in capital, part of proceeds to be used for developing additional plant facilities.

Raymond Foundry & Machine Shop, Raymond, Wash., has been bought by Lamb-Grays Harbor Co., having plants at Hoquiam and Aberdeen. Harris H. Wilt will be manager at Raymond.

Plant of North Bend Iron Works, North Bend, Ore., destroyed by fire Sept. 11, will be rebuilt at once.

Fir-Tex Insulating Board Co. will build a plant at St. Helens, Ore., to cost about $2,500,000. J. F. Shea Co., Portland, is general contractor.

Canada

TORONTO, Sept. 23.—While individual machine tool orders are confined to one, two or three tools to a customer, mostly for replacement, the total volume is large. There has been some improvement in demand for new works and dealers and builders report extensive orders for delivery before the end of the year. Inquiries are also appearing in good volume and several lists have been issued for new plant equipment. Small tools are moving freely, with large shipments to mining interests.

Trico Products Corporation, Bridgeburg, Ont., will call for bids at once for a new plant to cost $75,000. P. C. Cornell, 624 Elliott Street, Buffalo, is treasurer.

Hubbard Portable Oven Co. of Canada, Ltd., 1100 Queen Street West, Toronto, has purchased a site on King Street West, for erection of a plant.

Bids are being received by Smith, Hinchman & Grylls, 800 Marquette Building, Detroit, for addition to plant of Motor Products Corporation, of Canada, Walkerville, Ont., to cost $100,000.

A number of contracts have been awarded for erection of a $50,000 roundhouse at Windsor, Ont., for Canadian-Pacific Railway Co. Allan & Earl, Ltd., Equity Building, is general contractor.

International Harvester Co., has taken out a permit for erection of a forge plant at Hamilton, Ont., to cost $40,000. Engineering and construction work will be done by company's building department.

Riley Engineering & Supply Co., Toronto, has acquired a site at York Township, and will build a plant addition.

Bids will be called soon for a four-story addition at St. Jerome, Que., for Dominion Rubber Co., Ltd., 420 Lagauchetiere Street West, Montreal. De-Hueck & Co., Ltd., 620 Cathcart Street, Montreal, is engineer.

Western Canada

Sawmill of Beban & Mottishaw, Brechin Point, B. C., recently destroyed by fire, with a loss of $100,000, will be rebuilt and owners are interested in equipment for new mill.

Enamel & Heating Products Co., Ltd., Sackville, N. B., has taken over Albion Stove Works, Victoria, B. C. New owners plan enlargement and installation of additional machinery and tools. N. A. Hesler is managing director of Enamel & Heating Products Co. D. N. McDonald will be superintendent of Victoria plant.

Main building of new plant of Dominion Bridge Co. at Burnaby, B. C., will be 210 x 600 ft. A part of equipment will include four 25-ton, two 20-ton and one 10-ton electric traveling cranes. Five miles of railroad siding will be built.

Foreign

SITE has been purchased at Quimes, suburb of Buenos Aires, Argentina, by B. F. Goodrich Co., Akron, Ohio, manufacturer of automobile tires, for new plant to cost more than $400,000 with equipment. Paul R. Mahoney is executive vice-president.

Imperial Smelting Corporation, London, England, Sir R. Horne, chairman, is arranging for sale of 750,000 shares of stock, majority of proceeds to be used for plant expansion, with installation of equipment for substantial increase in present output.

Yale & Towne Mfg. Co., Stamford, Conn., manufacturer of locks, builders' hardware, hoists, etc., has purchased H. & T. Vaughan, Ltd., Willinhall, England, manufacturer of locks and other hardware products. Acquired interest will be operated as British subsidiary and expansion carried out.

Soviet Russian Government, Moscow, has approved plans for construction of irrigation system in Russian Turkestan and has engaged Arthur Powell Davis, formerly head of United States Reclamation Service, as chief engineer to supervise project. Work will be carried out over period of five years and will cost about 500,000,000 rubles (about $250,000,000). Water will be diverted from Amudaria and Sirdaria rivers, installation to include power and pumping machinery, pipe lines, trench-digging machinery, etc. It is said that large part of equipment will be purchased in United States. Amtorg Trading Corporation, 261 Fifth Avenue, New York, is official buying agency for Soviet Union.

Officials of Intercontinent Aviation, Inc., affiliated with Curtiss Aeroplane & Motor Co., Inc., Buffalo, both headed by C. M. Keys, have formed Compania Nacional Cubana de Aviation Curtiss, Ltd., to operate in Cuba. Large tract has been secured near Havana as site for airport, to include hangars, repair shops and other mechanical units. A cross-country and air-taxi service will be operated, as well as a flying school. Mr. Keys will head new organization.

New Trade Publications

Therapeutics of Electrical Equipment for Steel Mills.—Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. Reprint 375. Systematic list for "trouble shooters"; draws witty parellel with doctoring human ailments.

Texrope Drive for Machine Tools.—Allis-Chalmers Mfg. Co., Milwaukee. A well illustrated 20-page catalog describes the Texrope drive for machine tools and shows many installations on various kinds of machines.

Diesel Engines.—Buckeye Machine Co., Lima, Ohio. Bulletin 505 of 24 pages illustrates and describes a 4-cycle vertical Diesel engine built for isolated plant use. This is made in three sizes with three, four and six cylinders, the range being from 200 to 400 hp., all at 277 r.p.m. Fuel consumption is stated at 0.40 to 0.41 lb. for each hphr.

Box-Header Boiler.—Combustion Engineering Corporation, New York. Folder of 4 pages, illustrated, showing a single-seam construction for box-header boilers, eliminating butt-straps and said to be stronger than previous construction.

Water-Wheels.—James Leffel & Co., Springfield, Ohio. Bulletin W206 of 6 pages illustrates and describes a vertical-shaft water-wheel as installed in a hydroelectric plant at Middleport, N. Y. The three units are of 1650 to 3000 hp. each. The company's line runs from 5 hp. to 10,000 hp.

Oil Burning Equipment.—Combustion

Engineering Corporation, 200 Madison Avenue, New York. Catalog of 8 pages illustrating and describing the Quinn oil burner for industrial use. It is of the steam atomization type and is made in five sizes, rated from 10 to 150 gal. an hour.

Industrial Building Heating.—American Blower Corporation, Detroit. Bulletin 7818 of 24 pages, illustrated, describes Venturafin unit heaters for use in industrial buildings. Details of construction are shown. Tables indicate steam consumption for definite results in heating different types of buildings.

Forced Draft Fans.—American Blower Corporation, Detroit. Bulletin 10401 of 12 pages, illustrated, is devoted to Sirocco forced draft fans for domestic and other small furnaces and boilers. It is claimed that the forced draft fans will permit use of cheaper grades of fuel without losing heating efficiency.

Light-Weight Insulating Concrete.—Federal Cement Tile Co., Chicago. A four-page folder describes the benefits accruing from the use of featherweight concrete insulating roof slabs. Essential data are set forth on the last page.

Squirrel-Cage Motors.—Wagner Electric Corporation, St. Louis. Seven types of squirrel-cage motors are discussed and compared in bulletin No. 165, consisting of 24 illustrated pages. One section of the bulletin describes cost, performance and delivery, another analyzes and compares the starting and running characteristics of the motors and other sections are devoted to information about construction, ventilation, lubrication and mechanical diversifications. The bulletin also contains a history of the development of double squirrel-cage motors, directed-draft ventilation and air-jacketed motors.

Rotary Positive Blowers.—Connersville Blower Co., Connersville, Ind. Bulletin No. 110 describes the R-S and R-B series of Connersville rotary positive blowers suitable for the medium range of air volumes and pressures. In addition to setting forth the general operating characteristics and some of the features of design, the bulletin contains revised ratings, based on improvements in blower construction, which permit higher operating speeds.

Exhaust Fans.—Duriron Co., Dayton, Ohio. Duriron exhaust fans for installation in laboratory hoods, pickling rooms and other places where it is necessary to remove corrosive fumes, are described in bulletin No. 158 of 12 pages. Many dimension drawings are shown.

Durimet.—Duriron Co., Dayton, Ohio. Bulletin A tells about the new steel alloy, Durimet, recently put on the market by the company. The alloy is designed primarily to resist the action of hot weak solutions of sulphuric acid.

Electrical Machinery.—Westinghouse Electric & Mfg. Co., East Pittsburgh. Leaflets 3746-E and 20355-A of four pages each illustrate and describe respectively a line of synchronous motor-generators and one of engine-driven a. c. synchronous generators. The motor-generators described are of 2-unit and 3-unit design and have 60, 25 and 50-cycle current. The synchronous generators illustrated are from 275 kva. to 938 kva.

The Week's News Quickly Told

Current Events That Bear on the Course of Business

DISARMAMENT projects occupied the headlines last week, what with negotiations between Great Britain and America on naval limitation, and consideration of land armaments by the League of Nations at Geneva. Anglo-American discussions on cruisers have developed to such a point that Prime Minister Ramsay MacDonald will arrive at Washington Oct. 4 to reach final agreement. An invitation will also be dispatched from London to four other naval powers to meet there next January and discuss the limitation of all classes of warships. Meanwhile five 5000-ton British cruisers and 53 United States destroyers will be decommissioned and sold for junk.

* * * * *

SENATORS investigating W. B. Shearer's activities at the last Geneva naval conference learn that he was employed only to "observe and report" to three ship building firms. Messrs. Schwab and Grace of the Bethlehem corporation both testified that a subordinate official acted in this matter without their knowledge and against their policy. Mr. Schwab said that he would like to see an arrangement made by which all battleships could be sunk and all munition work abolished.

* * * * *

TRADE continues throughout the country at a remarkably even state. Of 12 business barometers quoted by the Department of Commerce only three (bond prices, interest rates and "Fisher's index") are less favorable than a year ago. Employment level is above the seasonal rate, and retailers generally have confidence in a good volume of fall and winter business. It is estimted that the gross value of Southern crops is $250,000,000 higher than last year; cash income from farm products in the Minneapolis region this August was double that of last. Basic industries, with the exception of new building construction, are operating at higher than seasonal rates; margins of profit per unit are low, but large production gives generally satisfactory net income.

* * * * *

MERGERS, holding companies and investment trusts dominate the financial news. Four department stores (Bloomingdale, New York, Abraham & Straus, Brooklyn, Filene, Boston, and Lazarus, Columbus, Ohio) with annual sales totaling $106,000,000 are merged by the same investment house that recently combined Macy, New York, and Bamberger, Newark, into a unit with $125,000,000 sales . . . National City Bank by acquiring Corn Exchange Bank, becomes largest in the world, with $2,300,000,000 assets, and 201 branches in New York City . . . Marine Midland Corporation is formed to acquire a chain of banks in New York State with aggregate resources of $500,000,000.

* * * * *

POWER companies on the Pacific Coast are the field of activity for two large holding companies in that region . . . Niagara Hudson Power Corporation, a $450,000,000 Morgan promotion, has acquired land and islands along the Long Sault on the St. Lawrence river, a site capable of developing 2,400,000 horsepower, and figuring in recent New York and Canadian politics. T. W. Lamont, Morgan partner, denies any political motive, pledging the corporation to assist and cooperate with the State in the best interests of all concerned.

* * * * *

AERONAUTICAL Chamber of Commerce, in considering traffic possibilities, finds that income from air mail is about all that can be expected, and that real profits must come first from express handling and later, when the public acquires more confidence, from passenger fares. A resolution asking the Interstate Commerce Commission to regulate rates was rejected . . . C. A. Lindbergh inaugurates an extension of the air mail from Florida to South America by way of the West Indies . . . Rail-air service, Los Angeles to New York, was resumed after a 10-day interruption following the disaster in New Mexico.

* * * * *

WATERWAYS are responsible for a $600,000,000 annual saving in the nation's freight bill, according to Secretary of War Good. Discounting their effect on railroad prosperity, he prophesied an extension of National projects until a network of navigable waterways will connect every important American City.

* * * * *

RAILROAD earnings are at a high rate, judging from the dividend at a 7 per cent rate declared by Baltimore & Ohio . . . Chicago, Burlington & Quincy will spend $5,000,000 for freight yard and terminal at Galesburg, Ill. . . . New York plans a new subway unit, 100 miles of three-track line, costing $500,000,000 for construction alone.

THE IRON AGE

New York, October 3, 1929

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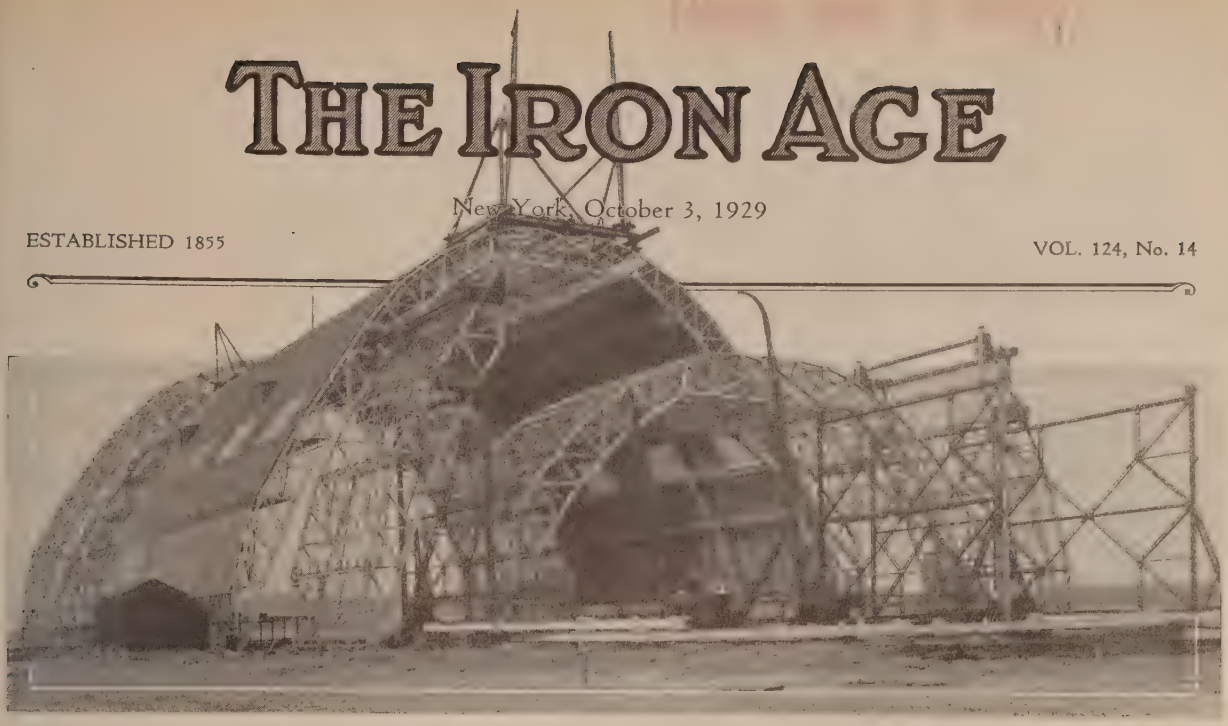


Huge Airship Factory and Dock Is Nearing Completion

PROPER conception of the magnitude of the Goodyear-Zeppelin Corporation's airship factory and dock now nearing completion at Akron, Ohio, is difficult to convey by pictures or even to acquire by a visit to the site, because the structure is set in a flat valley which has been graded exactly level for an area about a mile in diameter. Consequently there is no nearby structure of ordinary size which gives the scale of the construction.

The views show the skeleton about two-thirds completed; over-all dimensions are 1175 ft. long, 325 ft. wide, and 197.5 ft. high. The floor area is large enough for ten football gridirons.

The main structure consists of eleven three-hinged arches (with silicon steel main chords) set 80 ft. on centers. A unique method of erection was devised by the American Bridge Co.—haunches of a pair of arches are erected, the inner ends resting on temporary vertical bents, and all cross bracing attached. The central portion of this double arch is then erected in a low position, hoisted vertically to position with the aid of counterweights, and riveted fast. A traveller on the roof then erects the intermediate members.

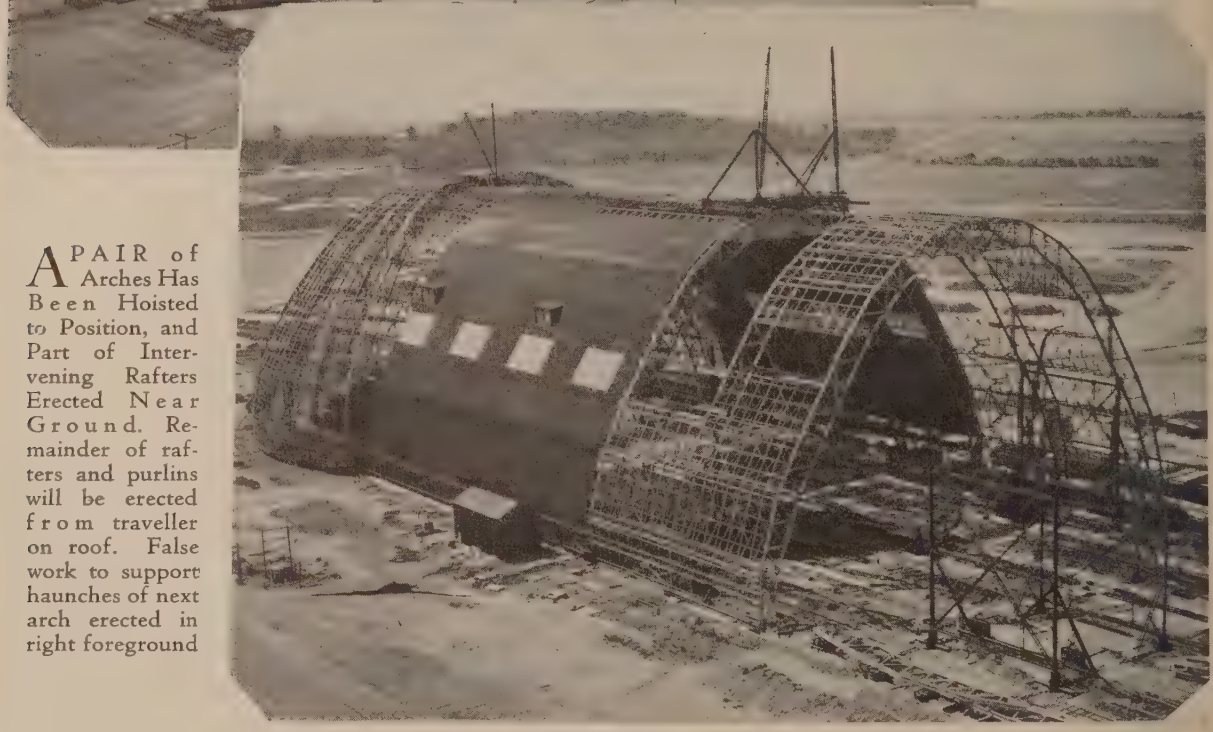
About 5350 tons of structural and silicon steel is required for the main shed. Four door leaves at the ends (made by the Detroit Steel Products Co.) require 1800 tons more. Physical properties are as follows:

	Structural Steel, Lb. per Sq. In.	Silicon Steel, Lb. per Sq. In.
Minimum yield point.....	30,000	45,000
Ultimate strength.....	55,000 to 65,000	80,000 to 95,000
Design Stress:		
Dead and snow load.....	18,000	24,000
Maximum from wind load..	24,000	32,000

Doors are shaped like segments of huge orange peel; they are hinged at the top to a 17-in. pin, 6 ft. long, set in a spherical joint 30-in. in diameter. At the bottom, each door rests on 40 forged steel wheels, separately journaled and sprung, rolling on a standard gage railroad track curved to a 187.7-ft. radius. Each door is opened and closed by a rack and pinion drive constructed by the Wellman-Seaver-Morgan Co. The rack consists of a 14-in. H-beam, bent to proper radius and built into the door near the base; teeth are 4-in. pins set 9 in. apart. Meshing into them is a bull gear with 22 teeth, connected to a 125-hp. General Electric motor by suitable worm gearing. Time limit relays, switches and controls are so arranged that a single push-button will close the doors in five minutes; deceleration at the end automatically occurs so the leaves creep together without bumping. Roof covering and siding is Robertson protected metal, with large corrugations fastened with special clips to resist stress in all directions.

Huge though this building is, it will house only one of the Navy airships to be constructed by Goodyear-Zeppelin Corporation. ZRS-4 and ZRS-5 are each to be 134 ft. diameter and 785 ft. long. Ample room is available at the sides of the structure for a row of shops and offices 42 ft. wide by 640 ft. long—a considerable manufacturing plant in itself. Longitudinal I-beams are attached to the lower chords of the main arches for 6-ton electric trolleys, to be used for erecting material into the airship structure or hoisting working platforms. Artificial light will be provided, all electrical equipment being carried in special gas-tight conduits and boxes, and all circuit breakers and fuses located outside the building.

STEEL Work for Spherical Doors Is Erected at This End. Doors are shown in the open position, rolled back past the end of the building, which has not yet been covered with corrugated metal



A PAIR of Arches Has Been Hoisted to Position, and Part of Intervening Rafters Erected Near Ground. Remainder of rafters and purlins will be erected from traveller on roof. False work to support haunches of next arch erected in right foreground

Underground storage for over 1,000,000 cu. ft. of helium gas at 750 lb. pressure will be provided in the form of about 100 pieces of 24-in. steel pipe, closed at both ends with forged heads, welded on, and with welded connections to an outlet manifold. Since each of the airships will require about 6,500,000 cu. ft. of gas each, a railroad siding is being installed alongside the gas handling plant, together with necessary piping, long enough for a dozen tank cars, each containing about 600,000 cu. ft. of helium under pressure.

Antiquity of Iron Discussed at Institute Meeting

T. A. RICKARD, the American mining journalist, contributed a discussion of the origin of iron smelting to the fall meeting of the (British) Iron and Steel Institute. He discounts the evidence of the piece of iron found imbedded in the Great Pyramid, built 2900 B. C., believing that the circumstantial account of its discovery is honest but mistaken. He bases his argument against such an early use of iron in industry by relics or inscriptions where iron is used or mentioned with gold as a precious metal.

Old poems or legends mentioning the use of iron, Mr. Rickard says, date from the author's time, which would be several centuries after the events he recounts. After considering all the evidence, Mr. Rickard concludes that the smelting of iron from its ores was commenced by the Hittites in what is now known as Anatolia, Asia Minor, some time after 1400 B. C. Previous to that time the only iron known was meteoric, which was very rare and costly.

Chrome-Nickel Stainless Alloys

Chemical and Physical Properties and Applications in Chemical Field—Chromium the Real Corrosion Resistant in Stainless Steels

BY T. HOLLAND NELSON*

MY two previous articles, [THE IRON AGE, April 25, page 1139, and May 30, page 1478] on the subject of stainless steel and chromium irons have each contained reference to the fact that I intended dealing with the nickel-chromium alloys in this field as a separate topic. I have done this in an attempt to avoid confusion and unfair comparisons.

Existing bibliographies are available for those who are interested in tracing the history of these alloys through the various patents and technical papers of a variety of inventors and authors on the subject. I shall, however, refer to only two of the outstanding metallurgists, who were undoubtedly pioneers in the development of these particular alloys. I refer to Dr. Benno Strauss, of the Krupp Laboratories, Essen, Germany, and to C. M. Johnson, of the Crucible Steel Co. of America. To their work and early patents on the subject much has since been added both by themselves and other workers.

The high alloys of chromium and nickel with iron had been a source of difficulty and worry to the metallurgist until comparatively recently. For a considerable time much trouble was experienced in producing material capable of being hot worked, although they were available in the cast form for heat-resisting purposes. Annealing presented quite a problem and of course machinability depended substantially upon the success of the annealing operation or the production of an alloy which did not require annealing to produce machinability.

Continued metallurgical study of these problems has finally enabled us to solve many of them and today we are able to establish definite ratios of chromium to nickel in iron with carbon, to produce material capable of being manufactured commercially into practically all the variety of shapes and sections which could be called for by the structural or chemical engineer.

*Consulting metallurgist, Widener Building, Philadelphia. In THE IRON AGE of April 25, Mr. Nelson discussed the basic questions of stainless steel and in the issue of May 30, various alloys of chromium and iron.

Patent Situation Outlined

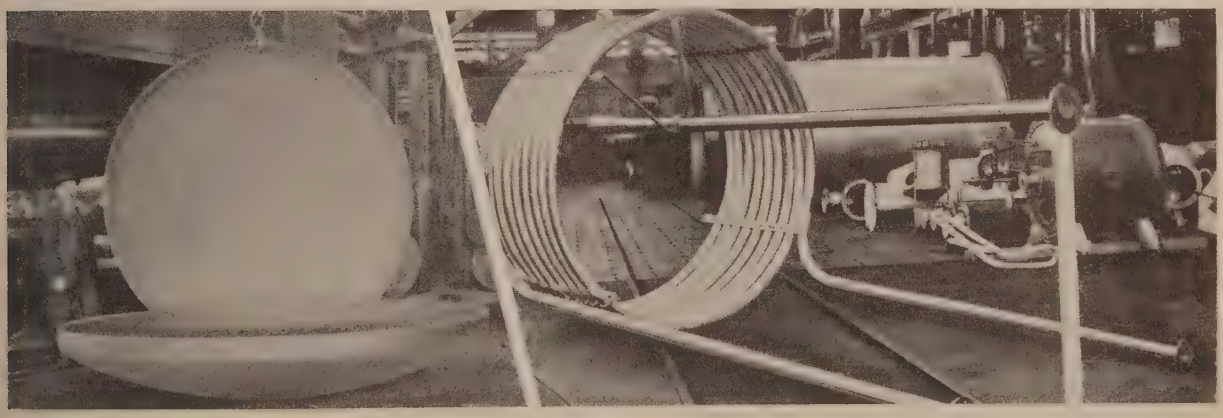
IN this particular alloy field, the patent situation is extremely regrettable. Chromium and nickel ranges have been allowed to overlap so hopelessly that an absolute disregard of any patents on the subject has resulted. The recent merging of various patents in the chrome-nickel series shows not only sound business common sense but holds out also the hope of wider development of the alloys themselves. There is within the scope of these various patents many alloy combinations of value not owned exclusively by any one patentee and therefore the trade has suffered as a result.

Within a short space of time I am convinced that we shall see a series of chrome-nickel alloys with varying proportions of nickel and chromium advocated unanimously by both patentee and licensee alike without the conflict of claims due to patent limitations.

Ratio of Nickel to Chromium

BEFORE the value of a definite ratio of nickel to chromium was established, many of these alloys were of such a type that they were martensitic, austenitic-martensitic, or entirely austenitic and, substantially as they existed through the hot working range, so were they not malleable, partially malleable or quite malleable.

In my first article I referred to a homogeneous structure as being the ideal for resistance to corrosion and,



COIL (Right) Made from Chrome-Iron Alloy (Courtesy of Enduro Committee). Flanged and dished heads (left) for tank or boiler construction. These can readily be made from either chrome-iron or chrome-nickel alloys. (Courtesy of Lukens Steel Co.)

so far as the chrome-nickel alloys are concerned, a homogeneous structure means not only ideal corrosion resistance but also reasonable malleability for hot-working operations such as forging, rolling, etc., and general fabrication.

Generally speaking, a material containing say from 16 to 18 per cent chromium requires from 9 to 11 per cent nickel present to render it entirely austenitic. Whereas if the chromium is raised say to 22 to 24 per cent then a nickel content of from 7 to 9 per cent would accomplish the same object. A material too low in nickel or chromium content would be correspondingly "red short," due to the fact that it would be unstable, partially martensitic and as a finished product difficult to machine and almost impossible to anneal.

Four Different Products

With this knowledge it is not difficult to understand that the rapid development which has taken place with the chrome-nickel alloys has been substantially with such alloys as are entirely austenitic—yet not too heavily alloyed to render them unnecessarily expensive.

modified to simpler design before they could be executed in straight chrome-iron.

Let us glance at the physical properties of a typical one of these alloys and review some of the outstanding features that such analysis modification brings about and then perhaps we shall more fully realize why the nickel-chrome alloys are to be regarded as a decidedly advantageous addition to the existing stainless steels and irons.

Chemical and Physical Properties of Chrome-Nickel Alloys

Chemical Analysis:		Per Cent
Carbon	under	0.07 or 0.15 as desired
Silicon	under	0.75
Manganese	under	0.50
Sulphur	under	0.025
Phosphorus	under	0.025
Nickel	from	8.00 to 10.00
Chromium	from	16.50 to 19.50
Physical Properties:		
(This is an austenitic material annealed by quenching)		
Tensile strength, lb. per. sq. in.		85,000 to 95,000
Yield point, lb. per sq. in.		30,000 to 40,000
Elongation in 2 in., per cent		55 to 60
Reduction of area, per cent		70 to 75
Brinell hardness		130 to 140
Izod impact (V notch)		100 to 120 ft. lb.

A TYPICAL Pickling Installation Showing Hydrochloric Acid Tank, Nitric Acid Tank and Spare Tank for Washing Off with Water. (Courtesy Lukens Steel Co.)

As evidence of this I have taken four popular brands and quote the manufacturer's analysis in each case. Incidentally it is amusing to note that each of them is operating under a different patent:

	No. 1 Per Cent	No. 2 Per Cent	No. 3 Per Cent	No. 4 Per Cent
Carbon	0.10 to 0.12	0.10 to 0.25	max. 0.20	max. 0.12
Silicon	0.75	1 to 3	max. 0.50	0.40 to 0.60
Chromium	17 to 19	17 to 19	17 to 20	18
Nickel	8 to 9	8 to 10	7 to 10	8 to 9

Where Is the Demand for Chrome-Nickel Alloys?

IT might be assumed that because the chromium-irons, previously dealt with in the other articles, have been adapted so readily to the chemical field there might be little demand for a similar material containing nickel, which obviously also increases the price.

However, experience with the stainless steels and chromium-irons in the building of chemical equipment brought to light many difficulties which were not easily surmounted. As for instance, due to the difficulty experienced in welding chromium-iron, large heating coils which called for tubes or pipe in one single length were extremely difficult to obtain. Many difficult bends and joints that could have been readily welded had to be

As stated above, just because many installations have been successfully built from chrome-iron, it does not necessarily follow that the chrome-irons were everything that could be desired. To date I know of not one single installation which has failed due to corrosive attack, but the fabrication was due entirely to close cooperation between the manufacturer of the material, the designing engineer and the fabricator and many modifications in design were necessary on account of the high physical properties of the material (particularly as induced by work hardening) restricted heating ranges, the difficulty of welding, etc., etc. Such modifications at times impaired general efficiency but were necessary, due to the material itself. Therefore any material a little more "fool-proof," more ductile, or with wider hot working ranges, either in the steel works or the fabricating shops, becomes immediately a welcome addition.

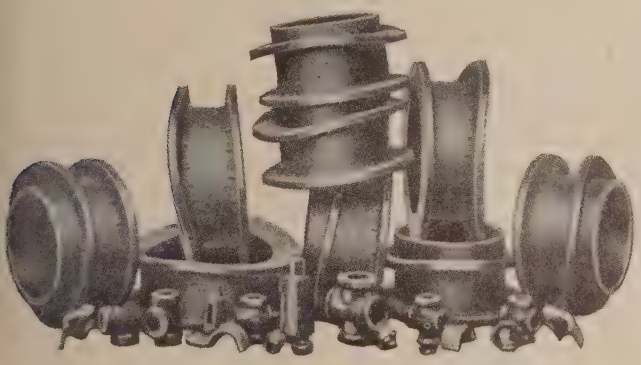
The nickel-chromium alloys offer us many of these improvements which in turn means that the designer can more nearly approach his true design. The wider temperature range makes it possible for both steel manufacturer and fabricator to form more complicated shapes the more readily and the absence of the serious grain growth which develops in the straight chromium-iron

at high temperatures, such as when welding, opens up the possibility of welded structures where welds for other reasons are not considered detrimental.

The Chromium-Iron Brittle Range

THE embrittlement of chromium-iron, due to prolonged heating in a temperature range between 850 and 1050 deg. Fahr., which caused considerable trouble in the oil industry, for a while, was responsible for the manufacturers of seamless tubes welcoming the advent of the chromium-nickel alloys, which so far apparently have shown no tendency to develop this phenomenon. Various reasons have been offered as an explanation to account for this brittleness, all of which, to the author's mind, are still inconclusive. Nor am I satisfied that a similar condition will not develop in some of the chrome-nickel alloys under certain atmospheric conditions although it may be in a less dangerous range and over a much longer time cycle.

Some of these alloys are yet so close to an unstable compound that elevated temperatures are apt to show striking results. These remarks are not made as a pessimist but because the author, in handling these stainless



Castings, Typical of the Kind Produced from Chrome and Nickel-Chrome Alloys

alloys since their birth, has seen childish and unwarranted optimism lead to disappointing and serious results. Coming from the original school of stainless steel, and following through the development of chromium-iron and having been associated in some capacity with practically all the large installations in the country has naturally brought to my attention many limitations of the straight chromium-alloys. I would unhesitatingly state, however, that, while welcoming the development of the chrome-nickel alloys, they cannot be regarded as a cure-all and every care should be used in their selection.

A very popular combination before us at the moment is that known as the "18 and 8 type," signifying 18 per cent chromium with 8 per cent nickel. The typical analysis and physical properties of this material are to be found in the preceding table. The low elastic limit, together with such high ductility as exhibited in the elongation, reduction of area, impact and Brinell, clearly explain how readily this metal can be cold worked. Articles of extremely intricate design can be formed and fashioned from this alloy which it would be impossible to produce in a straight chrome material.

Like all other metals these alloys become harder with continued cold work, which of course is reflected in an increase in the tensile strength and elastic limit, with a corresponding reduction in the elongation and reduction of area. A simple heat treatment, i.e., rapidly heating to 1900-2000 deg. Fahr. and either air cooling or

Fireplace Made from Chrome-Nickel Alloy

quenching according to section, will restore the original ductility of the annealed material.

A Personal View Regarding Nickel Content

THE author can perhaps make his own view still more clear (and incidentally leave himself open to serious criticism) by stating frankly that, in practically all these alloys, it is the *chromium* which gives the metal its corrosion-resistant properties. Undeniably the nickel additions are valuable more particularly in regard to their bearing upon the physical properties, which are of course reflected in easy fabrication.

If my view regarding the chromium is incorrect, then show me one of the commercial chrome-nickel alloys which does not contain more than the minimum chromium content stipulated by Brearley* as being required to produce a stainless or corrosion-resistant alloy. Further I would refer to the work of Pilling and Ackerman in an excellent paper on the subject of iron-nickel-chromium alloys wherein they state:

> The solubility in nitric acid of sufficient dilution to afford rapid rates of corrosion may be affected by changes in content of nickel, chromium or iron, yet the point at which substantial passivity is reached depends practically wholly on the chromium content independent of nickel or iron.

Inasmuch as I have made very definite claims regarding the value of chromium and its effect on the re-

**Mining and Metallurgy*, Feb., 1929.

Dinner Ware Made from Chrome-Nickel Alloy

sistance to corrosion, it should be clearly understood that I am aware of high-nickel-silicon alloys with and without small quantities of chromium; also the nickel-molybdenum alloys, which show remarkable resistance to sulphuric and hydrochloric acid. These are beyond the scope of this article and enter a different field from that covered by the alloys of chromium and nickel-chromium so far dealt with by the author, for which no claims have been made with regard to resistance to hydrochloric and sulphuric acids. I believe much will be heard of these new alloys in the near future and they too will be welcomed by the chemical engineer.

General Working Instructions

FORGING.—The chrome-nickel alloys available today of the "18 and 8" or similar type can be forged or rolled from a temperature of approximately 2200 deg. Fahr. down to about 1700 deg. Fahr. without difficulty. Working below this temperature is difficult and has a tendency to rupture if not crack and burst the material. Slow heating to approximately 1500 deg. Fahr. and then more rapid heating to maximum temperature is advised.

ANNEALING.—Being an austenitic alloy, the softest condition is obtained by heating the material to a temperature of from 1900-2100 deg. Fahr., according to modifications in analysis, and cooling as rapidly as possible. Air cooling on thin section is sufficient, but more massive sections would require quenching.

PICKLING.—It should be unnecessary to explain that the scale produced by any hot-working operation must be removed before any of these alloys can be considered in the best condition to resist rust or corrosion. The reason for this is explained in my first article.

The method of pickling the chrome-nickel alloys is substantially the same as that adopted with the straight chrome-irons and steels, except that sand blasting is not recommended to accelerate pickling, due to the fact that the material is so soft that the particles of sand readily become embedded in it. The general practice is to place the heat-treated material in a solution of hydrochloric acid, 20 to 40 per cent acid, to which sometimes a smaller percentage of nitric acid is added, allow it to remain until the scale is removed, wash with water and immerse in a solution of nitric acid, 10 to 20 per cent in water, with a final wash off in clear water. The temperature of the hydrochloric acid bath can be raised with advantage to approximately 180 to 200 deg. Fahr. and the material has a tendency to show a somewhat whiter surface if the subsequent immersions in nitric acid and final washing in water are also done hot. A typical pickling installation is shown in one illustration.

CASTINGS.—One sometimes despairs of the possibility of obtaining perfect castings in this type of alloy. The shrinkage of this material is approximately 9/32 in. compared to 1/8 in. in the case of cast iron. The rapidity with which the metal solidifies and the difficulty of convincing the ultimate user that he cannot get castings usually of the same low carbon content as the wrought material are but a few of the difficulties with which the alloy foundry is confronted.

There is no denying the fact that the nickel-chromium alloys are much more popular in the foundry than the straight chromium and today we are able to obtain, in either chromium or chrome-nickel, all types of fittings, manhole frames, nozzles, etc., such as are illustrated. Producing bars, sheets, plates, etc., is one thing. To produce a finished article in the cast form is another.

Alloy Foundry's Problems Today

THE problems before the present-day alloy foundry are largely due to the fact that, when an engineer picks a material to build his equipment from, he will expect to obtain that same material throughout his job, even to the cast parts. The result is that alloy foundries receive orders from time to time calling for castings from such and such a brand of material, which is advertised to a chemical specification practically impossible to produce in the cast form.

A foundry has its own problems to deal with and the wise buyer will have his castings made by a reliable house from a material of substantially the same analysis as that the rest of the equipment is to be built from, but leaving the foundry to make such modifications as may be necessary to produce sound clean castings capable of being machined.

Because there are 15 or 20 different trade names for materials with but slight variance in chemical analysis, there is no reason why there should be the same number of casting analyses, which has led in many cases to castings which on one hand were sound and not machinable, and on the other, material which was machinable but not sound. In the chrome-nickel alloy range, the foundryman needs his latitude, or working margin of safety, if you care to call it such. So that if you send a plate or bar specification to a foundry for castings do not be surprised if the intelligent foundryman declines to quote.

It is not easy to produce a perfectly satisfactory surface on a casting. Pickling is resorted to just as on the wrought material but the surface inundations and imperfections on such a rough surface have a tendency to hold small particles of foreign matter. In the early stages these small imperfections or inclusions will rust and stain quite a considerable area, but, as they are soluble, in service under corrosive conditions they are gradually eliminated. It is almost impossible to obtain a finished pickled casting which will not show some rust spots on it.

Some Concluding Thoughts

IN concluding this article may I again say that the development in the chrome-nickel alloys is extremely welcome to manufacturer, fabricator and user alike, inasmuch as they have opened up a wider field of application for corrosion-resistant alloys, due to their easier fabricating qualities.

May I, however, again reiterate that due regard should be paid to the chromium content of any alloy which is to be used to combat corrosion (hydrochloric and sulphuric acids excepted) for I am firmly convinced that chromium is the weapon with which we fight corrosion, and nickel, the friend that comes to our rescue when certain alloys have not the physical properties which we may possibly desire.

Finally, I have been asked repeatedly—is "18 and 8" the last word in this type of alloy? I am frank to say that I believe it is nearer the first word and that the future will see us using straight chrome and a series of chrome-nickel and nickel with silicon or chromium or other alloys, each dealing with separate problems.

Principle Established by Brearley

I firmly believe that Brearley established a principle which will carry on for all time. That principle was this, that "a certain percentage of chromium in iron renders that iron-chromium combination insoluble under certain conditions." So shall we find other alloy combinations and shall probably again modify and adjust them to meet the demands of the fabricator, for this is true progress.

My next article will be on heat resistant alloys, which I regard as a question of corrosion by atmospheres or by-products at elevated temperatures, in which chrome-nickel and nickel-chrome alloys in entirely different ratios play an important part.

Keeps Production Costs Down

By Closely Regulating Movement of Stock Through Manufacturing Departments, Studebaker Corporation Lowers Expenses

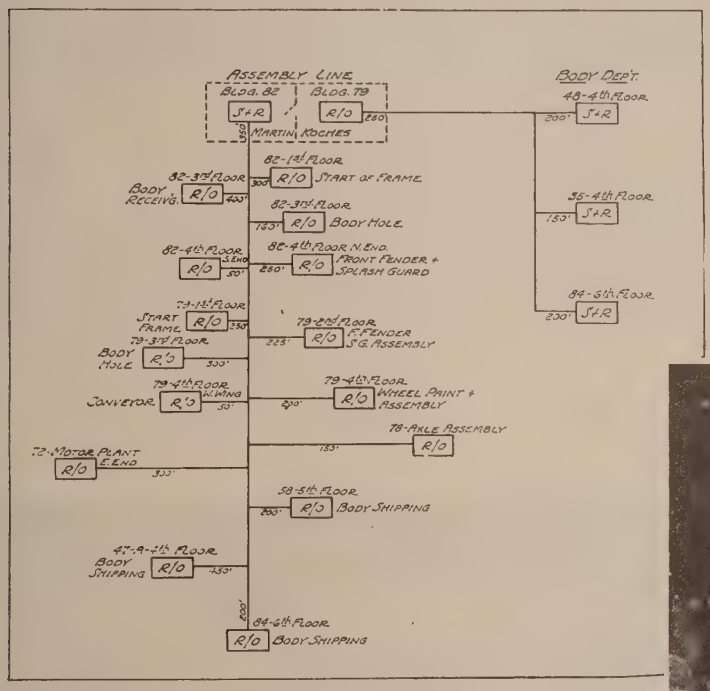
ONE of the statements most frequently heard nowadays is that "in buying an automobile one gets one's money's worth." This opinion has developed as a result of a general downward revision of prices within the automobile industry, and in most cases reductions have been made possible by the inauguration of manufacturing economies. To keep costs at a minimum figure in a plant capable of turning out 600 cars a day is the task which faced the management of the Studebaker Corporation at South Bend, Ind. How this is done is described in the following paragraphs.

Appropriations for manufacturing purposes originate in the finance committee, which is composed of officers and members of the board of directors. After an appropriation has been made, the sales department makes up a car schedule for the next three months, staying, of course, within the limits of the appropriation. The car schedule, when transmitted from the sales department to the manufacturing division, constitutes the latter's authority to purchase materials and to make sufficient parts to supply the assembly lines for 90 days.

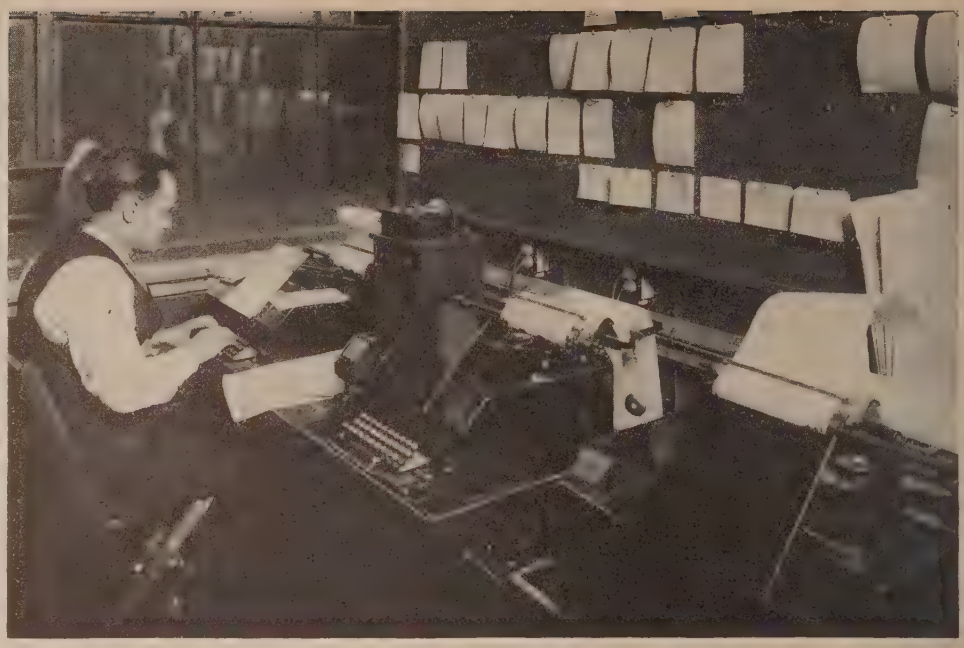
While some parts going into Studebaker automobiles are bought from outside sources, most of the major parts are manufactured by the company. In this connection the fact is obvious that there must be a well-defined method of scheduling production of parts to conform to the needs of the assembly lines. This is done by adhering to the following plan.

Each part has its own "bank," or reserve stock, to feed the main assembly lines. The size of the bank is determined by a number of shop schedule clerks who study plant operations and set the proper "bank" for every part.

As a protection against sudden development of a shortage of material, a six-days' supply of each part is



COMMUNICATION Between Various Production Departments and the Final Assembly Lines Is Maintained by Means of a Telephone Typewriter System Shown in the Diagram (Left). R/O indicates a "receiving only" instrument, S/O a sending instrument and S+R a sending and receiving machine. The photograph below shows a department head receiving a message from the final assembly department

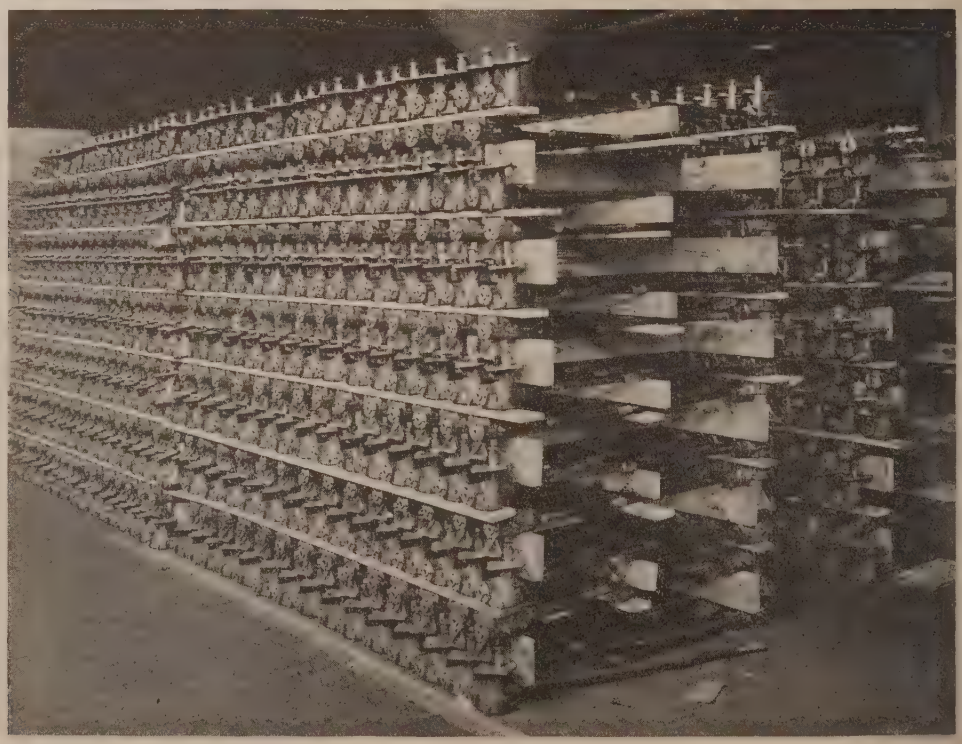


THE Typewriter Being Used Is the Master Machine in the Production Superintendent's Office, Which Is Sending Messages to the 15 Telephone Typewriters Along the Assembly Line. In the center is the emergency machine and at the right the machine which receives messages from the body department. The cards on the hooks are foreign orders

kept in stock, where it is not used except in an emergency. The storekeeper maintains a daily tab on stocks, and if he finds it necessary to go into the reserve supply for material for current production needs, he immediately sends an individual shortage report to the purchasing department, notifying it that the amount of stock has dropped below the danger line. When fresh material is received at the stockroom, the storekeeper brings the reserve supply for that part up again to the proper level and puts the remainder in stock for current use.

This plan has practically eliminated possibility of suddenly exhausting the supply of any part and thereby holding up work along assembly lines. It also serves as a perpetual inventory of reserve stock. It is applied not only to parts bought from outside sources, but also to those made by the company. In either case an individual shortage notice is equivalent to a rush order for a part required by the production division.

The purchasing department is responsible for getting prices from and placing orders with vendors and for delivery of materials at the specified time. In this respect it is just as important to prevent a surplus of stock from accumulating as it is to assure a proper supply. When material is delivered by vendors, it is checked and weighed in by the receiving department and a report is made to the production records department. Each department manufacturing parts maintains an accurate check of its output by having all finished parts pass



AS a Protection Against Sudden Shortage of Material, a Six-Days' Supply of Each Part Is Kept in Stock, Where It Is Not Used Except in an Emergency

through a clearing house station at final inspection before they leave the department. Here they are counted by a clerk and the production records department is supplied with the information. In this manner the production records department has in its possession at all times data upon which to base shop operations.

Every Department Has Stockroom

Each department has a stockroom in charge of a storekeeper, who has before him a copy of the daily schedule for assembly lines. Material is released from the stockroom according to this schedule. If the foreman of a department along the assembly lines finds that he must have additional stock, the storekeeper gives him the extra amount, but charges it against him as loss of stock. The precaution exercised in releasing stock has prevented waste on the part of production departments and has acted as a guard against shortage.

Once a year an inventory of raw and finished stock is taken. Storekeepers count the stock in storage, and clearing house clerks in departments producing parts tabulate the stock on the floor. Throughout the year the production records department compares its stock records with actual stock conditions as reported by storekeepers. If too great a discrepancy exists, a special inventory of the part in question is ordered.

If the use of a part is discontinued or, if a part is superseded by a new part, the production records department ascertains from its files the number of parts on hand. An attempt is made to make the change at a point when the supply of the old part is exhausted, but this is not always possible. If the change is such a decided improvement that the management thinks it advisable to substitute the new part as soon as possible, the cost of the old part and the quantity on hand are considered, and a decision is made in regard to scrapping the old part immediately.

When a new model of automobile is to be put on the market, invariably material for the old model is left over. A list of this stock is made up and given to the service department, which takes the quantity it wants. The remainder is sent to the salvage department, where it is kept until the new model is actually in production. It then is sold as scrap.

Foreman Furnished Production Sheet Monthly

Every month foremen are furnished with a parts production schedule sheet showing the number of parts needed that month and the daily requirements. Since there are usually a multitude of parts going through a department, it is sometimes difficult for a foreman to keep track of his standing. Consequently the production records department draws on the parts production schedule sheet a red line on the date up to which the quota for each part for that month has been manufactured. If the red line for any part has fallen behind the current date, the foreman knows that he is short of his quota and must concentrate on bringing his production of that part up to date. This simplified system helps the foreman to visualize in a moment the position of his department in relation to production needs.

It has already been stated that clearing house clerks count the number of parts going out from operating departments. This information is recorded on transfer tickets, which are sent at the end of each day to the production records department. Night clerks are employed to transfer the accumulated data to the shop schedule record, a copy of which is put in the hands of every foreman when he reports for duty at seven o'clock the following morning. Thus he has before him at the beginning of the day the results of the previous day's activities and of the month to date, and is in a position to determine what work is immediately ahead of him.

AN Accurate Check of Finished Parts Is Made by a Clerk at a Clearing House Station at Final Inspection Before They Leave the Department in Which They Have Been Manufactured

All of the executives of the company receive daily from the production records department a "current car production and shipment report," which lists the various Studebaker models and sets forth in parallel columns the schedule, production and shipments for the previous day and for the month to date. In a separate column is recorded the number of automobiles over or under the production schedule to date. At the extreme right of the sheet is the number of finished automobiles on hand for shipment to dealers.

Telephone Typewriter System Installed

Communication between various production departments and final assembly lines is maintained by means of a telephone typewriter system, which is the largest installation of its kind in the United States. It consists of 22 machines installed at a cost of approximately $18,000 and has been in operation since March 1. There are two groups of machines, one group comprising three machines in the body department, which send and also make a copy of what is being transmitted, connected with one receiving machine in the office of the production superintendent. In case one of the machines is in operation, a red light shows on the other two, indicating that the circuit is in use. A white light is the "go ahead" signal. This part of the system keeps the final assembly lines informed of bodies under construction and ready for delivery.

The other group consists of a sending and receiving machine (this machine also makes a copy of what is being

sent) in the office of the foreman in charge of final assembly, connected with 15 receiving machines located at different points along the assembly lines. One emergency typewriter is connected and ready to operate in case anything should go wrong with the machine in the foreman's office. Another is ready to replace any of the 15 typewriters which might develop serious trouble. All of the machines along the assembly lines receive messages from the sending instrument simultaneously.

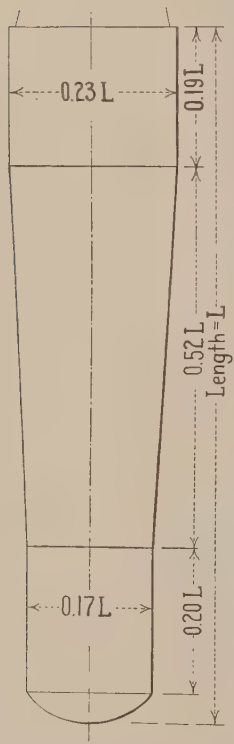
Back of the system is the idea of coordination, which does away with unnecessary delays in final assembly of Studebaker automobiles. With this method of communication between departments, everyone is kept informed of the different types of cars to be assembled, supervisors thus being enabled to have on hand in their departments all parts essential to keep assembly lines moving on normal schedules.

In place of mimeographed copies of orders formerly delivered by messengers, instructions now are typed on sending machines. Messages are received in typewritten form on page-size paper, and four copies can be made.

Installation of a conference telephone system of 13 stations was completed recently. Although it is not a direct part of the telephone typewriter service, it supplements it. The system provides for hooking up the entire group of stations so that in reality a conference is held over the telephone without the necessity of department heads leaving their offices. In case anything should go wrong with the typewriters (and, with two emergency machines and experts within call, such a situation is not probable), the telephone conference system could be brought into use as an emergency measure.

The telephone typewriter system has proved of great benefit and is a vital factor in a program of increased production brought about by the concentration of all Studebaker production at South Bend.

Casting Practice to Insure Uniformity in High Carbon Steel



Outline of Ingot, Designed, To Mitigate Segregation in High Carbon Steel

AN extended study of the ingot structure for 1.10 per cent carbon steels was reported by Axel Hultgren of Soderfors, Sweden, to the fall meeting of the (British) Iron and Steel Institute. Ingots weighing 1000 lb. and less, cast big end up and with hot top, were sectioned and etched. When teeming moderately hot steel the sectioned ingot showed the usual structure—a skin of fine crystals, a zone of columnar crystals and a center of large dendrites.

Certain blocks of steel were sawed into thin sections and the continuity of crystals traced from one to another, and indicated that these primary crystals are much larger than indicated in a single section; crystals interlock and interpenetrate; the main stems may also become bent and change the direction of the markings. Dark areas among large crystals shown on etched surfaces are crystalline planes approximately parallel to the etching plane.

In general, the direction of crystalline growth is perpendicular to the isothermal surfaces in the cooling ingot, so the columnar crystals generally curve upward. Low carbon or alloy steels which solidify mainly as delta iron develop a secondary crystalline structure when they transform to austenite; this secondary system is related only distantly to the primary dendrites.

The coarse dendritic crystallization may be suppressed by "after pouring" at the correct time and temperature, by stirring the partly solidified ingot, or by teeming very cool. Such fine grained ingots of 1.10 per cent steel all had a low carbon axis (about 0.97 per cent carbon) and a high carbon top. In one experiment the ingot mold was set on a turntable, and during solidification the mold was oscillated back and forth through a short arc, each reversal being sudden. This produced an ingot with an outer columnar shell about 1½ in. thick with normal carbon, and a very sharp transition to small random crystals; at this plane the carbon analyzed 1.36 per cent.

Analysis of Exuded Drops

Analysis of exuded drops showed the degree of "segregation on a small scale" to be as follows:

	Analysis of Heat	Analysis of Exuded Drop
Carbon	1.10	1.87
Silicon	0.26	0.33
Manganese	0.30	0.46
Phosphorus	0.015	0.029
Sulphur	0.006	0.019

This is a measure of the differences in analysis of the cores of the dendrites and the mother liquor trapped between their branches (much of this segregation is later diffused). Arrow-headed and V segregation "on a large scale" is thought by Mr. Hultgren to represent channels through which such enriched mother liquor has been sucked to feed shrinkage.

From theoretical considerations, the ingot contour illustrated was developed which practically eliminated these "segregations on a large scale," very prominent in slightly tapered ingots. The tendency for segregation is mainly a function of the difference in temperature between beginning and end of solidification, and consequently each grade of steel should be cast in a mold of correct taper for that grade.

Discussion by Dr. Hatfield

In discussion Dr. W. H. Hatfield said there was nothing in the paper which was contrary to the findings of the Institute's Ingot Committee. It would appear that the author had not given sufficient weight to that evidence. Dr. Hatfield challenged the statement which was sometimes made, although not by Mr. Hultgren, that the ingot commitee had largely confined its publications to the statement of what was to be observed in current practice, and had not contributed substantially to a complete solution of the troubles of the manufacturer. The author seemed to deal only with small ingots.

Prof. J. H. Andrew suggested that if the author wished to study segregation as known in Great Britain he must obtain his ingots from a country other than his own, for he seemed to have very little segregation in his ingots of high carbon steel.

Making Machine Tools Safe

Adequate Protection Should Be Given at the Cutting Point, the Most Dangerous and the Most Difficult of All to Guard

BY LUTHER D. BURLINGAME*

THE seven seals of safety mark the vital steps by which the safeguarding of machine tools has progressed, seal after seal barring the way to safety having already been broken.

Looking back to the days when machine tools were built without guards and without any provisions for safety, we see the first seal broken when partial and limited guards were applied as a protection against gears, belts and other moving parts. The second seal was broken when makers supplied the complete guards with the machines as placed on the market. The third, when through a redesigning of the machines, gears and danger points were placed inside the machine out of reach, where no guarding was necessary. The fourth, when mechanical controls for shifting belts, operating chucks, changing feeds, etc., became the standard practice; the fifth when individual motor drives largely replaced the use of exposed belts and eliminated other features of danger. The sixth, giving attention to the location and lighting of machines and proper instruction in their use, including also matters of clothing, goggles, etc. The breaking of this sixth seal for safety is still in progress, as is the breaking of the seventh, giving protection at the cutting point, the most dangerous as well as the most difficult of all to guard.

THAT much has been done to make the operation of machine tools safe is pointed out in this article by Luther D. Burlingame, who has been prominently identified with the machine tool industry for many years. He emphasizes, however, that much remains to be done, especially along the lines of educating workmen to use safe methods in carrying on their work. As he aptly says, "It is not that we should guard machines less, but that we should educate for safety more."

In connection with provision for the control of feeds, speeds and direction by conveniently located levers and push buttons on the outside of the machine, within easy reach and away from danger points, is the feature of convenient and safe dual controls from different stations, so that the workman does not have to step around or reach over the machine. Modern equipment often also includes automatic oiling and automatic control of the coolant. It is important that levers and other hand-operated parts shall have sufficient clearance so that the hand will not be pinched or the knuckles "barked" when at the extremes of movement. It is a feature of protection from accidents as well as safety to the work and tools to have the levers always operate in the direction of the traverse or feed. Where hand-wheels, cranks or other hand-controlled elements are used, and where they may at times be operated at comparatively high speed, the mechanism should be interlocked in such manner that it will be disengaged so as not to revolve when the power feed is engaged.

When cone pulleys are used and belt shifting is thus required, it has not as yet become usual, except on heavy types of machines, to make belt shifting devices a part of the regular equipment, these still being considered as extras as are also power-controlled chucks, except on turret machines. The trend of the times, however, is toward the adoption of such features, not only because of utility as labor-saving devices, but also for safety.

More attention is being given to providing chain hoists and other accessories as a part of the regular equipment of the machine, so that heavy work and attachments can be moved with less physical exertion and with greater safety. Where chain hoists are used, the question of safety in testing the links of the chain becomes an item for attention. Where power hoists are used, a "kink" is to have the hand-pulls arrow-headed, with the one that lifts pointing up and the one that lowers pointing down.

A convenience in placing heavy work between centers is to use "cradles" in which the work can rest so that when the footstock center is advanced the work is raised from the rest sufficiently to clear. After the operation is performed, the withdrawal of the center allows the work again to rest in the "cradle" ready for removal. This method is especially useful for heavy work in grinding and polishing machines as well as in some classes of heavy lathe work.

Automatic Operation Reduces Accident Hazard

The more completely stock to be operated on can be moved automatically by power, the greater is the reduction of the accident hazard. An example is in the magazine feed for automatic screw machines by which a new piece of stock is automatically fed into the machine upon the exhaustion of the previous piece.

The fifth seal to be broken for safety is in eliminating the cone drive by substituting a constant-speed belt drive, or better still by using a motor drive. It is generally conceded that the use of a motor drive increases the safety of operating a machine, although it is important that electric equipment should be properly installed and carefully inspected to avoid lurking dangers. As compared with a machine of the same class driven by a belt on a cone pulley, the motor-driven machine

*Industrial superintendent, Brown & Sharpe Mfg. Co., Providence, R. I. Abstract of a paper delivered at the annual meeting of the power press section of the National Safety Congress in Chicago, on Oct. 9.

represents a decided step forward in measures for safety.

When a machine is being repaired or oiled, the power should be shut off. Many insist on having the starting device locked so that the machine cannot be started until after repairs or adjustments are completed. Such measures, although some may think them extreme, help to keep safety in the minds of workmen.

Safety is affected by the location of machines as regards daylight and artificial light, aisles, distance from walls, columns, and other machines. Keeping the machine in good repair is also an important means of preventing accidents. The human element must always be reckoned with and is often a greater factor than guarding in preventing accidents. The safety program along this line is, however, intangible, and therefore does not always receive the attention that its importance warrants.

Fool-Proof Guarding Is Necessary

The fact that many operatives who have never before seen the inside of a machine shop are put to work on machines and that because of modern equipment employees with lower mentality as well as of less experience are often used makes the need of "fool-proof guarding" and instruction in safe methods of work more essential if accidents are to be avoided. Training workmen to become "safety-minded" by instruction, by giving them responsibility on safety committees and by the safety leadership of foremen and management are factors in breaking this sixth seal for safety.

When operators handle work where sharp or rough edges are liable to cut the hands, it is sometimes advisable to wear gloves; but generally speaking, the use of gloves around a machine adds a hazard which more than offsets any advantage gained. It is found that an unexpectedly large number of accidents, some being rather serious in nature, result from slipping wrenches. This is often due to the nibs of the wrench being spread so that it does not properly fit. The remedy is frequent inspection and repair of wrenches.

The wearing of caps by women operators of machines is a reasonable requirement to eliminate painful and disfiguring accidents. The wearing of goggles as protection from flying chips, or grindings, should become more and more the established practice.

The tendency of old employees to resist steps taken for their own good is illustrated not only in the use of goggles, but also when the use of safety dogs is required. Such workmen will often hunt up old-style dogs with projecting set screws, perhaps secreted for the purpose, instead of using the modern lathe dog with safety screw. To eliminate from the shop the old and more dangerous type of dog is a way to overcome this tendency.

Most Machinery Accidents Occur at Cutting Point

The seventh seal, which, when broken, will still further lead the way to safety, is in guarding the cutting point, which has already been named as the point of greatest danger. In woodworking machinery a greater amount of study has been given to such guarding, and perhaps for that reason more satisfactory results have followed. Cannot equal study give like results for machining tools? The flying chips from lathe work, the hazard of revolving cutters and drills, the danger from punch presses and shears and from grinding wheels will illustrate. At a machine tool factory, with over 6000 employees, less than one-fourth of the cost of compensation for accidents was for cases involving machinery, but more than three-fourths of the cost which came in this classification was for accidents occurring at the point of cutting, showing the importance of finding means for breaking this seventh seal obstructing the way to safety.

A lathe chip guard, with a glass opening, so that the work may be safely observed, is widely used, but it has limitations for many kinds of work, in fact to a point where its universal adoption cannot at present be recommended. The same can be said about milling cutter guards. Many designs have been brought out and some are satisfactory for use on certain jobs; but so far as known no guard universally applicable for this purpose has as yet been devised. The simple expedient of providing a brush to wipe away the chips so that the conditions of cutting can be seen and strict rules that the fingers shall not be used for this purpose eliminate one of the greatest hazards in milling machines. Another expedient used to advantage is to have a stream of coolant under pressure so that with a hand-operated valve a stream of sufficient force can be thrown against the cutter to clear away the chips. These expedients, however, are palliatives, not cures.

Guarding the grinding wheels is quite general, but a hazard exists for internal grinding for it does not seem practicable to provide a guard which can remain in place. The particular hazard here is that when the wheel is run back out of the work and a gage is used for testing the hole, there is danger of its releasing suddenly and the hand being cut against the revolving wheel. There are designs of guards to protect against this danger by the guard being automatically swung into place in front of the grinding wheel when the latter is withdrawn from the work, thus protecting the workman in case his hand should slip.

Important to Guard Against Fying Chips

Questions of guarding against flying chips, where guarding in the past may have been of doubtful expediency, may, when machine tools are designed for the record-breaking speeds now being experimented with, become of paramount importance. It is also a case where the human element must be given full consideration in order that safety may be insured, these more hazardous operations requiring workmen with steady nerves and superior intelligence, the demand being as great or greater, than in the case of the old-time mechanic, who, while he could produce marvelous results that handicraft skill required, might not be sufficiently versatile to fit himself to the equally exacting, although modern, conditions.

When definite steps to break the seals of safety were taken a quarter of a century ago, the general impression was that the remedy for accidents was for employees to guard gears and other moving parts of machines and that when these first and second seals were broken, the work would be completed. An analysis of accidents soon showed that by far the greater number were not caused by lack of physical guarding or equipment of machines, but were due to other causes, involving carelessness on the part of workmen or laxity in general shop instructions and practices; that, while but 15 or 20 per cent of accidents could be prevented by guarding, the most important effort was needed along the lines of educating workmen and foremen to use safe methods in carrying on their work.

Accidents Reduced 50 Per Cent by Foremen's Cooperation

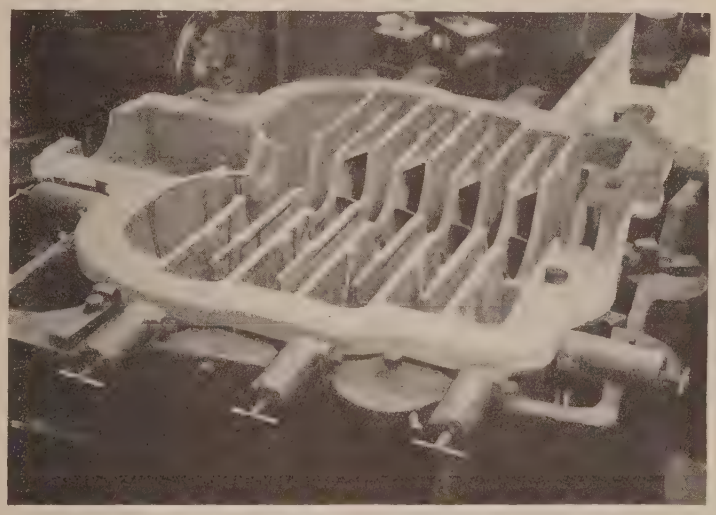
Over and over again it has been shown that when the foremen's cooperation can be fully enlisted, accidents, even in a well-ordered and well-guarded shop, can be cut in half. It is not that we should guard machines less, but that we should educate for safety more, so that the future may see this sixth seal of safety fully broken and the seventh, having to do with the still greater hazard at the point of cutting, made a matter of intensive study in order that it, too, may yield to the skill of the safety engineer.

Modern Tools Cut Production Time

Centrifugal Compressor Machining and Assembling Reduced from Three or Four Weeks to Three 8-Hr. Days by New Manufacturing Layout

CONFRONTED with the problem of manufacturing centrifugal compressors heretofore made by another company for its Centrifugal Refrigeration System, used for cooling theaters and other public buildings, the Carrier Engineering Co., Newark, N. J., has developed a method that reduces machining and assembling time from three or four weeks to three 8-hr. days.

Although the problem involved manufacture of the impellers, impeller shaft and other parts of the compressor or gas pump, description of machining the casing will serve to show the thoroughness and skill with which the entire proposition was handled. Also, this part of the manufacturing problem was, perhaps, the most troublesome, and in the selection and adaptation of machine tool equipment, fixtures, tools and gages, traditional methods were largely disregarded.



IN Redesigning with Reference to Manufacture, the Number of Parts in the Compressor Casing Was Reduced from 28 to 2 and Those in the Labyrinth from 216 to 22

As previously made, the pump casing consisted of 28 separate parts that necessitated some 44 machining operations. Being the "neck of the bottle" in the manufacturing process, this casing was closely studied and a way found to cast all parts in each half integral, which permitted machining the two halves in one set-up, thus combining the 44 operations. The redesign also resulted in reducing the number of parts in the labyrinth from 216 to 22. There is but one other machining operation on the casing, final reaming, which is done on a machine using special "combined" reaming tools, after the two halves are bolted together.

The casings are close-grained gray iron castings. Machining operations consist of milling the joints, boring six, seven or eight stages, boring and facing the impeller bearings and grinding the joints—all of which is done at one set-up on the 86 x 72-in., 18-ft. bed, planer-type milling machine illustrated, which was built by William Sellers & Co., Inc., Philadelphia. This machine has one rail milling head, one right-hand side-milling head, a grinding head on the rail, and a boring head that is carried on an extended apron integral with the left-hand end of the cross-rail. Being standard units, the two milling heads permit use of the machine for other work when the pump casings are not being machined.

Each half casing is set and locked in a separate fixture, which by means of a tongue and groove is located positively on the table, with relation to the boring head and to the corresponding table locks. The castings are placed joint upward in the fixtures and the first operation is milling this joint. This is done as a standard planer-type miller job, using a 12 or 16-in. inserted blade cutter in the rail head. One rough and one finish cut is taken, 3/16 in. metal being removed in all.

The next operation, boring out the centrifugal pump stages, is of unusual interest. For this a special Davis boring bar is bolted to the boring head faceplate and supported by outboard bearings fastened to the cross-rail, as shown. This bar, which is 7 ft. long and weighs more than 2000 lb., is made up of a number of integral disks corresponding to the number of stages in the pump. These disks and the bar proper contain the cutters necessary to bore and face the pump stages to the exact diameters and thicknesses. The cutters, 86 in all, are removable and are accurately set by micrometer gages, it being possible to remove and grind any cutter without disturbing the others. An idea of the accuracy of this work may be gained from the fact that on this casting, which weighs about 3000 lb. there are 41 dimensions calling for a limit of plus or minus 0.001 in., four calling for a limit of 0.002 in., 18 dimensions calling for a limit of plus or minus 0.0025 in., two requiring a limit of plus or minus 0.004 in., and 51 requiring a limit of plus or minus 0.005 in.

When the boring bar is in place, the table is traversed to the fixed stop opposite one of the castings or fixtures, and is locked in position. The boring head, driven by the rail milling head, is then set for the proper speed and the boring bar is set in motion. The crosshead, adjusted by unusually large screws, is then fed down slowly and steadily, carrying the rotating boring bar with it. When the cutters have been fed into the casting

the proper distance, the various pump stages, and the end and the intermediate bearings for the impeller shaft have been finish bored and faced to limits required. In this operation the cutters are fed down to a point which is 0.005 in. below the true center line, the gage illustrated herewith being used in this connection.

One half being finished, the cross-rail is raised and the table unlocked and traversed to bring the other half of the casing into position, which is bored out in exactly the same manner as the first.

The foregoing boring and facing operations were confined to surfaces of relatively small diameter. A second boring operation on the larger surfaces is then performed. For this a boring bar of similar design but larger than the first is employed. It is supported and driven in the same manner as the first, but is revolved at a slower speed.

Casing Joints Ground at Same Set-Up

Boring and facing operations on the two halves of the casing now being completed, the casings are then prepared for the final operation on the planer-type milling machine, that of grinding. The fixture clamps are loosened to relieve the castings of strain, the boring bar is removed and the grinding head brought into operating position. Then by traversing the rail and adjusting the grinding head slide, the wheel is set to grind off the 0.005 in. previously allowed for finish. Length of travel and reversal of the table is controlled as on a planer, except that the speed in both directions is the same. The grinding head is arranged with screw feed across the rail.

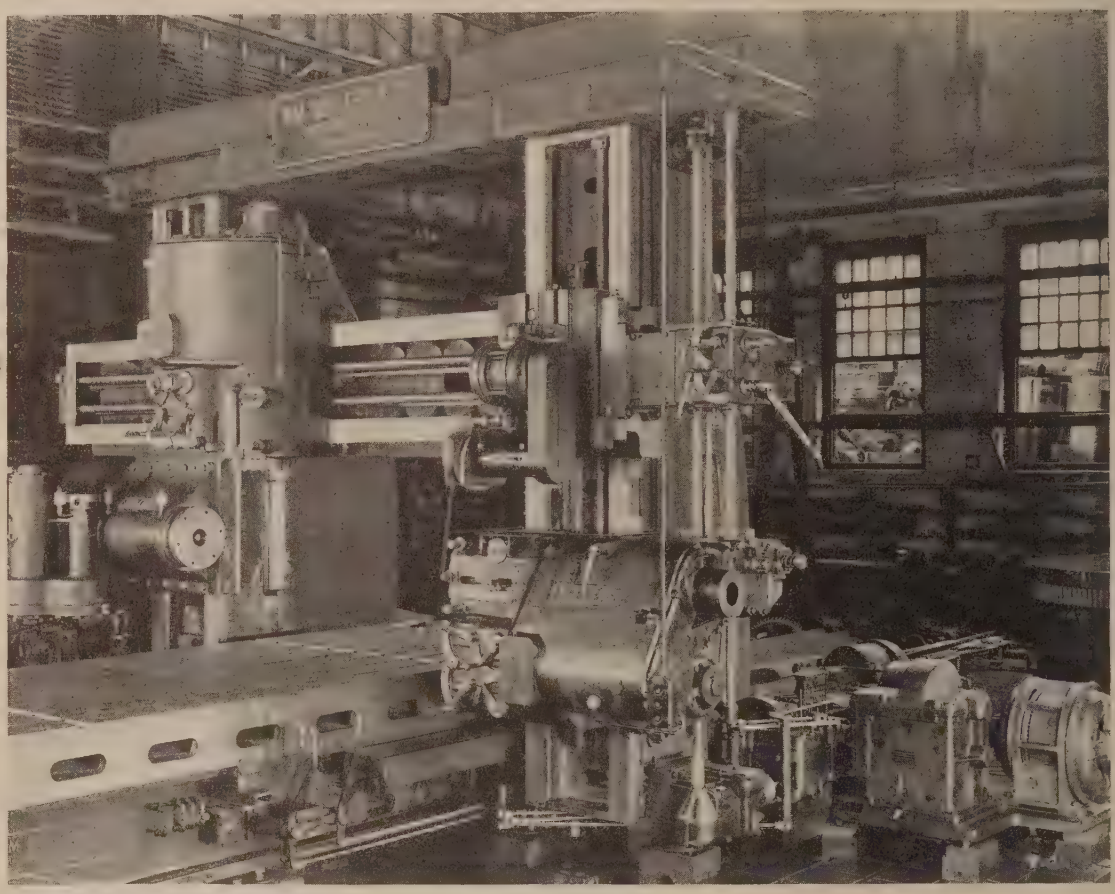
Reamer Bar Is 7 Ft. Long, 7 In. in Diameter

The casings are then removed from their fixtures, bolted together and then the bore for the impeller shaft is reamed. After the cases are taken from the machine, the two extreme surfaces which are used to support bearings are accurately scraped to a half-circle gage, which assures the casing being split on the center. They are then joined, with a plug in each end, and the dowel holes reamed; this assures proper alinement of the two outside holes.

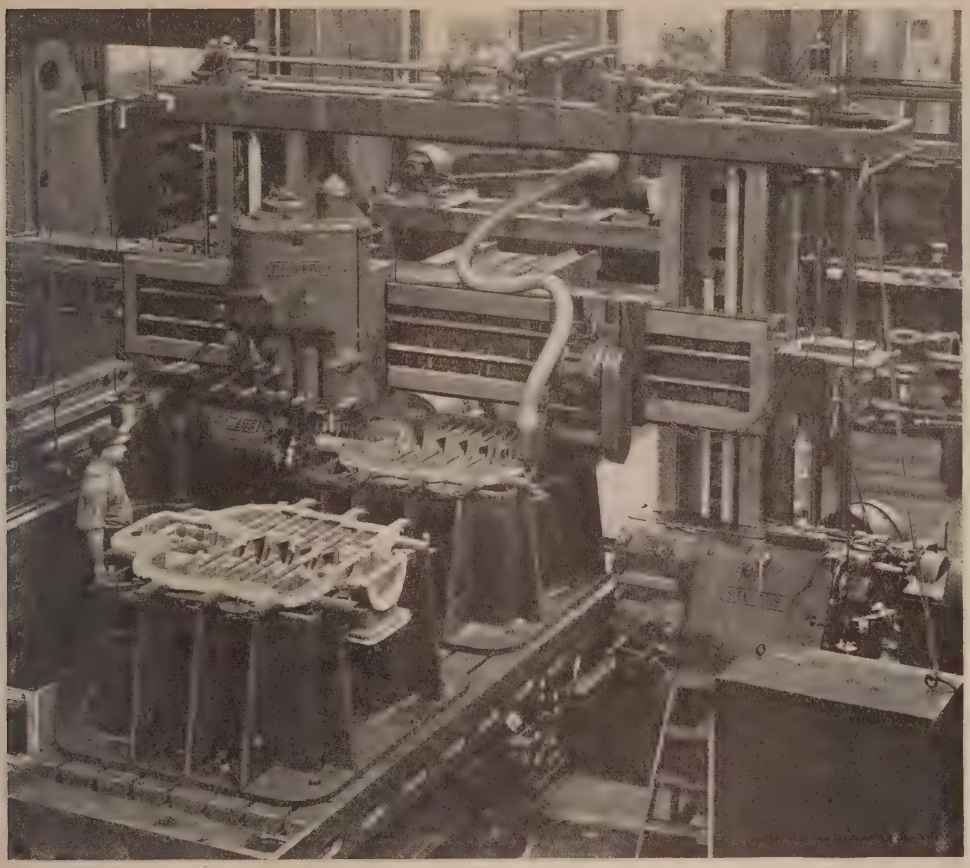
The 7-in. diameter 7-ft. long reamer bar shown herewith is then placed in the case on special bearings which replace the standard bearings used later. It is revolved and fed forward a distance of 2 in., when all the surfaces in the machine are accurately alined and sized; the casing is then ready for assembly.

Planer-Miller Heads Have Individual Motor Drive

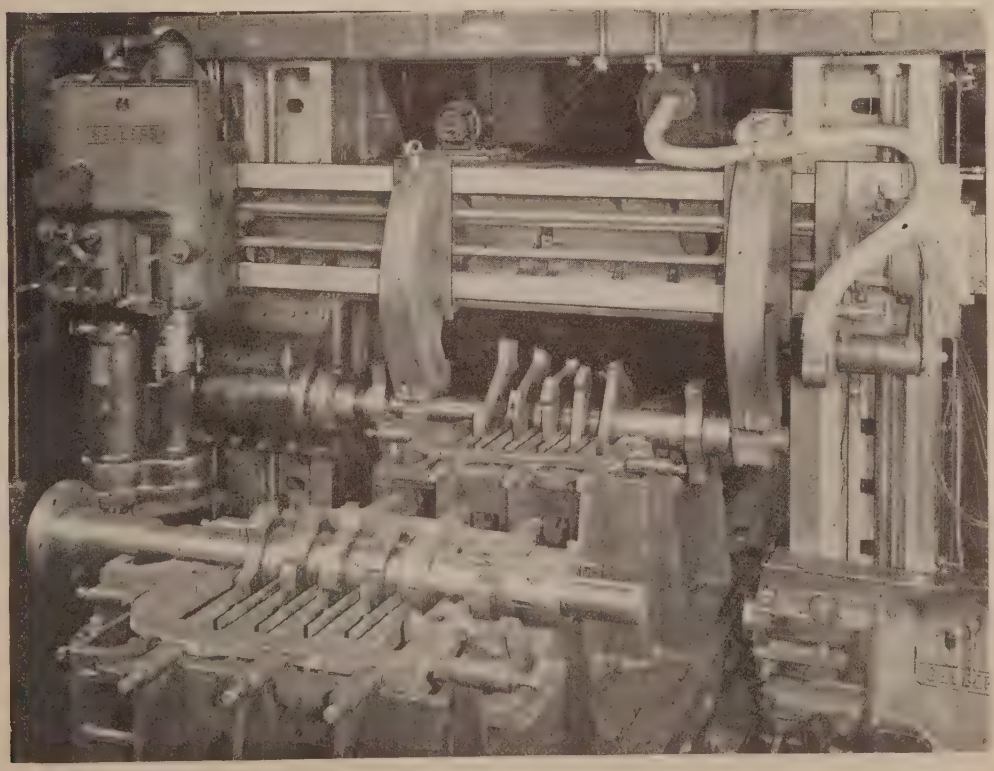
The Sellers planer-type miller is a slight modification of the standard machine described at length in THE IRON AGE of Nov. 1, 1928. Heads have individual motor drive,



IN Addition to the Rail and Right-Hand Side Milling Heads, the Sellers Planer-Type Miller Has a Grinding Head, on the Rail, and a Boring Head That Is Carried on an Extended Apron Integral with the Left-Hand End of the Cross-Rail. Heads have individual motor drive. Control is by push buttons and is completely interlocked

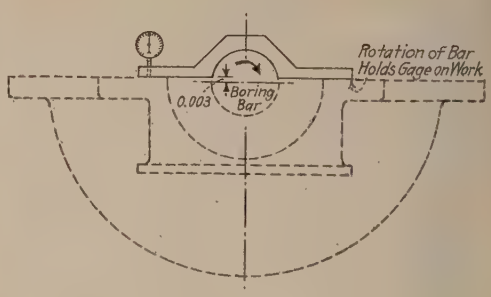


THE Two Halves of the Casing Are Machined in One Set-Up, Except the Final Reaming After the Halves Are Bolted Together. Operations consist of milling the joints, boring the stages, boring and facing the impeller bearings, and grinding the joints. The machine employed is a slight modification of the standard planer-type miller built by William Sellers & Co., Philadelphia



FOR Boring Out the Pump Stages a Special Davis Boring Bar Is Employed. This bar, which is 7 ft. long, weighs more than 2000 lb. and contains 86 accurately set cutters, is bolted to the boring head faceplate and supported by outboard bearings fastened to the cross-rail, as shown

FOR the Reaming That Follows the Planer-Type Miller Operations, a Special Reamer Bar That Is 7 In. in Diameter and 7 Ft. Long Is Used



GAGE Used in the Boring Operation. The boring bar is fed down until the gage rests on the casing—the indicator reading zero—which leaves 0.005 in. for grinding

as described in connection with the standard machine, and 16 different speeds, ranging from 15 to 300 r.p.m., are obtainable through sliding gears and clutches.

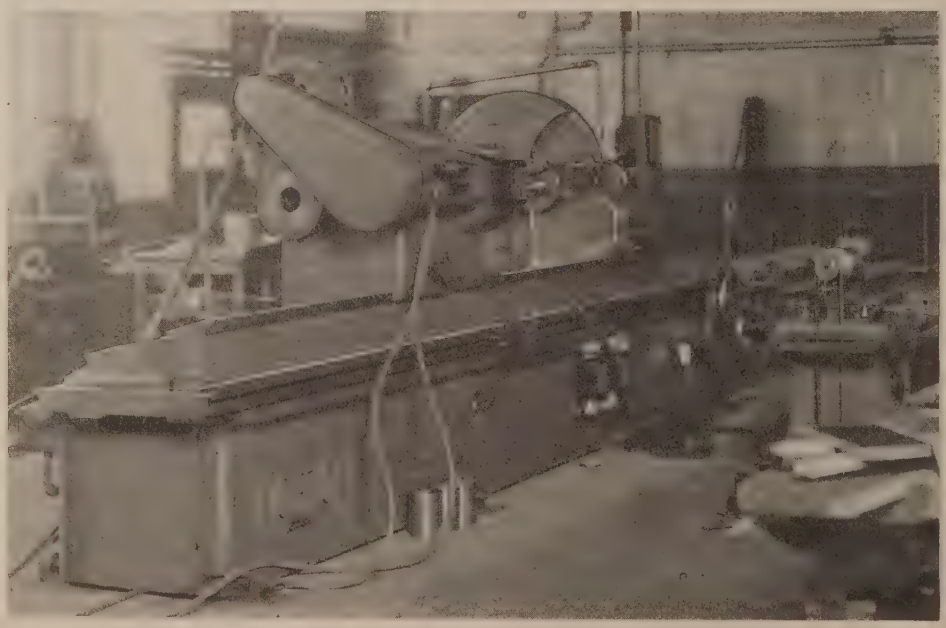
The special boring head, driven through a coupling by the rail milling head, utilizes a ground worm and a worm wheel to revolve the horizontal boring spindle. It has a range of speeds from 1 to 20 r.p.m., obtained through the gear changes in the milling head. The grinding head is equipped with a 12-in. wheel which is mounted on a horizontal spindle and driven by a 5-hp. motor through Texrope drive. Both the motor and the grinding spindle are mounted on a slide for fine adjustment.

The extended back type cross-rail, the deep box table carried on one flat and one double-vee way, the table drive and bed construction are the same as in the standard machine. A change gear box and rheostat provide the necessary feed range and rapid traverse, this type of drive being said to assure the steady feed so essential to smooth and accurate finish.

All motors are controlled by push buttons from panels located on both sides of the table, which arrangement makes it unnecessary for the operator to move from one side of the machine to the other to start, stop or reverse the motors. Control of the machine is completely interlocked; feed motors cannot be started in advance of the cutter motors; overload on the cutter motors will slow down or stop the feed as occasion demands. Safety clutches are added as precaution against abuse.

Impeller parts are die formed, the material being stainless steel of special quality. When the impellers are assembled on their shaft, the entire assembly is mounted in the massive 36 x 144-in. special Norton grinder illustrated, which finishes all revolving surfaces. Following this the impeller unit is dynamically balanced.

The grinder, designed for unusually large diameter work, is similar to the standard 28-in. Norton machine, except that the wheel-slide is hydraulically operated and controlled by one lever at the front of the machine. A separate motor is used for driving the hydraulic mechanism, and another motor for the lubricant pump.



WHEN the Impellers and Shaft Are Assembled, a Special 36 x 144-in. Norton Grinder Finishes All Revolving Surfaces. The unit is then dynamically balanced

"Courageous Spending Needed in Industry"

Charles F. Abbott of American Institute of Steel Construction Says It Is "Wasteful to Be Penurious"

IT is no extravagance to spend money largely, but rather it is wasteful to be penurious, declared Charles F. Abbott, executive director, American Institute of Steel Construction, in an address before the National Industrial Advertisers' Association, which is meeting this week in Cincinnati.

Industrial and commercial success, Mr. Abbott said, has been predicated upon a courageous expenditure of funds and a willingness to be generous in all worthy efforts.

Mr. Abbott went on to say:

"Today successful businesses are conducted on an entirely different plan from that which prevailed in the pre-war days.

"To manage a business successfully requires as much courage as that possessed by the soldier who goes to war. Business courage is the more natural because all the benefits which the public has in material wealth come from it.

"The problem of sales management is far more important than it ever was. We must not only teach our salesmen how to sell, but, what is of greater importance, we must teach the public how to consume.

"In the past, business has been operated on what we may call the economy principle, the principle of paring down and of saving; and it has a wonderful and worthy background. America would never be what it is without it.

Creative Spending Policy Needed

"But as this policy has had to pass; as we now understand that the hold-tight, spend-as-little-as-you-can principle must give way to a new more constructive and aggressive outlook—so business is now beginning to emphasize the principle of creative spending rather than that of pinching economy. We feel it in our family, in our business, and in our national attitude.

"We do not need the old quality of caution today nearly so much as we need the new, the courage to plan and chart enterprise. In days when panics were just around the corner we naturally needed a great deal of caution and watch-dogging, but the panics of business are gone.

"We now have bigger things than merely guarding what we already have. We have a vast creative job ahead of us to raise the standards of living of the 73 millions of people who still exist at or below the minimum comfort level.

"We now know that if we are selling industrial equipment our market is limited by the sales of our customers to the public. If they could sell more we could sell more to the factories; therefore the need of studying conditions that underly consumer buying.

Discarding Old Economic Ideas

"We are discarding the old economic idea that business is limited and that we must fight like three dogs over two bones to get it. We are realizing that an industry full of unequal units—some very modernly tooled and some poorly tooled; some using up-to-date methods and some ancient methods; some practicing enlightened principles and some practicing unwise principles—need not be accepted with no change possible, simply as the way fate deals out the cards.

"We know that something can and must be done about it. We must lift up an entire industry toward a higher average in tools, methods, and business principles. We are willing to spend money to accomplish it—a great deal of money, individually and collectively. That is courageous and creative spending, the statesmanship of consumption, and genuine progress.

"Cyrus Curtis, head of the Curtis publishing interests, once said he had an executive in his employ whom he had to discharge *because he could never teach the man to spend enough money!* The man had been trained in the old school where all the credit went to the man who *saved* the most.

"When the time came for a decision to spend $100,000 of Cyrus Curtis's money, promptly and effectively, this man's hand trembled, he procrastinated, and the business suffered. Of course, some other man, even more incompetent, might have spent too lavishly and thoughtlessly. What was needed was a well balanced, keen-minded man who knew how to spend creatively; a man who would decide promptly and courageously, and then spend.

An Example of Courageous Spending

"No better illustration of courageous spending exists than that of Ray Smith, president of the A. O. Smith Corporation, Milwaukee. With nothing but an idea, about eight million dollars was appropriated and expended before the idea was found to be practical. A great deal of courage and a lot of money were required, but the production of automobile chassis was increased from a few hundred to 10,000 a day. At the same time the manual staff was decreased to a fraction. Four hundred engineers engaged in research made possible another reduction in the sales force and only eight are now required to dispose of the output. To go a step further, the same enterprise was shown in the development of welded steel pipe, with the result that 26 miles of pipe a day can now be produced. Simultaneously other plants engaged in producing automobile chassis and steel pipe were rendered obsolete, unable to compete with such remarkably low costs. Without the courage and the spending as inaugurated by this one man the public would never have received the benefits of these unusual results in cost reductions.

"Instead of the hang-on-to-the-dollar type, there was needed the spend-plenty-of-money-promptly-on-competent-analysis type. The old guiding general principle was saving; the new principle is construction. Both are wonderful, useful American traits, but right now we need the latter type.

Predicts Many More Mergers

"Business is now being transacted on a large scale because our people have the income which makes large scale consumption possible. Small business units cannot successfully serve such a public demand. There have been nearly 2000 mergers in the past two years. More are to follow because it is the large organization that alone can meet efficiently the problems of distribution that modern conditions are creating.

"Where smaller units of industry can operate economically in the field of production they are organizing into institutes and similar associations in order that they may take advantage of the economies possible through co-operative effort in the field of distribution.

"These organizations, as well as co-operative merchants, are successful only so far as men can be found who can operate them, men who understand big-scale spending, men who can courageously authorize creative advertising appropriations running into millions of dollars and conduct their affairs with the greatest economies; men who can competently make big decisions and make them promptly when the necessary facts are in, and if the facts are not in, then go out and get them. That is the modern research technique which molds the judgment of the courageous spender.

Plan for Tomorrow's Profit

"We have already learned, as Carnegie taught us in the steel industry,

that our plans should be for tomorrow's greater profit. This is what should govern our spending today—not what we did or spent last year. Carnegie scrapped one steel process after another, sometimes before the shine was off the million-dollar equipment, simply because he was investing in greater future profits and a greater competitive advantage. By doing so he plucked the steel leadership right out of England's hands, never to return.

"The steel skyscraper has done the same. So profitable is this creative process that we are tearing down modern buildings, only 10 or 12 years old, to erect others in their place which will make more money for the owners. A man who owns a 12-story building, fairly modern and built 10 years ago, standing on ground rapidly becoming more valuable, finds that he is unable to get out of that building a proper return on the increased valuation of the land, or as large a return as possible. But that is not all. His tenants cannot get the up-to-date elevator service, office standards and comfort from the building erected 10 or 12 years ago, so rapid has been our advance in building conveniences.

"Exactly the same holds true of the manufacturer who decides to own a modern plant. He might believe that he could continue to manufacture in his old tumble-down factory, erected before modern ideas of routing or sanitation were known. But if he considers the cost of handling materials, and his engineers make full use of every new tool, new method and new principle; reducing labor to a minimum and applying the latest equipment, the manufacturer will undoubtedly find that he has been paying an immense premium every year to remain in the old plant with the old equipment.

"It all figures down to an engineering and mathematical basis. Here lies the big task of tomorrow for all industrial advertisers—to sell the idea of creative spending, and even of creative wasting, to more people.

A Need for Bold Spenders

"We need bold, determined, aggressive spenders; daring but cool; risk-taking, confident, even colossal spenders. Does this sound startling? Don't be afraid. Carnegie was called a colossal spender because of his fast scrapping policy, but Carnegie literally set the modern American industrial pace.

"In our keen interest in Ford and the automobile industry we forget that the steel industry in the United States really took the lead and changed the entire program of American industry.

"Carnegie was the Ford of yesterday, and with his scrapping policy he laid the foundation on which modern business rests. He introduced a new kind of dynamics into business—speed, punch and courage to go forward, whatever the cost in waste, if the engineering facts pointed the way. He introduced the line and staff organization and respect for experts and for research.

"It is no accident that the present has been called the steel age. Steel not only holds up our great skyscrapers, but the history of steel is the history of industrial America.

"We need men who will go around a factory or an office with just the same determined look and say 'Out with it—I don't care what he says!' We may dislike to see the junk man make much money, but take it from me, for every dollar the junk man makes, we would make a thousand.

"Hanging on to old, out-moded goods is a terrific brake on progress. A man once said to me 'I have a suspicion that any city would be better off if an earthquake came along every 10 years and shook to pieces everybody's factory, office and equipment. It seems as if nothing but an earthquake could ever make some people wake up to their need for up-to-date equipment. Did you ever notice how vastly improved and more efficient and prosperous a city is that has had an earthquake or a flood or a fire?

"'There's no mystery about it—everybody buys new equipment, business is brisk, and production is increased because the tools are better. And why shouldn't everything be much better? It is new and up-to-date.'

A Job for Industrial Advertising

"Industrial advertising interests should assume the greater part of the burden of teaching courageous spending. You must do the educating. It is a big task to break down habit and general outlook on life, which is the real problem that stands in the way, but it can be done.

"It is often easier to sell a man a yacht, which will prove to be a big expense to him, than it is to sell him a profit-making idea of value to his business. We must never let up in our fight, because our industries will suffer by comparison if we do. We cannot lag behind in this fast, modern pace.

"Only the man who is sure of his results is courageous in his spending. He has no doubts as to the outcome. The steel industry has produced some such men, though it still is in need of developing a better public consciousness. 'As hard as steel' is quite generally recognized, but that does not improve the standing of the material in the eyes of the public. If, instead, we could get people to say 'as fine as steel,' we would be accomplishing something. But to do that would require a real advertising appropriation.

Cites George M. Verity's Policy

"George M. Verity is a good example of the courageous spender. 'Go ahead and try' was his slogan in August, 1914, when Armco iron was first produced. His policy was to go ahead and find out what the buyer wants, go ahead and find out how best to produce it. Go ahead and do. Go ahead and tell. He coordinated his selling plans with his production—he did not hesitate to discard the supplanted machine. He has kept as a permanent asset the first 'go ahead' order.

"By advertising to the employee, the stockholder, and the public, as well as to the ultimate consumer, the American Rolling Mill Co. has developed a consumer acceptance for a raw material. It has not hesitated to continue advertising even in a notorious sellers' market because it wished to retain the good will of its customers. It has engaged in collateral advertising to promote the sales of the fabricator of its material. Such advertising has lifted Armco iron out of the rut of raw products, and placed it in the forefront of consumer thought. It has been expensive, but it has more than paid dividends. That is what I call courageous spending.

"In the whole field of advertising media there are no more important publications to be considered or more thoroughly deserving a larger part of the appropriation than the trade and industrial publications. They form the very basis for the essential educational effort so necessary if the industry itself is to be advanced. They blaze the trail for creative spending because they speak for the industry and thereby assert its leadership. The public is recognizing more than ever before that trade publication advertising is the real, dependable source of information.

Doing a Better Job in Advertising

"We are doing a greater and better job in advertising than we ever dreamed of doing in the old days. It is costing more money, but it is breaking down resistance, promoting bigger things because it is genuinely creative spending.

"The technical and industrial field is rapidly coming into the bigger sphere of usefulness, and he is a bold man who can predict where this era will end. A single advertiser today probably spends as much as the entire industry did in the old days when industrial advertising was looked upon solely as a handout, or as mere good will or institutional advertising.

"I have an idea that 10 years from now, perhaps less, we will look back even on today as mere pioneering in the bigger things to come in creative spending. But I am also sure that your organization will continue to be, as in the past, at the very tip of the forefront of the advance."

An International Heating and Ventilating Exposition will be held in the Commercial Museum, Philadelphia, under the auspices of the American Society of Heating and Ventilating Engineers, Jan. 27 to 31, 1930. President Thornton Lewis of the society has named an advisory committee and a cooperating committee for the exhibition, and Charles F. Roth, Grand Central Palace, New York, is manager.

Knee and Column Type Miller

Ease in Changing Feeds and Speeds a Feature—Plain, Universal and Vertical Units Made

AN improved and simplified method of changing speeds and feeds, and independent directional control levers for cross, vertical and longitudinal movement of the table, are features of the new No. 3 Cincinnati knee and column type miller which has been placed on the market by the Cincinnati Milling Machine Co., Cincinnati. This machine is being manufactured in the plain, universal and vertical types, operated by belt or inclosed chain motor drive.

Change in speeds and feeds is made convenient by means of an automatic power shift for the spindle speeds as well as the table feeds, controllable from either the front or rear of the machine. To change speeds the operator disengages the starting lever, throws the speed and control lever *E* (or lever *C* if working from the rear) to "Speed." The speed dial *B* rotates while the lever is in this position. When the speed desired on colored dial *B* appears opposite the arrow, the operator releases control lever *E*, pushes starting lever *A* away from the column, brings it back and then pushes it up.

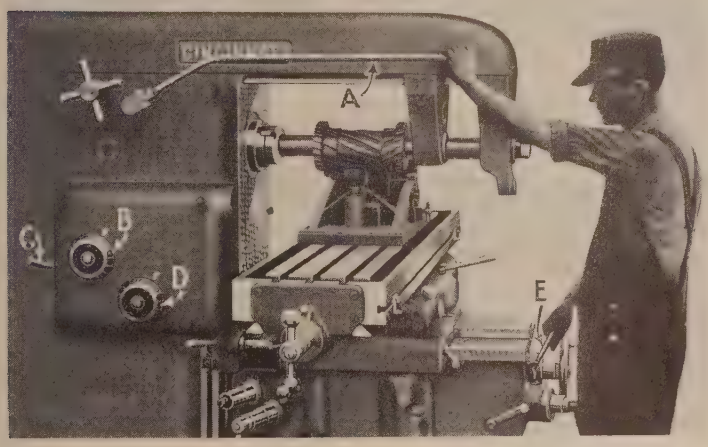
To change feed, the operator throws speed and feed control lever *E* (or lever *C* if working from the rear) to "Feed" position on the plate. This lever is held on this position until the desired feed on the colored dial *D* registers with the arrow and is released. It is claimed that the ease with which these changes can be made will result in the operators being more likely to change the feed and speed demanded by the cut, thus giving greater production and a higher quality of the milled surface.

Every movement of the machine's table has a power rapid traverse, in addition to the power feed, operated from either the front or rear. The rapid traverse is available with the spindle either stopped or running. Rapid traverse rates are: Longitudinal, 100 in. a minute; cross and vertical, 50 in.

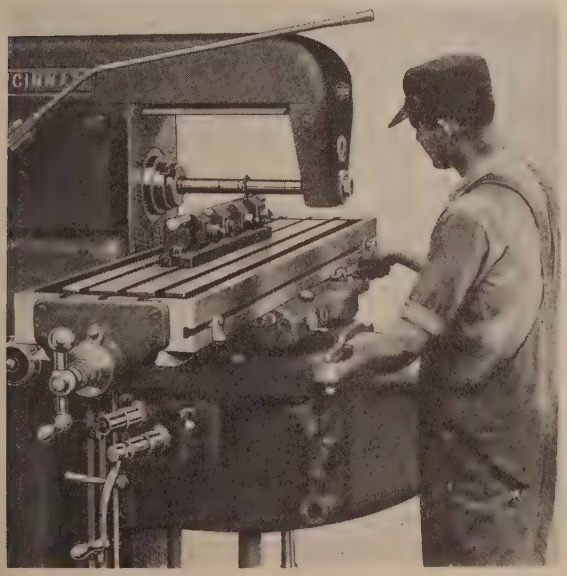
Illustrations show the operator taking a cut, with his right hand on the directional control lever and left hand on the power quick traverse. To rapid traverse out of the cut, he shifts the feed lever in the opposite direction and pushes down on the power quick traverse lever. It is necessary for the operator to hold this lever in position; as soon as he releases his hand, it clicks into feed. The rapid traverse for the table on the plain machine can be automatically disengaged by dogs on the side of the table. In such case, however, the operator holds the power quick traverse lever in position.

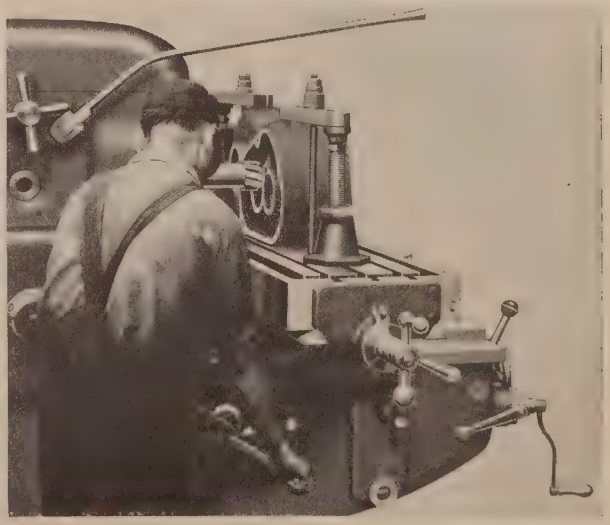
Hand adjusting cranks at the rear as well as at the front of the machine are provided for getting accurate cross and vertical adjustments. New micrometer dials, easily read, provide for accurately getting the desired hand feed.

The Cincinnati double mounting of anti-friction bearings at both the front and rear of the spindle, with a floating rear bearing, are used on this new machine. New proportioned



SPINDLE Speeds and Feeds Are Changed from Front by Power. To change speed, operator (upper left) pulls outward on starting lever and shifts lever at front of knee. Front independent directional control of table, knee and saddle movement and power quick traverse are features of machine. Operator (lower left) is taking cut with right hand on directional control lever and left on power quick traverse. Rear control of hand feeds is illustrated (lower right) by operator making accurate cross adjustment from rear with hand adjusting crank having large micrometer dial





gears slide on heat-treated spline shafts. Gear contacts in the spindle drive have been reduced, giving four on the forward and five on the reverse, thus making a positive direct drive. The rectangular overarm has been increased in size and the two arbor supports are made of aluminum, with automatic lubrication provided for the bearing collars.

A cutter coolant pump having a capacity of 8 gal. a minute is supplied as standard equipment. The mechanism within the column, including the spindle drive, runs in a bath of oil supplied by a gear pump inside the column. A pump located in the knee automatically lubricates the knee, while the saddle and table are lubricated by a one-shot oil system at the left end of the saddle.

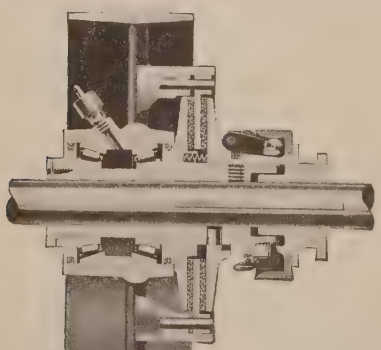
The leadscrew construction has been improved and the elevating screw—a single piece screw—has been substituted for the sleeve formerly used. The general proportions of the knee, column and other parts have been increased in dimensions. In addition, narrow guides and new type gibbing have been provided.

The table has a working surface and a size overall of 15 x 62½ in., with three 13/16-in. T-slots. The table on the universal type swivels 45 deg. The longitudinal range of all three types is 34 in.; the cross range of the plain and universal machines is 12 in., and the vertical type, 16 in. The vertical range on the plain type is 20 in., the universal 19 in. and the vertical 12 in. The machine is operated by a 7½-hp. motor running at 1720 r.p.m. The floor space occupied by the plain and universal types is 106 x 113-in. and by the vertical type 90⅝ x 113 in.

New Edgemont Disk Clutch

EASE of adjustment is a feature of a new disk clutch designated as the type SF which is being marketed by the Edgemont Machine Co., Dayton, Ohio, for a variety of applications, from countershafts to machines of all kinds. It is designed for transmitting either low or high speeds and for either slow and easy or quick pick-up of the load.

The mechanism is provided in a complete line of pulleys, with either oil-sleeve bearings, Timken roller bearings, and Fafnir transmission ball bearings. They are also made in extended sleeves, on which pulleys, sheaves, gears, etc., can be mounted. The mechanism alone can be furnished to those desiring to make their own mountings.



Single Adjustment, Made With One Hand and Without the Use of Tools, Is a Feature

Adjustment of the clutch may be made with one hand and without tools; it simply requires pressing down on a lock lever and turning the adjuster until the lever snaps into the next slot. Renewable asbestos metallic liners of large friction area are used, and the steel cam and rollers are hardened to assure long life. The design is such that it is impossible for centrifugal force to engage the clutch or cause dragging at any speed. Levers push on the plate without sliding action, thus eliminating wear at this point. The clutch is easily operated, rollers in long levers, and there is no sliding under heavy pressure. This permits the machine to be inched along.

Electro-Mechanical Riveting Machine

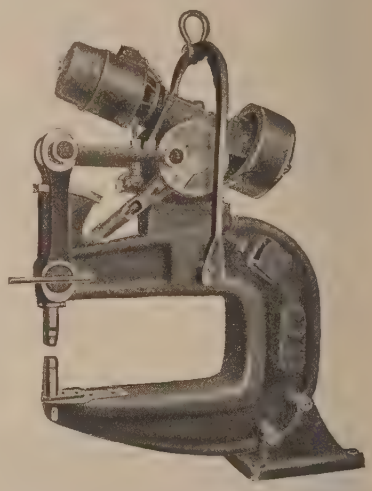
SAVINGS in power consumption, reduced maintenance expense, and high working speeds are claimed for the electro-mechanical toggle-lever riveting machine, known as the L. M. G., which is being marketed by the United Machine Tool Corporation, 75 West Street, New York.

The machine is entirely self-contained and is said to drive up to 24 rivets a minute. Seven sizes are built, the capacity of the largest and smallest machines being as follows:

	Type EKN II	Type EKN VIII
Working pressure, maximum	27 tons	145 tons
Boiler rivets, maximum	⅝ in.	1⅝ in.
Structural rivets, maximum	¾ in.	....
Stroke	2⅜ in.	4⅜ in.
Size of motor	2 hp.	7½ hp.
Hp. required for no load	0.8	1.5

Arrangement of the machine may be seen in the illustration. From the motor, the drive is through a steel worm and phosphor bronze wormwheel, contained in a housing between the motor and the flywheel, to a set of driving disks that are connected to the toggle levers. Between the wormwheel and the driving disks there is a clutch that is controlled by a handle just above the upper jaw of the yoke frame. The machine can be adjusted to operate continuously, or so that the plunger stops at the top and the bottom of each stroke, permitting the rivets to cool under pressure as long as desired. The plunger is adjustable.

The distance between the jaws is regularly 15¾ or 19¾ in., but other heights can be furnished. The depth of throat ranges from 1 ft. to 13 ft. 2 in. The machine will work in any position. Special types of hangers, or bales, such as swing cradle hangers, that permit sideways tilting of the machine, semi-universal or full universal hangers can be furnished. The flywheel, which runs at 1000 r.p.m., is connected by friction to the main driving shaft, and is disconnected automatically in case of overload. The motor starter is mounted on the yoke-frame, just below the flywheel, and the main switch, fuse box and socket for the cable connecting block is mounted on the side of the frame, as shown. A detachable foot that adapts the machine for stationary use is provided.



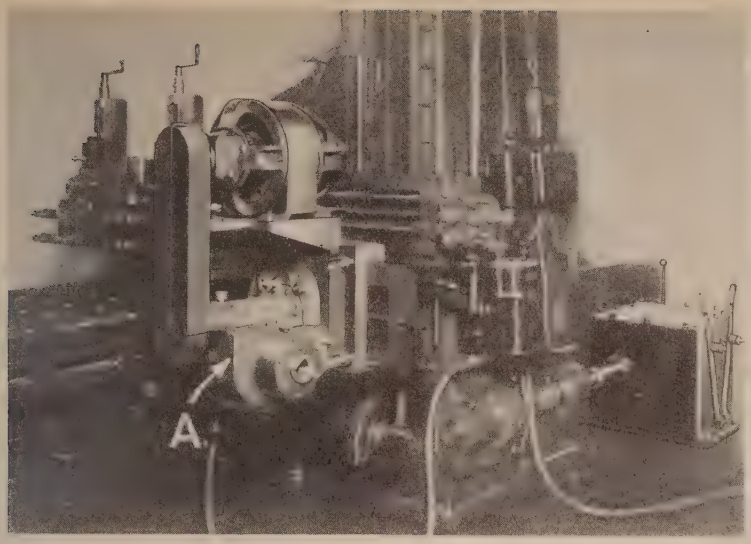
From the Motor the Drive Is Through Worm and Worm Wheel to Driving Disks That Are Connected to the Toggle Levers. Motors range from 2 to 7½ hp. and working pressures from 27 to 145 tons

The net weight of the smallest machine ranges from 1540 to 6270 lb. and the weight of the largest from 10,560 to 42,900 lb.

Harnischfeger to Expand

The Harnischfeger Corporation, Milwaukee, manufacturer of excavating machinery and electric traveling cranes, has announced a change in its financial structure by which the present common stock, consisting of 40,000 shares of no-par value, will be increased to 500,000 shares. Seventy-five thousand shares are being offered to the public through Otis & Co. and the First Wisconsin Co., Milwaukee. Approximately $2,000,000 of the fund provided by the new financing will be put into a two-year expansion program which will result in an increase of 50 per cent in the company's capacity.

The Northern Blower Co., Cleveland, has installed its Norblo dust collecting equipment in the plants of the Crucible Steel Casting Co., Lansdowne, Pa.; Rensselaer Valve Co., Troy, N. Y., and the Florence Pipe & Foundry Co., Florence, N. J.

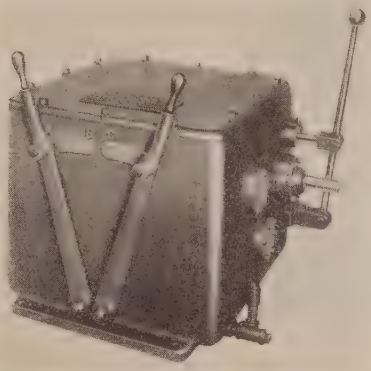


Milling Head for Use on Planers

AN improved milling machine head for planers is being manufactured by the Adams Co., Dubuque, Iowa, in three sizes. Although the illustration shows the head, *A*, mounted on the side rail of a Cleveland open-side planer, the same equipment can be used as a rail head, and an outer bracket can be supplied for supporting the end of horizontal arbors.

The drive is by means of a hardened steel worm engaging a phosphor-bronze worm wheel on the spindle, both the worm shaft and the main spindle being mounted on precision type Timken bearings. The head can be swiveled to any angle and consequently can be used for horizontal, vertical or angular milling. The saddle shown is made with an overhanging bracket to support an electric motor which drives the worm through silent chain and sprockets. A plain saddle and countershaft equipment can be supplied for the belt-driven unit.

The special gear box shown in the separate illustration was designed to provide the necessary reduced table speeds for milling. The shafts are multiple splined and are mounted on Timken bearings; the entire mechanism runs in a bath of oil. When planing operations are to be performed, throwing in of the clutch lever couples the driving and the driven shafts, and with the clutch out of engagement, a variety of milling speeds is available through the sliding gears. Any series of speeds can be provided, to meet requirements.



Milling Head Applied to Side Rail of Open-side Planer. The special gear box, shown above, provides suitable table speeds for the milling operation

Die Maker's Reamers

A REAMER having a taper of ¾-deg. included angle, or approximately 0.013 in. per in., is being made by the Morse Twist Drill & Machine Co., New Bedford, Mass., for use by die makers.

In laying out a die, holes can be drilled close together, thus outlining the shape desired, then reamed by the taper reamer until the holes run together and the central piece drops out. The tool can then be used on the outline of the die edge as a spiral mill, the resulting clearance being correct for the finished die. The larger sizes of these reamers may be used for profiling.

Rapid action and absence of chip clogging are features emphasized. Freedom from breakage is attributed to the fact that the easy shearing cut imposes little strain upon the cutting edges. Reamers with other tapers and in special lengths, both high-speed and carbon steel, can be furnished. Twenty-three sizes of the die makers' reamer, which is designated as the No. 678, are regularly made, the smallest having a diameter of 0.058 in. at the small end and 0.073 in. at the large end. The corresponding diameters of the largest tool are 0.443 and 0.518 in., respectively.

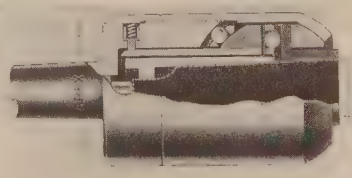
Having a Taper of 0.013 In. Per In., the Reamer is Suitable for Die Work

Full-Floating Tool-Holders

IN the full and semi-floating tool holders recently brought out by the Apex Machine Co., Dayton, Ohio, angular float is obtained by the upper row of balls and parallel float by the lower rows; in each case there are two rows at right angles. The balls operate in hardened and ground grooves, and in addition to producing a free floating tool, they minimize friction. The semi-floating holder has parallel float using only the lower row of balls.

In using the device in connection with reaming, the holder permits the reamer to follow the hole, correcting for misalinement between the work and the spindle or turret, and thus eliminates bell mouthed and tapered holes. Holes may likewise be tapped true to size.

An inserted socket type of this tool, having little overhang and adapted particularly for hand screw machines and automatics, is also manufactured.



Angular Float Is Obtained by the Upper Row of Balls and Parallel Float by the Lower Row

Two continuous pack-heating furnaces for finishing high-grade sheets are to be installed by the Wean Engineering Co., Warren, Ohio, in the plant of the Michigan Steel Corporation, Detroit. Two similar furnaces are reported by the Wean company to have been erected at the Empire Steel Corporation in the record time of six days each. The Michigan order brings the total number of furnaces of this type in the United States to 62.

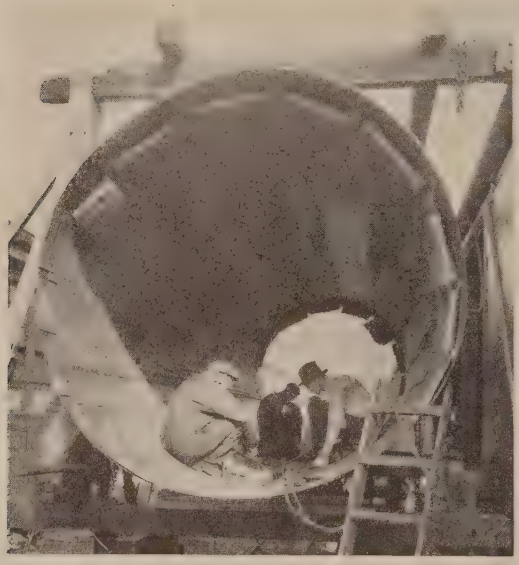
Pennsylvania Fabrication Co., Verona, Pa., has taken over the structural steel fabricating plant of the Bollinger-Andrews Construction Co. at that point and plans to begin operations this week. The latter company went into receivership a year ago.

Lining Tanks with Lead Strips

Method of Attaching Sheet Lead in Non-Homogeneous Coating Said to Save Cost

LEAD linings are being applied to tank car tanks by an interesting method, devised by the Gross Lead Burning & Coating Corporation, 3955 West Twenty-fifth Street, Cleveland, which is an adaptation of the lead-coating process developed by this company and described in THE IRON AGE, April 7, 1927. In the Gross process a liquid lead flux made from a formula developed after long experimental work is used, in place of the usual solder flux. An advantage claimed for this flux over ordinary soldering flux is that coatings applied with its use will withstand heat and acids.

Ordinarily the flux is applied to the surface that is to be coated, forming a skin base. A homogeneous coating of lead is then put on by means of a burning bar and oxy-acetylene torch. However, the expense of applying the coating was an objection to the use of this process for the homogeneous coating of large tanks. By the method adopted it is stated that the cost has been reduced to one-third of the cost of a homogeneous coating.



SHELL of 10,000 Gal. Tank Car, with Heads Off, and Operators Burning in the Lead Sheets. As shown, the tank is inverted, the dome being at bottom

The tanks being lead lined are for standard 10,000-gal. tank cars. They are 9 ft. 6 in. in diameter and 28 ft. 6 in. long, fabricated of tank car specification steel plates. Instead of providing a homogeneous lead lining, a series of strips of homogeneous lead bands ⅛ in. thick by 2 in. wide, extending the length of the tank, were applied lengthwise on the inside by the Gross method, and lead sheets were attached to these bands, the edges of the sheets being the only points of adhesion.

Lead Bands Burned On

First the surface of the tank was cleaned by grinding. Then the outside of the shell was preheated opposite the narrow strips that were to be coated to form the bands, and the skin base was applied. Then the bands were burned on. The bands are on 15-in. centers on the upper half of the tank and on 30-in. centers on the lower half.

Sheet lead ⅛ in. thick, which is used for the lining, was cut to the proper width to butt against the sides of the bands. The edges of the sheet were then burned to the bands, seams ¼ in. deep being made at the point of contact, assuring a strong adhesion of the sheets to the bands. After the inner circumference of the shell was lined, the heads were lined with 3/16-in. sheet lead burned to vertical homogeneous bands 2 in. wide placed on 15-in. centers. After the heads were lined, they were riveted in position, and the ends of the sheet lead in the shell were lapped over the rivets and burned to the sheet lead in the head.

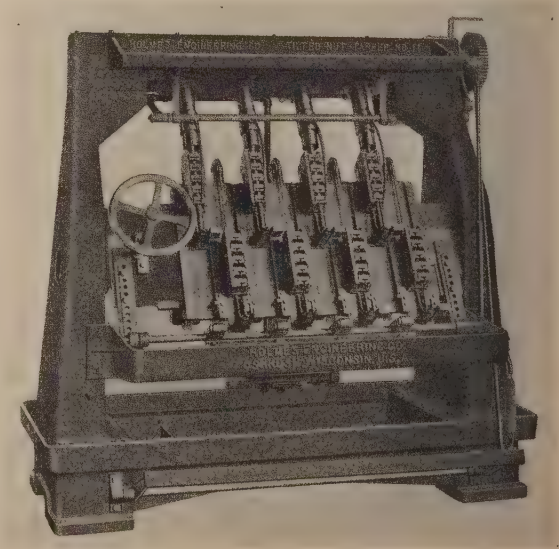
This method of lead lining, while regarded as satisfactory for tanks for certain uses, is not recommended where the working temperature inside the tank is 200 deg. Fahr. or higher, or in tanks in which a high vacuum is created.

The lead-lined tank cars are being built for the Champion Coated Paper Co., Hamilton, Ohio, for handling acids. This company's processes require that the acids inside the tanks be free from stains caused by iron and steel, and that the tanks be protected from corrosion.

Precision Claimed for Tilted Nut Tapper

THE Holmes Engineering Co., Oshkosh, Wis., has brought out a new tilted nut tapper with features intended to assure tapping square with the face of the nut. Precision is attributed to the 30-deg. tilt of the machine, which permits the nut to lie squarely on its face with no danger of tipping on its side. Secondly, the work-holding fixtures can be made absolutely true, are adjustable and can be lined up with the spindles. These fixtures are self cleansing, so that no chips can lodge at any point. The carriages are counterpoised to eliminate error in lead.

The capacity of the machine, which is designated as the No. 14, is for U. S. S. threads up to 1¼ in., and production is at the rate of 20 to 30 nuts per min. The machine may be arranged for belt or motor drive.

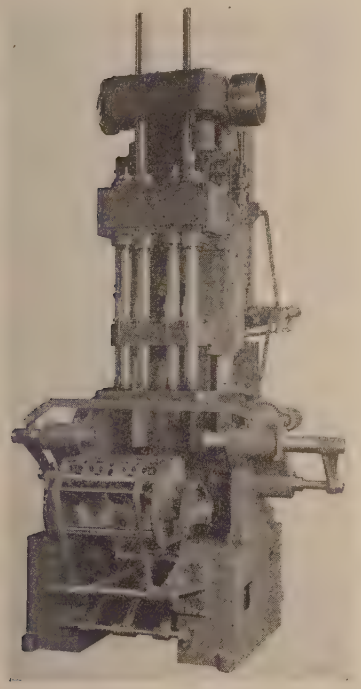


PRECISION Is Attributed to the 30-Deg. Tilt of the Machine, which Permits the Nut to Lie Squarely On Its Face. The adjustable fixtures can be alined with the spindles, and the carriages are counterpoised to prevent error in thread lead

Cylinder Borer for High-Production Operations

FOR high production on a definite set-up, the Moline Tool Co., Moline, Ill., has added to its line the No. 14 Hole Hog cylinder borer here shown.

The machine deviates from the company's standard practice of having independent spindle units adjustable for center distances between spindles. Timken roller bearings are used for the spindles, and all running bearings throughout the machine are either roller or ball bearings. The illustration shows the machine complete with jigs and tools for reaming a V-type eight-cylinder block.



Cylinder Borer Tooled for Reaming operation on V-type Cylinder

As in other Hole Hog boring machines, double-V guide construction is used, as well as the Oilgear feed mechanism, with the cylinder located between the vees and the pump inclosed in the column. From the motor, mounted on top of the column, the drive to the main driveshaft is through silent chain. The upper driving mechanism is fixed with respect to the column, the drive from the main horizontal driveshaft to the two vertical intermediate shafts being through hardened steel and bronze spiral gears that run in oil. The two vertical shafts are multi-splined, and on their ends are mounted hardened steel pinions that mesh with the gears on spindles. These gears are also immersed in oil.

The machines are made in pairs, two each for roughing, semi-finishing, and reaming operations, respectively, on the two series of holes. The fixture can be swung out in line with the conveyor so that the cylinder can be pushed into the cradle jig, and by very little effort in raising the lever at the front and center of fixture, the entire cradle swings into working position. By turning the crank at the right of the fixture, the two locating plungers enter the main crankshaft bearings, and simultaneously the two guide and clamp plungers are brought into position, centering and clamping the block in place.

In all cases, the boring bars are made as long as possible. In the roughing operation they are guided at the top of the fixture, close to the work, and in the semi-finishing operation are piloted both above and below the work. In the reaming operation the guide is mounted on the bottom of the slide and is not piloted directly in the fixture.

Punch Press for Large, Light Work

TO meet the demand for a punch press to accommodate large, light work that is usually handled on a heavier and slower press in order to get sufficient die space and bed area, the Federal Press Co., Elkhart, Ind., has brought out the new machine here illustrated. The press can also be used in the production of parts that require use of progressive dies, and has an opening in the bed which permits dropping through of stamped parts or the scrap from extremely long progressive dies.

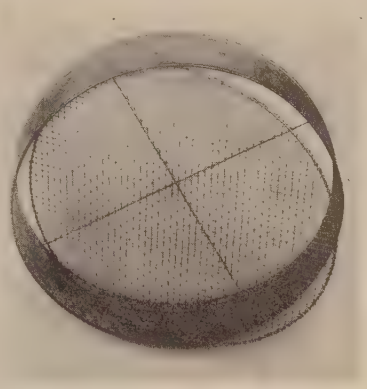
The die space, bed to slide, stroke down adjustment up, is 9¼ in. Approximately 2 hp. is required to drive the machine, which occupies 35 x 44¾ in. of floor space overall and weighs 3100 lb. complete.

Pressure exerted by the ram, near the bottom of the stroke, is 26 tons. The standard stroke is 1 in., but a stroke of 1½ in. can be provided. The size of the square hole, for round or square punch shanks, is 1 9/16 in. The depth of throat, ram center to frame, is 8¾ in., while the distance from bed to gibs is 13 in. The bed reclines 40 deg. from upright. The bolster plate measures 16 x 32 in. and is 1¾ in. thick. The flywheel is 27 in. in diameter, weighs 450 lb. and has a speed of 125 r.p.m. The crankshaft diameter is 2¾ in. at the main bearings and 3 in. at the crank bearings.

For preheating sheet mill rolls at the new works the Newton Steel Co. is building at Monroe, Mich., 24 electric roll heaters will be supplied by the Freyn Engineering Co.

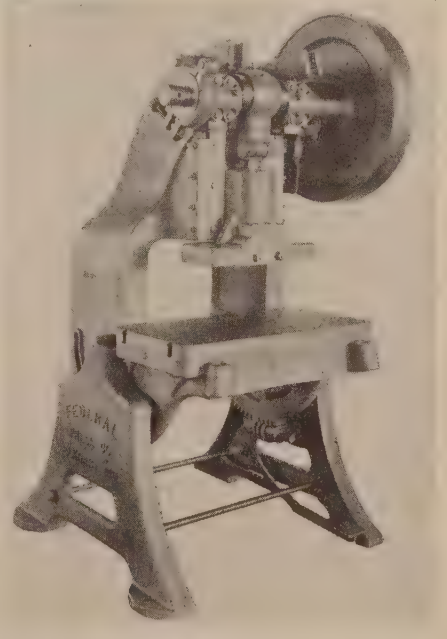
Foundry Riddle with Metal Rim

METAL-RIM riddles with removable bottoms have been brought out by Rolock, Inc., Southport, Conn., as illustrated. The greatest field for this riddle has been found in connection with the use of gyratory machines. Here it is possible to slip out a used bottom and replace it with a new one in a few seconds, instead of taking considerable time to remove the complete riddle, as formerly was necessary.



Separate Bottom with Metal Rim Makes This Riddle Easy to Replace in a Gyratory Machine

Stocking of riddle bottoms of different meshes is facilitated in a minimum of space by the fact that the bottom and rim are separate. There are three sizes made, one for the gyratory machine, the others being 16 and 18 in. in diameter respectively.

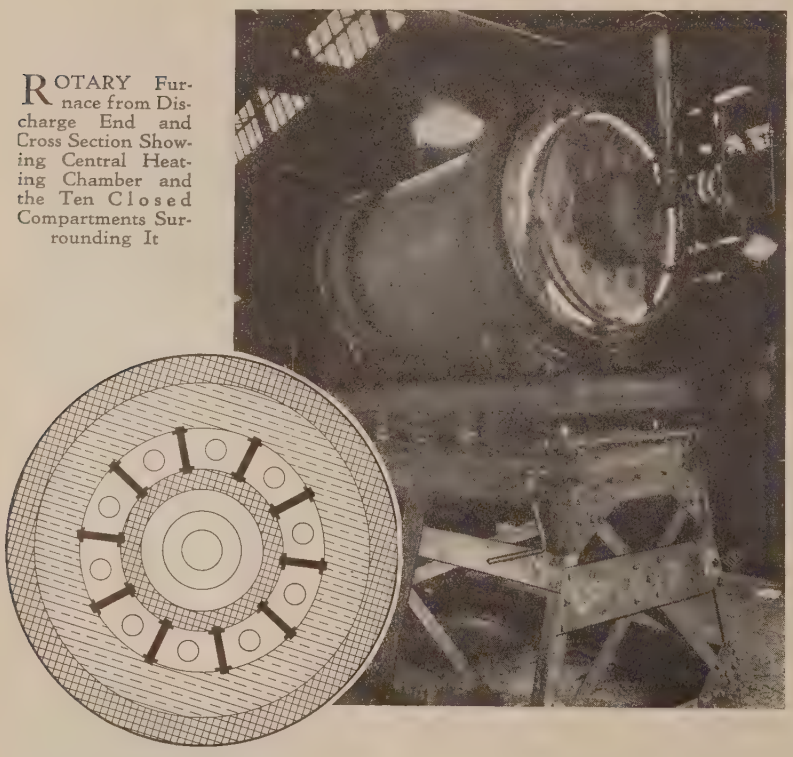


Press Designed for Production of Light Material of Large Size and Parts Requiring Use of Long Progressive Dies

Multiple-Hearth Rotary Furnace

Central Heating Chamber Is Surrounded by Ten Compartments for Holding Work

A ROTATING furnace for bluing, drawing, annealing and heating at temperatures from 700 to 1650 deg. Fahr. has been brought out by Strong, Carlisle & Hammond Co., Cleveland. The furnace illustrated was built for heating 1½ x 2½-in. brass billets, and has a capacity of 20 lb. per min., work heated to 1300 deg. Fahr.



ROTARY Furnace from Discharge End and Cross Section Showing Central Heating Chamber and the Ten Closed Compartments Surrounding It

As shown by the cross sectional drawing, a combustion chamber 12 in. diameter, made of Carbofrax, extends down the center. Surrounding the chamber is an annular space in which the work is carried. This is divided into either 8 or 10 compartments by ½-in. partitions of heat resisting alloy. Work is thus carried through a revolving barrel and is brought to temperature by radiant heat, not coming in contact with the products of combustion.

One of the compartments is used for a thermocouple, this section being inclosed at the feed end so the work will not enter. The thermocouple wires connect to the two brass rings shown in the view of the discharge end of the furnace. Contact brushes lead to a temperature recorder.

The outer wall of the heating chambers is built of 4½-in. Klondyke firebrick, surrounded in turn by insulating material; outside is the steel drum which forms the outer covering of the furnace.

The furnace barrel and drive is mounted on a frame, hinged to the structural steel base at the loading end. This permits the drum to be set at any desired incline by lowering the discharge end with the hand crank. The rate at which the work moves through the furnace, and consequently the heating time, is controlled by the inclination of the barrel axis and by the speed of the driving motor. The heating time can be varied from 5 min. to a maximum of 30 min.

Work is fed into the furnace by an elevator conveyor dumping into a hopper. Mechanical pickers carry the work from the hopper into the heating sections. As the drum rotates, the work not only moves toward the discharge end but is carried around on the hottest side of the chamber.

Work is discharged from each compartment through ports in the circumference of the cylinder; it drops into a two-way spout leading into either a water or oil quenching tank. Encircling these ports, except at the discharge point at the bottom of the furnace, is a fixed tubular ring which serves as a cover for the ports except at the discharge point, and also as an air preheating chamber, furnishing air to the burner at 150 to 200 deg. Fahr.

New Type of Heating Radiator

STEEL or copper fins welded on pipe have been made into a new type of heating unit by the Richmond Radiator Co., 1480 Broadway, New York. Known as the Richmond Floorline radiator, the unit is light and easy to handle. It is made 8½ in. high, 3½ in. thick and either 36 or 18 in. long, and occupies little room.

Units may be installed separately or they may be joined end to end or placed one above the other, in providing desired amount of radiation surface in any locality. Because of its low position, this radiator gives heat near the floor. It has been tested for efficiency and rating by the Frost Research Laboratory, Norristown, Pa., and by S. E. Dibble, professor of heating and ventilating, Carnegie Institute of Technology, Pittsburgh. The tests were made on a 30-in. section equivalent to 15 sq. ft. of cast iron radiation, according to the code of the American Society of Heating and Ventilating Engineers.

Specific Savings from Use of Skid Platforms

USE of skid platforms with electric lift trucks has given manufacturers and shippers large savings in time and in labor costs of handling, according to a statement from the Transportation Division of the Department of Commerce. Several instances cited in substantiation of the statement follow:

An automobile manufacturing company formerly unloaded crankshafts from a car by hand, requiring eight men for 7½ hr. at a labor cost of $24. When skid platforms and lift trucks were substituted for the old method, one driver and one helper could unload a car in 45 min., at a labor cost of 98c.

A railroad in the West reduced the labor payroll in the storekeepers' department over $15,000 a month by this means. Analysis disclosed a reduction in handling brakeshoes from 175 manual operations to seven; in handling brake beams, from 200 operations to 10.

One concern last year is said to have given to its customers without charge 4000 skids, at a cost of about $10,000. Its return came from a saving of considerably more than this amount, in stevedore payroll, from the use of the skids by the customers.

Loading a 50-ft. box car with paper by the old method took seven men in a paper company 3 hr. This is now accomplished on skids by two men in 45 min., representing a labor saving of 93 per cent.

August Exports Smallest of Year

Imports Largest in 3 Years—Eight-Month Exports 11 Per Cent Above Last Year, Mostly in Rolled and Finished Steel

WASHINGTON, Sept. 27.—Making a decrease of 27,676 gross tons, exports of iron and steel products from the United States in August totaled 242,856 tons, against 270,532 tons in July. In August of last year they aggregated 287,297 tons. For the eight months ended with August, they were 2,105,227 tons, an increase of 207,163 tons over the corresponding period of last year, with a total of 1,898,064 tons. The daily average for August was 7834 tons, compared with 8727 tons in July.

August exports were the smallest for any month so far this year, while scrap exports were the largest since August, 1928.

In contrast to outgoing shipments, imports in August, amounting to 83,969 tons, the largest since September, 1926, showed an increase of 12,591 tons over the 71,378 tons imported in July. Imports in August of last year were 76,172 tons. For the eight months of 1929 they were 513,192 tons, a decrease of 10,635 tons from the 523,827 tons imported in the like period of 1928. The daily average of imports in August was 2708 tons, compared with 2302 tons in July.

Scrap formed the largest item of exportation in August, reflecting an increase of 15,839 tons over that shipped abroad in July, but this gain was more than offset by a number of declines. Among the decreases were steel bars, which dropped to 11,936 tons from 17,183 tons; wire rods, decreasing to 2969 tons from 5822 tons; plates, decreasing to 13,924 tons from 19,675 tons and making the lowest total since last September; galvanized sheets, falling to 11,336 tons from 14,154 tons; black steel sheets, dropping to 15,890 tons from 18,259 tons; black and galvanized welded pipe, decreasing to 11,497 tons from 14,880 tons; and, the greatest decline of all, plain structural material, only 5278 tons, compared with 29,946 tons. Structural material, plain and fabricated, made the smallest total since September, last year; with that exception, the smallest since February, 1928.

The more important gains, in addition to scrap, were in tin plate, rising to 21,367 tons from 16,875 tons; fabricated material, increasing to 12,647 tons from 10,392 tons; and steel rails, which rose to 12,926 tons from 9999 tons.

Of the steel bars exported in August, 5556 tons went to Canada, 2611 tons to the United Kingdom and 1276 tons to Japan. Canada took 3473 tons

Exports of Iron and Steel from the United States

(In Gross Tons)

	August		Eight Months Ended August	
	1929	1928	1929	1928
Pig iron	2,251	8,404	40,818	42,331
Ferromanganese	204	1,041	1,257	7,039
Scrap	62,857	70,538	359,595	365,601
Pig iron, ferroalloys and scrap	*65,312*	*79,983*	*401,670*	*414,971*
Ingots, blooms, billets, sheet bar	3,407	5,109	29,694	16,349
Skelp	14,962	11,291	82,733	72,927
Wire rods	2,969	3,620	31,851	25,787
Semi-finished steel	*21,338*	*20,020*	*144,278*	*115,063*
Steel bars	11,936	12,517	141,739	97,080
Alloy steel bars	449	1,231	12,396	9,825
Iron bars	118	180	3,039	2,494
Plates, iron and steel	13,924	12,199	140,895	98,573
Sheets, galvanized	11,336	13,581	111,910	104,047
Sheets, black steel	15,890	19,069	126,912	128,480
Sheets, black iron	1,664	1,297	10,737	10,140
Hoops, bands, strip steel	4,785	5,121	52,377	37,805
Tin plate; terne plate	21,367	22,374	174,363	169,001
Structural shapes, plain material	5,278	14,333	181,090	118,739
Structural material, fabricated	12,647	6,716	77,710	61,133
Steel rails	12,926	23,999	108,491	144,202
Rail fastenings, switches, frogs, etc	2,851	2,681	23,000	32,759
Boiler tubes	1,384	1,456	12,690	11,387
Casing and oil-line pipe	9,884	15,164	89,305	79,796
Black and galvanized welded pipe	11,497	13,474	95,161	78,811
Malleable iron screwed pipe fittings	833	854	8,194	6,380
Plain wire	2,994	3,867	32,722	30,803
Barbed wire and woven wire fencing	4,001	5,494	45,384	49,457
Wire cloth and screening	148	235	1,185	1,300
Wire rope	576	509	5,234	3,473
Wire nails	733	905	9,943	10,937
Other nails and tacks	872	754	7,254	6,849
Horseshoes	32	37	252	306
Bolts, nuts, rivets and washers, except track	1,589	1,038	10,948	8,800
Rolled and finished steel	*149,714*	*179,085*	*1,482,931*	*1,302,577*
Cast iron pipe and fittings	1,735	2,998	22,679	22,848
Car wheels and axles	1,104	1,494	15,216	10,046
Iron castings	442	643	8,422	8,356
Steel castings	868	507	8,133	6,844
Forgings	964	1,318	9,216	7,458
Castings and forgings	*5,118*	*6,960*	*63,666*	*55,552*
All other	1,379	1,249	12,682	9,901
Total	242,856	287,297	2,105,227	1,898,064

Imports of Iron and Steel into the United States

(In Gross Tons)

	August		Eight Months Ended August	
	1929	1928	1929	1928
Pig iron	12,377	12,990	92,581	94,340
Ferromanganese*	8,496	2,721	46,293	30,017
Ferrochrome†	92	94	474	490
Ferrosilicon‡	1,124	416	6,340	2,459
Scrap	12,033	5,394	64,407	31,926
Pig iron, ferroalloys and scrap	*34,122*	*21,615*	*210,095*	*159,232*
Steel ingots, blooms, billets and slabs	2,639	1,338	18,541	14,422
Iron blooms, slabs, etc	....	....	....	4
Wire rods	1,369	1,042	11,207	11,054
Semi-finished steel	*4,008*	*2,380*	*29,748*	*25,484*
Rails and splice bars	1,517	911	5,644	12,091
Structural shapes	15,695	19,084	103,049	119,118
Boiler and other plates	362	707	2,818	4,062
Sheets and saw plates	3,090	1,566	16,338	17,565
Steel bars	3,778	8,270	25,259	63,608
Bar iron	175	67	2,285	1,453
Hoops, bands and cotton ties	7,225	8,434	28,673	29,929
Tubular products (wrot.)	2,866	4,456	28,114	28,429
Nails, tacks, staples	993	894	6,333	5,757
Tin plate	35	32	208	783
Bolts, nuts, rivets and washers	62	6	227	160
Round iron and steel wire	322	412	4,078	2,852
Barbed wire	727	384	4,269	2,359
Flat wire; strip steel	224	224	1,464	1,563
Steel telegraph and telephone wire	3	15	3	168
Wire rope and strand	175	186	1,686	1,157
Other wire	19	53	385	373
Rolled and finished steel	*37,268*	*45,701*	*230,833*	*291,427*
Cast iron pipe	8,397	6,288	41,054	45,536
Castings and forgings	174	188	1,462	2,152
Total	83,969	76,172	513,192	523,827
Manganese ore*	32,983	25,996	247,045	131,490
Iron ore	298,013	225,538	2,067,207	1,677,206
Magnesite (dead burned)	7,517	6,981	19,623	38,391

*Manganese content only.
†Chromium content only.
‡Silicon content only.

of plain structural material and 4035 tons of tin plate. Exports of tin plate to Japan were 4734 tons, while 3095 tons went to China. The great bulk of plates was shipped to Canada, that country taking 11,914 tons. It also led in rail shipments, taking 3190 tons; Brazil taking 2565 tons; Chile, 1710 tons; the Philippine Islands, 1475 tons; and Japan, 1372 tons.

Exports to Canada amounted to 35 per cent of the August total, while Japan took 17 per cent. Exports to Canada during the eight months of the current year were 879,228 tons, as against 729,191 tons for the corresponding period of last year, a gain of more than 20 per cent.

The largest item of importation in August was structural shapes, of which 6906 tons came from Germany, 6255 tons from Belgium and 2311 tons from France. Of the hoops, bands and cotton ties imported in August, 5433 tons came from Belgium and 1073 tons came from France. France supplied 6429 tons of the cast iron pipe, and 1945 tons came from Belgium. Sweden furnished 1412 tons of the steel bars imported, and 1351 tons came from Belgium. Canada supplied 11,490 tons of the scrap importations.

Norway was the source of 4378 tons of ferromanganese importations, while 2357 tons came from Canada and 1509 tons from the United Kingdom. Of the manganese ore imported, 24,843 tons came from Soviet Russia, 5696 tons from Brazil, 1520 tons from India and 884 tons from Chile.

Belgium led as the source of August imports, supplying 18,131 tons; 16,648 tons, an unusually high total, came from Canada; 14,225 tons from Germany and 11,423 tons from France.

UNITED STATES IMPORTS OF IRON AND STEEL PRODUCTS

(In Gross Tons)

	August	July	June
Austria	28	50	34
Azores and Madeira Islands	2	.....	.....
Belgium	18,131	15,497	9,888
Bulgaria	.....	170	.....
Czechoslovakia	95	.....	660
Denmark	1	.....	.....
Finland	1	.....	.....
France	11,423	13,556	9,965
Germany	14,225	13,163	12,580
Italy	367	217	387
Netherlands	908	837	.....
Norway	4,874	1,668	3,677
Poland	.....	.....	1,629
Sweden	3,140	3,491	3,835
Switzerland	.....	40	3
United Kingdom	6,725	4,034	5,790
Europe	*59,920*	.....	.....
Canada	16,648	13,305	10,042
British Honduras	3	.....	.....
Guatemala	2	.....	.....
Mexico	109	33	39
Cuba	.....	195	1,200
British India	7,227	5,120	3,903
Japan	30	2	3
Canary Islands	30	.....	.....
Total	83,969	71,378	63,635

Destination of Iron and Steel Exports from the United States

(In Gross Tons)

Country of Destination	August, 1929	July, 1929	August, 1928	January Through August 1929	January Through August 1928
North and Central America and West Indies	*109,270*	*143,303*	*116,659*	*1,067,324*	*889,348*
Canada and Newfoundland	86,937	118,163	95,638	880,714	731,830
Cuba	4,448	5,847	6,029	46,647	43,564
Guatemala	436	949	198	5,212	6,297
Honduras	434	495	326	7,656	4,785
Mexico	10,958	11,906	8,773	68,949	55,569
Panama	1,867	780	1,323	12,868	11,079
Salvador	652	462	209	5,327	2,427
British West Indies	638	697	715	13,720	5,596
Other West Indies	2,159	3,006	2,529	19,549	21,912
Other Central America	741	998	919	6,682	6,289
South America	*26,121*	*28,701*	*44,492*	*270,143*	*300,208*
Argentina	5,151	6,421	9,247	65,359	66,993
Brazil	6,160	6,739	8,528	46,415	59,363
Chile	4,396	5,074	9,408	41,311	49,690
Colombia	3,493	2,725	3,143	30,948	45,740
Peru	2,258	3,076	1,223	23,006	15,513
Uruguay	366	381	947	6,188	6,385
Venezuela	3,545	4,024	11,693	52,882	52,832
Other South America	752	261	303	4,034	3,692
Europe	*40,330*	*36,905*	*43,230*	*269,887*	*225,203*
Belgium	68	149	1,779	2,017	10,766
France	1,280	3,636	257	14,770	3,196
Germany	119	5,017	24	17,860	20,631
Italy	10,819	10,333	27,208	85,584	79,583
Netherlands	286	226	103	2,026	1,535
Poland and Danzig	13,755	6,634	7,840	68,151	53,645
Rumania	486	479	581	2,770	3,514
Soviet Russia	3,143	131	608	5,386	2,584
United Kingdom	6,657	6,005	3,944	43,973	35,408
Other Europe	3,717	4,295	886	27,350	14,341
Far East	*66,032*	*59,388*	*82,289*	*482,938*	*473,635*
British Malaya	2,270	382	937	7,060	4,793
China	4,623	4,740	5,457	50,714	69,715
Netherlands East Indies	3,543	7,452	7,628	47,816	25,369
India and Ceylon	2,381	382	3,794	14,009	18,120
Japan	40,578	31,330	51,482	258,650	266,023
Kwantung	228	617	4,569	8,716	9,048
Philippine Islands	6,974	11,302	5,936	65,327	61,162
Australia	2,502	2,116	1,747	16,065	10,942
New Zealand	18	142	218	2,955	1,429
Other Asia and Far East	2,915	925	521	11,626	7,034
Africa	*1,103*	*2,235*	*627*	*14,935*	*9,670*
Union of South Africa	586	1,168	187	5,947	4,000
Egypt	64	585	8	5,844	3,419
Mozambique	332	328	123	1,764	913
Other Africa	121	154	309	1,380	1,338
Total	242,856	270,532	287,297	2,105,227	1,898,064

Chilean Steel Industry to Have Government Support

The project to establish an iron and steel industry in south central Chile appears to be nearer realization with the passing of a law by the national Chilean Congress authorizing the President of the Republic to subscribe on account of the State the greater part of the shares, the total of which will amount to about $7,260,000, and to assume an active part in the organization and administration of the company, according to a report from Vice-Consul Comden L. McLain, Concepcion, Chile.

The initial project to manufacture iron and steel in the country began in 1905, when the Government granted a French company, the Sociedad Altos Hornos de Corral, a concession to exploit a large timbered tract in the vicinity of Valdivia and to construct a blast furnace at Corral. This plant was partially completed in 1910 at a cost of 14,700,000 pesos ($3,381,000), and in 1911 some 4000 tons of iron was manufactured.

Since that time the furnace has been closed, due principally, it is stated, to the impracticability of the Prud'homme system of ore reduction as applied at Corral. Subsequently the iron ore supply of the company in northern Chile was sold and in 1924 a group of industrialists at Valdivia organized a company under the name of Compania Electro-Siderurgica y Industrial de Valdivia and purchased the remaining property of the Sociedad Altos Hornos de Corral. The Government again offered generous aid (under Law 4110 of Dec. 28, 1926), but the problems surrounding the establishment of the industry on a sound basis appeared to be too great.

Former Munitions Plant to Make Track Material

HAMBURG, GERMANY, Sept. 16.—The former Government munition works at Spandau will start production of open-hearth bolts, rivets, spikes and other track material soon after Oct. 1. The plant will have an annual capacity of 150,000 tons and will be one of the most modern steel plants in Europe. Labor-saving devices have been installed throughout. In the bar mill, where output will be handled by a minimum of men, production per capita is expected to be the largest for any mill in Germany. The principal raw material used will be steel scrap shipped to Spandau from the Berlin district.

The Rohrbachwerke A. G., German builder of flying boats, has organized the Metal Flying Boat Corporation, with headquarters in New York. The American company will shortly start the production of metal flying boats similar to those in service in Germany, which have a maximum capacity of 45 passengers.

Institute of Metals Visits Düsseldorf

British Foundrymen Inspect Iron and Steel Plants in the Ruhr— Germans Hold Foundry Exposition

(Special Correspondence)

DÜSSELDORF, GERMANY, Sept. 15.—Nearly 300 members of the Institute of Metals attended the annual autumn meeting at this place, and while most were from Great Britain, a considerable number came from other countries. The Association of German Iron Foundries and the Society of German Iron Foundrymen were also in convention, and at their invitation many of the visitors inspected the educational and foundry trade exhibition.

The Düsseldorf meeting was the first that a British engineering or metallurgical body had held in Germany since the war and it was one of the most successful international gatherings of recent years. In view of the importance of Germany as a competitor of Great Britain in the world's markets, it had a special significance, but the whole proceedings were conducted in an even more than friendly manner and the arrangements could not have been better.

The feature of the exhibition that impressed one most was that the scientific, or what may be termed the metallurgical side of foundry practice, was more in prominence than the plant or equipment side. The display of micro-photographic equipment, pyrometric instruments and laboratory equipment was in advance of either of the Paris exhibitions or the several British exhibitions that have been held in recent years. It may be admitted that the exposition was not of as great interest to practical foundrymen, because it is doubtful if the machinery and furnace sections were as good. A number of molding machines were on view of orthodox designs, including several American machines, in operation that were made under license by German firms. Handling and conveying plant were not much in evidence, although there was a model of the mold conveyor used at the Citroen foundries in France. It was also rather disappointing that the model foundry in the exhibition hall was not laid out on more modern lines for repetition castings.

Copper Castings Deoxidized with Beryllium

Oil-sand cores have become very popular in Germany, but the most interesting exhibit was comprised of a number of copper castings, homogeneous and sound in every way. As is well known, it has until recently been almost impossible to obtain castings of pure copper, but this has now become possible by the addition of a small percentage of beryllium, which acts as a deoxidizer.

Electric furnaces are not used to a considerable extent as melting units in European foundries even yet, but there were a number of high-frequency and induction furnaces on view. One of the most interesting exhibits in the hall was a cupola tapping device made by Werner Handelsgesellschaft, Düsseldorf. By means of a simple arrangement of levers and weights a conical plug is directed into the tapping hole; when iron is required the furnaceman pulls a lever and this withdraws the plug, and when the ladle has been filled he simply releases the handle and the plug swings back into place. This device should be useful in jobbing foundries and is a most simple and practical method of controlling the flow of metal.

Several works were visited by the members, including those of J. G. Schwietzke and August Thyssen. Schwietzke are non-ferrous founders; their equipment includes shaft furnaces with crucibles up to 1300 lb. capacity and oil-fired and gas-fired furnaces. The firm claims to be one of the largest and best equipped non-ferrous foundries in Germany, comparable with large foundries in shipbuilding centers in England, and is well organized for production and has a very well equipped laboratory.

Steel and Iron Plants Visited

At the August Thyssen works a feature is a special type of blast furnace with an elaborately constructed charging gear. Steel castings are the specialty, but while many castings were examined closely by the visitors at both these works and, later, at the Krupp works at Essen, they seemed to be as good but no better than those obtained in British steel foundries.

Doctor Lehr, Lord Mayor of Düsseldorf, impressed his guests with the growing importance of Düsseldorf as an industrial center. The most important industry is the manufacture of iron, steel and other metals in all forms, while the heavy industries are chiefly concerned with the manufacture of semi-finished iron and steel, rolled sheets and wire, tubes, cast and forged machine parts of all sizes, bridges and iron work.

Few Electric Furnaces in Continental Foundries

One of the most interesting papers read was on "Progress in Electric Furnaces for Non-Ferrous Metals," by a German member of the institute, M. Tama. An American visitor contributed some interesting remarks to the discussion on this subject in regard to the use in the United States of the electric furnace for annealing purposes and also for electric carbonizing. The question of heat treating aluminum castings and forgings was also discussed, and the statement was made that in the Birmingham area, which is the largest non-ferrous district in Great Britain, electric melting had increased in recent years.

Krupp Plant Roomy and Clean

On the last day of the conference the members visited the Krupp works at Essen. At the present time the Krupp firm employs altogether about 70,000 people, 30,000 of whom are at Essen. It is a remarkable achievement that, apart from the shipyard at Kiel, the Krupp company's manufactures have been almost entirely changed since the war. All kinds of machinery, including agricultural, are made by the firm. The blast furnace plant is up-to-date, comprising 10 blast furnaces and two special furnaces for various classes of high grade ferromanganese and ferrochromium. The coke oven plant at the works, comprising 175 ovens, produces approximately 1700 tons of blast furnace coke per day, but much additional coke is required. There is an up-to-date by-product plant at Essen and most of the pig iron produced by the blast furnaces is utilized in the steel works after it has passed through two 900-ton mixers. Essen possesses 14 rolling mills, viz. three heavy blooming mills, four roughing, three intermediate and three finishing mills, together with a wire mill. Additions have recently been made to the blast furnace plant and hydraulic press plant. In the steel foundries castings are made from the smallest to the largest sizes. A feature of the whole works is the excellent lighting and ventilation.

It is but fair to say that while Krupps have shown great enterprise in turning their attention to peace manufactures, their general works practice appears to be in no way exceptional. In the laboratories, testing methods do not seem to be ahead of those in general use in England and America; in some cases the analytical methods are distinctly older than those used by many steel and iron firms. The firm was particularly hospitable to the visitors and afforded them every conceivable facility for obtaining information of an exact kind about the organization, methods and equipment of the works.

Meeting of Drop Forging Association

Costs, Market Research and Broad Future Developments Among Topics of Last Week's Convention

THE American Drop Forging Institute held a meeting at the Buckwood Inn, Shawnee-on-Delaware, Pa., Sept. 25, 26 and 27. It listened to a number of scheduled addresses on Wednesday and Thursday mornings, devoted itself to a discussion of costs and cost finding under the direction of R. T. Herdegen on Friday morning, played golf in the afternoons and banqueted Thursday evening, with L. W. Greve, one of the directors, presiding as toastmaster. Charles H. Smith, Steel Improvement & Forge Co., Cleveland, secretary-treasurer of the association, was executive officer of the convention.

President A. C. Johnson, secretary, Rockford Drop Forge Co., reported on the progress of the association. Two of the technical papers had to do (1) with the inclosed fan-cooled motor for the forge shop, presented by A. M. McCutcheon, Reliance Electric Co., Cleveland, and (2) with steam generation and steam consumption, presented by Harold F. Wood, Wyman & Gordon Co., Harvey, Ill. Dr. Zay Jeffries, United States Aluminum Co., gave an inspirational and informative address, outlining what is going on in the scientific world and what is shaping up by way of applications that are likely to have far-reaching effects on social as well as industrial progress.

Charles F. Abbott, executive director of the American Institute of Steel Construction, New York, under the title of "Rationalizing Output," made one of the principal addresses, which in part covered the following:

Value of Market Research

The principal problem confronting most industries at the present time is that of the market. In most cases the application of research by an organized industry would develop new practical uses for a product and at the same time locate new opportunities for extending present markets. Steel plate floor construction, the use of steel in dams, in airports and hangars and in residences, all represent the result of concerted research to locate and develop new uses for the structural steel industry.

When we suggest research for an industry we should not expect immediate results. It is no assured talisman, for results will depend upon how research is conducted. In order that it may be productive of good for the industry as a whole, it must be carried on by the industry and not left to a single company. In that case the industry will profit through impartial investigation while, when in the hands of a single corporation, the benefits must of necessity be selfishly applied and selfishly circumscribed.

It is too bad that some money-making and money-saving methods are called "research." The word calls up visions of high-brow investigations by expensive experts. "Research" has a scientific sound. An ordinary business man is scared by it; in fact, he may think trade research is theoretical and academic. He turns impatiently from it to his rule of thumb practices—which sometimes lead him to bankruptcy.

Research improperly applied may prove an industrial waste. Dr. Julius Klein, assistant secretary of commerce, holds that between eight and ten billion dollars annually is chargeable to waste in the conduct of business in America. This waste about equaled the value of all our foreign trade in 1928. Waste occurs through excessive expenditures in sales promotion, unwise credit methods, disorderly marketing, extravagant delivery services, ill-judged advertising, etc.

Research may be just as successful in the market place as in the laboratory. Often the opportunities of research are lying beneath our noses unnoticed, and that is what makes business opportunities so plentiful, and why it is always unwise to depreciate the efforts of even the smallest competitor. In cooperative effort we profit by bearing each other's burdens as well as in sharing each other's benefits.

Steel Merger Plan Approved

Hanna, Weirton, Great Lakes Holding Company Ratified—To Be Called National Steel Corporation

THE Hanna-Weirton-Great Lakes Steel merger became effective Oct. 1, following the approval of the terms of agreement by stockholders of affiliating companies, the Weirton Steel Co., Weirton, W. Va., Great Lakes Steel Corporation, Detroit, and the M. A. Hanna Co., Cleveland. The merged properties include the steel plants of the Weirton and Great Lakes companies and the blast furnaces, ore mines and vessel interests of the Hanna company.

The holding company that will control the merged properties will be known as the National Steel Corporation. This will be a Delaware corporation and will have an authorized capitalization of 3,000,000 shares of no par common stock, of which 2,080,000 will be issued at present and distributed to stockholders of the merged companies on the following basis:

Weirton stockholders will receive 1,120,000 shares or 4.7 shares of the holding company in exchange for each share of $100 par value Weirton stock. Hanna stockholders wll receive 560,000 shares in exchange for shares of stock of the Hanna subsidiaries. Great Lakes stockholders will receive 400,000 shares in even exchange for each full paid share of that corporation's no par common stock. In addition they will receive warrants entitling the holder to purchase an additional one-fifth share on or before Dec. 31, 1929, at $62.50 a share and warrants for the purchase of an additional one-fifth share on or before Oct. 1, 1934, at the same price.

George R. Fink, president of the Great Lakes Steel Corporation, who under an organization agreement with that corporation was given the right to subscribe within five years to 20,000 shares of common stock of Great Lakes at $50 per share, is given the right to purchase an equal amount of stock of the new corporation at $50 a share on or before Oct. 1, 1934.

Management of the holding company will be under the direction of E. T. Weir, president, Weirton Steel Co., as chairman of the board, George M. Humphrey, president of the M. A. Hanna Co., as president of the executive committee, and Mr. Fink, who will be president of the holding company. These three executives comprise a committee that is authorized to determine the form of articles of incorporation of the new company and to draw up by-laws and carry out other details that may be required to place the merger in effect.

Simplified Practice on Several Products

Elimination of waste through simplified commercial practice has been carried by the United States Department of Commerce into welded chain, sheet steel and grinding wheels, which form the subjects of recent practice recommendations issued by that department. The welded chain specifications are carried in recommendation R100-29, which lists the sizes and types of chains eliminated in making up the simplified list. The recommendation is subject to annual revision by those interested.

Sheet steel, covered in recommendation R28-29, shows in tabular form the sizes of sheets of various gages adopted by the simplification conference. These include galvanized flat sheets, one-pass cold-rolled box annealed sheets and blue annealed sheets. Grinding wheels are covered in recommendation R45-28. The types which have been adopted as standard are illustrated and are covered in tabular matter giving standard dimensions and other particulars.

To Trace Migration of Industry

Idle Power Equipment Also to Be Studied in Census of Manufactures for 1929

WASHINGTON, Oct. 1.—The census of manufactures for 1929 will include data showing the trends of industrial migration and the idle power equipment of the United States. This will be the first time such information has been gathered. It is also the purpose to tabulate the schedules, which will go out next January to every manufacturer in the country, as speedily as possible. Plans for the census have been made public, following the report to Secretary of Commerce R. P. Lamont of the Advisory Committee on Manufactures under the chairmanship of Col. L. S. Horner, president, Niles-Bement-Pond Co.

This report stated that the basic thought in mind is that the information will be of real practical value, directly or indirectly, to manufacturers in their studies of production and distribution problems. Data which do not fall under this general heading have been eliminated, and new material of large practical value will be requested for the first time from manufacturers of the country.

Movements of Industrial Plants

It is the underlying purpose to tabulate data furnished by manufacturers in such a way as to point out the most significant industrial trends. Among these trends is that of migration of industry. Large movements of industry have been under way, especially since the World War, the advisory committee reported.

Some of these movements have involved the transfer of thousands of employees from one section of the country to the other, and have entirely changed the industrial occupation of a large portion of the inhabitants of these sections. The textile industry was pointed to as being an outstanding example of such migration. In other cases, it was stated, there has been a distinct drift by manufacturers away from urban communities into the smaller towns.

Again, a tendency toward concentration of certain industries has been prevalent, while other industries have tended to spread throughout the country. All of these trends have been recognized by the committee as having a large influence on the employment phase of industry. It has been generally known that such trends are under way, but definite data are not available.

Much Power Equipment Is Idle

The amount of idle power equipment in the manufacturing plants of the country will be ascertained for the first time. Estimates have been made that as much as 50 per cent of the installed power practically is idle through obsolescence, over-capacity or other causes. Specific information, however, on this significant subject has never been made available from any source. Power installation was referred to in the report as one of the best possible bases for industrial market studies. But the inaccuracy of available data due to the inclusion of this large amount of idle power equipment has deprived such studies of much of their potential value.

The Census Bureau is making special efforts to get the statistics on manufacturing operations back to the manufacturers at as early a date as possible. Realizing that an early report from manufacturers is dependent largely on the interest they manifest in making early returns, the advisory committee has appointed a publicity committee composed of Robert M. Davis, McGraw-Hill Publishing Co., chairman; Dr. H. P. Baker, Chamber of Commerce of the United States, and Dr. Roland P. Falkner, National Industrial Conference Board. This committee will bring the census of manufacturers to the attention of manufacturing executives in a positive way in the next few months through radio and press and by addresses before trade organizations.

Members of the publicity committee are also members of the advisory committee. Among additional members of the latter committee are Charles F. Abbott, American Institute of Steel Construction, New York; George G. Crawford, Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.; Walter S. Tower, Bethlehem Steel Co., Bethlehem, Pa.; Clarence M. Woolley, American Radiator Co., New York; J. E. Edgerton, National Association of Manufacturers; Virgil Jordan, late of the National Industrial Conference Board, and now with *Business Week*, New York, and F. M. Feiker, Associated Business Papers, Inc., New York.

New Bolt and Nut Plant on Pacific Coast

PACIFIC COAST STEEL CO. has added a plant at its South San Francisco, Cal., works for the manufacture of bolts, nuts, rivets, cap screws, track spikes and kindred products. Capacity is 1200 tons a month.

Equipment includes two continuous and four hand-fed National hot bolt machines; three National hot nut machines; three cold press nut machines and two cold trimming machines, built by the Waterbury-Farrel Foundry & Machine Co.; 15 automatic Economy Engineering Co. threaders; three Landis Machine Co. automatic threaders; four Landis and two Holmes hand threaders; two Waterbury-Farrel hand roll threaders; three National burring machines; five National pointers; one National flash trimmer; two National spindle tappers, 15 National automatic cappers.

Bolt rod used is high tensile steel manufactured by the company. Heat treating facilities with automatic temperature control are provided. For heat treating the cold-headed product a Westinghouse electric rotary-hearth normalizing and heat treating furnace has been installed.

All machines are individually motor driven and every motor is remote controlled.

The new plant is a one-story steel frame structure, 180 x 540 ft., composed of two bays, each 90 ft. wide, and is sheathed and roofed with corrugated sheet steel. About 60 per cent of the wall area is glass, insuring natural illumination throughout the building. Each bay, throughout its length, is served by a 10-ton electric traveling crane. The building, exclusive of equipment, cost $120,000.

British and German Metallurgists Meet

Keynote of Düsseldorf Meeting Is Improvements in Production of Light Metals

DÜSSELDORF, GERMANY, Sept. 15.—The joint meetings of the British Institute of Metals and the Deutsche Gesellschaft für Metallkunde were held here from Sept. 7 to 13, at the invitation of the German institute. Papers were presented by members of the German organization during the first half of the week and by members of the British Institute of Metals in the latter part of the week. Certain of the German metallurgists read their papers in English, but the principal papers, which were presented by Dr. A. G. C. Gwyer and by Dr. W. Rosenhain, president, British Institute of Metals, were in German.

A total of 39 papers were read during the seven days of the meeting, of which 18 were submitted by members of the Deutsche Gesellschaft für Metallkunde. During the convention members of the two institutes visited the Kaiser Wilhelm Institute for Steel Research, attended the foundry exhibition and visited the J. G. Schwietzke Metal Works, Demag A. G. of Benrath, Duisburger Kupferhütte and the works of the Friedrich Krupp A. G. at Essen, where they inspected the departments producing Nirosta steel and Widia metal. Members of the British institute were guests of the German association at a dinner on the Rheinterassen in Düsseldorf, and there were excursions on the Rhine.

Improved Light-Metal Alloys

The keynote of the papers presented was improvement in the production of light-metal alloys. Doctor Rosenhain, president of the British Institute of Metals, discussed the importance of absolutely pure metals for the physicist and explained that pure zinc, iron, manganese and chromium have shown surprising results in tests of their physical properties, especially after heat treating. Absolutely pure metals show considerable resistance to oxidation and corrosion and offer the physicist such a wide field of research that the metal industry should begin to consider their production as of great importance. Doctor Rosenhain pointed out particularly that metal research is now devoting more attention to the interior structure of metals, studied by the X-ray. The physical properties of metals, he said, are not only dependent upon the alloy itself, but even more on the form of the interior structure, and there is the possibility of influencing the structure of the crystals through special methods of treating.

Aluminum Alloy Treatment

Dr. A. G. C. Gwyer, prominent in England for his research in the field of aluminum alloys, predicted that the present knowledge of aluminum alloys will be greatly altered through current investigations of their reactions under heat treatment. In the past, effort has been directed toward obtaining certain physical properties in aluminum alloys by changing the composition of the alloy, with additions of copper, zinc, lead, lithium or manganese. Special methods of heat treatment, however, promise far better results, especially with X-ray spectography.

Considerable interest was shown in a paper on magnesium-zinc-aluminum alloys, presented by Dr. G. Wassermann of Berlin. He said that the possibilities of such alloys have been carefully investigated for the first time and it has been found that magnesium promises to give especially good results where unusually high tensile strength and favorable elongation, not as yet found in other light-metal alloys, is required.

Aluminum Cable Used in Europe

As invited guests, Dr. A. Von Zeerleder and P. Bourgeois of Neuhausen, Switzerland, submitted a paper discussing the influence of temperature on cables in the open air. The paper largely dealt with the recently developed aluminum alloy "Aldrey," which is beginning to be used extensively in replacement of copper wire for cables in Continental countries. Its electrical conductivity is only 14 per cent less than that of copper. It is lower in cost and, of considerable importance, is but little influenced in its conductivity by current transmission or the heat of the sun. Copper cables, the paper pointed out, are affected both by the current and the sun's heat. As a result, it is possible to use a much higher electric tension with the aluminum alloy than with copper. It was noted that Swiss, German, Austrian, Italian and other telegraph companies are now installing the aluminum alloy cables.

Beryllium as Aluminum Alloy

A paper by Dr. I. N. Friend of Birmingham, England, called attention to recent advances in preventing corrosion in non-ferrous metals, and said that it appears certain that it will be easier to solve the problem of corrosion in non-ferrous metal products than in steel. He suggested that it will be possible in the future to produce corrosion-resisting non-ferrous metals with the physical properties of steel at lower costs than steel alloys. The future use of beryllium lies not so much in steel as in aluminum, according to Dr. Ing. Denzo Uno of Aachen. Experiments, he said, have shown that beryllium - aluminum alloys, when properly treated, lend themselves to wide use in the electrical industry, especially for the production of electric lamps.

The bending properties of galvanized steel products depend entirely upon the thickness of the zinc coating, said Dr. Heinz Bablik of Vienna. The lighter the coating the better the bending properties. Zinc should merely cover the steel, he said, and the area where zinc is fused with steel should be as thin as possible. To accomplish this, electrolytic zinc is most suitable, he declared. This was confirmed in the discussion which followed.

Other papers read included "Heat Treatment of Copper-Zinc Alloys," by M. Hansen; "Elongation of Aluminum," by Chevenard; "Crystallization of Iron and Copper Alloys," by Brenthel. During the meetings the British Institute of Metals elected Professor Thammann of Göttingen an honorary member.

"Pittsburgh's Preeminence in Steel Will Endure"

—C. M. Schwab

That Pittsburgh's preeminence in the world's iron and steel industry will endure for at least another century was the prediction of Charles M. Schwab, chairman of the Bethlehem Steel Corporation, in a talk on Sept. 26 at a house-warming of the Chamber of Commerce of Pittsburgh in its remodeled and enlarged quarters.

"Prophecy is a dangerous thing," said Mr. Schwab, "but I feel that Pittsburgh is going to be the greatest center for iron and steel for all time. I see no reason now for any prediction other than continued prosperity over the country with constantly good business for Pittsburgh, the city where I made my start in the steel industry just 50 years ago."

Speaking before an audience of Pittsburgh business men, many of whom he had known in the steel industry before the turn of the century, Mr. Schwab pointed out that Pittsburgh, because of its steel-making traditions and because the making of steel is in the blood of the people, need have nothing to fear from competitive centers. He traced the history of steel-making in the United States and pointed out that he had been ridiculed a few years ago for predicting that steel production in this country would reach 50,000,000 tons annually. Now, he pointed out, this figure is being exceeded by 4,000,000 or 5,000,000 tons.

Among those on the committee to welcome Mr. Schwab to Pittsburgh were Willis L. King, vice-president, Jones & Laughlin Steel Corporation; George M. Laughlin and T. M. Girdler, respectively chairman and president of that company, and J. M. Lind, president, Carlem Engineering Co. Mr. Girdler was toastmaster at the dinner.

An annual vacation of one week with full pay granted all factory employees by the Mathews Conveyer Co., Ellwood City, Pa., has proved beneficial, according to F. E. Moore, president, who states that each man seems happier and is showing more efficient workmanship as a result of the plan, which became effective during the past summer.

Charles M. Schwab Honored for Service

Directors of American Iron and Steel Institute Present Him with Clock as He Enters Fiftieth Year in Industry

DIRECTORS of the American Iron and Steel Institute, meeting at the Metropolitan Club, New York, Sept. 20, presented a gold folding desk clock to Charles M. Schwab, in commemoration of his entry into the fiftieth year of service in the iron and steel industry. The clock, which is a minute repeater with a radium dial, bears the initials, C. M. S., on the back and the following inscription on the base:

Charles M. Schwab
from
The Directors
of the
American Iron and Steel Institute
To Commemorate
Fifty Years of Constructive Service
in the
Iron and Steel Industry

James A. Farrell, president, United States Steel Corporation, made the presentation address, which follows:

Mr. Schwab, in behalf of your colleagues and fellow members of the directorate of the American Iron and Steel Institute on this occasion, we wish to offer our congratulations and best wishes to you upon your entry into the fiftieth year of your active association and leadership in the American iron and steel industry.

Your prominence in the steel industry has been universally accorded to you. You have risen to it solely through natural ability and application. You have had the distinction of being awarded the Bessemer Medal and many other honors of note.

This moment moves me to happy memories. Because of your genial nature and our many years of intimate friendship, we beg your indulgence for the unalloyed words of appreciation and praise which we now bestow upon you.

Back of every worthwhile deed of any man is the propulsive power of heart interest, something of which we think much, but seldom talk over with friends who have the same conviction. Nothing can endure unless it touches the sources of genuine heart sincerity, for "as we are sincere, so are we perfect," said one of the greatest of ancient philosophers.

In this moment of retrospection of the incidents and associations with Charles M. Schwab, which reach to the very depths of our hearts, it is difficult to find words adequate for expression. To be actively identified with a major industry of this country for 50 years is indeed an inspiring and outstanding chapter in the annals of human existence and endeavor.

Since the eventful day of Sept. 12, 1880, when you first applied for a job in the steel mills at Braddock in your home State, I have, with others, as a co-worker and colleague, had the good fortune to follow your advancement and your unceasing devotion and labor for the upbuilding of the steel industry of the United States.

Your march of progress to world recognition has been replete with action and history that will probably

CHARLES M. SCHWAB

never come to any other man. Your optimism has added color to many a drab day of life for those who know you best, and has been the incentive for others to work to the goals of success and to find happiness and contentment in their chosen vocations. Your influence has, like bands of steel, gripped the heart and soul of many young men also fired with an ambition to succeed in business. Many of your early and present co-workers will gladly testify that you put romance in work and magic in their everyday existence.

In the phase of management, you have contributed the factor of sentiment and the desire to consider the welfare of the worker and the entire industry as an art. You have tried to understand all people, large or small, progressive or conservative. In your work, you have not belonged to any particular locality, although we are well aware of your attachment to the Keystone State and its western hills and valleys.

In your vigorous career, you have seen not only our basic industry develop from an infant to one of important magnitude, but have seen others born and perfected, the possibilities of which we hardly dreamed of in the old "puddling" days.

You have also experienced, at first hand, the distress of modern warfare. With a keen sense of public obligation and putting other ambitions aside in order to serve your country, you played a mighty rôle in supplying the necessities of war. With our nation drawn into this conflict you, through force and personality, pointed the way of work and loyalty to a multitude of men in the shipbuilding industry, which has forever stamped you as an outstanding leader and a citizen whose usefulness can be measured only in terms of unbounded appreciation.

Your contribution of untiring energy and scholarship to the American Iron and Steel Institute is too well known throughout our land for me to comment upon it. Under your presidency it will continue to grow in quantity and quality, and we hope that you will be spared for many years to come to sound semi-annually to its members the keynote of our manufacturing progress and principles.

We fully realize that the greatest compensation which can come to you is the knowledge and assurance that you have the good-will of every member of this institute and your fellow directors. Our appreciation of your administration is unbounded, because of what it means to the progress of this country and the affairs of the world.

As our honored friend and member today, it is the desire of the directors of the American Iron and Steel Institute to have you carry away some visible evidence to commemorate your half century of service to the steel industry.

Acting in their behalf, it is, therefore, a happy privilege to present to you this clock, symbolic of the time and years you have labored with us, and the friendships that have survived the passing of time. May the memory of these friendships be a source of never ending satisfaction to you.

Technical Papers for Steel Institute's Fall Meeting

The thirty-sixth general meeting of the American Iron and Steel Institute will be held at the Commodore Hotel, New York, Friday, Oct. 25. There will be the usual technical sessions morning and afternoon, followed by a banquet in the evening. The technical program follows:

"Fatigue of Metals," by Prof. H. F. Moore, research professor of engineering materials, University of Illinois, Urbana, Ill.

"Thermit Welding and the Steel Mill," by J. H. Deppeler, chief engineer, Metal & Thermit Corporation, New York.

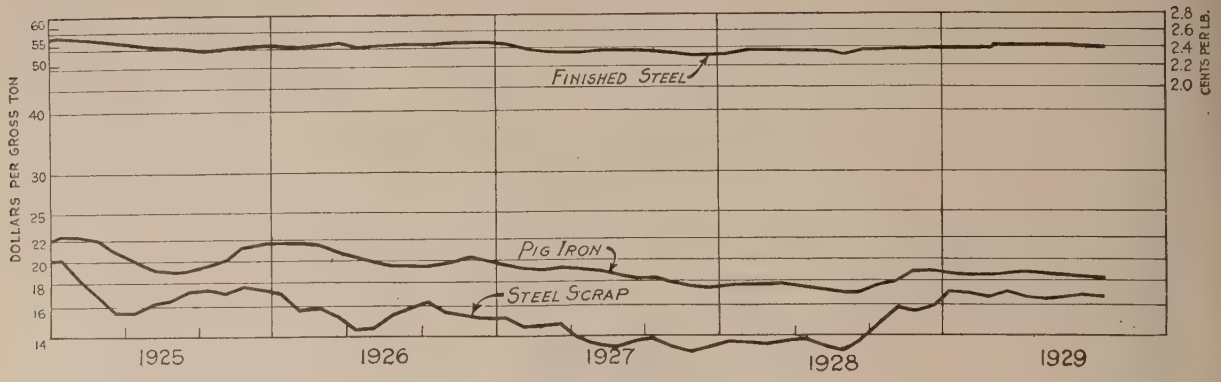
"Waste Prevention and Salvage as Applied to the Steel Industry," by Frank Parrish, supervisor of inventories, United States Steel Corporation, New York.

"Steel's Growing Service to Civilization," by E. F. Kenney, metallurgical engineer, Bethlehem Steel Co., Bethlehem, Pa.

"A Study of Basic Open-Hearth Slag by Solidification Tests," by E. J. Janitzky, metallurgist, South Works, Illinois Steel Co., South Chicago, Ill.

Latrobe Electric Steel Co. has moved its Cleveland office and warehouse from 1280 Ontario Street to larger quarters at 5140 Superior Avenue.

Scrap Prices Have Held Closely to Those for Pig Iron for Nearly a Year. By contrast, finished steel has had a narrow range over the past several years



Scrap Prices Have Moved Lower

Third-Quarter Average Is Lowest of Year—Spread Still Small Between Scrap and Pig Iron

AFTER a bulge in mid-August, prices of heavy melting steel scrap, averaged for Chicago, Pittsburgh and Philadelphia, have gone considerably lower, last week's level having been $16.33, against $16.92 prevailing through most of August. The latest average is exactly the same as that at the end of June and at the end of May, which is the lowest point that has been reached so far this year.

The trend of the year has been generally downward, maximum prices having been recorded at the end of January. The present level is $1.25 lower than eight months ago.

For the third quarter the average stands at $16.69, compared with $16.70 for the second quarter and $16.90 for the first quarter of the year. All three quarters this year have been at higher levels than have prevailed since 1925.

Meanwhile, the average price for pig iron has been lower, the general trend being downward since the second quarter. For the third quarter an average of $18.38 has been made, comparing with $18.62 for the second quarter and $18.39 for the first quarter.

Finished steel has taken a downward turn since early August, but the range since the middle of 1925 has been slight. For the third quarter the average is 2.403c. a lb., comparing with 2.412c. prevailing throughout the second quarter and 2.391c. throughout the first quarter. The current figures are not the lowest of recent years, as 2.318c. was registered in January, 1928.

A spread of $1.67 between scrap and pig iron in September may be compared with only $1.42 in January and February and with over $4 as recently as March, 1928.

Comparative figures for the past 21 months covering steel scrap, pig iron and finished steel are given in the table. The diagram carries the story of these changing prices over a period of nearly five years.

COMPOSITE PRICES

	(Gross Ton) Steel Scrap	Pig Iron	Finished Steel, Lb.
1925 average...	*$17.12*	*$20.58*	*2.465c.*
1926 average...	*15.48*	*20.42*	*2.439c.*
1927 average...	*14.00*	*18.55*	*2.357c.*
January, 1928 ...	13.70	17.63	2.318c.
February	13.71	17.73	2.361c.
March	13.65	17.73	2.362c.
April	13.81	17.67	2.359c.
May	13.90	17.45	2.350c.
June	13.52	17.23	2.341c.
July	13.13	17.10	2.325c.
August	13.75	17.11	2.348c.
September	14.75	17.54	2.348c.
October	15.85	17.94	2.363c.
November	15.73	18.46	2.368c.
December	15.97	18.51	2.385c.
Year's average.	*14.29*	*17.67*	*2.352c.*
January, 1929 ...	17.02	18.43	2.391c.
February	16.96	18.38	2.391c.
March	16.71	18.36	2.391c.
April	17.18	18.52	2.412c.
May	16.54	18.70	2.412c.
June	16.39	18.65	2.412c.
Half year.....	*16.80*	*18.51*	*2.402c.*
July	16.60	18.48	2.412c.
August	16.86	18.38	2.402c.
September	16.60	18.27	2.394c.
Third quarter..	*16.69*	*18.38*	*2.403c.*

Largest Nitriding Furnace Is Now Operating

The Central Alloy Steel Corporation has completed construction and started operation of the largest nitriding furnace in the world at its Canton, Ohio, works, according to an announcement by F. J. Griffiths, chairman of the company. The new furnace will be utilized to promote the use of Nitralloy, one of the new alloys being produced by the company under Krupp licenses. Demand has doubled in the last few months and the corporation is now on a regular production schedule for Nitralloy.

The nitriding process is applied after the metal has been fabricated into the finished part, and the company has placed the facilities of the new nitriding furnace at the disposal of manufacturers who, at present, lack such equipment. This is enabling them to make tests with Nitralloy before installing their own equipment for nitriding, which is a relatively simple process. The size of the furnace permits the company to nitride parts up to 23 ft. long, including such large pieces as cross-head guides for locomotives.

Mystic Iron Works Objects to Proposed Iron Rates

WASHINGTON, Oct. 1.—The proposed level of rates on pig iron from the furnace of the Mystic Iron Works, Everett, Mass., contained in the recent report of Examiner C. E. Simmons of the Interstate Commerce Commission, is objected to in a statement filed with the commission by counsel for the Mystic furnace.

It is contended in the statement that the proposed scale is too high and that it fixes rates for 30 miles and under that are higher than the present rates. In course of other exceptions it is stated as self-evident that the average interstate haul in New England is appreciably less than the average interstate haul in any other pig iron producing district. It is declared that the New England local rate structure on pig iron should correspond with the local rate structure on the same commodity in the other parts of the official territory for like hauls.

German Lathe Makers Unite

HAMBURG, GERMANY, Sept. 16.—Leading builders of lathes in Germany have formed a corporation, which will schedule output for the various manufacturers of turret, engine and other lathes, in an effort to prevent duplication of production. It is planned to confine each subsidiary company to one class of tool in an effort to reduce production costs. Sales will be controlled by the corporation both in Germany and abroad.

The International Acetylene Association will hold its annual meeting at the Congress Hotel, Chicago, Nov. 13 to 15. A. Cressy Morrison, 30 East Forty-second Street, New York, is secretary.

This Issue in Brief

Six-day "emergency stock" guards against production tie-up in the event of a material shortage. If reserve supply must be drawn upon for current production needs, a shortage report is immediately sent to the production department. When fresh material is received, reserve supply is immediately replenished. —Page 891.

* * *

Heat-treating furnace has ten hearths and one heating chamber. The furnace is of the rotary type, with the hearth extending down the center. Work is carried through a revolving barrel and is brought to temperature by radiant heat.—Page 908.

* * *

Accidents can be cut 50 per cent when foremen's cooperation is fully enlisted. Analyses of accidents show that, even in the well-ordered and well-guarded shop, most accidents are due to carelessness on part of the workmen or laxity in general shop instructions and practices.—Page 896.

* * *

Welding of stainless steels can be done successfully if nickel-chromium alloys are used. The serious grain growth, which develops in the straight chromium-iron alloys, is absent.—Page 888.

* * *

Condemns wearing of gloves around machine tools. Added accident hazard more than offsets any advantage gained, says manufacturing executive.—Page 896.

* * *

Iron and steel imports highest in three years. August total was 83,969 tons, largest since September, 1926. Exports were 242,856 tons, lowest this year.—Page 909.

Forging of chrome-nickel alloys can be done without difficulty between 2200 deg. and 1700 deg. Fahr. Below this range the metal has a tendency to rupture, if not crack.—Page 890.

* * *

Successful business today demands "creative spending" rather than "pinching economy," says association head. "Instead of the hang-on-to-the-dollar type there is needed the spend-plenty-of-money - promptly - on - competent-analysis type."—Page 901.

* * *

Pure copper castings, sound in every way, made by adding a small percentage of beryllium. The "almost impossible" is made possible by using the rare metal as a deoxidizer.—Page 911.

* * *

Cuts machining and assembling time from three weeks to three days. Pump casing which formerly consisted of 28 separate parts, requiring 44 machining operations, is now cast in two halves, which are machined in one set-up.—Page 897.

* * *

Production superintendent gives typed instructions simultaneously to 18 foremen by means of electric typewriters. New system speeds operations, does away with need for messengers, and reduces probability of error.—Page 893.

* * *

New September pig iron production record established with average daily output of 115,553 tons, which was 4.6 per cent below August daily rate. On Oct. 1 there were 205 furnaces in blast, a net loss of 5 for the month.—Page 922.

Machining costs cut by mounting 86 cutters on 7-ft. boring bar, weighing more than a ton. Cutters are set by micrometer gages, and each can be removed and ground without disturbing the others.—Page 897.

* * *

Non-rusting metal of the future will be non-ferrous, metallurgist believes. It appears certain, he says, that it will be easier to solve the problem of corrosion in non-ferrous metal products than in steel, and that the non-ferrous metals will be made at lower costs.—Page 914.

* * *

Will embrittlement develop in chromium-nickel alloys under certain atmospheric conditions? Stainless steel specialist fears so, although it may be in less dangerous range and over a much longer time cycle than in the case of chromium-iron alloys.—Page 889.

* * *

Chromium is what makes chromium-nickel alloys corrosion-resistant, says metallurgist. The nickel additions, he believes, are valuable more particularly in regard to their bearing on physical properties.—Page 889.

* * *

Oscillating the ingot mold during solidification produces an ingot having an outer columnar shell about 1½ in. thick, with normal carbon. There is a very sharp transition to small random crystals.—Page 894.

* * *

Errors in hoist manipulation are reduced by using arrow heads as hand-pulls. The arrow head pointing up lifts the load and the one pointing down lowers it. —Page 895.

A. I. FINDLEY
Editor

THE IRON AGE

W. W. MACON
Managing Editor

ESTABLISHED 1855

Commodity Price Prospects

THAT the general commodity price average has changed but little in the rising tide of prosperity of the last few years has given the economists no little concern, for the theory has been that rising prices and prosperity were interlocked. To ordinary business men the course has seemed more natural. A combination of competition and "sales resistance," or the determination of buyers not to pay advances, has held prices substantially stationary and increased profits where obtained have been through the medium of cost reduction.

Should there be just a mild reaction in trade activity—what then? There has been a theory that a long-range tendency of prices to decline after a great war has been offset of late by increasing activity, whereby in essence there was a price advancing tendency, prevented from working out into the actual figures by the other trend. Should both trends coincide in direction, the course of prices would presumably be different.

Despite the many new things, we should still be able to get some useful information from the past. In the light of fuller knowledge we should be able to interpret the past better now than was possible at the time. What is the theory that will explain satisfactorily the 50 per cent advance in prices from 1897 to 1913? The low point of all time fell in 1897 and the Bureau of Labor's general index number rose a trifle over 50 per cent to 1913. The ascent was almost uniform, there being merely short backsets in 1901, 1908-9 and 1911. It is true that times had been bad for several years prior to 1897 and were still bad, but there was a veritable "boom" in 1899 and there were periods of particularly intense activity in 1902 and in 1905-6-7; but after that, and into October of 1913 the price average continued to advance.

By observing the advances in individual groups of commodities from 1897 to 1913 one finds something that is of particular interest and value at the present time. With 50.6 per cent increase in the general commodity average in the 16 years, the group farm products advanced 95 per cent and foods and food products went up 56 per cent, a large increase in them being unavoidable when farm products advanced so much. The various other groups increased only between 32 and 49 per cent, except that lumber and building materials went up 68 per cent. The groups that advanced 32 to 49 per cent were cloth and clothing, fuel and lighting, metals and implements, drugs and chemicals, house furnishings and miscellaneous.

When the quantitative theory of money could not possibly explain these divergences, it is not worth while to consider in detail what influence it may have contributed to the general average. The notable thing is the large advance in farm products and it is obvious that this had something to do with the increases in the other groups. If farm products had not advanced as they did the other commodities would not have gone so high. Incidentally it has been a particularly lucky thing for the farmers that 1913 chanced to be selected for the comparisons of recent years.

The United States Government is now engaged in a serious effort to improve the position of the farmer, not so much by reducing his production costs as by raising his selling prices. There is no promise in this of lower costs for manufacturers and other producers and besides there is the continued downward trend in hours of labor.

The Ways of Investment Trusts

IF a corporate stock now selling at $100 per share for the reason that it is yielding an annual dividend of $5 should in the course of two or three years be put upon a $10 basis its quotational value would become $200 per share, assuming of course that economic conditions underwent no change affecting the satisfaction of investors.

In all probability if a corporation had such a success the abler investors would have sensed increasing earnings and upon the strength of their anticipatory buying the price for the stock would have advanced to $200 long before a $10 dividend rate were declared.

In the course of the advance there doubtless would be many fluctuations, undulating above and below an ascending line, and it is conceivable that a speculating investor starting with 100 shares, repeatedly selling out and buying back, might find himself at a final liquidation at $200 with a profit of $20,000 instead of $10,000.

In the converse instance of declining value all of the foregoing would be written in the opposite.

Of course, what we have remarked hereinbefore is thoroughly trite. Even so it helps in the understanding of investment trusts—their philosophy, operation, etc.—which have become a highly important thing in our economic affairs. It has been estimated that their aggregate capitalization now runs to something like 2.5 to 3 billion dollars, which probably is only a guess. However, the amount is undoubtedly very large.

The subject is too big and too ramifying for comprehensive discussion in a single editorial. Nevertheless there are certain principles that stand out clearly and may be broadly stated. The investment trusts express to the public the idea that they can handle money better than can the ordinary, even the average,

individual; and so much better that the yield to their clients is improved, although a large administration expense and a luscious commission have previously been deducted. It is clear from the exposition above, however, that the investment trust does not create any wealth, credit, or anything else. Using the term money in the vernacular, whatever the investment trust makes some one else does not make. There is simply a change of destination. Metaphorically the investment trusts may be described as the lions of Wall Street with whom the lambs lie down and become fat while the wolves grow lean, even to famishing. Of course, there will be instances of wolves disguising themselves as lions, and their particular lambs will not become fat.

Some of the superior investment trusts maintain extensive staffs of engineers and economists and base their commitments, or fill their portfolios (as financial writers like to say), upon the most intelligent and meticulous study. Others operate only on their commercial sense, or instinct. Still others govern themselves upon no other principle than the control of heaps of money. Analogously the investment trusts run the gamut from the exploration company to the speculative pool. Investment trusts of the latter type, that merely play the market, may be expected to explode every now and then, as happened to a little one lately. The sounder ones, which no doubt constitute the great majority, buying for dividends and increment, borrowing no money, are probably safe so long as our national economy is safe, although perhaps their income and profit may not always be so large as at present. After all, their position is much the same as that of the investment department of a university, or of an insurance company, or of a powerful individual, although there are certain important points of difference.

Your Convention Money's Worth

CONVENTIONS are a problem to many an employer. Do his representatives get a return in new knowledge and experience in any fair proportion to the money spent? Frequently not. Many pay too little attention to technical sessions and even less to the new features of the exhibition, if there is one. "Too many parties" is often the complaint. And yet the employer feels that he must be well represented.

A new departure was made recently and with apparent success by a large agricultural implement organization operating several plants. The chief metallurgist brought with him a group of his assistants. Each morning at breakfast the day's program (at the National Metal Congress in Cleveland) was gone over. Then selected individuals were given assignments to certain sessions or to visit designated departments of the exposition. At night, usually at dinner, the group came together and the members reported their impressions and discussed the papers. Often new ideas brought out in talks with fellow steel treaters were the topic.

While the subject of convention methods and results is up, it may be added that very recently the attitude of various industrial executives toward certain forms of entertainment has undergone a change. President Hoover's efforts for a more general observance of prohibition laws are the moving cause. We have in mind companies whose record for convention wetness has been well known, who are now taking their stand with the President and putting a ban on the serving of liquor by their sales departments from hotel room sideboards.

The Next Advance in Welding

AMONG the dozens of unexplained facts about welding is the following, which is fairly well known to the workmen: That if a piece of welding wire is merely rubbed bright with fine emery cloth, it is impossible to do satisfactory work with it. That is a very curious fact. But the present purpose is not so much to speculate upon the influence of a microscopic film of mill scale as to emphasize that *some* coating is necessary to stabilize the arc in metallic electrode welding. This is a first principle recognized by welding wire makers. A popular plan is to give the wire a copper coating; but each manufacturer has his own ideas about the most efficient way to give the so-called "bare electrode" its correct surface.

A few have reasoned that if some coating is absolutely essential, a little more would improve the welding characteristics, and consequently they have exploited the "covered electrode." Many varieties are now available, and have been developed independently by experimenters in America, England and on the Continent. Eventually we shall doubtless organize these isolated developments into systematic knowledge of what constituents are essential and what are merely psychological.

At present it appears that covered electrodes have these pronounced advantages: The arc wanders less than when using bare electrodes, thus permitting a higher current density and a greater rate of metal deposition. Further, the coating melts into a fusible slag which protects the weld metal from the atmosphere and thus improves its soundness and ductility. Counterbalancing these are the drawbacks that the covered electrodes are expensive and often fragile. Furthermore, the slag must be cleaned off the weld (a particular job when more than one layer must be deposited in a thick joint) and this extra operation is costly.

From the great preponderance of "bare" electrodes used in metallic arc welding, both manual and automatic, it may be concluded that the disadvantages of such covered electrodes as have been exploited more than offset the advantages. It is our belief, however, that this eminently practical conclusion is due to the fact that the covered electrode idea has not yet been developed to its logical limit—at least by companies that are in the business of making and selling welding equipment. The same cannot be said of certain firms who are much interested in automatic welding as a production process.

A specification for a really fine covered electrode would include the following important points: The covering material should be tough and adherent enough to stand shop handling; non-hygroscopic and stable in temperate climate. The covering material and the electrode should vaporize at the same rate, and the gas from the former should effectually prevent reaction between the white hot iron atoms and oxygen or nitrogen in the surrounding air. The vapor from the covering material should be a non-conductor

of electricity, or at least of such a nature as to concentrate the stream of electrons within a small area, thus stabilizing the arc, and increasing the rate of deposition of a superheated fluid steel. The slag from the melted covering should separate cleanly from the weld metal—no included particles. The slag should be a poor conductor of heat so that the weld metal may slowly cool, and have an annealed, fine-grained structure. The slag should solidify into a brittle mass, easily and cleanly removed from the underlying bright metal. For automatic welding the coating should be applied continuously just before using.

An ideal state; an impossible set of specifications? By no means. That the problem is not impossible is proved by the fact that it certainly has been solved already by at least two organizations (and perhaps more) working entirely independently. That the welding rate under such conditions is extraordinarily high is an open secret. That the quality of the welded joint is beyond reproach has been demonstrated by exhaustive tests.

When is the welding industry generally going to take these facts to heart and act accordingly?

Wide Field for Conveyor Systems

THAT mechanical conveyors can be successfully used only by large plants and in mass production is an idea still prevalent, but disproved by the experience of not a few companies. Some specific cases come to mind.

A Middle Western gray iron foundry making only three tons of castings a day has been equipped with conveyors after the fashion of the large automobile foundries and with a saving in men and space. An Ohio pump manufacturer of modest size has organized its factory on a progressive assembly plan with conveyors serving as the main stem in the production scheme. A New England machine shop has recently become more profitable through the use of material handling equipment.

Where conveyors cannot be employed in subassembly operations because of the nature of the work, they often can be made to solve the main assembly problem. Where they do not fit economically into the general manufacturing plan, frequently they can be used to lower the expense of certain operations. The point is that today no manufacturer, no matter how large or small, can overlook the possibilities of machine conveyors without risk of suddenly finding that a rival's vigilance in cutting production costs has allowed the latter to sell his product more cheaply.

Another popular belief is that the flow of materials through a plant must constantly be at a high rate in order to make mechanical conveyors profitable. That this cannot be applied as a blanket rule appears from the experience of a manufacturer of radio sets who installed a web of conveyors reaching into practically every department. The company's production for a time fell some 65 per cent below what the conveyors had been designed to handle, and yet the plant engineers estimated that, even though operations went on with no increase upon that rate, the conveying system would fully pay for itself within nine months.

Changing Production of Fuels

IN six years, 1923 to 1929, production of coal, petroleum and natural gas has increased about 5 per cent, as is shown when the three are added together on a heat-unit basis. The proportions, however, are greatly altered. Bituminous coal has lost about 10 per cent and anthracite nearly one-fourth, while oil has increased nearly a third and natural gas has increased by about two-thirds. Total B.t.u. represented were a trifle under 23 quadrillions in 1923 and will probably be measurably under 24 quadrillions this year.

The change in distribution is the interesting thing, represented by the following approximate figures:

Proportion of Heat Units

	1923	1929
Bituminous coal	65.0	58.6
Anthracite	11.1	8.5
Petroleum	19.2	25.1
Natural gas	4.7	7.8
Total	100.0	100.0

The course of natural gas production is of particular interest, and especially to the steel trade, seeing what a large demand there has been lately for line pipe for natural gas movement. The first statistics of natural gas production were for 1915, showing 628,578,842 thousands of cubic feet. Statistics for last year have just been issued, at 1,568,139,000 thousand cubic feet. Natural gas became a great thing for the Pittsburgh district in the eighties of the last century and a life saver for the infant tin plate industry in the next decade. The tin plate mills grouped in Indiana were called "the gas belt mills" and much glass manufacture was attracted to the same region.

Some of the older gas regions played out entirely, while others lost only slightly, but there have been big discoveries out west. The statistics show substantially uniform production for 1915 to 1922 inclusive; then large annual gains appeared, last year's production being double the average for the eight years through 1922. In each of the last three years there has been in the neighborhood of 10 per cent increase, and with the large number of gas lines laid recently, it is safe to estimate this year at 10 per cent over last year, or at somewhat more than 1,700,000,000 thousand cubic feet.

Petroleum will show a substantial gain over last year, probably about 11 per cent, to one billion barrels. There was a very large gain but restrictive measures have lately come to apply. The 1923 production was 732,407,000 barrels.

Comparison between 1923 and 1929 is not altogether fair to coal, for the reason that production in 1923 was stimulated after a strike year. Bituminous production this year, while below that of 1923, will be above that of any intermediate year except 1926. Anthracite production has been slipping slowly, in part because of strikes and consequent resort to fuel oil and gas. It had shown a distinctly standard rate at 90,000,000 tons until, in two war years, there was an excess of about 10 per cent. For several years after the war the old rate was in evidence, but now 75,000,000 tons is approximately the measure.

Continuous Sheet Process Licensed to Republic

The American Rolling Mill Co. has licensed its entire patent structure, covering processes for the rolling of wide thin sheets, to the Republic Iron & Steel Co., according to an announcement by George M. Verity, president of the American Rolling Mill Co.

This makes the fifth steel company to be licensed by the American Rolling Mill Co. Those granted licenses heretofore are the Weirton Steel Co., the Wheeling Steel Corporation, the United States Steel Corporation and the Gulf States Steel Co.

Rockwell Company Opens Its New Plant

The new home of the Stanley P. Rockwell Co., Hartford, Conn., at 296 Homestead Avenue, is announced as completed. It is an attractive building, equipped for the manufacture and servicing of the Rockwell dilatometer and other products of the company. A cordial invitation to inspect the new plant is extended to those interested.

Ornamental Iron and Bronze Makers to Meet

The twenty-second annual convention of the National Association of Ornamental Iron and Bronze Manufacturers will be held at Hotel Jefferson, St. Louis, Oct. 8 to 11. The program will include the following speakers: Harry F. Huff, manager, Kenosha, Wis., branch of the American Brass Co., on "History and Progress of Anaconda Extruded Metals"; Dr. Hugh P. Baker, manager, Trades' Association Department of the United States Chamber of Commerce, on "Trade Associations and American Business"; Harry A. Einstein, representative, Credit Clearing House Adjustment Corporation, New York, on "The Value of the Trade Association Credit and Collection Service," and C. C. Johnston, credit manager, St. Louis branch of Joseph T. Ryerson & Sons, Inc., on "Cost Accounting."

Crucible Buys Interest in Shenango Mines

The Shenango Furnace Co., Pittsburgh, announces the sale to the Crucible Steel Co. of America of a large interest in its extensive iron ore holdings located on the Mesabi range, St. Louis County, Minnesota, which will insure a supply of ore for Crucible Steel for about 30 years.

An operating company will be formed, the ownership of which will be held by the Crucible and Shenango interests. The present organization of the Shenango Furnace Co. will continue to operate the properties, as it has been active in the iron mining industry in the Lake Superior region for many years under the guidance of the W. P. Snyder interests. By this new deal these two old Pittsburgh concerns will be closely affiliated in future.

The ore produced from the different properties will be mostly consumed by the Shenango and Midland furnaces. The two largest properties figuring in the sale are the Shenango mine, which has been one of the big producers for many years, and the Webb mine, which has only recently been producing on a large scale. Both properties are operated by open pit mining.

By Crucible's purchase of a substantial part of these ore reserves it places itself in an independent position on raw materials, as the company already has ample coal and limestone properties to care for its requirements for many years.

The Week in Business

Drift of Current Financial and Economic Opinion

OPTIMISM seems to have become its own nemesis, so far as the stock market is concerned. The manifestly bright prospects for industry, particularly in this country, caused a world-wide rush to share in its future prosperity. But the speculation that ensued reached such proportions as to consume funds needed to insure the realization of business expectations.

The increase in discount rate of the Bank of England from 5½ to 6½ per cent in the past week is the latest of a series of central bank rate changes traceable to the demand for call money in the United States. Since Jan. 1, according to the New York *Herald-Tribune*, there have been 21 such rate changes, all but two being advances.

The English rate is now the highest since 1921 and, in the view of D. W. Ellsworth of the *Annalist*, will entail readjustments in international financial relations that are likely to react unfavorably on business in this country. A temporary slackening of activity, however, is the very thing needed to keep business on a sound and enduring basis, in the opinion of the National City Bank of New York, since it would have a sobering influence on speculative sentiment.

Commercial and Financial Chronicle takes a less sanguine view. In commenting on the further rise of brokers' loans to a new peak it says, "The full measure of the ill consequences in this last particular still remains for the future to determine."

This journal traces the origin of the stock market boom to the easy money policy inaugurated by the Federal Reserve authorities in the summer of 1927, when rediscount rates were reduced to the very low figure of 3½ per cent and the country was flooded with Reserve credit by the hundreds of millions through the purchase of Government securities. The purpose of the move was to divert bullion to Europe to help certain countries, notably Great Britain and France, to return to the gold standard. But, the *Chronicle* adds, the absorption of bank credit in stock speculation forced Europe "to yield up again the gold which Federal Reserve policy had so graciously placed at its disposal."

The general level of commodity prices, the Harvard Economic Society says, may weaken further over the remainder of the year. Continued firm money is in prospect; and in the fourth quarter the depressing influence of this condition upon foreign exchanges—and hence upon European commodity prices—is aggravated by the large seasonal expansion in export trade.

Certain it is that higher money rates in Great Britain will hamper the financing of its grain purchases. This factor must be taken into account in appraising the American agricultural situation. Our crop yields, according to an estimate by the Alexander Hamilton Institute, will show an average decrease of 9 per cent from those of 1928. The net result, in the belief of the Corn Belt Farm Dailies, is likely to be as many farm dollars as during the past year, but rather unevenly distributed. "It will be a very prosperous year for some farmers and a rather poor year for others."

The country as a whole, in the opinion of the Hamilton Institute, will be adversely affected. "Farm labor will not be so well employed, railroads will suffer from a reduction in freight, the nation's food bill will be increased and the people will have less money to spend for clothes, furniture, automobiles and other items which contribute to prosperity."

A Record September in Iron Output

Daily Rate Less Than August by 4.6 Per Cent or 5598 Tons—Nine Months' Total 1,553,500 Tons Over Next Largest—Net Loss of Five Furnaces

WITH all furnaces reporting and with only a few which could not give actual totals, data collected by wire on Oct. 1 show that September pig iron output established a new record for that month. A new total for the first nine months of any year was also registered.

September production was at the rate of 115,553 gross tons per day, a decline of 5598 tons or 4.6 per cent from the August rate of 121,151 tons per day. The nearest approach to this for September was 113,942 tons per day in 1918. The September total was 3,466,611 tons or 115,553 tons per day for the 30 days, as compared with 3,755,680 tons or 121,151 tons per day for the 31 days in August. The September daily rate is the smallest since February this year when it was 114,507 tons. In September a year ago the daily rate was 102,077 tons.

Operating Rate on Oct. 1

There were 205 furnaces operating on Oct. 1 having an estimated operating rate of 115,190 tons per day. This compares with an operating rate of 119,130 tons per day for the 210 furnaces active on Sept. 1. Nine furnaces were shut down and four were

Daily Average Production of Coke Pig Iron in the United States by Months Since Jan. 1, 1925—Gross Tons

	1925	1926	1927	1928	1929
Jan.	108,720	106,974	100,123	92,573	111,044
Feb.	114,791	104,408	105,024	100,004	114,507
Mar.	114,975	111,032	112,366	103,215	119,822
Apr.	108,632	115,004	114,074	106,183	122,087
May	94,542	112,304	109,385	105,931	125,745
June	89,115	107,844	102,988	102,733	123,908
½ year	105,039	109,660	107,351	101,763	119,564
July	85,936	103,978	95,199	99,091	122,100
Aug.	87,241	103,241	95,073	101,180	121,151
Sept.	90,373	104,543	92,498	102,077	115,553
Oct.	97,528	107,353	89,810	108,832	.....
Nov.	100,767	107,890	88,279	110,084	.....
Dec.	104,853	99,712	86,960	108,705	.....
Year	99,735	107,043	99,266	103,382	.....

Pig Iron Production by Districts, Gross Tons

	Sept. (30 days)	Aug. (31 days)	July (31 days)	June (30 days)
New York and Mass.	235,818	253,889	256,697	246,124
Lehigh Valley	82,097	88,395	95,571	102,302
Schuylkill Valley	69,413	74,871	71,350	70,265
Lower Susq. and Lebanon Valleys	37,900	37,706	37,775	44,651
Pittsburgh district	743,222	827,285	815,045	787,313
Shenango Valley	141,436	139,835	144,455	148,675
Western Pennsylvania	131,052	150,272	146,886	143,474
Maryland, Va. and Ky.	114,401	115,804	123,447	117,250
Wheeling district	125,009	130,296	127,136	133,450
Mahoning Valley	354,187	368,609	373,181	372,030
Central and North'n Ohio	359,420	377,604	387,383	374,138
Southern Ohio	46,992	54,842	52,232	46,345
Illinois and Indiana	702,234	773,150	772,276	771,070
Mich., Minn., Mo., Wis., Colo. and Utah	131,329	147,992	146,304	131,514
Alabama	182,427	205,209	225,513	219,235
Tennessee	9,674	9,921	9,869	9,389
Total	3,466,611	3,755,680	3,785,120	3,717,225

Daily Rate of Pig Iron Production by Months—Gross Tons

	Steel Works Iron	Merchant Iron*	Total
September, 1928	82,590	19,487	102,077
October	88,051	20,781	108,832
November	88,474	21,610	110,084
December	85,415	23,290	108,705
January, 1929	85,530	25,514	111,044
February	89,246	25,261	114,507
March	95,461	24,361	119,822
April	95,680	26,407	122,087
May	100,174	25,571	125,745
June	99,993	23,915	123,908
July	98,044	24,056	122,100
August	98,900	22,251	121,151
September	93,914	21,639	115,553

*Includes pig iron made for the market by steel companies.

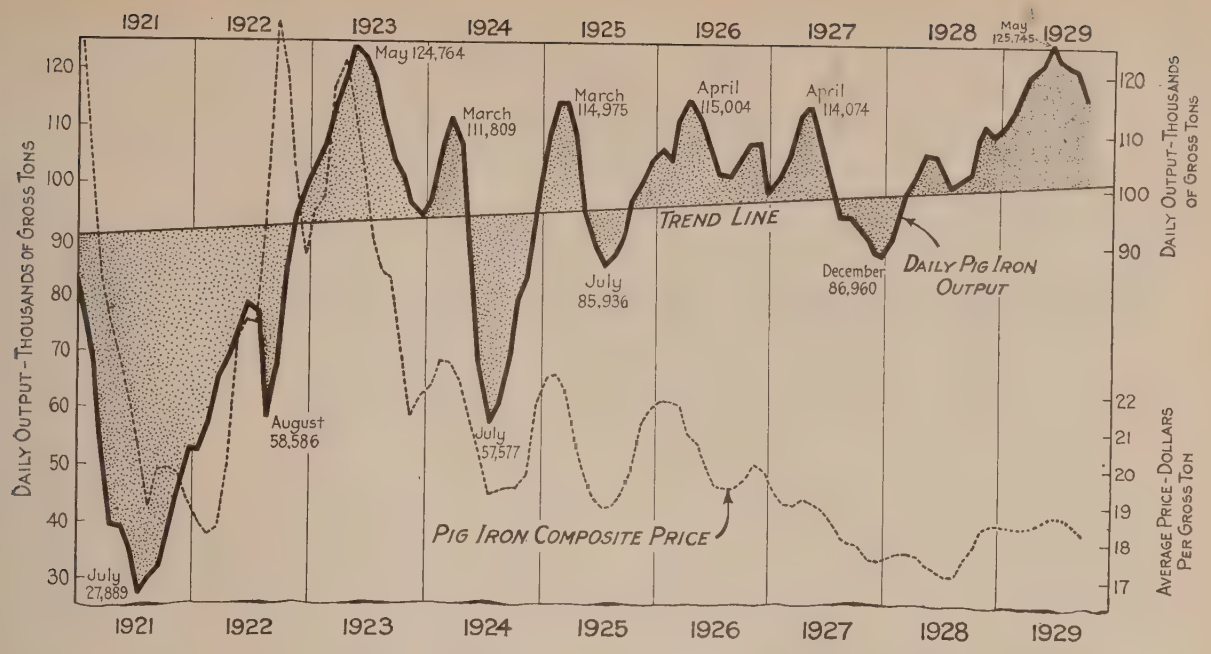
Coke Furnaces in Blast

Furnaces	Oct. 1 Number in Blast	Oct. 1 Gross Tons per Day	Sept. 1 Number in Blast	Sept. 1 Gross Tons per Day
New York:				
Buffalo	14	7,245	14	7,320
Other N. Y. and Mass.	2	615	2	595
New Jersey	0	....	0	....
Pennsylvania:				
Lehigh Valley	7	2,735	7	2,290
Schuylkill Valley	5	2,315	5	2,415
Susquehanna Valley	2	1,230	2	1,215
Ferromanganese	0	....	0	....
Lebanon Valley	0	....	0	....
Ferromanganese	0	....	0	....
Pittsburgh District	39	24,280	40	25,380
Ferro. and Spiegel	3	460	3	540
Shenango Valley	8	4,370	8	4,510
Western Pennsylvania	9	4,320	9	4,510
Ferromanganese	2	390	2	385
Maryland	5	2,985	6	3,220
Wheeling District	7	4,165	7	4,200
Ohio:				
Mahoning Valley	20	12,600	20	12,400
Central and Northern	18	11,425	19	12,000
Southern	4	1,565	4	1,770
Illinois and Indiana	32	22,650	35	24,940
Mich., Wis. and Minn.	6	2,820	6	2,825
Colo., Mo. and Utah	4	1,860	3	1,430
The South:				
Virginia	0	....	0	....
Ferromanganese	1	90	1	95
Kentucky	2	730	1	415
Alabama	13	6,020	14	6,360
Ferromanganese	0	....	0	....
Tennessee	2	320	2	315
Total	205	115,190	210	119,130

Production of Coke Pig Iron in United States by Months Beginning Jan. 1, 1927—Gross Tons

	1927	1928	1929
Jan.	3,103,820	2,869,761	3,442,370
Feb.	2,940,679	2,900,126	3,206,185
Mar.	3,483,362	3,199,674	3,714,473
Apr.	3,422,226	3,185,504	3,662,625
May	3,390,940	3,283,856	3,898,082
June	3,089,651	3,082,000	3,717,225
½ year	19,430,678	18,520,921	21,640,960
July	2,951,160	3,071,824	3,785,120
Aug.	2,947,276	3,136,570	3,755,680
Sept.	2,774,949	3,062,314	3,466,611
9 mos	28,104,063	27,791,629	32,648,371
Oct.	2,784,112	3,373,806	.....
Nov.	2,648,376	3,302,523	.....
Dec.	2,695,755	3,369,846	.....
Year*	36,232,306	37,837,804	.....

*These totals do not include charcoal pig iron. The 1928 production of this iron was 142,960 gross tons.



Production of Pig Iron So Far This Year Has Averaged Slightly Over 120,000 Tons a Day

Inclined line represents the gradually increasing theoretical needs of the country, ascertained by a balancing of the ups and downs in production. It shows an average yearly increase in consumption of about 423,000 tons

blown in during September—a net loss of five furnaces. This compares with a net loss of six furnaces in August.

No merchant furnaces were blown in or out last month. The Steel Corporation sustained the largest loss—one blown in and six shut down. Independent steel companies blew in three and shut down three. The net loss of five for the month was in steel-making furnaces.

Nine Months Make a New Record

For the nine months ended with September the total output was 32,648,371 tons. The nearest approach to this for the same period was 31,094,873 tons in 1923, an increase of 1,553,498 tons or 5 per cent.

Large Loss in Steel-Making Iron

There was a loss of 4986 tons per day, or 5 per cent, in steel-making iron or 93,914 tons per day for September compared with 98,900 tons per day for August. The merchant loss was only 612 tons per day.

September Output of Ferromanganese

Ferromanganese output in September was 27,310 tons which compares with 28,461 tons in August. It was the fifth largest this year. Two companies were making spiegeleisen last month.

Furnaces Blown In and Out

Among the furnaces blown in during September were one Ashland furnace of the American Rolling Mill Co. in Kentucky, No. 3 Ohio furnace of the Carnegie Steel Co. and one Campbell furnace of the Youngstown Sheet & Tube Co. in the Mahoning Valley, and one furnace of the Colorado Fuel & Iron Co. in Colorado.

Among the furnaces blown out or banked during September were No. 1 Isabella furnace of the Carnegie Steel Co. in the Pittsburgh district, C furnace at the Maryland plant of the Bethlehem Steel Corporation, No. 6 Ohio furnace of the Carnegie Steel Co. and Grace furnace of the Youngstown Sheet & Tube Co. in the Mahoning Valley, one furnace of the National Tube Co. for complete relining in Northern Ohio, two South Chicago furnaces of the Illinois Steel Co. and one Gary furnace in the Chicago district, and No. 3 furnace of the Sloss Sheffield Steel & Iron Co. in Alabama.

Production of Steel Companies for Own Use—Gross Tons

	Total Pig Iron Spiegel and Ferromanganese			Ferromanganese*		
	1927	1928	1929	1927	1928	1929
Jan.	2,343,881	2,155,133	2,651,416	31,844	22,298	28,208
Feb.	2,256,651	2,274,880	2,498,901	24,560	19,320	25,978
Mar.	2,675,417	2,588,158	2,959,295	27,834	27,912	24,978
Apr.	2,637,919	2,555,500	2,826,028	24,735	18,405	22,413
May	2,619,078	2,652,872	3,105,404	28,734	29,940	25,896
June	2,343,409	2,448,905	2,999,798	29,232	32,088	33,363
½ year	14,876,355	14,675,448	17,040,842	166,939	149,963	160,836
July	2,163,101	2,464,896	3,039,370	26,394	32,909	31,040
Aug.	2,213,815	2,561,904	3,065,874	21,279	24,583	28,461
Sept.	2,090,200	2,477,695	2,817,427	20,675	22,278	27,310
9 mos.	21,343,571	22,179,943	25,963,513	235,287	230,733	247,647
Oct.	2,076,722	2,729,589	.....	17,710	23,939	.....
Nov.	1,938,043	2,654,211	.....	17,851	29,773	.....
Dec.	1,987,652	2,647,863	.....	20,992	28,618	.....
Year	27,345,888	30,211,606	.....	291,840	312,061	.....

*Includes output of merchant furnaces.

The Pittsburgh Steel Co. and subsidiaries, for the year ended June 30, 1929, shows net income for that period of $4,535,437. After deductions for dividends on common and preferred stock, total surplus for the year was $3,041,687. During the year the company shipped 532,565 net tons of steel products. The average number of employees at steel works was 6153, and total salaries and wages paid amounted to $12,899,142.

Minnesota Steel Co., Duluth, Minn., has filed plans for a one-story addition to its merchant mill, to be equipped primarily for production of steel fencing, reported to cost about $100,000.

Iron and Steel Markets

Further Drop in Automobile Output

Two Leading Makers of Low-Priced Cars to Suspend Operations —Railroad Demand Still Expanding—Sheet Prices Weak—Scrap Lower

AUTOMOTIVE demand for finished steel has undergone a further slump, in contrast with the expanding requirements of the railroads and the sustained needs of the structural steel industry and other avenues of consumption.

The two leading makers of low-priced automobiles, both of which are bringing out new models, are scheduled to shut down their plants this month, one for two to four weeks and the other for 30 days. Although several motor car builders are preparing to get under production on new models about Nov. 1, the industry's operations during the rest of the year are unlikely to show much recovery.

Meanwhile railroad buying of both rails and equipment is assuming larger proportions. The Santa Fe has purchased 87,200 tons of rails, and the Monon, 4500 tons, while the formal distribution of orders by the Chesapeake & Ohio, Pere Marquette and Hocking Valley called for a total of 79,256 tons. The New York Central is in the market for 200,000 tons, to which 14,000 tons may be added for new lines. The Pennsylvania's inquiry for 310,000 tons is the largest it ever put out.

Orders for track accessories, the trend of which is upward, will call for at least 30 per cent of the tonnage of the rails bought, compared with 20 per cent a decade ago.

Rolling stock purchases include 3700 freight cars, nearly 1000 car bodies and 73 locomotives. Counting 7000 cars to be bought by the Baltimore & Ohio, approximately 6000 each by the Chesapeake & Ohio and the Santa Fe, 4000 by the Southern, 2700 by the Burlington and 1900 by the North Western, freight equipment orders definitely in sight total 30,000 units.

Mills serving the railroads and the construction industry, in contrast with those primarily dependent on the motor car manufacturers, have undergone the smallest reduction in operations and may show a gain this month. From the standpoint of weather conditions, October is an ideal production period and in past years has usually been the peak month of the last half of the year.

To fill up gaps in rolling schedules railroads and others are cooperating with producers by speeding up their specifications. A Chicago mill is already rolling 12,000 tons of plates for 1000 St. Paul cars, and the A. O. Smith Corporation, Milwaukee, which has booked two California line pipe orders, is releasing orders against the 69,000 tons of plates required.

Demands from the farm equipment industry, partly because of foreign orders for tractors, have improved. Fabricated structural steel lettings are large, totaling 50,000 tons, against 35,000 tons last week. Additions to pending work, amounting to 54,000 tons, include 17,000 tons for New York subway sections and 12,000 tons for a Chicago office building.

While ingot output for the steel industry at large has declined further and the lull in automobile manufacture will tend to offset heavier demands from other sources, it is possibly significant that the Steel Corporation rate, 89 per cent, shows a gain of a few points. Production of independents, on the other hand, probably does not average more than 80 per cent, with some of them running as low as 75 per cent of capacity.

Pig iron production in September totaled 3,466,611 tons, or 115,553 tons a day. While this was the largest output for any ninth month, it showed a decline from August, in terms of daily rate, of 4.6 per cent. Four furnaces were blown in and nine blown out, all of them steel company stacks, making a net loss of five stacks for the month. Output for the nine months, at 32,648,371 tons, established a new record, surpassing the previous high total, for the corresponding period in 1923, by 5 per cent.

Finished steel prices have developed further weakness, notably in sheets and wide strip, on which concessions are more common. Wire nails, despite the recent reduction in price, are very irregular, particularly in some parts of the Chicago district.

Scrap markets continue to weaken, and heavy melting steel has undergone a further decline of 25c. at Pittsburgh and 50c. at Chicago.

Pig iron demand has subsided, following a fair volume of contracting for fourth quarter. Melt is well sustained except in sections where automobile business is an important factor. Southern competition in Northern markets has diminished and surplus steel company iron has not yet disturbed prices. A purchase of 5000 tons of basic by a steel foundry failed to break the Valley market of $18.50, furnace.

Exports of iron and steel in August, at 242,856 tons, were the smallest of any month this year. Imports, at 83,869 tons, were the largest since September, 1926.

The International Steel Cartel has been renewed provisionally until the end of March, with production quotas unchanged for the fourth quarter. The International Rail Makers' Association has reaffirmed its prices.

Both of THE IRON AGE composite prices are unchanged, finished steel at 2.384c. a lb. and pig iron at $18.29 a gross ton. The former is 44c. a net ton higher than a year ago, the latter 45c. a gross ton higher.

A Comparison of Prices

Market Prices at Date, and One Week, One Month and One Year Previous, Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron, Per Gross Ton:	Oct. 1, 1929	Sept. 24, 1929	Sept. 3, 1929	Oct. 2, 1928
No. 2 foundry, Philadelphia	$21.26	$21.26	$21.26	$20.76
No. 2, Valley furnace	18.50	18.50	18.50	17.00
No. 2 Southern, Cin'ti	17.19	17.19	17.19	19.94
No. 2, Birmingham	14.50	14.50	14.50	16.25
No. 2 foundry, Chicago*	20.00	20.00	20.00	18.50
Basic, del'd eastern Pa.	19.75	19.75	19.75	19.00
Basic, Valley furnace	18.50	18.50	18.50	17.00
Valley Bessemer, del'd P'gh.	20.76	20.76	20.76	19.01
Malleable, Chicago*	20.00	20.00	20.00	18.50
Malleable, Valley	19.00	19.00	19.00	17.25
Gray forge, Pittsburgh	19.76	19.76	19.76	18.26
L. S. charcoal, Chicago	27.04	27.04	27.04	27.04
Ferromanganese, furnace	105.00	105.00	105.00	105.00
Rails, Billets, Etc., Per Gross Ton:				
Rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Light rails, at mill	36.00	36.00	36.00	36.00
Rerolling billets, Pittsburgh	35.00	35.00	35.00	32.00
Sheet bars, Pittsburgh	35.00	35.00	35.00	32.00
Slabs, Pittsburgh	35.00	35.00	35.00	32.00
Forging billets, Pittsburgh	40.00	40.00	40.00	38.00
Wire rods, Pittsburgh	*40.00*	42.00	42.00	42.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.85	1.85	1.85	1.90
Finished Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Bars, Pittsburgh	1.90	1.90	1.95	1.90
Bars, Chicago	2.05	2.05	2.05	2.00
Bars, Cleveland	1.95	1.95	1.95	1.92½
Bars, New York	2.24	2.24	2.29	2.24
Tank plates, Pittsburgh	1.95	1.95	1.95	1.90
Tank plates, Chicago	2.05	2.05	2.05	2.00
Tank plates, New York	2.22½	2.22½	2.22½	2.22½
Structural shapes, Pittsburgh	1.90	1.90	1.95	1.90
Structural shapes, Chicago	2.05	2.05	2.05	2.00
Structural shapes, New York	2.19½	2.19½	2.19½	2.19½
Cold-finished bars, Pittsburgh	2.30	2.30	2.30	2.10
Hot-rolled strips, Pittsburgh	1.90	1.90	1.90	1.75
Cold-rolled strips, Pittsburgh	2.75	2.75	2.75	2.75

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

Finished Steel,	Oct. 1, 1929	Sept. 24, 1929	Sept. 3, 1929	Oct. 2, 1928
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 24, P'gh.	2.85	2.85	2.85	2.75
Sheets, black, No. 24, Chicago dist. mill	2.95	2.95	2.95	2.75
Sheets, galv., No. 24, P'gh.	3.50	3.50	3.50	3.50
Sheets, galv., No. 24, Chicago dist. mill	3.60	3.60	3.60	3.60
Sheets, blue, No. 13, P'gh.	2.35	2.35	2.35	2.10
Sheets, blue, No. 13, Chicago dist. mill	2.45	2.45	2.45	2.20
Wire nails, Pittsburgh	2.45	2.45	2.55	2.55
Wire nails, Chicago dist. mill	2.50	2.50	2.60	2.60
Plain wire, Pittsburgh	2.40	2.40	2.40	2.40
Plain wire, Chicago dist. mill	2.45	2.45	2.45	2.45
Barbed wire, galv., P'gh	*3.10*	3.20	3.20	3.20
Barbed wire, galv., Chicago dist. mill	*3.15*	3.30	3.30	3.25
Tin plate, 100-lb. box, P'gh.	$5.35	$5.35	$5.35	$5.25
Old Material, Per Gross Ton:				
Heavy melting steel, P'gh.	*$17.75*	$18.00	$18.75	$17.00
Heavy melting steel, Phila.	16.00	16.00	16.50	16.00
Heavy melting steel, Ch'go.	*14.50*	15.00	15.25	13.25
Carwheels, Chicago	14.00	14.00	14.00	13.75
Carwheels, Philadelphia	16.50	16.50	16.50	16.50
No. 1 cast, Pittsburgh	15.50	15.50	15.50	15.00
No. 1 cast, Philadelphia	16.00	16.00	16.50	17.00
No. 1 cast, Ch'go (net ton)	14.50	14.50	14.50	15.00
No. 1 RR. wrot., Phila.	16.00	16.00	16.00	15.50
No. 1 RR. wrot., Ch'go (net)	14.00	14.00	14.00	12.00
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$2.65	$2.65	$2.65	$2.75
Foundry coke, prompt	3.75	3.75	3.75	3.75
Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	18.12½	18.12½	18.12½	15.25
Electrolytic copper, refinery	17.75	17.75	17.75	15.00
Tin (Straits), New York	*44.25*	45.25	45.50	49.75
Zinc, East St. Louis	6.80	6.80	6.80	6.25
Zinc, New York	7.15	7.15	7.15	6.60
Lead, St. Louis	6.70	6.70	6.55	6.32½
Lead, New York	6.90	6.90	6.75	6.50
Antimony (Asiatic), N. Y.	*8.50*	8.62½	8.62½	11.50

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Pittsburgh

Steel Demand Trend Still Indefinite, While Output Tapers —Railroad Needs Feature Market

PITTSBURGH, Oct. 1.—Pittsburgh district steel makers enter the last quarter of the year with the trend of demand rather undetermined and production still tending downward. Specifications during the last two weeks of September were at a considerably better rate on most products than they were during the first two weeks of the month, but they were still far from sufficient to maintain the operating rate which had prevailed during the summer months. At present most of the steel finishing departments are operating on a hand-to-mouth basis, although an exception might be made in the case of tin plate. The leading maker of this product has begun to work on anticipated tonnage. A few makers of sheets also have tonnage on their books which will carry them well into October, but such backlogs are rapidly being worked off as automobile demand for sheets tapers.

Railroad demand for steel continues to feature the market. Pittsburgh mills will undoubtedly share in the rail purchases of the Pennsylvania and the New York Central, both of which are to be slightly heavier than usual. Car buying also promises to continue. The Baltimore & Ohio has authorized the purchase of 7000 freight cars, from which local mills will likely benefit. Sheet makers in this district have received orders for galvanized material for cars recently.

Price concessions continue to appear on many products, although mills have not recognized this condition in their regular price schedules except on wire products. The weakness in nails and wire for the jobbing trade has not spread to manufacturers' wire, on which makers are maintaining a firm price policy. Concessions of $2 a ton on wire rods are being met in this district.

Recent price shading generally has not been among the regular customers of the larger mills, but has appeared when other steel companies, not so well supplied with business, have sought orders from users whom they do not ordinarily serve.

Pig iron shipments during September were ahead of those in August, and orders placed during the month gave some producers comfortable backlogs. However, many large users have not covered their needs for the last quarter and moderate buying is expected to be well distributed over the closing months of the year.

The scrap market shows further softness as a result of another week of practically no mill buying, but prices will be clarified somewhat by the closing of the railroad lists in the next few days.

Pig Iron.—Shipments during September from Valley and local merchant furnaces were somewhat larger than in the previous month, and aggregate sales of local dealers were considerably heavier. This was expected in view of fourth quarter contracting. It is believed, however, that consumers in this vicinity have by no means fully covered their needs for the last three months of the year, and that buying will be fairly well distributed throughout the quarter. Merchant furnaces are making no large additions to their stocks, and thus far

steel companies have not aggressively pushed the sale of iron in this territory. Two large steel companies are normally the sellers of pig iron, but no others are reported to have come into the market. American Steel Foundries has bought basic iron for its Alliance, Ohio, plant at the full $18.50, Valley, price. Price concessions are not reported in the market, although buyers are inclined to believe that the situation is not so strong as it was a short time ago. Foundry and basic iron are still quoted at $18.50, Valley, and malleable and Bessemer at $19, while the local furnace has quoted prices 50c. a ton higher.

Prices per gross ton, f.o.b. Valley furnace:

Basic	$18.50
Bessemer	19.00
Gray forge	18.00
No. 2 foundry	18.50
No. 3 foundry	18.00
Malleable	19.00
Low phos., copper free	27.00

Freight rate to Pittsburgh or Cleveland district, $1.76.

Prices per gross ton, f.o.b. Pittsburgh district furnace:

Basic	$19.00
No. 2 foundry	19.00
No. 3 foundry	18.50
Malleable	19.50

Freight rates to points in Pittsburgh district range from 63c. to $1.13.

Semi-Finished Steel.—As was the case at the beginning of the third quarter, buyers of semi-finished steel are hesitant in closing against their requirements for the last three months of the year. In some cases there is still some question as to the price on billets and slabs, while in others non-integrated companies have considerable steel coming to them on old contracts, and are in no immediate need of further supplies. Small users of billets, slabs and sheet bars have closed their fourth quarter contracts at $35, Pittsburgh, and forging billets are bringing $40. The weak price situation in wire and nails has been reflected in wire rods, and contracts have been taken at $40, Pittsburgh and Cleveland. The price of skelp is unchanged at 1.85c. to 1.90c., Pittsburgh or Youngstown.

Bars, Shapes and Plates.—Business is still rather spotty, although September specifications of some companies do not show so large a decrease as was indicated by the tonnage released in the first two weeks of the month. Most mills have considerable plate tonnage on their books yet to be rolled, and the buying movement in freight cars, which is now getting under way, will contribute to backlogs. It will be several weeks, however, before the steel for cars now being placed will reach the mills in the form of specifications. Barge buying in prospect also promises to contribute to the plate tonnage for the remainder of the year, and there is a real shortage of barges on the Ohio River and its tributaries. The Standard Unit Navigation Co. is expected to issue specifications this week on the 50 steel barges which it announced last week as probable purchases. Other barge work is also in prospect, although not many general inquiries have yet reached the trade. Structural business also looks more favorable. The Board of Commissioners of Allegheny County is expected to issue plans this month for a bridge across the Ohio River at McKees Rocks, Pa., which will require 15,000 tons. Another large bridge at Turtle Creek, Pa., is in prospect, and will require a large tonnage. Awards this week include a bridge at Point Marion, Pa., calling for 850 tons. Reinforcing bar business is still fairly active, and it is expected to keep up for several weeks before winter weather interferes with construction. Prices on bars and shapes are weak, and although some mills are still quoting 1.95c. on fourth quarter business, considerable tonnage is going at 1.90c. Concessions from 1.95c. on plates are not common in this territory.

Bolts, Nuts and Rivets.—Makers have no difficulty in signing up fourth quarter contracts at 70 per cent off list for bolts and nuts, and 70 and 10 on small rivets. The price of large rivets is unchanged at $3.10 a 100 lb., Pittsburgh or Cleveland. Makers have felt the falling off in automobile tonnage during the last month or six weeks, but operations for the industry as a whole average 65 to 70 per cent of theoretical capacity. The railroad car builders are expected to require large tonnages in the closing months of the year.

Rails and Track Accessories.—The Pennsylvania Railroad has issued its 1930 rail requirements, the total of 310,000 tons exceeding that of last year by 38,000 tons. The New York Central inquiry for 200,000 tons is also larger than last year's. Pittsburgh mills did not share heavily in the Chesapeake & Ohio tonnage, which was placed last week. The Baltimore & Ohio, which is soon expected to come into the market for 7000 freight cars, has not yet announced its next year's rail requirements. September shipments of track accessories were fairly good for this time of the year. This is the off season for such business, and improvements will not begin for another two months.

Sheets.—Attention in this market is centered largely on prices, as buyers are seeking lower quotations on fourth quarter tonnage. Mills, particularly the larger interests, are taking a firm stand on prices. However, some shading is occurring on all the common finishes of sheets and it remains to be seen whether concessions will become common enough to justify lower quotations. A few makers are still quoting 3.60c., Pittsburgh, on galvanized sheets, although 3.50c. is becoming a more common price. Black sheets are unchanged at 2.85c., Pittsburgh, and shading has not become general except to large Michigan buyers who ordinarily enjoy a preferential price. On light plates and blue annealed sheets, the common quotations are 2.20c. and 2.35c., Pittsburgh, respectively, although $2 a ton concessions are not infrequent. There is also occasional shading of the 4.10c. price on automobile body sheets. Fourth quarter contracting on the part of large users is still being delayed, but many consumers will have shipments coming to them during the greater part of October and a few mills still have sufficient backlogs to last for three or four weeks. The leading interest is still operating at close to 90 per cent of capacity and the independents

The Iron Age Composite Prices

Finished Steel

Oct. 1, 1929, 2.384c. a Lb.

One week ago	2.384c.
One month ago	2.398c.
One year ago	2.362c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products make 87 per cent of the United States output of finished steel.

	High		Low	
1929	2.412c.,	April 2;	2.384c.,	Sept. 24
1928	2.391c.,	Dec. 11;	2.314c.,	Jan. 3
1927	2.453c.,	Jan. 4;	2.293c.,	Oct. 25
1926	2.453c.,	Jan. 5;	2.403c.,	May 18
1925	2.560c.,	Jan. 6;	2.396c.,	Aug. 18

Pig Iron

Oct. 1, 1929, $18.29 a Gross Ton

One week ago	$18.29
One month ago	18.25
One year ago	17.84
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low	
1929	$18.71,	May 14;	$18.25,	Aug. 27
1928	18.59,	Nov. 27;	17.04,	July 24
1927	19.71,	Jan. 4;	17.54,	Nov. 1
1926	21.54,	Jan. 5;	19.46,	July 13
1925	22.50,	Jan. 13;	18.96,	July 7

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base per Lb.
F.o.b. Pittsburgh mill	1.90c. to 1.95c.
F.o.b. Chicago	2.05c.
Del'd Philadelphia	2.22c. to 2.27c.
Del'd New York	2.24c. to 2.29c.
Del'd Cleveland	1.92½c. to 1.95c.
F.o.b. Cleveland	1.90c. to 1.95c.
F.o.b. Lackawanna	2.05c.
F.o.b. Birmingham	2.10c.
C.i.f. Pacific ports	2.35c.
F.o.b. San Francisco mills	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills, 40, 50, 60-ft.	2.05c.
F.o.b. Pittsburgh mills, cut lengths	2.30c.
F.o.b. Birmingham, mill lengths	2.10c.

Rail Steel

F.o.b. mills, east of Chicago dist.	1.85c. to 1.90c.
F.o.b. Chicago Heights mill	1.95c.
Del'd Philadelphia	2.27c.

Iron

Common iron, f.o.b. Chicago	2.05c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	2.12c.
Common iron, del'd New York	2.14c.

Tank Plates

	Base per Lb.
F.o.b. Pittsburgh mill	1.95c.
F.o.b. Chicago	2.05c.
F.o.b. Birmingham	2.10c.
Del'd Cleveland	2.14c.
Del'd Philadelphia	2.15c.
F.o.b. Coatesville	2.05c.
F.o.b. Sparrows Point	2.05c.
F.o.b. Lackawanna	2.05c.
Del'd New York	2.22½c.
C.i.f. Pacific ports	2.35c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh mill	1.90c. to 1.95c.
F.o.b. Chicago	2.05c.
F.o.b. Birmingham	2.10c.
F.o.b. Lackawanna	2.05c.
F.o.b. Bethlehem	2.05c.
Del'd Cleveland	2.14c.
Del'd Philadelphia	1.96c. to 2.06c.
Del'd New York	2.14½c. to 2.19½c.
C.i.f. Pacific ports	2.35c.

Hot-Rolled Hoops, Bands and Strips

	Base per Lb.
6 in. and narrower, P'gh	2.00c.
Wider than 6 in., P'gh	1.90c.
6 in. and narrower, Chicago	2.20c.
Wider than 6 in., Chicago	2.10c.
Cooperage stock, P'gh	2.20c.
Cooperage stock, Chicago	2.30c.

Cold-Finished Steel

	Base per Lb.
Bars, f.o.b. Pittsburgh mill	2.30c.
Bars, f.o.b. Chicago	2.30c.
Bars, Cleveland	2.30c.
Bars, Buffalo	2.30c.
Shafting, ground, f.o.b. mill	*2.65c. to 3.60c.
Strips, P'gh	2.75c. to 2.85c.
Strips, Cleveland	2.75c. to 2.85c.
Strips, del'd Chicago	3.05c. to 3.15c.
Strips, Worcester	2.90c. to 3.00c.
Fender stock, No. 20 gage, Pittsburgh or Cleveland	4.25c.

*According to size.

Wire Products

(Carload lots, f.o.b. Pittsburgh and Cleveland, to jobbers and retailers.)

	Base per Keg
Wire nails	$2.45 to $2.55
Galvanized nails	4.45 to 4.55
Galvanized staples	3.15 to 3.25
Polished staples	2.90c. to 3.00c.
Cement coated nails	$2.45 to $2.55
	Base per 100 Lb.
Bright plain wire, No. 6 to No. 9 gage	$2.40 to $2.50
Annealed fence wire	2.55 to 2.65
Spring wire	3.50 to 3.60
Galv'd wire, No. 9	3.00 to 3.10
Barbed wire, galv'd	3.10 to 3.20
Barbed wire, painted	2.85 to 2.95
Woven wire fence (per net ton to retailers)	65.00

Chicago district mill and delivered Chicago prices are $1 per ton above the foregoing. Birmingham mill prices $3 a ton higher; Worcester, Mass. (wire), mill $3 a ton higher on production of that plant; Duluth, Minn., mill $2 a ton higher; Anderson, Ind., $1 higher.

Cut Nails

	Per 100 Lb.
Carloads, Wheeling, Reading or Northumberland, Pa.	$2.70
Less carloads, Wheeling or Reading	2.80

Light Plates

No. 10, blue annealed, f.o.b. P'gh	2.10c. to 2.20c.
No. 10, blue annealed, f.o.b. Chicago dist.	2.30c.
No. 10, blue annealed, del'd Phila.	2.42c. to 2.52c.
No. 10, blue annealed, B'ham	2.35c.

Sheets

Blue Annealed

	Base per Lb.
No. 13, f.o.b. P'gh	2.25c. to 2.35c.
No. 13, f.o.b. Chicago dist.	2.45c.
No. 13, del'd Philadelphia	2.67c.
No. 13, blue annealed, B'ham	2.50c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh	2.75c. to 2.85c.
No. 24, f.o.b. Chicago dist. mill	2.95c. to 3.00c.
No. 24, del'd Philadelphia	3.07c. to 3.17c.
No. 24, f.o.b. Birmingham	3.00c. to 3.10c.

Metal Furniture Sheets

No. 24, f.o.b. P'gh	4.10c. to 4.20c.

Galvanized

No. 24, f.o.b. Pittsburgh	3.50c. to 3.60c.
No. 24, f.o.b. Chicago dist. mill	3.60c. to 3.70c.
No. 24, del'd Cleveland	3.59c. to 3.69c.
No. 24, del'd Philadelphia	3.82c. to 3.92c.
No. 24, f.o.b. Birmingham	3.70c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.90c. to 3.00c.
No. 28, f.o.b. Chicago dist. mill	3.00c. to 3.10c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh	4.00c. to 4.10c.

Long Ternes

No. 24, 8-lb. coating, f.o.b. mill	4.00c. to 4.10c.

Vitreous Enameling Stock

No. 24, f.o.b. Pittsburgh	3.90c.

Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills	$5.35
Standard cokes, f.o.b. Gary	5.45

Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)
(Per Package, 20 x 28 in.)

8-lb. coating I.C.	$11.20
15-lb. coating I.C.	14.00
20-lb. coating I.C.	15.30
25-lb. coating I.C.	$16.70
30-lb. coating I.C.	17.75
40-lb. coating I.C.	19.85

Alloy Steel Bars

(F.o.b. makers' mill)

Alloy Quality Bar Base, 2.65c. to 2.75c. per Lb.

S.A.E. Series Numbers		Alloy Differential
2000	(½% Nickel)	$0.25
2100	(1½% Nickel)	0.55
2300	(3½% Nickel)	1.50
2500	(5% Nickel)	2.25
3100	Nickel Chromium	0.55
3200	Nickel Chromium	1.35
3300	Nickel Chromium	3.80
3400	Nickel Chromium	3.20
4100	Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50
4100	Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600	Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel)	1.05
5100	Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100	Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100	Chromium Spring Steel	0.20
6100	Chromium Vanadium Bars	1.20
6100	Chromium Vanadium Spring Steel	0.95
9250	Silicon Manganese Spring Steel (flats)	0.25
	Rounds and squares	0.50
	Chromium Nickel Vanadium	1.50
	Carbon Vanadium	0.95

Above prices are for hot rolled steel bars, forging quality. The differential for cold-drawn bars is ¾c. a lb. higher, with standard classification for cold-finished alloy steel bars applying. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis.

Billets under 4 x 4 in. carry the steel bar base. Slabs with a sectional area of 16 in. or over carry the billet price. Slabs with sectional area of less than 16 in. or less than 2½ in. thick, regardless of sectional area, take the bar price.

Rails

	Per Gross Ton
Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	36.00
Light (from rail steel), f.o.b. mill	34.00
Light (from billets), f.o.b. Ch'go mill	36.00

Track Equipment

	Base per 100 Lb.
Spikes, ⅜ in. and larger	$2.80
Spikes, ½ in. and smaller	2.80
Spikes, boat and barge	3.00
Tie plate, steel	2.15
Angle bars	$2.75
Track bolts, to steam railroads	$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel Inches	Black	Galv.	Iron Inches	Black	Galv.
⅛	45	19½	¼ and ⅜	+11	+36
¼ to ⅜	51	25½	½	23	5
½	56	42½	¾	28	11
¾	60	48½	1 and 1¼	31	15
1 to 3	62	50½	1½ and 2	35	18

Lap Weld

2	55	48½	2	23	9
2½ to 6	59	47½	2½ to 3½	28	13
7 and 8	56	43½	4 to 6	30	17
9 and 10	54	42½	7 and 8	29	16
11 and 12	53	40½	9 to 12	26	11

Butt Weld, extra strong, plain ends

⅛	41	24½	¼ and ⅜	+13	+48
¼ to ⅜	47	30½	½	23	7
½	53	42½	¾	28	12
¾	58	47⅞	1 to 2	34	18
1 to 1½	60	49½			
2 to 3	61	50½			

Lap Weld, extra strong, plain ends

2	53	42½	½	29	13
2½ to 4	57	46½	2½ to 4	34	20
4½ to 6	56	45½	4½ to 6	33	19
7 to 8	52	39½	7 and 8	31	17
9 and 10	45	32½	9 to 12	21	8
11 and 12	44	31½			

On carloads the above discounts on steel pipe are increased on block by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Steel		Charcoal Iron	
2 in. and 2¼ in.	38	1½ in.	1
2½ in.—2¾ in.	46	1¾ in.	8
3 in.	52	2 in.—2¼ in.	13
3¼ in.—3¾ in.	54	2½ in.—2¾ in.	16
4 in.	57	3 in.	17
4½ in. to 6 in.	46	3¼ in. to 3½ in.	18
		4 in.	20
		4½ in.	21

On lots of a carload or more, the above base discounts are subject to a preferential of two fives on steel and of 10 per cent on charcoal iron tubes. Smaller quantities are subject to the following modifications from the base discounts:

Lap Welded Steel—Under 10,000 lb., 6 points under base and one five; 10,000 lb. to carload, 4 points under base and two fives. Charcoal Iron—Under 10,000 lb., 2 points under base; 10,000 lb. to carload, base and one five.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	61	3 in.	46
1¼ to 1½ in.	53	3¼ to 3½ in.	48
1¾ in.	37	4 in.	51
2 to 2¼ in.	32	4½, 5 and 6 in.	40
2½ to 2¾ in.	40		

Hot Rolled

2 and 2¼ in.	38	3¼ to 3½ in.	54
2½ and 2¾ in.	46	4 in.	57
3 in.	52	4½, 5 and 6 in.	46

Beyond the above base discounts a preferential discount of 5 per cent is allowed on carload lots. On less than carloads to 10,000 lb., base discounts are reduced 4 points with 5 per cent preferential; on less than 10,000 lb., base discounts are reduced 6 points, with no preferential. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage take the mechanical tube list and discounts. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30%, base (carloads)	55
Carbon, 0.30% to 0.40%, base	50

Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

are probably not more than five points under this figure.

Wire Products.—Business in wire and wire nails is very slow, and is not helped by a very unsatisfactory price situation so far as jobbbers' business is concerned. Wire nails are still quotable at $2.45 to $2.55 per keg, Pittsburgh, although the price at Chicago is weaker by at least $1 a ton. Ordinarily the market at Chicago is $1 higher than Pittsburgh. Jobbers' wire products have reflected the weakness in nail prices, and the 2.40c. Pittsburgh price is being shaded on some business. On manufacturers' wire, this is the minimum of Pittsburgh district mills.

Tubular Goods.—Pipe mills in this and nearby districts continue fairly busy, with the operating rate of the industry as a whole at 70 to 75 per cent of theoretical capacity. Seamless mills are the most active, while the butt weld units are not so well engaged. Business in lap weld tubing is of a hand-to-mouth character as mills do not have heavy backlogs, but orders placed from day to day seem to be sufficient to justify a good operating rate. • Mechanical tubing is still rather dull on account of the reduced operations of the automobile industry, but signs of improvement are reported from some sources. There is a good movement of boiler tubes. Prices on lapwelded steel and standard commercial seamless boiler tubes have been advanced $4 a ton by leading makers, the advance effecting a two-point reduction of all base discounts f.o.b. Pittsburgh. No change has been made in the price of charcoal iron boiler tubes.

Tin Plate.—Mill operations are holding up remarkably well, with the leading producer running at 85 to 90 per cent of capacity and the independents ranging down to 70 or 75 per cent. The latter have not yet begun working on anticipated tonnage for next year, while such business is contributing to the well sustained operating rate of the largest maker. September shipments were high for that month, and the end of October will likely see a gradual improvement. However, little 1930 business is placed until the next year's price is announced, usually in the first half of November.

Strip Steel.—Business is spotty. Incoming tonnage is just about sufficient for a 70 to 75 per cent operation in the industry as a whole. In some cases, the cold mills have a better engagement while the reverse is true with other makers. Slightly heavier releases from some of the automobile companies are giving the market a somewhat more optimistic turn, although few makers expect a very large increase from this source in the fall months. Occasional price shading is reported, but the market is not quotably lower on either hot-rolled or cold-rolled material. In a few cases makers of welded tubing are reported to have renewed old contracts for cold-rolled strip, carrying a price under 2.75c., Pittsburgh or Cleveland, but this figure still represents the market. Instances of shading the hot-rolled strip prices of 1.90c. and 2c., Pittsburgh, are still rather uncommon and difficult to confirm.

Cold-Finished Steel Bars.—Reduction of the Cleveland base price on cold-finished steel bars to 2.30c. to meet the quotation of the new producer at Buffalo was not unexpected and places the market on the same price footing at all four of the basing points. Pittsburgh mills will meet outside competition in some cases, but the new basing point at Buffalo will not affect the price for many large users. The market is quiet, but demand was maintained at a rather steady rate during September and some improvement is looked for this month. Users in this territory have generally covered their third quarter needs at 2.30c., Pittsburgh.

Coke.—The coke market is still dull and prices have not gained strength on either the furnace or foundry grade. The former is still quotable at $2.65 to $2.75, Connellsville, on spot business, while contract tonnage is not bringing much above the top of this range. Shipments of foundry coke are expected to improve this month and domestic coke will begin to move more freely with the coming of cold weather. The premium grades of foundry coke are holding at $4.85 a net ton, ovens.

Old Material.—The scrap market is still in a very unsettled condition, and, with mill purchases delayed for at least another week, the principal grades are quotable at 25c. a ton less than they were a week ago. This places No. 1 heavy melting steel at $17.50 to $18 and compressed sheets at 25c. less. Specialties are also weaker, and heavy steel axle turnings are off 50c. a ton. Short shoveling steel turnings have declined, as purchases are being made to cover a recent order at $13. Dealers' buying prices on heavy melting steel range as low as $17, although such sales usually represent distress tonnages. One large consumer in the district is reported to be considering the purchase of scrap in the near future, but other mills seem well supplied, and there are still hold-ups at a number of points. The monthly list of the Pennsylvania Railroad, which closes on Oct. 2, is expected to throw some light on the price situation, as recent quotations have been largely nominal. This list contains 55,000 tons, including 9000 tons of heavy melting steel and 11,000 tons of rails. The Baltimore & Ohio list, which closes Oct. 7, contains 23,000 tons, including 5000 tons of heavy melting.

Prices per gross ton delivered consumers yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$17.50 to $18.00
No. 2 heavy melting steel	15.50 to 16.00
Scrap rails	16.50 to 17.00
Compressed sheet steel	17.25 to 17.75
Bundled sheets, sides and ends	16.00 to 16.50
Cast iron carwheels	16.00 to 16.50
Sheet bar crops, ordinary	19.00 to 19.50
Heavy breakable cast	12.00 to 12.50
No. 2 railroad wrought	17.50 to 18.00
Hvy. steel axle turnings	16.00 to 16.50
Machine shop turnings	11.50 to 12.00
Acid Open-Hearth Grades:	
Railr. knuckles and couplers	20.50 to 21.00
Railr. coil and leaf springs	20.50 to 21.00
Rolled steel wheels	20.50 to 21.00
Low phos. billet and bloom ends	21.50 to 22.00
Low phos., mill plates	21.50 to 22.00
Low phos., light grades	20.50 to 21.50
Low phos., sheet bar crops	21.50 to 22.00
Heavy steel axle turnings	16.00 to 16.50
Electric Furnace Grades:	
Low phos., punchings	19.50 to 20.50
Hvy. steel axle turnings	16.00 to 16.50
Blast Furnace Grades:	
Short shoveling steel turnings	12.00 to 12.50
Short mixed borings and turnings	12.00 to 12.50
Cast iron borings	12.00 to 12.50
Rolling Mill Grades:	
Steel car axles	21.50 to 22.00
Cupola Grades:	
No. 1 cast	15.00 to 16.00
Rails 3 ft. and under	19.00 to 20.00

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.25c.
Hoops	4.25c.
Black sheets (No. 24), 25 or more bundles	3.80c. to 3.90c.
Galv. sheets (No. 24), 25 or more bundles	4.45c. to 4.55c.
Light plates, blue annealed (No. 10), 1 to 24 plates	3.35c. to 3.45c.
Blue annealed sheets (No. 13), 1 to 24 sheets	3.50c. to 3.60c.
Galv. corrug. sheets (No. 28), per square	$4.43
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count.	60 per cent off list
Machine bolts, 100 count.	60 per cent off list
Carriage bolts, 100 count.	60 per cent off list
Nuts, all styles, 100 count.	60 per cent off list
Large rivets, base per 100 lb.	$3.50
Wire, black soft, ann'l'd, base per 100 lb.	$3.00 to 3.10
Wire, galv. soft, base per 100 lb.	3.00 to 3.10
Common wire nails, per keg.	2.90 to 3.00
Cement coated nails, per keg	3.05

Ship Construction Loans Call for Seven Vessels

WASHINGTON, Oct. 1.—The Newport News Shipbuilding & Dry Dock Co., Newport News, Va., will build two 20-knot combination passenger and cargo turbo-electric steamers of approximately 33,000 tons displacement each for the Dollar Steamship Line, Inc., which last week was awarded loans of $5,287,500 by the board for the construction of each vessel.

The board also has approved a loan of $6,304,687 to be used by the Motor Tankship Corporation in the aid of constructing five motor tankers of approximately 13,450 deadweight tons each. The vessels are to be built by the Sun Shipbuilding & Dry Dock Co., Chester, Pa.

The eleventh annual convention of the Southern Metal Trades Association will be held at Knoxville, Tenn., on Oct. 16 and 17. W. E. Dunn, Jr., Healey Building, Atlanta, Ga., is secretary.

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and under 10 in., Pittsburgh	$35.00
Rerolling, 4-in. and under 10 in., Youngstown	35.00
Rerolling, 4-in. and under 10 in., Cleveland	35.00
Rerolling, 4-in. and under 10 in., Chicago	37.00
Forging quality, Pittsburgh	$40.00 to 41.00

Sheet Bars

(Open Hearth or Bessemer)

	Per Gross Ton
Pittsburgh	$35.00
Youngstown	35.00
Cleveland	35.00

Slabs

(8 in. x 2 in. and under 10 in. x 10 in.)

	Per Gross Ton
Pittsburgh	$35.00
Youngstown	35.00
Cleveland	35.00

Skelp

(F.o.b. Pittsburgh or Youngstown)

	Per Lb.
Grooved	1.85c. to 1.90c.
Universal	1.85c. to 1.90c.
Sheared	1.85c. to 1.90c.

Wire Rods

(Common soft, base)

	Per Gross Ton
Pittsburgh	$40.00 to $42.00
Cleveland	40.00
Chicago	$41.00 to 43.00

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.80
Old range non-Bessemer, 51.50% iron	4.65
Mesabi Bessemer, 51.50% iron	4.65
Mesabi non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.40
Foreign Ore, c.i.f. Philadelphia or Baltimore	*Per Unit*
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algerian	12.00c.
Iron ore, low phos., Swedish, average 68% iron	12.00c.
Iron ore, basic Swedish, average 65% iron	10.00c.
Manganese ore, washed, 52% manganese, from the Caucasus	30.00c.
Manganese ore, Brazilian, African or Indian, basic 50%	30.00c.
Tungsten ore, high grade, per unit, in 60% concentrates	$16.25 to $16.50
	Per Gross Ton
Chrome ore, 45 to 50% Cr_2O_3, crude, c.i.f. Atlantic seaboard	$22.00 to $24.00
	Per Lb.
Molybdenum ore, 85% concentrates of MoS_2, delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$2.65 to $2.75
Foundry, f.o.b. Connellsville prompt	3.75 to 4.75
Foundry, by-product, Ch'go ovens	8.00
Foundry, by-product, New England, del'd	11.00
Foundry, by-product, Newark or Jersey City, delivered	9.00 to 9.40
Foundry, by-product, Phila.	9.00
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry by-prod., del'd St. Louis	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.25 to $1.75
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, ¾-in. f.o.b. Pa. mines	1.90 to 2.00
Mine run gas coal, f.o.b. Pa. mines	1.65 to 1.75
Steam slack, f.o.b. W. Pa. mines	80c. to 90c.
Gas slack, f.o.b. W. Pa. mines	1.00 to 1.10

Ferromanganese

	Per Gross Ton
Domestic, 80%, seaboard	$105.00
Foreign, 80%, Atlantic or Gulf port, duty paid	105.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$31.00 to $34.00
Domestic, 16 to 19%	29.00 to 32.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$83.50
75%	130.00

	Per Gross Ton Furnace		Per Gross Ton Furnace
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	45.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		Per Gross Ton
10%	$30.00	12%	$34.00
11%	32.00		

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		Per Gross Ton
6%	$23.00	10%	$27.00 to $28.00
7%	24.00	11%	29.00 to 30.00
8%	25.00	12%	31.00 to 32.00
9%	26.00		

Other Ferroalloys

Ferrotungsten, per lb. contained metal del'd	$1.40 to $1.50
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.15 to $3.65
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	$160.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton	$91.00
Ferrophosphorus, electric 24%, f.o.b. Anniston, Ala., per gross ton	$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silicon, gravel, f.o.b. Illinois and Kentucky mines	$18.00
No. 2 lump, Illinois and Kentucky mines	20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	$18.25 to $18.75
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines	32.50

Fire Clay Brick

	Per 1000 f.o.b. Works	
	High-Heat Duty Brick	Intermediate Heavy Duty Brick
Pennsylvania	$43.00 to $46.00	$35.00 to $38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	.....
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00
Standard size	45.00

Chrome Brick

	Per Net Ton
Standard size	$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts, blank or tapped, hexagons	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	7.00c. to 6.75c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled thread up to and including ⅛ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagons nuts	70
Semi-finished hexagons castellated nuts, S.A.E.	70
Stove bolts in packages, P'gh	75, 20, 10 and 5
Stove bolts in packages, Chicago	75, 20, 10 and 5
Stove bolts in packages, Cleveland	75, 20, 10 and 5
Stove bolts in bulk, P'gh	75, 20, 10, 5 and 2½
Stove bolts in bulk, Chicago	75, 20, 10, 5 and 2½
Stove bolts in bulk, Cleveland	75, 20, 10, 5 and 2½
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55, 60 per cent apply.

Large Rivets

(½-In. and Larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$3.10
F.o.b. Chicago	3.20

Small Rivets

(7/16-In. and Smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70 and 10
F.o.b. Cleveland	70 and 10
F.o.b. Chicago	70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10 and 5
Milled standard set screws, case hardened,	80 and 5
Milled headless set screws, cut thread	75 and 10
Upset hex. head cap screws, U.S.S. thread	85
Upset hex. cap screws, S.A.E. thread	85
Upset set screws	80, 10 and 5
Milled studs	70

Chicago

Outside Mills Offering Bars, Plates and Shapes at Concessions—Rail Inquiry Totals Over 500,000 Tons

CHICAGO, Oct. 1.—Sales of finished steel products, though the best in seven weeks, are still short of shipments and the indications are that further revision downward in the rate of ingot production is near at hand. Specifications are the largest in five weeks, but releases are for the most part at close range, as the future is viewed with less certainty by most consumers. Fresh inquiry is brisk, the aggregate tonnage being the largest for any week, with three exceptions, since the first of the year.

Eager desire to place tonnages as the fourth quarter opens is lacking, especially as prices show less certainty than a week ago. Local producers are asking 2.05c. a lb. for plates, shapes and bars. These products from other producing centers are being offered to a wider circle of buyers at 2c., Chicago.

The rail market continues to hold a prominent place, with inquiry well over the 500,000-ton mark.

The Santa Fe has ordered 87,200 tons, of which 74,860 tons was taken by the Colorado Fuel & Iron Co. and 6170 tons each by the Inland Steel Co. and the Illinois Steel Co. Railroad equipment orders include 2000 hopper cars by the Norfolk & Western and 500 gondola bodies by the Chicago & Eastern Illinois. An oil tanker requiring 5000 tons of steel has been ordered from a Lake Michigan shipbuilder by the Standard Oil Co.

Pig Iron.—Shipments of Northern pig iron from local furnaces in the first nine months of the year established a record. Releases remain heavy at the full rate of output of the five merchant stacks that now are in blast. Iroquois No. 5 will be lighted in a few days, and with this furnace in it will again be possible for local producers to amplify stocks. Forward buying is moving steadily and it is now disclosed that a few purchasers have placed their needs through the first quarter of next year. A melter near Chicago has taken 5000 tons of Southern iron at a price which figures between $13 and $13.50 a ton, Birmingham. Interest in low phosphorus iron is increasing as supplies of English iron brought to Lake Michigan ports early in the year near exhaustion. An order for 700 tons of 10 per cent silvery has been taken at $27 a ton, Jackson County, Ohio, furnace. Prices for this commodity show no tendency to gain strength. Occasional concessions on charcoal iron are still to be found in this market.

Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	$20.00
N'th'n No. 1 fdy., sil. 2.25 to 2.75	20.50
Malleable, not over 2.25 sil.	20.00
High phosphorus	20.00
Lake Super. charcoal, sil. 1.50	27.04
So'th'n No. 2 fdy. (all rail)	19.01 to 19.51
Low phos., sil. 1 to 2, copper free	29.50
Silvery, sil. 8 per cent	29.79
Bess. ferrosilicon, 14-15 per cent	46.29

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Ferroalloys.—This market is active only in less than carload lots. For business of this character prices are holding.

Prices delivered Chicago: 80 per cent ferromanganese, $112.56; 50 per cent ferrosilicon, $83.50 to $88.50; spiegeleisen, 19 to 21 per cent, $39.76 to $41.76.

Sheets.—The Chicago sheet market remains active, with output fully sustained at 90 per cent of capacity. New buying, the bulk of which is for nearby needs, is almost equal to shipments and backlogs have changed little in the week. Pressure for deliveries on the heavy gage blue annealed product is easier, and promises are now being made in six to seven weeks. Other grades range from three to four weeks, while roofing sheets are obtainable in two to three weeks. The price situation is still tangled, especially to the south of Chicago. Manufacturers of farm machinery are now entering specifications for the next three months, and, if their estimates of requirements hold true, they will take in the final quarter a larger tonnage of sheets than in the corresponding period a year ago.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 3c. to 3.05c.; No. 24 galv., 3.65c. to 3.75c.; No. 10 blue ann'l'd, 2.35c. Deliv'd prices at other Western points are equal to the freight from Gary, plus the mill prices, which are 5c. per 100 lb. lower than Chicago delivered prices.

Rails and Track Supplies.—The rail orders placed by the Chesapeake & Ohio, Pere Marquette and Hocking Valley totaled 79,257 tons. Of this amount, the Chesapeake & Ohio will take 53,480 tons, the Pere Marquette 20,300 tons and the Hocking Valley 5477 tons. The Chesapeake & Ohio awarded 16,273 tons to the Bethlehem Steel Corporation, 10,047 tons to the Inland Steel Co., 18,604 tons to the Illinois Steel Co. and 8556 tons to the Carnegie Steel Co. The Pere Marquette placed 7920 tons with the Illinois Steel Co., 9953 tons with Inland Steel, 1727 tons with Bethlehem and 700 tons with the Algoma Steel Corporation. The entire tonnage for the Hocking Valley went to the Illinois Steel Co. Reports elsewhere last week that the Missouri Pacific had ordered about 40,000 tons of rails were not correct. This railroad has not yet sent out an inquiry. The Pennsylvania is asking for 200,000 tons of rails and will take an option on an additional 110,000 tons. This total of 310,000 tons compares with 272,000 tons the Pennsylvania took last year. The New York Central's inquiry is for 200,000 tons and may be enlarged by 14,000 tons for new construction work. Local mills are still making deliveries against the 1929 purchase of the Illinois Central, and therefore sellers do not expect that this road will enter the market until nearly the end of the present buying movement. The Santa Fe has ordered 87,200 tons of rails, the distribution of which is given in one of the leading paragraphs of this report. The Monon has ordered 4500 tons of rails from the Illinois Steel Co. Inquiry for track supplies is impressive. The light rail market is without feature.

Prices f.o.b. mill, per gross ton: Standard section open-hearth and Bess. rails, $43; light rails, rolled from billets, $36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.15c.; angle bars, 2.75c.

Cast Iron Pipe.—Bids opened this week at Milwaukee show that 200 tons of 6-in. pipe was taken by R. D. Wood & Co. at $43.90 a ton, delivered, and 300 tons of 12-in. pipe was taken by the United States Pipe & Foundry Co. at $45.50 a ton, delivered. The freight rate from Birmingham to Milwaukee is $8.50. Sidney, Ohio, has awarded 15,000 ft. of 6 and 8-in. pipe to an unnamed bidder, and the McWane Cast Iron Pipe Co. has taken 100 tons of 2 to 6-in. for Kempton, Ill., and 200 tons of 4 to 8-in. pipe for Carmel, Ind. It is reported that the United States company is low bidder on 200 tons of pipe at Bridgman, Mich. This market remains moderately active in small tonnages, on which prices are easier,

Prices per net ton, deliv'd Chicago: Water pipe, 6-in. and over, $43.70 to $45.70; 4-in., $47.70 to $49.70; Class A and gas pipe, $3 extra.

Plates.—The Pacific Gas & Electric Co. has placed with the Milwaukee fabricator 348 miles of pipe, which will require about 55,000 tons of plates. The Milwaukee company has also booked a 14,000-ton order for 20-in. pipe for California. It is understood that these orders are for immediate fabrication, and local plate mill schedules are being helped out by releases of steel by this fabricator whose output was curtailed several weeks ago when a contract for line pipe was temporarily suspended. It is reported here that a 100,000-ton line pipe project is under consideration for the delivery of gas from Texas fields to the Central West. Shops which recently took car orders for the St. Paul have placed this week the needed 12,000 tons of steel. Tank steel orders total 5700 tons, and fresh inquiry is for 3000 tons. A Chicago shop will fabricate 3000 tons of plates for tanks to be erected in Texas and 1200 tons will be fabricated in Oklahoma.

Reinforcing Bars.—New inquiries before the trade indicate a more active market, but sales are sluggish notwithstanding the pressure brought to bear by the possibility of higher asking prices. In the past, like gestures by sellers have driven in numerous contracts. At present, however, buyers are handicapped in the matter of arranging loans for new construction purposes. Many plans have been

prepared by architects and in general purchases appear willing to come into the market as soon as funds are available. A small tonnage of Cook County, Ill., highway work is in early prospect. The lateness of the season may delay until spring extensive road building plans by the State.

Structural Material.—Business in prospect is enlarged this week by the announcement that the Marshall Field Estate will erect a 42-story office structure in Chicago. Preliminary estimates place the steel needed at 20,000 tons. Awards for the week, including 2300 tons for a Chicago public school building, total 4400 tons. Fresh inquiry amounts to 6300 tons, not including the Marshall Field Estate Building.

Mill prices on plain material, per lb.: 2.05c. base, Chicago.

Wire Products.—Little change has occurred in this market in the last week. Forward contracting has gained some headway, but spot orders, especially from the jobbing trade, are unusually light for this time of the year. Prices continue to lean to the weak side, especially when deliveries are to the south and southeast of Chicago.

Old Material.—Consumers of heavy melting have bought a total of 20,000 tons, following fairly large purchases of a week or so ago. Brokers are busily covering recent sales. Declines in prices in recent weeks have made buyers of all grades of scrap more cautious and, as a result, open inquiry has almost wholly disappeared from the market. However, shipments of most grades continue to go forward in good volume. Scrap iron and steel coming on track is a little in excess of melters' requirements, and this fact is tending to depress prices. Dealers find the needs of gray iron foundries more spotty than in September. On the whole, there is small change in the rate of melt by foundries, though their order books are growing lighter. Agreement among dealers as to definite specifications for hydraulic bundles prepared by them is leading buyers again to consider the use of this grade. Though offers of this grade have been made, no sales are reported. Dealers are finding a free supply of heavy melting steel at $15 a gross ton, delivered. Though prices are weak, brokers do not look for a serious break. The closing of two lists, one by the Chicago & North Western and one by the Burlington, have been postponed until late this week. New lists are being offered by the Pennsylvania, New York Central, Michigan Central, Big Four and various units of General Motors Corporation.

Prices deliv'd Chicago district consumers:

	Per Gross Ton
Basic Open-Hearth Grades:	
Heavy melting steel	$14.50 to $15.00
Shoveling steel	14.50 to 15.00
Frogs, switches and guards, cut apart, and misc. rails	16.25 to 16.75
Hydraul. compressed sheets	13.00 to 13.50
Drop forge flashings	10.75 to 11.25
No. 1 busheling	12.75 to 13.25
Forg'd cast and r'l'd steel carwheels	18.75 to 19.25
Railroad tires, charg. box size	18.75 to 19.25
Railroad leaf springs cut apart	18.75 to 19.25
Acid Open-Hearth Grades:	
Steel couplers and knuckles	17.00 to 17.50
Coil springs	19.00 to 19.50
Electric Furnace Grades:	
Axle turnings	14.25 to 14.75
Low phos. punchings	17.00 to 17.50
Low phos. plates, 12 in. and under	17.00 to 17.50
Blast Furnace Grades:	
Axle turnings	12.00 to 12.50
Cast iron borings	10.50 to 11.00
Short shoveling turnings	10.50 to 11.00
Machine shop turnings	7.50 to 8.00
Rolling Mill Grades:	
Iron rails	16.00 to 16.50
Rerolling rails	17.50 to 18.00
Cupola Grades:	
Steel rails less than 3 ft.	17.50 to 18.50
Steel rails less than 2 ft.	20.00 to 20.50
Angle bars, steel	17.00 to 17.50
Cast iron carwheels	14.00 to 14.50
Malleable Grades:	
Railroad	17.00 to 17.50
Agricultural	15.50 to 16.00
Miscellaneous:	
*Relaying rails, 56 to 60 lb.	23.00 to 25.00
*Relaying rails, 65 lb. and heav.	26.00 to 31.00
	Per Net Ton
Rolling Mill Grades:	
Iron angle and splice bars	15.00 to 15.50
Iron arch bars and transoms	21.00 to 21.50
Iron car axles	26.00 to 26.50
Steel car axles	17.50 to 18.00
No. 1 railroad wrought	14.00 to 14.50
No. 2 railroad wrought	13.00 to 13.50
No. 1 busheling	9.00 to 9.50
No. 2 busheling	7.00 to 7.50
Locomotive tires, smooth	14.50 to 15.00
Pipes and flues	10.00 to 10.50
Cupola Grades:	
No. 1 machinery cast	14.50 to 15.00
No. 1 railroad cast	14.00 to 14.50
No. 1 agricultural cast	13.25 to 13.75
Stove plates	12.25 to 12.75
Grate bars	11.75 to 12.25
Brake shoes	11.50 to 12.00

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Bars.—Fresh inquiry for mild steel bars is unusually heavy. New buying is dragging, though it is somewhat heavier than a week ago. The price situation in this market has changed only in a slight widening of the circle of preferred buyers. Forward contracting is going forward on the basis of 2.05c. a lb., Chicago. Forge shops in this area are laying plans for November output, and, as schedules now stand, the consumption of bars in that month will show some improvement over the current rate. Consumption of bars by builders of farm machinery is on the upturn. Railroad needs of iron bars for the fourth quarter are normal, as gaged by contracts already signed. Prices are steady at 2.05c. a lb., Chicago. The alloy bar market is steady in sales and shipments, and output remains at 70 per cent of capacity. Forward contracting in rail steel bars is gaining headway, though many users still prefer to buy at close range. Mills are having considerable trouble in trying to meet the exacting deliveries expected by buyers.

Bolts, Nuts and Rivets.—Total specifications for these products in the third quarter fell measurably short of the tonnages taken out in the first and second quarters. September started poorly, but in recent days releases have been growing and shipping schedules for October give promise of further improvement. Much of the betterment comes from farm implement manufacturers, who are going into production on tractors for export and who are entering into production on new lines of machinery which are taken by the trade in the spring and summer months.

Coke.—By-product foundry coke demand is steady and prices are firm at $8 a ton, local furnace.

Railroads Seek Reopening of Steel Rate Case

WASHINGTON, Oct. 1.—Railroads in Official Classification territory today filed a petition with the Interstate Commerce Commission asking for reopening of the Eastern general steel rate case. Reconsideration is specifically sought regarding five of the findings in the commission's decision, the effective date of which recently was postponed to Dec. 20 from Oct. 20 at the suggestion of the carriers.

The railroads claim that the scales prescribed would reduce their revenues in Official Classification territory by at least $2,500,000 annually and that other losses would result.

Sheet Mill Plant Expansion

Central Alloy Steel Corporation has authorized an expenditure of over $600,000 for improvements to its plants at Massillon and Canton, Ohio. The entire sheet rolling mill plant at Massillon will be equipped with continuous pack and pair furnaces and electric driving equipment will be installed. A new continuous furnace was recently constructed and similar equipment for the remaining four mills will be added. These improvements are expected to result in 40 per cent greater output of automobile body sheets. A normalizing furnace designed by the company's engineering and metallurgical departments will be installed at Canton. This will be 100 ft. long and 9 ft. wide.

Industrial Steel Treating Co., manufacturer of industrial furnaces and heat treating equipment, has removed to Sixth and Fallon Streets, Oakland, Cal.

Warehouse Prices, f.o.b. Chicago

	Base per Lb
Plates and structural shapes	3.10c
Soft steel bars	3.00c
Reinforc'g bars, billet steel	2.10c. to 2.35c.
Reinforc'g bars, rail steel	1.85c. to 2.00c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Bands (¼ in. in Nos. 10 and 12 gages)	3.20c.
Hoops (No. 14 gage and lighter)	3.75c.
Black sheets (No. 24)	4.05c.
Galv. sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.35c.
Spikes, ⅜ in. and larger	3.55c.
Track bolts	4.55c.
Rivets, structural	4.00c.
Rivets, boiler	4.00c.
	Per Cent Off List
Machine bolts	60
Carriage bolts	60
Coach or lag screws	60
Hot-pressed nuts, sq., tap. or blank	60
Hot-pressed nuts, hex., tap. or blank	60
No. 8 black ann'l'd wire, per 100 lb.	$3.45
Com. wire nails, base per keg	3.20
Cement c't'd nails, base per keg	3.20

New York

New York Central Inquires for 200,000 Tons of Rails—Bank Building Takes 15,000 Tons of Steel

NEW YORK, Oct. 1.—Pig iron sales for the week totaled 10,000 tons, of which about one-quarter was for shipment from Alabama. Prices on Southern iron are steadily growing firmer, with sellers holding to a minimum of $13.50, base Birmingham, on foundry grade. It is conceded that as low as $13 might still be quoted on attractive tonnages of stock iron of low silicon content. Most melters in this territory have covered for at least a substantial part of their fourth quarter requirements and their is no inclination to place any further tonnage for first quarter. A quieter market, therefore, seems to be in immediate prospect. Shipments, however, are going forward with virtually no interruption, and foundry melt is rather well sustained, being largely unaffected by the decline in automobile manufacture. Prices on eastern Pennsylvania foundry iron range from $18.50 to $19, base furnace, and on Buffalo foundry grade from $17.50 to $18, base furnace. Barge shipments from Buffalo, which have been heavy in the past six weeks, may decline in view of an impending increase in the grain movement and the possibility of higher rates. The Port Henry, N. Y., furnace, which has been out for repairs, is expected to be blown in by Oct. 15. The Worthington Pump & Machinery Corporation is in the market for 1600 tons of various grades for its Harrison, N. J., Holyoke, Mass., and Elmwood Place, Ohio, plants. The New York Central Railroad is inquiring for 350 tons for delivery to Frankfort, N. Y., or Elkhart, Ind.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	$22.41 to $22.91
*Buf. No. 2, del'd east. N. J.	20.78 to 21.28
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	19.89 to 21.02
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	20.39 to 21.52

Freight rates: $4.91 from Buffalo, $1.39 to $2.52 from eastern Pennsylvania.

*Prices delivered to New Jersey cities having rate of $3.28 a ton from Buffalo.

Cast Iron Pipe.—Quotations are still irregular, but Northern foundries are maintaining prices at a slightly higher level than for some weeks, quoting from $32 to $34 a ton, foundry, on most of the current business. Buying is limited to lots of a carload to a few hundred tons. Providence, R. I., has awarded 200 tons of 12-in. water pipe to the United States Pipe & Foundry Co. Municipalities are planning additions to their water supply, which should provide some fair tonnages of pipe for spring delivery. Authorization of bond issues or appropriations for water supply expansion have recently been made by Briarcliff Manor, N. Y., North Caldwell, N. J., and Danbury, Conn. Among recent private purchases of cast iron pipe is an order for about 400 tons placed by the American Construction & Securities Co. with a Southern maker for export to Cuba.

Prices per net ton deliv'd New York: Water pipe, 6-in. and larger, $34.60 to $36.60; 4-in. and 5-in., $37.60 to $39.60; 3-in., $44.60 to $46.60. Class A and gas pipe, $3 extra.

Reinforcing Bars.—The volume of orders has dropped off somewhat and inquiries also are less numerous. Prices are holding fairly well, although in a few cases foreign steel has been sold at less than the current market.

Billet steel reinforcing bars in 40, 50 and 60-ft. lengths, 2.05c. per lb., Pittsburgh, and 2.30c. per lb., Pittsburgh warehouse, for cut lengths. Out of New York warehouse, 2.90c. per lb. for lots of 5 tons or more, 3.05c. for lots of 2 to 5 tons and 3.30c. for less than 2 tons, all delivered at job.

Finished Steel.—Although steel bookings by local offices during September were generally larger than those of August and larger also than September orders last year, the steel situation lacks the snap to which the trade had grown accustomed during the earlier months of the year. Fourth quarter contracts for bars have generally been revised to the basis of 1.90c., Pittsburgh. Although the Pittsburgh price on shapes is also off $1 a ton, this does not materially affect the Eastern situation, which is based on the price of material at Bethlehem, Pa., in which no change has been reported. Sheet prices, while not quotably lower, are uncertain. The open price on black sheets is 2.85c., Pittsburgh, but quotations of 2.75c. have appeared on desirable business. On galvanized sheets, 3.50c. is the usual price, as some mills which have been holding for 3.60c. have abandoned efforts to obtain above 3.50c. Light-gage blue annealed sheets are steady, but on the heavy gages quotations of 2.10c., Pittsburgh, are fairly common. The New York Central will receive bids up to Oct. 9 on 200,000 tons of steel rails for its 1930 requirements. Railroad car buying continues to be a promising prospect, but expected inquiries are slow in coming out. The Farmers Loan & Trust Building, New York, will take 15,000 tons of structural steel, which has been awarded to the McClintic-Marshall Co. Two new subway sections in New York call for a total of 17,000 tons, on which bids will be received the last week of October. In export trade, the placing of 60,000 base boxes of tin plate by the Nippon Oil Co. for shipment to Japan was outstanding. The business was divided among five makers.

Mill prices per lb., deliv'd New York: Soft steel bars, 2.24c. to 2.29c.; plates, 2.22½c.; structural shapes, 2.19½c.; bar iron, 2.14c.

Warehouse Business.—Buying from stock was fair during September. Black, galvanized and blue annealed sheet prices are still subject to concessions of $1 or more a ton. Zinc sheet quotations have been advanced 25c. a 100 lb. to a range of 10.75c. to 11.25c. a lb. for No. 9 in casks.

Coke.—Demand for heating coke is increasing with the approach of cold

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.30c.
Soft steel bars, small shapes	3.25c.
Iron bars	3.24c.
Iron bars, Swed. charcoal	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Cold-roll. strip, soft and quarter hard	5.15c. to 5.40c.
Hoops	4.25c.
Bands	3.75c.
Blue ann'l'd sheets (No. 10)	3.70c. to 3.90c.
Long terne sheets (No. 24)	5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galv. annealed	5.15c.
Tire steel, 1½ x ½ in. and larger	3.40c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.75c.
Open-hearth spring steel, bases	4.50c. to 7.00c.

	Per Cent Off List
Machine bolts, cut thread:	
¾ x 6 in. and smaller	60
1 x 30 in. and smaller	50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	60
¾ x 20 in. and smaller	50 to 50 and 10
Coach screws:	
½ x 6 in. and smaller	60
1 x 6 in. and smaller	50 to 50 and 10

Boiler Tubes—	Per 100 Ft.
Lap welded, 2-in.	$17.33
Seamless steel, 2-in.	20.24
Charcoal iron, 2-in.	25.00
Charcoal iron, 4-in.	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
½-in. butt	46	29
¾-in. butt	51	37
1-3 in. butt	53	39
2½-6-in. lap	48	35
7 and 8-in. lap	44	17
11 and 12-in. lap	37	12
Wrought Iron—		
½-in. butt	5	+19
¾-in. butt	11	+ 9
1-1½-in. butt	14	+ 6
2-in. lap	5	+14
3-6-in. lap	11	+ 6
7-12-in. lap	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box	$6.45	$6.20
Charcoal, per Box—	A	AAA
IC	$9.70	$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating	$10.00 to $11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets, Box Annealed—Black, C. R. One Pass

	Per Lb.
Nos. 18 to 20	3.75c. to 3.80c.
No. 22	3.90c. to 3.95c.
No. 24	3.95c. to 4.00c.
No. 26	4.05c. to 4.10c.
No. 28*	4.20c. to 4.25c.
No. 30	4.45c. to 4.50c.

Sheets, Galvanized

	Per Lb.
No. 14	4.20c. to 4.40c.
No. 16	4.15c. to 4.25c.
No. 18	4.20c. to 4.40c.
No. 20	4.30c. to 4.50c.
No. 22	4.40c. to 4.60c.
No. 24	4.65c. to 4.75c.
No. 26	4.90c. to 5.00c.
No. 28*	5.15c. to 5.25c.
No. 30	5.55c. to 5.65c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

weather, but standard furnace grade is unchanged at $2.65 to $2.75 a net ton, Connellsville. Special brands of beehive foundry coke are quoted at $4.85 a net ton, ovens, or $8.56, delivered to northern New Jersey, Jersey City and Newark, and $9.44 to New York and Brooklyn. By-product coke is quoted at $9 to $9.40 a net ton, Newark or Jersey City, and $10.06, New York or Brooklyn.

Old Material.—Brokers filling No. 1 heavy melting steel contracts with eastern Pennsylvania mills have reduced their buying prices to $15.50 a ton, delivered, at which price a plentiful supply is reported. Shipments are being made to Bethlehem, Steelton, Conshohocken, Pa., and Claymont, Del. No. 2 heavy melting steel is being bought at $13.25 a ton, delivered to a Harrisburg, Pa., mill, and at $13 a ton, delivered Phoenixville, Pa. Buying prices of steel car axles, specification pipe and chemical borings are also off about 50c. a ton, and forge fire is about 25c. a ton lower in price.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel	$12.00 to $12.85
Heavy melting steel (yard)	8.00 to 9.50
No. 1 hvy. breakable cast.	10.25 to 11.00
Stove plate (steel works).	8.00 to 8.25
Locomotive grate bars....	8.25 to 8.75
Machine shop turnings....	7.75 to 8.00
Short shoveling turnings..	8.00 to 8.50
Cast borings (blast furn. or steel works).....	7.00 to 7.75
Mixed borings and turnings	6.75 to 7.75
Steel car axles.....	19.00 to 19.50
Iron car axles.....	23.00 to 24.00
Iron and steel pipe (1 in. dia., not under 2 ft. long)	10.25
Forge fire	9.50 to 10.00
No. 1 railroad wrought...	12.00 to 12.50
No. 1 yard wrought, long..	11.00 to 11.50
Rails for rolling.....	13.25 to 13.75
Stove plate (foundry)....	8.00 to 8.50
Malleable cast (railroad).	14.00 to 14.50
Cast borings (chemical)..	9.50 to 10.00

Prices per gross ton, deliv'd local foundries:

No. 1 machry. cast.....	$16.50
No. 1 hvy. cast (columns, bldg. materials, etc.), cupola size.....	14.50
No. 2 cast (radiators, cast boilers, etc.)	14.00

Cleveland

Price Weakness Follows Reduction in Mill Backlogs—Two Large Automobile Plants to Shut Down Temporarily

CLEVELAND, Oct. 1.—The fourth quarter has started with mill backlogs much reduced on some products and wiped out on others. Now that some of the mills are in actual need of orders, a tendency toward price weakness is apparent in some lines. While a few fair-sized orders were placed by Michigan automobile companies during the week, the revival of that industry apparently will not come for several weeks.

Two of the leading makers of low-priced automobiles that have already reduced production to bring out new models are scheduled to shut down their plants this month, one for two to four weeks and the other for 30 days. These suspensions indicate that the automobile output in October will fall considerably below that of any recent month. Some of the motor car builders are preparing to get under production on new models about Nov. 1, but the indications are that this industry will not get under operation at more than a moderate pace during the remainder of the year.

Galvanized sheets have again weakened and concessions are appearing on black sheets. It seems probable that automobile body sheets will be definitely established for the quarter at 4c., base, or a $2 a ton reduction. Concessions are reported on wide hot-rolled strip. Wire rods have definitely settled to $40, Cleveland. There has been some shading by one outside mill to 1.90c., Cleveland, on steel bars to meet local mill competition. The Cleveland base on cold-finished steel bars has been reduced $1 a ton.

Pig Iron.—Sales declined the past week, but inquiry showed a little gain. Cleveland interests sold 21,000 tons of foundry and malleable iron during the week. Many foundries in the automotive industry have not purchased iron for the last quarter, possibly because of the uncertainty as to the extent of their operation during the remainder of the year. Shipments during September were slightly heavier than in August, but are expected to fall off this month because of reduced shipping orders from automotive foundries. Consumers in other fields are taking iron at a good rate. Only two or three inquiries have come out for first quarter contracts, and no sales are reported for that delivery. A Columbus, Ohio, foundry is inquiring for 2000 tons of malleable iron for the remainder of the year. Other inquiries, all for foundry grades, include 350 tons from the New York Central Railroad, 600 tons from Tiffin, Ohio, and 500 tons from Erie, Pa. The market is firm at $18.50, Cleveland, for out-of-town shipment; $19, furnace, for local delivery, and $20, Lake furnace, for shipment in the Michigan territory.

Prices per gross ton at Cleveland:

N'th'n fdy., sil. 1.75 to 2.25	$19.50
S'th'n fdy., 1.75 to 2.25	$19.50 to 20.00
Malleable	19.50
Ohio silvery, 8 per cent...	28.00
Basic Valley furnace.....	18.50
Stand. low phos., Valley..	26.50 to 27.00

Prices except on basic and low phosphorus are delivered Cleveland. Freight rates: 50c. from local furnaces; $3 from Jackson, Ohio; $6 from Birmingham.

Iron Ore.—Shipments of Lake Superior ore continued at a high rate through September, the movement by water during the month, with one dock estimated, having been 9,547,000 tons. Water shipments to Oct. 1 amounted to 53,264,000 tons.

Rails and Track Supplies.—Orders for rails for the Chesapeake & Ohio, Pere Marquette and Hocking Valley railroads were closed during the week, and aggregated 79,257 tons. [For distribution see rail paragraph, Chicago market report.] Negotiations are under way for track accessories to go with these rails. The Chesapeake & Ohio alone will buy 8000 tons of tie plates.

Semi-Finished Steel.—Specifications against contracts for sheet bars, billets and slabs have further declined, and the leading local producer has nearly caught up on orders. This company is still operating 13 of its 14 open-hearth furnaces. Most consumers have closed fourth quarter contracts at $35, either Cleveland, Youngstown or Pittsburgh.

Wire rods are now commonly quoted at $40, Cleveland, attempts to get $42 apparently having disappeared. Some contracts are being closed for the fourth quarter.

Sheets.—As some of the mills have become more in need of orders, the market shows increasing signs of weakness on all grades but blue annealed, on which there has not been much of a market test recently. Concessions to 4c. on automobile body sheets in Detroit are reported, and it is expected that that will become the established price before the end of the week. While some of the mills report no difficulty in getting 2.85c. for black sheets, business has been taken at 2.75c. Galvanized sheets have further weakened and can be bought at 3.50c., Valley, equivalent to 3.40c., Pittsburgh. Specifications continue light.

Strip Steel.—Specifications for both hot and cold-rolled strip are light, and production has been materially reduced. Large buyers in the automotive field are not making extended future commitments because they are uncertain of their requirements during the rest of the year and apparently also because they expect to secure more favorable prices. Concessions to 1.80c. are reported on wide strip, but narrow material and bands are firm. Most cold-rolled strip mills need orders. This product is quoted at 2.75c., Cleveland, except for small lots.

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and struc. shapes.....	3.00c.
Soft steel bars.....	3.00c.
Reinforc. steel bars.....2.25c. to	2.50c.
Cold-fin. rounds and hex.....	3.65c.
Cold-fin. flats and sq.....	4.15c.
Hoops and bands, No. 12 to ¼ in., inclusive	3.25c.
Hoops and bands, No. 13 and lighter	3.65c.
Cold-finished strip .....*5.95c.	
Black sheets (No. 24).....3.70c. to	3.90c.
Galvanized sheets (No. 24).4.60c. to	4.75c.
Blue ann'l'd sheets (No. 10).....	3.25c.
No. 9 ann'l'd wire, per 100 lb.....	$2.80
No. 9 gal. wire, per 100 lb.....	3.25
Com. wire nails, base per keg.....	2.80

*Net base, including boxing and cutting to length.

Wire Products.—Specifications are light and new business is confined to small lots. Some car lot sales are being made at 2.40c. for wire and at $2.45 a keg for nails.

Cold-Finished Steel Bars.—Producers have reduced the Cleveland base on cold-finished steel bars $1 a ton to 2.30c. There are now four basing points with the same price, Pittsburgh, Cleveland, Chicago and Buffalo. Those northern Ohio consumers who have been buying on a Pittsburgh base will now get the benefit of the reduced Cleveland base. Some fourth quarter contracts that have been written at 2.35c. will be revised to the new base. Specifications continue light.

Bars, Plates and Shapes.—Specifications continue rather light. The curtailment of the automotive industry has resulted in a decided falling off in the demand for steel bars. Local forge shops engaged in automotive work are operating at greatly reduced capacity. Plates and structural material are in fair demand. Some of the builders of road machinery have curtailed production, but steam shovel makers continue at capacity. Local mills need tonnage in steel bars, and the 1.90c., Cleveland, price has become more common for out-of-town shipment. This price in some cases has been met by an outside mill. However, considerable fourth quarter contracting has been done at 1.95c. Plates and structural shapes appear firm in this market at 1.95c., Pittsburgh.

Coke.—A 25c. a ton price advance on by-product nut coke for domestic use to $4.50, ovens, has been announced by one Ohio producer, effective Oct. 1. Egg coke remains at $4.75. Foundry coke is quiet, with prices unchanged. Ohio by-product foundry coke is quoted at $8.25, ovens.

Old Material.—Shipments of steel making scrap to some of the mills in the Youngstown and Canton districts were held up during the week. As a result, Youngstown dealers have withdrawn from the market and prices in that district are weak. Locally, the market continues dull and weak. Shipments are still restricted by local mills and dealers are buying small lots to fill outstanding orders. In the absence of transactions most quotations are unchanged. Compressed sheet steel has declined 50c. a ton.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	$15.25 to $15.50
No. 2 heavy melting steel	14.50 to 15.00
Compressed sheet steel	15.00 to 15.50
Light bundled sheet stampings	12.00 to 12.50
Drop forge flashings	13.00 to 13.25
Machine shop turnings	10.00 to 10.50
Short shoveling turnings	11.50 to 12.00
No. 1 railroad wrought	13.50 to 14.00
No. 2 railroad wrought	16.00 to 16.50
No. 1 busheling	13.25 to 13.75
Pipes and flues	9.00 to 9.50
Steel axle turnings	12.50 to 13.00
Acid Open-Hearth Grades:	
Low phos., forging crops	17.75 to 18.00
Low phos., billet, bloom and slab crops	18.50 to 18.75
Low phos., sheet bar crops	18.00 to 18.50
Low phos., plate scrap	18.00 to 18.50
Blast Furnace Grades:	
Cast iron borings	10.25 to 10.50
Mixed borings and short turnings	10.25 to 10.50
No. 2 busheling	10.25 to 10.50
Cupola Grades:	
No. 1 cast	17.50 to 18.00
Railroad grate bars	11.00 to 12.00
Stove plate	12.00 to 12.50
Rails under 3 ft.	18.50 to 19.00
Miscellaneous	
Railroad malleable	18.00 to 18.50
Rails for rolling	16.25 to 16.50

Philadelphia

Bars, Shapes and Black Sheets Lower—Radio and Automobile Parts Makers Curtail Operations

PHILADELPHIA, Oct. 1.—Downward revision of $1 a ton on steel bar contracts in eastern Pennsylvania, following the change in the Pittsburgh district, has not yet been made, but the change to 1.90c., Pittsburgh, is expected in a few days. Meanwhile, the shape market has shown a softer tendency, although business continues moderately active and fabricators are well engaged. Black and galvanized sheet prices are lacking in firmness and sellers of high finished sheets are developing an increasing tendency to use 2.75c., base Pittsburgh, in figuring extras. Plate prices show no change, mills being fairly well engaged and looking forward to a fair demand for plates from shipbuilders and the railroads.

Allocation of 310,000 tons of rails for the Pennsylvania Railroad will be made on Oct. 10 and 200,000 tons for the New York Central Railroad on Oct. 9. Railroads continue active buyers of small tonnages of material. Steel axles and other car materials were recently placed with an eastern Pennsylvania mill by the Pennsylvania Railroad.

Pig Iron.—Foundry iron buying for fourth quarter delivery has not been extensive, some consumers having sufficient on hand, or due on contracts, to carry them temporarily, and others prefer to cover only for short periods under present market conditions. Southern foundry iron is still being sold to consumers in this district, but the total of such tonnage is diminishing. About 2000 tons of foundry iron was recently purchased by a Flemington, N. J., consumer from an eastern Pennsylvania steel company furnace. About 1000 tons of foundry iron for the American Engineering Co., Philadelphia, has not yet been closed. Basic iron is inactive, except for the purchase of a carload by a steel company in eastern Pennsylvania, which normally uses scrap, but occasionally buys limited quantities of basic as a substitute for stove plate.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil.	$21.26 to $21.76
East. Pa. No. 2X, 2.25 to 2.75 sil.	21.76 to 22.26
East. Pa. No. 1X	22.26 to 22.76
Basic (del'd east. Pa.)	19.75 to 20.25
Gray forge	20.00 to 20.50
Malleable	21.25 to 21.75
Stand. low phos. (f.o.b. N. Y. State furnace)	22.00 to 23.00
Cop. br'g low phos. (f.o.b. furnace)	23.50 to 24.00
Va. No. 2 plain, 1.75 to 2.25 sil.	24.04
Va. No. 2X, 2.25 to 2.75 sil.	24.54

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces; $4.54 from Virginia furnaces.

Billets.—Few contracts have been closed for the last quarter, as consumers in most cases have fair stocks, and in certain instances have not fully specified their third quarter commitments. Quotations are unchanged at $35 a ton, Pittsburgh, for rerolling billets and $40, Pittsburgh, for forging quality.

Bars.—Action of some mills in revising bar contracts to 1.90c., Pittsburgh, or 2.22c., delivered Philadelphia, has not yet been followed generally in eastern Pennsylvania, but the change is expected in a few days. Sellers here are inclined to believe that 1.90c., Pittsburgh, will apply on contracts and on orders for a carload or more of bars, but 1.95c., Pittsburgh, or 2.27c., Philadelphia, will continue to be quoted on less than carload business, which makes up a considerable part of the present buying activity.

Reinforcing Bars.—Prices of billet steel bars are unchanged at 1.95c. to 2c., Pittsburgh, or 2.27c. to 2.32c., delivered Philadelphia, with no extra for cutting to length. Rail steel bars are quoted at 1.95c., Franklin, Pa., or Tonawanda, N. Y., or 2.27c., delivered Philadelphia, with no extra for cutting to length, but actual transactions are at concessions from this price to meet the competition of billet steel bars. The new hospital for the Women's Medical College,

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.70c.
Plates, ⅜-in.	2.90c.
Structural shapes	2.70c.
Soft steel bars, small shapes, iron bars (except bands)	2.80c.
Round-edge iron	3.50c.
Round-edge steel, iron finished 1½ x 1½ in.	3.50c.
Round-edge steel planished	4.30c.
Reinforc. steel bars, sq. twisted and deform.	2.60c. to 2.80c.
Cold-fin. steel, rounds and hex.	3.60c.
Cold-fin. steel, sq. and flats	4.10c.
Steel hoops	3.55c.
Steel bands, No. 12 to ⅜-in. inclus.	3.30c.
Spring steel	5.00c.
*Black sheets (No. 24)	4.10c.
†Galvanized sheets (No. 24)	4.85c.
Light plates, blue annealed (No. 10)	3.25c.
Blue ann'l'd sheets (No. 13)	3.40c.
Diam. pat. floor plates—	
¼-in.	5.30c.
⅜-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

*For 50 bundles or more; 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.
†For 50 bundles or more; 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

Philadelphia, requiring 400 tons of bars, has been awarded to the Roslyn-Gilmore Steel Co., and rail steel bars will be used.

Shapes.—Although a sizable tonnage of business is being booked and shape mills are able to maintain about 80 per cent operations, prices at which business has recently been taken show a range from 1.90c. to 2c., f.o.b. nearest mill to consumer, or 1.96c. to 2.06c., delivered Philadelphia.

Plates. — Mills are operating at about 80 per cent of capacity and, with continued shipbuilding activity and railroad buying in prospect, are maintaining plate prices at 2.05c., Coatesville, or 2.15c., delivered Philadelphia. Contracting for last quarter delivery by plate consumers has not been heavy, but in the few cases that contracts have been made, 2.05c., Coatesville, has been maintained.

Sheets. — With consumption of sheets considerably less than available capacity, mills are seeking tonnage, and both black and galvanized sheet prices show a lack of strength. Local automobile manufacturers have curtailed their sheet buying and the leading radio manufacturer in this district has curtailed output greatly, at the same time requesting postponement of deliveries on contracts for sheets and other materials. Black sheets are still quoted at 2.85c., Pittsburgh, or 3.17c., delivered Philadelphia, but desirable business has been placed at concessions of $1 or $2 a ton. Recently, mills selling high finished sheets have been inclined to add finishing extras on a black sheet base of 2.75c. a lb., Pittsburgh. Galvanized sheets are still quoted by some mills at 3.60c., Pittsburgh, or 3.92c., Philadelphia, but business is rather generally at 3.50c. to 3.55c., Pittsburgh, or 3.82c. to 3.87c, delivered Philadelphia. Blue annealed sheets continue at 2.25c. to 2.35c., Pittsburgh, or 2.57c. to 2.67c., Philadelphia, for No. 13 gage and 2.10c. to 2.20c., Pittsburgh, or 2.42c. to 2.52c., Philadelphia, for light plates, blue annealed, No. 10 gage.

Imports.—In the week ended Sept. 28, 7227 tons of chrome ore arrived at this port, of which 3180 tons was from Portuguese Africa, 2347 tons from South Africa and 1700 tons from Greece. Steel arrivals consisted of 15 tons of structural shapes, 20 tons of steel hoops and 20 tons of steel scrap from the United Kingdom, 3 tons of drill steel and 2 tons of wire rods from Sweden and 78 tons of structural shapes from Germany.

Old Material. — Prices of most grades of scrap are unchanged, but the tendency of the market is toward lower levels, and, when new contracts are made, downward revision of prices would not be unexpected.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	$16.00 to $16.50
Scrap T rails	15.50 to 16.00
No. 2 heavy melting steel	12.50 to 14.25
No. 1 railroad wrought	16.00 to 16.50
Bundled sheets (for steel works)	11.50
Hydraulic compressed, new	14.50 to 15.00
Hydraulic compressed, old	12.00 to 12.50
Machine shop turnings (for steel works)	12.00
Heavy axle turnings (or equiv.)	14.00 to 14.50
Cast borings (for steel works and roll. mill)	11.00 to 11.75
Heavy breakable cast (for steel works)	14.50 to 14.75
Railroad grate bars	12.00 to 12.50
Stove plate (for steel works)	12.00 to 12.50
No. 1 low phos., hvy., 0.04% and under	22.00 to 23.00
Couplers and knuckles	19.50 to 20.50
Rolled steel wheels	19.50 to 20.50
No. 1 blast f'nace scrap	10.50 to 11.00
Wrot. iron and soft steel pipes and tubes (new specific.)	15.00
Shafting	19.00 to 20.00
Steel axles	23.00 to 23.50
No. 1 forge fire	14.00
Cast iron carwheels	16.50 to 17.00
No. 1 cast	16.00 to 16.50
Cast borings (for chem. plant)	14.50
Steel rails for rolling	16.50 to 17.00

International Derrick Buys Boykin Company

International Derrick & Equipment Co., Columbus, Ohio, has purchased the capital stock and manufacturing plant of the Boykin Machinery & Supply Co., Beaumont, Tex., which has been reorganized as a subsidiary company of the former under the name of the International Derrick & Equipment Co. of Texas, with Harry M. Runkle, Columbus, as president; B. Boykin, Jr., Beaumont, vice-president and general manager; and L. L. Powell, Houston, Tex., secretary and treasurer.

A new steel foundry and office building, as well as other structures, are being added to the Beaumont plant. The International company also owns the Houston Galvanizing & Plating Co., Houston, which has begun construction of a structural and galvanizing plant for production of the company's tower and metal building line.

The Boykin Company has manufactured rotary drilling equipment for many years, while the International Company makes a large line of rust-resisting steel products for the oil, gas, artesian well, power and aviation industries, as well as steel buildings, electrical power transmission equipment, railroad towers and building equipment, airway and airport towers, forest observation towers, hangars and other aeronautical products.

Sheffield Metallurgists at National Metal Congress

One of the features of the National Metal Congress and Exposition held in Cleveland, Sept. 9 to 13, was the presence of a large number of men who were either born or obtained their early training in Sheffield, England. Many of them have made notable contributions to the science and advance of steel metallurgy in different lines. Among these were the following:

Dr. George B. Waterhouse, now professor of metallurgy, Massachusetts Institute of Technology, Cambridge, Mass.; Charles K. Everitt, managing director, Edgar Allen & Co., Sheffield; Sidney Grayson, president, Jessop Steel Co., Washington, Pa.; Frank Hodson, president, Empire Steel Castings, Inc., Reading, Pa.; J. Kent Smith, consulting metallurgist, and associated with Climax Molybdenum Co., Detroit; Allwyn Wild, president Rustless Iron Corporation of America, Baltimore; Victor F. J. Tlach, president, Darwin & Milner, Inc., Cleveland; Oliver Smalley, consulting metallurgist, New York, and associated with Jessop Steel Co., Washington, Pa.; F. C. A. Lantsberry, William Jessop & Sons, Sheffield; George Batty, director of the Steel Castings Development Bureau, Philadelphia; Frank W. Brooke, chief engineer, William Swindell Brothers, Pittsburgh; T. Holland Nelson, consulting metallurgist, Philadelphia.

Withdraws from Boat Operation

Stewart Furnace Co., Cleveland, owner of a blast furnace at Sharon, Pa., will withdraw from the Lake transportation business in which it has long been engaged. It has sold its four Lake boats, which have been operated by Harvey H. Brown & Co., an affiliated interest, to the Youngstown Steamship Co., which is owned by the Youngstown Sheet & Tube Co. The ore boats of the Youngstown Steamship Co. are operated by Pickands, Mather & Co.

Revised New York Building Code May Allow Welding

Provisions that the allowable unit stress of steel structures be increased from 16,000 to 18,000 lb. a sq. in. and that welding be permitted under strict regulations in the construction of steel buildings have been recommended for inclusion in the proposed new building code being drafted by the City of New York. Recommendation also is made that the use of special alloy and high-carbon steels be permitted as rapidly as their qualities can be ascertained and specific silicon and nickel steels already on the market are named as acceptable.

The findings were made jointly by the subcommittee on structural steel and iron and the subcommittee on materials, loads and stresses of the Merchants' Association of New York. The subcommittees point out that adoption of these recommendations will result in a decrease of from 2 to 5 per cent in the cost of building.

Increases in industrial employment in the seventh Federal Reserve district during the period July 15 to Aug. 15 were about as large in the aggregate as the losses of a month earlier. Gains of 0.7 per cent in the number of workers and 3.9 per cent in payroll offset the declines of 0.2 and 5.0 per cent respectively, recorded for the preceding period. The metals and metal products group almost entirely recovered the loss reported in the previous month.

Birmingham

Pig Iron Sales Decline as Fourth Quarter Needs Are Well Covered—Steel Buying Fairly Good

BIRMINGHAM, Oct. 1.—Sales of pig iron to district consumers are beginning to ease off as the volume of fourth quarter requirements under contract approaches 75 per cent. Apparently buyers are still following the policy of covering part of their quarterly requirements and placing repeat orders from time to time as their needs are more clearly defined. Sales of Birmingham iron in competitive territories have also dropped. Inquiries for first quarter iron in outside districts have not begun to develop, and furnaces here make no predictions as to the extent they will compete in other markets for first quarter iron. The margin of shipments over output widened during the last half of September, and it is estimated that more iron was shipped during the month than in any previous month this year. The price situation is stronger. For district delivery, $14.50 for No. 2 foundry is reported quite firm. There have been no changes in furnace operations in the past three weeks. Of the 13 active furnaces, eight are on foundry and five on basic iron.

Prices per gross ton, f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil.	$14.50
No. 1 fdy., 2.25 to 2.75 sil.	15.00
Basic	14.50

Finished Steel.—New orders during the last week of the third quarter showed a slight increase over those of the preceding week and compared favorably with any week since early August. Backlogs are as large now as they were 30 days ago, and perhaps larger. Shipments are steady. Inquiries for wire products are stronger, and further improvement is expected in October. Tentative plans call for the opening of the Ensley rail mill by the third week in October. With this mill back in operation, finished steel mill operations in the district will be close to the peak of the year. The new plant of the Pullman Car & Mfg. Corporation at Bessemer is being placed in operation today. Effective in the last quarter, black sheets were reduced $1 a ton to 3c. All other prices are the same. New business of structural steel fabricators in September was lower than in any of the previous six or seven months. Current orders are mostly under 100 tons each. Prospects are reported good for an increase in tonnage during October. Fabricated plate work is at the low point of the year, with the October outlook reported only fair. The total of active open-hearth furnaces has remained at 17 for the past three weeks. The Tennessee company is working seven at Fairfield and four at Ensley. The Gulf States Steel Co. has all six in operation at Alabama City.

Cast Iron Pipe.—Scattered carload orders predominate in the pressure pipe market. Orders above 200 tons are rare. Most of the business is coming from outside points, the tonnage up for figures in the Southern territory being the lightest in several months. The American Cast Iron Pipe Co. has booked a few orders of 100 to 200 tons each for shipment to the Pacific Coast. Inquiries for next year have not begun to develop. Prices remain at $37 to $38 a net ton, Birmingham, on 6-in. and larger sizes.

Coke.—Contract requirements for foundry coke are moving freely. Sixty additional by-product ovens were placed in operation last week by the Semet-Solvay Co. Of the 1380 ovens in the district, less than 10 are idle.

Old Material.—A gradual improvement in steel grades during September has placed these lines in a fairly good position. Iron scrap has been without improvement, and prices have been reduced 50c. a ton on No. 1 cast and $1 a ton on tramcar wheels. Other prices are unchanged.

Prices per gross ton, deliv'd Birmingham dist. consumers' yards:

Heavy melting steel	$13.00 to $13.50
Scrap steel rails	14.00
Short shoveling turnings	9.00
Cast iron borings	9.00
Stove plate	11.50 to 12.00
Steel axles	21.00
Iron axles	23.00
No. 1 railroad wrought	10.00 to 10.50
Rails for rolling	15.50
No. 1 cast	13.00
Tramcar wheels	12.50
Cast iron carwheels	13.00 to 13.50
Cast iron borings, chem.	13.50 to 14.00

Boston

Pig Iron Sales Light—Demand for Scrap Declines and Prices Are Weaker—Steel Buying Falls Off

BOSTON, Oct. 1.—Pig iron sales the past week continued light. The largest was 1000 tons of malleable at the equivalent of $17.50 a ton, Buffalo. The next largest sale was 500 tons of No. 1X Mystic iron to the Westinghouse Electric & Mfg. Co., Springfield, Mass. A New York furnace competed actively for this order, and it is understood the seller had to make a price concession to obtain the business. Competing furnaces are now quoting prices equivalent to $17.50 a ton, base Buffalo. Buffalo stacks are cautioning foundries that rail and water freights probably will expire on or before Nov. 1. The Mystic Iron Works management announces that, contrary to common report, its furnace is not to be relined within the near future.

Foundry iron prices per gross ton deliv'd to most New England points:

†Buffalo, sil. 1.75 to 2.25	$21.78 to $22.28
†Buffalo, sil. 2.25 to 2.75	22.28 to 22.78
*Buffalo, sil. 1.75 to 2.25	22.41 to 22.91
*Buffalo, sil. 2.25 to 2.75	22.91 to 23.41
East. Penn., sil. 1.75 to 2.25	22.65 to 23.15
East. Penn., sil. 2.25 to 2.75	23.15 to 23.65
Va., sil. 1.75 to 2.25	25.21
Va., sil. 2.25 to 2.75	25.71
*Ala., sil. 1.75 to 2.25	24.11
*Ala., sil. 2.25 to 2.75	24.61
†Ala., sil. 1.75 to 2.25	20.25
†Ala., sil. 2.25 to 2.75	20.75

Freight rates: $4.91 all rail from Buffalo, and $4.28 rail and water; $3.65 all rail from eastern Pennsylvania; $5.21 all rail from Virginia; $9.61 all rail from Alabama and $5.75 rail and water from Alabama to New England seaboard.

*All rail rate.

†Rail and water rate.

Bars, Shapes and Plates.—Mill representatives report a falling off in the demand for bars, shapes, plates and steel products in general. The bar price situation has become unsettled.

Reinforcing Steel.—Current buying of billet steel bars is confined to small tonnages at 2.66½c. a lb., base, from stock. Large tonnages hanging over the market for several weeks apparently are no nearer closing than a week ago. The market for rail steel bars is quiet at 2.26½c. a lb., delivered common Boston freight rate points.

Coke.—The movement of by-product foundry coke from ovens to consuming plants is not so heavy as heretofore. So far, there has been little if any stocking by foundries for the winter. The price remains at $11 a ton, delivered within a $3.10 freight rate zone.

Warehouse Business.—For the second time within a month, wire nails have been cut 10c. a keg. The warehouse price is now $3.30 a keg, base. The demand for iron and steel, while more active than it was a month ago, is not so large as expected.

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars, small shapes	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway rounds	6.60c.
Norway squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tie steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold-rolled steel—	
Rounds and hex	*3.55c. to 5.55c.
Squares and flats	*4.05c. to 7.05c.
Toe calk steel	6.00c.
Rivets, structural or boiler	4.50c.

	Per Cent Off List
Machine bolts	50 and 5
Carriage bolts	50 and 5
Lag screws	50 and 5
Hot-pressed nuts	50 and 5
Cold-punched nuts	50 and 5
Stove bolts	70 and 10

*Including quantity differentials.

Cast Iron Pipe.—The United States Pipe & Foundry Co. was the low bidder on 250 tons of 12-in. pipe for Providence, R. I. No award has been made. Ayer, Mass., on Sept. 30 closed bids on 7800 ft. of 6 and 8-in. pipe. Westfield, Mass., will close bids on Oct. 12 for several thousand feet of pipe for a water supply extension. A Massachusetts utility company is feeling out the market on a large tonnage, presumably for 1930 requirements. The market for small pipe is steady, but concessions are still available on large dimensions. Prices quoted openly on domestic pipe are: 4 in., $44.10 to $45.10 a ton, delivered common Boston freight rate points; 6 to 12 in., $40.10 to $41.10; 16 to 20 in., $39.60. A $4 differential is asked on Class A and gas pipe. During September 842 pieces of French pipe were received at Boston.

Old Material.—Demand for most grades of old material is limited and prices are unsettled. Steel turnings are an exception. A week ago sales were reported at $6.60 a ton, on cars shipping point, but $7 is the lowest price today, and supplies at that figure are not excessive. In contrast, there has been a further shrinkage of 25c. a ton on No. 1 heavy melting steel, and long bundled skeleton has dropped 50c. a ton since a Worcester, Mass., consumer ceased buying. Brokers see no indication of improved scrap this month.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$11.00 to $11.50
Scrap T rails	10.50 to 11.00
Scrap girder rails	10.00 to 10.50
No. 1 railroad wrought	11.00 to 11.50
No. 1 yard wrought	9.00 to 9.50
Machine shop turnings	7.00 to 7.25
Cast iron borings (steel works and rolling mill)	6.50 to 6.75
Bundled skeleton, long	9.00 to 9.50
Forge flashings	9.50 to 10.00
Blast furnace borings and turnings	6.00 to 6.25
Forge scrap	9.00 to 9.50
Shafting	13.50 to 14.00
Steel car axles	17.50 to 18.00
Wrought pipe 1 in. in diameter (over 2 ft. long)	9.50 to 10.00
Rails for rolling	12.00 to 12.50
Cast iron borings, chemical	9.75 to 10.00

Prices per gross ton deliv'd consumers' yards:

Textile cast	$14.00 to $14.50
No. 1 machinery cast	15.00 to 15.25
No. 2 machinery cast	13.00 to 13.25
Stove plate	11.00 to 11.50
Railroad malleable	18.00 to 18.50

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-fin. rounds, shaftings, screw stock	3.75c.
Black sheets (No. 24)	4.25c.
Galv. sheets (No. 24)	5.10c.
Blue ann'l'd sheets (No. 10)	3.45c.
Black corrug. sheets (No. 24)	4.30c.
Galv. corrug. sheets	5.15c.
Structural rivets	3.95c.
Boiler rivets	3.95c.

	Per Cent Off List
Tank rivets, ⅞-in. and smaller, 100 lb. or more	65
Less than 100 lb.	60
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-pressed nuts, sq., blank or tapped, 200 lb. or more	60
Less than 200 lb.	50
Hot-pressed nuts, hex., blank or tapped, 200 lb. or more	60
Less than 200 lb.	50

St. Louis

10,000 Tons of Basic Pig Iron Sold—Improvement in Demand for Steel Products—Scrap Weak

ST. LOUIS, Oct. 1.—The principal pig iron transaction of the week was the sale of 10,000 tons of basic iron to a district melter by the St. Louis Gas & Coke Corporation, which sold an additional 3250 tons of iron, including 2000 tons of foundry, to a district stove manufacturer, 650 tons to an Illinois implement maker and 400 tons to an Illinois equipment builder, all for shipment during the remainder of the year. Sales of Southern iron have slowed up some. The market is firmer, makers generally being satisfied with the state of their backlogs. October shipments of the local maker are expected to exceed 34,000 tons.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill.	$19.50 to $20.00
Malleable, f.o.b. Granite City	20.00
N'th'n No. 2 fdy., deliv'd St. Louis	22.16
Southern No. 2 fdy., deliv'd	16.92 to 18.92
Northern malleable, deliv'd	22.16
Northern basic, deliv'd	22.16

Freight rates: 75c. (average) Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

Finished Iron and Steel.—An improvement is reported in new business and specifications against contracts. The Granite City Steel Co. is operating all of its rolling mills, except the plate mill, at 100 per cent. Plate rollings are at 75 to 80 per cent of capacity. Demand for galvanized sheets for roofing purposes is fairly good. Tin plate buying also is good. The structural trades report business quiet, with no large contracts in sight. Wire and wire products are fairly active.

Coke.—Sales of domestic grades of coke by the Granite City by-product ovens are ahead of production, dealers showing increasing interest. Foundry coke is in good demand, and smelters are taking their full quotas of furnace coke.

Old Material.—The market for old material is quiet. The only sale of consequence was a tonnage of miscellaneous rails at $16.75 and specialties at $19 to an East Side consumer, but this buyer later cut its prices. Heavy railroad offerings and shipments from country dealers tend to depress the market. The latter movement is slowing up considerably as the result of reduced prices. Miscellaneous standard-section rails, rails for rolling, and stove plate are off 25c. a ton. Iron car axles are up $1. Railroad lists: Pennsylvania Railroad, 58,000 tons; Missouri Pacific, 4500 tons; St. Louis-San Francisco, 1900 tons; Nashville, Chattanooga & St. Louis, 500 tons; Chicago, Milwaukee, St. Paul & Pacific, 600 tons.

Dealers' buying prices per gross ton, f.o.b. St. Louis district:

No. 1 heavy melting or shoveling steel	$14.00 to $14.50
No. 2 heavy melting or shoveling steel	13.25 to 13.75
No. 1 locomotive tires	15.50 to 16.00
Miscel. stand-sec. rails including frogs, switches and guards, cut apart	16.00 to 16.50
Railroad springs	18.00 to 18.50
Bundled sheets	10.50 to 11.00
No. 2 railroad wrought	14.00 to 14.50
No. 1 busheling	10.00 to 10.50
Cast iron borings and shoveling turnings	9.50 to 10.00
Iron rails	13.00 to 13.50
Rails for rolling	16.50 to 17.00
Machine shop turnings	7.50 to 8.00
Heavy turnings	10.00 to 10.50
Steel car axles	19.50 to 20.00
Iron car axles	27.50 to 28.00
Wrot. iron bars and trans.	21.50 to 22.00
No. 1 railroad wrought	13.75 to 14.25
Steel rails, less than 3 ft.	18.00 to 18.50
Steel angle bars	15.25 to 15.75
Cast iron carwheels	15.00 to 15.50
No. 1 machinery cast	15.25 to 15.75
Railroad malleable	16.00 to 16.50
No. 1 railroad cast	14.75 to 15.25
Stove plate	12.75 to 13.25
Agricult. malleable	15.25 to 15.75
Relay. rails, 60 lb. and under	20.50 to 23.50
Relay. rails, 70 lb. and over	26.50 to 29.00

Youngstown

Valley Mills Operating At Less Than 80 Per Cent—Declining Demand Brings Out Price Concessions

YOUNGSTOWN, Oct. 1.—The steel industry in the Valleys enters the fourth quarter with operations on a hand-to-mouth basis on all products with the possible exception of pipe and with an operating rate of less than 80 per cent. The schedules of sheet mills are best, averaging from 90 per cent to capacity, while other products range from 60 to 70 per cent.

Curtailment in the demands of automobile companies is the principal reason for the sharp decline during September, as other consuming industries are still taking steel at a fair rate, and there is no indication of any marked curtailment during the last three months of the year.

Comparatively high operations in the pipe mills are a bright spot in the picture. One large producer expects a record run in its pipe department during October, while the maker of the electrically welded products is securing more than enough business to keep its mill constantly occupied. Curtailment in tin plate operations has not been so great as might be expected for this time of the year, and, with buying for the next season less than a month away, the situation is rather satisfactory. Reduced operations in the strip mills has been accomplished largely by longer suspensions over the week-ends and mills are securing enough week-to-week business to keep both the hot and cold-rolled departments busy for the greater part of the week. The average operating rate for the district is approximately 75

per cent. Bar business is not so good, with the operations probably lower.

In the face of reduced demand for steel, a buyers' market has developed. One reason for the delay in fourth quarter contracting is a deadlock over prices. Buyers of steel recall that in previous years price weakness usually followed declining demand, and mills are having difficulty in convincing them that this time is to be an exception. Developments in the last two weeks indicate that buyers are gradually gaining the advantage. Sheet prices in general are weak. Youngstown mills still adhere to a quotation of 3.60c., Pittsburgh, on galvanized sheets, but this price is not holding. The usual $2 concession to jobbers is being extended to the trade by large makers at nearby points. Weakness in galvanized material may also have some influence on black sheet prices. Valley sheet mills are doing their best to hold the price of black sheets at 2.85c., Pittsburgh, although large buyers in Michigan are admittedly getting the usual concessions. Light plates, blue annealed, and blue annealed sheets are still fairly well represented at 2.10c. to 2.20c., Pittsburgh, for No. 10 gage and at 2.25c. to 2.35c. for No. 13. The lower figures are not recognized by all sellers. Strip prices are weak, but there has been no open break in the market.

On bars, Youngstown makers are not meeting the Cleveland base, which has declined to 1.90c., and are adhering to 1.95c., Pittsburgh, in quoting on fourth quarter business. This quotation is not bringing in orders, and concessions of $1 a ton are occurring more frequently. A range of 1.90c. to 1.95c., Pittsburgh, is now necessary to include the full list of buyers of this product.

Pig iron prices are holding, and strength was given to the market by the purchase of 5000 tons of basic iron by the American Steel Foundries at Alliance, Ohio, at $18.50, Valley furnace. The foundry grade is quoted at the same level, while malleable and Bessemer are at $19. Buying has been rather light. The scrap market is weak at $17.50 to $18 for No. 1 heavy melting steel and 25c. to 50c. less for compressed sheets.

Buffalo

Steel Backlogs Reduced—Pig Iron Sales Have Declined—Scrap Market Quiet and Prices Are Lower

BUFFALO, Oct. 1.—District foundries are purchasing only sufficient pig iron to supply their nearby needs, in consequence of which business has fallen off considerably. Most of the furnaces could book more tonnage for the rest of the year, although their backlogs are considerable, and in one instance just sufficient to take care of regular customers' excess requirements. The sales of Buffalo furnaces in New England have eased off. Considerable Buffalo iron is being shipped to Milwaukee and Chicago.

Prices per gross ton, f.o.b. furnace:

No. 2 fdy., sil. 1.75 to 2.25	$19.50
No. 2X fdy., sil. 2.25 to 2.75	20.00
No. 1 fdy., sil. 2.75 to 3.25	21.00
Malleable, sil. up to 2.25	20.00
Basic	18.50
Lake Superior charcoal	27.28

Old Material.—Conditions are quieter than they have been at any time this year. Mills which have experienced some decrease in operation have become cautious about extended purchasing. No. 1 heavy melting steel is bringing no more than $17 to $17.50, with the chances good that a tonnage could be purchased at a lower figure.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades:		
No. 1 heavy melting steel	$17.00 to	$17.50
No. 2 heavy melting steel	14.75 to	15.00
Scrap rails	16.50 to	17.00
Hydraul. comp. sheets	14.50 to	14.75
Hand bundled sheets	12.00 to	12.50
Drop forge flashings	14.25 to	14.50
No. 1 busheling	15.50 to	16.50
Hvy. steel axle turnings	14.00 to	14.50
Machine shop turnings	8.00 to	8.50
No. 1 railroad wrought	13.00 to	13.50
Acid Open-Hearth Grades:		
Knuckles and couplers	19.00 to	20.00
Coil and leaf springs	19.00 to	20.00
Rolled steel wheels	19.00 to	20.00
Low phos. billet and bloom ends	20.00 to	20.50
Electric Furnace Grades:		
Short shov. steel turnings	12.50 to	13.00
Blast Furnace Grades:		
Short mixed borings and turnings	11.50 to	12.25
Cast iron borings	11.00 to	12.00
No. 2 busheling	10.00 to	10.50
Rolling Mill Grades:		
Steel car axles	18.75 to	19.25
Iron axles	21.00 to	22.00
Cupola Grades:		
No. 1 machinery cast	16.00 to	17.00
Stove plate	13.00 to	13.50
Locomotive grate bars	12.50 to	13.00
Steel rails, 3 ft. and under	19.50 to	19.75
Cast iron carwheels	14.00 to	14.50
Malleable Grades:		
Industrial	18.00 to	18.50
Railroad	18.00 to	18.50
Agricultural	18.00 to	18.50
Special Grades:		
Chemical borings	12.50 to	13.50

Finished Iron and Steel.—The Lackawanna plant of the Bethlehem Steel Co. is operating 21 of 24 open-hearths. Its Bessemer department is down. Donner Steel Co. is operating five to six open-hearths. Steel backlogs are being reduced. The Courier-Express Building will require 800 tons of structural and 240 tons of reinforcing bars. A local fabricator has contracted for 185 tons for a grade crossing elimination for the New York Central Railroad at Rome, N. Y. Another contract placed was 325 tons of structural steel for a Buffalo apartment house. Warehouse business is reported to be holding up very well.

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and struc. shapes	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.95c.
Cold-fin. flats, sq. and hex.	4.45c.
Rounds	3.95c.
Cold-rolled strip steel	5.85c.
Black sheets (No. 24)	4.20c.
Galv. sheets (No. 24)	4.85c.
Blue ann'l'd sheets (No. 10)	3.50c.
Com. wire nails, base per keg	$3.60
Black wire, base per 100 lb.	3.75

Canada

Substantial Volume of Pig Iron Business

TORONTO, ONT., Oct. 1.—With the opening of fourth quarter, Canadian pig iron melters are showing more interest in placing contracts for iron to be delivered in the next three months. Producers are carrying a large volume of future business on their books. The daily iron melt is well sustained, and there appears little possibility of a slump in the immediate future. No curtailment in production has been made by Canadian blast furnaces. Pig iron prices are steady.

Prices per gross ton:

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75	$24.60
No. 2 fdy., sil. 1.75 to 2.25	24.10
Malleable	24.60
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75	$26.00
No. 2 fdy., sil. 1.75 to 2.25	25.50
Malleable	26.00
Basic	24.50
Imported Iron, Montreal Warehouse	
Summerlee	$33.50
Carron	33.00

Structural Steel.—Although new business is on a smaller scale than that of two or three months ago, tonnages are appearing in substantial volume. Contracts placed during the week ranged from 50 to 3000 tons.

Old Material.—New business is increasing. Improvement is noted in both spot sales and future contracts. The current demand continues to favor iron grades, although steel lines are improving in some localities. Despite the fact that old material prices have been sliding downward in many districts across the international boundary, Canadian prices are holding at their recent levels.

Dealers' buying prices:

	Per Gross Ton	
	Toronto	Montreal
Heavy melting steel	$10.00	$8.50
Rails, scrap	11.00	9.00
No. 1 wrought	10.00	12.00
Machine shop turnings	7.50	5.00
Boiler plate	7.50	6.00
Heavy axle turnings	8.00	7.50
Cast borings	7.50	5.00
Steel borings	7.50	6.50
Wrought pipe	6.00	6.00
Steel axles	15.00	20.00
Axles, wrought iron	17.00	22.00
No. 1 machinery cast	....	17.00
Stove plate	....	13.00
Standard carwheels	....	16.00
Malleable	....	13.00
	Per Net Ton	
No. 1 mach'ry cast	$16.00	....
Stove plate	12.00	....
Standard carwheels	15.00	....
Malleable scrap	14.00	....

The Carnegie Steel Co. has purchased a Freyn-Design continuous stock-line recorder for use at its blast furnace plant at South Duquesne, Pa.

Pacific Coast

Demand for Steel Products Continues Steady—Building Activity Increases—Pending Work Fairly Large

SAN FRANCISCO, Sept. 28 (*By Air Mail*).—Movement of iron and steel products continues on a fairly even keel. Outstanding among the week's orders were 1650 tons of structural shapes for a pulp plant in Everett, Wash., for the Puget Sound Timber & Pulp Co., placed with the Isaacson Iron Works, and 1000 tons of plates for the same interest for boilers and tanks, taken by the Puget Sound Machinery Depot. Pending business includes 2000 tons of reinforcing bars for approaches for the St. John's River bridge, Portland, and 5500 tons of cast iron pipe for Long Beach, Cal.

Building activity on the Pacific Coast during the past month has shown a healthy increase. The work of erecting the structural steel for the Southern Pacific bridge over the Carquinez Straits will be begun within a few days. Several new structures are planned in San Francisco, among them a 20-story office building on Montgomery Street.

Pig Iron.—Sales and inquiries continue to involve unimportant tonnages. Foundry operations lag. Prices are unchanged.

Prices per gross ton at San Francisco:

*Utah basic	$25.00 to $26.00
*Utah fdy., sil. 2.75 to 3.25	25.00 to 26.00
**Indian fdy., sil. 2.75 to 3.25	25.00 to 26.00

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Bars.—Pending business in reinforcing steel calls for nearly 5000 tons. Bids have been opened on 170 tons for a courthouse at Olympia, Wash., and bids will be opened on Oct. 16 for a bridge over the San Luis Rey River, Sacramento. The price structure continues unchanged at 2.30c., base, and 2.40c., base, in San Francisco and Los Angeles, respectively, on carload lots, and at 2.60c. and 2.70c., respectively, on smaller tonnages. Mild steel bars are firm at 2.35c., c.i.f.

Plates.—In addition to the 1000 tons for a pulp plant, mentioned above, the Puget Sound Machinery Depot took 400 tons for six locomotive boilers for the Great Northern Railroad at Seattle. After some delay, a pipe line at Bremerton, Wash., involving 200 tons, was finally awarded to James Coyne, who in turn sublet the fabrication to an unnamed interest. The only pending project of importance involves 140 tons for two syphons at La Mesa, Cal., bids on which will be opened Oct. 7. While the general quotation on plates continues at 2.35c., c.i.f., this price has been shaded in several instances on large and desirable tonnages.

Shapes.—Among the structural lettings were 185 tons for a store in Oakland, taken by the California Steel Co.; 850 tons for a conveyor frame at Azusa, Cal., for a dam, booked by the Consolidated Steel Corporation, and 100 tons for a theater in Stockton, placed with the Pacific Coast Engineering Co. Important pending projects involve 350 tons for a sugar warehouse in San Francisco, 405 tons for a bridge over the Trinity River and 1337 tons for a bridge over the San Luis Rey River, both in California. No change in quotations has occurred, 2.35c., c.i.f., remaining firm.

Cast Iron Pipe.—While pipe lettings are not heavy, pending business aggregated several thousand tons. Whittier, Cal., placed 109 tons of 4-in. Class B pipe with the American Cast Iron Pipe Co. Bremerton, Wash., which had an inquiry out for 875 tons of 4 to 24-in. Class B pipe, cancelled the inquiry and purchased riveted steel pipe. San Diego, Cal., rejected bids on 144 tons of 4 and 6-in. Class B pipe for Plata Avenue and on 201 tons of 4 and 6-in. Class C pipe for El Prado Avenue. The Butterfield Construction Co. was low bidder on 460 tons of 4 to 8-in. Class B pipe for Chesterton Street, San Diego. Bids have been opened on 5585 tons of 4 to 12-in. Class B pipe for Long Beach, Cal. Azusa and San Diego, Cal., are calling for bids on 110 tons of 4 and 6-in. Class B pipe and on 230 tons of 4 and 6-in. Class C pipe, respectively.

Warehouse. — Out-of-stock distributers report business well sustained. Price changes have recently been announced in the bay district. Plates and structural shapes are now quoted at 3.40c.; small angles, 3/16-in. and over, have been raised from 3.15c. to 3.40c.; small channels and tees, ¾ in. to 2¾-in., are now quoted at 3.90c.; spring steel, ¼-in. and thicker, is 5.10c.; structural rivets, ½-in. and larger, are 4.50c.; black sheets, No. 24 gage, blue annealed sheets, No. 10 gage, and galvanized sheets, No. 24 gage, are being quoted at 5.00c., 4.00c. and 5.40c., respectively.

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and struc. shapes	3.15c.
Soft steel bars	3.15c.
Small angles, ¾-in. and over	3.15c.
Small angles, under ¾-in.	3.55c.
Small channels and tees, ¾-in. to 2¾-in.	3.75c.
Spring steel, ¼-in. and thicker	5.00c.
Black sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.80c.
Galv. sheets (No. 24)	5.30c.
Struct. rivets, ½-in. and larger	5.65c.
Com. wire nails, base per keg	$3.40
Cement c't'd nails, 100 lb. keg	3.40

Cincinnati

Demand for Pig Iron Falls Off — Weakens in Scrap Market — Domestic Coke Shipments Larger

CINCINNATI, Oct. 1.—With foundries reported to have curtailed operations and automotive manufacturers displaying less interest in purchases, demand for pig iron in this district has receded sharply. In the past week sales were less than those of the preceding week, agents reporting that approximately 4500 tons in small lots was placed. The largest order was for three cars of foundry iron to be delivered to a southern Ohio consumer. Buyers, generally, are not showing any great interest in covering for fourth quarter requirements, but are purchasing as needs arise, although in some instances they are anticipating their needs about 30 days. Some foundries are reported to be carrying over a fair surplus of iron which was purchased the latter part of the second quarter in anticipation of a continued heavy demand from their customers during the third quarter. But a slight lull produced a surplus which will carry them into the fourth quarter. While none of the business placed was sufficient to test prices, the Northern iron brought about $18.50, base Lake furnace, and the Southern was placed at prices ranging from $13.50 to $14.50, base Birmingham. Among the orders for the week were three cars of silvery sold on the present schedules. The trade is entering a new quarter without any inquiry for pig iron.

Prices per gross ton, deliv'd Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25	$19.89 to $20.39
Ala. fdy., sil. 1.75 to 2.25	17.19 to 18.19
Ala. fdy., sil. 2.25 to 2.75	17.69 to 18.69
Tenn. fdy., sil. 1.75 to 2.25	17.19 to 18.19
S'th'n Ohio silvery, 8 per cent	26.89

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

Finished Material.—While the automotive demand for sheets has not increased greatly, other consumers who have been taking sheets in small quantities during the summer months have

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and struc. shapes	3.40c.
Bars, soft steel or iron	3.30c.
New billet reinforc. bars	3.15c.
Rail steel reinforc. bars	3.00c.
Hoops	4.05c.
Bands	3.50c.
Cold-fin. rounds and hex	3.85c.
Squares	4.35c.
Black sheets (No. 24)	4.05c.
Galvanized sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.45c.
Structural rivets	3.85c.
Small rivets	65 per cent off list
No. 9 ann'l'd wire, per 100 lb.	$3.00
Com. wire nails, base per keg	2.85
Cement c't'd nails, base 100 lb. keg	2.85
Chain, per 100 lb.	8.75

	Net per 100 Ft.
Lap-weld steel boiler tubes, 2-in.	$16.00
4-in.	33.00
Seamless steel boiler tubes, 2-in.	17.00
4-in.	34.00

sharply increased their specifications. District operators report that a gradual increase in operations will take place within the next 10 days. Although the fabricated material market is still firm, new business is sluggish.

Coke.—The movement of foundry coke during September was not so good as during August. Prices on by-product foundry coke will continue at about $10.05, delivered, in Cincinnati. With the advent of cooler weather, the movement of domestic coke is a trifle better, one oven representative reporting that a fair tonnage of this grade was shipped during the week into the Detroit area.

Old Material.—The softening in prices of old materials in other markets is being reflected in this district. Heavy melting steel and No. 2 wrought have been reduced to $13.50 to $14, and dealers expect that this weakness will spread to the entire market unless mill operations increase soon. The supply of material is larger than it was recently.

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel	$13.50 to $14.00
Scrap rails for melting	14.25 to 14.75
Loose sheet clippings	9.00 to 9.50
Bundled sheets	11.00 to 11.50
Cast iron borings	9.00 to 9.50
Machine shop turnings	8.25 to 8.50
No. 1 busheling	10.50 to 11.00
No. 2 busheling	7.00 to 7.50
Rails for rolling	14.50 to 15.00
No. 1 locomotive tires	14.25 to 14.75
No. 2 railroad wrought	13.50 to 14.00
Short rails	18.50 to 19.00
Cast iron carwheels	12.75 to 13.25
No. 1 machinery cast	19.00 to 19.50
No. 1 railroad cast	15.25 to 15.75
Burnt cast	10.25 to 10.75
Stove plate	10.25 to 10.75
Brake shoes	10.25 to 10.75
Agricultural malleable	14.25 to 14.75
Railroad malleable	15.25 to 15.75

Detroit Scrap Declines

DETROIT, Oct. 1.—The market on old material in the district has been very quiet during the past week, with few purchases of tonnage size. Busheling, flashings,' sheet clippings and turnings have declined 50c. a ton during the past week.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Hvy. melting and shov. steel	$14.00 to $14.50
Borings and short turnings	8.50 to 9.00
Long turnings	8.00 to 8.50
No. 1 machinery cast	12.50 to 13.00
Automobile cast	13.00 to 13.50
Hydraul. comp. sheets	14.00 to 14.50
Stove plate	9.00 to 9.50
New No. 1 busheling	12.00 to 12.50
Old No. 1 busheling	10.50 to 11.00
Sheet clippings	8.25 to 8.75
Flashings	12.50 to 13.00

Globe-Wernicke Co. and Unit Steel Co. Merged

Merger of the Globe-Wernicke Co., Cincinnati, and the Unit Steel Co., Dayton, Ohio, is confirmed by officials of both companies. John C. Haswell, president of the Dayton company, said that the Unit Steel Co. plant would be moved to Cincinnati. The Globe-Wernicke Co. manufactures office furniture and equipment and the Steel Unit Co. produces steel doors and partitions.

Concrete Bar Industry Adopts Trade Rules

Secret Rebates, Price Discrimination and Other Alleged Unfair Practices Are Condemned

WASHINGTON, Oct. 1.—The Federal Trade Commission has approved five and accepted 13 rules as expressions of the trade in connection with the trade practice conference of the reinforcing steel fabricating and distributing industry held at Asheville, N. C., on April 18. The rules as passed upon by the commission were made public last Thursday. The rules approved are designated as "Group I" and apply to unfair methods of competition. Those accepted as expressions of the trade are classified under "Group II."

"Group I" rules relate to inducing breach of contract; misbranding; secret rebates; discrimination in price and commercial bribery. "Group II" rules relate to a definition of the industry, circulation of current price lists; manner of submitting bids for each job; dumping; arbitration; standard forms of contract for sales; departure from original agreements with respect to terms of discount for cash; discriminatory prices; reduced price in event of a market decline; uniform method of cost finding; proper marketing and grading; and provision that the trade practice conference be made a continuing organization to act for progressive elimination of unfair and uneconomic trade practices in industry.

Some of the rules adopted are as follows:

GROUP I

Any willful attempt to induce a breach of any existing bona fide contract, or to prevent the performance of any contractual duty or service under any bona fide contract for the sale of reinforcing materials, is an unfair method of business.

The marking or branding of reinforcing materials (or any misrepresentation in connection with the sale of such materials) for the purpose or with the effect of misleading or deceiving purchasers with respect to the quantity, quality, grade substance, or origin thereof, is an unfair method of business.

The payment or allowance of secret rebates, refunds, credits, unearned discounts, whether in the form of money or gifts, the acceptance of securities at more than true market value, or otherwise, as a means of effecting or concealing price discrimination, or the extending to certain purchasers of special privileges, including discriminatory allowances for engineering, architectural or other services, not extended to all purchasers under like terms and conditions, are unfair methods of business.

Any discrimination in price for reinforcing materials between purchasers for the same grade, quality or quantity of product sold, after making due allowance for differences in cost of fabricating, servicing, selling, transportation and credit risks, or unless made in good faith to meet actual established competition, is an unfair method of business.

GROUP II

The entering into of contracts for reinforcing materials without actual obligation of the buyer to purchase any specified quantity or quantities, or for any particular jobs, for the purpose of securing to the buyer a special price, is condemned by the industry.

The industry approves the practice of each individual member of the industry independently publishing and circulating his own current price lists, and also notices of all advances, declines or other changes in price.

The industry approves the policy of each member submitting on each job a single bid based on individual costs and other factors deemed relevant by each firm or company, and of revising the quotation on any job only in the event of changes in plans or specifications as tending to place the industry in line with more businesslike merchandising methods in other progressive industries, and with accepted methods of bidding on Government contracts, and any violation of this policy is condemned by the industry.

The practice of dumping surplus stock outside of regular markets, at low discriminatory prices, is condemned by the industry.

The industry approves the settlement of controversies between members of the industry and those dealing with the industry by arbitration under the prevailing code in the industry.

The industry approves the policy of adopting standard forms of contract for sales, with clearly written and commonly understood provisions fair to both buyers and sellers, as tending to avoid controversy and to promote businesslike methods of distribution.

Any departure from original agreements with respect to terms of discount for cash or time of payment which results in discrimination between purchasers of the same class and under the same conditions is condemned by the industry.

Where several different concrete reinforcing materials are bid on at the same time, or for the same job, failure to quote a separate price on reinforcing bars and spirals, on wire mesh, on permanent and removable forms, and on other separate or unrelated products sold in connection with such materials and on the erection thereof or other labor to be performed thereon, or the making of the acceptance of any separately priced item in a quotation contingent upon the acceptance of another such item, where the purpose or the effect thereof is to secure to a buyer a discriminatory price, is condemned by the industry.

Contracts of sale which permit the buyer to cancel or provide for a reduced price in the event of a market decline, and which do not permit the seller to cancel or provide for an enhanced price in the event of a market rise, are lacking in mutuality and tend to induce controversy and breach of contract, and are condemned by the industry.

It is the judgment of this industry that an accurate knowledge of costs is indispensable to intelligent and fair competition, and the general adoption of accurate and uniform methods of cost finding and estimating as a means of correcting the various unfair practices heretofore mentioned is strongly recommended.

All contracts for the purchase or sale of reinforcing materials shall clearly state the quality and grade of such materials, and the quantity, or job on which the material is to be used, and any violation thereof is condemned by the industry.

Non-Ferrous Metal Markets

Copper Situation Favors Producers—Zinc and Lead Steady—Tin Declines

NEW YORK, Oct. 1.

Copper.—There are several factors in the market which give strength to the position of producers. In the first place, neither domestic nor foreign consumers have overbought, despite the unprecedented purchases early in September. They had refrained from placing orders for several months in an effort to break prices and when they finally came into the market they merely made up in part for the volume of business which ordinarily they would have contracted for in small quantities at frequent intervals. The fact that few bookings for December delivery have been made bears out this statement. Domestic shipments of copper in September were second only to the peak month of March, which is proof that users actually were in need of large tonnages to meet current needs rather than merely speculating in futures. Moreover, it is conservatively estimated that consumers will have to buy 200,000 tons to fill their requirements over the remainder of the year. Through recent purchases, consumers have got back into a normal position from a tonnage standpoint, but foreign users still are somewhat underbought. Fifty-eight thousand gross tons of copper was sold for export during September. Demand during the past week was of fair proportions, with electrolytic copper firm at 18c., delivered in the Connecticut Valley. The Lake copper market has been steady, with consumers buying at a moderate rate at 18c. to 18.12½c., delivered. The quotation of Copper Exporters, Inc., is 18.30c., c.i.f., usual European ports.

Copper Averages.—The average price of Lake copper for August, based on daily quotations in THE IRON AGE, is 18.12½c., delivered New York. The average price of electrolytic copper is 17.75c., refinery, or 18c., delivered in the Connecticut Valley.

Tin.—The Straits tin market was fairly active the first two days of the past week, when about 500 tons was sold for spot and October shipment. Some consumers had tin tendered to them on previous contracts and, since they were not in a position to use it, they resold it. Today the monthly tin statistics came out, showing a decrease of 1844 tons in the world's visible supply. Normally, such a favorable report should result in a firm market, but this development was off-

THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY

	Oct. 1	Sept. 30	Sept. 28	Sept. 27	Sept. 26	Sept. 25
Lake copper, New York	18.12½	18.12½	18.12½	18.12½	18.12½	18.12½
Electrolytic copper, N. Y.*	17.75	17.75	17.75	17.75	17.75	17.75
Straits tin, spot, N. Y.	44.25	45.00	....	45.125	45.00	45.00
Zinc, East St. Louis	6.80	6.80	6.80	6.80	6.80	6.80
Zinc, New York	7.15	7.15	7.15	7.15	7.15	7.15
Lead, St. Louis	6.70	6.70	6.70	6.70	6.70	6.70
Lead, New York	6.90	6.90	6.90	6.90	6.90	6.90

*Refinery quotation; price ¼c. higher delivered in the Connecticut Valley.

Rolled Products

Prices on rolled non-ferrous products are unchanged from those prevailing one week ago.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—
- High brass ..... 23.25c.
- Copper, hot rolled ..... 26.75c.
- Zinc ..... 10.25c.
- Lead (full sheets) .. 11.00c. to 11.25c.

Seamless Tubes—
- High brass ..... 28.25c.
- Copper ..... 29.25c.

Rods—
- High brass ..... 21.25c.
- Naval brass ..... 24.00c.

Wire—
- Copper ..... 19.87½c.
- High brass ..... 23.75c.

Copper in Rolls ..... 26.75c.
Brazed Brass Tubing ..... 30.87½c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also to St. Louis on shipments to points west of that river.

- Sheets, 0 to 10 gage, 3 to 30 in. wide ..... 33.00c.
- Tubes, base ..... 42.00c.
- Machine rods ..... 34.00c.

Chicago Warehouse

(Prices Cover Trucking to Customers' Doors in City Limits)

Sheets—	Base per Lb.
High brass	23.25c.
Copper, hot rolled	27.75c.
Copper, cold rolled, 14 oz. and heavier	30.00c.
Zinc	10.75c.
Lead, wide	11.35c.
Seamless Tubes—	
Brass	28.25c.
Copper	29.25c.
Brass Rods	21.25c.
Brazed Brass Tubes	31.00c.

New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—		
High brass	21.12½c.	to 22.12½c.
Copper, hot rolled, base sizes	27.75c.	to 28.75c.
Copper, cold rolled, 14 oz. and heavier, base sizes	30.00c.	to 31.00c.
Seamless Tubes—		
Brass	26.00c.	to 27.00c.
Copper	29.12½c.	to 30.12½c.
Brazed Brass Tubes	29.12½c.	to 30.12½c.
Brass Rods	18.87½c.	to 19.87½c.

New York Warehouse

Delivered Prices, Base Per Lb.

- *Zinc sheets (No. 9), casks* ..... 10.75c. to 11.25c.
- *Zinc sheets, open* ..... 11.50c. to 12.00c.

Metals from New York Warehouse

Delivered Prices, Per Lb.

- Tin, Straits pig ..... 47.00c. to 48.00c.
- Tin, bar ..... 49.50c. to 50.50c.
- Copper, Lake ..... 19.50c.
- Copper, electrolytic ..... 19.25c.
- Copper, casting ..... 19.00c.
- Zinc, slab ..... 7.75c. to 8.25c.
- Lead, American pig ... 7.62½c. to 8.12½c.
- Lead, bar ..... 9.62½c. to 10.12½c.
- Antimony, Asiatic ..... 11.00c. to 11.50c.
- Aluminum No. 1 ingots for remelting (guaranteed over 99% pure) .. 25.00c. to 26.00c.
- Alum. ingots, No. 12 alloy ..... 24.00c. to 25.00c.
- Babbitt metal, commercial grade ..... 25.00c. to 35.00c.
- Solder, ½ and ½ ..... 30.00c. to 31.00c.

Metals from Cleveland Warehouse

Delivered Prices, Per Lb.

- Tin, Straits pig ..... 50.25c.
- Tin, bar ..... 52.25c.
- Copper, Lake ..... 19.50c.
- Copper, electrolytic ..... 19.25c.
- Copper, casting ..... 18.75c.
- Zinc, slab ..... 7.75c. to 8.00c.
- Lead, American pig ..... 7.55c. to 7.75c.
- Lead, bar ..... 9.75c.
- Antimony, Asiatic ..... 16.00c.
- Babbitt metal, medium grade ..... 18.75c.
- Babbitt metal, high grade ..... 54.00c.
- Solder, ½ and ½ ..... 31.25c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged customers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	15.00c.	16.50c.
Copper, hvy. and wire	14.75c.	16.00c.
Copper, light and bottoms	12.75c.	14.00c.
Brass, heavy	8.50c.	9.50c.
Brass, light	7.50c.	8.50c.
Hvy. machine composition	12.00c.	13.00c.
No. 1 yel. brass turnings	9.75c.	10.50c.
No. 1 red brass or compos. turnings	11.25c.	12.25c.
Lead, heavy	5.50c.	6.00c.
Lead, tea	4.25c.	5.25c.
Zinc	3.50c.	4.25c.
Sheet aluminum	14.00c.	16.00c.
Cast aluminum	12.25c.	14.25c.

set by an estimate that Straits tin shipments during October will amount to 10,000 tons. If this estimate proves true, a new monthly record will be established. The reaction to this news came in the form of a bad break on the London market, with prices falling to £200 2s. 6d. for spot standard tin, £203 7s. 6d. for future standard, and £204 12s. 6d. for spot Straits. The Singapore market also was adversely affected, with quotations at £210 5s. The unfavorable London situation was reflected today in spot Straits tin at New York, which dropped to 44.25c.

Lead.—Consumers have been placing a fair volume of business for October shipment, but little inquiry has appeared for November delivery. Producers are looking forward to buying on a wider scale later in the month. Prices at St. Louis are steady and unchanged at 6.70c. and the leading interest is maintaining its contract price at 6.90c.

Zinc.—Although purchases have been confined to small tonnages for early delivery, sellers are of the opinion that the market from their standpoint is the strongest in many weeks. This is due partly to the fact that production has been curtailed and partly to the fact that consumers have exceedingly slim stocks on hand and therefore must place some orders soon. In the Tri-State district, 75 per cent of the mines have been shut down the past week. Since the first week of September the weekly output of ore has averaged from 13,000 to 13,500 tons. Sales in the past seven days, at 9820 tons, were about 1000 tons below those of the previous week. Producers are quoting 6.80c., East St. Louis, for prime Western zinc, but at least a small amount is available at a lower figure.

Antimony.—There has been a further recession in prices, with spot metal quoted at 8.50c., New York. Consumers, however, are unwilling to place orders at that figure and are offering 8.25c. The decline in the price of silver, which affects the rate of exchange of the Chinese metal, is largely responsible for the downward movement of quotations.

Nickel.—Ingot nickel is quoted at 35c. a lb. in wholesale lots, shot nickel at 36c. and electrolytic nickel in cathodes at 35c.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at 23.90c. a lb., delivered.

Non-Ferrous Metals at Chicago

CHICAGO, Oct. 1. — The market started dull in the opening days of the week, but recently sales have mounted to a satisfactory volume. The old metal market is quiet.

Prices per lb., in carload lots: Lake copper, 18.50c.; tin, 45.75c.; lead, 6.80c.; zinc, 6.90c.; in less-than-carload lots, antimony, 9.60c. On old metals we quote copper wire, crucible shapes and copper clips, 14c.; copper bottoms, 11.50c.; red brass, 11.50c.; yellow brass, 8c.; lead pipe, 4.50c.; zinc, 3.25c.; pewter, No 1, 24.50c.; tin foil, 26c.; block tin, 36c.; aluminum, 12.87½c.; all being dealers' prices for less-than-carload lots.

Railroad Equipment

Norfolk & Western Orders 2000 Cars, Boston & Maine 1500

ORDERS for freight cars in the week totaled 3700, of which 2000 are for the Norfolk & Western, 1500 for the Boston & Maine and 200 for the Lehigh Valley. In addition, an unconfirmed report is that the Louisville & Nashville has bought 1000. Orders for nearly 1000 car bodies were placed by two roads.

Locomotive orders included 42 for the New York Central, 17 for the Chilean State Railways and 14 for the Great Northern. The Pennsylvania is inquiring for 75.

With 7000 cars to be bought by the Baltimore & Ohio, probably 6000 by the Chesapeake & Ohio, upward of 2700 by the Burlington, nearly 6000 by the Santa Fe, 4000 by the Southern, and 1900 by the Chicago & North Western, car purchases now definitely in sight total about 30,000 units.

Details of the week's business follow:

Baltimore & Ohio is expected to come into the market soon for 7000 cars.

Louisville & Nashville is reported to have placed orders privately for 1000 cars, but this is not confirmed.

Norfolk & Western has ordered 2000 all-steel hopper cars, of which 1000 will be built by Bethlehem Steel Corporation and 1000 by Ralston Steel Car Co.

Great Northern has ordered 14 locomotives from Baldwin Locomotive Works.

New York Central has placed an order with American Locomotive Co. for 42 electric locomotives for use in New York City. Some weeks ago New York Central placed a similar order for 35 locomotives.

Seaboard Air Line has ordered 465 box car bodies from Standard Steel Car Co.

Lehigh Valley has ordered 200 hopper cars from Bethlehem Steel Corporation.

Boston & Maine has ordered 1000 box cars and 500 hopper cars from Standard Steel Car Co.

United Fruit Co. is inquiring for 100 fruit cars and 80 superstructures for fruit cars.

International Railways of Central America are expected to come into the market for 75 stock cars, 50 box cars, 50 flat cars, seven first-class passenger coaches, 15 second-class coaches, three baggage cars and five locomotives.

Chicago & Eastern Illinois has ordered 500 gondola car bodies from Mount Vernon Car & Mfg. Co.

Monongahela Connecting Railroad will buy one to four six-wheel locomotives and one to four eight-wheel locomotives.

Pennsylvania will buy 75 4-8-4 type locomotives.

Chilean State Railway has ordered 17 locomotives from Baldwin Locomotive Works.

It is understood that the Chesapeake & Ohio Railroad will be in the market shortly for 4000 hopper cars of 57½-ton capacity and 2000 box cars.

Great Northern has ordered three electric locomotives from General Electric Co.

Burlington directors have authorized purchase of 500 automobile, 600 flat, 800 hoppers, 10 baggage, 14 suburban and 10 gas-electric cars; also eight Mikado locomotives and five passenger engines. Authorized for its subsidiary, the Colorado & Southern, are 700 box and 100 flat cars.

Chicago & North Western to Buy New Equipment

WASHINGTON, Oct. 1.—Authority has been granted by the Interstate Commerce Commission to the Chicago & North Western Railroad to issue $8,775,000 in trust certificates to be used in the purchase of 1000 steel underframe automobile cars, 10 locomotives, 400 steel underframe gondola cars, 15 gas-electric motor passenger-train cars, 300 steel underframe flat cars, 200 steel ballast cars and 10 steel baggage cars. Equipment to be acquired under an agreement made in January consists of 1000 70-ton gondola cars and 25 locomotives.

Application was filed with the commission last week by the Baltimore & Ohio Railroad for authority to issue equipment trust notes of $13,500,000 to be used as a part of a total of $18,173,000 for the purchase of equipment, some of which has been ordered or is under negotiation. The equipment includes 2000 70-ton steel gondola cars, 2000 70-ton steel hopper cars, 3500 50-ton all-steel box cars and 50 all-steel passenger coaches.

Merger of Car Builders Said To Be in Progress

Reports are persistent that negotiations are under way for a union between General American Tank Car Corporation and Pullman, Inc. Officials of the two companies refuse to comment on the possibilities of consolidation.

Pullman, Inc., through its subsidiary, the Pullman Car & Mfg. Corporation, has an annual manufacturing capacity of 22,000 freight cars and 1800 passenger cars. The company is also engaged in the manufacture of car wheels and has a large car repair business. More than 8000 parlor and sleeping cars are operated by another subsidiary, the Pullman Co.

General American can produce 18,000 cars annually. The company owns and operates 31,000 tank, refrigerator, milk and special cars. This company has recently expanded by the formation of foreign subsidiaries.

Pullman, Inc., and the General American Corporation, as of Dec. 31, 1928, had combined net working capital of $80,000,000. Total assets of Pullman were $305,000,000 and of General American $56,000,000.

Fabricated Structural Steel

Structural Steel Activities Maintained at High Level—Awards Total 50,000 Tons

WITH awards of 50,000 tons and fresh inquiries for 54,000 tons, structural steel activities were maintained at a high level in the past week. Contracts placed for work in New York City accounted for almost half of the total lettings. Apartment, office and hotel buildings and other non-industrial structures will require a substantial portion of the aggregate tonnage. However, more than a third of the steel will go into industrial projects.

The largest award was 15,000 tons for a New York office building. Outstanding inquiries are 17,000 tons for two New York subway sections and 12,000 tons for a Chicago office building. Awards follow:

PROVIDENCE, R. I., 100 tons, bridge, to unnamed fabricator.

NEWPORT, R. I., 100 tons, bank, to J. H. Tower Iron Works.

NEW YORK, 15,000 tons, Farmers Loan & Trust Co. Building on William Street, to McClintic-Marshall Co.

NEW YORK, 1500 tons, apartment house at Madison Avenue and Eighty-eighth Street, to George A. Just Co.

NEW YORK, 800 tons, Grasslands Hospital, to Hinkle Iron Co.

NEW YORK, 2600 tons, apartment building at Eighty-first Street and Central Park West, to A. E. Norton, Inc.

NEW YORK, 2800 tons, apartment building at Seventy-first Street and Central Park West, to Harris Structural Steel Co.

NEW YORK, 600 tons, apartment building at 1068 Fifth Avenue, to Easton Structural Steel Co.

PENNSYLVANIA RAILROAD, 400 tons, bridges, to unnamed fabricators.

PHILADELPHIA, 1500 tons, factory for I. Fischman & Sons, to Bethlehem Fabricators, Inc.

ROME, N. Y., 185 tons, New York Central grade crossing elimination, to McClintic-Marshall Co.

BUFFALO, 325 tons, Lasser-Pryor Co. apartment house, to R. S. McMannus Steel Corporation.

QUEBEC, 100 tons, addition to City Hall, to Eastern Canada Steel Co., St. Malo.

SIMCOE, ONT., 2000 tons, plant for American Can Co., to Hamilton Bridge Co.

TORONTO, 100 tons, machine shop for Dominion Wheel & Foundries, Ltd., to John T. Hepburn, Ltd.

POINT MARION, PA., 850 tons, bridge for Point Marion Bridge Co., to Pittsburgh-Des Moines Steel Co.

SAGINAW, MICH., 1965 tons, building for Michigan Bell Telephone Co., to American Bridge Co., reported last week as 1500 tons.

ONTONAGON, MICH., 165 tons, highway bridge, to Milwaukee Bridge Co.

ALEXANDRIA, IND., 400 tons, Banner Rock Products Co., to Indiana Bridge Co.

ANDERSON, IND., 400 tons, National Tile Co., to Indiana Bridge Co.

CHICAGO, 2300 tons, Parker Junior High School, to Hansell-Elcock Co., local.

EAST CHICAGO, IND., 800 tons, highway bridge at Dickey Place, to Wisconsin Bridge & Iron Co.

ELMHURST, ILL., 300 tons, building for Elmhurst Stone Quarry, to Mississippi Valley Structural Steel Co.

MANITOWOC, WIS., 250 tons, addition to city power plant, to Worden-Allen Co.

MANITOWOC, 5000 tons, oil tanker for Standard Oil Co., to Manitowoc Shipbuilding Co.

JANESVILLE, WIS., 750 tons, bridge, to Milwaukee Bridge Co.

ST. PAUL, MINN., 300 tons, airplane hangars, to St. Paul Foundry Co.

TEXAS OIL FIELDS, 3000 tons, storage tanks for Landreth Co., to Chicago Bridge & Iron Co.

AJO, ARIZ., 500 tons, New Cornelia Copper Co., to Kansas City Structural Steel Co.

OAKLAND, CAL., 185 tons, Heeseman store, to California Steel Co.

CULVER CITY, CAL., 200 tons, stage building for Metro-Goldwyn, to Pacific Iron & Steel Co.

AZUSA, CAL., 850 tons, conveyor frame for work at Azusa dam, to Consolidated Steel Corporation.

STOCKTON, CAL., 100 tons, theater, to Pacific Coast Engineering Co.

EVERETT, WASH., 1650 tons, pulp plant, Puget Sound Timber & Pulp Co., to Isaacson Iron Works.

EVERETT, 1000 tons, plates, boilers, tanks and digesters for Puget Sound Timber & Pulp Co., to Puget Sound Machinery Depot.

TACOMA, WASH., 150 tons, hangar, to unnamed bidder.

BREMERTON, WASH., 200 tons, plates for pipe line, to unnamed bidder.

SEATTLE, 400 tons, six locomotive boilers for Great Northern Railroad, to Puget Sound Machinery Depot.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

BOSTON, 200 tons, banking house addition and alterations.

PITTSFIELD, MASS., 150 tons, school.

SPRINGFIELD, MASS., 125 tons, Court House.

NEW YORK, 17,000 tons, subway work; 12,000 tons for section 110, route 107, and 5000 tons for section 3, route 110.

NEW YORK, 1000 tons, public school No. 105 in Bronx.

NEW YORK, 2500 tons, Merchants Square Building at Church and Thomas Streets.

BROOKLYN, 850 tons, building for *Brooklyn Times.*

SCHENECTADY, N. Y., 500 tons, City Hall.

PENSACOLA, FLA., 2500 tons, bridge.

BUFFALO, 800 tons, *Courier-Express* Building.

OTTAWA, ONT., 3500 tons, second block of Government building; Department of Public Works to call for bids during winter.

DETROIT, 1000 tons, building for Detroit Edison Co.

DETROIT, 1500 tons, addition to *Detroit News* Building.

INDIANA HARBOR, IND., 325 tons, bar mill for Inland Steel Co.

CHICAGO, 12,000 tons, estimated, office building for Marshall Field Estate.

CHICAGO, 300 tons, addition to armory.

CHICAGO, 750 tons, addition to 124th Field Artillery Armory.

ST. PAUL, MINN., 400 tons, safety building.

ST. LOUIS, 4500 tons, Merrimac River bridge for Missouri Pacific Railroad.

NORTH BEND, ORE., 400 tons, power house.

LONG BEACH, CAL., 970 tons, auditorium.

SACRAMENTO, CAL., 405 tons, Trinity River bridge; Mercer-Fraser Co., Eureka, low bidder.

SACRAMENTO, 1337 tons, bridge over San Luis Rey River; bids Oct. 16.

SAN FRANCISCO, 350 tons, warehouse for Western Sugar Refinery Co.; bids being received.

SANTOS, BRAZIL, 400 tons, building for Phoenix Utility Co.

U. S. Steel Officials Visit Columbia Properties

SAN FRANCISCO, Sept. 30.—United States Steel Corporation officials, including James A. Farrell, president, and Myron C. Taylor, chairman of the finance committee; E. J. Buffington, president, and T. W. Robinson, vice-president, Illinois Steel Co.; Gordon G. Crawford, president, Tennessee Coal, Iron & Railroad Co.; E. W. Pargny, president, and W. A. Irvin, vice-president, American Sheet & Tin Plate Co., and John S. Keefe, president, and C. F. Blackmer, general superintendent in charge of operations, American Steel & Wire Co., are on a visit of inspection of the properties of the Columbia Steel Corporation at Pittsburg, Cal., and at Provo, Utah.

In San Francisco, Mr. Farrell told newspaper correspondents that their visit was in connection with the pending sale of the Columbia Steel Corporation to the United States Steel Corporation, but that "it was a little too early to discuss the outcome."

The United States Steel Corporation took a 90-day option on the Columbia properties while Mr. Farrell was in Europe recently.

Milling Machine Company Holds Sales Conference

More than 165 persons, representing many foreign countries and every State in the union, gathered on Sept. 27 at an international sales conference at the plant of the Cincinnati Milling Machine Co., Cincinnati. Approximately 12,000 ft. of floor space in one of the company's new buildings was converted into a theater, where each new machine to be demonstrated at the Cleveland show was exhibited to sales representatives. In addition to the display, papers on various subjects pertaining to machine tool manufacture and sales were read.

Hickman, Williams & Co., Inc., 1607 Oliver Building, Pittsburgh, has been appointed exclusive distributer of Clairton nut coke for domestic use. The domestic coke department will be in charge of M. M. Griest, former president of the Pittsburgh-Cambridge Coal Co., Pittsburgh, which has retired from business.

Study of Iron Alloys Started

Committee of Metallurgists Organizes to Carry Out Research of Engineering Foundation

IT was announced by H. Hobart Porter, chairman of the Engineering Foundation, at a dinner at the University Club, New York, on Wednesday evening, Sept. 25, that Dr. George B. Waterhouse, professor of metallurgy, Massachusetts Institute of Technology, will head the Iron Alloys Committee of the foundation.

With the cooperation of industries, engineering societies, universities, and the United States Government, the committee will inaugurate a program of cooperative research called vital to the progress of the American iron and steel industry, whose future, it was declared, will be greatly affected by its ability to maintain a strong position in alloy irons and alloy steels.

The research, the initial stage of which will require five years and cost $150,000, will, it is planned, develop as an international enterprise, coordinating researches in ferrous metallurgy, the most important of which, according to engineers, are going on in America, England and Germany.

Other members of the committee, who will at once begin a critical review of all available literature in English and other languages, resulting in a series of monographs and manuals, were named as follows:

Dr. George K. Burgess, director of the United States Bureau of Standards: Louis Jordan of the bureau, alternate, Washington.

Scott Turner, director of the United States Bureau of Mines; Dr. Charles H. Herty, Jr., alternate, Pittsburgh.

R. E. Kennedy, technical secretary of the American Foundrymen's Association, Chicago.

Dr. H. W. Gillett, director of the Battelle Memorial Institute, Columbus, Ohio.

Prof. Bradley Stoughton, director of the metallurgical engineering department of Lehigh University, South Bethlehem, Pa.

Jerome Strauss, chief research engineer of the Vanadium Corporation of America, Bridgeville, Pa.

T. H. Wickenden, metallurgical engineer of the International Nickel Co., New York.

Dr. John A. Mathews, vice-president of the Crucible Steel Co. of America, New York.

The Iron Alloys Committee, said Mr. Porter, who is president of the American Water Works & Electric Co., will work in cooperation with the American Institute of Mining and Metallurgical Engineers, American Society of Mechanical Engineers, American Society of Civil Engineers, American Institute of Electrical Engineers, American Iron and Steel Institute, Society of Automotive Engineers, American Society for Steel Treating, American Society for Testing Materials, United States Bureau of Standards, United States Bureau of Mines, numerous corporations in the metallurgical industries and several universities. There are encouraging indications, he added, that foreign cooperation also may be arranged. He also is quoted as saying:

> The subject of this committee's work is basic data on iron and its very numerous combinations with other metals and certain metalloids. Extensive as is the use of iron in this "Iron Age," very few persons have ever seen absolutely pure iron. Many thousands of tons of nearly pure iron are used annually for a variety of purposes.
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> By far the larger proportion, however, of the iron used in the arts is combined with other substances. First are the millions of tons of carbon steels for frames of buildings, for the plates of ships, boilers, tanks and pipes, for rails, in the steam and electric railroads, and for multitudinous other things. Iron castings account for many other thousands of tons. Our industries and engineers have scarcely more than begun to apprehend the possibilities of alloy irons and alloy steels. Nevertheless, progress has been rapid in recent years. Much more information is needed by both producers and users.
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> The Iron Alloys Committee consequently has accepted as its first duty the very large task of culling from the voluminous literature the essence of useful knowledge and putting it into forms convenient for use by researchers, technologists, engineers and superintendents. Repeatedly, foremost technical leaders in the industries and research institutions have urged this work as the greatest possible aid which the Engineering Foundation, on behalf of the engineering societies, could give to the progress of the iron, steel and related industries in developing alloy irons and alloy steels.
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> As the second part of its undertaking, the Iron Alloys Committee will aid, promote and organize researches for new basic information about pure iron and its combinations with other substances. It will not attempt to discover or devise commercial alloys; that is the business of the laboratories in the industries. Rather the committee will seek those underlying facts which will be necessary to all the industrial metallurgical laboratories. To conduct this extensive and important project, a committee of distinguished metallurgists has been selected from the several sectors of the field.

Among guests at the dinner, in addition to the members of the committee, there were:

Dr. Edward Dean Adams, honorary member of the foundation; Alva C. Dinkey, president of the Midvale Co.; J. V. N. Dorr, president of the Dorr Co.; Alfred D. Flinn, director of the Engineering Foundation; Dr. Arthur D. Little, president of the Arthur D. Little Co., Cambridge, Mass.; Roy V. Wright, managing editor of *Railway Age*; H. Foster Bain, secretary of the American Institute of Mining and Metallurgical Engineers; Dr. F. M. Becket, vice-president of the Union Carbide Co.; E. A. S. Clarke, secretary of the American Iron and Steel Institute; Calvin W. Rice, secretary of the American Society of Mechanical Engineers; J. V. W. Reynders, consulting engineer, New York.

Reinforcing Steel

Awards Total 5800 Tons—New Jobs Will Take 4200 Tons

CONTRACTS for reinforcing steel bars placed in the past week totaled 5800 tons. Twenty-five hundred tons will go into the construction of the New York State prison at Attica and 1100 tons into a department store at Dubuque, Iowa. Fresh work which came out in the last seven days totals 4200 tons. The largest job is a highway bridge at Portland, Ore., taking 2000 tons. Awards follow:

ATTICA, N. Y., 2500 tons for Attica State Prison, reported placed with Bourne-Fuller Co.

NEW YORK CENTRAL RAILROAD, 115 tons, 241st Street viaduct in New York, to Joseph T. Ryerson & Sons, Inc.

NEW YORK, 250 tons, New York Hospital, to Carroll-McCreary & Co., Inc.

BROOKLYN, 200 tons, post office extension, to Joseph T. Ryerson & Sons, Inc.

PHILADELPHIA, 400 tons, hospital for Women's Medical College, to Roslyn-Gilmore Steel Co.

CHICAGO, 400 tons, apartment building at Fifty-Second Street and Blackstone Avenue, to Inland Steel Co.

CHICAGO, 160 tons, addition to Prairie Farmer Building, to an unnamed bidder.

NOTRE DAME, IND., 400 tons, stadium for Notre Dame University, to Olney J. Dean & Co.

PEORIA, ILL., 100 tons, building for St. Francis Convent, to Laclede Steel Co.

DUBUQUE, IOWA, 1100 tons, department store, to unnamed bidder.

SAN DIEGO, CAL., 100 tons, Army-Navy Academy, to unnamed bidder.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

BUFFALO, 240 tons, *Courier-Express* Building.

AKRON, OHIO, tonnage unstated, seven-story building for Firestone Tire & Rubber Co.

AKRON, tonnage unstated, Mayflower Hotel.

AKRON, 800 tons, Polsky department store.

WILMINGTON, DEL., 500 tons, hospital and nurses' home.

CHICAGO, tonnage unstated, addition to Washington Park Armory.

CHICAGO, 350 tons, addition to Michael Reese Hospital.

RIVER FOREST, ILL., tonnage unstated, building for Bowman Dairy Co.

SPRINGFIELD, ILL., tonnage being estimated, 25 institutional buildings for State of Illinois.

OLYMPIA, WASH., 170 tons, Thurston County Court House; bids being received.

PORTLAND, ORE., 2000 tons, approaches to St. John's River bridge; bids opened.

SACRAMENTO, CAL., 128 tons, bridge over San Luis Rey River; bids Oct. 16.

PERSONAL

FREDERICK A. GEIER, president of the Cincinnati Milling Machine Co., was the guest of honor at a dinner in Cincinnati Saturday night, which was the climax of a three-day international sales conference of the Milling Machine company and its subsidiary, Cincinnati Grinders, Inc. Representatives of the company from all over the world, as well as from

F. A. GEIER

every State in the Union, together with leading members of the machine tool industry in Cincinnati, attended the dinner. Wallets with the name of each guest in gold letters served as place cards. Each guest also was given a recent photograph of Mr. Geier inclosed in a brochure entitled "Forty-Five Years," which contained a complete history of the Cincinnati Milling Machine Co., from 1884 to the present time. Speakers at the dinner included Henry Prentiss, New York, who was introduced as the "dean of the dealers", and Sol Einstein, chief engineer of the company. During the dinner George Merryweather, president of Motch & Merryweather, Cleveland, which has represented the company for 25 years, was presented with a bouquet of flowers to celebrate the company's twenty-fifth anniversary. Philip O. Geier, president of Cincinnati Grinders, Inc., was toastmaster.

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H. M. LANE, president, H. M. Lane Co., industrial engineer, Detroit, has recently removed his office to Gray Gables, East River Drive, Grosse Ile, Mich.

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MAURICE G. STEELE, director and development engineer of the Hart & Hutchinson Co., New Britain, Conn., has resigned to become manager of the Rome-Turney Radiator Co., Rome, N. Y. He has been active for years in the American Society of Mechanical Engineers, New Britain section, of late serving as vice-chairman of that body.

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MAURICE E. BROWN, formerly foreman of the Union Malleable Iron Co., East Moline, Ill., has resigned to join the sales department of the Arcade Mfg. Co., Freeport, Ill., maker of hardware specialties and molding machines.

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GUS A. SMITH, who started in 1906 in the foundry of the Simmons Co., Kenosha, Wis., has recently been named general manager of the Wisconsin plant, succeeding D. C. TRAVIS. From foundry foreman Mr. Smith was advanced to various posts and in 1922 became assistant general manager.

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SAMUEL M. VAUCLAIN, chairman of the board of the Baldwin Locomotive Works, Philadelphia, addressed the Cleveland Engineering Society, at a dinner meeting Oct. 1, on "Business Requirements of Engineers in Industry." This was the first meeting on the society's program for the year.

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RICHARD E. BROCK has been appointed chief engineer and master mechanic at the Etna. Pa., plant of Spang, Chalfant & Co., Inc., Pittsburgh, succeeding R. G. CONNELL, who resigned recently.

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G. H. HEDRICK, vice-president, Thomas Spacing Machine Co., Glenshaw, Pa., has resigned.

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H. E. PARKER, superintendent machinery division, Peck, Stow & Wilcox Co., Southington; F. G. HOUSMAN, factory superintendent, P. & F. Corbin Mfg. Co., New Britain; H. S. WASHBURN, Plainville Casting Co., Plainville; EDGAR SPENCER, Philbrick, Booth & Spencer, Hartford; P. W. SPENCER, Bradley & Hubbard Mfg. Co., Meriden; and CHARLES S. PARKER, Charles Parker Co., Meriden, have been appointed members of the advisory committee on foundry training in northern Connecticut to cooperate with the State Board of Education in bringing about closer relationships between the State trade schools and industries in that section.

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D. M. AVEY, editor of *Foundry*, will address the Oct. 3 meeting of the Chicago Foundrymen's Club at the City Club, Chicago, on "Value of District Foundry Associations and General Foundry Progress."

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RUDOLPH NELSON has been added to the Chicago branch staff of the United States Electrical Tool Co., Cincinnati.

FREDERICK E. GROSS, who has represented the pig iron department of the Donner Steel Co., Inc., Buffalo, in central and eastern New York, has resigned.

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R. G. GUTHRIE, metallurgist, Peoples Gas Light & Coke Co., Chicago, is to speak on "Metallurgy for the Shop Man" at a dinner meeting of the Tri-City chapter of the American Society for Steel Treating at the Davenport Chamber of Commerce, Davenport, Iowa, Oct. 8. He was nominated president of the national

R. G. GUTHRIE

society at the annual convention, Sept. 9 to 13, and will take office Jan. 1.

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PAUL J. KRUESI, president, Southern Ferro Alloys Corporation, Chattanooga, Tenn., has been elected president of the East Tennessee Coal & Iron Co., Knoxville, Tenn., succeeding the late SEN. LAWRENCE D. TYSON. Mr. Kruesi has been vice-president of the company for a number of years.

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SCOTT TURNER, director of the United States Bureau of Mines, will sail from San Francisco, Oct. 10, to attend the World Engineering Congress at Tokio. He was appointed by President Hoover as one of the five Federal engineers who are to represent the United States Government at this congress. Mr. Turner also holds a commission to represent the American Committee of the World Power Conference, and is listed as a member of the official party representing the American Institute of Mining and Metallurgical Engineers. He plans to return to the United States the latter part of November.

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J. HARVEY BRYAN, who represents the Apollo Steel Co., Apollo, Pa., and the Gulf States Steel Co., Birmingham, Ala., in New York, has been appointed New York district sales representative for Bliss & Laughlin, Inc., Harvey, Ill., maker of cold-drawn steel.

C. F. SCHERER, superintendent, Davenport Machine & Foundry Co., Davenport, Iowa, was elected chairman of the Tri-City Technical Council at a meeting held at the LeClaire Hotel, Sept. 20. HOWARD ROGERS, assistant treasurer, Williams, White & Co., Moline, Ill., was elected vice-chairman. E. C. XANDER, assistant secretary, Tri-City Manufacturers' Association, Moline, is the new secretary, and MAX SKLOVSKY, Deere & Co., Moline, continues as treasurer.

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GEORGE D. KINGSLAND, who has been associated for many years with the Minneapolis-Honeywell Regulator Co., Minneapolis, has been placed in charge of the unit heater control division of the company.

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EDWARD R. YOUNG, formerly research engineer of the Detroit Steel Casting Co., has joined the staff of the Climax Molybdenum Co., New York, as metallurgical engineer. He was graduated from the University of Michigan in 1915 and later specialized in foundry research as holder of an industrial fellowship in metallurgy.

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JOSEPH JACOBSON has been added to the staff of the Goodell-Pratt Co., Greenfield, Mass., to handle sales in Michigan, with headquarters at 205 South Marlborough Street, Detroit. JOHN H. METZ, Richmond Hill, L. I., has taken over the territory formerly assigned to E. C. MESLOH, and the F. J. Keller Co., Capps Building, Dallas, Tex., has been appointed to take care of sales in Texas, Oklahoma, Louisiana and Arkansas.

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RALPH MODJESKI, of Chicago, has been awarded the John Fritz medal "for notable achievement as an engineer of great bridges."

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C. K. EVERITT, managing director and general manager of Edgar Allen, Ltd., Sheffield, England, was given a testimonial luncheon by FRITZ J. FRANK, president, The Iron Age Publishing Co., and C. S. BAUR, advertising manager, THE IRON AGE, on Sept. 26 at the Union League Club, New York. Others who were present were H. S. HOYT, president; J. KING HOYT, JR., secretary and treasurer; V. A. GREENE, vice-president and general manager, and W. A. METZE, assistant treasurer, respectively, of the Edgar Allen Steel Co., Inc., New York; F. W. ECKER, assistant treasurer, Metropolitan Life Insurance Co., New York; and GIFFORD LE-CLEAR, member of the firm of Densmore, LeClear & Robbins, architects and engineers, Boston. Mr. EVERITT sailed for England on the Franconia, Sept. 28.

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G. H. CHARLS, president, National Association of Flat Rolled Steel Manufacturers, Cleveland, spoke on "Building the Family Spirit in Industry" at the opening of a three-day convention and exhibit, Sept. 30, of the National Industrial Advertisers' Association.

OBITUARY

H. COLE ESTEP, vice-president of the Penton Publishing Co., Cleveland, and prominent in the affairs of the American Foundrymen's Association, of which he had been a director the past year, died suddenly of heart disease Sept. 30, aged 43 years. He had been chairman of the committee

H. COLE ESTEP

on international relations of the American Foundrymen's Association for several years and it was largely through his efforts that the plan was adopted of having exchange papers between that association and European foundry societies. Mr. Estep was born in Stampede Tunnel, Wash., and was graduated as a mechanical engineer from the University of Minnesota in 1908. That year he joined the editorial staff of the *Iron Trade Review*, which he represented in Seattle and later in Chicago. In 1914 he became engineering editor of that publication, which position he held for three years. He was editorial director of the various Penton publications in 1918 and 1919 and European manager of these publications from 1919 to 1924. Mr. Estep was secretary of the Foundry Equipment Manufacturers' Association, member of the American Iron and Steel Institute, American Society of Mechanical Engineers, Institute of British Foundrymen, Engineers' Club of London, (British) Iron and Steel Institute, and Association Technique de Fonderie de France.

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GEORGE W. GILBERT, vice-president, A. Gilbert & Sons Brass Foundry Co., St. Louis, died there recently, aged 58 years. He was born in St. Louis, and soon after his graduation from high school entered the employ of his father, A. Gilbert, who founded the institution which bears his name.

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MORRIS BLOCK, president, M. N. Block Co., manufacturer of sheet metal products, Chicago, died recently of a fractured skull, following a fall in the bathroom of his home.

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LOUIS VAUGHAN HUBBARD, president, Taft-Peirce Co., manufacturer of tools, dies and engineering instruments, Woonsocket, R. I., died of acute indigestion at his home in Montclair, N. J., Sept. 26, aged 63 years.

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WALTER CHARLES WHITE, aged 52 years, president of the White Motor Co., Cleveland, died Sept. 29 from effects of injuries received in an automobile accident. He was graduated from Cornell University in 1898 and had been identified with the automotive industry since its early days. He was president of the White Co., the sales organization of the White Motor Co., a director of Bishop & Babcock Mfg. Co., Cleveland, and other companies.

Expect Gain in Shipments Over 1928 Last Quarter

WASHINGTON, Oct. 1. — Carload shipments of iron and steel during the fourth quarter of the year are expected by the Shippers' Regional Advisory Boards to total 522,943, or an increase of 5.4 per cent over the 496,038 carload shipments last year.

Machinery and boiler carload shipments are fixed at 54,391, an increase of 5.6 per cent over the 51,485 cars shipped during the last quarter of 1928. Coal and coke carload shipments are estimated at 3,079,509, an increase of 6.1 per cent over the 2,902,992 cars shipped for the corresponding period of last year. Ore and concentrate shipments estimated to require 472,053 cars, an increase of 3.1 per cent over the 457,907 cars for the final quarter of last year.

For the entire 29 commodities considered in the survey made by the Regional Advisory Boards, it is estimated that fourth quarter requirements will be about 9,134,023 cars, an increase of 2.3 per cent or 209,391 cars above the corresponding period of 1928, according to the Car Service Division of the American Railway Association.

Laconia Car Co. Drops Car Building Work

Laconia Car Co., Laconia, N. H., has definitely decided to discontinue the manufacture of street and railroad coaches. Several months ago, the management, following the failure of the company to secure certain Boston & Maine Railroad work, announced it was to discontinue operations, but such action was deferred. The Laconia plant has not been an important factor in the car building industry for three years. It will now devote its activities to power boat production.

Wholesale Prices Decline In August

Prices of commodities reported upon by the United States Bureau of Labor Statistics showed a fractional decline in August from the level of July, being 97.7 against 98, both referred to the average of 1926 is 100. Comparison shows 98.9 for August, 1928. Practically all of the 10 major items showed fractional changes.

Metals and metal products went down to 104.3, compared with 105 in July, owing partly to a decline in the iron and steel component from 97.9 to 97.6 and partly to a decline in automobile figures from 112.2 to 110.7. Non-ferrous metals, agricultural implements and other metal products did not change. Structural steel, one of the elements in the building material group, remained stationary at 99.6.

8-Month Automobile Output Near 12-Month Record

WASHINGTON, Sept. 21.—Making a decline of only 764, the August production of motor vehicles in the United States was 499,629 units, against 500,393 in July, according to the Department of Commerce. The output of passenger cars, however, increased by 17,553 units, rising to 443,714 from 426,159. Production of trucks decreased by 18,262 to 54,918 from 73,180, while there was a drop of 57 units in the production of taxicabs, the August total being 997 as against 1054 in July.

Canadian production of motor vehicles in August was 14,214, a drop of 3247 from the 17,461 produced in July and little more than one-third as much as in April last. The output of passenger cars was 11,037, a drop of 2563 from the 13,600 produced in July, while the truck production was 3177, a decline of 684 from the 3861 produced in July.

Production Increased

For the first eight months motor vehicles to the number of 4,223,414 were produced in the United States, an increase of 1,168,509 over the production of 3,054,905 for the corresponding period of last year. Passenger car production for the 1929 eight-month period increased to 3,642,211, a gain of 940,888 over the 2,701,323 produced during the corresponding period of 1928. Truck production increased by 218,979 units, rising to 568,519 from 349,540, and exceeding the 530,910 made in all of 1928, which itself was a record. Taxicab output was 12,684 for the first eight months, against 4042 during the corresponding period of last year, an increase of 8642.

Only three complete years have shown total output exceeding that for eight months this year: 1928, with 4,358,759 units; 1926, with 4,300,934; and 1925, with 4,265,830. At the August rate, 10 days of September's production would put the total ahead of any previous full year.

Canadian production of motor vehicles for the first eight months of 1929 was 220,036, compared with 181,459 during the corresponding period of last year, an increase of 38,577. Passenger car production was 176,250 against 152,265, an increase of 23,985. Truck output was 43,786 compared with 29,194, a gain of 14,592; it almost reached the 45,641 total for all of 1928.

Many More Portable Tools Exported

WASHINGTON, Sept. 28. — Foreign demand for American portable tools has been steadily expanding during the past few years and in 1928 sales exceeded $1,700,000, according to L. J. Cochrane, Industrial Machinery Division, Department of Commerce. Exports of last year, 33 per cent greater than those of 1926 and 47 per cent more than those of 1925, reflected a substantial gain over those of 1927.

During the first seven months of 1929 exports of portable tools were valued at $1,240,000, against about $920,000 for the like period of last year.

Shipments in 1928 went to more than 60 countries, the United Kingdom being the heaviest buyer, taking $465,000 worth, or 27 per cent of the total, but it was indicated that a considerable quantity was reexported. Japan was the next largest buyer, taking 15 per cent of all. Canada also was a large buyer, as was France, which took American portable tools to the value of $167,000.

Production and Shipment of Raw Materials and Finished Products

	August, 1929	July, 1929	August, 1928
By-product coke, net tons(a)	4,642,785	4,613,723	3,994,924
Beehive coke, net tons(a)	561,800	600,200	287,700
Total coke, net tons(a)	5,204,585	5,213,923	4,282,624
By-product daily average(a)	149,767	148,830	128,869
By-product, eight months(a)	35,950,237(b)	.....	31,577,542
Electric industrial trucks and tractors(c)	152	168	96
Electric industrial, eight months(c)	1,423	.....	1,466
Steel barrels produced(d)	806,574(e)	790,175	677,313
Steel barrels produced, eight months	5,847,773(b)	.....	5,033,749
Steel barrels shipped(d)	809,860(e)	782,411	675,600
Steel barrels shipped, eight months	5,837,538(b)	.....	5,028,811
Unfilled orders, end of month(d)	1,205,659	1,372,697	1,064,358

(a) United States Bureau of Mines.
(b) New high record for first eight months of any year.
(c) Number shipped; figures from Department of Commerce.
(d) Department of Commerce.
(e) Second highest total for any month.

Tin Exports from Malaya Are Increasing

WASHINGTON, Sept. 21.—Exports of tin from Malaya for the first six months of 1929 was 50,095 tons, while in the full year 1928 the total was 99,052 tons, valued at $109,028,000, or about 57 per cent of the world production, according to a report received from John H. Bruins, American consul at Singapore. Of the 1928 exports from Malaya, shipments to the value of $62,659,416 went to the United States. Total exports in 1927 were 83,773 tons and in 1926 they were 76,334 tons.

Philippine Steel Imports Up One-Half in 2 Years

WASHINGTON, Sept. 21.—Of 129,491 metric tons of iron and steel imported into the Philippine Islands in 1928, the United States provided 84,939 tons or 65.6 per cent, and Belgium 25,146 tons, according to a statement prepared by J. Joseph W. Palmer, Iron and Steel Division, Department of Commerce. In 1927 imports were 105,009 tons, of which 63,064 tons or 60 per cent came from the United States, 18,131 tons from Belgium and 13,539 tons from Germany. The 1926 imports totaled 86,727 tons, of which 55,742 tons or 64.3 per cent came from the United States, 13,198 tons from Germany, 10,874 tons from Belgium and 3850 tons from the United Kingdom. Largest items in 1928 were corrugated roofing sheets, 24,382 tons; railroad track material, 21,019 tons, steel bars or rods, 16,577 tons; and pipes and fittings. Of the corrugated roofing sheets imported, 24,056 tons came from the United States. America furnished 9882 tons of railroad track material; Belguim, 7719 tons; and Germany, 2348 tons. The United States supplied 12,638 tons of the imports of pipe and fittings.

Open-Hearth Capacity of Polish Mill Doubled

HAMBURG, GERMANY, Sept. 16.—The Friedenshütte A. G., Friedenshütte, Upper Silesia, Poland, the only important Polish steel plant in which American capital is not invested, has reorganized and expanded its capacity. The company has added six open-hearth furnaces, which will raise its output from 150,000 tons a year to more than 300,000 tons. Five of the furnaces are now in operation and the sixth, a 60-ton furnace, will be lighted in October.

A pamphlet entitled "Practical Aspects of Resuscitation" has been written by Edward Steidle, Dean of the School of Mines and Metallurgy, Pennsylvania State College, and published by Mine Safety Appliances Co., Pittsburgh.

Expansion in European Steel Mills

Several New Units in Operation—Pig Iron Prices Strong in Britain —Manganese Ore Plentiful—Italians Form Steel Cartel

(*By Cable*)

LONDON, ENGLAND, Sept. 30.

COKE prices are still advancing and sellers of Durham furnace coke are now asking 23s. 6d. ($5.70) per ton. Consequently pig iron prices are firm and Cleveland makers' quotations are unchanged. Midland furnaces, however, have advanced quotation 2s. 6d. (60c.) a ton on all grades.

Domestic demand is strong and good sales have been effected, but export is quiet, although inquiry is improving. Hematite iron is rather more active, but makers are not keen sellers at present prices, and some furnaces are piling their output in preference to selling.

Finished steel is generally quiet. The steel makers' association has reaffirmed prices, but advances are still being considered on the basis of increasing costs. Certain plate mills are well occupied while others, lacking orders for shipbuilding material, are seeking tonnage. Clyde launchings in September were 10 vessels of 28,000 tons, gross register.

Sales of Continental material here are dull despite declining prices. The International Steel Cartel has been prolonged until March 31, 1930, on the present basis. The International Rail Makers Association has reaffirmed prices.

Tin plate prices are strong as a result of sustained demand from consumers the world over buying for first quarter shipment at 19s. ($4.60) per base box, f.o.b. works port for large lots and 19s. 3d. ($4.66) per base box for small lots.

Galvanized sheet demand is slightly better, but mills are still in need of orders. Black sheets continue quiet.

The Ebbw Vale Steel, Iron & Coal Co. has issued notice of suspension to all iron and steel workers, about 4000 in all being affected. The chairman of the board states that foreign competition is the reason for closing the plant.

Luxemburg production in August was 252,000 metric tons of pig iron and 238,000 tons of raw steel. There were 38 furnaces in blast at the end of August.

Polish output in August was 65,000 metric tons of pig iron, 111,000 tons of raw steel and 80,000 tons of rolled steel.

The Saar output in August was 182,000 tons of pig iron and 192,000 tons of raw steel.

Russian output in August was 347,000 metric tons of pig iron, 400,000 tons of raw steel and 310,000 tons of rolled steel.

The Friedrich Krupp A. G., Essen, Germany, has laid off 1000, and the Rheinmetall A. G., 800 men.

British Pig Iron Prices Are Strong

Furnaces Still Claim Costs Leave Little Profit—Steel Market Quiet Except in Tin Plate

LONDON, ENGLAND, Sept. 17.—Business has not revived to any extent since the holiday period, but indications are that improvement will not be long delayed. Demand for pig iron has been consistently good during the past few months, and it appears that a considerable period of activity will ensue. With Continental iron no longer competitive in the British market, Cleveland furnaces are well engaged with domestic orders and have disposed of most of their October production. Scarcity and high cost of fuel still prevent a subtantial increase in output, but the number of furnaces in blast has increased steadily since May to the present total of 170, the largest since July, 1927.

Although Cleveland No. 3 foundry iron is at £3 12s. 6d. ($17.58) per ton, producers still complain that the margin of profit is too small. Hematite makers also seek higher prices, but each increase jeopardizes foreign business, which is most important to the hematite industry. Costs are in-

British and Continental European Export Prices per gross ton, f.o.b. United Kingdom Ports, Hamburg and Antwerp with the £ at $4.85

British Prices, f.o.b. United Kingdom Ports

Cleveland No. 3 foundry	£3	12½s.	to	£3	13½s.	$17.58	to	$17.82
East Coast hematite	3	16½	to	3	17	18.51	to	18.63
Ferromanganese, export	13	10	to	14	0	65.47	to	67.90
Billets, open-hearth	6	5	to	6	7½	30.31	to	30.92
Sheet bars, open-hearth	6	5	to	6	10	30.31	to	31.52
Black sheets, Japanese specifications	12	12½				61.22		
Tin plate, per base box	0	19	to	0	19¼	4.60	to	4.66
Rails, 60 lb. and heavier	7	15	to	8	15	37.59	to	42.43
						Cents per Lb.		
Steel bars, open-hearth	7	15	to	8	10	1.67	to	1.84
Beams, open-hearth	7	2½	to	7	12½	1.55	to	1.65
Channels, open-hearth	7	7½	to	7	17½	1.60	to	1.71
Angles, open-hearth	8	2½	to	8	12½	1.76	to	1.86
Ship plates, open-hearth	7	12½	to	8	2½	1.66	to	1.76
Black sheets, No. 24 gage	10	5	to	10	10	2.21	to	2.27
Galvanized sheets, No. 24 gage	13	7½	to	13	10	2.89	to	2.92

Continental Prices, f.o.b. Antwerp or Hamburg

Foundry iron, 2.50 to 3.00 per cent sil., 0.50 to 0.90 per cent phos.	£3	7s.	to	£3	10½s.	$16.24	to	$17.09
Foundry iron, 2.50 to 3.00 per cent sil. 1.00 per cent and more phos.	3	7	to	3	10	16.24	to	16.97
Billets, Thomas	4	14	to	4	14½	22.79	to	22.91
Sheet bars, Thomas	4	17½	to	5	0	23.64	to	24.25
Wire rods low C., No. 5 B.W.G.	6	5	to	6	6¼	30.30	to	30.61
Black sheets, No. 31 gage, Japanese	12	7½				60.02		
Rails, 60 lb. and heavier	6	8½	to	6	10*	31.16	to	31.52
Rails, light	6	1½				29.46		
						Cents per Lb.		
Steel bars, merchant	5	9½	to	5	10	1.18	to	1.19
Steel bars, deformed	5	8½	to	5	9	1.17	to	1.18
Beams, Thomas, British standard	5	0	to	5	4½	1.10	to	1.15
Channels, Thomas, American sections	5	14	to	5	18	1.24	to	1.27
Angles, Thomas, 4-in. and larger, over ⅝-in. thick	5	4				1.13		
Angles, Thomas, 3-in.	5	12				1.21		
Ship plates, open-hearth inspected	7	8				1.63		
Hoop and strip steel over 6-in. base	5	13	to	5	15	1.22	to	1.24
Wire, plain, No. 8 gage	7	4	to	7	5	1.58	to	1.59
Wire, galvanized, No. 8 gage	9	3	to	9	4	1.99	to	2.02
Wire, barbed, 4-pt. No. 12 B.W.G.	11	12½				2.58		
Wire nails, base	7	10	to	7	10½	$1.62	to	$1.63 per keg
Wire nails, assortments, 1 to 6-in. keg	10	6½				2.23		

*Open-hearth steel, 10s. ($2.42) per ton extra.

creasing, and it has been suggested that certain furnaces may be forced to suspend.

Finished iron and steel is still under the influence of the holidays. Inquiry is increasing, but the volume of new business is small, especially in heavy plates, as new tonnages from shipyards are slow to mature. Most of the shipyards are moderately well engaged, but there is little new tonnage to replace the old contracts being completed. The sheet market is quiet, but tin plate is active, with fall demand developing. Prices are strong, with a rising tendency, and mills are well sold ahead on the basis of restricted output. Overseas users are beginning to inquire for their 1930 requirements.

The recent report of the merger of Bolckow-Vaughn & Co. with Dorman, Long & Co., with a combined capital of about £20,000,000 ($97,000,000) has not been confirmed by any official statement from either company.

Italian Steel Cartel Is Formed

Includes 95 Per Cent of Producers — Not Expected to Affect Decision to Remain Out of International Cartel

ROME, ITALY, Sept. 13.—An Italian steel syndicate, which embraces about 95 per cent of the country's capacity, has been formed at the suggestion of the Government. A partial syndicate was established about one year ago, being organized as a stock corporation under the name of the Conzorzio Italiano delle Acciaierie e Ferriere. This syndicate included 16 corporations, which account for about two-thirds of the total national production. However, an important group, the Acciaierie e Ferriere Lombarde of Milan, refused to become a member and competition remained severe in the domestic market. This latter corporation has joined the new syndicate, and a more orderly market and rationalization of production are expected.

The steel industry of the country has 120 open-hearth furnaces and 60 electric furnaces with a total rated capacity of about 3,000,000 tons a year. Annual output, however, has never reached 2,000,000 tons. Production is spread over 40 steel works, and some of the minor companies produce less than 20,000 tons a year. Prices are high, partly because of uneconomic methods in some plants and partly on account of the general competition for supplies of raw material. With the new syndicate functioning, it is planned to buy all raw materials for members through a joint purchasing organization.

Each member company of the syndicate will be alloted a quota on the basis of its output of products and its rated capacity. It is believed that domestic prices will be advanced, and in some quarters increases of as much as 100 lire per ton are considered necessary. Italy's steel production was only 933,000 metric tons in 1913, but reached a high of 1,785,500 tons in 1925, after which it declined to 1,779,500 tons in 1926 and 1,594,500 tons in 1927. The total in 1928 was 1,692,632 tons.

Establishment of the syndicate is not expected to affect Italy's decision to remain outside the International Steel Cartel, since Italian production is claimed to be almost exclusively for domestic use. The pre-war syndicate of steel producers in Italy had certain relations with the pre-war German Stahlwerksverband, governing importation by Italy of German semi-finished material, structural shapes and rails, but the agreement was not renewed after the war.

Cartel Is Provisionally Renewed

(*By Radio*)

BERLIN, GERMANY, Sept. 30.

THE International Steel Cartel has been renewed provisonally until the end of March. No decisions were reached at the cartel meeting on the questions in dispute among the member countries, but prospect of a definite renewal is considered better. Production quotas of the cartel for the fourth quarter are unchanged.

Domestic prices of the German Steel Syndicate are unchanged for October. The home market is quiet, but production of iron and steel continues at the highest level since the war. Export trade is dull, except in semi-finished material, which is moving in good volume and firm prices to consumers in Great Britain. Export of pig iron to Belgium is also heavy.

Foreign demand for machinery and machine tools is active and machinery exports in August established a new high record.

Large Stocks of Manganese Ore in Caucasus

HAMBURG, GERMANY, Sept. 16.—The large manganese ore contract that the Russian Government recently closed with the United States Steel Corporation has directed the attention of Continental ore consumers to the greatly increased output of the Georgian mines since the Russian Government began operation, after terminating the contract with the Harriman interests in the United States. Operations have been greatly increased and stocks of manganese ore at Black Sea ports and at the mines are of record tonnage. As a result, German merchants dealing in manganese ore hesitate to buy in advance, apprehending that the Russian Government may find stocks so large as to necessitate "dumping," which would seriously affect the world market.

Stocks of manganese ore in Georgia in June are estimated to have been 500,000 metric tons. In arriving at an estimate it is pointed out that production in the fiscal year 1927-1928, was 304,000 tons, but from Oct. 1, 1928 to June 30, 1929, was 747,500 tons. Exports, however, increased from 203,000 tons in 1927-1928 to a total of 428,000 tons in the period from Oct. 1, 1928 to June 30, 1929. Consumption in Russia advanced from 73,000 tons in 1927-1928 to about 90,000 tons in the October-June period. Stocks at the mines and at ports in Georgia on Oct. 1, 1928, totaled about 200,000 tons.

Second New Krupp Stack Blown In

HAMBURG, GERMANY, Sept. 16.—The Friedrich Krupp A. G. has blown in the second of its new furnaces at Borbeck.

The company has practically completed construction of the largest cement plant in Russia at Gaiduk, Noworossisk, and has installed the machinery.

Recently the Siemens Halske A. G. received the contract to construct an entire automatic telephone system at Hankow, China, with exchanges in other Yangtse Valley cities.

German Exporters Expect More American Business

HAMBURG, GERMANY, Sept. 16.—Exporters of steel believe that the recent sharp reduction in the export prices of semi-finished material will bring increased orders from the United States. American consumers were substantial buyers of German semi-finished steel until the price advances in 1928, when this trade practically ceased.

Recently inquiries from the United States have been more numerous and some small lots have been booked by German mills. Exporters suggest that there is again a possibility of selling small tonnages of sheet bars, billets and skelp to American consumers near Gulf ports.

Output Per Furnace Up

HAMBURG, GERMANY, Sept. 16.—In the past few years German output per blast furnace has been raised materially through construction of larger stacks and abandonment of the older small-capacity furnaces. With 94 furnaces in blast at the end of August, 1925, production totaled 707,311 metric tons, while in August of this year with 95 furnaces in blast, production was 1,167,807 tons. It is expected that 20 or more old furnaces will be dismantled within the next year.

Machinery Markets and News of the Works

Tool Sales Slow Down

Cleveland Exposition This Week Expected, However, to Stimulate Business

SEPTEMBER machine tool sales failed to keep pace with those of August, and in some markets the decline was pronounced. However, the National Machine Tool Exposition in Cleveland this week is expected to stimulate buying, and builders agree that the outlook for fall business is favorable.

The respite in the steady flow of orders has been welcomed by machine tool plants, which have been compelled to push delivery dates farther ahead on account of the heavy accumulation of bookings. Despite the slowing down in activities, most shops have sufficient business on their books to maintain operations at full capacity until January or February.

The Continental Motors Co., Muskegon, Mich., has made purchases against its list. The Simmons Co., Kenosha, Wis., has placed orders for new press equipment at a cost of $250,000.

A northern Ohio manufacturer in the automotive field is inquiring for 20 to 30 tools. At Chicago dealers are quoting on a list of 17 machine tools for export to the Orient.

New York

NEW YORK, Oct. 1.—In the week preceding the opening of the National Machine Tool Exposition in Cleveland, sales of machine tools in the New York district turned sharply downward. There was a good volume of inquiry, however, and prospects continue good for the fourth quarter of the year. Considerable prospective business has admittedly been held up because buyers desired to inspect the machines to be shown at Cleveland before placing orders. One pending order for about $80,000 worth of tools probably will be placed shortly after the end of the Cleveland show. Requirements of the Amtorg Trading Corporation for a new tractor works in Soviet Russia are a feature of current demand.

Contract has been let by Cutler-Hammer Mfg. Co., 8 West Fortieth Street, New York, manufacturer of electrical control equipment and devices, to Barney-Ahlers Construction Corporation, 110 West Fortieth Street, for six-story addition to plant at Southern Boulevard and 144th Street, 90 x 150 ft., to cost about $300,000 with equipment. Headquarters and main plant are at Milwaukee.

Edward Victor, New York, has leased building at 38-44 West 144th Street, for machine and automobile repair shop.

Apollo Magneto Corporation, Kingston, N. Y., manufacturer of magnetos and kindred products, has acquired plant and business of Automatic Motor Control Corporation, 4-06 Astoria Avenue, Long Island City, and will consolidate. Equipment will be removed to Kingston where production will be concentrated and works will be extended to accommodate increase.

New York Belting & Packing Co., 91 Chambers Street, New York, manufacturer of mechanical belting, etc., will erect four-story and basement addition to plant at Passaic, N. J., to cost over $250,000 with equipment. Lockwood Greene Engineers, Inc., 100 East Forty-second Street, New York, is architect and engineer.

Safe-Guard Check Writer Corporation, 5 Beekman Street, New York, manufacturer of check protecting devices and equipment, has purchased property and business of Hercules Check Certifier Co., New York, and will consolidate. Expansion is planned.

William A. Lacerenza, 26 Court Street, Brooklyn, architect, has plans for a one-story automobile service, repair and garage building, to cost about $100,000 with equipment.

Rainbow Luminous Products Co., affiliated with Rainbow Light, Inc., 21-43 Forty-fourth Road, Long Island City, manufacturer of electric tube lighting equipment, is planning expansion to develop new specialties, including aviation beacons, white light tubes for interior lighting, etc. Company has secured financing for work. Raymond R. Machlett is president.

United Electric Coal Companies, Inc., 52 Vanderbilt Avenue, New York, is arranging for purchase of Electric Shovels Coal Corporation and affiliated interests, operating coal properties in Indiana, including surface mining by electric shovels. An expansion program is proposed.

City Council, Mount Vernon, N. Y., will soon begin superstructure for a one-story municipal service, repair and garage building for city-owned motor trucks and cars, to cost $100,000 with equipment.

American Bread Wrapper Co., 361 East Ohio Street, Chicago, manufacturer of processed paper wrappers, has leased space in new Bronx terminal of Lehigh Valley Railroad, New York, for factory branch and distributing plant.

Industrial Welded Alloys, Inc., a subsidiary of Industrial Alloy Products Corporation, Newark, Wallace C. Johnson, president, has taken over former local plant of Titan Steel Co., Lister Avenue, for new plant. Property consists of factory units totaling 75,000 sq. ft. floor space. A fabricating and machine shop will be operated for manufacture of stainless steel pressure vessels, pipe condensers, digesters, etc., with foundry for production of stainless steel and other alloy castings.

Harnischfeger Corporation, Milwaukee, and Eastern organization known as Harnischfeger Sales Corporation, 50 Church Street, New York, have leased one-story building totaling 12,000 sq. ft. floor space, to be erected at Hoboken, N. J. It will be equipped as main Eastern factory branch for assembling, repairing and distributing cranes, steam shovels and other hoisting machinery manufactured at Milwaukee plant, to cost more than $40,000.

Board of Education, Essex County Vocational Schools, Hall of Records, Newark, has rejected bids recently received for new three-story boys' vocational school at Bloomfield, N. J., to cost about $500,000 with equipment, and will take new bids soon on revised plans. Guilbert & Betelle, 24 Branford Place, are architects.

Newark Rivet Works, Inc., 262 Lafayette Street, Newark, has awarded general contract to William L. Blanchard, 972 Broad Street, for four-story addition, 100 x 100 ft., to cost over $80,000 with equipment. Victor H. Strombach, 1285 Stuyvesant Avenue, Union, N. J., is architect.

Sylentlyte Corporation, New York, has been formed with capital of 600 shares of no par value common stock to import automobile bodies made by Hibbard & Darrin, Paris, France. Bodies are made entirely of Bohn aluminum. Later they may be manufactured in United States. Offices of company will be at 20 East Fifty-seventh Street, New York, but temporarily all communications should be addressed to William May Wright of Wright, Slade & Co., 71 Broadway, New York.

New England

BOSTON, Sept. 30.—With interest of both buyer and seller focussed on the machine-tool show at Cleveland this week, the New England market is practically at a standstill. No new tools of importance have been sold, and sales of used tools were scattered.

Small tools continue active and deliveries are growing more extended.

W. L. Blake Co., 79 Commercial Street, Portland, Me., mill supplies, has started work on a one-story pipe shop, 80 x 100

ft. Cutting and miscellaneous equipment will be needed.

Samuel Galkin Co., 60 South Water Street, Providence, operating an automobile sheet metal works, is about to start work on a one-story and basement repair shop addition, 46 x 100 ft. Punches and shearing tools may be purchased.

Salem Electric Co., Salem, Mass., has plans for a power house on former Philadelphia & Reading Coal Co. wharf. Details are lacking, but handling equipment will be purchased.

Turners Falls Power & Electric Co., Turners Falls, Mass., has started work on a power station unit, 32 x 95 ft., to cost $50,000 without equipment.

Anglo-American Textile Machinery Co., Abington, Mass., has plans for a one-story addition, 30 x 100 ft., for one unit and a similar addition for another unit. Special machinery will be purchased.

Reed-Prentice Corporation, Cambridge Street, Worcester, Mass., manufacturer of machine tools, has awarded general contract to E. J. Cross Co., 82 Foster Street, for one-story addition, 65 x 150 ft., to cost about $50,000 with equipment.

Associated Gas & Electric Co., 61 Broadway, New York, has work under way on addition to artificial gas plant at Worcester, Mass., to have capacity of 7,000,000 cu. ft. carbureted gas per day, to cost over $500,000 with line extensions. Company is also carrying out expansion at Plattsburg, N. Y., where new artificial gas unit of 600,000 cu. ft. capacity will be installed and new distributing lines constructed.

Walworth Co., Statler Building, Boston, manufacturer of valves, steam specialties, etc., has purchased plant and business of Westcott Valve Co., East St. Louis, Ill., and will consolidate. Westcott plant will be continued for Middle West factory branch, and expansion carried out.

Hawie Mfg. Co., 729 North Washington Avenue, Bridgeport, Conn., manufacturer of wire goods, sheet metal buckles, etc., has filed plans for a one-story addition, 50 x 89 ft., to cost about $24,000 with equipment.

Board of Education, Woburn, Mass., will install manual training department in new one- and three-story high school to cost about $600,000, for which plans have been filed.

American Reinforced Paper Co., Starkey Avenue, Attleboro, Mass., has awarded general contract to C. K. Rathbone, Hospital Trust Building, Providence, for one-story addition, 45 x 175 ft., to cost about $45,000. Charles T. Main, Inc., 201 Devonshire Street, Boston, is architect.

Plainville Electro-Plating Co., Plainville, Conn., has begun construction of one-story plant, to cost about $20,000 with equipment.

Detroit Radio Products Corporation, 1040 West Fort Street, Detroit, has leased space in former plant of Everett Mills, Lawrence, Mass., for branch plant.

Buffalo

BUFFALO, Sept. 30.—Contract has been let by Rollway Bearing Co., 541 Seymour Street, Syracuse, N. Y., manufacturer of metal bearings to Hemmer Co., 315 Sunset Avenue, for one-story addition, to cost about $30,000 with equipment.

Officials of Columbus-McKinnon Chain Co., Tonawanda, N. Y., manufacturer of steel and iron chains, etc., have organized a company under same name, with capital of 30,000 shares of stock, no par value, to take over and expand local plant. New company is headed by Julius F. Stone, 1062 Westwood Avenue, Columbus, Ohio; Julius F. Stone, Jr., and Frank T. Stone, Tonawanda.

Union Free School District No. 6, Ellicott, N. Y., is said to be planning installation of manual training equipment in two-story high school at Falconer, N. Y., to cost about $240,000, for which bids have been asked on general contract. R. A. Freeburg, Hotel Jamestown Building, Jamestown, N. Y., is architect.

Consolidated Aircraft Corporation, 2050 Elmwood Avenue, Buffalo, has acquired Fleet Aircraft Corporation, Buffalo, and will consolidate. Fleet plant will be continued in service and capacity increased from two to three planes daily. Company has also purchased a substantial interest in Kinner Airplane & Motor Corporation, Glendale, Cal., and will be active in management of that organization, which will develop larger capacity. Lawrence D. Bell is vice-president.

Houde Engineering Corporation, 537 East Delavan Avenue, Buffalo, manufacturer of shock absorbers, a subsidiary of Houdaille-Hershey Corporation, same address, is arranging an expansion program to cost $200,000. Majority of fund will be used for purchase of new equipment. Parent organization is also making additions to plants of General Spring Bumper Corporation, Chicago and Decatur, Ill., another unit.

Philadelphia

PHILADELPHIA, Sept. 30.—Bids will be asked in about 30 days by F. G. Vogt & Sons, Inc., Thirtieth and Race Streets, Philadelphia, meat packer, for three- and four-story plant, to cost $1,000,000 with equipment; a refrigerating plant will be installed. C. B. Comstock, 110 West Fortieth Street, New York, is architect and engineer.

Paper Manufacturers' Co., Fifth and Willow Streets, Philadelphia, manufacturer of paper products, has awarded general contract to Edwin E. Hollenback, Inc., 1910 North Marshall Street, for new plant unit, to cost $50,000 with equipment. Clarence E. Wunder, 1520 Locust Street, is architect.

Lamont Gear & Machine Co., Inc., 2631 West Oxford Street, Philadelphia, has leased a part of building at Rising Sun Avenue and Bristol Street for parts production and assembling.

Board of Education, Nineteenth and Ludlow Streets, Philadelphia, is considering installation of manual training equipment in new four-story and basement junior high school at Thirty-third and Tasker Streets, to cost $1,200,000, for which plans are being completed by Irwin T. Catharine, architect for board, address noted.

Sol J. Maschke, 6244 Chestnut Street, Philadelphia, and associates have organized Rusticraft Fence Co., with capital of $100,000, to operate a plant at Malvern, Pa., to manufacture iron and other metal fencing, garden and farm furniture, etc. Samuel H. Tendler, 5459 Euclid Avenue, Philadelphia, is interested in new organization.

Good Lines, Inc., Camden, N. J., care of O. H. Higginbotham, Camden, recently formed by Mr. Higginbotham and associates, has purchased five-acre tract at Hi-Nella, N. J., as site for new plant to manufacture airplanes. Departments for parts production and assembling will be installed. Plans will be drawn at once. Plant will cost more than $65,000 including equipment.

Board of Education, Bridgeton, N. J., plans installation of manual training equipment in new two-story junior high school to cost $400,000, for which bids have been asked on general contract. Edwards & Green, 548 Federal Street, Camden, N. J., are architects.

Modern Utilities Co., Paxton Street, Harrisburg, Pa., manufacturer of floor plates for fitting around radiator and steam pipes, scales for measuring pipe lines, levels, etc., is planning expansion, increasing capacity of present plant to concentrate production at that place, discontinuing out-of-town manufacture and assembling at Harrisburg. Work will cost more than $50,000 with equipment. Grover C. Frantz is head.

Standard Oil Co. of Pennsylvania, Inc., Sixth and Chestnut Streets, Philadelphia, is planning new oil storage and distributing plant at Lancaster, Pa., to cost about $140,000 with equipment.

Inland Utilities, Inc., Harrisburg, Pa., operating water and gas properties in Pennsylvania and West Virginia, is disposing of new bond issue of $3,250,000, part of proceeds to be used for extensions and improvements in plants and systems.

South Atlantic

BALTIMORE, Sept. 30.—Contract has been let by Flynn & Emrich Co., 301 North Holliday Street, Baltimore, manufacturer of mechanical stokers, parts, etc., to C. W. Schmidt, Hearst Tower Building, for one-story addition, to cost $75,000 with equipment. W. S. Austin, Maryland Trust Building, is architect and engineer.

Davison Chemical Co., Garrett Building, Baltimore, manufacturer of commercial fertilizers, acids, etc., has acquired 15 acre tract on Houston ship channel, Houston, Tex., as site for new plant, including machine shop, boiler house and other structures, to cost about $850,000 with machinery. Company operates a subsidiary under name of Davison-Pick Fertilizers, Inc., Whitney Building, New Orleans, with plants at New Orleans, and Orange, Tex.

Carolina-Virginia Power Co., Roanoke Rapids, N. C., has applied for permission to construct a hydroelectric generating plant on Roanoke River, about 20 miles from city, where site has been secured, to have initial capacity of 30,000 hp. Transmission lines will be built for connection with system of Virginia Electric & Power Co., Richmond, which will use large part of output. Project will cost over $700,000.

Tide Water Oil Sales Corporation, Court Square Building, Baltimore, a subsidiary of Tide Water Oil Corporation, 11 Broadway, New York, will take bids in about 30 days for second unit of storage and distributing plant at Wagners Point, to cost more than $150,000 with equipment.

Curtiss Airports Corporation, 27-29 West Fifty-seventh Street, New York, has awarded contract to Engstrom & Wynn, 1117 Chapline Avenue, Wheeling, W. Va., for two-story hangar, 100 x 120 ft., at Baltimore, to include reconditioning and repair department, to cost about $80,000 with equipment. Kenneth Franzheim, 345 Madison Avenue, New York, is architect.

Horace E. Dodge Boat & Plane Co., 3 East Fifty-second Street, New York, Horace E. Dodge, president, recently organized to manufacture motor boats, flying boats and amphibian planes, has engaged Philip L. Small & Associates, Terminal Tower Building, Cleveland, architects and engineers, to prepare plans and supervise construction of new plant

on 100 acre tract at Newport News, Va., recently acquired, to cost about $1,000,000 with equipment. Company will take over and succeed to Horace E. Dodge Boat Works, Inc., 614 Lycaste Avenue, Detroit, and will remove plant to new location, where increase in present output will be carried out. J. Gilmore Fletcher is vice-president, and William M. Horne, secretary and treasurer.

Georgia Power Co., Atlanta, Ga., has plans for construction of new hydroelectric generating station on Oconee River at Purman Shoals, about four miles from Milledgeville, Ga., with initial capacity of 60,000 hp., divided into two 30,000 hp. generating units. Project will include transmission system to connect with present lines of company, and will cost more than $1,000,000.

City Council, Griffin, Ga., E. P. Bridges, city manager, will receive bids until Oct. 10 for equipment for new water supply development, including electric-operated pumping machinery with accessories, 300,000 gal. capacity steel standpipe, etc. Robert & Co., Inc., Bona Allen Building, Atlanta, Ga., is engineer.

Chicago

CHICAGO, Sept. 30.—Of special interest in local machine-tool trade circles is a list of 17 machines for export to the Orient. Progress is said to have been halted on the Pullman company's list for its Buffalo plant. Additional purchases have been made against the requirements of Continental Motors Corporation, Muskegon, Mich. Preliminary steps are being taken by a farm implement manufacturer to enter the market in a large way later this year. Railroad inquiry is confined to a request from the Illinois Central which is asking for prices on a 5-ft. radial drill. Simmons Co., Kenosha, Wis., has recently placed orders for new press equipment that aggregate close to $250,000.

As a whole September has been a profitable month for most sellers. Orders for large and small tools have been scattered, but the aggregate was good volume. Sales quotas in most instances were passed soon after the middle of the month.

The list for export to the Orient follows:

One 20-in. drill
One 20-in. shaper
One No. 2 key slotter
One 6-in. x 6-in. hack saw
One 24-in. and one 12-in. lathes
One 6-in. pipe machine
One sensitive drill
One 8-ft. steel break
One slitting shear
Two ¾-in. punches, one 24-in. throat and one 30-in. throat
One plate bending roll
One 40-lb. hammer
One tool and drill grinder
One 62-in. boring mill
One universal miller

Ingalls-Shepard Division of Wyman Gordan Co., Harvey, Ill., has started erection of an addition to house a heat-treating department.

Injunction halting construction of North Shore Foundry, Greenfield Avenue, North Chicago, has been dissolved by court action.

Hafner Mfg. Co., Chicago, maker of mechanical toys, has purchased site, 100 x 300 ft., on Kolmar Avenue, for one-story factory. Austin Co. is drawing plans.

The Crane Market

NEW inquiry for overhead cranes is small, but some substantial orders are pending award. A recent inquiry includes four 10-ton electric cranes for a plant in Chattanooga, Tenn. Among locomotive crane inquiries is one from the Baltimore & Ohio Railroad for two 25-ton, Diesel-driven cranes. Fay, Spofford & Thorndyke, Boston, consulting engineers, have been accepting bids on two 10-ton and two 20-ton, electric overhead cranes for the cast iron pipe foundry to be erected at Chelsea, Mass., for the Intercontinental Pipe & Mining Co. The National Tube Co., Chicago, is inquiring for a sizable list of electric traveling cranes.

Among recent purchases are:

Amtorg Trading Corporation, New York, 20-ton, 48-ft. span, hand power crane from Box Crane & Hoist Corporation.

Delaware, Lackawanna & Western Railroad, New York, four 5-ton, 26-ft. span hand power cranes for sub-stations at Newark, Summit, Kingsland and Denville, N. J., from Box Crane & Hoist Corporation.

General Electric Co., Schnectady, N. Y., two 10-ton electric cranes from unnamed bidder.

W. W. Jourdin Co., New York, 10-ton, 48-ft. span hand power crane from Box Crane & Hoist Corporation.

Edison Electric Appliance Co., Chicago, 10-ton, 61-ft. span overhead electric crane from unnamed bidder.

International Harvester Co., West Pullman, Ill., 15-ton, 113-ft. span electric crane from Whiting Corporation.

Broderick Co., Muncie, Ind., 20-ton, 60-ft. span electric crane from unnamed bidder.

Onsoud Machine Works, Chicago, 10-ton, 38-ft. span overhead electric crane from Whiting Corporation.

Rundle Mfg. Co., Milwaukee, 5-ton, 80-ft. span and 3-ton, 23-ft. span overhead electric cranes from Milwaukee Electric Crane & Mfg. Corporation.

Faith Mfg. Co., 2531-33 North Ashland Avenue, Chicago, manufacturer of die castings, etc., has awarded contract to W. Maedge, 5033 North Kostner Avenue, for a two-story plant, 120 x 145 ft., to cost about $70,000 with equipment.

Standard Oil Co., Main Street, Decatur, Ill., has plans for one-story storage and distributing plant at Robinson, Ill., to cost about $50,000 with equipment.

City Council, Duluth, Minn., has plans for steam power plant for central heating service in downtown district, to cost about $850,000 with equipment. W. J. Sullivan, Palladio Building, is architect.

Chicago, Rock Island & Pacific Railroad Co., 179 West Jackson Boulevard, Chicago, has awarded general contract to A. H. Neumann & Co., Hubbell Building, Des Moines, Iowa, for addition to local engine house, with repair facilities, to cost $65,000. A. T. Hawks is chief engineer.

Flour City Ornamental Iron Works, Inc., 2637 Twenty-seventh Avenue, South, Minneapolis, will soon begin superstructure for two-story addition, 60 x 100 ft., for which general contract recently was let to Piper, Drake & Schumacher, Baker Building, to cost about $45,000 with equipment.

International Tool & Engineering Co., 1910 Kedzie Avenue, Chicago, has asked bids on general contract for one-story unit, to cost about $30,000 with equipment. C. E. Frazier, 64 West Randolph Street, is architect. O. B. Bensen is president.

Chicago, Milwaukee, St. Paul & Pacific Railroad Co., Third Avenue, South, and Washington Street, Minneapolis, Minn., has plans for addition to local engine house, with repair facilities, to cost more than $80,000 with equipment. Arthur Daniels is district engineer.

Gardner-Denver Co.'s plant addition at Quincy, Ill., will be ready for occupancy Dec. 1. Company manufactures slush pumps, air compressors, rock drills, drill sharpeners and high-pressure drill steel forges. It has other plants at Denver, and La Grange, Mo.

Pittsburgh

PITTSBURGH, Sept. 30.—Machine-tool business has been rather quiet the past week, but inquiries are coming out regularly and orders are expected to improve materially after the machine-tool show in Cleveland. The list of the Westinghouse Electric & Mfg. Co. will be issued this week and it is expected to fully equal the usual quarterly requirements of that company. Railroad buying still lags, but improvement is looked for as the carriers are announcing heavy fall inquiries for rails and cars, and plan to be busy in their own shops also.

Deliveries of machine tools and heavy machinery are considerably delayed by many companies and local dealers are unable to bid on inquiries on which they would ordinarily be interested. Plant extensions in the Youngstown district are expected to require heavy quotas of tools and equipment and some large projects in the Pittsburgh area are quickly reaching the buying stage.

Contract has been let by Titusville Iron Works, Inc., Titusville, Pa., to Austin Co., Cleveland, for one- and two-story addition, 50 x 150 ft., to cost more han $100,000 with equipment.

Pittsburgh Metal Airplane Co., Pittsburgh, organized a few months ago by officials of Pittsburgh Aviation Industries Corporation, and now occupying part of former plant of American Car Co., will increase facilities for manufacture of all-metal cabin aircraft. Company has recently acquired Thaden Metal Aircraft Co., San Francisco, which has been removed to Pittsburgh where production will be concentrated. H. V. Thaden is chief engineer.

West Penn Power Co., West Penn Building, Pittsburgh, is arranging for a preferred stock issue to total $9,000,000, part of fund to be used for extensions and improvements in power properties and systems in western Pennsylvania and West Virginia.

Iroquois Gas Co., Oil City, Pa., subsidiary of National Fuel Gas Co., is carrying out expansion, to include construction of about 75 miles of new high-pressure transmission pipe lines, and 65 miles of low-pressure lines. Company has also acquired oil and natural gas lands in Cataraugus, Wyoming and Allegheny counties for development.

Fairmont Mining Machinery Co., Tenth Street, Fairmont, W. Va., is planning one-story addition to structural shop for fabricated steel production, one-story addition to foundry, and enlargements in machine shop. A new overhead traveling crane system will be installed. En-

tire program will cost about $100,000 including equipment.

City Council, Huntington, W. Va., has plans for a new hangar of six-plane type at municipal airport, with repair and reconditioning facilities, to cost about $50,000 with equipment. Louis Stone is field manager.

Pennsylvania Pipe Thread Protector Co., Pittsburgh, recently formed by Maurice M. Cavitt, 806 Heberton Avenue, and associates, is considering operation of local plant to manufacture pipe thread protectors, pipe fittings and kindred specialties. Company is capitalized at $50,000. Martin J. Roeser, 4743 Baum Boulevard, is interested in new organization.

Direct Flush Tank Co., Huntington, W. Va., has been incorporated to hold patent rights on a flush tank designed by D. F. Tracey. Company is soliciting inquiries from manufacturers who can furnish sheet metal and cast iron enameled tanks, vitreous porcelain tanks, brass flush valves, brass syphons and other metal parts. Communications should be addressed to D. F. Tracey, Box 55, Huntington.

Cleveland

CLEVELAND, Sept. 30.—The falling off in machine-tool sales, previously noted, has become more general, the slackening in orders having extended to some manufacturers who had not been affected by the lull. September sales showed a sharp decline as compared with August. Deliveries of some lines are beginning to show some improvement Manufacturers are not much concerned over the slowing down as the majority have good backlogs of orders.

An inquiry for 20 to 30 machines from a northedn Ohio manufacturer in the automotive field came out the past week. The prospective buyer may purchase used machinery. A fair amount of business is in prospect in single tool orders, but most of this is being held until after the machine-tool show this week.

Wheeler Metal Products Corporation, 1637 Collamer Avenue, Cleveland, has awarded contract to Austin Co. for a one-story addition, 80 x 300 ft. Company will extend its products to include heavy steel stampings and will use new building for steel stamping plant and other manufacturing purposes.

Osborn Mfg. Co., Cleveland, will erect an addition, 49 x 106 ft.

John Harsch Bronze & Foundry Co., manufacturer of brass, bronze, aluminum and manganese castings, Cleveland, states that it does not intend to build a new plant in near future, as reported recently in these columns. Company says that it will not build for at least two years.

Plans are being completed by Toledo Pipe Threading Machine Co., 1445 Summit Avenue, Toledo, Ohio, manufacturer of machine tools, for a two-story addition, to cost about $50,000 with equipment. Mills, Rhines, Bellman & Nordhoff, Ohio Building, are architects and engineers.

Sterling Grinding Wheel Co., Tiffin, Ohio, manufacturer of grinding wheels and other abrasive materials, has asked bids on general contract for a one-story addition, to cost about $45,000 with equipment. George S. Rider Co., Century Building, Cleveland, is architect and engineer.

Youngstown Radio, Lamp & Novelty Co., Scienceville Road, Youngstown, manufacturer of radio equipment, metal products, etc., has plans for a one- and two-story plant, to cost about $30,000 with equipment. Zenk & Campbell, 120 Wood Street, are architects.

National Lime & Stone Co., Bluffton, Ohio, is planning to rebuild part of quarry and mill destroyed by fire Sept. 19.

Dauntless Coal Co., Saltillo, Ohio, is planning expansion, including installation of mining machinery and surface equipment.

Columbia Axle Co., 852-76 East Seventy-second Street, Cleveland, manufacturer of automobile axles, etc., is considering one-story addition, to cost about $40,000 with equipment.

P. E. Hart, Akron, Ohio, and associates have organized Snyder-Hart Co. to manufacture radio equipment and parts. Former local mill of American Tire & Rubber Co. will be remodeled for initial plant. Floyd C. Snyder, Massillon, Ohio, is president.

Department of Parks and Public Property, City Hall, Cleveland, R. L. Harding, director, has plans for one-story municipal automobile service, repair and garage building, to cost about $100,000 with equipment. H. Kregelius, City Hall, is city architect.

St. Louis

ST. LOUIS, Sept. 29.—Woods Brothers, inc., 407 Security Building, Kansas City, Mo., manufacturer of airplanes and parts, is considering plans for new one-story plant at St. Joseph, Mo., for parts production and assembling, to cost about $55,000 with equipment. G. E. Stanley is one of heads of company in charge.

Central Brass & Aluminum Foundry Co., 503 South Twenty-first Street, St. Louis, has filed plans for a one-story addition, 33 x 60 ft., to cost about $20,000 with equipment.

National Garage Co., 1220 West Sixty-second Street, Kansas City, Mo., Harry A. Rubin, president, has plans for a six-story and double basement service, repair and garage building, 115 x 155 ft., with foundations to carry six additional stories, to cost more than $500,000 with equipment. Charles A. Smith, Finance Building, is architect.

Common Council, Galt, Mo., has approved plans for a municipal electric light and power plant, to cost about $35,000 with equipment. Rollins Engineering Co., Railway Exchange Building, Kansas City, Mo., is engineer.

Pittsburgh Equitable Meter Co., 400 Lexington Avenue, Pittsburgh, manufacturer of gas meters, parts, etc., has plans for one-story factory branch and distributing plant at Tulsa, Okla., 50 x 150 ft. to cost about $65,000 with equipment. Rush, Endacott & Goff, New Wright Building, Tulsa, are architects. A. J. Kerr, Kennedy Building, is local manager.

Ryan Aircraft Corporation, Lambert-St. Louis Flying Field, St. Louis, manufacturer of airplanes and parts, has plans for new one-story unit for parts production and assembling, to cost about $90,000 with equipment, near present plant or at Parks Airport, East St. Louis, Ill. Company is subsidiary of Aircraft Development Corporation, Union Trust Building, Detroit.

Curtiss Flying Service, Inc., Britton, Okla., B. S. Graham, local manager, with headquarters at 27-29 West Fifty-seventh Street, New York, has plans for new hangar, 100 x 120 ft., at local airport, with two-story reconditioning and repair shop adjoining, to cost $75,000 with equipment. M. L. Russell Co., Britton, is engineer.

DeCamp Consolidated Glass Casket Co., Muskogee, Okla., J. W. DeCamp, president, is considering three-story addition, 75 x 150 ft., to cost more than $90,000 with equipment.

Forrest City Cotton Oil Co., Forrest City, Ark., is planning one-story addition to cottonseed oil mill, to cost about $55,000 with equipment. Philip Hickey is general manager.

Ovens, power equipment, conveying and other machinery will be installed in four-story baking and coffee roasting plant to be erected by Bird Stores, Inc., 2101 Broadway, Kansas City, Mo., to cost about $220,000. Contract for superstructure has been let to John T. Thompson Construction Co., Huntzinger Building. Archer & Gloyd, Pioneer Trust Building, are architects; Hans von Unwerth, Finance Building, is mechanical engineer.

Fort Smith Gas Co., Fort Smith, Ark., is contemplating construction of pipe line from natural gas field at Lavaca to city limits, to cost about $100,000 with pressure stations, etc. A. Graham Williams is general manager.

Davis Boring Tool Co., 6200 Maple Avenue, St. Louis, has been incorporated to take over business of Davis Boring Tool Co., division of Larkin Packer Co., manufacturer of standard and special boring tools, blocks, cutters and reamers. B. J. Jostrand is secretary.

Detroit

DETROIT, Sept. 30. — North-Moeller Co., West Cortland Avenue, Jackson, manufacturer of grinding wheels and other abrasive materials, has awarded general contract to Macklin Co., Wildwood Avenue, for one-story addition, to cost about $60,000 with equipment.

Hastings Mfg. Co., Hastings, manufacturer of automobile equipment and accessories, will erect one-story addition, 65 x 320 ft., to cost more than $85,000 with equipment.

City Council, Battle Creek, plans extensions at Kellogg municipal airport, including construction of several new hangars, with shop and reconditioning facilities and other field units, to cost more than $80,000 with equipment.

Koestlin Tool & Die Co., 3601 Humboldt Avenue, Detroit, is taking bids on general contract for one and two-story addition, 65 x 120 ft., to cost about $60,000 with equipment. Muller & Krecke, American Radiator Building, are architects.

United Brass & Aluminum Mfg. Co., Port Huron, is considering rebuilding, part of plant recently destroyed by fire.

Venton Steel Sash Co., Sixth Street, Muskegon, manufacturer of steel sash doors, etc., has rejected bids for two one-story additions, and will have revised plans drawn at once, entire project to cost about $80,000 with equipment. A. A. Wickland & Co., 205 West Wacker Drive, Chicago, are architects.

Grand Trunk Railway Co., 400 East Jefferson Street, Detroit, is completing plans for electrification of four-track road from Detroit to Pontiac, to cost more than $2,500,000 with equipment.

Chrysler Corporation, 12200 East Jefferson Street, Detroit, has approved plans for a one-story machine shop 150 x 160 ft., to cost about $85,000 with equipment.

Detroit Steel Products Co., Mound and Lynch Roads, Detroit, has begun erection of new plant group to cost more than $500,000 with equipment. Work will in-

clude one-story power plant. Smith, Hinchman & Grylls, Marquette Building, are architects and engineers.

Board of Trustees, State of Michigan College of Mining and Technology, Houghton, will soon take bids for three-story addition to mechanical and electrical engineering building, to cost $340,000 with equipment. Derrick Hubert, 801 Sheridan Road, Menominee, is architect.

City Council, Allegan, Mich., has plans for municipal hydroelectric generating station, to cost about $500,000 with equipment, and will proceed with project at early date. Ayres, Lewis, Norris & Mays, Ann Arbor, are engineers.

Saginaw Foundries Co., Saginaw, Mich., has been incorporated with capital of $200,000 to manufacture electric steel and gray iron castings. It has taken over a plant containing a gray iron foundry and is remodelling part of building for production of electric steel castings. Company should be addressed care of Wickes, Stork & Pletscher, Saginaw.

Milwaukee

MILWAUKEE, Sept. 30.—Sales of machine tools are holding up to the recent level, but the volume of inquiries has fallen off. Manufacturers of agricultural implements and tractors are at nearly peak production. There is still a shortage of skilled mechanics.

Caswell Mfg. Co., 1000 St. Paul Avenue, Milwaukee, maker of portable electric phonographs, electrical pickups and other specialties, has leased a floor at 470-488 Virginia Street, about 20,000 sq. ft., for expansion.

H. W. Buemming, architect, 521 Jackson Street, Milwaukee, is taking bids for a three-story and basement factory, 63 x 134 ft., at West Allis, for Christian Hansen's Laboratories, Little Falls, N. Y. Two boilers, 10,000-gal. tank and cold storage facilities will be installed.

L. C. Hirshheimer, Inc., La Crosse, Wis., gray iron castings, has under construction first unit of a new plant, 80 x 180 ft., to cost $50,000.

Great Lakes Coal & Dock Co., Superior, Wis., will build dock No. 2 at Allouez Bay to cost about $500,000. M. J. Bartelme is superintendent and Roland C. Buck, Inc., United States National Bank Building, Superior, is engineer.

Indiana

INDIANAPOLIS, Sept. 30. — Contract has been let by Horat Brothers Machine co., Ferry Street, Lafayette, manufacturer of machinery and parts, to Schroyer & Parker, Farmers' & Traders' Bank Building, for one-story addition, 60 x 100 ft., to cost about $24,000 with equipment.

Bendix Aviation Corporation, South Bend, manufacturer of accessories for airplanes and automobiles, has approved an expansion program to cost more than $600,000, including erection of several multi-story factory units, one-story foundry, housing development for employees and other work. It is understood that part of new buildings will be used for affiliated organizations, including Bendix Brake Corporation.

Hartford City School Board, Hartford City, has plans for a new vocational training school, to cost about $100,000 with equipment. Houck & Smenner, 108 East Washington Street, Muncie, are architects.

Capehart Automatic Phonograph Co., East Pontiac Street, Fort Wayne, has taken bids on general contract for one-story addition for assembling and other work, to cost about $35,000 with equipment. Charles R. Weatherhogg, 250 West Wayne Street, is architect.

Bunnell-Moorhan Motors, Inc., 598 Hohman Street, Hammond, has plans for two-story service, repair and garage building, to cost $140,000 with equipment. L. C. Bernard, First Trust Building, is architect.

Board of Trustees, Indiana University, Bloomington, plans rebuilding part of power plant destroyed by fire Sept. 24.

Gulf States

BIRMINGHAM, Sept. 30.—Contract has been let by Cameron Iron Works, Inc., 711 Milby Street, Houston, Tex., to Truscon Steel Co., 1701 Oliver Street, for one-story unit, 100 x 102 ft., to cost about $35,000 with equipment.

Markle Steel Co., Shepherd Street, Houston, Tex., has plans for one-story shop addition, 100 x 125 ft., to cost about $75,000 with equipment. Giesecke & Harris, Second National Bank Building, are architects.

Company has been organized at Mount Calm, Tex., Hill County, under direction of local Commercial Club, H. M. Keeling, secretary, to construct an oil refinery on local site. Initial unit will be equipped to handle about 500 bbl. of crude oil per day, and will be supplemented with other units later, entire project to cost more than $150,000 with machinery. R. C. Pool, cashier of First National Bank, Mount Calm, and L. D. Mitchell, San Antonio, Tex., are interested in project.

Alabama Power Co., Birmingham, is arranging for expansion at Gadsden, Ala., to include installation of new equipment in power substations and switching plants, and construction of transmission lines; electric traveling cranes will be installed. Project will cost more than $450,000.

Continental Gin Co., Fourth Avenue South and Forty-sixth Street, Birmingham, manufacturer of cotton-ginning machinery, parts, etc., has awarded general contract to D. T. Underwood, Pioneer Building, for three-story addition for storage and distribution, 81 x 200 ft., to cost about $100,000 with equipment.

Orleans Parish School Board, City Hall Annex, New Orleans, will install manual training department in new three-story school to be erected at Algiers, to cost over $175,000, for which bids are being asked on general contract until Oct. 11. E. A. Christy is supervising architect for board.

Food Machinery Corporation, Tampa, Fla., has purchased local plant and business of Skinner Mfg. Co., manufacturer of citrus packing house machinery and parts. New owner plans expansion.

National Electric Mfg. Co., Florence, Ala., manufacturer of electric stoves and ranges, is considering removal of plant to Jackson, Miss., where capacity of about 500 units per month will be increased. It is understood that company will be reorganized with W. H. Jolly, Florence, as president, and T. B. Cabell, Jackson, vice-president.

Texas-Louisiana Power Co., Fort Worth, Tex., has begun construction of an addition to steam-operated electric generating plant at Pecos, Tex., with installation of new engine unit and auxiliary equipment, to cost over $100,000; transmission lines will be extended.

City Council, Ocala, Fla., and Board of County Supervisors have approved plans for city-county airport, to include hangar, repair shop, oil storage and other field units, to cost more than $70,000 with equipment. J. E. Walker, County engineer, will supervise installation.

Crane Co., 836 South Michigan Avenue, Chicago, has plans for three-story factory branch and distributing plant, 100 x 105 ft., at Jacksonville, Fla., to cost over $75,000 with equipment. Marsh & Saxelbye, Consolidated Building, Jacksonville, are architects.

Austin Bridge Co., 1813 Clarence Street, Dallas, Tex., has plans for a one-story steel fabricating works, to cost more than $80,000 with equipment.

Cincinnati

CINCINNATI, Sept. 30.—Metal Aircraft Corporation, Cincinnati, manufacturer of airplanes, with plant at Lunken airport, has been acquired by new interests headed by Robert H. Schryver, Columbus, Ohio, which will take over and operate property at once. Plans are being completed for acquisition of Johnson Airplane Supply Co., Dayton, Ohio, manufacturer of aircraft parts, by same interests, and two companies will be consolidated. Mason & Dixon Air Lines, Inc., Cincinnati, will be included in merger. Plant of Metal Aircraft Corporation will be increased for additional output.

Hobart Mfg. Co., Troy, Ohio, manufacturer of meat choppers, etc., is planning to produce a line of meat and bread slicers and kindred edge tools. Plans have been filed for a one-story addition to cost about $20,000. H. L. Johnston is president.

Frigidaire Corporation, 334 North Taylor Street, Dayton, manufacturer of electric refrigerators and refrigerating units, has filed plans for one-story addition, to cost about $30,000 with equipment. Company is a subsidiary of General Motors Corporation.

Dayton Airplane Engine Co., 1246 Leo Street, Dayton, manufacturer of aircraft engines and parts, is considering a one-story addition to cost about $70,000 with equipment, and contemplates an expansion program to cost over $400,000. Company has purchased Eastern Aircraft Corporation, Pawtucket, R. I., manufacturer of all-metal airplanes of German (Messerschmitt) type, and will operate as a unit of organization.

Pritchett-Thomas Co., Stahlman Building, Nashville, Tenn., has awarded general contract to Foster & Creighton, Fourth and First National Bank Building, for six-story and basement automobile service, repair and garage building, 100 x 175 ft., to cost about $450,000 with equipment. Marr & Holman, Stahlman Building, are architects.

Leland Electric Co., Dayton, Ohio, manufacturer of fractional horsepower electric motors, parts, etc., has disposed of a stock issue totaling $356,250, part of proceeds to be used for expansion. Company recently completed new plant unit.

Pacific Coast

SAN FRANCISCO, Sept. 26.—Plans are being considered by American Pipe & Steel Corporation, Alhambra, Cal., for extensions and improvements in plant, to cost about $55,000 with equipment.

John and Donald B. Parkinson, Title Insurance Building, Los Angeles, archi-

tects, have plans for one-story automobile service, repair and garage building, 100 x 250 ft. to cost $100,000 with equipment.

Pacific Telephone & Telegraph Co., 740 South Olive Street, Los Angeles, has purchased property at Ventura, for one-story equipment storage and distributing plant, 200 x 200 ft., to cost over $75,000 with equipment. A mechanical department will be installed.

American Can Co., Hunter-Dulin Building, San Francisco, has awarded general contract to Lindgren & Swinerton, Inc., 225 Bush Street, for four-story addition, to be used in part for storage and distribution, to cost about $100,000 with equipment. Company engineering department is in charge. Headquarters are at 120 Broadway, New York.

M. & M. Plywood Co., Longview, Wash., has approved plans for initial unit of new one-story mill, 200 x 400 ft., for manufacture of veneer and plywood specialties, to cost over $80,000 with equipment. Malarkey & Kallander, Postal Telegraph Building, Portland, are architects and engineers.

Firestone Tire & Rubber Co., Akron, Ohio, has plans for a one and one-half story factory branch, storage and distributing plant at Eugene, Ore., to cost about $100,000 with equipment.

Utah Oil Refining Co., Salt Lake City, Utah, is contemplating extensions and improvements in oil refinery to cost more than $350,000 with equipment.

American Concrete Pipe Co., San Diego, manufacturer of heavy concrete pipe sections of large diameter, will begin construction of new plant at Old Town, to cost $100,000 with equipment.

San Francisco Bay Airdome, Inc., care of Lynn Schloss, 1541 Webster Street, Alameda, Cal., engineer, will soon take bids for a new airport near Estuary Tube, consisting of three steel hangars, repair and reconditioning shops, oil storage and other field units, to cost over $600,000 with equipment. James A. Talbott, an official of Richfield Oil Co., San Francisco, is president.

Western Gear Works, Seattle, and Pacific Gear & Tool Works, San Francisco, have been merged. Companies will retain separate identity and there will be little change in personnel, but each will have benefit of patents, patterns, engineering and plant facilities of other.

Banta Ornamental Iron Shop, 122 West Twenty-eighth Street, Los Angeles, has been incorporated to continue manufacture of wrought iron specialties made by company for past year.

Canada

TORONTO, Sept. 30.—Superior Alloys, Ltd., Sault Ste. Marie, Ont., has awarded contract to McLarty Brothers, for erection of a plant to cost $75,000. Two electric furnaces will be installed.

Quebec Railway, Light, Heat & Power Co., 265 St. Joseph St., Quebec, will start work before close of year on erection of a substation to cost $650,000.

Barry & Ostler, Kirkcaldy, Scotland, contemplate erection of a linoleum manufacturing plant at Farnham, Que., work to start next spring.

Noranda Mines, Ltd., Rouyn, Que., has plans for a five-story plant at Levis, Que., to cost $350,000. Tenders will be called during winter for construction and equipment.

Work has started on the erection of a plant at Simcoe, Ont., for American Can Co., to cost $1,000,000. J. F. Abbey is engineer.

Canadian Paper Board Co., 32 Front Street West, Toronto, has awarded contract to Stephens Engineering & Supply Co., 25 St. Patrick Street, for an addition, to cost $60,000. Kerry & Chase, Confederation Life Building, Toronto, are engineers.

Dominion Wheel & Foundries Ltd., 121 Eastern Avenue, Toronto, has awarded contract to J. R. Page, 18 Toronto Street, for a machine shop and garage to cost $70,000. James Proctor & Redfern Ltd., 36 Toronto Street, is engineer.

Plant of Morash Stove Co., Morrisburg, Ont., was recently destroyed by fire with a loss of about $100,000. Owner contemplates rebuilding.

Stoughton Co., Stoughton, Wis., manufacturer of automobile bodies, is having plans prepared for erection of a sub-assembly plant at Regina, Sask.

Foreign

PLANS are being arranged by Eisler Electric Corporation, 750 South Thirteenth Street, Newark, recently formed to take over and expand Eisler Engineering Co., Inc., same address, manufacturer of machinery for production of radio tubes, incandescent lamp machinery, etc., for establishment of a branch plant in Germany, to manufacture similar equipment, including radio apparatus. An existing works will be acquired and developed to cost more than $100,000. Charles Eisler, president, has sailed for Europe to complete arrangements.

German General Electric Co., A. E. G., Berlin, has purchased controlling interest in National Electric Light Co., Panama, Panama, and will operate as a subsidiary. Plans are under way for expansion in power and transmission facilities.

Command-Aire, Inc., Little Rock, Ark., manufacturer of aircraft for military and commercial service, is completing plans for establishment of branch assembling plant at Santiago, Chile, one-story, to cost over $80,000 with equipment. It is proposed to have unit ready for service in January. Robert B. Snowden is president.

Mexican Mineral Co., Mazatlan, State of Sinaloa, Mexico, has work under way on a new smelting plant on local site for production of silver, zinc and other metals, to cost more than $175,000 with machinery.

Continental Can Co., 1 Pershing Square, New York, has purchased plant and business of Sociedad Industrial de Cuba, S. A., Havana, Cuba, and will operate as a subsidiary, including division for manufacture of bottle caps.

Thompson Products, Inc., 2196 Clarkwood Road, Cleveland, manufacturer of valves, pistons, brake rod assemblies and kindred automotive products, has purchased a controlling interest in S. A. des Etablissments Mecaniques Monopole, Ltd., Paris, France, manufacturer of similar products, with plant at Poissy, a suburb of Paris, totaling 100,000 sq. ft. floor space. Purchasing company will continue operation as a foreign subsidiary, and plans expansion. Considerable equipment will be produced under Thompson specifications, including pistons and piston rings. Charles E. Thompson is head of acquiring company.

New Trade Publications

Condensate.—W. B. Connor Co., 369 Lexington Avenue, New York. Booklet of 40 pages devoted to the draining of condensate from steam lines and steam-using apparatus. The booklet is in the nature of a treatise, illustrated, and giving particulars of equipment for doing the work outlined above.

Rotary Gas Exhausters.—Connersville Blower Co., Connersville, Ind. Bulletin 201 of 12 pages illustrates and describes exhausting units for service in by-product coke plants, gas plants, oil refineries, chemical manufacturing and other industries. These exhausters displace from 16,000 to more than 1,000,000 cu. ft. an hour of air or other gases.

Foundry Ovens.—Gehnrich Oven Co., Long Island City, N. Y. Bulletin of 16 pages, profusely illustrated, devoted to ovens for core baking, mold drying, pasting, blacking, pre-heating, aging, normalizing, etc. Many of the illustrations show applications in service.

Machine Forging.—Kilborn & Bishop, New Haven, Conn. Pamphlet of 20 pages by Holloway Kilborn, reprinted from a series of articles in THE IRON AGE in April and May, 1929. This describes equipment used for forging by machinery, the design of dies and other parts, and tells how the operations are best performed.

Hot-Blast Temperature Control.—Bristol Co., Waterbury, Conn. 24-page brochure describing equipment for maintaining blast furnace bustle pipe temperature at even heat. Air from stoves is normally superheated, and the temperature lowered by bypassing a regulated volume of wind from blowing engines direct to blast main.

Havemeyer Trusses.—Concrete Steel Co., 42 Broadway, New York. A 32-page pamphlet illustrating and describing in detail a form of truss for concrete floors and roofs which is said to give considerable construction economy. The truss is a built-up member based upon the design theory employed in bridges. Its weight for a given load capacity is said to be less than that of other types of floor members.

Recording Psychrometers.—Bristol Co., Waterbury, Conn. Catalog 2100 of 16 pages, accompanied by a four-page list price, illustrates and describes recording psychrometers of various types and shows the forms of chart produced by the instruments. A relative humidity table connecting up the wet bulb and dry bulb readings is given.

Alloy Cast Iron.—International Nickel Co., New York. A 12-page illustrated leaflet entitled "Nickel Cast Iron, Theory and Practice" contains ten studies on the results of the use of nickel in cast iron. To each study is devoted one page which, in parallel columns, gives the theory and the practice as well as illustrations of the product of certain compositions containing various amounts of nickel.

Steel Castings.—Sivyer Steel Castings Co., Milwaukee. A four-page leaflet in a series of "Sivyer Reports" is entitled "When Steel Replaces Gold." It is an argument for the use of electric steel castings with reference to the effect of cost, sales and business control upon

the gold in the profit coffers at the end of a year.

Alloy Steel.—International Nickel Co., New York. Under date of July 1, 1929, this company has issued a 12-page bulletin entitled "Buyers Guide" for nickel alloy steel products. It gives in detail the companies which produce all kinds of steel materials which contain nickel.

Steel Castings.—Lebanon Steel Foundry, Lebanon, Pa. A 4-page bulletin, illustrated, is devoted to the subject "Lebanon Steel Castings Speed Production." It discusses in general the claim that Lebanon steel castings are carrying heavy overloads successfully for various applications in trucks, tractors and special equipment for transmitting materials.

Steel Castings.—Nugent Steel Castings Co., Chicago. Bulletin No. 120 of two pages has been issued as an index of the bulletins issued by this company, an index revealing the various subjects discussed in the over 100 bulletins issued by the company.

Fuel Burning and Steam Generating Equipment.—Combustion Engineering Co., 200 Madison Avenue, New York. Catalog GC-5 of 16 pages, illustrated, describes briefly the more important fuel burning and steam generating equipment made by this company. Many sectional views are shown. Some of the illustrations show installations in use.

Wire Cloth.—Newark Wire Cloth Co., 365 Verona Avenue, Newark, N. J. Bulletin of four pages illustrating a variety of meshes of wire cloth, varying from an opening 1 in. square to 400 to the inch (160,000 to the square inch). Sieves and foundry riddles are featured.

Electronic Tornado.—Lincoln Electric Co., Cleveland. Folder describing automatic welder mounted on small carriage designed to travel along seam on pipe or flat tank bottom.

Hard Welding Rod.—Fusion Welding Corporation, Chicago. Bulletin No. 3 describes the application of "Weldite Type-T" welding rod, an intrinsically hard alloy which when deposited on a cutting tool or surface to resist abrasion has a Brinell hardness of 600 to 625 and considerable toughness.

Perlit High-Test Cast Iron.—Dursar Corporation, Newark, N. J. Folder reproducing microphotographs of Perlit iron, gun iron, and gray iron, listing physical characteristics, uses, and manufacturers of the first mentioned.

Crucible Steel Co. of America has published a booklet entitled "Quality Aircraft Steels," listing the products it makes for use in airplanes and engines, these including special steels for camshafts, connecting rods, crankshafts, cylinders, fuselage strut fittings, frame reinforcements, landing gear parts, magneto parts, push rods, valve guides, gears, etc. A list of airplane and airplane engine builders now using Crucible steels is also given.

The Division of Simplified Practice, Department of Commerce, has sent to manufacturers, distributers and users of die-head chasers requests for acceptance of the revised program of simplification adopted at the meeting of the National Machine Tool Builders, held at Asheville, N. C., in the week of May 20

The Week's News Quickly Told

Current Events That Bear on the Course of Business

TRADE continues seasonably good, although a note of conservatism characterizes many reports. Atlantic Seaboard States are generally hopeful; the heavy manufacturing regions in the Central West are a little slack; the advanced prices for stock and grain nearly compensate for the slender crops in the Northwest. Pacific Coast industries are going at a good pace with the exception of lumber. (Some 200,000 acres of National forest have been burned in recent forest fires.)

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STOCK market is nervous and unstable. Brokers' loans increased to record height—$6,760,000,000. Money rates for commercial purposes are generally high. Bank of England, in order to check gold export, raises discount rate from 5½ to 6½ per cent. Many British business men are blaming such high rates for the tardy trade revival.

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INTERNATIONAL trade will doubtless follow the resumption of diplomatic relations between Russia and England, announced Saturday . . . Bolivia faces an economic crisis due to slack consumption of tin, which forms 90 per cent of her exports . . . Dr. Carl Duisberg, addressing the German Federation of Industries, says that the Pacific Ocean is becoming the center of world economics due to the ascendency of American capital and political interests and the rapid industrial advance of Japan . . . Senor Negri, Mexican Minister of Commerce believes that when private enterprise ceases to operate, the nation should take charge of the stagnating industry to prevent damage to the national economy.

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RAILROADS on the average report 10 per cent higher net income in August than in 1928, and employees are paid at the highest rates since 1920. Even so, a 6 per cent increase in freight rates is necessary, in the opinon of R. N. Collyer, chairman Trunk Line Association, because the railroads have made money since 1922 only by better operating efficiency and an increase of $5,000,000,000 in capital—measures which have about reached their limit. Average freight carload (27.3 tons), daily freight car travel (32.1 miles) and freight train speed (13.4 miles per hour) are all made records in July. Railroads are also using motor coaches three times as much as last year, and are steadily extending the mileage of motor freight trucks. Trucks to handle all freight to and from metropolitan destinations via "inland" freight houses from railroad terminals in suburbs is the plan approved by Port of New York Authority and Eastern roads.

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AIRCRAFT does not compete with railroad for passenger traffic, says W. D. Storey, president Santa Fe railroad, because the fares are three times as high . . . German Reichstag voted a large credit to the Lufthansa for a trans-Eurasian line of Zeppelins. Sir Charles Burney, builder of the British dirigible R-100, has designed a much bigger ship with a bottom like a ship's hull for docking on the water and for carrying 400 passengers.

* * * * *

FLYING in fog will be safer when using more sensitive altimeters, new directional gyroscopes and visual radio beacons—all instruments proved by a 15-mile "blind" flight for the Guggenheim Fund for Promotion of Aeronautics . . . The first airplane, Amsterdam to Dutch East Indies, completes its 10-day trip on time. One plane a week is the schedule.

* * * * *

SHIPPING Board loans $17,000,000 for construction of two passenger liners and five tankers . . . Meanwhile the White Star line stops work on its 60,000-ton ship, to study the new conditions in trans-Atlantic traffic created by the Bremen's exploits. Smaller and speedier craft are probably the more profitable in that trade . . . Speed is not everything, however, for half the world's tonnage built since 1920 has been for less than 12 knots . . . In 15 years the Panama Canal collected $224,000,000 tolls, about two-thirds the cost. Yet maintenance and interest charges are so high that it will be 85 years before the debt is extinguished.

* * * * *

LABOR and employers must cooperate to bring higher wages, and shorter hours and to abolish company housing. This will solve the textile troubles, said Governor Gardner of South Carolina . . . To help eliminate the sweat shop, J. C Penney Co. and Sears Roebuck agree with International Ladies Garment Workers' Union to sell only such clothing as is made under approved sanitary conditions . . . A hospital program costing $4,600,000 is voted by the Southern Pacific Railroad . . . New York building contractors agree to maintain a 5-day week and 10 per cent wage increase for 115,000 workmen in 40 trades.

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Practical Aspects of Spark Testing

Large Steel Company Uses It to Sort Tons of Plain Carbon and Alloy Steels—Training a Spark Tester

BY WALTER G. HILDORF AND C. H. MC COLLAM*

EITHER an outline of its history, or a bibliography extending as far back as space will permit, is often the inevitable introduction to a technical subject. In the case of spark testing such an introduction is necessarily brief as, up to quite recently, there has been very little written on the subject. Probably the earliest reference is that quoted by Brearly in "The Heat Treatment of Tool Steel," wherein a French metallurgist, writing in 1804, comments on the variation in sparks from different steels. As a matter of fact, up to more or less recent times there was little or no practical use for such methods as spark testing. Tonnages were much lower, there were comparatively few grades of steel, and time was not such an important factor. Under the circumstances it is hardly surprising that the interest in the possibilities of spark testing was largely academic.

During recent years there has been a decided change. A large number of steels of different analyses have come into existence, tonnages have increased enormously, and time has become a matter of vital importance. As a result considerable interest has developed in cheap, or rapid, methods of segregating steel of different composition, as a measure of protection to the user.

It is hardly necessary to go into detail as to what happens when foreign steel does get mixed into an order, except to say that the results are very apt to be unfortunate. Protective measures are particularly important in the case of mills producing many different alloys on a quantity basis; it is practically impossible to devise a production sys-

CHARACTERISTIC Spark from a 0.30-Per Cent Carbon Steel. The bursts are more intense and there are small secondary bursts (below)

CHARACTERISTIC Spark from a 0.15 Per Cent Carbon Steel. The bursts are quite simple (above)

*Metallurgical engineer and chief chemist, respectively, of the Timken Steel & Tube Co., Canton, Ohio.

CHARACTERISTIC Spark from a 0.45-Per Cent Carbon Steel. Both the frequency and intensity of primary and secondary bursts are greatly increased

tem that is absolutely fool proof. At the plant of the Timken Steel & Tube Co., spark testing seemed to afford a great many possibilities as a method of checking steel, and therefore considerable work has been done to develop it as a practical process.

Scope and Limitations Outlined

BEFORE considering what has been accomplished, a brief discussion of the scope and limitations of the method may be of interest. Spark testing, from a practical standpoint, is a method of sorting different grades of steel according to the form of spark thrown off when they are ground. When applied with care to the sorting of certain definite classes of steel, it offers a reliable, fast, cheap and adaptable means of classification.

It is not, however, a test of the quality of the steel, for it will not detect laps, cracks or seams, nor will it determine hardness or grain size. It should not be used, as it sometimes is, for identification of steels selected at random. Its value lies in the fact that once two kinds of steel, whether in billets, bars, or tubes, or even in machined parts, have been mixed, it is almost impossible to tell from outward appearance which is which. The spark test may be applied to the sorting of steels so mixed, or it may be used as a safeguard against possible mixups of this sort. It is in the latter capacity that it has found its greatest usefulness in the Timken Plant.

Advantages Are Numerous

Spark testing has numerous advantages over other methods of sorting, although it does not always replace such methods. For example, while chemical analysis is an absolutely definite method of sorting, it is only practicable where a small number of pieces of large individual mass are concerned. Such cases would be largely restricted to ingots, large forgings, or blooms. Where it is a matter of smaller pieces, especially in the case of machined parts, even if it were possible to take samples from the individual pieces the analysis would probably cost more than the parts were worth.

Hardness tests, such as Brinell, Rockwell, and scleroscope require somewhat more time than spark testing and, where steels have the same carbon content, are practically worthless. Fracture determination is positive, as two steels will seldom show the same fracture, but the fractured piece has to be scrapped, which limits the practical value of the test. The use of the spectroscope requires as much technique as spark testing, and the instrument is much more expensive and is not conveniently portable.

The basic theory on which spark testing is founded is sound chemistry and physics. When steel is held on a grinding wheel, small particles of the metal are torn loose, and if the tearing is sufficiently violent the temperature of the particles rises considerably. This is a matter of physics—temperature rise in accordance with work done. As the hot particles fly through the air at high speed, they come in contact with a great deal of oxygen. As a result, as the individual particle proceeds, its iron is oxidized, becoming iron oxide.

Theory of Spark Testing Offered

OUR theory is that if there is carbon present, it combines with the oxygen to form carbon dioxide gas at a rate faster than that at which the iron oxide is formed. Since the carbon dioxide gas occupies greater volume than the original carbon, and the iron is soft and plastic at the high temperature reached, the carbon

CHARACTERISTIC Spark from a 1.00-Per Cent Carbon Steel. The primary bursts resemble small explosions and the secondary ones show even further or tertiary bursts

dioxide will escape into the surrounding air, carrying with it minute particles of iron.

In other words, there will be a series of secondary sparks. As the percentage of carbon increases the number and intensity of the bursts becomes greater, until with 1 per cent carbon steel they are distinct explosions. Or, as the proportion of carbon increases, the proportion of CO_2 gas to the weight of the metal increases, and the ability of the gas to throw small particles of metal off at a tangent to the spark line becomes greater.

The sparks given in first four illustrations show how the size and intensity of the bursts increase with a growing percentage of carbon. As a further confirmation of the theory, microscopic examination of the cooled particle will show small craters produced presumably by the escape of the CO_2.

In modern practice carbon is only one of several elements that may be present in a given steel, so that the carbon spark alone is not a trustworthy basis for sorting. In fact it may frequently happen that the tester will be called upon to sort two steels of the same carbon content, but differing with respect to the other alloys included. Fortunately most of these alloys either have characteristic effects of their own, or their presence has an effect on the carbon bursts that is easily recognizable.

As an example, the nickel-molybdenum spark given at right shows several marked peculiarities. The spear point at the end is always found when molybdenum is present, and the slight swelling in the carrier line near its beginning is characteristic of nickel. Actually this swelling is a spot of intensely white light, easily noted against the characteristic orange color of the normal carrier line. Nickel also has an inhibiting effect on carbon bursts, their absence, or comparative weakness, being another indication of its presence. The other alloys, chromium, manganese, etc., also have certain characteristic effects.

Shower of Sparks Examined in Three Areas

In ordinary practice the entire shower of sparks thrown from the wheel, or what is termed the "spark picture" is carefully examined. The whole picture is divided into three equal areas: The portion nearest the wheel, that in the middle, and that farthest from the wheel. Each is examined individually for salient features. These features, which are the variables upon which recognition is based, may be divided into three groups: (a) carrier lines, (b) spark bursts and (c) characteristic sparks.

As to the first, the carrier lines, which are the glowing streaks left by the iron particles, form the background of the spark picture. They may vary in length, breadth, color, and number of lines per picture. Spark bursts are found throughout the length of the carrier line. They will vary in number, size, intensity, shape, and distance from wheel to first burst, or from last burst to tail spark. The matter of characteristic sparks has already been discussed.

Training a Spark Tester

The first thing the tester must learn is to concentrate on one area of the picture at a time. Next he must learn to watch only those sparks that cross his line of vision, or, to keep his eyes fixed on a certain point and "catch" the sparks as they pass that point. Thus he will form a mental picture that gradually becomes clearer until he notes the details of the bursts, which he can visualize after they have died out. He confirms this mental picture again and again until he has definitely classified the spark with a known standard.

For practice with beginners it is better to start with two steels of known analysis, preferably with widely differing carbon content, and no alloys present. After an operator has had sufficient experience with different sparks he will soon develop the speed and confidence necessary to sort a great many different kinds of steel. It is a help to accurate work if he can be taught some of the reasons for spark variations. If he has some conception of these principles, he will be better equipped to detect variations among steels of somewhat similar characteristics.

If spark testing is to be accorded proper recognition, it must be absolutely infallible on any job to which it is applied. This means that the personnel must be well trained, but it also means that spark testers cannot be

CHARACTERISTIC Spark from Nickel-Molybdenum Steel. The "spearpoint" on the end of the carrier line is indicative of molybdenum and the swelling in the carrier line of nickel. Note the absence of carbon bursts, which is another indication of the presence of nickel

selected at random. It is well known that only a certain percentage of the men found in the average employment office are capable of development into steel inspectors. By the same token, not every inspector can be taught spark testing. The first requisite is, of course, good eyesight, but in addition the eyes must be "light-sensitive". The distinguishing of sparks is a matter of differences in the light rays thrown off, and it is frequently very fine variations that identify types of steel. Furthermore there is no room on a spark testing crew for men inclined to haphazard work.

If steel is to be sorted, it must be thoroughly sorted; every foreign piece must be taken out. The man who is apt to become careless after checking thousands of pieces in a day without finding a bad one simply does not belong on a spark-testing crew. On the other hand the one piece of steel of different analysis that comes up after a thousand pieces of OK stock will stand out like a red flag to the properly trained spark tester. It is not uncommon for a spark tester working on small pieces

in lots of a thousand to be four or five pieces beyond a bad one before he can stop. His muscular reactions become so automatic that they cannot be changed for several seconds, nevertheless the picture of that one foreign spark will register so clearly that there is no hesitation in sorting it out.

Equipment Which Is Necessary

ONCE spark testing had been settled upon a practical basis at the Timken Plant, the matter of equipment came in for considerable attention. The grinder which was selected as standard is the Dumore No. 1 JG grinder with 1¼ x ⅜ x ¼ 46-S wheels. The grinder complete weighs about 5 lb., and has a shaft speed of 15,000 r.p.m., giving it a peripheral speed of about 5000 r.p.m.

The grinders have been specially adapted for the work by the Commercial Tool Co. by the addition of an aluminum handle parallel to the shaft. The handle is equipped with a push button switch for controlling the motor. Ball type oilers are used, since lubrication is an important factor. The whole is light, and readily portable, being suitable for work on tables, and light enough to be used for testing steel in racks at some distance from the ground. The small wheel running at high speed gives a very satisfactory spark shower without removing an appreciable amount of stock. In fact, it sometimes requires close examination of the piece to find the place where the grinder was applied.

Another factor taken into consideration was the protection of the operators' eyes. The wearing of glasses to ward off small particles of metal and emery is of course a basic safety precaution. But, in this case there is another factor to be considered, protection from constant subjection to injurious light rays. Dr. E. J. Fieman, the plant physician, has supplied two types of glasses for this purpose. One is the ordinary light blue glass used in hospitals, while the other is a special glass, known as "Soft-lite", in the darkest shade; a very light rose tint.

It was first thought that the work could best be carried on in a dark room, but it was soon discovered that such conditions actually induced eye-strain, probably because of the intensity of the light rays in the absence of other light. The work is now done in a little more than half light, the sparks being thrown in shadow wherever possible. It is also good practice to use a black tarpaulin, spread on the floor, as a background for the sparks.

Method Has Saved Much Money

In conclusion, it might be said that spark testing has saved thousands of dollars in various industrial plants. A record of the work done at the Timken plant, or in other plants by men trained in the Timken plant, would show close to a million pieces sparked. At the present time there are over a dozen spark testers regularly assigned to the Canton plant of the Timken Steel and Tube Co., and at the company's Wooster and Gambrinus plants. Every tube made at these plants is checked by spark testers during its final inspection, as a precaution to prevent the shipment of mixed lots of steel.

The reason for using the test on tubes, and not on bar stock is that there are many more mill operations on the former, and it is correspondingly harder to keep them from getting mixed. If any question arises as to mixed steel in lots of bar stock, it is checked by spark testing before shipment. The value of the check on both tubes and bar stock is proved by the almost total lack of complaints arising from shipments of mixed steel to users.

Hoisting Rope Fails from Abuse Rather Than Fatigue

STUDIES on rope wire should not neglect the almost intangible evidence which leads the practical man, through constant experience, to the truth which he cannot explain, in the opinion of A. T. Adam, expressed in "Notes on Wire for Mining Ropes," read before the fall meeting of the (British) Iron and Steel Institute. In his opinion wire ropes are frequently stressed beyond the safe range, and whether caused by bending, crushing, bruising, friction or wear, the rope is gradually destroyed.

Many investigators believe that ductility and high fatigue limit are most desirable. Tests on individual wires and ropes made therefrom show that the high strength induced by cold work is not always associated with a high fatigue limit; a hard drawn 0.80 per cent carbon wire in which the hardening effect of cold working had been entirely removed by annealing at 600 deg. C. still retained a fatigue limit almost as high as the cold drawn wire and had much greater ductility.

Ropes made with such annealed wire, however, were definitely inferior in endurance to bending to others made identically but of patented and hard drawn wire containing 0.35 per cent carbon (the usual material for high-grade elevator ropes). It should be remembered, too, that the first mentioned has a well marked endurance limit, whereas the slope of the curve for heavily cold drawn wire is definitely down even at 11 million cycles.

Apparent contradictions such as these led Mr. Adam to the belief that a high and well defined fatigue limit is not the most important property of wire for hoisting rope, but the capacity to resist destruction from over-stressing and wear. The internal stresses associated with cold drawing, and the fibrous structure, are beneficial in this respect, as long as the wire is not "overdrawn." Reduction of about seven wire gages is necessary to stiffen the wire, to give it uniform torsional strength, to increase the strength, and to produce fiber. Overdraft is detected by a sharp increase of the tensile strength when plotted against wire size. Curves are also shown proving that the fatigue strength of wires patented and air cooled is much inferior to those patented and lead cooled.

In discussion, E. A. Atkin said that to produce good wire ropes, attention must be given to the quality of the steel used, as is done in the United States. He suggested that users of steel generally do not pay sufficient attention to the importance of getting the best possible use out of the steel, and that there is a tendency to increase the carbon content instead of giving the low-carbon steel the proper treatment.

Dr. W. H. Hatfield challenged the statement that wire ropes are subjected to stresses in excess of the elastic range of the material, and he added that ropes should not knowingly be subjected to such stresses. He had examined many ropes which had failed and he had found that failure was often due to the method of construction of the rope.

J. S. G. Primrose noted that it was safer to use the higher rather than a lower carbon content if the risk of over-drawing was to be avoided. He recommended the late Doctor McWilliam's method of putting the wire in boiling water for a short time. If the wire were overdrawn, the torsions dropped remarkably. Another useful method lay in examining the microstructures, which gave a measure of the original grain size and the degree of the deformation which had produced the fiber length.

J. D. Brunton advised steel makers to crop their ingots a little deeper to get rid of inclusions, and better wire ropes would result.

Pickling Principles in Galvanizing

The Longer the Pickling Time, the Heavier the Zinc Coating—Tests Made to Show This Relation

BY WALLACE G. IMHOFF*

PRACTICAL picklers soon become aware of the fact that far beyond their experience lie many definite rules in pickling which are difficult to get into organized knowledge. The far reaching influence of proper pickling of iron and steel has been recognized in the last few years only. As pickling has been considered just a simple process of taking scale off, not much study has been given to the underlying principles of this art.

It has been taken for granted that the pickling department must be a miserable, disagreeable place, full of choking acid fumes and steam vapor. Such is the condition found still in a large number of plants where iron and steel are cleaned and pickled preparatory to galvanizing or tinning. But this is not at all necessary.

Conditions Affecting Steel Surfaces

Since pickling conditions affect the steel surface and this condition affects the weight of the zinc deposited as galvanizing coating, it is of interest to examine some practical features of steel surfaces. Steel surfaces are affected by the chemical composition of the steel base, by the temperature of rolling, by the treatment of the surface during and after rolling, and by the thickness of the steel sheet.

Steel sheets vary in thickness, according to the United States Standard Gage, from No. 0000000 with an approximate thickness of ½ (0.5) in., weighing 320 oz. to the sq. ft. (20 lb. avoirdupois), to Gage No. 44 with an approximate thickness of 3/640 in. (0.0046875), weighing 3 oz. to the sq. ft. (0.1876 lb.). The thickness of the steel decidedly influences its treatment in the pickling solution.

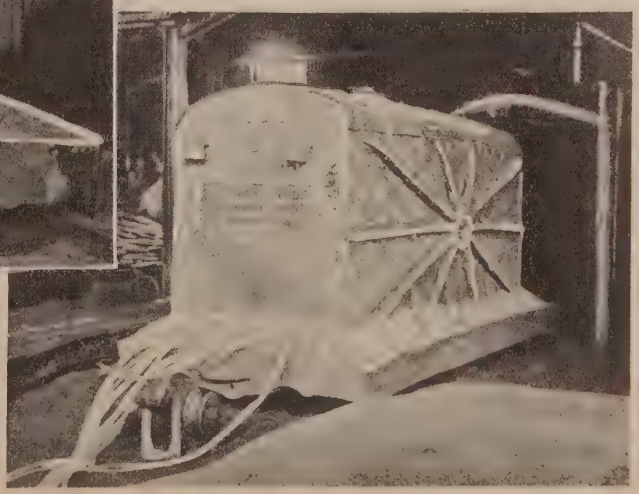
A further condition affecting the steel surface is the treatment the steel gets in rolling into sheets. This treatment is commonly known as the "finish", and the pickling time is directly affected by the kind of finish on the steel surface. To show more clearly just how the weight of the zinc coating is affected by the finish on the steel surface, and also by the length of the pickling time, a brief description of how the finishes are made will be given, and also the results of a definite test with various pickling times.

Rolling Sheet Bars Out into Sheets

Steel mill practice ends when the sheet bar enters the sheet mill. Sheet bars 30 ft. long are sheared to a

*President, Wallace G. Imhoff Co., consultant in zinc coating (hot galvanizing), 401 Highland Building, Pittsburgh.

ANNEALING Box Ready to Charge into the Furnace. (Courtesy of G. A. White.) Note the thermocouple connections coming through the sand seal, from under the lid (below)



SHEETS on the Annealing Bottom, Ready to Be Covered. (Courtesy of G. A. White.) Sheet bars placed between the sheets, at intervals, provide pockets for thermocouples (above)

STRUCTURE of a Steel Sheet After Improper Annealing and the Same Sheet Properly Annealed. At left the strained elongated grains still existing from hot rolling are evident; this sheet broke in stamping. At right, after the sheet was properly annealed, the grains are shown of equiaxed form and the sheet readily withstood stamping. Both photomicrographs were magnified 100 diameters

length which is the designed width of the sheets to be made. These short sheet bars are then conveyed to the sheet mill.

Sheet rolling mill units consist of two stands, roughing and finishing (rolls). There may be 9 to 12 or more units in the sheet mill. Sheet bars placed in a pair heating furnace, or simply "pair furnace," are brought to proper temperature for rolling. The furnace is so named because the sheet bars are rolled in pairs.

When the bars are ready for rolling, the heater drops two sheet bars, a pair, over to the roughing mills. Here the bars are passed singly between chilled iron rolls, one bar at a time being passed in by the rougher to the catcher, who stands on the opposite side and returns it over the rolls to the rougher. This operation is repeated until the thickness has been reduced and the length increased the desired amount.

As the roughing-out process consumes sufficient time to cool the metal, reheating is necessary. This is done in a sheet furnace, at a much lower temperature than the bar furnace, as too much heat would cause the sheets to stick together when rolling.

Doubling the Sheets into Packs

When these single pieces, which have been elongated to some extent, at right angles with the original rolling of the bar, are brought up to the proper rolling temperature, they are placed together, one on top of the other (doubles), and again passed through the rolls until they have been reduced as much as possible in this form. After this they are separated by a workman known as the "doubler", who carries, or drops, or bends one end over to the other and flattens out the doubled end on the doubling shear.

Then the pack, as it is now known, is returned to the furnace, brought up to the required rolling temperature and the same operation at the mill is repeated until it is again reduced as thin as possible in this form.

The pack, now containing four sheets, is carefully opened, and the doubling operation again performed, with the addition that at this stage one end of the pack must be sheared off, to give a square, open end. The pack of eight sheets, which it now contains, is again returned to the furnace, and again brought to the proper rolling temperature and put through the same rolling operation, being at this point drawn out to the required length, which is arrived at by measurement. This final rolling operation gives a pack of eight sheets of black plate as near to the gage called for as it is practical to make by any method of manufacture yet devised.

"Finish" Is Put on the "Black Plate"

These operations successively transform the sheet bar into the form of a sheet, commonly called black plate. The sheets must then be finished according to the use the material is to be put to in manufactured product. The operations just described produce what is known as a red hard sheet.

Red hard sheets are the sheets as they come from the hot rolls. Sheets in this condition are called also black plate, or finished black plate. They are called also black sheets, which is a general term broadly covering all uncoated products, but which in a more restricted sense may apply to the common finishes of blue annealed and one-pass cold-rolled, annealed. Black sheets are the sheets as they come from the rolls without any special finish on them. As a general thing they have been cold rolled once, but not necessarily annealed or pickled, though usually they have been annealed.

The dividing line between sheets and plates is not sharply drawn, but depends principally upon the type of mill on which they are rolled. It may roughly be taken that plates are ⅛ in. thick and over, while sheets are thinner than this. The United States Government has set the limit of sheets at No. 10 United States Standard Gage (0.1406 in. thick).

Blue sheets are sheets which have not received any special treatment aside from bluing. This class of sheets is used for stove pipes, ovens, automobile parts, bedstead tubing, metal ceilings, gear cases, light tanks, etc.

Black is a descriptive term for the condition of sheets before pickling. The term is used also to qualify other grades of material, as black plate, black sheet, etc. If the sheets in the black condition are box-annealed, the finish is then termed close-annealed, black. Sometimes they are annealed to remove the strains set up by hot rolling.

G. A. White* has shown clearly the condition of this steel before and after the steel has been annealed. One illustration shows the sheets on the annealing bottom ready to be covered, while another shows the annealing box ready to charge into the furnace. Two photomicrographs show the structure of the steel sheet before and after annealing. In this condition the sheets are called black plate, finished black plate, black sheets, or simply hot-rolled and annealed sheets.

Rolling Sheets Without Using Heat

Cold rolling means passing unheated sheets between rolls. In this treatment the sheets generally are passed through three sets of cold rolls. Cold rolling closes up the pores, rolls down all ragged edges left by the shears, and gives the sheet a smooth, dense surface. It also tends to make the sheets more accurate in size. Almost all sheets for galvanizing have been cold-rolled once, the purpose of this being to flatten the sheets.

One-pass stock is black sheets, one-pass cold-rolled, and box-annealed. One-pass cold-rolled means finished

*A Metallurgical Study of the Steel Base as Related to Galvanizing.

by passing once through cold rolls; two-pass, twice through cold rolls; three-pass, three times through cold rolls, etc. The sheets may then be either blue annealed or box annealed. Full-cold-rolled is a term which broadly applies to all sheets that have been not only cold-rolled, after hot rolling is completed, but also cold-rolled as an operation preliminary to, or intermediate in, the hot rolling.

Different Results from Annealing

Annealing is done for the purpose of softening the sheets, and removing the strains set up by rolling. There are a number of different finishes to sheets, based upon the annealing process used in producing the finish. Black annealed sheets are sheets which have been annealed after the sheet has been hot rolled. This annealing is also termed first annealing. The finish on sheets in the black condition after receiving the box-annealing treatment is termed close-annealed, black.

Close-annealed, cold-rolled sheets have been box-annealed and cold-rolled. Box-annealed or close-annealed means that the sheets have been heated in a suitable inclosed metal box, or pot, protected from oxidation. Extra-annealed and re-annealed means that an extra annealing, in addition to the annealing after hot rolling, has been given the sheets.

This description therefore gives a good idea of the steel base for galvanizing, which is usually designated as one-pass cold-rolled steel, or simply as O.P.C.R. sheet steel for galvanizing. There are other finishes of sheet steel also used for galvanizing, but the steel most largely used is O.P.C.R., that is, one-pass cold-rolled.

Making Pails from Annealed Sheets

Before arriving at the pickling and galvanizing department the steel is sent to the forming and stamping departments, where it is made into the black metalware articles. The complete operations for pails consist of forming the sections, folding and grooving, wiring, edging, seaming in the bottom, riveting on the ears, pickling, galvanizing, bailing, striping, labeling and bundling, and shipping.

We are here chiefly interested in the kind of steel base used, the finish on the surface, and the pickling and galvanizing operations. The O.P.C.R. sheet steel having been made into a 16-quart, heavy grade, water pail, we are now ready to make a test to establish a definite pickling principle and to discover the relation between the pickling time and the weight of the zinc deposited as galvanized coating.

Methods Used in Galvanizing Test

Five batches of six dozen each (72 pails) are used for the test. They are first carefully weighed in the black condition and then are wet and weighed again, the amount of water added being noted. After this they are put into the pickling solution and the time when they went in carefully noted, as is also the time they are taken out in the pickled condition. This gives the pickling time. They are then weighed again wet after pickling, and the weight of the water subtracted. After this they are immediately galvanized, and then again weighed carefully.

Since galvanizing operations affect also the weight of coating, it is necessary to establish uniform, systematic conditions for each set of pails. This is done by timing the articles to the flux box, through the flux, submersion time, withdrawal time, and to the pile. In practice under plant conditions it was of course not possible to make all conditions absolutely identical, but it is remarkable how nearly this has been done.

A complete record of pickling operations is shown in the table, particular attention being called to the variation in the pickling time, and in the amount of zinc deposited.

This test proves the pickling principle that **The Longer the Pickling Time, the Heavier Will Be the Zinc Coating Deposited.** The same results have been definitely verified on other lines of galvanized articles, and the principle found to be the same.

Silicon Steel Requires High Temperature

Difficulties experienced in Germany in the manufacture of mild structural steels with high silicon content are described by G. Wallmann in *Stahl und Eisen*, 1928, vol. 48, page 817. Higher temperatures of melting are necessary and result in more rapid wear of the furnaces and molds. The steel pipes deeply, which involves a high percentage of discard. Higher annealing temperatures or higher finishing temperatures in rolling have to be employed for the plates, and greater care must be exercised in reheating in order to avoid cracks. It is admitted that if the reheating of the ingots has been carefully conducted, the rolling of plates of normal dimensions does not present any special difficulty.

Test Results in Pickling and Galvanizing Water Pails

(a) PICKLING RECORD

Pail, Water, Heavy Grade, 16-Qt. Size

Batch	1	2	3	4	5
Quantity	72	72	72	72	72
Dry black weight	193 lb.	193 lb.	193.5 lb.	193.5 lb.	192.5 lb.
Wet black weight	197 lb.	197 lb.	197.5 lb.	197.5 lb.	197.5 lb.
Water	4 lb.	4 lb.	4 lb.	4 lb.	5 lb.
In pickle	10.25	11.12	9.00	8.00	1.35
Out pickle	11.35	1.10	11.10	10.28	4.35
Pickling time	*70 min.*	*118 min.*	*130 min.*	*148 min.*	*180 min.*
Wet pickled	194 lb.	193.5 lb.	194 lb.	193 lb.	193.5 lb.
Dry pickled	190 lb.	189.5 lb.	190 lb.	189 lb.	187.5 lb.
Scale and iron dissolved	3 lb.	3.5 lb.	3.5 lb.	4.5 lb.	5 lb.

Average pickling temperature, 118 deg. Fahr.

(b) GALVANIZING RECORD

Galvanized weight	238 lb.	238.5 lb.	241 lb.	241 lb.	241 lb.
Zinc deposited	*48 lb.*	*49 lb.*	*51 lb.*	*52 lb.*	*53.5 lb.*
Started (time)	2.46	4.04	2.00	1.27	10.54
Stopped	3.21	4.41	2.36	2.00	11.29
Time	35 min.	37 min.	36 min.	33 min.	35 min.
Rest period	10 min.	8 min.	0 min.	11 min.	10 min.
To flux box	0.05 min.	0.04 min.	0.04 min.	0.04 min.	0.04 min.
Through flux	0.13 min.	0.12 min.	0.13 min.	0.14 min.	0.12 min.
Submersion time	0.39 min.	0.42 min.	0.40 min.	0.41 min.	0.38 min.
Withdrawal time	0.16 min.	0.17 min.	0.15 min.	0.15 min.	0.12 min.
To pile	0.16 min.	0.17 min.	0.17 min.	0.16 min.	0.16 min.

Thirteen Classes of Mechanisms Convey Metal Through a Furnace

AN interesting classification of reliable mechanisms for conveying metal through a heat-treating furnace was given by E. G. de Coriolis, research engineer Surface Combustion Co., before a recent meeting of the American Society of Mechanical Engineers:

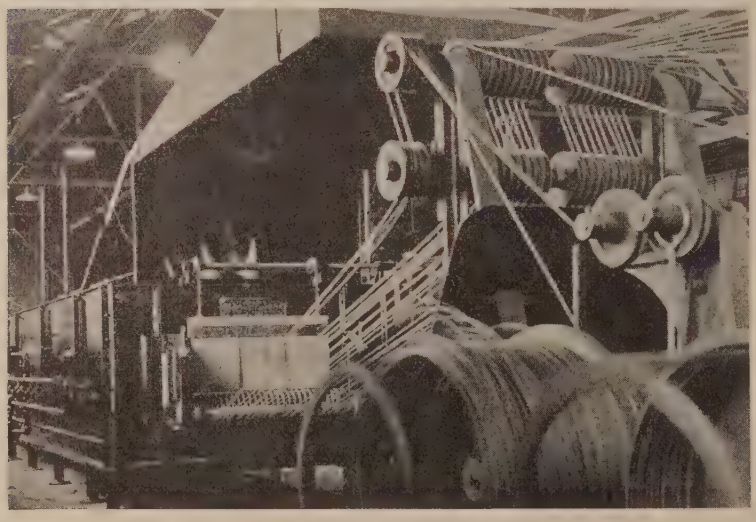
1. *Pusher*
2. *Puller*
3. *Car bottom*
4. *Conveyor chain*
5. *Conveyor belt*
6. *Rotary hearth*
7. *Rotary cylinder*
8. *Rotary retort*
9. *Spiral*
10. *Shaker*
11. *Vibrator*
12. *Walking beam*
13. *Roller hearth*

Several of these classes are shown in the accompanying views. Mr. de Coriolis's remarks on the other type are here summarized.

The conveyor belt is a recent development and has been used for the heat treatment of small parts, such as nuts, bolts and screws. Essentially this mechanism consists of a thin metal belt which is dragged over a hearth by a head pulley located in the hot zone of the furnace. The belt returns underneath the furnace, back to the charging end, where it goes over a tail pulley with tension take-up. A sufficient section of this belt is exposed outside the furnace to enable the operator to load the product uniformly so as to insure uniform heat treatment. After passing through the furnace the product discharges over the head pulley and into a quench, from which a conveyor lifts it.

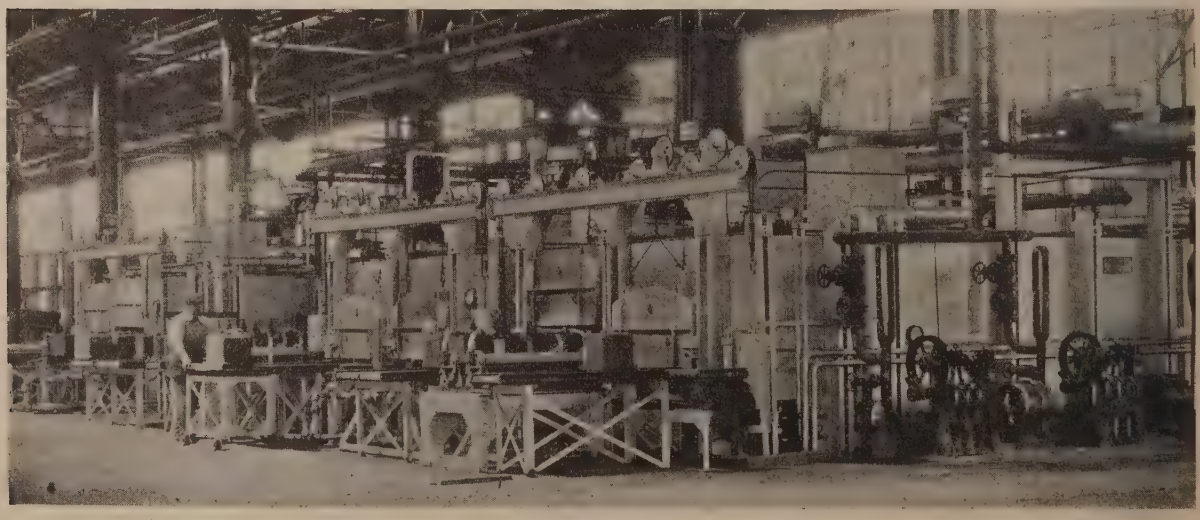
Rotary-hearth furnaces are unique in combining many advantages not possessed by other types. It need contain no alloy parts, as the conveyor mechanism is the refractory hearth itself. It can be fed and discharged through the same opening, and is, therefore, ideal for operation where the attendant is also engaged in some other and coordinated function.

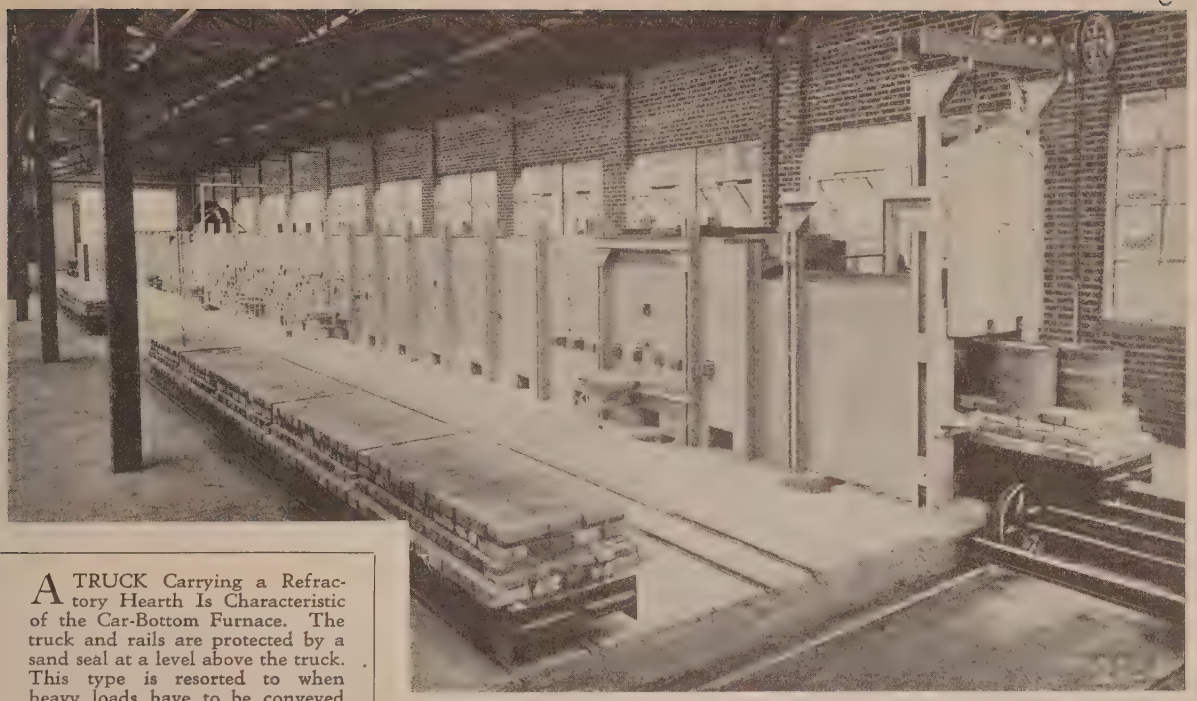
Rotary cylinders fit in best where it is permissible to fire the furnace from but a single point, namely, the dis-



THE Puller (at Left) Is Infrequently Used, as the Metal to Be Heated Is Seldom of Such a Nature That It Can Be Placed Under Tension When at Temperature. It is necessary, therefore, to use some form of a tray or pan upon which the product rests, and to this pan is attached the pulling cable, bar or chain. One other type of puller is where the product itself is pulled through the furnace, all moving parts being on the outside. This is adaptable to material of extreme length, such as wire or strip

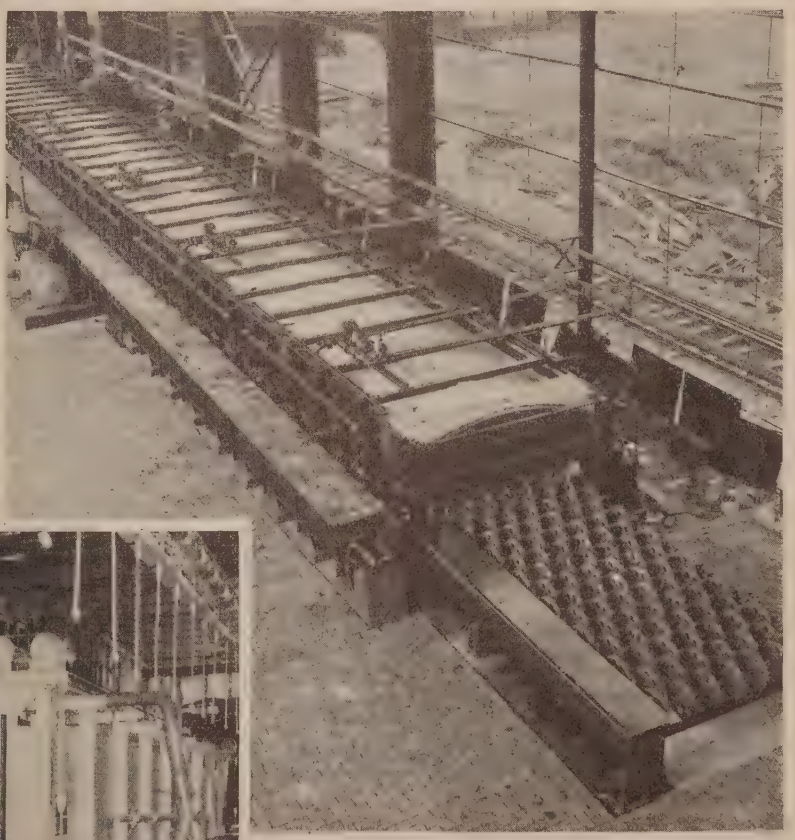
THE Pusher (Below) Is Probably the Simplest Mechanism, Involving no Moving Parts Within the Furnace, Sometimes Not Even Skid Rails in the Hearth. Pushers are utilized in this battery of recuperative counterflow carburizing furnaces

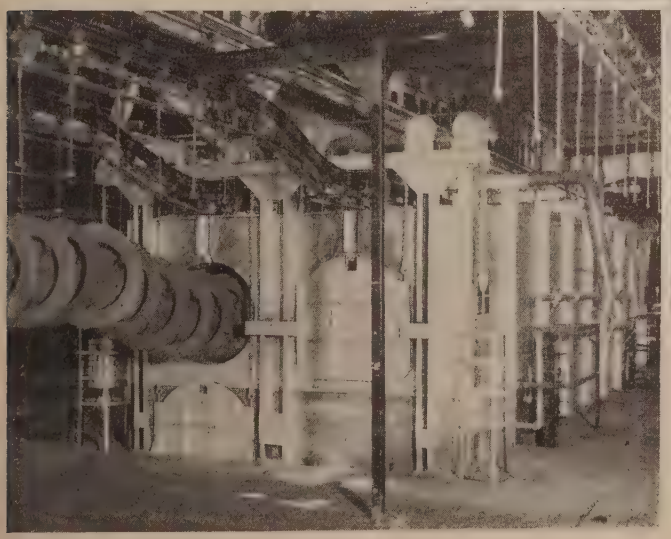




A TRUCK Carrying a Refractory Hearth Is Characteristic of the Car-Bottom Furnace. The truck and rails are protected by a sand seal at a level above the truck. This type is resorted to when heavy loads have to be conveyed through a furnace and when the heating cycle is of sufficient duration that the refractory car top is given time to come up to furnace temperature. Continuous kilns for brick and ceramic wares and furnaces for annealing and malleableizing castings are examples. (Above)

IN Furnace Construction the Conveyor Chain May Be Utilized in Several Ways. The chain may have attachments which propel the product itself along the hearth. Or the product may be placed upon a tray dragged by the chain or supported by it. An apron or stool may be fastened to the chain or supported by it, or fastened as an apron conveyor. Finally, the chain may be outside the furnace, extending over the roof, and the load, carried by suspenders through a slot in the roof, alone receiving heat. (Below)





THE Roller Hearth Possesses One Outstanding Characteristic in That It Is the Most Rapid Mechanism Yet Devised Where Extreme Length of Furnace Is Desired, and Additional Length in No Wise Complicates Its Construction. Above is an application in a steel plant for normalizing full finished auto body sheets

charge end. Like the rotary hearth, there need be no alloy parts within the furnace unless the material be abrasive to refractories. The most common example of this type is the cement kiln; its outstanding feature is the extreme lengths to which it can be designed.

Furnaces with rotary retorts have made but little progress due to a serious limitation in capacity. In this type the rotating tube projects through both ends of a cylindrical housing, which is stationary. The tube must be supported at the cold ends projecting through the furnace wall, and for this reason its length is limited by the sagging effect of the dead load at the center.

The spiral incorporates features very familiar to the rotary tube, and likewise partakes of its limitations. As the name implies, the equipment consists of a shaft with a spiral fin, which by its rotation conveys into and through the furnace such work as ring gears, which are of larger internal diameter than the spiral itself.

By "shaker furnace" is meant an alloy hearth suspended within a furnace at a slight inclination, actuated by a reciprocating motion in very much the same manner as the well known shaking screens used in various lines of industry.

The vibrator is an improvement over the above. In construction it is almost identical, except that it receives its impulse from a high speed vibrating mechanism outside the furnace, yet it is adaptable for heat treating a wide variety of miscellaneous parts.

From an operating viewpoint "walking beam" is one of the most desirable types. It requires comparatively little power to actuate it, and its motion may be so regulated as to convey the most delicate product without injury and without the use of pans, trays, or other supporting parts. It is, however, entirely dependent upon the durability of alloy parts in the heated zone, and for this reason its progress has been slow.

High-Elastic-Limit Structural Steels

A GENERAL survey of the field of manganese, silicon and nickel structural steels was described in a brief paper of the above title presented to the fall meeting of the (British) Iron and Steel Institute by J. A. Jones, Woolwich, England. He noted that carbon must be at least 0.30 per cent in order to develop a high true elastic limit, and that in any case the elastic properties will be largely dependent upon the finishing temperature or the conditions of final normalizing. Tests show conclusively that increasing the carbon content is a much less satisfactory method of securing high tensile properties than increasing the manganese content. High-carbon steels are also more affected by slight changes in heat treatment. Mr. Jones emphasizes that the two elements must be adjusted inversely; maximum manganese in a 0.20 per cent carbon steel should be 1.8 per cent, falling to 1.5 per cent with 0.35 per cent carbon, or even lower manganese in plates thinner than ¾ in.

Tests showed no advantage of a 4-per cent nickel steel over a 3-per cent. Manganese should be kept below 0.8 per cent to prevent the air-hardening effect. While small amounts of nickel increase the ductility of low-carbon steels, at least 3 per cent nickel (or an equivalent combination of nickel and chromium) is necessary to produce high-elastic-limit steel.

Thirteen mild steels containing various amounts of manganese and silicon up to 1.5 per cent were also investigated in detail. A medium-manganese steel without silicon (manganese 1.5 per cent) was better than any silicon steel containing 0.45 per cent manganese. The best combination was found to be 1.3 per cent manganese and 0.9 per cent silicon. The table indicates the types giving optimum physical properties in tests of ¾-in. bars.

Physical Properties of Best Steels

	Silico-Manganese	Medium-Manganese	Nickel
Analysis:			
Carbon	0.30	0.30	0.40
Silicon	0.9	less than 0.30	....
Manganese	1.3	1.60	0.60
Nickel	....	....	3.0
Heat Treatment (a):			
Preliminary	N 950	....	N 900
Final	N 860	N 830	N 800
Tensile Properties:			
Elastic limit	58,000	45,000	58,000
Yield point	67,000	55,000	65,000
Ultimate strength	102,000	94,000	94,000
Yield ratio	0.65	0.59	0.69
Elongation	30	32	29
Reduction in area	63	66	61
Brinell hardness	200	200	183
Izod impact	44	46	48

(a) N represents normalized (Centigrade temperatures).

In discussion, William Simons said in common with many others, his firm had made a lot of "elastic-limit" steel. To engineers, the elastic limit was often the true test of the value of steel, and he had been surprised to find great variations existing in that figure. He believed that the limit of proportionality was equally important. On the other hand, Dr. Hatfield regarded the limit of proportionality as a very unsatisfactory criterion, and he suggested the yield point as measured by Mr. Jones (i. e., that point where the permanent set equalled 0.2 per cent of the gage length) as the method by which the material should be passed.

V. B. Reichwald observed that manganese steel was getting much attention from railroad engineers in America and in England. High wheel loads are being carried, and medium-manganese steel has advantages in making rails for such heavy traffic.

Low-Alloy Copper-Chromium Steel

A new structural steel of unusual analysis has been marketed by the Dortmund Union Works, Germany, according to E. H. Schulz, writing in *Stahl und Eisen*, 1928, vol. 48, page 849. It has the following approximate composition: carbon 0.15 to 0.18 per cent, silicon 0.25, manganese 0.8, copper 0.5 to 0.8, and chromium 0.4 per cent.

It is stated to have mechanical properties as good as those of a silicon steel of similar carbon content, and it is claimed that the steel offers distinct advantages in its behavior during manufacture and working.

The amount of scrap produced is small, and in spite of the additional cost of the special elements the steel can be produced more economically and with more reliability than silicon structural steel. It is much easier to weld, and is more resistant to corrosion. Like other German steels, it has a lower tensile strength than the steels with a 45,000-lb. limit of proportionality used in England, but an increase of the carbon content with an adjustment of the copper and chromium contents might lead to the development of a steel of high quality possessing a high limit of proportionality and good ductility.

Hot Aqueous Solutions for Quenching

Advocated to Take Up Gap Between Extremes of Customary Coolants—Sources of Danger

HOT aqueous solutions for the quenching of steels was the subject of a discussion at the annual convention of the American Society for Steel Treating, during the National Metal Congress in Cleveland. A paper prepared by H. J. French, International Nickel Co., New York, and T. E. Hamill, United States Bureau of Standards, Washington, described experiments relating to the cooling properties of liquids used in the hardening of steel. Surface and center cooling currents were given for cylinders of 0.96 per cent carbon steel, ½ in. in diameter and 2 in. long. The effects of temperature of a coolant on the hardness and structure were shown, together with cooling times.

Graded Set of Cooling Characteristics Needed

The authors pointed out that present-day hardening practice is based on the use of oils, water and the more rapid-acting aqueous solutions, such as sodium chloride brines, sodium hydroxide solutions and water sprays at ordinary temperatures. There is a large gap between the cooling rates obtained with the customary quenching oils and with water, and this is now usually taken care of by tempering subsequent to hardening or by interrupted quenching. Such procedure, it was stated, is entirely satisfactory for many practical purposes, but simplification and economy and possibly also technical advantages would result if coolants were available to provide a more closely graded set of cooling characteristics.

The results obtained in these experiments, according to the authors, justify the view that some of the hot aqueous solutions can be useful in bridging the gap between the cooling rates obtained with water and oils at ordinary temperature, at least in the hardening of small pieces of steel, but some of the characteristics must be recognized as sources of danger.

The maintenance of rapid cooling at low temperatures may be undesirable in the hardening of some steels, but this also applies to drastic coolants, such as the cold brines and cold sodium hydroxide solutions now used industrially. Difficulties from this source can be minimized, in some cases at least, by removing the steel before it reaches coolant temperatures and under suitable control conditions any benefits derived need not be at the expense of high hardness.

Other Sources of Danger

Another source of danger in the hot aqueous solutions is lack of uniformity promoted by the formation of relatively large amounts of steam, but this becomes more marked as the bath temperature approaches the boiling point of water and can probably be counteracted through adequate circulation and adjustment of coolant composition and temperature.

F. R. Palmer, Carpenter Steel Co., in a written discussion of the paper, said that he felt the authors should step lightly in suggesting the possibility of substituting a properly regulated quenching speed by a full quench followed by a suitable draw. Quenching at best, he said, is subject to variables which at present are beyond the hardener's control. These variables are caused by the size and shape of the piece being quenched so that different parts and different areas must receive different quenching effects. This being the case, strains are bound to be present and anticipated structures will fail to materialize in certain unfavorable areas. In the present state of the art it would seem safer to subject the piece to a quenching speed sufficiently rapid to form a uniformly hard structure, even in the most inaccessible areas and then draw the parts back to secure the proper combination of hardness and toughness.

Sensitiveness of Quenching Bath's Temperature

It would also seem, he said, that the temperature of the quenching bath for the purposes described in the paper is more sensitive than furnace temperature when the steel is heated. That is, a difference of 10 deg. in the heating temperature probably would not affect the parts being hardened while, as the authors pointed out, this small variation makes quite a difference in the quenching effects of both brine and sodium hydroxide around 80 deg. C. For commercial service this would require accurate thermostatic control involving both heating and refrigerating facilities in the quenching bath. Mr. Palmer hoped the authors of the paper would continue their efforts to reduce quenching operations to understandable figures.

Increases the Life of a Die

In a verbal discussion, Mr. Palmer stated that a certain coining die was required that would stand a 200,000-lb. pressure but no satisfactory steel was available. Tool steel was used but lasted only for 3000 to 5000 operations. Then a quenching mixture was devised and dies made of the same steel properly quenched lasted for 50,000 operations.

The question of the permissible temperature range of a quenching medium is one of much practical importance and to which the authors have made a distinct contribution, said John L. Cox, Midvale Steel Co. There is no reason to doubt the superior cooling effect of a 5 per cent solution of sodium hydroxide over water at ordinary temperatures and he said that the authors had presented proof that the cooling rate as compared with water would be satisfactory at the higher temperature.

Practice of the Midvale Company

It has been the practice of the Midvale company to quench in warm water such steel as chrome-vanadium when it is desired to secure higher physical properties than could be produced by oil quenching and an unmachined surface made cold water quenching hazardous because of longitudinal cracking. To secure uniformity of surface hardness it was necessary to limit the water temperature to a maximum of about 55 deg. C. with a preferred temperature of about 45 deg. C. The authors' curve showing that a great increase in quenching temperature occurs with water between 40 and 60 deg. C. confirms practical experience, he said.

Mr. Cox concurred with the conclusions of the paper that water at a temperature above normal can be used for rates of cooling intermediate between water at its usual temperature and oil. He said that a wide range of permissible temperature is evidently available with accurate solutions if one is willing to go to the inconvenience that their use entails.

Foundry Accidents Reduced

Intelligent and Systematic Supervision by the Management Has Proved Effective in Preventing Unsafe Practices

ACCORDING to industrial accident statistics, between 85 and 90 per cent of personal injuries to workers result from unsafe practices rather than from unsafe conditions. It is natural to find, therefore, that industry is giving an increasing amount of attention to educational work, planned to instruct employees in safe practices and to stimulate their interest in accident prevention. Many organizations, however, realize that the safeguarding of machinery and the removal of physical hazards, in addition to being direct means of preventing a small percentage of accidents, are essential to convince the employees that the management is sincere in its educational program.

These facts were borne out in this study of foundry safety work in which it is indicated that considerable progress in accident prevention is being made by the industry. The majority of the 88 companies reported that their accident frequency or severity rates had improved during the past two years, in one case as greatly as 90 per cent. A summary of the reasons for the improvement is given below. It shows clearly the widespread use of educational methods. As classified and arranged, these reasons point out the most important activities which have been found of value in many types of industrial safety work and, therefore, may be useful in the development of a safety program.

1. *Executive Interest*
- *a.* Active interest of president.
- *b.* Interest and cooperation of management.
- *c.* Leadership of foundry superintendent.

2. *Supervisory Interest*
- *a.* Discussion and foremen's interest.
- *b.* Careful supervision.
- *c.* Foremen's safety committees.

3. *Safety Director*
- *a.* Work of safety engineer.

4. *Selection and Placement*
- *a.* Class of men and women employed.

5. *Employee Instruction*
- *a.* Instruction at time of treatment of injury.
- *b.* Instruction of new employees.

6. *Safety Committees*
- *a.* Safety committee meetings.
- *b.* Safety committee drive.
- *c.* Organization of safety committee.

7. *Competition*
- *a.* Well planned inter-departmental accident prevention contests.

8. *Advertising*
- *a.* Safety bulletins.

9. *Employee Meetings*
- *a.* Safety and welfare meetings.

10. *Safe Condition*
- *a.* Safe equipment.
- *b.* Improved equipment.
- *c.* Orderliness.
- *d.* Goggles, leggings and special shoes.
- *e.* Better light and guards.
- *f.* Improvement of shop conditions.

TO determine how the principles of effective accident prevention work are being applied in the foundry industry, the Safety Service of the Policyholders' Service Bureau of the Metropolitan Life Insurance Co., New York, has made a study, presented herewith, which summarizes the experience of 88 representative companies operating foundries, located in 24 different States and employing approximately 560,000 persons. The report deals with educational methods utilized to stimulate the interest of supervisors and workers in the prevention of accidents. The second part of the report will be published in a later issue.

Head Official Should Support Safety Work

A REVIEW of accident prevention work in industry discloses the fact that the results obtained are dependent in a large part upon the amount of personal interest taken in the company's safety program and the degree of leadership given to it by the chief operating official. Unless he is thoroughly convinced of the value of accident prevention work and indicates by actions as well as words his determination that accidents in the plant shall stop, those under his authority seldom take the proper amount of interest in safety. It has not been found necessary for this official to give personal attention to the details or actual direction of safety activities, but rather to manifest his approval adequately and to see that some competent executive is given the responsibility for the supervision of the work, either on a full or part time basis. In many plants the chief operating official indicates his approval by attending meetings of supervisors and safety committees, making a few remarks concerning the progress of the safety campaign. Letters over his signature, addressed to employees and either mailed to them directly or posted on bulletin boards, are often used to indicate his attitude. Many executives make it a practice to speak to their supervisors frequently about their safety work, congratulating those who have had good records and discussing with those less fortunate the reasons for their poor records.

From a careful analysis of the underlying causes of industrial accidents, it is apparent that many unsafe practices are involved which could be overcome by intelligent and systematic supervision. In a large number of organizations the support and active effort of the supervisory force are considered second only in importance to the leadership given the safety movement by the chief operating official. Means for reaching the supervisors with the safety message and of encouraging their constant attention to the prevention of accidents is, therefore, looked upon as one of the most important steps in the safety program.

In many of them the foremen are impressed with the fact that the prevention of accidents is a definite function of supervision and an essential activity in all phases of the company's operations.

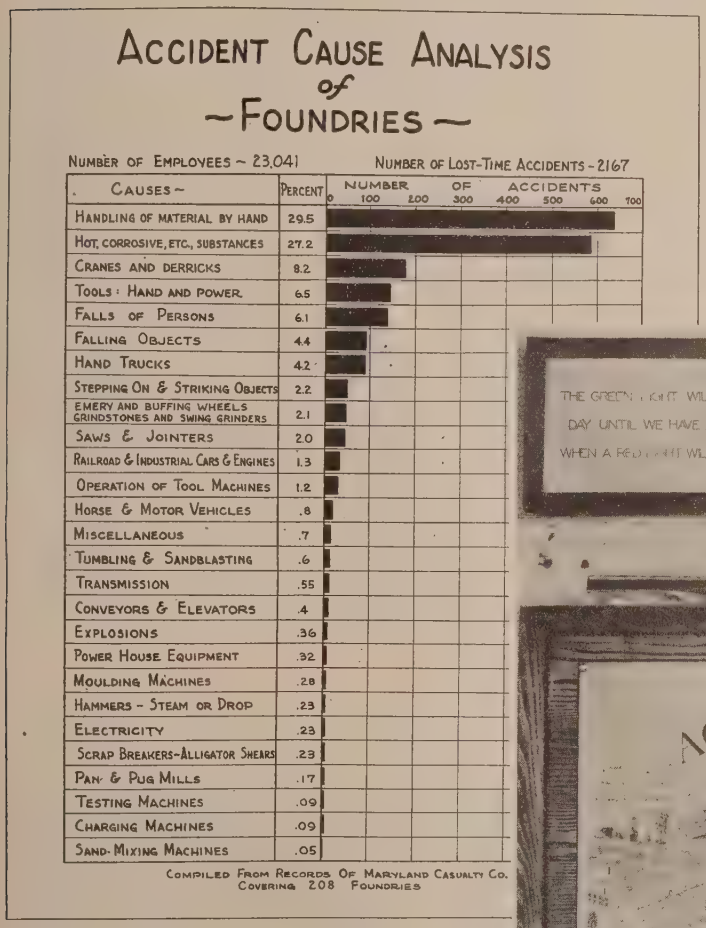
Foremen Responsible for Safety of Employees

Fifty-seven state that they are holding the foremen responsible for the safety of their employees. In 11

cases the accident costs are charged against the department in which the accident occurs or which is responsible for it. In some cases this is accomplished by including such costs in the departmental operating expenses; in others, by charging the costs against the foreman's profit-sharing fund. In the former instance, accident costs help to measure the foreman's efficiency; in the latter, they affect his income.

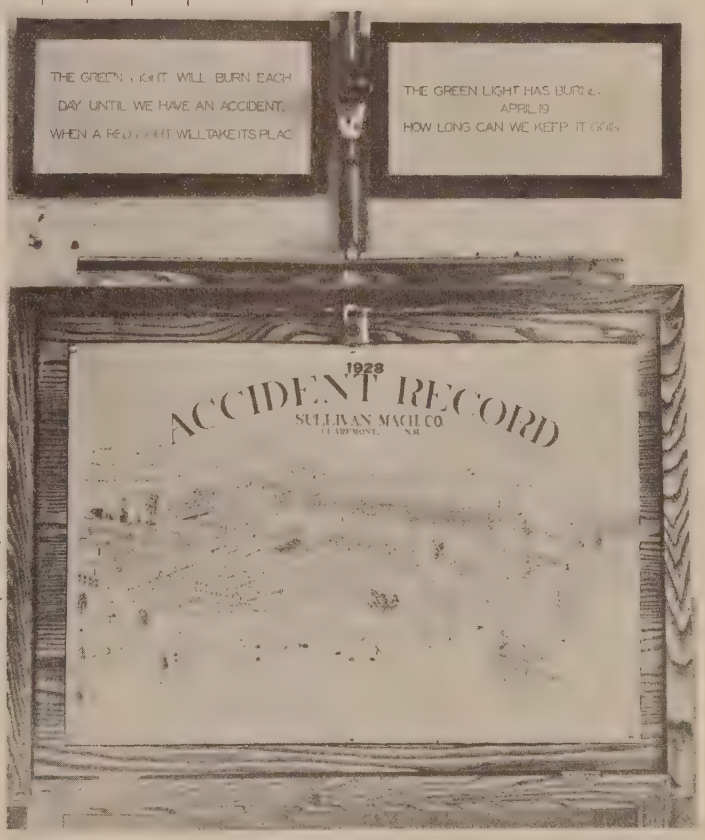
In addition to the personal contact between the supervisor and the chief executive, the majority of reporting organizations provide some regular method for reaching the foremen at definite intervals with the safety message. In some plants, safety committees are organized among the foremen. Others include safety on the program of all production meetings to indicate the relationship between accident prevention and production. At these meetings it is customary to discuss the outstanding accidents which have occurred since the last meeting, the relative standing of each department, the trend of the accident experience of the company as a whole and the outstanding causes of accidents. The policy of the company with regard to safety work and steps for the prevention of future accidents are also reviewed. Monthly meetings seem popular, but in several cases it was noted that they are held even more frequently. In fact, five foundries hold weekly meetings.

In a number of foundries, the foremen hold meetings of the employees of their respective departments. These are usually very short, held on company time, and are distinctively informal. They provide an opportunity for the department head to emphasize his personal interest in safety, review the personal injury record of the department and discuss with his men means for preventing the recurrence of accidents.


ACCIDENT CAUSE ANALYSIS
of
~FOUNDRIES~
NUMBER OF EMPLOYEES ~ 23,041
NUMBER OF LOST-TIME ACCIDENTS ~ 2167
CAUSES ~
PERCENT
NUMBER OF ACCIDENTS
0 100 200 300 400 500 600 700
HANDLING OF MATERIAL BY HAND 29.5
HOT, CORROSIVE, ETC., SUBSTANCES 27.2
CRANES AND DERRICKS 8.2
TOOLS: HAND AND POWER 6.5
FALLS OF PERSONS 6.1
FALLING OBJECTS 4.4
HAND TRUCKS 4.2
STEPPING ON & STRIKING OBJECTS 2.2
EMERY AND BUFFING WHEELS GRINDSTONES AND SWING GRINDERS 2.1
SAWS & JOINTERS 2.0
RAILROAD & INDUSTRIAL CARS & ENGINES 1.3
OPERATION OF TOOL MACHINES 1.2
HORSE & MOTOR VEHICLES .8
MISCELLANEOUS .7
TUMBLING & SANDBLASTING .6
TRANSMISSION .55
CONVEYORS & ELEVATORS .4
EXPLOSIONS .36
POWER HOUSE EQUIPMENT .32
MOULDING MACHINES .28
HAMMERS - STEAM OR DROP .23
ELECTRICITY .23
SCRAP BREAKERS-ALLIGATOR SHEARS .23
PAN & PUG MILLS .17
TESTING MACHINES .09
CHARGING MACHINES .09
SAND-MIXING MACHINES .05
COMPILED FROM RECORDS OF MARYLAND CASUALTY CO. COVERING 208 FOUNDRIES

CAUSES of Foundry Accidents Are Shown on the Above Chart. Note the fact that the greatest number of accidents results from carrying material by hand

A POPULAR Method of Presenting Accident Records to Employees Is the Posting of Signs and Charts in Prominent Places


THE GREEN LIGHT WILL BURN EACH
DAY UNTIL WE HAVE AN ACCIDENT,
WHEN A RED LIGHT WILL TAKE ITS PLAC
THE GREEN LIGHT HAS BURNE
APRIL 19
HOW LONG CAN WE KEEP IT GOIN
1928
ACCIDENT RECORD
SULLIVAN MACH CO

Safety Activities Should Be Headed by Director

THE desirability of having some representative of the company placed in charge of the safety work, either in a supervisory or consulting capacity, is emphasized by the fact that 62 of the 88 foundries reported this practice. The average number of employees in companies in which some one is designated to carry on safety work is 690. The smallest of these companies had 30 employees. Twelve of them considered that, on account of the size of the organization and the hazards involved, a full-time safety director was essential. These are the larger companies, although

four having full-time directors employ less than 500 men. Where the work is assigned to a full-time employee, titles of safety director, safety engineer, supervisor of safety or chairman of the safety committee are utilized; but when it is on a part-time basis, the safety work is carried on in conjunction with employment, industrial relations, personnel or welfare work.

In some organizations the superintendent of insurance also acts as a safety director, and in one or two instances responsibility for the work is assumed by the department superintendent or his assistant. In one large company, employing 6000 men, each plant superintendent is looked upon as a safety director in his particular unit and the safety work of these individuals is coordinated through the medical department.

The experience of many organizations conducting successful safety work indicates that best results are obtained when the responsibility for the prevention of accidents is placed upon the supervisors, the director of safety serving as a consultant to them and a correlator of the activities of the various departments. In such cases, the usual duties of the safety director consist of keeping the management informed of the progress of the safety work and the necessity for additional educational activities of physical safeguards, planning the company's safety activities and assisting the supervisors to stimulate the interest of the men under their authority in safe operating practices and carry out their part of the program. In most instances, he is held responsible for the compilation of accident statistics and the preparation of statistical reports for the use of executives and supervisors. In some cases, all plans for alterations, new construction and installations must be approved by the safety director, thus assuring that proper consideration has been given to safety features.

It has generally been found that an accurate knowledge of facts is as essential to the solution of the accident problem as it is to the correction of any other unsatisfactory operating condition in a plant. Simple and yet effective measures have been developed to obtain and tabulate information concerning personal injuries in a manner which will make it useful in the accident prevention work of the company. This information frequently forms the basis for the construction of the safety program by indicating those activities most essential, under particular conditions. It also provides the management with a measure of the need of safety work and of the results being obtained, and furnishes material of value in presenting the situation to supervisors, safety committees and employees.

Service Piping Welded in 40-Story Building

Practices Commonly Observed in Trunk and Distribution Mains and in Industrial Plants Extended to Architectural Field

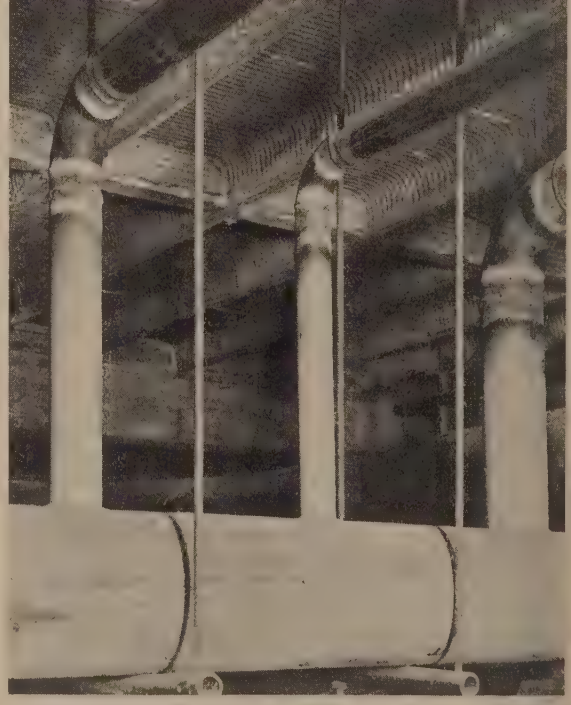
BY W. I. GASTON*

WELDED joints have been accepted as best practice for oil and gas distributing systems not only on account of reduced installation, but especially because of low maintenance costs and vanishing leakage. For some time oxwelded steam, air and other service piping has also been extensively employed in manufacturing plants. A notable recent extension of the same practice to a large office building is found in the new Carbide & Carbon Building in Chicago. Not only all steam piping above 2½ in. in diameter, but the fire protection lines and the automatic sprinkler system mains have been fabricated by oxy-acetylene welding.

Welding Saves Fittings and Insulation

The main steam header in the sub-basement was neatly and efficiently constructed by welding without the use of flanges or special fittings. This header has eight branches varying in diameter from 10 in. to 2 in. As shown in the illustration at the right it was made merely by cutting holes in the main steam pipe of correct size and shape, fitting into them a branch of smaller pipe, and welding the seam all around. All piping for auxiliary equipment in the boiler room is also welded; in several locations connections that would have been extremely difficult to make with flanged or screwed fittings were easily constructed. Trouble from gasket blowouts, leaky joints or split fittings in almost inaccessible places is avoided.

Considerable metal and insulating material were saved by the elimination of flanges and heavy cast fittings, and the pipe covering was correspondingly simplified. It has been the experience with welded steam piping in industrial plants that maintenance costs for insulation are reduced almost to zero when bolted and gasketed joints are eliminated, and a similar result is confidently expected for



Main Steam Header in Sub-Basement With Headers Welded in Place

*Technical publicity department, Linde Air Products Co., New York.

Workman Making Overhead Weld in Fixed Pipe

similar work in office buildings. No leakage occurs through a sound weld, whereas it is impossible to insure absolute tightness in mechanical pipe joints. A small leak will water-log and ruin an expensive mass of molded insulation in the vicinity, and cause a wholly disproportionate repair bill.

From the boiler room 8-in. and 10-in. lines turn upward into the pipe shaft. These risers are continuous and unbroken, to the thirteenth floor, where expansion joints are inserted. Above the expansion joints the lines make an easy swing to avoid structural members and then continue to the twenty-third floor. The view shows how these angles are made by sections cut on the job. At the twenty-third floor the larger riser bends, twists, and rises again to an attic space at the base of the tower. The pipe branches and circles the building, having take-offs at numerous locations for vertical returns to radiators in the rooms below.

This piping in the attic above the twenty-third floor is virtually the distributing system for all steam, the lower floors being heated by the return system from the 10-in. main (which rises untapped to this level), while the stories in the tower are heated by a direct system supplied by the 8-in. riser with take-offs at each floor above the twenty-third. Welded construction was especially handy in this cramped attic space, where heavy, cumbersome wrenches and pipe tongs could hardly be manipulated.

Fire Protection Lines Also Welded

A completely welded high pressure water system leads from the fire protection pumps in the sub-basement to every floor of the structure through one high-level and two low-level standpipes. In addition to these standpipes the mains and risers for the automatic sprinkler system in the basement and sub-basement are included in the fire protection equipment and are welded throughout. Such emergency piping must be joined in a most dependable manner. Sufficient experience has been had with welded joints, proving their reliability through intense conflagration, floods and earthquakes, that fire underwriters were willing to accept oxy-acetylene welding as an entirely satisfactory method of construction.

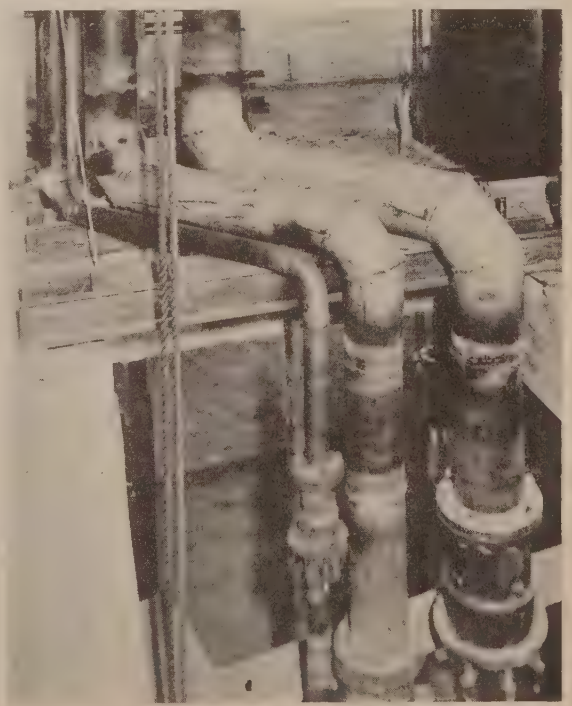
Tube Turns Replace Elbows or Miter Joints

One noteworthy feature is the extensive use of "tube turns" for elbows and bends. Tube turns are made by forming the pipe over a mandrel in such a way that the pipe wall is of uniform thickness at all points of the bend. An article describing the method of manufacturing such short radius bends was printed in THE IRON AGE, April 5, 1928, page 933. They are much more sightly and offer less resistance to fluid flow than the mitered 90 deg. elbow frequently made in the field by the welder with his cutting and welding blowpipes.

Regulating valves, supplied by the manufacturer with ends specially prepared for welding into the line instead of the customary flanged or threaded ends, constitute another innovation. Joints in the brass hot-water piping were welded by means of a recently developed bronze welding rod which produces extremely high strength joints with hardly any fuming.

When steam pressure was turned on for test not a leak appeared in the welded piping. The steamfitter foreman was much impressed by this demonstration and by the fact that it was possible to draw an unusually high vacuum in the system under operating conditions.

Devoted to the highway and the motor vehicle in Canada, a pamphlet of 34 pages issued by the Dominion Bureau of Statistics, Ottawa, Canada. The figures relate to 1928, at which time there were more than 1,000,000 automobiles. A great deal of information is given as to vehicles in the various provinces and subdivisions of provinces, production of automobiles in Canada, and such subsidiary items as accidents, registration fees and other particulars incident to the operation of cars.



Expansion Joints and Offset in Pipes at Thirteenth Floor

Intricate Castings from Automatic Dies

Alemite Company Pays Special Attention to Insets, Placing and Withdrawing Cores, and Gating and Venting Dies

BY J. B. NEALEY*

SOME 2000 dies comprise the active stock of the Alemite Die Casting & Mfg. Co., Chicago, from which a gross tonnage is made comparable to any other concern in America. Such a wide variety of work also involves a wide variety of alloys, capable of classification, however, into four groups with the principal metal either aluminum, zinc, tin or lead. The product is absorbed by a number of industries, of which the automotive stands first.

Operations on so large a scale permit an efficient handling of hot metal from alloying department to the casting machines. Alloys of specified analysis are made up from virgin metal (together with own scrap for remelt) in 15 gas furnaces built of firebrick inclosing oval or round pots. Each pot has a capacity of 3 tons and is heated with 10 gas burners. The pots are made from special acid-resisting and heat-resisting alloy castings developed by the research department of the Alemite company, and the molten metal is removed from these furnaces to the die casting machine in wheeled pots as needed. Any surplus is pigged and stored.

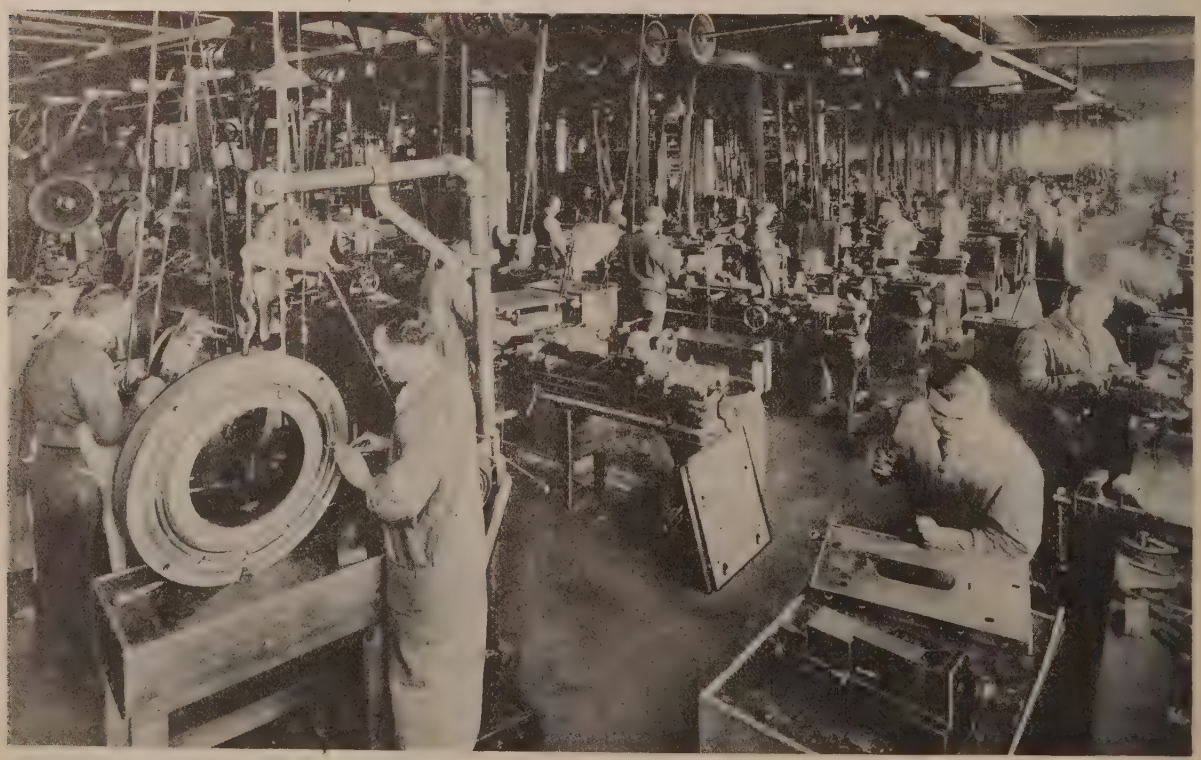
The view on page 969 shows a battery of 35 die casting machines in the Chicago plant. The hot metal is forced into the mold by compressed air in the customary manner.

*American Gas Association, New York.

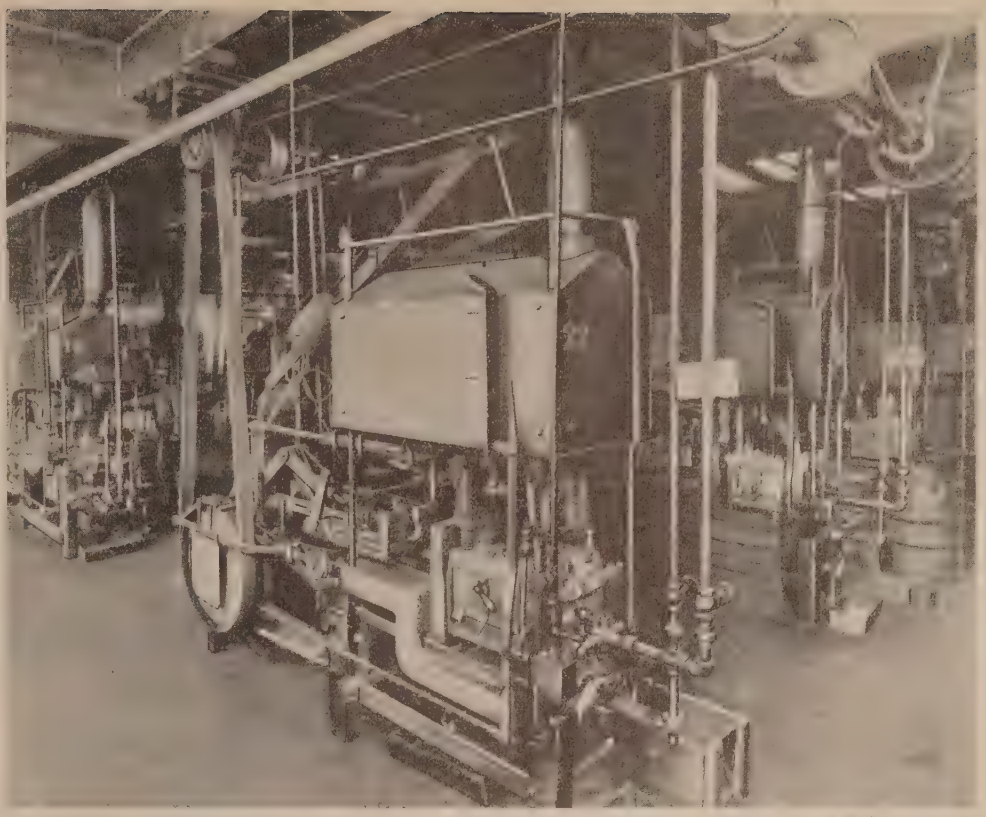
Each machine, however, was designed and built in the company's own tool room, especially for the service required. The gas-fired reservoir (made of steel) holds about 1500 lb. of molten metal; the die is shown in the open position. This machine is fully automatic; the operator merely presses a lever, the die is closed, the protective hood is dropped, the fluid metal is squirted into the mold, the hood rises, the die opens and the casting is ejected in a single cycle. Operating on medium sized work, a single machine will produce close to a ton of castings in a 9-hr. day.

Engineers for the Alemite company have devised many labor-saving arrangements for placing insets into the dies, and for placing and pulling cores. Occasionally as many as 25 cores and insets are used in a single casting; frequently fixtures for assembling them are very convenient. One casting made in quantity has a core which requires 20 tons' pull to remove, yet it is placed and pulled automatically.

Method of gating dies is of great importance because at a pressure on the molten metal of 600 lb. per sq. in. the time occupied in filling the cavity is measured in fractions of a second. It is therefore necessary so to design the gate that the metal will flow freely and with no restriction and the least possible friction. It is also essen-



Extensive Tool Room Required to Make Dies and Complete Machines for Castings of New Design



Battery of Thirty-Five Die Casting Machines, to Operate on Fully Automatic Cycle. Operator merely presses a lever, and the drive mechanism, by suitable cams and toggles, closes the die, drops the protective hood, fills the mold, pulls the cores, raises the hood, opens the die and ejects the casting

tial to vent the dies so the air can quickly escape but in such a manner that the metal cannot follow.

The latter essential is met by making very wide but very shallow air vents, which allow the air to escape at the proper speed but cause the metal to freeze upon entering, thereby preventing wastage of any metal, or the production of fins. A mold wash has also been developed which not only protects the die but improves the surface of the casting and modifies to a certain extent the speed at which the skin chills when the melted alloy strikes the face of the cool die.

This company's plant at Woodstock, Ill., has 150,000 sq. ft. of floor area, twice as large as the plant at Chicago. An interesting development at Woodstock is the introduction of machines for the manufacture of a full line of cast aluminum cooking utensils, already in production in a smaller way at the Chicago plant. A special alloy suitable for die casting, and containing no ingredients which can taint the food, has been developed by the research department.

In design, the metal body of these utensils is much thicker than similar articles now on the market, which, it is claimed, will afford the following advantages: retains heat longer, gives a more uniform distribution of heat, offers less chance of burning food, and gives longer life to the utensil. An added convenience is a handle made of material which is a nonconductor of heat.

These activities are illustrative of the manner in which large scale industry uses manufactured gas as a source of heat, primarily because of its adaptability, cleanliness, ease of control and economy. Gas is used to melt the alloys in the first place, and to keep the reservoir liquid at each machine. Practically all commercial varieties of plating, including chromium plating, are done in the finishing of die-cast hardware, and all requirements of heat in this department are supplied by gas. The dies themselves require accurate and complicated heat treatment, and this is done in gas-fired furnaces of most modern type.

Finds 42-Year Old Steel Skeleton of Building Unimpaired

The Robert W. Hunt Co., Chicago, has examined the metal from the dismantled Tacoma building, Chicago, erected in 1887. This 13-story building was among the first to use steel in such a way that the brick facing is supported by the skeleton. Columns in this building were of cast iron, round in section; beams were of steel (not wrought iron) of the following composition:

Carbon, 0.12 per cent; manganese, 0.40 per cent; phosphorus, 0.06 per cent; sulphur, 0.03 per cent.

Steel to cast iron connections were bolted; steel to steel were riveted by hand. Close examination showed that the framework of this building would have been good and efficient for many years to come. Original location markings in paint were as fresh and bright as when the beams were first covered. The material in the webs of the beams as originally rolled was less than ¼-in. thick, yet was still perfect and capable of carrying the loads when the sections were removed.

Steel Houses to Be Built in France

Because of the necessity of providing accommodations for those who have been expelled from the military zone around Paris, the authorities have under consideration, according to *Engineer*, London, a proposal to construct steel houses in the industrial suburb of La Courneuve. As an experiment about 50 houses will be built, and if satisfactory about 1500 houses of the same type will be constructed.

Diesel Plant Shows Marked Economy

Supplies Entire Power Needs, Including Welding Current, of Structural Fabricating Shop, for 1.2 Cents a Kilowatt-hour

BY EDGAR J. KATES*

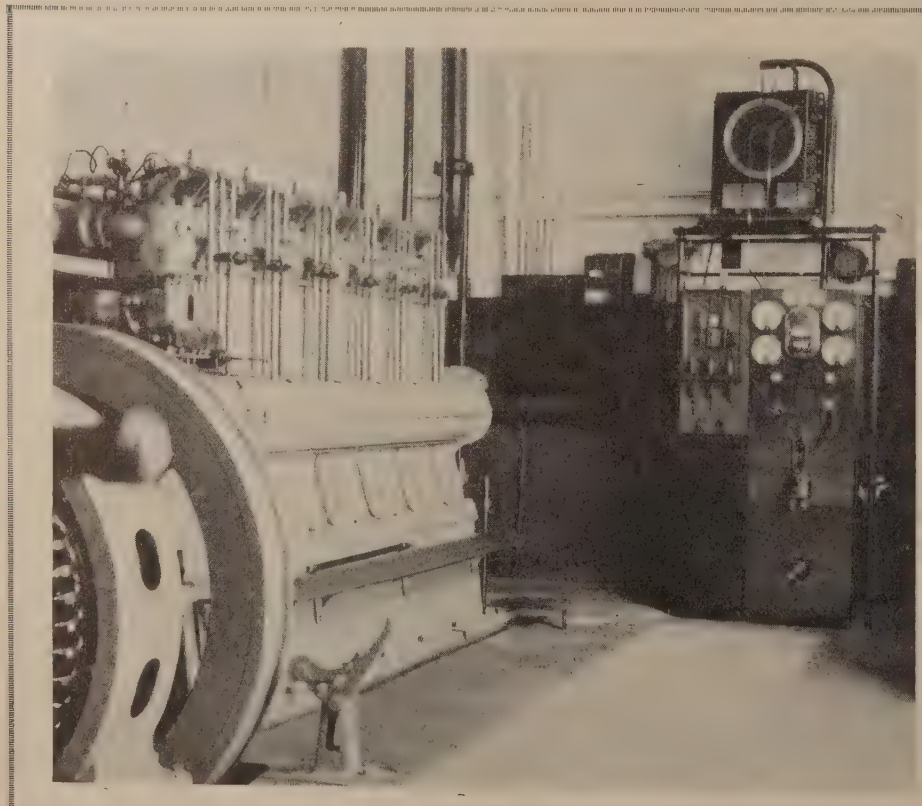
THE increasing use of electric welders, cranes and other labor-saving machinery in structural iron works has caused a steady growth in their power requirements. In consequence, the cost of power in these shops is becoming a more and more important factor in production cost. When power needs were small, electric current purchased from a public utility was the natural choice, but mounting electric bills are now giving much concern to many works managers.

With a view to cutting power costs several managers after investigation have installed modern Diesel engine power plants. Such an installation was put in service in March, 1928, by the Vulcan Rail & Construction Co., at Maspeth, N. Y., manufacturer of structural and ornamental iron, such as railings for bridges and viaducts. This Diesel power plant is a good example of modern design, and as the records of its operation and costs have been carefully kept, they should be useful to others.

The power unit is a 240-hp. six-cylinder Diesel engine, direct connected to a 160-kw. generator. The electric power developed supplies the entire shop requirements including the usual equipment of punches, presses and cranes, and in addition three arc welders having a very irregular demand, which is taken care of by an automatic voltage regulator. A large amount of compressed air is required for serving the shop tools, which include a large air hammer, and the demand for air is quite irregular. The air requirements are taken care of by two automatically controlled air compressors installed in the engine room. One of these is driven by a synchronous motor for high efficiency and is in continuous operation under the control of an automatic unloader. The other is driven by an squirrel-cage motor and is run only when the maximum air supply is needed.

The power plant was designed to operate with a minimum amount of supervision, and to this end various automatic controls were installed to take care of the supply of lubricating oil, fuel oil and cooling water to the Diesel engine. This has made it possible to put the plant in charge of a toolmaker working in the adjacent toolroom, who needs to leave his bench only to start and stop the engine and to give it an occasional inspection. In ad-

*Consulting engineer, New York.



DIESEL Engine Unit Supplies Power, including Welding Current, for Plant of Vulcan Rail & Construction Co., Maspeth, Long Island, N. Y.

CARNEGIE LIBRARY OF ATL

dition a laborer spends a few hours a week in keeping the engine room clean and in emptying the lubricating oil purifier.

This arrangement has cut the attendance cost down to $7.70 a week. In spite of the small amount of attendance, the engine has been kept in A-1 condition, and has given steady reliable service, not a single shutdown having occurred during working hours from the time the plant was started.

The operating cost of this power plant for the first seven months of 1929 is given in the accompanying table. This cost includes fuel oil, lubricating oil, attendance, cooling water, and a maintenance reserve, which was made quite liberal to take care of the future replacement of pistons, cylinders and bearings, when these parts wear out. Actually the cost of repairs and miscellaneous supplies up to now has averaged $7 a month.

The average load on the Diesel engine was only 37 per cent of its rating because an oversize engine was installed to allow for future expansion. Despite this low load factor, the power cost is only 1.2c. per kwhr. It is estimated that the engine can take care of 60 per cent greater average load than at present, and when this time comes the power cost will be even lower.

A saving which this power plant has effected but which is not shown in the table is in the price paid for fuel oil used for shop heating and forges. This oil was formerly bought in tank wagon loads at 8.5c. a gal. When the Diesel plant was installed, extra large oil storage tanks were put in, making it possible to buy the oil in carload lots. The same grade of oil was used as before, but the price was reduced to 6.05c. a gal., thus effecting a saving of $833 a year on the 34,000 gal. of oil used for factory heating and process work.

Operating Data and Generating Cost of 160-Kw. Diesel Power Plant for 7 Months Ended July 31, 1929

Operating Data	*Monthly Average*
Current generated, kwhr	12,761
Operation, hr	213.7
Average load, kw	59.8
Ratio average load to rated load, per cent	37.4
Fuel oil consumed, gal	1,350
Lubricating oil added, gal	15.7

Costs	*Average per Month*	*Average per Kwhr.*
Fuel oil (6.05c. per gal)	$80.30	0.63c.
Lubricating oil	9.47	0.07c.
Attendance	32.14	0.25c.
Cooling water	1.00	0.01c.
Maintenance reserve	30.00	0.24c.
Total generating cost	$153.41	1.20c.

Compared to the previous power cost when using purchased current, this installation has made a saving of $6,550 in its 17 months of operation, which is 27 per cent of the initial cost. Thus, even with no greater load than at present, the entire investment will be repaid in less than six years altogether. This attractive return, coupled with the complete reliability of service, has demonstrated the wisdom of providing Diesel engine power for this shop.

Use of Safe Dies Eliminates Many Power Press Accidents

SAFE dies are a necessary factor in punch press safety, because they create in the operator a positive thought of safety and stimulate in him a natural desire to be more thorough and exact in his operations about the press, stated R. A. Shaw, tool and die stamping division, Murray Corporation of America, Detroit, in an address at the meeting of the power press section of the National Safety Congress in Chicago last week. Safe dies also eliminate frequent accidents and remove the fear which has driven many efficient operators away. Mr. Shaw said, in part:

To be safe, a die must be built vertical to the horizontal, proper clearance, especially piercing and blanking dies. All large dies should have springs, air pressure or some mechanical method of loosening the work after forming, piercing or blanking. Too often operators are drawn into hazards because of the lack of these items.

Properly constructed dies should be used so that the guide pins are in at all times; if open, a spring should be connected in order to protect the open space. Moreover, the embossed sections containing the guide pins and bushings must be at least 1½ in. apart and more if possible.

When trimming dies are used, such as for auto doors and rear panels, approved cutters are added which cut the scrap into several pieces. Small sections are less hazardous to handle and are cheaper to transport to bailers or railroad cars. All heels and latches or the starting trigger should be so constructed that the operator cannot crush his finger. This is a part of die construction that is too often neglected.

The majority of accidents in connection with power presses occur when the metal parts are being placed or removed. Some authorities believe it advisable to add chutes, automatic arms or other practical devices to the die, thereby keeping the operator's hands from between the dies. Tweezers, pincers or rubber suction handles can be used to remove the work from the die.

Because the production of regular dies generally occupies his entire attention, the die manufacturing superintendent often neglects to carry out special ideas or certain safety requirements unless a formal request is made. Such a request should be accompanied by a detailed explanation for creating a safe die and by an increase in the budget to take care of the added expense. This duty should be assigned to one person, who must closely check its performance, for it is only in this way that a safe die program can be established. This system has been successfully put into effect at the Simmons Co., Kenosha, Wis., and the Ford Motor Co., Detroit. Many persons can design a die, but it requires an expert designer to construct plans for a safe die.

In the manufacture of dies many hazards exist. Approximately 80 per cent of all 4-in. to 6-in. grinding wheels operating at a regular speed are not equipped with guards. There also is an absence of shields between workmen to prevent grinding sparks and dust from injuring them. Eyerings should not be used to hold up or move the larger sections of dies. A forged specially-shaped hook retained by bolts is much more reliable and safe.

Methods now employed in spotting in a die lead to many hazards which sometimes result in serious accidents. In placing a die in a press, many operators lean between the upper and lower sections, thereby exposing themselves to the possibility of grave injuries.

Automatic feeding, automatic ejecting mechanism, transfer slides, hopper feeding attachments and a method of cleaning out dies to prevent the temptation of the operator wiping them out with his hands are safety factors which should be considered. Uses also should be developed for special combination dies, multiple or gang dies and compound dies in order to eliminate detail operations. Symbol numbers should be placed on the open outside of the die instead of on the upper face surface where the operator cannot see it unless he puts his head between the dies.

Machine Tool Exposition Shows Progress in All Lines

THE raising of the curtain on the second National Machine Tool Builders' Show, which opened at the Public Auditorium, Cleveland, Sept. 30, revealed an extensive aggregation of equipment that was a striking tribute to the machine tool industry. The number of new designs, some of them innovations, was large, while the use of tungsten-carbide cutting tools added considerably to the spectacle. Machines of all classes were in operation. High production, with close accuracy, even on machines performing cycles of complex operations, was to be noted on every hand.

With the dropping of the curtain, on the afternoon of Oct. 4, the showmen expressed satisfaction, for the attendance had been in excess of 20,000, a large amount of equipment had been sold, and many active contacts had been made with prospective buyers.

Sixty More Exhibits Than in 1927

With 245 exhibitors occupying 95,000 sq. ft. of floor space (150,000 sq. ft. gross), this show was some 40 per cent larger than that of two years ago. Furthermore, it included more new equipment, both in machines and shop accessories. Some of the 67 companies that were on the waiting list of the exposition committees but could not obtain space within the Auditorium, engaged space nearby.

Of the 245 exhibitors, 165 were machine tool builders. It is estimated that more than 900 machines, including electric and other portable tools, were shown; many of these were demonstrated in the production of automobile, airplane and other parts. The total value of the exhibits is put at more than $5,000,000.

The exposition was wired to supply 5000 hp., which is believed to be a record for an industrial exposition. Roomy booths and wide aisle space added to the comfort of visitors and exhibitors alike. The largest individual exhibit occupied 3000 sq. ft. floor space. Compact symmetrical design together with the painting of all machines the "machine tool gray" recently adopted as standard by the N. M. T. B. A. made the exposition as a whole, harmonious and pleasing to the eye. Exhibits required more than 400 cars for transportation to Cleveland; the total expense of putting on the show is said to have been in the neighborhood of $500,000.

As at the exposition of two years ago, the general public was not admitted, the attendance being confined largely to plant executives. Registration, including exhibitors and their staffs, was in excess of 20,000, or about 4000 a day, and, as many visitors remained more than one day, the attendance was heavy at all times. Every branch of the metalworking industry was represented.

Foreign visitors included a large delegation from the Soviet Union, and were far more numerous than at the previous exposition. Delegations from various technical schools also attended the show.

All classes of machine tools were to be seen. Of the large machines shown, the largest weighed 51 tons. Displays of small tools and gages were numerous; in small tools, a 0.005 in. diameter twist drill for watch and optical work was shown as a regular commercial product. Several manufacturers of anti-friction bearings had booths, and there were exhibits of gears, chain, belting and other transmission equipment. Electric motors, starters and controls were shown by several companies. Lubricating and cutting oils, coolant pumps, lubricating systems, oil clarifiers and extractors, metal cleaning compounds, and metal parts washers and dryers were exhibited.

Attractive displays of portable electric tools included high-frequency models, and high-speed air tools and flexible shaft equipment were shown. Forcing, straightening, punch and other presses were under power, as well as forging machines, riveters, punches and shears, bending and forming machines, slitters, marking devices, balancers, spring making machinery, welding equipment and woodworking machines. Pipe machinery was demonstrated by several companies, and materials handling equipment included industrial trucks, electric hoists and trolleys.

Tungsten-Carbide Tools Demonstrated

Tungsten-carbide tools were shown by the Carboloy Co., the Ludlum Steel Co., and Thomas Prosser & Son. The last mentioned demonstrated Widia tools on a 27-in. engine lathe. Camite tools were used on a new chucking machine of the Cleveland Automatic Machine Co. Twist drills, core drills, flat drills, and reamers tipped with tungsten-carbide, as well as lathe and boring tools, were displayed by various makers of small tools, and the exhibit of the Ludlum Steel Co. included tungsten-carbide lathe center inserts and taps. Engine lathes and turret lathes equipped with Carboloy and other tungsten carbide tools were used by more than 20 exhibitors of machine tools.

A tungsten carbide inserted tooth saw was a center of interest at the booth of the Henry Disston & Sons, Inc. A 16-in. 60-tooth blade was demonstrated in connection with an Espen-Lucas machine in the cutting of 3-in. diameter No. 1 yellow brass at a speed of approximately 9000 ft. per min. The machine was equipped with a 25-hp. motor and hydraulic feed, the feed being at the rate of about 3.3 in. per sec. These saw blades, made in a range of sizes, are intended for cutting ebony board, bakelite, magnesia composition board and other materials difficult to cut.

Other demonstrations of these tools

Three Year Intervals Advocated

THE holding of a machine tool show every three years and extending its length to ten days was recommended by the Associated Machine Tool Dealers after a survey conducted to obtain the sentiment of both its members and machine tool buyers. The survey was made at the request of the National Machine Tool Builders Association and the recommendation was adopted at a meeting of the dealers' association during the week.

Various arguments were presented by those favoring a longer exhibit. Some executives of plants that are large buyers of machine tools stated that their organizations were badly crippled during the Machine Tool Show because of the necessity of sending a large number of men to the show. If the show was of longer duration, they pointed out, a few men could go for two or three days and could be replaced by others and in that way the attendance of their representatives at the show could be handled much more satisfactorily.

Some of the exhibitors also expressed preference for a show of longer duration because their booths were so crowded much of the time that they could not give proper attention to all the interested visitors. The matter will be taken up by the machine tool builders at their meeting late this month, when the time of holding and length of the show may be decided.

included those of the Monarch Machine Tool Co. On a 27-in. model M lathe, a cast-iron piece 14½ in. in diameter was turned at the rate of 1180 ft. per min., with a feed of 0.134 in. S.A.E. 1045 steel was turned at the rate of 620 ft. per min., 0.006 in. feed, 1½ in. cut. A Niles 27-in. Timesaver lathe equipped with a Carboloy tool was cutting semi-steel castings at speeds ranging from 180 to 650 ft. per min., feed 1/16 to 1/32 in. and cut from ¾ to 1/32 in. The machine was driven by a 35-hp. motor. Carboloy tools were used on a Reed-Prentice 16-in. lathe at a speed of 1200 r.p.m. A Gisholt 2L 19-in. turret lathe with cross feeding turret was machining a 9-in. forged steel clutch housing at 275 ft. per min. with an average of 3/16 in. cut on multiple cuts, and an average feed of 0.021 in.

The Warner & Swasey Co., among other demonstrations, showed its new No. 5-A universal turret lathe boring, turning and facing a 28-in. semi-steel flywheel casting; the speed was 200 ft. per min., and the feed ⅛ in.

With a Monarch 27-in. lathe, having 30-hp. motor and ball-bearing tailstock center, Thomas Prosser & Son demonstrated Widia tools in cutting various materials. S.A.E. 1040 steel bars, as rolled, were machined at a speed of 306 ft. per min., 0.043 in. feed and 5/16 in. cut, and S.A.E. 3150 steel was turned at a speed of 350 ft. per min., 0.021-in. feed, ⅜ in. cut. KA 2 stainless steel, 18 per cent Cr and 8 per cent N, 200 Brinell, 60,000 lb. tensile strength, was turned at a speed of 100 ft. per min., feed of 0.021 and cut of 5/16 in. UMA 5 steel, 1 per cent chromium, 0.50 carbon, 320 Brinell, 130,000 lb. tensile strength, was machined as rolled at a speed of 150 ft. per min., feed of 0.0045 in. and cut of ⅝ in., the chips coming off red hot. Bronze, 88 per cent copper, 8 per cent tin and 4 per cent zinc, was machined at the rate of 1150 ft. per min., 0.145 in. feed and 5/16 in. cut. A cast iron bar with four slots was used in demonstrating interrupted or jump cuts; the speed was 1200 ft. per min., the feed 0.145 in. and the cut 5/16 in.

Some of the new machines exhibited were designed specifically to permit use of tungsten-carbide tools at the high speeds required to take advantage of the possibilities of that material. Other machines, however, are considered by their makers as suitable, with few changes, to the requirements of those tools. Generous use of anti-friction bearings, as well as heavy and rigid construction, seems to be common to all machines for this purpose.

Use of Hydraulic Mechanisms Increases Threefold

Another noteworthy development is the more extensive use of hydraulic mechanisms. In addition to broaching machines, drills, honing machines, grinders, saws and milling machines, straightening and other presses, a new automatic lathe, a turret lathe and a shaper-planer with hydraulic feeds were to be seen. Reckoning both gear pump mechanisms and the Oilgear device, there were more than three times as many hydraulically equipped machines as at the 1927 Show. About 60 machine tools were fitted with the Oilgear mechanism, as compared to 22 machines two years ago. Flexibility, simplicity, ease of control, long life, ample reserve power, and the protection afforded to the machines and the tools, especially in the case of drills, seems to underlie the growing application of the hydraulic mechanism. Hydraulic chucking and indexing were also to be seen.

As previously stated, this Exposition reflected substantial progress in high production facilities, with accuracy, in all types of equipment. Rapid and convenient operation, and automaticity, leaving little for the operator to do except load and unload the work, featured a number of tools. In the case of at least one automatic lathe, no operator was required at all, except to start and stop the machine when desired, which was done by means of push button. In many cases one operator can attend several machines. Compact, rigid construction, liberal use of anti-friction bearings thorough lubrication and coolant facilities, filtered oil, protected bearings, employment of balanced pulleys and driveshafts, and the use of better steels and other materials, are factors in this increased productivity.

Design that allows adapting machines for particular jobs, by means of special fixtures and by unit construction that permits removal and replacement of heads, feed and speed boxes, etc., to change the machine over to the production of a redesigned or a different piece, or for general work, seems also to be a tendency.

Smooth working of the exposition, from start to finish, was commented upon by exhibitors, credit being given to Roberts Everett, exposition manager, and his staff; E. F. Du Brul, general manager, N. M. T. B. A., and his staff, and the exposition committee of the machine tool builders association.

Some of the new machines data relating to which were not available for publication in our Sept. 19 and later issues, are briefly noted below. More extended descriptions will be included in forthcoming issues of THE IRON AGE.

Brief Notes on Equipment Not Announced Before the Show

IN addition to a new model GA 2⅝-in. Gridley four-spindle automatic bar machine having four independent cross-slides the National Acme Co., Cleveland, introduced a Gridley automatic 4-in. model H, four-spindle chucker for rapid roughing and accurate finishing operations. Features include an improved hardened and ground square face turret, new steel cross-slides and anti-friction bearing spindles. The maximum chucking capacity is 4 in., the maximum swing 6 in., and the maximum turret feed is 6 in. The cross-slides have a movement of 2½ in. Spindle speeds up to 1200 r.p.m. are available. Pneumatic chucking is employed.

The same company also featured Namco opening dies with new circular chasers which are said to have more than ten times the ordinary chaser life. The chaser is a precision circular forming tool, its periphery being a series of lapped thread-form rings without lead. Lead is obtained by mounting the chasers on hardened steel chaser blocks, the faces of which are ground to the exact helix angle. A new compact motor-driven centrifuge with 300-gal. per hour capacity was also shown. The machine is intended for clarification and separation of cutting and other oils.

The Pratt & Whitney Co., Hartford, demonstrated a new vertical six-station, five-operation automatic machine for high production and long runs. Flexibility is a feature, and when suitably tooled the machine will perform a large variety of operations, including milling, drilling, sawing, facing, threading, tapping, hollow milling, reaming, serrating, knurling and boring. The drive is by a 7½-hp. motor, controlled by push-button. Separate sets of charge gears permit separate control of spindle and table speeds. Vertical movement of the work during cutting is controlled by cams. The maximum work diameter swing is 8⅞ in. Cutter spindle speeds ranging from 150 to 1500 r.p.m. are obtainable. The floor space occupied is approximately 40 x 74 in., and the height, not including the motor, is approximately 81 in.

A vertical chucking machine with six tool heads and a traverse slide was introduced by the Columbia Machine Tool Co., Hamilton, Ohio. It is said to have been designed to use tungsten-carbide tools and to be adaptable to production work of wide range. It has single lever centralized control, automatic revolving turret, and independent feeds and speeds through pickoff gears. Timken bearings are used throughout.

The Cleveland Automatic Machine Co., Cleveland, exhibited a new 7-in. model M, five-spindle hydraulic chucking machine for first and second operation work. The machine is self-contained, and the chucking pressure is adjustable to suit the character of the work. Accessibility is a feature. The company also demonstrated a five-spindle bar machine for rapid production of small parts requiring a number and a variety of cut. Independent feed control is provided for each spindle.

The new No. 4 universal turret lathe built by the Gisholt Machine Co., Madison, Wis., was in operation. This machine has automatic chuck capacity for round stock up to 2 in., and 12 spindle speeds, from 28 to 751 r.p.m., are obtainable through sliding gears and clutch. The hardened alloy steel gears are mounted on spline shafts. Tapered roller bearings are used for the spindle and drive shafts. It is stated that the speed rating may be doubled without damage to bearings or clutches. The drive is by motor through Texrope belts.

The headstock drive pulley is balanced. Other features include a turret that is clamped and unclamped automatically to the slide, and the square turret mounted on the front of the bridge type cross slide which is indexed automatically.

The Potter & Johnston Machine Co., Pawtucket, R. I., brought out a platen turret type model of its 5-D Power-Flex automatic. Simplicity of tooling, ease of set up and flexibility are features emphasized.

Milling Machines

An outstanding exhibit of the Cincinnati Milling Machine Co. was the new No. 3 universal miller featuring new operating convenience, as described in THE IRON AGE of Oct. 3. A small plain Hydromatic milling machine, designated as the No. 3-24, was also introduced, as well as a No. 4-48 duplex Hydromatic with bridge-type fixed-height rail, standard vertical spindle carrier and standard horizontal spindle carriers. A No. 4-48 plain Hydromatic with variable height overhung rail was another example of the company's unit plan construction.

Centerless grinders, one with continuous hopper feed, automatic compensation for wheel wear and hydraulic wheel-truing device and another with continuous hopper feed and automatic in-feed attachments were exhibited by the Cincinnati Grinders, Inc. A No. 4 centerless grinder for work up to 9 in. in diameter was also demonstrated.

In addition to the bridge-type Mil-Waukee-Mil described in THE IRON AGE of Sept. 19, the Kearney & Trecker Corporation, Milwaukee, had in operation No. 2 vertical milling machine equipped with its new skip-stop rotary table. The machine was in operation milling around the ends of airplane engine articulator rods.

The Mil-O-Matic milling machine, a new product of the Oesterlein Machine Co., Cincinnati, was in operation. This is an automatic hydraulic-feed bed-type machine equipped with either plain reciprocating or automatic indexing table. As an indexing machine the table makes a half turn at the end of its return stroke, advances again to cut, feeds, returns and repeats. Single-spindle, duplex, vertical and multiple spindle models, with standard bed and table lengths are available.

A universal production rotary milling machine with Oilgear driven table, said to be the first commercial application of hydraulic table rotation to a machine of this type, was demonstrated by the Consolidated Machine Tool Corporation of America, Rochester, N. Y. Newton cold saw cutting-off machines with Oilgear feed, which eliminates feed shafts, gears, reversing clutches, etc., were also exhibited. The saw blade cuts in the upward direction so that the thrust of the saw carriage is directly down on the base. This feature, with the hydraulic feed, is said to markedly increase the productive possibilities of the machine.

Several New Gear Cutting Machines

A center of interest at the large exhibit of the Gleason Co., Rochester, N. Y., was a four-spindle hydraulically-operated machine for rough cutting in large quantities straight bevel gears similar to those used in automobile differential. Four blanks may be cut simultaneously. The work is mounted on four independent workheads arranged around the cutting tool, which is a 20.8 in. diameter disk milling cutter with inserted blades. Each head is fed into the cutter for cutting the tooth space, and after the last tooth has been cut, the work is pushed off the arbor and is replaced by a new blank. If the blank is not correctly placed in the arbor, the head will not return to the cutting position until the safety valve is opened by hand. A 3-in. spiral bevel and a 3-in. straight bevel generator, both new machines, were also in operation.

The Barber-Colman Co., Rockford, Ill., introduced a manufacturing hobbing machine, designated as the type B, for roughing and finishing spur gears, spline shafts and similar forms. It is claimed that the machine will operate at speeds and feeds beyond the capacity of present high-speed steel hobs. Features include simplified gearing and drives; liberal use of ball and roller bearings; worm and worm gear final drive to the hob; work-spindle drive outside of the bed; and work spindle mounted in a housing that is fast to the base, the work diameter being controlled by an elevating bed.

A manufacturing type gear hobber for roughing and finishing large diameter and medium pitch spur gears, limited angle helical gears, sprockets and worm wheel was among the new machines of Gould & Eberhardt, Newark, N. J. Rated at 2 D. P. in steel, these machines, designated as the No. 48 HS and the 48 HL, have capacity up to 32 in. diameter with arbor support, and 57 in. diameter with the support removed.

Shaper-Planer with Hydraulic Feeds

Hydraulically actuated table and feeds is a feature of the new shaper-planer introduced by the Rockford Machine Tool Co., Rockford, Ill. Table speeds up to 75 ft. per min. are instantly available, and the ratio of cutting to return speed is 1 to 3. Hydraulic power for feeds is provided by a separate pump. A grinding head may be mounted on the cross-rail for surface grinding operations. Sturdy construction and simplified design are features of the machine.

A continuous filing machine was a new feature at the booth of the Rockford Drilling Machine Co., Rockford, Ill. The files are carried on a continuous band and are jointed to permit traverse over the driving wheels. Any standard shape of file can be furnished. Two speeds are available, 60 ft. per min. for steel, and 120 ft. per min. for brass and other soft metals. The work table is arranged to permit filing at any angle up to 30 deg.

Coldcut sawing machines equipped with a hydraulic-air clamping unit were exhibited by the Higley Machine Co., South Norwalk, Conn. Rapid and easy clamping of the work, eliminating fatigue from hand clamping, are advantages claimed. Clamping pressure is adjustable up to 500 lb. An air pressure chamber at the top of the hydraulic cylinder serves to maintain pressure in case of failure of the hydraulic mechanism.

William Laidlaw, Inc., Belmont, N. Y., brought out a metal cutting band saw so arranged that two jobs may be handled simultaneously, one on each side of the machine. The drive is from a motor in the base.

A hydraulic power saw was featured by the Racine Tool & Machine Co., Racine, Wis. An "oilmotor" reciprocates the saw frame, feeds the blade into the work and lifts the blade on the non-cutting stroke. Constant, controlled rate of speed, wide range of cutting speeds, adjustable stroke and simplicity of construction are claimed for the machine.

The Armstrong-Blum Mfg. Co., Chicago, had in operation its new Marvel hacksaw, with and without automatic bar feed. The feed is a combination of positive and friction feed; four-speed transmission is used. The capacity is for 6 x 6 in. material.

High-production threading of bolts, studs and rods was demonstrated by the Economy Engineering Co., Willoughby, Ohio, on its new four-spindle semi-automatic bolt threader. The machine is for work ranging from ¼ to ¾ in. in diameter, 6 in. and more in length. The only duty of the operator is to load and remove the work.

A center of interest at the booth of the General Electric Co. was the new hydraulic operator for controlling brakes, clutches, spot welders, etc. It is intended to take the place of large a.c. and d.c. magnets and solenoids, and to be used in place of air cylinders where smooth upward thrust is desired through a given distance. It consists of a motor-driven centrifugal oil pump, the impeller of which is mounted in a piston and driven by means of a spline shaft.

An automatic grease lubricating system that is controlled by an electric clock was something of an innovation. This system, called the Pneuma-Lectric, was shown by the Keystone Lubricating Co., Philadelphia. The feed control employed permits automatic lubrication of bearings at intervals ranging from 5 min. to 24 hr. The system combines the company's pneumatic safety lubricator served by a motor compressor unit with automatic switch, and a new rotary distributor that is operated by motor through a speed reducer. The system may be applied to one or a line of machines.

Other new developments in machine tools and accessory equipment presented for the first time at the Show will be described in forthcoming issues.

Visitors from Abroad to the Machine Tool Show

VISITORS from abroad to the Machine Tool Show were numerous. A third of them hailed from Germany. Some represented machine tool builders of that country but the world-famous A. E. G., (the General Electric Co. of Germany) automobile builders and firms from such centers as Solingen had their emissaries.

England sent the next largest delegation, amounting probably to 20 per cent of the total. The industries of these participants seemed notably diversified. About half as many came from France as from England.

Of 90 who registered in the early part of the week, 29 were German, 18 English and 10 French. Five each were credited to The Netherlands and Soviet Russia, the latter interested mostly in the automobile business. There were four each from Switzerland, Italy and Belgium, and three each from Sweden and Australia. Spain sent two and Poland, China and Czechoslovakia were each represented by one. In all, this list of 90 covers 14 countries outside of the United States and Canada.

Steel Companies Win Safety Awards

National Congress in Chicago Sets New Records With Attendance of 7000 and Increase in Exhibits

IN registration by visitors and space occupied by exhibitors, new records were set at the eighteenth annual safety congress, held by the National Safety Council, Sept. 30 to Oct. 4 at the Hotel Stevens, Chicago Registration, which totaled 7000, exceeded that of the previous year by more than 12 per cent. Exhibitors numbered 125, an increase of almost 50 per cent over the 1928 figure.

Outstanding among events at this congress was the display, for the first time, of talking motion pictures prepared especially to further the cause of safety. Also worthy of note was the increased interest shown at the meetings of the industrial health and nursing divisions.

One Company Has Perfect Record

Only one unit, of 34 entered, completed the iron and steel industry annual safety contest with a perfect record. The company which attained this distinction is the Haynes Stellite Co., Kokomo, Ind. At this company's Kokomo plant are employed 239 workers, who completed 325,890 man hours without a lost time accident.

The 34 units were divided into groups A and B. In group A, the Midvale Co., Nicetown, Pa., was awarded a trophy because of its record of 2011 employed, 2,848,371 man hours of service, four lost time accidents, which give a frequency rate of 1.404. The Corrigan-McKinney Steel Co., Cleveland, and the American Rolling Mill Co., Columbus and Zanesville, Ohio, with frequency rates of 2.606 and 3.837 respectively, received certificates of merit.

A trophy was presented to the Haynes Stellite Co., which led group B with a frequency rate of zero. The American Rolling Mill Co., Middletown, Ohio, and the Driver-Harris Co., Harrison, N. J., with frequency rates of 6.889 and 7.515 respectively, were recipients of certificates in this group.

Summary of data compiled during the contest reveals that the 34 units employed 58,800 persons, who worked 87,085,498 man hours for an average of 1481 hr. per person. Accidents reported numbered 1290 and the average frequency rate was 14.813. Nineteen units had a frequency rate below the average. The ratio of persons employed to lost time accidents was 46 to 1.

Officers Elected

Officers elected are: President, C. E. Pettibone, American Mutual Liability Insurance Co., Boston; vice-president industrial safety, C. L. Close, United States Steel Corporation, New York; vice-president public relations, C. E. Hill, New York Central Lines, New York; vice-president public safety, Miller McClintock, Harvard University, Cambridge, Mass.; vice-president territorial councils, George Opp, Detroit Edison Co., Detroit; vice-president finance, C. W. Bergquist, Western Electric Co., Chicago; vice-president engineering, Earl F. Blank, Jones & Laughlin Steel Corporation, Pittsburgh; vice-president membership, G. T. Hellmuth, Chicago, North Shore & Milwaukee Railroad Co.; vice-president education, A. W. Whitney, National Bureau of Casualty & Surety Underwriters, New York; vice-president health, Dr. C. E.-A. Winslow, Yale University, New Haven, Conn.; treasurer, J. I. Banash, Fonda Tolsted Co., Chicago; managing director, W. H. Cameron, National Safety Council, Chicago.

New directors are: H. B. Flowers, president, New Orleans Safety Council, New Orleans; T. W. Bachus, vice-president and general manager, Hercules Powder Co., Wilmington, Del., and Paxton Mendelssohn, philanthropist, Detroit.

National Safety Council executive committee for coming year is composed of: J. I. Banash, consulting engineer, Chicago; C. W. Bergquist, Western Electric Co., Chicago; Earl F. Blank, Jones & Laughlin Steel Corporation, Pittsburgh; C. L. Close, United States Steel Corporation, New York; F. A. Davidson, Patent Scaffolding Co., New York; W. F. Dougherty, General Motors Corporation, Detroit; H. B. Flowers, New Orleans Public Service Corporation, New Orleans; William C. Dickerman, American Locomotive Co., New York; D. T. Harrington, United States Bureau of Mines, Washington; G. T. Hellmuth, Chicago, North Shore & Milwaukee Railroad Co., Chicago; C. E. Hill, New York Central Lines, New York; Miller McClintock, Harvard University, Cambridge, Mass.; J. E. Long, Delaware & Hudson Co., Albany, N. Y.; R. B. Morley, Ontario Safety League, Toronto; George Opp, Detroit Edison Co., Detroit; C. E. Pettibone, American Mutual Liability Insurance Co., Boston; R. B. Stoeckel, commissioner of motor vehicles, Hartford; J. P. Sutton, Ohio Oil Co., Findlay, Ohio; A. W. Whitney, National Bureau of Casualty & Surety Underwriters, New York; Dr. C. E.-A. Winslow, Yale University, New Haven, and W. H. Cameron, National Safety Council, Chicago.

C. E. PETTIBONE, vice-president and manager of the engineering department of the American Mutual Liability Insurance Co., Boston, who was elected president of the National Safety Council, was born at Syracuse, N. Y., Jan. 19, 1884. He was graduated from the University of Toledo in 1903 and in 1908 received a civil engineering degree from Case School of Applied Science. For several years after graduation he was employed in engineering work for the Wheeling & Lake Erie and the Lake Shore Railroads. In 1910 he was made district safety inspector at Cleveland for the American Steel & Wire Co. and in 1911, he was engaged by Pickands, Mather & Co., to organize and direct safety and welfare activities. In July, 1920, he became manager of the engineering department of the American Mutual Liability Insurance Co. and a year later he was made vice-president.

A first aid team composed of Armco women from the Nellis, W. Va., mines of the American Rolling Mill Co., won the girls' State championship of West Virginia on Sept. 7 by making 796 of a possible 800 points. Competing against the six men's teams of their own plant on Aug. 3, the girls tied for third place with 296 out of a total of 300 points.

Sale of the Metal Aircraft Corporation of Cincinnati to Robert H. Shryver, Columbus, Ohio, was ratified at a special meeting of stockholders. The company will continue operations in the construction and sale of the Flamingo all-metal airship at its Cincinnati plant. Mr. Shryver is a retired banker of Columbus.

For Fiftieth Anniversary of the A.S.M.E.

Program of Mechanical Engineers' Meeting, in April, 1930, Will Be International in Scope

IN April, 1930, many of the world's outstanding engineers will meet in New York, Hoboken and Washington to celebrate the fiftieth anniversary of the founding of the American Society of Mechanical Engineers. The exercises will be non-technical in nature and will stress the humanistic side of engineering. They will be preeminently an exchange of greetings between nations through the medium of a series of papers presented by a prominent engineer from each of sixteen countries or geographical divisions of the world. These papers will develop the theme of what engineering has done for each author's country in a national sense and also for the advancement of world culture and civilization. These engineers will also endeavor to forecast the lines along which engineering may be expected to develop in the future, and to inform the convocation of some of the great engineering problems confronting their respective nations.

The main sessions, in which each of sixteen of the world's distinguished engineers will present a summary of his paper, will be held in Washington on April 7 and 8. Washington has been selected to accord with the national and international character of the celebration. Honorary memberships will be awarded to individuals who have rendered conspicuous service to the society, and medals of distinction will be conferred.

The president of the society will present a paper which will be the national report for the United States and will outline the future possibilities of service of the society. At this time also an eminent scientist will review the past contributions of science to engineering, the relation of engineering to science, and the influence of science on the future of engineering. In addition, a prominent American will present, from an international viewpoint, an evaluation of the influence of engineering invention, development, and accomplishments upon the cultural, social, economic, and political progress of mankind, and an outline of the future of engineering in solving the problems of mankind.

Other gatherings of interest include the reception at the White House for delegates and members of the society and their guests.

New Constitution Adopted by Engineers' Association

The American Association of Engineers has outgrown its original constitution and by-laws and has adopted a new one, which went into effect Oct. 1. The number of membership classifications is increased and the qualifications are raised. One of the new requirements for membership is that an applicant must, if his State has a registration law, be a registered engineer before his application will be approved. The association was formed in 1915. Its aim, according to its corporate seal, is to "Advance—Cooperate." It seeks to unite with all engineers and their organizations for the attainment of these desirable ends:

> (1) To standardize, extend and enforce registration laws; (2) To develop a definite and enforceable code of professional practice; (3) To increase professional unity toward achieving the same solidarity among engineers as that of doctors and lawyers; (4) To better engineering by raising professional standards, eliminating fake technical schools, and restricting the professional title to qualified engineers; (5) To encourage engineer participation in public affairs; (6) To combat unionism and the resultant lowering of the profession to a trade, and (7) To attain general recognition and higher economic standards.

The association states that its efforts have led to the adoption of registration laws in over half of the States, the placing of thousands of engineers in better positions, the offering of reasonable and reliable insurance, the study of earnings and adoption of salary schedules, the publication of a code of ethics and the championing of professional improvement, public recognition and civic activity.

Make Awards for Industrial Advertising

The National Industrial Advertisers Association held its ninth annual convention, together with an exhibition of examples of advertising and advertising campaigns, at the Hotel Gibson, Cincinnati, Sept. 30 and Oct. 1 and 2. Some 13 awards in all were made to exhibitors, including the following:

Jenkins Brothers Co., New York, for the best exhibit of industrial advertising.

American Rolling Mill Co., for the best exhibit of industrial advertising campaign in publications.

Joseph T. Ryerson & Sons, Inc., for an industrial direct-mail advertising campaign.

Oxweld Acetylene Co., for the best advertisement in a business paper.

A. Leschen & Sons Rope Co. for the best use of color in industrial advertising.

Hyatt Roller Bearing Co., for the best series of not less than six pieces of industrial advertising featuring news.

Cincinnati Milling Machine Co., for the best series of not less than six advertisements featuring performance.

Sivyer Steel Casting Co., for the most effective use of arrangement and typography in industrial advertising.

Officers Elected

Officers were elected as follows:

President, George H. Corey, Cleveland Twist Drill Co., Cleveland; first vice-president, Allan Brown, Bakelite Corporation, New York; second vice-president, Forrest U. Webster, Cutler-Hammer Mfg. Co., Milwaukee; third vice-president, E. L. Becker, H. W. Roos Co., Cincinnati; secretary-treasurer, Ernest H. Smith.

Blast Furnace and Coke Oven Meeting

The autumn meeting of the Eastern States Blast Furnace and Coke Oven Association will be held at the Cleveland Country Club, Cleveland, Oct. 11. The blast furnace men will hold a round-table at 10 a. m. under the chairmanship of A. E. Maccoun. The coke oven men will hold a round-table at the same time under the chairmanship of Emil F. Vogel. C. L. Wyman is chairman of the committee on arrangements.

At the blast furnace round-table four subjects are announced for discussion. These include bell and stock-line diameters and their relation to blast furnace practice; latest developments in gas cleaning; latest designs in hot-blast stoves; cooling plates above the mantle.

Coke oven subjects also number four, as follows: Electric tar precipitation; possibilities of improvement in coke sizing; preparation of the coal charge; quality, preparation and marketing of domestic coke.

Open-Hearth Men to Meet

Continuing the semi-annual program of the open-hearth committee of the American Institute of Mining and Metallurgical Engineers, the autumn meeting of the committee is to be held in the Hotel Stevens, Chicago, Nov. 5 and 6. Leo F. Reinartz, American Rolling Mill Co., Middletown, Ohio, is chairman of the committee.

The Chicago branch of the institute is planning a joint dinner meeting with the members of the committee at the Chicago Engineers Club, Nov. 6. There is a possibility that the committee in a body may make a trip from Chicago to Alton, Ill., Nov. 7, to visit the Laclede Steel Co. and view the new furnace installed there in which control of combustion is said to be unusually complete.

Paasche Airbrush Co., Chicago, has removed its New York sales and service branch to larger quarters at 103 Lafayette Street. L. J. Dagon will continue as branch manager.

Urges Adherence to Published Prices

Concrete Reinforcing Steel Institute Discusses Methods for Making Bar Distribution More Profitable

"THE Federal Trade Commission, through approving the open publication and circulation of prices to the trade and in approving a single closed bid, has paved the way for the elimination of the Oriental method of individual barter and haphazard dickering in individual transactions." This statement by Arthur Fisher, of Chicago, at the semi-annual meeting of the Concrete Reinforcing Steel Institute, held last week at Wawasee, Ind., opened the discussion of methods by which conditions in the reinforcing steel industry might be radically improved.

Another speaker was Edward L. Ryerson, Jr., president, Joseph T. Ryerson & Son, Inc., who pleaded with the fabricators to "sell service" instead of indulging in cut-throat competition.

Harvey Wiley Corbett of New York, one of the foremost architects in the United States in the modernistic field, paused during his address on "The Meaning of Modernism" to remind his audience that the American Institute of Architects, by the adoption of and adherence to a fixed schedule of commissions, had placed the profession on a high ethical basis. "Steel fabricators should likewise adhere to published prices and sell service," he said.

Says Few Bar Distributers Have Shown Profits

C. Louis Meyer, president of the institute, reviewed present-day conditions in the industry in his semi-annual address. He said:

"Many millions of dollars are invested in the reinforcing steel industry through the members of this institute. It is logical and reasonable that adequate earnings should accrue from this investment and from an annual business which amounts to close to $50,000,000. Unfortunately, competition during recent years has been so keen that few companies have shown a profit and many of them have suffered serious losses. Is it not high time that we individually and collectively should determine that we must and will conduct our sales activities in such a manner as to provide satisfactory earnings? I like to refer to a phrase coined by our genial vice-president, O. W. Irwin—'Confidence, Courage, and Cooperation.' These factors applied to our sales problems will make better profits.

"Let us plan now that we will stop taking business for nothing. Let us have a profit in every sale.

"An ever increasing use of intermediate grade reinforcing steel should be very encouraging to the advocates of a single standard of new billet steel. Curves showing tonnages used this year indicate a marked upward trend for the intermediate grade and a definite downward trend for both the structural and hard grades.

"The Concrete Reinforcing Steel Institute should stand for a quality product and for superior service. The specification for intermediate grade billet steel is the specification of a quality product. We should encourage the building industry to accept this material as the best product which the steel industry can manufacture, as the best product for use in reinforced concrete. It should be known as the institute standard specification. High standards of shop practice, of fabrication of reinforcing steel—high standards of engineering practice, should be adopted by every member of this institute. With these high standards as to quality of steel and of superior service relating to fabrication and to engineering practice, the building industry will soon accept these standards as their definite requirements. Membership in this institute will then become a thing desired by every member of the industry. Architects and engineers will then specify the products and the service offered by institute members.

Cost Information Necessary in Getting Better Profits

"Accurate cost information pertaining to any business is absolutely essential to the success of that business. The cost data which has been developed through this institute relating to the fabrication of reinforcing steel has been exceedingly helpful, I am sure, in pointing the way to better profits. More recently cost information pertaining to engineering work has been enlightening. To those few members who still do not report fabricating and engineering costs, may I encourage the preparation of these reports. Do this for your own satisfaction, as well as for the good of the industry. Only through the keeping of continuous records of costs can you know positively and definitely how to intelligently operate your business. It is to be hoped that the future will permit us to develop a reporting system covering selling and overhead costs. These items are as much a part of your actual costs as the items of fabrication and engineering. To obtain a complete picture of the costs of the reinforcing steel business, it is necessary to cover all of the elements of cost. It is true that the feature of diversification of products of many of our members complicates to some extent the accurate keeping of costs as applied to each product. This can be accomplished, however, and I am personally very hopeful that the future may offer a complete standard cost keeping system, which may be acceptable to all members of this industry.

"Recent years have developed a new kind of competition, that of industry versus industry. Some industries are expending millions of dollars in the promotion of their products. Business today can no longer stand by and be contented with its position. It must either go forward or backward. Industries today are organized into trade associations, institutes, etc. Promotional work on a large scale and national advertising programs are conducted through these trade associations so that any particular industry may hold its own in the game of competition.

"Referring to our own industry, reinforced concrete has made very rapid strides in the past 20 years. Much of this progress, however, has been through the replacement of competitive building materials. Reinforced concrete is now used extensively for many types of building work, for bridges, for roads, for sewers, etc. Other industries have suffered to some extent because of the advancement and the extension of the use of reinforced concrete. These industries have organized and are putting up a fight to get back at least a portion of the business they have lost. New types of construction have been developed, and they likewise are bidding for the business in competition with reinforced concrete.

"If our industry is to progress in the future, as it has in the past, we, who make up the industry, must con-

President Meyer's Advice to Concrete Bar Trade

- Let us have a profit on every sale.
- Stand for a quality product and superior service.
- Continue industry's promotional work.
- Encourage closer relationship between mill and fabricator.
- Adhere to published prices on concrete bars.

tinue our promotional work. We must continue our efforts in market extension, we must overcome the resistance set up by competing industries. I sincerely hope the men of this industry will recognize their opportunity to expand their business, to extend the use of reinforcing steel. Reinforced concrete is the logical, practical, and economical material to use for many classes of building and construction work. Some progress has been made in the use of reinforced concrete for residence floors, but this field as yet has not been scratched. The tremendous volume of residential construction throughout the country should offer an inspiration to every man engaged in the reinforcing steel industry to promote the use of this construction in that field. Recent years have seen a tremendous increase in the use of concrete roads versus other types of paving. While the use of reinforcement for concrete pavements has increased very materially, many roads and pavements are still being built without the use of adequate reinforcement. An aggressive, intelligent campaign promoting the use of reinforcement for concrete roads and pavements will produce very definite results in the way of increased tonnage. Bridges, culverts, sewers, etc., are all logical structures for the use of reinforced concrete. Real promotional effort, however, must be applied to develop these fields to the maximum.

"In looking to the future, I think the most important problem before the industry is the establishment of the logical and proper relationship between the mill and the fabricator. Fortunately, most of the mills recognize the wisdom of a policy which establishes them as the manufacturer or wholesaler, and the fabricator as the distributer or retailer—they realize it is not a healthy condition for the manufacturer to be a competitor of the fabricator. There are, however, certain mills which have as yet not accepted this policy. Their policy has been one of straddling the fence, of attempting to do business with the fabricator and to compete with him at the same time — of being both wholesaler and retailer. To a large degree, it has been the fabricator or the so-called bar company, which in years past has done the missionary and educational work incident to the promotion of reinforced concrete work. It has only been in recent years that some mills have attempted to do business directly with the trade, thereby competing directly with the fabricators. A closer relationship between the mill and the fabricator in the future should improve this situation.

"The fabricator with warehouses and engineering organizations established in most of the leading cities of the country is a very essential factor in the plan of distributing reinforcing steel. To develop the greatest possible tonnage of reinforcing bars, is it not logical that there should be complete understanding and cooperation between the mill and the fabricator? The mill should encourage the fabricator to distribute more and more of its products, rather than to discourage him by competing with him."

Trade Practice Rules

At the Wednesday morning session the institute members listened to a very forceful address under the subject "The Road to Real Profits" presented by Arthur Fisher of Chicago, a member of the firm of Butler Lamb Foster & Pope, legal counsel for the institute.

Mr. Fisher stressed particularly the trade practice conference rules approved by the Federal Trade Commission following the trade practice conference held by the industry at Asheville last April. Mr. Fisher said:

"Under precedents established by trade practice conference rules approved by the Federal Trade Commission in recent months in the case of four important American industries, this association of reinforcing steel fabricators and distributors may, in my opinion, now safely require the publication of prices by each of its members. Industries in which rules with reference to the publication of prices have recently been promulgated by the commission include not only the reinforcing steel industry itself, but also such other groups as petroleum refining and distributing of scrap iron and steel.

"Your industry may also now take the position that any departure from published prices until after those prices have been publicly withdrawn and new prices published and circulated is an unfair and improper trade practice.

"While this trade practice is not to be construed in any sense as justifying any agreements between competitors with reference to uniform prices, the natural effect of the open publication of prices is to stabilize a market on the basis of broader considerations of an economic character, rather than on the basis of individual barter and unrevealed and ill-considered dickering in individual transactions. The open publication and circulation of prices to the entire trade and the public is essential to give real value to cost studies such as those which have been widely encouraged and developed under the leadership of the Department of Commerce during the period of President Hoover's secretaryship. This is particularly true in a building industry where each job is in a sense unique.

" 'Firm bidding' has also now met the endorsement of the Federal Trade Commission and is another step toward the merchandising of reinforcing steel rather than the auctioneering of the product by the lowest bidder. If the industry will throw its weight back of the practice of permitting but a single closed bid, after due consideration of all relevant costs and other factors, on any one job by any one firm, the American method of selling will have replaced the Oriental in your industry. The commission has also given its stamp of endorsement to this procedure and its enforcement, at least in part on the ground that a practice which is a requirement of Government contracts is not improper in private business.

"In order to complete the structure of intelligent rather than haphazard merchandising, it is finally necessary to require, where several items of a different character are included in a single lump sum bid, that each item be quoted separately, and that the bid and the contract show on their faces the application of the published price to the unit price of the commodity. This requirement in all contracts for reinforcing steel has also met with Government endorsement as the approved practice of the reinforcing steel fabricating and distributing industry."

Award by Anonymous Donor

The members of the institute accepted the offer of an award, by an anonymous donor, for the most outstanding achievement related to the industry during the next six months. The award will consist of a plaque (appropriately designed and suitably engraved) to be presented in the name of the institute at the next annual meeting. It will be given as a mark of recognition for service rendered to the industry in research work or improvement of the product, service, merchandising methods or for market extension.

James F. Curley, vice-president, Concrete Steel Co., New York, read a paper on "Inspection of Reinforcing Steel." Charles M. Gunn, president, Gunn Carle & Co., San Francisco, presented a survey on the subject "Pacific Coast Market Conditions." Louis Aronstam, president, Southern G-F Co., Atlanta, Ga., presented a picture of future possibilities in the field of concrete joist construction.

President Meyer announced the appointment of J. P. Thompson, as assistant engineer for the institute, to take effect immediately. Mr. Thompson was formerly employed by the Portland Cement Association. The institute will place Mr. Thompson in offices to be opened in New York and his promotional activities will include the entire East coast.

On Tuesday afternoon the semi-annual golf tournament was played over the course of the Wawasee Country Club. At the banquet that evening William Turner of the Genfire Steel Co., Youngstown, on behalf of the institute, awarded prizes to the following: Low gross, D. C. Schonthal, West Virginia Rail Co., Huntington, W. Va.; low net, Don E. White, Hugh J. Baker & Co., Fort Wayne, Ind.; second low net, P. M. Louwerse, Truscon Steel Co., Chicago; consolidation, B. C. Thomsson, Concrete Engineering Co., Pittsburgh. W. C. Sensing of the Wilson-Weesner-Wilkinson Co., Nashville, Tenn., won a set of matched golf clubs in a blind bogey contest conducted by Peter Durant, professional of the club.

Data That Machine Tool Buyers Need

Five Fundamental Questions That Salesmen, to Serve Best, Should Be Prepared to Answer

INFORMATION that the machine tool buyer needs from the machine tool salesman was discussed in a paper by George T. Trundle, president of the Trundle Engineering Co., Cleveland, at the opening session of the Machine Tool Congress, at the Hotel Cleveland, Cleveland, Sept. 30. Because of Mr. Trundle's absence, his paper was presented by C. O. Malpas, vice-president of the Trundle company. P. E. Bliss, president of the Warner & Swasey Co., was chairman of the session, which was arranged by the machine shop practice division of the American Society of Mechanical Engineers.

"In the purchase of equipment," said Mr. Trundle, "the buyer first wants to know that the machine tool is made by a reliable firm, reliable financially as well as in ability to design and build.

"Secondly, he wants to know that the machine is not an infringement on someone else's patent. I consider it humanly impossible for any manufacturer to say that his product is free from infringement. Therefore, the manufacturer of this machine must be financially able to protect the buyer. The purchaser has additional security if he is buying the machine from a reliable agent.

"Thirdly, the buyer wants facts as to what can be expected from the machine in the way of production, based on facts furnished by him. Fourth, he wants to know what delivery he can expect.

"The third and fourth are the first two items which start the argument between the buyer and the seller. Seldom does a machine tool salesman get sufficient information from the buyer to state intelligently what production can be expected.

"The production from any machine of the best design depends on the type of holding fixtures, the type of tools and the kind of material the tools are made of, the heat treating of these tools, the ability of the buyer to properly sharpen the tools, the skill of the set-up man, the skill of the operator, and the kind of cutting compound.

"The salesman is often given a blueprint of the part to be machined. The blueprint will call for 1/32, 1/16, or 1/8-inch finish. It may be a forging; it may be a casting. The casting may be hard; it may be soft. It may be full of blow holes or hard spots. The same thing is true of the forging. It may not have sufficient stock for finish or it may have two or three times the amount specified on the blueprint. All of which has a direct bearing on the production that can be expected from the machine tool to be purchased.

"The conservative manufacturer will have his estimated production conservative. The reckless machine tool salesman will assume all conditions ideal and guarantee a much higher production. The buyer is after production. He will purchase the machine promising the greatest production, or a fight, whichever way you want to call it.

"In the latter case the salesman has not misquoted. He is basing his facts on a blueprint which specifies ideal conditions. The buyer should, whenever possible, let the machine tool salesman see the job for which he is buying the machine and should give him the history of producing that part to make it suitable to be used in an assembly that will become another machine.

Technical Data Wanted

"Fifth, the buyer wants to know the range of feeds and speeds. He wants to know whether his standard equipment, such as arbors, chucks, fixtures, etc., will fit the machine. He wants to know in considerable detail the size and design of the spindle, what kind of bearings, what kind of gears, whether the machine is motor driven, belt driven or combination. He is particularly interested in knowing whether sufficient power can be applied through the belt or chain to operate the machine at its capacity. One of the most important things he wants to know is: Is the machine properly lubricated?"

Depreciation Reserve Should Be Set Aside

Regarding depreciation reserve, Mr. Trundle said: "I have advocated for many years that a manufacturer set aside a reserve for depreciation of equipment to be used in replacing that piece of equipment when it has reached the end of its usefulness, or, better, when it has ceased to be a money earner. If something should happen to bring this about, the machine tool manufacturers would have to expand to produce enough machine tools to supply the demand, rather than having a few years of prosperity and a long period of no business, as has been the case in the past. The fact of the matter is that the average manufacturer is transferring his reserve from his machinery account to working capital and expansion, and using all of the profits to pay dividends. In other words, he is automatically spending the tangible assets of his business.

"One of the things the buyer wants from the machine tool salesman, but does not know it, is a continuous sermon on the subject of using his reserve for depreciation to keep the plant equipped with modern machine tools."

Iron Ore Imports Continue Heavy in August

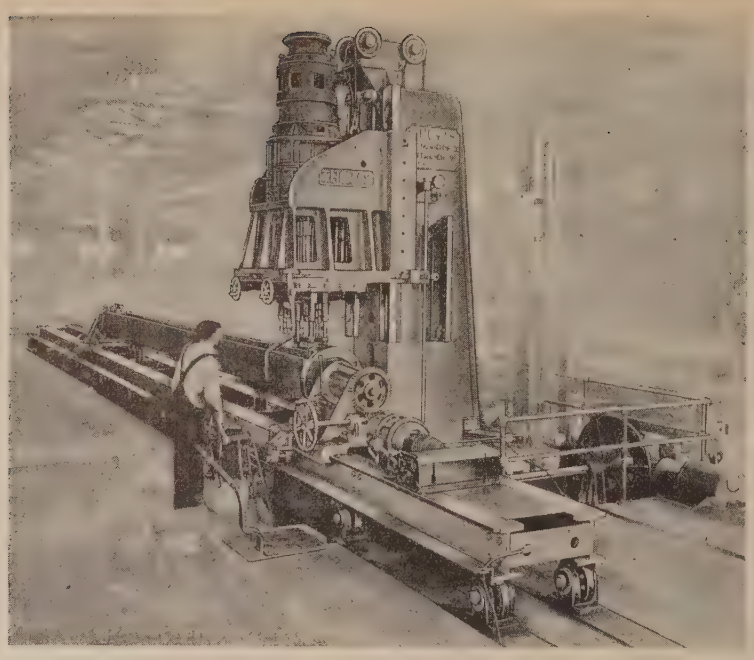
August imports of iron ore at 298,013 gross tons showed a drop of only 1.1 per cent from the 301,418 tons of July. The August total was the third largest in more than six years, having been exceeded slightly also by that of August, 1927. Otherwise no month subsequent to July, 1923, has shown so heavy a tonnage.

Compared with last year the month records a gain of nearly 33 per cent. The excess of imports in the elapsed portion of the year, over last year, is now 390,000 tons, or 23 per cent.

As has been the case for many months, Chile supplied the major portion of the incoming tonnage, with about 57 per cent of the total. Chile's proportion in the eight months of this year has been nearly 53 per cent; last year it was about 56 per cent. Cuba is in second place this year, with Sweden third and French Africa fourth. Last year French Africa was in second place, with Cuba third.

SOURCES OF AMERICAN IMPORTS OF IRON ORE
(In Gross Tons)

	August		Eight Months Ended August	
	1929	1928	1929	1928
Chile	170,756	130,800	1,083,623	948,300
Cuba	51,000	33,500	439,350	234,786
Spain	.....	544	38,231	16,747
Sweden	44,897	.....	210,367	19,614
French Africa	18,815	52,474	128,475	334,605
Canada	764	870	3,360	45,192
Other countries	11,781	7,350	163,801	77,962
Total	298,013	225,538	2,067,207	1,677,206



Drills Spaced Holes in Structural Members

A MULTIPLE drilling machine for drilling rivet holes in structural steel has been brought out by the Thomas Spacing Machine Co., Pittsburgh. It is said to be the heaviest of its type on the market. It has a special roll-over table with spacing attachments, and will drill columns on both flanges and webs. It will handle any size or length of column, with or without cover plates.

Drilling equipment is mounted on extra-heavy cored column in which the counterweights are completely inclosed and on the face of which the drill-head moves. A variable-speed motor is mounted with vertical axis on top of the head, and travels with it, thus assuring a maximum of power transmission with a minimum of moving parts.

Directly between the motor and the spindles is an inclosed gear chest containing 98 heat-treated and ground Westinghouse - Nuttall gears. Each gear is supported on either side by a Hyatt roller bearing. An oil pump supplies oil under pressure over all the gears. The gear chest has been so designed that, 90 per cent of the time, there is practically no angle to the universal joints.

Oil-gear feed gives flexibility for different drilling speeds and provides a rapid traverse when approaching or withdrawing from the work. The maximum feeding pressure is high, and this, coupled with the high power delivered to the drill through the direct transmission, results in rapid drilling through almost any sort of material. Vertical screws between the end supports serve to back up the column during drilling.

The standard roll-over table furnished with the drill embodies the latest developments in spacing table engineering. Power driven in both directions, with a hand wheel furnished for fine adjustments, it is operated entirely through controls grouped in one place directly in front of the operator. Both the flanges and the web are drilled from one set-up, through the roll-over feature.

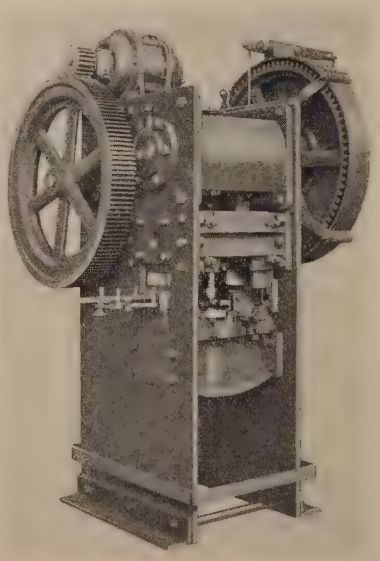
The spacing feature uses an indicator templet having three lines, one for each flange and one for the web. The cost of the templet is negligible, as it consists of a strip of wood with lines at proper intervals. The paper or drilling templet is a printed form, which is quickly marked to enable the operator to select the proper cluster of drills for each drilling. This marking is done in the templet shop, thus eliminating any of this work at the machine and letting the operator concern himself with operation only.

As illustrated, the machine is in use in the plant of the Mississippi Valley Structural Steel Co., Chicago. This unit is equipped with 24 spindles, which can be set in two or four rows.

Combination Machine with Steel Plate Frame

A COMBINATION punch, shear, trimmer and scarfer of double-crank guillotine construction, with a plate frame, is being manufactured by Hendley & Whittemore Co., Beloit, Wis. The frame consists of two rolled steel plates. The bearing housing is bolted between the frame plates. The eccentric shaft bearing castings are held by bolts which extend through the plate frames and the flanges of the bearing housing.

All gears are machine cut. The crosshead is held in guides provided with gibs adjustable in both directions. The die bed is a solid casting which extends through openings in the frame plates. The clutch, of the four-jaw dental type, has two keyways sliding over two splines embedded in the shaft, 90 deg. apart. End motion of the clutch is secured by a collar bearing against a shoulder on the clutch—the collar having three pins traveling in helical slots. All exposed working parts are guarded.

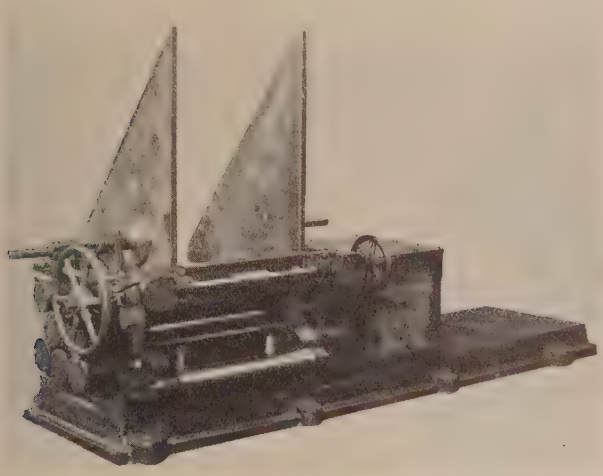


This machine is designed to shear, punch and diamond point 5-in. x ½-in. spring steel cold, and to scarf and nib 5-in. x ½-in. spring steel hot. General specifications are as follows: Floor space, 4 x 5 ft.; distance between frames, 20 in.; r.p.m. of flywheel, 275; strokes a minute, 38; standard stroke; 1⅛ in.; tight and loose pulleys, 20 x 5-in.; motor recommended, 7½ hp. at 1800 r.p.m.; approximate shipping weight, 5500 lb.

The American Chain Co., Inc., Bridgeport, Conn., and associate companies have moved their Chicago offices to room 1765 Chicago Daily News Building. The associate companies include the Ford Chain Block Co., Highland Iron & Steel Co., Manley Mfg. Co., Page Steel & Wire Co., Reading Steel Casting Co. and Wright Mfg. Co.

Machine to Open Coiled Strip Before Pickling

A NEW design of recoiler for opening heavy coils of cold-rolled strip before pickling has been brought out by the D. A. Clark Co., 1376 Fry Avenue, Cleveland. This machine has some new features provided, to give it large capacity and for handling wide strips and heavy gages at high speeds.



Three Options Obtain, in Methods of Opening Coils with This Machine, Depending on How Hard the Coils Are to Open

There are three optional methods for opening the strands. One is the retarding of the carrier rolls, to loop the material throughout the coil. This is regarded as sufficient for the average coil. An automatic feed to the bending roll is provided for opening the strands when harder stocks are being run. In addition, hand operation is available for quick adjustment, as needed.

The rolls are driven through spindles from the gear box, and all bearings are protected from scale. The gear unit has been designed to provide a smooth flow of power. This has been accomplished by a special arrangement of the gears which allows a straight-line drive to each roll, resulting, it is stated, in a marked saving of power.

One feature, which is optional, is a planetary safety clutch to protect the machine from overload. This, it is pointed out, assures more rapid production by protecting the recoiler against the shock of twisted coils, which are likely to damage the machine and necessitate a shutdown for repairs. The machines are sturdily built and are made in a complete range of sizes, either of the portable or stationary type.

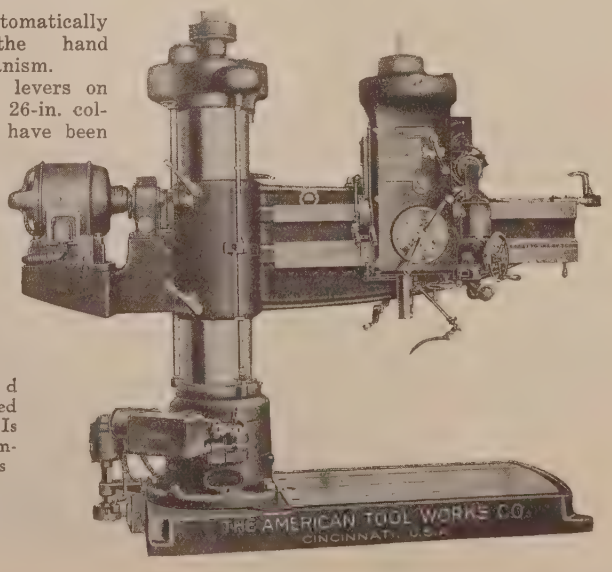
Improved Radial Drilling Machines

SEVERAL improvements, intended to facilitate operation, have been added recently to the radial drilling machines built by the American Tool Works Co., Cincinnati.

Electrical speed control operated from the head is outstanding. This mechanism is mounted on the right-hand side of the head and is within easy reach even when the arm is in its highest position. The control of speeds provided by a rheostat is through a star knob which operates the adjusting mechanism through a sprocket and chain. A graduated dial directly in back of the adjusting knob facilitates securing the desired speed.

An independent power traverse unit has been provided for rapidly moving the head along the arm. It is operated by a motor and switch on the right-hand side of the head and may be used when the machine is in operation or is idle. A small lever at the front operates the motor control switch and automatically disconnects the hand traverse mechanism.

Feed control levers on the 19, 22 and 26-in. column machines have been relocated, being placed at the extreme left-hand corner of the head. The entire range of 12 feeds is secured through the two levers, and the correct lever position for any desired feed is shown on the feed index plate. Unit control for clamping, unclamping, raising and lowering the arm is through a single lever located on the cuff of the column sleeve.

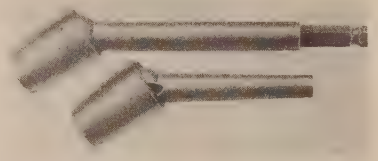


Electrical Speed Control Operated from the Head Is One of the Improved Features

Universal-Joint Nut Setters

FOR setting nuts and cap screws in inaccessible places, the Apex Machine Co., Dayton, Ohio, is offering the universal-joint tool illustrated. The socket end of the joint is made to fit over the nut, and the shank on the ball end is made to specifications as to shape, length and other dimensions. Advantages claimed include unusual strength at extreme angle, and the ability to set nuts tightly in one operation.

These tools are made of alloy steel and will operate at angles up to 30 deg. The illustration shows both the straight-shank style for welding to hand braces, and the special long-shank type with hexagon end for use in portable tools.



The Straight Shank Nut Setter Is for Welding to Hand Braces. The long-shank style has a hexagon end and may be used in portable tools

Hoffman & Scofield-Bruce & Cook Corporation, 66 Cliff Street, New York, jobber of sheet iron and galvanized and black hoops, has removed to 373 Pearl Street, where its business will be conducted under the name of Bruce & Cook, Inc.

Air-Operated Rivet Press

A WEDGE-TYPE rivet press exhibited at the Cleveland Machine Tool Show is made in two forms by the Hannifin Mfg. Co., Chicago. In one the gap is horizontal; in the other it is vertical; both types are illustrated.

No moving part except the ram is exposed. The five points requiring lubrication are provided with Alemite fittings. The operating cylinder is a double-acting air cylinder. Adjustment of the piston construction, to compensate for wear, is made from the outside.

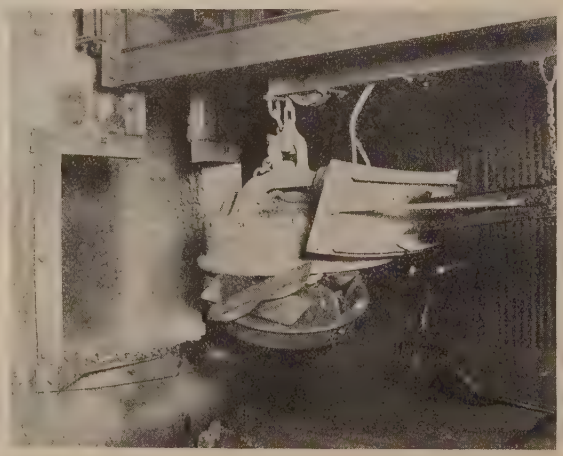
A wedge of predetermined angle is driven between two standard roller bearings mounted in the frame and a roller in the top of the ram. Forward movement of the air cylinder piston drives the wedge in and moves the ram down. The wedge has two angles, the first being comparatively steep to give rapid approach. This takes care of the first 2 in. of ram movement. For the final movement, which is 1 in. in stroke, there is a substantial decrease in the angle.

VERTICAL and Horizontal Forms of Wedge-Type Rivet Press

Although these presses are designed primarily for riveting they can be used for other squeezing operations. There are 13 sizes of the vertical type available, ranging from 5000 to 80,000 lb. pressure. Horizontal models over the same power range may be had in eight types.

Charging a Cupola with a Magnet

ASBESTOS insulation on the electro-magnet illustrated saves the magnet from damage from the heat of the cupola which it is charging. This is one of two 45-in. units used by the New York Car Wheel Co., Buffalo, continuously five days each week. The magnet was furnished by the Ohio Electric & Controller Co., Cleveland, to take the place of hand labor in charging the cupola.



SAVING Hand Labor by Using an Electro-Magnet to Charge a Cupola Involves Protecting the Magnet from the Heat of the Shaft

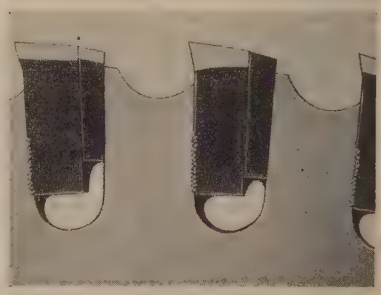
New Hacksaw Blades

A NEW line of hacksaw blades, for both hand and machine use, has been put on the market by the Simonds Saw & Steel Co., Fitchburg, Mass., under the trade name of Red Streak. The blades are said to be made of a highly wear-resisting heat-treated steel, and the teeth are of such shape that they will stand up under severe metal cutting operations, eliminating the difficulty of shelling when cutting hard metal. The blades are distinctively marked with a red back edge.

Inserted-Tooth Saw with Serrated Teeth

AN inserted-tooth saw, both the teeth and pockets of which are serrated, has been brought out by the Hunter Saw & Machine Co., Pittsburgh.

The serrations serve to lock the teeth firmly in the saw blade, eliminating the possibility of teeth moving while cutting. The teeth are adjustable by being moved up or down on the serrations; they are ground in the saw and need not be removed except for replacement, when worn out. A number of standard sizes are manufactured, and saw blades with thinner thickness of plate and kerf can be supplied.



The Serrations Lock the Teeth Firmly in the Saw Blade

To Discuss Heat Treatment of Springs

An address on the subject "Springs and Their Heat Treatment" will be delivered by R. W. Cook, vice-president the Wallace Barnes Co., Bristol, Conn., at the October meeting of the New York Chapter of the American Society for Steel Treating. The meeting will be held in the rooms of the Building Trades Employers' Association, 2 Park Avenue, New York, on Monday evening, Oct. 14. The lecture is scheduled for eight o'clock and will be preceded by a dinner at 6.30 in the dining-room of the association.

Railroads Protest Steel Rate Decision

Do Not Object to Uniform Scale But Object to Methods of Application by Commerce Commission

WASHINGTON, Oct. 8.—In their petition for reopening of the Eastern general steel rate case, carriers in Official Classification territory, in discussing the five points on which they based their plea, emphasized what they claimed were contradictory findings in the decision of the Interstate Commerce Commission as well as the losses in revenue which, they asserted, would arise from application of the decision.

The railroads protested against the level of scales prescribed as maximum reasonable rates throughout Official Classification territory; the port differentials; failure to prescribe the classification basis as the maximum reasonable basis for points within New England; the fixing of an arbitrary of 2c. per 100 lb. as the maximum to be added for interchange service between trunk and New England territories on traffic moving by way of New York harbor, and the alleged insufficiency of relief necessary under the long-and-short haul provision.

The estimate of the carriers that the scales prescribed would bring about a loss of $2,500,000 annually in revenues is the same as made by Commissioner Woodlock, who dissented in part from the decision. Other losses would result, according to the carriers, from the requirement that railroads compute mileage by way of the shortest possible route over which carload traffic can be moved without transfer of lading. In many cases, they stated, there are no actual open routes through which traffic can now move which are as short as those fixed by the formula for determining the rate. This, it was declared, would result not only in reduction of present mileages of the Central Freight Association lines, now computed on actual working distances, but in establishing a lower rate level based on a shorter distance than the shortest workable route between points.

As an example it was pointed out that, under the commission's formula, the rate-making mileage between Youngstown and Detroit is 230 miles, while the shortest workable distance and present class rate distance is 240 miles. The statement was made that the movement between Youngstown and Detroit is heavy and that the reduced rates resulting from the use of the commission's formula would necessarily entail a revenue loss not discernible by the application of the scale applicable to the entire territory excepting New England, which would take a scale 10 per cent higher than the basic scale. It was further declared that large additional losses in some territories would be suffered due to the fact that existing rates on billets, scrap iron and possibly other products, including pig iron, would in some cases be higher than the rates prescribed for manufactured articles.

The claim was set up that the carriers in Official Classification territory are not earning a fair return as contemplated by the statute and that the commission under the law cannot make a general reduction in rates on an important class of traffic such as manufactured iron and steel in such a way as to reduce the carriers' aggregate revenue.

The petition said that the carriers now accept the commission's general conclusion that a uniform basic scale should apply, except within New England, but they declared that the basic scale should be higher.

In opposing the port differentials which would be established by the decision for North Atlantic ports and Central territory differentially related as between ports, the petition renewed their request made at the hearing for preservation of the existing relationship. The petition said that the Baltimore & Ohio and Western Maryland consider the maintenance of port differentials incompatible with a mileage scale basis of rates and therefore do not subscribe to this portion of the petition.

The petition restated points made in a petition of Aug. 15, the substance of which was published in THE IRON AGE of Aug. 29, page 553, regarding what was described as the "irreconcilable conflict" between the rate-making rule and the fourth (long-and-short haul) section order, calling for fixing of rates by the most direct hauls, etc. It was declared that the relief granted will often prevent the prescribed rates from being published over the only open working routes. In this connection the petition deals with so-called origin departures and said that, as an instance, the rate from Coraopolis, Pa., to Hudson, N. Y., which would result from the application of the prescribed rate-making rule would become 35c., based on a distance of 500 miles, while the rate from the intermediate origin points on the same route would become 36c. under the same rate-making rule. Numerous other instances of a similar character were cited in an effort to support the contention that the long-haul rights of the carriers comprising the shortest working route would prevent the opening of the rate-making route. Cases were specifically mentioned also in connection with the argument that the equi-distant rule will disrupt prescribed group rates, using the rate-making mileage as a measure.

Among other allegations it was claimed that the order limiting the circuity of routes is inconsistent with the rate-making formula. It was pointed out that the commission approved the grouping of points in the Pittsburgh district and points in the New York metropolitan district, but that the circuity limitation would prevent the publication of the New York rate by way of certain routes to points mentioned in the finding and would result in the publication of higher rates, based on actual distances, to individual points. This, it was argued, would tend to disrupt the New York City group in its entirety and would violate that section of the Interstate Commerce act forbidding discrimination between connecting lines.

Railroads Justify Present New England Iron Rates

WASHINGTON, Oct. 8.—Present rates on pig iron from the blast furnace of the Mystic Iron Works at Everett, Mass., were declared to be justified in statement of exceptions filed with the Interstate Commerce Commission last week by the New York, New Haven & Hartford and the Boston & Maine railroads against the proposed report of Examiner C. E. Simmons, recommending a scale of rates on this traffic. The carriers declared present rates are on the exact level prescribed recently as reasonable by the commission itself for this traffic in New England, except where conditions beyond the railroads' control have forced a depressed basis even lower. The proposed finding, if finally approved, it was stated, would place the commission in the anomalous position of appearing to approve attacks on rate adjustments which it has prescribed as meeting its own standards of reasonableness.

The examiner's report previously was attacked by the complainant on the ground that the scale prescribed was not low enough.

The railroads said that the scale would bring about a rate reduction averaging 10c. a ton on the New Haven, while there would be both decreases and increases for the Boston & Maine. Contention was made that, contrary to the proposed report, reasons for the difference in rates as between those of the Boston & Albany and the Boston & Maine, on the one hand, and those of the New Haven, on the other, are controlling so far as the Boston & Maine is concerned.

The recommendation that the complainant be accorded a rate advantage over Troy, N. Y., because the Mystic plant performs its own industrial switching while the Hudson Valley Coke & Products Corporation at Troy receives a switching allowance, was also attacked. It was pointed out that neither the Boston & Maine nor the New Haven serves the Troy plant nor makes any allowance to it for services rendered by its plant facilities. It was added that the allowance made the Troy plant for this service amounts to 43c. a loaded car, or less than 1c. a ton on pig iron only, and does not apply to traffic paying only a switching charge.

The examiner recommended that the rates from Everett be made 20c. a gross ton lower than the Troy scale, equivalent to $10 a car, with a 50-ton

lading. Moreover, the railroads stated, it would be unsound if not unlawful to permit the question of switching allowance to be reflected in the level of a rate scale. It is recognized, the statement continued, that a carrier cannot be compelled to grant an allowance and must not make an allowance greater than the reasonable cost of the service. The railroads maintained that, if any discrimination is believed by the complainant to arise out of the present situation at Troy, "where the plant has not been operated since October, 1927, the matter should be made the subject of a separate complaint."

Hearing on Texas Steel Rate Reductions Nov. 4

WASHINGTON, Oct. 8.—Hearing on tariff schedules proposing to reduce rates on iron and steel products 7½c. per 100 lb. on carload traffic moving from Atlantic seaboard territory to Texas points by rail-ocean-rail has been assigned by the Interstate Commerce Commission for Nov. 4 at the Sherman Hotel, Chicago, before Examiner J. E. Smith. The schedules have been suspended until April 5. Typical of proposed reductions are those applying to Dallas, which would take a rate of 73½c. from Reading, Pa., against the prevailing rate of 81c., and a rate of 75c. from Bethlehem, Pa., compared with the existing rate of 82½c.

Baldwin to Acquire the Southwark Foundry

The Baldwin Locomotive Works will take over the Southwark Foundry & Machine Co., Philadelphia, the acquisition to be effected by an exchange of 43,000 shares of Baldwin stock for the entire assets of the Southwark company. Close business relations have existed between the two companies for many years.

Samuel M. Vauclain, chairman of the board of Baldwin Locomotive Works, issued the following statement regarding the transaction:

"Baldwin Locomotive has been engaged for some years in gradual diversification of its products into new lines allied with the locomotive industry. It holds substantial investments in four enterprises engaged wholly or partially outside of the steam locomotive industry, namely: Standard Steel Works Co., engaged in making forgings, steel castings and other parts for locomotives and railroad service in general and for other lines of industry; Midvale Steel Co., engaged in the making of large and special forgings and other high-grade engineering specialties; General Steel Castings Corporation, engaged in making a broad line of steel castings for railroad equipment and for industrial equipment, and George D. Whitcomb Co., engaged in the manufacture of oil locomotives for industrial and mining purposes."

Mr. Vauclain said that the Baldwin company's policy of diversification would be continued. It is planned, he said, to carry on the manufacturing operations of the Southwark company in a building of the Baldwin plant at Eddystone, Pa., but the company will be operated as a separate unit.

Gulf States Will Install Notable Plate Mill

To increase the diversity of its products, the Gulf States Steel Co., Birmingham, is preparing to install an electrically-driven three-high 32-in. universal plate mill, embodying a number of features which reflect the tendency toward refinement of rolling mill design. The main drive for the mill consists of a direct-connected 4000-hp. 800-volt, 80/160 r.p.m. adjustable-speed reversing mill-type direct-current motor, receiving power through a 3200-kw. flywheel motor-generator set. This will be the first three-high universal plate mill to have a direct-connected heavy-duty adjustable-speed drive.

One of the new features of the auxiliary equipment is the automatic screwdown control for adjusting the setting of the rolls for each pass, thus to secure a greater tonnage of more uniform and more accurately rolled thin plates with less labor than with the conventional manual control.

Contract for the complete electrical equipment has been let to the Westinghouse Electric & Mfg. Co., East Pittsburgh. Warren Worthington, Pittsburgh, is consulting engineer, and the F. H. McGraw Co., New York is construction engineer.

Production and Orders, Commercial Steel Castings (a)

	August, 1929	July, 1929	August, 1928
Total orders, net tons	96,709	102,443	81,286
Ratio to capacity, per cent	66	70	55
Orders for railroad specialties	35,889	37,731	25,171
Ratio to capacity, per cent	53	56	37
Miscellaneous castings	60,820	64,712	56,115
Ratio to capacity, per cent	73	83	70
Eight months, total orders	923,086	.....	657,546
Do., railroad specialties	413,566	.....	249,420
Do., miscellaneous castings	509,520	.....	408,126
Production, total, net tons	116,542	117,187	87,742
Do., railroad specialties	50,539	51,989	27,157
Do., miscellaneous castings	66,003	65,198	60,585

(a) United States Department of Commerce.

Good Machine Tool Business in Europe

An extended survey of the machine tool industry in Europe has been made by A. C. Cook, vice-president, Warner & Swasey Co., Cleveland, who returned a few days ago after a five months' trip abroad, during which he visited most of the European countries. "Machine tool business is fairly good in England and France, both in the amount of business the machine tool manufacturers are doing in those countries and in the amount of imports," he said.

"The demand for machine tools in England and France is centering at present around the automotive industry. However, in England the engineering trades are fairly busy and are furnishing business for the British, American and German machine tool builders. France has imported considerable machinery on reparation account. Switzerland and Holland are fairly busy and are buying some English, German and American machinery. Conditions are also fairly good in Czecho-Slovakia, where both American and European machinery is being bought. Austria is flat and there is not much demand for machine tools from either Italy or Belgium.

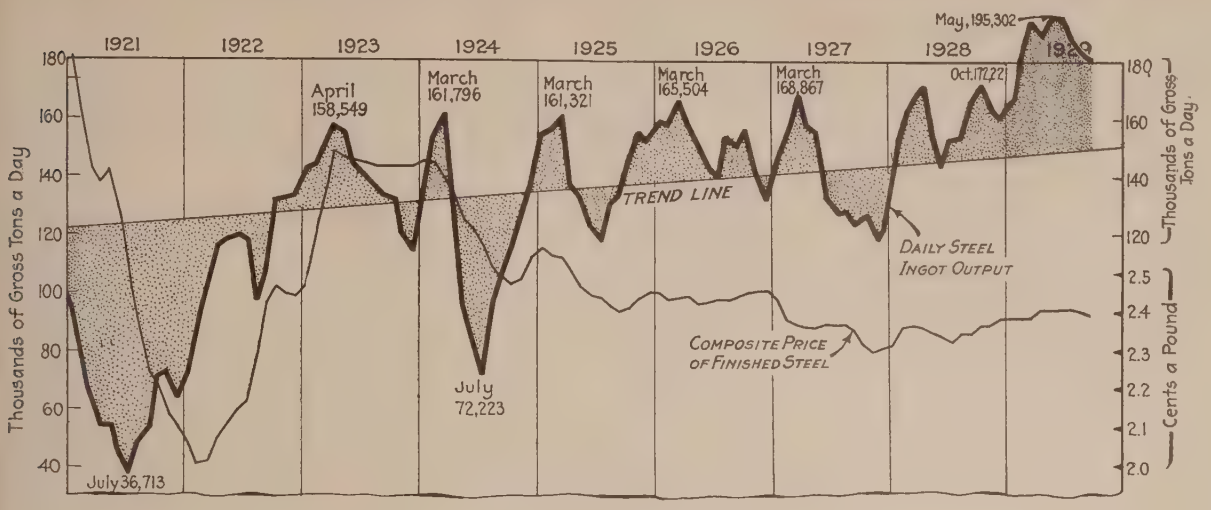
"In Germany business in about all lines is very slow. Some German machine tool plants are fairly busy and some are doing little. I was told that 60 per cent of the machine tools that are being made in Germany are exported. However, I did not attempt to confirm the accuracy of this statement.

"With American tools in Europe it is still the old story of price competition of German made machines. German machine tools are being delivered in European countries at approximately one-half the cost of American tools. It seems to be the general opinion that the cost of manufacturing machinery in both Germany and England will advance because wages are so low that labor may insist on better pay and this would mean higher cost for raw material and for producing machine tools."

Trade Practice Booklet

WASHINGTON, Oct. 5.—The Federal Trade Commission's pamphlet entitled "Trade Practice Conferences" was issued last week and copies are available at 25c. each from the Superintendent of Documents. The pamphlet traces the development of the Trade Practice Conference, explains that its purpose is to cooperate with industry in setting up principles to guide it in voluntarily eliminating unfair methods of competition, and points out that close to 70 industries have held such conferences, adopting more than 300 rules of business practice, with the power of the commission being invoked with reference to less than a dozen of them.

Heavy Ingot Output Was Maintained Through September, Though the Downgrade from the Spring Peak Is Manifest. Finished steel prices are 2 per cent above last year



Steel Ingot Production Continues Heavy

Largest September Ever Recorded, But Lowest Month Since February—Nine Month Total 17.1 Per Cent Above 1928

PRODUCTION of steel ingots in September showed a drop of 8.4 per cent from the August figures, but remained by a wide margin the largest total for any September. The nearest approach was last year, and the increase over that month was 8.7 per cent. The total is calculated by the American Iron and Steel Institute (from returns from companies which made 94.51 per cent of the 1928 output) at 4,510,879 gross tons of Bessemer and open-hearth ingots. Previous to this year, this monthly total had been exceeded by only two months in our whole history—March, 1927, and October, 1928. It is, however, the lowest total for any month since last February.

Daily averages, figured by eliminating Sundays from each month, show for the 25 days of September 180,435 tons, compared with 182,491 tons (revised figure) for 27 days in August. Here again the figure is the lowest since February, but it is higher than that for any month of any year preceding 1929. One year ago production was 165,916 tons a day in September.

Both open-hearth and Bessemer tonnage showed reductions in September from the preceding month. The drop in open-hearth was 9.1 per cent, while that in Bessemer was 4.9 per cent. Compared with September, 1928, however, both forms of steel showed increases, that in open-hearth having been 7.5 per cent, while that in Bessemer was 16.7 per cent.

For the nine elapsed months of the year the total output is calculated at 43,243,404 tons. This is an increase of 17.1 per cent over the 36,930,174 tons of nine months last year, and is the largest on record. Both the Bessemer and the open-hearth tonnages participated in this increase, open-hearth having shown a gain of 17.7 per cent and Bessemer, 13.4 per cent. In passing, it may be noted that only seven complete years of 12 months have shown over 43,000,000 tons of ingots. The first time this figure was reached was in 1917, when a spurt, due to war orders, carried the tonnage to a new high record.

Electric and crucible ingots are not included in the current totals. Production of these two types of steel last year averaged about 1480 tons a day. Some such amount would have to be added to the daily figures in the table to obtain the total ingot output of the country.

Particulars for the past 21 months are shown in the table. The diagram traces the course of ingot production and finished steel prices over the period from the beginning of 1921.

PRODUCTION OF OPEN-HEARTH AND BESSEMER STEEL INGOTS
(GROSS TONS)

1928 Months	Reported by Companies Which Made 94.51 Per Cent of the Steel Ingots in 1928		Calculated Output of All Companies		No. of Working Days
	Open-Hearth	Bessemer	Monthly	Daily	
January	3,273,294	498,691	3,990,902	153,496	26
February	3,300,407	521,250	4,043,457	161,738	25
March	3,692,648	567,330	4,507,217	166,934	27
April	3,505,104	564,110	4,305,382	172,215	25
May	3,394,301	582,128	4,207,212	155,823	27
June	3,010,341	528,193	3,743,903	143,996	26
July	3,068,257	528,588	3,805,598	152,224	25
August	3,379,625	569,771	4,178,610	154,763	27
September	3,375,654	544,710	4,147,893	165,916	25
Nine months	29,999,631	4,904,771	36,930,174	158,499	233
October	3,795,800	599.098	4,649,968	172,221	27
November	3,442,112	590,669	4,266,835	164,109	26
December	3,301,114	496,679	4,018,208	160,728	25
Total	40,538,657	6,591,217	49,865,185	160,338	311
1929					
January	3,694,218	549,616	4,490,354	166,309	27
February	3,599,224	489,279	4,326,000	180,250	24
March	4,183,869	596,691	5,058,258	194,548	26
April	4,026,576	640,351	4,938,025	189,924	26
May	4,276,186	707,484	5,273,167	195,302	27
June	3,990,798	622,585	4,881,370	195,255	25
July	3,922,532	649,950	4,838,093	186,080	26
August	3,988,729	668,023	4,925,802	182,491	27
September	3,627,639	635,593	4,510,879	180,435	25
Nine months	35,309,771	5,559,572	43,243,404	185,594	233

Status of Tungsten-Carbide Tools

Characteristics and Use of New Tool Material Discussed at Machine Tool Congress

THE present status of cemented tungsten-carbide tools and dies was reviewed by Dr. Zay Jeffries, consulting engineer, General Electric Co., at the second session of the Machine Tool Congress, which was held at the Hotel Cleveland, Cleveland, on the evening of Oct. 1. The session was arranged by the machine shop practice division of the American Society of Mechanical Engineers. R. E. Flanders, manager of the Jones & Lamson Machine Co., Springfield, Vt., was chairman.

In outlining the development of cemented tungsten carbide, Doctor Jeffries pointed out that it represents the work of a good many people, in this country as well as in Germany. Referring to the price, he said: "As you all know, the cemented tungsten-carbide material is offered to the trade at what we call a relatively high price. It is, in round numbers, $4.5(per lb. That, of course, is more than the material will cost in the future, and it is a price which none of us expect will be maintained in the industry. On the other hand, the industry is in the process of development, and development costs a great deal of money."

In another part, he said, referring to the price: "It is a subject which will always come up in the discussion; somebody asks: when is the price of the material coming down? If you are using the tools at a saving to yourselves, then of course you don't need to have the price come down to effect some saving; if you are waiting for the price to come down before starting the use of these tools, that is your own loss, provided at present prices you can effect a saving."

Large Field in Wire Drawing Dies

A number of applications of the cemented tugsten-carbide tools were cited. One wire drawing die using this material was said to have drawn 57,800,000 ft. of 0.0108-in. diameter screen wire with a wear of only 0.0007 in. in diameter. At this size the performance was approximately equivalent to that of a diamond die, but with more cuts possible. The overall improvement in cost over the diamond die, on a performance basis, was said to be 6 to 1.

Another example cited was the drawing of 0.105-in. diameter steel wire. Over a 12-day period, 264 chilled iron dies were used to one cemented tungsten-carbide die, which performed without going off size. On the basis of die cost alone the tungsten-carbide die was cheaper than the iron die by a ratio of 36.6 to 18. In addition, 20 per cent more wire was produced by the one tungsten-carbide die than by the 264 chilled iron dies. Cemented tungsten-carbide dies are also being used for hot drawing of tungsten and molybdenum, said Doctor Jeffries, and more will be heard in the future about the use of this carbide in hot drawing of other materials. Tungsten-carbide blanking dies are used by the General Electric Co., for punching transformer disks; a feature of these dies is the production of disks free from burr.

Expects Changes in Machine Tools

Tribute was paid to the machine tool industry for having developed, within the year or more since tungsten-carbide tools were made available, machines that better fit the properties of this new tool material. "If the machine tool builders have appraised this situation during the past year, and after appraisal have decided to spend the amount of money they have spent to build these special machines and think well enough of the future to exhibit those machines at an exposition of this sort (Machine Tool Builders Exposition), you can be assured that if the exposition is not held for another three years you will see a revolutionary change in machine tools."

Will Not Eliminate Steel Tools

In closing Doctor Jeffries said:

"We don't anticipate that cemented tungsten carbide, even though it be made very much more cheaply, or sold very much more cheaply than it is today, will eliminate high-speed steel or carbon steel tools. I strongly suspect that in 1935 there will be as much or more high-speed steel made per year as in 1929, and that is a big year.

"Furthermore, we do not regard this material as a cure-all for everything in the tool industry. Some applications have met with very indifferent success; some attempted applications can be branded at the present time as absolute failures.

Tungsten-Carbide Destined to Have Important Place

"We do not know where this material will lead us, especially from the standpoint of tool substitutions. We are learning, and you are learning; when we put all of our knowledge together we are going to find out what is economical and what is not. It seems to me, however, that we have gone far enough so that we can say definitely that cemented tungsten carbide is destined not only to have a definite place in the future of industry, but a most important place; that it will be used in large quantities and for a great variety of purposes in the future there can be no question, and when I say "it" at this stage, I mean cemented tungsten carbide, or its approximate equivalent, or what may be considered an improvement on existing material.

"This art is so new that we can confidently expect improvements in the future, but even with what we have now and what we know from our laboratory investigations, we can predict without any hesitancy that this material will have a very important place in the future.

"One of the results is going to be the carrying on of this high-speed steel and stellite activity toward greater economic benefits for mankind. It seems reasonable that the material offers the possibility of increasing, on the average, production in machine shops to the extent of 20 per cent, or will make possible the production in five days what now takes six. If that is true it cannot help but benefit all of the people, because machined goods will cost less. It will benefit the metal industries because more metal can be used."

A more extended abstract of Doctor Jeffries address will be included in a forthcoming issue of THE IRON AGE.

Automotive Engineers Arrange Sessions

TWO sessions of the Machine Tool Congress were under the direction of the production group of the Society of Automotive Engineers.

At one of these, held at the Hotel Cleveland on the evening of Oct. 2, F. E. Raymond, assistant professor of industrial research, Massachusetts Institute of Technology, presented a paper on "Economic Production Quantities." E. P. Blanchard, Bullard Co., Bridgeport, Conn., was chairman of this session.

The second S.A.E. session, on the evening of Oct. 3, was devoted to a symposium on the application of standard machine tools and the results due to new features in machine tool construction. A. K. Brumbaugh, engineer, White Motor Co., Cleveland, was chairman.

Joint Production Dinner

The Machine Tool Congress closed with a joint production dinner held at the Hotel Cleveland, Friday evening. This was sponsored by the Society of Automotive Engineers, the American Society of Mechanical Engineers and the Machine Tool Congress. E. P. Blanchard, Bullard Co., acted as toastmaster; he introduced a number of men prominent in the machine tool industry, including officers and former officers of the National Machine Tool Builders' Association. The speaker of the evening was James Schermerhorn, Sr., editor of the *Detroit Times*, Detroit.

At the conclusion of the dinner the chair announced the nomination of John Younger, professor of industrial engineering, Ohio State University, as vice-president in charge of production of the Society of Automotive Engineers.

This Issue in Brief

Saves $6,550 in power bills during 17 months by installing Diesel engine to produce electric current in place of purchased current. Entire cost of operation is only $153.41 a month, and power cost is 1.2 c. a kw-hr. A toolmaker, working in adjacent toolroom, looks at the engine occasionally. —Page 970.

* * *

To reduce power press accidents specify a *safe* die. An expert designer can provide a die which will eliminate accidents, otherwise frequent, and remove the fear which drives efficient operators away.—Page 971.

* * *

Die casting surface improved by use of mold wash which also protects the die. It modifies to a certain extent the speed at which the skin chills when the molten alloy strikes the face of the cool die.—Page 969.

* * *

Quenching in hot aqueous solutions is advocated to take up gap between cooling rates obtained with water and oil at ordinary temperatures. Lack of uniformity due to steam formation can be avoided by circulation.—Page 963.

* * *

Unsafe practices rather than unsafe conditions are accountable for 85 to 90 per cent of industrial accidents. To improve safety record, one should manifest a keen interest in accident prevention, speak to the supervisors about it and congratulate those with good records.—Page 964.

* * *

Welded steam piping reduces insulation maintenance costs. When gasketed joints leak, water - logging of expensive molded insulation results.—Page 966.

High-strength structural steels can best be made by increasing the manganese content, tests reveal. Raising the carbon content is much less satisfactory.—Page 962.

* * *

Hoisting rope failures are due to abuse rather than fatigue, says engineer. High fatigue limit is not the most important property of wire rope, he says, but the capacity to resist destruction from overstressing and wear.—Page 956.

* * *

When one buys machine tools, there are five questions the salesman should answer. Buyer wants to know that the maker is reliable, that the machine is not a patent infringement, what production he will get, when the machine will be delivered, and the range of speeds and feeds.—Page 979.

* * *

Pickling time is directly affected by the kind of finish on the steel surface. Weight of zinc coating is affected by the finish and also by the length of pickling time.—Page 957.

* * *

In heat treating, parts can be conveyed through furnaces by any of 13 different mechanisms. One of the most desirable types is the "walking beam." Little power is required, no trays are needed and a great variety of parts may be conveyed without injury.—Page 962.

Thousands of dollars saved manufacturers by "spark testing" method of sorting steels which have become mixed. Trained spark testers quickly identify different grades of steels by noting characteristics of sparks thrown off by grinding wheel.—Page 956.

* * *

Cuts cost of high-strength structural steel by alloying with small quantities of copper and chromium instead of silicon. The new steel welds more easily and is more resistant to corrosion.—Page 962.

* * *

Life of die increased tenfold by finding the right quenching mixture. Tool steel die to stand 200,000-lb. pressure lasted only 3000 to 5000 operations. When properly quenched, the dies lasted for 50,000 operations.—Page 963.

* * *

Secret price cuts will be regarded as "unfair and improper trade practice." Trade practice conference rules require reinforcing bar industry publicly to withdraw published prices when new prices are established. Submission of two bids is frowned upon. —Page 978.

* * *

Machinery exports decline. August total of more than 50 million dollars worth was over 6 millions below July figure. But eight-month total is 24½ per cent above same period of 1928 and a new high record for the period.—Page 1015.

A. I. FINDLEY
Editor

THE IRON AGE

W. W. MACON
Managing Editor

ESTABLISHED 1855

Use Steel and Plenty of It.

TIME was when much cast iron was used in building construction. It was the standard material for columns and compression members in trusses. Some of the bolder architects installed cast iron beams to carry wooden floor joists, or cast iron plates to ornament a pretentious exterior. Rolled beams of mild Bessemer steel then supplanted the iron ones, and terra cotta or other ceramic product has pre-empted the decorative function. Cast iron seems to be left only a minor market for columns for three- or four-story buildings.

That the possibilities of this reliable material in the building field have not been exhausted, however, is proved by a recent use of solid cast iron, strangely enough, to reinforce concrete. It is well known that concrete buildings have a distinct limit of height beyond which they become uneconomical. The dead load of the bulky concrete becomes such an increasingly greater multiple of the live load, as the building gets taller, that a height is soon reached where the lower floors would have little room for aught else but huge columns. But by carrying these heavy floor loads on cast iron, a much stronger material in compression, the size of the columns can be kept in control. Thus a 16-story concrete building for heavy manufacturing can be supported by columns at 20-foot spacing and no larger than 24 inches square, if the center is a solid cast iron core of 11 inches diameter.

This rather bizarre situation results from an intelligent effort to utilize tried and true building materials to the best advantage. A similar and even more striking achievement can be made by those who break away from the conventional reinforced concrete design, where the ideal is to use a minimum of steel and a maximum of concrete. This thought can best be developed by a reference to the problems of bridge design.

Engineers ordinarily assume that a highway floor slab plus a 2-inch asphalt wearing surface will weigh about 135 pounds per square foot. (This does not include the beams and stringers necessary for support.) Of this 135 pounds, about 10 pounds would be reinforcing steel, 100 pounds concrete and 25 pounds asphalt. Much of the truss work is therefore necessary merely to support this floor slab. For instance, in a steel suspension bridge of moderate length half the entire weight is concrete. This dead load obviously becomes a factor of major interest in long-span bridges.

Since an 8-inch slab is about as thin as is practicable with loose-bar reinforcement (owing to variations in setting the individual bars and liability to derangement during pouring) one way to economize on weight is to use trussed members for reinforcement, either pressed out of special steel shapes or made of rods welded together. Such means were used on the Philadelphia-Camden bridge, where a 6-inch slab of concrete with the following characteristics was used for a floor as strong as the heavier slab mentioned above:

Weight of steel.....	8¼	lb. per sq. ft. of floor
Weight of concrete.....	72¼	lb. per sq. ft. of floor
Weight of asphalt	25	lb. per sq. ft. of floor
Total	105½	lb. per sq. ft. of floor

In a big bridge or a big building this saving of one-quarter the weight of the floor would mean a great economy in the supporting structure, and far overbalance the increased proportion of steel in the slab itself. In fact, if the amount of steel is increased to where it equals the weight of concrete the saving is even more impressive. L. S. Moisseiff, advisory bridge engineer for the Port of New York Authority, has tested slabs of this sort. The steel is a row of inverted tees set so that flanges touch. The upstanding legs are slotted at 3-inch spacing and transverse bars pressed into them, making a steel checkerboard. When filled flush to the top with abrasion-resistant concrete it is a self-contained unit, with an enduring surface under traffic without need of asphalt. For equivalent strength to a standard highway floor it is about 3¼ inches thick and weighs 60 pounds per square foot, half steel, half concrete.

One might object that in such a design the steel is not working to maximum efficiency; that is, the concrete spalls before the steel stretches. But this overlooks the overall efficiency of using steel and plenty of it. Such a "waste" of steel cuts the weight of an ordinary floor slab in half; it makes corresponding savings in the supporting structure; it reduces the thickness from 8 to 3 inches (which means 4 per cent of the height of a tall building), and reduces the form work to zero.

In view of these achievements, the saying that the steel is working inefficiently falls flat. Use steel and plenty of it. In the end it will turn out best and therefore cheapest.

NATURALLY the recovery of the Russian steel industry from the effects of the war might be expected to be slower than that of other European nations. However, the Soviet Government evidently has been very successful in reorganizing and operating blast furnaces and steel plants. Today for the first time in over ten years the industry is again on a

pre-war basis. In 1913 Russia's production of pig iron was 4,145,000 gross tons or 345,500 tons a month. Reports thus far available for 1929 show a rate of 358,100 tons a month, indicating a yield of about 4,300,000 tons for the year. In steel Russia made 4,760,400 tons or 396,700 tons a month in 1913. The present rate of production is 390,300 tons a month. With 410,400 tons and 411,500 tons for the last two months reported, Russia's 1929 output may easily surpass that of 1913. Reports indicate large expansion in new plant as the future program, under the cooperation of American mechanical and metallurgical engineers. It would be quite premature to speculate on what this program may hold of possible competition in markets now occupied by the leading steel-producing countries of Europe. Russia's uncertain place in international diplomacy will prevent that question from being a live issue for a good many years. Meanwhile, however, Russia promises to be less and less of an importer of steel—a matter likely to be of most concern to the German makers, since the latter have chiefly benefited from that trade since the war.

The Next Upturn in Steel

WITH steel production off between 10 and 15 per cent from its peak rate of last May and June, and with further decreases probable, this is exactly the right time to refer to the next upturn. With the decline every one is familiar and the prospects of an upturn need to be brought out. While steel diverged from its usual seasonal swing in the past spring and summer, we may feel reasonably certain that of any decline that may occur in November and December a part will be seasonal, there being ample precedent for such an appraisal.

There are impressive precedents to be reviewed, showing that it is perfectly normal for steel production to turn upward immediately after December. When the entire second half of a year has been bad the recovery in the new year is more pronounced, but even after a good second half there is a substantial increase over the December rate. In seven consecutive years there has been no exception.

The comparison is made in the table below, which shows the increase in the rate of steel ingot production from December to the peak month of the first half of the new year, which was also, except in the case of 1928, also the peak month of the whole year.

Peak Month Gain Over Preceding December

	Per Cent
1923, April	20.0
1924, March	41.2
1925, March	17.5
1926, March	8.4
1927, March	27.1
1928, April	41.5
1929, May	21.5
Average	25.3

The large percentage gains, of course, occurred after years with poor endings. Both 1923 and 1927 ended poorly, but instead of that constituting an unfavorable augury for the new year there was all the greater percentage recovery. Indeed, the respective high months represented in the above compilation varied remarkably little from each other in actual tonnage rates. Rather, it was the respective low rates that varied from each other. When the daily rates each month are plotted it is seen that the peaks in the years 1923 to 1928 inclusive are quite uniform, with a slight annual rise, the notable divergence being that the 1929 peak represented a large rise. The troughs, on the other hand, vary greatly. Ingot production since 1921 is plotted regularly in THE IRON AGE, in connection with the monthly report, the present issue containing a fresh plot on page 985.

With the last seven years unanimous in recording an increase in steel production after the final month of the preceding year, it is clear that an upturn is to be expected after next December. If that does not occur it will be by reason of sweeping changes in the general trade and financial situation, so unusual as to be easily recognized as making a new situation, contrary to the plainly marked precedents. It is needless to say no such sweeping change is now in prospect.

Electroplating Grows Apace

WITH the development of chromium and cadmium plating in recent years, the electroplating industry has reached large proportions. This was impressively brought before members of the Institute of Metals during the recent National Metal Congress at Cleveland in a review of progress from the earlier days. Zinc plating was the first crude discovery. This led to plating with nickel and silver—used now for many years. Then followed copper, gold, tin, lead, and, more important, dual plating with brass and bronze; chromium and cadmium being the latest additions to the list.

In a single year now about 10,000 tons of zinc, 3000 tons of nickel and already close to 300 tons of chromium are used in plating, with the last named increasing rapidly. Cadmium has come into such favor that it is scarce and selling at a dollar a pound. If electrolytic refining be taken into consideration—copper, zinc and other metals—the industry takes on imposing proportions, for electrolytic refining is akin to electroplating.

One development is unfortunate. Not a little chromium plating has been unsatisfactory, so much so that certain automobile plants are turning to other products, stainless iron in particular. There is a right and a wrong way to plate with chromium. Here and there companies have cropped up which have not followed the approved practice and the work of some of these has impeded the progress of the industry.

Future of Investment Trusts

IN a previous editorial (Oct. 3) we explained that there is no magic in the philosophy of the investment trusts. Their theory is simply better financial conduct than is within the capability of the ordinary individual, either owing to his inferior intelligence, or his inferior resources, or both. However, those are good reasons why a small investor should join others and put the combined fund in the hands of a good manager. Manifestly an individual who had ten million dollars to invest, which he had accumulated by his own acumen, would have no such reasons. He would be an investment trust in himself and might not be interested in participating in a society unless he

were going to transfer to it some of his own securities at a high figure, which is suspected to have been done in some instances.

A clear idea of the operation of the common form of investment trusts may be obtained from almost any issue of the financial journals. One of them, for example, related the conspicuous success of a new concern sponsored by Boston bankers, which obtained 15 million dollars by public subscription, put it into the stocks of public utility companies during the August break, and now possesses a portfolio of 16 million dollars of quotational value.

In the same issue was listed the portfolio of another trust, which had an aggregate of $14,250,000 in quotational value, that was $2,700,000 in excess of cost. This portfolio comprised $12,800,000 of common stocks, spread among 24 issues, all of which were of first-class character.

An ordinary individual investor would not have had the means, and probably neither the temerity nor judgment, to have bought during the August break; and if he had the means to diversify among 24 common stocks his private portfolio would doubtless have comprised some weaklings and some wildcats, which that of the trust did not.

The investment trusts that are to be shunned are those that are merely speculative pools, buying on margin, selling short, engaging in all sorts of speculative maneuvers. These differ from partnership pools only in that they diversify themselves and expect to be continuing, but with the probability that a serious reverse would end them.

On the other hand there is a high type of investment trust that devotes expert study to the approaching development of new sources of wealth—the copper mines of Northern Rhodesia, for example—and invests in their shares, along with other things for diversification, awaiting increment in real value.

A perplexing feature of the vogue for investment trusts is their effect upon the stock market. We may safely deduce that this is discriminating. Their expert managers pass by the stocks that are dubious and concentrate upon those that are most promising. This has probably contributed to the selectiveness of the stock market during the last year. We may further deduce that in the event of a reaction in the market they would exert powerful buying.

Less simple are the effects of the loaning of their funds and speculation in the shares of investment trusts themselves. Altogether we have new influences in our financial affairs. On the whole they seem to be good, but they may lead us into unforeseen perils.

CORRESPONDENCE

The Mystery of the Increase of Brokers' Loans

To the Editor: The original purpose of collateral loans to brokers, namely, speculative trading in stocks, is no longer the only important cause of the long-continued increase in such loans. General increases in margin requirements have not caused contraction in the volume of brokers' loans; neither has the selling of stocks in the brief periods of falling prices. An increasing volume of buying orders for securities, without a counterbalancing volume of selling orders, must actually exist.

A high authority in banking has outlined another important influence in maintaining loans on securities at a high level. Wealthy men who invest capital in stocks on a rising market are liable to heavy surtaxes if, by selling the stocks, they take the profit into their income account. It is a fair inference that many security holdings showing a profit are therefore left in brokers' hands as collateral for loans, the funds from which may be used for purposes other than speculation. Abolition of surtax on profit obtained from capital used in the purchase and sale of securities would cause the liquidation of such frozen collateral loans, and leave the credit free to be used in other forms for the varying needs of industry and commerce.

An increasing number of people are apparently interested in buying stocks for investment. They are thoroughly familiar with the idea of ordering expensive articles and paying for them out of future earnings; so they order their investment securities at the time their interest is attracted, making an initial down payment and putting in the rest later as income may permit. These purchasers pay little attention to daily market changes. They are reluctant to sell at a loss, and in no hurry to sell at a profit. As their cash investments increase, they are open to suggestions for purchasing other securities; and so the amounts of their loans grow larger. Increase of brokers' loans for this purpose is an evidence of thrift, and is therefore to be encouraged.

It would probably be difficult, but it should not be impossible, to make a study of the situation and discover the approximate distribution of brokers' loans between the accounts of active speculators, temporary maintainers of paper profits, and investors of expected savings. This last group may form a larger proportion than any one has yet supposed. If ever the talent which has already developed the installment purchase system for manufactured articles should extend it to securities, the volume of financing which would become necessary would go far beyond the present large figures of loans on collateral. B. S.

New York, Oct. 3.

Soderberg Electrodes in Steel Furnaces

To the Editor: THE IRON AGE of Aug. 22, page 461, contains an abstract of an article by St. Kriz in *Stahl und Eisen* about electric steel furnaces in Germany. Some information about Soderberg electrodes may easily be misconstrued. Although the author does state that the Soderberg electrodes of larger sizes give a somewhat lower consumption than ordinary pre-baked electrodes, he puts the consumption at 44 lb. per ton of solid charge.

Soderberg electrodes in steel furnaces have been developed during the last four to five years, and the equipment as well as the way of making these electrodes are as yet far from uniform. Recent improvements have not been taken advantage of all along, and the results, therefore, vary quite a little. Furthermore, it is well known that the electrode consumption depends entirely upon the time used for each heat as well as upon the number of slags. Consequently a figure, like the one above referred to, does not mean anything except when explained.

The following results reported from one of the later installations seem more up to date. The figures are from a 20-ton Heroult steel furnace with three Soderberg electrodes, 28 in. each, in a solid charge: Electrode consumption, when making ordinary steel ingots for rolling mill, is approximately 17 lb. per net ton. For high-quality alloy steel, electrode consumption is approximately 32 to 34 lb. per ton.

M. SEM,
Metallurgical Engineer.
2050 Elmwood Avenue,
Buffalo, N. Y.,
Sept. 30.

Steel Founders to Meet in Chicago This Month

Makers of steel castings will be invited to an open meeting in Chicago in the last week of October to consider a report on conditions in the steel foundry industry in the United States and Canada and to take steps looking to a new plan of organization of the Steel Founders' Society of America together with a five-year program of activities. Granville P. Rogers, managing director of the society, 932 Graybar Building, New York, presented the results of an extensive survey to a meeting of the executive committee of the society at the Hotel Roosevelt, New York, Oct. 4. The report covered, among other things, the study of waste elimination, undesirable trade practices and market researching to widen the use of all types of steel castings.

The report and plan were enthusiastically received by the committee and the result is a call for the meeting to be issued shortly by the president of the society, John E. McCauley, president, Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa. Representatives from the steel foundries of Canada as well as the United States are expected at the Chicago meeting.

Salesmen and Purchasing Agents to Have Exhibit

The Salesmen's and Purchasing Agents' Association of America, Inc., with headquarters at Bridgeport, Conn., will hold its second cooperative exhibit at the Pyramid Temple Mosque, Bridgeport, Oct. 17, 18 and 19.

More than 120 companies have contracted for space, and the exhibits will include tool and other steels, small tools, electrical equipment and general factory supplies. There will also be demonstrations of tungsten-carbide cutting tools.

R. T. Phipps, Bullard Co., Bridgeport, is president of the association. W. H. Bradley, Hunter & Havens, is vice-president; L. R. Watkyns, Max Ams Machine Co., is secretary; and F. H. Braithwaite, Wellington-Kincaid Co., Inc., is treasurer.

Machine Tool Dealers Elect Officers

The Associated Machine Tool Dealers at their annual meeting held in Cleveland, Oct. 3, elected the following officers:

President, E. P. Essley, E. P. Essley Machinery Co., Chicago; vice-president, J. W. Wright, Colcord-Wright Machinery Co., St. Louis, and secretary, A. G. Bryant, Joseph T. Ryerson & Son Co., Chicago.

Three new members were elected to the board. They are: William K. Stamets, William Stamets Co., Pittsburgh, W. R. Stedfast, Stedfast & Roulston Co., Boston, and A. G. Bryant.

The Week in Business

Drift of Current Financial and Economic Opinion

SEPTEMBER was a month of liquidation in the stock market. Measured by the Dow-Jones industrial average, the decline in prices from Sept. 3 to Oct. 3 was 13.4 per cent—a sharper drop than occurred in May, 1929, June or December, 1928, or October, 1927.

Beginning last Saturday and continuing on Oct. 7 the securities markets rallied, and it is again a question, according to Alexander D. Noyes of the New York *Times*, whether the time has come for a frank recognition of realities or whether there will be continued confusion of intrinsic values with values arbitrarily established by a speculative craze.

The *Annalist*, in its issue of Oct. 4, unreservedly takes the view that the recent decline "marks definitely the end of the bull market," although predicting that a sharp rally would develop "some time during the coming week."

The Harvard Economic Society, on the other hand, looks for no "prolonged period of liquidation," while conceding that the recession "may go further and is likely to react unfavorably on business." It counts on the Federal Reserve system to ease money if business curtailment should reach undue proportions.

The probability of such action must be weighed in the light of the further expansion of brokers' loans and the alarm it has caused among leading American bankers. Such loans, according to the New York Stock Exchange compilation —which is more comprehensive than the Federal Reserve reports —reached a total of more than 8½ billion dollars on Sept. 30. The gain since August, in the face of falling securities prices, was two-thirds of a billion dollars and the increase in the four months from May 31 to Sept. 30 was close to two billion dollars.

The fact that additional loans have been mainly from "others" cannot be safely construed as indicating that the banks are unaffected. Speaking before the American Bankers' Association at San Francisco last week, Craig B. Hazlewood, that organization's retiring president, said:

"It is definitely known that many of our banks . . . have increased their loans on collateral securities to peaks never before attained. Some of them are overloaned—in some cases they are borrowers and in some cases, even if they are not borrowers, they have exhausted their secondary reserves."

Emphasizing the banker's responsibility in curbing the excessive use of credit for carrying stocks, Mr. Hazlewood declared, "There is a limit, and a very definite one, beyond which bank credit in this country must not be extended if we are to preserve our gold standard."

Recession in the stock market has been partly due to large realizing sales by British speculators, according to James B. Clews, Henry Clews & Co., New York. On this account and also because of the advanced English discount rate a large back-flow of money to London is getting under way. This turn, says Mr. Clews, has attracted attention in Washington, where a continuance of gold imports in recent volume is regarded necessary to support securities values at anything like the present level.

Besides threatening to reduce the gold base underlying our bank credit, the higher British discount will also impose a larger portion of the financing of autumn foreign trade on New York banks, according to Preston S. Krecker in *Commerce and Finance*.

A general recession in our exports is seen as an early possibility by some commentators. The decline in our shipments abroad in August, when a seasonal increase was to be expected, is interpreted by the Alexander Hamilton Institute as a result of this year's sharp contraction in foreign loans. But the general volume of business in this country remains large, according to the Harvard Economic Society, and in directions in which seasonal increases are most marked, such as wholesale and retail trade, activity has expanded. Autumn business, the Harvard review says, will rank high if comparison is made with previous years rather than with the unusual level of summer.

Iron and Steel Markets

Further Decline in Steel Production

Prospective November Upturn in Automotive Requirements and Impending Railroad Specifications Promise to Halt Recession

STEEL production has declined further, but developments of the week lend support to the belief that the low point in demand may have passed.

The movement of finished steel to the automotive industry, the principal factor in causing recent curtailment of mill operations, is now the smallest in more than a year, but orders placed in the past week point to some measure of improvement in November. Railroad buying continues to expand, structural steel business is heavy, farm equipment makers are taking more steel and requirements for barges and ships are in encouraging volume.

October promises to be a transition period in steel output. With steel specifications from the motor car trade at a low ebb, heavier releases are beginning to come from other sources, notably the railroads and builders of railroad equipment. Chicago rail mills will increase operations in the next week or two and the now idle plants at Pittsburgh and Ensley will soon resume production.

Steel companies serving the railroads are operating at a better rate than those with a less diversified output. The Steel Corporation average continues at 89 per cent of capacity and the rate for other mills with a similar range of products is estimated at 85 per cent. Independents relying more largely on the automotive trade are running at 75 to 80 per cent.

The extent of the impending recovery in motor car production is uncertain. Recent published announcements notwithstanding, the activities of parts makers and the movement of materials definitely point to the bringing out of new models by both of the leading makers of low-priced cars. The Chevrolet company's new car is expected to get under production in November on a schedule calling for the completion of 130,000 units in that month and December, a combined output that would fall short of the total for the single month of July.

Price developments have been influenced by the recent falling off in automotive steel requirements. Sales of automobile body sheets for November delivery brought out concessions of $2 a ton. Shading of blue annealed sheet prices is more extensive, and black sheets have undergone a rather general decline of $2 a ton to 2.75c., Pittsburgh.

Further weakness in wire products has wiped out the $1 a ton differential at Chicago, where wire nails at $2.45 and plain wire at $2.40 are now on the same quoted bases as at Pittsburgh and Cleveland.

The downward tendency of scrap prices has not been checked. Heavy melting steel has declined 50c. a ton at Pittsburgh and St. Louis and 25c. a ton at Cleveland.

New rail business of the week, including 62,000 tons for the Louisville & Nashville and 30,000 tons for the St. Louis-San Francisco, will add materially to the backlog of the Ensley mill.

Railroad freight cars placed total 3500—2000 for the Southern, 500 for the North Western and 1000 which the Pennsylvania will build in its own shops. Cars ordered in the past fortnight number 7200, or nearly one-tenth the total for the entire year up to Oct. 1. Additional orders for 2500 and 2000 cars respectively are expected from the Southern and the North Western, while the Louisville & Nashville and Great Northern are prospective buyers of 3000 and 1000.

Fabricated structural steel inquiries, at 92,000 tons, are the heaviest of the year. Of this total 63,000 tons is for the New York district, with 21,000 tons in the market for the Manhattan freight terminal of the Lehigh Valley Railroad and 18,000 tons for the Cornell Medical Center. Fabricating awards totaled 22,000 tons, compared with 50,000 tons last week.

Foundry operations reflect a shifting of activity. Melters of pig iron serving the automotive industry are buying from hand to mouth instead of for the full fourth quarter, because of the uncertainty of their requirements. Pig iron demand has improved from stove, furnace and radiator manufacturers and foundries supplying the railroads. Two steel foundries in the St. Louis district have bought 25,000 tons of basic iron.

Supplementary buying supplies most of the current activity in pig iron, since formal fourth-quarter contracting is largely completed and interest in first quarter needs is not yet active. The latest evidence of a stronger price attitude by Alabama producers is the marking up of prices on iron for delivery in the Chicago district to $13.50, Birmingham, an advance of 50c. a ton.

Steel ingot production in September, at 4,510,879 tons, declined 416,379 tons, or 8.4 per cent from the August total but exceeded the best previous September output, that of last year, by 8.7 per cent. The daily average, as computed by the American Iron and Steel Institute, was the lowest since February. Production in the first nine months set a new high mark and was 17.1 per cent larger than in the corresponding period in 1928.

The Hatry collapse in the London stock market is attributed to the failure of the Austin Friars Trust, a Hatry company, to obtain control of the United Steel Companies as a step in the formation of the proposed Steel Industries of Great Britain, Ltd.

THE IRON AGE composite price for finished steel has declined from 2.384c. to 2.369c. a lb., its lowest level this year. The pig iron composite remains at $18.29 a ton.

A Comparison of Prices

Market Prices at Date, and One Week, One Month and One Year Previous, Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron, Per Gross Ton:	Oct. 8, 1929	Oct. 1, 1929	Sept. 10, 1929	Oct. 9, 1928
No. 2 fdy., Philadelphia	$21.26	$21.26	$21.26	$20.76
No. 2, Valley furnace	18.50	18.50	18.50	17.00
No. 2 Southern, Cin'ti	17.19	17.19	17.19	19.94
No. 2, Birmingham	14.50	14.50	14.50	16.25
No. 2 foundry, Chicago*	20.00	20.00	20.00	18.50
Basic, del'd eastern Pa.	19.75	19.75	19.75	19.00
Basic, Valley furnace	18.50	18.50	18.50	17.00
Valley Bessemer, del'd P'gh.	20.76	20.76	20.76	19.26
Malleable, Chicago*	20.00	20.00	20.00	18.50
Malleable, Valley	19.00	19.00	19.00	17.50
Gray forge, Pittsburgh	19.76	19.76	19.76	18.26
L. S. charcoal, Chicago	27.04	27.04	27.04	27.04
Ferromanganese, furnace	105.00	105.00	105.00	105.00
Rails Billets, etc., Per Gross Ton:				
Rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Light rails at mill	36.00	36.00	36.00	36.00
Rerolling billets, Pittsburgh	35.00	35.00	35.00	33.00
Sheet bars, Pittsburgh	35.00	35.00	35.00	33.00
Slabs, Pittsburgh	35.00	35.00	35.00	33.00
Forging billets, Pittsburgh	40.00	40.00	40.00	38 00
Wire rods, Pittsburgh	40.00	40.00	42.00	42.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.85	1.85	1.85	1.90
Finished Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Bars, Pittsburgh	1.90	1.90	1.95	1.90
Bars, Chicago	2.05	2.05	2.05	2.00
Bars, Cleve'and	1.95	1.95	1.95	1.90
Bars, New York	2.24	2.24	2.29	2.24
Tank plates, Pittsburgh	1.95	1.95	1.95	1.90
Tank plates, Chicago	2.05	2.05	2.05	2.00
Tank plates, New York	2.22½	2.22½	2.22½	2.22½
Structural shapes, Pittsburgh	1.90	1.90	1.95	1.90
Structural shapes, Chicago	2.05	2.05	2.05	2.00
Structural shapes, New York	2.19½	2.19½	2.19½	2.19½
Cold-finished bars, Pittsburgh	2.30	2.30	2.30	2.10
Hot-rolled strips, Pittsburgh	1.90	1.90	1.90	1.75
Cold-rolled strips, Pittsburgh	2.75	2.75	2.75	2.75

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

Finished Steel,	Oct. 8, 1929	Oct. 1, 1929	Sept. 10, 1929	Oct. 9, 1928
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 24, P'gh	2.75	2.85	2.85	2.75
Sheets, black, No. 24, Chicago dist. mill	2.95	2.95	2.95	2.75
Sheets, galv., No. 24, P'gh	3.50	3.50	3.50	3.50
Sheets, galv., No. 24, Chicago dist. mill	3.60	3.60	3.60	3.60
Sheets, blue, No. 13, P'gh	2.35	2.35	2.35	2.10
Sheets, blue, No. 13, Chicago dist. mill	2.45	2.45	2.45	2.20
Wire nails, Pittsburgh	2.45	2.45	2.55	2.55
Wire nails, Chicago dist. mill	2.45	2.50	2.60	2.60
Plain wire, Pittsburgh	2.40	2.40	2.40	2.40
Plain wire, Chicago dist. mill	2.40	2.45	2.45	2.45
Barbed wire, galv., Pittsburgh	3.10	3.10	3.20	3.20
Barbed wire, galv., Chicago dist. mill	3.15	3.15	3.30	3.25
Tin plate, 100-lb. box, P'gh.	$5.35	$5.35	$5.35	$5.25
Old Material, Per Gross Ton:				
Heavy melting steel, P'gh	$17.25	$17.75	$18.25	$17.50
Heavy melting steel, Phila.	16.00	16.00	16.50	16.00
Heavy melting steel, Chicago	14.50	14.50	15.25	14.00
Carwheels, Chicago	14.00	14.00	14.00	13.75
Carwheels, Philadelphia	16.50	16.50	16.50	16.50
No. 1 cast, Pittsburgh	15.50	15.50	15.50	15.00
No. 1 cast, Philadelphia	16.00	16.00	16.50	17.00
No. 1 cast, Chicago (net ton)	14.50	14.50	14.50	15.50
No. 1 RR. wrot., Phila.	16.00	16.00	16.00	15.50
No. 1 RR. wrot., Ch'go (net)	14.00	14.00	14.00	12.75
Coke Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$2.65	$2.65	$2.65	$2.75
Foundry coke, prompt	3.75	3.75	3.75	3.75
Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	18.12½	18.12½	18.12½	15.25
Electrolytic copper, refinery	17.75	17.75	17.75	15.00
Tin (Straits), New York	43.37½	44.25	45.37½	48.50
Zinc, East St. Louis	6.80	6.80	6.80	6.25
Zinc, New York	7.15	7.15	7.15	6.60
Lead, St. Louis	6.70	6.70	6.70	6.32½
Lead, New York	6.90	6.90	6.90	6.50
Antimony (Asiatic), N. Y.	8.50	8.50	8.75	11.50

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Pittsburgh

Low Point in Steel Demand May Have Been Passed—Automotive Parts Specifications Slightly Improved

PITTSBURGH, Oct. 8.—Although the steel industry in the Pittsburgh and nearby districts is faced with tapering production schedules over the greater part of the present month, slightly heavier specifications in a few lines in the last week have led to the belief that the low point in demand may have been passed. It is also significant that improved specifications were reported as coming from makers of automotive parts, which are anticipating heavier demands early in November from the industry which they serve. Just now the movement of finished steel to automobile makers is at the lowest point in more than a year. Lack of demand from this channel is the largest single factor in bringing about a decline in steel production. With anticipated model changes by both the large makers of low-priced cars and unusually heavy dealer stocks of all kinds, it would not be surprising if improvement from this source would be slow in coming and of a very gradual nature.

With such conditions in its largest consuming industry, the steel business is looking to other outlets for the fourth quarter and expects to find them in heavy purchases of railroad equipment, continued strong demand for structural steel for bridges and public works and, in the Pittsburgh district particularly, in the large requirements of machinery and mill equipment builders.

Nearly all the large steel companies are taking advantage of the present lull in production to make badly needed repairs and replacements in their plants.

Operations in the Pittsburgh district will fall under 85 per cent this week for the first time in several months, and in the Valleys the average is scarcely more than 75 per cent. Smaller nearby centers approximate the Valley rate. The Pittsburgh area is held up by the well sustained output of the Steel Corporation subsidiaries and the leading independent producer.

Finishing mill operations are on a hand-to-mouth basis in all departments. The strip industry ranges from 50 and 60 per cent of capacity, while sheet mills, which have been the last to feel depression, are now down to about 80 per cent. The leading sheet interest is at a slightly higher rate. Tin plate production has held up remarkably well, and mills will begin rolling anticipated tonnage for next year before another month has passed. Plate and shape mills are fairly well engaged. Bar mills, which had dropped to a rather low point, are stepping up production gradually.

The muddled price situation, which has existed for several weeks, has undoubtedly resulted in delayed orders by many consumers. On hot and cold-rolled strip, present quotations seem to be holding, although concessions are not uncommon, particularly on the wider sizes of hot-rolled material. Galvanized sheets have not declined below 3.50c., Pittsburgh, but black sheets now seem to have eased off $2 a ton to 2.75c. Mills continue to quote the higher fig-

ure, but nearly all are meeting the lower price, notably on the heavy gages and full pickled stock. Despite reports of shading on blue annealed sheets and light plates, the market is still fairly represented in this and the Valley district at 2.20c., Pittsburgh, on the No. 10 gage and 2.35c. for No. 13. Wire and wire nail prices have developed no further weakness in this territory and are becoming established at $2.45 a keg on nails and at 2.40c. a lb. on plain wire. Concessions in wire are confined entirely to the jobbing trade. Billets, slabs and sheet bars are unchanged at $35, Pittsburgh or Youngstown, and wire rods are now generally quoted at $40, Pittsburgh or Cleveland. Bars and shapes are still quotable at 1.90c. to 1.95c., Pittsburgh, while plates are holding at the higher figure.

The pig iron market is quiet, and prices continue to hold. Scrap is off 50c. a ton on the basis of sale of a large part of the Pennsylvania Railroad list at less than $17.50, delivered.

Semi-Finished Steel.—Demand for billets, slabs and sheet bars is rather quiet, as most users have steel coming to them on third quarter contracts, and present prices offer little incentive to cover for the remainder of the year. Occasional reports of shading the $35, Pittsburgh or Youngstown, price are heard, but this figure seems to be holding in all open market transactions. It is admitted that large consumers of unfinished steel, depending constantly upon one source of supply for their material, are not paying this price, but the small buyer is not getting the advantage of concessions. The same situation holds true in the case of forging billets, on which the present quotation is $40, Pittsburgh. Wire rods have settled to $40, Pittsburgh, and most makers have revised downward the fourth quarter contracts of their principal customers. Shipments of rods are not up to the September rate so far this month.

Pig Iron.—The pig iron market remains inactive, although small tonnages are being sold regularly and consumers are occasionally coming into the market for their fourth quarter requirements. A small tonnage of malleable was sold to the Pressed Steel Car Co. at McKees Rocks, Pa., and brought the full Neville Island base plus freight. The Walworth Co. is said to have bought foundry iron for its Greensburg, Pa., plant, and a part of the tonnage required by the Richmond Radiator Co. for its Uniontown, Pa., plant is reported to have been placed. The American Steel Foundries, which recently bought basic iron for Alliance, Ohio, also placed a small tonnage for its works at Verona, Pa. The Standard Sanitary Mfg. Co. has not yet come into the market for its Pittsburgh plant, and this purchase is now expected to be further delayed. Pig iron shipments this month are up to the September rate, and leading merchant furnace interests are having no difficulty in disposing of their regular daily production. Steel company interests are competing for business on the same basis as merchant stacks.

Prices per gross ton, f.o.b. Valley furnace:

Basic	$18.50
Bessemer	19.00
Gray forge	18.00
No. 2 foundry	18.50
No. 3 foundry	18.00
Malleable	19.00
Low phos., copper free	27.00

Freight rate to Pittsburgh or Cleveland district, $1.76.

Prices per gross ton, f.o.b. Pittsburgh district furnace:

Basic	$19.00
No. 2 foundry	19.00
No. 3 foundry	18.50
Malleable	19.50

Freight rates to points in Pittsburgh district range from 63c. to $1.13.

Bars, Shapes and Plates.—Pittsburgh mills are not yet beginning to receive heavier specifications from the railroad car builders which have benefited by recent car awards, but have been called upon frequently in recent weeks to protect car builders in their bids on large railroad inquiries. It is believed that the present car buying movement is going to be heavier than general inquiries would indicate, as at least one large order for rolling stock is being placed quietly. The Baltimore & Ohio, which was mentioned last week as a probable buyer of 7000 freight cars, is reported to have placed part of this order tentatively some time ago. Pittsburgh district mills will share in the steel requirements of the Pennsylvania Railroad, which has placed 1000 freight cars with its Altoona, Pa., shops. This road is also expected to build at Altoona 25 of the 100 locomotives for which it is inquiring. Plate makers in this district are also expected to benefit by barge buying in this district during the next two months, although the only large inquiry before the market at present is that of the Standard Unit Navigation Co. for 50 barges, which was mentioned previously. Structural awards in the immediate Pittsburgh area have been light in the last few weeks, but fabricating shops are fairly well engaged on small jobs. Large pending projects around here are slow in development. Bar business is only fair, but specifications are about equal to the September rate. New buying is coming out slowly. Some mills are holding to 1.95c., Pittsburgh, on bars and plates. On bars, however, large buyers are getting 1.90c., and some contracts have been revised to this figure. Small buyers are meeting with difficulty in getting the 1.90c. price. Demand for plates is stronger, and this probably explains the steady price on that product.

Rails and Track Supplies.—The larger carriers have not yet closed against their recent rail inquiries, but action is expected in the next week on both the Pennsylvania and the New York Central tonnages. The former road has not yet closed for its fourth quarter track accessories. The Chesapeake & Ohio has placed 10,000 tons of tie plates with the Wheeling Steel Corporation, but has not yet ordered its spikes, which total 7000 kegs. The Louisville & Nashville is also inquiring for 9500 kegs of spikes, but has not yet issued its rail inquiry. The Pere Marquette expects to buy 5000 tons of tie plates. Mills in this district have not got under way on their rail rolling schedules, but probably will before the end of the month. Specifications for track accessories are not heavy, but seasonably satisfactory.

Wire Products.—Prices on wire and wire nails have weakened no further in the last week, with nails holding at $2.45 to $2.55 a keg and wire at 2.40c. to 2.50c. a lb., Pittsburgh. The higher figures are not applying on much tonnage. Producers are successfully holding the price of manu-

The Iron Age Composite Prices

Finished Steel

Oct. 8, 1929, 2.369c. a Lb.

One week ago	2.384c.
One month ago	2.398c.
One year ago	2.362c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products make 87 per cent of the United States output of finished steel.

	High		Low	
1929	2.412c.,	April 2;	2.369c.,	Oct. 8
1928	2.391c.,	Dec. 11;	2.314c.,	Jan. 3
1927	2.453c.,	Jan. 4;	2.293c.,	Oct. 25
1926	2.453c.,	Jan. 5;	2.403c.,	May 18
1925	2.560c.,	Jan. 6;	2.396c.,	Aug. 18

Pig Iron

Oct. 8, 1929, $18.29 a Gross Ton

One week ago	$18.29
One month ago	18.25
One year ago	17.84
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low	
1929	$18.71,	May 14;	$18.25,	Aug. 27
1928	18.59,	Nov. 27;	17.04,	July 24
1927	19.71,	Jan. 4;	17.54,	Nov. 1
1926	21.54,	Jan. 5;	19.46,	July 13
1925	22.50,	Jan. 13;	18.96,	July 7

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base per Lb.
F.o.b. Pittsburgh mill	1.90c. to 1.95c.
F.o.b. Chicago	2.05c.
Del'd Philadelphia	2.22c. to 2.27c.
Del'd New York	2.24c. to 2.29c.
Del'd Cleveland	1.92½c. to 1.95c.
F.o.b. Cleveland	1.90c. to 1.95c.
F.o.b. Lackawanna	2.05c.
F.o.b. Birmingham	2.10c.
C.i.f. Pacific ports	2.35c.
F.o.b. San Francisco mills	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills, 40, 50, 60-ft.	2.05c.
F.o.b. Pittsburgh mills, cut lengths	2.30c.
F.o.b. Birmingham, mill lengths	2.10c.

Rail Steel

F.o.b. mills, east of Chicago dist.	1.85c. to 1.90c.
F.o.b. Chicago Heights mill	1.95c.
Del'd Philadelphia	2.27c.

Iron

Common iron, f.o.b. Chicago	2.05c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	2.12c.
Common iron, del'd New York	2.14c.

Tank Plates

	Base per Lb.
F.o.b. Pittsburgh mill	1.95c.
F.o.b. Chicago	2.05c.
F.o.b. Birmingham	2.10c.
Del'd Cleveland	2.14c.
Del'd Philadelphia	2.15c.
F.o.b. Coatesville	2.05c.
F.o.b. Sparrows Point	2.05c.
F.o.b. Lackawanna	2.05c.
Del'd New York	2.22½c.
C.i.f. Pacific ports	2.35c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh mill	1.90c. to 1.95c.
F.o.b. Chicago	2.05c.
F.o.b. Birmingham	2.10c.
F.o.b. Lackawanna	2.05c.
F.o.b. Bethlehem	2.05c.
Del'd Cleveland	2.14c.
Del'd Philadelphia	1.96c. to 2.06c.
Del'd New York	2.14½c. to 2.19½c.
C.i.f. Pacific ports	2.35c.

Hot-Rolled Hoops, Bands and Strips

	Base per Lb.
6 in. and narrower, P'gh	2.00c.
Wider than 6 in., P'gh	1.90c.
6 in. and narrower, Chicago	2.20c.
Wider than 6 in., Chicago	2.10c.
Cooperage stock, P'gh	2.20c.
Cooperage stock, Chicago	2.30c.

Cold-Finished Steel

	Base per Lb.
Bars, f.o.b. Pittsburgh mill	2.30c.
Bars, f.o.b. Chicago	2.30c.
Bars, Cleveland	2.30c.
Bars, Buffalo	2.30c.
Shafting, ground, f.o.b. mill	*2.65c. to 3.60c.
Strips, P'gh	2.75c. to 2.85c.
Strips, Cleveland	2.75c. to 2.85c.
Strips, del'd Chicago	3.05c. to 3.15c.
Strips, Worcester	2.90c. to 3.00c.
Fender stock, No. 20 gage, Pittsburgh or Cleveland	4.25c.

*According to size.

Wire Products

(Carload lots, f.o.b. Pittsburgh and Cleveland, to jobbers and retailers.)

	Base per Keg
Wire nails	$2.45 to $2.55
Galvanized nails	4.45 to 4.55
Galvanized staples	3.15 to 3.25
Polished staples	2.90c. to 3.00c.
Cement coated nails	$2.45 to $2.55
	Base per 100 Lb.
Bright plain wire, No. 6 to No. 9 gage	$2.40 to $2.50
Annealed fence wire	2.55 to 2.65
Spring wire	3.50 to 3.60
Galv'd wire, No. 9	3.00 to 3.10
Barbed wire, galv'd	3.10 to 3.20
Barbed wire, painted	2.85 to 2.95
Woven wire fence (per net ton to retailers)	65.00

Chicago district mill and delivered Chicago prices are $1 per ton above the foregoing. Birmingham mill prices $3 a ton higher; Worcester, Mass. (wire), mill $3 a ton higher on production of that plant; Duluth, Minn., mill $2 a ton higher; Anderson, Ind., $1 higher.

Cut Nails

	Per 100 Lb.
Carloads, Wheeling, Reading or Northumberland, Pa.	$2.70
Less carloads, Wheeling or Reading	2.80

Light Plates

No. 10, blue annealed, f.o.b. P'gh	2.10c. to 2.20c.
No. 10, blue annealed, f.o.b. Chicago dist.	2.30c.
No. 10, blue annealed, del'd Phila.	2.42c. to 2.52c.
No. 10, blue annealed, B'ham	2.35c.

Sheets

Blue Annealed

	Base per Lb.
No. 13, f.o.b. P'gh	2.25c. to 2.35c.
No. 13, f.o.b. Chicago dist.	2.45c.
No. 13, del'd Philadelphia	2.67c.
No. 13, blue annealed, B'ham	2.50c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh	2.75c.
No. 24, f.o.b. Chicago d'st. mill	2.95c.
No. 24, del'd Philadelphia	3.07c.
No. 24, f.o.b. Birmingham	3.00c. to 3.10c.

Metal Furniture Sheets

No. 24, f.o.b. P'gh	4.10c. to 4.20c.

Galvanized

No. 24, f.o.b. Pittsburgh	3.50c. to 3.60c.
No. 24, f.o.b. Chicago dist. mill	3.60c. to 3.70c.
No. 24, del'd Cleveland	3.59c. to 3.69c.
No. 24, del'd Philadelphia	3.82c. to 3.92c.
No. 24, f.o.b. Birmingham	3.70c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.90c. to 3.00c.
No. 28, f.o.b. Chicago dist. mill	3.00c. to 3.10c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh	4.00c.

Long Ternes

No. 24, 8-lb. coating, f.o.b. mill	4.00c. to 4.10c.

Vitreous Enameling Stock

No. 24, f.o.b. Pittsburgh	3.90c.

Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills	$5.35
Standard cokes, f.o.b. Gary	5.45

Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)
(Per Package, 20 x 28 in.)

8-lb. coating I.C.	$11.20
15-lb. coating I.C.	14.00
20-lb. coating I.C.	15.30
25-lb. coating I.C.	$16.70
30-lb. coating I.C.	17.75
40-lb. coating I.C.	19.85

Alloy Steel Bars

(F.o.b. makers' mill)

Alloy Quality Bar Base, 2.65c. to 2.75c. per Lb.

S.A.E. Series Numbers		Alloy Differential
2000	(½% Nickel)	$0.25
2100	(1½% Nickel)	0.55
2300	(3½% Nickel)	1.50
2500	(5% Nickel)	2.25
3100	Nickel Chromium	0.55
3200	Nickel Chromium	1.35
3300	Nickel Chromium	3.80
3400	Nickel Chromium	3.20
4100	Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50
4100	Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600	Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel)	1.05
5100	Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100	Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100	Chromium Spring Steel	0.20
6100	Chromium Vanadium Bars	1.20
6100	Chromium Vanadium Spring Steel	0.95
9250	Silicon Manganese Spring Steel (flats)	0.25
	Rounds and squares	0.50
	Chromium Nickel Vanadium	1.50
	Carbon Vanadium	0.95

Above prices are for hot rolled steel bars, forging quality. The differential for cold-drawn bars is ¾c. a lb. higher, with standard classification for cold-finished alloy steel bars applying. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis.

Billets under 4 x 4 in. carry the steel bar base. Slabs with a sectional area of 16 in. or over carry the billet price. Slabs with sectional area of less than 16 in. or less than 2½ in. thick, regardless of sectional area, take the bar price.

Rails

	Per Gross Ton
Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	36.00
Light (from rail steel), f.o.b. mill	34.00
Light (from billets), f.o.b. Ch'go mill	36.00

Track Equipment

	Base per 100 Lb.
Spikes, ⅝ in. and larger	$2.80
Spikes, ½ in. and smaller	2.80
Spikes, boat and barge	3.00
Tie plate, steel	2.15
Angle bars	$2.75
Track bolts, to steam railroads	$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel Inches	Black	Galv.	Iron Inches	Black	Galv.
⅛	45	19½	¼ and ⅜	+11	+36
¼ to ⅜	51	25½	½	23	5
½	56	42½	¾	28	11
¾	60	48½	1 and 1¼	31	15
1 to 3	62	50½	1½ and 2	35	18

Lap Weld

2	55	48½	2	23	9
2½ to 6	59	47½	2½ to 3½	28	13
7 and 8	56	43½	4 to 6	30	17
9 and 10	54	42½	7 and 8	29	16
11 and 12	53	40½	9 to 12	26	11

Butt Weld, extra strong, plain ends

⅛	41	24½	¼ and ⅜	+13	+48
¼ to ⅜	47	30½	½	23	7
½	53	42½	¾	28	12
¾	58	47½	1 to 2	34	18
1 to 1½	60	49½			
2 to 8	61	50½			

Lap Weld, extra strong, plain ends

2	53	42½	½	29	13
2½ to 4	57	46½	2½ to 4	34	20
4½ to 6	56	45½	4½ to 6	33	19
7 to 8	52	39½	7 and 8	31	17
9 and 10	45	32½	9 to 12	21	8
11 and 12	44	31½			

On carloads the above discounts on steel pipe are increased on block by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Steel		Charcoal Iron	
2 in. and 2¼ in.	38	1½ in.	1
2½ in.—2¾ in.	46	1¾ in.	8
3 in.	52	2 in.—2¼ in.	13
3¼ in.—3¾ in.	54	2½ in.—2¾ in.	16
4 in.	57	3 in.	17
4½ in. to 6 in.	46	3¼ in. to 3½ in.	18
		4 in.	20
		4½ in.	21

On lots of a carload or more, the above base discounts are subject to a preferential of two fives on steel and of 10 per cent on charcoal iron tubes. Smaller quantities are subject to the following modifications from the base discounts:

Lap Welded Steel—Under 10,000 lb., 6 points under base and one five; 10,000 lb. to carload, 4 points under base and two fives. Charcoal Iron—Under 10,000 lb., 2 points under base; 10,000 lb. to carload, base and one five.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	61	3 in.	46
1¼ to 1½ in.	53	3¼ to 3½ in.	48
1¾ in.	37	4 in.	51
2 to 2¼ in.	32	4½, 5 and 6 in.	40
2½ to 2¾ in.	40		

Hot Rolled

2 and 2¼ in.	38	3¼ to 3½ in.	54
2½ and 2¾ in.	46	4 in.	57
3 in.	52	4½, 5 and 6 in.	46

Beyond the above base discounts a preferential discount of 5 per cent is allowed on carload lots. On less than carloads to 10,000 lb., base discounts are reduced 4 points with 5 per cent preferential; on less than 10,000 lb., base discounts are reduced 6 points, with no preferential. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage take the mechanical tube list and discounts. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30%, base (carloads)	55
Carbon, 0.30% to 0.40%, base	50

Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

facturers' wire at 2.40c., although the price to jobbers is not so strong. Demand for both wire and wire nails is slow so far as jobbers are concerned, and manufacturers' wire is not moving so well as it was a few weeks ago.

Tubular Goods.—Pipe demand continues fairly good, and some makers feel that the demand from the oil country has picked up in the last two or three weeks. However, distributers' stocks in those territories are large, and it is some time after heavier drilling operations are undertaken before the pipe industry feels the improvement. At present there is no prospect for sustained activity in that direction, as the oil industry is still mainly interested in curbing production. An order was recently placed for about 90 miles of 6-in. pipe, totaling close to 3000 tons, for a gas line which the Indiana Consumers Gas & By-Products Co. will lay from its plant at Terre Haute, Ind., to connect with the Insull properties in the Chicago district. No large natural gas line projects seem likely to be placed in the near future and no heavy tonnages of this sort may come out before the first of the year. Lap-weld mills in this and nearby districts are running at 65 to 70 per cent of capacity and seamless units are slightly busier. Demand for mechanical tubing continues to drop off, but there is a fair movement of boiler tubes.

Sheets.—If the first week can be taken as a criterion, October will be the low month so far in the year in the sheet industry. Specifications have fallen off in the last few days and declining demand is reported from industries other than the automotive. Nearly all the larger mills have now practically exhausted their backlogs and are gradually being reduced to a hand-to-mouth operating rate, which probably averages from 80 to 85 per cent of capacity. Mills are taking advantage of this opportunity to make needed repairs to their equipment, as the industry has just rounded out a full year of near capacity operations, and the present lull is not expected to be extended. The automobile industry will not improve its production this month, but the two large makers of cars in the low-priced field will probably begin to take steel again in a large way by the middle of November. Sheet prices continue very weak, with buyers pressing for lower quotations and many sellers agreeing to concessions on all the common finishes. Black sheets are quotable at 2.85c., Pittsburgh, but this price is subject to shading to 2.75c., and the 2.20c., Pittsburgh, price on light blue annealed plates has been shaded to 2.10c. The market on galvanized sheets seems to have settled to 3.50c., Pittsburgh, and automobile body sheets are easily purchased in considerable tonnages at 4c. Weakness is also reported in long ternes.

Tin Plate.—Shipments in September were exceedingly high for that month, with some makers reporting new high records for the ninth month. Operations this month average from 75 to 80 per cent of capacity among the independents, while the leading interest is at a slightly higher rate. Makers are actively negotiating for next year's tonnage, and most of the important contracts will be settled before the end of the month. Operations are not expected to decline much further, and a gradual upturn will likely occur in the early part of November.

Strip Steel.—Strip makers are feeling keenly the decline in automotive demand, and cold-rolling mills in this and nearby districts are not operating at more than 50 per cent of capacity. Hot mills are about 10 points higher, but operations are on a hand-to-mouth basis and may decline still more before improvement sets in. However, automotive parts makers are beginning to increase their specifications slightly in anticipation of heavier automotive demand within the next 30 days. Prices are not strong, but, with operations at such a reduced rate, not many makers are willing to take business at what would be an almost certain loss. Cold-rolled strip is still quotable at 2.75c. to 2.85c., Pittsburgh or Cleveland, the higher price continuing to be applicable to a small tonnage in this district. On hot-rolled strip the narrow widths are still quotable at 2c., Pittsburgh, and the wider sizes at 1.90c. Tendencies toward shading are more pronounced on the latter.

Coal and Coke.—Demand for domestic coal and coke has improved seasonably this month and is about normal for this time of the year. On furnace coke, however, the market is still weak and, with the promise of little steel company demand in the next month or two, prices are unchanged at $2.65 to $2.75, Connellsville. There has been a slight improvement in the movement of foundry coke, but the situation has gained little real strength. Coal prices have not changed materially.

Old Material.—Dealers were given added reason for pessimism by the low prices reported to have been paid for the Pennsylvania Railroad steel scrap, a large part of which is said to have brought as low as $17.35 at a nearby consuming point. Some of the steel went at slightly more, but the average paid for the heavy melting in the list was certainly not more than $17.50. The Baltimore & Ohio list, which was awarded this week, is said to have brought about $17.75 for steel scrap, but the market on No. 1 steel is not quotable at higher than $17 to $17.50. Dealers are offering scrap freely at the higher figure and, with no mills in the market, are not even getting counter offers at lower figures. It is reported that mills which took the bulk of the recent railroad lists were those which dealers had counted upon for purchases in the near future. One of them has now definitely withdrawn from the market. Compressed sheets are quotable at about the same level as heavy melting, although one dealer recently bought a fair-sized tonnage at $16.75, and the market at Detroit is said to be very weak. The lighter grades are unchanged, though a distress tonnage of borings was recently disposed of at $11.50. Dealers are paying $12.25 to cover old sales of this grade. Mill inspection is strict on all grades of steel and rejections are common at all points. Specialties are holding at recent levels, and steel foundries are taking shipments at a good rate. The blast furnace grades are quiet.

Prices per gross ton delivered consumers yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$17.00 to $17.50
No. 2 heavy melting steel	15.00 to 15.50
Scrap rails	16.00 to 16.50
Compressed sheet steel	17.00 to 17.50
Bundled sheets, sides and ends	15.50 to 16.00
Cast iron carwheels	15.50 to 16.00
Sheet bar crops, ordinary	18.50 to 19.00
Heavy breakable cast	12.00 to 12.50
No. 2 railroad wrought	17.00 to 17.50
Hvy. steel axle turnings	16.00 to 16.50
Machine shop turnings	11.50 to 12.00
Acid Open-Hearth Grades:	
Railr. knuckles and couplers	20.50 to 21.00
Railr. coil and leaf springs	20.50 to 21.00
Rolled steel wheels	20.50 to 21.00
Low phos. billet and bloom ends	21.50 to 22.00
Low phos., mill plates	21.50 to 22.00
Low phos., light grades	20.50 to 21.50
Low phos., sheet bar crops	21.50 to 22.00
Heavy steel axle turnings	16.00 to 16.50
Electric Furnace Grades:	
Low phos., punchings	19.50 to 20.50
Hvy. steel axle turnings	16.00 to 16.50
Blast Furnace Grades:	
Short shoveling steel turnings	12.00 to 12.50
Short mixed borings and turnings	12.00 to 12.50
Cast iron borings	12.00 to 12.50
Rolling Mill Grades:	
Steel car axles	21.50 to 22.00
Cupola Grades:	
No. 1 cast	15.00 to 16.00
Rails 3 ft. and under	19.00 to 20.00

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.25c.
Hoops	4.25c.
Black sheets (No. 24), 25 or more bundles	3.80c. to 3.90c.
Galv. sheets (No. 24), 25 or more bundles	4.45c. to 4.55c.
Light plates, blue annealed (No. 10), 1 to 24 plates	3.35c. to 3.45c.
Blue annealed sheets (No. 13), 1 to 24 sheets	3.50c. to 3.60c.
Galv. corrug. sheets (No. 28), per square	$4.43
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count,	60 per cent off list
Machine bolts, 100 count,	60 per cent off list
Carriage bolts, 100 count,	60 per cent off list
Nuts, all styles, 100 count,	60 per cent off list
Large rivets, base per 100 lb.	$3.50
Wire, black soft, ann'l'd, base per 100 lb.	$3.00 to 3.10
Wire, galv. soft, base per 100 lb.	3.00 to 3.10
Common wire nails, per keg	2.90 to 3.00
Cement coated nails, per keg	3.05

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and under 10 in., Pittsburgh	$35.00
Rerolling, 4-in. and under 10 in., Youngstown	35.00
Rerolling, 4-in. and under 10 in., Cleveland	35.00
Rerolling, 4-in. and under 10 in., Chicago	37.00
Forging quality, Pittsburgh	$40.00 to 41.00

Sheet Bars

(Open Hearth or Bessemer)

	Per Gross Ton
Pittsburgh	$35.00
Youngstown	35.00
Cleveland	35.00

Slabs

(8 in. x 2 in. and under 10 in. x 10 in.)

	Per Gross Ton
Pittsburgh	$35.00
Youngstown	35.00
Cleveland	35.00

Skelp

(F.o.b. Pittsburgh or Youngstown)

	Per Lb.
Grooved	1.85c. to 1.90c.
Universal	1.85c. to 1.90c.
Sheared	1.85c. to 1.90c.

Wire Rods

(Common soft, base)

	Per Gross Ton
Pittsburgh	$40.00
Cleveland	40.00
Chicago	$41.00 to 43.00

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.80
Old range non-Bessemer, 51.50% iron	4.65
Mesabi Bessemer, 51.50% iron	4.65
Mesabi non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.40

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algerian	12.00c.
Iron ore, low phos., Swedish, average 68% iron	12.00c.
Iron ore, basic Swedish, average 65% iron	10.00c.
Manganese ore, washed, 52% manganese, from the Caucasus	30.00c.
Manganese ore, Brazilian, African or Indian, basic 50%	30.00c.
Tungsten ore, high grade, per unit, in 60% concentrates	$15.25 to $16.50

	Per Gross Ton
Chrome ore, 45 to 50% Cr_2O_3, crude, c.i.f. Atlantic seaboard	$22.00 to $24.00

	Per Lb.
Molybdenum ore, 85% concentrates of MoS_2, delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$2.65 to $2.75
Foundry, f.o.b. Connellsville prompt	3.75 to 4.75
Foundry, by-product, Ch'go ovens	8.00
Foundry, by-product, New England, del'd	11.00
Foundry, by-product, Newark or Jersey City, delivered	9.00 to 9.40
Foundry, by-product, Phila.	9.00
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry by-prod., del'd St. Louis	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.25 to $1.75
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, ¾-in. f.o.b. Pa. mines	1.90 to 2.00
Mine run gas coal, f.o.b. Pa. mines	1.65 to 1.75
Steam slack, f.o.b. W. Pa. mines	80c. to 90c.
Gas slack, f.o.b. W. Pa. mines	1.00 to 1.10

Ferromanganese

	Per Gross Ton
Domestic, 80%, seaboard	$105.00
Foreign, 80%, Atlantic or Gulf port, duty paid	105.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$31.00 to $34.00
Domestic, 16 to 19%	29.00 to 32.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$83.50
75%	130.00

	Per Gross Ton Furnace		Per Gross Ton Furnace
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	45.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		Per Gross Ton
10%	$30.00	12%	$84.00
11%	32.00		

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		Per Gross Ton
6%	$23.00	10%	$27.00 to $28.00
7%	24.00	11%	29.00 to 30.00
8%	25.00	12%	31.00 to 32.00
9%	26.00		

Other Ferroalloys

Ferrotungsten, per lb. contained metal del'd	$1.40 to $1.50
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.15 to $3.65
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	$160.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton	$91.00
Ferrophosphorus, electric 24%, f.o.b. Anniston, Ala., per gross ton	$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silicon, gravel, f.o.b. Illinois and Kentucky mines	$18.00
No. 2 lump, Illinois and Kentucky mines	20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	$18.25 to $18.75
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines	32.50

Fire Clay Brick

	Per 1000 f.o.b. Works: High-Heat Duty Brick	Intermediate Heavy Duty Brick
Pennsylvania	$43.00 to $46.00	$35.00 to $38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	.....
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00
Standard size	45.00

Chrome Brick

	Per Net Ton
Standard size	$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts, blank or tapped, hexagons	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	7.00c. to 6.75c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled thread up to and including ⅛ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagons nuts	70
Semi-finished hexagons castellated nuts, S.A.E.	70
Stove bolts in packages, P'gh	75, 20, 10 and 5
Stove bolts in packages, Chicago	75, 20, 10 and 5
Stove bolts in packages, Cleveland	75, 20, 10 and 5
Stove bolts in bulk, P'gh	75, 20, 10, 5 and 2½
Stove bolts in bulk, Chicago	75, 20, 10, 5 and 2½
Stove bolts in bulk, Cleveland	75, 20, 10, 5 and 2½
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55, 60 per cent apply.

Large Rivets

(½-In. and Larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$3.10
F.o.b. Chicago	3.20

Small Rivets

(7/16-In. and Smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70 and 10
F.o.b. Cleveland	70 and 10
F.o.b. Chicago	70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10 and 5
Milled standard set screws, case hardened,	80 and 5
Milled headless set screws, cut thread	75 and 10
Upset hex. head cap screws, U.S.S. thread	85
Upset hex. cap screws, S.A.E. thread	85
Upset set screws	80, 10 and 5
Milled studs	70

Chicago

Steel Sales Swelled By Specifications for Plates for Two West Coast Gas Lines

CHICAGO, Oct. 8.—Including specifications for plates for fabrication into pipe for West Coast gas lines, the week's business in steel in this market assumes formidable volume. Contracts for these gas lines, which went to the Milwaukee pipe fabricator, were announced a week ago. Local interests say that steel specifications are the largest for any week since last April. Ingot output has not been stepped up, however, remaining at a shade above 85 per cent.

A review of the character of business taken, and also that which is being passed on to the mills for rolling, reveals that rail tonnage plays only a minor part in the week's business. Farm machinery manufacturers are beginning to release steel tonnage for fall production schedules for equipment which must be ready for use in the spring.

Prices for plates, shapes and bars are holding moderately well at 2.05c. a lb., Chicago, though concessions of $1 a ton are more common now than a week ago. Rail mills, with old orders at hand in sufficient volume to support output at the current rate of 75 per cent of capacity to the end of the year, are now getting releases against recent purchases and production will be stepped up in the next week or 10 days.

Bids are being tabulated on the Santa Fe cars, which will require about 80,000 tons of steel, and contracts may be placed any day. The Southern has ordered 2000 cars from Eastern builders and among potential buyers are the Chicago & North Western, with 2000 box cars, and the Great Northern, with 1000 box cars.

Prices for wire and wire products are again giving ground in a market that is listless.

The local sheet market is active, with hot mill output at 90 per cent.

Ferroalloys.—Activity in this market is confined to occasional sales of carloads at prevailing prices. Shipments continue at a high level.

Prices delivered Chicago: 80 per cent ferromanganese, $112.56; 50 per cent ferrosilicon, $83.50 to $88.50; spiegeleisen, 19 to 21 per cent, $39.76 to $41.76.

Pig Iron.—Announcements of advances in Southern iron are being made to become effective at the end of this week. Recent business in small lots has been taken at $13 a ton, Birmingham, and some quotations are still out at this figure. The new minimum will be $13.50 a ton, Birmingham. The Northern iron market remains firm in the immediate Chicago district. Competition, however, is growing keener in central Michigan, where Toledo producers are offering iron at $19, furnace. Iroquois furnace No. 3 was lighted Monday. All merchant stacks in this district are now in blast, and shipments, which have grown this week, are absorbing the full output. A cargo of low phosphorus pig iron from Europe is expected to arrive at Chicago about the middle of next week. It is reported that this iron has all been sold. Boat shipments of Lake Erie iron to Chicago aggregate close to 12,000 tons in the last five weeks. Fourth quarter contracting is near an end, but spot purchasing is active. Several malleable foundries find that railroad car work has taken up the slack which resulted from the letdown in automobile production.

Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	$20.00
N'th'n No. 1 fdy., sil. 2.25 to 2.75	20.50
Malleable, not over 2.25 sil	20.00
High phosphorus	20.00
Lake Super. charcoal, sil. 1.50	27.04
So'th'n No. 2 fdy. (all rail)	19.51 to 19.51
Low phos., sil. 1 to 2, copper free	29.50
Silvery, sil. 8 per cent	29.79
Bess. ferrosilicon, 14-15 per cent	46.29

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Sheets.—Chicago district sheet mills continue to produce at 90 per cent of capacity and current specifications are ample to support this rate. Forward contracting is still far behind the volume normally on producers' books at this time of the year, but spot sales are unusually heavy and backlogs are undiminished. It is worthy of note that light manufacturers are finding business less brisk and, as a result, the demand for jobbing mill sizes of blue annealed sheets has fallen off sharply in the last 10 days. At the turn of September, local producers of heavy gage blue annealed sheets found themselves in a position where deliveries were as far ahead as 12 weeks and they were not desirous of adding tonnage to books. Makers of metal shelving, lockers and the light tanks are now using smaller quantities, and deliveries have dropped to the range of four to five weeks, though backlogs are still of the size that will support present mill rates for four to six weeks. Demand for galvanized sheets by the roofing trade is lighter this week, and deliveries, which now range from four to five weeks, give promise of shortening. Local mills are making promises of four weeks' deliveries on black sheets. The price situation is little changed from a week ago, except that quotations on black sheets have definitely settled to 2.95c. a lb., Gary, or 3c., delivered Chicago. Quotations on galvanized sheets remain steady at 3.65c. to 3.75c., Chicago, and No. 10 gage blue annealed sheets are quoted at 2.35c. a lb.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 3c.; No. 24 galv., 3.65c. to 3.75c.; No. 10 blue ann'l'd, 2.35c. Deliv'd prices at other Western points are equal to the freight from Gary, plus the mill prices, which are 5c. per 100 lb. lower than Chicago delivered prices.

Cast Iron Pipe.—Inquiry for cast iron pipe is slower both from public and private buyers. The Central Foundry Co. has taken 225 tons of pipe for Bridgeman, Mich., and the United States Pipe & Foundry Co. has been awarded 15,000 ft. of 6 and 8-in. pipe by Sidney, Ohio. O'Fallon, Ill., expects to open bids Oct. 16 on 44,000 ft. of 8 or 10-in., 2500 ft. of 6-in. and 6000 ft. of 4-in. pipe. There is some doubt in the minds of sellers whether this contract will be placed in the near future; it is understood that financial matters have not been fully arranged. From scattered points throughout the Central West comes a fair volume of inquiry for lots of less than 100 tons each. Several Western railroads have placed orders for less than carloads. Prices remain steady at levels reached last week.

Prices per net ton, deliv'd Chicago: Water pipe, 6-in. and over, $43.70 to $45.70; 4-in., $47.70 to $49.70; Class A and gas pipe, $3 extra.

Rail and Track Supplies.—Chicago mills continue to produce at 75 per cent of capacity, but releases received this week against new orders will raise output in the next week or 10 days. This year, like 1928, has found local rail mills amply supplied with orders so that the seasonal shutdown, which usually comes late in the summer or in early fall, has not been experienced. The Chesapeake & Ohio is said to have placed 14,000 tons of track supplies with mills farther east. The local rail and track fastening market is quiet except in new inquiry, which is rapidly taking shape. The light rail market is quiet.

Prices f.o.b. mill, per gross ton: Standard section open-hearth and Bess. rails, $43; light rails, rolled from billets, $36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.15c.; angle bars, 2.75c.

Hot-Rolled Strips. — Automobile frame manufacturers and makers of rims are entering fourth quarter contracts. Prices are steady. Shipments are in moderate volume.

Bars.—With soft steel bar mills operating between 80 and 85 per cent of capacity, deliveries continue to improve, now ranging between two and seven weeks, depending on the product. Demand from the automobile trade continues to taper, except from scattered plants where new models are now being brought out. Demand for forging bars reflects the curtailed output by automobile manufacturers. Shipments of steel to road machinery manufacturers are at a steady pace, but below the rate maintained in the first eight months of the year. Farm machinery builders are releasing more steel in conformity with schedules arranged for early spring shipment of equipment. Specifications for rail steel bars are fully equal to shipments, which represent double turn operations at Chicago mills. New buying, especially for forward needs, is more active and prices are holding at 1.95c. a lb., Chicago Heights. Orders for fence posts made from old rails are more numerous following the announcement early in the week that fall terms were in effect.

Structural Material. — Awards for the week, including 1000 tons for a hospital in Chicago, totaled slightly over 2500 tons. Fresh inquiry is less brisk than a week ago, and there are indications that engineers' and architects' offices are less busy. It is reported that the 1700 tons needed for the Fine Arts Building, Chicago, will not be purchased in a lump, but that the job will be detailed and steel purchased in small lots as needed. Bids are to go in next week on 5000 tons for the Union Traction Co.'s bridge at Indianapolis. Miscellaneous users of shapes are freely entering the market for fourth quarter requirements. Of special note is the fact that several fabricators have placed sizable orders for stock, a practice which has not been followed for many months.

Mill prices on plain material, per lb.: 2.05c. base, Chicago.

Plates.—This market is without feature except for releases by the Milwaukee pipe maker. These are against new business. An oil producer in the Southwest has ordered 7000 tons of plates for oil tank construction. No new tank programs have come out this week, and outstanding inquiry for this kind of work is reduced to about 12,000 tons. Bids for the Santa Fe cars were submitted Oct. 1 and it is rather generally believed here that contracts for the cars will be placed in the very near future. Deliveries on narrow plates range from three to four weeks and on wide plates from five to eight weeks.

Wire Products.—Prices are not withstanding the test of competition. Common quotations on plain wire in the Chicago district are 2.40c. a lb., and wire nails are freely quoted at $2.45, base, per keg. Specifications from the manufacturing trade are steady, while some improvement is noted in the volume of wire and wire products moving to jobbers.

Reinforcing Bars.—Noteworthy in this week's business are two awards that aggregate 2200 tons. One of these is for a department store at Dubuque, Iowa, and the other for a store building in Chicago. Among fresh inquiries is 900 tons for a store and apartment building on Sixty-third Street, Chicago. A clearer price structure for reinforcing bars seems a step nearer. The rail steel commodity is being reasonably well held at 2c. a lb., warehouse. Efforts are being made to get higher prices for billet steel reinforcing bars, which normally sell for $6 a ton above rail steel bars. If this is accomplished, the minimum quotation on new billet reinforcing bars will be 2.30c. a lb., Chicago warehouse.

Warehouse Business.—Sales in September compared favorably with those in August and were measurably ahead of the ninth month a year ago. October, which is usually a good month from the viewpoint of business done by warehouses, is getting away to a good start.

Bolts, Nuts and Rivets.—Specifications continue to grow, but the rate is slow. Larger releases come for the most part from farm implement manufacturers, which are entering fall production schedules for equipment which must be ready for spring delivery. Output stands at 65 per cent of capacity and producers' stocks are well balanced.

Old Material.—The Chicago scrap iron and steel market is dull from the viewpoint of consumer purchases. Prices, though untested in recent days, are leaning toward the weak side. Heavy melting steel dropped last week to $15 a gross ton, delivered, and brokers immediately lowered their prices to $14.75 a ton, but upon finding that many were eager to ship at this price they quickly lowered their offers to $14.50. Dealers evidently find no strength in the market. Supplies are available for shipment against old orders even at the new low prices offered by brokers. Heavy melting steel is reaching consumers in more than ample tonnages, both for enlarging stocks and for immediate use, and, as a result, inspections have tightened and rejections are numerous. One large consumer, which recently refused to accept dealers' bundles, has again agreed to take this grade, but has made no gesture toward buying a tonnage. Rerolling rails, after lying dormant for some time, have jumped 75c. a ton to $17.85, Chicago, on a purchase of a round tonnage for delivery at Gary, Ind. The freight rate from Chicago to Gary is $1 a ton. Brokers are lowering their offering prices for cast iron borings, which a week ago they freely took at $10.50 to $10.75 a gross ton. Although output of borings is off in conformity with the lessened pace of the metal-working industry, there now is an oversupply of this grade, and dealers are offering $10.25 a gross ton for delivery against old orders. Taken as a whole, this market is listless. Sales to users of the heavy tonnage grades are at a standstill and melters of specialties will take scrap only in small lots for nearby use. The trade holds out no hopes for stronger prices in the near future, and there are those who look for further declines.

Warehouse Prices, f.o.b. Chicago

	Base per Lb
Plates and structural shapes	3.10c
Soft steel bars	3.00c
Reinforc'g bars, billet steel	2.10c. to 2.35c.
Reinforc'g bars, rail steel	1.85c. to 2.00c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Bands (¼ in. in Nos. 10 and 12 gages)	3.20c.
Hoops (No. 14 gage and lighter)	3.75c.
Black sheets (No. 24)	4.05c.
Galv. sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.35c.
Spikes, ¼ in. and larger	3.55c.
Track bolts	4.55c.
Rivets, structural	4.00c.
Rivets, boiler	4.00c.
	Per Cent Off List
Machine bolts	60
Carriage bolts	60
Coach or lag screws	60
Hot-pressed nuts, sq., tap. or blank	60
Hot-pressed nuts, hex., tap. or blank	60
No. 8 black ann'l'd wire, per 100 lb.	$3.45
Com. wire nails, base per keg	3.20
Cement c't'd nails, base per keg	3.20

Prices deliv'd Chicago district consumers:

	Per Gross Ton
Basic Open-Hearth Grades:	
Heavy melting steel	$14.50 to $15.00
Shoveling steel	14.50 to 15.00
Frogs, switches and guards, cut apart, and misc. rails	16.25 to 16.75
Hydraul. compressed sheets	13.00 to 13.50
Drop forge flashings	10.75 to 11.25
No. 1 busheling	12.75 to 13.25
Forg'd cast and r'l'd steel carwheels	18.75 to 19.25
Railroad tires, charg. box size	18.75 to 19.25
Railroad leaf springs cut apart	18.75 to 19.25
Acid Open-Hearth Grades:	
Steel couplers and knuckles	17.00 to 17.50
Coil springs	19.00 to 19.50
Electric Furnace Grades:	
Axle turnings	14.25 to 14.75
Low phos. punchings	17.00 to 17.50
Low phos. plates, 12 in. and under	17.00 to 17.50
Blast Furnace Grades:	
Axle turnings	12.00 to 12.50
Cast iron borings	10.00 to 10.50
Short shoveling turnings	10.00 to 10.50
Machine shop turnings	7.00 to 7.50
Rolling Mill Grades:	
Iron rails	16.00 to 16.50
Rerolling rails	18.25 to 18.75
Cupola Grades:	
Steel rails less than 3 ft.	17.50 to 18.50
Steel rails less than 2 ft.	20.00 to 20.50
Angle bars, steel	17.00 to 17.50
Cast iron carwheels	14.00 to 14.50
Malleable Grades:	
Railroad	17.00 to 17.50
Agricultural	15.50 to 16.00
Miscellaneous:	
*Relaying rails, 56 to 60 lb.	23.00 to 25.00
*Relaying rails, 65 lb. and heav.	26.00 to 31.00
	Per Net Ton
Rolling Mill Grades:	
Iron angle and splice bars	15.00 to 15.50
Iron arch bars and transoms	21.00 to 21.50
Iron car axles	26.00 to 26.50
Steel car axles	17.50 to 18.00
No. 1 railroad wrought	14.00 to 14.50
No. 2 railroad wrought	13.00 to 13.50
No. 1 busheling	9.00 to 9.50
No. 2 busheling	7.00 to 7.50
Locomotive tires, smooth	14.50 to 15.00
Pipes and flues	10.00 to 10.50
Cupola Grades:	
No. 1 machinery cast	14.50 to 15.00
No. 1 railroad cast	14.00 to 14.50
No. 1 agricultural cast	13.25 to 13.75
Stove plates	12.25 to 12.75
Grate bars	11.75 to 12.25
Brake shoes	10.75 to 11.25

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Algoma Bar Mills Shut Down For Rebuilding

SAULT STE. MARIE, ONT., Oct. 8.—Construction work in connection with the extension of the merchant mills of the Algoma Steel Corporation has resulted in the closing down of these mills. The 18-in. mill suspended Sept. 26 and the 12-in. mill on Oct. 1. Operations will be resumed about the first of the year, when the new mills will have been completed. The plant additions will represent an expenditure of $2,000,000 and will provide thoroughly modern equipment and double the capacity of the two mills.

Furnace at Milwaukee Being Dismantled

The Thomas furnace at Milwaukee is being dismantled. It was owned and operated by the Thomas Furnace Co., which was incorporated in Wisconsin in 1904. The furnace, with four stoves, was built in 1908. Its annual capacity was 110,000 tons.

New York

New Structural Steel Projects Call for 62,750 Tons—Pig Iron Demand is Fair

NEW YORK, Oct. 8.—Pig iron demand is in fair volume, considering the fact that fourth quarter contracting has been largely completed and little interest is being shown in first quarter needs. Sales of the week totaled about 9000 tons. The largest purchase was by the Worthington Pump & Machinery Corporation, which bought 1600 tons for various plants. Another buyer in this district closed for 1000 tons. The New York Central Railroad has bought 350 tons. In New England, the General Fire Extinguisher Co., Providence, R. I., placed orders for 1500 tons of foundry and malleable. The largest current inquiries call for 1200 tons and 1000 tons respectively. Total pending business actually before the trade is not large, but sellers continue to uncover considerable tonnage by thoroughly canvassing the market. Purchases to supplement previous orders are in encouraging volume. Suspensions of shipments are rare, and melt seems to be well maintained. Southern iron continues to be sold in this market, but is less of a factor than a few weeks ago. Alabama producers are quoting $13.50, base Birmingham, on foundry grade. Steel company offerings of surplus iron do not appear to have grown much larger, and prices both at Buffalo and eastern Pennsylvania furnaces are substantially unchanged. Repairs on the Port Henry, N. Y., furnace have been completed and drying out is now under way, with the blowing in of the stack on Oct. 15 assured. A threatened strike of towboat crews in New York harbor may result in some interference to barge shipments of pig iron.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	$22.41 to $22.91
*Buf. No. 2, del'd east. N. J.	20.78 to 21.28
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	19.89 to 21.02
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	20.39 to 21.52

Freight rates: $4.91 from Buffalo, $1.39 to $2.52 from eastern Pennsylvania.
*Prices delivered to New Jersey cities having rate of $3.28 a ton from Buffalo.

Cast Iron Pipe.—Pressure pipe buying by most private companies and municipalities is limited to small lots for completion of installations. Prices continue irregular, on most business ranging from $33 to $34 a ton, f.o.b. Northern foundry, but occasionally this range is shaded to $32 a ton or less, f.o.b. foundry. The Pennsylvania Railroad has closed on 6000 ft. of 6-in. pipe for installation at West Philadelphia. Inquiries include 30,000 ft. of 8 and 10-in. water pipe for Buffalo, bids on which will be opened Oct. 10, and 125 tons of 6 and 12-in. pipe and five tons of fittings for Newburgh, N. Y., bids opening Oct. 10. An export inquiry for shipment to Porto Rico calls for 4200 ft. of 24-in. pipe, about 500 tons, with alternate prices asked on 4200 ft. of 20 in.

Prices per net ton deliv'd New York: Water pipe, 6-in. and larger, $34.60 to $36.60; 4-in. and 5-in., $37.60 to $39.60; 3-in., $44.60 to $46.60. Class A and gas pipe, $3 extra.

Reinforcing Bars.—Activities have been fairly well sustained in the past week. Carroll-McCreary Co., Inc., has booked two jobs requiring a total of 670 tons of bars. Bids have been taken on 2000 tons for grade crossing elimination work for the Long Island Railroad. Action is expected soon on 700 tons for two New York subway sections. The Pennsylvania is inquiring for 750 tons of bars for electrification work at New Brunswick, N. J. Prices are steady and unchanged.

Billet steel reinforcing bars in 40, 50 and 60-ft. lengths, 2.05c. per lb., Pittsburgh, and 2.30c. per lb., Pittsburgh warehouse, for cut lengths. Out of New York warehouse, 2.90c. per lb. for lots of 5 tons or more, 3.05c. for lots of 2 to 5 tons and 3.30c. for less than 2 tons, all delivered at job.

Finished Steel.—Developments of the week in the local steel market have to do chiefly with prices. Black sheets have definitely settled to 2.75c., base Pittsburgh, for the larger buyers, though small buyers are still asked to pay 2.85c. Blue annealed sheets, both light and heavy, are also weaker. No. 10 gage is being offered to large buyers at 2.10c. and to small buyers at 2.20c.; the lower figure has been heard of occasionally in recent weeks, but has now become more general. No. 13 gage ranges from 2.25c. to 2.35c., Pittsburgh, the lower price applying on the more attractive lots. Light gage blue annealed sheets have until the past week or so been holding fairly well at 2.35c. Local steel sales offices are unable to discern any improvement in the volume of buying, but it is probable that demands have not decreased, being about the same as during the previous few weeks. In railroad equipment, the chief item of interest is the placing of 1500 steel gondola cars by the Southern Railway with the Pressed Steel Car Co. This road is expected to buy about 2500 more cars. New structural work in the New York area this week totals 62,750 tons, of which 18,000 tons is for three units of the New York Cornell Medical Hospital and 21,000 tons for a freight terminal for the Lehigh Valley Railroad. Lettings in September in the New York metropolitan district, exclusive of civil engineering work such as subways and bridges, totaled 54,119 tons, according to records of the Structural Steel Board of Trade of New York.

Mill prices per lb., deliv'd New York: Soft steel bars, 2.24c. to 2.29c.; plates, 2.22½c.; structural shapes, 2.19½c.; bar iron, 2.14c.

Warehouse Business.—Buying from stock has improved slightly, but blue annealed and galvanized sheet prices are still being shaded. Galvanized sheets are subject to concessions of about $2 a ton on desirable business. Blue annealed sheets, which are quoted by warehouses in this district at 3.90c. a lb., base, for No. 10 gage, have been sold at concessions down to 3.25c. to

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.30c.
Soft steel bars, small shapes	3.25c.
Iron bars	3.24c.
Iron bars, Swed. charcoal	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Cold-roll. strip, soft and quarter hard	5.15c. to 5.40c.
Hoops	4.25c.
Bands	3.75c.
Blue ann'l'd sheets (No. 10)	3.50c. to 3.90c.
Long terne sheets (No. 24)	5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galv. annealed	5.15c.
Tire steel, 1½ x ½ in. and larger	3.40c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.75c.
Open-hearth spring steel, bases	4.50c. to 7.00c.

	Per Cent Off List
Machine bolts, cut thread:	
¾ x 6 in. and smaller	60
1 x 30 in. and smaller	50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	60
¾ x 20 in. and smaller	50 to 50 and 10
Coach screws:	
½ x 6 in. and smaller	60
1 x 6 in. and smaller	50 to 50 and 10

Boiler Tubes—	Per 100 Ft.
Lap welded, 2-in.	$17.33
Seamless steel, 2-in.	20.24
Charcoal iron, 2-in.	25.00
Charcoal iron, 4-in.	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
½-in. butt	46	29
¾-in. butt	51	37
1-3 in butt	53	39
2½-6-in. lap	48	35
7 and 8-in. lap	44	17
11 and 12-in. lap	37	12
Wrought Iron—		
⅛-in. butt	5	+19
¾-in. butt	11	+ 9
1-1½-in. butt	14	+ 6
2-in. lap	5	+14
3-6-in. lap	11	+ 6
7-12-in. lap	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box	$6.45	$6.20
Charcoal, per Box—	A	AAA
IC	$9.70	$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating	$10.00 to $11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets, Box Annealed—Black, C. R. One Pass

	Per Lb.
Nos. 18 to 20	3.75c. to 3.80c.
No. 22	3.90c. to 3.95c.
No. 24	3.95c. to 4.00c.
No. 26	4.05c. to 4.10c.
No. 28*	4.20c. to 4.25c.
No. 30	4.45c. to 4.50c.

Sheets, Galvanized

	Per Lb.
No. 14	4.20c. to 4.40c.
No. 16	4.15c. to 4.25c.
No. 18	4.20c. to 4.40c.
No. 20	4.30c. to 4.50c.
No. 22	4.40c. to 4.60c.
No. 24	4.65c. to 4.75c.
No. 26	4.90c. to 5.00c.
No. 28*	5.15c. to 5.25c.
No. 30	5.55c. to 5.65c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

3.35c. a lb., base. Demand for structural material and steel bars is improving, and prices are fairly well maintained.

Coke.—Prices are unchanged at $2.65 to $2.75 a net ton, Connellsville, for standard furnace. Special brands of beehive coke are quoted at $4.85 a net ton, ovens, or $8.56, delivered to northern New Jersey, Jersey City and Newark, and $9.44 to New York and Brooklyn. By-product coke is quoted at $9 to $9.40 a net ton, Newark or Jersey City, and $10.06, New York or Brooklyn.

Old Material.—The trend of scrap prices continues downward. Consumers of No. 1 heavy melting steel are offering $15.50 a ton, delivered, although the most recent purchases of this grade were at $16 to $16.50 a ton, delivered. Machine shop turnings are quotable on a slightly lower basis as the result of recent buying by brokers at $11 to $11.25 a ton, delivered eastern Pennsylvania. Such items of railroad scrap as steel car axles, rerolling rails and malleable cast are off 50c. a ton on recent buying by brokers to fill contracts.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel	$12.00 to $12.85
Heavy melting steel (yard)	8.00 to 9.50
No. 1 hvy. breakable cast.	10.25 to 11.00
Stove plate (steel works).	8.00 to 8.25
Locomotive grate bars....	8.25 to 8.75
Machine shop turnings....	7.50 to 8.00
Short shoveling turnings..	7.50 to 8.00
Cast borings (blast furn. or steel works).....	7.00 to 7.75
Mixed borings and turnings	6.75 to 7.75
Steel car axles.....	18.50 to 19.50
Iron car axles.....	23.00 to 24.00
Iron and steel pipe (1 in. dia., not under 2 ft. long)	10.25
Forge fire	9.50 to 10.00
No. 1 railroad wrought...	12.00 to 12.50
No. 1 yard wrought, long..	11.00 to 11.50
Rails for rolling.....	12.75 to 13.25
Stove plate (foundry)....	8.00 to 8.50
Malleable cast (railroad).	13.50 to 14.00
Cast borings (chemical)..	9.50 to 10.00

Prices per gross ton, deliv'd local foundries:

No. 1 machry. cast.....	$16.00 to $16.50
No. 1 hvy. cast (columns, bldg. materials, etc.), cupola size	14.00 to 14.50
No. 2 cast (radiators, cast boilers, etc.)	13.50 to 14.00

Cleveland

Automobile Manufacturers Buy Good-Sized Tonnages of Sheets, But Prices Are Definitely Lower

CLEVELAND, Oct. 8.—The volume of business in finished steel increased during the week, due to the placing of some good-sized lots of sheets by the automotive industry in the Detroit territory. This furnished a test of prices and indicated a buyers' rather than a sellers' market. Buying by the automobile companies for some time has been at a low ebb, and this spurt of activity does not indicate an early revival of this industry. Auto body sheets cannot be delivered for earlier than November production. A Cleveland body plant placed some tonnage in auto body sheets for parts of the new model Chevrolet bodies that have been approved by the engineering department.

Some of the automobile companies that will bring out new models evidently have reached the point where they are about ready to place orders for parts, as Cleveland makers of forgings and stampings have received considerable inquiry for car parts.

While there is little expectation that the automotive industry will show a gain in production this month, some pickup seems probable in November. Although the Ford Motor Co. announces an increase in its production schedule for October over September, this company's figures apparently indicate that its daily output this month will be somewhat less than in September.

The steel market in this territory shows little change, business holding at about the recently reduced volume. The outstanding feature in the price situation is a weakness in the sheet market, with reduced prices on auto body, black and blue annealed grades.

Pig Iron.—Sales gained the past week, during which Cleveland interests sold 32,400 tons of foundry iron. Not much inquiry is pending. Considerable of the business came from radiators, furnace and stove manufacturers, and very little from the motor car industry. Some of the consumers in the automotive field are buying from hand to mouth instead of for the full quarter, because of the uncertainty as to their requirements during the remainder of the year. Shipping orders are in about the same volume as last month. There apparently is no deviation from the regular quotations of $18.50, Cleveland furnace, for out-of-town shipment, $19, furnace, for local delivery and $20, furnace, for delivery in the Michigan territory. The recent inquiry of the Westinghouse Electric & Mfg. Co. for iron for its Cleveland plant is still pending. B furnace of Pickands, Mather & Co., Toledo, which has been out for relining, was blown in Oct. 3.

Prices per gross ton at Cleveland:

N'th'n fdy., sil. 1.75 to 2.25	$19.50
S'th'n fdy., 1.75 to 2.25...	$19.50 to 20.00
Malleable	19.50
Ohio silvery, 8 per cent...	28.00
Basic Valley furnace.....	18.50
Stand. low phos., Valley..	26.50 to 27.00

Prices except on basic and low phosphorus are delivered Cleveland. Freight rates: 50c. from local furnaces; $3 from Jackson, Ohio; $6 from Birmingham.

Iron Ore.—Ore is moving at a good rate, and it is expected that October shipments will be 8,000,000 tons and that 4,000,000 tons will be moved in November. These would make a total water movement of slightly over 65,000,000 tons this year, breaking the previous record of 1916, when water shipments amounted to 64,734,198 tons. Water shipments until Oct. 1 were 53,264,827 tons, breaking the previous record in 1916 of 48,816,650 tons. Final figures for September showed a movement during the month of 9,547,040 tons. Shipments until Oct. 1 were 11,998,848 tons over the corresponding period last year, or a gain of 29.08 per cent.

The balance of ore on docks at Lake Erie ports Oct. 1 was 5,765,204 tons, compared with 6,100,456 tons on the same date a year ago.

Semi-Finished Steel.—While demand for sheet bars has become spotty, specifications are holding up well, suspensions by some consumers being offset by the releases by others. Weakness in sheet prices has been followed by some effort to secure concessions from the $35 price on sheet bars. Most consumers are under contract at that price.

Bars, Plates and Shapes.—Weakness in other districts has led to some pressure by buyers for price concessions, but outside mills that have closed a good many contracts at 1.95c., Cleveland, for steel bars and at 1.95c., Pittsburgh, for plates and shapes have refused to revise their contracts. The local mill price range of 1.90c. to 1.95c. on steel bars that has prevailed for some time is unchanged. Steel bar business is light owing to the decreased demand from the automotive industry, especially from makers of low-priced cars. A local mill has closed contracts with miscellaneous users of plates at 1.95c., Pittsburgh. The structural market is quiet. The Bethlehem Steel Co. will furnish 1200 tons of sheet steel piling for the Detroit water works.

Sheets.—Some round lot business was placed by the automotive industry in the Detroit territory the past week, making the volume of business considerably larger than during any previous week for some time. Locally, there was a little gain in business. Pressure by buyers at a time when mills need business resulted in a reduction on auto body sheets and in some sharp price concessions on round lots of blue annealed sheets. Auto body sheets, which had recently been wavering, were reduced $2 a ton to 4c., Pittsburgh. However, several mills with the hope of getting prices up

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and struc. shapes.....	3.00c.
Soft steel bars.....	3.00c.
Reinforc. steel bars.....2.25c. to	2.50c.
Cold-fin. rounds and hex.....	3.65c.
Cold-fin. flats and sq.....	4.15c.
Hoops and bands, No. 12 to ¼ in., inclusive	3.25c.
Hoops and bands, No. 13 and lighter	3.65c.
Cold-finished strip .....*5.95c.	
Black sheets (No. 24).....3.70c. to	3.90c.
Galvanized sheets (No. 24).4.60c. to	4.75c.
Blue ann'l'd sheets (No. 10).....	3.25c.
No. 9 ann'l'd wire, per 100 lb.....	$2.80
No. 9 gal. wire, per 100 lb.....	3.25
Com. wire nails, base per keg.....	2.80

*Net base, including boxing and cutting to length.

again for the first quarter are stipulating that specifications at this price must be in by Nov. 1. As about four weeks is required for manufacturing auto body sheets, buyers evidently will have their requirements well taken care of for the fourth quarter at 4c. Continuous mills have gone as low as 2c. for light blue annealed plates and 2.15c. for No. 13 blue annealed in the Detroit territory. However, the more common quotations on round lots appear to be 2.10c. and 2.25c. respectively for the two grades. Jobbing mills are not meeting the concessions. Black sheets have settled to 2.75c. as a common quotation. Galvanized sheets appear to be holding fairly well at 3.50c., Pittsburgh, although that has also been named as a Valley base.

Wire Products.—Wire is moving fairly well, but nails continue dull. On nails, $2.45, Cleveland, is the ruling price for car lots in this territory. Wire appears firm at 2.40c.

Track Supplies.—The Chesapeake & Ohio Railroad has placed 8000 tons of tie plates with the Wheeling Steel Corporation.

Strip Steel.—Mills are getting some hot-rolled strip business, but not enough to keep them in full operation. While there is considerable pressure for price concessions, regular quotations appear to be holding remarkably well. Demand for cold-rolled strip is slow. There appears to be no concession from the regular 2.75c., Cleveland, price and mills are still able to get 2.85c. for small lots.

Bolts, Nuts and Rivets.—Demand for bolts and nuts is still rather light, the volume of business showing no gain over that of last month. The industry is operating at 60 to 65 per cent of capacity. Prices are firm. Rivets are moving somewhat better than last month. Most buyers have signed contracts at the regular $3.10 per 100 lb. price for large rivets, which is holding for the regular run of business. However, a 1100-ton lot placed by an Eastern shipbuilding company is understood to have gone at slightly under $3 per 100 lb.

Coke.—Foundry coke is slow. By-product domestic coke is in good demand and firm. Foundry coke prices are unchanged at $8.25, ovens, for Ohio by-product coke and $4.85, ovens, for the better grades of Connellsville coke.

Old Material.—The market on steel making scrap is 25c. a ton lower, but blast furnace grades are firmer, following the purchase of a round tonnage of borings and turnings by a local mill at a reported price of $12. Dealers are paying $11.25 to $11.50 for scrap against these new orders, or an advance of $1 a ton. The purchase did not include No. 2 busheling, which advanced only 25c. No. 1 heavy melting steel is not bringing over $15.25 from dealers for the grades used by one Cleveland consumer, but for selected scrap for another Cleveland mill dealers are paying $16.75.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	$14.75 to $15.25
No. 2 heavy melting steel	14.25 to 14.75
Compressed sheet steel	14.75 to 15.25
Light bundled sheet stampings	12.00 to 12.50
Drop forge flashings	13.00 to 13.25
Machine shop turnings	10.00 to 10.50
Short shoveling turnings	11.50 to 12.00
No. 1 railroad wrought	13.50 to 14.00
No. 2 railroad wrought	16.00 to 16.50
No. 1 busheling	13.25 to 13.75
Pipes and flues	9.00 to 9.50
Steel axle turnings	12.50 to 13.00
Acid Open-Hearth Grades:	
Low phos., forging crops	17.75 to 18.00
Low phos., billet, bloom and slab crops	18.50 to 18.75
Low phos., sheet bar crops	18.00 to 18.50
Low phos., plate scrap	18.00 to 18.50
Blast Furnace Grades:	
Cast iron borings	10.75 to 11.25
Mixed borings and short turnings	10.75 to 11.25
No. 2 busheling	10.75 to 11.25
Cupola Grades:	
No. 1 cast	17.50 to 18.00
Railroad grate bars	11.00 to 12.00
Stove plate	12.00 to 12.50
Rails under 3 ft.	18.50 to 19.00
Miscellaneous	
Railroad malleable	18.00 to 18.50
Rails for rolling	16.25 to 16.50

Philadelphia

Steel Bar Contracts Being Reduced $1 a Ton—Shape Market Shows Weakness

PHILADELPHIA, Oct. 8.—Consumers of steel in this district are maintaining fair operations, but are not inclined to cover their future requirements to any extent. Builders of commercial car bodies are better engaged than the fabricators of passenger cars. Of the latter, however, one plant expects to increase output soon, when production begins on the new models of two leading motor cars. Steel bar contracts are being written down $1 a ton and most of the new business being placed for bars is at 1.90c., Pittsburgh.

Bars.—Contracts are in most cases being revised downward $1 a ton to 1.90c. a lb., Pittsburgh, or 2.22c., delivered Philadelphia. Although the former price of 1.95c., Pittsburgh, or 2.27c., Philadelphia, is still quoted on small lots, business of a carload or more is generally at the new level. Operating rates of mills are still curtailed in the absence of automotive activity.

Pig Iron.—Users of foundry iron are buying for immediate requirements, but show no inclination as a rule to contract for delivery over the rest of the year. Southern competition is still encountered in this district, but is of lessening importance, with Birmingham furnaces endeavoring to maintain $13.50 a ton, furnace, as a minimum quotation for foundry iron. Low phosphorus demand is small, but bids will be opened Oct. 11 on 100 tons for the Panama Canal Commission. No sizable purchase of basic iron has been made by consumers in this district for some weeks, but two of the leading users of this grade are expected to inquire shortly for their requirements to the end of the year.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil.	$21.26 to $21.76
East. Pa. No. 2X, 2.25 to 2.75 sil.	21.76 to 22.26
East. Pa. No. 1X	22.26 to 22.76
Basic (del'd east. Pa.)	19.75 to 20.25
Gray forge	20.00 to 20.50
Malleable	21.25 to 21.75
Stand. low phos. (f.o.b. N. Y. State furnace)	22.00 to 23.00
Cop. br'g low phos. (f.o.b. furnace)	23.50 to 24.00
Va. No. 2 plain, 1.75 to 2.25 sil.	24.04
Va. No. 2X, 2.25 to 2.75 sil.	24.54

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces; $4.54 from Virginia furnaces.

Reinforcing Bars.—Distributers of billet steel bars are quoting from 1.95c. to 2c., Pittsburgh, or 2.27c. to 2.32c., delivered Philadelphia, usually with no extra for cutting to required length. As a result, sellers of rail steel bars have found it necessary to offer concessions of $2 a ton and more from 1.95c., Franklin, Pa., and Tonawanda, N. Y., or 2.27c., delivered Philadelphia, with no extra for cutting to length. A recent sizable contract for bars has been awarded to a rail steel mill, 650 tons of bars for a building at Kearny, N. J., for the Western Electric Co., having been placed with the Danville Structural Steel Co.

Shapes.—Fabricating shops are well engaged, but the tonnage of prospective business is small. Shape prices are still irregular and lacking in strength. Quotations range from 1.90c., f.o.b. nearest mill to consumer, or 1.96c., Philadelphia, to 2c., mill, or 2.06c., Philadelphia.

Plates.—Operations are still at a good rate, with some mills rolling plates for shipbuilding and railroads and others completing old contracts for tank material, especially for the oil industry. New business is scattered and small. The price is un-

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.70c.
Plates, ¾-in.	2.90c.
Structural shapes	2.70c.
Soft steel bars, small shapes, iron bars (except bands)	2.80c.
Round-edge iron	3.50c.
Round-edge steel, iron finished 1½ x 1½ in.	3.50c.
Round-edge steel planished	4.30c.
Reinforc. steel bars, sq. twisted and deform.	2.60c. to 2.80c.
Cold-fin. steel, rounds and hex.	3.60c.
Cold-fin. steel, sq. and flats	4.10c.
Steel hoops	3.55c.
Steel bands, No. 12 to ¾-in. inclus.	3.30c.
Spring steel	5.00c.
*Black sheets (No. 24)	4.10c.
†Galvanized sheets (No. 24)	4.85c.
Light plates, blue annealed (No. 10)	3.25c.
Blue ann'l'd sheets (No. 13)	3.40c.
Diam. pat. floor plates—	
¼-in.	5.30c.
¾-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

*For 50 bundles or more; 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.
†For 50 bundles or more; 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

changed at 2.05c., Coatesville, Pa., or 2.15c., delivered Philadelphia.

Sheets.—A builder of commercial car bodies in this district is maintaining a slightly better rate of operation than the passenger car body fabricators. One local plant, however, expects to increase its scale of operations materially in the next few weeks, when production begins on the new models of two leading motor car builders, with which it has contracts. Black sheets have rather generally settled to 2.75c., Pittsburgh, or 3.07c., delivered Philadelphia, and galvanized sheets are quoted at 3.50c., Pittsburgh, or 3.82c., delivered Philadelphia. Blue annealed sheets continue in fairly active demand and mills are able to maintain higher operating rates on this grade than on either black or galvanized. Quotations are 2.35c. a lb., Pittsburgh, or 2.67c., delivered Philadelphia, for No. 13 gage and lighter and 2.20c., Pittsburgh, or 2.52c., Philadelphia, for No. 10 gage, blue annealed plates. On contracts with large consumers, or when competition is encountered from continuous sheets, these quotations are usually shaded $2 a ton to 2.25c., Pittsburgh, for No. 13 gage and 2.10c., Pittsburgh, for No. 10 gage blue annealed plates.

Old Material.—All grades of scrap show a tendency to weakness on the basis of dealers' offers to buy on current contracts. Most consumers are well covered in their scrap requirements at present and are not offering to buy additional tonnage, except at concessions of 50c. a ton or more from the prices they have previously paid.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	$16.00 to $16.50
Scrap T rails	15.50
No. 2 heavy melting steel	12.50 to 14.25
No. 1 railroad wrought	16.00 to 16.50
Bundled sheets (for steel works)	11.50
Hydraulic compressed, new	14.50 to 15.00
Hydraulic compressed, old	12.00 to 12.50
Machine shop turnings (for steel works)	12.00
Heavy axle turnings (or equiv.)	14.00 to 14.50
Cast borings (for steel works and roll. mill)	11.00 to 11.75
Heavy breakable cast (for steel works)	14.50 to 14.75
Railroad grate bars	12.00 to 12.50
Stove plate (for steel works)	12.00 to 12.50
No. 1 low phos., hvy., 0.04% and under	22.00 to 23.00
Couplers and knuckles	19.50 to 20.50
Rolled steel wheels	19.50 to 20.50
No. 1 blast f'nace scrap	10.50 to 11.00
Wrot. iron and soft steel pipes and tubes (new specific.)	15.00
Shafting	19.00 to 20.00
Steel axles	23.00 to 23.50
No. 1 forge fire	14.00
Cast iron carwheels	16.50 to 17.00
No. 1 cast	16.00 to 16.50
Cast borings (for chem. plant)	14.50
Steel rails for rolling	16.50 to 17.00

Imports.—In the week ended Oct. 5, 3274 tons of chrome ore arrived at this port, of which 2918 tons was from Cuba and 356 tons from Portuguese Africa. Iron ore arrivals consisted of 697 tons from Spain. Pig iron imports were 1203 tons from India. A hundred tons of spiegeleisen was received from the United Kingdom. Steel imports consisted of 76 tons of steel bars from Belgium, 55 tons from France and 21 tons from Germany, 24 tons of steel bands from France and 5 tons from Belgium, 207 tons of structural shapes from Belgium and 102 tons from France, 65 tons of steel billets from Sweden and 10 tons of steel scrap from the United Kingdom.

Detroit

Automobile Situation Still Uncertain

DETROIT, Oct. 8.—The automobile situation is still uncertain, but indications point to some improvement, as affecting demands for steel, by November.

Automobile manufacturers generally are using up their inventories, as model changes impend. There may be a further drop in steel orders before specifications are sent to the steel mills for the production of new models.

Despite denials by the Ford Motor Co. that it will bring out a slightly changed model in November, the opinion persists here that some alterations are in progress. The Ford plant is now operating five days a week on a daily schedule of about 7000 cars.

Chevrolet production is about 3500 cars a day. Its production schedule for November and December is said to call for 65,000 cars a month.

The Buick plant at Flint is producing about 1200 cars a day, 150 of which are the Marquette model. The November schedule is on the same basis.

The Chrysler Corporation, including the Dodge plant, Hudson-Essex, Graham-Paige, Hupp and Willys-Overland, are not operating much, if any, above 50 per cent of capacity. Pontiac, Oakland and Olds plants are about on the same basis.

The Packard and Cadillac plants, both of which have recently introduced new models, are running virtually at full capacity.

Detroit Scrap Unchanged

DETROIT, Oct. 8.—There have been no changes in prices on old material in the district. Small sales are being made at the lower side of the range. With curtailed automotive production, current orders are sufficient to cover scrap being produced.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Hvy. melting and shov. steel	$14.00 to $14.50
Borings and short turnings	8.50 to 9.00
Long turnings	8.00 to 8.50
No. 1 machinery cast	12.50 to 13.00
Automobile cast	13.00 to 13.50
Hydraul. comp. sheets	14.00 to 14.50
Stove plate	9.00 to 9.50
New No. 1 busheling	12.00 to 12.50
Old No. 1 busheling	10.50 to 11.00
Sheet clippings	8.25 to 8.75
Flashings	12.50 to 13.00

Reinforcing Steel

Lettings Amount to 4600 Tons—New Work Totals 5000 Tons

REINFORCING steel awards the past week totaled 4600 tons, of which 2000 tons will be required for a bridge at Pensacola, Fla. Over 5000 tons was added to the pending list. Two thousand tons will go into grade elimination work on the Long Island Railroad and 900 tons into an apartment and store building at Chicago. Awards follow:

BOSTON, 150 tons, Congress Street bridge, to Joseph T. Ryerson & Son, Inc.

NEW YORK, 375 tons, Farmers' Loan & Trust Co. Building, to Kalman Steel Co.

NEW YORK, 300 tons, section 6, route 107, of subway, to Carroll & McCreary.

NEW YORK, 250 tons, New York Cornell Hospital, to Carroll & McCreary.

NEW YORK, 120 tons, telephone building, to Carroll & McCreary.

PENSACOLA, FLA., 2000 tons, Pensacola Bay bridge, to Concrete Steel Co., Birmingham.

CHICAGO, 1100 tons, Roshek store, to Concrete Engineering Co.

CHICAGO, tonnage not stated, apartment building on Wilson Avenue, to Kalman Steel Co.

CHICAGO, 215 tons, St. Elizabeth's Hospital, to Concrete Engineering Co.

CHICAGO, 350 tons, addition to Michael Reese Hospital, to an unnamed bidder.

CHICAGO, 100 tons, Bethany Hospital, to Olney J. Dean & Co.

DUBUQUE, IOWA, 1100 tons, department store, to Concrete Engineering Co.; previously reported to an unnamed bidder.

ST. LOUIS, 100 tons, building for Krey Packing Co., to Laclede Steel Co.

KEARNY, N. J., 650 tons, buildings for Western Electric Co., to Danville Structural Steel Co.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

LONG ISLAND RAILROAD, 2000 tons, grade crossing elimination work.

PENNSYLVANIA RAILROAD, 750 tons, electrification work at New Brunswick, N. J.

CLEVELAND, 275 tons, film exchange building for Warner Brothers.

CHICAGO, 100 tons, warehouse for Norton Co.

CHICAGO, 100 tons, factory for Borg & Beck Co.

CHICAGO, 350 tons, Parker Public High School.

CHICAGO, 900 tons, Wieboldt apartment building and store on Sixty-third Street.

SEATTLE, 200 tons, Fourteenth Avenue South bridge; bids Oct. 21.

SEATTLE, 363 tons, approach to West Spokane Street bridge; bids Oct. 11.

Bliss & Laughlin, Inc., has appointed Denyven, Linn Co., 250 Stuart Street, Boston, as sales representatives for its cold-drawn steel and shafting in the New England States. In the New York metropolitan district sales have been put in charge of John Harvey Bryan, 50 Church Street. Expansion of the sales organization is due to increased business resulting from the establishment of the company's Buffalo plant.

Birmingham

Pig Iron Shipments Continue to Exceed Output—New Steel Business at a Good Rate

BIRMINGHAM, Oct. 8.—Pig iron buying is now being spread out more evenly from week to week. Though the volume is below the average of three or four weeks ago, it is considered fair. More iron is being sold and considerably more is under contract than in the corresponding period in the preceding quarter. Inquiries continue to develop, but more of the sales are the result of quiet negotiations. Small orders for prompt delivery are more frequent than they have been in some time. Sales to outside points, which have declined in the past two or three weeks, are expected to improve with the beginning of first quarter buying. The margin of shipments over output is undiminished. The district price of $14.50 remains firm, and concessions from this price in the competitive territories are confined to large orders. The No. 4 Bessemer furnace of the Tennessee company, which had been banked since Aug. 18, was placed in operation Oct. 1 on recarburizing iron. The Tennessee company has also changed its Ensley furnaces Nos. 1 and 3 from foundry to basic iron. The No. 1 furnace of the Republic Iron & Steel Co. is to be blown in about Oct. 10. Of the 14 active furnaces, six are on foundry iron, seven on basic and one on recarburizing iron.

Prices per gross ton, f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil.	$14.50
No. 1 fdy., 2.25 to 2.75 sil.	15 00
Basic	14.50

Finished Steel.—New business is coming in at a rate approaching that of the best buying periods. Structural shapes, bars, plates and sheets are the most active items. Railroad accessory demand has improved. Oct. 14 has been set as the date for reopening the Ensley rail mill. Stocks will be built up for the fall buying period. Bookings in both structural steel and reinforcing bars improved last week. The Virginia Bridge & Iron Co. received an order for 500 tons for the Buckeye cotton oil plant at Memphis. New orders of the Ingalls Iron Works Co. include 350 tons for the Nichols Copper Co. El Paso, Tex.: 170 tons for a school at Greenville, Miss., and 100 tons for a school at Booneville, Miss. The Concrete Steel Co. will furnish 2000 tons of reinforcing steel for the Pensacola Bay bridge at Pensacola, Fla. The Tennessee company is now operating five open-hearths at Ensley, an increase of one, making a total of 18 active in the district.

Cast Iron Pipe.—New business is lighter than last week. Pressure pipe manufacturers are not hopeful of much improvement in the market before the winter buying period for spring requirements. This buying is not expected to be up to the average of past years owing to the unsatisfactory market for bonds of Southern municipalities. Good shipments during the past several weeks brought some reduction in stocks. Prices remain steady at $37 to $38 a net ton, Birmingham.

Coke.—The movement of foundry coke on contracts continues steady and in fair volume for season. Prices remain at $5 a net ton, Birmingham.

Old Material.—Steel grades are holding up fairly well, though the volume of sales does not compare favorably with that of this time last year. Iron scrap continues inactive. Prices are unchanged.

Prices per gross ton, deliv'd Birmingham dist. consumers' yards:

Heavy melting steel	$13.00 to $13.50
Scrap steel rails	14.00
Short shoveling turnings	9.00
Cast iron borings	9.00
Stove plate	11.50 to 12.00
Steel axles	21.00
Iron axles	23.00
No. 1 railroad wrought	10.00 to 10.50
Rails for rolling	15.50
No. 1 cast	13.00
Tramcar wheels	12.50
Cast iron carwheels	13.00 to 13.50
Cast iron borings, chem.	13.50 to 14.00

Pacific Coast

Activity in Steel Moderates, but Fabricating Shops Are Well Filled with Tonnage

SAN FRANCISCO, Oct. 5 (*By Air Mail*).—Demand for iron and steel products on the Pacific Coast this week fell off to some extent. The Pacific Northwest has had a number of important projects up for figures during the past month or two, and most of the fabricating shops have enough business booked to keep them busy for three months or more. Outstanding awards included 405 tons for a bridge over the Trinity River and new projects include 2400 tons for a viaduct in Tacoma. The price structure is holding fairly well, but some weakness in plates is in evidence.

Pig Iron.—During the past six weeks nearly 5000 tons of foreign pig iron has arrived on the Pacific Coast to fill contracts placed some time ago. A shipment of special Indian iron, approximating 1500 tons, is scheduled to arrive about Oct. 20. It is understood that this iron will be used in the manufacture of sanitary ware. Jobbing plants continue to operate on limited schedules, and little improvement is looked for during the next 30 days. Prices are unchanged.

Prices per gross ton at San Francisco:

*Utah basic	$25.00 to $26.00
*Utah fdy., sil. 2.75 to 3.25	25.00 to 26.00
**Indian fdy., sil. 2.75 to 3.25	25.00 to 26.00

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Bars.—Awards of reinforcing steel bars were confined to lots ranging from 30 to 80 tons. Pending business, however, calls for more than 4500 tons, most of which, it is expected, will be closed within the next two weeks. Bids will be opened Oct. 11 on 363 tons for approaches for the West Spokane Street bridge, Seattle, and on Oct. 21 for 200 tons for the Fourteenth Avenue South bridge, Seattle. Out-of-stock prices in Los Angeles continue firm at 2.40c., base, on carload lots and at 2.70c. on smaller tonnages, while San Francisco district quotations are $2 a ton higher. Merchant bar steel is firm at 2.35c., with demand limited to unimportant tonnages.

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and struc. shapes	3.15c.
Soft steel bars	3.15c.
Small angles, ¾-in. and over	3.15c.
Small angles, under ¾-in.	3.55c.
Small channels and tees, ¾-in. to 2¾-in.	3.75c.
Spring steel, ¼-in. and thicker	5.00c.
Black sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.80c.
Galv. sheets (No. 24)	5.30c.
Struct. rivets, ½-in. and larger	5.65c.
Com. wire nails, base per keg	$3.40
Cement c't'd nails, 100 lb. keg	3.40

Plates.—Little of importance occurred in the plate market this week, business booked being confined to small lots. Only one project involving more than 100 tons of material is before plate fabricators for figures. This calls for 140 tons for two siphons at La Mesa, Cal., bids on which will be opened Oct. 7. The general quotation on plates continues at 2.35c., c.i.f., but this price is being shaded on desirable lots.

Shapes.—The structural shape market is active, some good-sized tonnages having recently come into the market. In addition to 2400 tons for a viaduct in Tacoma, mentioned above, on which bids will be opened Oct. 21, the city of Seattle is calling for bids, on the same date, on 1000 tons for the Fourteenth Avenue South bridge. The California Packing Corporation, San Francisco, is taking bids on two canning plants, one in Togoloan, P. I., and the other in Tahiti, involving 500 tons and 350 tons respectively. Awards included 405 tons for a bridge over the Trinity River, taken by the United States Steel Products Co.; 100 tons for a hangar at Albuquerque, N. M., placed with the Minneapolis Steel & Machinery Co., and 225 tons for an apartment at Pacific and Laguna Streets, San Francisco, secured by the Golden Gate Iron Works. Plain material remains firm at 2.35c., c.i.f. Coast ports.

Cast Iron Pipe.—Demand for cast iron pipe is beginning to show signs of improvement and pending business now exceeds 7000 tons. San Diego placed with an unnamed interest 460

tons of 4 to 8-in. Class B pipe for Chesterton Street. The Weyerhaeuser Timber Co., Klamath Falls, Ore., awarded 750 tons of 6 to 10-in. Class 150 pipe to the American Cast Iron Pipe Co. San Diego will open bids on Oct. 21 for 112 tons of 4 to 8-in. Class B pipe for Estelle Street. The United States Pipe & Foundry Co. was low bidder on 138 tons of 4-in. Class 150 pipe for Pleasanton, Cal., and on 5585 tons of 4 to 12-in. Class B pipe for Long Beach, Cal.

Steel Pipe.—Standard steel pipe continues to move well, due to building construction activity, which is holding up well. The Standard Pipe & Supply Co., Los Angeles, took 305 tons of 2 to 8-in. standard pipe for Long Beach, Cal.

St. Louis

Basic Pig Iron Purchases Total 24,000 Tons—Plate Mill Operations Expand—Scrap Weak

ST. LOUIS, Oct. 8.—Two large purchases of basic iron, one of 18,000 tons and the other 6000 tons, both by East Side melters for shipment during the remainder of the year from the St. Louis Gas & Coke Corporation featured an otherwise quiet week in the pig iron market. The local maker also sold 150 tons of malleable to one implement manufacturer, 250 tons of foundry iron to another and 1865 tons of foundry grades in lots of from a carload up to 100 tons. The company's shipments during September totaled 35,000 tons, the second largest month in its history, and sales were 42,000 tons, the largest for any month since October, 1928. Sales of Southern iron were light. The market is quite firm on both Northern and Southern make. Jobbing foundries catering to the electrical industry report business is light, while the melt of foundries handling stove castings has increased materially. There has been some inquiry for prices on pig iron for shipment during the first quarter of 1930, one melter seeking 1000 tons. The local maker is accepting orders for next quarter shipment at present prices.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill.	$19.50 to $20.00
Malleable, f.o.b. Granite City	20.00
N'th'n No. 2 fdy., deliv'd St. Louis	22.16
Southern No. 2 fdy., deliv'd	16.92 to 18.92
Northern malleable, deliv'd	22.16
Northern basic, deliv'd	22.16

Freight rates: 75c. (average) Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-fin. rounds, shaftings, screw stock	3.75c.
Black sheets (No. 24)	4.25c.
Galv. sheets (No. 24)	5.10c.
Blue ann'l'd sheets (No. 10)	3.45c.
Black corrug. sheets (No. 24)	4.30c.
Galv. corrug. sheets	5.15c.
Structural rivets	3.95c.
Boiler rivets	3.95c.
	Per Cent Off List
Tank rivets, ¾-in. and smaller, 100 lb. or more	65
Less than 100 lb.	60
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-pressed nuts, sq., blank or tapped, 200 lb. or more	60
Less than 200 lb.	50
Hot-pressed nuts, hex., blank or tapped, 200 lb. or more	60
Less than 200 lb.	50

Finished Iron and Steel.—The plate department of the Granite City Steel Co., the only department operative recently at less than capacity, began operating on this basis during the last week. The volume of business in galvanized sheets is exceedingly large, demand being greater than the company's ability to produce. Specifications for tin plate are smaller, a normal condition for this time of year, bookings for fourth quarter being only fair. Business with structural steel fabricators is dull.

Coke.—The demand for domestic grades of coke is heavy, and shipments exceed production of by-product ovens in the district. There is said to be a scarcity of foundry grades, and the movement of furnace coke to the smelters in the district is heavy.

Old Material.—The market for old material is weak, No. 1 heavy melting steel being off 50c. a ton, while No. 2 is 25c. down. Miscellaneous rails, bundled sheets, No. 2 railroad wrought, rails for rolling and stove plate also declined 50c., and railroad springs went off 25c. Mills in the district suddenly shut off buying, declaring their order files did not justify further commitments. Shipments from the country dealers are considerably reduced because of low prices. Railroad lists: Pennsylvania Railroad, 58,220 tons; Baltimore & Ohio, 22,940 tons; Wabash, 3250 tons; Ann Arbor, 320 tons; St. Louis-San Francisco, 35 carloads; Nickel Plate, Chicago Belt Line and Nashville, Chattanooga & St. Louis, 15 carloads each.

Dealers' buying prices per gross ton, f.o.b. St. Louis district:

No. 1 heavy melting or shoveling steel	$13.50 to $14.00
No. 2 heavy melting or shoveling steel	13.00 to 13.50
No. 1 locomotive tires	15.50 to 16.00
Miscel. stand-sec. rails including frogs, switches and guards, cut apart	15.50 to 16.00
Railroad springs	17.75 to 17.85
Bundled sheets	10 00 to 10.50
No. 2 railroad wrought	13.50 to 14.00
No. 1 busheling	10.00 to 10.50
Cast iron borings and shoveling turnings	9.50 to 10.00
Iron rails	13.00 to 13.50
Rails for rolling	16.00 to 16.50
Machine shop turnings	7.50 to 8.00
Heavy turnings	10.00 to 10.50
Steel car axles	19.50 to 20.00
Iron car axles	27.50 to 28.00
Wrot. iron bars and trans.	21.50 to 22.00
No. 1 railroad wrought	13.75 to 14.25
Steel rails, less than 3 ft.	18.00 to 18.50
Steel angle bars	15.25 to 15.75
Cast iron carwheels	15.00 to 15.50
No. 1 machinery cast	15.25 to 15.75
Railroad malleable	16.00 to 16.50
No. 1 railroad cast	14.75 to 15.25
Stove plate	12.25 to 12.75
Agricult. malleable	15.25 to 15.75
Relay. rails, 60 lb. and under	20.50 to 23.50
Relay. rails, 70 lb. and over	26.50 to 29.00

Cincinnati

Southern Iron Prices Slightly Firmer—Inquiry for 15,000 to 20,000 Tons of Basic—Scrap Market Weaker

CINCINNATI, Oct. 8.—Although general inquiries were lacking last week, district furnace representatives sold approximately 7200 tons of pig iron, of which about 2000 tons was Southern, 300 tons was silvery and the remainder was Northern iron. Buyers in this district are not making general inquiries in as great number as heretofore, but are placing their orders after quiet inquiry is sent to one or two furnaces. The largest tonnage in last week's business came from a Dayton, Ohio, consumer, which took 1000 tons of Northern foundry iron. A Zanesville, Ohio, consumer placed an order with a Northern furnace for 500 tons, and a Southern buyer took 600 tons of Northern iron to cover its needs for the remainder of the year. The rest of the business was in small lots, ranging from one car to 100 tons. Further strengthening of the Southern market was noted in reports that the lowest purchasing price of this iron in last week's business was $14, base Birmingham. The only inquiry before the trade is for 15,000 to 20,000 tons of basic iron for fourth quarter use.

Prices per gross ton, deliv'd Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25	$19.89 to $20.39
Ala. fdy., sil. 1.75 to 2.25	17.19 to 18.19
Ala. fdy., sil. 2.25 to 2.75	17.69 to 18.69
Tenn. fdy., sil. 1.75 to 2.25	17.19 to 18.19
S'th'n Ohio silvery, 8 per cent	26.89

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and struc. shapes	3.40c.
Bars, soft steel or iron	3.30c.
New billet reinforc. bars	3.15c.
Rail steel reinforc. bars	3.00c.
Hoops	4.05c.
Bands	3.50c.
Cold-fin. rounds and hex.	3.85c.
Squares	4.35c.
Black sheets (No. 24)	4.05c.
Galvanized sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.45c.
Structural rivets	3.85c.
Small rivets	65 per cent off list
No. 9 ann'l'd wire, per 100 lb.	$3.00
Com. wire nails, base per keg	2.85
Cement c't'd nails, base 100 lb. keg	2.85
Chain, per 100 lb.	8.75
	Net per 100 Ft.
Lap-weld steel boiler tubes, 2-in.	$16.00
4-in.	33.00
Seamless steel boiler tubes, 2-in.	17.00
4-in.	34.00

Finished Material.—Although new tonnage placed with district sheet mills last week was not quite equal to capacity, the new business volume was greater than that of the preceding week and indicated a strengthening in the demand. Because of reduced schedules of operation, backlogs were increased. Accordingly, with a fairly large unrolled tonnage on the books, mill operations next week will be increased to about 95 per cent. While activity in sheets has been fairly brisk, cold-rolled strip has been sluggish. The leading interest in this district reports that this unit has been operating at less than 50 per cent, but that the current inquiry indicates early improvement and an increase in operating schedules. Auto body sheets are down to 4.10c., base Pittsburgh. Although a number of large building operations have been announced, district steel fabricators do not expect much improvement in conditions before the first of next year.

Coke.—Specifications for by-product foundry coke are sustained at about the September level, which was noticeably less than the level set in August. Domestic grades are showing better activity with the approach of cooler weather.

Old Material.—While the mills are accepting shipments of old materials on contract, new business is very light, and dealers are still feeling the reluctance of mills to pay higher prices for scrap. Accordingly, the spread on heavy melting steel, No. 2 wrought and cast iron borings has been narrowed to 25c. The Southern Railway, the Chesapeake & Ohio and the Louisville & Nashville are offering their usual lists.

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel	$13.50 to $13.75
Scrap rails for melting	14.25 to 14.75
Loose sheet clippings	9.00 to 9.50
Bundled sheets	11.00 to 11.50
Cast iron borings	9.00 to 9.25
Machine shop turnings	8.25 to 8.50
No. 1 busheling	10.50 to 11.00
No. 2 busheling	7.00 to 7.50
Rails for rolling	14.50 to 15.00
No. 1 locomotive tires	14.25 to 14.75
No. 2 railroad wrought	13.50 to 13.75
Short rails	18.50 to 19.00
Cast iron carwheels	12.75 to 13.25
No. 1 machinery cast	19.00 to 19.50
No. 1 railroad cast	15.25 to 15.75
Burnt cast	10.25 to 10.75
Stove plate	10.25 to 10.75
Brake shoes	10.25 to 10.75
Agricultural malleable	14.25 to 14.75
Railroad malleable	15.25 to 15.75

Boston

Pig Iron Prices Still Unsettled—Alabama Competition a Factor—Scrap Market Weaker

BOSTON, Oct. 8.—The purchase of 1500 tons of four grades including malleable by the General Fire Extinguisher Co., Providence, R. I., featured an otherwise rather quiet pig iron market the past week. The bulk of the 1500 tons was placed with Buffalo district furnaces. In addition, the company bought a tonnage of Southern iron. The activity of Alabama iron in this market is still an unsettling price factor. While Alabama furnaces openly quote $14.50 a ton, base furnace, there has been no established base, price depending to a large extent on the desirability of the tonnage involved. The Mystic Iron Works, in various instances, has not tried to meet the Alabama price but has not held to its former price level. Prices on Buffalo iron also have been shaded when tonnages were attractive. The Universal Winding Co., Providence, R. I., is feeling out the market on a round tonnage of iron, and a Springfield, Mass., foundry intimates it will purchase 400 tons shortly.

Foundry iron prices per gross ton deliv'd to most New England points:

†Buffalo, sil. 1.75 to 2.25	$21.78 to $22.28
†Buffalo, sil. 2.25 to 2.75	22.28 to 22.78
*Buffalo, sil. 1.75 to 2.25	22.41 to 22.91
*Buffalo, sil. 2.25 to 2.75	22.91 to 23.41
East. Penn., sil. 1.75 to 2.25	22.65 to 23.15
East. Penn., sil. 2.25 to 2.75	23.15 to 23.65
Va., sil. 1.75 to 2.25	25.21
Va., sil. 2.25 to 2.75	25.71
*Ala., sil. 1.75 to 2.25	24.11
*Ala., sil. 2.25 to 2.75	24.61
†Ala., sil. 1.75 to 2.25	20.25
†Ala., sil. 2.25 to 2.75	20.75

Freight rates: $4.91 all rail from Buffalo, and $4.28 rail and water; $3.65 all rail from eastern Pennsylvania; $5.21 all rail from Virginia; $9.61 all rail from Alabama and $5.75 rail and water from Alabama to New England seaboard.

*All rail rate.

†Rail and water rate.

Fabricated Steel.—Awards of 1500 tons of steel for a second Harvard Business School unit at Cambridge and of 700 tons for a pipe foundry to be erected by the Warren Foundry & Pipe Co. at Everett, Mass., were the largest here the past week. Approximately 5000 tons for bridges, municipal and manufacturing buildings is pending, and may be closed this month. In addition, some good-sized tonnages are reported as in the making.

Reinforcing Bars.—Aside from 150 tons for the Congress Street bridge, Boston, awards of billet steel bars the past week were in small tonnages, which in the aggregate made a fairly good showing. Several good-sized jobs are still pending. The market is steady at 2.66½c. a lb., base, from stock. The rail steel bar market is quiet at 2.26½c. a lb., base, delivered common Boston freight rate points.

Coke.—September deliveries of by-product foundry coke by New England ovens fell quite a little short of those in August. Shipments so far this month have run just about even with those of September. The price remains at $11 a ton, delivered within a $3.10 freight rate zone. Demand for domestic coke is again quite active.

Cast Iron Pipe.—Providence, R. I., has awarded 250 tons of 12-in. pipe to the United States Pipe & Foundry Co. Southboro, Mass., is about to close on pipe required for a two-and-a-half-mile, 6 and 10-in. line; Putnam, Conn., has completed plans for a one-and-a-half-mile pipe line requiring 6, 8, 12 and 16-in. dimensions, and Webster, Me., also has completed plans for a tonnage of pipe. Prices quoted openly on domestic pipe are: 4-in., $44.10 to $45.10 a ton, delivered common Boston freight rate points; 6 to 12-in., $40.10 to $41.10; 16 to 20-in., $39.60. A $4 differential is asked on Class A and gas pipe. Foreign pipe is offered at prices a shade under the domestic prices.

Old Material.—Business in most kinds of old material is confined to scattered car lots. Prices have fallen to a level where few brokers and manufacturers will sell, and important Pennsylvania steel mills apparently have sufficient scrap for current needs. The local export market is moderately active, and shipments to Danzig probably will be announced shortly.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$10.50 to $11.00
Scrap T rails	10.50 to 11.00
Scrap girder rails	9.50 to 10.00
No. 1 railroad wrought	10.50 to 11.00
No. 1 yard wrought	9.00 to 9.50
Machine shop turnings	7.00 to 7.25
Cast iron borings (steel works and rolling mill)	6.50 to 6.75
Bundled skeleton, long	9.00 to 9.50
Forge flashings	9.50 to 10.00
Blast furnace borings and turnings	6.00 to 6.25
Forge scrap	8.75 to 9.00
Shafting	13.50 to 14.00
Steel car axles	17.50 to 18.00
Wrought pipe 1 in. in diameter (over 2 ft. long)	9.50 to 10.00
Rails for rolling	12.00 to 12.50
Cast iron borings, chemical	9.50 to 10.00
Prices per gross ton deliv'd consumers' yards:	
Textile cast	$14.00 to $14.50
No. 1 machinery cast	15.00 to 15.25
No. 2 machinery cast	13.00 to 13.25
Stove plate	11.00 to 11.50
Railroad malleable	18.50 to 19.00

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars, small shapes	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway rounds	6.60c.
Norway squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tie steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold-rolled steel—	
Rounds and hex	*3.55c. to 5.55c.
Squares and flats	*4.05c. to 7.05c.
Toe calk steel	6.00c.
Rivets, structural or boiler	4.50c.

	Per Cent Off List
Machine bolts	50 and 5
Carriage bolts	50 and 5
Lag screws	50 and 5
Hot-pressed nuts	50 and 5
Cold-punched nuts	50 and 5
Stove bolts	70 and 10

*Including quantity differentials.

The Bethlehem Steel Co. will install four steam generators to burn blast furnace gas in a completely water-cooled furnace. The boilers will be built by the Combustion Engineering Corporation, New York.

Buffalo

Steel Mill Operations Decline to 70 to 75 Per Cent—Chicago Melter Seeks 10,000 Tons of Basic Iron

BUFFALO, Oct. 8.—The pig iron market remains quiet. A Chicago melter requires 10,000 tons of basic, but there seems to be little possibility that this business will come to a furnace in this territory. The General Fire Extinguisher Co. has bought about 1000 tons of foundry. There are a few 200-and 300-ton inquiries for foundry and malleable. One order was placed for 300 to 400 tons of foundry. Shipments of iron have been very good and most of the local furnaces are maintaining a minimum all-rail price of $18 on Eastern business, though the differentials are not being adhered to. So far no books have been opened for the first quarter. The district price of $19.50 base is firm.

Prices per gross ton, f.o.b. furnace:

No. 2 fdy., sil. 1.75 to 2.25	$19.50
No. 2X fdy., sil. 2.25 to 2.75	20.00
No. 1 fdy., sil. 2.75 to 3.25	21.00
Malleable, sil. up to 2.25	20.00
Basic	18.50
Lake Superior charcoal	27.28

Finished Iron and Steel.—Operations of the Buffalo mills have dropped to about 70 to 75 per cent. The Lackawanna plant of the Bethlemen Steel Co. is operating 19 of its 24 open hearths, with about half of its mills on single turn. Sheet mill operation has fallen to 75 to 80 per cent. Declining demand for automobile sheets has made this reduction necessary. Construction of the new building for the Buffalo *Courier-Express* requires 800 tons of fabricated structural, which has been awarded, and the New York Central has awarded a contract for 200 tons of structural steel for a grade crossing elimination at Rome, N. Y. The *Courier-Express* building also requires 240 tons of reinforcing bars, which has been placed.

Old Material.—An unsettled condition prevails, with none of the mills actively buying. The entire list has weakened. Malleable plants are busy and have been absorbing most of the available malleable scrap. The last reported sale was at $19. Small sales of shoveling turnings at $11.50, Niagara Falls, have been made. No. 1 heavy melting steel has sustained a nominal weakening without any sales being reported. This scrap is now worth about $16.75 to $17.00.

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and struc. shapes	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.95c.
Cold-fin. flats, sq. and hex.	4.45c.
Rounds	3.95c.
Cold-rolled strip steel	5.85c.
Black sheets (No. 24)	4.20c.
Galv. sheets (No. 24)	4.85c.
Blue ann'l'd sheets (No. 10)	3.50c.
Com. wire nails, base per keg	$3.60
Black wire, base per 100 lb.	3.75

A mill which had been buying cast iron borings at a high price is understood to have reduced this, and dealers are now paying no more than $11 for this grade of material.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$16.75 to $17.00
No. 2 heavy melting steel	14.25 to 14.75
Scrap rails	16.00 to 16.50
Hydraul. comp. sheets	14.25 to 14.50
Hand bundled sheets	11.00 to 11.50
Drop forge flashings	14.25 to 14.50
No. 1 busheling	15.75 to 16.00
Hvy. steel axle turnings	14.00 to 14.50
Machine shop turnings	8.00 to 8.50
No. 1 railroad wrought	13.00 to 13.50
Acid Open-Hearth Grades:	
Knuckles and couplers	18.00 to 18.50
Coil and leaf springs	18.00 to 18.50
Rolled steel wheels	18.00 to 18.50
Low phos. billet and bloom ends	19.00 to 19.50
Electric Furnace Grades:	
Short shov. steel turnings	12.50 to 13.00
Blast Furnace Grades:	
Short mixed borings and turnings	11.50 to 12.25
Cast iron borings	11.50 to 12.25
No. 2 busheling	10.00 to 10.50
Rolling Mill Grades:	
Steel car axles	18.75 to 19.25
Iron axles	21.00 to 22.00
Cupola Grades:	
No. 1 machinery cast	15.50 to 16.00
Stove plate	12.75 to 13.00
Locomotive grate bars	12.50 to 13.00
Steel rails, 3 ft. and under	19.50 to 19.75
Cast iron carwheels	13.50 to 14.00
Malleable Grades:	
Industrial	18.00 to 18.50
Railroad	18.00 to 18.50
Agricultural	18.00 to 18.50
Special Grades:	
Chemical borings	12.50 to 13.50

Canada

Pig Iron Producers Have Large Backlogs

TORONTO, ONT., Oct. 8.—While the demand for merchant pig iron in the Canadian markets is holding at a satisfactory level and shows general improvement over that of a year ago, forward delivery booking is beginning to fall off. About 80 per cent of those who place quarterly contracts have covered to the end of the year and local blast furnace representatives point out that last quarter contracts compare favorably with those for any other quarter this year. Producers are carrying large backlogs and are assured of heavy shipments during the next three months. Prices are unchanged.

Prices per gross ton:

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75	$24.60
No. 2 fdy., sil. 1.75 to 2.25	24.10
Malleable	24.60
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75	$26.00
No. 2 fdy., sil. 1.75 to 2.25	25.50
Malleable	26.00
Basic	24.50
Imported Iron, Montreal Warehouse	
Summerlee	$33.50
Carron	33.00

Structural Steel.—Although there is a falling off in new business, sufficient orders are appearing to maintain heavy shipments of structural steel in the various districts of Canada. Fabricating shops are carrying extensive orders, some of which call for delivery as far as a year ahead. Current demand runs mostly to small tonnages, but several prospective orders total as high as 5000 tons each.

Old Material.—According to local dealers, business done in the first three quarters of this year was the best since the war and there are good prospects that it will continue at its high average to the end of the year. Future delivery contract placing was negligible during the week, and spot sales also fell into a slump. Inquiries, however, indicate a large volume of new business in the early future. Scrap prices are without change.

Dealers' buying prices:

	Per Gross Ton	
	Toronto	Montreal
Heavy melting steel	$10.00	$8.50
Rails, scrap	11.00	9.00
No. 1 wrought	10.00	12.00
Machine shop turnings	7.50	5.00
Boiler plate	7.50	6.00
Heavy axle turnings	8.00	7.50
Cast borings	7.50	5.00
Steel borings	7.50	6.50
Wrought pipe	6.00	6.00
Steel axles	15.00	20.00
Axles, wrought iron	17.00	22.00
No. 1 machinery cast	....	17.00
Stove plate	....	13.00
Standard carwheels	....	16.00
Malleable	....	13.00
	Per Net Ton	
No. 1 mach'ry cast	$16.00	....
Stove plate	12.00	....
Standard carwheels	15.00	....
Malleable scrap	14.00	....

Youngstown

Steel Production in Valleys Declines

YOUNGSTOWN, Oct. 8.—Average steel production in the Mahoning and Shenango Valleys drops this week to 75 per cent, against the 90 per cent rate maintained during the first eight months.

This week 35 open-hearth furnaces are being operated by the independents, against 38 last week and 41 the week before that. Of 120 independent sheet mills, 86 are active.

The Youngstown Sheet & Tube Co. and the Republic Iron & Steel Co. report average operations of 75 per cent. The Warren plant of the Republic company is operating at the lowest level of the year. The Carnegie Steel Co. is maintaining production at 80 per cent, while the Sharon Steel Hoop Co. is at 90 per cent. For the first time this year, the Newton Steel Co.'s rate of production has declined to 80 per cent.

However, Valley steel makers are hopeful that Ford Motor Co.'s requirements will shortly expand and that other automobile interests will also enlarge their orders.

Prospects are that new steel business and production will be irregular over the remainder of the year.

Central Alloy and Interstate to Merge

Acquisition of Chicago Company Will Create New Steel Unit with Nearly 2,000,000 Tons Capacity

THE Interstate Iron & Steel Co., Chicago, will be merged with the Central Alloy Steel Corporation, Massillon, Ohio, which has purchased the entire property, assets and business of the Chicago company. Announcement of the acquisition of the Chicago plant was made Monday by F. J. Griffiths, chairman of the board of the Central Alloy Steel Corporation.

PAUL LLEWELLYN, president, Interstate Iron & Steel Co., Chicago, which is to be merged with the Central Alloy Steel Corporation.

This merger brings under one organization two of the leading manufacturers of alloy steels in the country. The ingot capacity of Central Alloy, now 1,542,000 tons a year, will be increased to 1,938,000 tons by the addition of the Chicago plant, which has an ingot capacity of 396,000 tons. The acquisition of the Interstate properties will add approximately $17,000,000 to the assets of Central Alloy Corporation, making a total of more than $92,000,000.

Central Alloy is the country's largest producer of alloy steels. The plants of the Interstate company are well adapted to the production of alloy steel and the addition of its facilities is expected greatly to strengthen the market position of Central Alloy in the Chicago district, particularly with reference to corrosion resisting alloys.

As a result of the acquisition, Central Alloy Toncan iron will be more readily available to Western consumers and a Western distributing point will also be provided for Enduro Nirosta, the recently introduced Krupp stainless material.

The Interstate Iron & Steel Co. was incorporated in 1895 and has three plants in the Chicago district. Paul Llewellyn, son of the founder of the company, is president and general manager. In addition to alloy steels for the automotive industry, it manufactures carbon steel, wire rods, nails and other products. It has attracted considerable attention in the steel trade in recent years because of its excellent earnings showing.

Central Alloy was formed in 1926 by the merger of Central Steel Co., Massillon, and the United Alloy Steel Corporation, Canton, Ohio. F. J. Griffiths, who played a most important part in the development of the alloy steel industry and who was chairman of the board of the Central Steel Co., became chairman of the merged corporation. During the past year Central Alloy has acquired rights for the production in the United States of the new alloys developed by the Krupp interests in Germany and is taking a leading part in the introduction of these metals in this country. Both Continental Shares, Inc., and the Cliffs Corporation, Cleveland, investment companies with large steel holdings, with which the Cyrus S. Eaton interests are affiliated, are understood to have an important interest in the Central Alloy Steel Corporation.

Mr. Eaton's recent purchase of a controlling interest in the Donner Steel Co., Buffalo, led to reports that he planned to merge into one company several of the alloy steel plants.

Stockholders of the Interstate company, under the terms of the merger, will receive 1 11/40 shares of non par common stock of the Central Alloy Steel Corporation for each of the 250,000 shares of the outstanding non par common stock of the Interstate company. This ratio, according to a formal announcement sent to the stockholders of the Central Alloy Steel Corporation by F. J. Griffiths, chairman of the board, was arrived at after careful comparison of the relative values of the properties of the two companies.

The announcement further stated that Central Alloy officials have had under consideration for some time the desirability of constructing or acquiring a plant in the Chicago district so as to enable them to compete successfully with other steel companies having plants already located therein.

The merger has been approved by the board of directors of each company and is subject to the approval of stockholders of the Interstate company at a meeting to be held Oct. 16.

Scrap Institute to Hold Conference Oct. 23-24

The National Advisory Council of the Institute of Scrap Iron and Steel, Inc., will hold a special meeting, together with the officers, executive committees of the 12 chapters and special functional committees of the institute, on Oct. 23 and 24 in New York. The meeting will be in the nature of a semi-annual conference of the institute. The committee meetings on Oct. 23 will be held at the institute headquarters at 11 West Forty-second Street, while the meeting and dinner of the National Advisory Council will be held at the Commodore Hotel in New York.

Preceding the meeting of the National Advisory Council, the traffic committee will meet to consider the proper action with reference to securing revision of freight rates on scrap iron and steel. The research committee will also meet to outline a program of research, involving a study of the markets for scrap iron and steel and creating wider markets. A special committee on trade customs will also consider the contractural relations between brokers and dealers and will seek to codify the customs and usages of the trade.

The trade relations committee, which was authorized by the trade practice conference held in Pittsburgh on May 23, will conduct hearings on a docket of complaints which have been filed by consumers and members with the trade relations bureau of the institute.

Prices for Ingot Brass During September

CHICAGO, Oct. 5.—The Non-Ferrous Ingot Metal Institute reports the average prices per pound received by its membership on commercial grades of the six principal mixtures of ingot brass during the 28-day period ended Sept. 13. As there are, as yet, no generally accepted specifications for ingot brass, it must be understood that each item listed below is a compilation representing numerous sales of metal known to the trade by the designation shown, but each item, in reality, including many variations in formulas. Until the program of standardizing the principal specifications, now progressing in cooperation with the American Society for Testing Materials, is completed, the following specifications will be understood to refer to "commercial grades":

	Cents per Lb.
Commercial 80-10-10 (1% impurities)	16.974
Commercial 78% metal	15.161
Commercial 81% metal	15.313
Commercial 83% metal	15.734
Commercial 85-5-5-5	15.972
Commercial No. 1 yellow brass ingot	12.826

H. B. Wilson & Co., Syndicate Trust Building, St. Louis, who have been the sales representatives there of the Whiting Corporation for the last 10 years, will act in the same capacity for the Cleveland Crane & Engineering Co., Cleveland, on and after Oct. 16.

Non-Ferrous Metal Markets

Copper, Lead and Zinc Quiet With Prices Firm—Tin Inactive and Weak

NEW YORK, Oct. 8.

Copper.—Buying is moderate but steady and there are no features. The industry seems to be waiting for the September statistics, which are expected toward the close of the week. Various guesses prevail as to what they will show. A general opinion is that there will be a decrease in stocks of refined metal as well as of copper in the blister form. Consumers have been taking the metal on contract without interruption and production has not been increased. Buying by foreign consumers is in larger volume than that by domestic and is averaging at least 750 to 800 gross tons a day. The delivery involved is October and November, with considerable October metal yet to be purchased. The price is unchanged at 18.30c. c.i.f. usual European ports. It is generally conceded that domestic buyers are well covered for October, though there are occasional sales for that delivery, some of it spot metal. Consumers are now buying November metal more freely and only a little December copper has been sold. Books of fabricators are in a satisfactory condition. Prices are firm and unchanged with electrolytic copper quoted at 18c., delivered in the Connecticut Valley. Lake copper is moderately active and unchanged at 18c. to 18.12½c., delivered.

Tin.—Business in spot Straits tin is very light, and sales for the week ended Saturday, Oct. 5, were not more than 750 tons. Weakness developed in the market on Oct. 3 and 4, induced by the break on the New York Stock Exchange. Yesterday, the London market declined on the announcement that stocks in warehouses in London yesterday were 10,370 tons, the largest ever recorded. This fact, together with the announcement last week that there hangs over the market large estimated shipments from the Straits, has caused buyers to be cautious and has made the entire situation rather weak. London prices today were down £3 to £4 per ton from those of a week ago, with spot Standard quoted at £196 10s., future Standard at £200 10s. and spot Straits at £201. The Singapore market today was £203 10s. In New York today, the market was weak and inactive, with spot Straits tin quoted at 43.37½c., New York. Orders that

THE WEEK'S PRICES, CENTS PER POUND FOR EARLY DELIVERY

	Oct. 8	Oct. 7	Oct. 5	Oct. 4	Oct. 3	Oct. 2
Lake copper, New York	18.12½	18.12½	18.12½	18.12½	18.12½	18.12½
Electrolytic copper, N. Y.*	17.75	17.75	17.75	17.75	17.75	17.75
Straits tin, spot, N. Y.	43.37½	43.75	....	43.87½	44.00	43.55
Zinc, East St. Louis	6.80	6.80	6.80	6.80	6 80	6.80
Zinc, New York	7.15	7.15	7.15	7.15	7.15	7.15
Lead, St. Louis	6.70	6.70	6.70	6.70	6.70	6.70
Lead, New York	6.90	6.90	6.90	6.90	6.90	6.90

*Refinery quotation; price ¼c. higher delivered in the Connecticut Valley.

Rolled Products

Prices on rolled non-ferrous products are unchanged from those prevailing one week ago.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—
- High brass ..... 23.25c.
- Copper, hot rolled ..... 26.75c.
- Zinc ..... 10.25c.
- Lead (full sheets) .. 11.00c. to 11.25c.

Seamless Tubes—
- High brass ..... 28.25c.
- Copper ..... 29.25c.

Rods—
- High brass ..... 21.25c.
- Naval brass ..... 24.00c.

Wire—
- Copper ..... 19.87½c.
- High brass ..... 23.75c.

Copper in Rolls ..... 26.75c.
Brazed Brass Tubing ..... 30.87½c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also to St. Louis on shipments to points west of that river.
- Sheets, 0 to 10 gage, 3 to 30 in. wide ..... 33.00c.
- Tubes, base ..... 42.00c.
- Machine rods ..... 34.00c.

Chicago Warehouse

(Prices Cover Trucking to Customers' Doors in City Limits)

Sheets—	Base per Lb.
High brass	23.25c.
Copper, hot rolled	27.75c.
Copper, cold rolled, 14 oz. and heavier	30.00c.
Zinc	10.75c.
Lead, wide	11.35c.
Seamless Tubes—	
Brass	28.25c.
Copper	29.25c.
Brass Rods	21.25c.
Brazed Brass Tubes	31.00c.

New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—		
High brass	21.12½c.	to 22.12½c.
Copper, hot rolled, base sizes	27.75c.	to 28.75c.
Copper, cold rolled, 14 oz. and heavier, base sizes	30.00c.	to 31.00c.
Seamless Tubes—		
Brass	26.00c.	to 27.00c.
Copper	29.12½c.	to 30.12½c.
Brazed Brass Tubes	29.12½c.	to 30.12½c.
Brass Rods	18.87½c.	to 19.87½c.

New York Warehouse

Delivered Prices, Base Per Lb.
- *Zinc sheets (No. 9), casks* ..... 10.75c. to 11.25c.
- *Zinc sheets, open* ..... 11.50c. to 12.00c.

Metals from New York Warehouse

Delivered Prices, Per Lb.
- Tin, Straits pig ..... 46.00c. to 47.00c.
- Tin, bar ..... 48.00c. to 49.00c.
- Copper, Lake ..... 19.50c.
- Copper, electrolytic ..... 19.25c.
- Copper, casting ..... 19.00c.
- Zinc, slab ..... 7.75c. to 8.25c.
- Lead, American pig ... 7.62½c. to 8.12½c.
- Lead, bar ..... 9.62½c. to 10.12½c.
- Antimony, Asiatic ..... 10.50c. to 11.00c.
- Aluminum No. 1 ingots for remelting (guaranteed over 99% pure) .. 25.00c. to 26.00c.
- Alum. ingots, No. 12 alloy ..... 24.00c. to 25.00c.
- Babbitt metal, commercial grade ..... 25.00c. to 35.00c.
- Solder, ½ and ½ ..... 30.00c. to 30.50c.

Metals from Cleveland Warehouse

Delivered Prices, Per Lb.
- Tin, Straits pig ..... 50.00c.
- Tin, bar ..... 52.00c.
- Copper, Lake ..... 19.50c.
- Copper, electrolytic ..... 19.25c.
- Copper, casting ..... 18.75c.
- Zinc, slab ..... 7.75c. to 8.00c.
- Lead, American pig ..... 7.55c. to 7.75c.
- Lead, bar ..... 9.75c.
- Antimony, Asiatic ..... 16.00c.
- Babbitt metal, medium grade ..... 18.75c.
- Babbitt metal, high grade ..... 54.00c.
- Solder, ½ and ½ ..... 31.25c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged customers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	15.00c.	16.50c.
Copper, hvy. and wire	14.75c.	16.25c.
Copper, light and bottoms	12.75c.	14.00c.
Brass, heavy	8.50c.	9.50c.
Brass, light	7.50c.	8.50c.
Hvy. machine composition	12.00c.	13.00c.
No. 1 yel. brass turnings	9.75c.	10.50c.
No. 1 red brass or compos. turnings	11.25c.	12.25c.
Lead, heavy	5.50c.	6.00c.
Lead, tea	4.25c.	5.25c.
Zinc	3.50c.	4.00c.
Sheet aluminum	13.75c.	16 00c.
Cast aluminum	12.00c.	14.00c.

come in are in general met by the seller.

Lead.—Buying for November delivery has commenced this week, and sales of several hundred tons today are reported for that delivery. Previous to this the market has been quiet but steady, with most sales consisting of carload and small lots for early delivery. In the heavy buying of August and September consumers covered for most of their October needs. Prices are steady with the leading producer quoting 6.70c., St. Louis. The American Smelting & Refining Co. still maintains its contract price at 6.90c., New York.

Zinc.—With demand still very light, leading producers still hold their quotation for prime Western zinc at 6.80c., East St. Louis, although there are rumors of slight concessions here and there for limited quantities. The feeling is strong that consumers must soon buy the usual volume of metal. With the curtailment in ore production in the Tri-State district, last week's output was only 5500 tons, the smallest since the closing down the first of the year. Sales were 10,650 tons, as compared with 11,400 tons a week ago. Shipments increased about 400 tons to a little over 12,000 tons. The surplus is now about 47,000 tons. The quotation is still $44 per ton, Joplin, which has prevailed since the end of March.

Antimony.—In a very quiet market, Chinese metal is quoted at 8.50c., New York, duty paid, for all positions. It is possible that this could be shaded in some cases for future delivery.

Nickel.—Ingot nickel in wholesale lots is quoted at 35c. per lb., with shot nickel at 36c., and electrolytic nickel in cathodes at 35c.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at the published price of 23.90c. per lb., delivered.

Non-Ferrous Metals at Chicago

CHICAGO, Oct. 8.—Sales continue at a satisfactory volume and prices, with the exception of tin, are steady. The old metal market is quiet and prices are nominal.

Prices per lb., in carload lots: Lake copper, 18.50c.; tin, 44.75c.; lead, 6.80c.; zinc, 6.90c.; in less-than-carload lots, antimony, 9.60c. On old metals we quote copper wire, crucible shapes and copper clips, 14c.; copper, bottoms, 11.50c.; red brass, 11.50c.; yellow brass, 8c.; lead pipe, 4.50c.; zinc, 3.25c.; pewter, No. 1, 24.50c.; tin foil, 26c.; block tin, 36c.; aluminum, 12.87½c.; all being dealers' prices for less-than-carload lots.

The Automatic Transportation Co., Buffalo, manufacturer of electric industrial trucks, tractors and engines, has established a factory branch in Chicago at 531 Pershing Road. L. R. Lindsley, Chicago sales manager, and W. F. Weber, assistant Chicago sales manager, will be in charge of sales and service.

OBITUARY

GUSTAVE THEODORE SHANTS, who was Philadelphia sales manager for the Lukens Steel Co., Coatesville, Pa., for more than 40 years, and president of the Kutztown Foundry & Machine Co., Kutztown, Pa., for more than 30 years, died Oct. 3, at his home, 433 West Upsal Street, Germantown, Philadelphia. He had been confined to his bed since Sept. 7, when he suffered a heart attack at his home. Since last March, he had been away from the office in an endeavor to regain the good health he had enjoyed uninterruptedly in all the years he was engaged in business. He was born in 1868 in Strasbourg, France, to which point his father, who was a minister in the Evangelical Church, had been sent from America as a missionary. When he was four years old, the family came back to America, and it was at the age of 13 that he started work as an office boy with the firm of J. B. Wilson, in the Bullitt Building, Philadelphia. This firm was then the Philadelphia representative of Lukens Steel Co. When Mr. Shants was 21, the Lukens company opened its own office in Philadelphia and he was appointed sales manager, which position he held up to the time of his death. He was a member of the Union League of Philadelphia and secretary of the board of trustees of the First Methodist Episcopal Church of Germantown.

G. T. SHANTS

J. C. MC LAUCHLAN

JAY C. MCLAUCHLAN, partner of Pickands, Mather & Co., Cleveland, died Oct. 8 after an illness of several months, aged 55 years. He was born in Cleveland and educated in University School of that city and at Yale University. After his graduation from the latter institution in 1898 he joined the organization of F. A. Goodrich & Co., Detroit, pig iron sales agent. In 1903 he was appointed sales manager in Detroit for Pickands, Mather & Co. and for the Lackawanna Steel Co. He became affiliated with the home office of Pickands, Mather & Co. in 1917 and on Jan. 1, 1918, became partner in the firm. During the war he served in Washington as director of the pig iron section of the War Industries Board, having been one of the come in are in general met by the tain in the Reserve Ordnance Corps. In recognition of his services during the war he was honored in 1921 by being made a Knight of the Order of the Crown of Italy. Mr. McLauchlan was a director of the Central Alloy Steel Corporation, a director and vice-president of the Toledo Furnace Co. and the Perry Iron Co. and a director of various companies subsidiary to Pickands, Mather & Co.

FRANK TENNEY, secretary of the Pennsylvania Steel Co. for 15 years, before its merger with the Bethlehem Steel Co. in 1916, died of heart disease on the golf course of the Merion Cricket Club, Merion, Pa., on Oct. 5, aged 67 years. He was graduated from the Massachusetts Institute of Technology in 1883 and entered the employ of the Pennsylvania Steel Co., Harrisburg, where he soon became manager. Later he was transferred to the main office in Philadelphia and was appointed secretary about 1901. He retired from active business after the Bethlehem merger.

DAVID L. EYNON, president, Pittsburgh Rolls Corporation, Pittsburgh, died suddenly on Oct. 5, while returning from Europe on the Olympic.

WALTER BIRD MEHL, president, Mehl Machine Tool & Die Co., Roselle, N. J., died on Oct. 4. He was born in Philadelphia and started his career with the Baldwin Locomotive Works as a boy. Subsequently he became superintendent at the plant of the Waltham Watch Co., Waltham, Mass.

Fabricated Structural Steel

Inquiries, at 92,000 Tons, Largest of Year—Jobs in New York District Will Take 63,000 Tons

INQUIRIES for structural steel, at 92,000 tons, have been the heaviest of the year and are regarded by the trade as a forerunner of well-sustained building operations during the fall and early winter. The New York district again has been the most important center of prospective business, 63,000 tons having been added to pending work in New York City and vicinity. The New York Cornell Medical Center will require 18,000 tons and the New York freight terminal of the Lehigh Valley Railroad 21,000 tons. About 35,000 tons, for which inquiries have been made, is for railroad expansion and replacement purposes and 45,000 tons will go into non-industrial buildings.

Awards in the past week amounted to 22,000 tons, three-fourths of which will be needed for non-industrial structures. The largest booking was 2500 tons for a New York office building. Awards follow:

CAMBRIDGE, MASS., 1500 tons, second unit Harvard Business School, to New England Structural Co.

EVERETT, MASS., 700 tons, Warren Foundry & Pipe Co. plant, to McClintic-Marshall Co.

ATTLEBORO, MASS., 150 tons, Masonic temple, to an unnamed fabricator.

LEOMINSTER, MASS., 100 tons, manufacturing plant, to New England Structural Co.

BOSTON, 100 tons, Wood Hydraulic Hoist & Body Co. plant, to Boston Structural Steel Co.

NEW HAVEN, CONN., 1000 tons, Institute of Human Relations Building at Yale University, to Levering & Garrigues Co.

NEW YORK, 2500 tons, Merchants Square Building, to Taylor-Fichter Steel Construction Co.

NEW YORK, 1000 tons, apartment building at 834 Fifth Avenue, to Paterson Bridge Co.

NEW YORK, 500 tons, public school No. 89, to Harris Structural Steel Co.

NEW YORK, 425 tons, public school No. 147, to Easton Structural Steel Co.

NEW YORK, 1500 tons, apartment building on East Eighty-eighth Street, to George A. Just Co.

CORTLAND, N. Y., 150 tons, buildings for Brewer-Titchener Corporation, to Austin Co.

EAST ORANGE, N. J., 1500 tons, apartment building, to Shoemaker Bridge Co.

FLORENCE, N. J., 500 tons, extension to Florence Pipe & Foundry Co. plant, to Belmont Iron Works.

BEDFORD, VA., 200 tons, power house for Bedford Pulp & Paper Co., to Virginia Bridge & Iron Co.

ECCLES, W. VA., 200 tons, mine structures for Chicago, Wilmington & Franklin Coal Co., to Virginia Bridge & Iron Co.

GREENSBORO, N. C., 200 tons, Atlantic bridge, to Virginia Bridge & Iron Co.

GREENVILLE, S. C., 350 tons, work by Fiske Construction Co., to Virginia Bridge & Iron Co.

KINGSPORT, TENN., 300 tons, process building for Tennessee Eastman Co., to Virginia Bridge & Iron Co.

MEMPHIS, 300 tons, paper pulp plant for Buckeye Cotton Oil Co., to Virginia Bridge & Iron Co.

FLINT, MICH., 1700 tons, bank building, to American Bridge Co.

MILWAUKEE, 1000 tons, addition for A. O. Smith Corporation, to Wisconsin Bridge & Iron Co.

CHICAGO, 1000 tons, St. Elizabeth's Hospital, to New City Iron Works, local.

STATE OF MISSOURI, 325 tons, highway bridge, to St. Joseph Structural Steel Co.

EL PASO, TEX., 350 tons, Nichols Copper Co., to Ingalls Iron Works.

GREENVILLE, MISS., 170 tons, high school, to Ingalls Iron Works.

BOONEVILLE, MISS., 100 tons, new school, to Ingalls Iron Works.

DENVER, 1200 tons, Twenty-third Street viaduct, to an unnamed bidder.

GARLAND CITY, ARK., 1100 tons, Red River highway bridge, to Virginia Bridge & Iron Works.

ALBUQUERQUE, N. M., 100 tons, hangar for Western Air Express, to Minneapolis Steel & Machinery Co.

SEATTLE, 175 tons, warehouse for Firestone Tire & Rubber Co., to Hofius Steel & Equipment Co.

SACRAMENTO, CAL., 405 tons, bridge over Trinity River, to United States Steel Products Co.

SAN FRANCISCO, 225 tons, apartment building, Pacific and Laguna Streets, to Golden Gate Iron Works.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

PROVIDENCE, R. I., 300 tons, steel warehouse.

UTICA, N. Y., 225 tons, Spenandoa Corporation plant addition.

NEW YORK, 2000 tons, apartment hotel in Tudor City, East Forty-second Street.

NEW YORK, 18,000 tons, first three units of New York Cornell Medical Hospital.

NEW YORK, 1500 tons, public schools Nos. 147 and 153.

NEW YORK, 2500 tons, apartment building at 770 Park Avenue.

STATEN ISLAND, N. Y., 1000 tons, bridge; Charles Meade & Co., low bidder.

LEHIGH VALLEY RAILROAD, 21,000 tons, railroad freight terminal in New York, on block bounded by Eleventh and Thirteenth Avenues, Twenty-sixth and Twenty-seventh Streets.

BROOKLYN, 6500 tons, telephone building on Bridge Street.

LONG ISLAND RAILROAD, 7000 tons, grade crossing elimination work.

NEW YORK CENTRAL RAILROAD, 2500 tons, commissary building on East 161st Street, New York; general contract to Babor & Comeau.

PENNSYLVANIA RAILROAD, 1500 tons, electrification work at Norristown, Pa.

SUDBURY, ONT., 200 tons, office building; bids being taken by V. L. Morgan, 145 Yonge Street, Toronto.

MONTREAL, 2000 tons, office building for James T. Stranger & Co., 618 James Street, West.

MONTREAL, 400 tons, Y. M. C. A. addition, bids being received by Ross & Macdonald, 1 Belmont Street.

ERIE, PA., 200 tons, Lady of Charity Chapel and dormitories.

CLEVELAND, 300 tons, department store for Lakewood Land & Securities Co.

CLEVELAND, 1500 tons, Cleveland public school office building.

CLEVELAND, 400 tons, Cleveland Heights junior high school.

INDIANAPOLIS, 5000 tons, bridge for Union Traction Co.

PEORIA, ILL., 310 tons, St. Vincent's Convent, to Gage Structural Steel Co., Chicago.

RIVER FOREST, ILL., 350 tons, Bowman Dairy Co., to an unnamed bidder.

MILWAUKEE, 200 tons, railroad overhead for city; general contract to Steve Czaplewski & Sons, Inc., local.

KEWAUNEE, WIS., 525 tons, State highway bridge; general contract to Ferguson Construction Co., Rockford, Ill.

CHICAGO & NORTH WESTERN, 400 tons, bridge work.

STATE OF OKLAHOMA, 1000 tons, State highway bridge.

OKLAHOMA CITY, 3000 tons, Colcord Hotel.

SAN ANTONIO, TEX., 3000 tons, Southwestern Bell Telephone Co. building; W. J. Knight & Co., St. Louis, engineers.

TACOMA, WASH., 2400 tons, Eleventh Street viaduct; bids Oct. 21.

SEATTLE, 1000 tons, Fourteenth Avenue South bridge; bids Oct. 21.

SEATTLE, 243 tons, approaches for West Spokane Street bridge; bids Oct. 11.

SEATTLE, 100 tons, two telephone buildings for Pacific Telephone & Telegraph Co.; bids being taken.

SEATTLE, 100 tons, sack house for Fisher Flouring Mills Co.; bids being taken.

SACRAMENTO, CAL., 738 tons, bridge over Shasta River near Yreka; general contract to H. E. Doering, Portland, Ore.

SAN FRANCISCO, 500 tons, canning plant for California Packing Corporation in Togoloan, Philippine Islands; bids being taken.

SAN FRANCISCO, 350 tons, canning plant for California Packing Corporation in Tahiti; bids being taken.

OAKLAND, CAL., 240 tons, transit shed No. 2 for Port Commission; Pacific Coast Engineering Co., low bidder.

Railroad Equipment

Southern Orders 2000 Cars and May Buy 2500 More

DEMAND for railroad equipment continued active the past week. Orders were placed for 2500 cars, of which 2000 are for the Southern Railway. The Chicago & North Western bought 500 flat cars. Business in prospect is large. The Southern is expected to contract for an additional 2500 cars and the Chicago & North Western for 2000. The Louisville & Nashville may come into the market soon for about 3000 cars. In addition to its inquiry for 75 locomotives, the Pennsylvania probably will build 25 at its Altoona, Pa., shops. Details of the week's business follow:

Southern Railway has ordered 1500 steel hopper cars from Pressed Steel Car Co. and 500 from an unnamed company. This road is expected to place additional orders for about 2500 cars.

Louisville & Nashville is expected to come into the market shortly for about 3000 cars.

Chicago & North Western has ordered 500 flat cars from American Car & Foundry Co. It is reported that this road may buy 2000 box cars.

In addition to the 75 locomotives for which the Pennsylvania is inquiring in the open market, this road probably will build 25 at its Altoona, Pa., shops.

Great Northern may come into the market for 1000 box cars.

Denver & Rio Grande Western will buy two baggage mail cars.

Chicago, Burlington & Quincy is in the market for eight 4-8-4 and 12 Hudson type locomotives.

PERSONAL

C. K. EVERITT, managing director, Edgar Allen & Co., Ltd., Sheffield, England, was given a special luncheon in New York, Sept. 26, two days prior to his sailing for England, by the officers of the American company, the Edgar Allen Steel Co., Inc., New York. Arrangements were incorrectly stated in this column Oct. 3, in an account which listed the other guests.

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R. B. POGUE, of the engineering department of the American Brake Shoe & Foundry Co., New York, has been appointed assistant chief engineer of that company.

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JAMES A. HALL, professor of engineering, Brown University, addressed the machine shop section of the Providence Engineering Society, Oct. 8, on "What Science Is Doing for the Machine Shop."

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WALTER KNAPP, at one time engaged in organization work in the establishment of wage incentive plans for the General Electric Co., has become executive engineer of the DeWalt Products Corporation, Leola, Pa., manufacturer of high-speed cutting equipment for wood, metal and stone.

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HIBBARD S. GREENE, formerly vice-president and director of the Barber-Greene Co., Aurora, Ill., has been appointed assistant to C. R. MESSINGER, president, Chain Belt Co., Milwaukee.

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R. E. KELLY, who has been manager of the Boston office of the Independent Pneumatic Tool Co., Chicago, has been made sales engineer for the Eastern district, with headquarters in New York. JOHN ASHTON, heretofore in the New York district, has been appointed manager of the Boston office.

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J. S. MCCLELLAND has been appointed manager of the newly opened branch warehouse in Detroit of William Jessop & Sons, Ltd., Sheffield, England.

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A. N. GODDARD, Goddard & Goddard Co., Detroit, is scheduled for an address on milling cutters before the Detroit Engineering Society on the evening of Oct. 28.

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JOHN M. GAINES, JR., formerly associate physical chemist, Pittsburgh Experiment Station, United States Bureau of Mines, has resigned to engage in some advanced study at the Massachusetts Institute of Technology, Cambridge, Mass. For the past three years he has been associated with C. H. HERTY, JR., on the general problem of the physical chemistry of steel making.

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H. C. POWELL, superintendent and director of Vincent-McCall Co., Kenosha, Wis., spring manufacturer, is retiring from official connection with the concern because of ill health. His combined service with the company and its predecessor, the Windsor Spring Co., totaled more than 25 years.

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C. H. MACDONALD, heretofore director of sales and head of the market research department of the Colorado

C. H. MACDONALD

Fuel & Iron Co., Denver, has been elected vice-president of the company, in charge of sales in California.

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EDMUND P. BURKE, who for many years was associated with the San Francisco and Los Angeles offices of the Truscon Steel Co., Youngstown, has resigned to become Chicago manager for the R. C. Mahon Co., Detroit, structural steel fabricator.

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JOHN D. GILCHRIST, for several years purchasing agent of the hydraulic pressed steel division, Cleveland, of the Truscon Steel Co., has become affiliated with the sales department of G. F. Mitchell & Son, Cleveland, manufacturer of sheet metal stampings.

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ROBERT W. WOODRUFF has been elected president and chairman of the board of the White Motor Co., Cleveland, to fill the vacancy caused by the death of WALTER C. WHITE. Starting in the White company's branch at Atlanta, Ga., Mr. Woodruff eventually became vice-president and general manager of sales. Later he was elected president of the Coca-Cola Co., Atlanta, and gave up the sales managership of the White company but continued as a director and member of the executive committee. Promotions of four White company officials have been announced. SAUNDERS JONES has been named vice-president and assistant to the president; GEORGE H. KELLY, vice-president and treasurer; H. D. CHURCH, vice-president in charge of engineering, and GEORGE W. SMITH, JR., vice-president in charge of production.

—

H. C. THOMAS, recently assistant general manager of the merchandising department of the Westinghouse Electric & Mfg. Co., with headquarters at Mansfield, Ohio, has been appointed director of manufacturing stocks of the company, with headquarters at East Pittsburgh. He will be responsible for methods used in the control of all raw materials, work in progress and finished parts stock. Mr. Thomas was graduated from Purdue University in 1910, and, with the exception of a brief interruption during the war period, he has been continuously identified with various departments of the Westinghouse Electric & Mfg. Co.

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LOUIS RASMUSSEN, foundry superintendent, Nash Motors Co., Kenosha, Wis., will address the Quad-City Foundrymen's Association at a meeting to be held at the Fort Armstrong Hotel, Rock Island, Ill., Oct. 21. His subject will be "Advancement in the Foundry During the Last 10 Years."

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CHARLES PIEZ, chairman of the board, Link-Belt Co., Chicago, has been elected president of the American Society of Mechanical Engineers for the year beginning with December. RALPH E. FLANDERS, manager, Jones & Lamson Machine Co., Springfield, Vt., and ERNEST L. JAHNCKE, Assistant Secretary of Navy, Washington, have been elected vice-presidents.

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HAROLD V. COES, Ford, Bacon & Davis, New York, JAMES D. CUNNINGHAM, president, Republic Flow Meters Co., Chicago, and CLARENCE F. HIRSHFELD, chief, research department, Detroit Edison Co., Detroit, have been elected managers.

Minneapolis Company Has Industrial Department

The Minneapolis-Honeywell Regulator Co., Minneapolis, Minn., has formed an industrial department under the direct supervision of W. L. Huff, vice-president, which will maintain a staff of specialty engineers working out of branch offices located in 24 cities. Concurrent with this announcement comes word of the near completion of the new six-story addition to the Minneapolis factory of the company at a cost of $300,000.

The company has manufactured heating control equipment for domestic and industrial uses for 43 years and specializes in the manufacture of instruments for temperature control and of complete control systems for heating. Three branch factories are operated at Wabash, Ind.

Tin Plate Demand Is Good in Europe

British and German Mills Active—Cleveland Pig Iron in Demand—Tube Plants Close in Germany—Manchuria to Add Open-Hearth Furnaces

(*By Cable*)

LONDON, ENGLAND, Oct. 7.

INCREASED activity has developed in pig iron as Cleveland makers are now able to accept orders on limited quantities for early delivery. Costs are rising steadily and Midland and West Coast furnaces are asking higher prices.

East Coast hematite producers assert that the current market is several shillings a ton less than cost and are seeking higher prices although, as yet, unsuccessfully.

Heavy steel business is irregular, some plants being well supplied until the end of the year, while others are in need of new specifications, as old orders have been executed. Export demand is slack, but South Africa is displaying increased interest and some Canadian orders have been secured.

Tin plate demand is good and works are well booked for the first quarter with some good orders for delivery up to June. Prices are firm, with an upward tendency as a result of increasing costs. Galvanized and black sheets are quiet.

The Continental steel market is quiet, and mills are in need of export orders, although in some cases, particularly in France, works are well engaged with domestic business. Prices display an easier tendency, especially in merchant steel.

Belgian production in August was 347,000 metric tons of pig iron, 355,000 tons of raw steel and 306,000 tons of rolled steel. At the end of August 57 furnaces were in blast. Saar production in August was 182,000 metric tons of pig iron and 192,000 tons of raw steel.

British Hatry Failure Blocks Merger

Delay in Acquiring United Steel Companies Precipitated Collapse—Foreign Competition in Steel Relaxes

LONDON, ENGLAND, Sept. 25—Developments in the iron and steel trade have been somewhat overshadowed by the sensational disclosures attending the failure of the so-called "Hatry" group of companies. One of the companies involved was the Austin Friars Trust, which acted as negotiator in the plan to purchase the United Steel Companies and form Steel Industries of Great Britain, Ltd. This was to be only the beginning of a gigantic steel corporation, which Mr. Hatry had previously explained would eventually have a capital larger than the Imperial Chemical Industries, Ltd. Apparently the collapse of the Hatry issues was precipitated by the failure to complete negotiations with the United Steel Companies.

Business has been in fair volume, but there has not yet been any real fall revival. The brightest spot at the moment is pig iron. Cleveland and Midland producers are heavily sold, the former on restricted output. A number of additional furnaces could be put into commission, but increasing costs of production are an obstacle. Foreign pig iron is no longer competitive here, but at the same time British furnaces are unable to compete freely abroad; hence the business coming to them is mostly from domestic sources.

Steel mills are still in need of orders. Shipbuilding is slow to develop with the result that, while a number of plate mills are well engaged, others are operating irregularly. Foreign competition is still encountered in certain districts, but it is less severe as costs of production are increasing on the Continent. Some mills, however, seem unable to cope with the situation, and the Ebbw Vale Steel Iron & Coal Co. has announced its intention to suspend operations.

There has been a distinct improvement in the tin plate trade. Consumers at home and abroad are buying freely, even into the first half of next year. Many mills are sold out for this year and have a good tonnage on their books for the first quarter of next year. Prices have ad-

British and Continental European Export Prices per gross ton, f.o.b. United Kingdom Ports, Hamburg and Antwerp, with the £ at $4.85

British Prices, f.o.b. United Kingdom Ports

Cleveland No. 3 foundry	£3	12½s.	to	£3	13½s.	$17.58	to $17.82
East Coast hematite	3	16½	to	3	17	18.51	to 18.63
Ferromanganese, export	13	10	to	14	0	65.47	to 67.90
Billets, open-hearth	6	5	to	6	7½	30.31	to 30.92
Sheet bars, open-hearth	6	5	to	6	10	30.31	to 31.52
Black sheets Japanese specifications	12	12½				61.22	
Tin plate, per base box	0	19	to	0	19¼	4.60	to 4.66
Rails, 60 lb. and heavier	7	15	to	8	15	37.59	to 42.43
						C. per Lb.	
Steel bars, open-hearth	7	15	to	8	10	1.67	to 1.84
Beams, open-hearth	7	2½	to	7	12½	1.55	to 1.65
Channels, open-hearth	7	7½	to	7	17½	1.60	to 1.71
Angles, open-hearth	8	2½	to	8	12½	1.76	to 1.86
Ship plates, open-hearth	7	12½	to	8	2½	1.66	to 1.76
Black sheets, No. 24 gage	10	5	to	10	10	2.21	to 2.27
Galvanized sheets, No. 24 gage	13	5	to	13	7½	2.86	to 2.89

Continental Prices, f.o.b. Antwerp or Hamburg

Foundry iron, 2.50 to 3.00 per cent sil., 0.50 to 0.90 per cent phos.	£3	8s.	to	£3	11½s.	$16.49	to $17.33
Foundry iron, 2.50 to 3.00 per cent sil. 1.00 per cent and more phos.	3	8	to	3	11	16.49	to 17.21
Billets, Thomas	4	16	to	4	17	23.21	to 23.51
Sheet bars, Thomas	4	17	to	4	18	23.51	to 23.76
Wire rods low C., No. 5 B.W.G.	6	5	to	6	6¼	30.30	to 30.61
Black sheets, No. 31 gage, Japanese	12	7½				60.02	
Rails, 60 lb. and heavier	6	8½	to	6	10*	31.16	to 31.52
Rails, light	6	1½				29.46	
						Cents per Lb.	
Steel bars, merchant	5	8	to	5	9	1.16	to 1.18
Steel bars, deformed	5	7½	to	5	8	1.15	to 1.16
Beams, Thomas, British standard	5	0	to	5	4½	1.10	to 1.15
Channels, Thomas, American sections	5	14	to	5	18	1.24	to 1.27
Angles, Thomas, 4-in. and larger, over ⅜-in. thick	5	4				1.13	
Angles, Thomas, 3-in.	5	12				1.21	
Ship plates, open-hearth inspected	7	8				1.63	
Hoop and strip steel over 6-in. base	5	13	to	5	15	1.22	to 1.24
Wire, plain, No. 8 gage	7	4	to	7	5	1.58	to 1.59
Wire, galvanized, No. 8 gage	9	3	to	9	4	1.99	to 2.02
Wire, barbed, 4-pt. No. 12 B.W.G.	11	12½				2.58	
Wire nails, base	7	10	to	7	10½	$1.62	to $1.63 per keg
Wire nails, assortments, 1 to 6-in., keg	10	6½				2.23	

*Open-hearth steel, 10s. ($2.42) per ton extra.

vanced appreciably, and are now about 1s. (24c.) per base box more than the agreed minimum, and with costs increasing will probably go still higher.

Japan Buys German Steel Mill Equipment

HAMBURG, GERMANY, Sept. 23.—The Deutsche Maschinenbaugesellschaft (Demag) has booked an order from the Anzan Steel Works of the South Manchuria Railroad Co. for four 120-ton open-hearth furnaces. This is in addition to a contract for six 100-ton furnaces placed some weeks ago. The furnaces are to be installed by Japanese engineers from drawings furnished by the maker. These engineers are now in Germany studying furnaces of the same type in operation in the Ruhr. The Siemens-Schuckert A. G. recently received a repeat order for electric locomotives from the Fu-Shun mines of the South Manchuria Railroad Co.

German Mills to Add Tin Plate Capacity

HAMBURG, GERMANY, Sept. 23.—Tin plate mills in Germany are planning a considerable increase in capacity. August output reached a new record, totaling 13,089 tons, and extensions being planned would more than double this amount. It is noteworthy that little tin plate from Welsh mills is now reaching Germany and only a few thousand tons a month is being imported from the Saar. Exports of tin plate have averaged 3500 tons a month this year.

German Export Trade Fair Despite Higher Prices

BERLIN, GERMANY, Sept. 24.—The outlook for business is uncertain. The financial situation has not improved and unemployment is increasing. The coal, steel and chemical industries, however, are well engaged and the foreign trade balance has gained. August showed an export surplus of 117,000,000 m. ($27,846,000), and exports of manufactured goods of all kinds, totaling 883,500,000 m. ($210,293,000), were the largest since the war. Production of iron, steel and rolling mill products in August was larger than in August, 1928. Rolled products, particularly, registered a considerable advance, the total for August of this year being 1,012,666 metric tons compared with 979,421 tons for August, 1928.

Production of plates in the first eight months of this year showed a marked increase, while output of bars and structural shapes declined.

Export business is quiet at present, but the Stahlwerksverband has concluded some substantial contracts for delivery of semi-finished material to British consumers at prices about 2s. (49c.) per metric ton higher than on preceding contracts. Export demand for slabs, wire rods and wire is better, and prices are slightly higher than those of Belgian, French and Luxemburg makers. German exports of pig iron to Belgium are increasing, with 135,000 tons shipped in the first seven months of this year compared with 60,500 tons in the same period of 1928.

The *Deutsche Bergwerks Zeitung* has called attention to Germany's increased exports of steel bars to the United States. In 1928 bar exports to the United States were 31,600 tons, while in the first seven months of this year they totaled 29,900 tons. Sales of bands, structural shapes and sheets to the United States have also gained. It is suggested that, despite freight rates and projected increases in the American tariff, exports in these products may be further expanded.

Sweden Establishes New Iron Ore Classification

HAMBURG, GERMANY, Sept. 23.—Swedish producers and exporters of iron ore have agreed to classify their ore in four instead of three grades. The new standards will be No. 1 low phosphorus ore, not over 0.04 per cent phosphorus; No. 2 phosphorus, not over 0.07 per cent; No. 3 phosphorus, with more than 0.07 per cent phosphorus, and a new grade, "pure" iron ore, with a guaranteed maximum of 0.009 per cent phosphorus and 50.1 per cent iron. This fourth grade will also be supplied with the following analyses: P. 0.01 per cent and Fe 55.6 per cent; P. 0.011 per cent and Fe 61.1 per cent; and P. 0.0126 per cent and Fe 70 per cent. Of the total Swedish iron ore shipments in the past 20 years, amounting to 112,700,000 tons, it is stated that about 7 per cent was special, so-called pure iron ore, about 10 per cent No. 1 low phosphorus ore, about 37 per cent No. 2 grade and the rest No. 3.

Russian Purchases Here Total $109,000,000

Production of large-scale industry in Russia in the fiscal year 1928-1929, which ended Oct. 1, was 60 per cent above the 1913 total, says a report of the Amtorg Trading Corporation, New York. Production of electric power was three and one-half times the pre-war level and the railroad freight movement was one-third larger.

A favorable trade balance of more than $10,000,000 was attained in the past fiscal year, in contrast with a large adverse balance the previous year. Russian-American trade reached a record total of $149,000,000, compared with $113,000,000 in the previous fiscal year and only $48,000,000 in 1913. Of the total for 1928-1929, $109,000,000 represented purchases in the United States by the Amtorg Trading Corporation, which bought $73,000,000 worth of materials, and by the All-Russian Textile Syndicate, Centrosoyus, Selskosojus.

Purchases by the Amtorg Trading Corporation of industrial and electrical equipment totaled $30,000,000. Of the various Russian industries in the market for American machinery, the oil industry made the largest purchases last year, buying about $9,000,000 worth. Equipment for steel mills and the machine-building industry accounted for an outlay of $5,500,000. Development of the metallurgical and machine-building industries in the U.S.S.R. along American lines, says the report, promises to increase their importance as consumers of equipment produced in the United States.

Spiegeleisen Imports Large This Year

Imports of spiegeleisen into the United States this year are fairly large. To Sept. 1, according to official data, 12,228 gross tons had come in. This is at the rate of 1528 tons per month and compares with 435 tons per month in 1928. The spiegeleisen imported is material containing less than 30 per cent manganese and over 1 per cent carbon. The comparative statistics are as follows:

	Total	Per Month
1929 (8 mos.)	12,228	1,528
1928 (year)	5,218	435
1927 (year)	7,460	621

Thus imports this year are nearly four times the rate in 1928. The value of the 12,228 tons imported this year is put at $356,680. This is about $29 per ton. August imports were 985 tons valued at $29,770.

New Record in Agricultural Implement Exports

Shipments of agricultural implements and machinery from the United States for the first eight months of 1929 reached $100,463,571, a new record and an increase of 23 per cent over the like period of 1928, when exports amounted to $81,686,133. Implement exports during August amounted to $13,672,238, a slight decrease from August, 1928, when shipments reached $13,696,704.

German Tube Output Cut

HAMBURG, GERMANY, Sept. 23.—The unsatisfactory situation in the tube market has led the Vereinigte Stahlwerk A. G. to close its tube strip mill at Düsseldorf and to dismiss the workmen. Tube mill No. 1, also at Düsseldorf, is operating only a few days a week. Other tube mills in Germany are expected to suspend completely or drastically curtail their production.

Tungsten Alloys Up

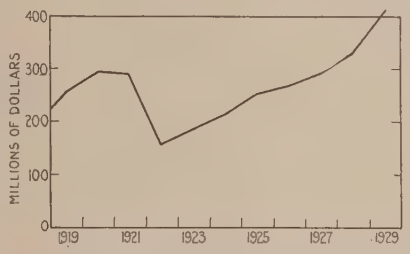
HAMBURG, GERMANY, Sept. 23.—On Sept. 20 producers of all grades of tungsten alloy steels advanced prices about 10 per cent.

Machinery Exports Decline in August

But Volume Is Still High and Eight-Month Total Is New Record, 24½ Per Cent Above 1928—Imports Continue Heavy

WASHINGTON, Oct. 7.—Declining $6,794,704, exports of machinery of all kinds from the United States in August were valued at $50,178,881, compared with $56,973,585 in July, which was the second highest total ever reached. Compared with exports of August, 1928, valued at $44,305,606, an increase of $5,873,275 is recorded. For the eight months ended with August, 1929, exports were valued at $413,460,580, a new high record and an increase of 24.5 per cent over those for the corresponding period of last year, valued at $331,884,809, which was previously the highest for the period.

Exports of machinery and vehicles in August were valued at $90,453,070, a decrease of $16,244,345 from July, $107,697,415, and a decline of $3,878,017 from August of last year, $94,331,087. For the eight months of the current year exports of machinery and vehicles were valued at $869,824,359, compared with $698,134,217, an increase of $171,690,142, or 24.6 per cent, over the like period of last year.



Eight-Month Machinery Export Totals Have Grown Steadily from the Low Point in 1922. Two New High Records Coming in 1928 and 1929

Industrial machinery exports, as classified by the Division of Statistics, Department of Commerce, were valued at $23,154,869 in August, 1929, as compared with $25,322,120 in July and $19,050,329 in August of last year. For the eight months of 1929 they were valued at $187,025,985, against $148,309,884 for the corresponding period of last year.

Total exports of power-driven metal-working machinery in August were valued at $2,315,664 compared with $2,913,687 in July and $2,650,532 in August of last year. For the eight months they were valued at $22,361,291 in 1929, against $17,351,134 in 1928. Power-driven metal-working exports listed in THE IRON AGE table represented 894 units, valued at $1,342,908, in August, against 1180, valued at $1,480,982, in July.

Exports of agricultural implements in August were valued at $13,672,000, against $14,722,000 in July and $13,697,000 in August of last year. For the eight months the value of this class of exports rose this year to $100,472,000 from $81,686,000 for the like period of last year.

Imports of machinery and vehicles in August were valued at $3,493,152, against $4,036,771 in July and $2,729,543 in August of last year. For the

Machinery Exports from the United States

(By Value in Thousands of Dollars)

	August		Eight Months Ended August	
	1929	1928	1929	1928
Locomotives	$814	$342	$2,561	$1,994
Other steam engines	55	42	543	682
Boilers	144	105	1,312	801
Accessories and parts	90	61	650	424
Automobile engines	540	1,246	8,835	10,593
Other internal combustion engines	751	875	6,702	5,864
Accessories and parts	312	272	3,103	2,525
Electric locomotives	3	43	466	1,112
Other electric machinery and apparatus	1,002	708	8,879	5,317
Excavating machinery	736	601	5,797	5,081
Concrete mixers	125	113	1,002	727
Road-making machinery	304	212	2,149	1,570
Elevators and elevator machinery	437	318	3,506	2,942
Mining and quarrying machinery	1,599	1,070	11,650	9,103
Oil-well machinery	1,874	1,613	17,104	10,019
Pumps	718	572	7,961	3,885
Bending and power presses	113	245	2,337	1,369
Machine tools*	2,088	1,489	18,995	10,578
Forging machinery	....	72	....	537
Other metal-working machinery and parts	566	572	5,103	4,111
Textile machinery	700	1,052	8,880	8,976
Sewing machines	786	694	6,967	5,892
Shoe machinery	172	191	1,356	1,244
Flour-mill and gristmill machinery	38	26	381	303
Sugar-mill machinery	754	288	2,423	2,784
Paper and pulp-mill machinery	645	155	2,547	2,086
Sawmill machinery	70	74	604	624
Other woodworking mach'ry	181	230	1,593	1,274
Refrigerating and ice-making machinery	1,902	613	11,059	6,413
Air compressors	651	473	5,224	4,607
Typewriters	1,639	1,106	16,244	14,296
Power laundry machinery	184	76	1,433	755
Typesetting machines	391	321	4,793	3,024
Printing presses	391	564	3,959	4,079
Agricultural machinery and implements	13,672	13,697	100,472	81,686
All other machinery and parts	15,732	14,175	136,871	114,608
Total	$50,179	$44,306	$413,461	$331,885

*Principal details in another table.

Exports of Power-Driven Metal-Working Machinery

	August, 1929		July, 1929	
	No.	Value	No.	Value
Engine lathes	59	$139,664	72	$155,015
Turret lathes	23	55,169	43	104,389
Other lathes	89	177,632	65	119,984
Vertical boring mills and chucking machines	13	25,505	20	62,880
Thread-cutting and automatic screw machines	89	121,082	114	176,920
Knee and column type milling machines	54	111,596	24	48,860
Other milling machines	42	94,321	44	99,031
Gear-cutting machines	31	33,792	55	191,494
Vertical drilling machines	45	43,863	40	25,520
Radial drilling machines	9	23,221	10	31,830
Other drilling machines	192	57,672	451	97,408
Planers and shapers	47	96,473	41	77,610
External cylindrical grinding machines	60	150,444	76	166,979
Internal grinding machines	33	103,125	29	68,774
Metal-working tool-sharpening machines	108	49,349	96	54,288
Total	894	$1,342,908	1,180	$1,480,982

Imports of Machinery into the United States

(By Value)

	August		Eight Months Ended August	
	1929	1928	1929	1928
Metal-working machine tools	$52,668	$30,584	$809,210	$397,731
Agricultural machinery and implements	663,680	277,835	6,957,881	3,506,061
Electrical machinery and apparatus	82,452	190,322	981,250	989,405
Other power-generating mach'ry.	184,697	366,389	869,998	489,697
Other industrial machinery	905,408	914,834	8,230,371	6,490,752
Vehicles except agricultural	713,404	301,787	3,868,192	2,043,195
Total	$2,602,309	$2,081,751	$21,716,902	$13,916,841

eight months they totaled $29,389,463, showing the sharp gain of $10,421,102 or 54.9 per cent over similar imports for the first eight months of 1928, valued at $18,968,361. This increase, along with gains in other import lines, is attributed to pending tariff legislation.

Imports of industrial, office and printing machinery in August were valued at $1,886,880, compared with $2,288,438 in July and $1,829,834 in August, 1928. For the eight months of 1929 they were valued at $16,662,852, an increase of 41.5 per cent over such imports for the corresponding period of last year, valued at $11,776,942.

Imports of machinery listed in THE IRON AGE table were valued at $2,602,309 in August, compared with $2,855,506 in July and $2,081,751 in August of last year. For the eight months this class of imports entering the United States was valued at $21,716,902, an increase of $7,800,061 or 56.4 per cent over last year. Sharp gains were made in imports of all kinds, except electrical machinery and apparatus.

Preparing to Take the Census

Enumeration of Population and Study of Many Phases of Activity to Be Undertaken

WASHINGTON, Sept. 30.—Preliminary work of organizing for the decennial census of 1930, the Department of Commerce announced today, consists of two major developments, including the employment of specialists in certain phases, such as distribution, unemployment, agriculture, occupation and manufactures, and the intensive training of a force of 573 supervisors, who will have charge of the activities of approximately 100,000 enumerators.

The specialists will be recognized authorities in their respective fields. They will cooperate with the regular census force in deciding upon the questionnaires and the instructions for their application. Their principal duties, however, will relate to the preparation of the final reports and the presentation of the data in the most practical and usable form.

In training the supervisors the Bureau of the Census is endeavoring to take advantage of the intervening time to make certain that each of these officials personally understands the different branches of the census of which he will have charge. To accomplish this, it is necessary to develop extensive correspondence with each supervisor. Most of the form letters have been established and a large number of supervisors have already received them.

Supervisors Must Prepare Reports

Previously it has been the practice to appoint the supervisors and immediately thereafter appoint the assistant supervisors. In a number of cases the supervisor turned the work over to the assistant. Radical changes will be made in this respect at the coming census. The bureau proposes to be careful that the supervisor understands the work, and actually performs some branches of it before next February, when the assistants will be appointed. In the meantime, the supervisors will have been required to prepare reports on the different census schedules concerning which they will have to instruct their enumerators. The Director of the Census or some other official of the bureau will have had personal contact with every supervisor.

All of the enumerators will be required to pass an examination designed not only to test their ability to do the work, but to make certain that they understand what is to be done and how it is to be done, before they will be appointed. Responsibility for correct work will be placed directly upon the supervisors.

Buildings 2000 Ft. High Structurally Possible

Skyscrapers 2000 ft. high are structurally possible, according to a study just completed for the American Institute of Steel Construction. This study of building height has been in progress for the past two years under the direction of W. C. Clark, chief economist and vice-president of S. W. Straus & Co. It was made for the institute by independent research for the purpose of providing unbiased proof that tall buildings in congested centers are economically advisable. The report found that buildings of 75 stories are not only economical, but under certain conditions will return more on the investment than a building of 50 stories or 30 stories.

These conclusions were based upon investigations made upon specific plans for various buildings of varied heights drawn by J. L. Kingston, architect of the staff of Warren & Wetmore. In making the studies the cooperation of numerous experts was enlisted, such as Stephen F. Voorhees of Voorhees, Gmelin & Walker; R. H. Shreve of Shreve & Lamb; David Lindquist, chief engineer of the Otis Elevator Co.; S. F. Holtzman and David C. Coyle of Gunvald-Aus, consulting engineers; the Levering & Garrigues Co. and the McClintic-Marshall Co., steel fabricators; Otto Goldschmidt, consulting engineer and expert on mechanical equipment; Hatzel & Buehler, electrical contractors; W. G. Cornell Co., plumbing, and in the building managers and rental field such experts as Lee Thompson Smith, Clarence T. Coley and William C. Demorest.

Industrial Consumption of Electricity Dips

August industrial activity in the United States, as rated by *Electrical World*, was 128.2, compared with 129 in July and with 120.8 in August, 1928. The figures are based upon monthly electrical energy consumption by 3600 scattered manufacturing plants, the average of 1923-1925 being 100.

The metal industries group dropped from 144.2 to 140.7, this being the net result of an increase in rolling mill and steel plant consumption from 144.4 to 150.9 and a decline in consumption of metal-working plants, ferrous and non-ferrous, from 144 to 134.6. Automobile plant consumption, including plants manufacturing parts, went up from 139.5 to 143.

Other industries showed varying changes, increases being recorded for leather, stone, clay and glass, paper and pulp and food products, while decreases were registered by textiles, forest products, rubber and its products, chemicals and shipbuilding.

Metallgesellschaft, Frankfort-on-Main, Germany, has started the publication in English of a *Periodic Review*, which will contain not only current statistics on lead, copper, zinc and tin, but also technical articles describing details of smelting plants and operations on these metals, as represented by practice in that company's own plants or of others allied to it.

Employment and Payroll Totals in Identical Plants in August and July (a)

	Establishments	Number on Payroll		Weekly Payroll (b)	
		August	July	August	July
Iron and steel	200	283,677	280,785	$9,226	$8,708
Foundry and machine shop	1,051	283,685	292,159	8,765	8,827
Machine tools	151	41,301	41,923	1,322	1,349
Hardware makers	70	31,109	31,881	803	791
Steam and hot-water appliances	111	31,647	30,069	914	848
Stoves	113	18,881	17,698	518	485
Structural ironwork	164	28,075	27,404	857	809
Cast iron pipe	38	12,043	11,856	291	286
Automobiles	217	437,202	447,823	15,099	12,997

(a) United States Bureau of Labor Statistics.
(b) Thousands of dollars.

Machinery Markets and News of the Works

Cleveland Show Big Success

Amtorg Purchases $1,200,000 Worth of Tools for Soviet Tractor Plant

WITH an attendance exceeding 20,000, including a large number of visitors from almost every country in the world, the National Machine Tool Exposition in Cleveland the past week was an outstanding success.

A substantial volume of orders was placed by buyers at the show and the extraordinary interest manifested by machine tool users is regarded as a forerunner of an active trade in the next few months.

The largest individual transaction was the purchase during the week of $1,200,000 worth of tools by the Amtorg Trading Corporation for installation in a tractor plant in Soviet Russia. Among the machines bought were 48 single-spindle drilling machines, eight automatic screw machines and 19 grinders. Considerable business, still pending, is expected to be placed by the Amtorg company in the immediate future.

Reports from machine tool centers indicate that bookings have been of fair volume and that production will remain steady at its present high rate during the remainder of the year. Demand for heavy tools has been unusually good.

The Chicago, Milwaukee, St. Paul & Pacific has contracted for two frog and switch planers, but railroad buying in general has been negligible. The Chesapeake & Ohio and the Norfolk & Western are considering issuing lists within a short time.

Few orders are coming from the automobile industry. In fact, almost all business is well distributed in the general industrial field.

New York

NEW YORK, Oct. 8.—So many machine tool sales executives and salesmen were in Cleveland last week attending the National Machine Tool Exposition that comparatively little business was done in this market. However, most of the sellers who were at Cleveland got oral orders or promises of orders and returned to New York with optimism that the remaining months of the year will bring a considerable volume of new business. The Amtorg Trading Corporation, 165 Broadway, New York, continues to place orders for the new tractor plant being built in Soviet Russia. A large pump and condenser manufacturer is expected to place large orders soon. A truck company was one of the week's buyers.

Plans are under way by Robert Gair Co., 420 Lexington Avenue, New York, manufacturer of corrugated boxes and containers, for four-story addition, 200 x 500 ft., to plant at Piermont, N. Y., to cost over $450,000 with equipment.

Seal Lock Burial Vault Co., Forest Hills, L. I., has awarded general contract to M. T. Heeg, Woodhaven Boulevard, Elmhurst, L. I., for one-story plant unit, to cost about $45,000 with equipment. W. J. Boegel, 185 Madison Avenue, New York, is architect.

Broadway Auto Radiator Co., 123 West Fifty-second Street, New York, has leased building at 449 West Fifty-fourth Street for new automobile radiator repair and chromium plating works.

New York Trap Rock Corporation, 252 Water Street, Newburgh, N. Y., has plans for new stone crushing, storage and distributing plant at Clifton Point, N. Y., to cost over $500,000 with equipment. Heidenreich Engineering Co., Kansas City Life Building, Kansas City, Mo., is consulting engineer.

American Seal Kap Corporation, 11-05 Forty-fourth Drive, Long Island City, manufacturer of milk bottle caps, etc., has acquired adjoining factory, 100 x 200 ft., for expansion.

Knickerbocker Ice Co., 41 East Forty-second Street, New York, has filed plans for four-story ice-manufacturing plant, to cost about $200,000 with equipment.

Swan-Finch Oil Corporation, 205 East Forty-second Street, New York, has plans for rebuilding part of lubricating oil refinery at Linden, N. J., recently destroyed by fire, with loss of about $400,000 with equipment, reconstruction to approximate like sum.

William Shary, 22 East Seventeenth Street, New York, architect, has plans for an eight-story automobile service, repair and garage building, to cost about $130,000 with equipment.

Officials of Remington Arms Co., 25 Broadway, New York, with plants at Ilion, N. Y., and Bridgeport, Conn., have organized Remington Automatic Quotation Board Corporation, a subsidiary, to manufacture automatic-operated stock exchange and other record boards where rapid change in figures is required. It is understood that part of one of present plants will be given over to production of new specialty.

Port of New York Authority, 75 West Street, New York, has acquired property for fourteen-story freight and warehouse terminal, comprising block bounded by Fifteenth and Sixteenth Streets, Eighth and Ninth Avenues, to cost about $15,000,000; installation will include elevating, conveying and other mechanical-handling equipment. Howard S. Cullman is chairman of inland terminal committee of board.

Wright Aeronautical Corporation, Paterson, N. J., manufacturer of aircraft engines and parts, has awarded general contract to J. W. Ferguson Co., 152 Market Street, for another one-story addition, to cost about $500,000 with equipment.

Pennsylvania Railroad Co., Pennsylvania Terminal, New York, has plans by Gibbs & Hill, Inc., same address, consulting engineer, for electrification of lines from Manhattan Transfer on Newark meadows to New Brunswick, N. J., to cost about $6,000,000 with power equipment and other machinery.

Annandale Graphite Co., Annandale, N. J., is planning new one-story plant unit, to cost more than $35,000 with equipment.

Electro-Matic Mfg. Co., Newark, recently organized, has leased part of former plant of Stengel-Rothschild Co., 137 Kossuth Street, and will remodel to manufacture automatic electric heaters and parts, to cost more than $65,000.

DeLuxe Auto Body Co., 5124 Boulevard, West New York, N. J., is considering new one-story plant for parts and assembling, to cost about $40,000 with equipment.

General Box Top Co., 568 Park Avenue, West New York, N. J., has awarded general contract to Bonanno Brothers, 1827 Bergen Turnpike, North Bergen, N. J., for new two-story plant, to cost about $70,000 with equipment.

Kolster Radio Corporation, 200 Mount Pleasant Avenue, Newark, manufacturer of radio equipment and parts, has purchased Earl Radio Corporation, 122 East Forty-second Street, New York, manufacturer of similar equipment, with main plant at Clifton, N. J. Large part of production in future will be concentrated at Clifton works. Rudolph Spreckels will be chairman of board of consolidated company.

New England

BOSTON, Oct. 7.—The local machine tool market the past week was very quiet and no sale of importance was reported by new tool dealers. In used equipment, transactions included a few lathes, drilling tools, a planer and a milling machine. Less activity was noted at some of the New England machine tool plants, owing to the fact that officials were attending the Cleveland exposition.

Sales of small tools hold up remarkably well. September business was considerably in excess of that for the corresponding month last year, and about on a par with August, this year.

Bird Machine Co., Washington Street, South Walpole, Mass., closed bids Oct. 4 for a boiler shop.

H. E. Holdbrook, Winona Street, Worcester, Mass., manufacturer of drop forgings, is taking bids on a one-story plant unit, 40 x 65 ft.

Randall & McAllister, 84 Commercial Street, Portland, Me., has started work on a one-story machine shop addition, 20 x 42 ft.

Nutmeg Crucible Steel Co., Branford, Conn., has started construction of a one-story foundry, 70 x 100 ft., to cost $20,000 without equipment.

Superior Spring & Mfg. Co., 373 Washington Street, Hartford, Conn., has plans for a one and two-story manufacturing and storage unit.

Westfield Boys Trade School, Westboro, Mass., has plans for a three-story trade school addition, 75 x 180 ft.

Wood Hydraulic Hoist & Body Co., Detroit, has started work on a one-story, 50 x 180 ft., addition on North Beacon Street, Boston.

Moore Drop Forging Co., Walter Street, Springfield, Mass., has plans for extensive plant alterations. Purchase of hammers is under consideration.

Bids were closed Oct. 8 for an airport at Warwick, R. I., to cost $300,000. Plans include a small machine shop for which equipment will be purchased.

Package Machinery Co., Springfield, Mass., Baker Perkins Co., Inc., Saginaw, Mich., and National Bread Wrapping Machine Co., Nashua, N. H., have consolidated. It is planned to move Nashua plant equipment to Springfield.

Bids will be asked in about 60 days by Continental Pipe & Mining Co., 475 Fifth Avenue, New York, Herbert Kennedy, president, for initial units of pipe-manufacturing plant on property recently acquired at Chelsea, Mass., to cost more than $1,000,000 with equipment. Fay, Spofford & Thorndike, 44 School Street, Boston, are engineers.

Norma-Hoffman Bearings Corporation, Stamford, Conn., manufacturer of precision ball bearings, thrust bearings, etc., will take bids at once for one and two-story addition, 100 x 200 ft., to cost about $90,000 with equipment. Fletcher-Thompson, Inc., 542 Fairfield Avenue, Bridgeport, Conn., is architect and engineer.

Boston & Albany Railroad Co., South Station, Boston, has awarded general contract to Tredennick-Billings Co., 10 High Street, for new engine house, with shop and repair facilities at West Springfield, Mass., to cost over $200,000 with equipment.

Continental Airports, Inc., care of Leo F. Caproni, 1056 Chapel Street, New Haven, Conn., consulting engineer, has plans for airport buildings at Milford, Conn., including hangar, repair shop, gas and oil storage units, to cost about $100,000 with equipment.

Firestone Tire & Rubber Co., Akron, Ohio, has purchased former Peabody mill of Dwight Mfg. Co., Newburyport, Mass., for branch plant. Extensions and improvements are planned.

Pratt & Whitney Aircraft Corporation, Hartford, Conn., has awarded general contract to R. G. Bent Co., Inc., 93 Edwards Street, for one and two-story power plant, 52 x 125 ft., to cost about $80,000 with equipment.

The Crane Market

INQUIRY for overhead traveling cranes continues rather limited. In the past week Sanderson & Porter, engineers, New York, have inquired for a 100-ton, 34-ft. span, 4-motor power house crane with 10-ton auxiliary, for the Cerro de Pasco Copper Co. Locomotive crane inquiries include a 50-ton crane for the New York Central Railroad, which is in addition to the inquiry for two 25-ton cranes, pending award for some weeks. The low bidder on two 25-ton locomotive cranes for the Mare Island Navy Yard was the Orton Crane & Shovel Corporation, but award has not yet been made. The V. D. Simmons Co., consulting engineer, Chicago, is inquiring for a 5-ton, 60-ft. span electric traveling crane for the Bryant Paper Co., Kalamazoo, Mich.

Among recent purchases are:

City of Holyoke, Mass., 15-ton crawl-tread crane from Northwest Engineering Co.

Pittsburgh Tube Co., Monaca, Pa., 5-ton, 55-ft. 7-in. span, electric traveling crane from Northern Engineering Works.

Cleveland

CLEVELAND, Oct. 7.—The center of machine tool activities the past week was the floor of the machine tool show. A number of new models which were demonstrated were sold and many good prospects were developed. Production men displayed a great deal of interest in the latest tools designed to speed up production and reduce manufacturing costs.

Among the larger buyers was the Amtorg Trading Corporation, which had a number of representatives at the exhibit. This company distributed a number of orders for equipment for Russian tractor plants with local and other machine tool manufacturers. Negotiations for considerable other machinery were conducted by this organization, but the final details of sales have not been concluded. A representative of the Amtorg corporation announced that its purchases during the exhibit aggregated $1,200,000, but this probably included some business that has not yet been developed into signed contracts. Orders placed with Cleveland machine tool manufacturers by this corporation included 48 single spindle drilling machines and eight automatic screw machines. An Eastern company received an order for 19 grinding machines.

Acme Refining Co., Cleveland, is erecting cutting oil and grease compounding plant at West Fifty-fifth Street and Wheeling & Lake Erie Railroad, to cost $150,000. Conveying and hoisting equipment will be required.

Plans are being considered by Tyson Roller Bearing Co., 1210 High Avenue, S.W., Canton, Ohio, for one-story addition, to cost about $40,000 with equipment.

Bessemer Securities Co., Youngstown, operating Bessemer Limestone & Cement Co., and other allied interests, has arranged for a new stock issue to total about $600,000, part of proceeds to be used for expansion. Company recently acquired property at Pittsburgh, and is planning for new cement mill.

City Council, Sandusky, Ohio, is contemplating construction of municipal electric light and power plant. C. W. Sadler, City Hall, is city manager.

National Lime & Stone Co., Bluffton, Ohio, will defer rebuilding local plant recently destroyed by fire and will concentrate production at other mills for present time.

Kent Rubber Products Co., Ravenna, Ohio, has awarded general contract to P. L. Frank Construction Co., Ravenna, for two-story mill, 50 x 95 ft., to cost about $45,000 with equipment.

Electric Auto-Lite Co., Toledo, Ohio, manufacturer of automobile lighting and starting equipment, has acquired property at Sarnia, Ont., as site for new Canadian branch plant, to cost more than $3,000,000 with equipment. Company has revised plans for new office and operating building at Toledo, to cost about $200,000. Alfred A. Hahn, Gardner Building, is architect. C. O. Miniger is president.

Osborn Mfg. Co., 5401 Hamilton Avenue, Cleveland, manufacturers of molding machines and foundry supplies, has placed contract with Hunkin-Conkey Construction Co. for a new factory and office building, adjoining present plant, which will increase facilities about 25 per cent.

St. Louis

ST. LOUIS, Oct. 7.—Carter Carburetor Co., 2838 North Spring Street, St. Louis, has awarded general contract to Fruin-Colnon Contracting Co., Merchants-Laclede Building, for two-story addition, to cost about $40,000 with equipment. Martin Engineering Co., Syndicate Trust Building, is architect and engineer.

Mid-West Steel Co., 1533 West Grand Street, Oklahoma City, Okla., has plans for one-story addition, 60 x 128 ft., for storage and distribution, to cost about $25,000 with equipment.

Crystal Ice Co., Mangum, Okla., has plans for ice-manufacturing and cold storage plant, to cost about $85,000 with equipment.

Detroit Aircraft Corporation, Detroit, operating Ryan Aircraft Corporation, St. Louis-Lambert Flying Field, St. Louis, and Parks Aircraft, Inc., East St. Louis, Ill., will consolidate operations of both subsidiaries at last-noted point, and proposed addition for expansion in parts production and assembling of Ryan division, referred to last week, will be carried out at that place, to cost about $90,000. It is purposed to dispose of present Ryan works. E. S. Evans is president of parent organization.

Board of directors, Flanagan Boys' Home, West Dodge, Neb., has awarded general contract to Parsons Construction Co., Grain Exchange Building, Omaha, Neb., for two-story boys' trade school,

to cost about $65,000 with equipment. Lahr & Stangel, W.O.W. Building, Omaha, are architects.

Robinson Supply Co., Tulsa, Okla., recently formed by H. E. Robinson, 205 West Archer Street, and associates, is considering operation of local plant to manufacture pumping equipment and kindred machinery for oil fields.

Locomotive Finished Material Co., Atchison, Kan., has plans for one-story addition, 125 x 400 ft., primarily for production of steel castings, to cost more than $80,000 with equipment.

Topeka Airport & Aviation Co., 1345 Fillmore Street, Topeka, Kan., has filed plans for hangar with repair and reconditioning shop facilities at North Topeka-Oakland airport, to cost about $40,000 with equipment. R. E. Scammell, National Reserve Building, is architect.

Fleetcraft Airplane Corporation, Lincoln, Neb., care of N. A. Sanders, Patterson Building, Denver, is considering plant near municipal airport at Denver for parts manufacture and asembling, to cost about $180,000 with equipment.

South Atlantic

BALTIMORE, Oct. 7.—Julien P. Friez & Sons, Inc., 4 North Cathedral Street, Baltimore, manufacturer of scientific instruments, has engaged Edward H. Glidden, American Building, architect, to prepare plans for new three-story plant, 65 x 100 ft., primarily for manufacture of precision instruments for airplanes, to cost about $100,000 with equipment. Company is a subsidiary of Consolidated Instrument Co. of America, Inc., 41 East Forty-second Street, New York.

Searchlight Metals Mfg. Corporation, Richmond, Va., recently organized, is completing first unit of new plant at Dumbarton, where 3-acre tract has been secured, for production of special alloys, Babbitt metal, type metals and kindred products. It is proposed to establish a second unit at early date for manufacture of copper, brass, and bronze products. Entire project will cost more than $45,000 with equipment.

Smith-Douglas Co., Board of Trade Building, Norfolk, Va., manufacturer of commercial fertilizers, has awarded general contract to J. L. Abbitt, same address, for new one-story plant on 10-acre tract, to cost about $70,000 with equipment.

Washington County School Board, Hancock, Md., is considering installation of manual training equipment in new local high school to cost about $120,000, for which bids on general contract will be asked in about 30 days. Architect for school board is preparing plans; Charles A. Weagly is president.

United States Bobbin & Shuttle Co., Providence, R. I., manufacturer of textile mill equipment, has acquired Jordan Mfg. Co., Monticello, Ga., manufacturer of kindred equipment, with plans at Monticello, Greenville, S. C., and Johnson City, Tenn., and will consolidate. Operations will be continued at present plants, with expansion in output, company to be known as Jordan Division. Charles H. Jordan will be vice-president of purchasing company in charge of Southern operations.

American Oil Co., American Building, Baltimore, has plans for a storage and distributing plant at East Butler, Pa., to cost over $50,000 with equipment. T. J. O'Connell is company engineer.

Bedford Pulp & Paper Co., Big Island, Va., has plans for new power plant to cost over $80,000 with equipment. Headquarters are in Mutual Building, Richmond, Va.

City School Commission, Salisbury, Md., is contemplating installation of manual training equipment in new three-story high school to cost $500,000, for which bids will soon be asked on general contract.

Industrial Electric & Machine Co., 507 East Russell Street, High Point, N. C., is planning erection of one-story foundry, to cost about $30,000 with equipment.

Richmond Coca-Cola Bottling Works, Inc., Richmond, Va., has leased building of Everhart Motor Co., Leesburg, Va., and will remodel for new plant, installation to include elevating, conveying, automatic bottling and other equipment, to cost over $75,000.

Maryland Machinery Co. has been incorporated in State of Maryland to deal in machinery with offices in Snow Building, Calvert and Lombard Streets, Baltimore. New organization, which will operate in Maryland, District of Columbia and parts of West Virginia and Virginia, will have exclusive representation of machine-tool manufacturers located in Middle West and New England. It will specialize in metal-working machinery. Officers are Thomas H. King, president, and W. J. Lippert, secretary and treasurer. Mr. King has long been identified with machine tool industry, and Mr. Lippert has for some years conducted business as a dealer in general machinery in Baltimore.

Detroit

DETROIT, Oct. 7.—Consumers Power Co., 212 West Michigan Avenue, Jackson, Mich., has plans for hydroelectric generating plant near Morley, to cost about $10,000,000 with transmission lines. Stevens & Wood, Inc., 20 Pine Street, New York, is consulting engineer.

Ex-Cell-O Aircraft & Tool Corporation, 1200 Oakman Street, Detroit, manufacturer of tool and precision equipment for airplanes, has superstructure under way on one-story plant unit, 112 x 440 ft., to cost about $100,000 with equipment. Company is considering construction of central power plant.

Sparta Foundry Co., Sparta, Mich., has awarded general contract to Lenger & Kool, 1812 Granville Avenue, S. W., Grand Rapids, for one-story foundry addition, to cost about $35,000 with equipment.

Reynolds Spring Co., Jackson, manufacturer of automobile springs and other automotive equipment, is carrying out an expansion, to include purchase of company in same line of manufacture at Detroit, name temporarily withheld. It is planned to concentrate assembling work at Detroit as soon as merger is completed, and to extend other divisions at Jackson.

Olds Motor Works, Inc., Lansing, is planning addition to automobile engine plant and engineering laboratories, totaling about 35,500 sq. ft. additional floor space, to cost more than $100,000 with equipment.

L. A. Darling Mfg. Co., Bronson, Mich., manufacturer of metal display fixtures, etc., has plans for a two-story addition, to cost about $40,000 with equipment. F. L. Shoemaker, Masonic Block, Sturgis, is architect and engineer. J. D. Spencer is president.

Wayne County Board of Commissioners, Barlum Tower Building, Detroit, will take bids at once for power plant at Middlebelt and Goddard Roads, to cost about $100,000 with equipment. Giffels & Vallet, Marquette Building, are engineers.

Fisher Body Corporation, Detroit, has asked bids on general contract for two extensions to works at Lansing, consisting of one-story addition to factory formerly occupied by Olds Motor Works, Inc., 140 x 250 ft., and new two-story unit, 70 x 450 ft., to cost about $400,000 with equipment. H. E. Beyster, General Motors Building, Detroit, is engineer.

United Brass & Aluminum Co., 3127 Goulden Street, Port Huron, plans early call for bids on two-story addition, to cost about $45,000 with equipment.

Buffalo

BUFFALO, Oct. 7.—Plans are under way by Buffalo, Niagara & Hudson Power Corporation, Electric Building, Buffalo, for another unit at local steam-operated generating plant, to cost about $1,000,000 with power switching station and other facilities.

Stewart Motor Corporation, 93 Dewey Avenue, Buffalo, manufacturer of motor trucks, has awarded general contract to Robert E. Williams & Son, Inc., Jackson Building, for one-story addition, 100 x 250 ft., for parts production and service, to cost $55,000 with equipment. North & Shelgren, Crosby Building, are architects.

Excel Metal Cabinet Co., Falconer, N. Y., will soon begin superstructure for one-story addition, to cost about $40,000 with equipment, for which general contract recently was let to Paddock & Nash, Phillips Building, Jamestown, N. Y.

Buffalo Electric Furnace Corporation, Buffalo, care of William G. Shoemaker, Jr., 35 Knox Avenue, recently formed by Mr. Shoemaker and associates with capital of $200,000, is planning early operation of local plant to manufacture electric furnaces, including parts and assembling departments.

Samson-United Corporation, Rochester, N. Y., has been organized to take over and succeed to local plant and business of Samson Cutlery Co., 8 Jones Street, manufacturer of shears, curling irons and kindred products. New organization is planning expansion in present facilities and is said to be contemplating new unit in near future.

American-LaFrance Foamite Corporation, Elmira, N. Y., manufacturer of motor-driven fire engines and trucks, motorized fire-fighting equipment, etc., has awarded general contract to John Cunningham, 103 South Avenue, for one-story addition, to cost about $55,000 with equipment. Haskell & Considine, Hulett Building, are architects.

Hyatt C. Hatch and Henry J. Neufang, Atlanta, N. Y., have organized Boggs Plow Co., with capital of $100,000, to operate local plant for manufacture of plows and other agricultural tools.

Philadelphia

PHILADELPHIA, Oct. 7.—Plans have been filed by Philadelphia Rapid Transit Co., Mitten Building, Philadelphia, for one-story mechanical shop, to cost about $30,000 with equipment.

Almar Stores, Inc., 925 North Front Street, Philadelphia, plans installation of traveling ovens, power equipment, conveying and other machinery in new two and three-story baking, storage and distributing plant, to cost more than $300,-

000 with equipment. Ballinger Co., Twelfth and Chestnut Streets, is architect and engineer.

Reading Co., Reading Terminal, Philadelphia, has awarded general contract to Arey-Hauser Co., Elverson Building, for one-story electric car repair shop, to cost about $225,000 with equipment.

Belmont Packing & Rubber Co., Butler and Sepviva Streets, Philadelphia, manufacturer of mechanical rubber goods for power plants, has work under way on rebuilding four-story plant recently destroyed by fire, to cost more than $100,000 with equipment.

Philadelphia Suburban Water Co., Jenkintown, Pa., is disposing of bond issue of $2,500,000, part of fund to be used for expansion and improvements in pumping plants and power facilities, piping systems, etc.

I. Fischman & Sons, Inc., Tenth Street and Allegheny Avenue, Philadelphia, manufacturers of soda fountains and equipment, has acquired John J. Deery Co., 373 Vernon Avenue, Long Island City, N. Y., marble and stone products, and will consolidate with its marble-working division in new plant now under way on local site, to cost about $1,500,000, operating under name of Consolidated Marble Co., recently organized as a subsidiary. Purchasing company will carry out expansion in marble-working department.

School Board of Kennett Square, Pa., is considering installation of manual training equipment in junior and senior high school to cost $700,000, for which plans will be drawn by E. William Martin, du-Pont Building, Wilmington, Del., architect.

Hercules Powder Co., Wilmington, Del., has acquired 300-acre tract near city limits as site for new experimental and research plant, to cost more than $400,000 with equipment. It is proposed to remove plant at Kenvil, N. J., to new location, following completion of buildings.

J. D. Johnson Co., Inc., 139 North Seventh Street, Philadelphia, plumbing equipment and supplies, has leased building at Freehold, N. J., for new factory branch and distributing plant.

Chicago

CHICAGO, Oct. 7.—Sales of machine tools are moderate. Fresh inquiries fall short of the volume of recent weeks, partly due to the attendance of many prospective buyers at the machine tool exposition at Cleveland. Reports from Cleveland are so favorable, from the viewpoint of sales and of general interest, that the local trade is preparing for active purchasing the remaining weeks of the month. Old inquiry, much of which is alive, bulks large and lends support to those who anticipate an active late fall trade. Requests for good used equipment are more numerous than the machines available and prices are high. The Chicago, Milwaukee, St. Paul & Pacific has placed orders for two frog and switch planers.

Northern States Power Co., Granite Falls, Minn., has started construction of a new power plant, to cost $2,500,000.

Kari-Keen Mfg. Co., Sioux City, Iowa, has let contract for one-story addition, 88 x 268 ft., which will add 25,000 sq. ft. to factory space and provide capacity for 1200 auto carrier and luggage units daily. New unit will cost $50,000 and is fifth addition company has made this year. Cecil H. Myers is president and general manager.

Sterling Mfg. Co., 1410 Wrightwood Street, Chicago, manufacturer of radio equipment and parts, has awarded general contract to A. Nelson, 2432 Irving Park Boulevard, for one-story addition, to cost about $50,000 with equipment. A. H. Durr & Co., 123 West Madison Street, are architects.

Crane Co., 836 South Michigan Avenue, Chicago, has awarded general contract to Oscar Sandstrom, 28 North Genesee Street, Waukegan, Ill., for one-story factory branch and distributing plant, 108 x 159 ft., at Waukegan, to cost about $55,000 with equipment. C. W. Webster is company architect.

Canadian-American Lines, Inc., 2600 Delaware Street, Minneapolis, Minn., Norman G. Warsinske, head, is considering establishment of airport, including hangars, repair shop, oil storage and other field units, to cost about $175,000 with equipment.

Chicago, St. Paul, Minneapolis & Omaha Railway Co., East Fourth Street, St. Paul, Minn., has awarded general contract to J. B. Nelson Construction Co., Mankato, Minn., for new engine house at Mankato, with repair and servicing facilities, to cost $55,000 with equipment.

North American Car Corporation, 327 South La Salle Street, Chicago, has arranged for increase in capital from 123,874 to 138,261 shares of stock, totaling about $600,000, part of fund to be used for expansion in production facilities.

Iowa Public Service Co., Sioux City, Iowa, is considering new steam-operated electric generating plant at Audubon, Iowa, to cost over $60,000 with equipment. A similar power station is planned at Ida Grove, Iowa, to cost close to like sum.

J. L. Shiely, Builders' Exchange, St. Paul, Minn., will build a sand and gravel washing, storage and distributing plant at Verendrye, N. D., including elevating, conveying, loading and other mechanical equipment. A power plant also will be constructed, entire project to cost about $125,000.

Kennedy Mfg. Co., Streator, Ill., is considering plans for the rebuilding of part of motor truck body manufacturing plant recently destroyed by fire.

Milwaukee

MILWAUKEE, Oct. 7.—Pending machine tool business is ahead of that in the corresponding weeks of August and September, although in most cases purchasing has been postponed until after the Cleveland show. Inquiries are increasing. While manufacture of agricultural implements has fallen off in some districts in Wisconsin, leading Milwaukee plants are expanding production facilities. Local and nearby automobile factories of the Nash Motors Co. have resumed quantity production on new models. Although Milwaukee employment figures are slightly lower than those of the preceding month they are higher than a year ago and there is no surplus of skilled machinists.

Chain Belt Co., Sivyer Steel Casting Co., Federal Malleable Co. and Interstate Drop Forge Co., all of Milwaukee, and Stearns Conveyor Co., Cleveland, have entered into a joint marketing arrangement. Hibbard S. Greene, assistant to President C. R. Messinger of Chain Belt Co., and formerly vice-president and director of Barber-Greene Co., Aurora, Ill., will be in charge.

Giddings & Lewis Machine Tool Co., Fond du Lac, Wis., is completing an addition, 90 x 225 ft., to be used principally for erecting. Present space used for this purpose will be devoted to production.

Racine Tool & Machine Co., Racine, Wis., is transfering its plant to building recently purchased, at State Street and Carlisle Avenue, and plans expansion.

Atlas Engineering Co., Clintonville, Wis., manufacturer of tractors, hoists, conveyors and other contractors' steel equipment, is contemplating plant extensions.

Board of Education, Williams Bay, Wis., has plans for an addition to high school, 57 x 101 ft., to include vocational training department. Edward Tough, 119 East Washington Avenue, Madison, Wis., is architect.

Board of Education, Racine, Wis., has plans by Frank J. Hoffman, architect, James Block, local, for first unit to vocational training school, three-stories, 68 x 128 ft.

City of Oconto, Wis., has retained Gordon & Bulot, engineers, 53 West Jackson Boulevard, Chicago, to design improvements to cost about $40,000 for city water plant, to include new electrically operated, deep well pumps, elevated steel tank, tower and standpipe.

Crucible Steel Casting Co., Fifteenth Avenue, Milwaukee, has begun construction of warehouse addition, one-story, 30 x 140 ft.

A. O. Smith Corporation, Milwaukee, will proceed with plans for eight story administration and science building as result of city's relaxation of zoning restrictions. E. W. Burgess, general plant engineer, is taking bids for new factory unit 200 x 270 ft., about 140 ft. high and is supervising designs for science building.

Pittsburgh

PITTSBURGH, Oct. 7.—Machine tool sales were rather light the past week, with nearly all buyers and sellers in this district attending the machine tool show at Cleveland. However, new inquiry was not entirely lacking and the market is anticipating railroad buying in the near future. Both the Chesapeake & Ohio and the Norfolk & Western are expected to issue lists soon and the Westinghouse Electric & Mfg. Co. is bringing out its fourth quarter list. Inquiries for individual tools are also coming out regularly and prospects for fall buying are considered very satisfactory.

Steel works buying of heavy machinery and equipment continues and local mills are figuring on a number of projects. Sales of shears for scrap yards have been very heavy this year. A Butler, Pa., yard recently contracted for four No. 2, two No. 2 and one No. 1 Canton shears and at least two other yards in this district have ordered equipment recently.

Work has been started by Tarentum Steel Corporation, Tarentum, Pa., on initial units of new mill, on site of former plant of Pittsburgh Plate Glass Co., for production of iron and steel products, to cost more than $1,000,000. Company was formed recently by William Cole, 1125 Park Street, and Frank C. Irvine, 128 East Eighth Street, Tarentum, and Pitts-

burgh interests identified with Pittsburgh Steel Foundry Co., Glassport. Mr. Irvine is treasurer.

Board of Trustees, Polk State School, Polk, Pa., has plans for extensions and improvements in steam power plant, to cost about $75,000 with equipment. J. N. Chester, Clark Building, Pittsburgh, is engineer.

General Motors Corporation, Detroit, has awarded general contract to Rust Construction Co., Koppers Building, Pittsburgh, for one and two-story parts and service building, 145 x 215 ft., at Pittsburgh, to cost about $150,000 with equipment. Albert Kahn, Inc., Marquette Building, Detroit, is architect and engineer.

Mesta Machine Co., West Homestead, Pittsburgh, manufacturer of rolling mill machinery, etc., has disposed of a stock issue to total $3,120,000, part of fund to be used for expansion.

Appalachian Electric Power Co., Bluefield, W. Va., a subsidiary of American Gas & Electric Co., 30 Church Street, New York, is said to be planning extensions in steam-operated electric power plant at Logan, W. Va., including installation of additional equipment, to cost more than $450,000.

Carnegie Forge & Tool Co., Commonwealth Building, Pittsburgh, is considering plans for new one-story factory, to cost more than $50,000 with equipment.

Cornelius Engineering Corporation, Pittsburgh, care of Albert Bruckman, 1144 Biltmore Street, treasurer, recently formed by Mr. Bruckman and associates, is planning early operation of local factory to manufacture heating and ventilating equipment and air conditioning apparatus. Paul F. Seibold, 1025 Chislett Street, is interested in new organization.

Gulf States

BIRMINGHAM, Oct. 7.—Oneonta Forge & Screw Co., Inc., Oneonta, Ala., has plans for extensions and improvements, with installation of equipment for production of light forgings, including harrow teeth, turnbuckles, etc.

Scobey Fireproof Storage Co., 315 North Medina Street, San Antonio, Tex., will take bids in November for four-story cold storage and refrigerating plant, 90 x 180 ft., to cost about $300,000 with equipment. Engineering Service Corporation, Post-Dispatch Building, Houston, Tex., is engineer.

Pantex Pressing Machine Co., 2306 Isabella Street, Houston, Tex., is considering new local plant, to cost about $60,000 with equipment.

Southern Union Gas Co., San Antonio, Tex., is planning construction of natural gas pipe line from McCamey, Tex., to Taylor-Link field, about 15 miles, to cost about $100,000 with booster stations, etc.

Otto F. Zangen, Davenport, Fla., will erect new plant at Davenport Terminals for manufacture of sectional houses, to cost about $30,000 with equipment. Latter will include woodworking equipment, bending, punching, shearing and other tools.

Alfred C. Finn, Houston, Tex., architect, has plans for five-story automobile service, repair and garage building, 103 x 250 ft., to cost about $300,000 with equipment.

Texas Gulf Sulphur Co., Gulf, Matagorda County, Tex., has acquired rights to sulphur properties of Gulf Production Co., an interest of Gulf Oil Co., at Long Point. It is planned to remove mining machinery from Big Creek to new location, and install additional equipment. Project will cost more than $150,000.

Houston Armature Works, Inc., 4 Preston Avenue, Houston, Tex., manufacturer of electrical equipment, has asked bids on general contract for four-story plant, 100 x 150 ft., to cost about $50,000 with equipment. Einar H. Stubee, 3940 Main Street, is architect.

Birmingham Stove & Range Co., Birmingham, is planning extensions to cost more than $40,000 with equipment.

Parkersburg Rig & Reel Co., 6300 Navigation Boulevard, Houston, Tex., manufacturer of oil well machinery, drilling equipment, etc., with main plant at Parkersburg, W. Va., has acquired additional property and is considering new local factory branch and distributing plant, to cost over $35,000 with equipment.

Cincinnati

CINCINNATI, Oct. 7.—Fresh bookings by machine tool manufacturers in this district were greater last week than in the preceding week, adding further to the large amount of unfilled orders. Production is being maintained at capacity, with indications that this rate will continue for the remainder of the year. The market reflects an easing in demand for lathes and lighter tools, while planers and heavier machines are still active. General inquiry, however, is fairly brisk.

Chicago, Milwaukee, St. Paul & Pacific placed an order with a local manufacturer for two large planers. Chevrolet Motor Car Co. and a Massachusetts buyer have ordered one planer each.

Cincinnati Grinders, Inc., 3058 South Avenue, Cincinnati, manufacturer of grinding machines, parts, etc., is considering one-story addition, to cost about $70,000 with equipment.

Aluminum Co. of America, Inc., Oliver Building, Pittsburgh, has plans for one-story addition to mill at Alcoa, Tenn., about 100 x 360 ft., for storage and distribution, to cost more than $75,000.

Allen Mfg. Co., Tenth Avenue, North, Nashville, Tenn., manufacturer of stoves, ranges, etc., has engaged Robert & Co., Inc., Bona Allen Building, Atlanta, Ga., architect and engineer, to prepare plans for one-story plant at Franklin, Tenn., totaling about 150,000 sq. ft. floor space, to cost about $200,000 with equipment.

Board of Education, Van Buren Township, Dayton, Ohio, care of Walker & Norwick, American Building, architects, plans installation of manual training equipment in new high school to cost $300,000, for which bids are being asked on general contract until Oct. 18.

Buckeye Cotton Oil Co., Gwynne Building, Cincinnati, a subsidiary of Procter & Gamble Co., same address, has awarded contract to Virginia Bridge & Iron Co., Roanoke, Va., for one and three-story and basement mill at Memphis, Tenn., 50 x 420 ft., largely for pulp manufacture, to cost about $200,000 with equipment. Robert & Co., Inc., Bona Allen Building, Atlanta, Ga., is architect and engineer.

Indiana

INDIANAPOLIS, Oct. 7.—American Metal Furniture Co., 325 West Seventeenth Street, Indianapolis, Stanley Brooks, secretary, has plans for one-story plant, 150 x 200 ft., to cost about $70,000 with equipment. Mothershead & Fitton, 960 North Pennsylvania Street, are architects.

Gordon Body Co., 306 North Talbott Avenue, Indianapolis, manufacturer of automobile bodies, has awarded general contract to Godsey & Case Co., Mooresville, for one-story plant, 100 x 160 ft., to cost about $75,000 with equipment.

Officials of Indiana Limestone Co., Bedford, have organized Texas Quarries, Inc., a subsidiary, to purchase and operate about 4000 acres of limestone properties near Austin, Tex. A quarry plant will be installed and one-story finishing mill constructed, with machine shop, boiler house and auxiliary units, to cost about $240,000 with equipment.

Northwestern Terminals, Inc., 226 Water Street, Evansville, plans early call for bids for a new coal storage, handling and distributing plant, to cost $100,000 with machinery. Vonnegut, Bohn & Mueller, Indiana Trust Building, Indianapolis, are architects and engineers.

Cord Corporation, Auburn, recently organized by officials of Auburn Automobile Co., Auburn, headed by E. L. Cord, president, is concluding negotiations for purchase of Stinson Aircraft Corporation, Wayne, Detroit, and will operate as a subsidiary. Plans are under way for expansion.

Pacific Coast

SAN FRANCISCO, Oct. 3.—Northrup Co., Burbank, Cal., has awarded general contract to Austin Co. of California, Inc., Los Angeles, for one-story aircraft manufacturing plant, including parts production and assembling, to cost about $50,000 with equipment.

Pacific Gas & Electric Co., 425 Market Street, San Francisco, will erect equipment storage and distributing plant, with mechanical and electrical repair departments, to cost about $100,000 with equipment.

United States Metal Products Co., 330 Tenth Street, San Francisco, will soon call for bids on general contract for one and two-story plant, considerable portion to be given over for storage and distribution, to cost about $100,000 with equipment. Ellison & Russell, Pacific Building, are architects and engineers.

Victor Talking Machine Co., Los Angeles, with main plant at Camden, N. J., has awarded general contract to Austin Co. of California, Inc., for one-story addition, 90 x 165 ft., to cost about $45,000 with equipment.

Fir-Tex Insulating Board Co., Pacific Building, Portland, has plans for group of one-story units at St. Helens, Ore., including digester plant, shredder shop, board-forming mill, finishing mill, power plant and other buildings to cost about $2,000,000 with equipment.

Lysall Welding Works, Inc., Port Angeles, Wash., has awarded general contract to Eric Anderson & Sons, Inc., Port Angeles, for one-story plant, 50 x 140 ft., to cost about $28,000 with equipment.

Everett Pulp & Paper Co., Everett, Wash., is considering construction of one-story machine shop, with woodworking department, to cost about $30,000 with equipment.

Illinois Electric Co., Los Angeles, has leased two-story factory to be erected at 912 East Second Street, for new plant to manufacture electrical specialties, to cost about $30,000 with equipment. John M. Cooper, Rives-Strong Building, is architect.

National Ice & Cold Storage Co., Postal Telegraph Building, San Francisco, will soon begin construction of one-story cold storage and refrigerating plant at Hol-

lister, Cal., to cost about $200,000 with machinery. Engineering department of company is in charge.

Canada

TORONTO, Oct. 7.—Machine tool sales for September showed about a 10 per cent gain over those for the previous month. New business is being received in good volume and the general outlook is bright. Small lists are appearing, and there is a steady flow of orders for two or three tools to a customer. The automotive industry is buying for replacement, but otherwise demand from this source is limited. Railroads are purchasing in small lots and demand is good from locomotive and car building companies.

Robert Mitchell Co., Ltd., St. Laurent, Que., is building brass and iron foundry departments in connection with its plant, and will have addition ready for operation by Jan. 1. Company expects to go more extensively into manufacture of special alloy castings.

Dominion Wood Pipe Co., Ltd., recently incorporated, has secured a site at LaSalle, Que., for erection of a manufacturing plant. R. L. Calder, 159 Craig Street West, Montreal, is interested.

Kroehler Mfg. Co., 552 Ontario Street, Stratford, Ont., will start work immediately on erection of a furniture manufacturing plant at Montreal, to cost $100,000.

S. C. Johnson & Co., Ltd., Frank Street, Brantford, Ont., manufacturer of cement, contemplate erection of a $50,000 addition.

Canadian Industries, Ltd., 1050 Beaver Hall Hill, Montreal, has awarded contract to Fraser-Brace Engineering Co., 107 Craig Street West, for a factory and storage building at Copper Cliff, Ont., to cost $2,000,000.

Foreign

WORK is under way by Mexican Eagle Oil Co., Minatitlan, State of Nuevo Leon, Mexico, on an expansion program at local refinery, to include installation of new equipment. Company is also planning early construction of pipe lines from Tonala field, Isthmus of Tehuantepec, to refinery site, entire project to cost over $200,000.

Societa Adriatica di Eletricita, Milan, Italy, operating electric light and power properties, will increase capital from 250,000,000 to 400,000,000 lire, part of proceeds to be used for extensions in plants and system.

Donugol Coal Trust of Soviet Russian Government, Moscow, has signed an agreement with Allen & Garcia Co., 332 South Michigan Avenue, Chicago, consulting engineer, for technical assistance in development of coal properties, particularly in connection with installation of new plants in the Donetz Basin and Siberia territories. American equipment will be largely used. It is proposed to increase coal output in Soviet Union from 35,000,000 to 75,000,000 tons during next four years. Amtorg Trading Corporation, 261 Fifth Avenue, New York, is official buying agency.

American Smelting & Refining Co., 120 Broadway, New York, is carrying out an expansion at plant at Monterey, State of Nuevo Leon, Mexico, including installation of equipment, to cost more than $250,000.

The Week's News Quickly Told

Current Events That Bear on the Course of Business

NAVAL establishments were discussed by President Hoover and Prime Minister MacDonald, the first personal conference ever held between chief executives of America and England . . . Invitations will be issued to a general parley on naval limitation in London next January.

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INTERNATIONAL trade will be so badly upset by higher American tariffs, that the pending law will be a world-wide issue, in the press' opinion in Chile and Argentine Republic. However the export duty per ton of flaxseed from the latter has increased from 31c. in July to $3.88 for this month . . . Cuba Cane Sugar Corporation, the largest producer of raw sugar in Cuba, becomes insolvent from the combined effect of governmental restriction of output and a low wholesale price . . . J. H. Thomas, British Minister of Employment, says he convinced large Canadian consumers of steel and coal that they should buy from English firms rather than American.

* * * * *

INDUSTRIAL output, on the average, is still at a steady rate, somewhat higher than a year ago. Low spots are noticeable in automobiles, residential construction, radio and textiles. However freight car loadings continue high, insolvency statistics for the third quarter show a sound condition of business and fifty manufacturers of machinery and equipment net 43 per cent more in first half of 1929 than in 1928 . . . The general decline in the stock market is nowhere attributed to unfavorable industrial news.

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EMPLOYMENT and retail trade are as good as the season warrants, and are unusually good in some regions. For instance, a gain of 10 per cent in payrolls over last year is reported in the Philadelphia district, and shoe business in St. Louis experienced a record business in September. Southern states have generous tobacco and cotton crops, and a good price for the latter.

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AGE limits are sharply drawn when an employer maintains a pension system, reports James O'Connell of the American Federation of Labor An unskilled laborer over 40 years of age, or a skilled workman over 45 cannot readily find work.

BANKERS, meeting in San Francisco, hear President C. B. Hazlewood say that they and not the Federal Reserve Board are responsible for correct apportionment of available credit, and that while a banker should encourage industrial development this is not done by boosting stock market prices . . . "Branch banking," an extension of the chain store idea, is the principal topic of discussion.

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TAX collections by the United States Government exceeded expenditures for the July quarter by $55,000,000. Last year there was a deficiency of $184,000,000 for that period . . . Governmental budgets in Europe are about stationary, and most of them balance (except for refunding of maturing bonds) . . . Russia, with a deficit of $300,000,000 in a total budget of three billions, is the outstanding exception.

* * * * *

ACCIDENTS due to automobile traffic resulted in 91 deaths every day in August, and the total for 1929 is 9 per cent greater than last year. National Safety Council hears that accident rate parallels the rising speed of traffic; nevertheless, a motor car manufacturer advocated a repeal of all speed limits but more stringent laws against reckless driving.

* * * * *

TROLLEY lines have generally absorbed competing jitney buses, and the worst competitor in the average city now is the private motor car, according to a report to American Electric Railway Association. The industry is spending at the rate of $20,000,000 monthly for improvements . . . An award for outstanding achievement was given the Chicago, South Shore and South Bend Railroad for its rehabilitation from bankruptcy within four years despite competition from nine steam railroads and a broad cement highway.

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PETROLEUM is being produced at a 10 per cent higher rate (world's total) than in 1928. Efforts at curtailment in America have failed except in Oklahoma where the State approved an agreement for limitation. Pennsylvania crude has dropped 25c. a barrel, the fourth cut since July . . . H. M. Crane of General Motors Corporation, said that engineers do not expect the Diesel to replace the gasoline engine to such an extent as to effect the problem of disposing of heavy oil residues.

THE IRON AGE

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Airport Passenger Depots Planned

Terminals, Similar to Those Operated by Railroads, Will Provide for Comfort, Safety and Convenience of Air Travelers

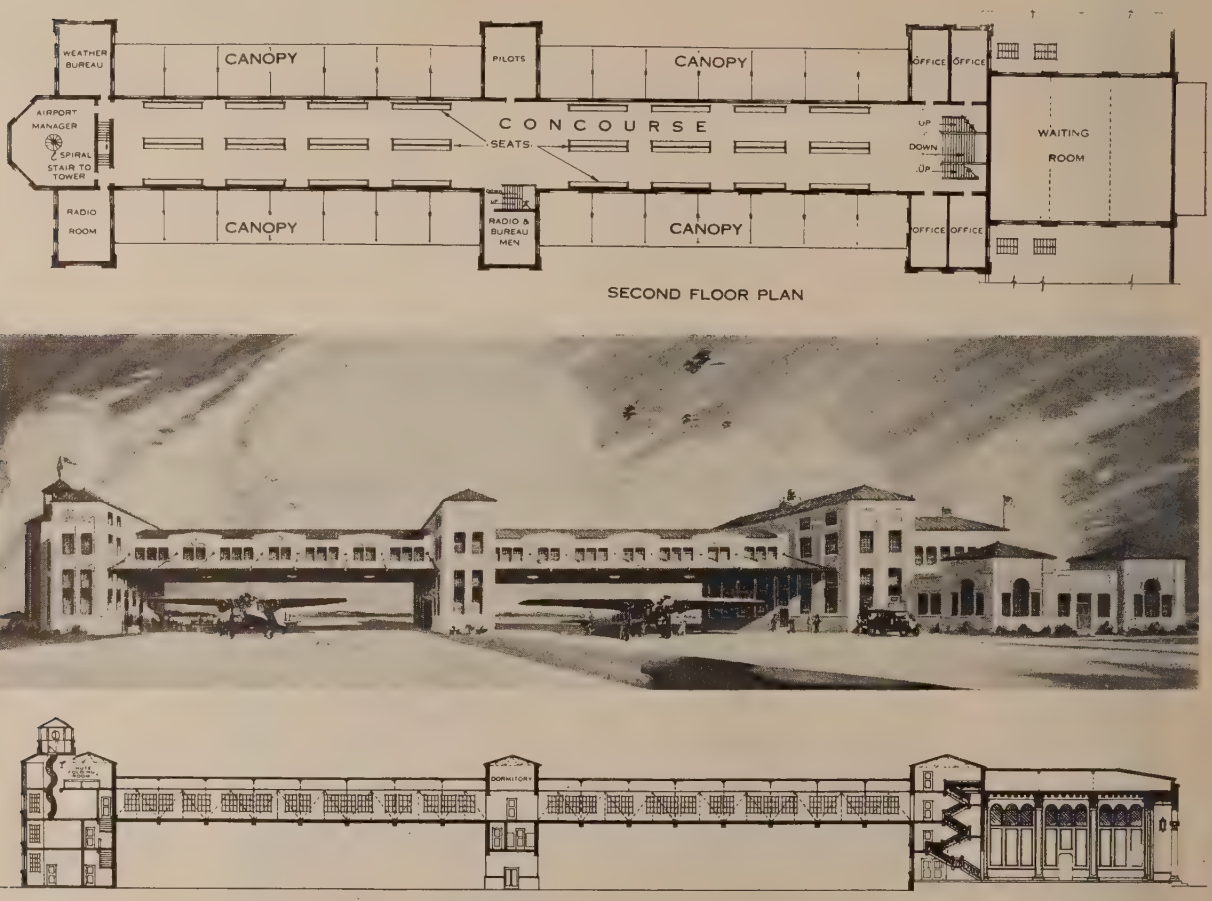
WITH the rapid increase in air transportation is coming the development of terminal facilities at airports that will provide safety, comfort and convenience for passenger traffic. It was not long ago that airports with few exceptions were little more than landing fields. It is only two years ago that a waiting room and ticket office for airplane passengers, which was said to be the first to be built in this country, was erected at the Ford Airport at Dearborn, Mich. Since then, airport building has been going on at a rapid rate and the number of airports in this country is now said to exceed 1500, but provision for adequate passenger terminals is still in its infancy.

The tremendous increase in the building of commercial airplanes, the large amount of new capital that has been put in this industry during the past year and the recent tying up of rail and air transportation by some of the larger railroads by providing part rail and part airplane transportation from coast to coast are indications that the carrying of passenger traffic by airplanes is getting well beyond its experimental stages and that the general public is learning to accept the airplane as a convenient and safe method of transportation. Air travel has shown remarkable growth in this country in the past two or three years, which doubtless is partially due to the building of larger and safer planes and the provision of comforts for passengers. The country is now overlaid with a network of air lines from coast to coast.

A COMBINATION Air-Rail-Water Passenger Terminal, as Conceived by the Austin Co., Cleveland, for Handling Airplane, Rail, Steamboat and Amphibian Plane Traffic

While there have been developments in the construction of airports, so far they have had to do largely with requirements growing out of the operation and maintenance of air-

craft or the necessities of companies operating planes. These include more convenient as well as larger hangars to accommodate the larger planes now being built, repair shops, rooms for the weather bureau and radio operating offices and better lighting facilities. Hangars have been improved in design and in architectural appearance. However, little attention has been given to providing for the comforts, safety and convenience of air travelers with adequate passenger terminals. While a few principal airports have passenger depots and comfortable waiting rooms, it is claimed that most of the existing airports are nothing more than open fields. The lack of terminal provision for air travelers, it is pointed out, is in sharp contrast with the safety features and provision for comforts in the newer types of passenger planes.



AIR Depots Will Have Covered Loading Areas Where Passengers Can Board Planes Conveniently in Bad Weather. Design of the air depot of the future as viewed by the Austin Co. is shown in the accompanying layout. Ample space is provided for waiting passengers and the covered areas where planes will be loaded.

Engineers Planning Passenger Terminals

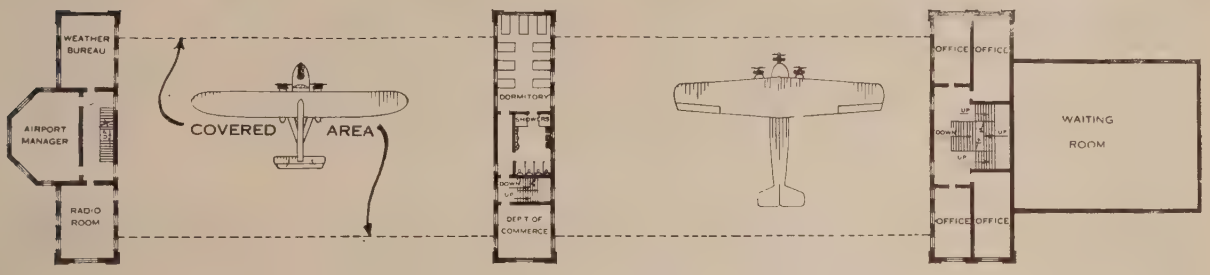
Competent airport engineers have not played an important part in the development of airports as they exist today, but are now being consulted to provide more adequate passenger terminal facilities, which, it is believed, will result in a marked increase in airplane passenger business. While a few airport depots have convenient waiting rooms, few if any have a system of traffic control similar to that at a large railroad terminal. Passengers in good weather and bad still embark and alight on the airport field, which not infrequently is muddy, and face the hazard of whirring airplane propellers.

The air depot of the future, as conceived by some engineers who have long been engaged in building airports and hangars, will follow closely the methods of modern railroad terminals in handling traffic. Passengers will go through the depot to concourses that will take them to waiting planes, which they will enter without leaving cover. Such a depot will consist of artistically designed two-story building units connected by steel bridges which will serve as concourses, the buildings themselves serving as piers for the spans of covered concourse bridges. The space beneath the spans and between the piers will form covered loading areas for the planes. When a passenger arrives at the depot, he will enter the waiting room under a marquee at the entrance, purchase his ticket and go to the passenger concourse on the mezzanine floor. When the plane is announced, he will descend a stairway built in one of the piers and walk across a portable railed-in passageway similar to a ship's gangplank and through the open door of the plane directly to his seat. A variation from this plan is to have a passageway in the form of subways underground instead of building overhead bridges.

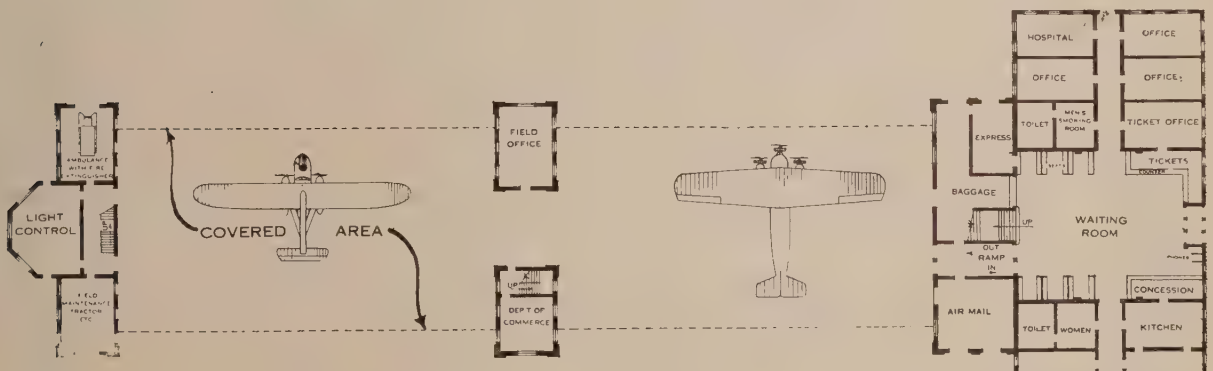
In addition to having a waiting room, the main building will have rooms for ticket and other offices, baggage room, restaurant and rooms for various other purposes. The small pier buildings will provide room for radio equipment, light control, dormitories for field pilots and rooms for other uses. This general plan, of course, is subject to various modifications in detail.

An airplane hangar designed and built recently by

THE Entrance, as Well as Other Parts of the Air Terminal, Will Closely Resemble That of a Railroad Depot



MEZZANINE FLOOR PLAN



FIRST FLOOR PLAN

CANTILEVER Type of Roof Truss Is Used in Cleveland Airport Hangar of National Air Transport, Inc. Because of the almost complete absence of columns, this hangar provides large clear spans and wide door openings

the Austin Co., Cleveland, at various locations, has a cantilever type of roof truss. Because of the almost complete absence of columns, this type provides large clear spans and wide door openings. Roof trusses are carried on the structural steel frame which supports the entire load. Hangars with this roof design can be built with door openings of unlimited width.

The horizontal top and bottom chords for the carrying trusses are built of H-sections, angles or channels, depending on the span, and consequently the stress. They are placed on 30 to 40-ft. centers. The web members can be of angles, H-sections or channels. Cantilever trusses, the outer ends of which are unsupported, are placed at right angles to the carrying trusses. They are fabricated of angles and are placed on 20-ft. centers. The roof purlins span the cantilever trusses and are placed on 8-ft. centers. They are made of 6x12 in. yellow pine on which is laid a 2-in. wood deck. In case a steel plate deck is desired, steel channels are used for purlins. In designing this type of hangar, the Austin Co. has applied its standard building design to the construction of hangars.

Side walls are brick below the sill line. Above the window sills, continuous windows of steel sash extending up to the roof trusses are usually provided. If any portion of the hangar is partitioned for small rooms, the partition walls may be of metal or brick.

Various Types of Hangar Doors Used

Various types of hangar doors are in use. There are different kinds of steel sliding doors built in sections usually with glass in the upper part, steel rolling doors and a cantilever type of door which is a recent development. This type is opened by raising it outward from the bottom and when open provides a canopy sheltering the entrance to the hangar. It is built in sections that are motor-operated independently or together. One, any number of or all the door sections can be operated in approximately one minute. This door is built of structural steel and plates and has large panels of steel sash.

The airport depot of the future, if some of the present elaborate plans materialize, will result in considerable increased demand for steel in this field. A passenger terminal of the proposed type, with structural steel bridges for concourses, will require up to 1000 tons or more of steel, depending on the size, and additional steel will be needed for ornamental stairways, passageways and various mechanical equipment.

Effect of Scrap on Operating Costs of Open-Hearth Steel

EXTENSIVE experiments have been made in Germany, on an actual operating scale, for studying the effect of particular grades of scrap in operating costs.

An open-hearth furnace is charged with a grade of scrap, and the manganese consumption, hot-metal additions, lime needed, time of melt, etc., are noted. On the basis of a fixed price for pig iron, the prices of the scrap are then adjusted to yield a constant operating cost per ton of steel made. Because open-hearth costs depend, to some extent, on the quality of the scrap, the Association of German Ironmasters made the instigation with the cooperation of several German plants. The results in brief, as reported by the London *Iron and Coal Trades Review*, are as follows:

In the experiments made by Ernst Kerl at the Vereinigte Stahlwerke at Hontrop, on two 120-ton tilting furnaces, the following grades of scrap were used:

(1) Block scrap, about 6x5x20 in., weighing about 180 lb.
(2) Clean sheet, bundled, about 36.5x30x30 in., weighing about 2,204 lb.
(3) Detinned sheet, bundled, about 18x16x6 in., weighing 176 lb.
(4) Clean steel turnings.
(5) Partly rusted steel turnings.
(6) Bought steel scrap.

The results of the experiments, consisting of eight heats in the case of scraps (1), (2), (3) and (6), and two heats in the case of (4) and (5), are shown in Table I. The two furnaces were fired with a mixture of coke-oven gas and blast-furnace gas.

On the basis of the data, the value of the different grades of scrap was determined, and the prices then fixed to yield a constant operating cost. The results of such an evaluation are to be seen in Table II (applied to German practice). Clean unrusted steel turnings, at a price of 54 marks a metric ton at a pig iron price of 65 m. per ton, are used as the basis for this calculation. With a pig iron price of 74 m. per ton, the cost of the clean scrap was not to exceed 51 m., and with pig iron at 90 m. per ton, the clean scrap had to be as low as 46 m.

Table II.—Price of Scrap, Marks per Ton

Pig Iron Per Ton	65 Mks.	74 Mks.	90 Mks.
(5) Rusty turnings	51.50	48.50	44.50
(3) Detinned sheet	49.50	42.00	29.50
(2) Clean sheet	56.00	51.50	44.50
(6) Steel scrap	56.00	52.50	46.00
(1) Block scrap	58.50	56.00	52.00

The pig iron was, whenever possible, charged into the open-hearth furnace in a molten state, and was of the following average analysis: C, 4.42; Si, 0.57; Mn, 3.77; P, 0.138; S, 0.03; and Cu, 0.15 per cent. The scrap was nearly throughout mild steel carrying about 0.08 per cent carbon, and 0.40 per cent manganese, except the turnings which had a carbon content of 0.25 per cent and 0.68 per cent Mn.

Table I.—Effect of Various Grades of Scrap on Open-Hearth Results

Kind of Scrap	(1)	(2)	(3)	(4)	(5)	(6)
Metallic charge, per cent	78.34	66.68	55.26	74.40	77.04	70.68
Average metal charge, tons	125.258	133.495	138.701	133.471	136.731	125.527
Charge in lb. per ton of steel made—						
(*a*) Scrap	1834.12	1650.31	1384.28	1824.59	1905.20	1659.41
(*b*) Pig (molten)	478.65	717.18	1028.67	516.30	477.44	640.33
(*c*) Pig (cold)	14.98	34.25	48.51	33.06	48.20	14.89
(*d*) Swedish ore (68 per cent Fe)	14.10	6.07	28.01	64.75	30.42	14.04
(*e*) Ferromanganese 73.5 per cent	7.61	9.81	12.71	12.41	8.23	10.54
Total	2349.46	2417.62	2502.18	2451.11	2469.49	2339.21
Time of melting, min	360	372	392	340	432	310
Time of boil, min	375	394	427	388	488	330
Total time of heat, min	473	468	517	554	611	450
Ingot yield, per cent	93.58	90.94	87.87	89.79	88.97	93.0
Ignition loss, per cent	4.24	6.38	9.64	7.37	9.26	4.54
Coal consumption per ton of steel, lb	328.9	315.9	333.0	361.9	411.4	319.4
Lime used per ton of steel, lb	32.5	35.9	69.3	74.1	87.2	33.0
Dolomite used per ton of steel, lb	36.6	36.6	36.6	36.6	36.6	36.6
Wear of furnace	Normal	Normal	——Badly damaged——			Normal

Cold-Heading and Thread Rolling

Characteristics of Steel Wire Best Suited to These Methods in Making Bolts, Screws and Rivets

BY FRED R. DANIELS*

GROWTH of the "cold process" as a means of manufacturing bolts, screws, rivets and other headed and threaded parts has been due as much to metallurgical research in steel making as to the development of automatic high-speed machinery. It is fully appreciated by many manufacturers that the process is faster than any other method for making bolts, screws and rivets of ordinary commercial sizes, and in most cases superior.

Such skepticism as once existed regarding the practicability of producing high-quality threaded work, for example, by rolling is now largely dispelled. In fact, thread rolling is generally conceded to be unsurpassed for producing screws of accurate thread form and lead. At least one reputable manufacturer employs the process for making the calipering screws of micrometers, which in itself is ample proof of the merits of the process.

It is true, however, that difficulty is liable to be experienced in producing both cold-headed blanks and rolled threads, if the physical qualities of the wire best suited for cold forging are not taken into account. It is the purpose of this article to deal briefly with this important subject.

Ordinary basic open-hearth steel of low carbon content is best adapted for cold heading, because it can be worked extensively without "crystallizing." Basic Bessemer steel is suitable also, although it has a comparatively short fibrous structure, which makes it more difficult to head, but easier to drill. Bessemer steel is, therefore, best for hollow rivets.

The wire is made from hot-rolled bar stock and cold drawn through dies which finish it to within plus or minus 0.002 in. of the desired size. It is furnished in coils up to 200 lb. in weight and should be wrapped in paper, or burlap with a tar paper covering, to prevent oxidation and corrosion, and should be stored in a dry place.

Importance of Adequate Drawing

Drawing the wire is of utmost importance, especially when producing wire that is to be threaded. The hot-rolled stock has an open, fibrous structure which is not suitable for thread rolling and which is liable to cause split threads and rough, irregular edges, particularly when rolling sharp V-threads.

If these conditions appear in thread rolling, it is quite evident that the wire was not drawn enough; that is, the hot-rolled bar from which the wire was drawn was too near the wire diameter, to start with. Drawing closes the open, fibrous structure of the rod, thereby refining the metal. When properly drawn and thoroughly annealed this wire is best suited for thread rolling.

Wire Finish for Bolts, Screws and Rivets

The finish of the wire is also important. Bright finished wire, which is the product resulting from drawing lime-coated stock that has not been subjected to a metallic bath, is suitable for machine bolts and similar work, and generally is not annealed. For such work as carriage bolts having large-diameter thin heads, and square corners upset underneath the head, the wire must be thoroughly annealed after drawing, and cleaned. If the wire is not dead soft these corners will not fill out in heading.

Liquor-finished wire is especially popular for work of high-quality finish, such as cap screw, machine screw and rivet blanks of medium and short lengths, generally made on solid die headers. The finish of this wire is the smoothest obtainable. The liquor is a copper sulphate wash which deposits a coating similar to copper, but which finishes harder than copper-coated stock. The coating fills in all seams and pores on the surface of the wire, with the result that the heading dies wear less and last a great deal longer.

Copper-finished wire, also, is used for cold heading, although not so extensively as the liquor finish. The coating is a wash of copper and tin solution.

Temper a Heavy Factor

Temper or hardness of the wire for heading and threading is of equal importance. The temper depends on the number of drafts, or reductions in diameter in drawing the wire, and it is often right here that the fundamental cause of troubles experienced in cold heading may be found.

It is common practice, when ordering wire for heading, to specify not only the analysis of the steel and the finish but also the temper or degree of hardness. Failure to take the various factors mentioned into account when ordering will result often in difficulties that could be prevented.

Heat Treatment of Blanks

Cold-headed blanks are usually annealed to remove the heading strains. Work having heads of unusual size or shape is annealed before the heads are completed and then finished in a reheader. However, the quantity of reheading work is comparatively small, it being possible in most cases to upset practically any head in a two or three-blow header.

A heat treatment is recommended, especially for carriage bolts and work having special heads, and consists of thoroughly heating and quenching the blanks in oil. The exact procedure depends on the composition of the steel and is defined by the manufacturer. Heat treating increases the tensile strength of the bolts and refines the structure of the metal. Quenching in water after heating is another means of toughening the blanks.

Machine bolts of ordinary proportions are not always heat treated after heading, because the heading strains are not so severe as those in carriage bolt heads, which are shallow and brought down to a thin edge.

Low-carbon steel analyses suitable for small screws, such as used in electrical work and ordinary fixtures, for

*Waterbury, Conn.

agricultural machinery bolts (not heat treated) and for machine and carriage bolts, follow:

Carbon	0.08 to 0.12 per cent
Manganese	0.35 to 0.45 per cent
Sulphur	0.03 to 0.04 per cent
Phosphorus	0.03 to 0.04 per cent
Silicon	0.10 per cent

For hex-head cap screws used in the automotive industry the steel known as Type G wire is used extensively. A steel of higher carbon content, known as Type E wire, is used also for automobile screws. Their chemical analyses are:

	Type G	Type E
Carbon	0.08 to 0.15 per cent	0.27 to 0.37 per cent
Manganese	0.30 to 0.45 per cent	0.70 to 0.90 per cent
Sulphur	0.05 per cent (maximum)	0.05 per cent (maximum)
Phosphorus	0.03 per cent (maximum)	0.05 per cent (maximum)
Silicon	0.07 to 0.15 per cent	0.07 to 0.15 per cent

Other steels suitable for cold-heading are those in the S.A.E. standard specifications, No. 1010 to 1035 inclusive.

In the alloy steel field are numerous analyses suitable for cold-heading and threading. It is difficult, however, to head a nickel steel containing over 3 per cent nickel and over 0.20 per cent carbon. All alloy steels should be heat treated after cold-heading. Following are two steels that can be recommended for average heading operations:

Carbon	0.30 to 0.40 per cent	0.10 to 0.14 per cent
Manganese	0.50 to 0.70 per cent	0.28 to 0.38 per cent
Phosphorus	0.04 per cent (maximum)	0.04 per cent (maximum)
Sulphur	0.04 per cent (maximum)	0.04 per cent (maximum)
Silicon	0.10 to 0.25 per cent	0.10 to 0.15 per cent
Nickel	1.00 to 1.50 per cent	.....
Chromium	0.50 per cent	0.25 to 0.30 per cent
Vanadium	.....	0.13 to 0.26 per cent

Preparing Steels for Forgings

Overcoming the Effect of Overheating—Service Not Affected by Dendritic Structure—Protective Glaze for Furnace Walls

THREE papers of special interest to forgers were presented at one of the sessions during the National Metal Congress in Cleveland, Sept. 9 to 13. Two of them discussed the protection of furnace walls and the overheating of steels, while the third considered the matter of fiber and dendritic structure.

Albany Slip—A Refractory Glaze for Furnaces

William J. Merten, metallurgical engineer, Westinghouse Electric & Mfg. Co., East Pittsburgh, finds that the so-called Albany slip (a refractory glaze used in the high-voltage porcelain industry) is an excellent protector of furnace fire brick. The finely ground powder suspended in water is sprayed thoroughly over the cold brick and left to dry. Then the heat is put on and raised gradually to 2000 deg. Fahr., when a glaze forms into a continuous protective sheet. This converts the chamber into a heat-reflecting and radiating body of high efficiency, reducing heat losses and the time required to raise the steel to temperature. Cooling causes the glaze to develop small craters but these heal on subsequent heating. Reglazing is necessary at intervals.

Fred G. Frisbie, Duquesne Steel Foundries, Pittsburgh, said he had used the glaze at a temperature of 1700 deg. Fahr., on annealing furnaces for steel castings, and found it to be a good heat reflector and to promote equality of temperature between furnace walls and contents even though the glaze had not been fritted by a preliminary high heat. However, he could not agree with Mr. Merten that the same glaze would protect steel from oxidation in a sharp furnace atmosphere, even if the metal had been dusted with soapstone previous to dipping into the Albany slip.

Effect of Overheating Steel for Forging

Two papers on the burning and overheating of steel had already been published by W. E. Jominy, University of Michigan, Ann Arbor, Mich., resulting from investigations financed by the American Gas Association. A final summary was presented under the title "Overheating of Steel for Forging." Temperatures at which steels show evidence of incipient fusion, that is, the burning temperatures, were determined by microscopic studies. The question then arose whether the coarse crystallization, caused by reheatings *below* the burning heat, would cause damage to forgings, or induced any effect which could not be removed by subsequent heat treatment. Mr. Jominy therefore raised the common carbon and nickel forging steels to various temperatures in a range just below burning, heat treated them (quench, draw, and normalize) and then tested them in tension, performed the McQuaid-Ehn test for carburizing, and examined the microstructure. In general he found no reduction in ductility or other properties when the steels were heated no higher than the following temperatures, which he fixed as the maximum safe temperature for heating prior to forging:

	Deg. Fahr.
S. A. E. steel No. 1015	2650
S. A. E. steel No. 1030	2600
S. A. E. steel No. 1050	2525
S. A. E. steel No. 1090	2375
S. A. E. steel No. 3145	2450

O. W. Ellis, Mellon Institute, Pittsburgh, pointed out that Mr. Jominy's determinations of the burning temperatures gave figures considerably higher that the solidus line in the iron-carbon equilibrium diagram as at present accepted, and indicated that some revision would be necessary. The new figures do check those of Carpenter and Keeling who published the earliest precise diagram showing the melting points of steels.

Problem of Dendritic Steel Discussed

An interesting treatment of the question of "Dendritic Steel" was given by H. G. Keshian, metallurgist, Chase Companies, Waterbury, Conn., since he gave evidence regarding the physical properties of steels of comparable analysis, some of which were dendritic and others which did not have this structure—at least to an evident degree. In the forged and heat-treated condition, no material difference can be detected in the tensile properties so the author concludes that the microstructure and not the macrostructure is the dominant factor. In fatigue, as denoted by the Stanton repeated impact test, a dendritic one per cent carbon steel had a slightly lower value. Directional properties (specifically, reduction in area) were less favorable in a dendritic chromium-nickel steel but in wearing properties, when made into drawing dies, no difference could be detected.

A free discussion followed this paper by Mr. Keshian, but it all had to do with the cause and production of dendritic steels, and did not contest his main conclusion that satisfactory service in a sound steel is not related to its possession of visible dendritic structure or lack of it.

Production Control in Steel Foundry

Sivyer Shop Uses Checks, Frequent Inspections and Daily "Pow-wow" to Meet Specifications and Scheduled Delivery Dates

BY ROGERS A. FISKE*

ACCURATE checks on materials and plant methods, rigid inspections at frequent intervals and establishment of channels of informed intelligence are the main factors which have enabled the Sivyer Steel Casting Co., Milwaukee, to keep close control of orders and materials in process, and to forward an unusually high percentage of orders on dates scheduled.

This is a jobbing foundry and imposed upon it are the common limitations in the standardization of materials and operations. Special attention, therefore, has been given to the control of variables from the standpoint of fundamentals of steel casting production and quality. Control of the variables which affect quality begin at an early stage of the process, even before a charge of scrap is loaded into the furnace. Incoming scrap and other materials are inspected before being unloaded from the car.

A 1000-lb. test heat, which is carefully observed by the melter, is made from each car of scrap before the car is unloaded. An analysis is made of a test piece taken from the furnace as soon as the metal has melted down. This analysis is taken not only to decide acceptance or rejection of the carload, but as a means of placing the scrap in its

*Western editor, THE IRON AGE, Chicago.

EVERY Afternoon Shop Executives (Right) Study Patterns Which Are to Go Into the Shop. Records of past difficulties are analyzed, also

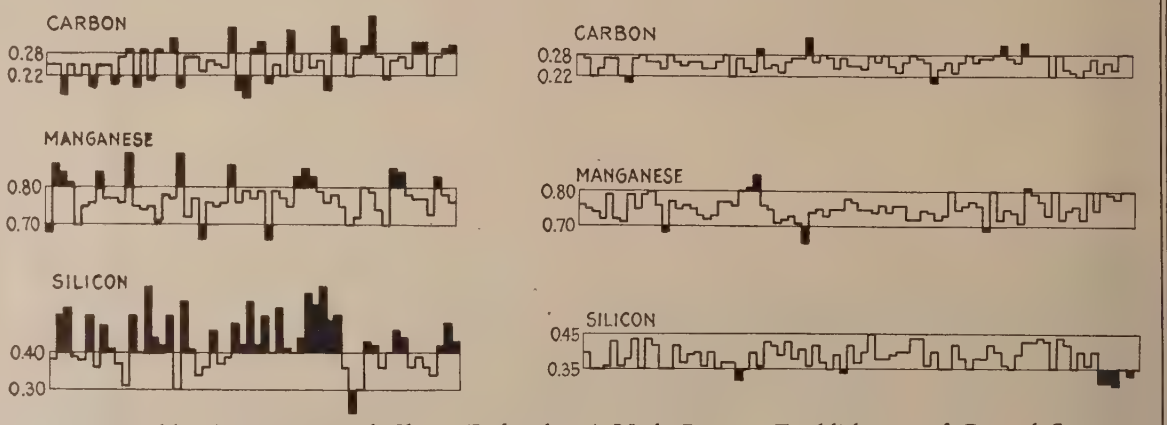
* * * *

WORK Order Cards Are Filed on the Schedule Board (Above) in Accordance with Dates Which Have Been Established by the Foremen

proper bin, since incoming scrap is segregated according to carbon or sulphur and phosphorus content.

Each heat of steel is analyzed for the required elements, immediately after tapping from the furnace, and its analysis is reported to the melter before the next heat is tapped. This practice promotes better analysis control, by giving the melter the analysis of one heat before he taps the next. It also enables the operating department to hold out castings the analysis of which does not conform to required specifications. This latter practice is of material aid to the production department, for new molds may be made up, without much time lost, to replace castings which do not meet analysis requirements.

Melters are paid a bonus to stimulate interest in analysis control. This bonus is based upon a score which is obtained by dividing the total number of points outside the desired analysis range by the total number of heats. As



Typical Monthly Furnace Control Chart (Left, above) Made Prior to Establishment of Control System. Black areas show heats outside of the desired range. At right is a chart similar to the other, showing benefits derived from close furnace control

the score diminishes, the per cent of bonus, based on monthly salary, is increased in ascending rates. If a heat is scrapped for wrong analysis, a definite percentage of the bonus is subtracted as a penalty.

The melter records the analysis of each heat, as well as the amount of alloys used, on an analysis log. He is required also to make a report of materials used for each heat, which is sent to the accounting department. And he makes a report of furnace operations and delays, for the melting foreman. Physical tests are made at regular intervals and their data, as well as the chemical analysis, are permanently recorded in the laboratory, the former on a card index file, the latter on a daily analysis report, which is later bound and filed.

Of special interest is the method of sand control. Incoming sand is tested for fineness. The sand mill is provided with an indicating and recording time-meter, which regulates the milling time. A control sand laboratory is placed near the sand mill. Here one man devotes his entire time to testing facing and backing sand mixtures, the object being to eliminate variables as much as possible.

Control of Work in Process

In a jobbing steel foundry the establishment and maintenance of production and shipping schedules require close and persevering attention. It is difficult to control fully by work tickets the movement of individual castings or orders. Automatic progression cannot readily be obtained by continuous conveyors, due to the varying condition of the product in process, and diverse circumstances governing sequence of operations. However, control is obtained by issuance of forms and records at strategic points, which are supplemented by organized personal attention of the production department or supervisory force.

New orders are entered on Form *A* in duplicate, one section being a recapitulation of the information given in the order, and the other section is used for entering information relative to cores needed. At this point, the receipt of the order, careful check is made of previous orders, if any, for the same patterns. Quotations are checked, questions of analyses are settled, and delivery promises previously given are entered for shop information.

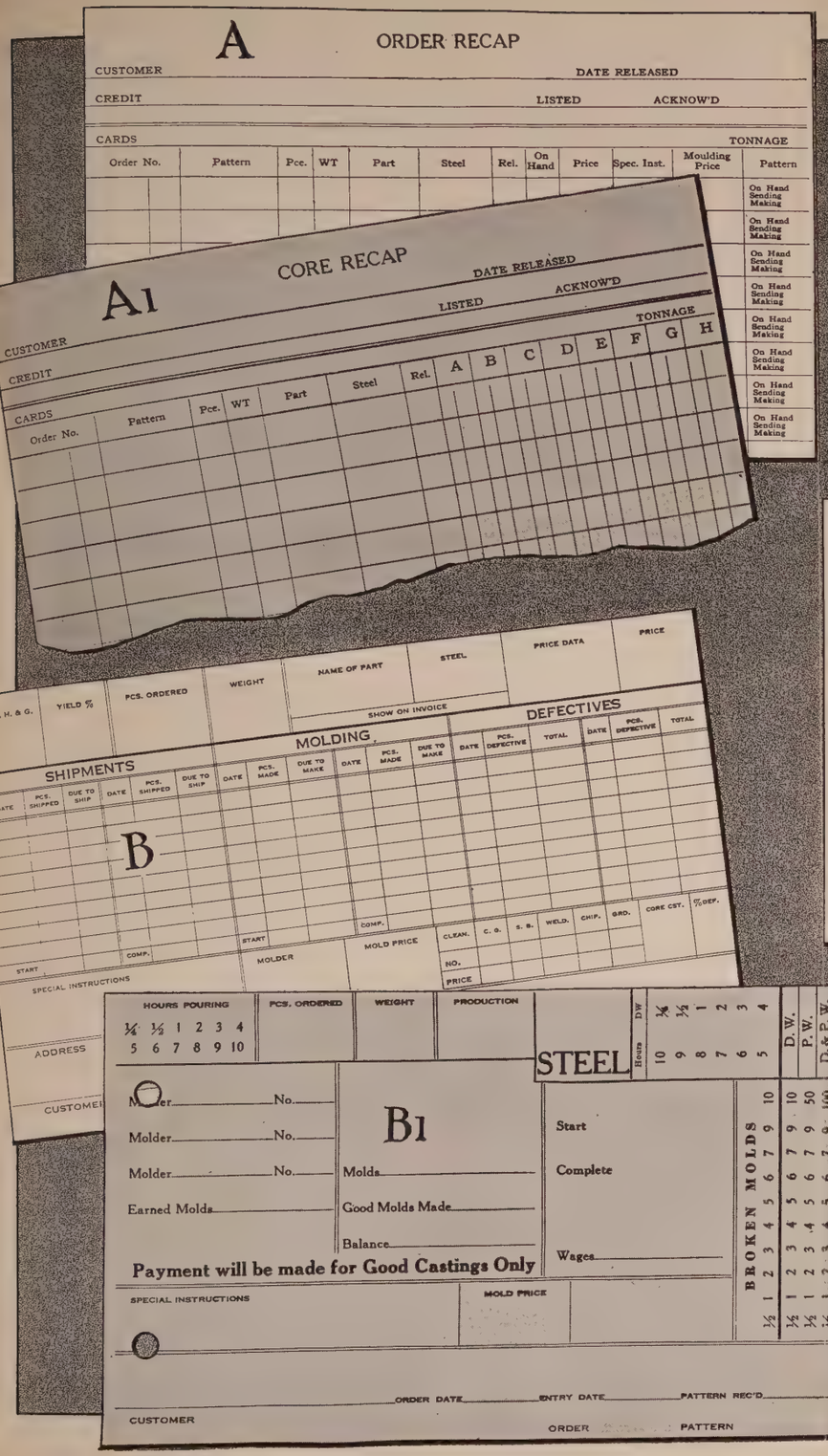
From the order recapitulation one work order, Form *B*, consisting of four cards, is issued for each pattern. One copy is sent to the shipping department, one to the pricing department and two to the pattern storage. The form sent to the shipping department provides space for dates, pieces made, pieces shipped, defectives and delivery dates scheduled. The shop cards provide space for specific instructions needed to put the job in process and to show a record of work performed. Printed on these cards in boldface type is the warning "Payment will be made for good castings only."

A core order, Form *C*, is made from the core recap of Form *A*. Form *C* is sent to the core department with core boxes at least two days before the molders get their work orders. This allowance of time is considered ample to permit the core-making department to have its part of the work completed well in advance of the beginning of molding operations.

Old Patterns Studied Before Again Being Sent into Shop

Shop orders, upon leaving the office, are sent direct to the pattern storage and all pattern equipment required is laid out on a bench for inspection. Every afternoon a meeting of the shop executives is held for the purpose of carefully studying and examining pattern equipment which is to be used. Accompanying each old pattern are records of any difficulties reported, either by the customer or the foundry, on previous orders. Unusual loss by defectives is also given consideration at this time.

Both old and new patterns are individually checked from the standpoint of design, method of casting manufacture, state of repair, anticipated defects and matters affecting scheduling of the order. In most cases foundry equipment consisting of heads, gates, etc., is inspected with the pattern or is ordered from the pattern shop at this meeting. This insures consistent manufacture of the casting in the approved method on successive orders. Matters requiring communication with the customer are



FORMS Used in Controlling Operations in the Foundry. *A* and A_1, made out together, show what the piece is to be and what cores are needed. *B* and B_1, four cards in all, give specific instructions for putting a job in production. *C*, the core order, goes to the shop two days before the molders get their work orders. *D* records orders for new patterns and is made in duplicate. *F* shows, when necessary, the high-scrap report or shortage; three copies go to superintendent, chief inspector and pattern record. A special instruction card *G* is issued if it is necessary to call attention to a difficulty

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brought to the attention of the production or the sales department. Corrective steps are taken if necessary, and these are noted on the shop orders and permanent records. This meeting is attended by the superintendent or his assistant, the chief inspector, the pattern foreman, the core room foreman and members of the production department.

Each morning all approved orders received at the pattern storage on the day before are given to the schedule clerk. The foreman of each molding department is called in and the jobs as a whole are discussed and molders are assigned. Dates on which shop work will begin on the various jobs are set according to work ahead. The work-order cards are then filed on the schedule board in accordance with the dates which have been designated. At this time the records of previous difficulties are examined and acknowledged by the molding foreman. The foreman is then held responsible for fulfillment of molding schedules according to orders assigned to individual units, and he makes necessary arrangements for delivery of complete equipment to the molders. A day-by-day record of his schedule efficiency is kept, and is one of the items considered at the daily production meetings.

After a job is definitely scheduled, one copy of Form *B* is sent to the office. From the date recorded thereon a shipping date is determined and the customer is notified when shipment will be made. This copy of the order is the production department's delivery control record. Both molding and shipping dates are recorded thereon and it is used daily in checking progress of orders so as to insure movement in process and shipment as promised.

Shipping Schedules Discussed at Production Meetings

At 2 p.m. each day a production meeting is held, at which molding and shipping of scheduled orders are discussed and current and overdue promises, both of molding and finishing departments, are given particular consideration. The primary purpose of this meeting is to pry into causes of delays and rectify them before they have been in effect long enough to check production seriously and result in dissatisfaction at a delivery promise not kept. It is the aim of the management squarely to place responsibility for all schedules and production work, but it does not want single-handed direction. Cooperation among all persons interested is expected, and accordingly the chance for error or omission is greatly lessened.

An interesting feature in connection with the pattern shop is that it has been placed on its own merits. A customer who is in need of a pattern may ask for a bid from the Sivyer shop which often is competitive with outside pattern makers. Blueprints are carefully studied by the superintendent and assistant superintendent and suggestions are made for design improvement if difficulty is foreseen. The most advantageous method of pattern construction from the casting quality viewpoint is determined and is used by the pattern shop in making its estimate. Patterns, when ordered, are recorded on Form *D*.

Back of the desire to eliminate difficulties and to rectify them quickly when encountered is the thought that every such case is an opportunity to build prestige with a customer, and it can be made an incentive to keep the pattern at the Sivyer foundry. Defects are often discovered in the shop. These frequently can readily be rectified without inconvenience to the buyer. However, it is the omission that leaves the plant that nettles the purchaser, and which may be the direct and primary cause of loss of future business. Accordingly special attention is given difficulties which purchasers have experienced with Sivyer products. An expression of trouble may come by letter or by word, or it may be passed along to a salesman. Whatever the source, immediate attention is given it.

The detailed report is entered on Form *E* (not illustrated), which is headed "Disposition of Difficulty Reported by Customer." This report shows how the difficulty has been overcome, a reply by the inspector, and finally the question "Have we written customer?" In the upper right-hand corner is a ruled space for the signatures of the superintendent, his assistant, the quality supervisor, chief inspector, and members of the production and sales department. If necessary to call attention to the difficulty reported, when future orders are produced, a "Special Instructions" card is issued.

Records Disclose Past Difficulties

This sheet (Form *E*) is attached to the pattern storage record, and goes with the pattern each time it is called out of storage. In this way the foremen familiarize themselves with past difficulties whenever a pattern is called into the shop.

Sample castings are made on any pattern specified by the customer, from new patterns produced in the Sivyer pattern shop, or when desired by the shop executives. These castings are given personal supervision by the assistant superintendent and the quality supervisor. A follow-up method is used, necessitating approval from both the manufacturing and the quality standpoints, to insure recording of instructions available for future reference before the original request is filed.

Careful watch is kept on the space on Form *B* which is provided for defective material. If an excessive percentage of castings on an order is found defective a high-scrap Form *F* is made out in triplicate by the production department. One copy goes to the superintendent, another to the chief inspector, and the third, which is printed on cardboard, is attached to the pattern record. This comes to light again when the pattern is next called into the shop. The information on Form *F* is studied at the pattern meeting.

Checks on general defective control are a daily procedure. In a conspicuous place in the main shop are three red lights which are labeled respectively floor molders, jolt machines and squeezers. At the end of each work day the total scrap is computed for each of these three departments. The one with the highest percentage of scrap is known to all the workmen because the red light designating that department burns during the next day.

Inspection forms an important link in maintaining quality and in catching errors before they reach the stage where they cannot be readily rectified and shipping schedules cannot be maintained. Each inspector has a specific station at which he examines each casting as it passes. It is also his duty, when not pressed with work at his station, to make general inspections. By this arrangement the workmen do not know at what stage of their work a close check will be made. The principal stations for inspectors are on the molding floors, prior to sand blasting, after grinding and chipping, after welding, and the final inspection prior to shipment.

Those in charge of responsible work are given full assistance, but, once a course is determined, then responsibility is placed squarely where it belongs. All reports made in the shop are written on carefully prepared forms, which always provide ample space for the signatures of the men through whose hands they pass. These reports are kept alive, that is, they are readily available for future use in placing responsibility, and it is known throughout the shop that they will quickly be used for that purpose.

At first this system may seem extremely strict in placing the blame for errors and omissions. However, it builds among the men a sense of responsibility and pride. Good work is quickly recognized and bonuses are the reword. It holds the organization to a sense of obligation to the purchaser, and the results are exceptionally satisfactory when it is considered that this jobbing steel foundry sends its products to 30 major groups of industries in 28 States.

Business Is on a Firm Footing

Industry and Trade Are Free From Inflation and Should Not Be Severely Shaken If Bull Stock Market Comes to An End

BY DR. CHARLES O. HARDY

BUSINESS continues to display a higher rate of activity than most observers anticipated a month or two ago, and such slackening as is evident has occurred chiefly in those industries whose pace during the summer was obviously too high to be maintained continuously.

Electric power consumption, railroad freight car loadings, coal production, employment and the turnover of bank deposits are all reported at high levels. Corporation reports of earnings for the first half of 1929 reflect an even more favorable condition than was expected on the basis of the high level of productive activity which has been reported throughout the year.

The decline in the rate of operations of the steel industry which began early in the summer continued up to the end of September, but reports of operation so far in October indicate a turn for the better. Unfilled orders of the United States Steel Corporation for Oct. 1 show an increase for the first time since April. The improvement is apparently due chiefly to a good volume of railroad buying, which offset a slackening of orders from the automobile industry.

Some relaxation of activity in the automobile industry is not surprising considering that the output for the first nine months of 1929 surpassed that of any previous complete year. The slack in the low-priced car market, which arose from the long interruption of Ford production, is apparently now substantially taken up, so that further sales may be expected to be more representative of replacement demand and the normal growth of the business.

Bad crop conditions in the West and in the South give rise to apprehension of restricted farm buying, but reports of both wholesale and retail trade are very favorable.

¶ Fundamentals of prosperity undisturbed by technical condition of securities market.

¶ Question is not whether speculation overestimated the prosperity of business, but whether business men have overestimated their markets.

¶ If bull market in stocks is over, major business depression need not be feared.

¶ In previous bull markets business itself was shot through with speculation and price inflation.

¶ Higher European bank rates do not necessarily mean tighter money here.

¶ Federal Reserve's attempt to restrict speculation is likely to be abandoned if business, rather than the stock market, is choked.

¶ A major stock market decline would interfere temporarily with financing programs.

¶ Shift from stocks to bonds might take three to six months, but would facilitate financing of small companies, residence construction, foreign loans and Government enterprises.

Gold Loss Forced Rise in English Rate

Money market conditions and the stock exchange have continued to hold the center of the stage throughout the month, the "big news" being, first, the increase of the discount rate of the Bank of England, followed by advances by the Scandinavian central banks, and, second, several spectacular breaks in prices on the New York Stock Exchange. Does either of these developments suggest the probability of a change for the worse in the level of business activity?

The increase in the Bank of England rate, from 5½ to 6½ per cent, undoubtedly points to the probability of continued high money rates. Ever since the Federal Reserve System abandoned its cheap money policy and began selling securities at the end of 1927, New York has been a magnet for European, and especially for British, gold. European funds in increasing volume have been placed in the New York call loan market and acceptance markets, while at the same time the amount of foreign bonds placed here has shrunk to a small fraction of the amounts placed a year or two ago. With more European money loaned here on short-term accounts and less borrowed on long-term accounts, pressure has been exerted on the European exchanges, the gold outflow from this country has stopped and since then over 200 million dollars of gold has come in.

This inflow has enabled our banks to replenish their reserves, offsetting the effects of the sale of securities by the reserve banks and to that extent reducing the need for rediscounts. If the higher rates in Great Britain should result in a renewed eastward movement of gold, the pressure on our money markets will be intensified.

This does not necessarily mean, however, that business will be so pinched by money shortage as to make impossible the continuance of the present era of prosperity. Several alternatives suggest themselves. First, the pull of the New York call loan market may be sufficient to overcome the influence of the new higher rates. If so, it seems unlikely that the British public opinion (which since the war has been extremely sensitive on the subject of money rates and their supposed cramping effect on business) would tolerate further advances in the rate. Rather it seems likely that indirect means would be found to replenish the gold reserve and restrictions would be placed on foreign lending of British funds in order to make possible the financing of domestic business at rates no higher than those now in effect.

As a second possibility, the stock market liquidation which has been under way for the past few weeks may proceed so far as to release funds now tied up in brokers' and speculators' balances, with the result of easing the market for all types of loans. This has obviously been the objective of Federal Reserve policy for months. While the policy has so far been unsuccessful, it may yet succeed,

or may seem to succeed, because the speculative fever has run its course.

Third, considerable relief may still be found through a change in the composition of the credit structure. A shift of a large volume of deposits from demand to the time form would lessen the required reserve and furnish slack to offset the tightening effect of the withdrawal of European funds. This process went on at a great rate for several years prior to 1929, though it has ceased for the past 12 months. More probably, and in greater degree, the market pressure may be relieved by the shift of funds from the bank loan accounts to direct loans by individuals and non-banking institutions (of which the conspicuous case is "brokers loans on account of others").

Federal Reserve Policy May Change

Fourth, and most likely, the Federal Reserve authorities may elect to put additional credit into the market to offset the effect of such gold withdrawals as may result from the recent advances in European bank rates. There can be little doubt that such action would be taken as soon as it became evident that the movement of goods in commerce and the rate of industrial production were being restricted on account of the tightness of the money market. The objective of the Federal Reserve policy in recent months has been to force a contraction of speculative credit, not because of immediate need but as a safeguard against an anticipated deficiency of commercial and industrial credit.

Because both business and speculation have shown such unexpected indifference to the level of money rates the restriction of Reserve credit has gone much further than any one anticipated when the policy was initiated. If it should presently appear that business, rather than the stock market, is being choked off by this restrictive policy, we may confidently expect it to be abandoned. Indeed, the softening of money rates over the past two weeks in the face of higher rates abroad seems to indicate that Reserve Bank purchases of acceptances have already gone beyond the amount necessary to accomplish the nominal purpose of providing credit for the autumn seasonal excess of demand for currency and for export credits.

It does not appear, therefore, that increase in the English bank rate is an alarming adverse development in our own business situation. British rates have long been obviously too low in the light of world-wide demand for credit for speculative purposes, and this attempt to bring them into line with world markets needs occasion neither surprise nor alarm.

The second adverse development of the past month is found in the behavior of the stock market, where prices have broken very sharply on several occasions, the break in each case being followed by a strong upward reaction. Many market observers are of the opinion that we have finally reached the top of the bull market which began in 1924, and there has been widespread uneasiness lest the anticipated decline in stock prices may operate to undermine confidence and lead to a curtailment of the scale of business operations.

We are not disposed to offer a prediction as to the immediate future of the stock market. Appearances certainly indicate that quotations are out of line with present and prospective earnings and are being sustained by buyers who hope to resell presently at still higher prices. Competent observers have been deceived so often, however, by the vitality of this bull market that confidence in all forecasts is at a low ebb.

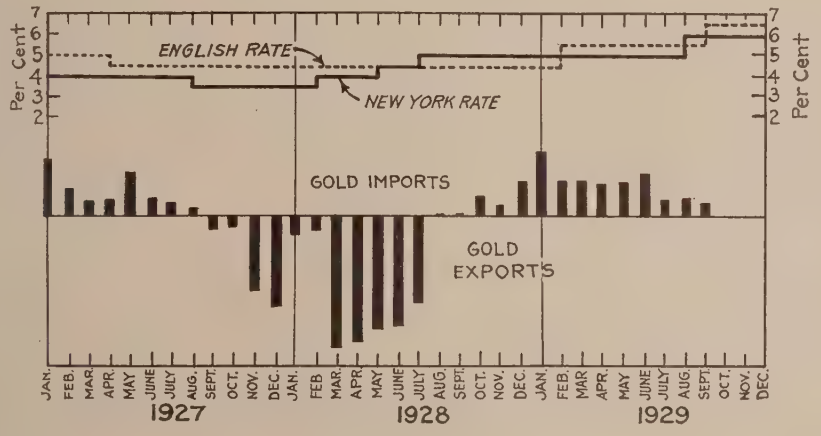
Inflation Localized in Stock Exchange

What, however, is the probable effect on business if the stock market has actually reversed its trend? In the past a major downward turn in stock prices has often been the immediate forerunner of a wave of business liquidation. This was true in 1890, in 1903, in 1907, and in 1919-20. Such experience, however, is of doubtful application to our present situation. These peaks of stock speculation which were forerunners of business collapse occurred at times when the whole business world was itself shot through with speculation and price inflation; indeed, those stock market booms were only indexes of a general excess of optimism which expressed itself in overborrowing, overexpansion of plants, and overaccumulation of inventories. Today apparently inflation is pretty well localized in the stock exchange. If this is true, we cannot safely use stock price trends as mechanical forecasters of business changes.

May there not be a more direct causal relationship? Would not the mere psychological effect of a stock market collapse produce a wave of pessimism and lead to the wholesale curtailment of business commitments? And further, would not the withdrawal of public support from the stock market curtail the financing of industry and thus force a contraction in industrial construction, with consequent repression of many other lines of activity?

As to the first of these questions, opinion is only opinion. Mass psychology defies prediction. Sometimes a turn in public sentiment has been effected by a shock much less far-reaching than a stock market collapse of major proportions would be now; and sometimes it has defied far greater shocks.

As to the second question something more definite can



CHANGES in Discount Rates of New York Federal Reserve Bank and Bank of England (Above)

Net American Imports and Exports of Gold (Below)

be ventured. Certainly a real stock market decline would interfere temporarily with current financial programs. The shift of preference of the investing public from bonds and other types of loans to stocks has led to a corresponding shift in American methods of financing business. The change has worked to the advantage of large and well-known firms which have already a market, or can create markets, for their stock. It has worked to the disadvantage of small concerns, of residence construction enterprises, of foreign borrowers, and of Government and municipal enterprises. A collapse of confidence in the stock market would presently lead to a revival of bond buying and of the types of enterprises which cannot take advantage of the stock market boom.

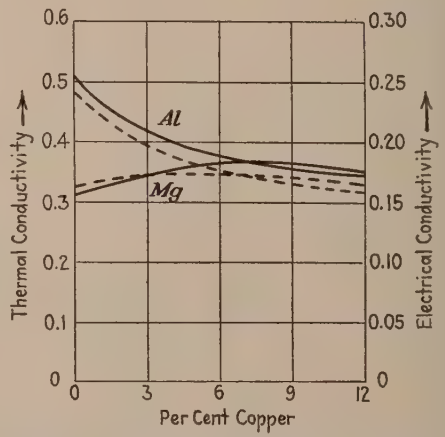
This effect would not be immediate. Typically in the past in a major liquidation of stocks, bonds, though already low, have gone down with stocks (largely on account of forced selling to protect stock holdings), and there has been an interval of from three to six months before the bond market turned upward. It would be surprising if a similar result should not fellow on the next prolonged stock market decline. Investors can wait, and in times of liquidation are likely to wait till the drift of things is clear. It seems probable, therefore, that some curtailment of new financing, and of new construction, will be necessary in connection with the next bear market in stocks—whether it occur this fall or many months hence.

Basically, however, the foundations of prosperity and depression are not to be found in the technical condition of the stock market or the bond market. The question is not whether investors and speculators have overestimated the prosperity of business; it is whether business managers, by and large, have overestimated their immediate and prospective markets. If we are right in our judgment that hand-to-mouth buying rather than speculative accumulation is still the order of the day in the commercial world, and that industry has not in general overestimated its needs and loaded itself with structures and equipment far beyond its needs, we must conclude that no serious business depression is in prospect.

Thermal Conductivity of Light Alloys for Pistons

A note by C. Grard and J. Villey, presented to a recent meeting of the French Academie des Sciences, shows that the thermal conductivity of aluminum-copper alloys decreases with increasing copper, whereas the effect in the magnesium-copper series is the opposite. Since copper is a usual hardener, it is important to know that there is little difference in the thermal and electrical properties of the two systems when the copper is 7½ per cent or more.

Several of these alloys are of particular value for aircraft engine parts, especially the aluminum alloy with 13 per cent of silicon known as Alpax, as well as two magnesium alloys with 4 per cent of copper and 2 per cent aluminum, and 2 per cent copper and 4 per cent aluminum. An aluminum alloy with 12 per cent copper is the mixture used largely in France for the casting of pistons for airplanes, experience having shown that this alloy is satisfactory under the conditions and heat (300 to 320 deg. C.) to which it is subjected in service.



Influence of Copper on Conductivity of Aluminum and Magnesium. Full line represents thermal conductivity at 100 deg. C.; dotted line represents electrical conductivity at 100 deg. C.

Steel Box Cars on Rubber Tires

THE St. Louis Southwestern Railway has placed in service several highway freight trains made up of steel vans approaching box car dimensions. The vans, which are mounted on pneumatic tires, have inside measurements of 16 ft. in length and 7 ft. in width and height. Rear doors have piano-type hinges and a side opening has sliding doors. When loaded the vans may be sealed to insure the safety of the goods in transit. The trains are drawn by large truck tractors and are equipped with Westinghouse brakes.

The highway freight train was developed following years of study by railroad engineers to find a way of avoiding frequent stops of heavy trains to pick up or deliver small shipments. The highway vans were built by the Columbian Steel Tank Co., Kansas City, Mo., and are mounted on Lapeer trailers.

Anneals Magnetic Sheets Electrically

Reducing Atmosphere Eliminates Necessity for Boxes and Produces Bright Sheets, Without "Stickers", Having Improved Magnetic Characteristics

BY F. E. FINLAYSON*

ANNEALING is one of the most important processes in the manufacture of laminated steel used in the magnetic circuit of an alternating current electrical machine. Proper annealing goes hand in hand with the proper chemical analysis in producing a grade of steel which will give the lowest electrical losses.

Silicon steels are most commonly used for magnetic purposes because of their relatively low cost, and their ability to reduce hysteresis losses in the machine, when properly heat treated. For some applications, steels are used having a silicon content in the neighborhood of 4 per cent. Other steels having the silicon content around 2.5 per cent and 1.25 per cent are used. One grade known as standard steel has a silicon content of less than 0.25 per cent.

Magnetic steel is rolled into thin sheets for laminations, which are most frequently about 0.014 in. thick. Laminations are used, however, ranging in thickness up to about 0.025 in. After rolling the sheets are cut to proper shape by stamping.

Magnetic steel is annealed either before or after punching. In preparing for the anneal the sheets (or laminations) are simply stacked in orderly large piles without regard to leaving any space between individual sheets. The resulting stack is unusually difficult to heat treat, having essentially the mass of a solid block, perhaps several feet thick, and the poor heat conductively of a series of separate sheets. Notwithstanding the difficulty however, the heating must be thorough and uniform all the way through the stack. In other words, the temperature at the end of the heat must be the same in the center of the stack as at the outer edges if the proper results are to be obtained. These difficulties are common to those of box annealing in any sheet mill.

For annealing, silicon steels are heated to a temperature of 725 deg. C., (1337 deg. Fahr.) held at that temperature for about two hours, and then cooled relatively slowly to about 150 to 200 deg. C. The so-called standard steel is heated to 750 deg. C. and held for about four hours before cooling. Grain structure before and after the process, is as shown in the photomicrographs.

*Industrial department, General Electric Co., Schenectady, N. Y.

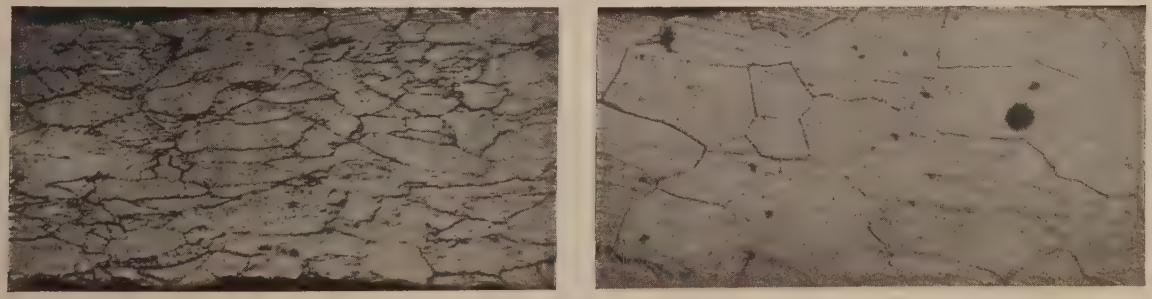
Old Method of Annealing

Before the installation of the electric furnaces now used, all of the magnetic steels were annealed in oil-fired furnaces. Sheets were carefully packed into steel boxes to protect them from oxidation by the furnace atmosphere. Many of these boxes were commonly stacked about the furnace. A sand sealed lid covered the box and excluded air from the sheets during the anneal. Four of these boxes usually constituted a load for one furnace.

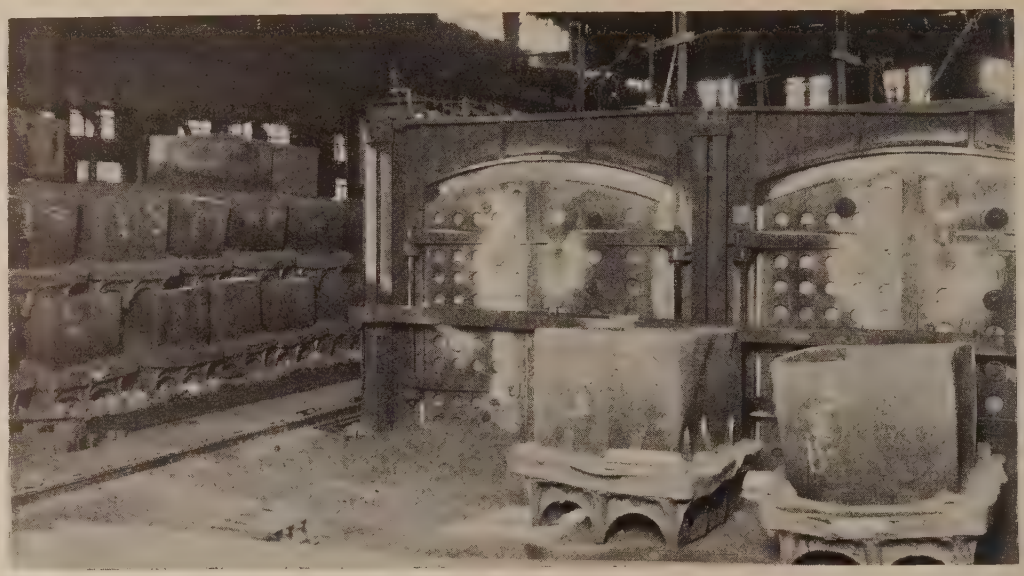
The disadvantages of this method of annealing were many and serious, the worst being the unsatisfactory results obtained, and the excessive cost. It was found to be practically impossible to get proper uniformity of temperature throughout the material in the boxes, and as a result much of the steel was found defective. Samples were taken from each box after the anneal, and where they showed up unsatisfactorily the entire box was reannealed. This retreatment averaged about one box load out of every eight.

Furthermore the sheets annealed in the oil furnace had a tendency to stick together. Large stacks of sheets had to be broken apart before any further work could be done on them. This not only required considerable time, but ruined many sheets, as the workmen would often bend or tear them beyond recovery.

Also the fuel consumed in these furnaces was excessive, not only because of the inherent inefficiency of furnaces of this type, but also because of the weight of the boxes required for containing the sheets. Each box weighed 2½ tons empty, whereas its useful load of sheet steel weighed only 3½ tons. Over 40 per cent of the energy reaching the boxes was therefore wasted in heat-



Grain Structure of a Silicon Steel Sheet, Before and After Annealing. Magnification 100 diameters

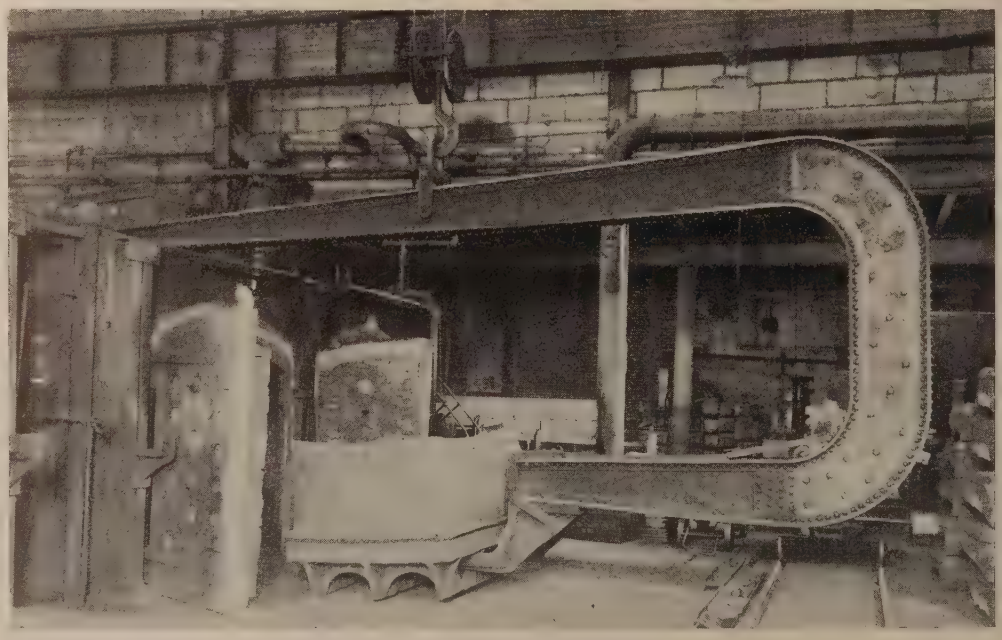


Oil Fired Furnaces Formerly in Use in General Electric Plant. Note extra space and investment required for annealing boxes and stools

ing the boxes themselves. Then, too, the cost of the periodical replacement of boxes became a very important item; actual figures on this will be given later.

It is obvious that the area covered by the oil furnaces was really the smaller part of the total floor space required for the annealing process. A large number of boxes were continually kept on hand, stacked about the furnace in every available place, to provide empty containers for the new work and to allow the heated work to cool outside of the furnace.

Heat losses from the furnace together with the heat from the cooling boxes united to make the room where



Charging Peel, Operated from Shop Crane, Used to Place Pot Load of Transformer Iron in Old-Style Annealing Furnaces

the annealing was done insufferably hot, particularly during the summer months.

Annealing with the Electric Furnace

These oil fired furnaces for annealing laminations have now been entirely replaced by elevator type furnaces such as the one shown in one of the cuts. These furnaces are electrically heated, and are filled with non-oxidizing gas which is a mixture of 15 per cent hydrogen to 85 per cent nitrogen. This artificial atmosphere not only prevents oxidation but actually *reduces* oxides which are already present when the steel enters the furnace. Therefore the steel sheets come out of this furnace clean and with absolutely no tendency to stick together. A slight flow of gas at slightly greater than atmospheric pressure is kept moving through the furnace at all times to insure that no oxygen will find its way in. There is little danger, however, of producing an explosive mixture in the furnace because of the diluted condition of the hydrogen.

The general construction and internal features of such a furnace are shown by the drawing. The furnace proper is raised several feet above the floor; in fact, sufficient clearance is allowed for a fully loaded car to roll under on the tracks provided for that purpose. The entire car carrying, with its load, is hoisted into the opening at the bottom of the furnace by a hydraulic or motor operated lift. A gas-tight seal is provided around the bottom of the furnace opening by inserting the edge of a steel plate into a trough of sand.

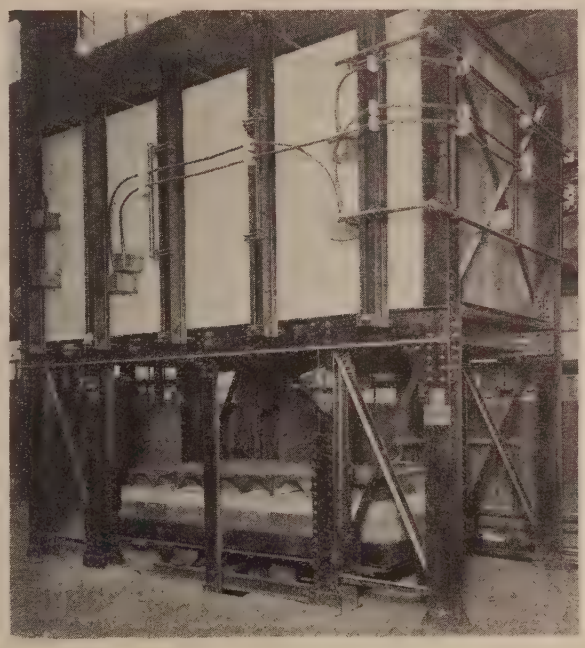
Heating units are arranged around the sides of the furnace chamber, low resistance terminals coming through sealed bushings in the walls. The furnace chamber is lined with fire brick, and the space between that chamber and the outside steel shell is filled with insulation.

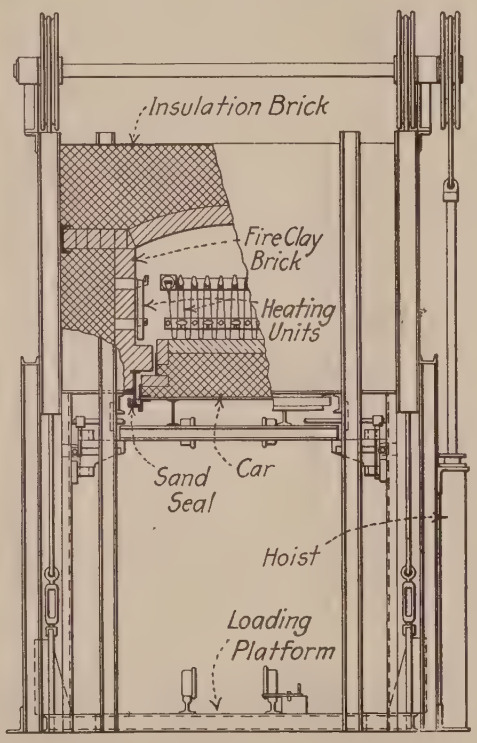
The furnace shown holds approximately 15 tons of steel, stacked 30 in. high upon a car having a series of metal hearth plates which measure 57 in. wide by 127 in. long.

Heat requirements, measured by the connected load of this furnace, is 240 kw. at 550 volts, 3 phase. An average load is brought to heat 12 to 18 hr., the actual time required depending on the final temperature, the weight and kind of material being heated, and how the work has been loaded. The load is then "soaked" in the furnace for 2 to 4 hr. to insure absolute temperature uniformity throughout the stack. Since very slow cooling is not essential to give correct magnetic properties, the loaded car is then removed from the furnace and placed under a non-insulated steel cooling hood, where it cools to between 150 and 200 deg. C. in approximately 24 hr. This cooling hood is kept filled with the same mixed gas used in the furnace to prevent oxidation, and by the time the steel is removed from this protecting atmosphere it has reached a temperature where but very little oxidation takes place.

Several cars are provided for each furnace so that one can be cooling under the hood, another heating in the furnace, and still others being loaded and unloaded. Obviously this results in a great saving of time and floor space. The use of the cooling hood also results in a saving in power, since it obviates the necessity of cooling the work in the furnace. This not only saves the power necessary to reheat the furnace, but makes it possible to insulate the furnace thoroughly and still get a short cooling time.

Efficiency of the insulation is shown by the following experiment: One-third of a load of standard steel was heated to 765 deg. C., power turned off, and the furnace allowed to cool with the charge inside. Forty-six hours





SIDE View and End Section of Electric Furnace for Annealing Stator and Rotor Punchings. The empty car body is shown under furnace; in the drawing the car body is elevated to form the bottom of the heating chamber

later the temperature had dropped to 630 deg. C., a cooling of only 135 deg. in nearly two days.

Naturally the most important things sought for in a new annealing process are improvement in the product itself, and reduction in cost. Electric annealing provided these, and more.

When the change was made from oil-fired to electric furnaces a number of tests were run to show the influence on the quality of the steel itself. Standard tests were used to determine the hysteresis loss in watts per pound of steel at a magnetic flux density of 10,000 lines, both before and after annealing in both kinds of furnaces. The accompanying table gives a summary of the results on "standard" steel.

Hysteresis Losses in Sheets (Watts per Pound)

Thickness, In.	Magnetic Losses Before Annealing	Where Annealed	Magnetic Losses After Annealing
0.025	2.410	Oil furnace	2.082
0.025	2.388	Oil furnace	2.062
0.014	2.515	Electric furnace in hydrogen	1.332
0.025	2.940	Electric furnace in hydrogen	1.990
0.014	2.595	Electric furnace in mixed gas	1.350
0.014	3.468	Electric furnace in mixed gas	1.455

Improvement in the higher silicon steels was not quite so marked, but 5 to 10 per cent is being regularly obtained.

In 1924 a careful record was kept on an electric elevator furnace and a car type oil-fired furnace to determine relative costs as a basis upon which to reach a decision regarding new facilities about to be installed. Both furnaces were practically new and of the same capacity; 3½ tons of sheets to the load. The electric furnace used a steel plate upon which the sheets were loaded and the oil furnace used one long box container.

The plates cost $18 each and were good for 30 anneals; the pots cost $400 each and were good for 50 anneals. With 3½ tons per load this makes the cost of plates 0.86 cents per 100 lb., and the cost of boxes 11.4 cents per 100 lb. The cost per 100 pounds annealed was found to be:

	Electric Furnace	Oil Furnace
Fuel.....	(10.8 kwhr.) 13.50c.	(2.89 gal.) 16.5c.
Plates or boxes	0.86c.	11.4c.
	14.36c.	27.9c.

Items of labor, overhead, maintenance, interest and depreciation required to give the true cost cannot be given, but the above figures give the essential facts. Three of these 3½-ton furnaces, having a total cost in the neighborhood of $25,000, resulted in an annual saving of approximately $23,000 over the same capacity in oil fired furnaces.

The advantages do not end there. Relative ease of handling the materials into the elevator furnace, the comfortable, quiet working conditions, the small floor space required for loading, heating, cooling and unloading all contribute to the saving in cost and the improvement in morale among the workmen.

Elevator type electric furnaces for annealing magnetic steel have proved entirely satisfactory in every respect. In fact, the unusual success of the installations for that purpose has resulted in one manufacturer of electrical equipment installing 25 furnaces of this kind, and the adoption of this type of electric furnace for other purposes, such as the annealing of castings, disk wheels and gear blanks. The design of the furnace adapts it particularly well to long time heating and lighter-than-air atmospheres such as hydrogen, because the opening, being at the bottom, materially reduces "door losses" and prevents the escape of gas.

If it is necessary to anneal without scale it will be found that it is not necessary to substitute an atmosphere such as hydrogen. The reason is that the steel being heated contains considerable quantities of gases, which are liberated during the annealing process, so that the resulting electric furnace atmosphere is in fact, reducing.

Summing up, the advantages over the old method by the use of elevator furnaces for annealing magnetic steel and other materials are as follows:

Marked improvement in annealing results.

Reduction in annealing cost per ton, because there are no pots to be heated, and the cost of pots, as well as the labor cost for handling them has been saved.

Possibility of heavier loading, and reduction in annealing time which results in greater output for a given area of floor space.

No oxidation or sticking of sheets because of the nature of the atmosphere in the furnace.

Improvement of working conditions around the furnace resulting from the elimination of noise and gases in the atmosphere, and the reduction of heat losses from the furnace.

ONE of the attractive exhibits at the National Metal Exposition in the Public Auditorium, Cleveland, Sept. 9 to 13, was that of the Gray Iron Institute, Inc. The products of a number of members of the institute were displayed, as shown by the illustration, and the booth was visited by many of those in attendance. It was a testimonial of the rapid expansion of the Gray Iron Institute and concrete evidence of the work which it is doing.

Fire Protection and Prevention

Methods of Precaution to Limit or Avoid Losses, Interruption to Business and Diverting of Markets

BY A. H. RODRICK*

DESTRUCTION of a factory building from fire not only means unemployment for the workers, but often involves a loss to the employer of his most valuable employees, who obtain other employment during the period of reconstruction and never return. The owner obviously suffers a further loss due to the cessation of business, unless he carries Use and Occupancy insurance.

Losses due to stoppage of production, disorganization of business and delay in filling orders, as well as the loss of customers who, like the workers, seek other business connections and are never regained, cannot be covered by insurance. When fires are frequent the insurance cost of protection is greater.

It is a subject to which every industrial manager should give serious thought, and he should study it from three angles: fire prevention, fire fighting and fire regulation.

SO frequently is fire the result of gross carelessness that it behooves us, every so often, to take stock to determine wherein that carelessness lies and observe once again how it can best be avoided. There is much suggestion in this article which would go a long way toward preventing industrial fires and limiting their destructiveness, if the cautions sounded are properly heeded.

Fire Prevention

Statistics are not available showing the percentage of fires resulting directly from carelessness, but like accidents fires do not happen; they are caused. A sure method of preventing fires is to remove the condition which is likely to result in a proximate cause.

Carelessness in the use of matches, in the handling of dangerous articles, and in the disposal or storage of combustible materials, is the primary cause of most fires. A careless act or unsafe practice or habit is the thing to be most guarded against.

If workmen handled flame with the same lack of concern as does a child a match, disastrous results would quickly follow. Some men use acetylene or gas torches in just as dangerous a manner as though they possessed the mind of a child. In many cases their apparent carelessness is due largely to lack of thoughtfulness, resulting from constant use.

A lighted cigarette is a most dangerous article in the hand of a careless man, as many men after smoking flip the burning stub, with no thought as to where it will land, or how long it may burn. During 1926 careless smoking was reported as the cause of fires involving $37,800,000.

When acetylene or gas torches are necessary the greatest care should be exercised in their use. Red-hot rivets and highly heated particles should not be allowed to be dropped on canvas or oil-soaked material. When such work is being performed caution should be used, that the dangerous articles do not come in contact with material inflammable or likely to ignite.

Workmen should be instructed that a match or cigarette should never be discarded until the flame or fire is thoroughly extinguished. The danger likely to result from a thoughtless act should be stressed, and they should be made to understand clearly that safety for themselves and others, as well as for property, is far more important than speed. Repetitive and rhythmical motion, while necessary to increased production, should not be permitted to become a habit and thereby subordinate safe practices.

To Avoid Spontaneous Combustion

Disposal or storage of combustible materials manifestly requires more consideration than is ordinarily given to material of a less hazardous nature. Cotton waste moistened with linseed oil should not be allowed to stand in contact with the air. Rags and cotton used by painters, as well as overalls and jumpers, should not be exposed to heat, but should always be stored in a metal receptacle. Sawdust in pans to catch oil drippings should be replaced with sand. Rubbish heaps are fire hazards and cleanliness is a requisite in fire prevention.

Spontaneous combustion is an ever-present cause for fires, and the theory of this condition should be clearly understood. Coal stored in large quantities is susceptible to combustion and its storing and piling should be conducted with this fact in mind. Soft coal should not be stored on damp spots, for dampness helps spontaneous combustion. Coal in piling should be tamped down to eliminate air spaces, and the height of the pile should not exceed 12 ft.

Storage of gasoline should be underground. Whenever trucks are being filled or emptied the danger of discharge of electric sparks should be guarded against by grounding.

Proper Design of Buildings Helps

In constructing buildings the subject of fire prevention should occupy a prominent part in drawing up plans to guard against unprotected vertical and wall openings. The idea that a building is fire-proof is a misnomer. This was evidenced in the case of the 15-story office building of the Chicago, Burlington & Quincy Railroad in Chicago, which burned on March 15, 1922.

Every attempt should be exerted to make buildings fire-resistive rather than fire-proof. The question of

* Industrial engineer, Washington.

arrangement of buildings to prevent fire from spreading should be considered also. The hazards in sawmills, lumber yards, etc., can be materially reduced by arrangement. As the greatest damage by fire is often due to spreading of the conflagration, thought should be given to both the exteriors and interiors of structures, to keep a possible fire localized.

Automatic fire alarms for detecting fires are advisable, and automatic sprinkler systems are most effective as to protection against spread of fire. Their installation whenever practical is economical, as the savings in insurance premiums pays for their cost within a few years.

Fire Fighting

When a fire does break out the situation must be faced in a calm manner, and the fire fought vigorously as well as intelligently. As in the case of accidents, many people lose their heads when they confront a fire emergency, and an excited and frenzied person is a liability rather than an asset.

Of course, the city fire department should be summoned immediately, but fires often reach an uncontrollable stage before arrival of the fire apparatus. Many such could have been restrained had they been tackled in their inception. The employer should see that his employees understand how to administer "first aid" at a blaze, just as first aid is administered to an injured or apparently drowned person, pending the arrival of a doctor.

Fire is the evolution of heat and light by combustion. It should be remembered that flame is not at all essential to the existence of a fire; it is only a part. There may be a fire without flame; bituminous coal, for example, gives more flame than anthracite coal.

The fire may smolder, and manifest itself only by smoke or smell, until the whole mass is reduced practically to ashes. Or oxidation may proceed so rapidly that the whole mass bursts into flame; in that event we have a plain case of what is ordinarily called "spontaneous combustion." To extinguish a fire of this character in a coal pile, the coal must be removed from around the burning part and spread out on the ground. The burning part can then be removed or put out by water.

Correct Use of Appliances

In fighting a fire, the fire itself should be attacked, rather than the flame. Extinguishers should be applied, not to the flame, but to the place from which the flame comes. Employees should be instructed how properly to use fire-extinguishers, fire hose and all other first-aid fire-fighting appliances. Fires involving oil or gasoline should be blanketed, for water spreads the burning liquid.

In buildings where automatic sprinkler systems have not been installed, water barrels, buckets, hydrants, hose and chemical extinguishers are simple and effective first-aid fire apparatus. The barrels and buckets should be kept filled at all times and the buckets plainly marked "For Fire Use Only."

Fire hose is almost indispensable, and should be a part of the plant equipment in all buildings having hydrants. It should always be hung at each hydrant ready for any emergency.

Fire Regulations

After a fire does occur its cause should be determined by an impartial investigation, and the necessary steps taken to prevent a recurrence from the same or similar cause.

The greatest fire protection is a set of effective fire regulations. Such regulations, when drawn up, should be rigidly enforced without fear or favoritism. It is better to lose one skilled employee who disregards such protective measures than to risk the danger of loss of human life and property. Disciplinary action serves as a deterrent to others, and is often the only means of compelling strict obedience.

It is impossible to enumerate all the hazardous acts which should be prohibited, for they differ according to the structure and situation of the industry. What would be negligible in a fire-resistive building could not be disregarded in a sawmill. A few major suggestions only can be offered, as a guide in framing such general regulations as are applicable to any kind of industry. By analogy the same suggestions would apply also to any business or other establishment not classed as industrial.

Avoid the Use of Matches

Because of the danger of fire from matches, the safety type only should be allowed in the plant. Whenever possible a flash-light should be used in place of matches. Workmen frequently seek a lost part in some dark spot by the light of a match; such practice should be forbidden.

If smoking is allowed, it should be confined to less dangerous places, and never permitted anywhere within one hour before closing time. This affords an opportunity to discover any smoldering fire which may be in existence prior to the time the buildings are vacated, since such a fire from this cause is likely to manifest itself within one hour.

All persons smoking should be required to deposit the cigarette, cigar or pipe remains in a metal cuspidor or receptacle filled with water. Sand as a filler for these receptacles should not be used. It is a fire preventive but, with cigarettes particularly, the stub continues to burn and the air soon becomes foul from the escaping smoke. If water is used, both the fire and the smoke are at once extinguished.

Unsafe practices of any character should be corrected as soon as they occur. Employees should be instructed at the time the dangerous practice is first noted, when it is fresh in the mind of the offender. It is then he is most likely to respond to correction. Advice and warning given in this manner are apt to be recalled in the future. Foremen and supervisors should at all times be observant of fire hazards and take the necessary steps to remove or rectify them.

If fire hose is installed it should be given a water test at regular intervals, and its condition carefully examined for leaks and breaks. A defective hose may be useless at a time when it is really needed. A red band should be painted around each post to which a fire-extinguisher is attached, and all emergency exits indicated by a red light.

Organizing to Fight Incipient Blazes

Fire squads should be organized throughout the entire plant, one on each floor, under the supervision of squad captains. One employee should be appointed fire marshal, whose duties would be similar to those of a safety engineer. He should conduct plant inspections in so far as fire hazards and fire equipment are concerned, and make pertinent recommendations regarding fire prevention and fire regulations. He should have charge of all fire squads. The fire marshal and squad captains should not be changed unless necessary, but the personnel of each squad should be changed monthly.

Each squad member should be assigned a specific duty to perform in case of fire, such as fire-extinguisher, fire hose, telephone city fire department, etc., and be trained to assume his post upon the sounding of an alarm. To make this effective a fire-drill should be held at least once during the period each squad is assigned to this duty, and in large buildings the remaining employees should be taught to leave in an orderly and expeditious manner. In such an organization each employee understands how to assist in fighting a fire, when called upon.

A fire-alarm system with station boxes should be in-

(*Concluded on page* 1074)

Full-Automatic Bevel Gear Rougher

Hydraulically-Operated Manufacturing Machine Cuts Four Blanks Simultaneously

FOR large quantity rough cutting straight bevel gears of the sizes ordinarily used in the differentials of automobiles, the Gleason Works, Rochester, N. Y., has designed the four-spindle rougher illustrated. The machine is entirely automatic, the only duty of the operator being to keep the four magazines supplied with bevel gear blanks. One attendant can handle several machines, which feature minimizes labor costs.

With the exception of the cutter drive, the entire machine is hydraulically operated. Four blanks can be cut simultaneously; these are mounted on four independent work-heads arranged around the cutting tool, which is a 20.8-in. diameter disk milling cutter having 32 inserted blades.

Each work-head is adjustable to set the work to the proper root angle and cone distance. In operation, each work-head is fed into the cutter to cut a tooth slot in the blank, and is then moved away to permit indexing. After all the teeth are cut, the work head backs away from the cutter approximately 5 in. to the loading position; the cut gear is pushed off the arbor automatically and a new blank is taken from the magazine by an automatic loading mechanism, placed on the arbor and clamped in position. The head then returns to the operating position and the cutting and indexing cycle is repeated. An automatic safety control prevents starting of the feed movement in case the blank is not properly placed on the arbor.

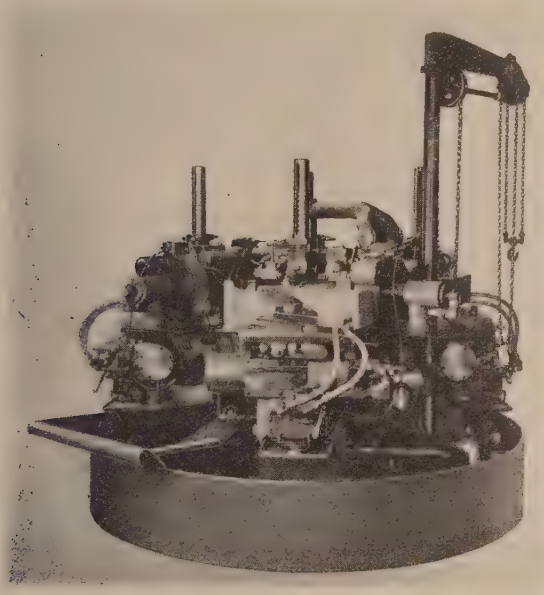
The index mechanism is of the notched-plate type. Movement of the piston which controls the indexing operation is constant for all numbers of teeth within the range of the machine, so that it is only necessary to change index plates to cut different numbers of teeth. Travel of each work-head is controlled by adjustment of a stop dog, and the speed of movement is governed by a cam which controls the opening of the main work-slide control valve.

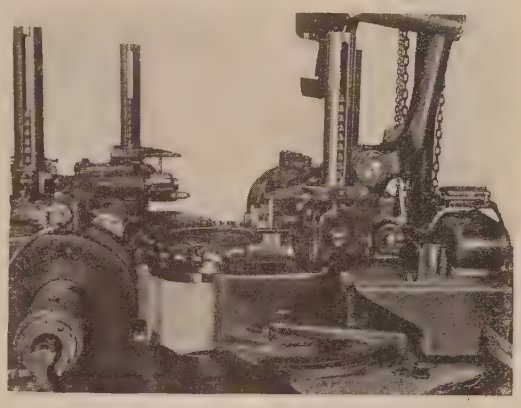
The time of movement of the work-head to loading position is governed by an adjustable control device, which can be set for gears of any number of teeth from six to 30. As the work-head slide moves away from the cutter after cutting each tooth, this control device is indexed one notch; when the last tooth is finished the control device trips to swing the work-head slide trip-dog out of the way, permitting the main piston to run back to its extreme position for loading. The control device resets itself automatically.

The loading operation is controlled from a series of valves cut into a single drum, so that it is impossible for the various operations to get out of time with each other.

Work-heads are entirely independent of each other, and any one of the four heads can be in operation at one time. In many cases, several different gears or pinions may be roughed satisfactorily at one time with the same cutter. The cutter is placed and removed by means of a crane and chain hoist, arranged as shown. Four supply pipes convey coolant to the cutter at the cutting positions, and the arrangement is such that when the cutter guard is swung up to permit access to the cutter, the coolant supply is automatically shut off. The cutting oil is supplied by a 45 gal. per min. centrifugal pump from a 145-gal. reservoir. Lubrication of the cutter and drive spindles and of all bearings is effected by two pumps, cam-operated from the main drive piston. Chip deflectors attached to the saddle housing direct the chips to the skirt surrounding the cutter. The control column that carries this skirt is provided with a circular floor of steep pitch so that the cut gears, oil, and chips slide down the chute into a pan, where they are separated.

Loading of the magazine is facilitated by use of a loading bar on which the blanks are assembled. About 20 gear blanks are carried in each magazine.





FOUR Bevel Gears Can Be Roughed Simultaneously. The machine is fully automatic, the only duty of the operator being to keep the magazines supplied with blanks, which permits one attendant to handle several machines. Based on cutter speed of 115 ft. per min., the cutting time per tooth ranges from 4.5 to 30 sec.

The machine is arranged for built-in motor drive, a 10-hp. motor being employed. It occupies floor space of 85 x 103 in., and weighs approximately 12,000 lb., net. Specifications are, in part, as follows:

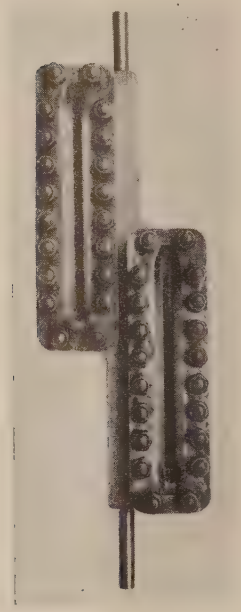
Capacity: Largest pitch, 3 D. P.; maximum and minimum feed movement of workslide, 1 in. and ¾ in., respectively; largest pitch diameter that can be cut, 4 in.; greatest and smallest pitch angle, 65 deg. and 25 deg., respectively; and greatest adjustment of work-head, parallel to feed slide, 3½ in. The speed of the cutter head ranges from 21.2 to 95.5 r.p.m., or from 115 to 520 ft. per min. Based on a cutter speed of 115 ft. per min., the cutting time per tooth ranges from 4.5 to 30 sec.

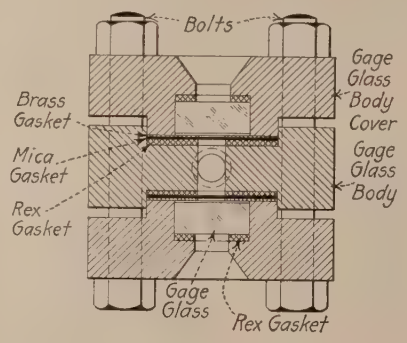
Workmen's safety committees obtain the best results when their real purpose is the placing of responsibility for developing a preventive attitude among workmen, states the Safety Service of the Policyholders Service Bureau of the Metropolitan Life Insurance Co., New York, in its bulletin, "Workmen's Safety Committees," which is the fifth in a series on industrial safety. The booklet outlines the methods of organizing and conducting safety committees.

Water-Gage for High Pressures

Unusual Construction Needed to Withstand Physical and Chemical Forces—Packing Was a Problem

WITH the high pressures of some of the latest steam power plants, experience shows that satisfactory service cannot be obtained from tubular water-gage glasses. With boilers operating at pressures over 350 lb. to the square inch the life of such glasses was found to vary from a few hours to about 6 weeks. The Babcock & Wilcox Co., New York, discovered that pure feed water at pressures above 350 lb. have a chemical action on the glass. Furthermore, even were the strength unimpaired, it is quite difficult to avoid breaking the glasses, when packing them for a pressure of 600 lb. and upward.





EXTRAORDINARY Precautions Are Needed in Water-Gages for Heavy Steam Pressures. As shown, there are two glasses, one each side, and several gaskets are used

Flat, plain or fluted gage glasses were found to be better for such high pressures. Even here, however, deterioration from the action of the water and difficulty in packing them render them unsatisfactory. Double flat glass protected on the water side by mica was tried and found successful up to about 600 lb. pressure. Above that, however, it was impracticable to pack it steam-tight without breaking it.

To meet the high-temperature and high-pressure conditions a new type of gage-glass, as illustrated, was developed by the Babcock & Wilcox Co. This is said to have given satisfactory service under pressures up to 2000 lb., above which it has not been tested. The body comprises a central holder and two covers, each slotted vertically.

In the recess in each face of the holder is first placed a gasket, then a sheet of mica and on that a thin brass gasket. In the recess of each cover is first placed a gasket and then a bar of glass about 0.7 in. thick.

When the parts are bolted together, which, as the half-tone shows, is done very thoroughly, only the boiler pressure can come on the glass, which is protected from chemical action by the sheet of mica. The thin brass gasket seals the edge of the joint between the cover and the glass. In service the glass has been found to last indefinitely, but the gaskets and mica need renewal every month or six weeks.

Two fittings at different elevations are used on the same water column, when considerable difference in water levels must be indicated.

Hydraulic Control Device in Place of Solenoids

A HYDRAULIC operator intended to take the place of large alternating or direct-current magnets and solenoids has been brought out by the General Electric Co., Schenectady. The device is also offered for use in place of air cylinders where quiet and smooth upward thrust is desired through a given distance.

It consists of a motor-driven centrifugal oil pump, the impeller of which is mounted in a piston and driven by means of a spline shaft. This arrangement permits the stationary mounting of the motor. The normal position is with the piston at the bottom of the cylinder which is approximately two-thirds full of oil. When energized the motor drives the impeller, creating a pressure between bottom of the piston and bottom of the cylinder.

The piston is cast so that the oil is fed to the center of the impeller from both the top and bottom. The oil is forced from the end of the impeller blades through ports to the space below the piston. The pressure tends to move the piston upwards and it will travel the full length of the cylinder provided the load on the ends of the push rods is not too great.

The operators are rated on the stalled thrust basis; that is, the number of pounds they will balance when the motor is running at full speed. The three standard sizes give 200, 300 and 600 lb. push. The speed of operating is somewhat slower than that of a solenoid. The ¼ to ½-hp. motors used come up to speed in approximately 0.1 sec. The time required to raise the piston will depend upon the diameter and speed of the impeller, the diameter and length of the cylinder and the load to be lifted.

In the largest size without load the piston will travel 6 in. in 0.45 sec. With 300 lb., or half load, it will start in 0.35 sec. and complete the travel in 0.85 sec. With maximum or stalled thrust load, 600 lb., it will not move at all or very slowly. Due to the stored energy in the revolving parts the downward movement does not start until 0.3 sec. after the motor is de-energized, and that is with maximum load. Since the oil must be forced back through the revolving impeller blades as dashpot action results, it requires 0.8 sec. for the total downward travel.

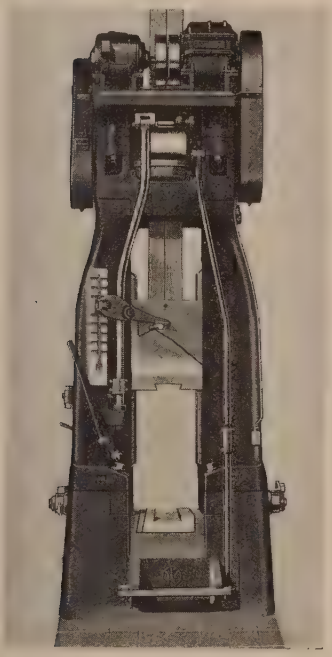
The device can be applied to brakes, clutches, door and window openers, spot welders, and pumps.

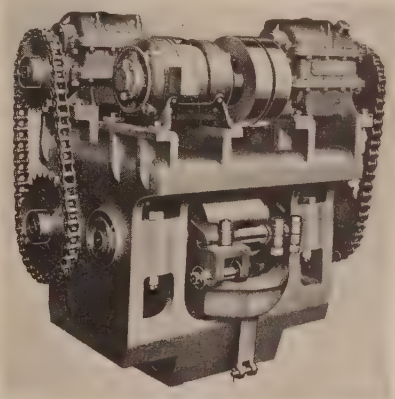
Hydraulic Operator for Use in Connection with Brakes, Clutches, Spot Welders, Pumps and Other Places in Which Solenoids and Air Cylinders Are Used

Drop Hammers with Motor-Driven Rolls

Roller-Bearing Equipped, Compact and Balanced Drive Claimed to Reduce Wear and Increase Output

DROP hammers featuring individual motor drive for both front and rear friction rolls have been brought out by the Billings & Spencer Co., Hartford, Conn. The machine is designated as the model G, and is built in nine standard sizes, ranging from 1000 to 3000 lb.





FRONT and Rear Friction Rolls Are Equipped with Individual Motor Drives. Each motor is connected by flexible flywheel coupling to a speed-reduction unit, from which the drive to the roll is by chain and sprocket. High production is claimed for the machine

Compactness and balance are features of this drive, which, in eliminating whip and pull of long horizontal belts, is said to prolong board life and markedly reduce wear on guides and other parts. The motor for each roll is connected by a flexible flywheel coupling to the helical gear speed reducer, from which the power is transmitted by chain and sprockets. Both motors are tested to run at synchronous speed, and are controlled from one push-button station. Hyatt solid inner and outer race, sealed roller bearings are used throughout the driving mechanism.

The head casting rests directly on the uprights, and the latter are held securely to the lower section of the head by heavy horizontal tie bolts. Springs located in pockets in the uprights take the shock from the tie bolts. The head carries counterbalanced cast-steel eccentrics, which are made unusually long so that the roll spindles may be mounted in long roller bearings. The roller bearings are separated by spacers, ample allowance being made for lubricant, which is applied by grease gun through Alemite fittings. Eccentric arms clamp on a large alining pin. The rolls are shrunk on to the spindles, and both rolls and spindles are ground so that the bearing will be smooth and the rolls will not rough the boards.

Board clamps are carried in a floating frame below the rolls, the same as in the company's model F hammer. Roll and clamp adjustments are made from the floor, at the rear of the hammer. Guides are of double-vee type, and are arranged so that the lower section may be removed conveniently and reversed or replaced without removing the ram or other parts.

To permit greater adjustment for various thicknesses of dies, the knock-off has been modified. A bolt and latch that slide in parallel holes in the left-hand upright has been provided, the latch being adjustable so that a late knock-off for thin dies is secured by sliding it to the right and an early knock-off for thick dies by sliding it to the left, or, in other words, varying the amount the latch projects under the friction bar dog. All adjustments are in plain view and may be made conveniently. The latch extends under a dog on the friction bar and is held up when the ram is falling. A safety latch is also provided. The friction bar is practically straight and when released falls vertically.

The bearing between the uprights and base is of larger area than in previous models and the upright has oil holes so that a film of oil may be maintained over the bearing area. No part of the treadle mechanism extends to the rear of the hammer, thus leaving the rear free for forgings. The hammer treadles with ease, due to the toggle joint mechanism of the board clamp. Production from the model G drop hammer is said to exceed that of any previous model built by the company.

Sheet Metal Finishing Machine

GENERAL operations on sheet metal, such as burring, turning, wiring, crimping, beading, slitting, flanging and elbow-edging, can be performed on a new electric combination machine, No. 172, made by the Niagara Machine & Tool Works, Buffalo. It will handle sheets up to No. 18 gage and is run by a ¼-hp. motor, built in and taking current from a lighting socket.

Features of the machine include a frame design that houses the motor and incloses all gears and clutch parts. The clutch of special design gives quick control by hand lever or foot-treadle. It can be locked for continuous operation. A switch on the machine provides for over-load protection. Ball bearings are fitted to the drive shaft and intermediate shafts while the roll shafts are bronze-bushed.

Flexibility in Operation Is Had by Use of a Variety of Forming Tools

Motion of the upper shaft is controlled by combination crank screw and foot-treadle. Either of these operates independently, without removing or adjusting the other. Lateral adjustment of the upper shaft is made from two knurled screws.

The Bantam Ball Bearing Co., South Bend, Ind., is building a roller thrust bearing 39 in. in diameter for use in a special boring mill.

Mileage Rate Case Stirs Controversies

Buffalo Producers Oppose Reopening, While Philadelphia Interests Claim Proposed Tariffs Are Too Low

WASHINGTON, Oct. 15.—Sharp controversy has developed over the request made of the Interstate Commerce Commission by the Eastern railroads for a reopening of the general Eastern iron and steel rate case. The case, decided under the Hoch-Smith resolution, prescribes a completely new rate based on mileage scales, throughout Official Classification territory. The railroads, as pointed out in THE IRON AGE of Oct. 10, page 983, raised five primary objections to the decision, among them the scales established, which were declared to be too low; the port differential relationships provided; routes to be followed and the New York harbor arbitrary of 2c. per 100 lb., etc.

Most of reply briefs vigorously oppose reopening of the case and make pointed attacks on the position of the railroads. Port authorities of New York have complained of the arrangement of differentials. Northern towns in New Jersey have objected to the relationship given as associated with New York. Philadelphia commercial organizations have gone on record before the commission in support of the views of the Eastern railroads that the level of rates prescribed is too low and have joined with the carriers in asking for reconsideration of the case. They also urge that the fourth section (long-and-short-haul) requirements are detrimental to Philadelphia interests.

On the other hand, strong protests against the reopening of the case have come from various affected sections, and the Baltimore Association of Commerce has opposed an attack on the differentials set up. One of the sharpest briefs in opposition to reopening of the case was filed by Edgar E. Clark, Wilbur LaRoe, Jr., and Frederick E. Brown, Washington attorneys, in behalf of Buffalo producers, including the Buffalo Bolt Co., the Donner Steel Co., the Seneca Iron & Steel Co., and the Wickwire-Spencer Steel Corporation. The reply petition filed for the Buffalo interests bluntly stated that the request of the railroads was entirely without merit.

The carriers' claim of a loss of $2,500,000 in revenue from the proposed scales was declared to be misleading because of the failure of the railroads to indicate "the enormous gains in carrier revenue during the last few months." It was pointed out that reports of the carriers showed that in the first seven months of the present year the net railroad income of the petitioning carriers was $63,173,000 greater than the net in the corresponding period of 1928.

"This makes the alleged revenue loss appear inconsequential," the reply brief stated. "The alleged revenue loss is but a drop in the bucket compared with the hundreds of millions in gain in carrier earnings, both gross and net, since this investigation was instituted."

The point made by the railroads that the rates are too low was declared to be nothing new.

"It has at all times been understood by the parties and by the commission that if the rates were established on a basis lower than full fifth class the carriers would consider the rates subnormal and depressed," the brief stated.

"It is immaterial that there will be some loss in revenue from the rates prescribed. Many of the iron and steel rates were unconscionably high. To a large extent the carriers had exacted the full fifth-class basis, which the commission finds too high. The carriers can not reasonably expect to obtain revenue increases from every investigation, although it is their strategy and their desire to produce that result."

At another point it was explained that the carriers lay considerable stress on the fact that under the commission's formula the distance between Youngstown and Detroit is 230 miles, while the shortest workable distance under the present classrate structure is 240 miles.

"This does not mean anything except that the carriers are charging 10 miles more than they should under the uniform plan approved by the commission in all other similar cases," it was declared. "How can this possibly be a ground for reopening the hearing?"

"The carriers say that 'they can find nothing in the record or in the commission's order or report which justifies or seeks to justify so substantial a revenue loss'. Railroads are proverbially unable to see a justification for any revenue reduction under any conditions. They are proverbially unwilling to admit that any rate is unreasonable. . . . Furthermore, the carriers have been guilty of indefensible discriminations because they have maintained widely different rates on iron and steel articles in different parts of Official Classification territory. . . . If the readjustment had resulted in assessing upon the shippers additional freight charges in the sum of $2,500,000 annually, the carriers would have been quite content."

The Baltimore Association of Commerce, through its attorney, Charles R. Seal, said that the Hoch-Smith resolution does not cover the differential adjustment about which New York has been fighting. It was contended that equal distribution of the burden of the transportation charges, provided for in the resolution, cannot be effected if the differentials are preserved as between New York and Baltimore. The petition for reopening of the case, Mr. Seal said, should be denied. He took occasion to add that none of the railroads serving Baltimore has joined in that part of the petition dealing with the differentials.

Railroads Extend Export Rates on Steel

WASHINGTON, Oct. 15.—Existing export rates on iron and steel products are assured until March 31. Eastern railroads last week filed tariffs with the Interstate Commerce Commission extending the current schedules which expire on Dec. 31. The fact that the railroads changed their policy by continuing the tariffs for a period of three months instead of six months, as was their practice for more than two years, has excited some comment.

The view prevails that the purpose of the new plan is to keep more immediate control over iron and steel export rates than heretofore because of the entirely new domestic steel rate structure in official classification territory, which the commission has proposed for application on Dec. 20. This is the so-called general Eastern steel rate case, decided under the Hoch-Smith resolution, a case that the railroads have asked the commission to reopen with both opposition and support from the different sections of the affected territory.

Production, Shipments, Orders and Consumption

	August, 1929	July, 1929	August, 1928
Steel boilers(a), orders, number..	1,881	2,054	1,647
do. do., sq. ft. ...	1,789,989	2,083,449	1,457,000
do. eight mos., No..	12,640	.....	13,117
do. do., sq. ft. ...	13,617,290	.....	11,963,933
Babbitt metal(a) consumption, lb.	5,432,597	5,360,711	4,755,662
Electric power production(b), millions kwhr.	8,259	8,014	7,485
do., by water-power.....	2,840	3,055	.....
Petroleum(c), bbl.	92,288,000(d)	91,827,000	77,829,000
do., eight months(c), bbl. ...	671,730,000	.....	589,623,000
Gasoline(c), bbl.	38,510,000	37,855,000	33,937,000
do., eight months(c), bbl. ...	282,943,000	.....	.....
Steel furniture orders(a).....	$2,417,725	$2,559,991	$2,619,234
do., eight months(a).....	23,030,821	.....	23,805,872(d)
Steel shelving orders(a).....	931,468	939,057	863,422
do., eight months(a).....	8,210,454(d)	.....	6,138,547

(a) United States Department of Commerce.
(b) By public utility power plants; figures from United States Geological Survey.
(c) United States Bureau of Mines.
(d) Highest ever recorded.

Ohio Foundrymen Thresh Out Problems

Association Holds Regional Meeting—Inadequacy of Profits Deplored—Improvement in Practices Outlined

PROBLEMS of the foundry industry, particularly those relating to making a fair profit on castings and the substitution of rolled steel for gray iron castings, were discussed by the Ohio Foundries Association, Inc., at the ninth annual meeting, held in Toledo, Oct. 10, Closer cooperation was urged to eliminate profitless competition.

Held at the Toledo Yacht Club, the meeting started with a luncheon, which was followed by talks, discussions and a business session that lasted through the afternoon. This was the first meeting to be held under the association's new plan for having four or five one-day meetings in different sections of the State, during the year, instead of one two-day annual meeting. That the plan will work out satisfactorily was indicated by a good attendance, the registration being close to 100. C. C. Smith, Toledo Steel Casting Co., president of the association, was in the chair.

Don McDaniel, Hamilton Foundry & Machine Co., Hamilton, was elected president for the ensuing year. George Alten, Alten's Foundry & Machine Works, Lancaster, was elected vice-president. Charles L. Seelbach, Forest City-Walworth Run Foundry Co., Cleveland, was reelected treasurer. Five new members of the Board of Administration were elected: George Alten; A. H. Kramer, Advance Foundry Co., Dayton; J. H. Bruce, Bowler Foundry Co., Cleveland; D. I. Miller, James B. Clow & Sons, Coshocton; and P. S. Horton, Wilmington Casting Co., Wilmington.

Profits of Foundries Too Low

The foundry industry as a whole does not make sufficient profit, declared M. L. Robinson, director of core oil sales, Werner G. Smith Co., Cleveland, in a talk on "What Has Become of the Foundrymen's Share of the American Dollar." Mr. Robinson listed nine reasons for the failure of foundries to make fair earnings. They were:

1. Lack of definite knowledge as to costs. As a remedy he urged the adoption of a uniform cost system.
2. Improper selling methods and unrestrained and unintelligent competition.
3. Failure to study customers' needs as well as failure to stress quality and service and not charging high enough prices for quality work.
4. Encroachments of other materials.
5. Taking tonnage lots at no profit.
6. Naming a flat price on all classes of castings.
7. Unwillingness of labor to give a fair day's work that will permit the employer to compete with other foundries having better labor conditions.
8. Lack of cooperation by the foundries, which places a foundryman at the mercy of buyers of castings and of competitors.
9. Lack of organization needed to enable the industry to articulate in the face of organized minorities.

Mr. Robinson emphasized the need of cooperation to improve conditions in the foundry industry, and spoke of the efforts being made by various other industries to cooperate through associations. In this connection he exhibited a number of newspaper clippings showing what some other industries are doing along cooperative lines to protect themselves and make a living profit.

Commenting on Mr. Robinson's talk, the chairman said that for a period of five years the earnings of 42 steel foundries were less than the money invested in their plants would have earned if put in banks at 3 per cent.

Improved Practices Outlined

Advances in foundry practice were discussed briefly by E. J. Lowry, consulting metallurgist, Detroit. The gray iron foundry industry is growing, but not to the extent of the other branches of the industry, he said. He held that the reason this is lagging behind is that the gray iron foundryman does not advertise his product.

Developments in the foundry industry have been fairly rapid the past four years, according to the speaker. Tensile strength of gray iron castings has been increased by melting at the proper temperature and by the addition of alloys. One foundry, he said, is producing castings with a tensile strength of over 60,000 lb. per sq. in.

Strength, hardness and ductility are needed in good castings. An analysis of these physical properties should be included in specifications. If alloys are used there should also be alloy specifications. The speaker pointed out that developments in the foundry industry have been in several directions. One has been the testing of sand. The sand problem is not very difficult. If the foundryman gets proper permeability and proper bond, good castings will be produced, and that is what the foundryman is interested in.

When Hot-Blast Cupolas Are Useful

With hot-blast cupolas there is a marked saving in coke. These have been operating with a coke ratio of 16 to 1, although the usual ratio is about 14 to 1. Whether the hot-blast cupola is applicable to a foundry depends on its size. If it is melting 50 tons or more a day, the hot-blast cupola can be used, but if only 10 tons is being melted, it is not applicable.

Temperature control is becoming a matter of importance in the foundry, he said, and market conditions are changing. Changes in flask and core equipment are working changes in production. The speaker believed it would be better for foundries to buy scrap according to definite specifications. Scrap may run 1.25 to 3 per cent in silicon. As a result, every ladle may vary in silicon content and good machineable castings may not be produced.

He said that the manufacture of pig iron in small pigs, as made by one Central Western furnace, is to the advantage of the foundry and that another has increased the uniformity of its product by tapping its blast furnace into large ladles.

Substitutes for Iron Castings

In the discussion B. D. Fuller, Cleveland, spoke of the loss to the foundry industry of many castings for various parts that are now made of rolled steel. These included high-test specialties for the automotive and other industries, for parts demanding strength and high-speed machineability.

Mr. Lowry attributed the substitution of steel for cast iron in many cases to the fact that the former has been properly advertised. Steel is no more uniform than cast iron, he said. Much work is being done in developing cast iron and in determining its qualities. When completed, some rather startling facts are likely to be brought out as to what cast iron will do. Engineers, he said, rate cast iron at a tensile strength of 15,000 lb., although test bars have been made with a tensile strength as high as 80,000 lb.

Apprenticeship Systems Urged

Closer cooperation between foundries and the public schools in working out apprenticeship systems was urged by Carl Cotter, director of vocational training, Toledo public schools, in a talk on vocational education. He pointed out that the Ohio compulsory education law has increased the high school enrollment, as it keeps boys in school who might otherwise be employed in industry. The Toledo schools have a foundry

with a 30-in. cupola and other equipment and an enrollment of 45 boys in that department, but he said it is hard to persuade boys to take the foundry course.

A comprehensive apprenticeship system under which the schools are to be tied up with various industries has been prepared in Toledo, but no action on adopting it has yet been taken by the Board of Education. Mr. Cotter said that the school board would be glad to work with the Ohio Foundrymen's Association in developing plans for apprenticeship training. In response to this offer the chairman stated that the Northwestern Ohio group of foundrymen would probably be pleased to take the matter up later.

President Smith in his annual report reviewed some of the activities of the association during the year. He said that one of the present aims is to promote a closer cooperation between pattern makers and foundrymen. He also said that work is being done with a view to effecting with other organizations a standardization of trade customs. The treasurer's report showed the association in a good financial condition.

Illinois Steel Plans Greater Expansion

Capacity in Chicago District Will Be Increased 2,500,000 Tons Instead of 1,500,000 Tons

THE Illinois Steel Co., subsidiary of the United States Steel Corporation, will add 2,500,000 tons to its annual capacity instead of 1,500,000 tons, as announced July 3 of this year.

Statement of this change in plans was made by James A. Farrell, president of the corporation, after a recent visit to the Illinois Steel Co. plants at South Chicago and Gary. New construction at the South Works will include 14 open-hearth furnaces, a new wide-flange rolling mill, a blooming and slab mill, two plate mills and an additional bar mill for rolling alloy steel bars. There will be built at Gary seven open-hearth furnaces, two batteries of by-product coke ovens of 70 ovens each, a blooming mill and a new strip mill.

Installation of the additional bar mill at the South Works will provide an annual capacity of 300,000 tons of alloy steel of all grades and sizes. This extension is noteworthy in view of the vast amount of work the Steel Corporation's research department has bestowed on alloy steels in the past year or two.

When the first expansion program announcement was made last July, it was estimated that the Illinois Steel Co. was planning to increase its productive capacity by 21 per cent and that capacity in the district would be enlarged by 15 per cent. Announcement that the Steel Corporation unit will expand by 2,500,000 tons annually brings these figures to 32 per cent increase for the Illinois Steel Co. and 25 per cent for the district as a whole.

The contemplated additions will produce more than the rated capacity of the largest independent producer in the Chicago district.

Soviet Engineers Select American Tools

Fifty-three Soviet engineers and industrial executives visited the recent National Machine Tool Exposition in Cleveland.

Mr. Markoff, vice-president of the Amtorg Trading Corporation, which arranged the attendance of the Soviet engineers, issued this statement at Cleveland:

"The reconstruction of Soviet industries on a modern technical basis, and the rapid realization of the great program of industrialization of the country have brought forth sharply the increasing importance of American machine tool production for Soviet industry. The year 1928-1929 marked the beginning of a widespread program of construction of new industrial plants. The work of designing the first large machine building plants, especially the two tractor plants in Stalingrad and Leningrad, an auto truck plant, Amo, in Moscow, an automobile plant in Nijni-Novgorod, an agricultural machinery plant, Selmachstroy, in Rostov, was, to a considerable degree, shifted to the United States. In this work the Amtorg Trading Corporation and the groups of Soviet engineers who have come from the Soviet Union have received the earnest cooperation of many American firms.

"The Soviet engineers came to the Cleveland exposition to study carefully the newest models of machine tools and the newest methods of production. Their purpose is to select proper equipment for the new plants now under construction in their country.

"During the exposition the Soviet engineers, with the assistance of Amtorg engineers and representatives of various American machine tool builders, have gone over their specifications and drawings and have made final decisions on purchases of equipment.

"During their short stay in Cleveland the representatives of Amtorg Trading Corporation have reached agreements with 28 firms to place orders amounting to about $1,200,000."

Mr. Markoff stated that the possibilities of export of machine tools to Russia are enormous, and that the winning of this market depends largely upon the foresight of American machine tool builders and the adoption of a more flexible policy.

Among the representatives of Soviet industrial organizations who attended the exposition were nine engineers of the Tractorstroi (Stalingrad Tractor Construction Bureau), headed by N. A. Kulikoff; eight engineers of the Autostroy (Automobile Plant Construction Bureau for Ford model car), headed by S. S. Dybetz, president of the bureau, and Mr. Isaacvitch, chief engineer; four representatives of the Gipromez (State Institute for Designing of Metal Works), headed by S. E. Weitzman, director of the Moscow division; Mr. Kuritzyn, chairman of the State Machine Building Trust; 10 engineers of the automobile producing trusts, headed by Mr. Golicoff, and five representatives of the Selmachstroy (Bureau for the Construction of the Rostov Agricultural Machinery Plant), headed by I. V. Sobolev.

The Amtorg Trading Corporation of New York, representing principal Soviet organizations, purchased during the past Soviet fiscal year ended Sept. 30, 1929, machine tools valued at about $5,200,000. This compares with purchases amounting to only $1,590,000 in the previous year. A total of 887 orders with 162 American machine tool firms were placed by the Amtorg during the past 12 months. The total Soviet-American trade for the past fiscal year amounted to $149,000,000, compared with $113,000,000 the year previous.

Production and Shipment of Raw Materials and Finished Products

	September, 1929	August, 1929	September, 1928
Bituminous coal mined(a), net tons...	44,480,000	43,889,000	41,971,000
Anthracite(a), net tons.....	6,758,000	5,954,000	5,927,000
Beehive coke made(a), net tons.....	506,800	563,200	322,000
Locomotives shipped(b)	75	129(c)	41
do., nine months(b).....	592(d)	.....	435
do., do., for export(e).....	80	.....	63
Unfilled orders, end of month(b)....	429	436	178
Whereof, for export(b).....	27	31	33
Trackwork produced(f), net tons.....	12,962	14,818	10,767
do., nine months(f).....	127,061	.....	110,712

(a) United States Bureau of Mines.
(b) United States Department of Commerce.
(c) Largest total since March, 1927.
(d) Exceeds the 550 for 12 months of 1928.
(e) Included above.
(f) American Iron and Steel Institute; relates to T-rail track of 60 lb. a yard and heavier.

Demonstrates New Munitions of War

Army Ordnance Association Stages Spectacle with Representatives of Metal Trades Present

LATE developments in arms and munitions were exhibited and demonstrated at Aberdeen, Md., Oct. 10, at the Government's proving ground, under the auspices of the Army Ordnance Association. The association holds a meeting of this kind every fall and includes among its guests those who are likely to be called upon in a national emergency to design or manufacture war material. This year one of the participating organizations was the National Metal Trades Association.

As might be expected the demonstration was a continuous series of impressive spectacles, seeing that detachments from the ordnance department, the field artillery, the coast artillery, the air corps, the signal corps, the infantry and the chemical warfare service take part. The firing of guns, the attack on an imaginary enemy position by a mechanized ground force, attacks by aircraft and attacks on aircraft were extended into the darkness of evening.

Among interesting late developments shown may be mentioned the following:

Some of the New Developments

A combined wheel and track-laying chassis designed by Walter Christie, which made over 40 miles an hour speed over rough terrain and has gone as high as 90 miles an hour on a paved road. It serves as a high-speed armored car.

A light tank was shown powered with a 135-hp. 8-cylinder V standard commercial Cunningham motor. It has a 1-pounder gun of a new semi-automatic type which can fire at the rate of 40 shots a minute; combined with it is a machine gun so that the gunner has a choice of weapons depending on his target. This machine is regarded as the equal if not the superior of the older machines of greater size and weight. A company of 25 such machines is rated a fire-power per man roughly 16 times as great as any ordinary infantry company, besides which it can advance about ten times as fast and the men are protected by armor against enemy fire.

Bomb Tests Spectacular

A notable departure was exhibited in bombs. One lot dropped by airplanes are not put into action until they strike the ground. Then they set off a fragmentation part which rises a predetermined height and then bursts above ground. Their chief use is to spread gases and their certainty of action is independent of the height above ground of the aircraft dropping them.

One of the spectacular tests was the dropping of a 4000-lb. demolition bomb from one of the new Air Corps Curtiss Condor bombing airplanes, flying at an altitude of about one mile. This 2-ton bomb contained one ton of high explosive. It is 14 ft. long and 2 ft. in diameter and is equipped with two fuses, one in the nose and one in the tail. The fuses are so constructed that they may be set to function with instantaneous action on striking an object or so that the explosion will be delayed after impact, in order that the bomb may penetrate the desired distance before functioning. With a delay setting of a fraction of a second, this bomb makes a crater in normal soil 19 ft. deep and 65 ft. in diameter, displacing 1078 cu. yd. of earth.

Association Holds Short Session

At a short discussion meeting of the Army Ordnance Association, President Benedict Crowell, who was assistant secretary of war and director of munitions during the World War, emphasized that "the principal objective of the association is an active membership of American citizens, on whom the duty of design and production of munitions will fall in war, who will have an accurate and authentic knowledge of the complex requirements of ordnance. Peace insurance in this form is the foremost aim of the Army Ordnance Association."

Major-General C. C. Williams, chief of ordnance, addressed himself to the present status of munitions, touching at length on the recent experiences in welding in the construction of ordnance material and on the centrifugal casting of guns.

Harold C. Smith, president, National Metal Trades Association, spoke on "The Metal Trades and Preparedness."

Stock Sizes of Full Disk Buffs to Be Reduced

A general conference of representatives of manufacturers, distributers and users of buffing wheels, on Oct. 7, approved a simplified practice recommendation in which 4, 5, 6, 7, 8, 11, 13, 14, 17, 18 and 20-in. full disk buffing wheels were selected as standard stock items. This action reduces standard diameters from 17 to 11, corresponding to an elimination of 35 per cent of needless varieties. The conference also voted that 20 ply should be adopted as the standard for stock buffs, according to the division of simplified practice of the Bureau of Standards, Department of Commerce.

The recommendation is to become effective Jan. 2, 1930, for production on the new schedule, and Jan. 2, 1931, for the elimination of current stocks of non-standard sizes.

For the standing committee the following representatives were named: Manufacturers of buffs, B. H. Divine, president Divine Brothers Co., Utica, N. Y.; Floyd T. Taylor, vice-president Hanson-Van Winkle-Munning Co., Matawan, N. J.; and E. Winthrop Hall of the F. L. & J. C. Codman Co., Boston. Users of buffs, one representative each from the General Motors Corporation, the Western Electric Co., and the Scovill Mfg. Co. Distributers of buffs, a representative of F. B. Stevens Co., Detroit. Textile manufacturers, a representative of the Cotton Textile Institute. Machinery builders, a representative of the United States Electrical Tool Co.

Expect to Reduce Waste

It was the combined opinion of the conferees that the adoption of the above diameters as standards would materially reduce the wasteful cutting of sheeting out of which buffs are made and at the same time reduce the cost of production and distribution. The standing committee is to give further attention to the possibilities for standardization of sewing, arbor holes, pieced buffs and polishing wheels.

All-Metal Airship Accepted by Navy

WASHINGTON, Oct. 15.—The Navy Department has accepted the all-metal dirigible ZMC-2. Recommendation that the ship be accepted was made by the Board of Inspection and Survey, following test trials. The contract required that the ship fly at a speed of at least 60 miles an hour. In the tests it exceeded this rate but, it is stated, it has never been flown at its maximum speed. Among tests made were those to determine the ascending and descending qualities of the ship and to ascertain whether the metal covering is gas-tight.

Accepted as an experimental type, the ship will be subjected to extensive operating tests so that data may be gathered for purposes of comparison with fabric-covered ships. It will be used for training purposes also. It is anchored at the Lakehurst, N. J., station.

MOVEMENT OF LAKE SUPERIOR ORE, IN GROSS TONS

Port	September, 1929	September, 1928	Season to Oct. 1, 1929	Season to Oct. 1, 1928
Escanaba	741,490	774,449	4,954,163	4,077,064
Marquette	671,770	590,001	3,556,660	2,568,355
Ashland	983,385	953,912	6,358,813	4,958,227
Superior	3,073,399	2,547,529	15,808,197	11,779,177
Duluth	3,041,587	2,941,011	17,050,529	13,469,637
Two Harbors	1,035,409	941,384	5,536,465	4,413,519
Total	9,547,040	8,748,286	53,264,827	41,265,979
Increase	798,754	.....	11,998,848	.....

Ohio River Canalization Completed

Iron and Steel Can Move from Pittsburgh to Cairo, Ill.—Event to Be Celebrated Oct. 17

MOVEMENT of iron and steel and other products over the full length of the Ohio River from Pittsburgh to Cairo, Ill., will be assured the year around with the completion on Oct. 17 of the Government canalization project, which has been in progress for about 50 years at a cost of approximately $200,000,000. The work has involved the construction of 50 locks and a great deal of dredging work which will make possible a 9-ft. stage over the entire length of the river, regardless of weather conditions.

The official opening ceremonies, which will begin at Pittsburgh on Oct. 17, will take the form of a parade of river craft down to the Mississippi, with stops at important ports such as Huntington, W. Va., Cincinnati and Louisville, Ky. Pittsburgh's part of the celebration will begin with an informal luncheon at noon, which will be attended by many notables in Government, transportation and industrial circles. The various wharf and docking facilities in the Pittsburgh district will be thrown open for inspection during the afternoon, and in the evening a banquet will be held at the William Penn Hotel.

Among those who will be in Pittsburgh for the occasion are Andrew W. Mellon, Secretary of the Treasury; James W. Good, Secretary of War; Charles Francis Adams, Secretary of the Navy; Robert P. Lamont, Secretary of Commerce; James J. Davis, Secretary of Labor; Governor John S. Fisher of Pennsylvania; Governor William G. Conley of West Virginia; W. W. Atterbury, president, Pennsylvania Railroad; Daniel Willard, president, Baltimore & Ohio; P. E. Crowley, president, New York Central, and J. J. Burnet, president, Chesapeake & Ohio.

The Ohio River canalization project involved the construction of 50 low-lift dams, each with a lock chamber 110 ft. wide and 600 ft. available length. To prevent any increase in flood height and to permit open-river navigation when the natural depth is 9 ft. or more, all the dams except the two immediately below Pittsburgh, are of the movable type. Lock No. 1, at Emsworth, Pa., 6.2 miles below Pittsburgh, was built in 1921 to replace the old locks Nos. 1 and 2, and is of the fixed type of construction, the principal object being the elimination of the violent fluctuations of water levels in Pittsburgh harbor, which were caused by the operation of movable dams. A second fixed dam is now being completed at Deadman Island, 13.3 miles below Pittsburgh, which will replace the old dams Nos. 3 and 4. Its opening marks the completion of the project.

The main part of each movable dam, through which navigation passes when the dam is lowered, is known as the navigable pass. It is from 600 to 1000 ft. long and consists of a series of wickets or shutters, 3 ft. 9 in. wide and 16 ft. to 20 ft. long, depending on the height of the dam, each supported in an inclined position by a prop. The dam is lowered by means of a derrick boat, known as a maneuver boat, the props being released from their seats one by one, and the wickets lowered so as to lie flush with the bottom of the river. In addition to the lock and navigable pass, there are weirs of different types for the purpose of regulating the pools and facilitating the raising and lowering of the dam.

The relatively long construction period required for the dam building has been due partly to the fact that most of the work must be done within cofferdams designed to hold out the river to a stage of 16 to 18 ft. When the river rises above this stage, work must be suspended until the water subsides. With this limitation, the working season rarely exceeded five months, or from July to November, inclusive.

Coincident with the opening of the Ohio River project, bids were opened in Pittsburgh last week for the construction of lock No. 7 on the Allegheny River, the last of the existing project on that stream. The Allegheny is under improvement by the open channel method and also by locks and dams. The work under way provides for open channel work from the mouth of the river at Pittsburgh to the New York State line, a distance of 214 miles, by the removal of boulders and snags and the construction of low dams and dikes to close secondary channels and concentrate the low water flow on shoals. By these improvements there has been established a well defined navigable channel from 150 ft. wide and about 1 ft. deep at low water at the New York State line, to about 300 ft. wide and approximately 2 ft. deep at low water at Natrona, Pa., 24 miles about the mouth. The slack water project provides for eight locks and dams, establishing a minimum slack water depth of 7 ft. by three structures to Natrona and thence of 8 ft. by five additional locks and dams to Rimerton, Pa., 61 miles above the mouth.

The existing project on the Monongahela River provides for the improvement of the stream by 14 locks and fixed dams to afford slack water navigation from Pittsburgh to a point 4 miles south of Fairmont, W. Va., a distance of 130 miles. Work under the approved project will give a depth of 8 ft. between Pittsburgh and lock No. 10, near Morgantown, W. Va., and 7 ft. for the remainder of the distance. In rebuilding the locks and dams from No. 1 to 6, the adopted standard was two parallel chambers, each 56 x 360 ft., with 8 ft. depth on sills and fixed concrete dams.

German Foreign Trade in Iron and Steel Products

(In Metric Tons)

Item	Exports July	Exports August	Imports July	Imports August
Pig iron and ferroalloys	57,583	45,968	12,798	11,382
Ingots, blooms and billets	46,885	45,228	13,785	7,142
Iron and steel bars, rods, angles	111,134	100,228	52,114	54,621
Structural shapes	8,444	10,740	537	480
Hoops and bands	14,562	14,445	8,545	7,084
Plates and sheets	67,227	67,647	5,768	6,434
Galvanized sheets	581	2,302	291	99
Tin plate	2,727	1,397	2,483	1,532
Cast iron pipe	12,843	13,404	6,698	4,783
Wrought iron pipe	35,665	31,212	1,472	814
Pipe fittings	4,933	4,931	83	112
Rails	47,308	36,174	9,881	9,729
Other railroad material	8,728	9,350	822	1,038
Plain wire	35,783	35,031	9,510	6,881
Barbed wire	5,327	4,821	61	90
Wire rope	1,673	1,959	100	91
Wire cloth	2,153	1,433	3	4
Other wire manufactures	708	816	44	46
Nails, tacks, rivets and washers	8,376	9,308	262	615
Castings and forgings	22,896	23,495	2,941	3,245
All other	5,262	4,930	1,077	1,109
Total	500,798	464,819	129,275	117,331

Based on cablegrams received by Iron and Steel Division, Department of Commerce, from Trade Commissioner James E. Wallis, Berlin.

Exports of Electrical Equipment

The Verband der Deutschen Elektrotechnischen Industrie has published a comparison of German exports in electrical equipment and appliances in 1923 and 1926. They totaled 330,000,000 m. ($78,540,000) in 1913 and 536,000,000 m. ($127,568,000) in 1926. Neverthless, Germany's share of total world trade in electrical equipment was only 28.8 per cent in 1926, compared with 46.4 per cent in 1913. The United States exported 112,000,000 m. ($26,656,000) worth of equipment in 1913, or 15.7 per cent of total world exports, and in 1926 shipped equipment valued at 448,000,000 m. ($106,624,000), or 24 per cent of the total. Great Britain's exports were 157,000,000 m. ($37,366,000) in 1913, or 22 per cent of the total, and 377,000,000 m. ($89,726,000) in 1926, or 20.2 per cent of world exports.

Steel Corporation's Orders Gain 244,370 Tons

A gain of 244,370 tons in its unfilled orders was reported for September by the United States Steel Corporation. This contrasts with a decrease in August of 429,966 tons which was the fourth consecutive monthly decline. The total on Sept. 30 was 3,902,581 tons as against 3,658,211 tons on Aug. 31. A year ago the unfilled tonnage was 3,698,368 tons; on Sept. 30 this year the orders are 204,213 tons larger than a year ago.

Unfilled tonnage at the end of each month for the past three years follows:

	1929	1928	1927
September	3,902,581	3,698,368	3,148,113
August...	3,658,211	3,624,043	3,196,037
July.....	4,088,177	3,570,927	3,142,014
June.....	4,256,910	3,637,000	3,058,246
May	4,304,167	3,416,822	3,050,941
April.....	4,427,563	3,872,133	3,456,132
March ...	4,410,718	4,335,206	3,553,140
February..	4,141,341	4,398,189	3,597,119
January..	4,109,487	4,275,947	3,800,177
	1928	1927	1926
December.	3,976,712	3,972,974	3,960,696
November	3,673,000	3,454,441	3,807,447
October ..	3,751,030	3,341,000	3,683,661

Farm Market for Galvanized Sheets Is 1,599,533 Tons

The total annual farm market for galvanized roofing is 1,599,533 tons, whereas the present quantity of galvanized sheets going into that market is only 429,000 tons, states the current issue of *Making Markets*, published by the Sheet Steel Trade Extension Committee, Cleveland. Approximately 474,533 tons is required for new construction, the remainder being needed for replacement purposes.

Recovery in Pig Iron Imports in August

August imports of pig iron from British India alone made more tonnage than the total in July from all countries. At 12,377 tons the gain was 84 per cent on the 6743 tons of July. The August figure showed a reduction from August last year of about 5 per cent.

For the first eight months of the year there has been a slight decline from last year—about 2 per cent. United Kingdom and British India remained the leaders, as a year ago, but India has taken first place, whereas last year United Kingdom was in first position. The Netherlands has been third each year, and no country outside these three supplied as much as 3 per cent of the total in either year.

UNITED STATES IMPORTS OF PIG IRON BY COUNTRIES OF SHIPMENT
(In Gross Tons)

	August		Eight Months Ended August	
	1929	1928	1929	1928
United Kingdom	3,903	2,550	31,187	37,327
British India	7,227	7,495	37,786	34,269
Germany	....	....	103	95
Netherlands	737	1,833	19,029	17,673
Canada	238	....	763	378
France	....	....	101	300
Belgium	....	....	184	202
Norway	101	321	1,441	412
Sweden	106	759	1,415	2,143
All others	65	32	572	1,541
Total	12,377	12,990	92,581	94,340

Expansion of Interstate Mills Being Planned

F. J. Griffiths, chairman of the board, Central Alloy Steel Corporation, in submitting the third quarter earnings report of the company, stated that the work of transferring the properties and other assets of the Interstate Iron & Steel Co. of Chicago to Central Alloy is proceeding rapidly and that plans are under way for expansion of the Interstate plants.

The Central Alloy Steel Corporation reported third quarter earnings of $1,342,974, after all charges but before dividends, equivalent to 90c. on each share of common stock outstanding. Earnings in the September quarter of 1928 were $1,160,606, equal to 76c. a share on the common. Earnings for the first nine months of this year were $4,667,251, after all charges but before dividends, equal to $3.19 a share on the common, against $3,400,965, or $2.22 a share, on the common in the first nine months of 1928.

The Interstate Iron & Steel Co., Chicago, which, as was announced in THE IRON AGE of Oct. 10, will be merged with the Central Alloy Steel Corporation, Massillon, Ohio, was incorporated in 1895 and operates three plants in the Chicago district. These are an alloy steel mill at South Chicago, Ill.; a rod and wire mill at Grand Crossing, Chicago, and an iron bar mill at East Chicago, Ind.

Equipment at the South Chicago Works includes four 100-ton open hearth furnaces, four 70-ton open hearth furnaces, a 35-in. blooming mill, a 21-in. Morgan continuous billet mill, a 12-in. Morgan finishing mill and a 10-in. Morgan finishing mill. Plans have been prepared for an additional 100-ton open hearth furnace at this plant. The rated capacity at South Chicago Works is 375,000 tons annually.

Equipment at the Grand Crossing Works includes a continuous rod mill with an annual capacity of 60,000 tons. Products are wire, both black and galvanized, nails, welding rods, tacks and staples. At the East Chicago Works are four three-high mills with a total capacity of 125,000 tons annually. The sizes of these mills are 8-in., 9-in., 16-in. and 22-in. The products are bar iron and steel and iron tie plates. There are also located at this works heat treating and cold-drawing departments.

The Interstate Iron & Steel Co. last year sold its rivet manufacturing business and it has also discontinued production of double-threaded wood screws.

Alloy Steels Discussed at Hartford Meeting

At the first meeting of the season of the Hartford chapter of the American Society for Steel Treating on Tuesday evening, Oct. 8, at the Hartford Electric Light Auditorium in Hartford, Conn., the subject was "The Manufacture of Alloy Steel." It was introduced by a five-reel motion picture presented by the Central Alloy Steel Corporation of Massillon, Ohio. A representative of the company answered many questions covering the pouring of ingots, the relation between the sizes of ingots and the intended product, the causes of seams and other internal defects found in finished bars, and methods of rolling and straightening. Various types of stainless irons and their product were described.

At the next meeting, on Nov. 12, the speaker will be J. P. Gill, chief metallurgist, Vanadium Alloys Steel Co., Latrobe, Pa., who will discuss "Alloys and Their Effects in Tool Steels."

Westinghouse to Furnish Drives for Chicago Mill

The Westinghouse Electric & Mfg. Co. has received the contract for the main roll drives of the new wide flange structural mill of the South Chicago works of the Illinois Steel Co. The value of the contract is approximately $1,250,000.

According to the Westinghouse announcement, the equipment will include the first application of the twin motor direct drive, which is an outstanding new development in rolling mill practice. In this installation the upper and lower rolls are driven by direct-connected individual motors, eliminating the pinions and housings which are required by conventional single motor drives. The electrical equipment for the new twin motor drive consists of two standard reversing motors, each of half the capacity required for a single motor drive, a motor-generator set and the necessary control and switching equipment.

The Hill-Curtis Co., Kalamazoo, Mich., manufacturer of grinding and polishing machinery, has changed its name to Hammond Machinery Builders, Inc.

Buyer Says Scrap Trade Must Improve Background

Cooperation of the American Rolling Mill Co. in bringing about better conditions in the scrap industry was offered to the Institute of Scrap Iron and Steel at a meeting of its Cincinnati chapter Oct. 8 by H. O. Miller, director of purchases of the steel company. Mr. Miller said:

"For the last 25 years it has been a hope of mine that the scrap iron dealers would accept the responsibility of creating a new background for their industry. Scrap is the only commodity we buy in which we need inspectors. I have been firm in the belief that the business will have to change from a speculative to a more substantial basis.

"I have been watching the institute closely and feel that it is on the right foundation to create this new background for the industry. I have read with a great deal of interest the high class publicity that has come out and the constructive work of the organization. I want to see the institute succeed, and any help I or my company can give will be given.

"We are concerned not only in keeping the good will of our sources of scrap, but in eliminating the causes which eventually mean losses to us. The dealer's loss in reshipment on account of rejected cars will eventually be made up out of our company or some other consumer. The institute can do a great deal to eliminate the causes of these losses. Brokers should inform the shippers of our specifications.

"Every scrap iron dealer in the country can afford to be a member of the institute. I wonder how many of the dealers who have already joined have done anything more than subscribe? Passive acceptance will kill the institute."

Mr. Miller was elected an honorary member of the Cincinnati chapter.

New England Steel and Iron Jobbers' Outing

The New England Iron & Hardware Association held its annual fall outing at the Tedesco Country Club, Swampscott, Mass., on Thursday afternoon and evening, Sept. 19. It was the largest outing ever held by the organization, more than 100 members and guests attending, and more than 50 entered the golf tournament. Franklin E. Bragg, N. H. Bragg & Sons, Bangor, Me., president of the association, presided at the dinner, and introduced Harry L. Doten, president, H. L. Doten & Sons, Boston, who awarded the prizes won during the tournament.

Prizes were donated by the Central Alloy Steel Corporation, Boston; F. S. Brewer, Bourne, Fuller Co., Unionville, Conn.; Bethlehem Steel Co., Boston; American Steel & Wire Co., Boston; Peter Gray & Sons, Inc., Cambridge, Mass.; Ames Shovel & Tool Co., North Easton, Mass.; Decatur & Hopkins Co. and Bigelow & Dowse Co., Boston; the president, Mr. Bragg; and the Standard Horseshoe Co., Boston.

Prizes were won by C. M. Doten, H. L. Doten & Sons, Boston; Murray Harvey, A. C. Harvey Co., Boston; Paul Avery, Avery & Saul Co., Boston; A. E. Carpenter, Chase, Parker & Co., Boston; R. H. Sanderson, E. P. Sanderson & Co., Cambridge, Mass.; C. C. Butts, Butts & Ordway Co., Boston; Arthur Avery, Avery & Saul Co.; W. C. Gray, Peter Gray & Sons, Inc.; Peter Gray; and J. S. Kenyon, Tremont Nail Co., Boston.

$2,000 for Best Industrial Advertising Campaign

Again the Harvard Advertising Awards Committee of the National Industrial Advertisers Association is announcing the annual Bok Award of $2,000 for the best industrial advertising campaign for 1929 appearing in newspapers and periodicals. Closing date of this competition is Dec. 31.

The industrial advertiser must submit a manuscript describing the campaign, its functions, and its application, together with reproductions of the ads as they appeared and a statement of the analysis of the market on which the campaign was founded. The manuscript and the ads must be submitted in certain prescribed form, the details of which can be secured direct from Harvard Graduate School of Business Administration (Harvard Advertising Awards), Soldiers' Field Station, Boston, or from A. H. Oberndorfer, Chairman Awards Committee of the National Industrial Advertisers' Association, in care of the Sivyer Steel Casting Co., Milwaukee.

Municipal Airports to Be Subject of Conference

Engineers and city officials of the American Road Builders' Association and members of the Aeronautical Chamber of Commerce will hold a conference on municipal airports in Washington on Oct. 24 and 25. The technical side of the program will include airport layout and planning, structures, drainage, surfaces and management. Lieutenant-Colonel U. S. Grant, III, director of public buildings and parks, District of Columbia, will deliver an address on "Airports and Public Parks," and Colonel C. M. Young, newly-named assistant secretary of commerce for aeronautics, will discuss European practices.

A Virginia Blast Furnace Sold for Scrap

The Bigstone Gap blast furnace of the Intermont Coal and Iron Co., at Bigstone Gap, Va., which was blown out a few years ago, has been sold to Platnik Brothers, Bluefield, West Va., who are now dismantling it for junk.

Cold-Drawn Bar Makers To Hold Conference

WASHINGTON, Oct. 11.—With approximately 70 to 75 per cent of the total production represented, the cold-finished steel bar industry will hold a trade practice conference with the Federal Trade Commission at a date and place not yet determined. It will be in charge of Commissioner C. W. Hunt. Among subjects thus far proposed are: Interference with contractual relations; defamation; espionage; price discrimination; premiums; misrepresentation; secret rebates; protection against decline or advance in price; failure to adhere to published prices and failure to maintain the validity of contracts.

The Southern Hardware Jobbers' Association also will hold a trade practice conference with the commission on Oct. 18 in Washington at the Chamber of Commerce of the United States before Commissioner G. S. Ferguson, Jr. Applications for the conference represent approximately 90 per cent of the hardware distributing industry in 14 Southern States. Among practices proposed for discussion are: Price discrimination; inducing breach of contract; misbranding; fraud and misrepresentation and secret rebates.

Foundry Labor Looking for Higher Wages

Cutting costs in a jobbing foundry was the subject selected by F. D. Campbell, Eastern Steel Castings, Newark, N. J., for his address at the October meeting of the New England Foundrymen's Association at the Exchange Club, Boston, Oct. 9.

The working space of the plant approximates 100,000 sq. ft., the average weight of castings produced is 20 lb., as high as 6 tons of metal is put into the molds in 9 min., all the result of high concentration of appliances. The company recovers 80 per cent of its defective castings at its shakeouts, which means a tremendous saving in subsequent handling departments. Of particular interest were the illustrations which he showed of sand hoppers equipped with automatic lubricated vibrators.

Carl S. Neumann, president of the New England association, presided and first introduced A. E. McClintock, National Founders Association, who gave a brief sketch of what the foundry labor situation is and is likely to be during the next six months or so. He stated that great pressure is being brought to bear on the president of the iron molders' union to start some sort of movement to lessen working hours and increase the pay in localities not receiving $1 an hour.

So far as can be ascertained, the foundry union intends to start next spring a general movement for a five-day week and $1.25 an hour wage with the hope of ultimately securing $1.10.

This Issue in Brief

Daily production meeting helps manufacturer keep delivery promises. Orders are assigned to various departments, delivery dates are set, production record is discussed, and delays are investigated.—Page 1033.

* * *

Don't pile coal higher than 12 ft., if spontaneous combustion is to be avoided. Soft coal should not be stored in damp spots. Air spaces should be eliminated by tamping.—Page 1041.

* * *

Business collapse is not likely to result from stock market deflation. Industry and trade are free from inflation, says economist. No serious business depression is in prospect, if industry has not in general overestimated market requirements. —Page 1034.

* * *

Cuts costs almost in half by annealing magnetic sheets in electric furnace, filled with non-oxidizing gas. Oxidation is prevented. The sheets come out clean. Stickers are eliminated.—Page 1037.

* * *

If your plant burned down tomorrow insurance would not repay you for lost customers. Every industrial manager should study fire-prevention methods. Every plant should have at least one fire squad, and fire prevention equipment should be tested regularly.—Page 1041.

* * *

If your foundry melts more than 50 tons daily you can save money by using the hot-blast cupola, says foundry engineer. Hot blast makes a big saving in coke. The usual ratio is 14 to 1. —Page 1047.

Determines cost of operating open-hearth furnaces with various grades of scrap. Block scrap has the highest value and detinned sheet the lowest.—Page 1026.

* * *

Use carefully drawn stock for cold-heading and thread-rolling. If split threads occur, the wire was not drawn enough.—Page 1027.

* * *

Forging furnace brick lasts longer and heat is conserved if the walls are treated with "Albany slip." Finely ground powder suspended in water is sprayed over the cold brick and left to dry.—Page 1028.

* * *

Bonus for analysis control is paid steel foundry melters. Bonus is based upon a score obtained by dividing the total number of points outside the desired analysis by the total number of heats. —Page 1030.

* * *

New big market for equipment and steel will result from building of passenger terminals at airports. Practically no facilities exist at present. Air depot will follow closely the methods used in modern railroad terminals, engineers believe.—Page 1023.

* * *

Forging quality is not influenced by presence of dendritic structure. In the forged and heat-treated condition, no material difference can be detected in the tensile properties, so investigator concludes that the microstructure and not the macrostructure is the dominant factor.—Page 1028.

Before accepting car of scrap a 1000-lb. test heat is made, prior to unloading car. Test piece is analyzed, and used as a basis for acceptance or rejection, and also for placing the scrap in its proper bin, according to analysis.—Page 1029.

* * *

Heading dies for cap screws, machine screws and rivet blanks last longer if wire is liquor-finished. The copper sulphate wash fills in seams and pores on the wire surface.—Page 1027.

* * *

By glazing the walls of furnace for annealing steel castings, good heat reflection is obtained, and equality of temperature between furnace walls and contents is promoted.—Page 1028.

* * *

Heat treating increases the tensile strength of cold-headed bolt blanks and refines the metal structure. Water-quenching is a good toughener.—Page 1027.

* * *

Unfilled steel orders show first gain since April. Steel Corporation's balance on order Oct. 1 was 3,902,581 tons, a gain of 244,370 tons.—Page 1051.

* * *

Boiler shops are working to closer limits. Rough-and-ready methods have been superseded by machine shop precision. Twenty years ago ½ in. out-of-round would go uncriticized. Today 1/16 in. out-of-round is about the maximum allowable.—Page 1055.

A. I. FINDLEY
Editor

THE IRON AGE

W. W. MACON
Managing Editor

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How Is General Business?

CONFRONTED with a decline in steel production when the normal seasonal trend is upward, and observing that there is a wide difference in the degree of activity in various consuming lines, the steel trade wants to know what is the real condition and trend in general business. In various respects there is confusion of testimony, particularly when different periods of time are taken for comparison. Thus, while "the year to date" compared with the same period in the preceding year has usually been a favorite basis for comparison, that fails to be informative at the present time, for the real question is whether any important change has occurred recently. This difficulty is increased by the fact that last year had its parts out of proportion, the second half being unusually good relative to the first half, which would set this year's comparisons with "a year previous" awry.

As to the validity of the steel trade's own showing, that of production, there is necessarily some doubt. When June, July and August showed 25 per cent heavier production of steel ingots than the same months of last year the increase could not be accepted as a general measure. Men's habits as to working in the summer and wanting steel could not be so greatly altered. There were then belated deliveries, while there might now be a temporary reaction to the other side of the general line.

We have selected three general measures or indicators of trade at large, to see what they suggest. The comparison covers only the recent past, not a large part of this year, for the question is whether any significant change has occurred recently. It develops that check payments in four weeks, freight car loadings in four weeks and Portland cement shipments in two months show increases from a year previous, 11 per cent in check payments, 3 per cent in car loadings and 1 per cent in cement shipments. The comparison is with what may be called the better part of last year.

These three general measures make a reasonably favorable comparison. In two important activities we have a different showing. Building contracts in eight weeks decreased in value 15 per cent from a year previous. Automobile production last month was below that of a year previous, making an impressive divergence, as previous months this year had run higher than a year previous, most of them very much higher.

It is easy to give too much regard to these individual instances. There is so much income or so much capital available, and the choice of how the money is spent may easily vary from time to time. One readily recalls complaints of clothing and shoe manufacturers that people were spending too much money on automobiles.

The decrease in automobile trade activity is measurable and it accounts for the greater part of the falling off in total steel production, while there has been a seasonal decrease in rail production that accounts for much of the remainder. It is evident that there has been no widespread decrease in the demand for steel even though the demand was exceptionally heavy earlier in the year. Many of the consuming trades must still be doing very well indeed.

Uncle Shylock

IT is notorious that Uncle Sam, exercising his attentive hand through the medium of bureaucratic nurses, mentors and policemen, is not very good to his nephews and nieces. We even forget that he is our uncle at all, so threatening, meticulous, and even confiscatory is he at times. Since the progressive, or we should say the bilious, senators have got ideas of their own about predatory wealth he seems to have become even harsher. Uncle Sam is no story-book uncle. Indeed, we may even be tempted to accept the European characterization of Uncle Shylock.

Every one who does business with Washington knows the trials and tribulations of it, especially in matters of contracts. In the matter of tax-gathering the contact has become even broader. The sour-grape politicians raise a rumpus every now and then over occasional income tax refunds, which we may be sure would never be made unless they were clearly due. Quite likely the Government trims its citizens more often than the other way around.

One of our friends who had to pay a large income tax discovered, after payment of the first installment, that his clerks had made an error in computation. So an amended return was filed, the data remaining exactly as originally reported, but the tax being recomputed. He was required, however, to continue his installments in accordance with the original, erroneous filing. After many days he received a refund, but he was out of pocket the interest on his overpayment.

Perhaps there have been even more quarrels over payment of duties on goods brought home by travelers abroad. The ungenerous law allows each person free entry of $100 worth. Many travelers have raised the question what is $100 worth. The law says wholesale value, but the inspectors and appraisers on the wharves have said retail value and have demanded of the victim to exhibit his bills of sale. If the victim has made an estimated discount to reduce to wholesale value he has been doomed to trouble.

The commissioner of customs has recently ruled

that incoming travelers who have known the law have had the right interpretation of it, and it follows that the great majority who have been ignorant or browbeaten have been overpaying Uncle Sam to the extent of some millions per annum. It is next to impossible, of course, to ascertain the wholesale or manufacturing value of the numerous trinkets and articles of clothing that tourists purchase abroad, and so comply with the letter of the law, but the traveler who is experienced in chaffering in Continental shops is pretty sure that what he finally pays is somewhere from plus 50 to plus 100 per cent.

World Steel at New High

NOT alone in the American steel industry is production on the increase this year. An analysis of the rate of steel output of five other leading countries shows that in each one there has been a substantial increase during the first half of this year. Production to July 1 of the six foremost producers, compared with the half-year outputs of 1928 and 1913, was as follows in thousands of gross tons per month, according to the compilation of the National Federation of Iron and Steel Manufacturers of Great Britain:

Monthly Steel Output for First Six Months

	1929	1928	1913
Great Britain	813.8	710.4	638.6
United States	4,828.0	4,154.8	2,608.4
Germany	1,365.6	1,190.8	1,445.7
France	790.2	769.8	384.5
Belgium	334.6	322.8	202.3
Luxemburg	215.8	211.0	109.0
The six	8,348.0	7,359.6	5,388.5

Thus at 8,348,000 tons per month to July 1, this year's rate is roundly a million tons, or 13 per cent, larger than the 7,359,600 tons per month in 1928. It is 55 per cent in excess of the rate of 1913.

While the American increase has been large—16 per cent to July 1 over 1928—the British have also made a good showing at 14.5 per cent. Germany has done equally well, having an increase of 14.7 per cent over 1928, but this is accounted for in part by a strike at the end of 1928. The gain in the other three countries has not been so large.

While the remainder of the year may not realize so large an increase as the first half—it certainly will not in the United States—the year's output for these six will possibly exceed 100,000,000 tons, compared with 88,315,200 tons for 1928—an increase of over 13 per cent. This year's showing is emphatic witness to the fact that the European steel industry has recovered from the war and is now headed toward prosperity. This is true of Russia, as well as of Poland, the Saar and Italy.

Length of Business Calls

HOW often is the length of a business call unsatisfactory to both the parties involved. The matter is a delicate one, for the fact that the visitor has taken extra time to make the visit, perhaps an overnight railroad journey, makes him in one sense the more important person of the two, though commonly that distinction is held by the other party to the conversation. But men who receive such visitors usually have many to see and that fact must also be taken into account. Wide differences are to be observed in the manner in which different men handle their visitors. Some have the knack of unobtrusively suggesting the time the caller is expected to spend or the proper scope of the conversation.

When a visitor has a long wait he is in one of two frames of mind when finally admitted. Either he is in a bad humor, which makes the visit less satisfactory to both parties, or he is in a mood, having seen others take so much time, to take his full share also. Of course, calls can be cut short unceremoniously, but that is not a good way to handle the matter. Obviously the call should leave no unpleasant recollection in the mind of either party.

It is assumed that nowadays the business calls that are made are necessary, involving only cases in which the mail, the telegraph or the telephone is inadequate. That makes them important, not mere routine to be gone through with somehow, and skill on both sides is called for in handling the matter. Every one observes how often there is a lack of skill. The office man may sometimes wish a given visitor would stay longer—certainly he wishes many would not stay so long—and the visitor on his part sometimes wishes he could have finished and got away again in less time.

Riveted Joints, Also, Are Better

ONE might imagine, from the plethora of matter on welding which has been carried in technical and engineering journals, and the relative silence from competitive processes, that the art of riveting was not progressing to any appreciable extent. That such a presumption does not correctly picture the situation, and is due to the lack of colorful news in an established industry, is immediately apparent to a visitor in a modern boiler works, particularly in one which makes drums for the higher pressures and superheats now installed in central stations.

Such an observer, remembering shop practices of 20 years ago, when inch plate was very heavy work, and ½ inch out-of-round would cause no criticism, opens his eyes at the close limits attained with the more precise machinery now available, even when working on much thicker and stiffer material. In fact, the rough and ready methods of the old-time boiler shop have been entirely superseded by machine shop precision. It is not surprising, indeed, to find that many of the foremen are men of machine shop training.

Refinements in boiler manufacture all point toward closer fitting. The thicker the plate, the more necessary is it that the shape should be correct (to avoid secondary stresses from the increased pressure), and that the fitting should be snug (to prevent leaks or infiltration of embrittling solutions). Consequently one sees the most meticulous care in the bending presses and rolls—1/16 inch out-of-round is about the maximum allowable. Edges are milled to correct angle; butt straps and faying surfaces are cleaned, ground and stoned to a paper fit. Bolts in unusual number are used for assembly prior to drilling the rivet holes; drilled holes would sometimes be reamed for a smoother surface and all burrs removed by a slight countersink. Rivets are machined on the shanks and under the head. Ground shanks are even resorted to for work to withstand the highest pressures, with clearances between the hot rivet and hole on the order of 0.01 inch. Imagine, if you can, what would have greeted a specification in 1900, calling for clearance of

1/32 inch in a 1½-inch rivet. It just simply wasn't done. That close fits are really necessary nowadays is indicated by the general practice of machining the skirts of the forged drum heads, turning the inside of the completed drum, and heating the latter mildly for a shrink fit over the head.

While many of these refinements have to do with boiler details other than riveting, the use of turned and ground rivets is in keeping with precision, the general order of the day. Riveting machinery has also been improved in step with advances in other machine tools, not only increasing in power and reach, but in adaptability and ease by which a drum weighing several tons can be moved a fraction of an inch to bring the head-forming dies or snaps in exact line with the center of the rivet hole. Such developments are matched in other plants using lighter thicknesses of metal in mass production, by machines making their own rivets and driving them cold at high speed, or shooting a pre-formed rivet into its hole by a compressed air gun.

No one familiar with the facts can doubt that the quality of the riveted joint made today is better than that of twenty years ago. Even its welding-minded competitors must admit that the riveting machine is extremely efficient (in the sense of cheap to operate) because such a complicated series of operations as laying out, punching and reaming or drilling the holes, assembling, and riveting the seam can still in most cases be quoted at a less price than merely assembling and welding. That in itself is proof that the art of riveting and the manufacturers of riveting machines have been progressing.

Prolonged Activity in Building

ALTHOUGH building construction permits have continued to decline (September making one of the poorest showings of the year, as reported by the F. W. Dodge Corporation), the types of structure that require heavy steel shapes remain an outstandingly strong support of the steel industry. The falling off this year, as compared with 1928, has been mostly in small-type residential buildings. Large work has been going ahead at an almost unprecedented pace, particularly in the New York district.

Figures compiled by the Structural Steel Board of Trade of New York show that in the nine months ended Sept. 30 the steel fabricators of the metropolitan area booked 423,501 tons of structural work in buildings alone, as compared with 458,259 tons for all of last year. Records are not kept by the Structural Steel Board of Trade on so-called civil engineering work, such as subways, bridges and elevated highways, but unofficial records indicate that the awards of steel for such work this year have fully equaled the tonnage used for buildings.

A large volume of new projects in New York is now in contemplation. THE IRON AGE last week reported that 63,000 tons had been inquired for, an unusually high weekly total. Large-scale work, some of which may not actually come into the market until next year, is in prospect. Included are the Metropolitan Opera House project, taking in two city blocks on Fifth Avenue; the Cornell medical center, the first units of which are now calling for 18,000 tons of steel, and a continuation of the city's subway program, with 100 additional miles of lines to be constructed within the near future.

With such enormous projects as the new Empire State Building, to be erected on the site of the old Waldorf-Astoria Hotel, requiring 40,000 tons of steel and itself constituting a city of office workers, and other buildings now in course of construction, some towering 60 stories or more, it may well be wondered whether New York office space will not soon reach the point of over-saturation. However, the constantly ascending scale of property valuations which such improvements bring to all surrounding sites, together with the better utilization of the less accessible sections which comes with new subway construction, will make necessary continuous rebuilding in New York to make investments profitable.

While special conditions prevail in the metropolitan district, because of its large and concentrated population, an approach to the New York situation is seen in some other cities in varying degrees. Chicago has pushed its business area well north of the Chicago River, breaking away from the limitations of its Loop district; Cleveland has undertaken a major reconstruction of its business area centering about the new union railroad terminal; Detroit business is moving miles up Woodward Avenue nearer to the large structures erected by the General Motors Corporation and the Fisher Brothers; Philadelphia is entering upon an era of rebuilding its business district, which will follow improvements now under way by the Pennsylvania Railroad.

Bookings of fabricated structural steel, as computed by the Department of Commerce, have run about 16 per cent ahead of those of 1928 for the country as a whole. In New York the indications are that steel for buildings for all of this year will take fully 25 per cent more than the 1928 total and possibly as much as 30 per cent.

While the outlook for a continued high rate of building construction is clouded somewhat by the money situation, this year's large-scale operations have gone on in spite of high money and the use of vast sums in the carrying of securities. A favorable indication of late is a revival of interest in the bond market. In the past this has been a sign of the return of money rates to a basis that would encourage investment in building construction.

Production Appears to Be Above Distribution

Industrial activity as a whole continues to make a more favorable showing than distribution, either at wholesale or retail. Although this statement must be made with full recognition of the incomplete and sometimes unreliable character of available data, it seems to be warranted by comparisons with past records. This is a situation commonly regarded as unfavorable in its bearing on the outlook for business, since it is taken to indicate that goods are being produced in response to a demand partly speculative, and is accompanied by a gradual accumulation of commodities in dealers' hands.

Something of the kind may be taking place in certain directions. It is suggested by the increase in dealers' stocks of automobiles, the market situation in certain branches of the textile and building-material industries, and similar conditions here and there in other parts of the business structure. While the heavy industries have

been making a series of new high records, the general level of trade, as measured by such standards as railroad freight loadings, bank debits, department store sales and the like, has followed approximately a normal course. Under such conditions, it would not be surprising to find that inventories in general were somewhat larger than a year ago.

If such a condition exists, however, it is not reflected in the usual ways. The level of commodity prices shows not the slightest trace of inflation; the transportation situation is excellent; there is no shortage of labor in most industries; and no conclusive evidence exists that stocks of goods in general are greatly above normal in relation to output and demand. Moreover, the general attitude of business men as to the probable course of trade in the next few months is unquestionably optimistic. —*Guaranty Survey.*

Business Survey Reveals Good Conditions

Industry throughout the country at the present moment is just a shade more favorably situated than it was a year ago, but numerous individual industries show recessions from their position last year, according to the annual trade survey of the National Association of Manufacturers, presented at the annual meeting in New York this week by J. Lewis Benton, general secretary of the organization.

A questionnaire, covering present trade, prospects for winter, comparison with last fall, production, sales quantities and values, employment, wages and labor conditions, was sent to 3000 members of the association the first of this month, with request that the report be made as of Oct. 4. The tabulation was closed Oct. 7, at which time nearly 1000 replies had been received. The survey covers a compilation of something more than 9000 detailed answers.

Taking the industries as a whole, of the companies reporting, 19 per cent class their present business as excellent; 45 per cent good; 31 per cent fair and 5 per cent poor. Last year they were classified, 17 per cent excellent; 41 per cent good; 34 per cent fair; 6 per cent poor. Prospects for the winter are regarded as excellent by 12 per cent; good by 54 per cent; fair by 30 per cent; poor by 4 per cent; while last year 14 per cent reported excellent; 43 per cent good; 36 per cent fair and 6 per cent poor.

Comparing the business done up to this fall with the same period last year, 53 per cent report better returns; 17 per cent less and 30 per cent find no change. A year ago the report was 50 per cent better; 25 per cent less; 25 per cent no change.

The Allis-Chalmers Mfg. Co. has received during the past week orders covering heavy power plant equipment for three utility companies, aggregating approximately $2,000,000.

The Week in Business

Drift of Current Financial and Economic Opinion

RECOVERY of the stock market, lower call money rates and a reduction in brokers' loans after seven weeks of continued expansion were marked developments of the past seven days.

Stocks regained two-thirds of the ground lost in the preceding month, but opinion still is divided regarding the next phase of the movement, according to Paul Willard Garrett, New York *Evening Post.*

Call Money Lowest in 14 Months

The drop in call money to 5 per cent, the lowest official figure for 14 months, is ascribed to various factors, among them the favorable position of the Federal Reserve banks, the buying of acceptances, the let-up in business activity and the loaning on call of large funds held by investment trusts. But the main cause, in the view of Alexander D. Noyes, New York *Times,* was stock market liquidation. He recalls the decline from 20 per cent to 6 per cent last March and the drop from 12 to 6 per cent last December. On both occasions resumption of speculation quickly drove up the rate again to 12 and 10. (On Monday, Oct. 14, it was 6 per cent.)

Decline in Brokers' Loans Sub-normal

The decline in brokers' loans—$91,000,000—was the least favorable omen, in Mr. Noyes's opinion, since previously a loan reduction of $120,000,000 to $220,000,000 in a week has always followed a roundup of stock market liquidation.

Reduced lending by banks more than accounted for last week's decline, as loans from "others" showed a further gain.

Appraisals of the credit situation are giving increasing attention to Federal Reserve policy. With the Reserve ratio at the high level of 74.4 per cent for the week ended Oct. 9, compared with 67.6 per cent one year previous, it is evident that more credit can easily be granted if the Reserve authorities so choose. Since the middle of July, says the *Annalist,* reserve holdings of acceptances have expanded more than $250,000,000 (corrected for seasonal variation). In fact, purchases of bills, in the view of Wade Brothers & Co., New York, are beyond ordinary seasonal needs.

Credit and Stable Commodity Prices

Control of credit by the Reserve Board may not have succeeded in harnessing stock market speculation, but it has undoubtedly been an important factor in preventing commodity price inflation.

In pre-war years an inflow of gold was usually attended by rising commodity values. But the increased imports of 1929 have been negatived by a contraction of Reserve credit. The level of wholesale prices during the year, according to the Alexander Hamilton Institute, has dropped some 2½ per cent.

American Buying Power Undiminished

With the more reassuring outlook in the money market has come a more sanguine view of business. "It is absurd," says Theodore H. Price in *Commerce and Finance,* "to maintain that American prosperity is conditioned upon a constant and unvarying gain in its business or industrial output. The truth is that the buying power of our wage earners and our agricultural workers is about as high as it ever was in the history of the country."

Meanwhile freight car loadings, for the week ended Sept. 28, were the largest this year, and shippers' advisory boards forecast heavier traffic in the current fourth quarter than last year for all but three out of 13 districts.

Recent relaxation in business activity has been chiefly due to a sharp drop in automobile production. L. A. Miller, president of the Willys-Overland company, states that manufacturers have shipped cars to dealers in excess of the purchasing power of their communities, resulting in an acute used car problem. New car stocks, on the other hand, have shown a downward trend in the past few months, according to *Automotive Industries.*

Iron and Steel Markets

Industry in Transition Period

Steel Producers Adjusting Themselves to Drastic Reduction in Automotive Demand—Banner Week in Railroad Car Orders

WITH further retrenchment by motor car manufacturers as they prepare to bring out new models, steel shipments to the automobile industry have reached the lowest point in 18 months. The reduction in demand from this major customer of the mills has been too drastic to be offset by the heavier requirements of the railroads, impressive as they are.

A failure to foresee the severity of this reaction, coupled with continued pressure for business volume, has caused wider unsettlement of the price situation, with dips in extreme cases of $2 and $3 a ton below market levels that prevailed 60 days ago.

The present problem of the steel industry is to adjust itself to a curtailed, though by no means low, scale of activity. It is perhaps significant that steel makers are increasingly concerned with gaging the duration of the present lull in automotive demand. While it is reported that the Chevrolet Motor Co. has suspended operations until Nov. 15, the placing of additional November orders for steel by both parts makers and motor car manufacturers themselves points to a gradual stepping up of the industry's production throughout next month. If this program is delayed it will be because of a general disposition to await changes in the Ford model before making definite plans for the future.

Steel ingot production has given further ground. The Steel Corporation's average is down to 80 per cent. The rate for the industry in the Chicago district is estimated at 85 per cent, while at Pittsburgh it does not exceed 80 per cent. The Youngstown average is 75 per cent and Wheeling district plants are running at 65 to 70 per cent of capacity.

Railroad equipment buying is the bright spot of the week. Orders for 11,600 freight cars raised the number placed since Oct. 1 to more than 18,000, requiring over 200,000 tons of steel, exclusive of the wheels and axles. New inquiries appeared for 6000 freight cars, as well as 45 locomotives.

The Pennsylvania will distribute orders for 310,000 tons of rails by the end of the week, and early action is expected on the New York Central's inquiry for 200,000 tons. The North Western and the Rock Island will also soon buy rails.

Rail purchases, as well as contracts for semi-finished steel, helped to account for the Steel Corporation's gain in unfilled tonnage in September. Specifications against these earlier orders are now being received and rail production at Chicago will be stepped up next week from 75 per cent to 80 per cent of capacity. The Ensley mill, which had been idle, resumed operations Monday.

Three light cruisers to be built in the Navy yards will require 22,000 tons of steel, on which bids will be opened early in November.

Pipe line inquiries from Cleveland and Detroit call for 10,000 to 15,000 tons of plates, and a 300-mile project for an oil company involves 20,000 tons of 4, 6 and 8-in. pipe.

Fabricated structural steel lettings for the week, at 23,000 tons, were light, but the unusually large total of pending work was augmented by new inquiries for 49,000 tons, of which 20,000 tons came out of the New York district.

Sheet mill operations have declined to 75 per cent of capacity or less, and strip mills are running at 50 to 60 per cent. Automobile body sheets are now generally quotable at 4c., Pittsburgh, or $2 a ton below the recent market. No. 13 blue annealed sheets have been sold to large buyers, in some instances, at 2.25c., Pittsburgh, also a reduction of $2 a ton. Such quotations, however, are usually made only by continuous mills, which have also sold No. 10 gage at as low as 2c., Pittsburgh, compared with a more common minimum of 2.10c.

Strip prices have been fairly steady, although occasional large tonnage sales of hot-rolled material have been made at 1.80c., a $2 a ton concession. Shapes and bars are more freely available at 1.90c., Pittsburgh, and plates, although still quoted at 1.95c., have not been exempt from shading.

Heavy melting scrap has declined 50c. a ton at Philadelphia and 25c. a ton at Chicago, but has developed strength at Pittsburgh, where a large steel company purchase took most of the surplus supplies out of the market.

Connellsville coke is firmer, following a sharp reduction in the output of furnace grade.

Pig iron buyers, particularly those near steel producing centers, have no incentive to hasten their purchases in view of the prospect of larger offerings of surplus tonnage from steel works blast furnaces. Reductions in foundry melt have been restricted mainly to the automobile industry. The Ford company, however, has bought 17,000 tons of basic iron and has placed additional orders for high-silicon malleable iron, bringing its total purchases of that grade in the past four weeks to 16,000 tons.

Fabricated structural steel lettings in September (computed) totaled 315,700 tons, compared with 365,750 tons in August. Bookings in the first nine months, at 2,952,950 tons, established a new record, exceeding the previous high mark of last year by nearly 16 per cent.

Both of THE IRON AGE composite prices are unchanged, finished steel at 2.369c. a lb., the lowest level so far this year, and pig iron at $18.29 a gross ton, which is 4c. a ton above the year's low.

A Comparison of Prices

Market Prices at Date, and One Week, One Month and One Year Previous, Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron, Per Gross Ton:	Oct. 15, 1929	Oct. 8, 1929	Sept. 17, 1929	Oct. 16, 1928
No. 2 fdy., Philadelphia	$21.26	$21.26	$21.26	$20.76
No. 2, Valley furnace	18.50	18.50	18.50	17.00
No. 2 Southern, Cin'ti	17.19	17.19	17.19	19.94
No. 2 Birmingham	14.50	14.50	14.50	16.25
No. 2 foundry, Chicago*	20.00	20.00	20.00	18.50
Basic, del'd eastern Pa.	19.75	19.75	19.75	19.75
Basic, Valley furnace	18.50	18.50	18.50	17.00
Valley Bessemer, del'd P'gh.	20.76	20.76	20.76	19.26
Malleable, Chicago*	20.00	20.00	20.00	18.50
Malleable, Valley	19.00	19.00	19.00	17.50
Gray forge, Pittsburgh	19.76	19.76	19.76	18.26
L. S. charcoal, Chicago	27.04	27.04	27.04	27.04
Ferromanganese, furnace	105.00	105.00	105.00	105.00
Rails, Billets, Etc., Per Gross Ton:				
Rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Light rails at mill	36.00	36.00	36.00	36.00
Rerolling billets, Pittsburgh	35.00	35.00	35.00	33.00
Sheet bars, Pittsburgh	35.00	35.00	35.00	33.00
Slabs, Pittsburgh	35.00	35.00	35.00	33.00
Forging billets, Pittsburgh	40.00	40.00	40.00	38.00
Wire rods, Pittsburgh	40.00	40.00	42.00	42.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.85	1.85	1.85	1.90
Finished Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Bars, Pittsburgh	1.90	1.90	1.95	1.90
Bars, Chicago	2.05	2.05	2.05	2.00
Bars, Cleveland	1.95	1.95	1.95	1.90
Bars, New York	2.24	2.24	2.29	2.24
Tank plates, Pittsburgh	1.95	1.95	1.95	1.90
Tank plates, Chicago	2.05	2.05	2.05	2.00
Tank plates, New York	2.22½	2.22½	2.22½	2.22½
Structural shapes, Pittsburgh	1.90	1.90	1.95	1.90
Structural shapes, Chicago	2.05	2.05	2.05	2.00
Structural shapes, New York	2.14½	2.19½	2.19½	2.19½
Cold-finished bars, Pittsburgh	2.30	2.30	2.30	2.10
Hot-rolled strips, Pittsburgh	1.90	1.90	1.90	1.75
Cold-rolled strips, Pittsburgh	2.75	2.75	2.75	2.75

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

Finished Steel,	Oct. 15, 1929	Oct. 8, 1929	Sept. 17, 1929	Oct. 16, 1928
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 24, P'gh	2.75	2.75	2.85	2.75
Sheets, black, No. 24, Chicago dist. mill	2.95	2.95	2.95	2.85
Sheets, galv., No. 24, P'gh	3.50	3.50	3.50	3.50
Sheets, galv., No. 24, Chicago dist. mill	3.60	3.60	3.60	3.60
Sheets, blue, No. 13, P'gh	2.35	2.35	2.35	2.10
Sheets, blue, No. 13, Chicago dist. mill	2.45	2.45	2.45	2.20
Wire nails, Pittsburgh	2.45	2.45	2.45	2.55
Wire nails, Chicago dist. mill	2.45	2.45	2.50	2.60
Plain wire, Pittsburgh	2.40	2.40	2.40	2.40
Plain wire, Chicago dist. mill	2.40	2.40	2.45	2.45
Barbed wire, galv., P'gh	3.10	3.10	3.20	3.20
Barbed wire, galv., Chicago dist. mill	3.15	3.15	3.30	3.25
Tin plate, 100 lb. box, P'gh	$5.35	$5.35	$5.35	$5.25
Old Material, Per Gross Ton:				
Heavy melting steel, P'gh	$17.25	$17.25	$18.25	$17.75
Heavy melting steel, Phila	15.50	16.00	16.50	16.00
Heavy melting steel, Ch'go	14.25	14.50	15.00	14.00
Carwheels, Chicago	14.00	14.00	14.00	13.75
Carwheels, Philadelphia	16.50	16.50	16.50	16.50
No. 1 cast, Pittsburgh	15.50	15.50	15.50	15.50
No. 1 cast, Philadelphia	16.00	16.00	16.50	17.00
No. 1 cast, Ch'go (net ton)	14.50	14.50	14.50	15.50
No. 1 RR. wrot, Phila	16.00	16.00	16.00	15.50
No. 1 RR. wrot., Ch'go (net)	14.00	14.00	14.00	12.75
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$2.65	$2.65	$2.65	$2.85
Foundry coke, prompt	3.75	3.75	3.75	3.75
Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	18.12½	18.12½	18.12½	15.25
Electrolytic copper, refinery	17.75	17.75	17.75	15.00
Tin (Straits), New York	42.25	43.37½	45.00	48.50
Zinc, East St. Louis	6.80	6.80	6.80	6.25
Zinc, New York	7.15	7.15	7.15	6.60
Lead, St. Louis	6.70	6.70	6.70	6.32½
Lead, New York	6.90	6.90	6.90	6.50
Antimony (Asiatic), N. Y.	8.50	8.50	8.75	11.00

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Pittsburgh

Steel Plant Operations Curtailed Further—Shipments to Automobile Industry Smallest in 18 Months

PITTSBURGH, Oct. 15.—Pittsburgh and nearby steel companies, particularly makers of flat-rolled products, have curtailed operations further in the last week. With shipments to the automobile industry at the lowest point in about 18 months, steel makers are now chiefly concerned in gaging the duration of the present lull in buying from that quarter. The Chevrolet Motor Co. today suspended operations until Nov. 15, but the placing of November orders by parts makers and the automobile companies themselves indicate that production will be gradually stepped up next month. The automobile industry seems to be waiting for proposed changes in the Ford model before making any definite plans for the future.

Placing of rather large car orders with railroad equipment builders tributary to Pittsburgh mills has been the most favorable factor in this market during the past week. This business will contribute heavily to the backlogs of local plate mills and at least one nearby car builder now has sufficient work ahead of it to last well into the first quarter of next year.

Barge builders are also well occupied for the remainder of the year and structural fabricators and shape mills are fairly busy. Demand for bars has improved slightly, but is by no means good.

The local rail mill will soon be actively engaged on new orders. The pipe market is quiet, but has been improved by an inquiry from a large oil company for 300 miles of 4, 6 and 8-in. line pipe.

Large users of tin plate are beginning to allot their 1930 tonnage, but operations of independent makers have declined further since the first of the month. The average for the industry is held up by the comparatively high rate of operations of the leading maker.

Reduced demand from the automobile industry has forced down sheet operations to about 75 per cent of capacity, while strip makers are not more than 60 per cent engaged. In the face of such light demand, strip prices have held remarkably well and concessions are still rather exceptional on both hot and cold-rolled material. Demand for cold-finished steel bars is also very quiet, but the price is holding.

Sheet prices are weak, but mills are making determined efforts to hold the market at recently reduced levels. In the Pittsburgh district, wire and wire nail prices are gaining some stability, but shading is still common in adjacent territory.

Pig iron is quiet, but shipments are improving slightly. A local steel company is inquiring for a tonnage of basic. The scrap market has developed considerable strength following a large purchase by a nearby steel company, which took most of the surplus heavy melting steel out of the market. Coke is also stronger and production of the furnace grade has been reduced sharply in the Connellsville district.

Pig Iron.—With the exception of an inquiry for basic iron by the Edgewater Steel Co., Oakmont, Pa., the pig iron market is very quiet. Sales of carload lots are common, but large users who have not contracted for their last quarter requirements seem in no hurry to cover and are buying on a hand-to-mouth basis. Shipments from local and Valley furnaces are a trifle heavier than they were in September and yard stocks of leading producers have grown very little. Some sellers are fairly well covered for several weeks, but others are beginning to need orders. Steel company iron is not yet a factor in the market, at least not any more than it is under normal conditions, but the possibility of cheaper iron being available as steel company operations decline is certainly giving large users of basic no incentive to hurry their purchases. Prices are holding at $18.50, Valley, for basic and foundry iron and at $19 for malleable and Bessemer.

Prices per gross ton, f.o.b. Valley furnace:

Basic	$18.50
Bessemer	19.00
Gray forge	18.00
No. 2 foundry	18.50
No. 3 foundry	18.00
Malleable	19.00
Low phos., copper free	27.00

Freight rate to Pittsburgh or Cleveland district, $1.76.

Prices per gross ton, f.o.b. Pittsburgh district furnace:

Basic	$19.00
No. 2 foundry	19.00
No. 3 foundry	18.50
Malleable	19.50

Freight rates to points in Pittsburgh district range from 63c. to $1.13.

Semi-Finished Steel.—This market is dull, as large users have quietly extended their third quarter contracts and very little spot tonnage is coming into the picture just now. Shipments are about the same as they were during the greater part of September, although the requirements of some consumers have been curtailed slightly this month. This is notably true in the case of strip makers, whose operations are very low. Mills have now fully replenished their normal reserve stocks of unfinished steel and, in the face of light demand from their finishing mills, are reducing operations from week to week. The price structure for the fourth quarter has been given little open market test, but it seems reasonably certain that small tonnages have moved at $35, Pittsburgh or Youngstown, for billets, slabs and sheets bars. Large customers enjoy preferentials in the usual way. There is some consumer opposition to this price, particularly from sheet makers who are selling their finished product at lower prices. Wire rods have settled to $40, Pittsburgh or Cleveland, and fourth quarter contracts of most users have been readjusted to this level. Further price weakness seems unlikely at this time, as makers of wire and nails are striving to maintain the market at present levels and a decline in raw material prices would have an unfavorable sentimental effect.

Bolts, Nuts and Rivets.—Demand has declined slightly this month, but bolt and nut makers are still operating at a good rate for this season of the year. The average for the industry is not less than 65 per cent of capacity. Better business is anticipated in view of the large car orders now being placed and the carriers are expected to be heavy consumers during the remainder of the year. Prices are unchanged at 70 per cent off list for bolts and nuts and $3.10 a 100 lb., base Pittsburgh, for large rivets. Rivets 7/16-in. and smaller are sold at 70 and 10 per cent off list.

Rails and Track Supplies.—The market is very active from the standpoint of work in prospect, but actual awards have not been numerous in the last week. The Louisville & Nashville has placed 62,000 tons of rails with the Southern mill, as well as 10,000 kegs of spikes with the same maker. The New York Central and the Pennsylvania have not yet announced the distribution of their rail orders and the Baltimore & Ohio has not brought out its inquiry. Specifications for track accessories are rather light at this time of the year, but are seasonably satisfactory. Light rails are quiet, with prices ranging from $34 on the rerolled product to $36 for the new billet material.

Bars, Shapes and Plates.—Business in the first half of October has shown no further decline from September and slight improvement is reported from some quarters. Pittsburgh district mills are not yet receiving specifications against recent car orders placed with builders in this area, although recent awards will benefit Pittsburgh shops. It is expected that the steel for 1500 of the 5000 freight cars placed by the Southern will come to a mill in this territory. Barge business is also showing improvement; a recent order for five steel barges placed with a local maker will take 750 tons. Considerable additional tonnage is in prospect from this source and the completion of the Ohio River canalization project, which will be celebrated this week, is expected to give renewed impetus to this work. Structural business is marking time, and, although few large projects are coming out in this vicinity, both mills and fabricators in this district are well occupied with work from more distant points. Demand for merchant bars is not active. Cold-finishing mills are operating at a reduced rate and other large consumers are only fairly well occupied. The reinforcing bar trade, which has been very busy all summer, is growing less active as cold weather approaches. Prices show no substantial change, with mills still quoting 1.95c., Pittsburgh, on plates, but with the market on bars and shapes ranging from 1.90c. to 1.95c. Large tonnages nearly always command the lower price. There is less question about the plate price, as demand is somewhat stronger and mills have less incentive to quote a lower figure.

Wire Products.—Following several weeks of instability, wire and wire nail prices appear to be gaining some strength at recent low levels. In Pittsburgh, the minimum on nails is $2.45 a keg, although concessions in outlying districts are reported occasionally. The wire price to jobbers is still somewhat unsettled, but the price to the manufacturing trade is holding at 2.40c., Pittsburgh. Demand is generally quiet, so far as jobbers are concerned, but there is a fair movement of manufacturers' wire. The lull in automotive buying has adversely affected business with some makers.

The Iron Age Composite Prices

Finished Steel

Oct 15, 1929, 2.369c. a Lb.

One week ago	2.369c.
One month ago	2.398c.
One year ago	2.362c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products make 87 per cent of the United States output of finished steel.

	High	Low
1929	2.412c., April 2;	2.369c., Oct. 8
1928	2.391c., Dec. 11;	2.314c., Jan. 3
1927	2.453c., Jan. 4;	2.293c., Oct. 25
1926	2.453c., Jan. 5;	2.403c., May 18
1925	2.560c., Jan. 6;	2.396c., Aug. 18

Pig Iron

Oct. 15, 1929, $18.29 a Gross Ton

One week ago	$18.29
One month ago	18.29
One year ago	17.84
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High	Low
1929	$18.71, May 14;	$18.25, Aug. 27
1928	18.59, Nov. 27;	17.04, July 24
1927	19.71, Jan. 4;	17.54, Nov. 1
1926	21.54, Jan. 5;	19.46, July 13
1925	22.50, Jan. 13;	18.96, July 7

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base per Lb.
F.o.b. Pittsburgh mill	1.90c. to 1.95c.
F.o.b. Chicago	2.05c.
Del'd Philadelphia	2.22c. to 2.27c.
Del'd New York	2.24c. to 2.29c.
Del'd Cleveland	1.92½c. to 1.95c.
F.o.b. Cleveland	1.90c.
F.o.b. Lackawanna	2.00c. to 2.05c.
F.o.b. Birmingham	2.10c.
C.i.f. Pacific ports	2.35c.
F.o.b. San Francisco mills	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills, 40, 50, 60-ft.	2.05c.
F.o.b. Pittsburgh mills, cut lengths	2.30c.
F.o.b. Birmingham, mill lengths	2.10c.

Rail Steel

F.o.b. mills, east of Chicago dist.	1.85c. to 1.90c.
F.o.b. Chicago Heights mill	1.95c.
Del'd Philadelphia	2.27c.

Iron

Common iron, f.o.b. Chicago	2.05c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	2.12c.
Common iron, del'd New York	2.14c.

Tank Plates

	Base per Lb.
F.o.b. Pittsburgh mill	1.95c.
F.o.b. Chicago	2.05c.
F.o.b. Birmingham	2.10c.
Del'd Cleveland	2.14c.
Del'd Philadelphia	2.15c.
F.o.b. Coatesville	2.05c.
F.o.b. Sparrows Point	2.05c.
F.o.b. Lackawanna	2.05c.
Del'd New York	2.22½c.
C.i.f. Pacific ports	2.35c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh mill	1.90c. to 1.95c.
F.o.b. Chicago	2.05c.
F.o.b. Birmingham	2.10c.
F.o.b. Lackawanna	2.05c.
F.o.b. Bethlehem	2.05c.
Del'd Cleveland	2.14c.
Del'd Philadelphia	1.96c. to 2.06c.
Del'd New York	2.14½c.
C.i.f. Pacific ports	2.35c.

Hot-Rolled Hoops, Bands and Strips

	Base per Lb.
6 in. and narrower, P'gh	2.00c.
Wider than 6 in., P'gh	1.90c.
6 in. and narrower, Chicago	2.20c.
Wider than 6 in., Chicago	2.10c.
Cooperage stock, P'gh	2.20c.
Cooperage stock, Chicago	2.30c.

Cold-Finished Steel

	Base per Lb.
Bars, f.o.b. Pittsburgh mill	2.30c.
Bars, f.o.b. Chicago	2.30c.
Bars, Cleveland	2.30c.
Bars, Buffalo	2.30c.
Shafting, ground, f.o.b. mill	*2.65c. to 3.60c.
Strips, P'gh	2.75c. to 2.85c.
Strips, Cleveland	2.75c. to 2.85c.
Strips, del'd Chicago	3.05c. to 3.15c.
Strips, Worcester	2.90c. to 3.00c.
Fender stock, No. 20 gage, Pittsburgh or Cleveland	4.25c.

*According to size.

Wire Products

(Carload lots, f.o.b. Pittsburgh and Cleveland, to jobbers and retailers.)

	Base per Keg
Wire nails	$2.45 to $2.55
Galvanized nails	4.45 to 4.55
Galvanized staples	3.15 to 3.25
Polished staples	2.90c. to 3.00c.
Cement coated nails	$2.45 to $2.55
	Base per 100 Lb.
Bright plain wire, No. 6 to No. 9 gage	$2.40 to $2.50
Annealed fence wire	2.55 to 2.65
Spring wire	3.50 to 3.60
Galv'd wire, No. 9	3.00 to 3.10
Barbed wire, galv'd	3.10 to 3.20
Barbed wire, painted	2.85 to 2.95
Woven wire fence (per net ton to retailers)	65.00

Chicago district mill and delivered Chicago prices are $1 per ton above the foregoing. Birmingham mill prices $3 a ton higher; Worcester, Mass. (wire), mill $3 a ton higher on production of that plant; Duluth, Minn., mill $2 a ton higher; Anderson, Ind., $1 higher.

Cut Nails

	Per 100 Lb.
Carloads, Wheeling, Reading or Northumberland, Pa.	$2.70
Less carloads, Wheeling or Reading	2.80

Light Plates

No. 10, blue annealed, f.o.b. P'gh.	2.10c. to 2.20c.
No. 10, blue annealed, f.o.b. Chicago dist.	2.30c.
No. 10, blue annealed, del'd Phila.	2.42c. to 2.52c.
No. 10, blue annealed, B'ham	2.35c.

Sheets

Blue Annealed

	Base per Lb.
No. 13, f.o.b. P'gh	2.25c. to 2.35c.
No. 13, f.o.b. Chicago dist.	2.45c.
No. 13, del'd Philadelphia	2.57c. to 2.67c.
No. 13, blue annealed, B'ham	2.50c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh	2.75c.
No. 24, f.o.b. Chicago dist. mill	2.95c.
No. 24, del'd Philadelphia	3.07c.
No. 24, f.o.b. Birmingham	3.00c. to 3.10c.

Metal Furniture Sheets

No. 24, f.o.b. P'gh	4.10c. to 4.20c.

Galvanized

No. 24, f.o.b. Pittsburgh	3.50c. to 3.60c.
No. 24, f.o.b. Chicago dist. mill	3.60c. to 3.70c.
No. 24, del'd Cleveland	3.59c. to 3.69c.
No. 24, del'd Philadelphia	3.82c. to 3.92c.
No. 24, f.o.b. Birmingham	3.75c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.90c. to 3.00c.
No. 28, f.o.b. Chicago dist. mill	3.00c. to 3.10c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh	4.00c.

Long Ternes

No. 24, 8-lb. coating, f.o.b. mill	4.00c. to 4.10c.

Vitreous Enameling Stock

No. 24, f.o.b. Pittsburgh	3.90c.

Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills	$5.35
Standard cokes, f.o.b. Gary	5.45

Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)
(Per Package, 20 x 28 in.)

8-lb. coating I.C.	$11.20
15-lb. coating I.C.	14.00
20-lb. coating I.C.	15.30
25-lb. coating I.C.	$16.70
30-lb. coating I.C.	17.75
40-lb. coating I.C.	19.85

Alloy Steel Bars

(F.o.b. makers' mill)

Alloy Quality Bar Base, 2.65c. to 2.75c. per Lb.

S.A.E. Series Numbers		Alloy Differential
2000	(½% Nickel)	$0.25
2100	(1¼% Nickel)	0.55
2300	(3½% Nickel)	1.50
2500	(5% Nickel)	2.25
3100	Nickel Chromium	0.55
3200	Nickel Chromium	1.35
3300	Nickel Chromium	3.80
3400	Nickel Chromium	8.20
4100	Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50
4100	Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600	Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel)	1.05
5100	Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100	Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100	Chromium Spring Steel	0.20
6100	Chromium Vanadium Bars	1.20
6100	Chromium Vanadium Spring Steel	0.95
9250	Silicon Manganese Spring Steel (flats)	0.25
	Rounds and squares	0.50
	Chromium Nickel Vanadium	1.50
	Carbon Vanadium	0.95

Above prices are for hot rolled steel bars, forging quality. The differential for cold-drawn bars is ¾c. a lb. higher, with standard classification for cold-finished alloy steel bars applying. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis.

Billets under 4 x 4 in. carry the steel bar base. Slabs with a sectional area of 16 in. or over carry the billet price. Slabs with sectional area of less than 16 in. or less than 2½ in. thick, regardless of sectional area, take the bar price.

Rails

	Per Gross Ton
Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	36.00
Light (from rail steel), f.o.b. mill	34.00
Light (from billets), f.o.b. Ch'go mill	36.00

Track Equipment

	Base per 100 Lb.
Spikes, ⅝ in. and larger	$2.80
Spikes, ½ in. and smaller	2.80
Spikes, boat and barge	3.00
Tie plate, steel	2.15
Angle bars	$2.75
Track bolts, to steam railroads	$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel Inches	Black	Galv.	Iron Inches	Black	Galv.
⅛	45	19½	¼ and ⅜	+11	+36
¼ to ⅜	51	25½	½	23	5
½	56	42½	¾	28	11
¾	60	48½	1 and 1¼	31	15
1 to 3	62	50½	1½ and 2	35	18

Lap Weld

2	55	43½	2	23	9
2½ to 6	59	47½	2½ to 3½	28	13
7 and 8	56	43½	4 to 6	30	17
9 and 10	54	42½	7 and 8	29	16
11 and 12	53	40½	9 to 12	26	11

Butt Weld, extra strong, plain ends

⅛	41	24½	¼ and ⅜	+13	+48
¼ to ⅜	47	30½	½	23	7
½	53	42½	¾	28	12
¾	58	47½	1 to 2	34	18
1 to 1½	60	49½			
2 to 3	61	50½			

Lap Weld, extra strong, plain ends

2	53	42½	½	29	13
2½ to 4	57	46½	2½ to 4	34	20
4½ to 6	56	45½	4½ to 6	33	19
7 to 8	52	39½	7 and 8	31	17
9 and 10	45	32½	9 to 12	21	8
11 and 12	44	31½			

On carloads the above discounts on steel pipe are increased on block by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Steel		Charcoal Iron	
2 in. and 2¼ in.	38	1½ in.	1
2½ in.—2¾ in.	46	1¾ in.	8
3 in.	52	2 in.—2¼ in.	13
3¼ in.—3¾ in.	54	2½ in.—2¾ in.	16
4 in.	57	3 in.	17
4½ in. to 6 in.	46	3¼ in. to 3½ in.	18
		4 in.	20
		4½ in.	21

On lots of a carload or more, the above base discounts are subject to a preferential of two fives on steel and of 10 per cent on charcoal iron tubes. Smaller quantities are subject to the following modifications from the base discounts:

Lap Welded Steel—Under 10,000 lb., 6 points under base and one five; 10,000 lb. to carload, 4 points under base and two fives. Charcoal Iron—Under 10,000 lb., 2 points under base; 10,000 lb. to carload, base and one five.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	61	3 in.	46
1¼ to 1½ in.	53	3¼ to 3½ in.	48
1¾ in.	37	4 in.	51
2 to 2¼ in.	32	4½, 5 and 6 in.	40
2½ to 2¾ in.	40		

Hot Rolled

2 and 2¼ in.	38	3¼ to 3½ in.	54
2½ and 2¾ in.	46	4 in.	57
3 in.	52	4½, 5 and 6 in.	46

Beyond the above base discounts a preferential discount of 5 per cent is allowed on carload lots. On less than carloads to 10,000 lb., base discounts are reduced 4 points with 5 per cent preferential; on less than 10,000 lb., base discounts are reduced 6 points, with no preferential. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage take the mechanical tube list and discounts. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30%, base (carloads)	55
Carbon, 0.30% to 0.40%, base	50

Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

Ferroalloys.—Shipments have declined slightly in the last month, but one or two companies have recently increased their requirements, following curtailment in August and September. Both buyers and sellers of ferromanganese are watching the tariff situation closely, but it is likely that next year's contracts will be made on the basis of present conditions, with revision in case the duty on manganese ore is removed. Contracting will begin in another month. Spiegeleisen is quiet and the market is lacking in inquiry.

Warehouse Business.—Sales out of warehouse have been rather slow in this district in the last few weeks, but prices have not reflected weakness in mill quotations, except in the case of sheets and wire nails. Black sheets are quoted at 3.80c. a lb. in lots of 25 or more bundles, while galvanized are at 4.45c. Wire nails are available at $2.80 a keg, and plain wire is off $2 a ton. Plates and structural shapes are holding at 3c., and reinforcing bars at 2.75c., in cut lengths.

Tubular Products. — Business in standard butt-weld pipe is reaching the end of its season, but mills are still fairly well occupied. This product has shown something of a decline from last year in aggregate tonnage, but makers who have followed the trend of small building work during the year have not been disappointed in the showing. Lap-weld operations continue fairly high, but are on a hand-to-mouth basis and few mills have any large backlog tonnages. Demand from the oil country is only fair, but seamless mills have had a fair year and see no prospect of any marked curtailment in demand. Pipe makers are watching the oil industry closely in an effort to discern the trend of conservation programs in prospect, but moves in this direction are not expected to have any immediate effect on steel pipe business. Mechanical tubing is quiet, but there is a fair demand for boiler tubes. The recent $4 a ton advance in seamless and lap-welded boiler tubes has been adopted by all makers.

Sheets. — Declining sheet demand which has been in evidence for several weeks is now beginning to be reflected fully in sheet mill operations, which are now not more than 75 per cent of capacity, with some companies considerably under that figure. The leading interest ran its mills last week at 79 per cent. After record September shipments the decline this month is rather marked, but there are already signs of improved demand for November rolling. By that time the large makers of automobiles are expected to have completed their model changes and, although improvement may be rather slow, production schedules are expected to be stepped up regularly. Prices are still rather unsettled. Black sheets have definitely declined to 2.75c., Pittsburgh, and mills are no longer making any effort to get more than 4c. for automobile body sheets. Higher quotations are encountered occasionally. Galvanized material is still quotable at 3.50c. to 3.60c., Pittsburgh, although the higher figure is applying on less business than it did a month ago. On blue annealed sheets, prices on the jobbing mill product are holding at 2.20c. and 2.35c., Pittsburgh, for the No. 10 and No. 13 gages, respectively, but the sizes made on the continuous strip or sheet mills are going at $4 a ton less. On the No. 10 gage strip, prices as low as 1.90c., Pittsburgh, have been encountered. Such a condition adds considerable confusion to a market which is already rather muddled, but the leading maker of blue annealed sheets by the jobbing and plate mill method still has four weeks' works on its books and is not meeting with any particular difficulty in maintaining the full quoted price.

Tin Plate.—Mill operations have declined during the last week, and, although the leading maker has reduced its rate very little, the average for independent mills is not above 60 per cent of capacity. However, orders for 1930 tonnage are beginning to come in and mill schedules will be stepped up during the next month as makers begin to work on this business.

Strip Steel.—Strip demand is anything but brisk, but reports of expected improvement are heard on all sides and it now seems certain that a better demand from the leading consuming industry can be relied upon by the middle of next month. The automobile makers are not placing orders for strip, nor are they releasing tonnage on old orders. As a result, the strip industry is not operating at better than 60 per cent of capacity. Prices are holding fairly well, although there have been some concessions. The principal weakness is in the wider sizes of hot-rolled, on which mills are quoting 1.90c., Pittsburgh. The narrower width are rather firm at 2c., and the market on cold-rolled is unchanged at 2.75c. to 2.85c., Pittsburgh or Cleveland.

Cold-Finished Steel Bars and Shafting.—This market is very quiet, although conditions have not changed materially since early September. With the automobile industry virtually out of the market, demand is confined to widely diversified lines which are not large tonnage users.

Coal and Coke.—The furnace coke market has a better tone, as most of the surplus material which forced prices down a few weeks ago has been disposed of, and production in the Connellsville region has been curtailed sharply. The H. C. Frick Coke Co. put out 1241 ovens in the region last week. Furnace coke is still quotable at $2.65 to $2.75, Connellsville, but the lower quotation is less common and will likely disappear in a short time. Demand for foundry coke is still quiet and prices are weak. Domestic fuel needs are improving consistently.

Old Material.—Following the sale of a large tonnage of No. 1 heavy melting steel to a nearby steel company at $17, the scrap market has a much stronger tone. This purchase took much surplus steel out of the market, and dealers are paying better prices to cover against this sale than they were a week ago. Other small sales to mills have also been made, bringing prices as high as $17.50. Compressed sheets are still rather quiet, and, in the continued absence of mill buying are hardly quotable as high as steel. Dealers have paid $16.75 and less for this material and the principal users are turning down offers to buy at $17 and $17.25. The light grades of scrap are quiet, but sales of specialties are being made regularly at $20.50 to $21. Steel foundry operations are good and shipments of this grade of scrap are keeping up.

Prices per gross ton delivered consumers yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$17.00 to $17.50
No. 2 heavy melting steel	15.00 to 15.50
Scrap rails	16.00 to 16.50
Compressed sheet steel	16.75 to 17.25
Bundled sheets, sides and ends	15.50 to 16.00
Cast iron carwheels	15.50 to 16.00
Sheet bar crops, ordinary	18.50 to 19.00
Heavy breakable cast	12.00 to 12.50
No. 2 railroad wrought	17.00 to 17.50
Hvy. steel axle turnings	16.00 to 16.50
Machine shop turnings	11.50 to 12.00
Acid Open-Hearth Grades:	
Railr. knuckles and couplers	20.50 to 21.00
Railr. coil and leaf springs	20.50 to 21.00
Rolled steel wheels	20.50 to 21.00
Low phos. billet and bloom ends	21.50 to 22.00
Low phos., mill plates	21.50 to 22.00
Low phos., light grades	20.50 to 21.50
Low phos., sheet bar crops	21.50 to 22.00
Heavy steel axle turnings	16.00 to 16.50
Electric Furnace Grades:	
Low phos., punchings	19.50 to 20.50
Hvy. steel axle turnings	16.00 to 16.50
Blast Furnace Grades:	
Short shoveling steel turnings	12.00 to 12.50
Short mixed borings and turnings	12.00 to 12.50
Cast iron borings	12.00 to 12.50
Rolling Mill Grades:	
Steel car axles	21.50 to 22.00
Cupola Grades:	
No. 1 cast	15.00 to 16.00
Rails 3 ft. and under	19.00 to 20.00

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.25c.
Hoops	4.25c.
Black sheets (No. 24), 25 or more bundles	3.80c. to 3.90c.
Galv. sheets (No. 24), 25 or more bundles	4.45c. to 4.55c.
Light plates, blue annealed (No. 10), 1 to 24 plates	3.35c. to 3.45c.
Blue annealed sheets (No. 13), 1 to 24 sheets	3.50c. to 3.60c.
Galv. corrug. sheets (No. 28), per square	$4.43
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count,	60 per cent off list
Machine bolts, 100 count,	60 per cent off list
Carriage bolts, 100 count,	60 per cent off list
Nuts, all styles, 100 count,	60 per cent off list
Large rivets, base per 100 lb.	$3.50
Wire, black soft, ann'l'd, base per 100 lb.	$2.90 to 3.00
Wire, galv. soft, base per 100 lb.	2.90 to 3.00
Common wire nails, per keg	2.80 to 2.90
Cement coated nails, per keg	2.95 to 3.05

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and under 10 in., Pittsburgh	$35.00
Rerolling, 4-in. and under 10 in., Youngstown	35.00
Rerolling, 4-in. and under 10 in., Cleveland	35.00
Rerolling, 4-in. and under 10 in., Chicago	37.00
Forging quality, Pittsburgh	$40.00 to 41.00

Sheet Bars

(Open Hearth or Bessemer)

	Per Gross Ton
Pittsburgh	$35.00
Youngstown	35.00
Cleveland	35.00

Slabs

(8 in. x 2 in. and under 10 in. x 10 in.)

	Per Gross Ton
Pittsburgh	$35.00
Youngstown	35.00
Cleveland	35.00

Skelp

(F.o.b. Pittsburgh or Youngstown)

	Per Lb.
Grooved	1.85c. to 1.90c.
Universal	1.85c. to 1.90c.
Sheared	1.85c. to 1.90c.

Wire Rods

(Common soft, base)

	Per Gross Ton
Pittsburgh	$40.00
Cleveland	40.00
Chicago	$41.00 to 43.00

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.80
Old range non-Bessemer, 51.50% iron	4.65
Mesabi Bessemer, 51.50% iron	4.65
Mesabi non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.40

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algerian	12.00c.
Iron ore, low phos., Swedish, average 68% iron	12.00c.
Iron ore, basic Swedish, average 65% iron	10.00c.
Manganese ore, washed, 52% manganese, from the Caucasus	30.00c.
Manganese ore, Brazilian, African or Indian, basic 50%	30.00c.
Tungsten ore, high grade, per unit, in 60% concentrates	$15.25 to $16.50

	Per Gross Ton
Chrome ore, 45 to 50% Cr_2O_3, crude, c.i.f. Atlantic seaboard	$22.00 to $24.00

	Per Lb.
Molybdenum ore, 85% concentrates of MoS_2, delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$2.65 to $2.75
Foundry, f.o.b. Connellsville prompt	3.75 to 4.75
Foundry, by-product, Ch'go ovens	8.00
Foundry, by-product, New England, del'd	11.00
Foundry, by-product, Newark or Jersey City, delivered	9.00 to 9.40
Foundry, by-product, Phila.	9.00
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry by-prod., del'd St. Louis	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.25 to $1.75
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, ¾-in. f.o.b. Pa. mines	1.90 to 2.00
Mine run gas coal, f.o.b. Pa. mines	1.65 to 1.75
Steam slack, f.o.b. W. Pa. mines	80c. to 90c.
Gas slack, f.o.b. W. Pa. mines	1.00 to 1.10

Ferromanganese

	Per Gross Ton
Domestic, 80%, seaboard	$105.00
Foreign, 80%, Atlantic or Gulf port, duty paid	105.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$31.00 to $34.00
Domestic, 16 to 19%	29.00 to 32.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$83.50
75%	130.00

	Per Gross Ton Furnace		Per Gross Ton Furnace
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	45.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		Per Gross Ton
10%	$30.00	12%	$34.00
11%	32.00		

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		Per Gross Ton
6%	$23.00	10%	$27.00 to $28.00
7%	24.00	11%	29.00 to 30.00
8%	25.00	12%	31.00 to 32.00
9%	26.00		

Other Ferroalloys

Ferrotungsten, per lb. contained metal del'd	$1.40 to $1.50
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.15 to $3.65
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	$160.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton	$91.00
Ferrophosphorus, electric 24%, f.o.b. Anniston, Ala., per gross ton	$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silicon, gravel, f.o.b. Illinois and Kentucky mines	$18.00
No. 2 lump, Illinois and Kentucky mines	20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	$18.25 to $18.75
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines	32.50

Fire Clay Brick

	Per 1000 f.o.b. Works	
	High-Heat Duty Brick	Intermediate Heavy Duty Brick
Pennsylvania	$43.00 to $46.00	$35.00 to $38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	.....
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00
Standard size	45.00

Chrome Brick

	Per Net Ton
Standard size	$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts, blank or tapped, hexagons	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	7.00c. to 6.75c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled thread up to and including ⅛ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagons nuts	70
Semi-finished hexagons castellated nuts, S.A.E.	70
Stove bolts in packages, P'gh	75, 20, 10 and 5
Stove bolts in packages, Chicago	75, 20, 10 and 5
Stove bolts in packages, Cleveland	75, 20, 10 and 5
Stove bolts in bulk, P'gh	75, 20, 10, 5 and 2½
Stove bolts in bulk, Chicago	75, 20, 10, 5 and 2½
Stove bolts in bulk, Cleveland	75, 20, 10, 5 and 2½
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55, 60 per cent apply.

Large Rivets

(½-In. and Larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$3.10
F.o.b. Chicago	3.20

Small Rivets

(½-In. and Smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70 and 10
F.o.b. Cleveland	70 and 10
F.o.b. Chicago	70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10 and 5
Milled standard set screws, case hardened,	80 and 5
Milled headless set screws, cut thread	75 and 10
Upset hex. head cap screws, U.S.S. thread	85
Upset hex. cap screws, S.A.E. thread	85
Upset set screws	80, 10 and 5
Milled studs	70

Chicago

Railroad Needs Still Feature of Steel Market—Ingot Output Barely Sustained at 85 Per Cent

CHICAGO, Oct. 15.—The limelight in the Western iron and steel market is held by railroad needs of rails and equipment. The Santa Fe has closed for 5754 freight cars and 51 passenger type cars, requiring in all well over 85,000 tons of steel for superstructures alone. Fresh inquiry, issued by the St. Louis-San Francisco, is for 3800 freight cars and 15 baggage and mail cars. The Burlington states its locomotive requirements at 12 passenger type and eight for freight service.

Western railroads which placed rail orders early in the fall are issuing instructions for immediate shipment. Rail mills, which on old orders have sustained output at 75 per cent of capacity, will increase production to 80 per cent in the next week.

Railroads named as probable buyers during the next week or 10 days are the New York Central, the Pennsylvania, Rock Island, Chicago & North Western and the Illinois Central.

The plate, shape and bar market is scarcely altered from a week ago, except that deliveries on many sizes may now be had in a little more than a week. Price concessions of $1 a ton on bars and shapes appear not to have spread and, in this respect, the price structure for these commodities seems to be more stable.

Ingot output in the Chicago district still holds at 85 per cent of capacity. However, backlogs are not impressive, and some producers doubt that this rate can be sustained for long unless heavier buying and larger new releases soon come to their aid.

A blast furnace that has been held banked at Gary is again producing iron in the place of a furnace that has been blown out. This leaves only one banked stack.

Pig Iron.—Six merchant stacks now in blast in this district are producing a little more iron than is going forward on current shipments. The current melt is steady at the rate in effect at the end of September. Sales of Northern iron are confined to an active spot market and the closing of a few late fourth quarter contracts. Reports that the market in Michigan had dropped to $19, base furnace, are said to be without foundation, but it is well established that going prices there are $19.50 to $20 a ton, base furnace, with the higher quotation holding only on small lots. It is reported here that several Lake Erie interests have closed orders for 10,000 to 15,000 tons of basic iron for delivery at Detroit. An Illinois user of Southern iron has exercised an option for 10,000 tons and a Milwaukee user has closed for 2000 tons.

Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	$20.00
N'th'n No. 1 fdy., sil. 2.25 to 2.75	20.50
Malleable, not over 2.25 sil.	20.00
High phosphorus	20.00
Lake Super. charcoal, sil. 1.50	27.04
So'th'n No. 2 fdy. (all rail)	$19.01 to 19.51
Low phos., sil. 1 to 2, copper free	29.50
Silvery, sil. 8 per cent	29.79
Bess. ferrosilicon, 14-15 per cent	46.29

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Sheets.—Demand continues to run lighter, and deliveries are slowly improving. Black and galvanized sheets may now be had in two to three weeks and the blue annealed commodity can be shipped in four weeks. The reduction in backlogs of blue annealed sheets is leading Chicago producers to enter the market for a share of going business. This is in contrast with their attitude six to eight weeks ago, when promises of delivery got so far ahead that they withdrew from the market. The price situation is little changed from a week ago. Competition in the territory served by the Ohio River has brought out galvanized sheets prices as low as 3.55c. a lb., Gary. Black sheets have recently been sold in Chicago at 3c. a lb. Consumers are not changing their policy of hand-to-mouth buying, and though local hot mill output still averages 85 to 90 per cent of capacity, it is becoming increasingly difficult to maintain this rate on the amount of business offered. Larger releases by steel shelving manufacturers are noted.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 3c.; No. 24 galv., 3.65c. to 3.75c.; No. 10 blue ann'l'd, 2.35c. Deliv'd prices at other Western points are equal to the freight from Gary, plus the mill prices, which are 5c. per 100 lb. lower than Chicago delivered prices.

Ferroalloys.—This market is quiet and prices are unchanged. Several car lots of spiegeleisen have been placed at $34, Hazard, Pa.

Prices delivered Chicago: 80 per cent ferromanganese, $112.56; 50 per cent ferrosilicon, $83.50 to $88.50; spiegeleisen, 19 to 21 per cent, $39.76 to $41.76.

Cast Iron Pipe.—The local cast iron pipe market seems to have touched the low spot of the year. Royal Oak, Mich., is said to have placed a sizable tonnage with an unnamed bidder, and Riverside, Ill., will buy 100 tons of 12 and 16-in. pipe. Some interest is being shown by private buyers, but the aggregate tonnage is not impressive. It is reported here that Rockford, Ill., has thrown out bids on a sewage disposal plant.

Prices per net ton, deliv'd Chicago: Water pipe, 6-in. and over, $43.70 to $45.70; 4-in., $47.70 to $49.70; Class A and gas pipe, $3 extra.

Rails and Track Supplies.—Transactions in these commodities in the week were confined to an order for 14,000 tons of track fastenings. Of special note, however, is the fact that rail mill output, now at 75 per cent of capacity, is to be stepped up to 80 per cent by the end of the coming week. Heavy purchases of standard-section rails are reported to be near at hand. Local sellers expect contracts to be placed next week by the New York Central and the Pennsylvania. The Rock Island, which took 50,000 tons a year ago, is expected in the market in the near future, and there is promise that the Illinois Central may soon buy rails, notwithstanding reports given out recently that this purchase would be made late in the year. Another purchase near at hand is that by the Chicago & North Western.

Prices f.o.b. mill, per gross ton: Standard section open-hearth and Bess. rails, $43; light rails, rolled from billets, $36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.15c.; angle bars, 2.75c.

Cold-Rolled Strip.—Releases continue light, and production is barely supported between 60 and 65 per cent of mill capacity. Prices are holding on small-lot sales.

Warehouse Business.—Chicago warehouses are announcing lower prices on common and cement coated wire nails. The new quotations are $2.95, base, per keg, this being a drop of 25c. a keg. Demand for steel commodities out of warehouses is fully equal to that in the previous week.

Reinforcing Bars.—This market is quiet both as to orders placed and fresh inquiries. Prices for billet steel reinforcing bars continue weak and mixed, occasional lots having been taken below 2.15c. a lb., Chicago warehouse. Though there have been many reports of efforts to stabilize prices, there is no evidence that measures taken thus far have been effective. Rail steel bars are quiet, with the asking price 2c. a lb. The Milwaukee Road, which estimates its track elevation needs in Chicago at 800 tons, has ordered about 150 tons in small lots. Bids on 50 tons for Illinois State buildings are to be opened Oct. 15.

Hot-Rolled Strip.—Buyers continue to take this commodity only as their immediate needs dictate. Bookings are unusually light for October. Prices are holding moderately well, though concessions are noted from the current quotations of 2.20c. a lb., Chicago, for 6 in. and narrower, and 2.10c. for strips wider than 6 in. Releases from automobile manufacturers are light, not only because of curtailment of output, but also because of efforts to reduce inventories. Output of hot-rolled strips ranges from 60 to 65 per cent of capacity.

Cold-Finished Steel Bars.—This market remains steady at 2.30c. a lb., Chicago. Contracting for fourth quarter has been in fair volume. Demand from automobile manufacturers is light, but specifications from makers of farm implements have helped to fill in cold-finished bar production schedules, and the industry is operating at close to 75 per cent of capacity.

Plates.—Orders for more than 85,000 tons of steel will come to Western

mills to cover car orders placed with Western shops. The Santa Fe has ordered 5754 freight cars and 51 passenger cars. The 5000 tons of steel needed for the Chicago & Eastern Illinois order will be booked locally. There is a possibility that some of the 5000 cars recently ordered by the Southern will be built in shops which draw on Chicago mills for their steel needs. New inquiry looms large as the St. Louis-San Francisco comes into the market for 2500 box, 800 gondola, 500 automobile, 10 baggage and five baggage and mail cars. The Great Northern, in announcing its budget for next year, discloses that it will build 1000 box cars at St. Cloud, Minn., 300 ore cars at Superior, Wis., and 30 locomotives at Great Falls and Hillyard, Mont. Also included in this program is the purchase of 1000 gondola cars. An oil refiner in the Southwest has ordered 3000 tons of plates, which will be fabricated into tanks by a local shop. Fresh tank inquiry is dull and outstanding projects now call for not more than 12,000 tons. The Milwaukee pipe maker has received an order for 11,000 tons of 20-in. pipe for the Southern California Edison Co. Deliveries of plates show marked improvement, with practically the full range in sizes to be had in 10 days to five weeks.

Old Material.—Heavy melting steel, shoveling steel and No. 2 wrought have declined 25c. a ton. Many specialties have declined, as the entire market seeks the lower level reached a week ago by heavy tonnage grades. A sale of 1000 tons of hydraulic bundles recorded a new low price of $13 a gross ton, delivered. Rerolling rails, which were strong a week ago on a direct purchase by a steel mill from a railroad, have receded again to the general level of the market. Short rails are also easier. Consumers' commitments in the last few weeks have given brokers sizable books, and it is quite evident that sellers are now taking more interest in covering old business than in accumulating orders for future deliveries. Steel foundries in this district have sizable books and are taking scrap freely. Use of scrap by malleable foundries is spotty, though there are some foundries in this class that are pressing for deliveries. Requirements of gray iron foundries are still in fair volume, but decidedly more spotty than a week ago. The break in prices paid by consumers is being followed by lower prices paid to the railroads. The Santa Fe is said to have received $17 a ton, delivered, for malleable and $13.25 for No. 1 wrought. The Chicago & Alton has sold 1000 tons of scrap and the Pere Marquette 3000 tons.

Prices deliv'd Chicago district consumers:

Per Gross Ton	
Basic Open-Hearth Grades:	
Heavy melting steel	$14.25 to $14.75
Shoveling steel	14.25 to 14.75
Frogs, switches and guards, cut apart, and misc. rails	15.75 to 16.25
Hydraul. compressed sheets	12.50 to 13.00
Drop forge flashings	10.75 to 11.25
No. 1 busheling	12.75 to 13.25
Forg'd cast and r'l'd steel carwheels	18.50 to 19.00
Railroad tires, charg. box size	18.50 to 19.00
Railroad leaf springs cut apart	18.50 to 19.00
Acid Open-Hearth Grades:	
Steel couplers and knuckles	17.00 to 17.50
Coil springs	19.00 to 19.50
Electric Furnace Grades:	
Axle turnings	14.25 to 14.75
Low phos. punchings	16.50 to 17.00
Low phos. plates, 12 in. and under	16.50 to 17.00
Blast Furnace Grades:	
Axle turnings	12.00 to 12.50
Cast iron borings	10.00 to 10.50
Short shoveling turnings	10.00 to 10.50
Machine shop turnings	7.00 to 7.50
Rolling Mill Grades:	
Iron rails	16.00 to 16.50
Rerolling rails	16.75 to 17.25
Cupola Grades:	
Steel rails less than 3 ft.	17.50 to 18.50
Steel rails less than 2 ft.	19.50 to 20.00
Angle bars, steel	17.00 to 17.50
Cast iron carwheels	14.00 to 14.50
Malleable Grades:	
Railroad	17.00 to 17.50
Agricultural	15.50 to 16.00
Miscellaneous:	
*Relaying rails, 56 to 60 lb.	23.00 to 25.00
*Relaying rails, 65 lb. and heav.	26.00 to 31.00
Per Net Ton	
Rolling Mill Grades:	
Iron angle and splice bars	15.00 to 15.50
Iron arch bars and transoms	20.50 to 21.00
Iron car axles	26.00 to 26.50
Steel car axles	17.00 to 17.50
No. 1 railroad wrought	13.50 to 14.00
No. 2 railroad wrought	12.75 to 13.25
No. 1 busheling	9.00 to 9.50
No. 2 busheling	7.00 to 7.50
Locomotive tires, smooth	14.50 to 15.00
Pipes and flues	10.00 to 10.50
Cupola Grades:	
No. 1 machinery cast	14.50 to 15.00
No. 1 railroad cast	14.00 to 14.50
No. 1 agricultural cast	13.25 to 13.75
Stove plates	12.25 to 12.75
Grate bars	11.75 to 12.25
Brake shoes	10.75 to 11.25

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Bars.—Both new buying and specifications for mild steel bars compare favorably with shipments. Needs of farm implement manufacturers are heavier and enlarged schedules are in the making. It is reported here that heavier production of automobiles is planned for November. In the meantime, the only live spots in demand are in shops where new models are going into production. Backlogs in rail steel bars are shrinking. Specifications continue to match shipments, but new buying, both for nearby and future needs, has tapered rather sharply. Announcements of fall terms on fence posts are not yet productive of larger orders.

Structural Material—Building contracts continue to drag in the immediate Chicago territory, but in outlying districts prospects look brighter. A power plant in central Illinois has added 3800 tons to steel makers' books. Included in new work in sight are 3000 tons for a new hotel at Oklahoma City, Okla., 2000 tons for an addition to the Union Station, Omaha, Neb., and 4000 tons for the Northwestern Mutual Life Building, Milwaukee. A meeting which had been called for this week by the Chicago Board of Education has been postponed and it may be several weeks before a decision is reached as to the placing of a 3500-ton contract for a new junior high school.

Mill prices on plain material, per lb.: 2.05c. base, Chicago.

Wire Products.—Nail demand is under 50 per cent of normal for this time of the year. Prices continue weak. Shipments of manufacturers' wire to other than automobile plants is in good volume. Jobbers report improvement in fall trade, but still hesitate to carry suitable stocks and are pressing mills for prompt deliveries of small orders. Output by wire mills still stands at 65 per cent of capacity, at which rate producers are able to build stocks.

Bolts, Nuts and Rivets.—This market is holding to the gains noted a week ago. Prices are steady on small-lot sales.

Coke.—All ovens in this district are lighted and shipments of by-product foundry coke are fully equal to production. Prices are firm at $8 a ton, local ovens.

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars	3.00c.
Reinforc'g bars, billet steel	2.10c. to 2.35c.
Reinforc'g bars, rail steel	1.85c. to 2.00c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Bands (¼ in. in Nos. 10 and 12 gages)	3.20c.
Hoops (No. 14 gage and lighter)	3.75c.
Black sheets (No. 24)	4.05c.
Galv. sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.35c.
Spikes, ⅝ in. and larger	3.55c.
Track bolts	4.55c.
Rivets, structural	4.00c.
Rivets, boiler	4.00c.
	Per Cent Off List
Machine bolts	60
Carriage bolts	60
Coach or lag screws	60
Hot-pressed nuts, sq., tap. or blank	60
Hot-pressed nuts, hex., tap. or blank	60
No. 8 black ann'l'd wire, per 100 lb.	$3.45
Com. wire nails, base per keg	2.95
Cement c't'd nails, base per keg	2.95

Detroit Scrap Declines

DETROIT, Oct. 15.—A decline of 25c. a ton has occurred on most grades of old material in this district during the past week. No sales of importance are reported.

Automotive production is at the low point for the year, with indications that some new models will be in the foundry in November, with accompanying increase in melt.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Hvy. melting and shov. steel	$13.75 to $14.25
Borings and short turnings	8.25 to 8.75
Long turnings	8.00 to 8.50
No. 1 machinery cast	12.50 to 13.00
Automobile cast	13.00 to 13.50
Hydraul. comp. sheets	13.75 to 14.25
Stove plate	9.00 to 9.50
New No. 1 busheling	11.75 to 12.25
Old No. 1 busheling	10.25 to 10.75
Sheet clippings	8.00 to 8.50
Flashings	12.25 to 12.75

Industrial & Combustion Engineering Corporation, 303 Protective Life Building, Birmingham, has been appointed district engineer for the Despatch Oven Co., Minneapolis, Minn. The district includes Alabama, Georgia, Mississippi and Tennessee.

New York

Line Pipe Inquiries Upward of 20,000 Tons—Structural Steel Market Active—Prices Weaker

NEW YORK, Oct. 15.—Pig iron buyers are not pressing to cover their forward requirements, but purchases for nearby needs, in many cases to supplement previous orders, are in fair volume. Sales for the week, at 10,000 tons, compare with a total of 9000 tons in the previous week. In the absence of a broad buying movement and pending the development of interest in first quarter iron, sellers find it necessary to search for business. It is not surprising that prices have become somewhat more flexible, with $17.50, base Buffalo, occasionally shaded on foundry iron. Less Southern iron is being sold, but it is understood that Alabama furnaces are prepared to compete actively for first quarter tonnage when it comes into the market. Melt in this territory is holding up well. In some instances, foundries are pressing for shipments, indicating that their stocks are low; in other cases, November specifications have already been received by furnaces. All in all, increases in melt by some consumers tend to offset decreases by others. The New York Air Brake Co. is in the market for 600 tons of malleable for its Watertown, N. Y., plant. It is reported that another moderate-sized consignment of Dutch iron will soon be shipped to Bridgeport, Conn. The cargo has already been sold. Dutch foundry is quoted at $22.75, duty paid port of entry, for No. 1X and lower grades. The Port Henry, N. Y., furnace, which has been out for relining, is scheduled to blow in today.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	$22.41 to $22.91
*But. No. 2, del'd east. N. J.	20.78 to 21.28
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	19.89 to 21.02
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	20.39 to 21.52

Freight rates: $4.91 from Buffalo, $1.39 to $2.52 from eastern Pennsylvania.
*Prices delivered to New Jersey cities having rate of $3.28 a ton from Buffalo.

Finished Steel.—Most of the local steel sales offices report improved buying in the past week. While no spectacular gain in orders has occurred, the rise in some instances has been quite noticeable as compared with preceding weeks. Moreover, inquiries are better, especially for pipe. One inquiry calls for about 300 miles of 4, 6 and 8-in., totaling upward of 20,000 tons, and other scattered inquiries total several thousand tons. An Eastern contracting company is taking prices on 4000 tons of plates for a pipe line in Cleveland. Fresh structural inquiries in the New York district call for a total of 19,500 tons, on top of the 63,000 tons reported in the week before. New pending work includes 9400 tons for the Salmon Building, Fifth Avenue at Forty-second Street, and 6800 tons for new subway work, making a total of 23,800 tons for subways now pending. The Pennsylvania Railroad is in the market for 7500 tons for a viaduct and suburban stations in Philadelphia. Awards have been light in the past week, but the outlook for building construction in the next several months is reported by fabricators to be exceptionally good. In the nine months ended Sept. 30, the total for the New York district of structural steel work for buildings, and not including subways, bridges, etc., was 423,501 tons, according to the Structural Steel Board of Trade of New York, compared with 458,259 tons for all of 1928. New orders for railroad cars placed in the East include 2500 for the Baltimore & Ohio. The steel price structure shows increasing weakness, especially on the large tonnage projects. Structural shapes are obtainable by most buyers at 2.14½c., delivered, with some large users getting still lower prices. No. 13 gage blue annealed sheets are being sold to the larger buyers at 2.25c., Pittsburgh, by some mills, though others are holding for 2.35c., and the latter price applies in most instances on small orders. No. 10 gage blue annealed ranges from 2.10c. to 2.20c., but the material above 24-in. wide rolled on continuous mills is being sold frequently at as low as 2c., Pittsburgh. Hot-rolled strip steel has been sold at concessions of $2 a ton to large buyers. In the main, however, strip prices remain fairly steady. Buyers have attempted to obtain concessions on plates, but except for the large tonnages, on which concessions are usually obtainable, there appears to be no marked change in the price situation on this product.

Mill prices per lb., deliv'd New York: Soft steel bars, 2.24c. to 2.29c.; plates, 2.22½c.; structural shapes, 2.14½c.; bar iron, 2.14c.

Reinforcing Bars.—Bookings this month have been at a somewhat higher rate than in September. The Concrete Steel Co. has taken three jobs nearby which will require a total of 400 tons of bars. A third subway section is now out for bids, making about 1000 tons of bars which will be awarded shortly for New York subway work. Although new billet bars are generally priced at 2.05c., Pittsburgh, a few contracts are reported to have been made at $4 to $6 a ton under that figure.

Billet steel reinforcing bars in 40, 50 and 60 ft. lengths, 2.05c. per lb., Pittsburgh, and 2.30c. per lb., Pittsburgh warehouse, for cut lengths. Out of New York warehouse, 2.90c. per lb. for lots of 5 tons or more, 3.05c. for lots of 2 to 5 tons and 3.30c. for less than 2 tons, all delivered at job.

Cast Iron Pipe.—Buying of pressure pipe is limited to small tonnages and prices are generally unchanged. Hartford, Conn., has awarded about 350 tons of centrifugal pipe to one Southern maker and about 20 tons of fittings to another. Newburgh, N. Y., has placed 125 tons of water pipe with the Warren Foundry & Pipe Co., the low bid having been $36.45 a net ton, delivered. Inquiry for pipe from private companies continues small and is not expected to show much im-

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.30c.
Soft steel bars, small shapes	3.25c.
Iron bars	3.24c.
Iron bars, Swed. charcoal	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Cold-roll. strip, soft and quarter hard	5.15c. to 5.40c.
Hoops	4.25c.
Bands	3.75c.
Blue ann'l'd sheets (No. 10)	3.50c. to 3.90c.
Long terne sheets (No. 24)	5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galv. annealed	5.15c.
Tire steel, ½ x ½ in. and larger	3.40c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.75c.
Open-hearth spring steel, bases,	4.50c. to 7.00c.

	Per Cent Off List
Machine bolts, cut threads:	
¾ x 6 in. and smaller	60
1 x 30 in. and smaller	50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	60
¾ x 20 in. and smaller	50 to 50 and 10
Coach screws:	
½ x 6 in. and smaller	60
1 x 6 in. and smaller	50 to 50 and 10

	Per 100 Ft.
Boiler Tubes—	
Lap welded, 2-in.	$17.33
Seamless steel, 2-in.	20.24
Charcoal iron, 2-in.	25.00
Charcoal iron, 4-in.	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
½-in. butt	46	29
¾-in. butt	51	37
1-3 in. butt	53	39
2½-6-in. lap	48	35
7 and 8-in. lap	44	17
11 and 12-in. lap	37	12
Wrought Iron—		
½-in. butt	5	+19
¾-in. butt	11	+ 9
1-1½-in. butt	14	+ 6
2-in. lap	5	+14
3-6-in. lap	11	+ 6
7-12-in. lap	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box	$6.45	$6.20
Charcoal, per Box—	A	AAA
IC	$9.70	$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating	$10.00 to $11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets, Box Annealed—Black, C. R. One Pass

	Per Lb.
Nos. 18 to 20	3.75c. to 3.80c.
No. 22	3.90c. to 3.95c.
No. 24	3.95c. to 4.00c.
No. 26	4.05c. to 4.10c.
No. 28*	4.20c. to 4.25c.
No. 30	4.45c. to 4.50c.

Sheets, Galvanized

	Per Lb.
No. 14	4.20c. to 4.40c.
No. 16	4.15c. to 4.25c.
No. 18	4.20c. to 4.40c.
No. 20	4.30c. to 4.50c.
No. 22	4.40c. to 4.60c.
No. 24	4.65c. to 4.75c.
No. 26	4.90c. to 5.00c.
No. 28*	5.15c. to 5.25c.
No. 30	5.55c. to 5.65c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

provement until buying for spring delivery begins late in the fall.

Prices per net ton deliv'd New York: Water pipe, 6-in. and larger, $34.60 to $36.60; 4-in. and 5-in., $37.60 to $39.60; 3-in., $44.60 to $46.60. Class A and gas pipe, $3 extra.

Warehouse Business.—Buying from stock has been fairly active this month. Demand for structural material, steel bars and black sheets is active, but galvanized sheets have been quiet in the past week or more, and prices continue weak. Concessions of $2 and more a ton are not uncommon.

Coke.—Furnace coke is firmer, the standard furnace grade being quoted at about $2.75 a net ton, Connellsville, Beehive foundry coke is unchanged at $4.85 a net ton, ovens, for special brands, or $8.56, delivered to northern New Jersey, Jersey City and Newark, and $9.44 to New York and Brooklyn. In the by-product coke field, foundry coke production will shortly be increased by the addition of this grade to the Koppers operation at Swedeland, Pa. In the past, these ovens have produced only furnace and sized coke. By-product foundry coke is quoted at $9 to $9.40 a net ton, Newark or Jersey City, and $10.06, New York or Brooklyn.

Old Material.—Although consumers in eastern Pennsylvania are either temporarily out of the market or offering to buy scrap only at reductions from recent purchase prices, brokers' buying prices are generally unchanged. No. 1 heavy melting steel is being shipped on contracts to Coatesville, Pa., and Bethlehem, Pa., brokers paying $15.50 a ton, delivered. The mill at Claymont, Del., has not been accepting shipments in the past week. No. 2 heavy melting steel prices have receded slightly and are now $13 to $13.50 a ton, delivered, and a sufficient supply is reported to be available at these prices.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel	$12.00 to	$12.85
Heavy melting steel (yard)	8.00 to	9.50
No. 1 hvy. breakable cast.	10.25 to	11.00
Stove plate (steel works).	8.00 to	8.25
Locomotive grate bars....	8.25 to	8.75
Machine shop turnings....	7.50 to	8.00
Short shoveling turnings..	7.50 to	8.00
Cast borings (blast furn. or steel works).....	7.00 to	7.75
Mixed borings and turnings	6.75 to	7.75
Steel car axles	18.50 to	19.50
Iron car axles.....	23.00 to	24.00
Iron and steel pipe (1 in. dia., not under 2 ft. long)		10.25
Forge fire	9.50 to	10.00
No. 1 railroad wrought...	12.00 to	12.50
No. 1 yard wrought, long..	11.00 to	11.50
Rails for rolling.....	12.75 to	13.25
Stove plate (foundry)....	8.00 to	8.50
Malleable cast (railroad).	13.50 to	14.00
Cast borings (chemical)..	9.50 to	10.00

Prices per gross ton, deliv'd local foundries:

No. 1 machry. cast.....	$16.00 to	$16.50
No. 1 hvy. cast (columns, bldg. materials, etc.), cupola size	14.00 to	14.50
No. 2 cast (radiators, cast boilers, etc.).....	13.50 to	14.00

Cleveland

Steel Demands Light and Prices Weaken—No Important Gain in Automobile Industry Expected This Year

CLEVELAND, Oct. 15.—Demand for all lines of finished steel continues light. The steel industry has been counting on a revival of automobile manufacturing this month, but a pickup of any proportions is not in sight, and the general opinion is that automobile production will remain rather slow the remainder of the year.

With further retrenchment by some of the car builders to change over to their new models, the production of automobiles is still declining. However, a few of the automobile manufacturers have placed orders for round lots of sheets for November delivery and some increase is looked for in the output of motor cars late in November.

Sheet mills have cleaned up on shipments of material for Chevrolet bodies, and during the week received releases of good tonnages of sheets for bodies for this company's new cars. Shipments of this material are to start Nov. 4. Automobile parts makers as yet have received few orders for parts for new cars.

Steel production has been further curtailed. The leading local producer of steel bars is now operating at about 75 per cent of capacity and some of the sheet and hot and cold-rolled strip mills are down to about 50 per cent.

While there are still price irregularities, the market shows little change in this respect from a week ago. The steel bar price situation appears to have been clarified by the adoption of a 1.90c., Cleveland, base by local mills. Some weakness has developed in plates.

Pig Iron.—The Ford Motor Co. on Saturday purchased 17,000 tons of basic pig iron for October shipment. While the source of the iron was not announced, it is understood that it will be shipped by water and presumably will come from a Lake furnace. Additional purchases of high silicon foundry iron have been made by the Ford company, making the reported total of 16,000 tons over the past three of four weeks. This company is not yet through buying iron for this year's delivery, but probably will conclude its purchases in time to have the iron shipped by water before the close of the season of Lake navigation. The market was dull the past week, sales by Cleveland interests amounting to 13,600 tons, as compared with over 32,000 tons during the previous week. There is little buying by foundries in the automotive field as these feel the effects of the slackening of the automotive industry. Shipments to automotive foundries are spotty. Consumers in other fields are taking a fair amount of iron and some producers expect to ship a little more this month than in September. Cleveland quotations are unchanged at $18.50, furnace, for outside shipment and $19 for local delivery. While $20, base, is still the ruling quotation in Michigan, this price has been shaded to $19.50, or 50c. has been cut off the silicon extra on some business in central and western Michigan to meet a $19.50 price that is being quoted from Chicago and attributed to sellers of boat iron.

Prices per gross ton at Cleveland:

N'th'n fdy., sil. 1.75 to 2.25		$19.50
S'th'n fdy., 1.75 to 2.25...	$19.50 to	20.00
Malleable		19.50
Ohio silvery, 8 per cent...		28.00
Basic Valley furnace.....		18.50
Stand. low phos., Valley..	26.50 to	27.00

Prices except on basic and low phosphorus are delivered Cleveland. Freight rates: 50c. from local furnaces: $3 from Jackson, Ohio; $6 from Birmingham.

Iron Ore.—There has been a fair amount of late season buying of Lake Superior ore recently for fill-in purposes in lots up to 50,000 tons. Buying is thought to be about over for the season. Shipments show a moderate decline from September.

Semi-Finished Steel.—Specifications for sheet bars gained slightly during the week due to releases from two or three mills that have picked up some new sheet orders from the automotive industry. Shipments are being made against $35 contracts. Wire rods are firm at $40, Cleveland.

Strip Steel.—Demand continues light, both for hot and cold-rolled strip. Some of the hot rolling mills are not operating at more than 60 per cent of capacity and cold-rolling mills are even less favorably situated. Consumers are ordering from hand-to-mouth and not much gain in volume is looked for until the automotive industry picks up. Hot-rolled strip, while untested on round lot business, appears to be holding to the regular quotations of 1.90c., Pittsburgh, for wide and 2c. for narrow strip. Mills are maintaining the 2.75c., Cleveland, price for cold-rolled strip and some are still trying to get 2.85c. for small lots.

Bars, Plates and Shapes.—Demand for steel bars continues light, as mills are not getting much tonnage from the automotive industry. Structural

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and struc. shapes.....	3.00c.
Soft steel bars.....	3.00c.
Reinforc. steel bars.....2.25c. to	2.50c.
Cold-fin. rounds and hex.....	3.65c.
Cold-fin. flats and sq.....	4.15c.
Hoops and bands, No. 12 to ¼ in., inclusive	3.25c.
Hoops and bands, No. 13 and lighter	3.65c.
Cold-finished strip .....*5.95c.	
Black sheets (No. 24).....3.70c. to	3.90c.
Galvanized sheets (No. 24).4.60c. to	4.75c.
Blue ann'l'd sheets (No. 10).....	3.25c.
No. 9 ann'l'd wire, per 100 lb.....	$2.65
No. 9 gal. wire, per 100 lb.....	3.00
Com. wire nails, base per keg.....	2.65

*Net base, including boxing and cutting to length.

material and plates are in fair demand from manufacturing industries. The building field is very quiet. The Cleveland Water Works Department has taken bids for extensions requiring 4000 tons of plates, and Detroit will ask for bids shortly for five miles of pipe, half 54 in. and half 66 in. of ½-in. plate. The Consumers Power Co., Jackson, Mich., has placed with two mills orders for 1700 tons of sheet steel piling for permanent use in dam work. The Cleveland mill price on steel bars has settled to 1.90c., mill. Pittsburgh district mills are trying to hold to 1.95c., Cleveland, for steel bars for delivery in this territory. Plates have been shaded to 1.90c., Pittsburgh. On shapes, 1.95c., Pittsburgh, is the ruling quotation.

Sheets.—Orders for good-sized lots of sheets have been placed by at least three automobile companies and with this business several mills have considerable more tonnage on their books than at the first of the month. There is fair demand from other sources, including refrigerator, stove and metal furniture manufacturers. No further price weakness has developed. Black sheets are holding at 2.75c., Pittsburgh, and galvanized at 3.50c. Continuous mills are quoting blue annealed sheets at 2.10c. for No. 10 and at 2.25c. for No. 13, and these prices have been shaded $2 a ton for attractive orders in the Detroit territory. However, jobbing mills seem to be holding to regular quotations on blue annealed sheets.

Wire Products.—Demand is dull and prices are still weak, particularly where there is competition from Ohio River and Indiana mills. The ruling quotations are $2.45 a keg for nails and 2.40c. a lb. for wire. Jobbers have sharply reduced prices for shipment out of stock to meet this situation.

Warehouse Business.—The volume is rather light, showing no improvement over last month. Orders are fair in number but are mostly for small lots. There is a good seasonal demand for galvanized sheets. Prices are firm.

Cold-Finished Steel Bars.—Specifications are very light for material used in the automotive industry, but orders from other consumers show some gain. The market is firm.

Coke.—By-product coke for domestic use is moving well and some of the producers have their entire output sold for this month. Prices are unchanged at $4.75, Ohio ovens, for egg and $4.50 for nut size, but producers are talking of an advance Nov. 1. Foundry coke is quiet. Ohio by-product foundry coke is quoted at $8.25 ovens.

Old Material.—The market is weak and very dull. No new demand has come from the mills and dealers are not buying much scrap to fill old orders. Heavy melting steel in lighter grades has declined 25c. a ton and blast furnace scrap has similarly declined, losing a portion of its recent gain. The slowing down in the automotive industry is reflected in a sharp reduction in the amount of scrap coming out of the Detroit territory.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$14.75 to $15.00
No. 2 heavy melting steel	14.25 to 14.50
Compressed sheet steel	14.75 to 15.25
Light bundled sheet stampings	12.00 to 12.50
Drop forge flashings	13.00 to 13.25
Machine shop turnings	10.00 to 10.50
Short shoveling turnings	11.50 to 12.00
No. 1 railroad wrought	13.50 to 14.00
No. 2 railroad wrought	16.00 to 16.50
No. 1 busheling	13.25 to 13.75
Pipes and flues	9.00 to 9.50
Steel axle turnings	12.50 to 13.00
Acid Open-Hearth Grades:	
Low phos., forging crops	17.75 to 18.00
Low phos., billet, bloom and slab crops	18.50 to 18.75
Low phos., sheet bar crops	18.00 to 18.50
Low phos., plate scrap	18.00 to 18.50
Blast Furnace Grades:	
Cast iron borings	10.50 to 11.00
Mixed borings and short turnings	10.50 to 11.00
No. 2 busheling	10.50 to 10.75
Cupola Grades:	
No. 1 cast	17.50 to 18.00
Railroad grate bars	11.00 to 12.00
Stove plate	12.00 to 12.50
Rails under 3 ft	18.50 to 19.50
Miscellaneous	
Railroad malleable	18.00 to 18.50
Rails for rolling	16.25 to 16.50

Philadelphia

Demand for Shapes Improves with Prices Still Unstable—Pennsylvania Rails To Be Allocated This Week

PHILADELPHIA, Oct. 15.—Steel business continues irregular, products such as bars and sheets, which enter into automotive manufacture, being decidedly inactive, while plates and shapes are in moderate demand. Plate orders are limited to small tonnages, but shape mills have had a slight increase in the volume of orders since the beginning of this month. Despite this improvement, shape prices are lacking in firmness and cover a rather wide range.

The Pennsylvania Railroad is expected to allocate its 310,000 tons of rails for next year by the end of this week, and will open bids tomorrow on about 14,000 tons of structural steel for the West Philadelphia terminal viaducts and suburban station. The terminal building itself, which is not yet being inquired for, will require an additional 14,000 tons of steel.

Pig Iron.—Foundry iron is still quoted by eastern Pennsylvania furnaces at $21, base furnace, but with shipments of iron slightly in excess of new contracts an increased willingness has been evident to shade this price by 50c. a ton or more. Competition is still encountered from Southern sellers of pig iron, but the minimum quotation of Birmingham furnaces today is about $13.50, furnace, and certain sellers are maintaining $14 a ton, base. On 100 tons of low phosphorus iron, bids on which were recently opened by the Panama Canal Commission, Washington, the Bethlehem Steel Co. was low bidder and the Delaware River Steel Co. next. No other furnaces quoted on the business. The Virginia furnace will not be ready to go into blast until about the end of this month. Present plans are to offer both sand and machine cast pig iron and compete with the Birmingham producers in the sand cast grade. Consumers of basic in this district are not expected to buy before Nov. 1.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil.	$21.26 to $21.76
East. Pa. No. 2X, 2.25 to 2.75 sil.	21.76 to 22.26
East. Pa. No. IX	22.26 to 22.76
Basic (del'd east. Pa.)	19.75 to 20.25
Gray forge	20.00 to 20.50
Malleable	21.25 to 21.75
Stand. low phos. (f.o.b. N. Y. State furnace)	22.00 to 23.00
Cop. br'g low phos. (f.o.b. furnace)	23.50 to 24.00
Va. No. 2 plain, 1.75 to 2.25 sil.	24.04
Va. No. 2X, 2.25 to 2.75 sil.	24.54

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces; $4.54 from Virginia furnaces.

Bars.—Business is limited to small orders, in most cases at the new level of 1.90c. a lb., Pittsburgh, or 2.22c., delivered Philadelphia. Contracts for bars are being generally revised to the new basis, which is apparently firm in this district.

Reinforcing Bars.—Some substantial tonnages of bars are being placed with distributers and both billet steel and rail steel grades are being furnished. Billet steel bars are quoted at 1.95c. to 2.05c., Pittsburgh, or 2.27c. to 2.37c., delivered Philadelphia, usually with no extra for cutting to length. Rail steel bars range from 1.90c. to 1.95c., Franklin, Pa., and Tonawanda, N. Y., or 2.22c. to 2.27c., delivered Philadelphia, with no extra for cutting to length. Occasionally the rail steel bar quotation is shaded by $1 a ton or more to secure desirable contracts. Pending projects in this district are 500 tons of bars for a sewer and bulkhead on Spring Gar-

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.70c.
Plates, ⅛-in.	2.90c.
Structural shapes	2.70c.
Soft steel bars, small shapes, iron bars (except bands)	2.80c.
Round-edge iron	3.50c.
Round-edge steel, iron finished 1½ x 1½ in.	3.50c.
Round-edge steel planished	4.30c.
Reinforc. steel bars, sq. twisted and deform.	2.60c. to 2.80c.
Cold-fin. steel, rounds and hex.	3.60c.
Cold-fin. steel, sq. and flats	4.10c.
Steel hoops	3.55c.
Steel bands, No. 12 to ⅛-in. inclus.	3.30c.
Spring steel	5.00c.
*Black sheets (No. 24)	4.10c.
†Galvanized sheets (No. 24)	4.85c.
Light plates, blue annealed (No. 10)	3.25c.
Blue ann'l'd sheets (No. 13)	3.40c.
Diam. pat. floor plates—	
¼-in.	5.30c.
⅛-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

*For 50 bundles or more; 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.
†For 50 bundles or more; 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

den Street, Philadelphia, and 140 tons in a freight warehouse for the Pennsylvania Railroad at Harrisburg.

Plates.—Orders and specifications against contracts are in fair volume, but tonnages are small. Consumers of plates in this district are well engaged, especially boiler shops, most of which have sufficient business to carry them into next year. The price is being maintained at 2.05c., Coatesville, Pa., or 2.15c., delivered Philadelphia.

Shapes.—Fabricating shops are well occupied, in some cases having enough tonnage for the rest of the year. New fabricated projects are plentiful and shape mills have been booking a slightly increased volume of business this month. Prices, however, are still unstable, ranging from 1.90c., f.o.b. nearest mill to consumer, or 1.96c., delivered Philadelphia, to 2c., f.o.b. mill, or 2.06c., delivered Philadelphia. Occasionally less than 1.90c., f.o.b. mill, is quoted on desirable business.

Sheets.—Black and galvanized sheet prices are lacking in firmness and recent business, although for only moderate-sized tonnages, has been at 2.75c., Pittsburgh, or 3.07c., delivered Philadelphia, for black and 3.50c., Pittsburgh, or 3.82c., delivered Philadelphia, for galvanized. Blue annealed sheets are also inactive, but the prices are unchanged at 2.35c., Pittsburgh, or 2.67c., delivered Philadelphia, for No. 13 gage and 2.20c., Pittsburgh, or 2.52c., Philadelphia, for No. 10 gage blue annealed plates. To preferred buyers, or when competition is encountered from sheets made on the continuous mill, concessions of $2 a ton and more to 2.25c. for No. 13 gage, and 2.10c. for No. 10 gage, are usually made. Automobile body builders are still inactive, while awaiting the specifications on the new models of two prominent makers, with whom they have contracts. Meanwhile, commercial body builders have been increasing their output slightly. Radio manufacturers are becoming less active, as the end of their season of heaviest manufacture approaches.

Imports.—In the week ended Oct. 11, arrivals at this port consisted of 20 tons of structural shapes from Germany and 9 tons of steel rods from Sweden.

Old Material.—A large eastern Pennsylvania consumer of scrap has bought a sizable tonnage of No. 1 heavy melting steel at $15.50 a ton, delivered eastern Pennsylvania. Specification pipe is off 50c. a ton, on the basis of a purchase by a Lebanon, Pa., mill at $14.50 a ton, delivered, and No. 1 heavy melting steel is quotable at $15.50 to $16 a ton, delivered.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	$15.50 to $16.00
Scrap T rails	15.00 to 15.50
No. 2 heavy melting steel	12.50 to 14.25
No. 1 railroad wrought	16.00 to 16.50
Bundled sheets (for steel works)	11.50
Hydraulic compressed, new	14.50 to 15.00
Hydraulic compressed, old	12.00 to 12.50
Machine shop turnings (for steel works)	12.00
Heavy axle turnings (or equiv.)	14.00 to 14.50
Cast borings (for steel works and roll. mill)	11.00 to 11.75
Heavy breakable cast (for steel works)	14.50 to 14.75
Railroad grate bars	12.00 to 12.50
Stove plate (for steel works)	12.00 to 12.50
No. 1 low phos., hvy., 0.04% and under	22.00 to 23.00
Couplers and knuckles	19.50 to 20.50
Rolled steel wheels	19.50 to 20.50
No. 1 blast f'nace scrap	10.50 to 11.00
Wrot. iron and soft steel pipes and tubes (new specific.)	14.50
Shafting	19.00 to 19.50
Steel axles	23.00 to 23.50
No. 1 forge fire	14.00
Cast iron carwheels	16.50 to 17.00
No. 1 cast	16.00 to 16.50
Cast borings (for chem. plant)	14.50
Steel rails for rolling	16.50 to 17.00

Eastern Mills Oppose Rail-Water Rates

Say Proposed Combinations in Examiner's Report Are Most Favorable to Pittsburgh and Chicago

WASHINGTON, Oct. 15. — Eastern steel manufacturers, through the Bethlehem Steel Co., have filed exceptions with the Interstate Commerce Commission against the examiner's report in the so-called Consolidated Southwestern cases as it would affect iron and steel rates from interior trunk line points to interior Southwestern points, a suggested basis for which was incorporated in the Bethlehem brief.

The contention was made that the proposed rates would subject Eastern mills to excessive and prejudicial rates in exacting the full combination of the locals to interior Southwestern points while according to Pittsburgh and other competing origins through rates less than their combinations. The Eastern steel shipper, it was stated, is vitally interested in securing rates to the Southwest by way of the ocean routes which are no higher than is reasonable and nonprejudicial as compared with rates from competing origins.

The following table was cited to show the rates in cents per 100 lb. on structural steel to Dallas that would result if the report is approved:

From	Rail-Water Rail Combination	Effective Rate if Proposed Report is Approved	Difference
Pittsburgh	100.5	93	7.5
Chicago	93	71	22
Steelton	84	84	0
Bethlehem	84.5	84.5	0
Baltimore	75.5	75.5	0

It was pointed out that Pittsburgh would be brought within 15.5c. of Baltimore, while the present local rate is 31c., and would be brought within 8.5c. of Bethlehem, while the present difference in their rates to Philadelphia is 19c., and under the adjustment prescribed in the Eastern general steel rate case it will be 17c. Bethlehem, Steelton, Baltimore and all similar Eastern points, it was declared, will pay their full combinations, while Pittsburgh and Chicago will pay 7 per cent and 23 per cent less than their respective combinations.

Rates suggested for iron and steel articles to Dallas were: From Pittsburgh, 90c.; from Steelton, 76c.; from Bethlehem, 73c., and from Baltimore, 70c. It was declared that the suggested basis would treat all shippers and destinations alike as to the water factor in their through rates. The rates proposed on iron and steel articles generally are: From Pittsburgh, 93c.; from Steelton, 86c.; from Bethlehem, 82.5c. and from Baltimore, 75.5c. The per cent of combinations under the suggested basis would be 90 for Pittsburgh; 88.4 for Steelton; 88.4 for Bethlehem and 92.7 per cent for Baltimore.

Youngstown Mills at 75 Per Cent

YOUNGSTOWN, Oct. 15.—Steel makers in this district believe that the low point in the current automobile demand has been passed and that improvement will be registered from now on. Independent steel companies are averaging 75 per cent operation. The number of active sheet mills shows a moderate increase this week.

Ford to Have Record Size 1350-Lb. Boilers

The Ford Motor Co., Detroit, has bought of the Combustion Engineering Corporation, New York, for the Fordson plant two steam generating units, designed for 1350 lb. steam pressure superheated to 750 deg. Fahr. Each unit will have a maximum capacity of 700,000 lb. of steam an hour, a capacity believed to be the highest yet built for pressures as high as 1350 lb.

The boiler units will be fired by pulverized coal, the fuel entering the furnaces tangentially at the corners to give a turbulent mixing action of fuel and air for combustion. The furnaces will be of the all metal, water-cooled type and air preheaters will be installed to use the heat of the exit gases for preheating the air used for combustion.

Newton Steel Earnings $472,770 in Third Quarter

Net profits of the Newton Steel Co. for the third quarter totaled $472,770, after all charges, comparing with net of $799,923 for the second quarter and $719,692 for the first quarter. The company's statement shows a deduction of $64,468 for the quarter for Federal income taxes.

H. D. Conkey & Co., Mendota, Ill., manufacturer of overhead traveling crane equipment, has appointed the Cleveland Tool & Supply Co. as its agent in the Cleveland district.

Pacific Coast

Long Beach, Cal., Places 4285 Tons of Cast Iron Pipe—Los Angeles Building Takes 3000 Tons of Steel

SAN FRANCISCO, Oct. 12 (*By Air Mail*).—The United States Pipe & Foundry Co. booked 4285 tons of cast iron pipe for Long Beach, Cal. The McClintic-Marshall Co. was awarded 3000 tons of structural steel for a Los Angeles office building. These were the outstanding awards of the week.

Prices on steel products are holding fairly well, weakness in plates being the only marked divergence from levels which have been in effect for some time.

Pig Iron.—The pig iron market is without feature. Melters are taking only small tonnages.

Prices per gross ton at San Francisco:

*Utah basic	$25.00 to $26.00
*Utah fdy., sil. 2.75 to 3.25	25.00 to 26.00
**Indian fdy., sil. 2.75 to 3.25	25.00 to 26.00

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Bars.—Pending business in reinforcing steel is not large. The week's awards included 175 tons for a court house at Olympia, Wash., 200 tons for a market building in Seattle and 100 tons for an office building in Bellingham, Wash. Bids were opened this week on 363 tons for the approach to the West Spokane Street bridge, Seattle. Bids will be opened on Nov. 19 on 233 tons for the Lake Union bridge near Seattle. Out-of-stock prices in San Francisco remain at 2.30c., base, on carload quantities and at 2.60c. for smaller lots. In the Los Angeles district, quotations are $2 a ton higher.

Plates.—The recent order of the Pacific Gas & Electric Co. for 55,000 tons of fabricated steel pipe, which was awarded to the A. O. Smith Corporation, Milwaukee, as stated in the Oct. 3 issue of THE IRON AGE, was for 40 miles of 12-in., 80 miles of 16-in., 80 miles of 20-in. and 159 miles of 22-in. for a line to run from Kettleman Hills and the San Francisco district. Plate fabricators on the Pacific Coast bid on this business. Another order which went to the A. O. Smith Corporation, as also stated in the Oct. 3 issue, was for 11,000 tons of 20-in. welded pipe for the Southern California Edison Co., which will build a line from Kettleman Hills to Elk Hills. Bids will be opened on Oct. 24 on 1400 tons of 36 to 48-in. welded steel pipe for Everett, Wash. On orders for lots of ordinary size, the usual quotation is 2.35c., c.i.f., but on especially desirable business prices as low as 2.25c. have been made.

Shapes.—Structural steel shape lettings were heavier than usual this week and included a number of fair-sized projects. The McClintic-Marshall Co. took 3000 tons for an office building on Broadway, Los Angeles, the Consolidated Steel Corporation; secured 1500 tons for the Los Angeles Stock Exchange Building, and the United States Steel Products Co. booked 450 tons and 250 tons respectively for canning plants at Cagayana, P. I., and Cape Haitien, Tahiti, for the California Packing Corporation, San Francisco. New inquiries include 1000 tons for an auditorium at Long Beach, 400 tons for a power house at North Bend, Ore., and 276 tons for a bridge at California Park, Cal. Plain material continues firm at 2.35c., c.i.f.

Cast Iron Pipe.—Cast iron pipe lettings included 4285 tons of 6 to 12-in. Class 150 pipe for Long Beach, Cal., placed with the United States Pipe & Foundry Co., and 353 tons of 2 to 6-in. Class B pipe for Long Beach Boulevard, Compton, Cal., secured by Gadza & Gogo, Los Angeles. Azusa, Cal., placed 110 tons of 4 and 6-in. Class B pipe for Coney Avenue with J. J. Showalter, Los Angeles. C. E. Printiss, San Jose, took 138 tons of 4-in. Class 150 pipe for Pleasanton, Cal. No new inquiries of importance came up for figures during the week.

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and struc. shapes	3.15c.
Soft steel bars	3.15c.
Small angles, 3/16-in. and over	3.15c.
Small angles, under 3/16-in.	3.55c.
Small channels and tees, 3/4-in. to 2 3/4-in.	3.75c.
Spring steel, 1/4-in. and thicker	5.00c.
Black sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.80c.
Galv. sheets (No. 24)	5.30c.
Struct. rivets, 1/2-in. and larger	5.65c.
Com. wire nails, base per keg	$3.40
Cement c't'd nails, 100 lb. keg	3.40

Birmingham

Pig Iron Inquiries for First Quarter Appear—Ensley Rail Mill Resumes Operations

BIRMINGHAM, Oct. 15.—Inquiries for pig iron for first quarter requirements are beginning to come in from Eastern and Middle West points. Several round tonnages have been sold recently in competitive territories, but they have been for the last quarter requirements. Stocks at furnaces continue to be reduced by the heavy shipments to other territories. District prices remain on the basis of $14.50 for No. 2 foundry. Prices on iron to outside districts are stronger. The No. 1 furnace of the Republic Iron & Steel Co. was blown in Oct. 14 on foundry iron, making a total of 15 active furnaces in the district. Of this number, seven are on foundry iron, seven on basic and one on recarburizing iron.

Prices per gross ton, f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil.	$14.50
No. 1 fdy., 2.25 to 2.75 sil.	15.00
Basic	14.50

Finished Steel.—Demand is undiminished. The rate of new business compares favorably with that of last month. There is no noticeable change in the steady rate of specifying on contracts. Operations were resumed at the Tennessee company's rail mill at Ensley Oct. 14, following receipt of large rail orders, including 62,000 tons for the Louisville & Nashville. Prices on galvanized sheets have been increased $1 a ton to 3.75c. All other prices are unchanged. Structural steel fabricators have not booked any large orders, but small tonnages have been numerous enough to equal current output. Reinforcing bar manufacturers report better business, mostly in small orders. Eighteen open-hearths remain active, the same as last week.

Cast Iron Pipe.—The rate of buying has declined gradually during the past few weeks, and it is now at the low point of the year. Incoming business is less than the output at the plants, and backlogs are thin. Recent bookings have been made up almost entirely of small lots. A project at Dallas, Tex., estimated to require between 12,000 and 15,000 tons of the larger sizes of pipe, will be up for figures the end of this month. Bids are expected to be asked for in the near future on a project at St. Petersburg, Fla., to require about 1000 tons. These are the only projects of importance known to be pending. Quotations continue at $37 to $38 a net ton, Birmingham.

Coke.—Spot delivery for foundry coke is a little stronger. Shipments on contracts continue steady. Quotations have been at $5 a net ton, Birmingham, for almost two years.

Old Material.—Demand for steel grades is growing a little stronger as prospects for an increase in the melt become more certain. Iron scrap remains inactive. Prices are unchanged. In steel lines they show strength and in others they are soft.

Prices per gross ton, deliv'd Birmingham dist. consumers' yards:

Heavy melting steel	$13.00 to $13.50
Scrap steel rails	14.00
Short shoveling turnings	9.00
Cast iron borings	9.00
Stove plate	11.50 to 12.00
Steel axles	21.00
Iron axles	23.00
No. 1 railroad wrought	10.00 to 10.50
Rails for rolling	15.50
No. 1 cast	13.00
Tramcar wheels	12.50
Cast iron carwheels	13.00 to 13.50
Cast iron borings, chem.	13.50 to 14.00

Murray Iron Works Co., Burlington, Iowa, has appointed the following sales agents: Isaac Hardeman, Charlotte, N. C.; C. Keiser & Co., Dayton, Ohio; William Rudolph, Los Angeles, Cal.; and P. Schmertz, Detroit.

St. Louis

First Pig Iron Sale for First Quarter Is Made—Coke Demand Heavier—Scrap Still Weak

ST. LOUIS, Oct. 15.—The first sale of pig iron for delivery during the first quarter of 1930 was made by the St. Louis Gas & Coke Corporation—500 tons of foundry iron to an Illinois wheel manufacturer at present prices. Other inquiries for first quarter are pending. Otherwise, it was an uninteresting week, the local maker selling only an additional 2000 tons for shipment during the remainder of the year, including 500 tons each to an Iowa implement manufacturer and to a local jobbing foundry; 600 tons to a machinery manufacturer and 300 tons to a Missouri jobbing foundry. Sales of Southern iron were light as a result of heavy bookings several weeks ago. The market is firm on both Northern and Southern makes. Shipments of the local maker have averaged 1118 tons daily since Oct. 1.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill.	$19.50 to $20.00
Malleable, f.o.b. Granite City	20.00
N'th'n No. 2 fdy., deliv'd St. Louis	22.16
Southern No. 2 fdy., deliv'd	16.92 to 18.92
Northern malleable, deliv'd	22.16
Northern basic, deliv'd	22.16

Freight rates: 75c. (average) Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

Finished Iron and Steel.—With other lines quiet, interest is centered in buying of rails. The St. Louis-San Francisco Railway, as noted, has tentatively placed 30,000 tons for 1930 with the Tennessee Coal, Iron & Railroad Co. It is understood that other railroads are working on their budgets, which will be approved probably about Nov. 1, and the impression is that purchases will be equal to last year's. There is little doing in plates, shapes and bars. The structural trade is dull, and fabricators are in need of orders.

Coke.—A steady increase in the demand for coke is noticed. Domestic coke buying exceeds the by-product output in the district, and the increasing melt is helping the sale of foundry grades. Demand for furnace coke by smelters is heavy, one factor increasing its schedules for October from 1000 tons to 1500 tons.

Old Material.—While prices of old material are unchanged, the market still is weak. There was some buying of rolling mill grades during the week and one consumer bought a small tonnage of steel grades. While the movement of scrap iron from the country districts has been cut down as the result of lower prices, railroad lists are heavy, including the following: Chesapeake & Ohio, 8981 tons; Louisville & Nashville, 8000 tons; Atchison, Topeka & Santa Fe, 6235 tons; Southern Pacific, 3450 tons; Texas & Pacific, 3120 tons; Terminal Railway Association (St. Louis), 2350 tons; International-Great Northern, 1500 tons; Chicago & Alton, 1230 tons; Chicago, Rock Island & Pacific, 180 carloads; St. Louis-San Francisco, 71 carloads; Nickel Plate, 41 carloads; Chicago & Eastern Illinois, 18 carloads; Nashville, Chattanooga & St. Louis, 14 carloads; Pullman Co. (St. Louis), 11 carloads, and Chicago, Milwaukee, St. Paul & Pacific, 9 carloads.

Dealers' buying prices per gross ton, f.o.b. St. Louis district:

No. 1 heavy melting or shoveling steel	$13.50 to $14.00
No. 2 heavy melting or shoveling steel	13.00 to 13.50
No. 1 locomotive tires	15.50 to 16.00
Miscel. stand.-sec. rails including frogs, switches and guards, cut apart	15.50 to 16.00
Railroad springs	17.75 to 18.25
Bundled sheets	10.00 to 10.50
No. 2 railroad wrought	13.50 to 14.00
No. 1 busheling	10.00 to 10.50
Cast iron borings and shoveling turnings	9.50 to 10.00
Iron rails	13.00 to 13.50
Rails for rolling	16.00 to 16.50
Machine shop turnings	7.50 to 8.00
Heavy turnings	10.00 to 10.50
Steel car axles	19.50 to 20.00
Iron car axles	27.50 to 28.00
Wrot. iron bars and trans.	21.50 to 22.00
No. 1 railroad wrought	13.75 to 14.25
Steel rails, less than 3 ft.	18.00 to 18.50
Steel angle bars	15.25 to 15.75
Cast iron carwheels	15.00 to 15.50
No. 1 machinery cast	15.25 to 15.75
Railroad malleable	16.00 to 16.50
No. 1 railroad cast	14.75 to 15.25
Stove plate	12.25 to 12.75
Agricult. malleable	15.25 to 15.75
Relay. rails, 60 lb. and under	20.50 to 23.50
Relay. rails, 70 lb. and over	26.50 to 29.00

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-fin. rounds, shaftings, screw stock	3.75c.
Black sheets (No. 24)	4.25c.
Galv. sheets (No. 24)	5.10c.
Blue ann'l'd sheets (No. 10)	3.45c.
Black corrug. sheets (No. 24)	4.30c.
Galv. corrug. sheets	5.15c.
Structural rivets	3.95c.
Boiler rivets	3.95c.
	Per Cent Off List
Tank rivets, ⅞-in. and smaller, 100 lb. or more	65
Less than 100 lb.	60
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-pressed nuts, sq., blank or tapped, 200 lb. or more	60
Less than 200 lb.	50
Hot-pressed nuts, hex., blank or tapped, 200 lb. or more	60
Less than 200 lb.	50

Boston

Pig Iron Sales Less Than 5000 Tons—Scrap Market Dull and Prices Decline Further

BOSTON, Oct. 15.—The Universal Winding Co., Providence, R. I., has bought 600 tons of Buffalo pig iron, silicon 2.50 to 3 per cent, and 400 tons of New York State No. 2X iron. A Massachusetts pump manufacturer bought 450 tons of Buffalo iron and some imported iron, while the Mystic Iron Works disposed of one 500-ton lot and another of 300 tons. Otherwise, business was confined to comparatively small tonnages, the aggregate of all sales falling under 5000 tons. There are no inquiries of importance in the market. Foundries that have not purchased fourth quarter iron apparently are in no hurry to do so. While Buffalo furnaces are maintaining $18 a ton, base furnace, on rail-and-water shipment iron, that price can be bettered on all-rail business, and some furnaces have been disregarding silicon differentials. The Mystic Iron Works sales the past week were at prices ranging from $20 to $20.75 a ton, furnace.

Foundry iron prices per gross ton deliv'd to most New England points:

†Buffalo, sil. 1.75 to 2.25	$21.78 to $22.28
†Buffalo, sil. 2.25 to 2.75	22.28 to 22.78
*Buffalo, sil. 1.75 to 2.25	22.41 to 22.91
*Buffalo, sil. 2.25 to 2.75	22.91 to 23.41
East. Penn., sil. 1.75 to 2.25	22.65 to 23.15
East. Penn., sil. 2.25 to 2.75	23.15 to 23.65
Va., sil. 1.75 to 2.25	25.21
Va., sil. 2.25 to 2.75	25.71
*Ala., sil. 1.75 to 2.25	24.11
*Ala., sil. 2.25 to 2.75	24.61
†Ala., sil. 1.75 to 2.25	20.25
†Ala., sil. 2.25 to 2.75	20.75

Freight rates: $4.91 all rail from Buffalo, and $4.28 rail and water; $3.65 all rail from eastern Pennsylvania; $5.21 all rail from Virginia; $9.61 all rail from Alabama and $5.75 rail and water from Alabama to New England seaboard.
*All rail rate.
†Rail and water rate.

Cast Iron Pipe.—Ayer, Mass., has awarded 125 tons of 6 and 8-in. pipe to the Warren Foundry & Pipe Co., and Foxboro, Mass., 100 tons of 6-in. to the McWane Cast Iron Pipe Co. No other municipal business has been placed openly, but no less than a dozen towns and cities have placed orders for lots of a carload or more. Prices on domestic pipe are well maintained, especially on small dimensions. Quotations made openly are: 4-in., $44.10 to $45.10 a ton, delivered common Boston freight rate points; 6 to 12-in., $40.10 to $41.10; 16-in. and larger, $39.10 to $40.10. Business for next spring delivery is shaping up well. Already the following municipalities have announced plans for work then: North Attleboro, Mass.; North Kingston, R. I.; Westwood, Mass.; Dighton, Mass.; Brownville, Me.; Lenox, Mass.; Sudbury, Mass. The Worcester Gas Light Co., Worcester, Mass., has bought a round tonnage of steel pipe and is in the market for additional tonnages.

Reinforcing Bars.—The largest individual sale of billet steel bars the past week was 215 tons for a local bank building. Competition for this tonnage was keen. Mill representatives are quoting 2.66½c. a lb., base, from local stock, but that price has been shaded. The market for rail steel bars continues quiet at 2.26½c. a lb., base, delivered common Boston freight rate points.

Coke.—New England by-product coke ovens are devoting most of their attention to domestic fuel, demand

for which has been large the past week owing to a cold snap. Shipments of foundry coke on contract are steady, and the price remains at $11 a ton, delivered within a $3.10 freight rate zone.

Old Material.—Prices of old material continue on the downgrade. The weakness is ascribed to the softness of prices in the Pittsburgh territory and to the lack of buying by steel mills rather than to any pressure to sell. In fact, brokers say it is difficult to pick up more than an occasional carload of scrap at going prices and that owners of material in general are prepared to hold on until market conditions improve. Business in heavy melting steel the past week was practically nil. A small tonnage of steel turnings, mixed borings and turnings, steel mill borings, skeleton and forge scrap changed hands. There is virtually no market for T, girder and rerolling rails, shafting, axles, forge flashings and wrought. Consumers of chemical borings are holding up shipments.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$10.50 to $10.75
Scrap T rails	10.50 to 10.75
Scrap girder rails	9.50 to 10.00
No. 1 railroad wrought	10.50 to 11.00
No. 1 yard wrought	9.00 to 9.50
Machine shop turnings	6.50 to 7.00
Cast iron borings (steel works and rolling mill)	6.00 to 6.50
Bundled skeleton, long	9.00 to 9.50
Forge flashings	9.50 to 10.00
Blast furnace borings and turnings	6.00 to 6.25
Forge scrap	8.50 to 9.00
Shafting	13.50 to 14.00
Steel car axles	17.50 to 18.00
Wrought pipe 1 in. in diameter (over 2 ft. long)	9.25 to 9.50
Rails for rolling	12.00 to 12.50
Cast iron borings, chemical	9.50 to 9.75

Prices per gross ton deliv'd consumers' yards:

Textile cast	$14.00 to $14.50
No. 1 machinery cast	15.00 to 15.25
No. 2 machinery cast	13.00 to 13.25
Stove plate	11.00 to 11.50
Railroad malleable	18.50 to 19.00

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars, small shapes	3.265c.
Flat, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway rounds	6.60c.
Norway squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tie steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold-rolled steel—	
Rounds and hex	*3.55c. to 5.55c.
Squares and flats	*4.05c. to 7.05c.
Toe calk steel	6.00c.
Rivets, structural or boiler	4.50c.

	Per Cent Off List
Machine bolts	50 and 5
Carriage bolts	50 and 5
Lag screws	50 and 5
Hot-pressed nuts	50 and 5
Cold-punched nuts	50 and 5
Stove bolts	70 and 10

*Including quantity differentials.

Cincinnati

Pig Iron Melters Slow in Covering Future Needs—Southern Prices Firmer—Scrap Market Weak

CINCINNATI, Oct. 15.—District consumers of pig iron continue to display reluctance toward entering the market for substantial tonnages, although reports indicate a fairly heavy melt and a sustained demand for castings. As a result, sales of pig iron last week declined sharply, furnaces reporting a total of approximately 3550 tons, of which 1550 was Southern foundry iron and the remainder Northern iron. While the Southern iron sold last week was in small quantities, generally carload lots, and no real test of prices resulted, furnaces maintained quotations at $14 to $14.50, base Birmingham. With surplus stocks of Southern furnaces substantially reduced, the market appears to be strengthening, and prices under $14, even on good tonnages, are less likely. Northern furnaces are adhering to present schedules, and current sales all figure at about $18.50, base, Lake furnace. The largest order of the week was from a central Indiana consumer, which took 400 tons of Northern Foundry iron. The Wickham Piano Plate Co., Springfield, Ohio, is asking for quotations, but no amount of iron is specified. The Favorite Stove Co., Piqua, Ohio, is inquiring for 400 tons of iron with 2.75 to 3.25 per cent of silicon.

Prices per gross ton, deliv'd Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25	$19.89	to $20.39
Ala. fdy., sil. 1.75 to 2.25	17.19	to 18.19
Ala. fdy., sil. 2.25 to 2.75	17.69	to 18.69
Tenn. fdy., sil. 1.75 to 2.25	17.19	to 18.19
S'th'n Ohio silvery, 8 per cent	26.89	

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

Finished Material.—Although new business of district sheet mills last week was approximately 25 per cent below capacity production, backlogs were increased slightly because a good portion of the new specifications was for forward delivery. Accordingly, the anticipated improvement in operating schedules did not materialize, but production at about 75 to 80 per cent is well sustained. Operators continue sanguine that schedules will be increased to full capacity by the first of next month, basing their opinions on the present volume of inquiry and the moderate improvement in the automotive demand. Seven to 10 days is about the average time for shipment of stock material, while three to five weeks is the general promise on special sheets. While prospects are still fairly good in the structural market, the current volume of business of district steel fabricators is small and competition is keen.

Coke.—Domestic coke is moving steadily, district oven representatives reporting about 3000 tons in miscellaneous lots as last week's total. By-product foundry coke is going forward at a good rate on contract, but new business is in small quantities.

Old Material.—Although the supply of good scrap is not large, the situation is a trifle easier than a week ago. The continued pressure on prices by the mills has given the market a tone of softness, and, accordingly, dealers are bidding 25c. a ton less on heavy melting steel and No. 2 wrought than a week ago. Demand for the cast iron grades has improved and, since these grades did not advance with the steel grades, prices are unchanged.

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and struc. shapes	3.40c.
Bars, soft steel or iron	3.30c.
New billet reinforc. bars	3.15c.
Rail steel reinforc. bars	3.00c.
Hoops	4.05c.
Bands	3.50c.
Cold-fin. rounds and hex	3.85c.
Squares	4.35c.
Black sheets (No. 24)	4.05c.
Galvanized sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.45c.
Structural rivets	3.85c.
Small rivets	65 per cent off list
No. 9 ann'l'd wire, per 100 lb.	$3.00
Com. wire nails, base per keg	2.85
Cement c't'd nails, base 100 lb. keg	2.85
Chain, per 100 lb.	8.75

	Net per 100 Ft.
Lap-weld steel boiler tubes, 2-in.	$16.00
4-in.	33.00
Seamless steel boiler tubes, 2-in.	17.00
4-in.	34.00

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel	$13.25 to $13.50
Scrap rails for melting	14.25 to 14.75
Loose sheet clippings	8.75 to 9.25
Bundled sheets	11.00 to 11.50
Cast iron borings	9.00 to 9.25
Machine shop turnings	8.25 to 8.50
No. 1 busheling	10.50 to 11.00
No. 2 busheling	7.00 to 7.50
Rails for rolling	14.50 to 15.00
No. 1 locomotive tires	14.25 to 14.75
No. 2 railroad wrought	13.25 to 13.50
Short rails	18.50 to 19.00
Cast iron carwheels	12.75 to 13.25
No. 1 machinery cast	19.00 to 19.50
No. 1 railroad cast	15.25 to 15.75
Burnt cast	10.25 to 10.75
Stove plate	10.25 to 10.75
Brake shoes	10.25 to 10.75
Agricultural malleable	14.25 to 14.75
Railroad malleable	15.25 to 15.75

German Cable Exports Gain

HAMBURG, GERMANY, Sept. 30.—Exports of cable continue to increase. The total in the first eight months of this year was 38,100 tons, compared with 49,000 tons in all of 1928, 42,000 tons in all 1927 and 31,800 tons in all of 1926. Shipments of cable to South American markets registered a considerable gain in the first seven months of this year, Argentina receiving 8828 tons compared with 5139 tons in the same period of 1928. The total value of cable exported in the first eight months of this year was about 40,000,000 m. ($9,520,000).

The Central Iron & Steel Co., Harrisburg, Pa., has moved its Boston office from 131 State Street to the Statler Building, Park Square. G. T. Armstrong is district manager.

Buffalo

Ford Motor Co. Buys Pig Iron—Mill Operations Show No Gain—Large Purchase of Steel Scrap

BUFFALO, Oct. 15.—The Ford Motor Co. has placed a tonnage of high silicon malleable pig iron with a Buffalo furnace for water shipment, and is reported to be in the market for an additional tonnage of the same grade of iron, which will probably be placed with another maker. The exact amount of the iron placed is not known, but it is reported to be around 5000 tons. The price was not disclosed. Inquiry for pig iron has fallen off, with a total of 3000 tons reported. Included in this is one lot of 1000 tons of foundry iron for New England shipment. The Worthington Pump & Machinery Corporation, which bought 1600 tons last week, is understood to have placed part of this iron with a Buffalo furnace.

Prices per gross ton, f.o.b. furnace:

No. 2 fdy., sil. 1.75 to 2.25	$19.50
No. 2X fdy., sil. 2.25 to 2.75	20.00
No. 1 fdy., sil. 2.75 to 3.25	21.00
Malleable, sil. up to 2.25	20.00
Basic	18.50
Lake Superior charcoal	27.28

Finished Iron and Steel.—Operation of Buffalo mills shows no increase over the past week, with 70 per cent the average. A Buffalo fabricator took 170 tons of structural steel for a new job at the Elmira Reformatory, and an inquiry is out for 200 tons of structural for a school in the town of Amherst. The reinforcing bars for the new Attica prison, totaling 2400 tons, are understood to have been placed with a Chicago company.

Old Material.—A Buffalo steel plant has bought a large tonnage of No. 1 and No. 2 heavy melting steel, paying $15.50 for the No. 1 steel and $14 for No. 2. A sale of considerable tonnage of stove plate is noted at $12.75. It is probable that about 5000 tons was involved. There is a fair demand for malleable scrap. One of the railroads recently closing a list obtained $20, Buffalo, for this scrap, though all of it went out of town. A sale of 1000 tons of cast iron wheels at $13.50 is noted, and a new borings order is out at $12. Dealers are expecting that another tonnage of No. 1 machinery cast and No. 1 heavy melting steel will be purchased within a week. Stocks in dealers' yards are heavy, and this also applies to most of the consumers. The largest consumer in the district reports that its stock of scrap is the heaviest of any time in months, receiving as high as four boat loads of material a week from Detroit. Its total of boat shipments during the season runs well over 200,000 tons.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$15.50 to $16.50
No. 2 heavy melting steel	14.00 to 14.50
Scrap rails	16.00 to 16.50
Hydraul. comp. sheets	14.25 to 14.50
Hand bundled sheets	11.00 to 11.50
Drop forge flashings	14.25 to 14.50
No. 1 busheling	15.75 to 16.00
Hvy. steel axle turnings	14.00 to 14.50
Machine shop turnings	8.00 to 8.50
No. 1 railroad wrought	13.00 to 13.50
Acid Open-Hearth Grades:	
Knuckles and couplers	18.00 to 18.50
Coil and leaf springs	18.00 to 18.50
Rolled steel wheels	18.00 to 18.50
Low phos. billet and bloom ends	19.00 to 19.50
Electric Furnace Grades:	
Short shov. steel turnings	12.50 to 13.00
Blast Furnace Grades:	
Short mixed borings and turnings	11.50 to 12.25
Cast iron borings	11.50 to 12.00
No. 2 busheling	10.00 to 10.50
Rolling Mill Grades:	
Steel car axles	18.75 to 19.25
Iron axles	21.00 to 22.00
Cupola Grades:	
No. 1 machinery cast	15.50 to 16.00
Stove plate	12.50 to 12.75
Locomotive grate bars	12.50 to 13.00
Steel rails, 3 ft. and under	19.50 to 19.75
Cast iron carwheels	13.50
Malleable Grades:	
Industrial	18.00 to 18.50
Railroad	18.00 to 18.50
Agricultural	18.00 to 18.50
Special Grades:	
Chemical borings	12.50 to 13.50

Canada

Pig Iron Prices Are Reduced $1 a Ton

TORONTO, ONT. Oct. 15.—A reduction of $1 a ton in Canadian pig iron prices, effective in both Toronto and Montreal markets, has been announced. This cut was made in an effort to shut out Buffalo competition in the Toronto market and Port Henry competition in the Montreal district. With Buffalo iron quoted at $18, the price laid down to consumers in Toronto, duty and freight paid, is approximately $24 a ton, whereas the drop in the Canadian price brings the local quotation to $23.60 for No. 1 iron. United States producers, however, continue to supply the Canadian agricultural implement industry, as iron for these plants enters the country free of duty. A falling off in demand for pig iron has occurred. Curtailment is directly due to the decline in forward delivery contracts. Most of the melters who place quarterly contracts are now covered to the end of the year. Spot demand, however, is well sustained and showing improvement in some localities. The Algoma Steel Corporation, Sault Ste. Marie, Ont., has blown out one of its blast furnaces and now has two stacks operating, making a total of eight active furnaces of a total of 11 in Canada.

Prices per gross ton:

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75	$23.60
No. 2 fdy., sil. 1.75 to 2.25	23.10
Malleable	23.60
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75	$25.00
No. 2 fdy., sil. 1.75 to 2.25	24.50
Malleable	25.00
Basic	23.50
Imported Iron, Montreal Warehouse	
Summerlee	$33.50
Carron	33.00

Structural Steel.—Demand has declined during the past two weeks, but fabricators are still running full time and report large backlogs.

Old Material.—Business failed to show improvement during the week, although sales are holding at a level higher than a year ago. Prices are firm.

Dealers' buying prices:

	Per Gross Ton	
	Toronto	Montreal
Heavy melting steel	$10.00	$8.50
Rails, scrap	11.00	9.00
No. 1 wrought	10.00	12.00
Machine shop turnings	7.50	5.00
Boiler plate	7.50	6.00
Heavy axle turnings	8.00	7.50
Cast borings	7.50	5.00
Steel borings	7.50	6.50
Wrought pipe	6.00	6.00
Steel axles	15.00	20.00
Axles, wrought iron	17.00	22.00
No. 1 machinery cast	....	17.00
Stove plate	....	13.00
Standard carwheels	....	16.00
Malleable	....	13.00
Per Net Ton		
No. 1 mach'ry cast	$16.00	....
Stove plate	12.00	....
Standard carwheels	15.00	....
Malleable scrap	14.00	....

The management of the American Society for Steel Treating at Cleveland announces that the dates for the semi-annual meeting of the national society will be held Feb. 7 and 8, at the Hotel Pennsylvania, New York.

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and struc. shapes	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.95c.
Cold-fin. flats, sq. and hex	4.45c.
Rounds	3.95c.
Cold-rolled strip steel	5.85c.
Black sheets (No. 24)	4.20c.
Galv. sheets (No. 24)	4.85c.
Blue ann'l'd sheets (No. 10)	3.50c.
Com. wire nails, base per keg	$3.60
Black wire, base per 100 lb	3.75

Shipments of Equipment and Enameled Ware

	Sept., 1929	Aug., 1929	Sept., 1928
Electric industrial trucks and tractors [a]	161	154	118
Electric industrial trucks and tractors, nine months [a]	1,586 [b]	.....	1,047
Mining and industrial electric locomotives [a]	$1,516,397 [c]	$1,121,162 [c]	.....
	Aug., 1929	July, 1929	Aug., 1928
Sheet-metal ware, enameled, [a] dozens	385,162	290,532	358,811
Sheet-metal ware, enameled, value [a]	$1,371,354	$1,097,956	$1,354,316

[a] United States Department of Commerce.
[b] Highest on record.
[c] Shipments represent quarters ended Sept. 30, and June 30.

Fabricated Structural Steel

Thirty Per Cent of Lettings, Totaling 23,000 Tons, Are for Pacific Coast Work

APPROXIMATELY 30 per cent of the structural steel lettings in the past week, totaling 23,000 tons, were for construction work on the Pacific Coast. The tonnage in the aggregate was about evenly divided between industrial structures and buildings for other purposes. Thirty-six hundred tons for a power house at Powerton, Ill., and 3000 tons for an office building at Los Angeles, Cal., were the largest awards.

Inquiries, at 49,000 tons, were less than half of those of the previous week. Almost 20,000 tons of fresh inquiries came out in the New York district, where business in prospect is unusually heavy. Among the new jobs on which bids are being taken are a New York office building, requiring 9400 tons, a viaduct and suburban stations at Philadelphia for the Pennsylvania Railroad, 14,000 tons, and a New York subway section, 6800 tons. Awards follow:

SPRINGFIELD, MASS., 100 tons, warehouse for Gilbert & Barker Mfg. Co., to Palmer Steel Co.

HOLYOKE, MASS., 100 tons, paper plant, to Haarmann Steel Co.

BOSTON & ALBANY RAILROAD, 500 tons, roundhouse at Springfield, Mass., to Haarmann Steel Co.

STATE OF NEW YORK, 125 tons, highway bridges, to American Bridge Co.

NEW YORK, 500 tons, Roosevelt Memorial at Seventy-seventh Street and Central Park West, to Easton Structural Steel Co.

NEW YORK, 2300 tons, apartment building at Park Avenue and Seventy-third Street, to A. E. Norton, Inc.

NEW YORK, 1200 tons, apartment building on Seventy-second Street, to Paterson Bridge Co.

BOUND BROOK, N. J., 435 tons, building for Calco Chemical Co., to Levering & Garrigues Co.

PHILADELPHIA, 350 tons, alteration work for Corn Exchange National Bank & Trust Co., to McClintic-Marshall Co.

PHILADELPHIA, 160 tons, bridge for Pennsylvania Railroad, to McClintic-Marshall Co.

PENNSYLVANIA RAILROAD, 700 tons, work in West Philadelphia, to McClintic-Marshall Co.

CHESAPEAKE & OHIO RAILROAD, 700 tons, bridge at Ceredo, W. Va., to American Bridge Co.

AMBRIDGE, PA., 150 tons, electric welding building for National Metal Molding Co., to Jones & Laughlin Steel Corporation.

ROME, N. Y., 200 tons, New York Central grade crossing improvement, to McClintic-Marshall Co.

ELMIRA, N. Y., 170 tons, shop for Elmira Reformatory, to Kellogg Structural Steel Co.

BUFFALO, 800 tons, Buffalo *Courier-Express* building, to McClintic-Marshall Co.

CLEVELAND, 270 tons, Lakewood Land & Securities Co. Lakewood store for Bailey Co., to Kilroy Structural Steel Co.

RIVER FOREST, ILL., 300 tons of steel and 100 tons of castings for Bowman Dairy Co., to A. F. Anderson, Chicago.

POWERTON, ILL., 3600 tons, power house, to Mississippi Valley Structural Steel Co.

JANESVILLE, WIS., 700 tons, Monterey overhead bridge, to Lakeside Bridge & Steel Co.

MILWAUKEE, 130 tons, Oklahoma Avenue bridge, to Worden-Allen Co.

MADISON, WIS., 650 tons, University of Wisconsin field house, to Mississippi Valley Structural Steel Co.

TWO RIVERS, WIS., 200 tons, Hamilton Mfg. Co., to Vulcan Mfg. Co., Fond du Lac, Wis.

STEVENS POINT, WIS., 200 tons, Whiting Plover paper mills, to Wausau Iron Works.

GREAT NORTHERN, 400 tons, tender tanks, to Williamson Brothers Boiler Works.

ILLINOIS CENTRAL, 120 tons, bridge, to American Bridge Co.

CHICAGO, MILWAUKEE, ST. PAUL & PACIFIC, 275 tons, bridges, to American Bridge Co.

UNION PACIFIC, 425 tons, bridges, to an unnamed bidder.

DENVER, 1200 tons, viaduct, to American Bridge Co.; previously reported to an unnamed bidder.

OAKLAND, CAL., 150 tons, apartment building on Lenox Avenue, to Herrick Iron Works.

OAKLAND, 140 tons, hotel, San Pablo and Twenty-fourth Streets, to Herrick Iron Works.

OAKLAND, 120 tons, factory for Wills Motor Co., to Pacific Coast Engineering Co.

OAKLAND, 240 tons, transit shed No. 2 for Port Commission, to Pacific Coast Engineering Co.

SAN FRANCISCO, 450 tons, canning plant at Cagayana, Philippine Islands, for California Packing Corporation, to United States Steel Products Co.

SAN FRANCISCO, 250 tons, canning plant for California Packing Corporation, Cape Haitian, Tahiti, to United States Steel Products Co.

LOS ANGELES, 3000 tons, office building, Ninth Street and Broadway, to McClintic-Marshall Co.

LOS ANGELES, 1500 tons, Los Angeles Stock Exchange Building, to Consolidated Steel Corporation.

TACOMA, WASH., 150 tons, hangar, to Star Iron Works; previously reported to an unnamed bidder.

TACOMA, 150 tons, smelter addition, to Star Iron Works.

MARSHFIELD, ORE., 400 tons, power house, to an unnamed bidder.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

NEW YORK, 9400 tons, Salmon Building at Fifth Avenue and Forty-second Street.

NEW YORK, 6800 tons, section 7, route 108, of subway in Queens; bids due Oct. 25.

NEW YORK, 2300 tons, apartment building at 895 Park Avenue.

NEW YORK, 1000 tons, apartment building at 992 Park Avenue.

BROOKLYN, 4000 tons, Kings County Hospital; new bids being taken.

PENNSYLVANIA RAILROAD, 14,000 tons, viaduct and suburban stations at Philadelphia.

PASSAIC, N. J., 1000 tons, building for United States Rubber Co.

PASSAIC, N. J., 250 tons, Young Women's Christian Association Building.

PHILADELPHIA, 1500 tons, junior high school.

FORT WAYNE, IND., 800 tons, theater.

LANSING, MICH., 1700 tons, office building for R. E. Olds Co.

CHICAGO, 900 tons, Swedish Engineers' Society Building.

CHICAGO, 500 tons, 124th Field Artillery Armory; Great Lakes Construction Co., general contractor.

CHICAGO, 950 tons, Wieboldt department store on Sixty-third Street.

MILWAUKEE, 4000 tons, Northwestern Mutual Life Building; plans out.

OMAHA, NEB., 2000 tons, addition to Union Pacific Station.

EVERETT, WASH., 1400 tons plates for pipe line; bids Oct. 24.

NORTH BEND, ORE., 400 tons, power house; bids being taken.

LONG BEACH, CAL., 970 tons, municipal auditorium; bids being taken.

PHOENIX, ARIZ., 171 tons, bridges on Holbrook-Lupton highway; bids Nov. 4.

SACRAMENTO, CAL., 276 tons, overhead crossing at California Park; bids Nov. 6.

Fire Protection and Prevention

(*Concluded from page* 1042)

stalled; but if this is not advisable the alarm may be sounded by ringing a bell or by word of mouth. Alarms for fire-drills should be sounded only by the fire marshal. Upon the sounding of an alarm in case of actual fire the fire marshal assumes control of the situation and directs the fighting by orders to the squad captains. Upon arrival of the city fire department that control is relinquished and the authorities take full charge.

Instruction of Employees Is Essential

We are particular about educating employees along the lines of (accident) safety and conducting safety campaigns, both to prevent accidents and to treat them when they occur. An educational and instructive campaign to prevent fires and to plan what to do when they occur is no less important. Such education should be along the lines of fire prevention, fire fighting and obeying fire regulations. The average workman needs such instruction just as much as a child. Employees like to know that there is adequate fire protection and that they can leave the building with safety in case of a fire.

A campaign to prevent fires is necessary as a prerequisite to saving property and human life. Losses from this cause frequently go beyond the individual plant suffering from fire loss, because often one or more other establishments depend upon goods produced by the plant to maintain production. On the other hand, one or more establishments may depend largely upon goods consumed by the plant to keep them running at full capacity. Industry must insist on fire protection, to protect itself from destruction and the waste of material wealth.

Non-Ferrous Metal Markets

Tin at Lowest Level Since 1924—Other Metals Quiet and Firm

NEW YORK, Oct. 15.

Copper.—Despite September copper statistics favorable to sellers and made public on Oct. 11, demand continues very light. The statistics show a decrease of nearly 10,000 tons in refined copper stocks and an increase of about 11,000 tons in blister stocks. Thus, the net increase of copper above ground was only about 1000 tons. The drop in stocks was influenced by a two weeks' strike at a New Jersey refinery. September shipments increased less than 2000 tons. It was thought that buying would increase after the announcement of favorable statistics, but there has been very little change in the week. The larger part of the week's selling was to foreign consumers, buying by domestic melters continuing in moderate volume. Prices are unchanged, with electrolytic copper quoted at 18c., delivered in the Connecticut Valley, and Lake copper at 18.12½c., delivered. Copper Exporters, Inc., continues to quote 18.30c., c.i.f. usual European ports.

Tin.—At 42.25c. yesterday and today, spot Straits tin, New York, sold at the lowest price since June 11, 1924, when the quotation was 42.12½c. Sales for the week ended Saturday, Oct. 12, were about 1000 tons, but yesterday the market turned active because of a big break in London prices and 500 tons changed hands, with consumers the principal buyers. In London, sales included deliveries through May. Today demand let up and the market was very quiet. When tin in London declined to £200 a ton recently, the group became buyers but yesterday, when the market turned weak, they did not support it and quotations dropped to the lowest point in several years. Today the London market turned upward, due to buying by a large London house credited as acting for the group. Prices today were £191 2s. 6d. for spot standard, £195 15s. for future standard and £195 12s. 6d. for spot Straits, all considerably lower than a week ago. The Singapore market today was £197 5s. London warehouse stocks, at 12,712 tons, were again reported as the largest in history.

Lead.—Conditions have changed little from those ruling a week ago. Buying for November continues with some purchases for October delivery, but the total volume is not large.

THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY

	Oct. 15	Oct. 14	Oct. 11	Oct. 10	Oct. 9
Lake copper, New York	18.12½	18.12½	18.12½	18.12½	18.12½
Electrolytic copper, N. Y.*	17.75	17.75	17.75	17.75	17.75
Straits tin, spot, N. Y.	42.25	42.25	42.87½	43.25	43.37½
Zinc, East St. Louis	6.80	6.80	6.80	6.80	6.80
Zinc, New York	7.15	7.15	7.15	7.15	7.15
Lead, St. Louis	6.70	6.70	6.70	6.70	6.70
Lead, New York	6.90	6.90	6.90	6.90	6.90

*Refinery quotation; price ¼c. higher delivered in the Connecticut Valley.

Rolled Products

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—
- High brass ..... 23.25c.
- Copper, hot rolled ..... 26.75c.
- Zinc ..... 10.25c.
- Lead (full sheets) .. 11.00c. to 11.25c.

Seamless Tubes—
- High brass ..... 28.25c.
- Copper ..... 29.25c.

Rods—
- High brass ..... 21.25c.
- Naval brass ..... 24.00c.

Wire—
- Copper ..... 19.87½c.
- High brass ..... 23.75c.

Copper in Rolls ..... 26.75c.
Brazed Brass Tubing ..... 30.87½c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also to St. Louis on shipments to points west of that river.

- Sheets, 0 to 10 gage, 3 to 30 in. wide ..... 33.00c.
- Tubes, base ..... 42.00c.
- Machine rods ..... 34.00c.

Chicago Warehouse

(Prices Cover Trucking to Customers' Doors in City Limits)

Sheets—	Base per Lb.
High brass	23.25c.
Copper, hot rolled	27.75c.
Copper, cold rolled, 14 oz. and heavier	30.00c.
Zinc	10.75c.
Lead, wide	11.35c.
Seamless Tubes—	
Brass	28.25c.
Copper	29.25c.
Brass Rods	21.25c.
Brazed Brass Tubes	31.00c.

New York or Cleveland Warehouse

Delivered Prices, Base per Lb.

Sheets—	
High brass	21.12½c. to 22.12½c.
Copper, hot rolled, base sizes	27.75c. to 28.75c.
Copper, cold rolled, 14 oz. and heavier, base sizes	30.00c. to 31.00c.
Seamless Tubes—	
Brass	26.00c. to 27.00c.
Copper	29.12½c. to 30.12½c.
Brazed Brass Tubes	29.12½c. to 30.12½c.
Brass Rods	18.87½c. to 19.87½c.

New York Warehouse

Delivered Prices, Base Per Lb.

- *Zinc sheets (No. 9), casks* ..... 10.75c. to 11.25c.
- *Zinc sheets, open* ..... 11.50c. to 12.00c.

Metals from New York Warehouse

Delivered Prices, Per Lb.

- Tin, Straits pig ..... 45.00c. to 46.00c.
- Tin, bar ..... 47.00c. to 48.00c.
- Copper, Lake ..... 19.50c.
- Copper, electrolytic ..... 19.25c.
- Copper, casting ..... 19.00c.
- Zinc, slab ..... 7.75c. to 8.25c.
- Lead, American pig ... 7.62½c. to 8.12½c.
- Lead, bar ..... 9.62½c. to 10.12½c.
- Antimony, Asiatic ..... 10.50c. to 11.00c.
- Aluminum No. 1 ingots for remelting (guaranteed over 99% pure) .. 25.00c. to 26.00c.
- Alum. ingots, No. 12 alloy ..... 24.00c. to 25.00c.
- Babbitt metal, commercial grade ..... 25.00c. to 35.00c.
- Solder, ½ and ½ ..... 29.50c. to 30.00c.

Metals from Cleveland Warehouse

Delivered Prices, Per Lb.

- Tin, Straits pig ..... 48.00c.
- Tin, bar ..... 50.00c.
- Copper, Lake ..... 19.50c.
- Copper, electrolytic ..... 19.25c.
- Copper, casting ..... 18.75c.
- Zinc, slab ..... 8.00c. to 8.25c.
- Lead, American pig ..... 7.55c. to 7.75c.
- Lead, bar ..... 9.75c.
- Antimony, Asiatic ..... 16.00c.
- Babbitt metal, medium grade ..... 18.75c.
- Babbitt metal, high grade ..... 52.00c.
- Solder, ½ and ½ ..... 30.25c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged consumers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	15.00c.	16.50c.
Copper, hvy. and wire	14.75c.	16.25c.
Copper, light and bottoms	12.75c.	14.00c.
Brass, heavy	8.25c.	9.25c.
Brass, light	7.50c.	8.50c.
Hvy. machine composition	12.00c.	13.00c.
No. 1 yel. brass turnings	9.75c.	10.50c.
No. 1 red brass or compos. turnings	11.25c.	12.25c.
Lead, heavy	5.50c.	6.00c.
Lead, tea	4.25c.	5.25c.
Zinc	3.50c.	4.00c.
Sheet aluminum	13.75c.	16.00c.
Cast aluminum	12.00c.	14.00c.

Prices are unchanged, with the leading producer at 6.70c., St. Louis, and the American Smelting & Refining Co. at 6.90c., New York, as its contract price.

Zinc. — Conditions are somewhat mixed as to prices. Leading producers still maintain 6.80c., East St. Louis, as their quotation for prime Western, and it is known that substantial sales have been made during the week at that level. There have also been some sales of small amounts at 6.75c. It is known that stocks in consumers' hands are very low in some cases. Should these be replenished, it is contended that there will by no means be enough metal under 6.80c. to supply the demand, and this demand must materialize before long. It was expected to appear before this. Mining of ore has been resumed in the Tri-State district, and production last week was estimated at about 13,000 tons, which is close to the output previous to the curtailment. Shipments were more than 12,100 tons and sales about 10,700 tons, with the surplus estimated at 41,612 tons, compared with about 47,000 tons a week ago. The quotation is still $44, Joplin.

Antimony.—Because China is again facing a revolution with the possibility of a demoralization of its trade with other countries, a large importer in New York has sent out a circular to the effect that, while there is no indication of an early shortage, conditions in China could lead to an advance in price. New York dealers are offering Chinese antimony at a level somewhat lower than it can be purchased in China. A good buying for November-December arrivals as an insurance against contingencies in China is not unlikely. Quotations today are 8.50c., New York, duty paid, for all positions.

Nickel. — Wholesale lots of ingot nickel are quoted at 35c. per lb., with shot nickel at 36c. and electrolytic nickel in cathodes at 35c.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at the published price of 23.90c. per lb., delivered.

Non-Ferrous Metals at Chicago

CHICAGO, Oct. 15.—Prices generally are firm with the exception of tin and antimony, which are weak under the influence of foreign markets. Sales are in fair volume. The old metal market is quiet.

Prices per lb., in carload lots: Lake copper, 18.50c.; tin, 43.25c.; lead, 6.80c.; zinc, 6.90c.; in less-than-carload lots, antimony, 9.37½c. On old metals we quote copper wire, crucible shapes and copper clips, 14c.; copper, bottoms, 11.50c.; red brass, 11.50c.; yellow brass, 8c.; lead pipe, 4.50c.; zinc, 3.25c.; pewter, No. 1, 24.50c.; tin foil, 26c.; block tin, 36c.; aluminum, 12.87½c.; all being dealers' prices for less-than-carload lots.

Railroad Equipment

Santa Fe Purchases 5805 Cars, Southern 3500, Baltimore & Ohio 1000

WITH orders having been placed for 11,579 cars and with inquiries having appeared for 5860 cars, the past week was one of the most active of the year in the railroad equipment market. The Santa Fe and the Southern bought 5805 and 3500 cars respectively, the purchase of the latter having been in addition to the 1500 cars contracted for the previous week. The Great Northern will build 1300 cars in its own shops. The Baltimore & Ohio has ordered 1000 cars and 1500 car bodies.

Outstanding among inquiries are 3815 cars for the St. Louis-San Francisco and 2060 for the Argentine State Railways. The Burlington is asking for bids on 20 locomotives and the Seaboard Air Line on 15. The Chicago, Indianapolis & Louisville is expected to purchase 10 locomotives. Details of the week's business follow:

Interstate Commerce Commission has granted authority to Chicago, Indianapolis & Louisville Railroad to issue equipment trust certificates to the value of $520,000 to be applied toward purchase of 10 locomotives at total cost of $650,850.

Southern has ordered 3500 steel frame automobile cars from American Car & Foundry Co., in addition to 1500 hopper cars from Pressed Steel Car Co., as reported last week.

Santa Fe has purchased 1500 box cars, 500 refrigerator cars, 10 chair cars, 10 smoking and five dining cars, two observation cars, 19 mail and baggage, two gas-electric and three mail and smoking cars from Pullman Car & Mfg. Corporation, 200 gondola cars from Standard Steel Car Co., 500 box and 500 automobile cars from Pressed Steel Car Co., 300 stock cars from Pennsylvania Car Co., 1000 box cars from General American Car Corporation, 300 gondola, 500 box, 200 ballast, 104 caboose and 150 flat cars from American Car & Foundry Co. One hundred tank cars with cast steel underframes are still to be placed.

St. Louis-San Francisco is in the market for 2500 box, 800 gondola, 500 automobile, 10 baggage and five baggage and mail cars.

Great Northern will build 30 locomotives, 1000 box and 300 ore cars in its own shops, and will buy 1000 gondola cars.

Baltimore & Ohio has ordered 1500 box car bodies from Standard Steel Car Co. and 1000 steel gondola cars from Bethlehem Steel Corporation.

New York, New Haven & Hartford is inquiring for 12 steel underframes.

St. Louis-San Francisco has ordered 10 box car underframes from American Car & Foundry Co.

Columbian Gasoline Corporation has ordered 25 tank cars from General American Tank Car Corporation.

Republic Iron & Steel Co. has ordered 43 gondola car bodies from Pressed Steel Car Co.

Argentine State Railways are inquiring in the American market for 1102 box cars, 500 gondola cars, 398 platform cars and 60 caboose cars.

Burlington is asking for prices on 12 4-6-4 and eight 4-8-4 type locomotives.

Seaboard Air Line will buy four Mikado, five switch and six Decapod type locomotives.

Reinforcing Steel

With Awards of 3000 Tons, Week Has Been Quiet

REINFORCING steel awards in the past week totaled only 3000 tons. With the exception of 600 tons for a sewage disposal plant at Chicago, lettings ranged from 100 to 300 tons each. Awards follow:

STONECOE, N. Y., 900 tons, building for New York Traprock Co., to Concrete Steel Co.

ALLANTOWN, PA., 100 tons, bridge at Wyoming Street, to Taylor-Davis Co.

BOSTON, 215 tons, banking building, to Joseph T. Ryerson & Son, Inc.

NORWALK, CONN., 150 tons, sewage disposal plant, to Concrete Steel Co.

GLENCOE, N. Y., 100 tons, grade school, to Kalman Steel Co.

PASSAIC, N. J., 100 tons, addition to United States Rubber Co.'s plant, to Concrete Steel Co.

WANAQUE, N. J., 150 tons, reservoir, to Concrete Steel Co.

PALISADES PARK, N. J., 200 tons, bridge, to unnamed fabricator.

ATTICA, N. Y., 2400 tons, new State prison, to American System Co., previously reported placed with the Bourne-Fuller Co.

BUFFALO, 240 tons, *Courier-Express* building, to Joseph T. Ryerson & Son, Inc.

SOUTH BEND, IND., 100 tons concrete mesh, to a general contractor by Concrete Engineering Co.

CHICAGO, 600 tons, Northwest sewage treating plant, to Concrete Steel Co.

CHICAGO, 125 tons, building for the Kroeger Grocery Co., to an unnamed bidder.

CHICAGO, 285 tons, Parker Junior High School, to Calumet Steel Co.

CLAYTON, MO., 125 tons, St. Louis County hospital, to Missouri Rolling Mills Corporation.

SEATTLE, 200 tons, market building on Third Street, to Pacific Coast Steel Co.

BELLINGHAM, WASH., 100 tons, office building for Puget Sound Light & Power Co., to Pacific Coast Steel Co.

OLYMPIA, WASH., 175 tons, Thurston County Court House, to Pacific Coast Steel Co.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

HARRISBURG, PA., 140 tons, freight building for Pennsylvania Railroad.

PHILADELPHIA, 500 tons, sewer and bulk head on Springgarden Street.

OLYMPIA, WASH., 233 tons, Lake Union bridge; bids Nov. 19.

Non-Ferrous Ingot Metal Unfilled Orders

CHICAGO, Oct. 15.—On Oct. 1, unfilled orders for brass and bronze ingots and billets on the books of the members of the Non-Ferrous Ingot Metal Institute amounted to a total of 16,246 net tons, according to an announcement of the Institute issued today. On Sept. 1, the unfilled orders were 15,065 tons.

PERSONAL

S. L. BENGTSON, of the International Construction Co., London, England, which has been appointed consulting engineer on the new iron and steel plant to be erected at Pretoria, South Africa, by the South African Iron & Steel Corporation, will arrive in New York, Oct. 22, on the Majestic, for a short tour of American steel centers. He will make his headquarters at the National Bank of South Africa, 44 Beaver Street, New York.

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M. E. DANFORD, for some seven years works manager of the Middletown division of the American Rolling

M. E. DANFORD

Mill Co., Middletown, Ohio, has been appointed assistant vice-president of the company. He has been connected with the company since Feb. 1, 1910.

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E. J. MOHR, for many years sales manager for the Kinite Corporation, Milwaukee, has become manager of industrial sales for the Gunite Corporation, Rockford, Ill.

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DR. RICHARD MOLDENKE, consultant in foundry operations, Watchung, N. J., spoke on the evolution of the foundry at the first fall meeting of the Philadelphia Foundrymen's Association, Oct. 9, at the Manufacturers Club, Philadelphia.

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DWIGHT CLARK WHEELER, who has been prominently identified with the growth of the Acme Shear Co., Bridgeport, Conn., has been elected president of that company.

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HEINRICH CALLOW, president, Callow & Co., Bielefeld, Germany, machinery manufacturers, is spending several weeks in the United States visiting industrial plants.

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ROBERT C. NORTON, Oglebay, Norton & Co., ELTON HOYT, II, Pickands, Mather & Co., and T. P. DURELL, president American Fork & Hoe Co., have been elected directors of the American Shipbuilding Co. Mr. Hoyt fills the vacancy caused by the death of Henry S. Pickands.

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A. E. MCKINSTRY, vice-president International Harvester Co., Chicago, was elected president of the National Association of Farm Implement Manufacturers at its thirty-sixth annual convention, held in Cleveland last week. H. G. NEWCOMER, president, Eureka Mower Co., Utica, N. Y., was named executive chairman.

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T. H. KING and WILLIAM J. LEPPERT have organized the Maryland Machinery Co., with offices in the Snow Building, Baltimore. The company will represent manufacturers of machine tools, woodworking machinery, power transmission machinery and steam pumps in Maryland, Virginia and the District of Columbia. Mr. King was for many years with the Landis Tool Co. and the Wayne Tool Co., Waynesboro, Pa. Mr. Leppert was for a number of years with the Aumen Machinery Co., Baltimore.

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KENNETH B. LEWIS, manager of sales, wire machinery department, Morgan Construction Co., Worcester, Mass., is returning from Mexico this week. He has been there in the interests of the company in connection with the installation of multiple-head drawing blocks of the Morgan-Connor type.

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C. E. RUTH, formerly in the engineering department of the Rust Engineering Co., Pittsburgh, has become district sales manager for northern Pennsylvania, Ohio, western New York and Ontario, of the Homestead Valve Mfg. Co., Coraopolis, Pa.

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GEORGE M. DEMOREST, who has been engaged in sales promotion work on speed reducers, power transmission and conveyor equipment for over 12 years, has been appointed Pittsburgh district representative for the Palmer-Bee Co., Detroit.

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ROBERT E. MCGILL and EDWARD R. BRAZEL have been appointed Western manager and district manager respectively with offices in San Francisco, for Aluminum Industries, Inc., Cincinnati, to handle the distribution of Permite-Diamond products.

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ALEXANDER F. JENKINS, president Alexander Milburn Co., Baltimore, sailed Oct. 12 for England.

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HARRY W. CROSS, for the past five years vice-president of the Arch Machinery Co., Pittsburgh representative of Manning, Maxwell & Moore, Inc., New York, has been appointed works manager of the latter company's Putnam Machine Works, Fitchburg, Mass., succeeding W. O. FORMAN, who has resigned.

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A. H. D'ARCAMBAL, consulting metallurgist, Pratt & Whitney Co., Hartford, Conn., will address the Worcester chapter of the American Society for Steel Treating, Oct. 17, at Rebboli's Restaurant, Worcester, Mass. His subject will be "The Machineability of Metals."

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CHARLES REES, who has been consulting engineer to the Vanadium Corporation of America, New York, since 1923, has been appointed vice-president, in charge of mining operations. After his graduation from the University of Wisconsin, he engaged in mining activities for various com-

CHARLES REES

panies, including the Minnesota Iron Mining Co., the Oliver Iron Mining Co. and the Midvale Steel & Ordnance Co.

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W. WORLEY KERLIN, research chemist, Enterprise Sand Co., Conneaut, Ohio, will speak on "Grain Sizes and Its Effect on the Properties of Molding Sand" at the regular monthly meeting of the Pittsburgh Foundrymen's Association, to be held at the Fort Pitt Hotel on Oct. 21.

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G. H. HEDRICK, recently vice-president of the Thomas Spacing Machine Co., has been appointed chief engineer of the Gem Mfg. Co., Pittsburgh, maker of railroad sheet metalware and special stampings.

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H. A. BRASSERT, president, H. A. Brassert Co., Chicago, has returned from England, where his firm has been retained as consultant for a number of iron and steel companies of England and Scotland.

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JOSEPH F. PFLUM has been appointed representative in the Dayton and Cincinnati districts, with offices at 3721 St. Lawrence Avenue, Cincinnati, by the Reed-Prentice Corporation, Worcester, Mass.

CLINTON S. DARLING, for several years in charge of sales in the western territory for the Pennsylvania Crusher Co., Philadelphia, has been appointed assistant to COL. GUILFORD C. BABCOCK, president, 4-One Box Machine Makers, Rockaway, N. J., the licensing company for the manufacture and sale of 4-One wirebound boxes.

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JAMES F. CROFT, who resigned as metallurgist for Mackintosh-Hemphill Co., Pittsburgh, on Sept. 15, has become metallurgist, in charge of the roll department, of the Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.

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J. P. GILL, metallurgist for the Vanadium Alloys Steel Co., Latrobe, Pa., will address the New Haven chapter of the American Society for Steel Treating on "Tool Steels—Their Manufacture, Inspection and Selection" in the Bristol Mfg. Co. auditorium, Waterbury, Conn., Oct. 17.

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ERNEST MOELLER has been elected president of the newly-formed Industrial & Combustion Engineering Corporation, 303 Protective Life Building, Birmingham. Vice-presidents are GEORGE C. MAPES and LOUIS LYON, JR.

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IRWIN B. LAUGHLIN, who has been appointed United States Ambassador to Spain by President Hoover, was formerly identified with the Jones & Laughlin Steel Corporation, Pittsburgh, having served as treasurer of the company until 1903, when he resigned to enter diplomatic service.

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WALTER C. ALLEN, president, Yale & Towne Mfg. Co., Stamford, Conn., has been made a director of the Western Electric Co., Inc.

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BRADLEY STOUGHTON, professor of metallurgy, Lehigh University, Bethlehem, Pa., has been awarded the Grasselli Medal for 1929 for his paper "Light Structural Alloys" written several years ago. The formal presentation will be made on Nov. 8 by the American Chemical Society.

Wages of European Steel Workers Advancing

HAMBURG, GERMANY, Sept. 30.—Wages continue to advance in the European steel industry. Wages in Luxemburg were increased 5 per cent in September, the second advance this year, and Czechoslovakian steel producers have granted an increase of 2½ to 5 per cent and a larger bonus for overtime work, effective Oct. 1. Polish steel workers are seeking a 10 per cent wage increase, and it is believed probable that the mills will agree to advances of 5 to 7½ per cent. Steel workers in Belgium and employees in the heavy hardware industry in Germany are seeking further wage increases.

OBITUARY

DAVID L. EYNON, president Pittsburgh Rolls Corporation, Pittsburgh, whose sudden death on Oct. 5 was mentioned in THE IRON AGE last week, had long been prominently identified with the roll industry in this country. He was one of a group of Welshmen who have contributed heavily to the development of roll turning, roll design and rolling mills in the United States, which among others included the late D. R. Mathias, who had a prominent part in the construction of the mills of the Illinois Steel Co., and James E. Jones, who now is superintendent of the roll department,

D. L. EYNON

South works, Illinois Steel Co., Chicago. Mr. Eynon, who was born in Dowlais, Wales, in 1861, came to this country when he was 18 years of age and located in Philadelphia, where he joined his cousin, William D. Eynon, then in charge of the roll shop of Hughes & Patterson. He left that company a few years later to take a position with the Pencoyd Iron Works, now the Pencoyd works of the American Bridge Co. His next connection was with a rolling mill company in Bridgeport, Conn., following which he went to the Colorado Fuel & Iron Co., Pueblo, Colo., and became associated with James E. Jones. In 1904, after a brief identification with the Jones & Laughlin Steel Co., Pittsburgh, he joined the Phoenix Roll Works, Pittsburgh, as superintendent. When that company was reorganized in 1917 as the Pittsburgh Rolls Corporation, he became its first president.

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HARRY SHEAFF PAUL, for many years president of the Verona Tool Works, Verona, Pa., died on Oct. 10, at his home in Oakmont, Pa., aged 73 years. He was born at Pittsburgh, and became associated with the Verona company soon after leaving school. He served for a time as superintendent and later became president, having served in that capacity for 30 years prior to his retirement 10 years ago. He had been active in political and financial circles in western Pennsylvania.

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GEORGE F. ERNST, sales manager of the A. Leschen & Sons Rope Co., St. Louis, died in that city on Oct. 9, aged 64 years.

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FRANCIS WILLIAM GILBERTSON, chairman of the board and managing director, W. Gilbertson & Co., Ltd., Pontardawe, Glamorgan, Wales, died Oct. 8, aged 56 years. He was closely associated with the Welsh steel, tin plate and galvanizing industries for many years, was chairman of the Swansea Metal Exchange, had been a member of the Iron and Steel Institute since 1896, and was a past member of council of the institute.

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JOHN WILLIAMS, managing director, Clayton Tin Plate Co., Ltd., Pontardulais, Wales, died Oct. 8, aged 69 years. He was one of the pioneers of the Welsh tin plate trade and a member of the Iron and Steel Institute since 1908.

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FRANK HENDERSON, manager of the Cleveland office of the Combustion Engineering Corporation, died suddenly on Sept. 25, aged 53 years.

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STEPHEN BALKWILL, president, Balkwill Manganese Crossing Co., Cleveland, and associated with the Cleveland Frog & Crossing Co. for 23 years, died Oct. 9, aged 58 years. His business connections also included a part ownership in the Cleveland Steel Casting Co. He attended Case School of Applied Science, Cleveland, and was a member of a number of engineering societies.

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FREDERICK KAHL, owner and founder of the Frederick Kahl Iron Foundry, Detroit, died at his home in Detroit on Oct. 11, aged 72 years. In his youth Mr. Kahl entered the employ of the Frontier Iron Works in Detroit. In 1888 he organized his own company, of which he was the active head until illness compelled him to retire two years ago.

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WILLIAM D. JOHNSON, president of the Milwaukee Boiler Co., Milwaukee, which he founded, died Oct. 7, following an illness of one year, which did not bar him from retaining active charge of the business until a few weeks before his death. He was born in Milwaukee in 1869.

—

JOSEPH E. HUSTON, secretary and treasurer, Connersville Blower Co., Connersville, Ind., died of a heart attack at his home in Connersville, Sept. 22, aged 67 years. He had been connected with the company since its inception in 1893.

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GEORGE B. CURTIS, vice-president and treasurer of the St. Louis Struc-

tural Steel Co., East St. Louis, Ill., died in his home there of heart disease after an illness of several weeks, aged 57 years.

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W. A. KINGSLEY, for many years active in the iron and steel industry, died suddenly at Orlando, Fla., on Oct. 12. He began his business career nearly 50 years ago with the Pomeroy Iron & Steel Co., Pomeroy, Ohio, of which he was general manager. Later he went with the Union Iron & Steel Co., Youngstown, and when that company was taken over by the Carnegie Steel Co., he was made general manager of the hoop mills in the Youngstown district. Upon the formation of the Steel Corporation, he became manager of sales at Chicago for the American Steel Hoop Co. Later he served as manager of the General Fireproofing Co., Youngstown, and prior to this retirement, held a similar position at the Garry Iron & Steel Co., Cleveland.

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R. W. BELL, formerly general superintendent of motive power for the Illinois Central, died suddenly Oct. 14. He retired from active service Oct. 1.

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WILLIAM PAUL MARTIN, chairman of the board of directors of the Stromberg Electrical Co., Chicago, died of heart disease Oct. 14, aged 63 years. He was formerly general manager of the Union Carbide Co. and of the Peoples Gas Light & Coke Co., Chicago.

Chicago's Expansion in Steel Production

President Buffington of Illinois Steel Co. Tells of Its Beginnings and Growth

THE value to a community of an ample supply of iron and steel is universally recognized, and the extent of its development is regarded as a measure of community strength and commercial importance, said E. J. Buffington, president, Illinois Steel Co., in an address delivered Oct. 16 before the Chicago Association of Commerce.

The beginning of the industry in Chicago was about contemporaneous with the invention and use of the Bessemer process. In 1857 Capt. E. B. Ward, owner of a small iron furnace and bloomery in Wyandotte, Mich., built a blast furnace and rolling mills in Chicago on the north branch of the Chicago River. The plant was known as the North Chicago rolling mill. In 1864 the first steel ingots made in this country by the Bessemer process were produced in an experimental plant at Wyandotte, sent by sailing vessel to the North Chicago rolling mill and there were rolled into rails. These were the first steel rails made in the United States.

In 1869 ownership of the several plants in Chicago, Joliet and Milwaukee, was consolidated into one company and incorporated as the Illinois Steel Co. This was the first merger of important steel-producing interests in the United States, a forerunner of subsequent larger mergers which integrated a large part of the industry into companies owning many plants and large supplies of practically all essential raw materials.

Growth and development of the industry, especially during recent years, has been more rapid in the Chicago district than elsewhere in the United States. Between the years 1912 and 1928 annual steel production in the United States as a whole increased from 30,000,000 tons to approximately 50,000,000 tons, equivalent to an increase of 60 per cent, while production in the Chicago district increased from 4,400,000 tons in 1912 to over 9,000,000 tons in 1928, or nearly 107 per cent.

It is estimated that the iron and steel industry in the Chicago district employs about 75,000 workmen and disburses payrolls aggregating $150,000,000 annually. Production last year of over 9,000,000 tons of steel in the Chicago district required the assembly of approximately 60,000,000 tons of raw materials.

Nine-Month Record in Fabricated Steel

WASHINGTON, Oct. 15.—Fabricated structural steel orders reported in September totaled 246,016 tons, or 82 per cent of the capacity of the 296 firms making returns to the Department of Commerce. Bookings reported in August were 300,008 tons, according to 223 firms, representing 95 per cent of their capacity.

Computed orders were 315,700 tons in September, compared with 365,750 tons in August. Computed shipments were 319,550 tons, or 83 per cent of capacity, against 346,500 tons, or 90 per cent of capacity in August.

Computed bookings for the first nine months of the current year were 2,952,950 tons, against 2,553,750 tons for the corresponding period of last year. Computed shipments were 2,671,900 tons and 2,252,250 tons respectively.

Both orders and shipments, on the computed basis, were higher for the nine-month period than ever before.

Navy Calls for Bids on 21,490 Tons of Steel

WASHINGTON, Oct. 15.—The Navy Department has sent out schedules to steel manufacturers covering requirements for the three light cruisers being built in navy yards, and will open bids on Nov. 1 for approximately 7800 tons of special treatment plates and on Nov. 5 it will open bids for 8593 tons of medium plates, 637 tons of high-tensile plates, 3800 tons of medium shapes and 300 tons of high-tensile shapes.

Europe's Steel Cartels Face Critical Situation

LONDON, ENGLAND, Oct. 7.—It now leaks out that the steel conference at Vienna [see page 1080, this issue] came near being a failure. The final agreements were the result of compromises, and the extreme feeling now is that if the European steel industry does not brace up in the next three or four months the rail cartel as well as the general steel cartel may expire.

Increased quotas were demanded by the Belgians and by most of the Germans and increased total tonnages. In the German delegation there was a split as to the allotments among the German plants — differences which some think will take five or six months to settle. The French, on the other hand, asked for lower rollings by 10 per cent or so.

The situation was saved, at least temporarily, by proroguing the meeting to Dec. 14 at Düsseldorf, by provisionally continuing the cartel until March 31, by agreeing to hold the fourth quarter rollings at the third quarter basis and by reducing penalties for exceeding quotas to 25 per cent of the previous amounts.

Malleable Castings Well Above Last Year

WASHINGTON, Oct. 15.—Orders for malleable castings in September totaled 50,464 net tons, against 61,982 tons in August, according to reports received by the Department of Commerce from the principal manufacturers. Production amounted to 57,380 tons, representing 59.7 per cent of capacity, against 68,651 tons, or 70 per cent of capacity. Shipments were 61,492 tons, compared with 69,240 tons.

Orders for the first nine months of the current year were 638,336 tons, against 572,264 tons for the corresponding period of last year. Production was 664,772 tons, compared with 586,453 tons last year.

Higher Factory Earnings

Average weekly earnings in representative New York State factories are reported by the State Industrial Commissioner at $30.08 for August. This is nearly 1 per cent above the $29.80 for July and, with the exception of the $30.35 last March, it was the highest for any month so far this year. With the further exception of $30.12 last December, it is the highest for any month on record.

Pig Iron Most Active Item in Europe

British, Belgian and German Operations Heavy—Larger Production of Steel in Several Quarters—Wire Situation Tense

(*By Cable*)

LONDON, ENGLAND, Oct. 14.

PIG IRON demand is sustained and supplies are going into direct consumption, but steel output declined in September and, with export demand for pig iron poor, furnaces are somewhat apprehensive of the future. Cleveland furnaces are generally well sold for the current month, but increasing costs are a disquieting factor.

Hematite iron is active in both the home and export markets so that October deliveries have become less easy to obtain. Prices are unchanged, but concessions are less common.

Finished steel is dull. Some small business has been taken for India and Canada, but export demand is generally quiet. In the domestic market fresh ship contracts are releasing more steel tonnage, but plate mills, especially, are still in need of work.

September exports of pig iron were 32,500 tons of which the United States received 65 tons. Total exports of iron and steel were 299,500 tons.

Continental steel sales here are quiet and prices sagging, especially in semi-finished material and merchant bars. Welsh consumers have bought some sheet bars, but other consuming industries show but little interest in foreign material.

Tin plate demand is good, with 19s. to 19s. 3d. ($4.60 to $4.66) per base box, f.o.b. works port, paid for substantial quantities. Mills are well sold ahead and the general outlook is bright.

Galvanized sheets are quiet and prices easier. Black sheets, Japanese specifications, continue inactive.

Dorman, Long & Co. and Bolckow, Vaughan & Co. have officially announced a plan for merger of their interests, which provides for exchange of shares. The total capital of the new corporation will exceed £17,000,000 ($82,450,000).

Cartel Meeting Results in Compromises

Extended Six Months for Discussion—Reduction of German Penalties Equivalent to Quota Increase

DÜSSELDORF, GERMANY, Sept. 30.—The provisional extension of the International Steel Cartel until March 31, 1930, gives more time to the commission appointed to prepare a definite renewal plan. The official statement of the Vienna meeting of the cartel was that "all groups showed a conciliatory spirit and the unanimous wish is to attain a definite agreement as soon as possible."

From unofficial sources it appears that the meeting was not nearly so satisfactory as the public announcements imply. Opposition developed to the German demand for an increased allotment and a compromise was reached by reducing the German penalties for excess output to 25 per cent of the former amounts. Germany had been paying $1 a ton for overproduction up to 7½ per cent in excess of the quota, $2 a ton on the next 2½ per cent of excess output and $4 a ton on production over 10 per cent more than the quota. Under the provisional agreement for the next two quarters, Germany will pay only 25c. a ton on the first 7½ per cent of excess tonnage, 50c. a ton on the next 2½ per cent of excess and $1 on production over 10 per cent.

In certain quarters it is pointed out that these penalties are so small that, although the German allotment has not been increased, German producers may exceed their quota to a greater extent than formerly at a lower cost in fines. The fact that the total annual allotment for the entire cartel has been continued at 32,000,000 tons is causing some speculation in the steel industry as to future results of what has already been found to be excess production. It is believed that any effort to stabilize export prices, as has been suggested, will prove impossible with such a heavy production program effective.

Extension of the cartel for another

British and Continental European Export Prices per gross ton, f.o.b. United Kingdom Ports, Hamburg and Antwerp, with the £ at $4.85

British Prices, f.o.b. United Kingdom Ports

Cleveland No. 3 foundry	£3	12½s.	to	£3	13½s.	$17.58	to	$17.82
East Coast hematite	3	16½	to	3	17	18.51	to	18.63
Ferromanganese, export	13	10	to	14	0	65.47	to	67.90
Billets, open-hearth	6	5	to	6	7½	30.31	to	30.92
Sheet bars, open-hearth	6	5	to	6	10	30.31	to	31.52
Black sheets, Japanese specifications	12	12½				61.22		
Tin plate, per base box	0	19	to	0	19¼	4.60	to	4.66
Rails, 60 lb. and heavier	7	15	to	8	15	37.59	to	42.43
						Cents per Lb.		
Steel bars, open-hearth	7	15	to	8	10	1.67	to	1.84
Beams, open-hearth	7	2½	to	7	12½	1.55	to	1.65
Channels, open-hearth	7	7½	to	7	17½	1.60	to	1.71
Angles, open-hearth	8	2½	to	8	12½	1.76	to	1.86
Ship plates, open-hearth	7	12½	to	8	2½	1.66	to	1.76
Black sheets, No. 24 gage	10	5	to	10	10	2.21	to	2.27
Galvanized sheets, No. 24 gage	13	2½	to	13	7½	2.84	to	2.89

Continental Prices, f.o.b. Antwerp or Hamburg

Foundry iron, 2.50 to 3.00 per cent sil., 0.50 to 0.90 per cent phos.	£3	8s.	to	£3	11½s.	$16.49	to	$17.33
Foundry iron, 2.50 to 3.00 per cent sil., 1.00 per cent and more phos.	3	8	to	3	11	16.49	to	17.21
Billets, Thomas	4	14	to	4	15	22.79	to	23.03
Sheet bars, Thomas	4	15	to	4	16	23.03	to	23.21
Wire rods low C., No. 5 B.W.G.	6	5	to	6	6¼	30.30	to	30.61
Black sheets, No. 31 gage, Japanese	12	7½				60.02		
Rails, 60 lb. and heavier	6	8½	to	6	10*	31.16	to	31.52
Rails, light	6	1½				29.46		
						Cents per Lb.		
Steel bars, merchant	5	7	to	5	8	1.15	to	1.16
Steel bars, deformed	5	6½	to	5	7	1.14	to	1.15
Beams, Thomas, British standard	5	0	to	5	4½	1.10	to	1.15
Channels, Thomas, American sections	5	14	to	5	18	1.24	to	1.27
Angles, Thomas, 4-in. and larger, over ⅜-in. thick	5	3				1.11		
Angles, Thomas, 3-in.	5	10				1.19		
Ship plates, open-hearth inspected	7	8				1.63		
Hoop and strip steel over 6-in. base	5	12½	to	5	15	1.22	to	1.24
Wire, plain, No. 8 gage	7	4	to	7	5	1.58	to	1.59
Wire, galvanized, No. 8 gage	8	18	to	9	3	1.92	to	1.99
Wire, barbed, 4-pt. No. 12 B.W.G.	11	5				2.43		
Wire nails, base	7	10	to	7	10½	$1.62	to	$1.63 per keg
Wire nails, assortments, 1 to 6-in., keg	10	6½				2.23		

*Open-hearth steel, 10s. ($2.42) per ton extra.

six months gives time for negotiating the renewal of the German domestic syndicates. It is believed that the Ingot Steel Syndicate (Rohstahlgemeinschaft) will have been renewed by the end of the year. Many of the German selling syndicates expire about the middle of next year and their renewal depends largely upon an agreement between the Friedrich Krupp A. G. and the Mannesmann Tube Co.

Wire Competition in Europe Brings Low Prices

HAMBURG, GERMANY, Sept. 30.—While the volume of business in the wire market on the Continent has been increasing, prices have been steadily declining. According to a report of the German Wire Manufacturers' Syndicate, orders during the first three weeks of September exceeded the August total, which was about 15 per cent larger than in July. Prices, however, are receding and galvanized wire has declined to £9 4s. per ton (2.02c. per lb.), bright wire to £7 5s. per ton (1.59c. per lb.) and barbed wire to £11 10s. per ton (2.53c. per lb.). Belgian mills are shading these prices in some cases by several shillings a ton.

The situation in the wire netting market is not much better than in wire. The discount from the British standard list is now 84 to 84¼ per cent, a record low price. Competition among Continental makers of wire netting has become so severe that certain mills have found it impossible to compete and Austrian and Czechoslovakian makers have withdrawn from the market. British manufacturers are also affected and, with their quotations 15 to 20 per cent higher than the Continental prices, are unable to sell wire netting except in such of their own markets as provide a preferential duty on British products.

Italy Plans Regulation of Iron and Steel Industry

WASHINGTON, Oct. 11.—Considerable progress has been made toward outlining a plan to survey the entire Italian iron and steel industry for the purpose of determining the relationship of all its operations, according to an announcement forwarded to the Department of Commerce. One of the chief aims will be to find a means of restraining competition between individual producers, a condition which is reported to have led to serious disorganization in the domestic markets.

Meetings in connection with the survey have been attended by Government officials, representatives of industry and by Professor Guarnieri, commissioner of the National Fascist Metallurgical Association. As a result, it has been decided to take concerted action, with the support of the Italian Government, to reduce costs, systematize production, promote specialization and more efficient operation of plants, and to eliminate unnecessarily long and costly transportation of material and products. This extensive program is said to cover only immediate purposes. Later an effort will be made to regulate the local market and stabilize prices "to the mutual benefit of both the producers and the consumers."

Japanese Steel Imports Increasing

YOKOHOMA, JAPAN, Sept. 17.—Efforts to restrict importation of foreign steel appeared somewhat successful in 1928, but in the first half of this year steel imports registered a considerable increase. A total of 60,690 tons of steel bars was imported in the six months, an average of more than 10,000 metric tons monthly, compared with an average in 1928 of slightly less than 5000 tons a month. Imports of angles in the first half of this year totaled 14,242 metric tons, an average of 2372 tons a month, compared with about 1500 tons a month last year. The only exception to this increase was rails, the imports of which decreased from an average of 3611 tons a month in 1928 to 2828 tons a month in the first half of this year.

International Tube and Wire Rod Cartels Renewed

LONDON, ENGLAND, Sept. 30.—A feature of the conference of the International Wire Rod Cartel at Brussels was the agreement of the French members to an extension of the cartel until the end of 1930 without any stipulation that a French wire manufacturers' syndicate must be established by that time.

Although no changes were decided upon at the recent meeting of the International Tube Cartel, it is understood that some serious differences of opinion have developed between the Continental producers and the British, American and Canadian manufacturers of tubes. Also, German mills are dissatisfied with their production quota.

Germany Expects Orders from Persian Railroad

HAMBURG, GERMANY, Sept. 30.—Contracts for locomotives, cars and track equipment are expected from Persia. The Julius Berger A. G. is the contractor on the northern section of the Persian railroad, which will be 1600 km. (994 miles) long and is to be completed by the end of 1932. The German contractor announces that the first 85 km. (53 miles) of the road has been finished and the Persian Government will shortly inquire for the necessary equipment and rolling stock for that section.

The American Ceramic Society will hold its thirty-second annual meeting in the Royal York Hotel, Toronto, Canada, the week of Feb. 16, 1930.

British Iron and Steel Output in September

LONDON, ENGLAND, Oct. 12. (By Cable).—Pig iron production in September was 664,600 gross tons and that of steel ingots and castings 847,900 tons. This is the third largest pig iron output this year while the steel production is the second largest. The peak in steel was at 859,900 tons in March.

Comparison of recent output with other periods is as follows:

	Pig Iron, Gross Tons	Steel Ingots and Castings, Gross Tons
1913—Av. monthly..	855,000	638,600
1920—Av. monthly..	669,500	755,600
1922—Av. monthly..	408,500	490,100
1923—Av. monthly..	620,000	706,800
1924—Av. monthly..	609,900	685,100
1925—Av. monthly..	519,700	616,400
1926—Av. monthly..	203,500	296,700
1927—Av. monthly..	607,800	758,200
1928—Av. monthly..	550,900	710,400
1929—Av. first half..	599,600	813,800
1929—August	682,000	753,300
1929—September ...	664,600	847,900

India and United States Ship Scrap to Japan

YOKOHOMA, JAPAN, Sept. 17.—Imports of iron and steel scrap at Wakamatsu, site of the Government Steel Works, have been large this year, with the United States and India furnishing practically the entire tonnage. In the first six months of this year the Government works received 79,719 metric tons of scrap, of which 38,857 tons was from the United States and 39,050 tons from India. All other countries contributed only 1812 tons of the total. This compares with 77,640 metric tons imported at Wakamatsu in all of 1928.

German Railroads to Spend $50,000,000

HAMBURG, GERMANY, Sept. 30.—The equipment purchasing program of the German Railroad Corporation for the first half of 1930 has been announced and includes 50 express locomotives, to cost about 7,000,000 m. ($1,666,000); passenger and freight cars, calling for a total expenditure of 70,000,000 m. ($16,660,000), and track equipment valued at about 140,000,000 m. ($33,320,000).

Belgium Importing More Pig Iron

WASHINGTON, Oct. 15.—The demand of the Belgian iron and steel industry for foreign pig iron is steadily growing, according to a report received by the Department of Commerce from Berlin. During the first seven months of 1929, pig iron imports into Belgium, including Luxemburg, totaled 407,000 metric tons, compared with 281,000 tons for the corresponding period of last year.

Exports of pig iron from Germany during the seven months of the current year were more than 135,000 metric tons.

Machinery Markets and News of the Works

Tool Prospects Are Bright

Builders Have Three Months' Backlogs—Norfolk & Western Puts Out Inquiry

ALTHOUGH machine tool sales have been only moderate in volume, prospects for increased buying have brightened as a result of interest stimulated by the National Machine Tool Exposition at Cleveland.

Despite the fact that the index of the National Machine Tool Builders' Association shows that September orders were the lowest of the year, the ratio of unfilled orders to shipments, at 2.76, reached a new high level, indicating that manufacturers have backlogs representing nearly three months' full operations.

The slackening in demand is attributed in large measure to the almost total absence of automobile companies from the market. A large percentage of the total machine tool business in the past few years has come from the motor car industry and the temporary halt in bookings from that source has made it necessary for builders to look to other fields for current orders.

Signs of a revival of interest on the part of railroads have appeared. The Norfolk & Western has put out an inquiry for 33 tools and a number of miscellaneous equipment items. The Santa Fe and the Chicago, St. Paul, Minneapolis & Omaha also are taking bids on a few machines.

The Pullman Co. is reported to have closed for tools for its Buffalo plant. A leading can maker is expected to buy a liberal amount of machine tool equipment for its Cincinnati plant, which is engaged in the manufacture of can making machinery. The Westinghouse company's fourth quarter list is now out and some items already have been purchased.

The International Harvester Co. has bought $100,000 worth of reconditioned tools for installation in its Weber works at Chicago.

New York

NEW YORK, Oct. 15.—Machine tool buying in this district, which fell off somewhat in the two weeks preceding the National Machine Tool Exposition and in the week in which the exposition was taking place, revived considerably in the past week. Nearly all machine tool sellers who visited the exposition brought back a number of tentative orders and a fresh accumulation of prospects. If most of these promises of business mature, the machine tool industry will get a good volume of orders from this district during the next several weeks.

New York City Airport, Inc., care of Lawrence Halleran, Halleran Agency, 63 Broadway, Flushing, L. I., real estate, recently formed by Mr. Halleran and associates, has acquired 305 acre tract between Flushing and College Point, as site for airport, with facilities for seaplanes. Plans will be prepared at once for group of hangars to house more than 100 airplanes, machine and repair shop, service plant, oil storage building and other units, to cost more than $750,000 with equipment. Mr. Halleran will be president of new organization; Henry J. Dooley, vice-president; and E. E. Stapleton, treasurer.

Brooklyn Union Gas Co., 1721 Sheepshead Bay Road, Brooklyn, has plans for a two-story equipment repair, storage and distributing plant, including automobile service and repair shop for motor trucks, to cost over $200,000 with equipment. Bloch & Hesse, 18 East Forty-first Street, New York, are architects.

Topping Brothers, Inc., 159 Varick Street, New York, manufacturer of marine and other heavy hardware, has filed plans for addition to seven-story factory, including improvements in present structure, to cost about $300,000. Russell G. Cory, 30 Church Street, is architect and engineer.

Remington Automatic Quotation Board Co., New York, recently formed as a subsidiary of Remington Arms Co., 25 Broadway, has arranged for sale of stock issue to total $1,700,000, part of proceeds to be used for manufacturing. Company will specialize in production of automatic-operated stock exchange and other record boards. Manufacture will be carried out under direction of parent company, with main plant at Ilion, N. Y. Milton Reynolds is president.

T. F. Farrell, commissioner of canals and waterways, State Public Works Building, Broadway, Albany, N. Y., will receive bids until Nov. 1, for two hydraulic turbine units for use at Fort Edward, N. Y., with accessories, to cost $6,500,000.

J. S. Kennedy, 157 Remsen Street, Brooklyn, architect, has plans for eight-story automobile service, repair and garage building, 100 x 160 ft., to cost more than $300,000 with equipment.

Board of Trustees, New York Trade School, First Avenue and Sixty-seventh Street, New York, has awarded general contract to William Crawford, 7 East Forty-second Street, for two and one-half story addition, 200 x 225 ft., to cost $500,000 with equipment. William Miltenberger is architect for board.

American Can Co., 120 Broadway, New York, has approved plans for immediate erection of plant unit at Simcoe, Ont., where property recently was acquired, to cost more than $300,000 with equipment.

Western Electric Co., 195 Broadway, New York, manufacturer of telephone equipment, sound-producing mechanisms for motion pictures, etc., is disposing of stock issue to total $30,000,000, part of proceeds to be used for plant expansion.

New York Power & Light Corporation, 126 State Street, Albany, N. Y., a subsidiary of Mohawk-Hudson Power Corporation, same address, plans extensions in hydroelectric generating plant at Spier River Falls, on Hudson River, to cost over $1,000,000 with transmission lines.

Wallace & Tiernan Co., Inc., 11 Mill Street, Belleville, N. J., manufacturer of chlorine control equipment and parts, etc., has acquired local property for expansion. Present structure will be razed and plans drawn for new unit, to cost more than $75,000 with equipment.

Packard Motor Car Co., Broadway and Sixty-first Street, New York, and 198 Central Avenue, Newark, has superstructure under way for three-story service, repair and sales building, 183 x 200 ft., at 637-43 Central Avenue, to cost more than $400,000 with equipment. Present plant will be removed to new location. Albert Kahn, Inc., Marquette Building, Detroit, is architect and engineer.

Sonatron Tube Co., 57 State Street, Newark, manufacturer of radio tubes and equipment, has plans for a six-story addition, 70 x 120 ft., to cost over $100,000 with machinery. Siegler & Greenberg, 164 Market Street, are architects.

American Machinery Supply Corporation, care of Charles J. McPhillips, Liberty Trust Building, Philadelphia, president, has leased two-story factory at 49-55 Frelinghuysen Avenue, Newark, for local plant, part of unit to be used for storage and distribution.

Kolster Radio Corporation, 200 Mount Pleasant Avenue, Newark, manufacturer of radio equipment and parts, is arrang-

ing for increase in capital from 1,000,000 to 1,500,000 shares of stock, no par value, part of proceeds to be used for expansion. Company recently merged with Earl Radio Corporation, 122 East Forty-second Street, New York.

Radio Corporation of America, Inc., Woolworth, Building, New York, manufacturer of radio broadcasting equipment, etc., is said to be planning two-story and basement experimental plant at Bound Brook, N. J., to cost about $60,000 with equipment.

Cleveland

CLEVELAND, Oct. 14.—The machine tool market was dull the past week. The spurt of buying that was expected to follow the machine tool show in Cleveland has not yet materialized. However, it aroused a great deal of interest in the new equipment exhibited and in addition to a good volume of orders placed developed numerous prospects for business as well as definite inquiries that are still pending. These are expected to stimulate activity in the next few weeks. Among the most active prospects is the American Can Co., which is in the market for considerable machinery for its Cincinnati plant. The automotive industry is buying practically no machine tools at present and the dullness of the market is largely due to lack of activity in that field.

Ohio Seamless Tube Co., Shelby, Ohio, will complete its $400,000 plant extension program about Dec. 1. It is expected that new equipment will be in operation by first of year, increasing plant capacity about 40 per cent.

Newburgh Steel Co., 6318 Kinsman Road, Cleveland, will take bids for one and two-story addition to cost about $50,000 with equipment. George S. Rider Co., Marshall Building, is architect and engineer. Maurice Cohen is president.

Cleveland Railway Co., Hanna Building, Cleveland, has awarded general contract to A. A. Lane Construction Co., 1869 East Fifty-fifth Street, for new shops, one-story, 50 x 150 ft., including mechanical repair, forge and tool shops, to cost about $100,000 with equipment.

Middle States Airport Service, Inc., Akron, Ohio, care of C. W. Frank, Akron Savings & Loan Building, architect, has plans for hangar, with repair and reconditioning facilities, at Fulton field, to cost about $70,000 with equipment.

Truscon Steel Co., 6100 Hydraulic Avenue, Cleveland, Hydraulic Pressed Steel Division, is planning one-story addition, 75 x 290 ft., to cost over $60,000 with equipment. Headquarters are at Youngstown.

Willard Storage Battery Co., St. Clair Avenue and East 131st Street, Cleveland, has awarded general contract to H. M. Baruch, Los Angeles, for new plant at Montibello Park, near Los Angeles, to cost more than $400,000 with equipment. All machinery will be electrically operated.

Reliance Mfg. Co., Massillon, Ohio, manufacturer of lock nuts, washers, etc., has awarded general contract to A. F. Wendling Co., 11 Buckius Street, for one-story addition, to cost $45,000 with equipment.

Ohio Seamless Tube Co., Shelby, Ohio, has work under way on expansion to cost over $350,000.

The Crane Market

INQUIRY is improving for overhead traveling cranes and sellers expect some active buying in the next few weeks. Business in locomotive cranes has also shown improvement with a number pending for railroads and more interest in buying shown by the smaller contractors. Included in pending locomotive crane business are two Diesel engine-driven cranes for the Baltimore & Ohio Railroad, a 50-ton and 25-ton cranes for the New York Central Railroad and four crawl-tread cranes for the Amtorg Trading Corporation, New York.

In the Chicago district the Norfolk & Western Railroad will buy a 10-ton, 23-ft. 10½-in. span electric traveling crane, a 20-ton trolley, a 50-ton stationary drop table and eight 4000-lb., 22-ft. lift electric hoists.

Among recent purchases are:

Phoenix Utility Co., 71 Broadway, New York, 27½-ton, 71-ft. 6-in. span, 2-motor, power house crane from Whiting Corporation.

Stevens & Wood, engineers, New York, 10-ton, 31-ft. 6-in. span hand power crane from Whiting Corporation.

Consolidated Gas & Electric Co., Baltimore, small capacity locomotive crane, reported purchased from Koehring Co.

Electric Power & Maintenance Co., Monroe and Eleventh Streets, Toledo, Ohio, has plans for one-story service and repair works, to cost about $50,000 with equipment. Langdon, Hohly & Gramm, Security Building, are architects.

St. Louis

ST. LOUIS, Oct. 14.—Guardian Aircraft Corporation, 2504 Texas Street, St. Louis, manufacturer of airplanes and parts, has plans for one-story plant at Moberly, Mo., to cost over $40,000 with equipment. Ludwig Abt, Reigle Building, Moberly, is architect.

Mid-Continent Petroleum Corporation, 320 North Fourth Street, St. Louis, is considering new oil storage and distributing plant at Hannibal, Mo., to cost about $45,000 with equipment.

Moon Motor Car Co., 4400 North Main Street, St. Louis, is planning to diversify line of production and will use part of plant for manufacture of new automatically operated machine for agricultural service, including parts production and assembling. Company will carry out expansion, continuing production of automobiles, and has arranged for stock issue of 100,000 shares, no par value, to be used in part for such purpose.

Patterson Steel Co., 801 North Xanthus Street, Tulsa, Okla., has plans for storage and distributing plant, 100 x 150 ft., and 33 x 100 ft., to cost about $40,000 with equipment.

Swift & Co., Union Stock Yards, Chicago, have awarded a general contract to James T. Taylor, First National Bank Building, Fort Worth, Tex., for three-story plant at Ardmore, Okla., 76 x 130 ft., to cost about $150,000 with equipment.

Transcontinental Air Transport, Inc., Syndicate Trust Building, St. Louis, and Curtiss Flying Service, same address, with main offices at 27 West Fifty-seventh Street, New York, has asked bids for aircraft buildings at St. Louis air terminal, Highway No. 3, East St. Louis, Ill., including one-story motor torque building, 42 x 45 ft.; one-story repair and reconditioning shop, 120 x 213 ft.; and one-story shop, 50 x 101 ft., to cost over $75,000 with equipment. Kenneth Franzheim, 345 Madison Avenue, New York, is architect.

Davis Boring Tool Co., St. Louis, has been organized to take over and expand company of same name with local plant at 6200 Maple Avenue, manufacturer of special boring tools, reamers, cutters, etc.

Massey-Harris Harvester Co., Fairfax Industrial District, Kansas City, Kan., has awarded general contract to Lonsdale Brothers Construction Co., Bryant Building, for one-story addition to assembling plant, to cost over $40,000 with equipment. W. L. McLean is manager.

Buckley Aircraft Co., 148 North Fountain Street, Wichita, Kan., Roy D. Buckley, president, is considering new one-story plant near airport for parts production and assembling, to cost about $45,000 with equipment.

Missouri & North Arkansas Railway Co., Harrison, Ark., has acquired 7-acre tract adjoining engine shops at Kinsett, Ark., and plans construction of engine house, machine shops, sheds for passenger equipment and other structures, to cost more than $85,000 with equipment.

Evans-Wallower Zinc Co., East St. Louis, Ill., has plans for a lead plant, adjacent to its new electrolytic zinc plant, to cost $1,000,000. It will be operated as a part of present plant and will use virtually same process of manufacture.

Granite City Steel Co., Granite City, Ill., is completing a new machine shop, 150 x 300 ft., at a cost of about $250,000.

Hyman-Michaels Co., Railway Exchange building, St. Louis, has leased 20 acres of ground adjacent to its plant at Granite City, Ill., which will be used as a storage yard for relaying rails and for storage and repair of tank cars.

Buffalo

BUFFALO, Oct. 14.—Plans have been filed by McCauley Metal Products, Inc., 660 Grant Street, Buffalo, for extensions and improvements to cost about $30,000.

General Aviation Co., Syracuse, N. Y., operating an air service, plans removal of headquarters to Elmira, N. Y., where new hangar with repair and reconditioning facilities will be constructed. S. P. Voorhees is manager.

Firestone Tire & Rubber Co., Akron, Ohio, has taken out a permit to erect multi-story factory branch, storage and distributing plant at 1477 Main Street, Buffalo, to cost about $100,000 with equipment.

Hydraulic Transmission, Inc., Canandaigua, N. Y., care of C. W. Willis, 176 East Main Street, Webster, N. Y., recently formed by Maynard E. Estey, R. F. D., Canandaigua, and associates, with capital of $20,000, is said to be planning operation of local plant for production of hydraulic transmission machinery and parts.

Motor Transit Management Co., 1157 South Wabash Avenue, Chicago, has plans for one-story automobile service, repair and garage building at Syracuse, N. Y., to cost about $100,000 with equipment.

Dahlstrom Metallic Door Co., Buffalo Avenue and East Second Street, Jamestown, N. Y., manufacturer of fireproof doors, sash, elevator enclosures, etc., has

plans for two-story addition, including improvements in present plant, to cost about $40,000. Oliver Johnson, Fenton Building, is architect.

Consolidated Aircraft Corporation, 2050 Elmwood Avenue, Buffalo, is considering expansion at local plant in connection with removal of works of Thomas-Morse Co., Ithaca, N. Y., a subsidiary, to Buffalo, where production will be concentrated. Thomas-Morse Co. specializes in manufacture of all-metal single-motored planes open cockpit observation type, and will continue this line at Buffalo. Contract has recently been secured from Army Department for 70 units of this kind. Lawrence D. Bell is in charge of plant operations. Parent organization is completing plans for establishment of service and repair plants in different parts of country, initial units to be located in Canada and Southern California.

New England

BOSTON, Oct. 14.—Machine tool bookings the past week exceeded those for any week in some time. They included boring mills for 22 weeks' delivery, lathes for April delivery, a jig borer for 32 weeks' delivery, and shapers and milling machines, also for extended delivery. If dealers secure one-third of the business during the remainder of this month on which quotations have been made, October will make a record. Prospective business includes lots of one, two and three machines to the individual buyer and it is estimated that the total number involves nearly 500 tools.

Used tool dealers are having no difficulty in selling every conditioned lathe they can obtain. There is an active demand for shapers and milling machines, as well as horizontal boring mills. One local used tool house is maintaining a night and day force for reconditioning tools.

New England airplane and parts manufacturers continue to operate under pressure. Pratt & Whitney Aircraft Corporation, Hartford, has booked orders for 350 engines and parts having an approximate value of $2,355,000. This company has sufficient business on its books to maintain operations at capacity until June.

Small tool manufacturers in this territory state that 1929 will be the greatest year of production on record.

Lever Brothers Co., Cambridge, Mass., soap, has closed bids on a coal hopper. Purchase of conveying equipment is under consideration.

William E. Arnold Co., 17 Center Street, Malden, Mass., is building a one-story machine shop addition, to cost $30,000 without equipment.

Bay State Abrasive Products Co., Westboro, Mass., has started work on a one-story, plant, 80 x 100 ft. Some equipment is still to be purchased.

Terry Steam Turbine Co., Hartford, Conn., has plans for a one-story boiler plant, 50 x 50 ft. Bids for equipment will be taken later.

Franklin Foundry, West Glenwood Avenue, Hyde Park district, Boston, last week suffered considerable loss by fire.

United Aircraft & Transport Co., Inc., East Hartford, Conn., has awarded a contract for a power house, 50 x 120 ft.

Atlantic Wire Co., Church Street, Branford, Conn., has begun construction of one-story addition, 60 x 60 ft. Leo F. Caproni, 1056 Chapel Street, New Haven, Conn., is engineer, in charge.

Martin Trailer Co., Westfield, Mass., manufacturer of motor trailers and parts, plans new one-story factory, 80 x 100 ft., to cost about $45,000 with equipment.

New England Power Association, Worcester, Mass., has arranged an expansion program to cost about $60,000,000 over a 36 months' period, including construction of hydroelectric generating plant at Fifteen-Mile Falls, N. H., now in progress, representing an investment of $40,000,000, including steel tower transmission lines. About $15,000,000 will be expended for increased power and transmission facilities in Massachusetts, and $5,000,000 for similar work in Rhode Island for its subsidiary, Narragansett Electric Co., Providence. Frank D. Comerford is president of parent organization.

Cochrane Chevrolet Co., Main Street, Bridgeport, Conn., local representative for Chevrolet automobile, has plans for three-story addition to service, repair and sales building, to cost about $100,000 with equipment. Fletcher-Thompson, Inc., 542 Fairfield Avenue, is architect and engineer.

Strathmore Paper Co., Mittineague, Mass., has plans for addition to mill at West Springfield, Mass., to cost about $140,000 with equipment.

Westfield Mfg. Co., Westfield, Mass., manufacturer of bicycles, children's vehicles, parts, etc., has arranged for a stock issue to total $1,642,000, part of proceeds to be used for expansion.

Sikorsky Aircraft Co., Lordship, Bridgeport, Conn., has plans for one and two-story addition, 200 x 250 ft., to cost over $90,000 with equipment. Fletcher-Thompson, Inc., 542 Fairfield Avenue, Bridgeport, is architect and engineer.

F. S. Payne Co., Radcliffe Avenue, Cambridge, Mass., manufacturer of electric power and hydraulic elevators, parts, etc., has awarded general contract to Walsh Brothers, 150 Hampshire Street, for two-story machine shop addition, 50 x 110 ft., to cost about $45,000 with equipment.

Philadelphia

PHILADELPHIA, Oct. 14.—Contract has been let by United Motors Service, Inc., 342 North Broad Street, Philadelphia, an interest of General Motors Corporation, to Golder Construction Co., Insurance Co. of North America Building, for two-story service, repair and sales building, to cost $150,000 with equipment. Albert Kahn, Inc., Marquette Building, Detroit, is architect and engineer.

Board of Education, Nineteenth and Ludlow Streets, Philadelphia, is considering installation of manual training equipment in new four-story junior high school to cost $1,200,000, for which bids are being asked on general contract until Nov. 5. Irwin T. Catharine is architect for board.

Monroe Calculating Machine Co., Inc., 2020 Market Street, Philadelphia, manufacturer of computing machines and parts, with main plant at Orange, N. J., has leased building at 2039 Arch Street, for new local factory branch and distributing plant.

Board of City Commissioners, Ocean City, N. J., has authorized purchase of 130-acre tract on Bay Avenue, as site for municipal airport, and will have plans drawn in near future for hangars, repair and reconditioning shop, oil storage and other field units, to cost more than $85,000.

National Casket Co., 60 Massachusetts Avenue, Boston, has plans for three-story factory branch and distributing plant at Scranton, Pa., to cost over $75,000 with equipment. John H. Weida, 1425 Dickson Avenue, Scranton, is architect.

William J. Kuntz, 544 East Boundary Avenue, York, Pa., and associates have organized Lime & Hydrate Plants Co., to operate a local plant to manufacture equipment for lime production, mechanical dryers, and other products. Samuel LeRoy Jacobs, York, is also interested in new company.

Safe-Guard Check Writer Corporation, 5 Beekman Street, New York, with plant at Lansdale, Pa., has purchased plant and business of Repeater Stamp & Duplicator Corporation, 114 East Thirty-second Street, New York, manufacturer of patented devices for reproduction purposes. Purchasing company will remove New York factory to Lansdale, where increased facilities will be provided. Company recently acquired Hercules Check Certifier Co., manufacturer of check protecting machines and parts, and will develop capacity for this product at Lansdale plant.

W. P. Paul Co., Drexel Building, Philadelphia, manufacturer of forgings, etc., plans rebuilding part of machine shop at 1013 North Front Street, recently damaged by fire.

Chicago

CHICAGO, Oct. 14.—A good sized list of machine tools and mechanical equipment for the Norfolk & Western, several small lot inquiries by Western railroads and more active work on 1930 budgets are reviving interest in railroad buying. The Santa Fe will purchase two shears and and a floor grinder and the Chicago, St. Paul, Minneapolis & Omaha is in the market for an 18 x 3-in. double floor grinder and a 24-in. upright drill press.

Demand for used tools is unabated. The International Harvester Co. has recently closed for $100,000 worth of reconditioned tools which are being placed in the Weber works, Chicago. Fresh inquiries this week have added little to the pending list, which is impressive. New sales were widely scattered and in no larger volume than in the first week of October. Bids are being tabulated on the list issued for a buyer in the Orient. It is reported that the Pullman Co.'s Buffalo list has been closed.

Norfolk & Western List:

One 30 x 36-in. jarring machine.
Two journal truing and axle turning lathes.
One 24-in. x 8-ft. engine lathe.
One 48-in. x 10-ft. gap lathe.
One 90-in. driving wheel lathe.
One heavy-duty turret lathe.
Twenty-eight locomotive blowers, with apron, for 24-in. diameter stacks.
Two 36 x 36-in. x 36-in. x 12-ft. planers.
Two 250 gal. per min. centrifugal pumps, 345-ft. head, water temp. 200 deg. Fahr.
One 600 gal. per min. portable gas-engine driven centrifugal pump.
One four-cylinder single-acting pump, 25 gal. per min., 1500 lb. head.
Three 500-cu. ft. per min. cross-compound compressors, synchronous motor drive.
Five automatic feed water regulators.
Two 400-hp. boilers, 125-lb. pressure.
One 364-hp. boiler, 125-lb. pressure.

One 10-ton crane, 23-ft. 10½-in. span.
One 20-ton trolley crane.
One Whiting 50-ton drop table.
Two 16-in. drill presses.
One 6-ft. radial drill.
Five 18 x 3-in. double-floor grinders.
One internal grinder.
One 7 x 1-in. floor grinder.
One bevel gear cutter.
Eight 4000-lb., 22-ft. lift, electric hoists.
Two drop hammers.
One 8000-lb. steam hammer.
One ¼ to 2-in. pipe cutter.
One 50-ton forcing press.
One 750-ton hydraulic press.
One 36-in. crank shaper.
One 32-in. crank shaper
One pneumatic flanging press, ¾-in., 100 lb. pressure.
One dumping platform electric truck.
One 2½-ton auto truck.
One 1-in. bolt-heading machine.
One car-type core oven 8½ x 17½ ft., 11½ ft. high.
One 15-in. portable disk grinder.
Eight stationary tilting-type brass melting furnaces, 300 lb. per heat.
Miscellaneous list of motors and starters for machine drives, also transformers.

Continental Air Service, Municipal Airport, Chicago, will build a one and two-story hangar, 90 x 120 ft. R. V. Murison, Fisher Building, is architect.

Western Electric Co. has leased three-story building containing about 98,000 sq. ft. of floor area at 620 South Kilbourn Avenue, Chicago, for light manufacturing.

Eaton Metal Products Co., manufacturer of steel tanks, culverts and other metal products, with factories at Omaha, Neb., and Denver, has broken ground for a branch plant at Billings, Mont.

Reed & Prince Mfg. Co., Worcester, Mass., manufacturer of screws, rivets, burrs, nuts and bolts, has purchased 18,000 sq. ft. and a two-story building at 3635 Iron Street, Chicago, and will remove its present office and warehouse at 121 North Jefferson Street to new location.

Marvin Radio Tube Corporation, 1603 South Michigan Avenue, Chicago, has plans for enlargements, including installation of additional equipment, to cost more than $75,000.

Douglas Iron Works, Inc., 1128 South Fairfield Avenue, Chicago, is taking bids on general contract for a one-story plant unit, to cost about $100,000 with equipment. Structure will be used in part for ornamental iron work.

Minneapolis Gas Light Co., 16 South Seventh Street, Minneapolis, Minn., has plans for one-story equipment storage and distributing plant, with mechanical shops, etc., 80 x 200 ft., to cost about $130,000 with equipment.

Cities Service Oil Co., 1745 University Avenue, St. Paul, Minn., is considering one and two-story storage and distributing plant, to cost $100,000 with equipment.

American Steel & Wire Co., 208 South La Salle Street, Chicago, has plans for immediate erection of one-story unit, 80 x 800 ft., at Waukegan plant, primarily for wire drawing, increasing that division by about 25 per cent, estimated to cost $800,000 with equipment.

Atchison, Topeka & Santa Fe Railway Co., Topeka, Kan., and 80 East Jackson Boulevard, Chicago, has awarded general contract to W. A. Smith & Son, Fort Madison, Iowa, for addition to engine house, with shop facilities, at Shopton, Iowa, to cost more than $65,000 with equipment. E. A. Harrison is company architect.

Insulite Co., International Falls, Minn., manufacturer of insulating board products, is planning an expansion at local mill to double present output, to cost more than $100,000 with equipment. Company is a subsidiary of Backus-Brooks Co., Minneapolis.

Binks Mfg. Co., 3114-26 Carroll Avenue, Chicago, manufacturer of spraying equipment and devices, has purchased adjoining factory and will remodel for expansion. Present occupant, Hafner Mfg. Co., manufacturer of mechanical toy railroads and kindred products, will remove to a new plant on Kolmer Avenue, one-story, 100 x 300 ft., to cost about $85,000 with equipment, for which superstructure will soon begin. Austin Co., is engineer and contractor for last noted structure.

Hayes-Custer Stove Co., Empire Street, Bloomington, Ill., is considering one-story foundry addition, to cost more than $30,000 with equipment.

South Atlantic

BALTIMORE, Oct. 14.—Contract has been let by Union Tank Car Co., Fourteenth Street and Fourth Avenue, Baltimore, to Austin Co., Philadelphia, for one-story plant unit, to cost about $40,000 with equipment.

Gulf Refining Co., Frick Annex, Pittsburgh, has acquired waterfront property at Baltimore, vicinity of Frankfurst and Childs Streets, and plans construction of oil storage and distributing plant, with steel tanks and facilities for initial capacity of about 500,000 bbl. Project will include main unit, 150 x 350 ft., and motor truck service, repair and garage building, 75 x 116 ft. Pier, 40 ft. wide and 720 ft. long, will be built, to be provided with conveying, loading and other handling equipment.

Kreider-Reisner Aircraft Co., Inc., Pennsylvania Avenue, Hagerstown, Md., has plans for one-story addition, with two-story section, totaling about 7200 sq. ft. floor space, for expansion in airplane assembling and parts production, to cost about $50,000 with equipment. Company will also build a hangar, 60 x 80 ft., at local airport, with shop and repair facilities. H. Henry Reisner is head.

Southern Building Products Corporation, Savannah Fire Insurance Building, Savannah, Ga., recently formed as a subsidiary of Certain-teed Products Corporation, 100 East Forty-second Street, New York, to manufacture roofing and kindred building products, has awarded general contract to Artley Co., 504 East Bay Street, Savannah, for new local plant, including boiler house, machine shop and auxiliary structures, with storage and distributing facilities, to cost more than $400,000 with equipment. W. G. Will is company engineer in charge.

Nachman-Springfilled Co., 2241 South Halsted Street, Chicago, manufacturer of upholstery and mattress springs, etc., has arranged for establishment of branch plant at Norfolk, Va.

Valliant Fertilizer Co., Marine Bank Building, Baltimore, is considering new two-story commercial fertilizer manufacturing plant at Pocomoke, Md., to cost about $50,000 with equipment.

Keystone Water Works & Electric Corporation, Wilson, N. C., operating electric light and power utilities, ice plants and waterworks in North Carolina, Ohio, West Virginia, Kentucky, Georgia and other States, has disposed of a stock issue totaling $1,300,000, part of proceeds to be used for expansion.

City Council, Rome, Ga., has appointed special committee, headed by Hugh McCarty, to complete plans for a municipal electric light and power plant, to cost over $250,000 with equipment.

Leroi Patent Cup Co., Savannah, Ga., manufacturer of turpentine containers and kindred products for naval stores, is planning one-story addition, to cost about $25,000 with equipment.

Chesapeake & Ohio Railroad Co., Richmond, Va., has work under way on expansion at local engine terminal and shops, including new engine house, with machine, boiler-washing and other shop units, to cost about $800,000 with equipment, including similar expansion at Fulton, now in progress.

Cincinnati

CINCINNATI, Oct. 14.—Although inquiry continues good, the slowness of buyers to close after receiving quotations has caused a slight recession in the volume of new orders in this district. While business in September was good, the total was less than that of August, although slightly ahead of September last year. Fresh bookings the past week were about equal to the preceding week and were mostly for one or two machines. A Chicago buyer is inquiring for several small planers.

The Niagara Machine & Tool Works placed an order with a local manufacturer for one large planer, and the Hamilton Manufacturing Co., Two Rivers, Wis., bought one medium sized planer. An Eastern buyer purchased four 16-in. lathes from a local builder.

Contract for construction of first unit of plant for Crosley Aviation Co. was awarded last week to Austin Co., Cleveland. Building will be one story, 100 x 120 ft.

Exact Weight Scale Co., 265 West Spring Street, Columbus, Ohio, has awarded general contract to E. Elford & Sons, Inc., Columbus, for one-story plant, totaling 35,000 sq. ft. floor space, to cost $100,000 with machinery. Carmichael & Milspaugh, 8 East Long Street, are architects.

Board of Education, Jackson, Ohio, is said to be planning installation of manual training equipment in new three-story high school to cost about $240,000, for which plans are being drawn by Granville Scott, Citizens' Bank Building, Norwalk, Ohio, architect.

Southern Ohio Electric Co., Athens, Ohio, is disposing of bond issue to total $2,487,000, part of proceeds to be used for expansion and improvements in power plants and system. Company is closing negotiations for purchase of plant and property of Chillicothe Electric Railroad, Light & Power Co., Chillicothe, Ohio, and will consolidate; extensions and betterments will be carried out, including transmission line construction.

Knoxville Power & Light Co., Knoxville, Tenn., has awarded a general contract to Gervin Construction Co., 215 North Broadway, for one-story brass foundry and forge shop, to cost about $35,000 with equipment.

Federal Tile Co., North High Street, Columbus, Ohio, manufacturer of roofing tile, etc., has acquired local property as site for new three-story plant, to cost about $100,000 with equipment.

Delco Products Co., 329 East First Street, Dayton, Ohio, manufacturer of isolated electric lighting plants, lighting and starting equipment for automobiles,

etc., has plans for new seven-story unit, to cost about $200,000 with equipment.

Tennessee-Eastman Corporation, Kingsport, Tenn., subsidiary of Eastman Kodak Co., Rochester, N. Y., has approved construction of steam-operated electric power plant at local chemical works, 52 x 100 ft., to cost over $85,000 with equipment. Baker & Spencer, 17 Battery Place, New York, are engineers.

Detroit

DETROIT, Oct. 14.—Wolverine Bolt Co., 9660 French Road, Detroit, manufacturer of bolts, nuts, studs, etc., has awarded general contract to Henry W. Heide, 1243 Rademacker Avenue, for one-story plant unit, to cost about $70,000 with equipment. Mildner & Eisen, Hamm Building, are architects.

Beck, Koller & Co., General Motors Building, Detroit, manufacturer of mechanical equipment, has awarded general contract to Austin Co. for one-story machine shop at Hamtramck, Mich., to cost about $40,000 with equipment.

AC Spark Plug Co., Flint, is planning three-story addition, 100 x 160 ft., to cost about $100,000 with equipment. Several departments, including testing division and laboratories will be removed to new unit and additional equipment provided. Space vacated will be used to manufacture an electric gasoline gage, recently perfected by company. Harlow H. Curtice is vice-president and assistant general manager.

Motor Wheel Corporation, Saginaw Street, Lansing, manufacturer of wire and steel disk automobile wheels, has asked bids on general contract for four-story addition, to cost about $200,000 including equipment.

Interests identified with Detroit Edison Co., 2000 Second Avenue, Detroit, have organized Electro-Master, Inc., to take over and operate electric range manufacturing division of utility company, known as Electrochef, including local plant unit. New company will have assets of about $1,000,000 and will increase production facilities. Warren Noble is president; and Richard B. Marshall, vice-president and general manager.

Ford Motor Co., Detroit, has superstructure under way on new units at aircraft plant at Fort Dearborn, Mich., for production of one all-metal tri-motor airplane per day. It is proposed to remove small parts and forging departments from River Rouge plant to Fort Dearborn as soon as new units are ready.

Page Steel & Wire Co., Adrian, will carry out expansion, including installation of additional machinery for new department for production of a front wheel brake cable for Chevrolet Motor Co., Flint, to cost close to $75,000.

Hayes Body Corporation, Seventh Street, N. W., Grand Rapids, has asked bids on general contract for one-story metal press shop, 175 x 565 ft., to cost about $250,000 with equipment. Fett, Pearson & Goffeney, Associates Building, South Bend, are architects.

Evans Auto Loading Co., Union Trust Building, Detroit, manufacturer of automobile loading decks and equipment, and other loading devices, has disposed of a bond issue of $900,000, part of proceeds to be used for expansion.

Chrysler Corporation, 12200 East Jefferson Street, Detroit, has awarded general contract to W. E. Wood Co., Union Trust Building, for one-story machine shop, 160 x 160 ft., to cost about $85,000 with equipment.

Commerce Pattern Foundry & Machine Co., Grand River Avenue, Detroit, is building an addition to manufacture machine tools, to cost $30,000. Contract for design and construction has been awarded to Austin Co., Cleveland.

Acorn Nut Co., Flint, Mich., has been incorporated with capital of $250,000 to manufacture metal nuts, particularly those used by automobile industry. A new plant erected at Flint is now operating with a daily capacity of 120,000 acorn nuts.

Pittsburgh

PITTSBURGH, Oct. 14.—Machine tool business has been active the past week from both the standpoint of orders and new inquiries. Many local dealers will benefit by orders booked at the machine tool show, while others are now actively engaged in following up leads. The fourth quarter list of the Westinghouse Electric & Mfg. Co. is now out and orders for some of the tools will begin to be placed immediately. The Norfolk & Western has also issued a list, but it is the only railroad which has yet brought out an inquiry of importance. Nevertheless, local dealers look to the railroads for rather heavy purchases in the next three months.

Orders are being placed regularly for equipment for the last steel plant expansion in this district and heavy machinery makers and crane builders are busier than they have been for a long time. Purchases are being made regularly for the McKeesport plant of the National Tube Co., and other Steel Corporation subsidiaries, notably the American Sheet & Tin Plate Co., have been large buyers.

Babcock & Wilcox Tube Co., Farmers' Bank Building, Pittsburgh, an interest of Babcock & Wilcox Co., same address, manufacturer of watertube boilers, etc., headquarters at 85 Liberty Street, New York, has approved an expansion program at Beaver Falls, Pa., to double, approximately, present capacity, to cost more than $400,000.

Pittsburgh Plate Glass Co., Frick Building, Pittsburgh, has work under way on new sheet glass plant at Crystal City, Mo., to cost more than $500,000 with machinery. Company is also building new sheet glass mill at Henryetta, Okla., to cost over $1,000,000 with equipment. Work is in progress on extensions in plant at Mount Vernon, Ohio.

Carbide & Carbon Chemical Corporation, 30 East Forty-second Street, New York, has awarded contract to Kinstrey Co., South Charleston, W. Va., for new plant at that place for production of synthetic alcohol and allied products, consisting of four main units, to cost more than $1,500,000 with machinery.

International Nickel Co., 67 Wall Street, New York, has awarded general contract to Hatfield Construction Co., Fourteenth Street, Huntington, W. Va., for two one-story additions to Huntington mill. Main unit will be 158 x 400 ft., and will be occupied by American Mond Nickel Co., Clearfield, Pa., a recently acquired subsidiary, which will be removed to Huntington and capacity increased for production of cold drawn nickel specialties. Project will cost more than $350,000.

Milwaukee

MILWAUKEE, Oct. 14.—Renewed activity in the machine tool trade indicates fall volume comparable with any during the summer. Much pending business is being closed following the Cleveland show. Some manufacturers of electrical machinery, construction equipment, cranes, tractors and agricultural implements are contemplating expansion, but few of the plans are as yet out of the hands of the draftsmen. Activity in the pattern shops is beginning to be followed by increased production in the foundries.

Quantity production is being slowly resumed in local automobile factories and changed models have necessitated purchase of considerable special equipment. The delivery situation has not improved.

Yates-American Machine Co., Beloit, Wis., has authorized purchase of $250,000 for expansion and modernization of plants at Beloit, Rochester, N. Y., and Hamilton, Ont.

Universal Tool & Die Co., 128 Ferry Street, Milwaukee, is completing new two-story plant, 75 x 150 ft., to cost $50,000.

Pittsburgh Plate Glass Co., paint and varnish division, 205 Pittsburgh Avenue, Milwaukee, has announced $2,000,000 enlargement program for its paint, varnish and lacquer plants at Milwaukee, construction to begin next spring. Ludington Patton is resident vice-president in charge.

Hamilton Mfg. Co., Two Rivers, Wis., manufacturer of dentists' equipment and wood and steel printers' furniture, has let contracts for two-story addition, 65 x 178 ft., to cost about $75,000. W. Frank Dolke, Jr., Chicago, is consulting engineer, and T. W. Suttard, secretary, is in charge.

Barnes-Ames Co., 201 Board of Trade Building, Duluth, Minn., will build new grain elevator at Superior, Wis., next spring to cost about $1,500,000. Arthur P. Barnes is secretary.

Northern Conveyor & Mfg. Co., Janesville, Wis., through the completion of a plant addition, 160 x 200 ft., has doubled its capacity. Additional land has been bought for future extensions to present plant area of 64,000 sq. ft.

Gulf States

BIRMINGHAM, Oct. 14.—Hughes Tool Co., 300 Hughes Street, Houston, Tex., manufacturer of oil well tools and equipment, has plans for one-story addition, 35 x 180 ft., to cost about $50,000 with equipment.

Acme Machine Co., Galveston, Tex., is planning to rebuild part of plant destroyed by fire Oct. 6.

City Council, Shreveport, La., has engaged J. N. Chester, Clark Building, Pittsburgh, engineer, to prepare plans for new municipal pumping plant at Cross Lake, to cost $425,000 with machinery.

Board of Education, Texarkana, Tex., is considering installation of manual training equipment in new high school to cost $150,000, for which plans will be drawn by Witt, Seibert & Halsey, Texarkana, architects.

Atlas Metal Works, Inc., 2601 Alamo Street, Dallas, Tex., has awarded general contract to Austin Brothers, 1815 Coombs Street, for one-story plant unit at West

Dallas, 200 x 210 ft., to cost about $100,000 with equipment.

City Council, Fort Worth, Tex., has plans for new units at municipal airport, including hangar, 80 x 100 ft., with repair and reconditioning facilities, two-story administration building, 45 x 100 ft., and other structures. Fund of $500,000 recently was voted for airport and buildings. C. M. Thelin is city engineer in charge.

Pasotex Petroleum Co., Womble Boulevard, El Paso, Tex., is considering expansion at local oil refinery to increase capacity close to 2000 bbl. daily, developing total output of 5500 bbl. per day; new storage and distributing units will be built. Entire program will cost about $1,000,000 with equipment.

Board of Education, El Paso, Tex., is considering installation of manual training equipment in new two-story high school to cost about $350,000, for which plans are being drawn by Guy L. Frazer, Martin Building, architect; Braunton & McGhee, First National Bank Building, are associate architects.

Sugar By-Products Corporation, 7407 Bordeaux Street, New Orleans, R. E. Blouin, president, has arranged financing to an amount of about $500,000, considerable part of fund to be used for construction of alcohol distilling plant, including by-products factory for production of potash specialties, acids, etc.

City Council, Tampa, Fla., is planning new municipal airport at Ballast Point, Hillsborough Bay district, to cost about $700,000 with hangars, repair and reconditioning shops, oil storage and other units. An additional fund of $50,000 is proposed for improvements at present airport. Special election has been called on Nov. 16 to approve bonds for $750,000.

Central Power & Light Co., San Antonio, Tex., plans extension and improvements in steam-operated electric power plant at Presidio, Tex., including installation of new engine unit and other machinery, to cost over $100,000.

Indiana

INDIANAPOLIS, Oct. 14.—Bendix Aviation Corporation, South Bend, manufacturer of airplane accessories and equipment, a subsidiary of Bendix Corporation, has awarded general contract to H. G. Christman & Co., 306 South Notre Dame Avenue, for one-story addition, 360 x 1000 ft., to cost about $450,000 with equipment.

Blackford Window Glass Co., 537 Willow Street, Vincennes, is considering new unit for production of sheet glass, to cost about $100,000 with equipment. Frank J. Bastin is president.

Indiana Consumers Gas & By-Products Co., Terre Haute, operating by-product gas plants and system, has disposed of a preferred stock issue to total $2,000,000, part of fund to be used for extensions, including construction of new high pressure gas lines, about 78 miles, and increased distributing facilities.

Board of School Commissioners, 150 North Meridian Street, Indianapolis, is considering installation of manual training equipment in three-story and basement Irvington High School, to cost about $750,000, for which bids will soon be asked on general contract. McGuire & Shook, 941 North Meridian Street, are architects.

Time-O-Stat Controls Co., Elkhart, manufacturer of electrically-operated control devices and equipment, has awarded general contract to George C. Kistner Co., 514 South Main Street, for one-story plant unit, to cost about $25,000 with equipment.

D-A Lubricant Co., Twenty-ninth Street and Canal, Indianapolis, has awarded general contract to Brown & Mick, Inc., 1020 East Michigan Street, for two-story and basement oil storage and distributing plant, to cost about $38,000 with equipment.

American Metal Furniture Co., Indianapolis, has awarded contract for erection of a new factory, 150 x 200 ft. Company specializes in furniture for physicians' and dentists' offices.

Peerless Wire Goods Co., Lafayette, manufacturer of wire baskets, bakers' equipment and other products, will erect a new plant, consisting of group of buildings, which will provide 65,000 additional feet of floor space.

Pacific Coast

SAN FRANCISCO, Oct. 10.—Alco Oil Tool Co., Compton, Cal., has awarded general contract to A. R. Eaton, 526 Burton Avenue, for one-story addition, 60 x 350 ft., to cost about $60,000 with equipment.

Fokker Aircraft Co., Glendale, W. Va., has awarded general contract to Eaves Construction Co., 1524 LaBaig Street, Los Angeles, for new airplane manufacturing plant near El Monte, Cal., adjoining airport of Western Air Express, to cost about $300,000 with equipment. Works will include units for parts production and assembling.

Las Vegas High School District, Las Vegas, Nev., plans manual training shop at new high school group to cost $250,000, for which plans are being completed by George Ferris & Son, Reno, Nev., architects.

Imperial Valley Irrigation District, El Centro, Cal., is considering installation of steam-operated electric generating plant with capacity of 6000 kw., using Diesel engine units, instead of group of hydroelectric generating plants, in accordance with recommendations made by Edward Hyatt, State engineer, to cost more than $100,000 with equipment.

State Board of Harbor Commissioners, San Francisco, has plans for extensions and improvements in cold storage and refrigerating plant at Pier 43, to cost about $250,000 with equipment. Frank White, Ferry Building, is engineer.

Olympic Forest Products Co., Port Angeles, Wash., has awarded general contract to Christopher Kuppler, Port Angeles, for two one-story units for local pulp mill, 150 x 370 ft., and 60 x 257 ft., latter to be used in part as a machine works, to cost more than $1,000,000 with equipment. J. H. Bloedel and Joseph Irving head company.

Puget Sound Power & Light Co., Seattle, has arranged for a bond issue of $8,000,000, part of proceeds to be used for expansion in power plants and system. Company is planning for hydroelectric generating plant on Skyhomish River, near Everett, Wash., to cost more than $1,500,000. It is operated by Stone & Webster, Inc., Boston.

Huntington Park Union High School District, Huntington Park, Cal., is considering installation of manual training equipment in new high school at South Gate, to cost $300,000, for which bids will soon be asked on general contract. George M. Lindsey and Erwood P. Eiden, Insurance Exchange Building, Los Angeles, are architects.

Oliver United Filters Co., Fourth and Madison Streets, Oakland, Cal., manufacturer of filtering machinery, parts, etc., is considering new plant in Fruitvale district, to cost over $75,000 with equipment.

McLennan, McFeely & Prior, Ltd., Vancouver, B. C., iron and steel merchant and hardware jobber, has purchased Anderson & Lusby, New Westminster, B. C., and will operate the latter under the name of Anderson & Lusby, Ltd., with L. B. Lusby as director and manager. McLennan, McFeely and Prior, Ltd., was created in June, 1928, through a consolidation of McLennan, McFeely & Co. and E. G. Prior & Co., Victoria, B. C.

Canada

TORONTO, Oct. 14.—Current demand for machine tools is well up to the average for the year, with inquiries in good volume. Railroads are buying for shop replacements and considerable business is pending for plants under construction. The automotive industry is a regular customer and while most of the orders are for one or two tools, total sales show a good average each week. The manufacturing industry as a whole is maintaining a steady demand for machine tools.

Bancroft Light & Power Co., Bancroft, Ont., has plans for construction of a power plant to cost $40,000. Work will be started next spring.

Electric Auto Light Corporation, Toledo, Ohio, has let general contract to Thomas Grace, 291 Christina Street South, Sarnia, Ont., for a one-story plant at Point Edward, Ont.

Thompson Products Co., 2196 Clarkwood Road, Cleveland, will build a manufacturing plant at St. Catharines, Ont., bids to be called Nov. 15. Roberts-Wright Co., Swetland Building, Cleveland, is engineer.

Canadian Metal Window & Steel Products Co., Ltd., 160 River Street, Toronto, has awarded contract to Walter Davidson & Co., 188 Duke Street, for an addition.

St. John Iron Works, Vulcan Street, St. John, N. B., has awarded contract to George Lawson, 51 Wright Street, for a foundry to cost $20,000.

Dominion Coal Co., a subsidiary of British Empire Steel Corporation, has awarded contract to United Engineers & Constructors, Ltd., Montreal, for design and construction of a steam power plant at Glace Bay, N. S.

E. B. Eddy Co., Hull, Que., will build a $1,500,000 paper mill on its property. A survey has been made and plans are being prepared by company's architect, M. Pratt.

Royal Securities Corporation, 244 St. James Street, Montreal, has awarded contract to Morrow & Beatty, Ltd., Peterborough, Ont., for construction of a power development plant at Chats Falls, Que., to cost $2,500,000.

Foreign

PROPERTY at La Plata, Argentina, has been acquired by Goodyear Tire & Rubber Co., Akron, Ohio, as site for new plant to manufacture automobile tires and tubes, to cost more than $3,000,000 with equipment.

Compania Mexicana de Gas, Monterey, Mexico, a subsidiary of Moody-Seagraves Co., Fort Worth, Tex., has begun construction of pipe line from Jennings gas field, Zapata County, Tex., to Monterey, by way of Roma, Tex., about 142 miles, for natural gas supply at Monterey and vicinity, to cost more than $400,000 with booster stations and operating facilities.

American & Foreign Power Co., 2 Rector Street, New York, operated by Electric Bond & Share Co., same address, has concluded arrangements with Minas Geraes State Government, Brazil, to take over and operate electric light, power and traction properties at Belle Horizonte, capital of State. Acquiring company plans expansion and improvements, to cost more than $1,000,000 with equipment; property will be operated in conjunction with other utilities now controlled in that district. American & Foreign Power Co. has also secured a 50 per cent interest in Tata Sons, Ltd., Bombay, India, operating Tata Hydroelectric Agencies, Ltd., furnishing electric light and power at Bombay and vicinity, and will be active in management; expansion is proposed.

Seiberling Rubber Co., Akron, Ohio, manufacturer of automobile tires and other rubber goods, is planning for early establishment of new plant in Germany to manufacture tires and tubes. Entire project is reported to cost about $500,000 with equipment.

Real del Monte Mining Co., Pachuca, State of Hidalgo, Mexico, has plans for extensions and improvements in local gold and silver milling plants and properties, to include new buildings and machinery, to cost about $1,750,000.

New Trade Publications

Triple-Service Boilers.—International Boiler Works Co., East Stroudsburg, Pa. Circulars illustrating and describing a water-tube boiler for domestic use which has within its shell arrangements for heating a house by steam or hot water through the use of gas or oil as fuel, a domestic hot water heater and a garbage incinerator. This boiler is made in 21 sizes ranging from 500 to 12,000 sq. ft. of steam radiation.

Steel Shelving.—General Fireproofing Co., Youngstown, Ohio. A catalog has been issued illustrating over 2000 different combinations of steel shelving which are designated as standard units. The listing of these units, with the price sheet accompanying the catalog, simplifies the matter of selecting and ordering steel shelving.

Firebond High-Temperature Cement.—Harbison-Walker Refractories Co., Pittsburgh. An elaborate booklet of 12 pages tells in pictures and words how the use of Firebond will reduce furnace maintenance costs by prolonging the life of refractory linings. Tables for calculating the quantities of brick required for arches of different spans and thicknesses are published.

Flexible Couplings.—Poole Engineering & Machine Co., Baltimore. Advantages of using Poole flexible couplings are set forth in a 36-page illustrated hand book. Many typical installations are described.

Squirrel Cage Induction Motors.—Century Electric Co., St. Louis. Bulletin No. 6-1 describes type SCN squirrel cage induction polyphase motors.

The Week's News Quickly Told

Current Events That Bear on the Course of Business

WAR between nations is banished by Kellogg treaty, consequently old problems can be approached "from a new angle and in a new atmosphere," to quote the statement issued by President Hoover and Premier MacDonald. Addressing the Senate, the latter said that war is "impossible if you and we do our duty" and endorsed naval parity without reserve.

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RADIO successfully broadcast Premier MacDonald's speeches to listeners in England . . . Radio telephone connection has been made between New York and Australia, 15,000 miles. . . . Communications between Spain and South America are much improved by new wire lines between Chile and Uruguay, across the Andes, pampas and Rio Platte, and a beam wireless to Seville, 6,000 miles away.

* * * * *

SHIPMENTS from Winnipeg to England via the Hudson Bay railroad have been commenced by the Hudson Bay Co., which in 1668 started to trade over this route . . . The largest American-built passenger ship, the Pennsylvania, of 33,000 tons, has been built at Newport News and delivered within one year; it will ply between Atlantic and Pacific ports . . . Rolling stock and auxiliary equipment for New York subways costing $20,146,000 will be purchased.

* * * * *

AIRPLANES weighing 50 to 100 tons, to carry 200 persons in regular 36-hr. trans-Atlantic flight, are expected in the near future by Igor Sikorsky . . . French aviators Coste and Bellonte fly 6,160 miles, a record distance, Le Bourget to Manchuria . . . The huge British dirigible R-101 passes preliminary tests and is visited by a million sight-seers.

* * * * *

TRAFFIC on the Philadelphia-Camden bridge has in three years reached the capacity of its approaches; it is carrying about a million automobiles a month, and will pay for itself by 1940, six years ahead of the expected time . . . Purchase of foreign plants by General Motors, said President A. P. Sloan, is not to stifle competition but to provide plants for manufacturing a European car for European markets . . . He expects a steady annual consumption of 5,000,000 cars in America, but executives of Willys-Overland and Reo believe the 1930 production must be kept to 1929 figures to avoid saturation of market.

* * * * *

BUSINESS men are generally optimistic over trade conditions, which compare well with the corresponding period last year, even though the large margins of advance made earlier in 1929 have not been maintained. Wholesale trade, jobbing, retail trade and car loadings show that consumption of goods is pursuing a normal and steady course . . . Sales of life insurance, said to form a new barometer of prosperity, are considerably higher than a year ago . . . Each of the trans-Mississippi "corn and cow States" shows a material decrease in farm mortgage indebtedness since 1925 . . . Pacific coast industrial employment and activity are making records.

* * * * *

CALL money dropped to 5 per cent, the lowest for over a year, and collateral time loans also declined nearly 1 per cent. Easy money is said to be due to closing out of many speculative accounts during the recent stock market slump . . . Sterling crossed par for the first time in 14 months, and gold exports from England abruptly stopped . . . Committees, meeting at Baden-Baden to formulate rules of conduct for World Bank, consider whether the bank should be limited to the duty of handling German reparations, or permitted to serve as an international clearing house to stabilize national currencies and prevent industrial panics . . . Americans subscribed to a third of a billion of dollars in South American governmental bonds last year, a record figure.

* * * * *

COFFEE prices crumbled so rapidly that one day the exchange closed early in accordance with its rule to limit price changes to 2c. in one day. Brokers believe that the Brazilian Government's attempt to peg the price has failed because of expanded production.

* * * * *

RUBBER producers and consumers are planning a central selling organization capable of pooling 20 per cent of the plantation rubber whenever necessary to maintain price. F. R. Henderson, president New York Rubber Exchange, opposes the idea, saying that an open market has kept the price between 18 and 28c., whereas most violent fluctuations (35c. to $1.21) occurred during the British growers' attempt to restrict the output . . . Tire manufacturers have a 16,000,000 inventory, 40 per cent above a year ago, and about a 2-months' supply—said to be without danger as long as crude rubber prices remain steady.

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UTILITY earnings (gross) are steadily increasing, year by year. Net earnings are increasing at an even higher rate. For the first eight months of 1926 net was 35 per cent of the gross; now it is 43 per cent.

THE IRON AGE

New York, October 24, 1929

ESTABLISHED 1855 VOL. 124, No. 17

Studies on Migration of Industry

Industrial Methods of Communities —Reasons Underlying Location or Relocation of Plants—Growth in Smaller Cities

SEVERAL months ago studies were put under way by the Policyholders' Service Bureau of the Metropolitan Life Insurance Co., in conjunction with the Civic Development Committee of the National Electric Light Association, with the object of determining the reasons underlying movement of industries from one community to another and from one general area of the country to another. At the same time, the location of new industries within given areas or communities was studied, as well as the reasons back of the losses, sustained by certain communities, in the industrial fabric of the country.

What follows is taken from a summary of the survey, and from an address delivered by William J. Barrett of the Policyholders' Service Bureau, which was read before the Connecticut Chamber of Commerce, Hartford, last May.

Two forces are causing considerable thought to be given to the subject of industrial development. (1) Many cities have come to realize that their social and economic advancement depends upon the industries within their borders, and are beginning to give attention to those industries and to the securing of additional payrolls. Industry, on the other hand, has been caused to study intensively its present location and, where movement is contemplated, to arrive at a future location by scientific means.

Many of the larger cities, realizing that they cannot depend entirely upon past momentum, have set about actively to exploit their advantages of a large market, established industries, available labor supplies and intensive transportation facilities. Smaller communities have been active in urging the advantages of stable labor and ideal working and living conditions.

Plants Gained by Communities

It has been estimated that nine-tenths of all industries are improperly located. They have been placed where they are by rule-of-thumb methods, for personal reasons, or for other causes of unscientific character. In many cases the inadequacy of present location is a result of changed conditions.

Mergers and consolidations are doing a great deal to focus attention on proper location. Keen competition, foreign and domestic, has caused industry to seek the lowest possible costs, both in production and in distribution. It is realizing that strategic location is an important factor in lowering costs to the consumer.

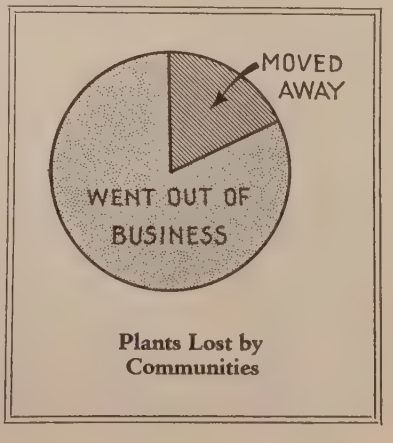
Industrial relocation since the World War has had wide publicity. Among the larger groups of movements have been that of the cotton textile industry to the Southern States, the setting up of an immense rayon industry in the South, development of a large shoe industry in the St. Louis territory, movement of the center of the steel industry from Pittsburgh and development of the Kraft paper industry in the South.

To secure their share of gain in these shifting industries many communities have sought to attract individual plants. Advertising campaigns, offering freedom from taxation, in some cases providing rent-free factories for a period of time, have been among the means used.

How the Survey Was Made

Two general objects of the survey were: (1) To measure for a two-year period, in terms of number of plants and of employees, the extent and nature of certain phases of industrial developments in the United States and Canada; (2) to define the underlying economic reasons which brought about these changes.

In studying the question, information was gathered concerning the name of a company participating in any one of the three items mentioned on page 1090, together with data on the product manufactured, the number of employees, sources of capital



Plants Lost by Communities

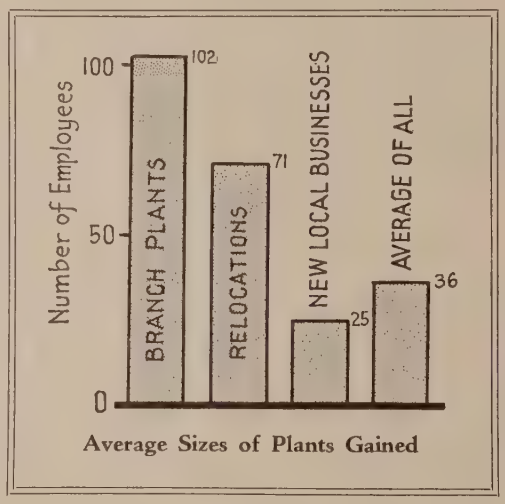
of new local industries and reasons underlying the development. In addition, movements away from a given community and information regarding firms which had gone out of business were sought, but with less success.

Both questionnaire and personal interview were utilized in securing the desired data. It was recognized that there are four distinct types of industrial development:

1. Growth resulting from the acquisition of industries which have moved to a given point from another city—a relocation.
2. Growth through the establishment of branch plants.
3. Growth through the organization of new local industries.
4. Growth through the expansion of existing industries—a phase which was not included in the survey.

Reports were had from 1934 cities or communities in the United States and 150 in Canada, representing 90 per cent of those in the United States with 10,000 or more people and one-third of those having between 2500 and 10,000, together with a large number of smaller communities, and two-thirds of the urban population of Canada. The information covered more than 16,000 firms, employing approximately 600,000 workers. More than 10,000 plants were gained by the 2084 communities.

Bodily shifting of industry from one community to another, although it has assumed much importance in the public eye, is on a relatively small scale. Such relocations account for only 10 per cent of the plants gained by the different communities. New local industries represented over 80 per cent of the growth in number of plants; branch plants were responsible for about 9 per cent. Thus, the outstanding factor in industrial development is the upbuilding of a community by new local industries.



Average Sizes of Plants Gained

Branch plants proved to be larger than any of the others studied, averaging 102 employees. This compares with 71 employees in the average relocation of plants and only 25 in the average of new local plants. The average for all plants gained by communities was 36 employees.

In the two-year period covered by the study the various communities lost 5908 plants, or about 58 per cent as many as the plants which were gained. Of the losses, 82 per cent went out of business; the remaining 18 per cent moved away. The average size of plant lost was 35 employees.

Growth of Industry in Small Places

SMALLER communities are growing in importance as industrial locations. This includes both the isolated small city and the suburban community. Several underlying motives for the growth of industry in smaller communities are: Stable labor supply, good living and working conditions, lack of congestion, ease of transportation and available power. The suburban community offers the advantages of the large city, without its disadvantages.

Cities under 10,000 population received more than one-quarter of all branches reported, more than one-sixth of the relocations and one-tenth of the new local industries. Most frequently mentioned as reasons for this movement were, in order of frequency: Markets, labor, transportation, materials, available factory buildings.

Information on plants lost was difficult to secure. Such communities as have the data do not care to give it out. Information was obtained, however, from plants which had moved, of their reasons for leaving their earlier locations.

One plant locating in a small community found it difficult to hold a supervisory force. These people had become accustomed to the social and recreational advantages of a large city and missed them greatly in the small community.

In another case, a gray iron foundry was located in a small community. The growth of the business was rapid and a considerable expansion was needed shortly. Investigating the labor supplies in the community and adjacent territory, the management found that present requirements were absorbing practically the entire employable population. It thus became impossible to make the needed expansion at that point.

One small community was found so favorable for industries that its industrial development has gone considerably ahead of its size and recreational facilities. It has started to provide such facilities, as a partial result of which land values in the retail business section have gone skyward.

One reason for a recent movement of industries to small cities lies in the fact that many of them have, within the past five years, received the advantages of electric power service formerly enjoyed only by the larger communities. This has made it possible for industries to locate in these smaller places with full assurance of dependable 24-hr. electric service from an inter-connected system. It is significant that the preponderant movement in six of the nine geographical areas is from the larger to the smaller cities.

Middle Atlantic States Gained Most

Of the movement of an industry from one community to another, that between the Middle Atlantic States (New York, New Jersey and Pennsylvania) and New England is of some interest. Practically 86 per cent of the movement into New England was from the Middle Atlantic States, the principal trend being from New York into Connecticut. Conversely, most of the plants moving out of New England went into the Middle Atlantic States.

As a whole, the Middle Atlantic States showed the greatest gains due to relocations of industry, with New England second. The Middle Atlantic States led in new branch factories, with East North Central territory second. The Middle Atlantic States are substantially ahead in establishment of new local plants; New England stands second in this respect.

Cold Worked Gun Forgings

The forgings for guns manufactured during the past year have all been cold worked, according to Major-General C. C. Williams, chief of ordnance, United States Army. At a meeting of the Army Ordnance Association, Oct. 10, he said that 165 forgings have now been produced by this method and not one has failed in service. Watertown Arsenal has continued to make minor improvements in the process and equipment, but the process is now standardized and is highly satisfactory.

GRAINGER LIBRARY

Evolves New Beehive Coke Process

Humphreys Coal & Coke Co., After Long Experiments, Obtains Product Meeting New Specifications of Foundries

MORE exacting coke specifications from foundry consumers and growing competition from by-product coke producers have led the Humphreys Coal & Coke Co., Greensburg, Pa., to evolve a process for manufacturing beehive coke comparable with by-product coke in both physical characteristics and chemical analysis. The Humphreys company, a subsidiary of American Radiator Co., with mines and ovens in Westmoreland County, Pa., operates in the famous "Old Basin" Connellsville seam.

During the many years of its history Humphreys beehive foundry coke has enjoyed a good reputation, both for its chemical and physical characteristics. Until recently, however, the coke was manufactured from coal that received no preparation or refinement prior to coking; nor was any effort made to control the porosity and shatter qualities or weight by formulæ in the introduction of air into the ovens. As the coke requirements of modern foundries became more exacting, the company realized that, if it were to supply satisfactorily the foundries of the parent company, as well as a large outside trade, improvements in beehive coke would have to be introduced.

The Humphreys situation was complicated because the company's production of coal is limited under its leasehold to a comparatively small tonnage, equivalent only to the requirements of its battery of 145 ovens. With this limitation there was an additional reason for producing a quality product marketable at a premium price.

What Foundries Now Expect of Coke

A better understanding of the problems that faced the Humphreys company in getting out a product which would meet the test of modern usage is afforded by the following comparison of characteristic specifications of today with those of a few years ago:

Old Specifications

Shatter index (standard of the American Society for Testing Materials used) 60 to 65 per cent on a 2-in. screen

Porosity—its utility not understood.

Weight per cu ft.—its importance not valued.

Ash—less than 12 per cent

Sulphur—less than 1 per cent

Volatile and moisture as low as possible.

New Specifications

Shatter index over 85 per cent.

Porosity variable from 48 per cent to 55 per cent to suit the requirements of the consumer.

Weight per cu. ft.—29 to 33 lb. to suit the requirements of the consumer.

Ash—as low as possible, consistent with structure; preferably less than 10 per cent.

Sulphur—less than 0.75 per cent.

Volatile and moisture low with a correspondingly high fixed carbon, which should be 89 per cent or over.

In setting out to meet the new specifications outlined

GENERAL View of Surface Plant, Showing Pangborn Dust Arresters and Classifiers on Right, Preparation Plant in Center, and Ovens on Extreme Left

on page 1091, the company installed a laboratory at its plant and engaged a chemist and metallurgist. This laboratory is believed to be the first of its kind in the Connellsville district. With the laboratory in operation, a series of experiments covering a period of three years was undertaken. In these experiments the company sought to determine the proper type of mechanical coal cleaning equipment to install, the best size of coal to make the toughest coke in beehive ovens, and the proper size of coal to give the most efficient separation. Exhaustive study was made of the further desulphurization of coke by use of acid in the coal, and methods of introducing air into the ovens to improve and assume control over porosity, weight and shatter index. Nearly all of this work represented pioneering in beehive coke manufacture.

The extent to which the company has been successful in solving these problems is best illustrated by the following typical analysis of its foundry coke:

Shatter Index:			Per Cent
On 3-in. screen	76 per cent	Moisture	0.60
On 2-in. screen	88 per cent	Volatile matter	0.70
Porosity	52 per cent	Fixed carbon	89.55
Weight per cu. ft.	32 lb.	Ash	9.75
		Sulphur	0.66

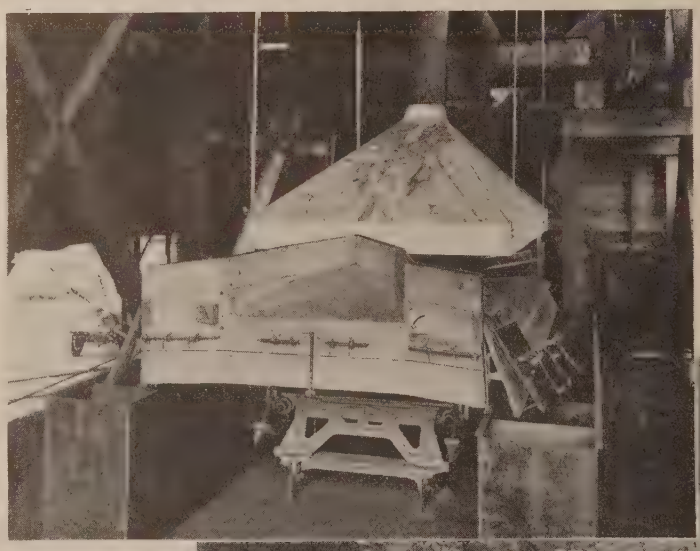
Pneumatic Separation Utilized

After the coal is brought to the preparation plant from the nearby mine, it is first crushed to a proper fineness and then passed over pneumatic separators, furnished by the American Coal Cleaning Corporation. Here a novel arrangement has been introduced by giving all the coal a primary treatment and a portion of it a secondary treatment over the separators. This is done to insure uniform chemical quality. With only one treatment, which is customary, an extra quantity of refuse in the feed coal may not all be eliminated, but with a secondary treatment complete elimination to a predetermined standard is assured. After the coal has been run through the separators, it is given a treatment of acid to reduce further the sulphur content of the resultant coke.

After the coal passes into the ovens and during the entire coking period, operation is regulated with extreme care to insure the proper porosity, weight and shatter index. The porosity and weight per cu. ft. can be and are varied to suit the requirements of the various customers. This diversification ranges in porosity from 49 to 56 per cent, and in weight per cu. ft. from 28 to 34 lb. This effort on the part of the producer to meet the requirements of its customers is another recognition by the Humphreys company of the economies in foundry operation to be derived from the use of the proper kind of coke.

Sea Coal Produced as By-Product

During the process of coal beneficiation by the pneumatic process, considerable fine dust is produced. This is collected by means of Pangborn dust arresters, which have been erected adjacent to the preparation plant, and is classified into two sizes which are marketed as sea



ONE of the Pneumatic Separators in Cleaning Plant. Here all coal is given a primary treatment, and a portion of it a secondary treatment over the separators to insure uniform chemical quality

THE Structure of the Coke Before Hand - Drawing from a Beehive Oven Is Clearly Shown in This View

HAND-Drawing of the Coke Has Little Effect on the Size Because of Its Toughness

coal, or as an alternative can be re-introduced into the coking coal.

The analyses of the two grades of sea coal are:

	Per Cent		Per Cent
No. 1 Grade		Volatile matter	30.5
		Fixed carbon	62.5
Through 100 Mesh	94	Ash	7.00
Through 200 mesh	62	Sulphur	0.80
No. 2 Grade		Volatile matter	31.4
		Fixed carbon	61.55
Through 100 mesh	60	Ash	7.05
Through 200 mesh	20	Sulphur	0.83

While this sea coal might be termed as a by-product of the coal preparation plant, the No. 1 grade is comparable with the highest grades which are manufactured.

Each car of foundry coke is tested for shatter index, porosity and weight per cu. ft. and analyzed for volatile matter, moisture, ash, fixed carbon and sulphur. Through the laboratory close control is maintained over the proper functioning of the coal crushing and coal separation plants, as well as the proper formulæ for air control of the ovens. In fact, the laboratory is used to exercise control over the coal from the mines to the finished coke in cars. Every active working place in the mines is analyzed at stated intervals, and an inactive place is not resumed until a complete analysis is made.

Enlarge Old Motor for Reversing Blooming Mill Drive

BY G. P. WILSON*

REVAMPING of a motor driving a reversing blooming mill at the Indiana Harbor, Ind., works, Youngstown Sheet & Tube Co., to accommodate larger equipment, was recently accomplished by increasing the size of the motor from 5000 hp. at 40 r.p.m. to 8000 hp. at 50 r.p.m. The old motor, installed on the 35-in. blooming mill in 1918, was supplied with power from a 3500-kw. flywheel motor-generator set with two 1750-kw., 600-volt, d.c. generators.

Increasing the power of the motor necessitated the replacement of the present armature copper with greater cross-section, to allow for this increased rating. To improve operating conditions further on the motor, under peak-load conditions, tapered inter-poles were provided on the machine and new compensating and commutating windings. The old shunt field coils were removed and new field coils with improved insulation were provided.

New end bells and baffle plates were installed, which will improve the ventilating condition of the machine. Redesigning the ventilation of the motor in line with present-day practice, and increasing its horsepower to 8000, necessitated increasing the amount of air to the motor from 40,000 cu. ft. to 80,000 cu. ft. a minute.

The increased horsepower rating of the motor required new generators which would have a combined rating of 6000-kw. and a 5000 hp. driving motor for these generators. The speed of the mill motor was raised from 40 to 50 r.p.m. by increasing the voltage of the generators from 600 to 700. The new set and the revamped motor are provided with a new control, and a foot-operated master switch replaces the old hand-operated master switch. The field relays for the motor and generator are of the latest improved type. This new control will increase the performance of the set enabling faster acceleration and increased over-all performance to be made.

The old flywheel set and control will be left installed as a standby, so that the motor may be operated from either the old set or the new, thus assuring available power for driving it. The motor has a spare armature also, so that this arrangement of the two motor-generator sets will make the power supply conform to the spare that is available for the motor.

When completed the installation will be the only one of its kind operating in steel mills, and will be the second largest reversing mill installed. Comparison of the operation of the new foot-master control with the old hand-operated control will then be possible.

*General engineer, Westinghouse Electric & Mfg. Co., East Pittsburgh.

Heat Treating Woodsmen's Axes

Lead and Salt Baths, Electrically Heated and Automatically Controlled, Improve Output and Cut Costs Made by Semi-Muffle Furnaces

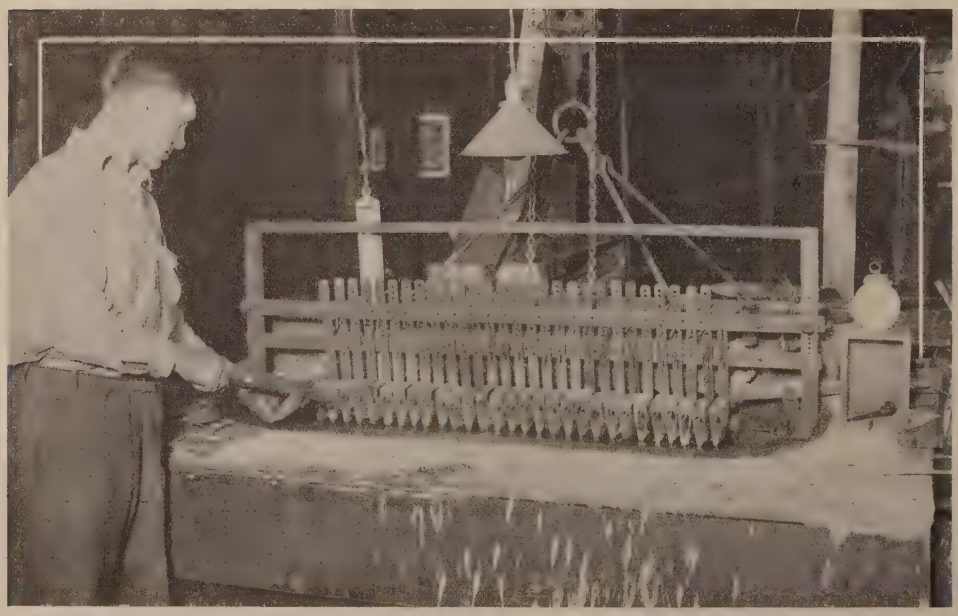
AN opportunity to appraise the over-all costs of heat treating carbon steel tools, and to show that reduction in collateral costs may overbalance an increase in fuel cost, occurred in the plant of Warren Axe & Tool Co., Warren, Pa., manufacturer of high-grade axes and logging tools of some 33 years' experience. As described by Wirt S. Scott, Westinghouse Electric & Mfg. Co., Mansfield, Ohio, in a paper before the meeting on fuels, American Society of Mechanical Engineers, Philadelphia, Oct. 7, the body of an axe is forged from low-carbon steel, and to this is welded the cutting edge, consisting of high-carbon crucible steel. Only the blade or cutting bit needs to be hardened; hence it is unnecessary to heat the entire axe except for obtaining a blue temper color, which is a characteristic and advertised feature of the company's highest grade tools.

In the past, in order to secure the best results obtainable from fuel-fired furnaces, each axe was individually hardened and tempered. Despite the utmost care in heat treatment and testing, the necessary free replacements of tools sold under an unconditional guarantee became an appreciable item, and one to be eliminated if possible. This resulted in extensive investigation of new ideas and new methods of heat treating the parts, particularly as applied to tempering.

Prior to electrification, the axes were heated in semi-muffled, gas furnaces. Individual treatment was thought to produce the ultimate quality. The possibility for error in judgment on the part of the heat treater was appreciated, but this was minimized by the employment of experienced heat treaters.

To secure the dark blue color of tempered steel was the aim of the heat treaters in the final operation, but the accomplishment was a matter of judgment, subject to many variables and resulted in different shades of tempered steel and different degrees of hardness. To improve the quality of product, and to secure the most dependable uniform quality, it was decided to eliminate some of the variables, and reduce others to a minimum, through the use of electric heat, regardless of the operating cost.

After electric furnaces were put in operation, the entire method of heat treatment was reversed. Equipment included batch-type, semi-continuous operation, bath-type furnaces in place of hearth type; separate hardening and tempering furnaces; one hardening and one tempering furnace in place of five combination hardening and tempering furnaces.

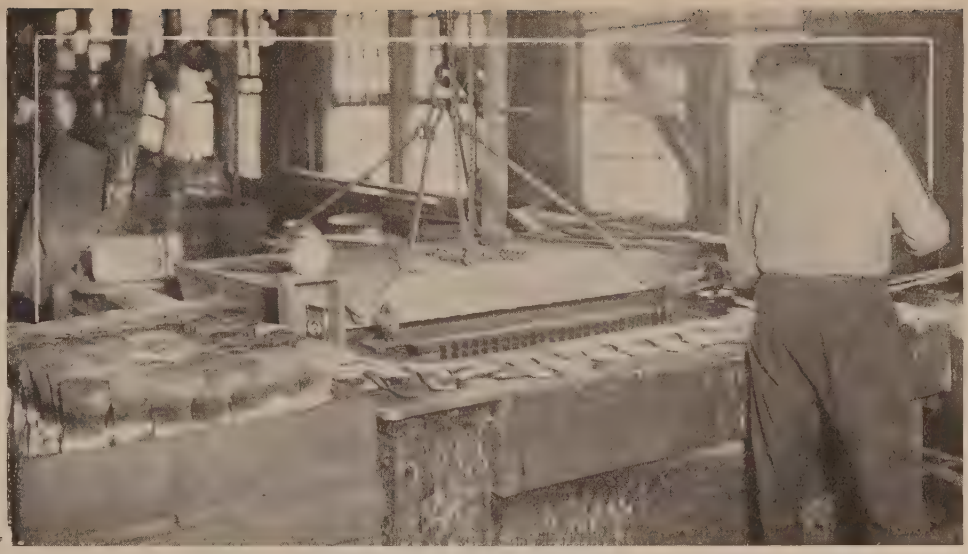


SALT Tempering Bath, with 29 Single-Bit Axes in the Bath. Hot axes are replaced by cold ones at regular intervals. Steady operations and unique current control hold temperature of bath within close limits

The electric furnaces are of the rectangular bath-type, consisting of a steel plate shell, lined with heat-insulating and refractory brick. Heating elements formed of return-bend coils of nickel-chromium resistors are suspended from hooks anchored in the side walls, and also placed in the bottom in suitable refractory spacer blocks.

The vessel for the bath is made of cast nickel-chromium alloy, supported from an upper flange. A nickel-chromium protective apron is placed around the flange, and over this is laid a steel top plate, to protect the brick work from damage, and prevent the molten material from entering the heating chamber.

The hardening bath is operated at a temperature of 1405 deg. Fahr.; the vessel is 22 in. wide by 60 in. long and 14 in. deep. The electrical capacity is 65 kw.



TEMPERING Double-Bit Axes in a Special Salt Solution That Tempers and Blues the Axe at the Same Time. There are 26 double-bit axes completely immersed in the salt bath

The tempering bath is operated at a temperature of 580 deg. Fahr.; the vessel is 12 in. by 46 in. at the top, and 12 in deep. Its electrical capacity is 57 kw.

Coils in each furnace are divided into two equal circuits, each operated by separate contactor switches, which are opened and closed by means of temperature recording and controlling pyrometers.

Two thermocouples are used with each furnace, one of the protected type plunged in the bath; the other is bare and placed within the heating chamber. This double protection and control is necessary to protect the heating elements fully against excessive temperatures, particularly during the heating up periods, and to maintain the bath temperature constant within 7.5 deg. Fahr.

Theoretically, if a definite amount of heat be supplied each minute to a bath, it should be possible to put just enough work through it each minute to hold the temperature constant. Some means should be employed to indicate whether or not the operator was working at the correct rate. This may be accomplished by placing three contacts on the pyrometer, operating three lamps. A white light would indicate correct temperature; a blue light, temperature too low; a red light, temperature too high; a white and blue light, a downward swing in temperature; a white and red light, an upward swing in temperature.

In practice, it is impossible to comply entirely with the theory above outlined. For one thing the weights of axes vary, consequently the rate of heat absorption is not constant. This condition necessitates a furnace having a capacity sufficient for heating the largest charge at the given production rate, and, as a factor of safety, an excess capacity for unforeseen contingencies. The temperature variation of this combined system under the worst conditions was sufficient to hold the hardening temperature within 15 deg. plus or minus. In order that the signal system noted above should burn continuously, and not intermittently, it was necessary to use two recording and controlling instruments, one for the bath and one for the heating chamber.

The use of two control instruments, two separate contactor switches and two circuits in each furnace opened the way for an investigation for further refinement of temperature control. Temperature surges had been reduced from 30 deg. to 20 deg. by controlling the temperature of the heating zone. If the amount of energy necessary to control, on and off, intermittently, could be reduced, the corresponding surges in temperature would

DOUBLE-BIT Axes Are Being Heated in the Electrically Heated Lead-Hardening Furnace. The bit only is immersed in the lead. Note the three lamps on the wall at the extreme right, with the white light showing, indicating proper temperature and correct rate of production. The brine quench tank is directly back of the furnace operator. After finishing the day's production, the rack for holding the axes in the bath is removed, and the insulated cover is placed in position over the lead bath, so that the lead is still in a molten condition next morning

be reduced. This was accomplished by taking one circuit of the furnace entirely off the recording control pyrometer for the bath and placing it on the control pyrometer for the heating chamber, with the net result that one-half of the furnace capacity was in constant service and one-half in intermittent service.

Whether one circuit or both circuits are on, they are at all times under the control of the heating chamber thermocouple and pyrometer, cutting off the current entirely should the temperature of the heating chamber rise to a predetermined point, and cutting it on again as the temperature is lowered. With this scheme, the temperature fluctuation was reduced to 7.5 deg. Fahr. plus or minus.

Furnaces never cool sufficiently to freeze the bath, except during the week end. Heavily insulated covers are provided which, at the end of the day's run, are lifted from their stand by a chain hoist, and lowered over the furnace. Cooling over night (15½ hr.) lowers the temperature of the lead 500 to 550 deg., and this is recovered in about half an hour in the morning. The tempering furnace cools over night from 580 deg. (the operating temperature) to about 450 deg., but is reheated in 20 min. In either case, an equal amount of time is given the furnace to equalize the temperature thoroughly, before heat treatment starts.

In the hardening bath, 23 axes are suspended, point down and immersed in the lead bath up to within one inch of the hole for the handle. On top of the molten lead is placed a blanket of granular carbon, which has the effect of reducing the radiation losses, reducing oxidation of the lead, and wiping lead globules from the hot axes when removing. After the axes have been in the bath a definite length of time they are removed, quenched in brine, rinsed in clear water, and are ready for tempering. This work is done in rotation—taking one axe out, quenching it, replacing it in the hardening bath with another, removing the next, and so on.

With 4-lb. single-bit axes, 5 min. is allowed for this complete cycle, permitting the operator to work at a very comfortable pace, without hurrying. With 6½-lb. axes, an 8-min. schedule is required for 23 axes.

Operation of the tempering furnace is substantially the same as the hardening furnace, except that the entire axe is submerged in the liquid, and a double-bit axe requires only one tempering operation, whereas it is run through the hardening furnace twice, once for each blade. Tempering 4½-lb. double-bit axes, both points at one time, the length of time any one axe was in the bath was 8 min. The tempering bath holds 26 double-blade axes, or 29 single-blade axes by the changing of the jig.

One operator is required for each furnace, working on piece work, each man turning out 1450 axes a day. Two men and the electric furnaces turn out a larger production than five heat treaters previously turned out of the fuel-fired furnaces, are not rushed as they were in the past to average a certain wage per day, and have better working conditions.

Maintenance Costs

Maintenance of the gas furnaces was amazingly small ($14.90 a month) due to the simple construction of the furnaces, and to the fact that the heat-treaters supplied most of the labor at no cost, since they were on piece work.

No expenditures for repairs to the electric furnaces have occurred to date, but the vessel of the hardening furnace will have an average life of 6000 hr. Tempering vessels have been in use for 13,000 hr. with no signs of depreciation. If a vessel costs $800 installed in the furnace, and is used 200 hr. per month, the monthly depreciation is $23.20. Two hundred eighty lb. of lead and 28 lb. of tin are used each month in the hardening bath to make up the loss of metal, which amounts to $31. One ton of granular carbon will last 9 months, and costs $50 delivered. Average monthly cost is therefore $5.60.

One barrel of special tempering salt costs $75 and lasts three weeks. This item amounts to $100 a month.

Recapitulating the total maintenance per month for the two electric furnaces is:

Vessel	$23.20
Lead	31.00
Carbon	5.60
Salt	100.00
Total	$159.80

"Slush Molding"—What It Is and How Conducted

RECENTLY an inquiry came to THE IRON AGE as to what "slush molding" of cast iron is. There is no allusion to it in the literature and questions propounded to a number of foundrymen were without results. Finally, however, an answer was obtained.

Slush molding is nothing more than the well known method of making zinc statuary applied to cast iron. When a statue is cast, the mold made with the pattern has no core. After molten zinc is poured into the mold, it is held until a coating against the walls, about ⅛ in. thick, has set. By turning the mold upside down the remaining molten zinc is poured out. This leaves a hollow statue, which is bronzed and sold for genuine.

This method can be successfully applied to cast iron, but not to aluminum. In making a kettle, for example, no core is used but the molten iron is poured into the mold, allowed to stand just long enough so that the desired thickness of metal sets against the mold surfaces, after which the still molten iron is poured out. Several kettles can be made with the remaining iron so long as it is sufficiently hot. The time allowed for hot or cold metal would be a matter of experience.

The whole process depends upon the rate of cooling of the molten metal in contact with the green sand of the mold and with comparatively cold and damp mold walls. It is also essential that the metal have a fairly wide range of temperature from the liquid to the solid state. A rich gray iron has this when high in silicon. In the case of aluminum the metal sets practically all at once and slush molding cannot be employed.

Measuring Open-Hearth Temperatures Accurately

ONE rather surprising fact in connection with gas temperatures in the open-hearth furnace, has recently been reported by A. Schack in *Stahl und Eisen*, 49 (1929), pages 1196 and 1197. This is that in five different furnaces the upper limit of temperature in the outgoing gases at the ends of the furnaces is no higher than 1610 deg. C. (2930 deg. Fahr).

Measurements were made with the "Durchflusspyrometer," a thermocouple so arranged that a stream of gas is drawn rapidly over the hot junction, thus minimizing errors due to radiation from surfaces hotter or colder than the gas.

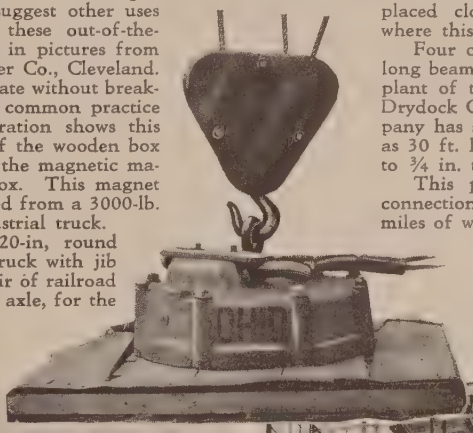
Temperatures of outgoing gases measured in this way at the top of the checkers were some 120 to 150 Fahr. hotter than those obtained with the ordinary couple. With incoming air, at the same location, the "true" temperatures were from 180 to 270 deg. Fahr. lower than those found by usual procedures.

Unusual Uses of Magnets in Handling Materials

WHILE electric magnets have for some years been standard equipment for handling scrap, pig iron and many other items of iron and steel, both in steel mills and foundries and in scrap yards, there are a number of uses to which magnets have been put in some plants which may suggest other uses to other plants. Some of these out-of-the-ordinary practices are shown in pictures from the Ohio Electric & Controller Co., Cleveland.

Picking up a box of tin plate without breaking out contents has become common practice in some plants. One illustration shows this operation wherein one side of the wooden box lies between the magnet and the magnetic material contained within the box. This magnet 18 in. in diameter is suspended from a 3000-lb. jib crane on an electric industrial truck.

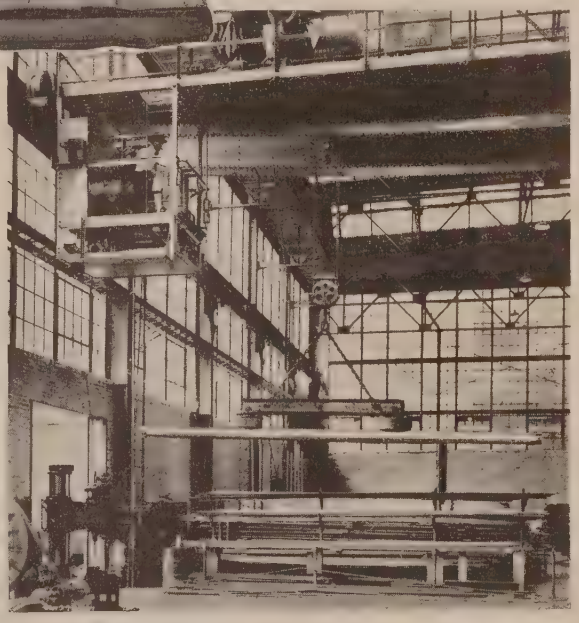
Another view shows a 20-in, round magnet, also on an electric truck with jib crane attachment, lifting a pair of railroad carwheels with the connecting axle, for the Indiana Harbor Belt Railway at Indiana Harbor, Ind.



Two small magnets (20-in.) on a spreader-beam are used for handling pipe, as shown in a third illustration. These magnets will pick up about 900 lb. of pipe in several sizes and save time and labor in so doing. Space is saved also, because the pipe racks may be placed close together, without aisle space, where this method is used.

Four of these 20-in. round magnets on a long beam are used in handling plates in the plant of the Newport News Shipbuilding & Drydock Co., Newport News, Va. The company has six such sets, taking plates as much as 30 ft. long by 8½ ft. wide, and from ⅜ to ¾ in. thick.

This particular job was undertaken in connection with machining plates to form 90 miles of water pipe 6 ft. in diameter, for use in California. There were 5145 carloads of these plates to be handled. The magnets unloaded the plates, piled them, carried them from machine to machine and finally loaded them on shipboard.



Conveyors Reduce Factory Accidents

Growth of Mechanical Transportation, However, Has Created Special Hazards from Which Workers Must Be Protected

BY W. DEAN KEEFER*

As related to industrial progress in metal-working plants, this might be called the age of conveyors, for the increased use of mechanical means of transportation has in large measure enabled the metal-working plants of the United States to make such pronounced world-wide production and efficiency records.

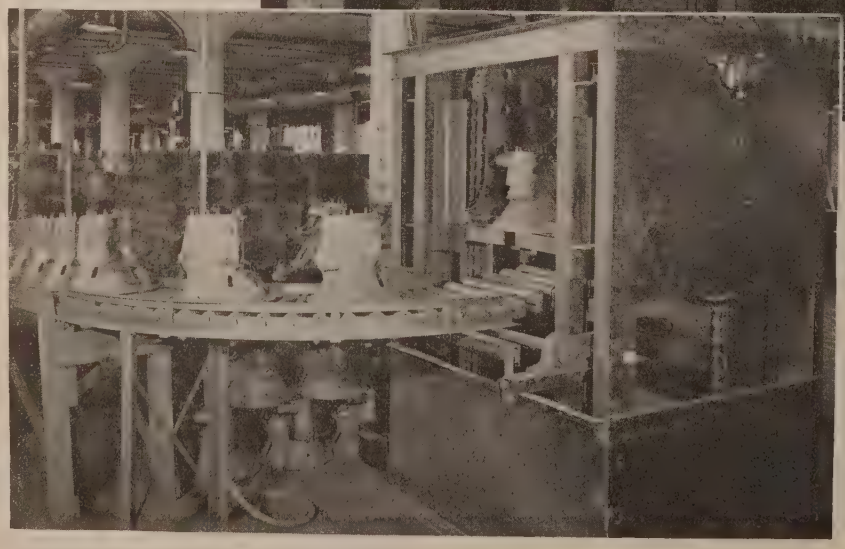
One of the most important benefits coming from the employment of conveyors is in lessening industrial accidents. Although conveyors are seldom installed wholly to prevent accidents, they usually replace hand labor, and this reduction in the working force tends to cut down the number of personal injuries because of the decreased man-hours exposure.

One reason why our modern factories have been able to effect such pronounced reductions in accidents is because of the displacement of dangerous operations by the use of conveyors. This is one form of engineering revision which has become closely associated with sound safety work. Fatigue, cluttered-up working places, congestion, irritating delays due to accidents and many other forms of industrial waste are being minimized by the engineering application of mechanical principles in handling materials.

However, mechanical conveying systems introduce special hazards which must be recognized, for the reason that accidents resulting from them are usually quite severe. A conveyor represents a mass of moving steel under the control of power. It is not surprising, therefore, that most injuries to men who become caught in conveyors are likely to be serious, probably resulting in broken arms or legs or a crushed body. For this reason no conveyor system can be considered complete until it is pro-

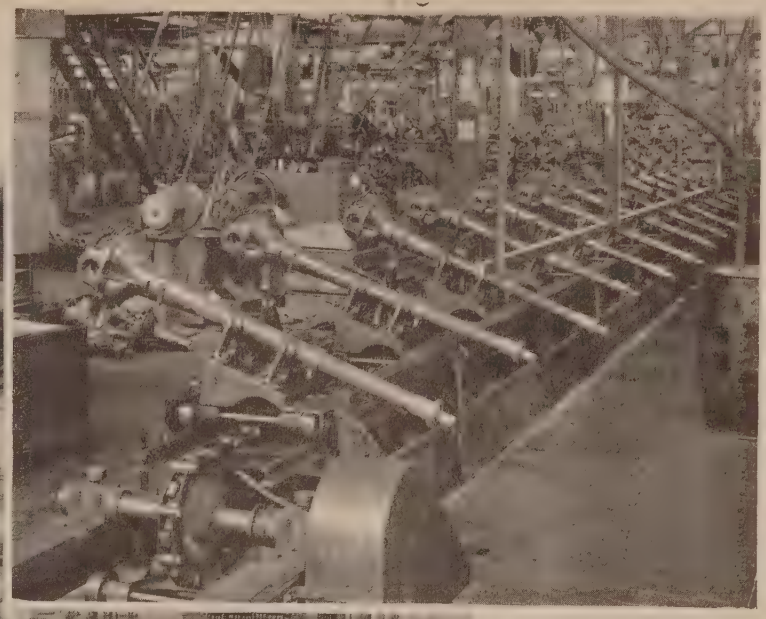
*Director, Industrial Safety Division, National Safety Council

BASKET Guards Should Be Placed Underneath Overhead Chain Conveyors to Prevent Material from Falling upon Workmen (at Right)



TRANSMISSION Cases Are Loaded On and Discharged from This Conveyor Automatically, Thereby Reducing to a Minimum the Possibility of Accidents to Employers (at Left)

RAIL Guards Protect Workmen at the Point Where This Core Conveyor in an Automobile Foundry Passes from One Floor to Another (Below)



ALONG This Chain Conveyor a Rail Guard Has Been Erected to Keep the Drive Shaft Housing from Flying Up and Possibly Hitting a Worker If the Chuck Holding the Axle Should Break or Fall (Above)

vided with every possible mechanical device for safety, to lessen such accidents and hazards.

Conveyor Hazards Discussed at Safety Meetings

Conveyor accident hazards are always important topics of discussion at regional and national safety conferences. For example, one of the outstanding addresses at the 1926 National Safety Congress was on "The Hazards of Assembly," by R. F. Thalner, safety director of the Buick Motor Co. He indicated as his experience that a large percentage of the hazards of assembly was in the use of conveyors. He listed them as hazards in transportation from machine shops to assembly plants, in sub-assembly and in main assembly. Under the latter he listed hazards with conveyor lines, chains, motive power and stop buttons. Additional hazards occurred in connection with appurtenances to conveyor lines, such as in frame-riveting, ventilation, furnaces and hammers and hazards with cables, and their inspection, lighting, stock bins for small parts, belts and gears, steaming room, painting and drying, subconveyors, hoists, pit work, punches, drifts and chisels.

Mr. Thalner is of the opinion that conveyors are probably the most efficient and safest method for transporting stock, provided the equipment is properly installed.

Conveyors which require attention only at the loading and unloading ends eliminate to the highest degree possible the human factor, because in the entire process of transportation the only help required is in feeding the conveyor and removing the stock when it has reached the assembly line. Some additional help must be employed to maintain the equipment, "but this," as Mr. Thalner states, "is usually of a higher caliber than ordinary labor and consequently can be relied upon to protect itself. Proper mechanical safeguards over gears, chains and belts, as well as a number of stop stations along the conveyor, will make this equipment almost 'fool-proof.'"

As another protection for a conveyor system, the motor equipment should be completely inclosed. This is needed not only as a safety precaution, but also to protect the system from possible damage, for shutdowns are always costly.

Repairs Should Be Made While Conveyor Is Stationary

It is a good safety rule that no adjustments or repairs of any kind on a conveyor system should be made while the conveyor is in motion. Through the use of modern pressure oiling and greasing devices, however, the oiler may be able to reach out-of-way places without special hazards. Extension pipes on oil and grease cups are also a good protective device. Automatic gravity oilers are in wide use, and a central oil reservoir or container is not only economical but removes accident hazards.

Conveyors should not be started without first giving warning to the men who may be making repairs or adjustments or oiling the machinery. Every repair man should be provided with a lock or a warning sign, which

he should put on the starting lever or control switch before starting his work on the conveyor. Rules forbidding anyone to remove a lock or a warning sign, except the person who placed it, should be rigidly enforced.

In the case of long conveyors running through two or more rooms, or in one room to points from which controls or lever cannot be seen, it is sometimes a good plan to provide a gong or a whistle to be sounded by the operator about a half minute before the machinery is started, thus giving warning to anyone who may happen to be in a position of danger.

National Conveyor Safety Code Being Formulated

The problem of protecting conveyors is considered of enough importance to demand a national conveyor safety code. Such a code is being worked out under the auspices of the American Standards Association, with the American Society of Mechanical Engineers and the National Bureau of Casualty and Surety Underwriters as sponsors. Twenty-eight groups and organizations, with 42 special representatives, are cooperating in formulating it. These organizations include the American Society of Safety Engineers, American Foundrymen's Association, American Railway Engineers Association, International Belting Conference, National Safety Council, Society of Industrial Engineers, United States Bureau of Standards, factory representatives and other like groups. Their purpose is stated as follows: "Safe operation and maintenance of gravity, belt, chain, flight, bucket, apron, screw and jigging conveyors, car hauls, aerial cableways, overhead trolleys and pneumatic tubes."

Safety in the use of conveyors is closely associated with safe practices with belts and belt guards, shafting, coupling, pulleys, gears, sprockets and chains. Hooks and chains should often be inspected. Electrical equipment also is important. There are many possible hazards in switches, through control stations, from wiring, and in points where limit stops are made.

Proper methods of securely fastening overhead carriers of different sorts are also important, and wire ropes and cables should be frequently inspected. There are special hazards at regular cross-over points of conveyors, unless protected by elevated bridges or tunnels with proper guard rails. There is always danger in the practice often seen in factories of boys and other workmen riding on certain kinds of conveyors. Such a practice should be strictly prohibited; it usually can be done by the establishment of guard rails at proper points.

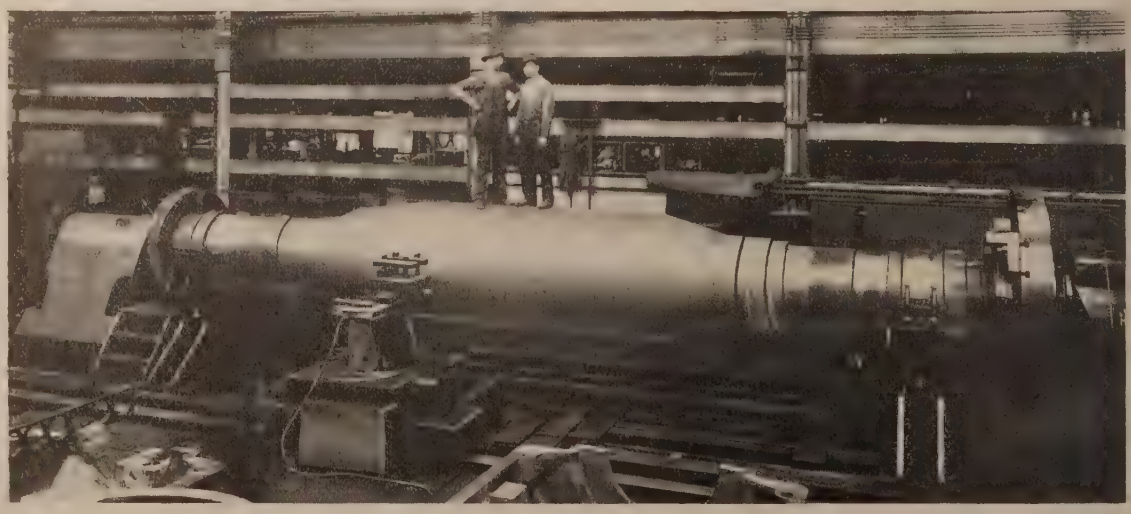
The Chevrolet Motor Co. has made novel use of one of its overhead traveling conveyors to carry safety messages. This conveyor travels slowly and safety signs are so arranged as to appear about every 5 min. at a given point. "Even a busy bee uses safety" is one of these slogans. Others are: "The safe way is the best way," "Safety ways prove safety pays," "Safety ways bring happy days," and "Today is safety day."

Many factory accidents are due to falls and therefore it is suggested that loading and discharging stations of conveyors be protected with anti-slip floor surfaces.

Overhead Conveyors Need Special Protection

The efficiency of many small plants has been greatly increased through the addition of suitable conveyors, many of which are of the overhead type. These conveyors demand special protection with nets or flooring underneath them. Where there is such overhead flooring there should always be foot-boards, guard-rails, and the like, to prevent material from falling.

Extension of conveyors from one floor to another has introduced a special fire hazard, permitting a fire, unless there is proper protection, to spread quickly between floors. Two methods have been devised to eliminate this hazard—one to inclose the chute in a tower of steel, concrete or masonry and the other to provide fire doors (draft checks) where the chute passes through the floors.



THE shaft shown in the accompanying illustration weighs 140,000 lb., with a maximum finished diameter of 53 in. and an overall length of 32 ft., and is thought to be one of the largest ever built. It was forged by the Midvale Co., Nicetown, Philadelphia, from an octagonal ingot about 82 in. in diameter and weighing 290,000 lb., and was machined in the shops of the Westinghouse Electric & Mfg. Co., East Pittsburgh. It is designed to be supported with the rotor on two large bearings, 30 in. in diameter and 60 in. long. The shaft will be used in the rotating part of a 60,000-kva. 514-r.p.m. horizontal generator in the Westinghouse company's test laboratory.

Possibilities of High-Test Cast Iron

Need of Classification and Proper Test Bars— Use of Alloys and Special Melting Processes

HIGH-STRENGTH cast irons offer possibilities to the gray iron foundryman not only to increase his field of operations but also to regain some of the types of work now being placed in other iron and steel groups. An essential point to be remembered is that, in the present condition of development of high-strength cast iron, this material is still in the experimental stage, and, further, as it develops, it will be necessary to classify or grade cast irons according to their merits, said E. J. Lowry, consulting metallurgist, Detroit, in a paper, "High-Strength Cast Irons," presented at the National Metal Congress, Cleveland, in September.

European investigators have perhaps been more forward in the development of this material than our own research and production men, said the author. This no doubt is due to the fact that American foundrymen are faced with the problem of mass production, whereas in Europe more time can be given to technical developments of processes surrounding the production of cast iron of new physical properties.

Various Types Should Be Classified

When one considers the nomenclature, "high-test cast iron," it is apparent that the cast iron industry has not taken full recognition of the possibilities existing in the industry. Instead of departing from empirical standards, it is continuing in the same vein. It is essential that the varying types of cast iron be properly classified. This is apparent when one considers the trade name "semi-steel." This term will allow a foundryman to make his product with as low as 1 per cent of steel in his mixture and as high as 100 per cent steel melted in his cupola. This cannot be taken as a condemnation of the product, but merely shows the latitude with which this kind of cast iron may be made.

Another illustration is afforded by the case of alloyed cast irons. In this instance claims may be made where alloys are used but no full percentage is given. It must be admitted that it would not be an easy task to classify cast irons under such methods as the S.A.E. uses in designating various types of steel for definite uses, for cast irons are more complicated in their structure, physical and chemical analyses than are steels. If, however, the engineer is to be enlightened, cast irons must be categorically named for him with subsequent listing of what might be expected in cast irons in these classes.

Quite often the engineer is guided solely by text books with an exception here and there of actual experience. It is often the case that data in text books are based on assumptions of strength obtained under varying circumstances 20 years ago. They further are based on inaccurate determinations in comparison with those made today. It is quite usual that engineering text books quote the tensile strength of cast iron as a maximum of 14,000 lb., and more usually at 12,000 lb. per sq. in. Such physical properties are ridiculous on their face value unless the specimens were cut from 2½-in. sections made from analyses of too soft a chemical composition. As an instance, keeping the section the same and using a different silicon analysis, the strength may be dropped from the range of 25,000 to 13,000 lb., when the silicon is raised from 0.75 to 2.25 per cent. It is obviously quite wrong to judge cast iron at a 14,000-lb. strength when by ordinary practice 25,000 lb. can be readily obtained.

Test Bar Needed Which Can Be Correlated

Test bars mean very little under their present acceptance. Their use is limited to comparisons for the physicals obtained by varying the analyses and the irons used in mixtures. They cannot be used to mean the actual strength of a casting. This leads to doubt by the engineer. Therefore, there is an immediate necessity for the development of a test bar which may easily be correlated to the physical properties of a casting. When this is accomplished it will be easier to understand the action of new processes developed.

Production of high-strength cast iron by the use of alloys has long been known, but to produce strengths of 60,000 to 65,000 lb. per sq. in. has led to the use of special melting processes with the subsequent addition of alloys. Such methods have not generally been accepted by foundrymen. It must be realized that a change of method requires courage, whereas a simple method of introduction of alloys could be generally accepted. Any change in the method of melting requires a revising of the usual production processes.

It has been generally thought that alloys may be introduced into inferior irons with the resulting effect that high-strength cast irons will be produced. Such is not the case. Alloys act merely as an aid to the betterment of a condition. When alloys are properly used in connection with correct section and analyses, it becomes a fairly easy matter to produce high strength without special processes. This means that when a foundryman has adjusted mixtures, he can use regular cupola metal and, with the addition of one of the known alloys, increase his average strength from 28,000 lb. to 45,000 lb., and even as high as 65,000 lb. per sq. in. The known alloys are nickel, chromium, molybdenum, vanadium and titanium.

Special Melting Processes

Too little attention has been paid to methods of procedure and basically so because of the apparent initial cost. When, however, one considers the use of special melting processes, plus the use of alloys, in comparison to a combination of alloys with regular iron, the resulting costs are apparently the same. It is easier to work with the latter method than to apply the former in production foundry work.

There are still further possibilities in the production of high-strength iron when the question of annealing is considered. A process may allow a casting to be made harder and stronger. By proper annealing the hardness and strength are little affected and yet the machinability is increased to the point of the lower strength, softer cast iron. Continued experiments with varying analyses and later heat treatments offer great possibilities for the production of high-strength cast iron.

World's Largest Nitriding Furnace

Over Two Tons Can Be Treated with Ammonia Gas—Products 11 Feet Long Hardened in It

AMONG recent developments in the process of hardening steel with ammonia gas or nitriding is the construction by the Central Alloy Steel Corporation, at its Canton, Ohio, plant, of what is said to be the largest nitriding furnace in the world.

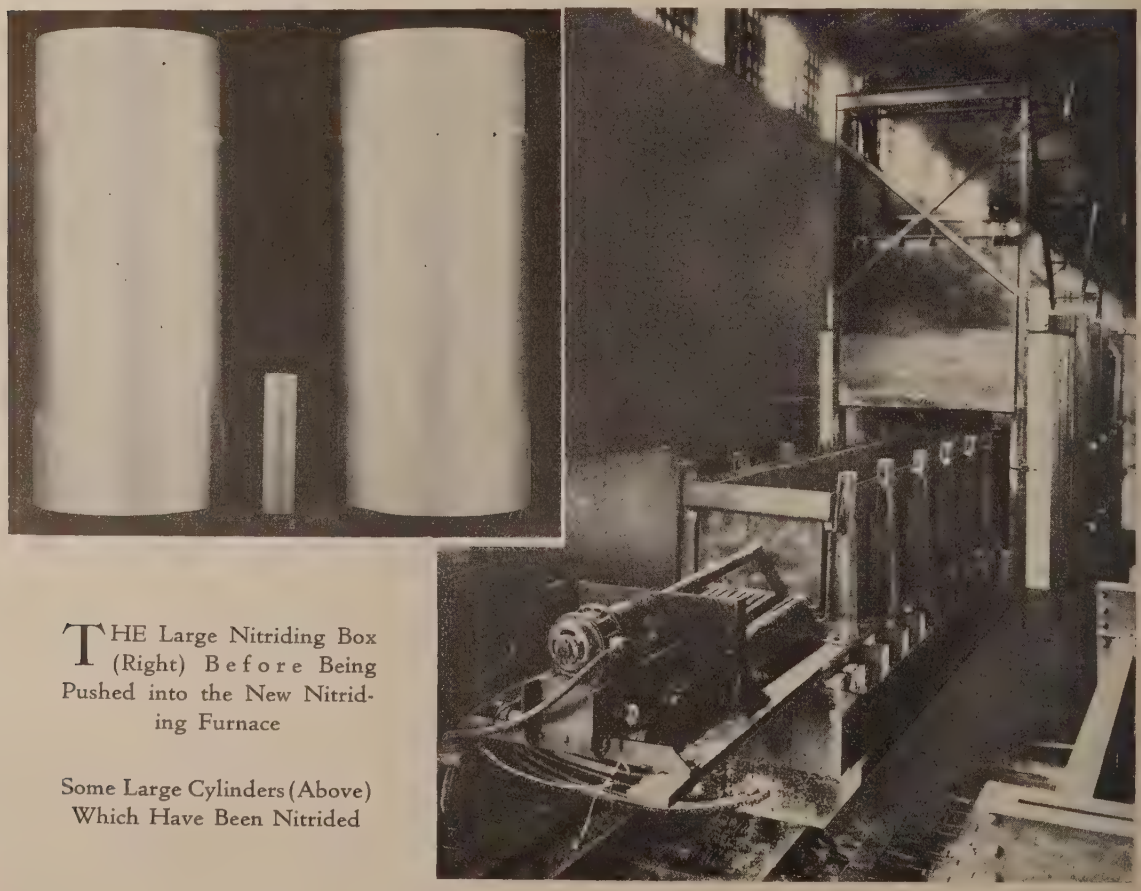
The plant was built for nitriding large parts. It is a 580-kw. double-end car-type furnace. The heat control is separated into three sections—the two ends and the middle, the heating elements being located in the bottom and at the sides. The furnace is designed for operation at temperatures up to 1800 deg. Fahr. to permit its use as a quenching and drawing furnace as well as for nitriding.

The furnace is 26 ft. long between doors, with an effective length of 24 ft. It is 5 ft. 9 in. wide and has a loading clearance of 4 ft. 8½ in. The nitriding box is 22 ft. long, 34 in. wide and 30 in. high. It is mounted on an 8-wheel motor-driven car.

The nitriding box is of welded construction, the joints necessarily being gas tight. It is made of KA2 stainless iron sheets. The cover is sealed by tin, lead and bismuth, metals that melt at low temperatures. A platform of three 1½ x 4-in. strips running lengthwise is built up in the bottom of the box to support the material being nitrided, as it is necessary to have the work well supported to avoid warpage. Other strips, ¾ x 4 in., are placed across the longitudinal strips, which are of plain carbon steel.

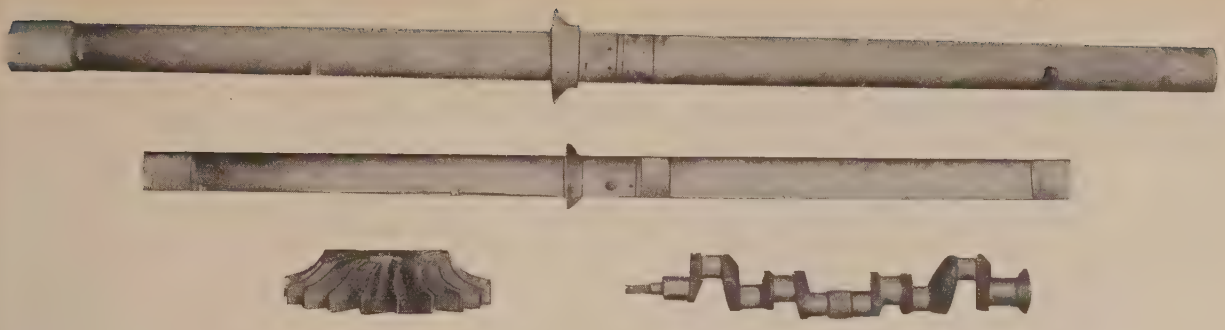
The box rests on cast steel cradles which are bolted to steel slabs extending lengthwise. The slabs rest on sand covered bricks that are laid on the car platform, the sand taking care of the difference in expansion between the brick and the slabs when the box is being heated.

Ammonia is delivered from five tanks to a bustle pipe and from that to two outlets, one for connection to the box when it is outside and the other for connection when it is inside the furnace. Connection from these outlets to the box is through heavy rubber tubing that connects to a bustle pipe. This pipe feeds five ½-in. tubes made of KA2 tubing that serve as inlets. These pipes extend through the end of the box in the bottom of the box and are of different lengths, their discharge ends being 4 ft. apart permitting the distribution of the gas through the



THE Large Nitriding Box (Right) Before Being Pushed into the New Nitriding Furnace

Some Large Cylinders (Above) Which Have Been Nitrided



Some Large Sections Which Have Been Nitrided. The two upper products are large piston rods for a gas engine. An impeller and a crankshaft are the other two products

box. Three 1-in. outlets provide sufficient outlet for the gases leaving the box and to take care of the back pressure. These outlets connect with a bustle pipe and from this the gas mixture passes into three other outlets which feed into water bubblers. The extent of the ammonia dissociation is determined at the outlet before the gas enters the water bubblers.

A feature that is unusual is a fan located in the box to insure the circulation of gas through the work. This is direct driven by a motor mounted on the car and connected to a shaft running through a tube into the box. Because of the high temperature, the bearings supporting the fan cannot be lubricated.

A combination of steels of extreme hardness, heat-resisting and non-corrosive, all working in a loose fit, is used to take the place of lubricated bearings. The driving shaft is of Enduro-KA2 steel. The sleeve is of nitralloy and the bushing of a heat-resisting alloy. The temperature control is by pyrometers in the roof of the furnace. For checking purposes there are also two pyrometers in the nitriding box.

The work is cleaned before it is placed in the box, making it as free from scale as possible. Then the lid is placed on with a crane and the car runs into the furnace under its own power, the end of the car carrying the motor remaining outside the furnace. When the car is in the proper position in the furnace the open end of the furnace is bricked up before the heat is turned on.

The nitriding temperature in 975 deg. Fahr. Work is kept in the furnace from 50 to 90 hr. Ammonia is introduced when the seal melts or at about 300 deg. Fahr. causing the cover to seat. It takes from one hour to 90 min. to drive out the air after the box is sealed and 5 to 6 hr. for the furnace to reach temperature. After the heat is turned off the work is allowed to cool down to about 800 deg. before being taken from the furnace. After the car is taken out, the parts are allowed to cool to about 300 deg. before the lid is taken off the container. The work comes out with a silver white finish.

The largest furnace charge to be nitrided so far is 2 tons. However, it is expected that the furnace would work satisfactorily with a larger amount of work in the box at one time. Work that has been nitrided in this furnace includes a shaft 11 ft. long and 6 in. in diameter, locomotive cross head guides, crank shafts for motor buses and piston rods and piston pins for gas engines. The maximum depth of case is 0.035 in.

The nitriding box, car and auxiliary equipment were built in the Central Alloy plant. The furnace was built by the Electric Furnace Co., Salem, Ohio.

Failures in the Brazing of Steel

TWO general methods for joining thin-walled steel tubes are in use, according to W. Riede in *Stahl und Eisen*, 49 (1929), pages 1161 and 1162. These are the torch-brazing process and the dipping process. Objection to the first is mainly on the ground that the flame melts the steel, while the second, although entailing a certain amount of extra finishing labor, appears more rational and with the exercise of care, will give uniform results.

In the dipping process, however, cracks appear in that part of the steel which has been exposed to the brass. This appearance is quite the general rule, but may be diminished by suitable aging and heat treatment.

As a result of experimentation, the following explanation is offered: Steels, which have been subjected to severe cold work, tend to recrystallize strongly when subjected to the heat of the brazing liquid. Internal stresses thus set up, accompanied by penetration of the brass between the large newly-formed grains, are the cause of the cracks.

It is recommended that the brass be kept below 1100 deg. C. In order to detect the intrusion of brass into the intercrystalline spaces a polished section is etched 3 min. in ammonium hydroxide; this shows the brass as a deep block. The grain boundaries are then brought out in the usual way with a 2 per cent solution of alcoholic nitric acid.

Much Nickel Used in Radio Tubes

ADVANTAGES of nickel for screens and plates in the screen grid tubes or other radiotrons are enumerated by C. C. Colby, Westinghouse Lamp Co., Bloomfield, N. J., writing for *Inco*, Vol. IX, No. 2. It is pliable, and the mesh can be readily formed into any shape desired; it is easily cleaned by baking in a hydrogen atmosphere, and is relatively immune to tarnishing on standing or handling; it can be readily spot-welded to other nickel parts; it has a relatively high melting point and it can be secured in a pure state at a reasonable cost.

The use of nickel mesh is restricted to the outer element of the tube for several reasons. The two grids within the plate are of comparatively small diameter, must be accurate in diameter, and if made of mesh would have to be of very open weave. Under these conditions, a more satisfactory grid can be manufactured using a spirally-wound wire than using woven mesh. In order to obtain satisfactory operation, the plate of the tube would have to be of very fine woven material if mesh were used; because of the difficulty and cost of weaving such fine mesh, solid nickel strip is still used for the plate.

In general, it may be said that every metal part within the glass bulb of the radiotron either consists of nickel, contains nickel as an alloying material, or is mounted upon nickel supports.

Efficient Wire Enameling Unit

Vertical Electric Tube Furnace, with Efficient Feed Mechanism and Temperature Control, Speeds Output and Improves Quality of Finished Wire

BY CHRISTIAN E. RUGH, JR.*

PRIME considerations in the enameling of wire is either to produce a satisfactory coating with decreased production costs or to apply a superior coating at the same cost. To achieve both of these objectives at the same time has been found commercially practical with the electric oven.

An extreme variation in varnishes and enameling procedure makes a fair comparison of different types of ovens a difficult matter. In comparative tests on two ovens, one gas and one electric, the results were judged solely upon the ability of each method to produce wire that would pass rigid inspection. A varnish that was considered satisfactory in a gas oven was used for both runs. Adjustment of temperature, speed of wire and ventilation were determined for each oven separately in order to produce a high quality of finish on the wire.

The type of electric oven used in these tests is the subject of the accompanying pictures, although the oven illustrated has 50 per cent more capacity than the oven actually used for the test. The ovens have an overall height of 22 ft. Take-off mechanisms and feeder spool racks are attached to both sides of the oven. The method of dipping the wire in the enamel is also shown.

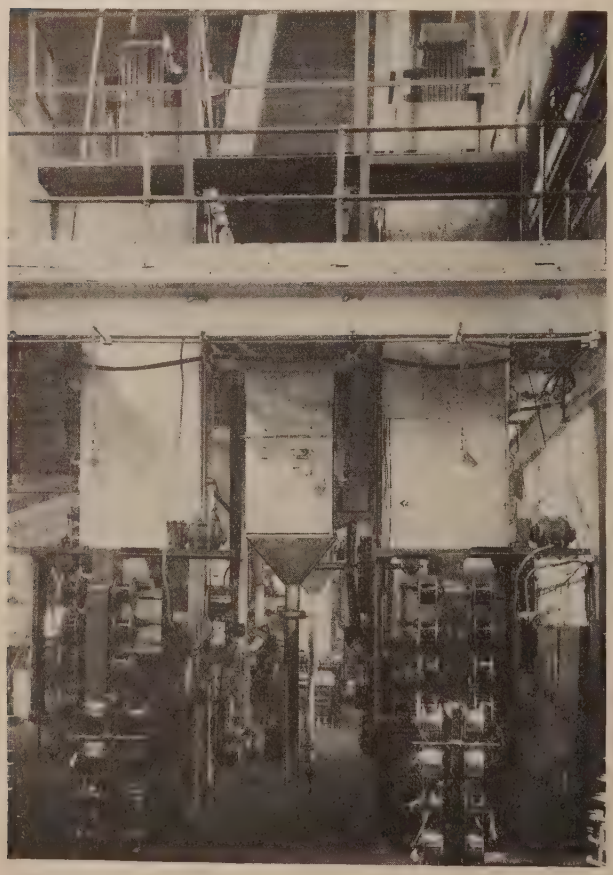
Table I shows the result of the experiment conducted on the two different types of ovens. The same size wire was run in both cases and it was taken at random from factory stocks.

Gas used in the test was 550 B.t.u. gas and the purchase price was 80c. per 1000 cu. ft. Electricity was purchased at 1c. per kwhr. Taking into consideration the increased speed that could be obtained in the electric oven, the cost comparison becomes 0.445c. per 1000 ft. of finished wire in the electric oven as against 0.815c. per 1000 ft. of finished wire in the gas oven.

On another occasion and in a different plant, a comparative test on 28.5-mil copper wire run at a speed of 22 ft. per min. showed the results given in Table II.

Gas in the above case cost 72c. per 1000 cu. ft. and the

*Industrial Heating Engineering Department, General Electric Co.



ELECTRICALLY Heated Vertical Ovens for Enameling Wire (at Left)

* * * * *

WIRE from Spools Passes Under Grooved Sheaves Which Dip into Liquid Varnish. More than one coat may be given by looping the wire back outside the furnace and around this sheave as many times as desirable (Below)

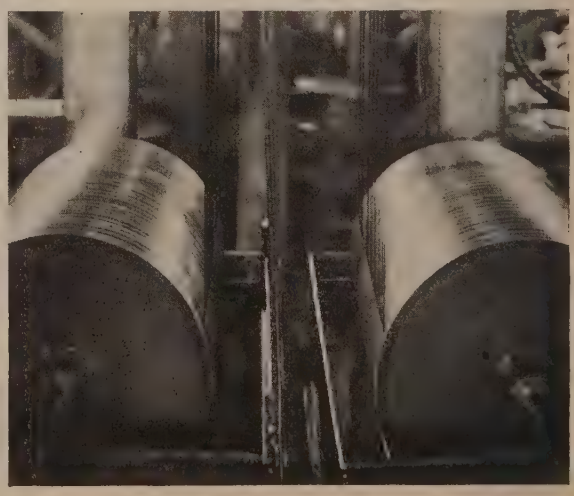
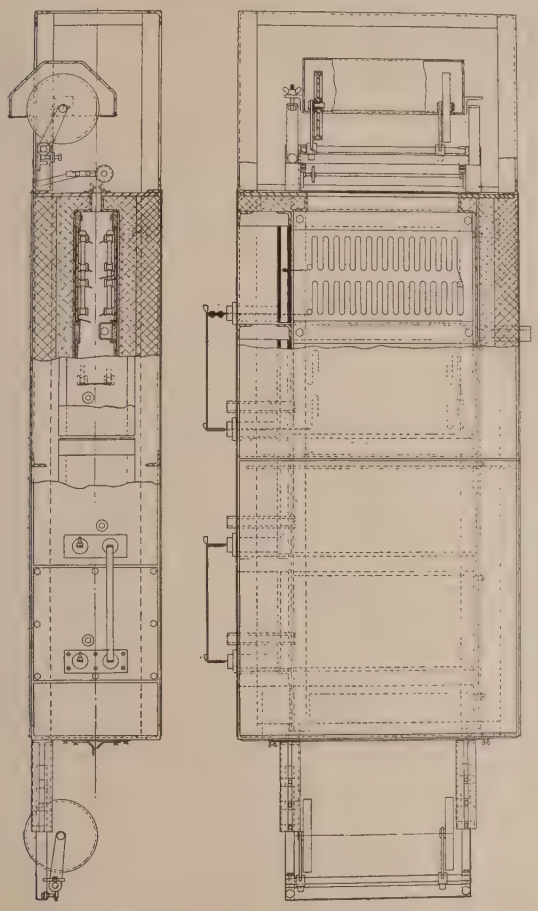


Table I.—Comparative Production of Electric and Gas Ovens

Oven	Bare Wire Dia. in Mils	Insulation Limits in Mils	Speed in Ft. per Min.	Fuel Consumption per Hour	Fuel Cost per Hr. in Cents
Electric	25.5	1.2 to 2.1	25	8 kwh.	8.00
Gas	25.5	1.2 to 2.1	22	160 cu. ft.	12.80

In both cases, the number of wires through oven was 48; the number of dips, 4, and the number of heads, 12.



VERTICAL Oven Is a Narrow Rectangular Slot Through Which Wires Are Threaded. Air circulation for oxidizing the varnish and carrying heat from resistors to wires is insured by baffles on inside walls (not shown)

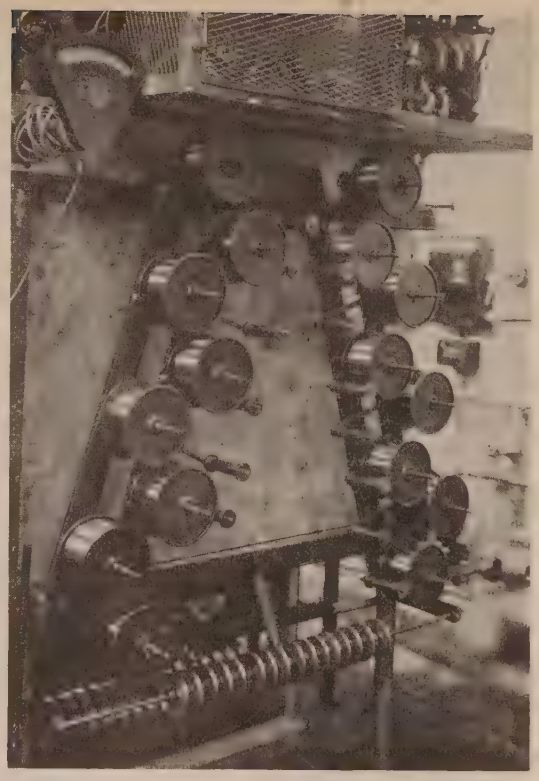
electric rate was 1¼c. per kwhr. The electric load was so desirable that a rate of ¾c. per kwhr. was made for complete electrification of the enameling plant. This lowered rate figured to a net saving of $500 per oven per year on fuel alone.

The characteristic design of an electric wire enameling oven shows that the wire is fed from spools arranged on a suitable rack mounted to the back of the oven. To

Table II.—Comparative Cost of Insulating Copper Wire

Oven	Bare Wire Dia. in Mils	Insulation Limits in Mils	Speed in Ft. per Min.	Fuel Consumption per Hour	Fuel Cost per Hr. in Cents
Electric	28.5	2.6 to 4.4	22	6.8 kwh.	8.54
Gas	28.5	2.6 to 4.4	22	178 cu. ft.	12.80

Number of dips, 8; number of heads, 6; wires through oven, 48.



ARRANGEMENT of Feeder Spool Rack and Control Panel Is Compact

SECTIONAL Construction of Electrically Heated Wire Enameling Ovens. Skeleton framework shown at center; unit heating plates and refractory walls installed at left; completely cased oven at right

anneal the finer sizes of hard drawn copper, the wire is passed under small guide sheaves and up through the oven without being dipped in enamel. The wire then passes down the front of the oven to a sheave having four grooves and dipping into the enamel. In going through the enamel, the wire picks up a thin film that flows out evenly as the wire passes into the oven. The wire is looped up and down in this manner four times and gets as many separately baked coats of enamel, of required total insulation thickness.

The distance of both bottom and top sheaves from the oven can be varied. The bottom sheave must be placed so that the enamel will flow out smoothly along the wire before reaching the heated chamber. The top must be far enough away to allow the enamel to thoroughly cool and harden before being run over the sheave.

Heating units are made of high heat resisting alloy and are so shaped as to give very efficient heat transfer to the air. Units are mounted on metal plates, suitably insulated as shown, and are removable through the side of the oven making the entire heating chamber accessible.

Quality of product is much improved by use of the electric oven. In one enameling plant the old standards required the wire to be bent around a mandrel four times the diameter of the wire without cracking the varnish coat. The specifications now call for the same test around a mandrel three times the wire diameter. It is not uncommon to take samples of electrically enameled wire from production spools and bend them around their own diameters without noticeable cracking.

A similar inprovement was found in the continuity of the varnish film on the wire. Standard requirements call for not more than 15 breaks per 100 ft. when an electric potential is placed between the wire and a mercury bath through which the wire is run. (Voltage varies with the size of wire.) Long-production runs have shown that electrically enameled wire consistently runs less than 10 breaks per 100 ft.

Other standard tests such as dielectric strength, hardness of enamel, flexibility, oil immersion and thickness showed the electrically enameled wire to run regularly well within the limits established under other methods of enameling. Reasons for these exceptional economies can be traced directly to the inherent characteristics of electric furnaces and ovens of sound design. The design is the result of extensive experience in adapting electricity to industrial heating problems.

The compact arrangement that may be effected with the electric wire enameling oven is obvious from the various illustrations. The base plate covers 12 sq. ft. and up to the height of an average man there is no overhang. The projected floor space occupied by the oven, pick-up mechanism, feeder spool rack, oven control panel, transformers and vapor condenser is 20 sq. ft.

Heat regulation is of particular importance and the arrangement of heating units compensates for losses at the points where they occur. Thus the temperature distribution within the oven is remarkably uniform. The design of heating units can also be such as to increase the temperature along the height of the oven at almost any desired rate and hold it constant at any set value. For such purposes a "high-low" power control has definite advantages. The high heat is adjusted to supply slightly more than the normal power requirements and the low heat, to supply slightly less. Any changes in temperature then take place very slowly, enabling the control instrument to function with a very slight lag behind the actual temperature change, and makes it unlikely that the temperature at other points than the control pyrometer will vary from the limits set upon the controlling device.

Coincident with the baking process, the varnish oxidizes, i.e., undergoes a chemical change. The importance of this phase of the operation emphasizes the advantages of the electric oven quite clearly. The electric oven converts power to heat with no gases of combustion. Tests on exhaust gases show no CO_2 or CO from electric ovens while exhaust gas from gas ovens showed 4 to 5 per cent CO_2, with a trace of CO, and a reduced percentage of oxygen by this amount. It is possible to control the ventilation and admission of air in the electric oven to an extent impractical in ovens using fuels.

The oxidizing process is not hindered in the electric oven but is aided by the fact that fresh air is constantly surrounding the wire at all points. To further assist the complete chemical change in the wire coating, the air is repeatedly forced across the wires as they pass up, through the oven. Continuous motion of the air is insured by placing baffles on the sides of the oven. These baffles, while they in no way obstruct the operator in stringing the wires, act in a two-fold manner. They cause the necessary air to be forced into intimate contact with the wire, as mentioned before. Since practically all of the heat is obtained by convection currents of air, the baffles cause the heated air to flow to the line of the wire, and in this manner the two requisites of baking varnish—heat transfer and oxidation—are carried on simultaneously.

Centrifugal Casting of Guns

EXPERIMENTAL work on centrifugal casting of guns leads to the belief that the process has been satisfactorily established for the 37-mm. gun, the 75-mm. infantry mortar and the 75-mm. howitzer, says Major-General C. C. Williams, chief of ordnance, United States Army. A larger casting machine for production of the 75-mm. field gun, the 105-mm. howitzer and the 3-in. anti-aircraft gun is under construction, it appears, and will soon be in operation.

General Williams discussed the subject at a meeting of the Army Ordnance Association, Oct. 10. Approximately three mobile guns, he said, can be cast from the amount of molten metal that has heretofore been required for one built-up gun made from forgings. It is estimated, he added, that a gun can be cast and cold worked in approximately one-third the time and at about one-half the cost of built-up guns forged from ingots.

The physical properties obtained from centrifugal castings after treatment are better, he asserted, than obtained from forgings of the same composition. "The metal generally is exceedingly ductile and in this respect appears to be superior to that of forgings of the same composition. . . . Also the carbon is thrown toward the center in a gradual change so that, for example, in the 75-mm. pack howitzer, the carbon may be 20 to 25 points higher at the bore than at the outside. This gives greater strength at the bore where high elastic limit is needed and a correspondingly ductile outside wall. Segregations of other elements, although not so pronounced, behave generally like the carbon."

The frame work of the doors of the Goodyear-Zeppelin Corporation's airship factory and dock at Akron, Ohio, as well as that of the building proper, were manufactured and are being erected by the American Bridge Co., although the fact was not made clear in the illustrated descriptive article on the subject appearing in THE IRON AGE of Oct. 3.

Trade Association Is a Necessity

Group Effort Is Talisman of Successful Business—Sound Competitive Conditions and Expanded Markets Unobtainable Without Cooperation

BY CHARLES N. FITTS

WE are in the throes of economic forces which are steering us to new fields of endeavor, new opportunities of service, wider outlook and a greater spirit of industrial cooperation. Coincident with the narrowing margin of profit and the intensive cultivation of markets, we find business executives helplessly carried along with the tide. It is not to be wondered at that they are discovering that unless they are willing to cooperate with their competitors across the way, harmonize with other independent units in the industry, they will soon be swept aside, driven into a court of bankruptcy or swallowed up in another merger.

Business Individualism Invites Competition

The growth of the cooperative movement is something unprecedented. The Department of Commerce estimates that there are 13,000 trade associations and organizations in the United States, of which some 2000 are national in scope. This is more than six times as many as were operating 15 years ago.

In staid New England, where we have for generations believed and practised individual rights and maintained the most rigid spirit of aloofness, we are just emerging from a serious industrial slump. This depression, I believe, was due entirely to our tardiness in appreciating this newer trend in industry, which has fostered a widespread tendency toward cooperation in all sections of the United States. Once recognizing that, however, New England is rapidly forging ahead in profiting from cooperative effort.

Business individualism invites outside competition. Better organized industries from other sections of the country come in and take away from local firms the business that belongs to them by right of territorial location. That has happened in every backward section of the country. Of course, this is a sad situation, but there is a way to profit from it. We realize that if we would successfully combat these newer forces in business we must cooperate one with another. We must join together in trade associations, we must foster our cooperative tactics, forget our dignity and help each other to fight for that business which is rightfully ours.

CHARLES N. FITTS, of the New England Structural Steel Co., and President, American Institute of Steel Construction

Cooperation Does Not Mean Price Fixing

Through cooperation, competitive business units do not expect any longer to frustrate the spirit of the anti-trust laws. Efforts to fix prices or to restrain trade are foreign to their thought, and purely selfish interests are lacking to a far greater degree than the public would be led to believe. But because competitive units may not agree upon prices or divisions of markets is not denying that there is tangible profit in cooperative endeavors which are legal and ethical.

As a matter of fact the courts have decreed that trade statistics, upon which good business judgment can be based, may be gathered through cooperative effort and may be disseminated by a trade association. We can measure our markets and our stocks, even though we may not mutually determine prices. We may jointly develop new markets for our product, conduct research, advertise, hold patents, review legislative enactments and bills, petition Congress and jointly agitate for equable rates and tariff protection.

It is not strange, therefore, that we today witness trade associations of various sizes and of various kinds. The American Bicycle Manufacturers' Association has a present membership of six, while the American Bankers' Association has 21,000 members. Some are more concerned in the elimination of waste in marketing, whereas others are more concerned with excess plant capacity.

Never before in our history, the Department of Commerce has noted in its latest report on trade associations, has there been such a general willingness on the part of individuals and private organizations to unite in working for the constructive upbuilding of our commerce and industry through greater efficiency of each group of related interests. The exchange of ideas and knowledge among competitors, which would have been considered commercial suicide at the beginning of the present century, is now deemed mutually beneficial and constructive—a distinct contribution to higher business ethics.

Steel Industry Cultivating Consumer Markets

Take the steel industry, with which I am better acquainted, as an example. We have the American Iron and Steel Institute, a parent group of the steel mills, concerned primarily with the collection and dissemination of statistical information. There are some other branches of the hot steel industry organized, and a few of these, notably the Flat Rolled Steel Manufacturers, are actively engaged in market development upon a broad scale by research and advertising. In conjunction therewith we have numerous organizations of the fabricators of products from steel. The members of these organizations are really consumers of the output of the mills, but they also—like the American Institute of Steel Construction—are interested in promoting consumer markets for steel products.

In some ways the steel industry is supplied better with organized effort than others; yet I must confess there is much room for improvement. We are able to maintain active organizations in this industry because the out-

standing leaders are fully aware of the practical results that can be achieved. James A. Farrell, president of the United States Steel Corporation, in a speech the other day, said: "Any efforts designed to promote new uses of steel products or to expand their present usage, to assist both the manufacturing and consuming trade to a better understanding of the problems of initial manufacture and remanufacture, are worthwhile."

Promotional Efforts Must Be Honest

We, in the steel industry, look to Mr. Farrell as a leader, for we realize that few men in the business know so much about steel as he does. That is probably pretty generally acknowledged also outside the steel industry. In view of that fact I want to call attention to some remarks made by Mr. Farrell before the Flat Rolled Steel Manufacturers which escaped the attention of most of the newspaper editors of the country. These remarks should be carefully studied. He said:

> Remedies for any ills affecting our business are in our own hands. For instance, the orgy of excessive claims for the superiority of products differing but slightly, if at all, from those of other manufacturers, has assumed fantastic proportions. It incites competitive and expensive effort along similar lines by all competitors, with a mass of assertions and refutations which in the end merely serve to confuse the mind of the buyer or promote harmful conflict among manufacturers.
>
> If this is intended to be a challenge as to the lengthiest pocketbook in advertising achievement and promotional publicity, the challenge will, of course, be met by the interests who naturally resent insinuations as to the superiority of competitive product or the inferiority of their own.
>
> It is in effect a form of salesmanship universally abhorred, of decrying the wares of a competitor, or vaunting unfounded or unprovable claims of excellence of products whose chief merit may be in the assumption of a peculiar or meaningless name.

Many businesses have been ruined by the circus antics of competitors. Many an industrial reputation has been blackened by slander. Competent trade organizations are putting an end to such shameful tactics and we are beginning to realize that there is profit to us individually to bring them to an end. Structural steel is not alone in having suffered through unwarranted attacks by competition, or the unwarranted claims of superiority of other materials. Cotton, brass, coal and many other industries have been similarly deeply and unjustifiably injured.

False Claims Stopped by Ethical Codes

Of course, not all trade organizations came into existence merely to offset the inroads of competitive industries. Yet most of them have profited by the experiences of those that did. And the result is today we have established a code of ethics for competition, very largely put an end to false claims of salesmen, and stopped the circus antics of advertising and publicity.

An industry may gain a temporary advantage through leading the public into accepting a false estimate of its superiority. But that advantage is not long-lived, and the reaction is much more severe than were the gains previous thereto. The more truth we can put into our advertising and publicity, the more stability will we give our industry. Better business bureaus have sprung into being in every commercial city in the United States. They would have been impossible had not industries organized and through cooperative effort attained a better education of their duties and their obligations. The impetus this work has been given will carry the standards of ethical trading far beyond anything we can conceive of today.

> "WE can measure our markets and our stocks, even though we may not mutually determine prices.
>
> "We may jointly develop new markets for our product, conduct research, advertise, hold patents, review legislative enactments and bills, petition Congress and jointly agitate for equable rates and tariff protection."

The gold rivet story of the steel erector is a relic of the wooden nutmeg days. It has been a favorite with the press agent to commemorate an important structural job by saying a gold rivet was driven, whereas the facts were exactly contrary. Gold is too soft; it could not be used as a rivet. What actually occurs is that a regular steel rivet is gilded and displayed for the advertising satisfaction it affords. It is a harmless fake and probably the public cares little about it. But it is a successful fake palmed off on newpaper editors and should be stopped. Harmless as it may be to the public, it is injurious to the individuals in the industry, for it tends to encourage them to indulge in falsehoods in other regards.

New Business World in the Making

In days gone by it may have been possible to sell wooden nutmegs with impunity, but that was before the time of cooperative efforts on the part of trade associations. "Through group effort of business men," the Union Trust Co., Cleveland, recently declared in a published advertisement, "a new business world is in the making."

Trade relations and arbitration in commercial disputes are tending to do away with trade abuses and unethical practices. "For business success," the Equitable Trust Co. of New York stated in a paid advertisement, "a man must look beyond the confines of his immediate problems and keep abreast of his whole industry."

The majority of business executives are alive to the situation and appreciate the tendencies of the times. Even though they may happen to be so blind as to deny the practical benefits of cooperative effort, they cannot overlook the attitude of their bankers toward organization work. Every industrial unit is dependent upon his banker for capital and current cash. He would keep his credit impeccable. But it is difficult to do so and not join his trade association.

Wall Street has been engaged in some large financial operations in recent years. Stock listings on the "big board" have doubled since the war, and most of this represents new issues. I seriously doubt whether industrial units could have been accommodated so easily had the old days of ruthless competition and stiff-backed individualism continued. I doubt whether the public would have advanced its money to capitalize industries which refused to join in cooperative efforts calculated to promote better business conditions.

Trade association membership is really a talisman of a modern successful business.

"Lack of Responsibility Jeopardizes Scrap Trade"

The problem of costs in handling scrap iron and steel was discussed at the dinner meeting of the St. Louis chapter of the Institute of Scrap Iron and Steel, at the Lennox Hotel, St. Louis, Oct. 9. B. P. Williams, of Hickman, Williams & Co., president of the chapter, presided.

"At the bottom of many of the difficulties of the industry is a lack of responsibility," declared Benjamin Schwartz, director general of the institute. "The dealer who scrambles for scrap with the idea of showing a tonnage record, and without consideration to costs or profit, is not only injuring himself, but is engaging in unfair competition and is endangering the future of the industry. The dealer who 'doctors' hydraulic bundles or cars of scrap is not only eliminating himself, but is putting a stigma on the rest of the trade, and is menacing legitimate markets of others. The dealer who, through lack of interest or carelessness, allows accidents to occur in his yard, which could be prevented, is not only increasing his own cost of compensation insurance, but is hurting the rest of the trade, because that preventable accident is marked up against the industry in his State, with a certain increase in the basic rate for all the dealers.

"This lack of responsibility is at the root of many of the troubles in the scrap iron industry. If it is at all within the power of the printed and spoken word, the institute intends to organize a public opinion within the industry that will have to be reckoned with by every dealer who has been operating in entire disregard of the effects on his competitor and the rest of the industry."

Band Saw Handles Two Jobs Simultaneously

TWO jobs may be handled simultaneously, one on each side, on the metal-cutting band saw illustrated, which has been brought out by William Laidlaw, Inc., Belmont, N. Y.

Although designed for production work, the machine can be used economically where a variety of sizes and shapes are to be cut, and is adaptable to special cutting. An example of the latter is cutting of tools that require both rake and clearance. These tools can be cut in double lengths, from nested bars, on one side of the machine; then by using a special fixture the double length can be cut in two at a compound angle on the other side of the machine, the correct rake and clearance being thus obtained without further machining. The machine, designated as the type C.M.T., is heavy and rigid, and has capacity for cutting 12 x 12-in. bar stock.

A unique feature of the machine is that while the saw is in the center of the vises and carriages, rather than on one side as in the usual practice, either side can be set quickly for cutting at any angle, and an automatic stop prevents the saw from cutting into the vise should the operator be away from the machine when the cut is finished.

The tables swivel to permit cutting of long pieces on either side without interfering with the work on the opposite side of the machine. Pieces up to 30 in. long can be cut without twisting the saw on either side; for pieces longer than 30 in. a twist of only 15 deg. is necessary. It is claimed that having the saw run without twist the greater part of the time results in better work and an appreciable increase in the life of both the saw and the saw guides.

Quick - acting vises requiring no wrenches are mounted on heavy carriages supported on steel balls that travel in accurately machined ways. Carriages are held downward by annular ball bearings contacting a special inverted way with an adjustment for taking up wear. A downward work clamping device is also provided. These two features are said to prevent either the work or the work-holding members from raising upward on the left, or up-cutting, position.

The two 30 in. x 1½ in. disk band wheels are a combination of cast iron with steel disks on each side, and are light and rigid. They permit the use of a simple guard that extends only around the outer periphery of the wheels and to the cutting point. Saws can be changed without removing the guards. The upper wheel is mounted on cup and cone ball bearings.

The power unit, consisting of motor, speed-reducing gears and four-speed sliding gear transmission, is mounted on a plate in the base of the machine. The entire unit is ball bearing and all gears and bearings run in oil. All parts are doweled to assure correct alinement. A large door on each side of the machine permits access to the various parts and the arrangement is such that the base plate with all parts mounted on it can be removed from the frame castings as a unit. Speed changes are made by means of a shift lever that extends up through the frame casting to the operating position.

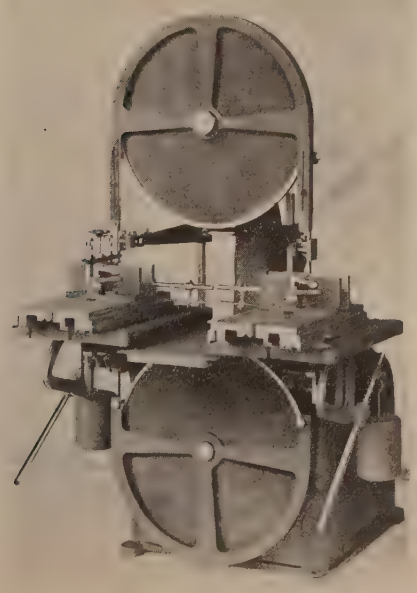
Large Bars and Billets Cut on Vertical Saw

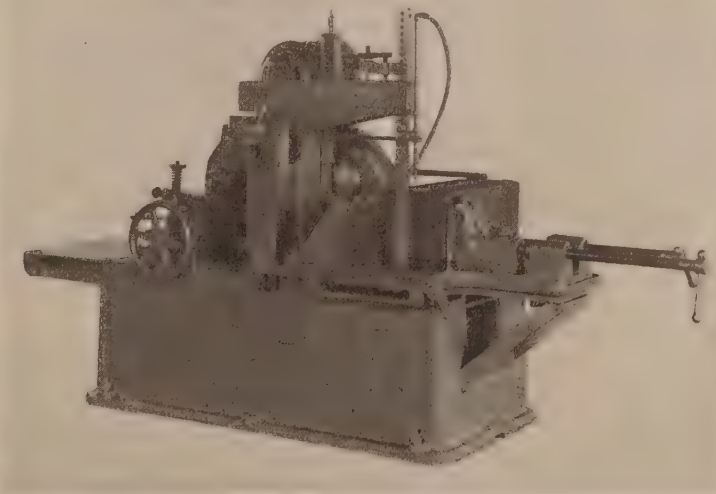
THE Peerless Machine Co., Racine, Wis., has brought out a heavy-duty vertical metal sawing machine having a capacity of 14 x 16 in. The machine is intended for cutting large bars and billets, which can be placed on or removed from the table by an overhead crane. The vertical position of the blade also makes possible the application of a stream of coolant at the top of the cut. The blade automatically relieves itself on the non-cutting stroke, and at end of cut the machine is automatically tripped out.

A roller device is built in each side of the work table so that when a large bar or billet is placed thereon the operator by the use of a handle can raise the piece of work, where it will remain until he has rolled it to the point where it is desired to be cut. Then by lowering the handle the stock rests on the table. Each of the front vise jaws is arranged with hardened steel serrations to prevent shifting of the stock.

The pressure mechanism by means of which the blade is fed into the work includes both a positive and compensating feed, the positive feed being provided with a safety device to prevent the blade from breaking when it becomes dull. Ball bearings are used throughout the machine, and the transmission runs in oil. Three speeds are obtainable, and a trip can be set to cut out the machine at any given distance within its capacity. Saw blades from 17 to 24 in. long can be used. The machine is driven by motor and chain. It is 10 ft. long, 4 ft. 4 in. wide and 4. ft. 9 in. high. The weight is approximately 4500 lb.

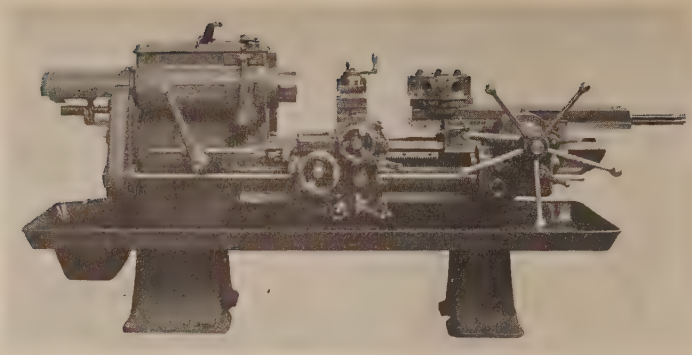
Freyn Engineering Co., Chicago, has been engaged as consultant by the Otis Steel Co., Cleveland, in the remodeling of the No. 2 blast furnace plant at the Riverside Works of the Otis company.





The Metal Cutting Band Saw, at the Left, Is Designed to Permit Handling Two Jobs Simultaneously. The saw blade runs without twist except when cutting unusually long pieces

In the Vertical Sawing Machine Above, Large Bars and Billets Can Be Placed and Removed by an Overhead Crane



Universal Turret Lathe with New Features

A TURRET that is clamped and unclamped automatically is an outstanding new feature of the No. 4 universal turret lathe recently brought out by the Gisholt Machine Co., Madison, Wis.

A bevel clamp ring, operated by an eccentric toggle, is opened and closed automatically by the backward and forward travel of the turret slide. It binds the turret rigidly to the slide, with no increase in the effort needed to move the slide. Two movements per station, or 12 movements where a full set of tools are used, are thus saved for the operator and damage and loss of accuracy arising from failure to clamp the turret tightly to the slide after indexing is eliminated. The entire strain of the cut is taken by the bevel clamp ring, the locating pin and bushings having only to position the turret. A protected positive gib lock keeps the turret slide in alinement. The stop roll, of new design, permits adjustment to 0.002 in. between the automatic feed trip and the dead stop.

Twelve spindle speeds, from 28 to 751 r.p.m. are obtained selectively through sliding gears and a positive jaw clutch. A single lever controls the starting, stopping and reversing of the spindle through a multiple disk clutch. A brake is applied automatically in the neutral position of the control lever and a special safety latch prevents accidental starting of the spindle. Hardened alloy steel gears mounted on spline shafts, tapered roller bearings for the spindle and drive shafts and centrifugal lubrication of all gears and bearings are features of the headstock. Speed change levers seat firmly and are positive in position. The machine is driven by 3-hp. 1200-r.p.m. motor through Texrope belts and balanced drive pulley, the motor being mounted on the rear of the headstock leg. It is claimed that speed rating may be doubled without damage to bearings or clutches.

Automatically indexed square turret is another feature. The square turret is mounted on the front of the bridge-type cross-slide. It indexes automatically with the release of the clamping lever, permitting the operator to use his right hand for indexing and clamping while his left hand positions the carriage for the next cut. An auxiliary tool-holder may be mounted on the rear of the cross-slide for the cutting off or for use of taper attachment. The carriage moves on hardened steel ways with apron bearing on the bottom of the bed. Apron parts run in oil, and a hand-operated pump is provided for lubricating the bed ways, cross-slide and cross-feed screw. Taper attachment and threading attachment supplied as extras.

Specifications are:

Automatic chuck capacity, round stock 2 in.; hexagon stock, 1¾ in. and square stock, 1 7/16 in. Swing over ways, 19¾ in.; swing over cross-slide wings, 17¼ in., and swing over cross-slide, 10¼ in. The maximum distance from the face of the turret to the end of the spindle nose is 31 in., the longitudinal travel of the hexagon turret is 14 in., the swing over the turret slide is 7⅝ in., the longitudinal travel of the cross-slide is 26 in., and the cross travel of the cross-slide is 10⅞ in.

Floor space occupied is 40 x 99 in. and the length of the bar feed beyond the pan is 38 in. The net weight of the machine is 3450 lb.

Centrifugal Oil Extractors, Washers and Dryers

STURDY construction, minimum of vibration and safety of operation are features of an improved self-contained motor-driven centrifugal oil extractor which is being marketed by the Leon J. Barrett Co., Worcester, Mass. Extraction of 90 to 95 per cent of the cutting oil from saturated chips is claimed. It is estimated that 100 lb. of average chips pick up 3 gal. of oil; 1 gal. of this oil may be recovered by draining overnight and practically all of the remaining 2 gal. may be recovered in 2 to 3 min. by the centrifugal extractor.

The starting lever is interlocked in the neutral position so that the machine cannot be started inadvertently. The lid of the extractor is a semi-steel casting and is balanced to facilitate raising and lowering. The arrangement is such that to operate the machine the lid must be closed and locked, and when the lid is locked all moving parts are inaccessible. The starting lever is arranged to prevent unlocking while the machine is in operation, either in the running or braking position. Unlocking the cover shuts off the current automatically. The machine is available with either hand chain or hydraulic hoist.

Cyclone dryers for the rapid and complete drying of washed metal parts are also built by the company. Air under room conditions is drawn in and forced through the contents of the machine, entering through a dehumidifier in the cover containing electric heating coils. The heating and expanding of the air occurs at the point of entrance; drying is effected, first, by expelling the surplus moisture by centrifugal force; and second, by absorbing the remainder by the rapid swirling current of heated air.

Self-contained Typhoon metal parts washers are also manufactured. In the center of the pan there is a cone having a series of holes in the upper part but with the bottom open. The parts to be washed free of grease, oil, soda, alkali or acid are placed in the pan and brought up to speed. Water or other fluid, under valve control, enters the central column and passes through the holes in its side wall, due to centrifugal force, and thus the impurities from the inner side of the load are carried to the wall of the pan. A much larger quantity of water passes down through the opening of the bottom of the cone, up the sloping side with continually increasing velocity, flushing out all the impurities that may have become washed to or collected along the wall. The supply valve is then shut off and in a few seconds all the water is thrown off from the parts in the pan. A strong suction is caused by the rotating bowl, and the air rushing in and through the parts in most cases dries the product. A heating or dehumidifier grid may be applied.

Reclaiming of 90 Per Cent of the Oil from Chips Is Claimed

Notable Progress in Steel Research

Pittsburgh Group Studies Manufacture of Clean Steel and Iron Alloys of High Purity

STANDING room was at a premium at the afternoon session of the third open meeting of the Metallurgical Advisory Board to the Carnegie Institute of Technology and the United States Bureau of Mines, held in Pittsburgh Oct. 18. About 250 prominent metallurgists and research workers from all sections of the steel industry crowded the auditorium at the Bureau of Mines, and listened to the reports on investigations now in progress at the two institutions. A five-year research program was initiated in 1926, and in the intervening three years some $150,000 has been spent, of which $55,000 has been contributed by 43 steel companies in the Pittsburgh district. The work is gaining momentum constantly; 30 men are now engaged, nine on the Bureau of Mines staff, six of Carnegie Institute's faculty, seven research fellows, and eight employees of the Advisory Board, four of the latter being engaged in plant research. F. N. Speller of the National Tube Co., chairman of the Advisory Board, praised the active cooperation by operating officials of the several steel companies where open-hearth steel making reactions are being studied on a grand scale.

Quantitative Estimation of Slag Inclusions

Dr. C. H. Herty, Jr., physical chemist of the United States Bureau of Mines, has been giving his entire time since the beginning of the investigation to a study of the non-metallic inclusions in steel, with particular reference to the underlying chemical reactions between metal and slag in an open-hearth furnace and to the conditions responsible for "dirty" steel. Laboratory studies in connection with this problem have included the solubility of iron oxide in steel and various kinds of slag, the effect of commercial deoxidizers on these solubilities, the viscosity of slags at various temperatures, the chemical and microscopical identification and analysis of inclusions and gases in steel.

Lack of precision in the last mentioned items has hampered the progress of the work, and especially the correlation of data gained from open-hearth heats to the theoretical results of laboratory findings. The high spot in Dr. Herty's report, therefore, was the announcement of the discovery of new methods for measuring the amount of sonims contained in steel. These new methods have been used in re-analyzing and re-computing some old data, and have served to explain former unexplained and puzzling discrepancies.

In the study of deoxidation by silicon, for instance, it was known that the best chemical method for determining oxygen in steel was inaccurate in the presence of much silicon or manganese. In order to get some more accurate data, polished samples of the steel were examined for inclusions under a micrometer microscope; each globule was measured and classified as to its nature (whether glassy type containing about 80 per cent silica, the intermediate type, or the "F-type" with about equal amounts of silica and iron oxide). Duplicate slag counts of this sort made on various planes through a metal sample, gave remarkably concordant results. In over 120 samples there was also found much more visible oxygen than given by chemical analysis—60 per cent excess at times.

This new method of visual determination, and a new electrolytic method of segregating non-metallic inclusions, form not only a new basis of appraising past work on slag-metal reactions, but also will be used in future work on the synthesis of inclusions in the laboratory and their identification in steels.

Deoxidation of Steel with Silicon

Plant studies on the deoxidation of steel with silicon started three years ago. Complete data on several heats from 40-ton, 90-ton and 250-ton furnaces have been obtained. Heats would be worked down to 0.10 to 0.14 per cent carbon and 100 lb. of silicon added to kill the metal; the bath would then be reboiled, and in about 30 minutes would be tapped, adding manganese only in the ladle. Frequent samples were taken at all stages, and Dr. Herty concludes from all the studies that silicon so used, alone in the furnace, produces steel no cleaner than other heats made without it, so the added ferroalloy and the time required are wasted. While it deoxidizes the bath temporarily, it does not eliminate the glassy silicates formed. Silicon and manganese both are needed for cleansing action, and studies on this practice are now being pushed so intensively that results should be available within the next year. Proper deoxidation and cleanliness require big inclusions of the F-type, which will be rapidly eliminated. Later reoxidation from the slag may be prevented by increasing the viscosity of the slag or skimming it at the end, or by lowering the iron oxide in the slag as much as possible without rephosphorization.

Effect of Sonims on Seamless Tubes

Forty-three heats of steel designed for a seamless tube mill were studied, especially the relationship between slag inclusions and chipping costs and the physical properties of the finished steel. Full results are to be published soon, but it may be said that chipping costs and workability of the pipe steel is related to so many other factors than sonims that unless the latter are unusually numerous no specific influence can be noted. However the strength, elastic limit and ductility of the metal (both in longitudinal and transverse directions) are adversely affected by increase in "dirt."

Standards for Abnormal Steel

Of the many important offshoots of the main investigations outlined briefly above may be mentioned studies by Dr. V. N. Krivobok and his associates at Carnegie Institute of Technology into the reasons for random grouping of crystal aggregates after carburizing. At the outset it was endeavored to set up standards of comparison for so-called "normal" or "abnormal" steel (as defined by the McQuaid-Ehn test). For this purpose some oxygen-free iron from a vacuum fusion was carburized, and a pearlitic structure was found which contained but little granulated cementite—a structure neither abnormal nor normal. Further investigations indicated two types of abnormality, (a) structural abnormality involving segregations of cementite and (b) grain size abnormality involving non-uniformity in size.

Certain factors were found to influence the structural type of abnormality; for instance, manganese in steel makes for normality; the rate of solidification in the ingot and the rate of cooling from the carburizing furnace also have an influence. Oxygen in the steel as iron oxide undoubtedly promotes structural abnormality; if such a steel is deoxidized by aluminum or silicon the structure is like carburized pure iron, i.e., neutral.

Grain-size uniformity is promoted by the carbon originally in the steel. Manganese coarsens the carburized grain.

The effect of sub-microscopic inclusions is still doubtful, as all steels are believed to have such particles; normal carburized microstructures have been found in steels certainly full of them.

Pure Manganese and Manganese-Iron Alloys

A considerable quantity of pure manganese (spectroscopically free of silicon and aluminum) has been made by distillation, as described in THE IRON AGE, Dec. 13, 1928, page 1499. When alloyed with pure iron, and melted in special equipment to prevent contamination by oxygen or other elements, the resulting steels containing 0.2 and 0.4 carbon and 7 and 10 per cent manganese are remarkably tough. They have a hardness of 37 to 45 Rockwell C and harden quickly on cold work. Hardness, however, is little affected by hot forging or by heat treatment. Thermal analysis shows no critical points. The microstructure develops Widmanstattian markings, the more pronounced as manganese increases. This structure is explained on the hypothesis of two distinct solid solutions.

Studies are also being continued of the commercial cast manganese steels of the Hadfield type. It has been found that the microstructure and critical temperatures of such alloys may be changed materially by preliminary

heat treatments, and an effort is being made to intensify this effect so that steels of unique properties may be produced.

Studies on Alloy Steels

Another side line of investigation concerns the development of steels made with alloys produced in the United States which may be substituted for others made with imported metals. Related to this is the study of special analyses for extra severe duty, either at high temperature, high pressure or in corrosive atmospheres. A preliminary exploration was made of the chromium steels containing 0.10 to 0.60 per cent carbon and 16 to 35 per cent chromium—a field which is relatively unknown. Microscopic and thermal analyses have developed a provisional equilibrium diagram showing four constituents, one of which is new. All the findings are in accordance with the assumption that chromium is an element which stabilizes alpha iron and restricts the formation of the gamma configuration.

On account of the interest in the so-called 18-8 stainless irons, a considerable quantity of a pure iron-chromium alloy containing 18 per cent chromium will be manufactured, and with this as a basis a series of alloys containing increasing additions of carbon and nickel will be made and the physical properties studied, especially at high temperatures.

T. M. Girdler to Join Eaton-Mather Group

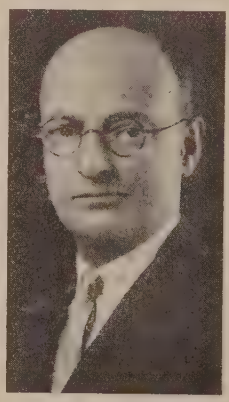
Jones & Laughlin President Resigns—Will Be Actively Engaged in Plans for Merger of Steel Companies

T. M. GIRDLER, president of the Jones & Laughlin Steel Corporation, has resigned that position to become associated with the Eaton-Mather financial interests of Cleveland. This group, headed by Cyrus S. Eaton of Otis & Co., Cleveland investment bankers, is said to be one of the largest owners of steel company stocks in the country. Most of these stocks are owned by two holding companies, Continental Shares, Inc., and the Cliffs Corporation, which are affiliated with Otis & Co.

Mr. Girdler's association with the group, according to the official announcement, is regarded "as an indication of other important steps to follow." It is stated that Mr. Girdler will not be connected in an executive capacity with any of the steel companies in which the Eaton-Mather group is interested, but will be actively engaged in "the development of plans affecting the iron and steel industry."

It is officially said that the selection of Mr. Girdler is a forerunner of the announcement of a large merger of independent steel companies. No intimation is given as to what companies will be put together in such a merger, though it has been generally assumed in the steel industry that the Republic Iron & Steel Co. will be prominent because of the large interest of the Eaton group in that company. Mr. Eaton is generally credited with being responsible for the acquisition by the Republic company of the Trumbull Steel Co., Warren, Ohio, and Steel & Tubes, Inc., Cleveland.

Companies in which Continental Shares, Inc., and the Cliffs Corporation are financially interested include the Inland Steel Co., Central Alloy Steel Corporation, Otis Steel Co. and Donner Steel Co. The Cliffs Corporation some months ago acquired complete ownership of the Cleveland Cliffs Corporation through an exchange of stock. Cyrus S. Eaton is a director and member of the executive committee of the Republic company and a director of Inland



T. M. GIRDLER

Steel Co. and the Central Alloy Steel Corporation. William G. Mather, with whom Mr. Eaton is now closely associated, is chairman of the board of the Otis Steel Co. S. Livingston Mather is a director of Otis Steel.

Mr. Girdler will enter upon his new duties Nov. 1. No successor has yet been named by the Jones & Laughlin Steel Corporation. Mr. Girdler's new official connection will be as a partner in the banking firm of Otis & Co. He was elected president of the Jones & Laughlin company on Jan. 12, 1928. He was graduated in mechanical engineering from Lehigh University, Bethlehem, Pa., in 1901, and immediately became associated with the Buffalo Forge Co., Buffalo, N. Y. Shortly afterward he was sent to London, England, as sales engineer and assistant to that company's London representative.

In 1902 Mr. Girdler returned to this country to become identified with the Oliver Iron & Steel Corporation, Pittsburgh, remaining with that company until 1905, when he went with the Colorado Fuel & Iron Co., Pueblo, Colo. Two years later he became general superintendent of the Atlantic Steel Co., Atlanta, Ga., remaining with that company until 1914, when he joined the Jones & Laughlin company as assistant to the general superintendent of the Aliquippa works, Woodlawn, Pa. Later he was successively assistant general superintendent and general superintendent of that works and general manager of all plants and properties of the company. He was elected vice-president and a director of the company in 1925, holding that position until his accession to the presidency.

Merger of Screw Machine Products Organizations

A merger of the Screw Machine Products Association with the Screw Machine Products Institute was officially authorized in Chicago on Thursday, Oct. 17, at a meeting of the former organization. About a year ago a survey of the screw machine products industry was made by Dr. Arthur E. Swanson. Upon his recommendation the Screw Machine Products Institute was set up among members of the association to work out certain policies and plans centering largely around cost studies. This has now progressed to the extent that it was felt that all of those in the association should share in the benefits to be derived and, as a result, the institute takes over the activities of the former association. Dr. Swanson, who has been director of the institute since its organization early this year, continues as director. The management is in the hands of the officers and directors of the former association. Group meetings are planned for the future.

Loan Made for Two Ships; 22 Boats to Be Scrapped

WASHINGTON, Oct. 22.—The Shipping Board has approved a loan to be used by the Oceanic Steamship Co., San Francisco, in aid of constructing two 11,300 deadweight tonnage, combination passenger-cargo vessels, the contract for which has been drawn up by the Bethlehem Shipbuilding Corporation. According to the board, it is expected that the ships will be built at the Fore River yard at Quincy, Mass.

The board also has announced the sale of 22 laid-up vessels to the Union Shipbuilding Co., Baltimore, with the understanding that the vessels will be scrapped. The vessels were sold for $335,000 cash.

Gray Iron Institute in Annual Meeting

A Cost System Adopted—Research Plan Outlined—Scheme for Certifying Castings Recommended

A PLAN for adopting standards of quality for gray iron castings and for certifying castings that come up to the standard was recommended to the Gray Iron Institute by its president, Walter L. Seelbach, at its second annual meeting held at the Hotel Cleveland, Cleveland, Oct. 16. This certification would be a guarantee of quality. Members would be allowed to use the seal and trademark on their products after safeguards in the way of tests had been provided to give assurance that the castings were up to the adopted standards of quality. These tests would be made by recognized laboratories in the various districts.

Mr. Seelbach said that it is difficult to work out a method of certification, but he believed the problem could be solved. Included in the suggested plan would be the carrying out of a publicity program by means of which he believed the public would come to accept certified gray iron castings.

The adoption of a cost system was announced and this will soon be issued in pamphlet form. Reports of various other committees indicated that the institute has accomplished a great deal of work during the past year and has much under way. Speakers expressed the feeling that the gray iron industry is in a much more favorable position than a year ago, that the merits of gray iron castings are being more generally recognized and that the competition of other products as substitutes for castings has been largely reduced.

Growth of Institute Satisfactory

The institute has enjoyed very satisfactory growth the past year, but still needs additional members to aid in carrying out the work it has undertaken. Starting with a membership of 40, it had 83 members at the annual meeting a year ago and its present membership is over 200. The registered attendance at this year's meeting was 119, representing 19 States and Canada. Eighty-two member companies and 42 cities were represented.

Four new directors were elected for a three-year period. They are as follows: J. D. Coltman, Bullard Co., Bridgeport, Conn.; William J. Grede, Liberty Foundry, Inc., Wauwatosa, Wis.; E. H. Williams, Vulcan Mold & Foundry Co., Latrobe, Pa., and R. M. Hill, East St. Louis Castings Co., East St. Louis, Ill. The old officers were reelected. They are:

President, Walter L. Seelbach, Forest City-Walworth Run Foundry Co., Cleveland; vice-presidents, B. H. Johnson, Florence Pipe Foundry & Machine Co., Florence, N. J., and A. E. Hageboeck, Frank Foundries Corporation, Moline, Ill.; treasurer, H. S. Chafee, Builders Iron Foundry, Providence, R. I.; assistant treasurer, H. C. Wilson, Cleveland, Cooperative Stove Co., Cleveland, and manager, Arthur J. Tuscany.

Industry's Present Status Improved

The gray iron industry presents a different picture from that of a year ago and, through the work of the institute, a good name has been established for gray iron castings, declared President Seelbach in his annual report. The industry was threatened a year ago, he said, with encroachments by other products. He summarized the work accomplished during the past year. The working out of a uniform cost system, he believes, will solve the problem of getting fair prices. New uses should be found for gray iron castings rather than trying to compete for products for which other materials are better suited.

Conditions that led to the formation of the institute early in 1928 were reviewed by Manager Arthur J. Tuscany, who declared that the gray iron industry had found it necessary to organize for its own protection. The institute, he said, has made a good start in showing the importance of gray iron. It has created a more favorable attitude on the part of the public in general and of casting buyers toward castings. Gray iron has advanced and is now shown at its true worth.

Reviewing the various activities of the industry during the year, Mr. Tuscany said that through its efforts the gap between excess production and consumption had been reduced. Some consumers of castings had been shown that it would be more economical for them to buy castings outside than to operate foundries and in other cases the building of excess foundry capacity has been discouraged. He referred to the adoption of the cost system as an important achievement of the year. While a fair start has been made along various lines, Mr. Tuscany pointed out that there is yet much to be accomplished. The report of the treasurer showed that the institute is in a healthy financial condition, its receipts during the year having been well above expenditures.

A Cost System Adopted

The report of the cost committee was submitted by its chairman, J. L. Carter, Sacks-Barlow Foundries, Inc., Newark, N. J. He said that a standard cost system and a general accounting system were among the most important needs of the industry. The aim of the committee was to develop a cost system applicable to both large and small foundries and in their work the members were assisted by many practical foundrymen, as well as expert accountants. Various systems were studied, and the committee attempted to pick out the best features of each.

Systems studied were found to be largely similar except as to the methods of determining cleaning and shipping costs. The committee found the most difficulty in arriving at a method for determining cleaning costs. It made actual studies of various methods and found that often foundrymen guessed at their cleaning costs. The committee held that the only satisfactory method of figuring cleaning room costs was by basing these on the direct labor of cleaning, together with indirect labor costs. There would be valid objections if uniform labor charges were applied to all kinds of jobs. This difficulty, however, will be solved by so carrying cleaning costs that actual costs can be figured on special jobs. In the opinion of the committee many leaks would be stopped by the adoption of the system.

The second objective of the committee is to induce foundries to adopt the cost system. Mr. Carter favored the holding of local group meetings of the foundrymen at which the system would be explained. An experienced cost accountant will usually be required to help place the system in effect. The institute would supply expert accountants for that purpose. The cost committee also reported that it had extended its work to include a system of uniform accounting.

The finance and budget committee, through its chairman, Howard O'Neil, Western Foundry Co., Chicago, reported that the institute has sizable funds available for continuing its various activities during the coming year.

Standard Sales Agreement Developed

The merchandising committee through its chairman, Don McDaniel, Decatur Castings Co., Hamilton, Ohio, reported that the committee has developed a standard sales agreement and trade customs and, in addition, has prepared various pamphlets which have received favorable comment. A number of problems confront the committee, he said. Facts developed by the research committee should be presented to buyers of castings. Mr. McDaniel felt that a survey of the gray iron industry is needed and that a survey should also be made of some one outstanding industry in other fields, believing that such a survey would be of value in solving the merchandising problems of the gray iron foundries. An important task of the institute, he said, is to sell the organization to buyers of castings. The seal of the institute should be made to mean something, and he believed a suitable slogan should be developed and that a technical department should be established to show where gray iron should be used. Mr. Seelbach, commenting on reports, said that the merchandising committee had the hardest job of all the committees.

Plan of Research Outlined

The research committee through its chairman, B. H. Johnson, reported that it had studied the work of other organizations and had endeavored to set up a program to show what has been done and is being done along the

line of research work. A plan was briefly outlined for making tentative recommended practices for certain gray iron castings. Under the plan 25 foundries will be selected from which test bars will be secured and tests will be made and the results tabulated. Information will also be secured as to cupola practice, mixing, etc. This investigation will lead to standard specifications for certain classes of castings and engineers will be supplied with these specifications. The association will keep the specifications up to date. The committee will cooperate so far as it is able with the Engineering Foundation in research work in alloy iron and steel.

The statistical committee, through its chairman, K. L. Green, Green Foundry Co., St. Louis, reported that 115 members are making monthly trade reports but the number should be increased. Mr. Seelbach said that he carefully studied these reports and found them valuable in his business.

Mr. Tuscany presented the report of the trade practice committee for R. M. Hill, chairman. This committee has made a study of conferences held in other industries with a view of determining how conferences would help the gray iron industry. The committee had decided to make further investigation before determining the character of conference that would be best suited for the gray iron industry.

Members will be allowed to use the institute's seal on their castings or stationery on securing permission from the executive committee under a change voted in the by-laws.

Trade Associations Important Factors

The business sessions were supplemented by an interesting program of three speeches on topics that appealed to the gray iron foundrymen. At a group luncheon meeting a talk was given on the business man and his trade associations by Dr. Hugh P. Baker, manager of the Trade Association Department, Chamber of Commerce of the United States. Trade organizations, he predicted, will become more important factors in business than at present. Bankers, he said, are looking with favor on membership in trade organizations by industrial companies, believing that there is a sounder upbuilding of industries by organized effort. He listed as outstanding problems of industry, overproduction, price cutting, invasion of another's territory, wasteful, harmful practices that lead to unfair competition, lack of standards and nonmaintenance of quality. The speaker emphasized the importance of a sound cost system and the gathering of statistics covering all phases of the industry. Codes of business practice, he said, are helpful but often are not lived up to in periods of depression. Good results have come from trade practice conferences. Trade promotion is an important activity. He urged the foundrymen to sell quality and service.

"The New Day Marketing" was the subject of a talk by R. R. Cunningham, National Sales Development Service, Cleveland. The speaker added a pleasing mixture of humor to his talk, which covered some of the problems of distribution. Declaring that the price is not the only thing in merchandising, he also emphasized the importance of quality and service, which he said was counting for more every day. Long profits are in noncompetitive selling in which the seller is rendering service.

Labor Control Changing

Labor cost control in jobbing foundries was discussed by T. M. Harrison, Stevenson, Harrison & Jordan, New York and Cleveland. He outlined a method of setting molding and coremaking piece rates developed for making wage incentives possible in jobbing foundries despite frequent changes due to short runs. Management and labor control has been undergoing a change, he said. The number of employees that are paid according to time is growing smaller. In foundries a great deal of work is being done on a day rate, because of short runs, on which piece rates could be applied. Often piece rate on such work is likely to be set by a foreman relying only on his judgment. Under the system presented, scientific methods take the place of the foreman's judgment.

Standard Time for Each Job Advocated

The speaker described molding as a combination of various minor operations and pointed out that standards can be established by time studies of these various elements, these being largely mechanical. He demonstrated the system by exhibiting a pattern and describing the method of figuring out the time allowances by taking measurements of the pattern, showing area and cubic contents, taking the cubic contents of the flask, net sand, classification of cores, etc. The data obtained showing standard times for various operations were tabulated, the total being the standard time for the job. For a jobbing foundry he advocated a bonus rather than a piece rate system.

The speaker contended that poor performance in a jobbing foundry is often the fault of the management and not of the molders and that the adoption of a wage incentive system will cause a foundry to be organized so that skilled men will not be doing unskilled work. The system he discussed, he said, would enable a jobbing foundry to predetermine its costs and help eliminate unintelligent competition. He claimed that by using the system a jobbing foundry would make a net saving of over 20 per cent.

The meeting closed with a banquet and entertainment in the evening.

Herberts-Moore Machinery Co., San Francisco, has been appointed exclusive sales agent in northern California and Nevada for South Bend engine lathes made by the South Bend Lathe Co., South Bend, Ind.

Shop Equipment Exhibited at Bridgeport

A WIDE variety of shop equipment and supplies was shown at the second cooperative exposition held under the auspices of the Salesmen's and Purchasing Agents' Association of America, Inc., at the Pyramid Shrine Mosque, Bridgeport, Conn., Oct. 17, 18 and 19.

Gross space of approximately 13,500 ft. was occupied, and more than 125 companies were represented at the 60 or more separate booths. About 50 companies were unable to obtain space, and the taking of larger quarters for the next exposition is being considered. The attendance was in excess of 5500.

All classes of factory supplies, including tool steels and small tools, were on display. Widia tungsten carbide tools were shown by Hunter & Havens, representing Thomas Prosser & Son, New York, and Strauss metal tools were displayed by the Ludlum Steel Co., Watervliet, N. Y. The carboloy Co., New York, demonstrated its tools in connection with a 36-in. Bullard vertical turret lathe. Heppenstall die steel of 0.48 per cent carbon and 0.63 per cent manganese was machined at 190 ft. per min., 5/16-in. cut, and 0.033-in. feed. Bronze bearing metal, copper 85 per cent, and lead, tin and zinc 5 per cent each, was turned at 450 ft. per min., ⅝-in. cut, 0.068-in. feed, the tool holding its edge for a long period. High test iron castings such as used in Bullard machine tools was machined at the rate of 220 ft. per min., ½-in. cut, 0.068-in. feed. This material has a tensile strength of 38,000 lb. and hardness of 207 Brinell.

Displays of chromium-plated products were another center of interest. One company showed chromium-plated files, the plating on which was said to markedly prolong the life of the tools. Another concern exhibited a large chromium-plated roll used in the production of highly finished sheet brass, the plating being applied to resist wear.

Officers of the association are: R. T. Phipps, Bullard Co., Bridgeport, president; W. H. Bradley, Hunter & Havens, vice-president; L. R. Watkyns, Max Ams Machine Co., secretary; and F. H. Braithwaite, Wellington-Kincaid Co., treasurer.

Celebrates Opening of New Plant Addition

To celebrate the opening of its new factory addition, which adds 60 per cent to its production capacity, the Brown Instrument Co., Philadelphia, maker of indicating, recording and controlling instruments, held a company party on Oct. 3. In honor of the event a souvenir program was printed containing a history of the company by Richard P. Brown, president. Organized in 1860 with two employees and an annual business of $16,000, the company now employs 500 people and its sales approximate $3,000,000 a year.

This Issue in Brief

Strategic location of factory lowers cost to consumers. Nine-tenths of all industries are improperly located, investigators estimate. They have been placed where they are, by chance or by rule-of-thumb methods, while keen competition requires manufacturers to seek the lowest possible cost.—Page 1089.

* * *

Material-handling costs are cut by using lifting magnets. Their use need not be confined to handling bulky materials, such as pipe, plate, scrap, etc. They can lift and move boxed parts also.—Page 1097.

* * *

Your repair man should have a lock or warning sign to place on the starting lever of the conveyor before repairing it. Don't let him adjust or repair the conveyor while it is in motion, as the percentage of accidents from this source is high.—Page 1099.

* * *

You can not make a high-strength cast iron merely by introducing alloys into inferior irons. Alloys act simply as an aid to the betterment of a condition. But properly used, it is easy to produce a high-strength iron without special processes.—Page 1101.

* * *

Nitrides large parts in world's largest nitriding furnace, 26 ft. long between doors. Parts are placed in a nitriding box 22 ft. long, mounted on an 8-wheel motor-driven car. A fan located in the box circulates the gas through the work.—Page 1102.

* * *

Low-cost foundry operation is encouraged by use of the proper kind of coke. Therefore, Pennsylvania coke manufacturer experiments and discovers a new process which enables him to make beehive coke comparable with by-product coke, in both physical characteristics and chemical analysis.—Page 1091.

To combat today's competition successfully, manufacturers in the same industry must cooperate one with another. The most efficient means of doing this is through trade associations. Competent associations can discourage unfair competitive tactics within the industry and help fight "outside" competition.—Page 1107.

* * *

When joining thin-walled steel tubes by brazing, beware of high heat. Better keep the brass below 1100 deg. C., for steels which have been subjected to severe cold work tend to recrystallize strongly when subjected to the heat of the brazing liquid.—Page 1103.

* * *

Danger signal of too little or too much heat in hardening bath is given by colored lights connected to pyrometer. This signal enables operator to regulate the introduction of axes into the lead hardening furnace, so that the proper temperature will be maintained.—Page 1095.

* * *

Not much shifting of factories from one place to another. Relocations account for only 10 per cent of growth in number of plants, survey reveals. Great bulk of new industries in any community are *new* local manufacturing businesses.—Page 1090.

* * *

Cleaning costs are often guessed at by foundrymen, survey reveals. Cost committee finds most difficulty in arriving at a method for determining real cleaning costs. The only satisfactory method is to take the direct labor cost, and add indirect labor.—Page 1113.

* * *

Moving messages impress "safety first" on workers' minds. Overhead conveyor bears safety slogan signs, so arranged as to appear about every five minutes at a given point.—Page 1100.

Keeps hardening bath temperature fluctuation within 7.5 deg. Fahr. plus or minus by means of double control instruments, double circuits and switches. In axe plant one circuit is entirely off the recording control pyrometer for the salt bath and is placed on the control pyrometer for the heating chamber.—Page 1095.

* * *

What is "slush molding?" Method used in making zinc statuary can be applied successfully to cast iron. Molten metal is poured into the mold and allowed to stand just long enough so that the desired thickness of metal sets against the mold surfaces, after which the still molten iron is poured out. No core is used.—Page 1096.

* * *

Revamps old motor to provide greater power for larger rolling mill requirements. Size of motor is increased from 5000 to 8000 hp. by replacing armature copper with greater cross-section.—Page 1093.

* * *

Cheap labor may prove expensive in the long run. So many fears about the competition of cheap labor have proved groundless that wise employers generally have come to believe that labor is worth about what one pays for it.—Page 1116.

* * *

Cuts production costs and improves quality of enameled wire by using a vertical-tube electrical furnace. Wire is fed from spools arranged on a suitable rack mounted to the back of the oven. Four coats of enamel are baked on.—Page 1105.

* * *

Adopt a wage incentive system and you will eliminate the waste of having unskilled work done by skilled men. Cost consultant estimates that in a jobbing foundry this system will make a net saving of over 20 per cent.—Page 1114.

A. I. FINDLEY
Editor

THE IRON AGE

W. W. MACON
Managing Editor

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This Year and Next

ALREADY thought begins to turn to the new year —what it will bring in volume of steel demand. Such looking forward is stimulated by recently declining production and the unlikelihood, according to precedent, that there will be an upturn in the remainder of this year. Hope must be centered on next year.

Naturally the first thing to do is to appraise this year, to determine how far it may be used as a basis for the future; and difficulty is at once encountered. This has been an anomalous year. It showed 18 per cent gain in first-half production over the previous record, which is too big a jump to be considered permanent; the peak rate in production came two months later than usual; the familiar summer dip was replaced by a very slow and continuous decrease, and there has not been the usual autumn rise.

One can find in the past no satisfactory parallel for this performance. Statistically, 1923 appears to afford a parallel, for it showed peak production in April and monthly decreases thereafter through December, but marketing conditions were different. That year belonged to the old regime of price advances, forward buying and the carrying of stocks by steel consumers. This year there were no deliveries to be accepted and put in stock to take advantage of old and lower prices. In 1927 the second half was poor throughout. In all other years after 1923 there was a dull summer with an autumn recovery.

Some assistance in gaging this year is gained by a comparison between industrial activity in general and steel production in particular. Was there a divergence in steel, and if so does the divergence promise to be permanent? The Federal Reserve Board compiles a monthly index of industrial production, manufacturing and mining. The board's base is 1923-4-5, and computing ingot production relatives according to the same plan we find that the first eight months of this year ran 16 per cent above the 1923-4-5 relation to industrial production, which seems somewhat suspicious; but going back one finds that 1928 ran 9 per cent high, and that 1927 showed an even balance. Thus the higher proportion of steel production to general activity has some measure of permanence in it, though it cannot be regarded as fully established.

In few lines of steel consumption this year was there anything really unusual or abnormal. Automobile production during the first eight months was phenomenal and line pipe demand was exceptional. But little of this year's demand can be picked out as definitely unlikely of duplication next year. There was, however, an unusual combination of favorable circumstances and these might not all hit together next year.

There is one favorable point for next year. All precedents indicate that each year takes a fresh start, a poor ending of the previous year being no handicap. Apparently if a year ends poorly demand accumulates, while if it ends well the momentum is held and some accretion is furnished. Consulting the statistics, one finds that each of the four years 1924 to 1927, inclusive, had a March peak, with ingot production lying between 161,000 and 170,000 tons daily, whereas the preceding Decembers had shown the following widely different rates: 114,531, 137,279, 152,728, 133,337 tons.

Cheap Labor Not So Cheap

OUTCRIES have been heard recently from certain labor leaders that so much American capital is being invested in European factories that it will eventually mean the importation of automobiles, radios, farm equipment and other products made more cheaply abroad by virtue of cheaper labor, and to the disadvantage of our own workingmen. How such an inflow of products can surmount our tariffs, which so far have protected our industries against unfair competition, and which will undoubtedly be maintained, is not stated.

Without denying that there are combinations of natural resources, climate and over-population which tend to pauperize the inhabitants, it should be remembered that so many fears about the competition of cheap labor have proved groundless that wise employers generally have come to believe that labor is worth about what one pays for it. In our own country, for instance, the presence of a large colored population, first slave, then free, caused grave concern to thoughtful people in both South and North. Today it is well understood that this mass of backward humanity exercised a sinister influence on the white population and the general progress of the South. Only in recent years has it been surmounted, and what does a traveler in the Birmingham district find today? Expensive automatic machinery being installed to replace the mythical cheap Negro labor. With common labor at $3 for eight hours, skilled labor $4 to $5, and best molders on piece rates earning $7 to $8, a Southern plant is bound to mechanize if it is to continue production.

A pipe foundry will thus spend $2,500,000 to develop a method of centrifugal casting which converts the whole foundry into a complicated machine. A fittings manufacturer will install completely automatic units for molding, pouring, cleaning and delivery to

inspectors at the rate of one mold per worker per minute. A steel producer will replace four scattered blast furnaces with two new ones, surrounded by so many labor-saving devices that the two new ones will use only as much labor as one of the old ones.

Such are the conditions we find when backward labor becomes reasonably well civilized. The situation which existed some generations prior to that time is illustrated in the new Central African copper region. The Union Minière, with rich ore, produces hardly one-third the copper that comes from the lean ores in Arizona; yet it employs more workers than all the Arizona mines put together. Why should an African Negro work? He can get everything he really needs and actually wants from the jungle without working, and it takes generations of association with higher standards of living before the Negro begins to hanker after the comforts and luxuries with which the white man surrounds himself. Experience on the Rand is repeating itself in Rhodesia that mining costs are higher because labor is cheaper. Consequently, the new districts seriously consider bringing in expensive white labor to operate mines and smelters in a land well populated with pauperized blacks.

It may be objected that conditions in Ireland or France cannot be compared directly with those of Katangâ. But the latter illustrates the principle at the limit, as the mathematician would say. European labor may be more fairly compared with the white mill operatives in Tennessee and North Carolina. Even there, the employers are finding that textile factories, built to exploit "cheap" labor, are hardly operating before they face an insistent demand for shorter hours, better rates, cheaper housing, and all the other elements that constitute an enlightened labor policy and a prosperous, contented public which consumes the articles their machines can manufacture.

Old Automobiles as Scrap

"LET your old car apply as first payment on a new one," an advertising and sales promotion slogan used in one form or another by nearly all automobile companies, has become a boomerang. This turning in of old cars, together with many cases of excessive trade-in allowances, has created a used car problem of such magnitude that automobile manufacturers generally are now taking note of it, though it was once regarded as exclusively a dealers' matter.

About 2,500,000 automobiles become obsolete every year; but that does not mean that all of them go out of existence. Many old automobiles, which naturally should seek the scrap heap, are rejuvenated so that they will run further, and are sold over and over again or traded in for new cars or other used cars which have more life in them.

Some time back the story was repeatedly told of old automobiles taken from scrap dealers' yards and turned in as part payment on new cars, with allowances of from $200 to $300, whereas as scrap they would not be worth $25.

In various sections of the country the abandonment of worn-out cars at the roadside has created problems for municipalities. The borough of Queens, New York, was in disturbance lately over the thousands of such old wrecks that were cluttering up the landscape and that cost the city government a large sum to haul away to dumps. A city scrap yard was one plan proposed to meet the situation.

In several cities the automobile dealers have banded together to establish their own scrap yards, agreeing that all cars of a certain age shall not be resold but shall go to the scrap heap. These efforts are being watched closely by the National Automobile Chamber of Commerce and by individual automobile manufacturers as pointing the way to the best organized handling of the wrecking of old cars.

Old automobile scrap also presents a problem for steel manufacturers. If properly prepared and segregated, it is usable in the blast furnace and in the open-hearth furnace; but when mixed with other and better grades of scrap, as frequently happens, it dilutes the value of the latter. When alloy steel parts are included in the mixture, the trouble caused to the steel plant operator is sometimes serious, since it is impossible to get rid of some alloys in the open-hearth furnace. If, however, these alloy steels are properly segregated and their analyses known, the use of some of them becomes possible.

The situation calls for concerted effort on the part of the automobile industry, the scrap industry and the steel scrap consumers. Old material dealers at present sees no great profit in scrapping old automobiles because of the expensive equipment required to do the work properly and the comparatively low prices at which this grade of scrap must be sold. If such scrapping were done on a large scale, with the cooperation of the automobile industry, the scrap trade and the steel companies, much good would result.

The automobile industry would benefit by the reduction in number of used cars on the market. Steel makers would gain by a more careful preparation of automobile scrap, and a great deal of old material now going to waste would be conserved for remelting, thus creating a larger open market supply of usable scrap and stabilizing prices at levels which would permit the maximum use of old material in steel furnace mixtures. Moreover, many municipalities would be relieved of a problem that may eventually react unfavorably on the automobile industry, which, rightly or wrongly, is often charged by public officials with some responsibility for cluttering of roadways with automobile wrecks.

Changing Tides in Industry

SIGNIFICANT of the changes over the years which have brought metal manufacturing to the fore is the story told in a review of industrial development in Indiana, which has been published by the Bureau of Business Research, Indiana University. An outstanding feature is a series of tables showing the ten leading industries at a succession of dates, beginning with 1860 and closing with 1925. To some degree the great steel plant at Gary may have unbalanced the showing for metals, but the remaining factors in the State's metal-working industries probably show a typical development.

Metal-working in 1860 was represented among the ten leading industries by foundry and machine shop products, in fifth position, and agricultural implements, in eighth position. The two together accounted for products amounting to $2,280,000, while the leading

industry (flour and meal) reported products valued at $17,338,000.

This may be contrasted with the ten leading industries of 1925, all but two of which—the fourth and fifth—are metal-working. Iron and steel works and rolling mills head the list, followed by motor vehicles, foundry and machine shop products, slaughtering and meat packing, furniture, electrical machinery, iron blast furnaces, electric and steam railroad cars, steam railroad repair shops, motor vehicle bodies and parts. The tenth item in the 1925 showing had more than three times the value of product reported for the first item in 1860.

Gradual displacement of the leading items in the earlier years is traced from one list to the next as successive decennial periods yielded their returns. The flour and grist-mill products remained in first position through 1890 and were in second position in both 1900 and 1910. But they do not appear at all among the ten leading industries of 1925. Slaughtering and meat packing held first position in 1900 and 1910, dropping to fourth in 1925.

Iron and steel first entered the list in 1870, in ninth place, advancing to sixth in 1880, disappearing altogether in 1890, so far as the first ten items are concerned, reappearing in 1900 as fifth item (a position retained in 1910) and, as indicated above, taking first place in 1925, owing largely to the great concentration of iron and steel making in the northwest corner of the State.

Automobiles first became prominent in 1910, in seventh position. They held second position in 1925, while bodies and parts in tenth position should be added to the volume of manufacture of automotive units. These two items together, however, would not have displaced the steel works and rolling mills from first rank.

Taking the total value of product in 1860, metal-working represented only 6.8 per cent of the $33,379,000 aggregate output of the ten leading manufacturing industries in that year. In 1925, when the aggregate output of the ten leading industries was $1,045,155,000, metal-working constituted 83.5 per cent of the total. In the interim the metal-working percentage had shown a consistent gain—to 9½ per cent in 1870, 22½ in 1880 and 1890, 26½ in 1900 and 40½ in 1910. During the 65 years the output of metal-working plants among the ten leading industries had multiplied by 382, compared with an increase only 39-fold for the two items apart from metal-working which were in the 1925 list of the first ten lines of industry.

A Unique Presidential Address

Mr. Hoover Glorifies Scientific Research as a Potent Impulse to Progress

PRESIDENT HOOVER made a notable address at Dearborn, Mich., Monday evening, Oct. 21, when many leading Americans were guests of Henry Ford in celebrating the 50th anniversary of Thomas Alva Edison's invention of the incandescent electric lamp and in dedicating the Edison Institute of Technology, the gift of Mr. Ford.

What the President said in tribute to Mr. Edison and in appraisal of the world's debt to him was on a high plane. Of especial interest to IRON AGE readers are the President's views of the relation of research to progress in pure science and the industrial arts—a subject in which he has taken the deepest interest since he entered public life. His fruitful activity in behalf of the National Research Fund gives emphasis to these passages from his Dearborn address, which in their scientific understanding are unique among the utterances of our presidents:

"In making this, as in his other great inventions, Mr. Edison gave an outstanding illustration of the value of the modern method and system of invention, by which highly equipped, definitely organized laboratory research transforms the raw material of scientific knowledge into new tools for the hand of man. * * *

"Mr. Edison, using organized, systematic laboratory research, has been one of the great leaders who have converted the pure physics of electricity into a taxable product. Today the governments of the world levy upon upward of sixty billions of new wealth founded upon electricity.

"But the taxes and new wealth are not the major accomplishments of the men of this genius. These are the rivers of sweat saved from the backs of men and the infinite drudgery lifted from the hands of women.

"I may emphasize that both scientific discovery and its practical application are the products of long and arduous research. *Discovery and invention do not spring full grown from the brains of men. The labor of a host of men, great laboratories, long, patient, scientific experiment build up the structure of knowledge; not stone by stone, but particle by particle.* This adding of fact to fact some day brings forth a revolutionary discovery, an illuminating hypothesis, a great generalization, or a practical invention.

"Research both in pure science and in its application to the arts is one of the most potent impulses to progress. For it is organized research that gives daily improvement in machines and processes, in methods of agriculture, in the protection of health, and in understanding. From these we gain constantly in better standards of living, more stability of employment, lessened toil, lengthened human life and decreased suffering. *In the end our leisure expands, our interest in life enlarges, our vision stretches. There is more joy in life.*

* * * "Our scientists and inventors are among our priceless national possessions. *There is no sum that the world could not afford to pay these men who have that originality of mind, that devotion and industry to carry scientific thought forward in steps and strides until it spreads to the comfort of every home.*"

* * * "Not by all the profits of all the banks in the world can we measure the contribution which these men make to our progress. Their discoveries are not the material for headlines. Their names are usually known to but a few. But the nation owes them a great honor and is proud to demonstrate through Mr. Edison today that their efforts are not unappreciated. The country can well pay its tribute to the men of this genius by expanding the facilities for their labors. The nation today needs more support to research. It needs still more laboratories."

Southern Metal Trades Hold Annual Convention

John S. Schofield, president of the J. S. Schofield's Sons Co., Macon, Ga., was elected president of the Southern Metal Trades Association at its eleventh annual convention at Knoxville, Tenn., Oct. 16 and 17. Paul R. Moore, Columbus Iron Works Co., Columbus, Ga., was named first vice-president; W. G. Mealor, Gainesville Iron Works, Gainesville, Ga., treasurer; and William E. Dunn, Jr., Atlanta, secretary.

George B. Cocker, Cocker Machine & Foundry Co., Gastonia, N. C., who retired as president of the association, was presented with a handsome silver service by the members in appreciation of his services. Mr. Moore led the discussion on the subject of costs at the business session. The convention closed with a visit to the plant of the Aluminum Co. of America near Knoxville.

Meetings of American Electrochemists

For the annual spring meeting of the American Electrochemical Society to be held in St. Louis, May 29 to 31, 1930, a symposium on hydroelectrometallurgy is scheduled. The chairman is T. H. Donahue, research engineer, Anaconda Lead Products Co., East Chicago, Ind. The symposium will cover copper, zinc, lead, cadmium, bismuth, silver, etc. There will also be sessions on refractories, rectifiers and the plating of rare metals.

A visit to a new electrolytic zinc plant and other industries in and around St. Louis, as well as an all-day excursion to the lead mines through the beautiful Ozark Mountains, are on the program. The headquarters will be at the Hotel Coronado.

Future conventions of the society are announced as Detroit in the fall of 1930; Birmingham, Ala., in the spring of 1931, and Salt Lake City in the fall of that year.

Index for Industrial Use of Electricity Rises

Industrial consumption of electricity in the United States, according to the *Electrical World* index, was 135.8 in September, compared with 128.2 in August and with 134.5 in September of last year. The index is based upon electrical energy consumption by 3600 scattered manufacturing plants, their average in 1923-1925 being 100.

The metal industries group advanced from 140.7 to 149.2. Both components showed an increase, that for rolling mills and steel plants going from 150.9 to 152.3, while metal-working plants, ferrous and non-ferrous, advanced from 134.6 to 147.4. Automobiles, including parts manufactured, declined from 143 to 138.1. Shipbuilding showed a large advance, from 96.3 to 114.9.

The Week in Business

Drift of Current Financial and Economic Opinion

STOCK market deflation has proceded further, following a brief interruption in the second week of the month. The main cause for the decline, according to Col. Leonard P. Ayres, is an excessive accumulation of undigested securities. "For months past," he says, "the outpourings of new securities have been enormous, and finally the public ceased to take the new issues with the avidity they had shown earlier."

The large-scale flotation of securities has a definite connection with the high level of brokers' loans, in the opinion of Alexander D. Noyes, New York *Times*. In the face of stock market liquidation, there has been an increase of $400,000,000 in brokers' borrowings in New York alone since Sept. 1, on top of a billion dollar expansion in the preceding three months. Such a picture, says Mr. Noyes, raises the question whether a great part of the year's new issues have not remained unsold and carried along on brokers' credit, in first or second hands.

Reduction in "Outside" Loans Throws Burden on Banks

The gain of $88,000,000 in brokers' loans last week nearly wiped out the reduction of the previous week, bringing the total to within $3,000,000 of the record peak. A new feature of the latest increase was that it was supplied by the banks and that loans from "others" declined. In the view of Benjamin Baker, *Annalist*, "the figures show again the banking danger which made its appearance so emphatically at the beginning of the year—namely, that with any withdrawal of "others" loans the member banks and the Reserve banks would have to take up the load as the only means of avoiding a money disturbance of greater or less severity."

The fact that "stocks tumbled badly" last week with call rates relatively easy is interpreted by *Commercial and Financial Chronicle* as demonstrating that the course of the money market does not control the course of the stock market. On the other hand, the Harvard Economic Society sees the possibility of easier money again "stimulating speculative activity, as it usually does." But it does not expect more than a moderate easing of credit under the present Reserve policy, which is unlikely to be changed unless serious business recession threatens.

Signs of Moderating Business Pace

While general business has definitely moderated, it is still high in comparison with previous autumns. Symptoms of slackened activity are seen in a decline in commodity prices and an expansion of commodity stocks, which, however, are not seriously large except in a few lines. Bank debits and export trade have failed to show their usual seasonal gain, says the Harvard Economic Society, important branches of manufacturing have slowed up, and building remains in reduced volume.

Both building and foreign trade are expected to benefit from securities deflation. The outlook for residential construction is steadily improving, in the opinion of Standard Statistics, because, under money conditions of the past year, demand has been catching up with supply. Betterment in the capital market of the outside world, according to advices from abroad, is regarded as the logical sequel of the withdrawal of European funds from New York and renewed American interest in fixed-return securities.

Sees Stocks Back on Sound Basis

A sanguine view of the present status of business and of stocks is taken by Charles E. Mitchell, chairman of the National City Bank of New York, as quoted in a London message to the New York *Times*. "All the basic industries are doing satisfactorily and, unless something unforeseen occurs, should continue to do so," he said. The shakedown of stock prices has brought "many leading industrial securities to levels which would have been considered perfectly sound and conservative even by the standards of 10 years ago."

Iron and Steel Markets

Good Bookings in Ship Steel and Rails

Rail Orders Account for 563,000 Tons and Vessels for 105,000 Tons—Inquiries for 25,000 Freight Cars in Prospect —Motor Car Outlook Still Uncertain

THE week's news has accentuated the contrast between the reduced steel requirements of the automobile industry and the sustained demand from other sources.

Rail orders have added 563,000 tons to mill books and shipbuilding contracts will account for 105,000 tons. Structural steel awards for the week are high, totaling 58,000 tons, compared with 23,000 tons in the preceding week. Freight equipment purchases so far in October call for 20,000 cars, or 28 per cent of the total number bought in the first nine months of the year, and orders for 25,000 additional cars are in prospect.

Farm implement manufacturers are stepping up production of spring tools and will soon be operating at a peak rate. The entering of orders for tin plate, following the impending announcement of next year's price, will enable mills that are not now working on anticipated tonnage to increase their production.

Steel mill operations show wide variations, depending on the extent to which different finished products are used in the motor car industry, but steel ingot output has undergone little further reduction. Some independents are making raw steel at the rate of 70 per cent, or even less, but the Bethlehem Steel Corporation is operating at 82 per cent and the United States Steel Corporation average remains at 80 per cent.

The view is gaining ground that production has struck bottom. In the Valley district, which ships more steel to the automobile industry than any other producing center, ingot output is down to 70 per cent, but no further curtailment is looked for. In the Pittsburgh area crude steel production is being maintained at an 80 per cent rate and rail mill operations are being increased. At Chicago the tardiness of rail specifications has caused the temporary banking of a steel works blast furnace.

Scrap markets are inactive, but the downward trend of prices has been arrested, with heavy melting grade unchanged at Pittsburgh for a second week. Pig iron melt is well sustained except among foundries serving the automotive industry. In fact, Cleveland reports an increase in pig iron shipments, notably to manufacturers of heating equipment. Good operations among steel foundries reflect the influence of railroad equipment buying.

The outlook in the automobile industry remains uncertain. Production of new models is being delayed until large stocks of present models, both in manufacturers' and dealers' hands, are disposed of. The sale of used cars is also a problem, although in some sections distributers' stocks have been reduced materially.

With the steel industry adjusting itself to the slump in automotive requirements, the price situation gives signs of clarifying. At least changes of the past week were not significant, being limited to recognition of recent concessions or to the readjustment of quotations on certain products to bring them into line with others. Thus wire nails, which have lacked stability for some time, now range from $2.40 to $2.50 a keg, Pittsburgh, the lower figure representing a decline of $1 a ton from the previous minimum open quotation. At Chicago, bars and shapes have been reduced $1 a ton, following frequent shading of the former price. A decline in metal furniture sheets to a flat price of 4.10c., Pittsburgh, is in sympathy with prior reductions in commoner finishes.

Shipbuilding is looming up as a more important outlet for steel. Two Dollar line vessels have been placed with the Newport News Shipbuilding & Dry Dock Co., and six tankers have been awarded—two for the Sinclair company to the Bethlehem Shipbuilding Corporation, two Standard Oil Co. vessels to the Federal Shipbuilding & Dry Dock Co., and two for the Tidewater Oil Co. to the Sun Shipbuilding & Dry Dock Co. These vessels, together with two merchant ships to be placed this week, will require close to 105,000 tons of steel. Six car floats, ordered by the Reading Co., will call for 3500 tons of plates and shapes.

Railroad equipment business recently closed, together with that which will probably be placed in the next two months, will give most freight car builders a substantial backlog of work for the early months of 1930. The Pennsylvania has bought 1000 steel box cars from the Bethlehem Steel Corporation, and the Burlington has entered the market for 600 cars out of a total of 2700 to be inquired for.

The week's awards of fabricated steel included 17,500 tons for the Cornell Medical Center, New York, and 16,000 tons for a Pennsylvania Railroad station at Philadelphia. Of 38,000 tons of new work that came into the market, 15,000 tons is for a Chicago tower building. Conspicuous among prospective projects is a 100-story building in New York for the Metropolitan Life Co., which will require 30,000 to 40,000 tons of steel.

THE IRON AGE composite price for pig iron has advanced from $18.29 to $18.38 a gross ton. The finished steel composite remains at 2.369c. a lb.

A Comparison of Prices

Market Prices at Date, and One Week, One Month and One Year Previous, Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron, Per Gross Ton:	Oct. 22, 1929	Oct. 15, 1929	Sept. 24, 1929	Oct. 23, 1928
No. 2 foundry, Philadelphia	$21.26	$21.26	$21.26	$21.76
No. 2, Valley furnace	18.50	18.50	18.50	17.00
No. 2 Southern, Cin'ti	**17.69**	17.19	17.19	19.94
No. 2, Birmingham	14.50	14.50	14.50	16.25
No. 2 foundry, Chicago*	20.00	20.00	20.00	19.00
Basic, del'd eastern Pa.	19.75	19.75	19.75	19.75
Basic, Valley furnace	18.50	18.50	18.50	17.00
Valley Bessemer, del'd P'gh.	20.76	20.76	20.76	19.26
Malleable, Chicago*	20.00	20.00	20.00	19.00
Malleable, Valley	19.00	19.00	19.00	17.50
Gray forge, Pittsburgh	19.76	19.76	19.76	18.26
L. S. charcoal, Chicago	27.04	27.04	27.04	27.04
Ferromanganese, furnace	105.00	105.00	105.00	105.00
Rails, Billets, Etc., Per Gross Ton:				
Rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Light rails at mill	36.00	36.00	36.00	36.00
Rerolling billets, Pittsburgh	35.00	35.00	35.00	33.00
Sheet bars, Pittsburgh	35.00	35.00	35.00	33.00
Slabs, Pittsburgh	35.00	35.00	35.00	33.00
Forging billets, Pittsburgh	40.00	40.00	40.00	38.00
Wire rods, Pittsburgh	40.00	40.00	42.00	42.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.85	1.85	1.85	1.90
Finished Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Bars, Pittsburgh	1.90	1.90	1.90	1.90
Bars, Chicago	*2.00*	2.05	2.05	2.00
Bars, Cleveland	*1.90*	1.95	1.95	1.90
Bars, New York	2.24	2.24	2.24	2.24
Tank plates, Pittsburgh	1.95	1.95	1.95	1.90
Tank plates, Chicago	2.05	2.05	2.05	2.00
Tank plates, New York	2.22½	2.22½	2.22½	2.22½
Structural shapes, Pittsburgh	1.90	1.90	1.90	1.90
Structural shapes, Chicago	*2.00*	2.05	2.05	2.00
Structural shapes, New York	2.14½	2.14½	2.19½	2.19½
Cold-finished bars, Pittsburgh	2.30	2.30	2.30	2.20
Hot-rolled strips, Pittsburgh	1.90	1.90	1.90	1.90
Cold-rolled strips, Pittsburgh	2.75	2.75	2.75	2.75

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

Finished Steel,	Oct. 22, 1929	Oct. 15, 1929	Sept. 24, 1929	Oct. 23, 1928
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 24, P'gh	2.75	2.75	2.85	2.75
Sheets, black, No. 24, Chicago dist. mill	2.95	2.95	2.95	2.85
Sheets, galv., No. 24, P'gh	3.50	3.50	3.50	3.50
Sheets, galv., No. 24, Chicago dist. mill	3.60	3.60	3.60	3.60
Sheets, blue, No. 13, P'gh	2.35	2.35	2.35	2.10
Sheets, blue, No. 13, Chicago dist. mill	2.45	2.45	2.45	2.20
Wire nails, Pittsburgh	*2.40*	2.45	2.45	2.55
Wire nails, Chicago dist. mill	2.45	2.45	2.50	2.60
Plain wire, Pittsburgh	2.40	2.40	2.40	2.40
Plain wire, Chicago dist. mill	2.40	2.40	2.45	2.45
Barbed wire, galv., P'gh	*3.05*	3.10	3.20	3.20
Barbed wire, galv., Chicago dist. mill	3.15	3.15	3.30	3.25
Tin plate, 100 lb. box, P'gh	$5.35	$5.35	$5.35	$5.25
Old Material, Per Gross Ton:				
Heavy melting steel, P'gh	$17.25	$17.25	$18.00	$18.00
Heavy melting steel, Phila	15.50	15.50	16.00	16.00
Heavy melting steel, Ch'go	14.25	14.25	15.00	14.00
Carwheels, Chicago	14.00	14.00	14.00	13.75
Carwheels, Philadelphia	16.50	16.50	16.50	16.50
No. 1 cast, Pittsburgh	15.50	15.50	15.50	15.50
No. 1 cast, Philadelphia	16.00	16.00	16.00	17.00
No. 1 cast, Ch'go (net ton)	14.50	14.50	14.50	15.50
No. 1 RR. wrot., Phila	16.00	16.00	16.00	15.50
No. 1 RR. wrot., Ch'go (net)	14.00	14.00	14.00	12.75
Coke, Connellsville,				
Per Net Ton at Oven:				
Furnace coke, prompt	$2.65	$2.65	$2.65	$2.90
Foundry coke, prompt	3.75	3.75	3.75	3.75
Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	18.12½	18.12½	18.12½	15.62½
Electrolytic copper, refinery	17.75	17.75	17.75	15.25
Tin (Straits), New York	*41.37½*	42.25	45.25	48.75
Zinc, East St. Louis	*6.70*	6.80	6.80	6.25
Zinc, New York	*7.05*	7.15	7.15	6.60
Lead, St. Louis	6.70	6.70	6.70	6.32½
Lead, New York	6.90	6.90	6.90	6.50
Antimony (Asiatic), N. Y.	**8.75**	8.50	8.62½	10.50

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Pittsburgh

Reduced Requirements of Automobile Industry Only Flaw in Steel Demand—Operations at 80 Per Cent

PITTSBURGH, Oct. 22.—If it were not for the reduced requirements of the automobile industry, steel demand in this and nearby districts would be considered about normal for this time of the year. It might be somewhat less than it was last October, which was a month of unusually heavy activity in many steel-consuming industries, but was not a period in which the automobile makers accounted for as large a percentage of steel shipped as they did in the first six months of this year.

The placing of heavy rail tonnages in the last week improved sentiment in the market somewhat, although these orders were scarcely 5 per cent ahead of placements last year by the same railroads. The rail mill in the district is already stepping up its schedules, and diversion of steel to this use will perhaps reduce the amount of semi-finished steel which might be offered for sale.

Steel orders from car builders are being received by local sheet and plate mills, and a survey indicates that shops served by steel makers in the Pittsburgh district have secured enough business from the recent buying movement to keep them well occupied until the second or third month of next year.

Agricultural implement makers are taking steel in increasing quantities, and, in gaging the implement demand for next year on which they are now beginning to work, they do not expect curtailed buying from the farmers in any districts except possibly parts of Western Canada.

Next year's price on tin plate is expected to be announced within the next two or three weeks and the entering of orders at that time will enable mills which are not already working on anticipated tonnage to increase production in that department. Structural demand is not heavy in this particular locality, but fabricating shops are fairly well engaged. Barge builders are now completing orders booked earlier in the year, but prospective business in both barges and self-propelled river craft is encouraging.

Steel plant operations have not changed materially in the last week. Slight improvement in some departments is naturally stressed more than further curtailment in others. Ingot operations average about 80 per cent of capacity, with the larger mills making a well diversified line of products at a somewhat better rate. Some independent makers of sheets and strips are not higher than 50 per cent. Sheet mill operations, as a whole, are at 70 to 75 per cent, while strip mills average between 50 and 60. Pipe mills have been slowed down slightly this month.

Present prices are holding and recent reductions have clarified the situation and probably have led to the placing of considerable tonnage which had been held in abeyance.

Wire nails have been reduced $1 a ton and are now quoted at $2.40, Pittsburgh, to large buyers and at $2.50 in carload lots. Wire prices are

unchanged, with 2.40c. a lb. generally quoted for manufacturers' wire. Bars and shapes are still quotable at 1.90c. to 1.95c., Pittsburgh, and, although the lower figure is not applying on much plate tonnage in this territory, reports of shading are common in the East.

Pig Iron.—The market continues very dull so far as sales or inquiries for large tonnages of iron are concerned. Local sellers are taking orders regularly for lots of two or three carloads, and foundries in the district are evidently buying iron only as they actually need it. Prompt shipments are readily obtainable from nearly all the Valley and local furnaces, and, with prices subject to little or no shading, there is no incentive to cover against future wants. The steel foundries in the district are operating at a good rate, and shipments to them are heavy. The same cannot be said of the sanitary ware and radiator makers, whose wants are limited. The largest maker of sanitary ware does not expect to buy any large tonnages of iron before the first of the year, although some small lots may be purchased to fill out. Prices are unchanged at $18.50, Valley, for basic and foundry iron, and $19 for malleable. The local furnace is quoting prices 50c. higher.

Prices per gross ton, f.o.b. Valley furnace:

Basic	$18.50
Bessemer	19.00
Gray forge	18.00
No. 2 foundry	18.50
No. 3 foundry	18.00
Malleable	19.00
Low phos., copper free	27.00

Freight rate to Pittsburgh or Cleveland district, $1.76.

Prices per gross ton, f.o.b. Pittsburgh district furnace:

Basic	$19.00
No. 2 foundry	19.00
No. 3 foundry	18.50
Malleable	19.00

Freight rates to points in Pittsburgh district range from 63c. to $1.13

Semi-Finished Steel.—The market is without feature, as there is little or no spot inquiry for semi-finished steel, and most non-integrated steel companies have covered their requirements for this quarter by contract. A few companies, which are not ordinarily large sellers of billets, slabs and sheet bars, are making rather active efforts to dispose of surplus tonnage, but users of these products are limited and the majority of them have definite sources of supply from whom they seldom divert their tonnage. The price situation seems reasonably firm, with $35 the ordinary quotation on billets, slabs and sheet bars, and $40 on forging billets. Wire rods are holding at $49, Pittsburgh or Cleveland, and there is little activity.

Rails and Track Accessories.—Both the Pennsylvania and New York Central rail tonnages were placed during the last week, the Pennsylvania having ordered 310,000 tons and the New York Central 206,430 tons. The Erie Railroad has placed 46,460 tons of rails. Distribution of these orders is given elsewhere in this issue. The Erie has not yet placed its track accessories, nor has the New York Central. The Pennsylvania track accessories are bought quarterly. The Pere Marquette is reported to have closed on 5000 tons of tie plates.

Bars, Shapes and Plates.—Business in the heavy hot-rolled products has changed very little in the last three weeks, but sentiment in the market has improved somewhat, and a few companies reported slightly better specifications on bars. Structural awards in this district are not heavy, but fabricating shops are fairly well engaged and there is enough work in prospect to insure a fairly good business for the remainder of the quarter. Specifications for plates to cover recent car awards are not yet reaching mills in this district in heavy amounts, but this business is bound to be placed in the near future and will improve mill backlogs materially. Prices are still subject to shading, but there is no indication that less than 1.90c., Pittsburgh, is being done on either bars or shapes. Plates are holding better in this district, although there are reports of lower prices in the East.

Wire Products.—Makers of wire and wire nails have announced new prices, effective immediately, and are now quoting nails at $2.40 to $2.50 per keg, Pittsburgh, the range depending on the size of the jobber. This is a decline of $1 a ton from recent levels. Manufacturers' wire is now quoted at 2.40c., Pittsburgh base, while quotations to jobbers on bright plain wire, No. 6 to 9 gage, are unchanged at 2.40c. to 2.50c., Pittsburgh. With the $3 extra for annealing, this makes a price of 2.55c. to 2.65c., Pittsburgh, for annealed fence wire, which constitutes the largest part of the jobbers' tonnage. Business is rather quiet, but recent changes are expected to clarify the price situation somewhat. Demand for manufacturers' wire has been influenced adversely by the decreased automobile production, but this is expected to show some improvement next month.

Tubular Products.—The inquiry for 300 miles of 4, 6 and 8-in. line pipe, which was reported last week, is now thought to have been confused with an inquiry for 50 miles of 6-in. and 50 miles of 8-in. pipe, on which the prospective buyer asked for prices on three types of end finishes. This inquiry also included a few miles of 4-in. pipe. Otherwise inquiry for line pipe is quiet and demand for seamless goods from the oil country is not heavy. Movement of butt-weld pipe is receding seasonably, but mills are still fairly well engaged. Mechanical tubing is quiet, but there is a better call for boiler tubes.

Sheets.—If it were not for the automobile industry, the sheet business would be considered excellent for this time of the year, as other important consuming industries are taking tonnage at a satisfactory rate. Heavier specifications for blue annealed and galvanized sheets are expected from the railroad car builders in a short time, and if the automobile industry begins to come back next month the quarter may prove to be a more satisfactory one than was anticipated a few weeks ago. At present, demand from the automotive industry is negligible, but the Ford Motor Co. has begun to place specifications for November shipments and others are expected to follow suit in a short time. It is worthy of note that the Ford specifications do not indicate any marked model changes. Sheet prices are becoming better established at recent reduced prices. Black sheets are now quotable at 2.75c., Pittsburgh, as the

The Iron Age Composite Prices

Finished Steel

Oct. 22, 1929, 2.369c. a Lb.

One week ago	2.369c.
One month ago	2.384c.
One year ago	2.362c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products make 87 per cent of the United States output of finished steel.

	High	Low
1929	2.412c., April 2;	2.369c., Oct. 8
1928	2.391c., Dec. 11;	2.314c., Jan. 3
1927	2.453c., Jan. 4;	2.293c., Oct. 25
1926	2.453c., Jan. 5;	2.403c., May 18
1925	2.560c., Jan. 6;	2.396c., Aug. 18

Pig Iron

Oct. 22, 1929, $18.38 a Gross Ton

One week ago	$18.29
One month ago	18.29
One year ago	17.92
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High	Low
1929	$18.71, May 14;	$18.25, Aug. 27
1928	18.59, Nov. 27;	17.04, July 24
1927	19.71, Jan. 4;	17.54, Nov. 1
1926	21.54, Jan. 5;	19.46, July 13
1925	22.50, Jan. 13;	18.96, July 7

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base per Lb.
F.o.b. Pittsburgh mill	1.90c. to 1.95c.
F.o.b. Chicago	2.00c. to 2.05c.
Del'd Philadelphia	2.22c. to 2.27c.
Del'd New York	2.24c. to 2.29c.
Del'd Cleveland	1.90c. to 1.95c.
F.o.b. Cleveland	1.90c.
F.o.b. Lackawanna	2.00c. to 2.05c.
F.o.b. Birmingham	2.10c.
C.i.f. Pacific ports	2.35c.
F.o.b. San Francisco mills	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills, 40, 50, 60-ft.	2.05c.
F.o.b. Pittsburgh mills, cut lengths	2.30c.
F.o.b. Birmingham, mill lengths	2.10c.

Rail Steel

F.o.b. mills, east of Chicago dist.	1.85c. to 1.90c.
F.o.b. Chicago Heights mill	1.95c.
Del'd Philadelphia	2.27c.

Iron

Common iron, f.o.b. Chicago	2.05c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	2.12c.
Common iron, del'd New York	2.14c.

Tank Plates

	Base per Lb.
F.o.b. Pittsburgh mill	1.95c.
F.o.b. Chicago	2.05c.
F.o.b. Birmingham	2.10c.
Del'd Cleveland	2.14c.
Del'd Philadelphia	2.15c.
F.o.b. Coatesville	2.05c.
F.o.b. Sparrows Point	2.05c.
F.o.b. Lackawanna	2.05c.
Del'd New York	2.22½c.
C.i.f. Pacific ports	2.35c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh mill	1.90c. to 1.95c.
F.o.b. Chicago	2.00c. to 2.05c.
F.o.b. Birmingham	2.10c.
F.o.b. Lackawanna	2.05c.
F.o.b. Bethlehem	2.05c.
Del'd Cleveland	2.14c.
Del'd Philadelphia	1.96c. to 2.06c.
Del'd New York	2.14½c.
C.i.f. Pacific ports	2.35c.

Hot-Rolled Hoops, Bands and Strips

	Base per Lb.
6 in. and narrower, P'gh	2.00c.
Wider than 6 in., P'gh	1.90c.
6 in. and narrower, Chicago	2.20c.
Wider than 6 in., Chicago	2.10c.
Cooperage stock, P'gh	2.20c.
Cooperage stock, Chicago	2.30c.

Cold-Finished Steel

	Base per Lb.
Bars, f.o.b. Pittsburgh mill	2.30c.
Bars, f.o.b. Chicago	2.30c.
Bars, Cleveland	2.30c.
Bars, Buffalo	2.30c.
Shafting, ground, f.o.b. mill	*2.65c. to 3.60c.
Strips, P'gh	2.75c. to 2.85c.
Strips, Cleveland	2.75c. to 2.85c.
Strips, del'd Chicago	3.05c. to 3.15c.
Strips, Worcester	2.90c. to 3.00c.
Fender stock, No. 20 gage, Pittsburgh or Cleveland	4.25c.

*According to size.

Wire Products

(Carload lots, f.o.b. Pittsburgh and Cleveland, to jobbers and retailers.)

	Base per Keg
Wire nails	$2.40 to $2.50
Galvanized nails	4.40 to 4.50
Galvanized staples	3.10 to 3.20
Polished staples (per lb.)	2.85c. to 2.95c.
Cement coated nails	$2.40 to $2.50
	Base per 100 Lb.
Bright plain wire, No. 6 to No. 9 gage	$2.40 to $2.50
Annealed fence wire	2.55 to 2.65
Spring wire	3.50 to 3.60
Galv'd wire, No. 9	3.00 to 3.10
Barbed wire, galv'd	3.05c. to 3.15c.
Barbed wire, painted	2.80c. to 2.90c.
Woven wire fence (per net ton to retailers)	65.00

Cut Nails

	Per 100 Lb.
Carloads, Wheeling, Reading or Northumberland, Pa.	$2.70
Less carloads, Wheeling or Reading	2.80

Light Plates

No. 10, blue annealed, f.o.b. P'gh	2.10c. to 2.20c.
No. 10, blue annealed, f.o.b. Chicago dist.	2.30c.
No. 10, blue annealed, del'd Phila.	2.42c. to 2.52c.
No. 10, blue annealed, B'ham	2.35c.

Sheets

Blue Annealed

	Base per Lb.
No. 13, f.o.b. P'gh	2.25c. to 2.35c.
No. 13, f.o.b. Chicago dist.	2.45c.
No. 13, del'd Philadelphia	2.57c. to 2.67c.
No. 13, blue annealed, B'ham	2.50c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh	2.75c.
No. 24, f.o.b. Chicago dist. mill	2.95c.
No. 24, del'd Philadelphia	3.07c.
No. 24, f.o.b. Birmingham	3.00c. to 3.10c.

Metal Furniture Sheets

No. 24, f.o.b. P'gh	4.10c.

Galvanized

No. 24, f.o.b. Pittsburgh	3.50c. to 3.60c.
No. 24, f.o.b. Chicago dist. mill	3.60c. to 3.70c.
No. 24, del'd Cleveland	3.59c. to 3.69c.
No. 24, del'd Philadelphia	3.82c. to 3.92c.
No. 24, f.o.b. Birmingham	3.75c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.90c. to 3.00c.
No. 28, f.o.b. Chicago dist. mill	3.00c. to 3.10c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh	4.00c.

Long Ternes

No. 24, 8-lb. coating, f.o.b. mill	4.00c. to 4.10c.

Vitreous Enameling Stock

No. 24, f.o.b. Pittsburgh	3.90c.

Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills	$5.35
Standard cokes, f.o.b. Gary	5.45

Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)
(Per Package, 20 x 28 in.)

8-lb. coating I.C. $11.20	25-lb. coating I.C. $16.70
15-lb. coating I.C. 14.00	30-lb. coating I.C. 17.75
20-lb. coating I.C. 15.30	40-lb. coating I.C. 19.85

Alloy Steel Bars

(F.o.b. makers' mill)

Alloy Quality Bar Base, 2.65c. to 2.75c. per Lb.

S.A.E. Series Numbers		Alloy Differential
2000	(1½% Nickel)	$0.25
2100	(1¼% Nickel)	0.55
2300	(3½% Nickel)	1.50
2500	(5% Nickel)	2.25
3100	Nickel Chromium	0.55
3200	Nickel Chromium	1.35
3300	Nickel Chromium	3.80
3400	Nickel Chromium	3.20
4100	Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50
4100	Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600	Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel)	1.05
5100	Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100	Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100	Chromium Spring Steel	0.20
6100	Chromium Vanadium Bars	1.20
6100	Chromium Vanadium Spring Steel	0.95
9250	Silicon Manganese Spring Steel (flats)	0.25
	Rounds and squares	0.50
	Chromium Nickel Vanadium	1.50
	Carbon Vanadium	0.95

Above prices are for hot rolled steel bars, forging quality. The differential for cold-drawn bars is ¾c. a lb. higher, with standard classification for cold-finished alloy steel bars applying. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis.

Billets under 4 x 4 in. carry the steel bar base. Slabs with a sectional area of 16 in. or over carry the billet price. Slabs with sectional area of less than 16 in. or less than 2½ in. thick, regardless of sectional area, take the bar price.

Rails

	Per Gross Ton
Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	36.00
Light (from rail steel), f.o.b. mill	34.00
Light (from billets), f.o.b. Ch'go mill	36.00

Track Equipment

	Base per 100 Lb.
Spikes, ⅝ in. and larger	$2.80
Spikes, ½ in. and smaller	2.80
Spikes, boat and barge	3.00
Tie plate, steel	2.15
Angle bars	$2.75
Track bolts, to steam railroads	$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel Inches	Black	Galv.	*Iron* Inches	Black	Galv.
⅛	45	19½	¼ and ⅜	+11	+36
¼ to ⅜	51	26½	½	23	5
½	56	42½	¾	28	11
¾	60	48½	1 and 1¼	31	15
1 to 3	62	50½	1½ and 2	35	18

Lap Weld

2	55	43½	2	23	9
2½ to 6	59	47½	2½ to 3½	28	13
7 and 8	56	43½	4 to 6	30	17
9 and 10	54	42½	7 and 8	29	16
11 and 12	53	40½	9 to 12	26	11

Butt Weld, extra strong, plain ends

⅛	41	24½	¼ and ⅜	+13	+48
¼ to ⅜	47	30½	½	23	7
½	53	42½	¾	28	12
¾	58	47⅛	1 to 2	34	18
1 to 1¼	60	49½			
2 to 3	61	50½			

Lap Weld, extra strong, plain ends

2	53	42½	½	29	13
2½ to 4	57	46½	2½ to 4	34	20
4½ to 6	56	45½	4½ to 6	33	19
7 to 8	52	39½	7 and 8	31	17
9 and 10	45	32½	9 to 12	21	8
11 and 12	44	31½			

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note. Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Steel		*Charcoal Iron*	
2 in. and 2¼ in.	38	1½ in.	1
2½ in.—2¾ in.	46	1¾ in.	8
3 in.	52	2 in.—2¼ in.	13
3¼ in.—3¾ in.	54	2½ in.—2¾ in.	16
4 in.	57	3 in.	17
4½ in. to 6 in.	46	3¼ in. to 3½ in.	18
		4 in.	20
		4½ in.	21

On lots of a carload or more, the above base discounts are subject to a preferential of two fives on steel and of 10 per cent on charcoal iron tubes. Smaller quantities are subject to the following modifications from the base discounts:

Lap Welded Steel—Under 10,000 lb., 6 points under base and one five; 10,000 lb. to carload, 4 points under base and two fives. Charcoal Iron—Under 10,000 lb., 2 points under base; 10,000 lb. to carload, base and one five.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	61	3 in.	46
1¼ to 1½ in.	53	3¼ to 3½ in.	48
1¾ in.	37	4 in.	51
2 to 2¼ in.	32	4½, 5 and 6 in.	40
2½ to 2¾ in.	40		

Hot Rolled

2 and 2¼ in.	38	3¼ to 3½ in.	54
2½ and 2¾ in.	46	4 in.	57
3 in.	52	4½, 5 and 6 in.	46

Beyond the above base discounts a preferential discount of 5 per cent is allowed on carload lots. On less than carloads to 10,000 lb., base discounts are reduced 4 points with 5 per cent preferential; on less than 10,000 lb., base discounts are reduced 6 points, with no preferential. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage take the mechanical tube list and discounts. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30%, base (carloads)	55
Carbon, 0.30% to 0.40% base	50

Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

higher figure has practically disappeared and automobile body sheets are now at 4c., flat. Metal furniture sheets are also quotable at a flat 4.10c. Galvanized material is still quotable at 3.50c. to 3.60c., although the higher figure is gradually disappearing. Shading in blue annealed sheets has not developed to any marked extent in this district, although the wide strip mill product is quoted at $4 a ton under the regular maximum quotations of 2.35c., on the No. 13 gage jobbing mills sheets and 2.20c. on the No. 10 gage.

Tin Plate. — Operations have changed little in the last week, although the leading interest has curtailed its production slightly. The average for the independent companies is about 60 per cent of capacity. It will be two or three weeks before the 1930 price on tin plate will be announced and, in the meantime, contracting is held in abeyance.

Strip Steel.—The strip market has a firmer tone, as the demand is improving from many industries and a few companies are receiving increased specifications from the automobile makers. The Chevrolet Motor Co. has begun to place tonnage for November shipments and other smaller users will soon be back in the market. The hardware industry is now an active consumer of strip steel. Operations in the district average between 50 and 60 per cent of capacity and have improved slightly in some mills in the last week. Prices are unchanged and shading seems to be on the wane rather than on the increase. Hot-rolled material is holding at 1.90c. and 2c., Pittsburgh, and cold-rolled at 2.75c. to 2.85c.

Cold-Finished Steel Bars.—Specifications are coming in at approximately the rate which has prevailed during the month, but there are signs of improvement in some directions. The agricultural implement industry is stepping up its operations in preparation for next season's requirements and will soon be at the peak rate. This business is one of the largest consumers of cold-finished bars and, while Pittsburgh mills do not share heavily in this business, it constitutes a fair portion of their tonnage. Demand from the automobile industry has not yet begun to show much improvement. Prices are holding at 2.30c., Pittsburgh.

Old Material.—The scrap market has undergone little change in the last week, and, while at least two consumers are reported to have placed small tonnages, both sales come within the recent price range of $17 to $17.50 for No. 1 heavy melting steel. Scrap is not nearly so plentiful as it was at the beginning of the month, but dealers are having no trouble in picking up material for shipment against recent sales. Hold-ups are still in effect at two important consuming points, but steel scrap is moving more freely into other plants and it is believed by some that the market has reached bottom. Generally speaking, prices quoted last week are still representative of the market on all grades and tendencies toward strength are reported in a few lines.

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.25c.
Hoops	4.25c.
Black sheets (No. 24), 25 or more bundles	3.80c. to 3.90c.
Galv. sheets (No. 24), 25 or more bundles	4.45c. to 4.55c.
Light plates, blue annealed (No. 10), 1 to 24 plates	3.35c. to 3.45c.
Blue annealed sheets (No. 13), 1 to 24 sheets	3.50c. to 3.60c.
Galv. corrug. sheets (No. 28), per square	$4.43
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count,	60 per cent off list
Machine bolts, 100 count,	60 per cent off list
Carriage bolts, 100 count,	60 per cent off list
Nuts, all styles, 100 count,	60 per cent off list
Large rivets, base per 100 lb.	$3.50
Wire, black soft, ann'l'd, base per 100 lb.	$2.90 to 3.00
Wire, galv. soft, base per 100 lb.	2.90 to 3.00
Common wire nails, per keg	2.80 to 2.90
Cement coated nails, per keg	2.95 to 3.05

Prices per gross ton delivered consumers yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$17.00 to $17.50
No. 2 heavy melting steel	15.00 to 15.50
Scrap rails	16.00 to 16.50
Compressed sheet steel	16.75 to 17.25
Bundled sheets, sides and ends	15.50 to 16.00
Cast iron carwheels	15.50 to 16.00
Sheet bar crops, ordinary	18.50 to 19.00
Heavy breakable cast	12.00 to 12.50
No. 2 railroad wrought	17.00 to 17.50
Hvy. steel axle turnings	16.00 to 16.50
Machine shop turnings	11.50 to 12.00
Acid Open-Hearth Grades:	
Railr. knuckles and couplers	20.50 to 21.00
Railr. coil and leaf springs	20.50 to 21.00
Rolled steel wheels	20.50 to 21.00
Low phos. billet and bloom ends	21.50 to 22.00
Low phos., mill plates	21.50 to 22.00
Low phos., light grades	20.50 to 21.50
Low phos., sheet bar crops	21.50 to 22.00
Heavy steel axle turnings	16.00 to 16.50
Electric Furnace Grades:	
Low phos., punchings	19.50 to 20.50
Hvy. steel axle turnings	16.00 to 16.50
Blast Furnace Grades:	
Short shoveling steel turnings	12.00 to 12.50
Short mixed borings and turnings	12.00 to 12.50
Cast iron borings	12.00 to 12.50
Rolling Mill Grades:	
Steel car axles	21.50 to 22.00
Cupola Grades:	
No. 1 cast	15.00 to 16.00
Rails 3 ft. and under	19.00 to 20.00

Coal and Coke.—The coke market is without interest and, while demand for the domestic grade is rather strong at this time, furnace coke is quiet and is feeling the reduced requirements of the steel industry. Prices seem to be showing more strength, but the market on furnace coke is still quotable at $2.65 to $2.75 per ton, Connellsville. Stronger prices are reported from the East. Foundry coke shipments are showing some improvement, but the demand is not heavy and little spot tonnage is coming into the market. Coal business still disappoints, and although reports of better prices and heavier demand come from the lower West Virginia field, the districts around Pittsburgh are not doing so well. The end of the Lake movement in a few weeks will also influence shipments adversely.

Jones & Laughlin Profit in Quarter $5,690,226

The Jones & Laughlin Steel Corporation, in the quarter ended Sept. 30, had net income, after deductions for depreciation, depletion, bond interest, etc., of $5,690,226. After payment of dividends on common and preferred stock, balance carried to surplus amounted to $3,366,014. Net income in the first nine months of the year amounted to $16,995,913.

The regular dividends of 1¾ per cent on preferred and 1¼ per cent on common stock were declared, as well as an extra of 1 per cent on common.

Steel Foundry Operates 45 Days Without Accident

Having won the inter-plant contest of the Chicago Safety Council for the best record in July, the Pettibone Mulliken Co., manufacturer of steel castings, is now setting out to make an even better mark in the prevention of accidents. For 45 days beginning July 1 the company did not have a lost-time accident.

By assuming its own casualty risk, the company has cut its cost of insurance from $36,000 to $11,000 yearly. A central safety committee, composed of the operating manager, plant physician and superintendents of the various departments, supervises safety. This group holds regular monthly meetings at which problems are discussed and plans mapped out for cutting down the accident rate.

Each month the committee appoints from a different department some man to act as an inspector. This employee devotes a portion of each day to a tour of the plant, inspecting safety devices, noting whether the men are taking all precautions against injury and making recommendations for changes and improvements.

Joseph T. Ryerson & Son, Inc., Chicago, has sold its line of table and floor-type horizontal boring, drilling, and milling machines to the Ohio Machine Tool Co., Kenton, Ohio, but will retain rights as exclusive distributors of the line. The Ohio Machine Tool Co., which has been building these machines for some time for the Ryerson company, will expand and improve the line.

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and under 10-in., Pittsburgh	$35.00
Rerolling, 4-in. and under 10-in., Youngstown	35.00
Rerolling, 4-in. and under 10-in., Cleveland	35.00
Rerolling, 4-in. and under 10-in., Chicago	37.00
Forging quality, Pittsburgh	$40.00 to 41.00

Sheet Bars

(Open Hearth or Bessemer)

	Per Gross Ton
Pittsburgh	$35.00
Youngstown	35.00
Cleveland	35.00

Slabs

(8 in. x 2 in. and under 10 in. x 10 in.)

	Per Gross Ton
Pittsburgh	$35.00
Youngstown	35.00
Cleveland	35.00

Skelp

(F.o.b. Pittsburgh or Youngstown)

	Per Lb.
Grooved	1.85c. to 1.90c.
Universal	1.85c. to 1.90c.
Sheared	1.85c. to 1.90c.

Wire Rods

(Common soft, base)

	Per Gross Ton
Pittsburgh	$40.00
Cleveland	40.00
Chicago	41.00

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.80
Old range non-Bessemer, 51.50% iron	4.65
Mesabi Bessemer, 51.50% iron	4.65
Mesabi non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.40

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algerian	12.00c.
Iron ore, low phos., Swedish, average 68% iron	12.00c.
Iron ore, basic Swedish, average 65% iron	10.00c.
Manganese ore, washed, 52% manganese, from the Caucasus	30.00c.
Manganese ore, Brazilian, African or Indian, basic 50%	30.00c.
Tungsten ore, high grade, per unit, in 60% concentrates	$15.50 to $16.50

	Per Gross Ton
Chrome ore, 45 to 50% Cr_2O_3, crude, c.i.f. Atlantic seaboard	$22.00 to $24.00

	Per Lb.
Molybdenum ore, 85% concentrates of MoS_2, delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$2.65 to $2.75
Foundry, f.o.b. Connellsville prompt	3.75 to 4.75
Foundry, by-product, Ch'go ovens	8.00
Foundry, by-product, New England, del'd	11.00
Foundry, by-product, Newark or Jersey City, delivered	9.00 to 9.40
Foundry, by-product, Phila.	9.00
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry by-prod., del'd St. Louis	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.25 to $1.75
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, ¾-in. f.o.b. Pa. mines	1.90 to 2.00
Mine run gas coal, f.o.b. Pa. mines	1.65 to 1.75
Steam slack, f.o.b. W. Pa. mines	80c. to 90c.
Gas slack, f.o.b. W. Pa. mines	1.00 to 1.10

Ferromanganese

	Per Gross Ton
Domestic, 80%, seaboard	$105.00
Foreign, 80%, Atlantic or Gulf port, duty paid	105.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$31.00 to $34.00
Domestic, 16 to 19%	29.00 to 32.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$83.50
75%	130.00

	Per Gross Ton Furnace		Per Gross Ton Furnace
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	45.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		Per Gross Ton
10%	$30.00	12%	$34.00
11%	32.00		

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		Per Gross Ton
6%	$22.00 to $23.00	10%	$26.00 to $28.00
7%	23.00 to 24.00	11%	28.00 to 30.00
8%	24.00 to 25.00	12%	30.00 to 32.00
9%	25.00 to 26.00		

Other Ferroalloys

Ferrotungsten, per lb. contained metal del'd	$1.40 to $1.50
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.15 to $3.65
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	$160.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton	$91.00
Ferrophosphorus, electric 24%, f.o.b. Anniston, Ala., per gross ton	$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silicon, gravel, f.o.b. Illinois and Kentucky mines	$18.00
No. 2 lump, Illinois and Kentucky mines	20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	$18.25 to $18.75
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines	32.50

Fire Clay Brick

	Per 1000 f.o.b. Works: High-Heat Duty Brick	Intermediate Heavy Duty Brick
Pennsylvania	$43.00 to $46.00	$35.00 to $38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	.....
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00
Standard size	45.00

Chrome Brick

	Per Net Ton
Standard size	$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts, blank or tapped, hexagons	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	7.00c. to 6.75c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled thread up to and including 1 in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagon nuts	70
Semi-finished hexagon castellated nuts, S.A.E.	70
Stove bolts in packages, P'gh	75, 20, 10 and 5
Stove bolts in packages, Chicago	75, 20, 10 and 5
Stove bolts in packages, Cleveland	75, 20, 10 and 5
Stove bolts in bulk, P'gh	75, 20, 10, 5 and 2½
Stove bolts in bulk, Chicago	75, 20, 10, 5 and 2½
Stove bolts in bulk, Cleveland	75, 20, 10, 5 and 2½
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55, 60 per cent apply.

Large Rivets

(½-in. and larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$3.10
F.o.b. Chicago	3.20

Small Rivets

(⅞-in. and smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70 and 10
F.o.b. Cleveland	70 and 10
F.o.b. Chicago	70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10 and 5
Milled standard set screws, case hardened	80 and 5
Milled headless set screws, cut thread	75 and 10
Upset hex. head cap screws, U.S.S. thread	85
Upset hex. cap screws, S.A.E. thread	85
Upset set screws	80, 10 and 5
Milled studs	70

Chicago

Bar and Shape Prices Settle to Minimum of 2c.—Rail Orders Only Feature of Buying

CHICAGO, Oct. 22.—Both sales and new offers to consumers in this district establish prices for mild steel bars and structural shapes at 2c. to 2.05c. a lb., Chicago. This price situation is somewhat a reflection of a market which is gradually becoming quieter in sales and consumption of steel. New business, largely influenced by rail orders, averages well with purchases in recent weeks, but the fact that rail business is heavy serves to stress the slackened demand for plates, shapes and bars. Specifications for steel mill products are the best since mid-March, but fully one-half of the tonnage released is for rails and a large share of the remaining 50 per cent is for car material, leaving little tonnage that will be taken by miscellaneous consumers, including fabricating shops. Chicago mills participated to the extent of over 200,000 tons in a rail-buying movement which brought the total placed in the week to well over the 500,000-ton mark.

Notwithstanding that heavier-than-usual rail purchases have been made earlier than is customary and that some shipping schedules have already been arranged, actual releases are being held in check and rail mill output has not gained as was expected by producers.

Lack of immediate shipping instructions for rails, together with light demand for steel in other directions, has necessitated curtailment in blast furnace output. No. 7 stack at Gary has been banked. The leading producer is now operating 16 of its 27 furnaces, and for the district as a whole there are 25 steel mill stacks in blast of a total count of 36. Two stacks are banked in the hope that business will soon warrant putting them in blast in the near future.

New railroad equipment inquiries include 600 cars for the Burlington. The trade is expecting inquiries from the Missouri - Kansas - Texas, Cotton Belt and Chesapeake & Ohio.

Plate and shape business developing in Oklahoma includes 11,000 tons for tanks and 7500 tons for buildings and bridges.

Ferroalloys.—This market, viewed from all angles, is quiet. It is reported that 50 per cent ferrosilicon contracts will be offered by the middle of November.

Prices delivered Chicago: 80 per cent ferromanganese, $112.56; 50 per cent ferrosilicon, $83.50 to $88.50; spiegeleisen, 19 to 21 per cent, $39.76 to $41.76.

Sheets.—Output in this district remains at close to 85 per cent of hot mill capacity. New buying by the bulk of consumers is still for nearby needs and in the aggregate it is still about equal to shipments. New specifications, which usually are entered at mills at time of purchase, amply support the current rate of output. Backlogs are small and stationary. Lighter commitments for blue annealed sheets have brought deliveries to the range of three to four weeks, and mills that six weeks ago were out of the market with heavy order books are now actively seeking tonnages for delivery about the middle of November. Prices in and near Chicago and the Northwest are holding.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 3c.; No. 24 galv., 3.65c. to 3.75c.; No. 10 blue ann'l'd, 2.35c. Deliv'd prices at other Western points are equal to the freight from Gary, plus the mill prices, which are 5c. per 100 lb. lower than Chicago delivered prices.

Pig Iron.—Prices for silvery iron have given away $1 a ton on recent sales in this market. Shipments are at the low point of the year and new business is scarce, thereby leading to unusually keen competition. The Northern iron market in and around Chicago remains steady at $20 a ton, furnace. Shipments are well up to the average of September, and practically the full output of local furnaces is moving to melters. Forward buying is practically at a standstill, but spot purchases are at a high fall level. Demand for malleable iron is on the upturn, as use of malleable castings on railroad equipment absorbs some of the slack in melt made necessary by the curtailment in automobile manufacture. Four charcoal furnaces are in blast and output exceeds shipments by a small margin. Prices for Southern iron remain unchanged.

Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	$20.00
N'th'n No. 1 fdy., sil. 2.25 to 2.75	20.50
Malleable, not over 2.25 sil.	20.00
High phosphorus	20.00
Lake Super. charcoal, sil. 1.50	27.04
So'th'n No. 2 fdy. (all rail)	$19.01 to 19.51
Low phos., sil. 1 to 2, copper free	29.50
Silvery, sil. 8 per cent	$28.79 to 29.79
Bess. ferrosilicon, 14-15 per cent	46.29

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Wire Products.—Favorable weather conditions throughout most of the country have contributed to outdoor work in rural communities. The result is that jobbers are experiencing an active fall demand, which is fully equal to, if not above, what had been expected. In the Great Lakes region and in the Northwest the weather has remained open longer than usual, and this has been of benefit to the jobbing trade. The manufacturing trade, with the exception of automobile builders, continues to take satisfactory tonnages. The demand for nails is seasonally dull. Prices at Chicago are not above $2.45, base, per keg. Shipments of woven wire fencing are in good volume, the bulk of the tonnage going to jobbers, with only occasional lots being taken by the railroads. Production schedules for heavy electrical cables are well filled to the end of the year. Demand for wire rope is steady and has run ahead of the corresponding part of 1928.

Cold-Rolled Strip.—Specifications are measurably lighter, and output for the country as a whole has receded to 50 per cent of capacity. Backlogs, inquiries, new buying and specifications are at the low point of the year. Some estimates place the normal needs of cold-rolled strip by automobile manufacturers at 60 per cent of the output of the country. It is pointed out that no improvement in demand for this commodity can be expected until there is a swing upward in output of automobiles.

Rails and Track Supplies—About 563,000 tons of standard-section rails have been ordered by the Pennsylvania, New York Central and the Erie. Other orders are expected from the Rock Island, Illinois Central and Chicago & North Western. Though no official figures are available on the tonnages these railroads will take, the opinion is generally expressed here that they will exceed in size the orders placed for 1929 delivery. The Pennsylvania bought 310,000 tons, which is said to be the largest single order ever placed by a railroad. The distribution of the past week's orders is given elsewhere in this issue. New business in track fastenings is confined to tonnages for current track work. Releases against new rail orders have not been as heavy as sellers had expected, and the increase in the rate of rolling, which was to have gone into effect this week, has been postponed.

Prices f.o.b. mill, per gross ton: Standard section open-hearth and Bess. rails, $43; light rails, rolled from billets, $36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.15c.; angle bars, 2.75c.

Cast Iron Pipe.—This market continues to mark time, with only occasional inquiries and lettings of more than 100 tons each. Sellers look for little improvement in conditions in the near future, though they see some light in the early part of next year if the bond market continues to strengthen. The Merkle Contracting Co., Kansas City, Mo., has been awarded the general contract to lay 44,000 ft. of 8-in., 2500 ft. of 6-in. and 6000 ft. of 4-in. pipe at O'Fallon, Ill. Royal Oak, Mich., has placed 1500 tons of cast iron pipe with the Lynchburg Foundry Co. This award was reported last week as having been taken by an unnamed bidder. The only inquiry of note in this district is by Streeterville, Ohio, which will buy 1000 ft. of 8-in., 17,000 ft. of 6-in., 6000 ft. of 4-in. and 3000 ft. of 2-in. cast pipe. Notwithstanding lagging interest on the part of buyers, prices are well stabilized at $35 to $38 a ton, Birmingham. Deliveries of all common sizes of cast iron pipe are prompt.

Prices per net ton, deliv'd Chicago: Water pipe, 6-in. and over, $43.70 to $45.70; 4-in., $47.70 to $49.70; Class A and gas pipe, $3 extra.

Reinforcing Bars.— Fabricating shops are shipping close to a normal volume of bars for this time of the year, but backlogs are light. Prices continue to show wide variation. Rail steel bars appear well established at

2c. a lb., but billet steel reinforcing bars show weakness and business has been taken at 2c., Chicago warehouse. Stocks in the hands of dealers are ample for current needs and promises of deliveries from mills are satisfactory. Sellers of reinforcing bars are closely watching progress of the plans for subway construction in Chicago. Preliminary estimates of reinforcing bars needed place the figure at 150,000 tons. As now indicated this work may get under way in 1930.

Wire Rods.—Specifications are coming in only in moderate volume. Prices have been definitely settled to $41 a ton, Chicago.

Plates.—New inquiries for oil storage tanks loom large as prospects brighten for an increase of petroleum production in the Oklahoma City, Okla., field. New business in sight totals 11,000 tons of plates. This, added to the inquiry that has been before the trade, brings the total prospective tonnage to more than 20,000 tons. New orders of tank plates total 2200 tons, of which 1000 tons is for shipment to an Oklahoma fabricator. The railroad equipment market remains active. Orders are close at hand for the 85,000 tons of steel needed for the Santa Fe cars. Although official plans are not announced, it is generally believed that shops will not rush through new orders, but rather will spread them out by holding to the present rate of output.

Old Material.—The Chicago scrap iron and steel market is dull in the heavy tonnage grades, but a substantial volume of quiet purchases is being made by steel foundries. Dealers are finding scrap harder to sell and they are also finding greater difficulty in meeting with the closer lines being drawn on specifications. Rejections are running unusually high, but the inflow of scrap is ample and there is little doubt that large melters are having their needs well filled. Railroad shipments are normal for this time of the year, while industrial scrap is probably in somewhat smaller volume than is usually expected in the early fall months. Dealers' yards in Chicago are not overburdened with stocks, but it is reported that country yards are piled high with scrap that is not moving. Prices, with few exceptions, are weak. Late last week heavy melting steel on sales that aggregated between 15,000 and 20,000 tons sold off 25c. a ton. Brokers offering cast iron borings to users at present quotations find no takers. Stocks of this grade are accumulating in the hands of producers and dealers and it is rather commonly believed that prices must be revised downward before they will be attractive to consumers. The Burlington will sell 3000 tons and special mid-month lists are being offered by the Pennsylvania and Nickel Plate.

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars	3.00c.
Reinforc'g bars, billet steel	2.00c. to 2.30c.
Reinforc'g bars, rail steel	2.00c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Bands (1/8 in. in Nos. 10 and 12 gages)	3.20c.
Hoops (No. 14 gage and lighter)	3.75c.
Black sheets (No. 24)	4.05c.
Galv. sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.35c.
Spikes, 1/2 in. and larger	3.55c.
Track bolts	4.55c.
Rivets, structural	4.00c.
Rivets, boiler	4.00c.

	Per Cent Off List
Machine bolts	60
Carriage bolts	60
Coach or lag screws	60
Hot-pressed nuts, sq., tap. or blank	60
Hot-pressed nuts, hex., tap. or blank	60
No. 8 black ann'l'd wire, per 100 lb.	$3.45
Com. wire nails, base per keg	2.95
Cement c't'd nails, base per keg	2.95

Prices deliv'd Chicago district consumers:

	Per Gross Ton	
Basic Open-Hearth Grades:		
Heavy melting steel	$14.25 to	$14.75
Shoveling steel	14.25 to	14.75
Frogs, switches and guards, cut apart, and misc. rails	15.75 to	16.25
Hydraul. compressed sheets	12.50 to	13.00
Drop forge flashings	10.75 to	11.25
No. 1 busheling	12.75 to	13.25
Forg'd cast and r'l'd steel carwheels	18.50 to	19.00
Railroad tires, charg. box size	18.50 to	19.00
Railroad leaf springs cut apart	18.50 to	19.00
Acid Open-Hearth Grades:		
Steel couplers and knuckles	17.00 to	17.50
Coil springs	19.00 to	19.50
Electric Furnace Grades:		
Axle turnings	14.25 to	14.75
Low phos. punchings	16.50 to	17.00
Low phos. plates, 12 in. and under	16.50 to	17.00
Blast Furnace Grades:		
Axle turnings	12.00 to	12.50
Cast iron borings	10.00 to	10.50
Short shoveling turnings	10.00 to	10.50
Machine shop turnings	7.00 to	7.50
Rolling Mill Grades:		
Iron rails	16.00 to	16.50
Rerolling rails	16.75 to	17.25
Cupola Grades:		
Steel rails less than 3 ft.	17.50 to	18.50
Steel rails less than 2 ft.	19.50 to	20.00
Angle bars, steel	17.00 to	17.50
Cast iron carwheels	14.00 to	14.50
Malleable Grades:		
Railroad	17.00 to	17.50
Agricultural	15.50 to	16.00
Miscellaneous:		
*Relaying rails, 56 to 60 lb.	23.00 to	25.00
*Relaying rails, 65 lb. and heav.	26.00 to	31.00
	Per Net Ton	
Rolling Mill Grades:		
Iron angle and splice bars	15.00 to	15.50
Iron arch bars and transoms	20.50 to	21.00
Iron car axles	26.00 to	26.50
Steel car axles	17.00 to	17.50
No. 1 railroad wrought	13.50 to	14.00
No. 2 railroad wrought	12.75 to	13.25
No. 1 busheling	9.00 to	9.50
No. 2 busheling	7.00 to	7.50
Locomotive tires, smooth	14.50 to	15.00
Pipes and flues	10.00 to	10.50
Cupola Grades:		
No. 1 machinery cast	14.50 to	15.00
No. 1 railroad cast	14.00 to	14.50
No. 1 agricultural cast	13.25 to	13.75
Stove plates	12.25 to	12.75
Grate bars	11.75 to	12.25
Brake shoes	10.75 to	11.25

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Bars.—Schedules at mild steel bar mills are more flexible, and deliveries may be had in 10 days to four weeks, depending on the sizes. Both sales and specifications, influenced largely by the needs of railroad car builders, are heavier than a week ago. Prices still show variation, with occasional concessions of $1 a ton. Demand for iron bars shows some improvement as the railroads take larger quantities. The rail steel bar market is featureless. New business balances shipments. Prices are steady.

Structural Material.—The outstanding award this week was 4500 tons for a railroad bridge in St. Louis. Other than this, awards were fairly plentiful, but of small individual size and spread over a wide area. Structural shop backlogs are growing lighter. Even large shops, which to date have been fairly well fortified with work, now are showing hunger for new tonnage. Prices of fabricated steel are weak and at a lower level than a year ago.

Mill prices on plain material, per lb.: 2.00c. to 2.05c. base, Chicago.

Wholesale Prices Fall Slightly

The index number of wholesale prices in September, as reported by the United States Bureau of Labor Statistics, was 97.5, compared with 97.7 in August and with 100.1 in September, 1928. All are based on 100 as the average of 1926. Of the major groups farm products and metals showed declines from August. Foods, hides and leather, fuel and lighting, building materials, chemicals and drugs and the miscellaneous items registered increases. Textile products and house furnishing goods showed no change.

While metals and metal products declined from 104.3 to 104.1, the iron and steel component remained stationary at 97.6, non-ferrous metals dropped from 105.1 to 104.9, agricultural implements from 98.3 to 98.2 and automobiles from 110.7 to 110.3. Other metal products showed no change.

Distribution of Week's Orders for Rails

THE Pennsylvania divided its order for 310,000 tons of standard-section rails as follows: Carnegie Steel Co. and Illinois Steel Co., jointly, 155,000 tons; Bethlehem Steel Corporation, 136,400 tons; Inland Steel Co., 18,600 tons.

New York Central orders totaling 206,430 tons were apportioned as follows: Bethlehem Steel Corporation, 87,040 tons; Illinois Steel Co., 76,200 tons; Carnegie Steel Co., 13,860 tons; Inland Steel Co., 16,930 tons; Dominion Iron & Steel Co. of Canada, 12,400 tons.

The Erie ordered 46,460 tons, of which Carnegie Steel Co. will furnish 24,387 tons; Illinois Steel Co., 11,112 tons; Bethlehem Steel Corporation, 7474 tons; Inland Steel Co., 3487 tons.

New York

Pig Iron Melt Well Sustained—Railroad Needs and Structural Work Feature Steel Orders

NEW YORK, Oct. 22.—Pig iron consumption in this district is holding up well. Virtually no suspensions of shipments are reported and in some cases melters are asking for deliveries of iron scheduled for shipment in November. Since little automotive work is done in this territory, the sustained melt is regarded as testimony to continued satisfactory condition of business outside of the motor car industry. The fact that there is little interest in first quarter requirements is merely a reflection of caution on the part of buyers. Purchases are confined mainly to spot needs and, at 8000 tons for the week, are of average proportions. The only large current inquiry is one for 3000 tons for the Thatcher Co., of which 1000 tons of No. 2X is for its Newark, N. J., plant and 2000 tons of No. 2 plain is for Garwood, N. J. While deliveries are to extend into the first quarter, they are to begin in November. Southern foundry iron is still offered at $13.50 to $14, base Birmingham, or $19 to $19.50, at docks in New York harbor. At this level Alabama iron is sharply competitive with Northern brands. Considerable barge iron is moving down the State canal from Buffalo, but it is doubtful whether the water movement this year will equal that of 1928. Current sales for barge movement must be made with an eye to the closing of navigation about the middle of next month.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	$22.41 to $22.91
*Buf. No. 2, del'd east. N. J.	20.78 to 21.28
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	19.89 to 21.02
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	20.39 to 21.52

Freight rates: $4.91 from Buffalo, $1.39 to $2.52 from eastern Pennsylvania.
*Prices delivered to New Jersey cities having rate of $3.28 a ton from Buffalo.

Cast Iron Pipe.—Municipal buying of pressure pipe has declined with election approaching, and private purchasing is limited to small lots of pipe and fittings. Prices continue unsteady, with $32 to $33 a net ton, foundry, usually quoted by Northern makers, but $31 is occasionally bid when competition is keen. The Department of Water Supply, Gas and Electricity, New York, has opened bids on a number of small contracts for furnishing and laying water and gas pipe, but awards are still pending.

Prices per net ton deliv'd New York: Water pipe, 6-in. and larger, $34.60 to $36.60; 4-in. and 5-in., $37.60 to $39.60; 3-in., $44.60 to $46.60. Class A and gas pipe, $3 extra.

Finished Steel.—Railroad and structural steel orders are the features of steel buying in this market. The rail orders of the New York Central and Erie roads were placed last week, and details of distribution are given elsewhere in this issue. Car builders are optimistic that the car buying movement will continue during the remainder of the year, and prospective inquiries total upward of 25,000 cars. In structural steel, the principal award of the week was 17,500 tons for a hospital for the Cornell Medical Center in New York, which went to the Hedden Iron Construction Co. The Metropolitan Life Insurance Co. will build a 100-story building facing Madison Square Park which will require 30,000 to 40,000 tons of steel, but the inquiry has not yet been issued. In some lines of steel consumption, the demand has increased moderately in the past week, but the gains are too spotty to be indicative of a general upward trend in buying.

Mill prices per lb., deliv'd New York: Soft steel bars, 2.24c. to 2.29c.; plates, 2.22½c.; structural shapes, 2.14½c.; bar iron, 2.14c.

Old Material.—Buying prices of brokers are off 50c. a ton to $15, delivered, on No. 1 heavy melting steel for the consumer at Bethlehem, Pa., but are unchanged at $15.50 a ton, delivered, to mills at Coatesville and Steelton, Pa. No. 2 heavy melting steel is being bought at $11.75 a ton, delivered Pottsville, Pa., $13 a ton, delivered Phoenixville, Pa., and $13.25 a ton, delivered Harrisburg, Pa. The quotation on steel mill stove plate is slightly softer, with brokers paying a maximum of $8 a ton, New York, or $11.50 a ton, delivered to a consumer at Phoenixville, Pa. Despite the low level of prices, a fair volume of all grades of scrap is reported available, although no surplus supplies are pressing on the market.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel	$12.00 to $12.35
Heavy melting steel (yard)	8.00 to 9.50
No. 1 hvy. breakable cast.	10.25 to 11.00
Stove plate (steel works).	8.00
Locomotive grate bars	8.25
Machine shop turnings	7.50 to 8.00
Short shoveling turnings	7.50 to 8.00
Cast borings (blast furn. or steel works)	7.00 to 7.75
Mixed borings and turnings	6.75 to 7.75
Steel car axles	18.00 to 18.50
Iron car axles	23.00 to 24.00
Iron and steel pipe (1 in. dia., not under 2 ft. long)	10.25
Forge fire	9.50 to 10.00
No. 1 railroad wrought	12.00 to 12.50
No. 1 yard wrought, long	11.00 to 11.50
Rails for rolling	12.75 to 13.25
Stove plate (foundry)	8.00 to 8.50
Malleable cast (railroad)	13.50 to 14.00
Cast borings (chemical)	9.50 to 10.00

Prices per gross ton, deliv'd local foundries:

No. 1 machry. cast	$16.00
No. 1 hvy. cast (columns, bldg. materials, etc.), cupola size	14.00
No. 2 cast (radiators, cast boilers, etc.)	13.50

Warehouse Business.—Activity this month has not shown the improvement over September that is usual at this season. Demand for galvanized sheets is fair, but prices are still subject to concessions on both black and galvanized. There is a moderate volume of buying in structural steel, but bars, plates and blue annealed sheets are quiet.

Coke.—The market is unchanged, with furnace grade at $2.75 a net ton, Connellsville. Beehive foundry coke is

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.30c.
Soft steel bars, small shapes	3.25c.
Iron bars	3.24c.
Iron bars, Swed. charcoal	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Cold-roll. strip, soft and quarter hard	5.15c. to 5.40c.
Hoops	4.25c.
Bands	3.75c.
Blue ann'l'd sheets (No. 10)	3.50c. to 3.90c.
Long terne sheets (No. 24)	5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galv. annealed	5.15c.
Tire steel, ½ x ½ in. and larger	3.40c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.75c.
Open-hearth spring steel, bases,	4.50c. to 7.00c.

	Per Cent Off List
Machine bolts, cut threads:	
¾ x 6 in. and smaller	60
1 x 30 in. and smaller	50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	60
¾ x 20 in. and smaller	50 to 50 and 10
Coach screws:	
½ x 6 in. and smaller	60
1 x 6 in. and smaller	50 to 50 and 10

	Per 100 Ft.
Boiler Tubes—	
Lap welded, 2-in.	$17.33
Seamless steel, 2-in.	20.24
Charcoal iron, 2-in.	25.00
Charcoal iron, 4-in.	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
½-in. butt	46	29
¾-in. butt	51	37
1-3 in. butt	53	39
2½-6-in. lap	48	35
7 and 8-in. lap	44	17
11 and 12-in. lap	37	12
Wrought Iron—		
½-in. butt	5	+19
¾-in. butt	11	+ 9
1-1½-in. butt	14	+ 6
2-in. lap	5	+14
3-6-in. lap	11	+ 6
7-12-in. lap	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box	$6.45	$6.20
Charcoal, per Box—	A	AAA
IC	$9.70	$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating	$10.00 to $11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets, Box Annealed—Black, C. R. One Pass

	Per Lb.
Nos. 18 to 20	3.75c. to 3.80c.
No. 22	3.90c. to 3.95c.
No. 24	3.95c. to 4.00c.
No. 26	4.05c. to 4.10c.
No. 28*	4.20c. to 4.25c.
No. 30	4.45c. to 4.50c.

Sheets, Galvanized

	Per Lb.
No. 14	4.20c. to 4.40c.
No. 16	4.15c. to 4.25c.
No. 18	4.20c. to 4.40c.
No. 20	4.30c. to 4.50c.
No. 22	4.40c. to 4.60c.
No. 24	4.65c. to 4.75c.
No. 26	4.90c. to 5.00c.
No. 28*	5.15c. to 5.25c.
No. 30	5.55c. to 5.65c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

quoted at $4.85 a net ton, ovens, for special brands, or $8.56, delivered to northern New Jersey, Jersey City and Newark, and $9.44 to New York and Brooklyn. By-product foundry coke is quoted at $9 to $9.40 a net ton, Newark or Jersey City, and $10.06, New York or Brooklyn.

Cleveland

Improvement in Automotive Steel Buying Expected To Be Slow—Some Orders Placed for November-December

CLEVELAND, Oct. 22.—The volume of business continues light in all finished steel products. Reports from the automotive industry do not offer encouragement for much, if any, improvement for several weeks. Automobile manufacturers are still confronted with the problem of disposing of large stocks of present models of cars. Not only are dealers well stocked up but some manufacturers have rather large stocks that have not yet been passed along to the dealers. The disposal of used cars is still a problem, although in some sections stocks of used cars have been reduced considerably.

One automobile plant that recently resumed operations on a 1600 car per week schedule is shut down this week. Several motor car manufacturers are evidently delaying in getting under production on their new models until they can get present stocks largely disposed of. There is little expectation that the automotive industry will get under good operation again before January, and, if that is the case, the steel industry will not be stimulated much from this source before December. Operations of other industries in this territory are holding up fairly well.

Steel bar, sheet and strip mills in this territory are operating on considerably reduced schedules and have little tonnage on their books. There is little change in the price situation. Sheet prices appear well stabilized at the recent reductions, the only evidence of weakness being in metal furniture sheets.

Pig Iron.—The most encouraging feature of the market is an increase in shipments, which so far this month show quite a gain over those of the corresponding period of September. The increase is confined to fields other than the automotive industry. Shipments to automotive foundries continue light. Stove, radiator and furnace manufacturers are taking a fair amount of iron. Sales by Cleveland interests in the past week amounted to 18,600 tons in foundry and malleable iron, which was a gain over those of the previous week. The Westinghouse Electric & Mfg. Co. purchased approximately 1000 tons against its recent inquiry for iron for its Cleveland plant. The business went to Lake furnaces. Several other Cleveland foundries purchased smaller lots. There is practically no change in the price situation. Local furnaces are holding to $19, furnace, for Cleveland delivery. For outside shipment, $18.50 is the ruling price, and this is also being quoted by Valley furnaces. Lake furnaces that serve the Michigan territory appear to be holding to a $20 base for foundry grades for the eastern half of the State, but a $19.50 price is prevailing in central and western Michigan, where there is competition from the Chicago territory. Lower prices seem to have disappeared on Southern foundry iron, which is now quoted at $14 to $14.50, Birmingham.

Prices per gross ton at Cleveland:

N'th'n fdy., sil. 1.75 to 2.25	$19.50
S'th'n fdy., 1.75 to 2.25	$20.50 to 21.00
Malleable	19.50
Ohio silvery, 8 per cent	28.00
Basic Valley furnace	18.50
Stand. low phos., Valley	26.50 to 27.00

Prices except on basic and low phosphorus are delivered Cleveland. Freight rates: 50c. from local furnaces; $3 from Jackson, Ohio; $6 from Birmingham.

Semi-Finished Steel.—Sheet bar specifications have been a little better the past week than during the early part of the month. Billets and slabs are dull. The Corrigan, McKinney Steel Co. has reduced operations, now running 11 of its 14 open-hearth furnaces. Incoming orders are against $35 contracts for sheet bars, billets and slabs.

Coke.—Demand for foundry coke is light and prices on better grades are unchanged. Connellsville heating coke is moving in limited volume at $2.75 to $3, ovens. There is a lull in the demand for blast furnace coke for domestic use, but producers have their October output sold. Ohio by-product foundry coke is quoted at $8.25, ovens.

Iron Ore.—The consumption of Lake ore during September amounted to 5,361,567 gross tons, a decrease of 417,570 tons from August. The amount consumed in September last year was 4,607,963 tons. Ore on hand at furnaces Oct. 1 amounted to 32,360,108 tons and the amount at furnaces and Lake Erie docks on that date was 38,125,312 tons, as compared with 35,808,367 tons on Oct. 1 of last year. Central district furnaces consumed 2,745,624 tons of ore in September, a decrease of 167,320 tons for the month. Lake front furnaces used 2,378,053 tons, a decrease of 202,021 tons. Eastern furnaces melted 124,098 tons, a decrease of 1123 tons, and all-rail furnaces used 113,792 tons, a loss of 47,106 tons. There were 186 furnaces using Lake ore in blast Sept. 30, a decrease of six for the month.

Strip Steel.—While some hot-rolled strip was purchased by the automotive industry during the week, the orders were not large enough to have much effect on mill schedules, which have been sharply reduced. Some of the mills are operating at not over 50 per cent of capacity and have virtually no backlogs. Cold-rolled strip appears to be moving even slower than the hot-holled material. Prices on hot-rolled strip appear to be holding fairly steady, for the small lots that are moving, at 1.90c., Pittsburgh, for wide material and 2c. for narrow. On cold-rolled strip 2.75c., Cleveland, is the ruling quotation.

Bars, Plates and Shapes.—Demand for steel bars, which declined sharply with the curtailment of the automotive industry, shows no improvement. Structural shapes and plates also are rather quiet. Orders for all three products are confined to small lots. Forge shops catering to the automotive industry do not have much business. Reinforcing bars are very dull. In the structural field, 3500 tons was placed for an Akron bank and office building. New inquiry is light. Small fabricating shops are well filled with work, but some of the larger shops need orders. Steel bars are quoted at 1.90c., Cleveland, by local mills. While outside mills quote a range of 1.90c. to 1.95c., Cleveland, the lower price has become more general. Weakness recently reported on plates seems to have disappeared, and plates and shapes are commonly quoted at 1.95c., Pittsburgh.

Sheets.—Orders from the automotive industry are rather spotty and business in the aggregate is light. Additional releases of good-sized lots of auto body sheets for the new Chevrolet cars were issued during the week for November and December shipment. An inquiry for 1300 tons of various grades for electric refrigerators is pending from a Cleveland stamping plant. Steel barrel manufacturers are operating better than a few weeks ago and this has brought orders for black sheets. Weakness has developed in metal furniture sheets, on which 4.10c. is now the common price, with reports of a 4c. price. Blue annealed sheets and light plates rolled on jobbing mills appear to be holding to regular quotations, but on continuous mill products going to the automotive industry in fair to large-sized lots the market seems definitely established at 2.15c. for No. 13 gage and 2c. for No. 10 light plates. Galvanized sheets

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and struc. shapes	3.00c.
Soft steel bars	3.00c.
Reinforc. steel bars	2.25c. to 2.50c.
Cold-fin. rounds and hex	3.65c.
Cold-fin. flats and sq.	4.15c.
Hoops and bands, No. 12 to ⅛ in., inclusive	3.25c.
Hoops and bands, No. 13 and lighter	3.65c.
Cold-finished strip	*5.95c.
Black sheets (No. 24)	3.70c. to 3.90c.
Galvanized sheets (No. 24)	4.60c. to 4.75c.
Blue ann'l'd sheets (No. 10)	3.25c.
No. 9 ann'l'd wire, per 100 lb.	$2.65
No. 9 gal. wire, per 100 lb.	3.00
Com. wire nails, base per keg	2.65

*Net base, including boxing and cutting to length.

are steady at 3.50c. and efforts to get a higher price seem to have disappeared.

Wire Products.—Wire is moving slowly and nails are very dull. The nail market continues weak. Ruling prices are $2.40 per keg to jobbers and $2.50 to dealers. Wire is fairly steady at 2.40c., Cleveland.

Warehouse Business.—The improvement that usually appears in jobbers' business in October has failed to materialize this month. While warehouses are getting a good number of orders, they are for smaller lots than usual. Demand for galvanized sheets is tapering. Prices are well maintained.

Old Material.—The market continues dull, activity being largely limited to purchases of heavy melting steel and blast furnace scrap by dealers to cover outstanding orders. With the exception of a 50c. a ton reduction on No. 2 busheling, prices are unchanged and the market does not show a tendency toward either higher or lower quotations. Dealers are able to buy all the scrap they need within the range of the quoted prices. Mills have good stocks, and it is not expected that there will be much new consumer demand during the next few weeks.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$14.75 to $15.00
No. 2 heavy melting steel	14.25 to 14.50
Compressed sheet steel	14.75 to 15.25
Light bundled sheet stampings	12.00 to 12.50
Drop forge flashings	13.00 to 13.25
Machine shop turnings	10.00 to 10.50
Short shoveling turnings	11.50 to 12.00
No. 1 railroad wrought	13.50 to 14.00
No. 2 railroad wrought	16.00 to 16.50
No. 1 busheling	13.25 to 13.75
Pipes and flues	9.00 to 9.50
Steel axle turnings	12.50 to 13.00
Acid Open-Hearth Grades:	
Low phos., forging crops	17.75 to 18.00
Low phos., billet, bloom and slab crops	18.50 to 18.75
Low phos., sheet bar crops	18.00 to 18.50
Low phos., plate scrap	18.00 to 18.50
Blast Furnace Grades:	
Cast iron borings	10.50 to 11.00
Mixed borings and short turnings	10.50 to 11.00
No. 2 busheling	10.00 to 10.50
Cupola Grades:	
No. 1 cast	17.50 to 18.00
Railroad grate bars	11.00 to 12.00
Stove plate	12.00 to 12.50
Rails under 3 ft	18.50 to 19.50
Miscellaneous	
Railroad malleable	18.00 to 18.50
Rails for rolling	16.25 to 16.50

Philadelphia

Plate and Shape Demand Active—Pennsylvania Expected To Take Full Rail Options This Year

PHILADELPHIA, Oct. 22.—Steel orders continue in fair volume, but small in individual tonnage, especially in bars and sheets. Plate mills in eastern Pennsylvania are maintaining varying rates of operation, certain mills having curtailed, while others are still fairly well engaged. Shape mills are booking some good business, with construction work at a high level despite the advanced season. A substantial part of the present business is coming from the railroads. Plates and shapes for six car floats for the Reading Railroad have been placed by shipbuilders and the Pennsylvania Railroad has placed 1000 cars to be built by the Bethlehem Steel Co. at Johnstown, Pa.

Allocation of the Pennsylvania Railroad's 1930 rail requirements brought 88,000 tons, with 48,400 tons more on option, to the Bethlehem Steel Co., 100,000 tons, with 55,000 tons more on option, to the Carnegie Steel Co., and 12,000 tons, with 6600 tons on option, to the Inland Steel Co. Although this railroad on its 1929 rail tonnage took only slightly more than one-third of its 70 per cent option, the fact that this year's option is for 55 per cent of the award and that considerable electrification work is in progress leads mills to believe that the entire optional tonnage may be taken.

Pig Iron.—Current buying of foundry iron is confined almost entirely to carload lots or less than 100 tons. The market is somewhat less firm, with certain eastern Pennsylvania sellers seeking more tonnage, but concessions of more than 50c. a ton from $21, base, furnace, have not generally appeared, as present buying is not sufficiently large to bring out the minimum price. Consumers are increasingly inclined to delay purchases while they seek concessions from the current market. About 1000 tons of foundry iron for a local foundry has been pending award since August and the buyer has, meanwhile, been buying carload lots for immediate needs at $21 a ton, base. No inquiries have been made for basic iron, but two leading buyers are expected in the market soon.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil.	$21.26 to $21.76
East. Pa. No. 2X, 2.25 to 2.75 sil.	21.76 to 22.26
East. Pa. No. IX	22.26 to 22.76
Basic (del'd east. Pa.)	19.75 to 20.25
Gray forge	20.00 to 20.50
Malleable	21.25 to 21.75
Stand. low phos. (f.o.b. N. Y. State furnace)	22.00 to 23.00
Cop. br'g low phos. (f.o.b. furnace)	23.50 to 24.00
Va. No. 2 plain, 1.75 to 2.25 sil.	24.04
Va. No. 2X, 2.25 to 2.75 sil.	24.54

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces; $4.54 from Virginia furnaces.

Bars.—Buying is limited to small lots and 1.90c., Pittsburgh, or 2.22c., delivered Philadelphia, is the usual price on new business, although 1.95c., Pittsburgh, or 2.27c., delivered Philadelphia, is still quoted on the less desirable specifications.

Reinforcing Bars.—Projects requiring steel are increasing and a substantial tonnage of bars is being placed, but prices show no tendency to advance. Billet steel bars are quoted at 1.95c. to 2.05c., Pittsburgh, or 2.27c. to 2.37c., delivered Philadelphia, usually without the extra charge for cutting to length. Rail steel bars range from 1.85c. to 1.95c., Franklin, Pa., or Tonawanda, N. Y., or 2.17c. to 2.27c., delivered Philadelphia. New bids being taken on the Farm Show Building, Harrisburg, Pa., call for 245 tons of reinforcing bars. A bulkhead on the Schuylkill River in Philadelphia will require 500 tons of bars.

Shapes.—Certain of the smaller fabricators are seeking tonnage and quoting keenly competitive prices, but most shops are well engaged with contracts and bidding on a larger tonnage of new business than is usual at this season. Prices, however, show no tendency to advance from 1.90c. to 2c., f.o.b. nearest mill to consumer, or 1.96c. to 2.06c., delivered Philadelphia. The Pennsylvania Railroad has awarded the steel contract for a suburban passenger station at West Philadelphia to the McClintic-Marshall Co. The project calls for 16,000 tons of steel. Steel for the Farm Show Building, Harrisburg, Pa., on which former bids were rejected as they exceeded the appropriation, has been reduced on the new inquiry from 4000 to 1700 tons.

Plates.—Shipyards and railroads are contributing some good tonnages of plates. A total of 3000 tons has been placed for six car floats for the Reading Railroad, two to be built by the Newport News Shipbuilding & Dry Dock Co. and four by the New York Shipbuilding Corporation. The United States Lines is expected to call for bids about Nov. 15 on two large passenger ships. The Pennsylvania Railroad has placed 1000 cars with the Bethlehem Steel Co. Plate

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.70c.
Plates, ⅜-in.	2.90c.
Structural shapes	2.70c.
Soft steel bars, small shapes, iron bars (except bands)	2.80c.
Round-edge iron	3.50c.
Round-edge steel, iron finished 1½ x 1½ in.	3.50c.
Round-edge steel planished	4.30c.
Reinforc. steel bars, sq. twisted and deform.	2.60c. to 2.80c.
Cold-fin. steel, rounds and hex	3.60c.
Cold-fin. steel, sq. and flats	4.10c.
Steel hoops	3.55c.
Steel bands, No. 12 to ⅜-in. inclus.	3.30c.
Spring steel	5.00c.
*Black sheets (No. 24)	4.10c.
†Galvanized sheets (No. 24)	4.85c.
Light plates, blue annealed (No. 10)	3.25c.
Blue ann'l'd sheets (No. 13)	3.40c.
Diam. pat. floor plates—	
¼-in.	5.30c.
⅜-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

*For 50 bundles or more; 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.
†For 50 bundles or more; 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

prices are unchanged at 2.05c., Coatesville, Pa., or 2.15c., delivered Philadelphia.

Sheets.—The market is quiet and demand is light, with both automobile body and radio manufacturers on curtailed operations in most cases. Black sheets range from 2.75c. to 2.85c., Pittsburgh, or 3.07c. to 3.17c., delivered Philadelphia, and galvanized sheets are at 3.50c., Pittsburgh, or 3.82c., delivered Philadelphia. Blue annealed sheets are unchanged at 2.35c., Pittsburgh, or 2.67c., delivered Philadelphia, for No. 13 gage and blue annealed light plates, No. 10 gage, are quoted at 2.20c., Pittsburgh, or 2.52c., delivered Philadelphia. These prices on blue annealed sheets and light plates are shaded $2 a ton when competition is encountered from the product of the continuous mill, or preferred buyers are in the market.

Imports.—In the week ended Oct. 19, a total of 204 tons of pig iron arrived at this port from Norway, 31 tons of ferromanganese from the United Kingdom and 28 tons of ferrochrome from Switzerland. Steel imports consisted of 37 tons of steel scrap from the United Kingdom, 25 tons of steel bars from France and 19 tons from Belgium, 46 tons of steel hoops from Germany, 101 tons of structural shapes from France and 100 tons from Germany.

Old Material.—Buying of scrap by consumers is small and prices show a continued tendency to decline. Heavy breakable cast, however, seems to have reached a temporary low point at $14.50 a ton, delivered, as efforts of consumers to buy at $14 and $14.25 a ton, delivered, have not met with much success. No. 1 and No. 2 heavy melting steel is coming out in good volume at the present level of prices.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	$15.50 to $16.00
Scrap T rails	15.00 to 15.50
No. 2 heavy melting steel	12.50 to 14.00
No. 1 railroad wrought	16.00 to 16.50
Bundled sheets (for steel works)	11.50
Hydraulic compressed, new	14.50 to 15.00
Hydraulic compressed, old	12.00 to 12.50
Machine shop turnings (for steel works)	12.00
Heavy axle turnings (or equiv.)	14.00 to 14.50
Cast borings (for steel works and roll. mill)	11.00 to 11.50
Heavy breakable cast (for steel works)	14.50 to 14.75
Railroad grate bars	12.00 to 12.50
Stove plate (for steel works)	12.00
No. 1 low phos., hvy., 0.04% and under	22.00 to 23.00
Couplers and knuckles	19.50 to 20.50
Rolled steel wheels	19.50 to 20.50
No. 1 blast f'nace scrap	10.50 to 11.00
Wrot. iron and soft steel pipes and tubes (new specific.)	14.50
Shafting	19.00 to 19.50
Steel axles	22.75 to 23.25
No. 1 forge fire	14.00
Cast iron carwheels	16.50
No. 1 cast	16.00 to 16.50
Cast borings (for chem. plant)	14.50
Steel rails for rolling	16.50 to 17.00

Railroad Equipment

Orders for 25,000 to 30,000 More Cars Expected This Year

ALTHOUGH railroad equipment buying in the week was featured by only one sizable order, that of the Pennsylvania Railroad for 1000 steel box cars, the outlook for railroad equipment purchases over the remainder of the year continues promising.

Fully 25,000 to 30,000 cars may be purchased in the next two months. For most of these the formal inquiries have not appeared, but they are expected soon.

Details of the week's business follow:

Of about 2700 cars to be inquired for by the Burlington, inquiries have reached the market for 500 automobile cars and 100 flat cars.

Pennsylvania Railroad has ordered 1000 steel box cars from Bethlehem Steel Corporation.

An inquiry from the Chesapeake & Ohio for 5000 or 6000 cars is expected soon.

Bessemer & Lake Erie is reported to be preparing plans for 3000 cars.

An official statement of Pere Marquette says that a rehabilitation program will involve purchase of rolling stock to replace about 25 per cent of that now owned. This would mean purchase of about 4500 freight cars and more than 100 locomotives.

Missouri Pacific's expected inquiry may be for about 4000 cars.

Wabash may inquire for 2000 cars.

New York, New Haven & Hartford and Chicago & North Western are expected purchasers of several thousand cars each. Chicago & North Western is now inquiring for 100 underframes for caboose cars.

North American Car Corporation is inquiring for 1500 steel underframe refrigerator cars.

Cerro de Pasco Copper Corporation has ordered 20 50-ton cars from American Car & Foundry Co.

Imperial Refining Co., Ltd., is inquiring for 215 tank cars.

Reinforcing Steel

Pending Work Totals 7680 Tons —Awards 4600 Tons

INCLUDING 1000 tons for a bridge on the Pacific Coast, reinforcing steel awards in the week totaled nearly 4600 tons. Pending work amounts to about 7680 tons, of which 1100 tons is for an assembly plant for the Ford Motor Co. at Edgewater, N. J., 1000 tons for a rubber manufacturing building at Passaic, N. J., and 1000 tons for a warehouse in San Francisco. Awards follow:

PHILADELPHIA, 375 tons, medical building for Temple University, to Taylor-Davis, Inc.

PHILADELPHIA, 325 tons, Henry Avenue bridge, to Taylor-Davis, Inc.

CHICAGO, 125 tons, building for Kroger Grocery Co., to Concrete Engineering Co.; previously reported to an unnamed bidder.

CHICAGO, 500 tons, warehouse for Goodyear Tire & Rubber Co., to Calumet Steel Co.

CHICAGO, 150 tons, Fine Arts Building, to Joseph T. Ryerson & Son, Inc.

CHICAGO, 250 tons, bridge, to Concrete Engineering Co.

PEORIA, ILL., 350 tons, bridge, to Concrete Engineering Co.

MILWAUKEE, 100 tons, structure for Milwaukee Railroad, to American System of Reinforcing.

TACOMA, WASH., 290 tons, cold storage plant, to unnamed bidder.

EVERETT, WASH., 500 tons, pulp plant for Puget Sound Pulp & Timber Co., to Pacific Coast Steel Co.

PORTLAND, ORE., 1000 tons, St. John's River bridge, to Pacific Coast Steel Co.

PORTLAND, 200 tons, plant for Paper Makers Corporation, to Mercer Steel Co.

SACRAMENTO, CAL., 100 tons, club house, to unnamed bidder.

SAN FRANCISCO, 135 tons, school at Turk and Ashbury Streets, to Truscon Steel Co.

LOS ANGELES, 320 tons, warehouse at Bay and Mateo Streets, to Blue Diamond Co.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

EDGEWATER, N. J., 1100 tons, assembly plant for Ford Motor Co.

PASSAIC, N. J., 1000 tons, United States Rubber Co. plant, general contract to Turner Construction Co.; 100 tons for foundation was awarded to Concrete Steel Co., as reported last week.

HARRISBURG, 245 tons, Farm Show Building; bids open Oct. 23.

PHILADELPHIA, 700 tons, Henry Avenue bridge over Wissahickon Creek; previously reported as 150 tons.

CITY OF PHILADELPHIA AND PENNSYLVANIA RAILROAD, 550 tons, bulkhead on west bank of Schuylkill River; Frederick Snare Corporation, general contractor.

PHILADELPHIA, 100 tons, viaduct, Thirtieth and Arch Streets; Vincent Jafolla, general contractor.

AURORA, ILL., 175 tons, building for Illinois Bell Telephone Co.

CHICAGO, 500 tons, warehouse for Goodyear Tire & Rubber Co.

CHICAGO, 500 tons, garage.

STURGEON BAY, WIS., 110 tons, State highway bridge; bids Nov. 6.

TACOMA, WASH., 800 tons, Eleventh Street viaduct; bids Oct. 21.

PORT ANGELES, WASH., 500 tons, pulp mill; bids being taken.

SAN FRANCISCO, 550 tons, Pier No. 1; general contract placed.

SAN FRANCISCO, 1000 tons, warehouse for Pacific Gas & Electric Co.; bids opened.

Machine Tool Builders Meet

The practical value of establishing an apprenticeship training program and a further improvement in trade practices were stressed by Henry Buker, vice-president, Brown & Sharpe Mfg. Co., Providence, R. I., in his address as president of the National Machine Tool Builders' Association at its twenty-eighth annual convention, which opened its general sessions at Briarcliff Manor, N. Y., Tuesday afternoon.

The association unanimously voted to expand its program of activities during the coming year and elected the following directors for a three-year term: C. R. Burt, vice-president and general manager, Pratt & Whitney Mfg. Co., Hartford, Conn.; George E. Randles, president, Foote-Burt Co., Cleveland, and Robert M. Gaylord, vice-president, Ingersoll Milling Machine Co., Rockford, Ill.

Pacific Coast

Reinforcing Steel Awards Total Upward of 2500 Tons—Demand for Structural Steel Well Sustained

SAN FRANCISCO, Oct. 19 (*By Air Mail*).—Reinforcing steel bar trade was the most active feature of the steel market this week, more than 2500 tons having been placed. Included among the more important contracts were 1200 tons of structural shapes for a viaduct in Denver, 1000 tons of bars for a bridge at Portland and 450 tons of rails for Long Beach, Cal. Prices continue on a fairly even keel, and little shading has been indulged in.

Pig Iron.—Foundry operations have shown little signs of improvement and increased pig iron buying is not looked for until after the first of the year. Prices are unchanged.

Prices per gross ton at San Francisco:

*Utah basic	$25.00 to $26.00
*Utah fdy., sil. 2.75 to 3.25	25.00 to 26.00
**Indian fdy., sil. 2.75 to 3.25	25.00 to 26.00

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Bars.—Mild steel bars are not in active demand, though prices appear to be firm at 2.35c., c.i.f. coast ports. Most of the orders received by mills call for small lots of numerous sizes. Awards of reinforcing steel bars this week were the heaviest of any week since the latter part of June. The Pacific Coast Steel Co. took 1000 tons for the approaches to the St. John's River bridge, Portland, and 500 tons for a pulp plant at Everett, Wash. The Mercer Steel Co. secured 200 tons for a factory in Portland and the Truscon Steel Co. booked 135 tons for a school in San Francisco. Included among pending projects are 1000 tons for a warehouse in San Francisco and 800 tons for the Eleventh Street viaduct in Tacoma. Prices on this class of material continue at 2.30c., base, on carload lots and 2.60c. on smaller tonnages in the San Francisco district, Los Angeles prices being $2 a ton higher.

Plates.—Plate business this week was limited to lots of less than 100 tons, and new inquiries of importance were lacking. The largest pending project calls for 1400 tons for a 36 to 48-in. welded steel pipe line at Everett, Wash., bids on which will be opened Oct. 24. Prices are not firm at 2.35c., c.i.f.

Shapes.—Demand for structural steel is well sustained. Awards this week included, in addition to 1200 tons for the Twenty-third Street viaduct, Denver, mentioned above and placed with the American Bridge Co., 500 tons for a telephone building in Vancouver, B. C., placed with the Western Bridge Co., and 100 tons for a school in San Francisco, booked by Dyer Brothers. Bids were opened this week on 1337 tons for a bridge over the San Luis Rey River in southern California. The Port Stockton Cement Co., Stockton, Cal., is taking bids on 1000 tons for a cement plant. Plain material remains firm at 2.35c., c.i.f.

Track Material.—The United States Steel Products Co. secured 300 tons of 128-lb. girder rails and 150 tons of 90-lb. T-rails at $34,181 for Long Beach. Bethlehem Steel Co. was the only other bidder at $35,025.

Cast Iron Pipe.—Only three awards in excess of 100 tons were noted in the cast iron pipe market this week. The American Cast Iron Pipe Co. took 110 tons of 10-in. Class 150 pipe for Eureka, Cal. Burbank, Cal., placed 109 tons of 4-in. Class B pipe with C. G. Claussen & Co. and has opened bids on 261 tons of 6 and 8-in. Class B pipe. An unnamed interest secured 185 tons of 4 to 12-in. Class B pipe for Broadway, Santa Monica, Cal. The National Cast Iron Pipe Co. was low bidder on 297 tons of 10-in. Class B pipe for El Segundo, Cal. Vernon, Cal., and Los Angeles have opened bids on 800 tons and 215 tons respectively.

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and struc. shapes	3.15c.
Soft steel bars	3.15c.
Small angles, ¼-in. and over	3.15c.
Small angles, under ¼-in.	3.55c.
Small channels and tees, ¾-in. to 2¾-in.	3.75c.
Spring steel, ¼-in. and thicker	5.00c.
Black sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.80c.
Galv. sheets (No. 24)	5.30c.
Struct. rivets, ½-in. and larger	5.65c.
Com. wire nails, base per keg	$3.40
Cement c't'd nails, 100 lb. keg	3.40

Birmingham

Open-Hearth Operations Increased at Alabama Plants—Rail Buying Helps Out at Ensley

BIRMINGHAM, Oct. 22.—As this is an in-between buying period for pig iron, new business is light. It is too early for local consumers to show interest in first quarter iron and inquiries coming in from other territories are in the nature of feelers and have not brought in business for the first quarter. Specifications on contracts for November requirements are frequent, and pressure for immediate shipment is still a factor in the market. Shipments continue to exceed the make, and there is a possibility that October will be the outstanding month of the year in tonnage moved. The base price for the district remains firm at $14.50. Prices to outside points continue to be adjusted to meet competition, concessions varying from 50c. to $1 a ton. Furnace operations are unchanged. Seven are on foundry iron, seven on basic and one on recarburizing iron, a total of 15.

Prices per gross ton, f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil.	$14.50
No. 1 fdy., 2.25 to 2.75 sil.	15.00
Basic	14.50

Finished Steel.—Some improvement is noticed in new business, with the beginning of the fall buying period for certain lines. Recent steel rail and railroad accessory buying has added considerably to the backlog of the Tennessee company. Demand for bars, plates and structural shapes continues at the brisk rate that has been characteristic of the market for some time. Wire products are overcoming some of the slump that began in late summer. New business of structural steel fabricators was better last week than for either of the two preceding weeks. The Nashville Bridge Co. received orders of 450 tons for the Allen Mfg. Co. plant at Franklin, Tenn., and 75 tons for a bascule section of the Pensacola Bay bridge. New orders of the Virginia Bridge & Iron Co. include 220 tons for a garage at Birmingham. The Nichols Copper Co., El Paso, Tex., has ordered 185 tons more from the Ingalls Iron Works Co. New tonnages for reinforcing bars are also developing at a better rate, but demand is still considered below normal. The Tennessee company is operating eight of nine open-hearths at Ensley, an increase of three. Seven of eight are active at Fairfield, and the Gulf States Steel Co. continues to work all six at Alabama City.

Cast Iron Pipe.—Backlogs are being rapidly depleted, and reduced operations will occur unless there is an improvement in buying within the next two weeks. All current projects are small. These include 6000 ft. of 6-in. pipe for Greenville, Ala., to be let Nov. 1; one mile of 12-in. and two miles of 8-in. for Murfreesboro, Tenn., to be let Nov. 1, and 1200 ft. of 6-in. for Marks, Miss., to be let Nov. 5. The United States Pipe & Foundry Co. will ship 44,000 ft. of 20-in., 18,000 ft. of 18-in. and 2000 ft. of 16-in. pipe to Griffin, Ga. Stocks on yards are low and all the current make is being shipped. Prices remain at $37 to $38 a net ton, Birmingham.

Old Material.—A gradual development in demand over the past few weeks has placed steel scrap in a fairly good position. Both dealers' and consumers' stocks are low. Iron material continues inactive, and dealers have large stocks. Prices are unchanged.

Prices per gross ton, deliv'd Birmingham dist. consumers' yards:

Heavy melting steel	$13.00 to $13.50
Scrap steel rails	14.00
Short shoveling turnings	9.00
Cast iron borings	9.00
Stove plate	11.50 to 12.00
Steel axles	21.00
Iron axles	23.00
No. 1 railroad wrought	10.00 to 10.50
Rails for rolling	15.50
No. 1 cast	13.00
Tramcar wheels	12.50
Cast iron carwheels	13.00 to 13.50
Cast iron borings, chem.	13.50 to 14.00

Youngstown

Valley Steel Output at 70 Per Cent—No Further Reduction May Be Necessary

YOUNGSTOWN, Oct. 22.—Valley steel makers seem to have reached the low point in operating schedules occasioned by the reduced demands of automobile makers, and began the present week with slightly increased operating rates in some departments. However, the rate of steel ingot production remains essentially unchanged, with approximately two-thirds of the open-hearth furnaces in the district melting and production at not more than 70 per cent of theoretical capacity. It is believed that no further reduction in steel output will be necessary to bring production in line with demand, but the extent of the expected recovery next month is a matter of some conjecture on the part of steel company executives.

Valley steel mills have realized more than ever before in the last two months the full extent of their dependence upon the automobile industry, and the amount of total tonnage produced in the district which goes to the automotive makers or related users is estimated at as high as 35 per cent. No other steel center, with the possible exception of Cleveland, ships more material to that industry.

Increased specifications for November shipment are reported by nearly all companies. But it is not yet known just how large will be the requirements of the two largest makers of low-priced cars. However, it seems assured that both the Ford and Chevrolet companies will be in production on their changed models by Dec. 1 and that their steel tonnage will be gradually stepped during the last month of the year. The future course of other companies is not so well defined, but it is believed in many quarters that other car makers will pursue a very cautious course over the remainder of the year and cannot be counted upon to take steel at anything approaching a maximum rate.

Tin plate production in the district does not average more than 60 per cent of capacity, but a low rate is expected at this time of the year and during November operations can be counted upon to improve gradually as next year's tonnage reaches company order books. Nail and wire mills are also running slowly, and pipe production, at least in butt-weld departments, is tapering off seasonably. Lap-weld and seamless mills are fairly active, but backlogs are light, and oil-country demand is not impressive. Bar mills are running at about 75 per cent of capacity, and demand is described by most makers as somewhat better. Strip operations are very low, but this department is probably profiting more than any others by improving specifications for future delivery. The leading maker of high-finished sheets is running at close to 80 per cent, but this is above the average for sheet mills as a whole.

The price structure, following reductions of an average of $2 a ton on most of the leading products, is much stronger than it was at the opening of the month. A notably favorable influence is the apparent strength of primary materials quotations. As finished steel prices weakened, pig iron and semi-finished steel quotations held, and at higher levels than were in effect in the first and second quarters. Non-integrated steel makers ordinarily exert considerable pressure for lower crude steel prices under such circumstances, but a large per cent of semi-finished steel requirements is now furnished either by a related company or under a long time contract and buyers have found that any open market decline in the price of billets, slabs and sheet bars is nearly always nullified by lower finished steel prices. Nearly all the buyers of semi-finished steel have covered their requirements for the fourth quarter at unchanged prices, and the market is very quiet. The pig iron market is also very quiet, but the price is not seriously questioned by larger users.

Youngstown steel companies are frankly pleased by an opinion made public last week by the Interstate Commerce Commission declaring that the proposed rate of $1.02 on coal from river terminals at Conway and Colona, Pa., into Youngstown is too high. This is the first victory of Valley interests in their effort to secure the advantage of rail-and-barge rates from southeastern Pennsylvania mines to the Valleys.

Canada

Pig Iron Shipments By Water Are Heavy

TORONTO, ONT., Oct. 22.—Although the reduction in Canadian pig iron prices brought no general improvement in the demand, new business continues to appear in steady volume, with the weekly average well sustained. Only a small amount of forward tonnage was booked during the week, but spot sales were fairly heavy. The demand for immediate delivery is holding at a good level and melters are entering the market regularly for lots up to 500 tons. Hand-to-mouth buyers are responsible for the bulk of new business. Shipments on new order account and against contracts are said to be at the high point for the year. Much of the improvement in shipments is due to the fact that water deliveries are being speeded up and endeavors are being made to get as much iron as possible over this route before the close of navigation. Pig iron prices are unchanged for the week and local blast furnace representatives do not look for further reductions in the immediate future.

Prices per gross ton:

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75	$23.60
No. 2 fdy., sil. 1.75 to 2.25	23.10
Malleable	23.60
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75	$25.00
No. 2 fdy., sil. 1.75 to 2.25	24.50
Malleable	25.00
Basic	23.50
Imported Iron, Montreal Warehouse	
Summerlee	$33.50
Carron	33.00

Structural Steel.—Some improvement in sales was noted during the week. Individual tonnages were mostly under the 1000-ton average, but new orders were more numerous than for three or four weeks past. Inquiries are good and some large tonnages are still in prospect for closing before the end of the year. Shipments to new works are in large tonnage and fabricators are running at capacity on back orders.

Old Material.—Except for a slight improvement in demand, the old material market is without change. Mills are taking in good supplies of heavy melting steel and turnings against contracts and are placing small-tonnage orders for immediate delivery. The iron grades are holding at a high level, with foundries and other consumers showing keen interest in the market.

Dealers' buying prices:

	Per Gross Ton	
	Toronto	Montreal
Heavy melting steel	$10.00	$8.50
Rails, scrap	11.00	9.00
No. 1 wrought	10.00	12.00
Machine shop turnings	7.50	5.00
Boiler plate	7.50	6.00
Heavy axle turnings	8.00	7.50
Cast borings	7.50	5.00
Steel borings	7.50	6.50
Wrought pipe	6.00	6.00
Steel axles	15.00	20.00
Axles, wrought iron	17.00	22.00
No. 1 machinery cast	....	17.00
Stove plate	....	13.00
Standard carwheels	....	16.00
Malleable	....	13.00
	Per Net Ton	
No. 1 mach'ry cast	$16.00	....
Stove plate	12.00	....
Standard carwheels	15.00	....
Malleable scrap	14.00	....

Michigan Steel Castings Plant Expands

Rebuilding its main foundry and replacing its 1½-ton furnace with a 3-ton Moore furnace is the program of the Monroe Steel Castings Co., Monroe, Mich. The main foundry, when completed, will be 50 ft. x 225 ft. Oil-fired core ovens are to be installed, consisting of a double compartment rack oven, each compartment to be 5 ft. 6 in. wide and 8 ft. deep to accommodate racks of cores 4 ft. wide, 7 ft. long and 6 ft. high. There are to be two drawer ovens, each 3 ft. x 5 ft., furnished by the Crawford Oven Co., New Haven, Conn. The electric furnace is to be equipped with a 2500-kva. transformer, furnished by the Pennsylvania Transformer Co. A new sand-blast room was recently installed and a 5-ton crane has been purchased.

Boston

Pig Iron Sales Decline—Scrap Prices Hold Firm but There Is Little Business

BOSTON, Oct. 22.—There was a falling off in pig iron sales the past week, with transactions totaling scarcely 2500 tons. The Mystic Iron Works took about 1000 tons, from 800 to 1000 tons went to Buffalo furnaces, and the remainder was in scattered orders, some of which went to Alabama furnaces. Practically all of the sales were in small tonnages for delivery during this quarter and they afforded no real test of prices. The Mystic furnace is holding at $20 to $20.75, furnace, and Buffalo producers are quoting $18, Buffalo. A Rhode Island foundry is inquiring for 1000 tons of malleable for December and first quarter.

Foundry iron prices per gross ton deliv'd to most New England points:

†Buffalo, sil. 1.75 to 2.25	$21.78 to $22.28
†Buffalo, sil. 2.25 to 2.75	22.28 to 22.78
*Buffalo, sil. 1.75 to 2.25	22.41 to 22.91
*Buffalo, sil. 2.25 to 2.75	22.91 to 23.41
East. Penn., sil. 1.75 to 2.25	22.65 to 23.15
East. Penn., sil. 2.25 to 2.75	23.15 to 23.65
Va., sil. 1.75 to 2.25	25.21
Va., sil. 2.25 to 2.75	25.71
*Ala., sil. 1.75 to 2.25	24.11
*Ala., sil. 2.25 to 2.75	24.61
†Ala., sil. 1.75 to 2.25	20.25
†Ala., sil. 2.25 to 2.75	20.75

Freight rates: $4.91 all rail from Buffalo, and $4.28 rail and water; $3.65 all rail from eastern Pennsylvania; $5.21 all rail from Virginia; $9.61 all rail from Alabama and $5.75 rail and water from Alabama to New England seaboard.

*All rail rate.

†Rail and water rate.

Reinforcing Bars.—A State bridge at Jewett City, Conn., calls for 270 tons of reinforcing bars, contract for which has been awarded to the Concrete Steel Co. Other small awards totaled about 300 tons.

Structural Steel.—The city of Boston has awarded two jobs to the New England Structural Co. One was 250 tons for a fire station and the other was 150 tons for a health unit. Structural fabricators are taking a fair volume of work in small tonnages.

Old Material.—One of the quietest weeks of the year has been experienced by the scrap trade. Sellers show little interest in the market and are offering very little scrap, which counterbalances with the position of buyers, who are demanding very little scrap. For the first time in months there was no change in scrap prices, which in itself tells the story of market stalemate. The Italian steamship Amaranto is loading about 1500 tons of scrap at this port for Egypt.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$10.50 to $10.75
Scrap T rails	10.50 to 10.75
Scrap girder rails	9.50 to 10.00
No. 1 railroad wrought	10.50 to 11.00
No. 1 yard wrought	9.00 to 9.50
Machine shop turnings	6.50 to 7.00
Cast iron borings (steel works and rolling mill)	6.00 to 6.50
Bundled skeleton, long	9.00 to 9.50
Forge flashings	9.50 to 10.00
Blast furnace borings and turnings	6.00 to 6.25
Forge scrap	8.50 to 9.00
Shafting	13.50 to 14.00
Steel car axles	17.50 to 18.00
Wrought pipe 1 in. in diameter (over 2 ft. long)	9.25 to 9.50
Rails for rolling	12.00 to 12.50
Cast iron borings, chemical	9.50 to 9.75

Prices per gross ton deliv'd consumers' yards:

Textile cast	$14.00 to $14.50
No. 1 machinery cast	15.00 to 15.25
No. 2 machinery cast	13.00 to 13.25
Stove plate	11.00 to 11.50
Railroad malleable	18.50 to 19.00

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars, small shapes	3.265c.
Flat, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway rounds	6.60c.
Norway squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tie steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold-rolled steel—	
Rounds and hex	*3.55c. to 5.55c.
Squares and flats	*4.05c. to 7.05c.
Toe calk steel	6.00c.
Rivets, structural or boiler	4.50c.

	Per Cent Off List
Machine bolts	50 and 5
Carriage bolts	50 and 5
Lag screws	50 and 5
Hot-pressed nuts	50 and 5
Cold-punched nuts	50 and 5
Stove bolts	70 and 10

*Including quantity differentials.

St. Louis

Pig Iron Market Extremely Dull—Improvement in Steel Buying—Scrap is Weaker

ST. LOUIS, Oct. 22.—With sales of only 800 tons of pig iron, the last week was perhaps the lightest period the St. Louis Gas & Coke Corporation has had since it began production. Sales of Southern makers were correspondingly small. The dullness now marking the pig iron trade is the aftermath of the exceedingly heavy buying movement of more than a month ago. Most melters now are well covered for the remainder of the year. The Granite City maker's sales included 500 tons to a local jobbing foundry, 250 tons to an Iowa melter and 100 tons to a Belleville, Ill., foundry. The melt is holding up well except in foundries catering to the automobile trade. Shipments are not up to last month's movement, but are above the average.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill.	$19.50 to $20.00
Malleable, f.o.b. Granite City	20.00
N'th'n No. 2 fdy., deliv'd St. Louis	22.16
Southern No. 2 fdy., deliv'd	16.92 to 18.92
Northern malleable, deliv'd	22.16
Northern basic, deliv'd	22.16

Freight rates: 75c. (average) Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

Coke.—The movement of domestic grades of coke continues very good, and producers of by-product fuel are reducing their piles. Foundry and furnace grades are also in good demand.

Finished Iron and Steel.—An improvement in buying of plates, shapes and bars and sheets is reported. However, the demand is for materials as they are needed, with little future buying. Bids have been asked for the construction of Wenzlick Tower, an office building which has been under discussion for some time; it will require 3800 tons of structural steel and 450 tons of reinforcing bars. Business continues dull with fabricators.

Old Material.—The market for old material continues weak. Consumers are buying very little, and prices they are offering to pay are reported to be less than dealers are willing to accept. Heavy offerings by railroads centering here were absorbed by dealers, most buying being to fill contracts. Because of low prices very little is coming in from the country dealers. Miscellaneous standard-section rails, rails for rolling, No. 1 railroad cast and stove plate are 25c. off, while heavy turnings, cast iron car wheels and railroad malleable are 50c. less, and railroad springs declined 75c. Railroad lists: Chicago, Burlington & Quincy, 4860 tons; Wabash, 360 tons; New Orleans Great Northern, 150 tons, and Pullman Co., St. Louis, four carloads.

Dealers' buying prices per gross ton, f.o.b. St. Louis district:

No. 1 heavy melting or shoveling steel	$13.50 to $14.00
No. 2 heavy melting or shoveling steel	13.00 to 13.50
No. 1 locomotive tires	15.50 to 16.00
Miscel. stand.-sec. rails including frogs, switches and guards, cut apart	15.25 to 15.75
Railroad springs	17.00 to 17.50
Bundled sheets	10.00 to 10.50
No. 2 railroad wrought	13.50 to 14.00
No. 1 busheling	10.00 to 10.50
Cast iron borings and shoveling turnings	9.50 to 10.00
Iron rails	13.00 to 13.50
Rails for rolling	15.75 to 16.25
Machine shop turnings	7.50 to 8.00
Heavy turnings	9.50 to 10.00
Steel car axles	19.50 to 20.00
Iron car axles	27.50 to 28.00
Wrot. iron bars and trans.	21.50 to 22.00
No. 1 railroad wrought	13.75 to 14.25
Steel rails, less than 3 ft.	18.00 to 18.50
Steel angle bars	15.25 to 15.75
Cast iron carwheels	14.50 to 15.00
No. 1 machinery cast	15.25 to 15.75
Railroad malleable	15.50 to 16.00
No. 1 railroad cast	14.50 to 15.00
Stove plate	12.25 to 12.50
Agricult. malleable	15.25 to 15.75
Relay. rails, 60 lb. and under	20.50 to 23.50
Relay. rails, 70 lb. and over	26.50 to 29.00

Cincinnati

Easing in Automotive Foundry Demand Affects Pig Iron and Coke—Scrap Market Dull and Weak

CINCINNATI, Oct. 22.—The district pig iron market is quiet and featureless. Sales of iron last week totaled about 3600 tons, an increase of only 50 tons over those of the preceding week. The easing off in the automotive demand is causing district consumers to become cautious and, consequently, buying is confined almost entirely to immediate requirements, with an occasional purchase in anticipation of needs for 30 to 45 days. The largest tonnage placed last week was from the Wickham Piano Plate Co., Springfield, Ohio, which took 300 tons of Northern foundry iron for fourth quarter use. The remainder of the week's tonnage was made up of carload and 100-ton lots. It is apparent that the heavy buying of Southern iron has been checked for the time being. All Southern furnaces doing business in this district are maintaining quotations at about $14 to $14.50, base Birmingham, and no concessions are reported. Quietness of the market in general is reflected by the absence of any sizable inquiry.

Prices per gross ton, deliv'd Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25	$19.89 to $20.39
Ala. fdy., sil. 1.75 to 2.25	17.69 to 18.19
Ala. fdy., sil. 2.25 to 2.75	18.19 to 18.69
Tenn. fdy., sil. 1.75 to 2.25	17.69 to 18.19
S'th'n Ohio silvery, 8 per cent	26.89

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

Finished Material.—New orders for sheets last week were a trifle less than during the preceding week. Backlogs have been reduced substantially, and the delivery situation is improving, 10 days to three weeks being the usual promise on blue annealed and black sheets and three to five weeks on special sheets. Uncertainty of prices is affecting the wire and wire nail market.

Coke.—As a result of the reduction of specifications for by-product foundry coke from automobile foundries, the shipment of coke on contracts last week was noticeably less than in the preceding week. In fact, oven representatives say that, if specifications continue at the present rate, October shipments will total less than those of September. New business is confined to spot shipments of a car or two at a time.

Old Material.—The old material market is soft and dull. Dealers report that the supply of good scrap is none too plentiful. While the mills are accepting shipments on old contracts at a fair rate, new business is small. Accordingly, dealers have broadened the spread on heavy melting steel, No. 2 wrought, cast iron borings and machine shop turnings to 50c. by cutting the bottom prices 25c.

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel	$13.00 to $13.50
Scrap rails for melting	14.25 to 14.75
Loose sheet clippings	8.75 to 9.25
Bundled sheets	11.00 to 11.50
Cast iron borings	8.75 to 9.25
Machine shop turnings	8.00 to 8.50
No. 1 busheling	10.50 to 11.00
No. 2 busheling	7.00 to 7.50
Rails for rolling	14.50 to 15.00
No. 1 locomotive tires	14.25 to 14.75
No. 2 railroad wrought	13.00 to 13.50
Short rails	18.50 to 19.00
Cast iron carwheels	12.75 to 13.25
No. 1 machinery cast	19.00 to 19.50
No. 1 railroad cast	15.25 to 15.75
Burnt cast	10.25 to 10.75
Stove plate	10.25 to 10.75
Brake shoes	10.25 to 10.75
Agricultural malleable	14.25 to 14.75
Railroad malleable	15.25 to 15.75

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and struc. shapes	3.40c.
Bars, soft steel or iron	3.30c.
New billet reinforc. bars	3.15c.
Rail steel reinforc. bars	3.00c.
Hoops	4.05c.
Bands	3.50c.
Cold-fin. rounds and hex	3.85c.
Squares	4.35c.
Black sheets (No. 24)	4.05c.
Galvanized sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.45c.
Structural rivets	3.85c.
Small rivets	65 per cent off list
No. 9 ann'l'd wire, per 100 lb.	$3.00
Com. wire nails, base per keg	2.85
Cement c't'd nails, base 100 lb. keg	2.85
Chain, per 100 lb.	8.75
	Net per 100 Ft.
Lap-weld steel boiler tubes, 2-in.	$16.50
4-in.	31.50
Seamless steel boiler tubes, 2-in.	17.50
4-in.	36.00

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-fin. rounds, shaftings, screw stock	3.75c.
Black sheets (No. 24)	4.25c.
Galv. sheets (No. 24)	5.10c.
Blue ann'l'd sheets (No. 10)	3.45c.
Black corrug. sheets (No. 24)	4.30c.
Galv. corrug. sheets	5.15c.
Structural rivets	4.15c.
Boiler rivets	4.15c.
	Per Cent Off List
Tank rivets, ½-in. and smaller, 100 lb. or more	65
Less than 100 lb	60
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-pressed nuts, sq., blank or tapped, 200 lb. or more	60
Less than 200 lb	50
Hot-pressed nuts, hex., blank or tapped, 200 lb. or more	60
Less than 200 lb	50

Buffalo

Mill Operations Range from 65 to 70 Per Cent

BUFFALO, Oct. 22.—The Ford Motor Co is understood to have placed about 3000 tons of basic with a district furnace. The price is reported to have been about $17.25 to $17.50 on boats, Buffalo. The basic placed is understood to have been of a special grade, analyzing 1.50 per cent silicon. The Ford purchases of pig iron recently are said to total 23,000 tons. An inquiry is out for 1000 tons of malleable from New England and two foundry inquiries from the East run 1500 tons each. The General Electric Co. has bought 1500 tons of foundry and malleable.

Prices per gross ton, f.o.b. furnace:

No. 2 fdy., sil. 1.75 to 2.25	$19.50
No. 2X fdy., sil. 2.25 to 2.75	20.00
No. 1 fdy., sil. 2.75 to 3.25	21.00
Malleable, sil. up to 2.25	20.00
Basic	$17.50 to 18.00
Lake Superior charcoal	27.28

Finished Iron and Steel.—Mill operations in this district have dropped further, running now about 65 to 70 per cent, and probably will not gain until the automobile plants resume fuller schedules. A school at Amherst, Mass., calls for 575 tons of shapes instead of 300 tons as previously reported.

Old Material.—Mills apparently have adequate supplies of scrap for present operations and are not now interested in further buying. There has been a nominal weakening of prices in most of the grades. One of the larger mills has issued instructions to dealers to slow down their shipments.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$15.50 to $16.50
No. 2 heavy melting steel	14.00 to 14.50
Scrap rails	16.00 to 16.50
Hydraul. comp. sheets	14.00 to 14.50
Hand bundled sheets	11.00 to 11.50
Drop forge flashings	14.25 to 14.50
No. 1 busheling	14.00 to 14.50
Hvy. steel axle turnings	14.00 to 14.50
Machine shop turnings	7.50 to 8.00
No. 1 railroad wrought	13.00 to 13.50
Acid Open-Hearth Grades:	
Knuckles and couplers	17.50 to 18.00
Coil and leaf springs	17.50 to 18.00
Rolled steel wheels	17.50 to 18.00
Low phos. billet and bloom ends	18.00 to 18.50
Electric Furnace Grades:	
Short shov. steel turnings	11.50 to 12.00
Blast Furnace Grades:	
Short mixed borings and turnings	11.50 to 12.00
Cast iron borings	11.50 to 12.00
No. 2 busheling	10.00 to 10.50
Rolling Mill Grades:	
Steel car axles	18.75 to 19.25
Iron axles	21.00 to 22.00
Cupola Grades:	
No. 1 machinery cast	15.00 to 15.50
Stove plate	12.50 to 12.75
Locomotive grate bars	11.50 to 12.00
Steel rails, 3 ft. and under	19.50 to 19.75
Cast iron carwheels	13.50
Malleable Grades:	
Industrial	17.50 to 18.50
Railroad	17.50 to 18.50
Agricultural	17.50 to 18.50
Special Grades:	
Chemical borings	12.50 to 13.50

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and struc. shapes	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.95c.
Cold-fin. flats, sq. and hex	4.45c.
Rounds	3.95c.
Cold-rolled strip steel	5.85c.
Black sheets (No. 24)	4.20c.
Galv. sheets (No. 24)	4.85c.
Blue ann'l'd sheets (No. 10)	3.50c.
Com. wire nails, base per keg	$3.60
Black wire, base per 100 lb.	3.75

Detroit

October Auto Output to Show Further Decline

DETROIT, Oct. 22.—Industries in this area not directly supplying the automotive plants have not yet been influenced to any great extent by the slowing down of automotive production. Operations in these industries continue at a rate above average.

There have been no important developments in the automotive field during the past week. October output will fall below that of last month and probably below the total for October, 1928. If the total for the current month reaches 400,000 units, it probably will be as much as can be expected.

According to a statement of L. A. Miller, president, Willys-Overland Co., his organization will limit 1930 production to approximately 300,000 units. It is also stated that the Reo Motor Car Co. will adopt a similar policy.

The Murray Corporation of America will reach capacity operation about December, with a daily average of about 1500 bodies. Its new plant containing 750,000 sq. ft. of floor space will be completed by Nov. 1.

Old Material.—The tone of the market on old material is decidedly weak, with most sales on the low side of the price range. Further curtailment of automobile production has reduced the pig iron melt to the lowest point of the year.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Hvy. melting and shov. steel	$13.75 to $14.25
Borings and short turnings	8.25 to 8.75
Long turnings	8.00 to 8.50
No. 1 machinery cast	12.50 to 13.00
Automobile cast	13.00 to 13.50
Hydraul. comp. sheets	13.75 to 14.25
Stove plate	9.00 to 9.50
New No. 1 busheling	11.75 to 12.25
Old No. 1 busheling	10.25 to 10.75
Sheet clippings	8.00 to 8.50
Flashings	12.25 to 12.75

City in Iowa Objects to New Rail Rates

WASHINGTON, Oct. 22.—Exceptions to the proposed report of Examiners William J. Koebel and Peter C. Paulson in connection with the investigation of the steel rate structure in Western Trunk Line territory have been filed with the Interstate Commerce Commission by the Marshalltown (Iowa) Chamber of Commerce and Marshalltown shippers. It was urged that the commission should not approve the recommendations, which, it was said, would result in higher rates.

If the report be approved in part or in modified form, the petition said, such action should not be taken until after additional hearings are held. Contention was made that the Western Trunk line carriers are not as a whole entitled to increased class rates. Establishment of higher rates, the petition said, would be prejudicial to interior Iowa points as a whole and especially to central Iowa points and unduly preferential to Mississippi River, Illinois and Official territory competitors of the Iowa shippers.

Tri-cities Ask for Lower Freight Rates on Steel

WASHINGTON, Oct. 22.—Treating bars, plates and shapes as raw materials which their manufacturers use in producing agricultural products and other lines, the Chambers of Commerce of Davenport, Iowa, and Rock Island, Ill., and the Association of Commerce and Deere & Co., Moline, Ill., have petitioned the Interstate Commerce Commission to reopen the Official Classification territory steel rate case and place these products on a lower scale and raise the minimum carload requirement from 40,000 to 80,000-lb. The petition of the Tri-Cities expressed the view that the scale prescribed is excessive and will produce an increased cost of transportation in Illinois territory alone in excess $2,500,000 annually. The increased revenue on the business of the petitioners is estimated at $250,000.

The petition declared that within approximately two years water transportation will be available from the Chicago Steel district, their chief source of supply, to the Tri-Cities and that the cost of transportation of steel by water will be much less than the present rate of 17c. a 100-lb., minimum 36,000-lb., and less than one-half of the proposed rate of 19.5c. per 100-lb., minimum 40,000-lb. The annual movement to the Tri-Cities, it was stated, is about 500,000 tons.

Foundry Equipment Orders Decline Slightly

The September index of gross orders for foundry equipment, as reported by members of the Foundry Equipment Manufacturers Association, was 216.3, compared with 229.5 in August and 170 in the same month a year ago. The index of shipments, at 176.8, showed a gain from the 150.8 of August. Unfilled orders also increased, standing at 480.8, the highest index since September, 1928.

Otis Steel Co. Earnings $1,093,376 in Quarter

Net profits of the Otis Steel Co. for the third quarter of 1929 were $1,093,376, after all charges including estimated Federal taxes of $149,096. This compared with $950,786 reported for the third quarter of 1928, after all charges including taxes of $129,653. Earnings for the period were equal to $1.05 a share on the 841,002 shares of common stock outstanding, against 92c. a share reported on 806,002 shares one year ago.

For the first nine months of 1929, as reported by E. J. Kulas, president, the company earned $3,891,774, after all charges and Federal taxes of $530,696, equal to $3.89 a share on the 841,002 shares of common stock outstanding. In the corresponding period of 1928, the company earned $2,693,852, after all charges and Federal taxes of $367,343, equal to $2.57 a share on the 806,002 shares of common stock.

During September earnings, after all charges, were $321,667, compared with $307,481 in September, 1928.

Youngstown's Earnings Increase in Quarter

The Youngstown Sheet & Tube Co.'s net profits in the third quarter were $6,756,741, a gain of almost $650,000 over the $6,107,057 reported for the June quarter. Gross income was $10,705,026, from which $2,129,213 is deducted for depreciation, $918,403 for miscellaneous charges and $900,668 for interest on funded debt.

Total net profit for nine months is $17,294,114. After dividend requirements on 5½ per cent preferred stock, this is equal to $16.67 per share on 1,000,000 shares of common stock outstanding.

Sharon Steel Hoop Co. to Issue 90,000 New Shares

The Sharon Steel Hoop Co., Sharon, Pa., has authorized the issuance of 90,000 shares of the no par common stock of the company to be offered to stockholders of record on Oct. 28 at $40 a share, and is asking waivers from stockholders on 15,000 shares of this authorized issue. The proceeds of this sale are to be used by the company to reduce its funded debt and for other corporate purposes. Only stockholders owning 25 or more shares will be requested to waive or assign their pro rata subscription rights to the 15,000 shares desired by the company, which are to be held for the purpose of sale to employees and for such other purposes as the directors decide.

Organization Plan for Steel Foundries

A complete plan of organization and program of activities for the future conduct of the Steel Founders' Society of America has been recommended to the executive committee of the society after an exhaustive survey of the steel foundry industry. This recommendation has been favorably received by the executive committee and will be presented to the full membership of the society and to the industry at large at a meeting at the Sherman Hotel in Chicago, Tuesday, Oct. 29. The managing director of the society, Granville P. Rogers, in a statement, urges all steel foundries in the country to be represented at this meeting, which "may mark a turning point in the affairs of the society and the industry."

Non-Ferrous Metal Markets

Lowest Tin Price Since 1923 — Zinc Declines — Copper and Lead Quiet and Steady

NEW YORK, Oct. 22.

Copper.—Consumers of copper continue to buy sparingly and the price is unchanged. Sellers are of the opinion that the present quotation will remain in force for some time to come. Despite moderate activity at present, sales of copper for domestic delivery in October have thus far been the largest since the record month of March when about 110,000 gross tons was sold. Most of this buying took place in September. Domestic consumers are well covered for October, but still have some metal to buy for November delivery. Only a little December metal has been purchased. Foreign consumers are buying fair quantities each day, but still have metal to buy for both October and November delivery, particularly November. Weakness in the London market, which has affected tin and zinc particularly, has had no influence on copper. Electrolytic copper for delivery in the Connecticut Valley is quoted at 18c., with Lake copper at 18c. to 18.12½c., delivered. The quotation of Copper Exporters, Inc., is still at 18.30c., c.i.f. usual European ports.

Tin.—Spot Straits tin has continued to decline each day during the past week from the low point of a week ago until yesterday when it was 40.25c., New York. This was the lowest price since Aug. 21, 1923, when it was 39.37½c. Today, because of a slight recovery in London, spot Straits tin, New York, was higher at 41.37½c., New York, about 500 tons changing hands, with dealers the principal buyers. Sales for the week ended Saturday, Oct. 19, were about 700 tons, with sales for yesterday and today amounting to about 700 tons more. Despite the declining market, buyers continued hesitant and did not buy much on the way down. Yesterday the market was very weak, but today buying by two London houses, one evidently covering short sales, has strengthened the situation. A feature has been the free selling in the Far East, where good quantities have been disposed of each day. A revision in the estimate of Straits shipments in October places the total at about 9000 tons instead of 10,000 tons. London prices today were about £1 per ton higher than yesterday, with spot standard quoted at £182, future standard at £186 and spot Straits at £186 10s. The Singapore price today

THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY

	Oct. 22	Oct. 21	Oct. 19	Oct. 18	Oct. 17	Oct. 16
Lake copper, New York	18.12½	18.12½	18.12½	18.12½	18.12½	18.12½
Electrolytic copper, N. Y.*	17.75	17.75	17.75	17.75	17.75	17.75
Straits tin, spot, N. Y.	41.37½	40.25	40.87½	41.00	41.50	42.12½
Zinc, East St. Louis	6.70	6.75	6.80	6.80	6.80	6.80
Zinc, New York	7.05	7.10	7.15	7.15	7.15	7.15
Lead, St. Louis	6.70	6.70	6.70	6.70	6.70	6.70
Lead, New York	6.90	6.90	6.90	6.90	6.90	6.90

*Refinery quotation; price ¼c. higher delivered in the Connecticut Valley.

Rolled Products

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—
- High brass ..... 23.25c.
- Copper, hot rolled ..... 26.75c.
- Zinc ..... 10.25c.
- Lead (full sheets) .. 11.00c. to 11.25c.

Seamless Tubes—
- High brass ..... 28.25c.
- Copper ..... 29.25c.

Rods—
- High brass ..... 21.25c.
- Naval brass ..... 24.00c.

Wire—
- Copper ..... 19.87½c.
- High brass ..... 23.75c.

Copper in Rolls ..... 26.75c.
Brazed Brass Tubing ..... 30.87½c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also to St. Louis on shipments to points west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide ..... 33.00c.
Tubes, base ..... 42.00c.
Machine rods ..... 34.00c.

Chicago Warehouse

(Prices Cover Trucking to Customers' Doors in City Limits)

	Base per Lb.
Sheets—	
High brass	23.25c.
Copper, hot rolled	27.75c.
Copper, cold rolled, 14 oz. and heavier	30.00c.
Zinc	10.75c.
Lead, wide	11.35c.
Seamless Tubes—	
Brass	28.25c.
Copper	29.25c.
Brass Rods	21.25c.
Brazed Brass Tubes	31.00c.

New York or Cleveland Warehouse

Delivered Prices, Base per Lb.

Sheets—		
High brass	21.12½c.	to 22.12½c.
Copper, hot rolled, base sizes	27.75c.	to 28.75c.
Copper, cold rolled, 14 oz. and heavier, base sizes	30.00c.	to 31.00c.
Seamless Tubes—		
Brass	26.00c.	to 27.00c.
Copper	29.12½c.	to 30.12½c.
Brazed Brass Tubes	29.12½c.	to 30.12½c.
Brass Rods	18.87½c.	to 19.87½c.

New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets (No. 9), casks ..... 10.75c. to 11.25c.
Zinc sheets, open ..... 11.50c. to 12.00c.

Metals from New York Warehouse

Delivered Prices, Per Lb.

Tin, Straits pig ..... 43.00c. to 44.00c.
Tin, bar ..... 45.00c. to 46.00c.
Copper, Lake ..... 19.50c.
Copper, electrolytic ..... 19.25c.
Copper, casting ..... 19.00c.
Zinc, slab ..... 7.75c. to 8.25c.
Lead, American pig ... 7.62½c. to 8.12½c.
Lead, bar ..... 9.62½c. to 10.12½c.
Antimony, Asiatic ..... 10.50c. to 11.00c.
Aluminum No. 1 ingots for remelting (guaranteed over 99% pure) .. 25.00c. to 26.00c.
Alum. ingots, No. 12 alloy ..... 24.00c. to 25.00c.
Babbitt metal, commercial grade ..... 25.00c. to 35.00c.
Solder, ½ and ½ ..... 29.00c. to 30.00c.

Metals from Cleveland Warehouse

Delivered Prices, Per Lb.

Tin, Straits pig ..... 46.50c.
Tin, bar ..... 48.50c.
Copper, Lake ..... 19.50c.
Copper, electrolytic ..... 19.25c.
Copper, casting ..... 18.75c.
Zinc, slab ..... 8.00c. to 8.25c.
Lead, American pig ..... 7.55c. to 7.75c.
Lead, bar ..... 9.75c.
Antimony, Asiatic ..... 16.00c.
Babbitt metal, medium grade ..... 18.75c.
Babbitt metal, high grade ..... 50.50c.
Solder, ½ and ½ ..... 29.50c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged consumers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	15.00c.	16.50c.
Copper, hvy. and wire	14.50c.	16.00c.
Copper, light and bottoms	12.75c.	13.75c.
Brass, heavy	8.25c.	9.25c.
Brass, light	7.00c.	8.00c.
Hvy. machine composition	12.00c.	13.00c.
No. 1 yel. brass turnings	9.75c.	10.50c.
No. 1 red brass or compos. turnings	11.25c.	12.25c.
Lead, heavy	5.50c.	6.00c.
Lead, tea	4.25c.	5.25c.
Zinc	3.50c.	4.00c.
Sheet aluminum	13.75c.	16.00c.
Cast aluminum	12.00c.	14.00c.

was £186 10s., with 475 tons reported sold, which does not add strength to the market. Stocks in London warehouses are lower at 10,412 tons because of shipments to New York.

Lead.—Although the London market was decidedly lower yesterday, with a slight recovery today, prices here are unchanged at 6.70c., St. Louis. Demand has been quiet for some time and is even lighter now. The leading interest continues to quote 6.90c., New York, as its contract price.

Zinc.—Because of marked weakness in the London market, with prices at a level which would permit imports of prime Western zinc at prevailing levels, producers here have generally lowered their quotations to 6.70c., East St. Louis, or 7.05c., New York. Thus far, this has not stimulated buying, which continues moderate. It is stated that orders from consumers are at the lowest point since the organization of the American Zinc Institute. With stocks so low, it is argued that larger buying must appear before long. This depends largely on the conviction of consumers that the bottom of the market has been reached. Because of a deadlock between producers and buyers of ore, purchases were down to 7720 tons last week, increasing stocks materially. Production was 13,000 tons for the week. The ore price is unchanged at $44, Joplin.

Antimony.—There is a good demand from consumers for October and early November delivery, due to the Chinese revolutionary disturbances. The market is accordingly stronger for Chinese metal at 8.75c., New York, duty paid, for all positions.

Nickel.—Ingot nickel in wholesale lots is quoted at 35c. per lb., with shot nickel at 36c. and electrolytic nickel in cathodes at 35c.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at the published price of 23.90c. per lb., delivered.

Non-Ferrous Metals at Chicago

CHICAGO, Oct. 22.—The local nonferrous metal market is quiet. Prices for tin are off 2c. a lb. and quotations are lower on zinc. Prices for antimony have reacted upward. The old metal market is without feature.

Prices per lb., in carload lots: Lake copper, 18.50c.; tin, 41.25c.; lead, 6.80c.; zinc, 6.80c.; in less-than-carload lots, antimony, 9.62½c. On old metals we quote copper wire, crucible shapes and copper clips, 14c.; copper bottoms, 11.50c.; red brass, 11.50c.; yellow brass, 8c.; lead pipe, 4.50c.; zinc, 3.25c.; pewter, No. 1, 24.50c.; tin foil, 26c; block tin, 36c.; aluminum, 12.87½c.; all being dealers' prices for less-than-carload lots.

L. A. Benson & Co., Baltimore, have been appointed distributers in the Baltimore district for the products of the Diamond Chain & Mfg. Co., Indianapolis.

Non-Ferrous Ingot Prices in October

CHICAGO, Oct. 21. — Non-ferrous Ingot Metal Institute reports below the average prices per pound received by its membership on commercial grades of the six principal mixtures of ingot brass during the 28-day period ended Oct. 11. As there are, as yet, no generally accepted specifications for ingot brass, it must be understood that each item listed below represents metal known to the trade by a common designation but, in reality, including many variations in formulas. Until the program of standardizing the principal specifications, now progressing in cooperation with the American Society for Testing Materials, is completed, the following specifications will be understood to refer to "commercial grades."

	Cents per Lb.
Commercial 80-10-10 (1 per cent impurities)	17.31
Commercial 78 per cent metal	15.25
Commercial 81 per cent metal	15.574
Commercial 83 per cent metal	15.827
Commercial 85-5-5-5	16.086
Commercial No. 1 yellow brass ingot	12.861

The combined deliveries of brass and bronze ingots and billets by the members of the Non-Ferrous Ingot Metal Institute for September amounted to 7944 tons, according to announcement made by the institute today.

New Copper Refining Plant in Canada

A new $5,000,000 custom copper refining plant is being erected by the Ontario Refining Co. on a 40-acre site near Sudbury, Ont. It is anticipated that the plant will be in operation by January, 1931.

Three main buildings will be erected. The electrolytic cell house will be 300 x 400 ft. and will have 1200 reinforced concrete cells with lead linings. The casting buildings will be 200 x 400 ft. and will have three furnaces, each with a capacity of 450,000 lb. of copper. Both buildings will be of brick over steel construction. Associated in the Ontario Refining Co. are the International Nickel Co. of Canada, the American Metal Co., Consolidated Mining & Smelting Co. of Canada, and Ventures, Ltd.

Textiles and Coal Are More Active, Say Statisticians

Both production and distribution have been continuing well above last year's level, according to the October report of the Conference of Statisticians in Industry, operating under the auspices of the National Industrial Conference Board, New York.

Slight recessions in the iron and steel and automobile industries have been balanced in part by an increase in operations in several divisions of the textile group and in coal mining, due partly to seasonal influences. Bituminous coal production has been larger, since Aug. 1 than for the same period in any recent year except 1926.

Newspaper advertising continues to run well above last year's appropriations, indicative of optimism among dealers as regards available fall business.

While in several of the heavier industries stocks on hand are more than normal, indicating a slackening of demand in those particular commodities, this is ascribed to conservatism on part of buyers and as having obviated all danger of commodity price inflation.

September Sheet Output and Shipments Declined

The decreased demand for sheets due to the slowing down of the automotive industry is again reflected in the monthly report of the National Association of Flat Rolled Steel Manufacturers, which shows that there was less activity by independent mills during September in sales, production and shipments than in any pervious month this year. There was a rather sharp falling off in production and shipments as compared with August, but not much decrease in the tonnage booked. Sales were 274,568 tons, compared with 282,107 tons in the previous month. Production was 302,490 tons, against 366,734 tons in August while shipments declined from 365,649 tons in August to 301,330 tons last month. Unfilled orders also declined, having been 522,803 tons on Oct. 1, compared with 570,613 tons on Sept. 1. The September report and comparisons in net tons follow:

	September	August	July
Total number of mills.	715	722	723
Capacity per month	459,075	492,765	486,430
Percentage reporting	67.4	67.9	67.9
Sales	274,568	282,107	337,222
Production	302,490	366,734	323,905
Shipments	301,330	365,649	344,676
Unfilled orders	522,803	570,613	658,155
Unshipped orders	111,042	108,887	107,751
Unsold stocks	43,886	34,436	47,103
Percentages of Capacity			
Sales	88.7	84.4	102.2
Production	97.7	109.7	98.1
Shipments	97.4	109.4	104.4
Unfilled orders	168.9	170.7	199.4
Unshipped orders	35.9	32.6	32.6
Unsold stocks	14.2	10.3	14.3

River Movement of Iron and Steel Is Heavy

September movement of iron and steel products on the Ohio River amounted to 150,163 tons, another high record for this traffic, compared with 137,734 tons in August and 125,062 tons in September, 1928. On the Monongahela River, 135,773 tons of iron and steel was moved in September, compared with 134,426 tons in the preceding month and 136,227 tons in September, 1928.

Four 78-in. vortex collectors are to be provided for the Aliquippa plant of the Jones & Laughlin Steel Corporation by H. A. Brassert & Co., Chicago. They will be built by the American Blower Corporation. Capacity is 90,000 cu. ft. a minute each of blast furnace gas at 350 deg. Fahr.

Fabricated Structural Steel

Awards of 58,000 Tons Include 17,500 Tons for New York Hospital and 16,000 Tons for Philadelphia Station

FABRICATED structural steel lettings in the week, as reported to THE IRON AGE, totaled slightly more than 58,000 tons, compared with 23,000 tons in the preceding week. The amount added to pending work was nearly 38,000 tons.

The largest award was 17,500 tons for a hospital for the Cornell Medical Center, New York, taking 17,500 tons. A Chicago tower building accounts for 15,000 tons of the new work in the market. The Metropolitan Life Insurance Co. will soon ask for bids on a 100-story building in New York that will take 30,000 to 40,000 tons of steel.

Awards follow:

NEW HAVEN, CONN., 1300 tons, Sterling Law School and dormitories at Yale University, to Levering & Garrigues Co.

NEW YORK, 17,500 tons, New York Hospital for Cornell Medical Center, to Hedden Iron Construction Co.

NEW YORK, 1100 tons, apartment building at Seventh Avenue and Sixteenth Street, to Hedden Iron Construction Co.

NEW YORK, 1250 tons, 19-story apartment building on East Seventy-second Street, to Paterson Bridge Co.

NEW YORK, 1100 tons, American Museum of Natural History, to Easton Structural Steel Co.

STATE OF PENNSYLVANIA, 125 tons, highway bridge in Bedford County, to McClintic-Marshall Co.

MEDIA, PA., 700 tons, Delaware County Court House, to Lehigh Structural Steel Co.

PENNSYLVANIA RAILROAD, 16,000 tons, suburban terminal at West Philadelphia, to McClintic-Marshall Co.

YORK, PA., 350 tons, high school building, to Bauman Iron Works, Reading.

STATE COLLEGE, PA., 400 tons, building, to Anthracite Bridge Co., Scranton.

ARDMORE, PA., 300 tons, store for Strawbridge & Clothier, to Shoemaker Bridge Co.

MINEOLA, N. Y., 180 tons, Junior beams, Roosevelt Field hangars, to Jones & Laughlin Steel Corporation.

MORRISTOWN, N. J., 118 tons, Junior beams, Our Lady of Grace School, to Jones & Laughlin Steel Corporation.

BALTIMORE, 1200 tons, highway bridge, to Bethlehem Steel Co.

BIRMINGHAM, 220 tons, Woods-Chevrolet garage, to Virginia Bridge & Iron Co.

FRANKLIN, TENN., 450 tons, Allen Mfg. Co. plant, to Nashville Bridge Co.

EL PASO, TEX., 185 tons, Nichols Copper Co. power house, to Ingalls Iron Works.

STATE OF TEXAS, 500 tons, bridge for Wharton Bridge Co., to Virginia Bridge & Iron Co.

BRAZIL, SOUTH AMERICA, 400 tons, steel flume for a Brazilian electric company, to Virginia Bridge & Iron Co.

FLINT, MICH., 1500 tons, office building, to Flint Structural Steel Co.

LANSING, MICH., 965 tons, factory for Fisher Body Co., to Whitehead & Kales Co.

HAMILTON, ONT., 100 tons, Junior beams, Hamilton General Hospital, to Jones & Laughlin Steel Corporation.

PORTSMOUTH, OHIO, 112 tons, Junior beams, George D. Schudder School, to Jones & Laughlin Steel Corporation.

PORTSMOUTH, 100 tons, Junior beams, Harding Elementary School, to Jones & Laughlin Steel Corporation.

AKRON, OHIO, 3500 tons, bank and office building for Central Savings & Trust Co., to Berger Iron Works.

CHICAGO, 1200 tons, Ruth garage, to an unnamed bidder.

ST. LOUIS, 4500 tons, bridge for Missouri Pacific across Merrimac River, to an unnamed bidder.

EAST ST. LOUIS, ILL., 280 tons, buildings at Curtiss-Steinberg Air Field, to McClintic-Marshall Co.

SAN FRANCISCO, 100 tons, school, Turk and Ashbury Streets, to Dyer Brothers.

BURNABY, B. C., 500 tons, addition to plant of Dominion Bridge Co., owner to do fabricating.

VANCOUVER, B. C., 500 tons, telephone office building, to Western Bridge Co.

SEATTLE, 100 tons, sack house for Fisher Flouring Mills Co., to Isaacson Iron Works.

DENVER, 1200 tons, Twenty-third Street viaduct, to American Bridge Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

HARRISBURG, PA., 1700 tons, Farm Show Building; bids opened Oct. 23, original bids rejected as exceeding appropriation.

BOSTON, 2200 tons, Atlantic National Bank.

EDGEWATER, N. J., 800 tons, viaduct over Erie Railroad tracks for Ford Motor Co.'s new assembly plant.

PROVIDENCE, R. I., 1000 tons, Crawford Street bridge.

NEW YORK, 1000 tons, New York Trade School on East Sixty-sixth Street.

NEW YORK, 2400 tons, apartment building at Park Avenue and Seventy-third Street.

STATE OF NEW JERSEY, 600 tons, bridge over Passaic River.

WILMINGTON, DEL., 250 tons sheet steel piling, deep water power station for United Engineers & Constructors, Inc.

PHILADELPHIA, 5000 tons, municipal convention hall.

PHILADELPHIA, 500 tons, building for Stanley Co.

LEBANON, PA., 300 tons, building for Lebanon Steel Foundry Co.

NEWPORT NEWS, VA., 500 tons, building for Horace E. Dodge Boat & Plane Corporation.

LANSING, MICH., 1800 tons, R. E. Olds Co. bank and office building; Hunter Construction Co., Fon du Lac, Wis., general contractor.

SPRINGFIELD, ILL., 1500 tons, State buildings; J. B. French & Co., general contractors; Mississippi Valley Structural Steel Co., low bidder on steel.

CHICAGO, 1000 tons, apartment building.

NORTHERN PACIFIC, 800 tons, bridge work.

CHICAGO, 500 tons, 124th Field Artillery Armory; Mississippi Valley Structural Steel Co., low bidder.

CHICAGO, 15,000 tons, addition to building and tower of National Bank of the Republic.

OMAHA, NEB., 2000 tons, Union Pacific station; this is in addition to previous tonnage.

UNION PACIFIC RAILROAD, 300 tons, viaduct.

STURGEON BAY, WIS., 1340 tons, State highway bridge; bids Nov. 6.

KENOSHA, WIS., 300 tons, factory for Snap-On Wrench Co.

SACRAMENTO, CAL., 1337 tons, bridge over San Luis Rey River; bids opened.

SALINAS, CAL., 109 tons, two bridges for Monterey County; bids Oct. 21.

STOCKTON, CAL., 1000 tons, plant for Port Stockton Cement Co.; bids being taken.

International Standards Association Formed

WASHINGTON, Oct. 19.—The national standards bodies of 20 countries have made notable endeavor in recent years to establish a permanent international standards organization, according to M. H. Bletz, chief, Foreign Standards Section, Department of Commerce. As a result of this activity, organizations of 16 European countries now have agreed to establish the International Standards Association and have elected a president and secretary.

Early activities of the association, Mr. Bletz said, will be directed toward definite cooperation among the separate national bodies, standardization of methods and procedure, comparison of experience and results of investigations, and the coordination of activities when possible.

"International scientific organizations have given the world most of the existing international standards," said Mr. Bletz. "These are standards of time, length, weight, color and temperature, as well as basic standards for chemical, mechanical, physical and electrical elements. While the exigencies of international commerce required these standards, science or science in industry has actually been a few steps ahead of the demand.

"On the other hand, competition for world industrial supremacy, or, at least, the desire for leading positions in world commercial or industrial accomplishments, appears to act as a drawback to greater international uniformity in specifications for commodities. Apparently, until there is a greater equality in the producing methods in the different countries, industrial rivalry between nations will continue to delay a larger development of international commodity standards."

Interstate Stockholders Approve Sale

Stockholders of the Interstate Iron & Steel Co., Chicago, have formally approved the acquisition of the company by the Central Alloy Steel Corporation. The plan calls for the exchange of one and eleven fortieths shares of Central Alloy stock for each share of Interstate Iron & Steel common, of which there are 250,000 shares outstanding.

PERSONAL

JAMES P. ALLEN, president and general manager, Union Steel Casting Co., Pittsburgh, has resigned, effective immediately, and has been succeeded by JAN R. DUNSFORD, vice-president of the Lewis Foundry & Machine Co., Groveton, Pa., another subsidiary of

J. P. ALLEN

Q. S. SNYDER

the Blaw-Knox Co., Blawnox, Pa. Mr. Allen went with the Union company more than 27 years ago as sales manager and had been president and general manager since 1918. He began his business career with the American Steel Foundries, first at the Thurlow plant, Chester, Pa., and later as superintendent of the company's Alliance, Ohio, plant. He then went with the Union company. Mr. Allen has no definite plans for the future, but expects to spend the next six months in travel and rest. Mr. Dunsford became identified with the Lewis company two years ago, after having served as sales manager of the Wheeling Mold & Foundry Co., Wheeling, W. Va., where he was associated with Frank Cordes, now president of the Lewis company. When this company was acquired by the Blaw-Knox Co. a few weeks ago, Mr. Dunsford was made a director in the parent company. W. C. EICHENLAUB, secretary and sales manager of the Union Steel Casting Co., has also resigned and is now identified with the Pittsburgh Steel Foundry Corporation, Glassport, Pa., as sales manager. He became associated with the Union company 25 years ago and has served in his recent capacity for 12 years. C. H. LEHMAN has been elected secretary of the Union company to succeed Mr. Eichenlaub. GEORGE DAUMBAULD, assistant treasurer of the Blaw-Knox Co., has been made a director of that company.

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Q. S. SNYDER has been elected president of the Pittsburgh Rolls Corporation, Pittsburgh, subsidiary of the Blaw-Knox Co., Blawnox, Pa., and has also been made a director in the parent company. He succeeds the late David L. Eynon as president of the Rolls corporation. Mr. Snyder went with the company 10 years ago as vice-president and became general manager three years ago.

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A. D. BROWN, who has acted as special factory representative for the Pittsburgh transformer division of Allis-Chalmers Mfg. Co., Milwaukee, for the past year, has been appointed district manager of the Buffalo office of the company, succeeding M. W. PHELPS, who has resigned.

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THOMAS I. S. BOAK, formerly superintendent of one of the plants of Goulds Pumps, Inc., Seneca Falls, N. Y., has been made works manager for all of the plants.

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ROBERT L. WHEARLEY has been appointed manager of the Chicago office of the Dudlo Mfg. Co., wire manufacturer, Fort Wayne, Ind., succeeding R. A. CONNER, who has joined the sales department of the Inca Mfg. Co., Fort Wayne, Ind., wire manufacturer.

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FRANK DUNSTAN and O. B. SCHMELTZ, sales engineers formerly located at the Putnam machine works, Fitchburg, Mass., of Manning, Maxwell & Moore, Inc., have been transferred to the Pittsburgh office to assist the Arch Machinery Co. in the sale of Putnam machine tools.

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MAURICE M. WHELDON, recently identified with the Federal furnaces of the By-Products Coke Corporation, South Chicago, has been appointed assistant superintendent of blast furnaces for the Pittsburgh Steel Co., Monessen, Pa. Mr. Wheldon has had wide acquaintance with blast furnace operation, having gained his early ex-Jackson, Ohio, maker of high-silicon iron. Later he was identified for a short time with one of the Lavino furnaces in eastern Pennsylvania, but returned to the southern Ohio region to become superintendent of the Wellston Iron Furnace Co., Wellston. When this plant ceased to operate he went with the Federal furnaces.

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L. H. UNDERWOOD, for four years superintendent of blast furnaces and coke plant at the Indiana Harbor, Ind., plant, Youngstown Sheet & Tube Co., has resigned.

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W. C. WALLIS, who has been superintendent of blast furnaces at the Brier Hill works, Youngstown Sheet & Tube Co., Youngstown, has been made assistant general superintendent at that plant. P. D. CROMWELL, recently superintendent of the company's Hubbard, Ohio, blast furnaces, has been appointed superintendent of blast furnaces at the Campbell works.

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L. J. VOYER, who has been New York district sales manager for the Newton Steel Co., Youngstown, has been transferred to the home office, where he will be identified with the general sales department. F. C. FLOOD, recently identified with the company's Cleveland sales office, succeeds Mr. Voyer at New York, and W. H. WILLIAMS, who has been in the Detroit office, succeeds Mr. Flood at Cleveland.

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C. W. EDWARDS, formerly superintendent of rolling mills at the Indiana Harbor, Ind., plant, Youngstown Sheet & Tube Co., has been made assistant general superintendent at that plant. He has been identified with the company at that location for the last 12 years. GEORGE W. ABEL, who has been assistant superintendent of the slab mill at South Works, Illinois Steel Co., Chicago, has succeeded Mr. Edwards as superintendent of rolling mills at Indiana Harbor.

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FRED L. FLANDERS, vice-president, Muskegon Motor Specialties Co., Muskegon, Mich., has been elected a director of the Sparta Foundry Co. He was formerly associated with the White Motor Co. and the Continental Motors Corporation.

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MILTON GREENBERGER, president, Steel Mill Products Co., Chicago, has been elected president of the Appleton Steel Tube Co., Appleton, Wis. He succeeds JOHN M. BALLIET, who resigned because of poor health.

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DAVID B. REEDER, formerly associated with the Keystone Driller Co., has been appointed metallurgist, with offices in the Oliver Building, Pittsburgh, of the Electro Metallurgical Sales Corporation, New York.

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H. A. MASON, secretary of the Columbus Bolt Works Co., Columbus, Ohio, sailed on Oct. 19 for Europe. He will join J. R. POSTE, president of the company, who is now in London, and they will return in November.

W. R. EBERHARDT, who has been structural engineer for the H. K. Ferguson Co., Cleveland, has become manager of the New York office of the company.

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E. J. LOWRY, consulting metallurgical engineer, Detroit, spoke on "A New Material: Still Called Cast Iron" at the first fall meeting of the Newark Foundrymen's Association, to be held at the Down Town Club, Newark, on Oct. 23.

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GEORGE M. BECHTEL, heretofore of the Los Angeles office of Combustion Engineering Corporation, New York, has been made branch manager of the Seattle office of the company.

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DON MCDANIEL, vice - president, Hamilton Foundry & Machine Co., Hamilton, Ohio, has been elected president of the Ohio Foundries Association, Inc., Cleveland.

DON MC DANIEL

FRANK A. WEIDMAN has been appointed manager of the wrought iron division of the Sharon Steel Hoop Co., Sharon, Pa., to handle the development and distribution of wrought iron sheets made from Byers new process wrought iron. The perfection of the Aston process for producing wrought iron on a tonnage basis makes wrought iron sheets available, after having been practically unobtainable for two decades or more. Mr. Weidman until recently was special representative for the Inland Steel Co., Chicago. Previous to that he was with the American Sheet & Tin Plate Co. at Pittsburgh.

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H. W. LYNN, formerly connected with the Aetna-Standard Engineering Co., Youngstown, Ohio, has become manager of machine sales of the Wean Engineering Co., Inc., Warren, Ohio, engineer in sheet and tin mill equipment.

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F. P. NORRIS, who has been identified with the Phoenix Iron Co., Philadelphia, for the past 40 years, for 28 of which he has served as manager, has been appointed a vice-president of the company.

A. E. UDELL has resigned his position as general purchasing agent of the Oliver Farm Equipment Co., Chicago, and plans to go to Florida for a short stay.

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D. H. SMITH has been placed in charge of the Chicago office, at 221 East Twentieth Street, of Clark Brothers Bolt Co., Milldale, Conn.

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J. L. RHOADS, who has been associated for many years with S. F. Bowser & Co., pump and tank manufacturers, Fort Wayne, Ind, has been appointed service manager for all territories in the United States except the San Francisco district.

Hardware Jobbers Adopt Trade Practice Rules

WASHINGTON, Oct. 22. — Approximately 90 per cent of the sales by hardware jobbers in 14 Southern States is estimated to have been represented either directly or indirectly at a trade practice conference held here on Friday of last week by the Southern Hardware Jobbers' Association with Commissioner Garland S. Ferguson, Jr., and Trade Practice Director M. Markham Flannery of the Federal Trade Commission. Sixteen rules were adopted. They covered the following subjects: Interference with contracts; misbranding; fraud and misrepresentation; substitution of quality; giving of secret rebates, gratuities or premiums; selling below cost or without profit; arbitration; defamation of competitors; enticement of employees; definition of qualified distributer; datings; continuance of conference; dumping; price discrimination; free deliveries; terms of sales.

X-Ray Studies of Wire Described

Work that is being done with X-ray studies applied to wire by the American Steel & Wire Co. was discussed by F. C. Elder, chief metallurgist, Cleveland district, of that company, at the first meeting of the season of the Cleveland chapter of the American Society for Steel Treating, at the Cleveland Engineering Society rooms, Oct. 15. The meeting was attended by the Canton-Massillon chapter.

The studies discussed applied to the cold working of wire. Some of the specimens were stretched on tensile machines and others were cold drawn in dies. The talk was illustrated by lantern slides of numerous X-ray photographs. Reductions up to 99½ per cent were made in the wire by a series of light drafts. Photographs showed the effects of annealing the cold-drawn wire for 1 hr. at temperatures ranging from 700 to 1600 deg. Fahr. Wire annealed at 700 deg. showed little change in structure. At 900 deg. it began to lose its fibering. Annealed at 1000 deg. it revealed the beginning of recrystallization and the number and size of crystals increased as the annealing temperature rose. Photographs showed that cold-drawn wire was well annealed at a temperature of 1600 deg. Studies of cold-drawn wire having an 80 per cent reduction were also discussed and illustrated.

In reply to questions Mr. Elder said that the use of the spectograph is a good method of showing a good normalized structure. Referring to the practical application of the X-ray at the present stage of the art, he said that he had found the method of advantage in solving difficult problems that did not yield to microscopic studies or other methods of investigation.

Nitriding Symposium in Special Volume

In a special edition of its *Transactions* the American Society for Steel Treating has just published the complete proceedings of the memorable symposium on nitriding which was a feature of its eleventh annual convention during the National Metal Congress in Cleveland in September. The edition contains 222 pages, which include each of the eight papers and the special address by Dr. Adolph Fry of Germany, inventor of the process, who was present at the meeting. There is also a report of the written and oral discussions.

As an introduction there is a statement on behalf of the officers and board of directors by Dr. Zay Jeffries, president, and W. H. Eisenman, secretary, giving the reasons for printing this special issue. In the ordinary course of procedure the various papers would have been printed in the monthly issues of the *Transactions*. The statement also expresses appreciation to W. B. Coleman for the organization of the symposium, to Dr. George B. Waterhouse chairman of the sessions, and to the authors of the papers and those who contributed to the discussions.

The edition includes photographs of the chairman and vice-chairman of the sessions, and of Adolph Fry and Pierre Aubert, honorary vice-chairmen.

Copies of this symposium are available at $3 each, bound in cloth, postpaid in the United States, and $3.50 postpaid to foreign countries.

Obituary

HOWARD SELLERS, formerly a director of William Sellers & Co., Inc., machine tool builders, Philadelphia, died at his home at Wynnewood, Pa., on Oct. 14, aged 72 years.

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CHARLES B. SALMON, founder of the Eclipse Windmill Co., which formed the nucleus of the Fairbanks, Morse & Co. industrial organization, died at his home in Beloit, Wis., on Oct. 15, aged 79 years. He was identified with the establishment and management of numerous other large industrial enterprises and was noted for his charities and philanthropies.

September Automobile Production Down

Output of Nine Months Exceeds That for Any Previous Full Calendar Year, in Total, in Passenger Cars and in Trucks

WASHINGTON, Oct. 21.—Totaling 415,332 units, production of motor vehicles in the United States in September was the lowest since January, when the output was 401,037 units, according to reports received by the Department of Commerce. Production of passenger cars in September was 364,786, also the lowest output since January, with 347,382. Motor truck output in September was 49,681, the lightest since last December, with a total of 28,123. Production of taxicabs in September was only 865, the smallest since last November, with a total of 700.

August production of motor vehicles totaled 498,361 units, the September production showing a decline of 83,029, or 17 per cent. Passenger car output in August was 441,942, the decrease for September being 77,156. Production of trucks in August was 55,379, the September decline being 5698.

For the nine months of the current year production of motor vehicles was 4,637,471 units, an increase of 1,167,252 over the 3,470,219 in the corresponding period of last year. The current total was higher than in any previous complete calendar year.

Passenger car production increased to 4,005,177, a gain of 945,239 over the 3,059,938 vehicles in the first nine months of 1928, and higher than in any previous 12-month. Truck production rose to 618,702 units, an increase of 212,739 over the 405,963 of the first nine months of last year, and again higher than in any previous full year.

Canadian motor vehicle production in September was 13,817 units, the smallest since last December, with a total of 9425. The August output was 14,214. Passenger car production in September was 10,710 and truck production was 3107, each the lowest since last December, with totals of 6734 and 2691 respectively. August production was 11,037 and 3177 respectively.

Total Canadian production for the nine months of 1929 was 233,853, against 202,652 for the corresponding period of last year. Passenger car output was 186,960 and 168,837 respectively, while the respective figures for truck production were 46,893 and 33,815.

Pittsburgh Barge Rates to Southwest Reduced

The American Barge Line, operating a line of barges between Pittsburgh, New Orleans and intermediate ports, and also ports on the upper Mississippi River, has announced new through rates on iron and steel articles from the Pittsburgh district to western Louisiana, Texas, Oklahoma and Arkansas. These new rates will represent a net saving to shippers of $2.20 a net ton as compared with the present all-rail rate. The American company will also soon publish a Pittsburgh terminal tariff, absorbing switching and barge loading charges in that district. The new reduced rates are to hold on pipe as well as other iron and steel articles and will be effective Dec. 1.

Record Freight Traffic with Less Equipment

While the loading of revenue freight in the United States during the first seven months of the year was a new high record for that period, reaching more than 30,000,000 cars, this enormous traffic is reported by the car service division of the American Railway Association to have been handled with fewer freight cars and locomotives than have been used at any time since 1923. The number of freight cars owned by Class I railroads July 1 was 2,266,069, a reduction of 34,600 in two years.

Average capacity of the units has been increasing steadily, the freight cars having advanced from 43.1 tons five years ago to 46.1 tons. In addition, there has been more intensive use of the individual cars. There has also been a decline in the number of locomotives owned, but the average tractive power of the units has gone up. This is now reported at 43,985 lb., compared with 38,217 lb. seven years ago.

Much Industrial Machinery Shipped to Canada

WASHINGTON, Oct. 19.—In a report relating to the market for industrial machinery in the Canadian prairie provinces of Manitoba, Saskatchewan and Alberta, Consul General P. S. Heintzleman, Winnipeg, points out that the principal classes of this class of equipment imported into the three provinces are mining machinery, pulp-mill and paper-mill machinery and road-building machinery. The report has been made public by the Industrial Machinery Division, Department of Commerce.

Separate figures for imports into the provinces are not available, but it is estimated that, of the total of more than $49,220,000 of strictly industrial machinery shipped from the United States to Canada in 1928, one-fourth was destined for use in the prairie provinces. A steadily increasing volume of trade is expected, although manufacturers in Canada, it was declared, are becoming more desirous of meeting the country's requirements and equipment is gradually being installed for the manufacture locally of the different lines, thus increasing competition for the American product.

Other competitors are principally the United Kingdom and, to a much less extent, Germany, Sweden, France, Norway and Switzerland. Pulp-mill machinery, coke and gas-producing machinery, textile machinery and briquette-making machinery are the items principally involved in this competition.

Mr. Heintzleman reported that, since one-tenth of the population of the prairie provinces is American-born, and further because of the proximity of the provinces to the United States and the easy access between the peoples of the two countries, there is naturally a marked preference for industrial machinery of American manufacture. The report deals at some length with the best methods for American manufacturers to follow in building up the markets in the provinces.

COMING MEETINGS

OCTOBER

Society of Industrial Engineers. Oct. 23 to 25. Sixteenth national convention, Hotel Statler, Cleveland. George C. Dent, 205 West Wacker Drive, Chicago, secretary.

American Gear Manufacturers Association. Oct. 24 to 26. Fall meeting, Benjamin Franklin Hotel, Philadelphia. T. W. Owen, 3608 Euclid Avenue, Cleveland, secretary.

American Iron and Steel Institute. Oct. 25. Thirty-sixth general meeting, Hotel Commodore, New York. E. A. S. Clarke, 75 West Street, New York, secretary.

American Management Association. Oct. 29 to Nov. 1. Fall meeting, Hotel Statler, Detroit. W. J. Donald, 20 Vesey Street, New York, managing director.

NOVEMBER

Open-hearth Committee of American Institute of Mining and Metallurgical Engineers. Nov. 5 and 6. Semi-annual meeting, Hotel Stevens, Chicago. Leo F. Reinartz, American Rolling Mill Co., Middletown, Ohio, chairman.

International Acetylene Association. Nov. 13 to 15. Annual meeting, Congress Hotel, Chicago. A. Cressy Morrison, 30 East Forty-second Street, New York, secretary.

American Institute of Steel Construction. Nov. 13 to 16. Annual meeting, Edgewater Gulf Hotel, Biloxi, Miss. Charles F. Abbott, 200 Madison Avenue, New York, executive director.

National Founders' Association. Nov. 20 and 21. Annual meeting, Hotel Astor, New York. J. M. Taylor, 29 South LaSalle Street, Chicago, secretary.

Quiet Prevails in European Markets

Even Pig Iron Is Less Active—Japan Has Expanded Operations—Russia Seeks More Technical Assistance

(*By Cable*)

LONDON, ENGLAND, Oct. 21.

PIG iron is quiet and Cleveland makers are becoming apprehensive of the future. Ironstone miners are pressing for a wage advance, but the mine owners are unwilling to discuss the question at present, as costs are still very high.

Export sales of Cleveland iron are negligible and foreign basic iron is again arriving in small tonnages for British consumers. Meanwhile, Cleveland makers have sold their October output, but have no forward contracts, and it is possible that some furnaces may be blown out at a later date.

Hematite makers are securing business at unprofitable prices, but are unable to advance the market, as French hematite is again competing.

Finished steel is quiet, but mills are busy on orders received prior to the latest steel makers' meeting, and specifications are coming in freely.

Tin plate is quiet, both manufacturers and consumers being disturbed by the recent set-back in the tin market, so that business is only moderate. Demand is good for light weight 14 x 20-in. wasters for the Far East and supplies are scarce, but other business is quiet although inquiry is well maintained.

Galvanized sheets are weak on poor demand and reduced costs of production in the form of lower priced sheet bars and spelter. Black sheets are dull.

Continental iron and steel markets are weak, with mills eagerly seeking business. Some British users of foreign sheet bars have placed orders, but the tonnage has been small. Finished steel is especially quiet in the absence of good export demand.

Czechoslovakian production in August was 137,000 metric tons of pig iron, and 185,000 tons of raw steel. French production in August was 893,000 metric tons of pig iron and 872,000 tons of raw steel. At the end of August 156 French furnaces were in blast. German pig iron output in September was 1,109,000 metric tons with 100 furnaces in blast at the end of the month.

British Trade Remains Quiet —Foreign Prices Lower

LONDON, ENGLAND, Oct. 11.—The iron and steel markets continue dull and there is but slight indication of a change for the better. The volume of new tonnage on mill books, except in pig iron, is not sufficient to maintain better than part-time operation. Blast furnaces, however, are generally well sold ahead and in some cases have advanced prices. The Cleveland producers have not as yet altered quotations, but are expected to do so shortly, as costs of production are increasing. A deterrent is the fact that they are seeking to increase export sales, and foreign users are reluctant to pay even the present prices. Domestic pig iron demand is good, but Continental iron, while still imported in special cases, is generally not an attractive proposition.

In the semi-finished market the rapid decline in the price of foreign billets and sheet bars is affecting domestic producers. British mills have for some time had a fair share of this business, but Continental competitors are becoming more active. However, Continental mills are in need of orders for prompt and early shipment, while British consumers are generally well covered on their immediate requirements and are seeking supplies for next year only.

Export trade is quiet. It is reported that a moderate amount of Canadian business in finished material has been booked as a result of efforts by the Steel Makers' Export Committee, and some business has been received from Japan. While prices are not disclosed, it is known that the market must be shaded considerably to meet Continental competition.

Returns of the Clyde shipbuilding industry for September were small, and the volume of new ship construction contracts is not good, so that shipyards are not likely to require large quantities of ship steel in the near future. There are, however, large electrical, structural and railroad projects, which call for substantial quantities of steel and other material.

British and Continental European Export Prices per gross ton, f.o.b. United Kingdom Ports, Hamburg and Antwerp, with the £ at $4.85

British Prices, f.o.b. United Kingdom Ports

Cleveland No. 3 foundry	£3 12½s.	to £3 13½s.	$17.58 to $17.82
East Coast hematite	3 16½	to 3 17	18.51 to 18.63
Ferromanganese, export	13 10	to 14 0	65.47 to 67.90
Billets, open-hearth	6 5	to 6 7½	30.31 to 30.92
Sheet bars, open-hearth	6 5	to 6 10	30.31 to 31.52
Black sheets, Japanese specifications	12 12½		61.22
Tin plate, per base box	0 19	to 0 19¼	4.60 to 4.66
Rails, 60 lb. and heavier	7 15	to 8 15	37.59 to 42.43
			Cents per Lb.
Steel bars, open-hearth	7 15	to 8 10	1.67 to 1.84
Beams, open-hearth	7 2½	to 7 12½	1.55 to 1.65
Channels, open-hearth	7 7½	to 7 17½	1.60 to 1.71
Angles, open-hearth	8 2½	to 8 12½	1.76 to 1.86
Ship plates, open-hearth	7 12½	to 8 2½	1.66 to 1.76
Black sheets, No. 24 gage	10 0	to 10 5	2.17 to 2.21
Galvanized sheets, No. 24 gage	13 0	to 13 7½	2.81 to 2.89

Continental Prices, f.o.b. Antwerp or Hamburg

Foundry iron, 2.50 to 3.00 per cent sil., 0.50 to 0.90 per cent phos.	£3 8s.	to £3 11½s.	$16.49 to $17.33
Foundry iron, 2.50 to 3.00 per cent sil., 1.00 per cent and more phos.	3 8	to 3 10	16.49 to 16.97
Billets, Thomas	4 13	to 4 15	22.65 to 23.03
Sheet bars, Thomas	4 13	to 4 14	22.65 to 22.79
Wire rods, low C., No. 5 B.W.G.	6 5	to 6 6¼	30.30 to 30.61
Black sheets, No. 31 gage, Japanese	12 6	to 12 7½	59.65 to 60.02
Rails, 60 lb. and heavier	6 8½	to 6 10*	31.16 to 31.52
Rails, light	6 1½		29.46
			Cents per Lb.
Steel bars, merchant	5 2	to 5 3	1.10 to 1.11
Steel bars, deformed	5 1	to 5 2	1.09 to 1.10
Beams, Thomas, British standard	4 19	to 5 3	1.07 to 1.11
Channels, Thomas, American sections	5 14	to 5 18	1.24 to 1.27
Angles, Thomas, 4-in. and larger, over ⅝-in. thick	5 0		1.10
Angles, Thomas, 3-in.	5 7		1.15
Ship plates, open-hearth inspected	7 8		1.63
Hoop and strip steel over 6-in. base	5 10	to 5 12	1.19 to 1.21
Wire, plain, No. 8 gage	7 4	to 7 5	1.58 to 1.59
Wire, galvanized, No. 8 gage	8 17½		1.91
Wire, barbed, 4-pt. No. 12 B.W.G.	11 5		2.48
Wire nails, base	7 10	to 7 10½	$1.62 to $1.63 per keg
Wire nails, assortments, 1 to 6-in., keg	10 6½		2.23

*Open-hearth steel, 10s. ($2.42) per ton extra.

Germany Imports Scrap Cans for Detinning

HAMBURG, GERMANY, Oct. 7.—Detinning of scrap tin plate in Germany is handicapped by a shortage of scrap and a diminishing recovery of tin, as a result of improved methods of plating, which provide a thinner tin coating. Recently scrap tin cans have been imported from the United States, Great Britain, Australia and the Far East. Some increase in the supply available for detinning is expected from the decision of certain municipalities to devote more attention to classifying this part of their scrap separately.

Most of the detinning in Germany is done by one company, Goldschmidt of Essen. Although the coating of tin plate is thinner than formerly, profits from the detinning process have continued at about the same level, following improvements in the method of recovering the tin. While accurate statistics are not available, it is estimated that about 14.5 kg. 32 lb.) of tin per metric ton of scrap is recovered. The total production of tin by this method in 1928 was about 2,755,000 lb., or 1250 metric tons.

Iron and Steel Output of Hungary Increasing

WASHINGTON, Oct. 18.—Increased demand from the Hungarian machinery industry and greater exports caused an increase in the production of both pig iron and crude steel during the first six months of 1929, according to a report received by the Department of Commerce from Budapest. Output of pig iron for the first half of the current year was 184,320 metric tons, compared with 136,857 tons for the first half of last year. Crude steel production was 241,440 tons, compared with 223,500 tons.

Scrap Prices Reduced in Germany

HAMBURG, GERMANY, Oct. 7.—Prices of iron and steel scrap have again been reduced. No. 1 heavy melting steel is now quoted at 64 m. ($15.23) per metric ton, delivered. Other grades of scrap have also been reduced 1 to 2 m. (24c. to 48c.) per ton. During August imports of scrap totaled 47,000 tons, but there is an abundant supply, and importation is expected to decline at the new prices.

Belgian Exports Light—Electrical Merger Near

BRUSSELS, BELGIUM, Oct. 2.—Steel export business in the past fortnight has been quiet and the price per gross ton for steel bars, f.o.b. Antwerp, has declined to £5 7s. ($25.95), which is 5s. ($1.21) per ton below the price at the end of August. Except for some small orders from Argentina, little foreign business has been booked. Business is fairly good in semi-finished material, but lack of demand for finished products may cause slight curtailment by some mills. Iron and steel scrap prices have weakened slightly. Export prices are low, and Belgian sellers have been unable to obtain business in South American markets and Japan except by offering concessions.

German Chemical Industry May Make Rustless Iron

HAMBURG, GERMANY, Oct. 7.—It is currently reported that the I. G. Farben A. G., the German Dyestuffs Corporation, is planning the establishment of a rustless iron division, which will manufacture equipment for use in the chemical industry. The use of rustless iron in the chemical industry has become so large that it is believed that a plant manufacturing equipment under the Krupp-Nirosta patents would be profitable.

German Cable Makers May Build American Plant

HAMBURG, GERMANY, Oct. 7.—A cooperative export corporation has been established in Berlin by 10 German cable manufacturers. While the new company will handle sales of cable to foreign markets, its principal purpose is understood to be the establishment of plants in foreign countries where duties are too high to permit cable imports. At present the new company is considering plans for a cable manufacturing plant in the United States. Exports of cable from Germany this year have averaged 5000 tons a month.

Japan's Pig Iron Output 753,591 Tons in Half

YOKOHAMA, JAPAN, Sept. 11.—The leading producers of pig iron in Japan are the Government Steel Works and the South Manchuria Railroad Co. Of 753,591 metric tons of iron produced in the first half of this year, the Government works output was 403,779 tons and the South Manchuria Railway Co.'s production 111,368 tons. Other producers were the Mitsubishi Steel Co. with 76,804 tons, Japan Steel Works with 57,912 tons, Okura Mining Co. with 28,145 tons and the Asano Shipbuilding Co. with 29,281 tons.

Despite this heavy production of pig iron, importation is necessary. The Government Steel Works program for 1930 calls for a steel production of more than 1,350,000 metric tons, while its pig iron capacity is not more than 860,000 tons.

Czech Iron Output Rises

WASHINGTON, Oct. 15.—Production of pig iron in Czechoslovakia in August increased to 138,000 tons, but steel production decreased to 185,000 tons, according to a cablegram received by the Department of Commerce from Prague.

Japanese Sheet Exports Reach Many Markets

YOKOHAMA, JAPAN, Sept. 11.—Exports of galvanized sheets from Japan in August totaled 5028 metric tons, of which 3187 tons was flat sheets and 1840 tons corrugated. The official statistics are given in number of sheets, and the totals with destinations were as follows: To South Sea countries, 505,402 sheets; to China, 225,617 sheets; Kwantung Province, 225,010 sheets; Siam, 147,142 sheets; Manchuria, 41,499 sheets; Hong Kong, 40,700; British India, 15,626; Philippines, 5800, and to Asiatic Russia, 5600 sheets. The total was 1,212,296 sheets, or 5028 metric tons.

German Mills to Issue New List of Extras

DÜSSELDORF, GERMANY, Oct. 7.—Rolling mills are preparing a new list of extras on steel bars and shapes for export. For some time the extras charged have not corresponded to the standard list by several shillings a ton. For example, on 3/16-in. bars the standard size extra is 25s. per ton (27.5c. per 100 lb.), and on ¼-in., the average standard extra is 17s. 6d. a ton (19.5c. per 100 lb.). On recent export business the usual extra on both sizes has been about 10s. per ton (10.9c. per 100 lb.). Extras charged on light angles, tees and other shapes are also less than the present standard list.

Britain May Exceed Rail Quota with New Contract

HAMBURG, GERMANY, Oct. 7.—The agreement between Great Britain and Argentina, under which about £8,000,000 ($38,800,000) of rails and railroad material will be placed with British mills, may lead to Britain's exceeding its quota in the International Rail Manufacturers' Association. As British mills, under the agreement, will receive all rail orders placed by Argentina, the British allotment in the association may be exhausted soon and orders from the British dominions and colonies would be in excess of the quota. Meanwhile, Belgian and Luxemburg mills have declared themselves opposed to any increase in the allotment of a member.

German Mannesmann Not in Control of Saar Mill

The recent report from Germany that the German Mannesmann Tube Co. had acquired control of 65 per cent of the stock of the French Mannesmann mill, Acieries et Usines a Tubes de la Sarre, is stated to be incorrect by Louvroil & Recquignies, Paris. This company owns 34 per cent of the stock of the Mannesmann mill in the Saar and states that other French tube manufacturers control 26 per cent, while the German Mannesmann company owns the remaining 40 per cent.

More Russian Agreements with American Companies

HAMBURG, GERMANY, Oct. 7.—At a recent meeting of delegates from the South Russian Chambers of Commerce and German manufacturers, the head of the Russian foreign trade department, the Gurewitch, outlined the status of technical assistance agreements in Russia. In the past four years, he said, 71 such agreements had been made, of which 30 were with German companies, 17 with American and the rest with British, Swedish and French organizations. He pointed out that the trend is toward more agreements with American companies, because they are less secretive about improvements in their plants than companies in Germany and other countries.

Spiegeleisen Imports Mainly from Britain

Of the total imports of 11,243 gross tons of spiegeleisen into the United States to Aug. 1, this year, 10,868 tons came from Great Britain and 375 tons from Germany.

Of the 10,868 tons of British alloy, 3543 tons was received through the port of New Orleans, 2550 tons through the port of Philadelphia, 2235 tons through ports in Maryland, 2000 tons at Chicago, 240 tons through ports in Massachusetts, 135 tons at Los Angeles, 90 tons through ports in Washington, 50 tons through New York and 25 tons at San Francisco. The 10,868 tons of British alloy had a valuation of $314,490, or $28.94 per ton. The 375 tons of German alloy had a valuation of $12,320, or about $32.85 per ton. All of it came through the ports of San Francisco and Los Angeles.

German Rail Prices Cut

HAMBURG, GERMANY, Sept. 30.—The official price of £6 17s. 6d. ($33.34) a ton for rails was left unchanged by the International Rail Makers' Association at its recent meeting in Vienna, but German mills, which sold rails at £7 ($33.95) a ton during the second and third quarters of this year, have reduced their price to £6 18s. 6d. ($33.58) a ton, which is still 1s. a ton more than the official price. Mills continue to report satisfactory business in rails.

Swedish Sponge Iron Plant Increases Capacity

The Höganäs Co. of Sweden, maker of sponge iron, considerably increased its capacity during the spring and summer because of an increased demand for its product. It is stated that recently orders were so heavy, during rebuilding of the plant, that new business could not be accepted. Importers in this country have received word that the new units for producing sponge iron have had their trial run and are now in satisfactory condition to proceed with production. In the proposed new tariff sponge iron has been listed in a special paragraph for a duty of $2 per ton; under the present tariff it comes in under the same duty as pig iron.

Soviet to Adopt American Coal Mining Methods

The Donugol Coal Trust, the largest coal mining unit in the U. S. S. R., operating about 300 mines in the Donetz Basin, has concluded a fourth technical assistance contract with an American company. The new agreement, which is with Stuart, James & Cooke, Inc., New York, provides for assistance in increasing the efficiency of operation in the mines and plants.

This is the first contract of its kind made by a Russian Government organization, 30 other technical agreements having been for designing or building new plants. Stuart, James & Cooke, Inc., is already acting as a consultant for the Moscow Coal Trust and other coal companies in Russia.

Large Laboratories for Research in Canada

Large research laboratories have been authorized by the Dominion Government of Canada. The initial expenditure for these laboratories was fixed at $1,000,000, but it is now intended to proceed with the whole enterprise at a cost of $3,000,000. Tenders for the laboratory building, which is to be built in Ottawa, will soon be asked for, the specifications having been already prepared by the architects.

G. S. Whitby, professor of organic chemistry, McGill University, Montreal, will be director of the department of industrial chemistry. R. W. Boyle, professor of physics and dean of the faculty of applied science at the University of Alberta, will be director of the department of physics and engineering physics. J. H. Parkin, associate professor of mechanical engineering at the University of Toronto, will be assistant director of the department of physics and engineering physics in charge of aeronautical research.

To Expand Aluminum Output

HAMBURG, GERMANY, Oct. 7.—Further expansion of aluminum production in Germany is in prospect, and the Lautawerk, the largest producer, has made preliminary plans for another plant, with a capacity of 8000 to 10,000 tons a year. It is estimated that consumption of aluminum in Germany this year will total about 41,000 metric tons, compared with 37,800 tons in 1928, and that production will be about 35,000 tons, compared with 30,500 tons in 1928. An effort is being made to supply all German aluminum requirements from domestic production. It is noteworthy that in 1913 production of aluminum in Germany was only 1000 tons and consumption was 13,300 tons.

German Copper Output Up in August

HAMBURG, GERMANY, Sept. 30.—Copper production in Germany reached a new record in August with a total of 10,214 metric tons, compared with 9752 tons in July. Of the August output, 5130 tons was smelted from German ores.

Brazilian Steel Industry

Active development work in extracting iron ore from deposits in the State of Minas Geraes, Brazil, is reported to be in progress by the Itabira Iron Ore Co. This organization holds a concession from the Brazilian Government which requires prosecution of the work, according to the United States commercial attaché at Rio de Janeiro. To reach the ore beds, engineers are locating a route for new sections of the Victoria-Minas Geraes Railroad. Preliminary work on docks is under way at the port of Santa Cruz and also on the mining plant itself in the Doce River district.

The simplified practice recommendation for woven wire fencing has been reaffirmed. The pamphlet covering this recommendation may be obtained for 5c. from the Superintendent of Documents, Washington.

Production, Shipments, Consumption and Orders of Raw and Finished Materials

	September, 1929	August, 1929	September, 1928
Portland cement made(a), bbl.(b)	17,223	18,585	17,884
do., nine months(a)(b)	128,165(c)	.....	131,178
do., shipments(a), bbl.(b)	19,950	23,052	20,460
do., nine months(a)(b)	133,545(c)	.....	136,284
Babbitt metal consumed(d), net tons	2,613	2,716	2,654
Bituminous coal(a), net tons(b)	44,515	43,889	41,971
Bituminous coal(a), nine months, net tons(b)	380,250	.....	351,174
Anthracite(a), net tons(b)	6,792	5,954	5,927
Anthracite(a), nine months, net tons(b)	54,248	.....	54,240

(a) United States Bureau of Mines.
(b) Thousands.
(c) First recession since 1921.
(d) United States Department of Commerce.

Machinery Markets and News of the Works

Sales Show Improvement

Individual Orders Have Been Small, But Have Come from Almost All Consuming Lines

AGAIN in sales is reported by some machine tool builders who booked considerable business the past week.

However, there is a noticeable absence of buying on a large scale, individual orders having consisted largely of from one to three machines each. With the exception of the automobile industry, where tool purchases are almost at a standstill, bookings have been drawn from almost all consuming industries.

Despite the past week's improvement, the volume of business is lagging somewhat behind that in September. Production is not being affected, for the industry's backlog will carry operations along at capacity until well into next year.

An automobile truck maker has expended $35,000 for tools and a company in the Detroit district has bought four large automatic lathes from a Cincinnati builder. The Worthington Pump & Machinery Corporation is expected to contract for upward of $60,000 worth of equipment in the near future.

Among recent purchases by the Amtorg Trading Corporation for a tractor plant in Soviet Russia were a large number of presses from an Ohio manufacturer.

The United States Aluminum Co. has issued a supplementary list of tools which it will buy for its New Kensington, Pa., plant. The A. M. Byers Co. may inquire for machinery and other equipment for its Ambridge, Pa., works in the next few weeks, although purchases will be delayed until late in the year.

The Western Electric Co. continues to contract for large quantities of machine work and jobbing shops in the Chicago district are profiting from this situation.

New York

NEW YORK, Oct. 22.—Machine tool sales are holding up fairly well. Inquiries are in promising volume. A motor truck manufacturer has placed orders for upward of $35,000 worth of equipment. The Worthington Pump & Machinery Corporation, Harrison, N. J., is expected to close shortly on about $65,000 worth of tools.

Queens County Motor Car Co., 103 Arleigh Road, Douglaston, N. Y., has plans for a six-story service, repair and garage building at Briarwood, N. Y., to cost more than $200,000 with equipment. Henry C. Brucker, 2424 Myrtle Avenue, Brooklyn, is architect.

New York Edison Co., Irving Place and Fifteenth Street, New York, has arranged a fund of $40,500,000, out of total appropriation of $80,000,000 for new construction, for extensions and improvements in transmission and distributing lines, including underground conduit installation and network systems.

United States Electric Mfg. Corporation, 222 West Fourteenth Street, New York, manufacturer of electrical equipment, has leased building at 154-56 West Nineteenth Street, for expansion.

Curtiss Flying Service, Inc., 39 Broadway, New York, will soon begin work on new airport near municipal airfield at Los Angeles, including eight steel hangars, machine and repair shop, laboratories, school for students and other field units, to cost over $1,000,000 with equipment.

American Radiator & Standard Sanitary Corporation, 40 West Fortieth Street, New York, is closing negotiations for acquisition of C. F. Church Mfg. Co., manufacturer of plumbing and bathroom fixtures, etc., and will consolidate. Purchased company has plants at Washington, N. J., Holyoke, Mass., and Brattleboro, Vt., all of which are to be continued. Expansion is planned.

Phono-Kinema Syndicate, Inc., 729 Seventh Avenue, New York, manufacturer of sound equipment for motion pictures, etc., has arranged for sale of 100,000 shares of common stock, part of proceeds to be used for expansion in production.

Yankee Metal Products Co., 200 Fifth Avenue, New York, has leased floor in building at 460 West Thirty-fourth Street for expansion.

Board of Education, Park Avenue and Fifty-ninth Street, New York, has purchased property at St. Marks Place, Wall Street and Belmont Place, St. George, S. I., as site for new vocational school to cost over $500,000, for which plans will be drawn by W. C. Martin, school architect, Flatbush Avenue Extension and Concord Street, Brooklyn.

Continental Can Co., 1 Pershing Square, New York, has purchased Nashville Corrugated Box Co., Nashville, Tenn., manufacturer of corrugated shipping containers, etc., and will operate as unit of organization. Expansion in output is planned. Company has also merged with Owens-Illinois Glass Co., Toledo, Ohio, manufacturer of glass containers. A new company has been formed to operate consolidated organization under name of Continental Containers, Inc. Increase in present manufacture is planned.

Thomas A. Edison, Inc., West Orange, N. J., has awarded a general contract to Austin Co., New York, for new plant on Kearny meadows, Kearny, N. J., to manufacture storage batteries, comprising four one and two-story units, 120 x 280 ft.; 60 x 90 ft.; 30 x 47 ft.; and 80 x 80 ft., last-noted to be used as power house, to cost $220,000 with equipment.

Ford Motor Co., Detroit, has asked bids on general contract for new assembling plant at Edgewater, N. J., to replace works at Kearny, N. J., recently sold to Western Electric Co. Main unit will be two stories, 360 x 1500 ft., with steam power house, 50 x 113 ft., and auxiliary units, to cost over $1,000,000 with equipment. Albert Kahn, Inc., Marquette Building, Detroit, is architect and engineer.

Board of Freeholders of Passaic County, Court House, Paterson, N. J., is considering County airport on Paterson-Hamburgh Turnpike, Preakness, consisting of hangars, repair shop, oil storage and other mechanical units, to cost $200,000 with equipment.

Tungsten Electric Co., Union City, N. J., has been formed to take over and consolidate International Wire Co., Inc., Callite Products Co., Precision Metal Products Co., Independent Contact Mfg. Co., all with plants at 540 Thirty-ninth Street, Union City. New company is arranging for sale of stock to total $955,000, part of fund to be used to carry out merger and for expansion in output.

United States Rubber Co., Broadway and Fifty-eighth Street, New York, has asked bids on general contract for a five-story and basement plant, 110 x 425 ft., at Paterson, N. J., to cost about $800,000 with equipment. Lockwood Greene Engineers, Inc., 100 East Forty-second Street, New York, is architect and engineer.

Manufacturers Electro-Plating Co., 303 New Brunswick Avenue, Perth Amboy, N. J., has opened a plant to engage in general plating, specializing in chromium and cadmium plating.

International Stamping & Enameling Corporation, 360 Furman Street, Brooklyn, has been organized to manufacture enameled products, especially for hospitals and sick rooms. It plans to purchase controlling interests in stamping

companies equipped to do such work and has acquired a major interest in one such company and is negotiating with others. It will also purchase dies and stamping machinery for products for which it can create a market.

South Atlantic

BALTIMORE, Oct. 21.—Bids will be asked early in November by Stonleigh Stores Corporation, 810 North Charles Street, Baltimore, for five-story automobile service, repair and garage building, with addition of three stories underground, 190 x 194 ft., to cost $1,500,000 with equipment. Wyatt & Nolting, Keyser Building, are architects.

Public Improvement Commission, City Hall, Baltimore, is considering installation of manual training equipment in four-story junior high school on Harrington Road, for which bids will be asked on general contract in 60 to 90 days, to cost $1,000,000. Smith & May, Calvert Building, are architects.

Automatic packing machinery, conveying, elevating and other equipment will be installed in four and six-story addition to plant of American Tobacco Co., Richmond, Va., 128 x 270 ft., to cost about $2,500,000, of which more than $1,500,000 will be used for machinery. A steam power house with capacity of 2000 hp. is also under consideration. J. E. Sirrine & Co., Greenville, S. C., are architects and engineers. Executive offices of company are at 111 Fifth Avenue, New York.

Curtiss Flying Service, Inc., 39 Broadway, New York, is planning construction of hangar, with repair and reconditioning facilities, at municipal airport at Columbia, S. C., to cost about $100,000 with equipment.

Bedford Pulp & Paper Co., Mutual Building, Richmond, Va., has begun construction of steam-operated electric power plant at mill at Big Island, Va., to cost over $100,000 with equipment.

Anchor Post Fence Co., Eastern Avenue and Kane Street, Baltimore, manufacturer of iron fencing, has purchased plant and business of Fluid Heat Corporation, 2637 Greenmount Avenue, manufacturer of oil burning equipment and devices, and will consolidate. New line of manufacture will be continued and it is proposed to remove acquired plant to main works where expansion will be carried out and department established for oil burner production. J. R. Ellison is production manager in charge.

William Hellbach & Co., 409 Aisquith Street, Baltimore, plumbing and heating equipment and supplies, have awarded general contract to West Construction Co., Knickerbocker Building, for two-story storage and distributing plant with shop, to cost about $30,000 with equipment. Kubitz & Koenig, Emerson Tower Building, are architects.

Proctor Mfg. Co., Baltimore, has been organized to take over and operate Proctor Screen & Weatherstrip Co., with local plant at 3601-11 Elm Avenue. Plans are under way for extensions and installation of additional equipment.

Pitcairn Aviation, Inc., Land Title Building, Philadelphia, has awarded general contract to Birmingham Construction Co., 1612 North Thirty-fourth Street, Birmingham, for hangar, 120 x 120 ft., at airport at Atlanta, Ga., with repair facilities, to cost about $65,000 with equipment. John K. Ottley, Jr., Fourth National Bank Building, Atlanta, is company representative in charge.

The Crane Market

THE volume of inquiry for locomotive cranes has increased in the past week, but buying has been small. Stevens & Wood, Inc., engineer, New York, has closed on a locomotive crane for the Saginaw River development in Michigan and the New York Central Railroad has purchased a 25-ton locomotive crane for use in Ohio, but still has pending a 25-ton, gasoline driven crane for use in Pennsylvania and a 50-ton locomotive crane. Inquiry for overhead traveling cranes is good, but purchasing in this field also has been light, although a number of small orders has been placed recently with but little competitive bidding.

Among recent purchases are:

Union Shipbuiding Co., Baltimore, two 10-ton, 60-ft. span overhead cranes from a Western builder.

General Electric Co., Schenectady, N. Y., two 10-ton, one 35-ft. and the other 55-ft span overhead cranes from an unnamed builder.

New York Central Railroad, 25-ton locomotive crane for use in Ohio from Ohio Locomotive Crane Co.

Jones & Laughlin Steel Corporation, Pittsburgh, two mill-type cranes from Cleveland Crane & Engineering Co., and two ladle cranes from Alliance Machine Co.

Wheeling Steel Corporation, Wheeling, W. Va., two ladle cranes from Alliance Machine Co.

American Oil Co., American Building, Baltimore, will soon begin work on oil storage and distributing plant at West Bridgewater, Pa., to cost about $40,000 with equipment. T. J. O'Connell is company engineer.

Philadelphia

PHILADELPHIA, Oct. 21.—Bids have been asked on general contract by Electric Service Supplies Co., Seventeenth and Cambria Streets, Philadelphia, manufacturer of electrical equipment, for addition to plant, to cost over $45,000 with equipment. Conrad Neff, Philadelphia, is architect.

Grinnell Co., Providence, R. I., manufacturer of fire extinguishers, piping systems, etc., will soon begin work on new factory branch and distributing plant at Philadelphia, to cost over $65,000 with equipment. Local headquarters are in Commercial Trust Building.

Sun Oil Co., 1608 Walnut Street, Philadelphia, is considering construction of four new units at refining, storage and distributing plant at Marcus Hook, Pa., to be used primarily for enlarged output of high-test gasoline, to cost over $1,000,000 with machinery.

Philadelphia & Reading Coal & Iron Co., Reading Terminal, Philadelphia, will soon begin work on second electrically-operated coal breaker at St. Nicholas, Pa., in connection with expansion and electrification of coal properties for which an appropriation of $19,000,000 has been arranged; new unit will supplement another centralized breaker now in course of construction at Locust Summit, Pa., scheduled for completion early in next year. Work will include electrification of all transportation facilities at mines, electric hoists and conveyors, ventilating fans and equipment, pumping and power machinery. Stone & Webster Engineering Corporation, 49 Federal Street, Boston, is engineer.

Atlantic Refining Co., 260 South Broad Street, Philadelphia, has acquired waterfront property at New Haven, Conn., and plans new oil refining, storage and distributing plant, with 500-ft. pier equipped with mechanical loading and handling facilities, to cost about $450,000 with equipment.

Keystone Aircraft Corporation, Bristol, Pa., a unit of Curtiss-Wright Corporation, Buffalo, is contemplating expansion, to include erection of several one-story units for commercial plane manufacture, including parts and assembling divisions. Parent company proposes to transfer a large volume of commercial aircraft manufacture to this point, including multi-passenger airplanes. Expansion will cost more than $250,000. C. L. Roloson is vice-president and works manager at Bristol.

Standard Oil Co. of Pennsylvania, Sixth and Chestnut Streets, Philadelphia, has awarded general contract to Charles Cump, Kenwood Avenue, Chambersburg, Pa., for oil storage and distributing plant at Chambersburg to cost about $50,000 with equipment.

Safe Harbor Water Power Corporation, recently organized as subsidiary of Pennsylvania Water & Power Co., Holtwood, Pa., with headquarters in Lexington Building, Baltimore, has plans for hydro-electric power project at Safe Harbor on Susquehanna River, about eight miles from plant at Holtwood, to cost about $30,000,000 with steel tower transmission system. J. E. Aldred is president.

American Manganese Fertilizer Co., 1030 Vermont Avenue, N. W., Washington, Frank R. Porter, secretary, recently formed with capital of $500,000, has acquired six-acre tract at Alexandria, Va., heretofore held by Virginia Shipbuilding Corporation, and is contemplating construction of plant for production of commercial fertilizers, to cost over $85,000 with machinery.

Pittsburgh

PITTSBURGH, Oct. 21.—Machine tool orders were only moderate the past week, but additional inquiry has appeared and the volume of pending business is as great as at any time during the year. Among the larger inquiries before the trade are those of the Westinghouse Electric & Mfg. Co. and the Norfolk & Western. The United States Aluminum Co., which recently placed a sizable list of tools for its New Kensington plant, has issued a smaller supplementary list. The Baltimore & Ohio is also inquiring for a few miscellaneous items but otherwise railroad inquiry is rather limited.

Inquiry for machinery and equipment for the Ambridge plant of the A. M. Byers Co. is expected within the next few weeks, although purchase will be delayed until late in the year. National Tube Co. will also be a large buyer toward the end of the year, although inquiry has not yet appeared for the machine tools required for its new McKeesport plant. Other large prospective equipment purchases are still dormant, but crane buying has been active and the placing of crane orders usually precedes machinery buying by only a few months.

Plans are being considered by United States Chain & Forging Co., Union Trust

Building, Pittsburgh, for addition to plant at McKees Rocks, to cost about $45,000 with equipment.

Mutual Telephone Co., 24 East Tenth Street, Erie, Pa., will take bids for a one and two-story equipment storage and distributing plant with electrical and mechanical repair departments, and automobile service and repair shop, to cost $175,000 with equipment. Myers & Johnson, Commerce Building, are architects.

Manion Steel Barrel Co., Rouseville, near Oil City, Pa., will begin superstructure for a one-story plant unit, 50 x 100 ft., to cost about $45,000 with equipment. General contract has been let to L. O. Bouquin, 13 East First Street, Oil City. D. S. Manion is president.

Board of Public Education, Bellefield Avenue and Forbes Street, Pittsburgh, H. W. Cramblet, secretary, is asking bids until Nov. 6, for equipment for Clifford B. Connelly Trade School.

Cohen Auto Parts Co., 150 East Ninth Street, Erie, Pa., has awarded a contract to George Hart, 1011 Twenty-ninth Street, for one-story plant, to cost $35,000 with equipment. Shutts & Morrison, Marine Bank Building, are architects.

United Zinc Smelting Corporation, 233 Broadway, New York, is said to be planning extensions and improvements in plant at Moundsville, W. Va., with installation of additional equipment, to cost $175,000.

New Kanawha Power Co., a subsidiary of Union Carbide & Carbon Corporation, 30 East Forty-second Street, New York, is considering hydroelectric power plant at Hawks Nest, near Gauley Junction, W. Va., on New River, to develop capacity of 100,000 hp., to cost more than $2,000,000 with transmission system. Company also plans another development on same river at Sandstone Falls, to cost about $750,000.

Barium Reduction Corporation, Charleston, W. Va., plans branch sodium sulphate plant at Horseshoe Lake, near Ormiston, Sask., to cost more than $400,000 with machinery, to be ready for service in six to eight months.

Buffalo

BUFFALO, Oct. 21.—American Roto-Floor Corporation, care of Rupert Swinnerton, Eleanor Apartments, Niagara Falls, N. Y., representative, manufacturer of steel rotating floors for commercial garages, etc., is contemplating new plant to cost more than $75,000 with equipment. Company has been carrying out production for some time at local works of Niagara Steel Finishing Co.

Brewer-Tichenor Corporation, Cortland, N. Y., manufacturer of automobile accessories and equipment, will build two new plant units, for which general contract has been let to Austin Co., Cleveland, consisting of one-story machine shop, 60 x 80 ft., and one-story forge shop, 75 x 100 ft.; a one-story extension to storage and distributing building will also be erected, 35 x 75 ft., entire project to cost more than $125,000 with equipment. Two traveling cranes of 5 and 12-ton capacities will be installed in addition to other equipment.

Hanau Engineering Co., Inc., Buffalo, has been organized to take over and expand local company of same name, with plant at 951 West Ferry Street, manufacturer of dental instruments and kindred precision equipment. Rudolph L. Hanau and J. L. Stern are heads.

Town of Amherst, Central School District No. 1, A. A. Cushing, 69 Chassin Avenue, Eggertsville, N. Y., in charge, is considering installation of manual training equipment in new high school at Amherst, for which bids have been asked on general contract, to cost $450,000. Paul H. Harbach and James W. Kideney, 271 Delaware Avenue, Buffalo, are architects.

George J. Egan, 414 Woodward Avenue, Buffalo, and Herbert H. Streng, 187 Crosby Street, Kenmore, N. Y., have organized Egan & Streng, with capital of 200 shares of stock, no par value, and will operate local plant for production of machinery and parts.

North East Appliance Corporation, Rochester, N. Y., has been organized by General Motors Corporation to take place of former North East Electric Co., recently purchased by General Motors Corporation. Directors of new corporation are Anthony H. Russo, Aloysius F. Powers, and Henry W. Hogan, all of 1775 Broadway, New York. Former North East Appliance, Inc., controlled by virtually same stockholders as was North East Electric Co., but which was not included in sale to General Motors, has been granted a certificate of change of name to Electromatic Typewriters.

Detroit

DETROIT, Oct. 21.—Contract has been let by Koestlin Tool & Die Co., 3601 Humboldt Avenue, Detroit, to Krieghoff Co., 6601 Humboldt Avenue, for one and two-story addition, 65 x 120 ft., to cost about $60,000 with equipment. Muller & Krecke, American Radiator Building, are architects.

United States Pressed Steel Co., Ypsilanti, Mich., has plans for one-story addition to manufacture new type of universal drive shaft for passenger automobiles, to cost about $75,000 with equipment.

Ex-Cell-O Aircraft & Tool Corporation, 1200 Oakman Avenue, Detroit, has arranged for an increase in capital, part of proceeds to be used for expansion. Company is completing an addition aggregating 62,000 sq. ft., floor space, for manufacture of new precision parts for aircraft engines, to cost about $100,000 with equipment.

Consumers Power Co., Jackson, has plans for extensions in plant at Zilwaukee, Mich., to include construction of dock for coal unloading, storage facilities for handling about 250,000 tons of coal at one time, hoisting, conveying and other coal-handling equipment, etc., to cost about $500,000.

Defoe Boat & Motor Works, Inc., Bay City, has approved expansion program at boat building plant, to cost over $75,000 with equipment.

Terrell's Equipment Co., Hall Street, Grand Rapids, manufacturer of steel equipment for factory service, lockers, etc., has awarded a general contract to John McNabb & Sons, Murray Building, for two-story top addition, 100 x 350 ft., to cost about $80,000 with equipment.

Motor Wheel Corporation, Saginaw Street, Lansing, in addition to four-story extension to wire wheel manufacturing plant, to cost about $200,000, is considering two-story addition at plant of Prudden wheel division, 80 x 475 ft., for storage and distribution, to cost $120,000 with equipment.

American Twist Drill & Tool Co., 2804 West Jefferson Avenue, Detroit, has plans for a one-story addition, 175 x 200 ft., to cost about $135,000 with equipment. C. W. Ditchy, 415 Brainard Street, is architect.

In connection with expansion program to cost about $100,000 recently authorized by Electric Auto-Lite Co., Toledo, Ohio, manufacturer of automobile starting and lighting equipment, plans are under way for extensions and improvements in plant of American Enameled Wire Co., Muskegon, with installation of equipment.

Olds Motor Works, Inc., Lansing, a subsidiary of General Motors Corporation, has plans for a new two-story unit, 75 x 141 ft., for automobile engine service for Oldsmobile Six, and for a two-story engineering laboratory, 60 x 90 ft. Work is under way on an addition to sheet metal department and an extension for parts and service divisions. Entire expansion will cost more than $1,000,000.

Panyard Piston Ring Co., Muskegon, Mich., has been incorporated with capital of $60,000 to manufacture piston rings and has purchased at receiver's sale plant of Panyard Machine & Mfg. Co. Company is in market for castings and spring steel. Philip P. Schnorbach is president and D. Briggs vice-president and general manager.

Hastings Mfg. Co., Hastings, Mich., has been organized to make automobile piston rings and is building plant, 64 x 321 ft., containing 20,000 sq. ft. manufacturing space. It is in market for equipment. C. W. Dolan is secretary.

Cleveland

CLEVELAND, Oct. 21.—Machine tool sales picked up considerably the past week following quite an extended dull period. There is also a marked increase in inquiry. Demand is well distributed through various industries and is mostly for single machines. The automotive industry, however, continues an unimportant factor in the market. The National Cash Register Co. and the Frigidaire Corporation, Dayton, Ohio, are each credited with the purchase of several lathes. Recent purchases by the Amtorg Trading Corporation for Russian tractor plants are understood to include a round lot of presses placed with an Ohio manufacturer.

Youngstown Pressed Steel Co., Warren, Ohio, subsidiary of Sharon Steel Hoop Co., Sharon, Pa., has plans for several new units, to cost $400,000 with equipment. Work will include one-story enameling works, scheduled for completion early next year.

Screw & Fastener Supply Co., 3913 Mayfield Road, Cleveland, has awarded general contract to G. W. Pelton, 19760 Lakeshore Boulevard, for one-story addition, to cost $55,000 with equipment. E. F. Devine is one of heads of company in charge.

Firestone Tire & Rubber Co., Akron, Ohio, is disposing of a preferred stock issue of $60,000,000, part of fund to be used for expansion, including developments in foreign countries. Company will soon begin superstructure for seven-story addition to Akron mill, 110 x 180 ft., to cost about $1,000,000 with machinery, and will also build branches and service units in different cities.

E. T. Pierce Co., 4903 Harlem Avenue, Cleveland, manufacturer of tools, dies, etc., will build one-story plant, 65 x 100 ft., to cost about $45,000 with equipment. G. A. Ebeling, 737 Prospect Avenue, is architect.

Mid-West Forge Co., 17301 St. Clair Avenue, Cleveland, is considering one-story addition to cost about $40,000 with equipment. R. I. Gale is president.

Ohio Injector Co., main plant and office at Wadsworth, Ohio, has started construction on a four-story addition, 280 x 340 ft. Building will be used for manufacture of brass and iron valves and is expected to be ready for operation shortly after first of year.

Werner G. Smith Co., Cleveland, manufacturer of oils for foundry trade, has been amalgamated with Archer-Daniels-Midland Linseed Co., Minneapolis, Minn., latter company having acquired a substantial interest in Smith company. No change will be made in corporate name of Werner G. Smith Co.

Chicago

CHICAGO, Oct. 21.—Machine tool dealers in this district are still busy following leads developed at the recent Cleveland show. Sales are not impressive in the absence of large lists. Scattered purchases of individual tools, many of which are of small size, are fairly numerous and inquiry of this character is more brisk than a week ago. Western Electric Co. continues to contract for large quantities of machine work and jobbing shops are profiting by this situation. A Chicago district steel mill is in the market for six tools for its maintenance department.

Used tools remain in good demand. The International Harvester Co. will buy several more for its Weber works, Chicago, and dealers from California are seeking supplies in this market.

Hafner Mfg. Co., 1010 North Kolmar Avenue, Chicago, toy manufacturer, will build a new factory, 100 x 270 ft., to cost $60,000. T. B. Jorgenson, 510 North Dearborn Street, is architect.

Johnson Motor Co., Waukegan, Ill., manufacturer of outboard motors, has started erection of an addition which, with equipment, will cost over $100,000.

McIlvaine Burner Corporation, Evanston, Ill., manufacturer of oil burners, contemplates building a new assembly plant.

Edgar T. Ward & Son, 1455 West Thirty-seventh Street, Chicago, iron and steel, will soon take bids for a one and two-story addition to storage and distributing plant, to cost over $100,000 with equipment. A. Epstein, 2001 West Pershing Road, is architect and engineer.

Grigsby-Grunow Co., 2038 North Kolmar Avenue, Chicago, manufacturer of radio equipment and sets, has purchased plant of General Motors Corporation on Dickens Avenue, consisting of building with 650,000 sq. ft. floor space and adjoining land which will be used for early erection of a multi-story addition to approximate 350,000 sq. ft. floor area. Company also plans three-story addition to plant on Armitage Avenue. Entire expansion will cost over $1,000,000 with equipment.

City Council, Ottumwa, Iowa, has plans for a municipal hydroelectric generating plant to cost about $750,000 with transmission lines, and will soon ask bids on general contract. Brown & Cook, 106 North Market Street, are engineers. Charles Wyman, City Hall, is city engineer.

Allis-Chalmers Mfg. Co., West Allis, Wis., has plans for an addition to tractor plant at Springfield, Ill., to cost more than $400,000 with equipment. Company will carry out an expansion at West Allis works, including construction of one-story forge shop and new unit for manufacture of motors, to cost about $1,500,000 with machinery.

Minneapolis Gas Light Co., 16 South Seventh Street, Minneapolis, Minn., will soon take bids for three-story equipment storage and distributing plant, with mechanical and repair divisions, to cost $180,000 with equipment. Ekman, Holm & Co., Phoenix Building, are architects. John K. Swanson, vice-president and general manager, in charge.

Brasco Mfg. Co., 5035 South Wabash Avenue, Chicago, manufacturer of metal store fronts, has acquired factory of Morgan-Gardner Electric Co., Halsted and 152nd Streets, Harvey, Ill., totaling about 50,000 sq. ft. floor space, and will use for new plant. Company is said to have plans for a one-story addition on adjoining site, to cost about $100,000 with equipment, for which bids will be asked on general contract early in November.

Temple, Inc., 1925 South Western Avenue, Chicago, manufacturer of radio equipment and devices, is considering construction of new plant unit, to cost over $125,000 with machinery.

Apex Regulator Co., 508 South Third Avenue, Marshalltown, Iowa, has been organized to manufacture pressure reducing and regulating valves, expansion valves and relief valves. Plant is in production.

National Stoker Co., 2020 Nicollet Avenue, Minneapolis, has been incorporated and is manufacturing automatic ram-type coal stokers specially adapted for burning wet screenings. Part of machine work and all of assembly work is done in company's plant. Purchase of additional equipment is contemplated. C. E. Betcher is secretary and treasurer.

Paf Mfg. Co., Greenville, Ill., manufacturer of spark plugs, is erecting a new factory at a cost of $30,000.

Milwaukee

MILWAUKEE, Oct. 21.—Machine tool bookings are running considerably ahead of those during the first three weeks of September, and October business is expected to compare favorably with that of any summer month. Many orders were taken during the Cleveland show and a large part of the pending inquiries were closed shortly after. Although the volume of automobile production is low for the season, manufacturers continue to buy some equipment.

Milwaukee Electric Railway & Light Co., 217 Michigan Street, has plans for 60,000 to 75,000-kw. steam generating plant to be constructed at Port Washington, Wis., with ultimate investment of $25,000,000. Negotiations are under way for purchase of municipal light and power plant at Port Washington.

Wrought Washer Mfg. Co., 46-54 South Bay Street, Milwaukee, has purchased property at Oklahoma and First Avenues, including 16 acres and building with 150,000 sq. ft. floor space, and will equip for own use or that of a subsidiary.

Snap-On Wrench Co., 1270 South Pierce Street, Milwaukee, will move to Kenosha where a building costing $150,000 will be completed in January, and $215,000 worth of new equipment will be installed. William Seideman is secretary, and Frank D. Chase, Inc., 720 North Michigan Avenue, Chicago, is general contractor.

Utility Mfg. Co., Portage, Wis., recently organized to manufacture ice cream freezers, metal household appliances and novelties, is building a two-story factory, 80 x 80 ft.

Board of Education, West Allis, Wis., has closed bids for construction of third unit, three stories, 40 x 57 ft., to West Allis Vocational School.

Barkhausen Oil Co., 815 South Monroe Street, Green Bay, Wis., is planning to rebuild oil refining and storage plant, damaged by recent fire.

Gulf States

BIRMINGHAM, Oct. 21. — Bids have been asked by Universal Metal Mfg. Co., Tarrant, Ala., for one-story addition, 75 x 125 ft., to cost about $28,000 with equipment. Charles H. McCauley, Jackson Building, Birmingham, is architect.

Montgomery Elevator Co., Moline Ill., manufacturer of elevators, parts, etc., has purchased property at Houston, Tex., for a new branch assembling plant, to cost about $25,000 with equipment.

Central Power & Light Co., San Antonio, Tex., has secured permission to use water from Devil's River, near Del Rio, Val Verde County, for a hydroelectric generating plant, on which work will start before close of year. Initial unit will have capacity of 45,000 kw., and will cost about $1,000,000 with transmission system.

Republic Portland Cement Co., San Antonio, Tex., is disposing of a bond issue of $1,250,000, part of fund to be used for new cement mill now being completed about 10 miles from city. Plant will have an initial output of about 100,000 bbl. per month. Terrell Bartlett Engineers, Inc., San Antonia, and Richard K. Meade & Co., 10 West Chase Street, Baltimore, are engineers.

Planters' Package Co., Crystal Springs, Miss., an interest of Hazlehurst Box Co., Hazlehurst, Miss., has authorized rebuilding of fruit and vegetable package plant recently destroyed by fire. Several new units will be built, including veneer mill, box factory, machine shop, power plant and wood-working mill. Alexander Wilson is company engineer in charge.

Officials of Engineers Public Service Co., 120 Broadway, New York, operating Baton Rouge Electric Co., Baton Rouge, La., and other electric light and power utilities, are organizing Louisiana Steam Products Co., to construct a new steam-operated generating plant adjoining refinery of Standard Oil Co. of Louisiana at Baton Rouge, utilizing residue petroleum and gases, and natural gas for fuel. Plant will have a capacity of 45,000 kw., and will cost more than $800,000 with equipment. It will furnish service to Standard Oil Co. refinery where expansion costing close to $7,000,000 is under way. C. M. Smith will be president of Louisiana Steam Products Co., which will be under executive management of Stone & Webster, Inc., 49 Federal Street, Boston, engineer.

National Portland Cement Co., Vicksburg, Miss., has plans for new mill at Fort Hill, where property has been acquired, including machine shop, power house and other buildings, to cost $1,000,000 with equipment. Work will begin in about 60 days.

Gruver Roller Bearing Co., Gruver, Tex., will erect new one-story plant 50

x 100 ft., for manufacture of roller bearings and kindred equipment, to cost $25,000 with equipment.

Texas Quarries, Inc., Austin, Tex., recently organized, will be an independent company and will not be affiliated with Indiana Limestone Co., Bedford, Ind., previously reported. Company has tract of about 4000 acres near city, and will soon begin construction of quarry plant and finishing mill to cost about $240,000 with machinery.

Gulf Pipe Line Co., a subsidiary of Gulf Oil Corporation, Frick Annex, Pittsburgh, with main refinery at Port Arthur, Tex., has purchased a 200-acre tract near Lucas, Tex., for extensions in storage and distributing plant, including steel storage tanks, pipe lines, pumping and power equipment, to cost more than $125,000.

East Coast Refrigeration Co., Lake Worth, Fla., has plans for a two-story cold storage and refrigerating plant, 65 x 125 ft., to cost about $85,000 with machinery. Daniel C. Smith is secretary.

D. S. Mair Machinery Corporation, Houston and Dallas, Tex., has been formed by D. S. Mair and Charles J. Harter to succeed D. S. Mair Machinery Co. Mr. Harter has been railroad representative in Texas for Joseph T. Ryerson & Son, Inc., and new organization will represent Ryerson company in machinery sales only for industrial and railroad uses in Texas, Louisiana and southern Arkansas. It will also represent in same territory, Whiting Corporation, Harvey, Ill., and Landis Machine Co., Waynesboro, Pa. Mr. Harter will be in charge of Dallas office, 4521 Edmondson Avenue.

Cincinnati

CINCINNATI, Oct. 21.—Although the volume of machine tool business so far this month indicates a slight recession from the level of the first half of September, fresh bookings by manufacturers the past week were larger than in the first week of October. While demand for planers and heavier tools was sustained, improvement in the call for lathes contributed to the increase.

An automobile manufacturer placed an order with a local builder for four large high-production lathes. A Pittsburgh company bought one 32-in. lathe from a local manufacturer.

Commerce Garage, 321 Race Street, Cincinnati, has awarded general contract to Hillsmith & Co., Chamber of Commerce Building, for seven-story and basement service, repair and garage building, to cost about $180,000 with equipment.

Columbus Auto Brass Co., 767 North Fourth Street, Columbus, Ohio, has awarded a general contract to F. & Y. Construction Co., 731 East Broad Street, for two-story addition, to cost about $25,000 with equipment.

Allen Mfg. Co., Tenth Avenue, North, Nashville, Tenn., manufacturer of stoves, ranges, etc., will take bids at once for one-story plant at Franklin, Tenn., with about 150,000 sq. ft. floor space, to cost $200,000 with equipment. Robert & Co., Bona Allen Building, Atlanta, Ga., are architects and engineers.

Second National Garage, Inc., American Trust Building, Nashville, Tenn., has asked bids on general contract for a multi-story garage, repair and service building, to cost about $500,000 with equipment. Hart, Freeland & Roberts, Independent Building, are architects. R. R. Ogilvie is head.

Reynolds Metals Co., Thirtieth and Grand Streets, Louisville, has arranged for increase in capital from 525,000 to 1,000,000 shares of stock, part of fund to be used for expansion. Plans have been completed for new plant near city, to cost over $100,000 with equipment. Arthur Tafel, 140 South Third Street, is architect.

Holophane Co., Newark, Ohio, manufacturer of lighting equipment, reflectors, etc., has plans for two-story addition for storage and distribution, to cost about $45,000 with equipment. Headquarters are at 342 Madison Avenue, New York.

Hauser-Stander Tank Co., Cincinnati, has received bids for new plant on an 11-acre tract in Pleasant Ridge, a suburb. Present plant on Spring Grove Avenue will be razed to make way for overhead right of way for Baltimore & Ohio Railroad.

St. Louis

ST. LOUIS, Oct. 21.—St. Louis Spring Co., 3135 Washington Street, St. Louis, manufacturer of steel springs, has leased for expansion, one-story addition to be built on adjoining site, 75 x 130 ft., to cost $40,000 with equipment. Benjamin Shapiro, Syndicate Trust Building, is architect.

Red Wing Commercial Aircraft Co., St. Joseph, Mo., has plans for new one-story plant for parts production and assembling, to cost about $55,000 with equipment.

City Council, Campbell, Mo., has plans for municipal electric light and power plant, with Diesel engine prime mover, to cost more than $85,000 with machinery. Russell & Axon, 6200 Easton Avenue, St. Louis, are engineers.

Board of Education, St. Joseph, Mo., plans installation of manual training equipment in new central high school, to cost $750,000, for which plans will be drawn by Eckel & Aldrich, Corby Building, architects; William B. Ittner, Board of Education Building, St. Louis, is associate architect.

Chicago, Rock Island & Pacific Railroad, La Salle Street Station, Chicago, W. H. Peterson, chief engineer, will soon begin construction of one-story car repair shop at Kansas City, Kan., 70 x 300 ft., to cost over $75,000 with equipment.

Century Engine Works, Inc., 3813 Independence Avenue, Kansas City, Mo., manufacturer of engines for industrial, marine and other service, is planning installation of lathes, milling machine and other tools. C. V. Fitzpatrick is vice-president, in charge.

Shell Petroleum Corporation, Shell Building, St. Louis, has plans for a new oil storage and distributing plant at Toledo, Ohio, with dock to accommodate tank steamers, to cost over $2,000,000 with mechanical-handling and other equipment.

Glenn-Smith Fuel Co., Omaha, Neb., manufacturer of fuel briquettes, is planning to rebuild part of plant destroyed by fire Oct. 7.

Topeka Airport & Aviation Co., 1345 Fillmore Street, Topeka, Kan., has plans for steel hangar with repair facilities, to cost about $35,000 with equipment.

Dodge City Terminal Elevator Co., Dodge City, Kan., will soon begin construction of grain elevator with capacity of 500,000 bu., including conveying, elevating, screening and other equipment, to cost over $100,000. Structure will be operated under lease by C. C. Isley Lumber & Grain Co., Dodge City.

St. Joseph Railway, Light, Heat & Power Co., St. Joseph, Mo., is concluding purchase of municipal electric light and power plant at Oregon, Mo., and will operate in conjunction with properties. Extensions and improvements are planned, including transmission lines.

Tiffany Aluminum Products Co., 1319 Locust Street, St. Louis, has purchased a building at Branch and Buchanan Streets, containing 17,000 sq. ft. and will remove to new location shortly after Nov. 1. About $20,000 is being spent on improvements and additional equipment.

City Council, Junction City, Kan., is planning construction of municipal electric light and power plant, to cost $425,000 with equipment. A special election has been called Oct. 22 to vote bond issue in amount noted. Charles A. Haskins, Finance Building, Kansas City, Mo., is consulting engineer.

Indiana

INDIANAPOLIS, Oct. 21.—Supplementing contract recently let for two-story mill to cost about $200,000 with equipment, United States Corrugated Fibre Box Co., 1315 Martindale Avenue, Indianapolis, has awarded contract for second unit to Hall Construction Co., Board of Trade Building, for storage and distribution, one story, 105 x 160 ft., to cost $65,000 with equipment. Charles E. Bacon, Odd Fellow Building, is architect.

Municipal Airport Commission, A. B. Ayres, chairman, Newcastle, is planning establishment of airport with hangars, repair shop and other units, to cost about $100,000 with equipment.

Dixie Sales Co., Odd Fellow Building, Indianapolis, manufacturer of special fuel, formed as a by-product of turpentine kilns, with resin, etc., is planning enlargements in plant at Douglas, Ga., to cost more than $60,000. O. C. Brown is general manager.

Dudlo Mfg. Co., Wall Street, Fort Wayne, manufacturer of electric wire, coils, etc., has awarded general contract to Indiana Engineering & Construction Co., Central Building, for addition, 65 x 75 ft., to cost about $50,000 with equipment.

General Electric Co., 1635 Broadway, Fort Wayne, headquarters at Schenectady, N. Y., has awarded general contract to Indiana Engineering & Construction Co., Central Building, for one-story addition, 50 x 70 ft., to cost about $35,000 with equipment.

Westinghouse Electric & Mfg. Co., East Pittsburgh, and 814 North Senate Street, Indianapolis, has plans for a one-story factory branch, storage and distributing plant, 80 x 90 ft., to cost about $60,000 with equipment. Charles H. Byfield, Peoples' Bank Building, is architect.

Hydroil Corporation, Lebanon, has been reorganized with capital of $250,000 to manufacture oil conditioning equipment for use by public utility companies, shipbuilding companies and industrial plants.

H. O. W. Machining Co., Fort Wayne, has been incorporated and is operating a plant at 843 Walnut Street, doing general machine production work.

Joslyn Mfg. & Supply Co., Fort Wayne, manufacturer of small steel bars, bands and shapes, will soon begin erection of an addition, 80 x 230 ft., to cost about $100,000.

New England

BOSTON, Oct. 21.—An order for 30 Pratt & Whitney 5-in. milling machines has been booked by Botwinik Brothers, Inc., for spot delivery to Middle West.

Kerite Insulated Wire & Cable Co., Seymour, Conn., has awarded general contract to H. Wales Lines Co., Meriden, Conn., for one-story and basement addition, 30 x 45 ft., to cost about $25,000 with equipment. Headquarters are at 30 Church Street, New York.

Plans are under way by Bourden Aircraft Co., Hillsgrove, R. I., for merger with Viking Flying Boat Co., New Haven, Conn., under last noted name. Consolidated organization will concentrate production at New Haven plant, which will be expanded for manufacture of Kitty Hawk aircraft, as produced by Bourden company. Robert E. Gross is president of new organization, and Reginald D. Thomas, vice-president and general manager.

C. I. Brink, Inc., 24 Gold Street, South Boston, manufacturer of electric signs and displays, has awarded general contract to William T. Reed Co., 89 Broad Street, for one-story addition, to cost about $25,000 with equipment.

Warren Foundry & Pipe Co., 201 Devonshire Street, Boston, headquarters at 11 Broadway, New York, has asked bids on general contract for one and two-story plant at Everett, Mass., to cost more than $50,000 with equipment. French & Hubbard, 210 South Street, Boston, are architects and engineers.

Superior Spring & Mfg. Co., 373 Washington Street, Hartford, Conn., has filed plans for two-story unit, 55 x 130 ft., to cost about $50,000 with equipment. K. Schulz, Sr., 118 Sheffield Avenue, is architect.

Rubel Ice Co., 200 Geneva Avenue, Boston, has plans for a new ice-manufacturing plant, to cost about $100,000 with machinery. Headquarters are at 937 Fulton Street, Brooklyn, N. Y.

DuPont Viscoloid Co., Leominster, Mass., will soon break ground for addition to manufacture new type of safety glass for automobiles, to cost $1,000,000 with machinery. Company is a subsidiary of E. I. duPont de Nemours & Co., Wilmington, Del.

Merger is being arranged between Thomson Electric Welding Co., Lynn, Mass., and Gibb Welding Machines Co., Bay City, Mich., both manufacturers of electric welding equipment. Thomson-Gibbs Electric Welding Co., will be formed to operate consolidated organization, and expansion will be carried out. It is purposed to continue production at both plants.

Possner Fire Alarm Corporation, 55 Rice Street, Providence, R. I., has been formed to manufacture automatic fire detecting systems for installation in residences and industrial buildings. Factory is now being equipped. A. W. Possner is president.

Pacific Coast

SAN FRANCISCO, Oct. 17. — Oliver United Filters Co., Fourth and Madison Streets, Oakland, Cal., manufacturer of mechanical filtering equipment, has engaged Reed & Corlett, Oakland Bank of Savings Building, architects, to prepare plans for a new plant group at Fruitvale, reported to cost about $500,000 with equipment.

Western Light & Fixture Co., Los Angeles, has awarded a general contract to William P. Neil Co., Inc., 4818 Lomita Vista Avenue, for one-story plant, 160 x 198 ft., to be used in part for storage and distribution, to cost $45,000. Lawrence Nowell, 4814 Lomita Vista Avenue, is engineer.

General Motors Corporation, General Motors Building, Detroit, is considering purchase of more than 150 acres near Los Angeles, as site for new automobile assembling works for one of its units, to cost more than $2,000,000 with equipment.

Pacific Gas & Electric Co., 245 Market Street, San Francisco, has awarded a general contract to Monson Brothers, 475 Sixth Street, for group of one-story equipment storage and distributing units, with mechanical and electrical repair departments, to cost over $200,000 with equipment.

R. F. Fleming Co., 68 North Eleventh Street, Portland, has leased a one-story building, 100 x 100 ft., to be erected at Eleventh and Everett Streets, for a new mechanical equipment and repair shop, to cost $30,000. Claussen & Claussen, Buyers Building, are architects.

Inland Power & Light Co., Public Service Building, Portland, has secured permission for a hydroelectric power project on Lewis River, near Columbia National Forest, Wash., with initial capacity of 54,000 hp., and ultimate output of 216,000 hp., to cost over $6,000,000 with transmission system.

Vancouver Cross Arms Co., Vancouver, Wash., recently organized to manufacture pole equipment for electric, telephone and other service, is planning erection of one-story factory, 70 x 560 ft., to cost about $100,000 with equipment. A traveling crane will be installed.

Board of Works, Tacoma, Wash., has awarded contract to Walesby Construction Co., Puget Sound Bank Building, for one-story municipal machine and repair shop, to cost about $25,000 with equipment.

Canada

TORONTO, Oct. 21.—Increased volume in machine tool sales was noted the past week, partly due to the closing of several small lists. Much of the demand is for replacement and consists of one or two tools to a customer. Small tools are moving freely.

It is stated that Waterloo Mfg. Co., Waterloo, Ont., and an agricultural implement company of Melbourne, Australia, are interested in a company to be formed to locate a plant at Waterloo for manufacture of a new combine thresher.

Bids will be received by Mayor S. McBride, chairman of the Board of Control, Toronto, until Nov. 5, for the supply and installation of a 10,000,000-gal. centrifugal pump and motor, for Riverdale pumping station.

Kroehler Mfg. Co., Stratford, Ont., has awarded a number of contracts for erection of a plant at Montreal, to cost $50,000.

Canadian Liquidair Co., Montreal, will erect a plant at Regina, Sask., to cost $40,000, for which bids will be called immediately.

Malcolm & Hill, Ltd., Kitchener, Ont., manufacturer of furniture, etc., will erect a factory at Regina, Sask., to cost $250,000. Construction will start early next year.

Foreign

PROPERTY at Cologne, Germany, has been acquired by Ford Motor Co., Detroit for new assembling plant to cost more than $750,000 with equipment.

Southern Railway Co., London, England, has authorized electrification of main line from London to Brighton, including branches to Worthing and Hove, about 48 miles in all, using third rail system, to cost over $2,500,000 with equipment and rolling stock.

Magnavox Co., Oakland, Cal., manufacturer of radio equipment, has plans for organization of a subsidiary to establish a plant near London, England, initial works to represent investment of more than $200,000.

Patino Mines & Enterprises Consolidated, 20 Pine Street, New York, has purchased tin smelting plant of Williams, Harvey & Co., Ltd., Bottle, Liverpool, England, and will operate in conjunction with other plants. New owner is considering improvements in property, and installation of additional equipment.

Charles F. Kamrath, 222 West Adams Street, Chicago, of Bloom & Kamrath, same address, refrigerating and packing-house engineers, has been engaged by Soviet Russian Government through Amtorg Trading Corporation, 261 Fifth Avenue, New York, to prepare plans for a modern meat-packing plant at Moscow, to be first of seven such units in European Russia and Siberia, under a five-year modernization program, to cost about $50,000,000, including mechanical-handling equipment, power and refrigerating machinery, etc., larger part of which is expected to be of American manufacture. Frank W. Marlow, formerly in engineering department of Armour & Co., Chicago, will be associated with engineers in work.

New Trade Publications

Tool Steels.—A. Milne & Co., 741 Washington Street, New York. Booklet divided into 12 sections devoted to tool steels, hollow tool steels, drill steels, Wardlow's products, anvils, Swedish Lancashire iron, Swedish electrical iron, Reynolds' aircraft tubing, tool hammers and picks, ball bearing steels, specialties, specifications and tables.

Flow-Meters.—Brown Instrument Co., Philadelphia. Bulletin of 32 pages, illustrated, showing the application of steam flow-meters in making economies in a steam plant operation estimated to cost $2,000,000,000 a year in the United States.

Oil-Burner Boilers.—Johnston Brothers, Ferrysburg, Mich. Catalog No. 29 of 12 pages illustrates and describes a steel boiler built in three sizes for residential use, to heat with oil as fuel. Features indicated are vertical, straight-line circulation and long gas travel, compared with conditions found in the usual domestic heating boiler.

Conveyor Equipment.—Saginaw Stamping & Tool Co., Saginaw, Mich. Catalog 29-CE of 42 pages illustrates and describes, with price list, the component parts of overhead conveyors for use in manufacturing plants and other places. Illustrations of installations are mainly, though not wholly, automotive. Trolley wheels are shown with both ball and roller bearings.

Gear-Grinding Chuck.—City Machine & Tool Works, Dayton, Ohio. Folder

of four pages illustrating and describing the Bolender gear-grinding chuck, in which the gears are so held while grinding that the bore is definitely concentric with the pitch line of the teeth.

Motor-Generator Sets.—Roth Brothers & Co., Chicago. A four-page bulletin, No. 20-301, sets forth information about Roth motor-generator sets.

Ingot Iron in the Oil Industry.—American Rolling Mill Co., Middletown, Ohio. "How Armco Ingot Iron Saves in the Oil Industry" is the title of a handsomely illustrated 32-page booklet which describes the advantages to be gained by using Armco ingot iron in the construction of equipment for refining, producing and marketing oil.

Mechanical Drive Turbines.—General Electric Co., Schenectady, N. Y. Bulletins 957-A and 197-B of four pages each illustrate two types of mechanical drive turbines. The first includes units up to 600 hp. and up to 6000 r.p.m., while the other includes units up to 500 hp. of 1200 to 4000 r.p.m. Both types may be had either condensing or non-condensing.

Improved Stable-Arc Welders.—Lincoln Electric Co., Cleveland. Four-page folder describing four improved models with separately-excited generator field and reactor in the arc circuit.

Floor Plate.—Alan Wood Steel Co., Conshohocken, Pa. Illustrated, eight-page pamphlet on "A W" Diamondette floor plates for use on car platforms, motor bus running boards and other applications where a light-section material will serve. For general structural purposes, where the plate itself must sustain the load, the company recommends the use of standard "A W" diamond pattern rolled steel floor plates.

Alloy Iron Castings.—Duriron Co., Inc., Dayton, Ohio. Bulletin No. 157 of four pages, illustrated, is entitled "Duriron Kettles and Tanks." It describes some special products which are used in the chemical industry as made by this company's special high-silicon alloy. A discussion of their design is particularly emphasized.

Alloy Iron Castings.—International Nickel Co., New York. A four-page leaflet entitled "Quality Castings," illustrated, discusses the use of "F" nickel in the manufacture of various types of castings. Under eight different sections some of the many uses and products, as well as important users, are outlined.

Electric Furnaces.—General Electric Co., Schenectady, N. Y. An illustrated booklet of 20 pages, attractively presented, discusses the general subject of "Electric Furnaces for Industrial Use," using at the same time the slogan, "Ultimately—Electric Heat in Every Industry." About 32 applications of various forms of furnaces for electric heating are illustrated and briefly discussed.

Lubricating Systems.—Keystone Lubricating Co., Twenty-first and Clearfield Streets, Philadelphia. Illustrated folder of 12 pages devoted to the pneuma-lectric lubricating system, which is said to give automatic attention to machinery of all descriptions. It is controlled by clock movement determining the frequency of application of lubrication.

The Week's News Quickly Told

Current Events That Bear on the Course of Business

ALL naval powers have accepted the invitation to meet in London and consider limitation. The Japanese Naval Minister said that the real purpose of the meeting is to effect "positive reduction of armaments to a condition in which no nation could attack another."

* * * * *

MARKETS are spotty. The pace of business remains high as measured by 1928, but slow as measured by the spring of 1929 . . . Wheat prices are 5 to 6c. lower as the visible supply increases; export trade is rather slow and the milling rate is smaller than the 5-year average . . . Hardware is in good demand and prospects are good for the remainder of the year . . . Stocks and securities declined sharply, despite many evidences of easy money and a statement by C. E. Mitchell, president, National City Bank, that he sees no reason for an end-of-the-year slump in business expected by many . . . Retail trade is generally satisfactory except in the North Central States.

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EMPLOYMENT in manufacturing industries during September was 4.5 per cent higher than a year ago, and payrolls 7.5 per cent greater. All industries shared in the advance except ceramics, tobacco and vehicles . . . Federal Reserve Board predicts that the agricultural income will be at least as large as 1928, and finds no evidence of curtailed purchasing power in farm centers.

* * * * *

ELECTRICAL industries are especially active, the employment index now being 127.3 as compared with 98.0 a year ago . . . General Electric Company's orders are 29 per cent greater than in the third quarter of 1928 . . . Coincident with "Light's Golden Jubilee" many large projects are announced, such as a 230,000-hp. hydroelectric plant on the Susquehanna, a 375,000-hp. steam-electric plant near Milwaukee, a $6,000,000 plant at Baton Rouge using oil refinery residues for fuel, and an $80,000,000 extension of underground power circuits in New York.

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TELEPHONE profits for the third quarter are $40,600,000, so much larger than last year that a reduction in toll charges is in prospect . . . Profits of Western Union are about the same as last year . . . International Combustion Engineering Corporation (manufacturer of power plant equipment) and United Cigar Stores Company both passed their usual dividend . . . Chrysler Corporation earned $1.49 per share the last quarter, as compared to $2.29 in 1928. Slow delivery of bodies for new models is blamed for decreased sales.

* * * * *

COTTON prices are sagging . . . Government estimates place the total crop at 14,915,000 bales, than which only two were higher in the last 10 years. Texas alone has a disappointing yield . . . Cotton cooperatives have received the lion's share of the $57,000,000 in loans so far approved by the Federal Farm Board, but of this total only $700,000 has actually been called for . . . Alexander Legge, chairman Federal Farm Board, said that while all its activities have so far been designed to strengthen the cooperatives, in an emergency the Board would be justified in purchasing and storing a portion of a crop to maintain a reasonable price.

* * * * *

TEXTILES are in generally satisfactory condition. Philadelphia plants are especially busy. Finished cotton goods are active. Prices of woolen fabrics for women's spring wear, announced by American Woolen Company, are from 3 to 10c. a yard lower than quoted last fall.

* * * * *

PENSIONS and group life insurance are both provided in a new plan arranged for employees of the Southern Railway System . . . About 20,000 establishments now have group insurance for employees, and annual benefits total $80,000,000 . . . A uniform and model old-age pension law, providing for at least $300 per year for persons over 65, will be vigorously promoted in all States by the American Federation of Labor. . . . Lieutenant Governor Lehman of New York said that State assistance to aged citizens is no more revolutionary a project than the construction of an orphan asylum.

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FREIGHT car loadings decline a little in all classifications except grain and live stock . . . The Interstate Commerce Commission, acting on its so-called O'Fallon decision, finds that the cost of reproducing the New York Interconnecting railroad would be $24,500,000, instead of $27,700,000, the company's book value . . . Baltimore has leased to Western Maryland Railway the $8,500,000 freight terminal constructed in accordance with comprehensive plans for improving the harbor, costing $50,000,000.

THE IRON AGE

New York, October 31, 1929

ESTABLISHED 1855 VOL. 124, No. 18

Output Regulated by Simple Plan

Inexpensive Method of Controlling Flow of Materials in a Forging Plant Reduces Production Costs

MORE than 95 per cent of the manufacturing establishments in the United States employ less than 250 men, in numerous cases as few as from 25 to 50. Many of them produce a variety of articles and consequently their problems of production and stock control are similar in various respects to those of larger plants. This article, setting forth the plan successfully used by a company employing about 25 men and turning out over 500 different products, should be of special interest to the small manufacturer.

FOR the relatively small company making a multitude of parts, close control of production to keep stocks within normal bounds is just as important as for the large company. When the number of parts is several hundred, the matter of controlling stocks becomes acute and calls for rigid supervision. To solve this problem in a simple yet effective way has been the achievement of the Kilborn & Bishop Co., New Haven, Conn., manufacturer of drop forgings.

Making close to 500 different parts, the company has found it advantageous from the standpoint of costs to eliminate, so far as possible, the keeping of elaborate records. Cluttering of the office files with innumerable cards and record sheets serves no good purpose. It occupies the undivided time of one or more clerks and in many cases means duplication of effort without tangible benefits.

After experimenting over an extended period with the trial and error method, the Kilborn & Bishop Co. has devised a system which is simple but adequate, inexpensive but profitable. It centers about what is termed a "supply and demand sheet," which is equivalent to a perpetual inventory of material in the plant. A separate sheet is used for each individual article made by the company. In the first column are recorded production orders or purchase orders for material bought from an outside source. The figures in this column give a running grand total of the production or purchase orders for each part during the fiscal year, which consists of the 12-months' period from one annual inventory to the next.

Data Regarding Outside Purchases Recorded

In the second and third columns, designated "invoiced" and "received" respectively, are kept data regarding outside purchases, the date of the invoice and the date that the material was received. These columns are not used for production orders going through the company's own shop. When material reaches the finished stock room, whether it comes from an outside source or from the shop, the information is entered in the fourth column marked "to stock." Each day's cumulative orders for each part are recorded in the fifth and sixth columns, which are headed by the title "sales." Incidentally, these two columns do not tell the size of individual orders or where each order is going, this information being given on another sheet.

The total of ordered parts (obtained from the first column) minus the total of parts in the finished stock room (fourth column) gives the number of parts in process. This, of course, is based on the assumption that all of the parts ordered have already been started through the shop. The stock total (fourth column) minus the sales total (fifth or sixth column) gives the number of finished parts in stock available for sale.

At the top of the sheet, opposite "date and source," are given the name of the company from which outside purchases have been made and the date the first order was placed with that source of material. The serial number of the part, its name, size and finish are put at the bottom of the sheet. The "minimum" for the part also is recorded. By "minimum" is meant the minimum amount of each part that should be kept in finished stock, this figure being derived by multiplying the total sales of that part for one month by the number of months necessary to produce or procure from an outside source that particular part, for obviously it is essential to keep on hand in finished stock enough parts to supply customers for that period.

Every time the "available for sale" amount falls below the minimum, the "supply and demand sheet" is scanned to determine whether a new minimum should be set. Here the sales record is the guide. For instance, if 300 units of a part are the average monthly sales, and two months are allowed for replenishing stock, the minimum would be 600

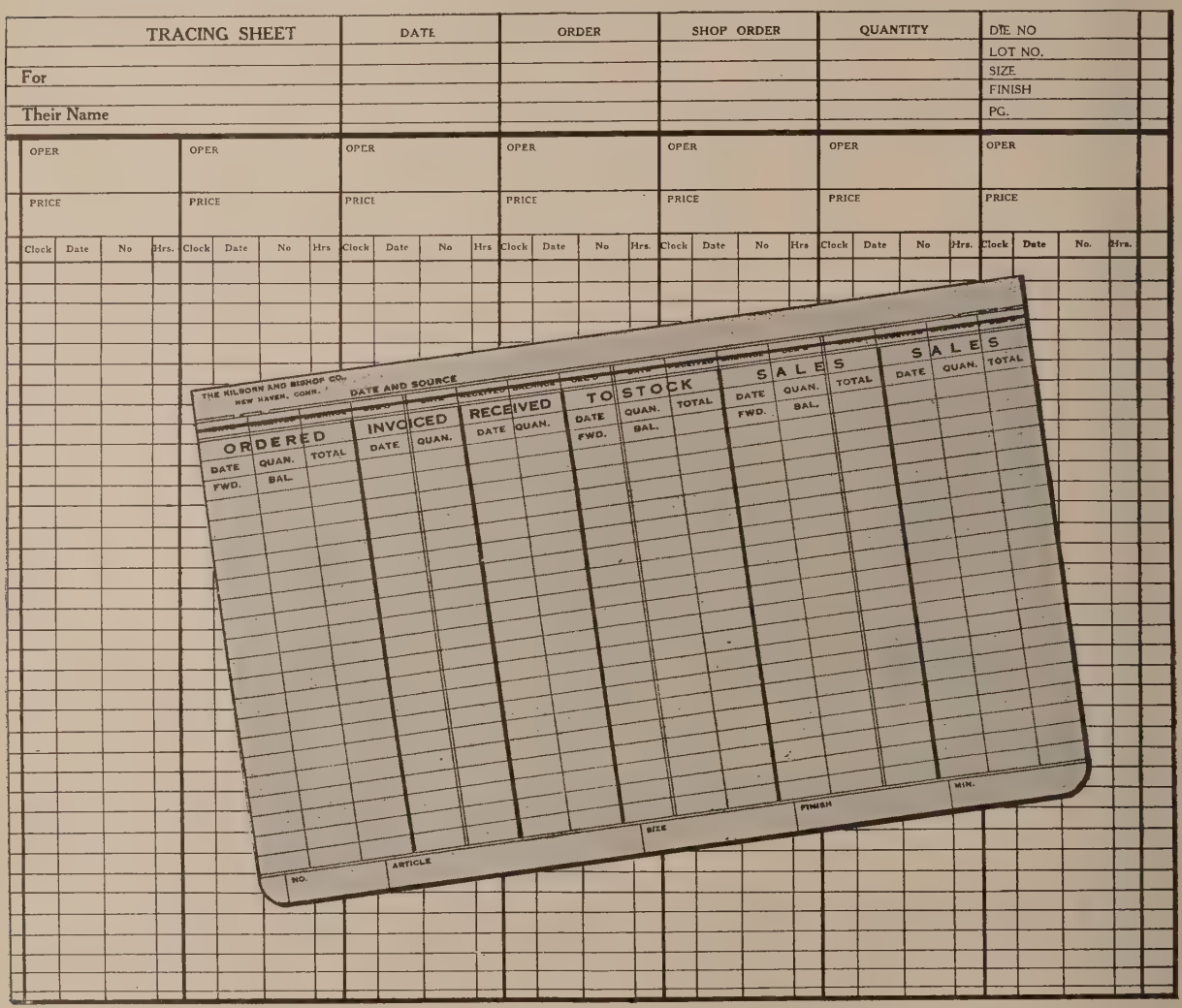
units. When the amount "available for sale" drops below 600, advantage is taken of the opportunity to see whether recent sales have been averaging 300 units a month. If not, the figure for the monthly average is changed to conform with the requirements of the situation and a new minimum is set.

When the number "available for sale" is below the minimum, a signal is attached to the center of the card. In an emergency, when there actually is a shortage and stock at hand is not sufficient to fill orders (that is, the "available for sale" is a minus quantity or the sales are greater than the stock), the signal is put at the right side of the card. Ordinary paper clips are used for danger signals. The company believes that clips are the cheapest and easiest article to employ for this purpose.

minimum, based on the experience of the preceding two months, is usually established.

When a card is started for a new part, in the "ordered" column is placed the total supply available or soon to be available, which includes the number in finished stock, the number in process and the number on production orders on which manufacture has not yet begun. As each production order is issued, the number of parts on that order is added to the total already in the ordered column. In the "to stock" column is entered the number in stock and each delivery to stock is added. In the sales column the number of unfilled shipping orders is first entered and then every additional order received by the sales department is added.

Any red entries on the sheet are of a negative char-

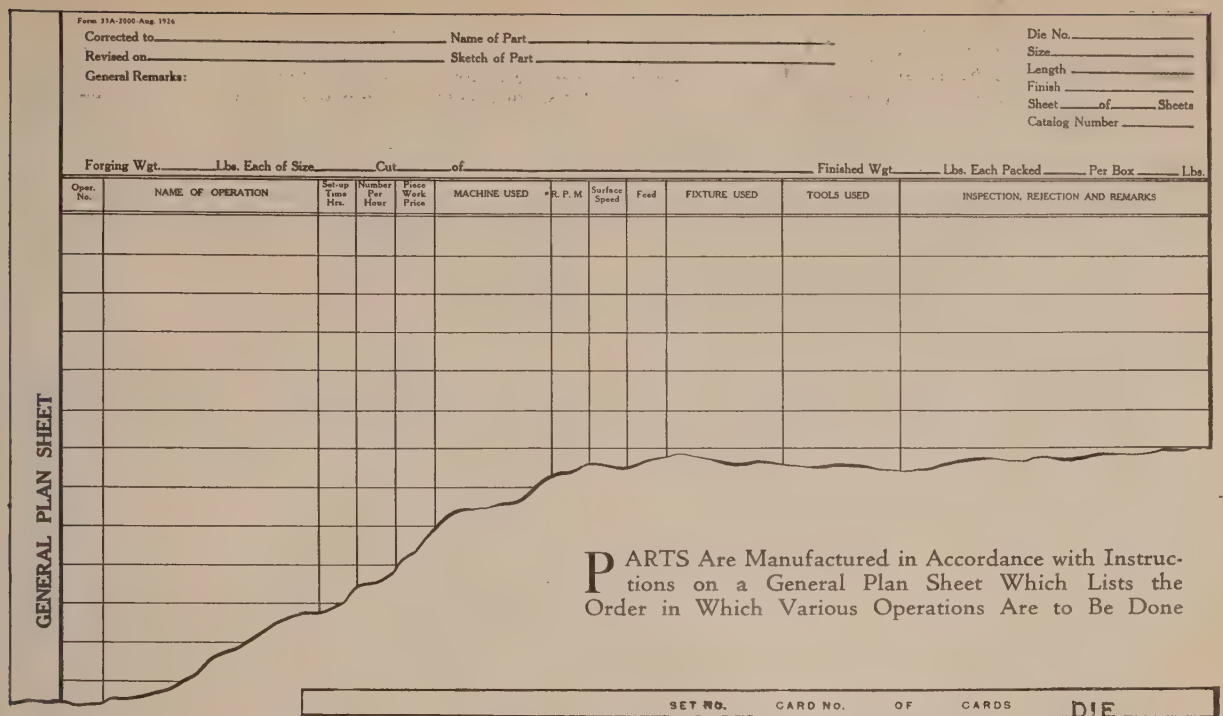


Control of Stocks Revolves About a Supply and Demand Sheet (Center) Which Is Equivalent to a Perpetual Inventory of Material in the Plant. A tracing sheet has been provided to keep track of material in process between the time it is entered in the ordered column and in the stock column of the supply and demand sheet

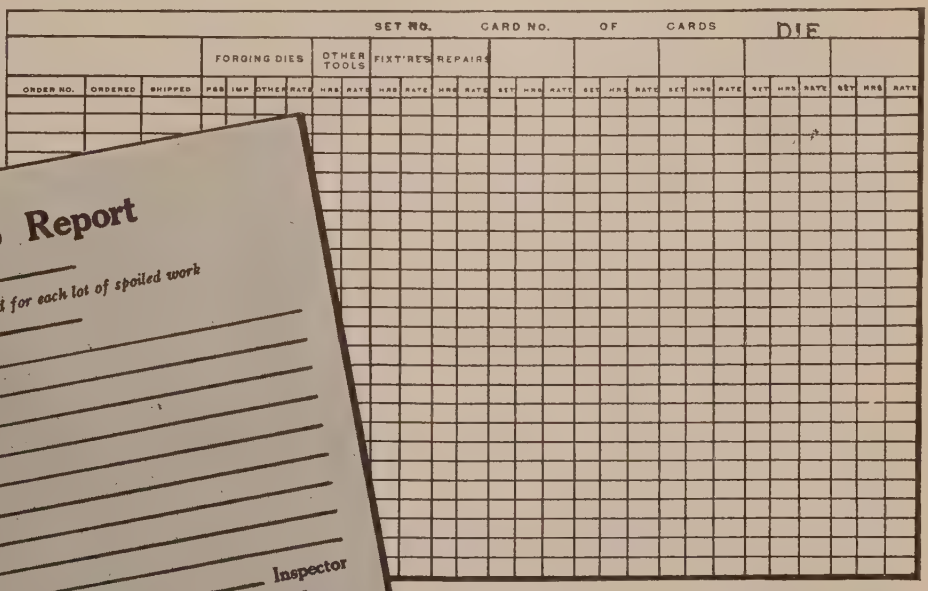
If the minimum plus sales is greater than the number of parts in stock, the stock is low and deliveries from the production department to the stock room are closely watched. On the other hand, if the minimum plus sales is greater than the number of parts ordered, more stock must be ordered from the production department. During the first two months of the current fiscal year, the monthly sales average from the previous year is used to determine the minimum. At the end of that period, however, a new

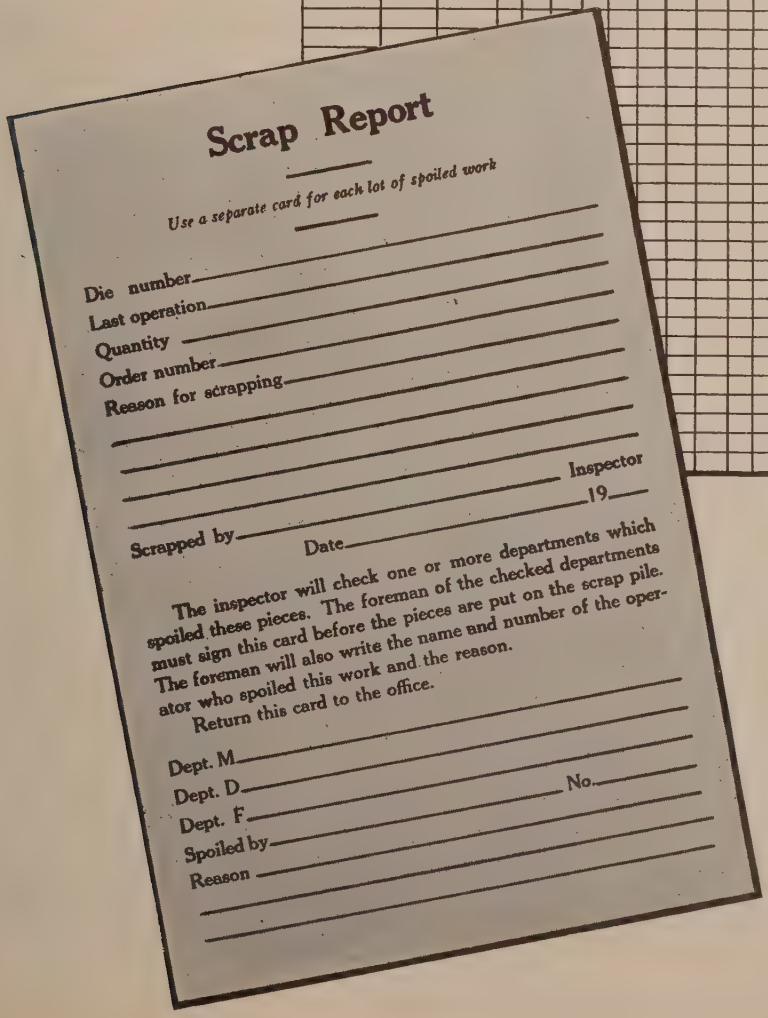
acter. In the stock column they are goods which for any reason have been returned from finished stock to the shop. Red in the sales column is the sign of either a cancellation or a returned shipment. Only in these few cases is there any subtraction on the sheet. One of the main purposes in originating the sheet was to get away from subtraction, in which tests have proved that employees make far more errors than in addition.

To keep track of material in process between the



PARTS Are Manufactured in Accordance with Instructions on a General Plan Sheet Which Lists the Order in Which Various Operations Are to Be Done





Scrap Report

Use a separate card for each lot of spoiled work

Die number
Last operation
Quantity
Order number
Reason for scrapping

Inspector

Scrapped by Date 19

The inspector will check one or more departments which spoiled these pieces. The foreman of the checked departments must sign this card before the pieces are put on the scrap pile. The foreman will also write the name and number of the operator who spoiled this work and the reason.

Return this card to the office.

Dept. M
Dept. D
Dept. F No.
Spoiled by
Reason

TOTAL Sums from Tracing Sheet Are Transferred for Filing Purposes to a Rate Card (Above) Which Contains Condensed Information About Rates of Various Operations in Producing Parts

* * *

WHEN Parts Are Rejected by Inspectors or Pieces Are Spoiled in Production Departments, a Scrap Report Is Sent to the Office to Be Scanned by the Management

time it is entered in the "ordered" column and in the "to stock" column, a tracing sheet has been provided. One tracing sheet is used for each production order. However, if a second order for the same part is issued before the first is completed, the information is put on the same sheet. Data contained on this sheet include the names of the various operations in manufacturing the part, the piece-work price (if any), operator's clock number and date worked, number of pieces on which operator worked and time consumed in doing the work.

The total sums from the tracing sheet are transferred for filing purposes to a rate card, which contains condensed information about the rates of the various operations in producing the parts. The time for making forging dies and other tools, fixtures and repairs also is tabulated.

The shop production schedule is usually decided upon by the chronology of orders. However, the matter of giving precedence to special orders is determined by an informal conference of the sales manager, general manager and shop superintendent. All parts are manufactured in accordance with instructions on a general production plan sheet, which lists the order in which various operations are to be done. One copy of the plan sheet goes to the shop and one is kept on file in the office. There is a plan sheet for each part.

Annually in July a physical inventory of materials is taken. The stockkeeper in charge of the stock room makes an actual count of finished parts and puts the record for each part on a separate inventory card, which is sent to the office. The cards are sorted according to general ledger accounts, the sum totals of the general ledger groups being transferred to inventory ledger sheets.

In the matter of inventories, the fundamental rule of the company is to calculate each part of the annual statement to the same degree of accuracy as every other part. For example, it is regarded as distorting values to determine within a few cents the worth of a lot of material totaling possibly $5 when it is a matter of judgment whether a machine costing $1,000 shall be depreciated $50, $100 or $150. The company is of the opinion that any item appraised within 5 per cent of its actual value for inventory purposes has been calculated closely enough. In these cases the theory that all errors are compensatory is followed. Thus, if all errors are within 5 per cent of the actual value, the average of the grand total of the inventory would be within ½ per cent.

When parts are rejected by inspectors or pieces are spoiled in production departments, a scrap report is filled out and sent to the office for perusal by the management. The report contains the die number, last operation on the piece, quantity, order number, reason for scrapping and the name of the inspector who was responsible for scrapping the material. The operators know that a report of all scrapped material goes to the office and consequently the psychological effect is beneficial.

Orders for special forgings are handled in a slightly different manner than orders for stock items. The tracing sheet and the rate card are retained, but instead of the supply and demand sheet a master card is kept. It contains the customer's name and address, description of the forging, die number, size and weight of stock, size and quality of die blocks, finished weight, order number, date, quantity price and material cost. A separate card is used for each special part.

The entire system has been designed to handle periodic production of the same pieces and from it many benefits have accrued. Complete information regarding production control and the rate of operations is tabulated on three sheets: the supply and demand sheet, tracing sheet and rate card. In fact, the tracing sheet is only of temporary service, as it is filed after the totals have been transferred to the rate card and is seldom referred to later.

From an inspection of previous sales, as reflected by the "minimum" figure on the supply and demand sheet, the management can tell instantly at what rate the shop should turn out any given part at any given time. The system also reveals at all times what the shop has been asked to produce, what it actually has produced and what amount the sales department has sold. Moreover, it shows the rate of production on all previous orders, a matter essential in determining manufacturing costs. It sets forth the facts necessary for the management to operate its business intelligently and accomplishes efficiently what much more elaborate systems often fail to achieve.

Money Rates as a Business Forecaster

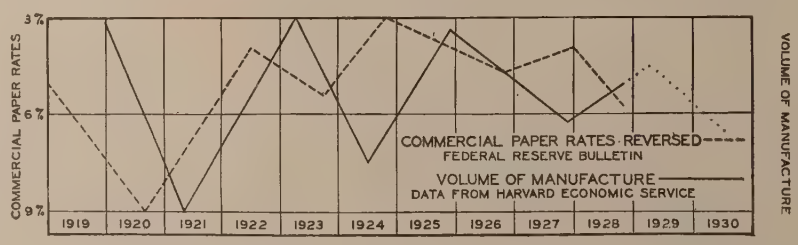
MAJOR swings in money rates have forecast accurately, many months ahead, the major fluctuations of business activity for 1927, 1928 and 1929—and, it might be added, for every year since the war, says Alvan T. Simonds, president, Simonds Saw & Steel Co., Fitchburg, Mass., in *Looking Ahead* for Nov. 1.

Using major swings in commercial paper rates as a business forecaster, it was evident at the beginning of 1927, he asserts, that 1928 would probably be a year of revival. This forecast was corroborated as the decline in 1927 developed and continued to the end of the year and as money rates moved lower all through the year (1927), making for a rise in business activity in 1928. Similarly, at the beginning of 1928 money rates began to move up and continued upward through that year and the greater part of 1929, indicating that the cyclical peak of business activity would come in the first half of 1929 and would be followed by a falling off.

Since the war rising money rates have been followed, after a long lag, by declining business and easing money rates have been followed, after a similarly long lag, by improving business. The long lag is seldom recognized, says Mr. Simonds. Business in the United States is too big, its inertia is too great, to be stopped and turned in a different direction at once—indeed, it requires months.

On this basis Mr. Simonds believes that the next major upswing in business activity will begin nine to 15 months after the approaching turndown in money rates.

He also calls attention to the fact that each major falling off in business since the war has been less severe than the previous one. The recession of 1927 was briefer and less severe than that of 1923-1924. The recession of 1923-1924 was decidedly less severe than the depression of 1920-1921. Emotional pessimism would now be a mistake, in Mr. Simonds' view, since it would help to increase any recession of business that may be ahead.



The Curves for Commercial Paper Rates (Reversed) and Volume of Manufacture Show Correlation, But There Is a Lag Between Them

Heat Treats Stainless Steel Tubes

British Firm Forms Soft Strip into Tubing and Draws It Through Pair of Dies with Electric Furnace Between

SINCE 1924 Boulton & Paul, Ltd., Norwich, England, has been engaged on research, design and constructional work for the Air Ministry in connection with the giant airship R-101 (described in considerable detail in THE IRON AGE, June 27, page 1753). In this time the firm has successfully developed new types of members, materials and methods of manufacture. In the latter part of 1924 two experimental longitudinal girders were constructed of the type ultimately adopted for the ship, incorporating several patented features, in particular the use of the process for continuously heat treating steel members after forming, and embodying the results of the research work on structural stainless steel which had been under way for a year or so previously. It was this work which rendered possible the use of stainless steel for airship construction.

For many years aircraft practice in Great Britain had been to form the required section from the already hardened and tempered strip, the forming being carried out either by rolling or drawing. These operations involved shaping the strip only, and not a reduction of thickness. It was realized, however, that this method of forming would not be particularly suitable for large scale production owing to the facts that

(a) The strip used, which had been hardened and tempered in the coil, was not uniform in its mechanical properties along its length; hence the "spring back" from the rollor die was not consistent. This resulted in uneven sections being produced at the first pass, and often the irregularity was so marked that the section had to be passed through dies several times to make it more uniform.

(b) The design of sections was limited by the ductility or lack of ductility of the hardened and tempered strip.

To avoid these disadvantages there was developed a method of working the softened strip and, after having completely formed it to the requisite shape, carrying out the hardening and tempering by a continuous process.

Solid drawn tubes were not and are not now available in the material, size and mechanical properties required for the airship, viz., to quote one item: 1¾-in. tubes in metal ranging from 26 to 20 gage, length up to 47 ft., and having a minimum proof stress of 145,000 lb. per sq. in. The above process therefore, then in its early stages of development, was the only method of providing the required sections. The fact that quantities like 30,000 ft. of 1¾-in. tube for longitudinal girders have been produced shows that the method is a practical one for production working.

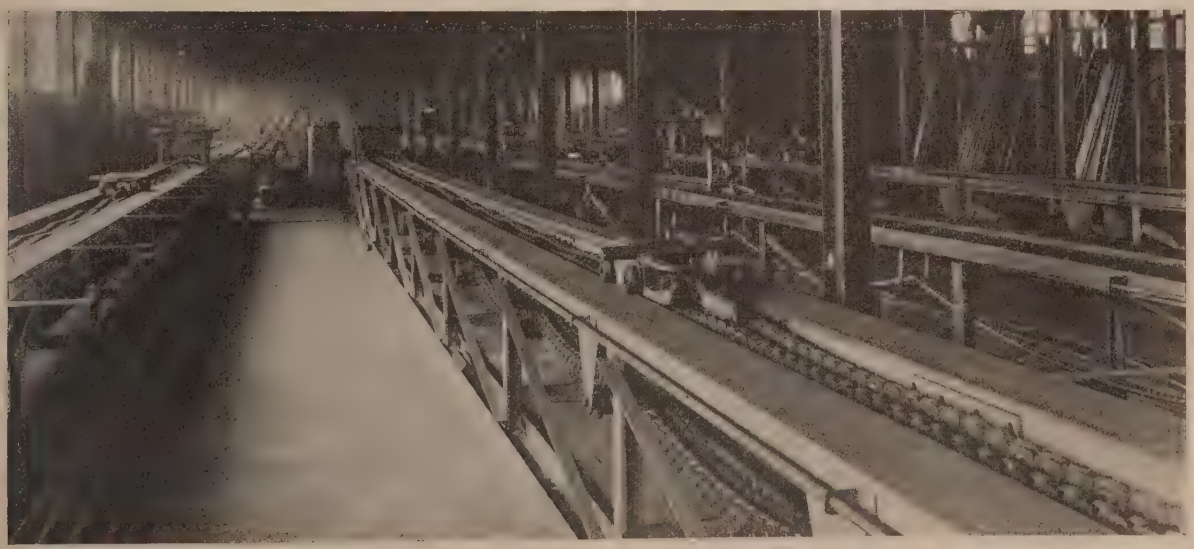
Plant for Fabricating Shapes

The actual plant used for the manufacture of the airship section comprises four drawbenches, shown in an accompanying illustration, each 70 ft. long, two rolling machines, one strip cutter and one section cutter.

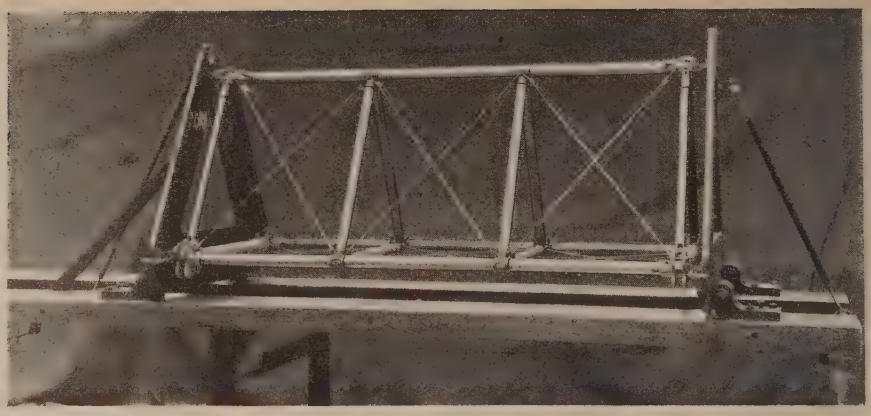
The drive of the drawbench is through a friction disk so that a variable speed of pull is obtainable, which is also capable of being very gradually changed. Dies are held in special holders fitted to the drawbench channels and definitely locked in position by a downward moving head operated by a hand wheel.

Speed is controlled from the die head end of the bench by means of a push rod, so that the operator setting the dies can readily control the speed of the chain.

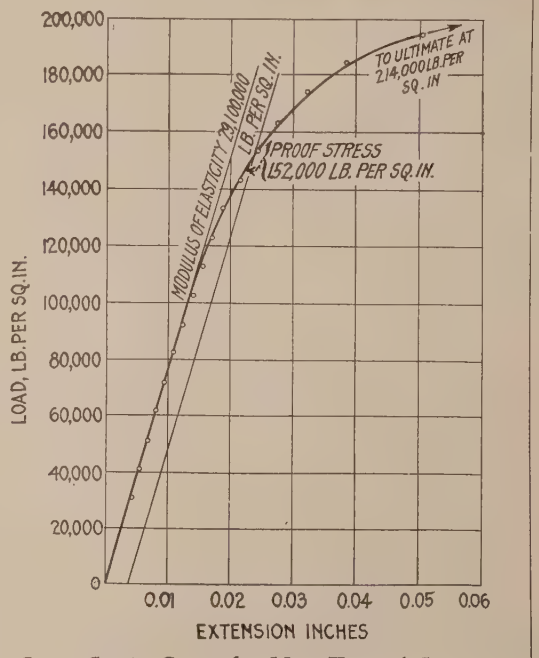
Each drawbench may also be fitted with an electric fur-



General View of the Four Drawbenches at Boulton & Paul's Norwich Works, Which Were Used in Forming Sections for the Airship R-101



FRAME Longitudinal in Assembly Jig. This member is made of stainless steel tubing with closed joints, the ends entering special fittings, and with diagonals of high tensile wire



Stress Strain Curve for Heat-Treated Stainless Steel Strip. Hardened from 980 deg. C., tempered at 550 deg. C.

Chemical Composition:

Carbon	0.19 per cent
Silicon	0.41 per cent
Manganese	0.27 per cent
Chromium	13.9 per cent
Nickel	0.22 per cent

nace at the die holder end and also, as speed of drawing is of vital importance when the section is being either hardened or tempered, a speed indicator is attached to each bench.

Drawing of Section

Sections such as the 1¾-in. tubes used for the longitudinals are made entirely on the drawbench. The flat strip, in its softened condition as received from the makers, is passed successively through a series of dies until the desired shape is obtained. It should be noted that these drawing operations merely form the strip to a particular shape and that the gage of metal remains constant throughout the whole process.

For close jointed tubing (such as is shown in the frame longitudinal) the necessary corrugations are first formed along the edges by drawing the strip through dies and then the whole bent to curved shape. The final seaming is carried out by pulling this section through a circular die and over a mandrel shaped so as to fold the corrugated edges over one another.

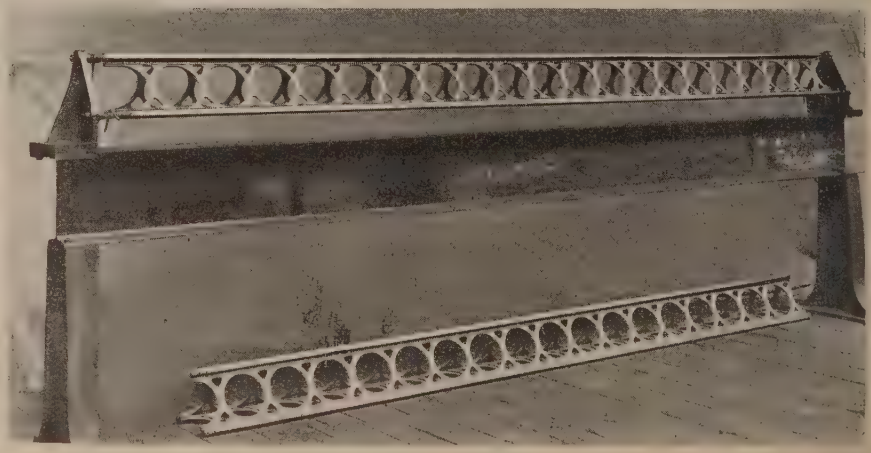
A 70-ft. tube can thus be formed easily; all work is carried out while the steel is in annealed condition.

Physical Properties of the Steel Used

Stainless steel strip of a composition within the limits indicated below has been used for all members such as close jointed tubes, which are formed on the drawbenches and hardened and tempered by the Boulton & Paul continuous heat treatment process:

Carbon	0.16 to 0.22 per cent
Silicon	Not exceeding 0.5 per cent
Nickel	Not more than 1.0 per cent
Chromium	12.5 to 14.0 per cent

It has been found that steels in this range, after hardening from a temperature of 960 to 1000 deg. C. and tem-



RIDGE Girder in End-Fitting Jig. Stainless steel tubing with open joints is used at the angles, riveted to duralumin webs, flanged around all openings so as to combine lightness and stiffness

pering at a suitable temperature, have the following mechanical properties:

Proof stress ..... Not less than 145,000 lb.
Ultimate stress.... 200,000 to 215,000 lb. per sq. in.
Close bend (transverse) ..... Around pin three times the thickness

A typical stress-strain diagram is shown in Fig. 4.

Proof stress is defined as that stress at which the stress-strain diagram departs from the straight line of proportionality by 0.1 per cent of the gage length.

The Continuous Heat Treatment Process

As before remarked, each of the 70-ft. drawbenches may be equipped with a wire-wound electric tube furnace, fitted with automatic temperature control. When heat treating is to be done on fully formed sections, one such furnace is brought up to heat, say 50 deg. above the correct temperature for the steel, and a die set up on the entry side of the furnace of such size that there is a little friction offered to the passage of the section through it.

Full lengths of the formed section, such as close jointed tube, are then fed through at a rate which is dependent upon

(1) The nature of the operation—whether hardening or tempering.

(2) The class of steel.

(3) The form of the section.

(4) The gage of the strip from which the section was formed.

(5) The mass of steel per linear foot.

The section is raised in temperature and soaked at least two minutes at the hardening or tempering temperature before emerging into the air. After traveling in air a few inches, the section enters a cast iron water cooled die (set in the die holder of the drawbench) which completes the cooling and maintains the section in its correct shape. What really happens in the hardening operation is an air quench; the section has cooled through its critical range before reaching the water cooled die. An air hardening steel must therefore be used. The first die, ahead of the furnace, merely maintains sufficient tension on the section while in the furnace to insure straightness in the finished product.

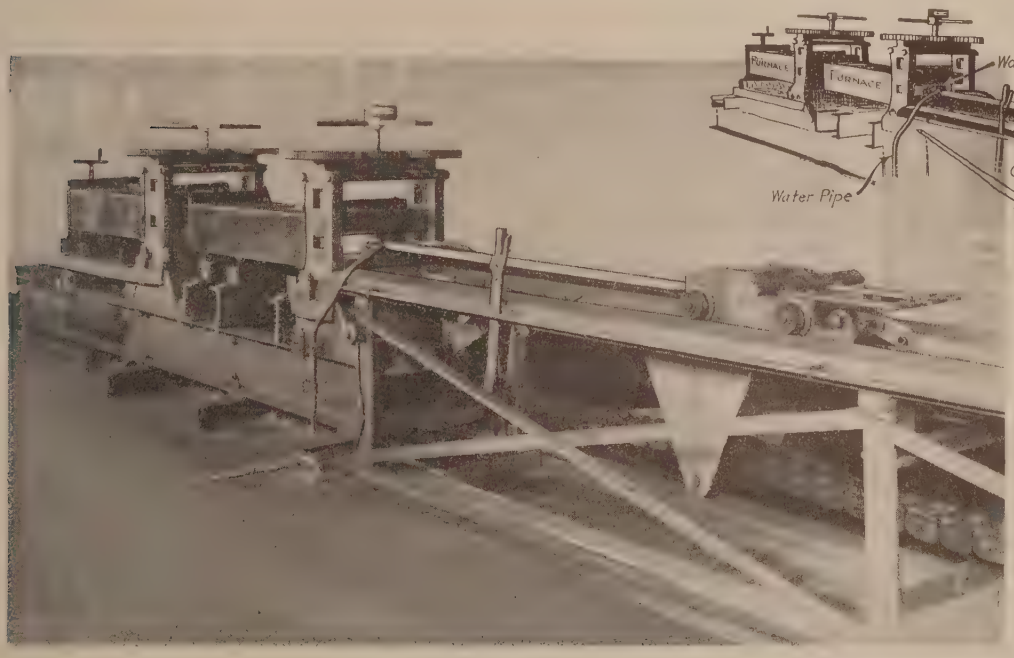
Formidable practical difficulties were encountered in the hardening of stainless steel in the early days, due principally to two things:

(1) The high hardening temperature, 960 to 1000 deg. C.
(2) The comparatively slow and variable response to heat treatment of the stainless steel used

However, a few miles of strip in this difficult steel have now been successfully and uniformly heat treated in equipment such as shown in one of the illustrations. But this has been achieved only by the closest attention to every detail, involving

(1) Very close knowledge of the composition and microstructure in the annealed state of the strip to be treated
(2) Close control of temperature
(3) Close control of rate of feed through the muffles

The tempering operation is very similar to the hardening described above, with, of course, a suitable adjustment of temperature. For most of the stainless steel used for the airship a temperature between 420 and 450 deg. C. has been used. In order to speed up the rate of drawing two furnaces are put in tandem on one bench for this operation.



CLOSE-UP of Die Holders on Drawbench Arranged for Tempering Tubes for Airship Booms. Note how rigidly the dies are held in adjustable fixtures

Uniformity of the Product

The product is more uniform than has been found in steel strip hardened and tempered in the coil. Coil treated strip often showed a variation of as much as 50,000 lb. per sq. in. in the tensile strength along a length of 60 ft. As typical of the continuous process, a 50 ft. close jointed tube in stainless steel made in the above manner was taken at random and cut into short test lengths. The size was 1¾ in. by 20 gage, i. e., most difficult from the heat treatment point of view. The tests fell within the following range:

Proof stress..... 145,000 to 154,000 lb. per sq. in.
Ultimate strength..... 198,000 to 208,000 lb. per sq. in.
Transverse closed bend.. 2¼ to 3 thickness

Control Tests on Heat Treated Sections

Rockwell hardness tests and close bend tests are carried out on each end of every section after cutting to

length (an allowance being made on the length for test purposes).

With the difficult steel used, direct correlation between the Rockwell machine and the testing machine is realized by furnishing the Rockwell machine with tensile test pieces which have been pulled for proof stress and ultimate stress. It is necessary to supply such test pieces representing every cast of steel used, every gage of strip and every annealing heat (by strip rollers).

The special character of the steel is responsible for the multiplicity of the comparison standards.

Special combinations of loading and penetrators of the Rockwell machine are necessary for dealing with very thin strip, such as 26 to 30 gage.

Cutting to Length

These hardened and tempered sections are cut by means of a mild steel disk, about 16-gage thick, running at high speed. It is found that this method is quick and very economical.

The machine carrying the disk is fitted with a quick clamping device on a moving table, and by the turning of a handwheel the disk is brought in contact with the section.

Germany Extruding Seamless Tubes of Stainless Steel

MARKED developments in the making of seamless tubes in Germany were reported in an address at Akron, Ohio, Oct. 23, before a sectional meeting of the American Society of Mechanical Engineers, by Prof. W. Trinks, Carnegie Institute of Technology, Pittsburgh.

The Mannesmann Tube Co., he says, extrudes seamless tubes up to 3 in. in diameter, and what is more, of stainless steel. Each tube is extruded vertically downward by means of a 4000-ton press at high speed (a 25-ft. tube in 1 sec.), is moved sideways and is cut out of the die by a rotary knife. Nothing is said, he added, about the material of the dies. They are air cooled between operations, and are similar to the mandrels of our present-day seamless mills, as far as heat action is concerned.

The Pilger mill, Professor Trinks finds, no longer reigns supreme. This mill, which received its name because the pilgrims on the way to Andernach walked five steps forward and three steps backward, "wears out of true quickly and is therefore quite well adapted to small orders of different size, which require frequent roll changing anyway, but is not suited to large orders. German engineers and manufacturers realize this situation and are therefore following our lead. They state that for seamless tubes of 3 to 6 in., single piercing and an automatic mill are correct, and that for 6 to 10 in. or 11 in., so called double piercing is correct. For 12 to 24 in. double piercing and expanding is recommended."

Has Mandrel in Tension

Several expanding mills, it appears, are being developed. The Mannesmann company has a mill which is similar to the Stiefel expanding mill, but uses a tension mandrel instead of a compression mandrel. It is claimed that the compression mandrel, due to vibration of the mandrel rod, produces a pipe of variable diameter, which requires much reeling. The tension mandrel is claimed to be free from this trouble. The Deutsche Machinen Fabrik is likewise developing a new expanding mill.

He mentioned a new piercing mill, which has two rolls on each side to take the place of the present piercing mill roll, so that there are four rolls, all told; two rolls form the converting part of the pass, while two other rolls form the diverging part of the pass. Up to the present time, he added, only small sample tubes have been rolled, and German mill engineers doubt the usefulness of this design for commercial tubes.

Pipes, boiler drums, and reaction chambers of more than 24-in. diameter are either hollow-forged, or welded or rolled by a new process. He said boiler drums are frequently welded of two half shells and that the boiler makers are allowed 90 per cent of the strength of an integral shell, whereas here in the United States such procedure is prohibited under the boiler code of the American Society of Mechanical Engineers. The welded shell is turned and bored, and tested hydraulically. Then the ends are wedged down, and the drum is tested once more under hydraulic pressure.

Rolling from Large Hollow Ingots

He agreed that the cost of welding sections three or more inches thick is high. Accordingly, "one steel works has developed a process in which ingots are cast hollow over a collapsible core. The hollow ingots are then elongated by means of a special rolling mill which applies a number of small rolls, say six, on the outside and an equal number of rolls on the inside of the hollow ingot. The rolls are designed for great elongation and are set slightly on a skew so that they both rotate and feed the ingot forward. Seamless tubes up to 40 in. in diameter and 30 ft. long have been rolled by this process.

In making the molds for the hollow ingots, a new core material is used which costs only 1c. a lb. but is limited to 4½-in. thickness of ingot wall. For similar purposes another core material has been developed which consists of aluminum oxide with some aluminum nitride (to act as a binder). It can be used for any wall thickness. The same material is also used in Germany as a wash for cores of steel castings and is claimed to have reduced the cost of cleaning castings by more than 50 per cent.

One of the most striking fruits of X-ray investigation is the recognition of the somewhat complex cell structure which exists in certain alloy bodies which are commonly described as intermetallic compounds, said Dr. Walter Rosenhain, in an address before the recent meeting of the British Institute of Metals. A large amount of further work remains to be done before this question can be cleared up. Closely allied to this problem is the question of the real nature of the complex structure found in certain pure metals, notably manganese, which displays a striking similarity to the structure of the peculiar intermetallic combinations previously mentioned. It would appear that the underlying laws of intermetallic combination have yet to be discovered, and that the true nature of intermetallic compounds and the features which distinguish it, if a true distinction exists, from a solid solution, have yet to be accurately defined.

Three rare metals are interestingly discussed in an attractive and well illustrated booklet of 58 pages issued by the Fansteel Products Co., Inc., North Chicago, Ill. The three metals are tantalum, tungsten and molybdenum, and their history, properties and uses are discussed. About 15 pages are devoted to "Tantalum, the Everlasting Metal"; about 10 pages to "Tungsten, the Metal of Another World," and 6 pages to "Molybdenum, the Metal of Radio." A concluding section of about seven pages deals with facts and figures on rare metals.

Modern Electrical Repair Shop

Steel Mill Requirements in Keeping Its Many Motors in Active Service—Should Not Manufacture Parts

BY J. M. ZIMMERMAN*

ON building a new repair shop a steel mill purchased some $30,000 worth of modern equipment. A great deal of thought was given to the layout of this shop and its system of costs. It is now operating, with an enviably low maintenance cost.

In laying out a modern electric repair shop all lost motion in man-hours may be kept low by proper arrangement of the shop. The places to which the workman must have access while performing his tasks—tool and stock disbursement window, time clerk's window in foreman's office, and washroom—should be located centrally, where his coming and going will not interrupt the workmen in other groups.

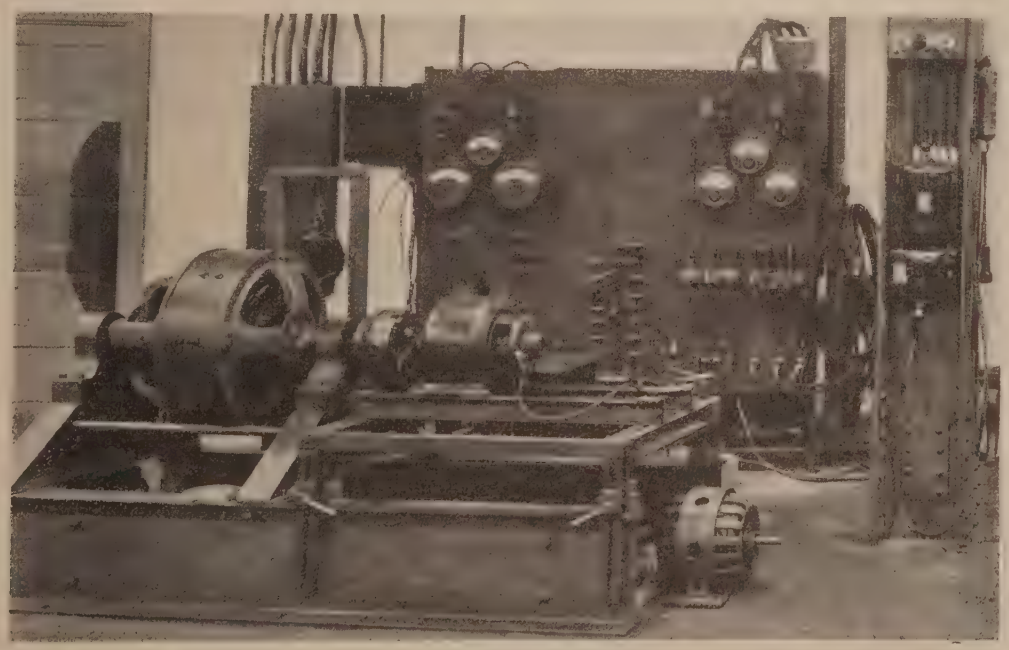
With this in mind the foreman's office is in the center of one wing of the building, with the washroom on one side and the storeroom and toolroom on the other. The stock and tool disbursement window is as near the foreman's office as is convenient, so that it will be near the center of the building. The stores office is in the corner of the storeroom, next to the foreman's office, but is not connected to it except by a window through which the necessary clerical work passes. The receiving door is at the far end of the storeroom.

If the roof of the building is high enough the space above the foreman's office and the washroom can be utilized to store parts, such as armature coils, which must be kept in their original shipping containers until they are used.

An overhead crane is essential for quick handling of heavy motor parts. The plan as shown in Fig. 1 provides such a crane to span the center bay and travel its entire length. Machines handling the heavy work are located in this aisle, while those doing the light work are located in bay III, with the exception of the coil repair department, which occupies the end of bay I.

The shop is divided into nine sections, each being separated from the other by white lines on the floor. Two wide aisles at right angles are provided for electric truck traffic. One runs from the foreman's office through the center of the building to the exit on the opposite side, while the other runs the entire length of bay III. These

*Maintenance engineer, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.



Dynamometer Testing Set, with Control Board, for Load Testing. The frame permits easy alinement for motor shaft

arteries enable small shipments of stock to be brought in or removed from the shop quickly.

Since the receiving and shipping department is the beginning and finishing of any job, we have arranged the shop to receive and ship the work at the end of bay II. The outside doors permit a motor truck to enter. The part to be repaired is lifted by the crane off the truck and over the wall to a section reserved for this material. This wall serves as a shield, so that the doors can be opened without chilling the shop. The storeroom is connected to this truckroom also, and a monorail crane is provided to lift the electrical supplies from the truck, thereby saving the storekeeper the labor of handling them.

Testing Department

The testing department is conveniently located between the unloading department and the assembly floor, to eliminate excess handling of complete equipment. When a motor comes into the repair shop for repairs it is moved to the testing department, where the extent of the repairs is determined. From the test floor it goes to the assembly floor to be disassembled. On its outward journey it returns from the assembly floor for a final test before being shipped.

Equipment in the testing department includes the dynamometer and control board for load testing. The control board has four panels, one for starting and controlling d.c. motors; another for starting and controlling a.c. motors, both wound and squirrel-cage type; a third for controlling the load on the generator; and a fourth for power distribution. The control equipment on these panels is designed to handle the maximum output of the dynamometer.

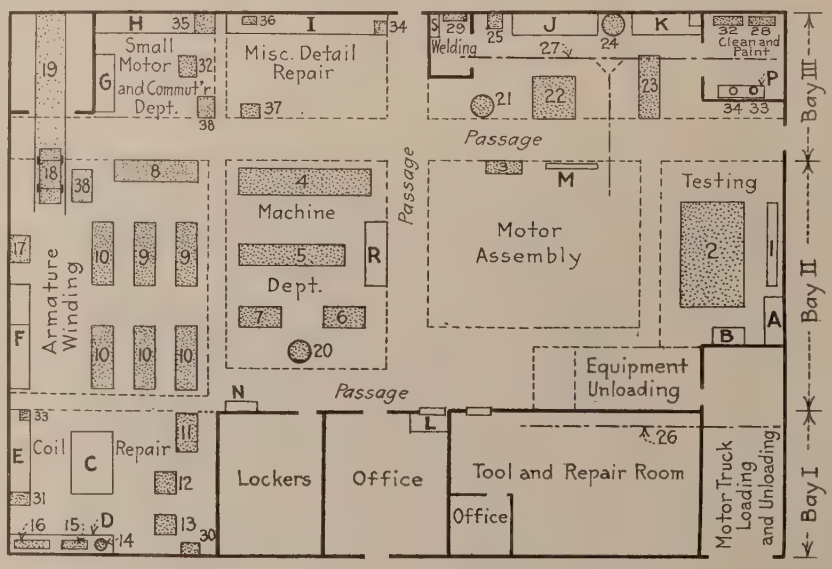
The dynamometer set as shown was made by the Miller-Seldon Co., Detroit, for quick connecting and disconnecting of motors to generator. The generator is of sufficient capacity to overload by 50 per cent the largest general-purpose motor in the plant, for a period of 15 minutes to obtain the best results.

A welded fabricated steel frame mounts generator and motor. The platform on which the motor is to be mounted for quick alinement to the generator shaft is raised or lowered by four jackscrews, one at each corner. Each screw has a sprocket wheel, all driven by a common chain, for the raising and lowering operation. The outside corners of the platform should be supported by feet sliding up and down, as shown. When the correct height of the table is obtained, these feet should be permanently clamped so as to form a solid base for the motor, thereby eliminating vibration. The platform has two steel cross channels which can be spread to fit the various feet dimensions of any motor being tested.

A lathe chuck pressed on the generator shaft will receive several sizes of center pins, as needed to fit the various sizes of centers in different motor shafts. A dog placed over the motor shaft serves to drive the generator. This manner of connecting the motor eliminates a lot of sizes of couplings and makes it possible to operate the set efficiently without accurate alinement of the shaft.

Assembly Floor

After disassembling equipment to be repaired, the assembly floor distributes parts to the various departments where they will be repaired. Such repairs made, the parts are assembled and the equipment is turned over to the testing department for final test. This department should be fitted with a complete set of wrenches, each in its own place when not in use. In addition there should be a portable drill, air hammer, and pinion puller. This depart-



LAYOUT of Electrical Repair Shop for Steel Mill, Showing Location of All Equipment and Relations of Departments

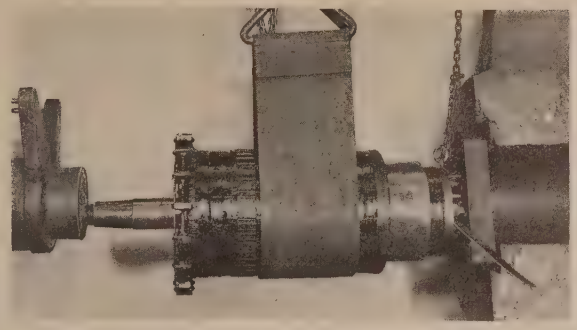
Equipment Installed

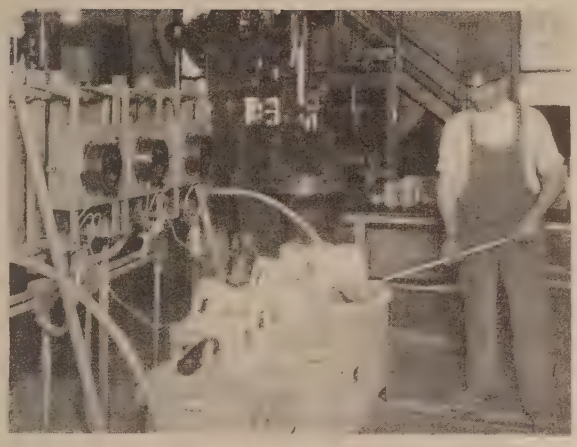
BENCHES, DESKS, AND CASES

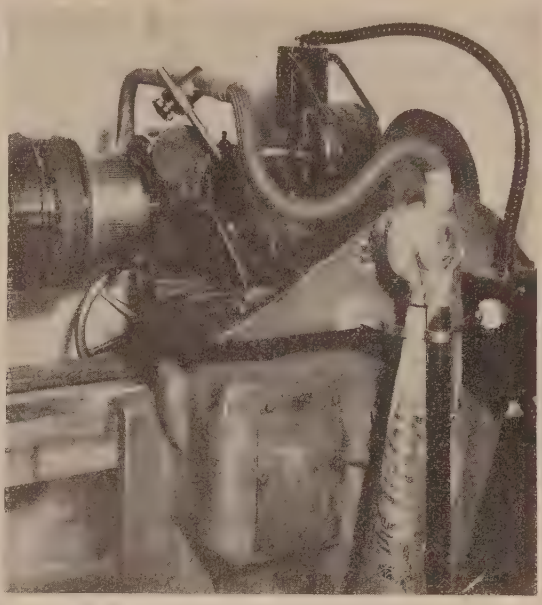
A—Instrument case
B—Tester's desk
C—Field coil repair table
D—Armature coil repair table
E—Insulation detail repair bench
F—Cut insulation bins
G—Commutator repair bench
H—Small motor and control repair bench
I—Machinists' work bench
J—Machinists' work bench
K—Babbitting work bench and mandril case
L—Time clerk's desk
M—Motor assembly tool rack
N—Check board
P—Cleaning bench
R—Machinists' work bench
S—Welding work bench

MACHINES AND TOOLS

1—Panel for test set
2—Load test set
3—Emery stone and buffer
4—100-ton hydraulic press
5—30-in. lathe
6—Milling machine
7—24-in. Planer
8—24-in. Banding lathe
9—Stator winding table
10—Armature winding table
11—Shear to cut insulation
12—Tension device for tool 13
13—Coil winding head
14—Electric gluepot
15—Coil taping machine
16—Coil pulling machine
17—Dipping tank
18—Car for baking oven
19—Electric baking oven
20—18-in. radial drill press
21—10-in. radial drill press
22—35-ton forcing press
23—Bearing machining lathe
24—Electric babbitting pot
25—Portable emery wheel
26—Storeroom monorail crane and track
27—Monorail crane for welding department
28—Exhaust fan for cleaning booth
29—Exhaust fan for welding booth
30—Band saw
31—Coil testing set
32—Portable stand for commutator repairs
33—Bench drill
34—Bench drill
35—Armature winding lathe for small motors
36—Small emery wheel
37—Hand press
38—Commutator undercutting lathe







Armature Shafts Are Removed or Put in Place in a 100-Ton Hydraulic Press (Upper Left)

Undercutting Outfit in Armature Repair Department to Permit Undercutting and Polishing on the Machine (Above)

Babbitting Bearings, the Metal Being Melted in Electric Furnaces Under Close Regulation (Lower Left)

ment is the most convenient place for locating the emery wheel and buffer.

Miscellaneous Section

Cleaning booth, babbitting pot, bearing machining lathe and welding booth are in one section. The motor details are sent to this department from the assembly floor for cleaning. The cleaning booth has a pickling vat and a rinsing vat, both large enough to hold the largest motor frame.

Any mechanical part which does not have insulation attached is dipped first in a caustic soda bath, and then rinsed in a bath of water. Field coils and armatures are cleaned by the gasoline spray method. The booth has two sprays for painting and for gasoline cleaning. The latter has a valve which will pass a spray of gasoline and air, or just a spray of air to evaporate the gasoline after cleaning. All repairs are sent to this booth to be painted before leaving the shop. The painting spray may be taken to the apparatus and connected to an air line for painting. This room is ventilated by an exhaust fan.

The bearings after cleaning are re-babbitted in an electric babbitting pot. This can be mounted on a truck so it can be taken out for babbitting large bearings which cannot be conveniently brought to the shop. After babbitting, the bearings are machined to fit the armature shaft on which they are to be used. For this reason the department has a small lathe.

A 35-ton forcing press is provided for pressing a bearing into a housing. In this case the bearing is machined if necessary, after it has been pressed into the housing. To do this requires a large lathe which can swing the housing.

A portable welder for the welding booth sets under the work bench, thereby being out of the way. It can be taken easily to other parts of the plant, if necessary. This booth has also a portable gas torch. An exhaust fan removes excess welding heat and thereby provides a comfortable working place for the welder. Outside the booth is a Martindale flexible-shaft emery wheel to smooth off the welds and rough spots. This grinder, on a portable stand, can be moved to other departments, wherever it can be used to advantage—especially the armature stripping benches, where it is used to clean out armature slots.

Machine Department

The machine department should have suitable tools to handle the necessary repairs, and make parts only in emergency. It is false economy to be equipped to machine from rough stock parts which can be purchased from the manufacturer of the original equipment.

It is desirable to have a 100-ton hydraulic press to remove and assemble armature shafts, tighten commutators, etc. A large machine lathe is sufficient for this section, as the bearing and armature winding departments have their own lathes. A planer and a milling machine are handy, but could be omitted. A large drill press is necessary.

Armature Repair Department

To rewind armatures and stators, the usual armature-winding horses and stator-winding tables are required. The banding lathe for this department should have a tension device for keeping the proper tension on the banding wire. A separate undercutting outfit is essential, so that the commutator can be undercut and polished on the machine. The dipping tank should have a hinged cover opened by a weight connected to it by a rope passing through a pulley. In case of fire this rope would burn in two and let the cover drop on the tank.

A swinging crane with chain hoist handles the parts to be dipped, and holds them above the tank for draining. After dipping they are put on a car and rolled into an

automatic temperature-controlled electric oven to be baked. Along the outer walls is a tier of bins to store cut insulating material for the convenience of the winding department.

Repair of field and magnet coils, and general repair and replacement of insulating details on various kinds of apparatus, occupies the coil-repair department. It has a shear to cut insulation, a band saw to cut commutator mica strips, bench drill, press, electric glue pot, field-coil testing outfit and a taping machine for general repair work. To provide for emergency it has also a winding head and coil puller, so that coils can be made.

Small Motor and Commutator Repairs

Commutators should always be tightened with a press after heating, so this section is located close to the hydraulic press and the baking oven. Since it is easier to assemble the commutator details with the armature vertical, a portable stand to hold the armature in upright position during repair is provided, thereby maintaining a quick method of moving it to the press and thence to the oven.

It does not pay to rewind small motor armatures if a man's time is taken up wholly to do this type of work. But it does pay to have a man do this work during spare time. Hence this department has a small motor armature-winding tool.

Miscellaneous Detail Repairs

Odds and ends of control and motor details are brought for repair and reclamation to the miscellaneous detail section. The best facilities here are several good vises, a bench drill for light work, small emery and buffing wheel and a hand press for removing and replacing worn bushings.

The economics of repairing and reconditioning of electrical parts is quite similar to that of repairing and reconditioning the mechanical parts of any other type of machines. It is essential that the various operations be carefully studied so that the organization will perform them with the least amount of effort and time. With this type of shop lay-out we feel that an economical repairing schedule can be properly maintained.

British Comment on Chromium Plating

Temperature a Factor in Successful Results—Porosity Often a Source of Trouble—Experience Important

CHROMIUM plating is recognized as having wide possibilities if a surface can be produced that is unstainable for an unlimited time. There has been some question as to the success of the coating in the United States and according to a British authority, W. E. Harvey of Harcourts, Ltd., reports as to its success have varied in England.

In some trades, especially in motor car work, it has been pronounced an unqualified success. Brass founders have had very indifferent results at times, says Mr. Harvey in *Ironmonger*, London, but in the manufacture of bathroom fittings chromium plating has become an indispensable finish, its wide adoption in that branch of the trade being pronounced remarkable. Theoretically, a coating of chromium, glass hard, of polished, silver-like appearance, applied under the same conditions, should remain a permanent untarnishable surface as long upon one brass article as upon another. In practice it does in most cases, but not in all; hence the doubt which has arisen as to whether it should be depended upon as a sound commercial proposition.

Effects of Temperature

Chromium is an exceedingly hard metal and is affected by variations in temperature in a different degree from the metals upon which it is deposited. Although the differences in contraction and expansion are very slight, the possible effects in some cases are obvious. It may be that an intermediate elastic medium is required. Sometimes under coats of copper, or nickel, or both, are found to be a satisfactory base for chromium deposit. In other cases there is no necessity for this. It depends upon the metal to be plated, the shape and thickness of the article and the use to which the article is to be put. A thick metal article may be a different proposition from a thin one, and so on. Every chromium plating job presents its own problem, and the expert realizes when he sees an article where trouble is likely to occur. Want of experience is responsible for many so-called "mysteries."

Porosity of Plated Product Cause of Trouble

Porosity of a plated surface is often responsible for trouble. As chromium plating is a high-class finish, it is worth while using good quality metal in the manufacture of plated articles, and using dried molds, too, when the metal is in the form of castings. Apart from the trouble that may be caused by the exudation of acid from "blow holes" under the chromium deposit, there is the question of appearance. A pitted surface may not be conspicuous with a brass finish; but defects of this kind are necessarily accentuated by bright plating. The thickness of the deposit is important, and information and advice upon this point should be sought from platers.

A fairly thick deposit is essential in many cases, and it is not every plant that is capable of giving the required result. In preparing the surface of an article for chromium plating it should be remembered that, if it is well "dressed" and polished, the result will repay the extra care in workmanship involved. All these are points worth keeping in mind, and many disappointments will be obviated by doing so.

Unsatisfactory Work a Bogey

So much for the origin of much talk about chromium deposit being unsatisfactory. It would, indeed, be surprising if, in the case of a new process of this kind, every small plating plant could reach perfection straight away. Further, it would be astonishing if even the larger plants, where research work is carried out to discover the cause of defects, could be absolutely proof against every possible cause of trouble, seeing that there is nothing in human experience that has yet reached this ideal state.

Although chromium plating has so far been mainly considered in regard to its virtue as a "finish," this is far from being the end of its uses or even, perhaps, the most important, says Mr. Harvey. Its application to molds and tools has been so successful in increasing their wearing properties and in other respects that it is in regular use for these purposes. Here, again, the correct method of plating must be adopted or it is useless.

As a final word, it may be pointed out that there has been much misunderstanding regarding the cleaning of chromium. There is a great difference between cleaning and polishing. While the latter is unnecessary, the former is essential, and is easily done by rubbing over with a damp cloth and finishing with a dry one.

Institute Unalarmed by Stock Break

Calm Confidence in Sound Position of Business Characterizes Both Public and Private Expressions at Hotel Commodore Meeting

CONVENING in its thirty-sixth general meeting the day after one of the worst stock market crashes in history, the American Iron and Steel Institute was undisturbed by the alarm that had captured an excited Wall Street. Both public and private expressions by leaders of the iron and steel industry reflected calm confidence in the sound position of business and the reassuring outlook for coming months.

Mill Operations Still Good

The growing stability of the iron and steel trade and the absence of price inflation were stressed by President Charles M. Schwab in the opening address, Friday morning, Oct. 25, in the Grand Ball Room of Hotel Commodore. Extemporaneous remarks from the platform by James A. Farrell, president of the United States Steel Corporation, were also encouraging. Pessimism, he declared, is not justified so far as the steel business is concerned. Operations, at 75 to 80 per cent, are good. Demand is sustained except in one or two lines and in some directions is even better than six months ago, he declared. Shipbuilding and structural steel fabricating plants are unusually active, being booked four to six months ahead.

Enlightened Selling Urged

Both Mr. Farrell and Mr. Schwab stressed the need for an enlightened selling policy, now that trade has receded somewhat from its peak volume. "If the people of the steel industry cannot maintain their equilibrium, we won't have good business," asserted Mr. Farrell. "If we fail at this juncture and violate the golden rule as between men and as between companies, then we can blame ourselves for anything that happens that will make the situation any different from what it is at the present time."

The cost sheet was recommended by Mr. Schwab as a means of forestalling an unsound price structure and of discouraging attempts to produce at capacity regardless of demand. He emphasized the fact that the industry's favorable showing this year has not been due to higher prices, but rather has resulted from greater demand for steel, enlarged output and lower costs.

The price stability of the past year has benefited steel consumers, according to Mr. Schwab, because it has enabled them to operate on a non-speculative basis. Steel buying has been for current consumption, and no big inventories have been built up. Since prices are not inflated, he added, there is no reason why they should give ground because of the present slight let-up in demand.

Willis L. King, veteran vice-president of the Jones & Laughlin Steel Corporation, also made a few remarks from the platform, at the conclusion of Mr. Farrell's speech. Mr. Schwab introduced Mr. King as "the only American honorary vice-president this institute ever had."

The technical program ensued, and some of the papers read are abstracted in the current issue of THE IRON AGE.

The banquet, held in the Grand Ball Room Friday evening, was featured by addresses affirming the good will existing between the United States and Great Britain. Hon. Winstont Churchill, former British cabinet member, said that the rest of the world "is dependent almost entirely in the immediate future on the cooperation and development of the English-speaking countries." He committed himself to naval equality between Britain and America, saying: "We have pledged our hands and hearts that Britain and the United States shall be for all time equal upon the seas, albeit strong.

"We don't want all the good people in the world to disarm while the bad ones remain heavily equipped for war," he added. "You are the friends we would most like to see strongly armed."

Mr. Churchill paid tribute to President Schwab and to J. Leonard Replogle and Bernard M. Baruch, who were also at the speakers' table, for the services they rendered during the war. He recounted how in November, 1914, Mr. Schwab had agreed to build twenty submarines in nine months, when the shortest time in which submarines had been previously built was 19 months. When work on the vessels was stopped because of President Wilson's opposition to American manufacture of war equipment for either side in the war, the incompleted submarines were transferred to Canada, where 10 of them were put into commission within seven months after they were ordered.

John W. Davis, former American ambassador to the Court of St. James, and Democratic candidate for President in 1924, indorsed Mr. Churchill's pleas for amity.

"The note struck here tonight," he declared, "stirs my being more deeply than anything that can be said about foreign policy. We have no fixed conviction that runs so deep as our earnest desire to maintain friendship with our kinsmen across the sea."

American Enterprise Praised

An address was made by another distinguished British guest, Sir Frederick Mills, chairman of the Ebbw Vale Steel, Iron & Coal Co., Ltd., Ebbw Vale, Monmouth, England, and past president of the Iron and Steel Institute (British). He contrasted the unsolved difficulties under which the British iron and steel industry is laboring with the prosperity of American plants. He frankly stated that he had come to this country to find out how to make steel at a profit.

"It is no mean achievement to make more than half of the steel of the world," he asserted, "but it is more of an achievement to make it at a profit."

Sir Frederick commented on the readiness of American steel manufacturers to give him all the information he asked for, and recalled that more than 30 years ago he had heard Mr. Farrell tell the steel masters of Europe that it was to their self interest to cease quarreling and that they would gain the most by working together in the closest harmony on the basis of a "live and let live" policy.

Dr. Sperry Awarded Medal

All those who contributed technical papers in the day's program sat at the speakers' table and were introduced to the audience. Mr. Schwab announced that the institute's

medal for the best paper read at its meetings last year had been awarded to Dr. Elmer A. Sperry. As Dr. Sperry is enroute to Japan, the actual presentation of the medal will be deferred until his return, President Schwab added. The subject of the winning paper was "Non-Destructive Detection of Hidden Flaws" (THE IRON AGE, page 1214, Nov. 15, 1928).

The attendance at the banquet was 1837.

President Schwab Says Prospects Were Never Brighter

IN my long association with the steel industry I have never known it to enjoy a greater stability or more promising outlook than it does today. We are approaching the close of the best year the industry has ever experienced. It is estimated that the steel production for 1929 will exceed 57,000,000 tons. This is 10 per cent greater than it was in 1928, the best previous year. This high production establishes an important landmark but is by no means the most important or most significant aspect of the year in steel.

Gain in Stability and Balance

Greater output is, of course, gratifying to every steel man. As I view the industry, however, its most fundamental progress has been made this year in the degree of stability and balance which is now the outstanding characteristic of our business.

This fundamentally sound condition is largely responsible for the uniform prosperity which has been shared by all branches and all companies in the industry. It is significant that the industry's favorable showing has not been due to higher prices; our improved earnings are due to three factors: greater demand for steel, enlarged output and lower costs. There has been some slight increase in prices, but on the whole prices have been largely stabilized and held on an even keel. Here certainly is concrete evidence that when the whole steel industry within itself practices sound business principles, the resulting benefits are shared by every element in it.

No Big Inventories

Steel consumers as well as producers have benefited from this stability because it has enabled them to operate their own business on a firm non-speculative basis. Throughout the year sound buying methods have prevailed. Steel has been purchased for current consumption. No big inventories have been built up. At the moment there is a slight let-up in demand but we are in this fortunate position: that because prices are stabilized and contain no element of inflation there is no reason to give ground on prices whatever slight but inevitable fluctuations may occur in demand. In other words, it would be unfortunate if we were to let such fluctuations disturb the healthy balance which has been established.

Stability is the order of the day in every industry. Moreover, it is quite as ethical and necessary for the steel industry to think in terms of stabilized profits as it is to strive for stability in other respects. It is high time we scrapped the idea that the steel business must be either a prince or a pauper. Everyone recognizes that the ability of the steel industry to meet the greater demand for its products at lower costs has been helpful all around. It has benefited our customers and it has enabled us to make a better return on our investment than heretofore. There is absolutely no reason why this favorable situation cannot be maintained year in and year out even in times when business may not be as good as it has been right along.

Stability More Essential with Lessened Demand

This stability is beneficial not only during periods of greater demand; it is even more so in periods of lessened demand. We have all seen how lower costs have favorably affected earnings when we have a high output. We also know that if this demand falls off our costs are bound to increase, no matter what we may do. More than ever we need a stabilized price structure at such a time, for no industry can stand a double onslaught of high costs and lower prices and still make headway. So I repeat that it is fortunate that our present prices contain no element of inflation that will bear purging in the event of a lessened demand. In other words, let us continue to be profit-minded. Let us be mindful of our costs as well as volume in seeking to further stabilize the industry in every respect.

Since I have been your president I have given a great deal of thought to this problem. It seems to me that if we are to make our efforts permanently effective we must know and be able to evaluate the true economic facts of our business and have a complete understanding of their significance upon production and distribution. I am a firm believer that one of the best ways of assuring progress on an even keel is to let the cost sheet be our compass. The cost sheet will tell us whether productive capacity in any branch of the business is in excess of current requirements. It will reveal uneconomic and obsolete practices. It will forestall an unsound price structure. It will discourage the attempt to produce to capacity all the time, regardless of demand.

It is time to discard the idea that costs are not important in determining sales policies because the latter are fixed by competitive prices. The fact is that competitive prices frequently fail to yield a proper return because they do not give adequate consideration to costs.

Two Reasons for Increased Steel Consumption

If we analyze steel's accelerated consumption we find it is due to two outstanding reasons: First, the extension and replacement of steel in its traditional fields, such as building, automobiles, railroads, highways, bridges, pipe lines, etc., and, second, the growing demand for steel for new uses.

The replacement factor alone provides a huge annual backlog for our business. You would be astounded if we were to compile figures to show the amount of steel that is used recurrently every year for replacements and extensions. I dare say that this field alone accounts for an enormous part of present day production. For instance, just as the replacement factor in the automobile industry is increasing in importance as more automobiles are put into service, so it is with steel—the more steel that goes into service the greater becomes the demand for its replacement and recurrent use. Fortified with this constant demand and the new uses to which steel is being put for things that are new, the industry occupies indeed an impregnable position as a basic necessity to our national growth.

Machine Not Causing Unemployment

Of course, underlying all other considerations, it is upon the prosperous condition of our people generally that the future of steel and every other industry depends. Under present-day living standards where one want makes way for another, high and sustained purchasing power is essential. It is highly gratifying, therefore, that labor generally is enjoying good wages, a surplus of which is finding its way into saving accounts and other fields of sound investment.

Labor as a whole is quite fully employed today. The mechanization of industry has resulted not only in light-

ening the load of the worker and affording him more leisure, but this same development has created many new jobs. You will find that the percentage of the population gainfully employed is probably as great as it has been at any time in the last decade. Certainly this would not be true if the development of the machine were creating fewer instead of greater opportunities for gainful employment.

If the equilibrium between production and consumption is maintained, there is no reason, in my opinion, why our present prosperity should not continue indefinitely. Fundamentally there is every reason why the use of steel will increase. The per capita consumption is growing rapidly —steel finding its way into many new fields and, through its adaptability, economy and its elemental security, is supplying a service which no other metal can perform.

No Grounds for Pessimism, Says James A. Farrell

THERE is a good deal of pessimism around at the present time; it affects some people more than others. I cannot see where it affects the steel business at the present time. With the exception of one or two of our commodities we are just as busy as we were; the prospects are just as good as they were, and I think that we are going to have a continuance of the present business. I think business is good when we can operate our plants 75 or 80 per cent. With the capacity which existed a year ago, we would be running about 110 per cent now. But, of course, we kept up with the demand; we have gone on expanding to meet the necessities of the country, and these necessities are increasing all the time.

Some Lines Even Better Than Six Months Ago

There are some lines of business which are even better than they were six months ago. I do not believe that there is a fabricating shop in the country today that is not booked up for the next four or five months.

As Mr. Grace said yesterday in his report to his stockholders, the shipbuilding business has not been as good in 15 years as it is at the present time. The shipbuilding yards on the Atlantic Coast, and they are all large yards, have sufficient work at the present time for six months, and there has certainly appeared a demand for new vessels.

Cupidity Is Greatest Danger

I think that Mr. Schwab has laid down principles which were more or less known to us, but it is like a great many other rules and regulations, they are more observed in the breach than otherwise. Now if the people in the steel industry cannot maintain their equilibrium, why we won't have a good business, because the cupidity of people is ever with us, and when somebody thinks he can take business that belongs to somebody else the natural result is that somebody else is going to take something that does not belong to him. That is the main trouble with our industry. You cannot sell seven tons of steel to a man that only wants to buy one, and if somebody sells that one there is no reason why the other six should go around and spoil the bargain or the sale.

No New Tricks in the Game

Now, this whole situation is in our hands, and I have not found anybody in the steel business that is any smarter than anybody else, and there are no new tricks in the game (laughter). Now, with the standard that has been laid down by Mr. Schwab, assuming that he speaks for his own company, which I know that he does, I will guarantee, as far as the United States Steel Corporation is concerned, that there will be no complaint about their ethics in business. You know this word "ethics" has become a very popular word, and "trade practices." I am not going to detain you any longer. There is a great deal of information which is more or less hermetically sealed inside of my anatomy, but I think I had better keep some of it there for the moment; but, if we fail at this juncture and violate the golden rule as between men and as between companies, then we can blame ourselves for anything that happens that will make the situation any different from what it is at the present time.

Steel's Growing Service to Civilization

BY E. F. KENNEY*

IT is estimated that the nation will consume more than half a ton of steel this year for every inhabitant. Without steel there would be practically no transportation by land, water or air. The generation of power, as we know it, or the application of power to perform useful work, would be impossible.

Non-ferrous metals have played a most important part in the development of civilization. But more than 21 times as much steel is produced in the United States as the combined consumption of copper, lead, zinc, aluminum and tin.

Railroads are pressing for stronger and safer rails and wheels to carry the heavier loads. For a number of years they have tried to meet the issue by increasing the weight of the rail and the carbon content. Today it is realized that the limit has been reached in carbon content, and that, unless the physical properties of steel are increased, the heavier and more massive rails will be no more resistant to wear than the lighter ones. Alloys have been tried, without much success. Heat treatment has been resorted to, and appears to be more promising than any other remedy so far tried. But the future development of heat treatment depends on the economic necessity of greater wheel pressures and speeds to carry the increasing traffic.

Great Bridges of Steel

Spans of structural steel up to 500 ft., capable of carrying the heaviest loads, are not unusual. But the spanning of clear openings of extreme width has not been common in the past, and recent performances are striking. The largest completed to date is the Delaware River Bridge at Philadelphia. It has a clear span of 1750 ft., and carries six lines of automobile traffic, rapid transit and surface car tracks, as well as pedestrians. The entire load is supported by two cables, each made up of 18,666 steel wires having a total tensile strength of 59,000 tons. The work of constructing the cable, placing each of the 18,000 wires so that it will take its proportionate part of the load, and compacting the wires and protecting the cable, calls for the greatest skill and precision.

This bridge, great as it is, will be completely overshadowed by another bridge of similar character now being

*Metallurgical engineer, Bethlehem Steel Co., Bethlehem, Pa.

erected over the Hudson River at New York. Here the clear span is doubled to 3500 ft., or two-thirds of a mile, and four cables are used. These are similar to those in the Delaware River Bridge, but are larger, each having a total strength of 100,000 tons.

It is characteristic of the engineering strides being made in steel construction and significant of its future that within a period of five years the gap that we can span has doubled in breadth.

Buildings of Ever-Increasing Height

Spectacular development of large bridges is paralleled by the tall buildings in the congested metropolitan districts. The latest and greatest is the 80-story Empire State Building, to be erected on the site of the Waldorf-Astoria Hotel, New York. This building will be nearly 1000 ft. high and will house 50,000 persons.

Like a number of its neighbors, it is composed of a heavy steel framework carrying the masonry exterior which beautifies and protects the steel structure. It has been shown by the dismantling of Madison Square Garden and other older buildings that masonry covering is a complete protection against atmospheric corrosion of the steel frame. Experience, as far as available, indicates that such steel construction is the safest known for resisting wind, earthquake, fire or overloading.

Automotive Steels Demand Highest Qualities

Sometimes the demands for perfection in automobile steels seemed unreasonable. Trying to meet them was very hard; it was often discouraging, but it had its reward. Today the automobile is the greatest of all users of steel. In five years its requirements of steel have increased from 3,500,000 tons to 6,700,000 tons annually. There are more than 24,000,000 automobiles in general service in the United States; this year more than 5,000,000 will be built.

Because of the use of lighter materials in the construction of airplanes and airships, one does not immediately think of steel as a great necessity in their development. Yet the steel cylinders and other engine parts require the greatest perfection in the steel maker's art and without them the conquest of the air could never have been attained. A British seaplane recently averaged 355.8 miles an hour.

This required engines not only of tremendous power, but also of extremely light weight. To develop one horsepower for each 1½ lb. of engine weight means that every part is reduced to the lowest possible size, and that the steel composing these light high-speed rods and shafts must be not merely extremely strong, but must be perfect. Failure is fatal; no imperfection can be tolerated.

Enhanced Agricultural Productivity from Steel Uses

Seventy-five years ago two-thirds of the population lived in the country. Today only 43 per cent are rural dwellers. For purposes of comparison we may say that in the earlier period 10 farmers provided food for themselves and five city dwellers. Today 10 farmers provide for themselves and 13 city dwellers. The increase in productivity is due to steel. The power tractor, the multiple plow, and the many farm implements for tilling the soil and gathering the harvest, as well as the rail, water and automotive transportation utilized to conserve time and broaden markets, are possible because of steel.

In the petroleum industry, in the cracking processes by which the heavier oils are decomposed to produce gasoline, pressures up to 800 lb. with temperatures to 900 deg. Fahr. are not uncommon. One large company has inquired for an experimental oil refining plant to use a maximum pressure of 2200 lb. and a maximum temperature of 1500 deg. Fahr. The high pressures would not involve great difficulty, but the use of high temperatures, at which all of the commonly used steels are materially softened and weakened, presents a staggering problem. As practically all of our manufacturing processes involve softening by heat to facilitate working, it is evident what difficulties are to be overcome if the material which is required must have the property of not softening on heating.

American Leadership Secure

Our own country produces now one-half of the world's steel supply. We have in our grasp a commercial leadership that must encourage us to the utmost effort to further the use of steel by careful manufacture and patient research. Steel today is far in the lead of other metals, both in adapting itself to the manifold new requirements of a changing world, and in the creation of new uses through research.

In the social, economic and political life of man, steel has made contributions without which the inhabited globe would be another, and far more primitive, place to live in. The service of steel to civilization is greater now than ever before. The pride of superior service and a spirit of scientific inquiry will carry steel to heights of usefulness of which as yet we can only dream.

What Steel Has Done for Humanity

MAN'S capacity to cooperate with others for the benefit of the human race, said Charles P. Perin of Perin & Marshall, New York, has shown its result in what steel has done for humanity. Steel is needed largely for transmission of energy and for vessels to transport food and other products. At the world's present rate of production of approximately 100,000,000 tons a year, the known reserves of iron ore will either have been completely depleted by the year 2000 or so highly impaired that we shall need a very great use of methods of beneficiation and a much more efficient use of the material itself. The present large proportion of scrap used in making steel is a great benefit in conserving ore.

Highly important for the future is the increasing use of rust-resisting products. Corrosion has been estimated to cause the discarding of from 19,000,000 to 31,000,000 tons of steel annually. However, the price at which alloy steel can profitably be sold must come down decidedly if enough of it is to come into use to cut down much waste from this source.

It might be mentioned in passing that the estimated reserves of ore in Cuba, amounting to 4,000,000,000 tons, account for some 80,000,000 tons of chromium and 40,000,000 tons of nickel, on the basis of 2 per cent of the former and 1 per cent of the latter. If these elements could be dissociated from their surroundings at a low enough price, this might point the way to much rust-resisting steel in the future.

Romantic Is the Story of Steel

Fairly romantic is the story of the increasing penetration of the universal metal into the life of our time, said Alvin I. Findley, editor THE IRON AGE, New York. Only a few years ago a per capita consumption of 500 lb. a year in the United States was pointed to as a mark to be aimed at; but only so confirmed an optimist as Mr. Schwab would predict its early realization.

Yet, difficult as we find it to account for the performance of this amazing year 1929, on the heels of the remarkable record of 1928, our use of steel this year will represent no less than half a ton for every man, woman and child. We are finding each year that the important outlets which we are able to check fairly well—automobiles, railroads and new construction—fall farther short of accounting for our increased production, and that much of it is due to the multitude of new forms in which steel is entering into everyday life.

The paper gives us a distinct impression of the steady

pushing up of the demands of modern engineering upon the steel maker and the more than adequate response of the industry. Illustrating how fast we are moving are two items made public since the paper was put in print. One is a contract made by a Detroit automobile company for record-size steam generating units that will use steam at 1350 lb. pressure, against the 1200 lb. mentioned. The other is the announcement of plans for a 100-story building in New York, coming while wonder was still new over the 80-story Empire State Building referred to.

The author has well summarized the situation in respect to steel rails. There may be dissent from his reference here to alloy steel, and the difference may be partly one of definition, seeing that the steel rail statistics of the institute do not classify as alloy steel the considerable rollings in recent years of rails carrying an extra content of manganese. Cost will be an important factor, but a further development of the alloy steel rail would seem likely if service demands continue to increase.

Highly interesting are the references to steel as a factor in airplane and airship construction. It may be added that chromium-molybdenum steel tubing is now standard construction for airplane fuselages and that, while most of the dirigibles have duralumin skeletons, the great British R-101 has stainless steel tubing in all main members.

Nothing in his paper is of more moment to the industry today than Mr. Kenney's references to the part research must play in making a product that will meet all the new requirements of a fast changing world, and in creating new uses for steel. In the minds of our European competitors American steel making has long been synonymous with tonnage. Sometimes they have even hinted that we sought volume at the expense of quality.

If they have been alive to what has taken place, especially in the past four or five years, they have learned that research for the betterment of the product and the enlargement of its place in modern life has engaged our steel makers as never before. Steel that will resist corrosion, steel that will carry heavier loads with lighter section, steel that will withstand high temperatures, steel that will meet the present-day demand for speed of transportation by water, by land or by air—these are the main objectives of fourfold more investigators than were similarly engaged as the century opened.

The paper before us is entirely within bounds in its prophecy of the greater achievements of the industry in providing steel of better quality and wider variety of form. Not only may we look confidently to the steel of tomorrow to add vastly to the satisfactions of human life, but to aid largely in making it possible for the average man to maintain life on a high level by working but 40 hr. out of nature's weekly allowance of 168.

Fatigue of Metals—A Review

BY H. F. MOORE

IN the ten years which have elapsed since Professor Moore last addressed the Institute there has been one outstanding achievement of research on fatigue of metals: It has been definitely proved that metal actually has an endurance limit. About a dozen different steel test specimens have survived a billion reversals of stress without fracture; one is unbroken after 10 billion. Generally speaking, the more ductile metals must be operated to a very high number of cycles to determine precisely the endurance limit, and duralumin constitutes the only doubtful exception to the first statement (although work on this alloy is still in progress).

Professor Moore's paper contains illustrations of a wide variety of fatigue testing machines. (In passing it might be mentioned that he favors the term "failure from progressive fracture" to the term "failure from fatigue.") Some of them are designed to stress the specimen in direct tension and compression, in order to avoid the concentration of stresses existing in a rotating beam, but the uniformity of stress across a tension specimen is said to be illusive—differences of 10 per cent can be found by mounting extensometers at different places on a tension specimen mounted in the best of approved grips.

Short-time tests were also discussed. Experiments at loads which cause breakdown in a short time are of no value, for the ability to stand excessive punishment is related to the ductility of the metal, whereas the true endurance limit is a function of the ultimate strength or the hardness, as shown by the curve. Other than inferring the value from a tensile test, the only rapid method of promise was described in THE IRON AGE, June 6, page 1572, and depends upon finding the first microscopic flaw to open up, under gradually increasing loads, by measuring the electrical conductivity of the specimen. Professor Moore has tested this method, using four steels and four nonferrous alloys, and finds it to give results which closely approximate those of more tedious methods.

GRADUATED from New Hampshire College in 1898, H. F. Moore received his degree of doctor of science in 1922. He was instructor in machine design at Cornell University, 1900 to 1903. From 1904 to 1907 he was assistant professor of mechanics, University of Wisconsin. He has been professor of engineering materials at the University of Illinois since 1907. He is author of "The Materials of Engineering." He has served the American Society for Testing Materials as president.

Theory of Fatigue Still Doubtful

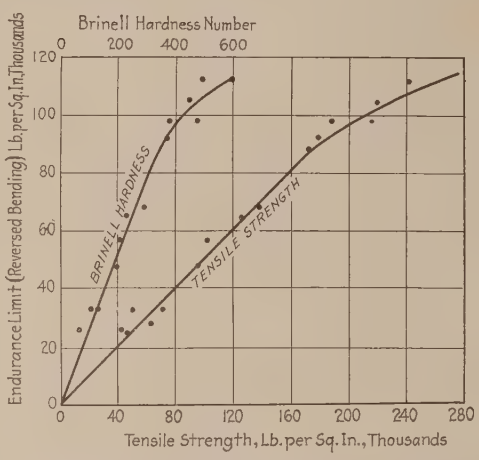
A comprehensive theory for the phenomena of failure from progressive fracture is not yet formulated. It must harmonize such curious facts as (a) understressing increases the endurance limit, even as much as 30 per cent, but this figure varies for different materials; (b) overstressing decreases the endurance limit; (c) the surface condition, such as polish, has a great effect on the result; (d) a Vee notch with bottom radius of 0.005 in. reduces the endurance by two-thirds; (e) running the sample in fresh water reduces the endurance limit as much as 50 per cent, and removes whatever advantage heat treatment may give to a specimen when run dry; (f) while the endurance limit of most metals is below their elastic limit, this is not true for annealed iron or copper.

It is believed, however, that a failure from progressive fracture cannot occur unless the stress on the entire piece is sufficient to *start* the fracture at some point where stresses are concentrated by a flaw existing in the metal, or induced by corrosion on the surface. Homogeneity is therefore to be striven for in the production of metal for

high endurance. Furthermore, there is no special alloy steel which has unusual virtue, except as it may be successfully and uniformly heat treated in a commercial way to a high ultimate strength, because laboratory treated carbon steels give just as high endurance limits as the best alloys.

Some tests made at elevated temperature suggest to Professor Moore that, at temperatures of 1000 deg. Fahr. or above, the endurance limit will probably be above the limiting stress from creep or plastic deformation.

In conclusion, the speaker gave it as his opinion that three-quarters of the fatigue failures in service were due



Endurance Limit of Metal May Be Inferred from Its Hardness or Ultimate Strength by Using the Above Curves

to faulty design or surface corrosion, rather than to poor materials.

Practical Use of Endurance Data

In discussing the paper, J. A. Capp, engineer Testing Laboratory, General Electric Co., Schenectady, N. Y., described some efforts he had made to interpret the static and endurance tests of metal to designers in his organization. He emphasized that engineering formulæ are based on the supposition of homogeneous materials acting within the elastic limit, whereas steel and in fact all metallic alloys are random crystalline aggregates shot full of non-metallic inclusions and probably sub-microscopic voids. Nevertheless the static or slow-moving tests, as of tension, torsion or hardness, give statistical results, integrating all the irregularities of stress distribution and elastic movement within the specimen. The fundamental difference of the alternating endurance test is that it searches out the weakest spot—this spot is what initiates the crack which ultimately spreads across sounder metal to complete fracture. It is a microscopic test of the finest details of structure, rather than an averaging of the strong with the weak.

F. N. Speller, director department of metallurgy and research, National Tube Co., Pittsburgh, pointed out the similarity of the harmful effect on the endurance limit of tiny notches and of surface corrosion; the latter is due to non-uniformity and the familiar pitting action merely produces damaging notches. Unfortunately, alternating stress apparently increases the corrosion rate greatly at these random centers. Experiments in his laboratory indicate that the bad effects of tap water corrosion may be entirely counteracted by greasing the specimen or by a small percentage of an inhibitor, such as sodium chromate, dissolved in the water; but this is effective only as long as the inhibitor is used. It has also been found that the rate at which the stresses alternate has a great effect upon the damage done by corrosion fatigue. Thus, a corroding specimen, run slowly, may actually have a long life in hours.

Short time tests were also discussed by Dr. H. W. Gillette, director Batelle Memorial Institute, Columbus, Ohio. He observed that time could be saved by speeding up the reversals to the condition where the specimen is a vibrating reed. Jenkin, in England, has in this manner achieved as many as 10,000,000 reversals of stress in 15 min.; his results (which may be in error as to the maximum stress) do not check those found by the relatively slow rotating beams. Similar work on very high frequency alternations at the United States Bureau of Standards do not seem to agree with Jenkin's work, and the whole question requires further study. Other investigations must also be made on large specimens—like a full-sized axle—and on refrigerated metal, at temperatures met in severe winters or by flyers at high altitudes.

Detecting Sulphide Areas in the Presence of Phosphides

THE original method of Heyn and Bauer for detecting sulphides and phosphides depends on the difference in color of the sulphide and phosphide of mercury. When a polished section is etched with an acid solution of mercuric chloride, the sulphide areas appear black, while the phosphides are colored a lemon-yellow.

However, according to M. Niessner, in *Stahl und Eisen*, the sulphide reaction, in the presence of a large quantity of mercury salts, and a deficiency of hydrogen sulphide, yields the so-called sulpho-salts, which are white to yellow in color. In order to prevent erroneous interpretation of the etching figures, therefore, some further test was necessary, and has been developed.

It was found that a solution containing iodine and sodium azide reacts with sulphides, evolving nitrogen gas. In making the test, gelatin paper is first soaked with the acid mercuric chloride and placed upon the sample. After four to five minutes it is removed and dried. Dark areas represent sulphides. Yellow areas are tested by dropping upon them a little of the azide solution. In the case of sulphides a visible evolution of gas takes place. Absence of gas indicates a phosphide area.

The azide solution is approximately one-tenth normal in iodine and one-fifth normal in sodium azide (NaN_3).

The behavior of binary alloys is affected by the presence of relatively very small quantities of impurities. In more than one instance it has been found that less than 0.1 per cent is sufficient to produce serious modifications in the apparent equilibrium diagrams obtained. A striking example occurs in the case of the alloys of aluminum and zinc. Certain of these alloys containing about 78 per cent of zinc, after quenching at a suitable temperature, undergo a spontaneous hardening, followed by spontaneous softening accompanied by the evolution of a considerable amount of heat. In the course of the investigations of Hanson and Gayler in England, zinc and aluminum of the highest available purity were utilized, and the phenomena in question made themselves very strongly evident. If, however, alloys of this type are made up of commercial zinc with a small content of lead, the whole of these phenomena are either suppressed or rendered very feeble. In the same way, it has recently been discovered that small amounts of impurity in iron materially affect the position of the critical transformation temperatures, and it has even been suggested that in entirely pure iron the so-called allotropic transformations would not occur at all.

Gear Makers Meet in Philadelphia

Discussions Include Market Analysis, High-Strength Cast Iron, Tungsten Carbide Tools and Technical Standards

IMPORTANT problems bearing directly on gear manufacture and marketing were discussed at the semi-annual meeting of the American Gear Manufacturers Association, held at the Benjamin Franklin Hotel, Philadelphia, Oct. 24, 25 and 26.

High-strength cast iron, tungsten carbide cutting tools, and a recently started investigation of worm gear drives were among the topics featured. There were also addresses dealing with a method of analyzing the market for gears, and the rôle of the trade association in industrial standardization.

Progress reports were submitted by 12 sub-committees of the association's general standardization committee, which is headed by B. F. Waterman, engineer, Brown & Sharpe Mfg. Co. One recommended practice, for herringbone gears, was accepted. Renewed activity in the association's commercial standardization work is indicated by the appointment of a new committee with F. W. Sinram, president, Gears & Forgings, Inc., Cleveland, chairman. A. F. Cooke, vice-president, Gears & Forgings, Inc., and president of the association, presided at all sessions.

Two companies were elected to membership. They were the Massachusetts Gear & Tool Co., Woburn, Mass., with E. R. Lyman, president, as executive representative, and the Atlantic Gear Works, Brooklyn, N. Y., George Scherr, executive representative.

Members and guests of the association were luncheon guests of the Philadelphia Gear Works, Oct. 25, at the Benjamin Franklin Hotel. The Hon. Harry A. Mackey, mayor of Philadelphia, was the principal speaker, and was introduced by G. L. Markland, Jr., chairman of the board of the Philadelphia Gear Works.

Hugo Bilgram, president of the Bilgram Machine Works, Philadelphia, widely known for his contributions to the art of gear cutting, was a speaker at the opening session. His outline of the invention of his bevel gear shaper in 1874 and 1875 and of other mechanical inventions was received with interest.

The spring meeting of the association will be held next May in Cincinnati, the dates to be announced later.

Gear Standardization Makes Progress

A RECOMMENDED design practice for herringbone gears, submitted by A. A. Ross, engineer metal gear department General Electric Co., West Lynn, Mass., and chairman of the herringbone gear committee, was accepted. This practice sets maximum and minimum values for such factors as pressure angle, helix angle, etc., instead of offering at present a definite single standard for all factors.

The metallurgical committee, the chairman of which is C. B. Hamilton, Jr., president of the Hamilton Gear & Machine Co., Toronto, Canada, has been working with sub-committee No. 8 of the sectional committee on the comments received since the broadcasting of proofs of the recommended practice for forged and rolled alloy steel for gears.

Use of a non-resonant railway gear is to be suggested at the next meeting by the electric railway, mill and mine gears and pinions committee, which is headed by L. F. Burnham, manager of engineering Nuttall works of the Westinghouse Electric & Mfg. Co. "The non-resonant gear," it was explained, "is one which has its high-pitched operating notes, due to vibrations caused by tooth interference and impact, deadened by the use of an attached body in intimate contact with the gear itself."

The worm gear committee, with W. H. Himes, mechanical engineer Westinghouse Electric & Mfg. Co., chairman, presented for discussion some 15 changes in the worm gear nomenclature submitted to the association at its meeting last Spring. This part of the committee's work is now before the A. G. M. A. nomenclature committee. A series of tests which may later develop into a recommended practice is contemplated by the worm gear committee.

The work of the bevel and spiral bevel gear committee, headed by F. E. McMullen, Gleason Works, Rochester, N. Y., is at a halting point pending review of its report on nomenclature by the association's nomenclature committee. It is planned to work up data on loads for bevel gears.

The nomenclature committee plans to submit at the next meeting four different nomenclature reports which will include definitions, sketches, etc. The columns in the nomenclature designated as "symbols" will be changed to "abbreviations." D. T. Hamilton, Fellows Gear Shaper Co., is chairman of the committee.

Progress was reported by the spur gear committee in its work on horsepower tables. The tables so far worked out are to be reduced in size. J. L. Williamson, Fellows Gear Shaper Co., Springfield, Vt., is chairman of this committee.

H. R. Moyer, Westinghouse Electric & Mfg. Co., has been appointed chairman of the non-metallic-gearing committee to succeed T. C. Roantree of the Westinghouse company, who is engaged in other work.

A number of changes in the roller chain and sprocket recommended practice adopted by the association in 1925 are contemplated by the A. G. M. A. sprocket committee and other cooperating committees of the A. S. A. G. M. Bartlett, consulting engineer, Diamond Chain & Mfg. Co., Indianapolis, is chairman of the A. G. M. A. committee.

A new series of chains with pitches from ¾ to 3 in. are recognized; these have the same proportions as the standard series but have thicker sideplates and are to be known as the extra-heavy series. The formula for minimum breaking strength included in the recommended practice is abolished. A light weight machinery chain, to be designated as the No. 41, is recognized as standard. Its pitch is ½ in., width ¼ in. and roller diameter 0.306 in. Limiting tolerances, maximum and minimum, for chain parts, within which it is necessary to keep in order to assure interchangeability between connecting links as produced by different makers of chain are included in the committee's recommendations. Supplementary information includes recommended chain working loads, maximum sprocket speeds, and metal pattern teeth for cast sprockets.

H. J. Eberhardt, secretary Newark Gear Cutting Machine Co., Newark, N. J., in reporting for the tooth form committee, read a communication from Prof. U. Holland of the University of Pennsylvania, asking for information relating to the tooth

form standards promulgated by the A. G. M. A. The committee's reply to this letter contains an interesting elaboration of some of the details of these standards, and will be included in a later issue of THE IRON AGE.

C. B. LePage, assistant secretary of the American Society of Mechanical Engineers, outlined the status of the work of the 10 sub-committees of the sectional committee on the standardization of gears.

Role of the Trade Association in Standardization

AS heretofore at the fall meetings an evening was set aside for a technical standards meeting, at which the 12 or more technical sub-committees get together to formulate plans for the winter months. Immediately preceding these group meetings, Dr. P. G. Agnew, secretary of the American Standards Association, New York, addressed the association on "The Role of the Trade Association in Industrial Standardization."

A large number of trade associations make standardization one of their principal activities, and at present more than 200 trade associations are officially cooperating in the work of the A. S. A., said Dr. Agnew.

The organized standardization movement, so far as it has been developed, largely begins and ends (in the use of standards) in the individual company. "Company executives should be alive to the economic importance of the movement and in sympathy with it. Instead of leaving their standardization work as a more or less incidental and somewhat unconscious function of the engineering and production departments, industrial executives are more and more providing a definite organization through which the standardization activities of the company are carried out," he said. "While steady progress is being made, we are still far behind Germany in the matter. There, more than 1000 firms have a special organization for carrying on this work; in all of the great companies the standards department reports directly to the general management."

In discussing the function of the trade association in the standardization movement, Dr. Agnew pointed out that one of the educational functions of the association should be to bring home to the executives of its member companies the economic importance of standardization and its significance as a management tool.

The attempt to control a standardization project entirely within the association, when other groups have an important stake in the project, was said to be an error frequently made, especially by the less experienced associations. "The number of standardization undertakings sufficiently narrow in scope to be properly handled without the cooperation of other groups is very much smaller than is generally realized," he said. "Too often there is also the attempt to leave competent consuming groups entirely out of the picture."

It was emphasized that the trade association should require responsible representation on the part of its members on committees dealing with standards. The meaning of representation and of the responsibilities it entails is not always understood, said Dr. Agnew. "In committee work the A. S. A. has so frequently found it necessary to call the importance of this matter to the attention of cooperating bodies and their representatives that it has formulated the following for use in such cases: It is the duty of a representative 'to keep sufficiently in touch with his organization so that he can correctly interpret its attitude in the development of the work and in participating in decisions in the sectional committee; to keep his organization informed of developments; to act as a leader in the formulation of the policies of the organization in regard to the matters with which he is dealing; and to refer back to his organization questions upon which he feels unauthorized to speak for it.'"

Another essential function of the association in the standardization movement was said to be the systematic promotion of the use both of its own standards and of those national standards in whose formation it has taken part. "One of the easiest ways of accomplishing this is by stimulating systematic references to such standards in catalogs, in advertisements, etc. Surveys by the association of the extent of the use of its standards is a most effective means to this end," said Dr. Agnew.

New Commercial Standards Committee

PROJECTS to be undertaken by the new commercial standardization committee include revision of some of the items of the proposal form that was recommended as standard practice by the association some years ago. It is also planned to gather periodical trade statistics, including orders and billings, that will serve as an index to aggregate business conditions in the industry. In addition to F. W. Sinram, chairman, members of the committee are: S. L. Nicholson, assistant to the vice-president of the Westinghouse Electric & Mfg. Co., New York; A. R. Ford, president Frost Gear & Forge Co., Jackson, Mich.; Howard Dingle, president Cleveland Worm & Gear Co., Cleveland; and R. C. Ball, president Philadelphia Gear Works.

In an address on the "Market for Gears," W. E. Kennedy, sales manager, *American Machinist*, New York, effectively illustrated a method of market analysis and planned selling as applied to the gear industry. In all lines, the market for gears is expanding, due to the increase in machinery production, he said.

The intensive cultivation of local or neighborhood markets, because of the advantage of shipping rates, closer contact with buyers and their needs, was stressed. Small or single gear orders were in many cases taken at a loss, he said. The percentage of such orders is frequently much larger than realized, and proper analysis of sales would lead to greater effort in obtaining the more profitable type of business.

Investigating Worm Gear Drives

THE equipment and methods of a recently begun investigation of worm gear drives were outlined in a paper by Emil Dukes, Gears & Forgings, Inc., Cleveland, on "Load and Speed Conditions of Worm Gear Drives." The object of the tests, which are being conducted at the Case School of Applied Science, Cleveland, is to determine a reliable method of calculating worm gearing.

"The method used at present is rather vague," said Mr. Dukes. "The load per sq. in. of projected area of one tooth is calculated, and this multiplied by the pitch velocity of the worm gives a factor called pv. The value of this factor determines whether a certain worm and gear combination is adapted for the work in question. It is left to the experience and judgment of the designing engineer what value of pv will be acceptable in each case.

"This method obviously is not scientific and does not correspond to the actual facts. The value of p, the pressure per sq. in. of projected area, while proportional in a degree to the actual bearing area, which is a secondary curve resembling the ellipse, does not take into consideration the number of teeth in contact. The larger the number of teeth in contact for the same pitch, the larger the bearing area produced by the elastic deformation of the materials under load.

"All calculations will be based on this actual bearing area. Instead of p being the tooth load divided by the area, it will be figured as the maximum specific pressure existing between two cylinders in contact under pressure. For this purpose we will use the Hertz equation.

"The factor v also is used without discrimination. The permissible pv which we hope to arrive at will take into consideration whether the worm has a single thread or multiple threads."

The test apparatus includes a 30-hp. Sprague dynamometer, which is coupled to the worm shaft by a Franke coupling, and a Prony brake. A platform scale is used for measuring the Prony brake load, and a revolution counter for getting the speed. Temperature measurements were made by iron-constantan standardized wire thermocouples, with a Leeds

& Northrup potentiometer. Four couples were used, at the worm, the case, the thrust bearing carried and the oil sump.

It is expected that the tests will require a period from 6 to 12 months; results will be given in papers at subsequent meetings.

Tungsten-Carbide Tools Most Remunerative on Production Jobs

"IT may now be said without fear of successful contradiction that cemented tungsten-carbide tools are here to stay and that they will fill an even more important place in our industrial life than was evident a year ago" said Dr. Samuel W. Hoyt research laboratories, General Electric Co., Schenectady, in an address on "Tungsten Carbide Tools" at the second general session, Oct. 24, of the gear association meeting.

"In many instances it has been the spectacular performances which have attracted attention," he said. "They merit all the attention they have received, but it has already become clear that the new tools find their most remunerative work on the much more prosaic 'production' jobs. It is by doing the large scale production jobs that these tools have won their place. They have demonstrated their ability to take their place 'in the line' on a truly commercial basis, and the results, measured in terms of increased production and reduced costs, and in terms of thousands of tools and hundreds of thousands of parts produced, speak more eloquently than words for the place cemented tungsten carbide has already attained."

Effects of Cobalt Content

In describing the nature of cemented tungsten carbide and its manufacture, Dr. Hoyt said, in part: "While the function of the cobalt is to cement the particles of tungsten carbide together, it is also true that the amount of cobalt used affects the hardness and strength of the mixture. Thus greatest hardness and least strength are obtained with low cobalt, or of the order of 5 per cent, while much greater strength and toughness and somewhat lower hardness are secured with higher cobalt, or of the order of 15 per cent. Cobalt contents of 20 per cent and above have been found to be too soft, or to wear too rapidly, for use as a cutting tool."

The various methods of "tipping" tungsten carbide to the steel shank of the tool were outlined. The most common method is by copper brazing.

"For this method the shank is first milled out to receive the tip, and here a fairly good fit is desirable, for the better the fit, the better and stronger the joint," said Dr. Hoyt. "The brazing is done in an electric furnace in an atmosphere of hydrogen, according to the usual technique. Later it was found that the carbide tip may be fastened on by welding the tip and shank around the contact between the two. The shank is first beveled at the margin and the space left filled in with a welding rod and the atomic hydrogen flame. This is particularly well adapted for use in a shop. Tools have also been made by uniting the tip and shank by the special cements made for uniting high speed steel tips to a steel shank.

"It has been found that tungsten carbide tips which are rigidly welded to the shank are only too apt to come off, either directly after the tool is made, or after being put in service. This is due to thermal stresses which are set up by temperature changes and differences in the coefficients of expansion of the carbide and the steel. This circumstance accounts for the popularity of copper brazing, because here the thin layer of copper affords a soft cushion which absorbs such stresses without transmitting them to the carbide tip. On the other hand, copper softens at elevated temperatures, so that it is necessary, in the design of the tool, to remove the joint far enough away from the cutting edge so that it does not get dangerously hot during operation. The 'welded' tool loses less strength at high temperatures and hence can be made smaller for a given job."

It was pointed out that at the start of the work on tungsten carbide tools, the grinding of the tools presented new and unique problems, which, however, have been solved. Silicon carbide wheels are used, coarse grinding being done on a wheel of grade 60, while for fine grinding wheels of grade 100 to 120 or even 200 are employed. The pressure on the wheel should be light and grinding should be away from the cutting edge to avoid chipping. For tools used for fine finishing work, the edge is frequently lapped with boron carbide or diamond dust. It was stated that by this means the tool can be given a very good edge and, if necessary, can be brought to size within a tenth of a mil. The lapped edge is found to have considerably longer life on such operations than the edge produced by grinding.

Cutting Angles Differ from Those of Steel Tools

In regard to the clearance angles of the tool and the shape of the cutting contour, it was pointed out that those best suited to tungsten-carbide tools differ from those which are used with high-speed steel. "With this tool design the cutting edge is given the maximum support commensurate with the cutting requirements of the material being machined, while the stresses imposed by the chip are properly taken up by and transmitted to the shank," said Dr. Hoyt. "Both Friedrich Krupp and the Carboloy Co. adhere to these general principles although they differ in some details. In all cases the specific application should be considered on account of the variation of these factors from case to case.

"In general, we may say that the top side rake of a simple turning tool for steel is made 12 to 14 deg., or 4 to 6 deg. less than is common with high-speed steel. The front and side clearance angles are made from 3 to 6 deg. If the tool is always set at center, or below, the smaller angle can be used to get the greater support. Perhaps the most unusual feature is the 0 deg. or even negative back rake which is so common. Another feature is the radius that is ground on the upper surface which curls the chip and increases the life of the tool. The body angle of the cutting edge is increased as the strength of the steel being machined increases.

"The cutting angles for cast iron are not greatly different from those used for steel, for general purposes. In this way advantage is taken of the keener cutting edge, a factor which will become more and more important as the speed of machining is increased.

"Non-ferrous metals require, again, different angles. Here it is customary to grind the tool with more of a "hook" by increasing the side rake and by adding a back rake which may be as great as 14 deg. Within the limits of this discussion, the same may be said of the non-metallics like Bakelite, hard rubber, etc."

High Cutting Efficiency May Be Utilized in Three Ways

To illustrate the significance of this new tool material when properly applied, some of the accomplishments in the field of machining metals were cited.

"The outstanding characteristic of cemented tungsten carbide is its high cutting efficiency," said Dr. Hoyt. "This cutting efficiency can be utilized in machine shop practice in three ways, to secure greater tool life with about the same speeds, feeds, etc.; to secure higher cutting speeds; or to machine materials which have been classed as non-machinable. A good example of what can be accomplished along the first line is furnished by automatic screw machine work. Here the feeds are light and the speeds high, while the time involved in setting up the various tools to get the accuracy required in this work becomes an important factor in the cost of doing the operation."

Use of the tungsten carbide tools for general turning work in the general automatic machine department of the General Electric Co., Schenectady, was cited. Automatic machines of every make and size are used to produce parts which vary greatly in material, size, shape and accuracy, and the department is being equipped entirely with Carboloy tools.

A notable achievement cited to illustrate how the tool material is able to make an otherwise non-machinable material available to industry was the machining of the

"Lo-Ex" aluminum alloy used for pistons by the Reo Motor Car Co. "This piston alloy was developed several years ago, and was known to possess valuable properties for this service, one in particular being its low coefficient of expansion," said Dr. Hoyt. "The high-silicon content rendered this alloy 'non-machinable' with the tool materials available at the time. With the advent of the cemented tungsten carbide tools it became possible to machine these pistons commercially."

Machine Tools Designed for New Tools

In discussing the effect of tungsten carbide on machine tool construction, reference was made to demonstrations of "carbide" lathes at the recent expositions held under the auspices of the American Society for Steel Treating and the National Machine Tool Builders Association. On these machines, designed especially to take advantage of the cutting efficiency of the new tool materials, cast iron was machined at a speed of 1200 ft. per min. and steel at 600 ft. per min., with a power consumption which exceeded 30 hp. This, it was pointed out, was a development since the introduction of tungsten carbide a little over a year ago. "The performance is of an entirely new order of magnitude," said Dr. Hoyt. "The speed and feed were such that the tool post runs from 40 in. per min. as compared to 20 in. or less per min. for high-speed steel. This should be sufficient answer, but it is capped by the situation that these new lathes are geared so high that high-speed steel tools will not work on them."

Improvements Adapt Gray Iron for Wider Use

IN an address on "Gray Iron—a New Material," E. J. Lowry, consulting metallurgist, Detroit, outlined at the opening session of the gear association meeting the possibilities of gray iron in its present status as a material for gears and other machine parts.

The loss of a great deal of the popularity of cast iron as a material of construction was attributed to the fact that the developments in connection with the improvements of the material had not been given sufficient publicity. "During the last ten years the consumption of malleable castings has increased 100 per cent and that of steel castings 200 per cent, whereas the consumption of gray iron has increased barely 10 per cent," said Mr. Lowry. "Improvements in the quality of cast iron have been commensurate with those in the other two materials, but whereas the malleable iron and cast steel industries have promoted the sale of their product by educational advertising, the gray iron industry has been comparatively inactive and depended wholly upon individuals and technical societies to enlighten the interested public regarding the progress made in the production of this material.

"During recent years, careful technical control together with mechanical improvements has largely eliminated the causes for the unreliability of gray iron. The patternmaker no longer uses a constant shrinkage factor, but varies the factor and thus eliminates certain strains. The foundryman has improved his melting conditions and obtains surfaces with better finish by sand control and better molding practice.

Many Types of Cast Iron

From the standpoint of the iron founder it is unfortunate that the nomenclature of the industry has not changed with the improvement of the product. In the mind of the average engineer cast iron is still cast iron. As a matter of fact, there are just as many types of cast iron as there are types of steel. Purchasers have generally bought on a price basis, and nine times out of ten they receive exactly what they pay for. Within the last few years some consumers have attempted to improve their product by specifying the analysis and the Brinell hardness when issuing purchase orders. While this improves the reliability of castings, the industry should go further and grade cast irons in the same way as steels are graded according to S. A. E. specifications.

"The need for such specifications is well illustrated by the example of semi-steel. This material is made with from 1 to 50 per cent of steel, but all mixtures are covered by the same term. The steel content might well be added to the hardness and strength figures.

"At the present time many foundries operate on a basis of strength control and produce cast irons having between 30,000 and 60,000 lb. per sq. in. tensile strength. In comparison with these results the textbook figure of 20,000 lb. maximum looks ridiculous."

Mr. Lowry referred to the special cast irons which have been developed in Germany and England, as well as to those developed in this country by the International Nickel Co. and Ross-Meehan company. One foundry which uses the process of the International Nickel Co. consistently obtained over 60,000 lb. in more than 100 heats. For tensile strengths of the order of 50,000 lb. per sq. in. it does not seem necessary to resort to the use of special processes, as these can be obtained by the addition of one or more alloying elements, such as nickel, chromium, molybdenum and vanadium. Each of these alloying elements has certain definite effects, and by combining them in suitable proportions, almost any desired results may be obtained.

Cast Iron for Gears

"In the gear industry cast iron has been losing ground, particularly in the automotive branch," said Mr. Lowry. "Engine flywheels for instance, formerly had the starter teeth cut in them directly, while now these teeth are cut in a steel ring which is shrunk onto the cast iron flywheel. The change was made mainly because of the porosity and the unreliability of the metal. Price played a big part. If the need for quality material had been impressed upon the consumer the troubles could have been avoided.

"In the machine tool industry cast iron gears have been replaced largely with bronze and steel gears. Bronze was chosen largely because of its greater resistance to impact. In some cases, however, alloy cast irons have regained this field for the iron founder.

"With an increase in tensile strength of cast irons their impact value also increases, sometimes in direct proportion and sometimes much faster. In one particular case an increase of 30 per cent in tensile strength was accompanied by an increase of 400 per cent in impact value. This combination of high tensile strength with high impact value is essential in industrial gearing because of the shocks to the gears when starting machinery."

In reference to the attempts to replace cast iron in machinery frames by welded steel sections, Mr. Lowry said that considering the finished product, the material cost is less in the case of cast iron than in that of welded materials or other than gray iron castings. With increase in strength, sections may be lightened and the safety factor be reduced in many instances.

To successfully use cast iron it must be bought on the basis of quality rather than of price; proper specifications must be applied to it, and a definite classification of cast irons must be formulated and adhered to.

Prizes for Developments in Gas Cutting

A series of prizes "for the best authenticated results when cutting iron and steel with the aid of illuminating or by-product gases, tending to lower the costs of present methods" will be awarded in 1930, 1931 and 1932 by Alexander Milburn Co., Baltimore, Md. These prizes amount to $1,000 each year, thus aggregating $3,000. Interested parties and contestants should address the Milburn company for further particulars and rules.

The preliminary announcement of the contest calls attention to the high cost of dissolved acetylene ordinarily used as a fuel gas in the cutting flame, and notes that various substitutes have been exploited for some years. "The most extensive ship scrapping program ever attempted was accomplished with apparatus using coke oven gas." Believing that such processes, which are used to a certain extent in many shops, have not yet been developed to their economic limit, the award has been offered to stimulate experimentation and development.

Non-Financial Incentives Important

Psychological and Economic Effects of Group Bonus Are Inseparable—Plan Applied to Office Workers

THE importance of good management to the success of an incentive plan was emphasized at a dinner meeting of the New York Metropolitan Section of the Taylor Society, held at the Fraternity Clubs, New York, Thursday evening, Oct. 24. While the program was devoted to a discussion of the group bonus, it was pointed out that in the application of any plan—individual or group—consideration must be given to non-financial as well as financial incentives. The two factors are inseparable, since psychological effects may nullify or accentuate economic considerations. Rate cutting, for example, may dampen the ardor of the employee, because behind his disappointment over the reduced rate is the fear that it may be cut again. Then again the employee's pride may be hurt if he finds that he is working at a lower base rate than a fellow workman on a similar job.

The human side of the problem, in other words, makes it advisable to separate the engineering from the administrative sides of developing a group incentive plan, in the opinion of Dr. C. C. Balderston, industrial research department, Wharton School of Finance and Commerce, Philadelphia. It is one thing scientifically to ascertain "par" for a given job and quite another to set the task for a given group of employees.

Administrative Functions

It is an administrative function to assign the task (to decide whether the base should be easy or difficult), to set the base rate and to select the bonus curve. These are questions of policy demanding the exercise of the best judgment at the command of the management. Whether all gains in efficiency should be given to the worker or divided between the worker and the company must be decided, and also whether the task should be expressed in money (gang piecework) or in time (group bonus). Time standards, if standard throughout an organization, offer the advantage of giving a basis of comparison for control records, said Dr. Balderston. All that is necessary is to express time in standard hours and compare them with actual hours worked, and a percentage of efficiency can be obtained for each group.

Complications Arise from Gang Piecework

Gang piecework has the surface advantage of appearing to be simple, the speaker declared, but it introduces difficulties whenever earnings are changed among members of small groups. Assume that A has a base rate of 60c. and B a base rate of 40c. and that together they earn $10 extra. A receives $6 and B receives $4. Later B is raised to the 60c. rate and the extra earnings remain at $10. This sum is now divided evenly and the attitude of A is that B's extra dollar came out of his (A's) pocket.

The group incentive appeals to those who believe in the philosophy of leadership as opposed to the philosophy of driving, declared Dr. Balderston. It emphasizes cooperative effort and teamwork in place of individual self-interest. The star worker is a hazard to others under an individual incentive plan. For example, if he makes too much money the rate may be cut. Under a group plan, on the other hand, the star is the hero of the group.

Leadership vs. Driving

The leadership theory advanced by Dr. Balderston was questioned by Dr. H. S. Person, managing director, Taylor Society, in a brief discussion of the group incentive. The group bonus is a deliberate shifting of the responsibilities of management to the employees, he declared, and may easily result in the gang boss driving the group or individual members driving out weaker members. Whether leadership or driving develops depends on management. It may be added that the kind of group bonus is no less important than the kind of individual incentive in determining whether the workers are driven or led.

Important to Have Minimum of Variables

Dr. Person declared that it is fundamental to the success of any plan that there be the most precise standardization of conditions and that there be a maximum of constants and a minimum of variables. It is not generally appreciated, he said, to what degree conditions can be controlled.

The setting of tasks frequently shows a lack of understanding of the principle that there is no use being more precise in one measurement than in measurements added to it, asserted Gorton James, of the editorial staff of *Business Week*. He said that he has a bone to pick with those who reduce a task to terms carried out to a fraction of a second and then add 40 per cent allowance for fatigue. All time settings are fallible, he believes, because human ability is too variable to be measured with the degree of precision that gets down to fractions.

The way a given plan is presented and the way it affects individuals must be coordinated with the whole problem of management, said Mr. James. It is one thing to work out a scheme. Once it is administered it becomes a labor problem.

Group Plan for Insurance Offices

The application of a group bonus plan to office workers was outlined by H. L. Rhoades, assistant to personnel officer, Metropolitan Life Insurance Co. He referred to what has been done by his company as an experiment, since heretofore incentives have rarely been considered in connection with office employees. The plan adopted now affects about 75 groups, each with its own unit of work. The number in the group varies from nine or ten to 200, with 45 to 50 regarded as the most satisfactory unit. A total of 7300 employees are now working under the arrangement and about 500 will be added before the year is out, bringing the number up to about 80 per cent of the entire office personnel.

Costs are used as the basis for the incentive. Since costs vary widely at different times of the year, a different base is used for each of 13 "months," the year having been divided into 13 equal four-week periods. In each case a four-week period is compared with the standard for that particular "month." This plan was selected because an arrangement was wanted that would make it possible to make payments throughout the year.

Both gains and losses are shared 50-50 with the company. If losses are made they must be made up before the next payment is made. Payments are allotted on the basis of salaries.

For a part of the employees the plan is now in its third year; for others it is in its second year. Results, although not yet regarded as conclusive, have been as follows:

1. The growth of the personnel has been completely halted. Previously the number of employees had increased 8½ to 9 per cent a year, just matching the growth of the company's business.

2. Total gross savings this year will be $1,750,000.

3. Overtime last year was cut to one-third of what it had been at its lowest.

4. Rate of turnover was cut 25 per cent last year. The reason lay in the fact that total personnel did not increase—turnover is always highest in new employees.

5. Employees' earnings last year increased 22 per cent. Eight per cent was due to the general leveling up of average salaries as a result of the sharp decline

in new workers, and 14 per cent was due to the bonus itself.

6. Office records have shown a very substantial improvement in accuracy.

7. Fair correlation between speed and accuracy seems to exist, although the records of the first year were not conclusive on this point and those of the second year only partially so.

8. The most beneficial effect of the plan has been in developing in the managing heads the ability to manage. They have a definite stake in planning, in forecasting work, in disciplining employees, in studying office methods and procedure. Groups, however, are not given credit for improvements of a major character, such as would result from the introduction of new machinery.

9. The entire plan is carried by five clerks, by an overhead of one-half of 1 per cent of the bonus payments.

10. There has been a very sharp reduction in controllable absence. The bonus is not paid during absences, whether excused or unexcused. The bonus is divided among those who remain at work.

11. There is greater willingness on the part of the group to take hold of peak loads. The problem of discipline has been partly shifted to the group itself.

R. G. Wagenet, director of the New York Building Congress and chairman of the Metropolitan Section of the society, announced that the next meeting, on Nov. 21, will be devoted to a discussion of the latest developments in industrial management in Russia.

Scrap Buyers Aided by Uniform Standards

Bureau of Standards Receives Commendatory Letters on Results of Simplified Practice Recommendations

ALTHOUGH the classification of iron and steel scrap, adopted in 1926 by the Division of Simplified Practice, Department of Commerce, does not yet enjoy universal acceptance, it has done a great deal toward clarifying the problems of buying and selling such material by specification, according to H. P. Dalzell of the division, who has just completed a survey showing the results and benefits.

Mr. Dalzell has prepared an article on the subject which will appear in the November issue of Commercial Standards Monthly, the news magazine of the Bureau of Standards.

At the meeting in New York last week of the Institute of Scrap Iron and Steel, attention was called to the fact that, though some of the large organizations in the country, such as the American Railway Association and the National Purchasing Agents' Association, have approved the scrap classifications, as now published in Simplified Practice Recommendation No. 58, a great many of the steel companies and other large consumers of scrap adhere to their old specifications. Steel companies, it was said, have specifications for No. 1 heavy melting steel which vary considerably. The scrap institute is working on uniform specifications for all districts and all consumers.

That the results of the adoption of the scrap classification have been beneficial to many consumers is borne out by numerous letters the Bureau of Standards has received, but Mr. Dalzell points out that greater cooperation is needed between producers, dealers and consumers. The Bureau of Standards circularized a large number of consumers, and among the replies received are many of a commendatory character.

The purchasing agent of a company producing steel castings wrote: "We have been able to place orders over the telephone for low phosphorus steel scrap by giving the number of your classification, and with very few exceptions the scrap received was the same scrap that we had in mind when we made the purchase. We were obliged, up until the time that we accepted your recommendation, to make special trips to inspect the scrap before we placed an order."

The purchasing agent of a machinery manufacturer said: "As a result of using your classification of iron and steel scrap, we have in the past three years been able to effect a very substantial saving in purchases of material for our gray iron foundry. Aside from the actual saving in money, we have been able to avoid misunderstandings with dealers by having a clear understanding as to the materials which they were to furnish."

The secretary of a foundry and machine works informed the Division of Simplified Practice that, "Under the simplified classification of iron and steel scrap accepted by us, we have eliminated grounds for controversy to a large extent, and expedited adjustment in those cases where the material did not meet specifications. It undoubtedly made it easier to purchase the grade and quality of scrap needed, with the added protection and assurance of the least possible chance of misunderstanding between buyer and seller."

Another industrial machinery company said, "We are using the classification of iron and steel scrap regularly with considerable saving, we know, because of the proper segregating of various materials."

The director of purchases of a Middle Western steel corporation wrote that his company is strongly in favor of simplified practices but could give no specific instance of dollars and cents savings. He continues, "However, we are thoroughly convinced that the scrap business is on a more business-like basis today than ever before, and we are getting a better grade of material for the same price than we formerly received There is a better understanding of the scrap classification and this, we feel, is conducive to economy. It has also helped the consumer in the way of according him protection against unscrupulous traders."

Another steel foundry and machine company said: "Referring particularly in our case to classification of iron and steel scrap, we find that there is greater care taken by the dealers in scrap to avoid misrepresentation in the grades that they are selling. We feel that the results are very satisfactory since we have had fewer rejections on account of inferior quality, both in chemical analysis and the physical structure of scrap."

An officer of one of the country's foremost motor companies wrote: "We cannot give you any report in dollars and cents, but we can say that the efforts made in the direction of simplified practice are making themselves manifest. Our interest was at first centered in that phase dealing with grading of scrap from a producer standpoint. We have found that these classifications recommended and adopted, as far as they may cover our particular grades, are recognized by consuming mills. However, the benefits we will derive from the broad use of simplified practice will be far reaching."

Chicago Interests Oppose Reopening Steel Rate Case

WASHINGTON, Oct. 29. — Independent iron and steel interests of the Chicago district have filed a petition with the Interstate Commerce Commission vigorously opposing the request of the railroads for reopening of the Official Classification territory steel rate case for rehearing as to the general level of the rates prescribed. Revenue losses claimed by the carriers in Trunk Line, New England and Central Freight Association territories, the Chicago interests said, fail to include the revenue figures for Illinois Freight Association territory "in which many of the Central Freight Association lines operate and in which territory they would receive substantial increased earnings as a result of the commission's scale 'F' rates." The scale referred to is the one set up to apply to all of Official Classification territory except New England whose scale is 10 per cent higher.

The Chicago manufacturers insisted that if the proceeding is reopened as to the general level of the scales the carriers in the entire territory shall present revenue studies for a current period throughout the entire territory. The petitioners were the Acme Steel Co., Clayton Mark & Co., Inland Steel Co., Interstate Iron & Steel, Joseph T. Ryerson & Son, Inc., and the Crane Co.

The State Corporation Commission of Virginia has filed a petition with the Interstate Commerce Commission asking that the proceeding be reopened and that that portion of Virginia on and north of the main line of the Norfolk & Western Railroad from Norfolk to Bristol be included in Official Classification territory so that this section may also be granted the rates prescribed.

Scrap Industry to Engage in Research

Institute to Create Special Fund of $50,000 to Carry on Various Constructive Activities

RESEARCH, as a means of improving conditions in the scrap iron and steel industry, widening markets and conserving the natural resources of the country, was the keynote of the meeting of the national advisory council of the Institute of Scrap Iron and Steel at the Hotel Commodore, New York, last week.

Cooperation with scrap consumers, the freight rate structure on old material, unfair competition among dealers and brokers in scrap, and the organization of a scrap export association under the Webb-Pomerene law were among the other subjects discussed.

The national advisory council decided to conduct an immediate survey involving the investment, employment and scope of the scrap industry and the production, consumption and distribution of scrap. It also decided to prepare a case to be presented to the Interstate Commerce Commission seeking a reconsideration of freight rates on scrap. A working fund of $50,000, in addition to the annual dues paid by members, will be created to carry on the various activities which the institute has planned.

The next annual meeting will be held in Chicago in March, 1930.

A frank discussion of the problems of the industry, such as has rarely taken place at a meeting of scrap dealers, characterized the two-day conference. Representative dealers from all sections of the country representing the 12 chapters of the institute were in attendance.

Unfair Competition Criticized

Unfair competition among the scrap dealers was sharply criticized by Benjamin Schwartz, director general of the institute, whose leadership of the scrap industry toward a better background, better ethics and better practices has been apparent to those who have watched the institute's activities in the past year.

"It seems that the scrap iron business has been conducted by intuition and not by facts," said Mr. Schwartz. "Intuition found the dealers long or short of the market, but it rarely found them with an assured profit, based on the facts of merchandising. Nobody was interested to plan ahead for the future of the industry. Nobody has been interested, because we, ourselves, were never interested in our future. One must search far and wide to find an industry like this one, that has operated in the dark, that has submitted in silence to circumstances which should have been corrected, and that stood by complacently while events were happening which should have been correctly interpreted.

Signs of Times Ignored

"One of the so-called trade customs that seems to have the sanction of law in this industry is the privilege or custom of one dealer cutting his own, as well as his competitor's, throat. This questionable privilege has been jealously guarded and preserved for years past, while on all sides of the industry cooperation, mergers and adjustment to modern conditions were flashing signals to the scrap iron dealers that were completely ignored. It is a rare dealer who knows the cost of his operations, or knowing it, knows how to use such knowledge. The psychology that has prevailed has been 'What can I lose?', and not 'How much profit can I make?' It is a rare dealer who has included in his vocabulary the simple word 'No,' when faced with a proposition on which he should know he cannot make a profit, were he to consider himself as a merchant of service or a manufacturer, as he properly should be. The mania for volume, without regard to the interests of competitors, has created a menace that will prove a boomerang to those who live by this rule. The problem in this industry is not price cutting but price boosting in the purchase of the materials of this business.

"The scrap iron industry must dig into the facts and must learn to face them. The knowledge of the few, which has been erroneously considered the secrets of the trade, must be made the possession of the industry. With the changes that will inevitably occur in the scrap iron industry in the next few years, this industry can benefit from the successful experience of American business by calling upon research to improve its service and create greater markets.

"This constructive program must be undertaken, if the scrap iron industry is to be recognized as an industry, and if it is to be in a position to demand certain fundamental rights, without which no business relationship can be profitable. The signs of the times all point to the elimination of business men or of an industry that does not keep pace with the progress of American business, that refuses to adjust itself to conditions, that continues to function blindly on the basis of intuition and speculation. The Institute of Scrap Iron and Steel has fortunately arrived at a time when men are beginning to realize the value of organization, when men are beginning to sense an industrial responsibility and consciousness. This program should be placed in the hands of leaders who have vision and the interests of the industry beyond their own selfish concern. The institute should be strengthened to meet its opportunities and demands for service. There can be no denying that the future of the industry is now inextricably tied up with the future of the institute and as the institute goes, so will the measure of the scrap iron industry be taken."

Export Corporation Proposed

The organization of an export corporation for scrap iron and steel was recommended by Luther Becker, chief of the iron and steel division of the Department of Commerce, at the dinner which closed the conference. According to figures submitted by Mr. Becker, 516,139 tons of scrap iron and steel were exported by the United States during 1928, approximately five times the tonnage exported in 1926. His address will be printed in a later issue.

The value of business statistics was emphasized by C. E. Wright, associate editor, THE IRON AGE, who said that the scrap industry was almost in a class by itself in that no reliable data regarding production, consumption and distribution of scrap have ever been gathered.

"While the members of the scrap industry may be the principal beneficiaries of the information to be gleaned from scrap statistics, a survey of the business should not be approached from a merely selfish point of view," Mr. Wright said. "The publication of such statistics should be of interest and value to producers and users of scrap and to the carriers of scrap, the railroads, and all of them should be willing to contribute their share of information to such a survey as the institute has planned."

He added that accurate facts of the industry are becoming more essential because of the trend of the industry away from speculative buying and toward merchandising of the product on a cost plus basis.

Buyers No Longer Misled

"Buyers are no longer misled by reports of scrap shortages," he said, "and it behooves you, as dealers and brokers, to know the obtainable facts of your industry so thoroughly that neither buyers nor sellers will be misled by rumors or propaganda set in motion to influence demand or prices."

Walter S. Doxsey, editor of the *Daily Metal Trade*, spoke of the value of research work in scrap, particu-

larly in establishing markets for alloy steel scrap through organization of the gathering and preparation of such scrap, which is a factor of growing importance to steel companies and scrap dealers alike.

Research Program Comprehensive

The research program, as outlined by E. G. Howell, Chicago, chairman of the research committee, covered five fields: 1, A survey of the industry; 2, specifications; 3, conservation, with special reference to alloys; 4, methods of operation, including cost accounting; 5, economics of the industry, including the problem of direct dealing between producers and consumers of scrap.

The trade customs committee, of which Harry Ehrlich, Springfield, Mass., is chairman, submitted a series of clauses to be included in a uniform contract, which it is planned to formulate for the scrap iron industry.

The trade relations committee, of which Charles Dreifus, Pittsburgh, is chairman, reported that it had heard evidence in five cases filed with the institute by leading consumers of scrap, involving violations of the code of business practices and had adopted measures to prevent a recurrence of these complaints.

At this meeting, a program of cooperation with consumers was outlined by Mr. Schwartz. "The Institute of Scrap Iron and Steel," he said, "has already given sufficient evidence of its sincerity of purpose and of its usefulness to the steel industry. It has furthermore demonstrated that there is no conflict between the best interests of the consumers and of the scrap iron dealers. There is a great field of cooperation between consumers and the institute which has yet to be developed, which should result in better and less costly scrap, a freer movement of this commodity, wider markets and full utilization of these by-products of American industry.

Economics of Direct Dealing

"The economics of direct dealing between consumer and producer should be carefully examined by the consumers. If the increasing practice of some consumers in securing their scrap without regard to the elements of fair competition with other consumers is countenanced by the steel industry, it will not be long before a system of undesirable competition in securing scrap will develop among the mills, a situation which they should not desire to see injected into the steel industry. The consumers will realize, if they have not already, that they cannot get service out of the scrap iron industry in times when their operations are high, if the scrap iron industry is prevented from operating. It ought to be evident that one cannot stifle and revive an industry at will.

"Cooperative discussion may not only prevent costly competition among the mills, but may also bring about a re-examination of the buying methods of some, which have created a paradox of increased costs of scrap for themselves and reduced profits to the dealers. Scrap is too important a commodity to the steel industry to allow it to be made the subject of a battle of wits.

Clarification of Specifications Needed

"Specifications of scrap and their interpretation could be discussed to the mutual advantage of consumer and dealer. In many cases, specifications still prevail that were framed many years ago and have not kept pace with the demands and conditions of American industry.

"The conservation of natural resources by the fullest utilization of all sources of scrap, especially alloys, which has assumed increasing importance, can be brought about by cooperation. Research into markets and freight rates, contemplated by the institute, with the cooperation of the consumers, would inevitably result in a freer distribution of scrap.

"The Institute of Scrap Iron and Steel is an appeal to the responsible leadership of the steel industry. It is hoped that a representative forum of leadership in the steel industry will be available in the near future for a consideration of these matters, so that there will be no necessity to seek advice and cooperation outside of the industry. This cooperation should be based on recognition of the service of the scrap iron industry and on recognition of the fact that this service is entitled to a fair return and consideration."

Two-Motor Direct Drive for Blooming Mill

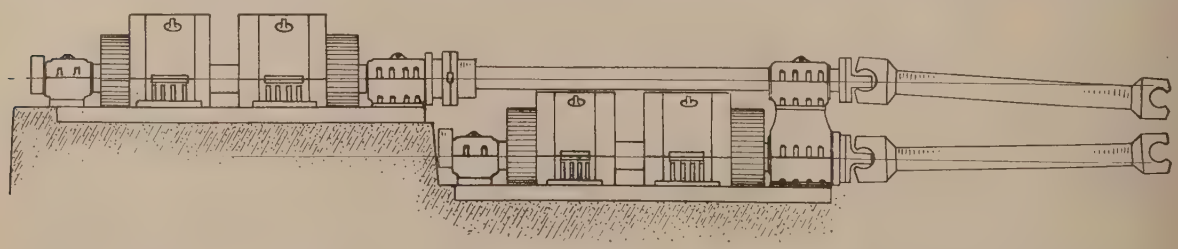
WHAT constitutes a two-motor direct drive for rolling mills, replacing the conventional drive with pinions, is indicated in the accompanying sketch. The drawing will serve to illustrate the 10,000 hp. in twin motors which the Illinois Steel Co. has arranged to install at its South Works for a 54-in. blooming mill. The equipment will include two 5000-hp. of 40 to 80 r.p.m. speed, a 9000-kw. motor generator having a 6500-hp. driving motor and a 180,000-lb. 15-ft. diameter steel-plate flywheel and the necessary control apparatus. The entire equipment will be supplied by Westinghouse Electric & Mfg. Co.

The development of this direct drive is one of the outstanding recent advances in rolling mill design. By using an individual motor for both the upper and lower rolls, the pinions and couplings required for the single motor drive are eliminated. The motors are reversing, and a means of maintaining correct speed relations is provided. Considering first cost, maintenance charges and friction losses, R. H. Wright, steel mill engineer of the Westinghouse company, considers the twin-motor drive as thoroughly logical, whether comparison is made with the single motor drive employing pinions or drives calling for higher speed motors with speed reduction units.

Metallurgical Uses of Natural Gas

The probability that the development of metallurgical uses for natural gas may stimulate the growth of chemical and metallurgical industries on the Pacific Coast is suggested by the United States Bureau of Mines. The Pacific Experiment Station of the Bureau, located at Berkeley, Cal., has recently had many requests for information concerning possible metallurgical uses for natural gas.

It seems possible that, for strictly metallurgical or chemical uses, that is, aside from the use for direct production of power, the fields of greatest theoretical interest will be the manufacture of hydrogen for ammonia syntheses, and the direct reduction of such oxides as zinc or iron. Although the direct manufacture of hydrogen from methane is possible, it seems that the most economic method for producing the pure hydrogen required for ammonia syntheses will be by the action of steam on metallic iron, the iron oxides so produced being again reduced to metal by the use of the natural gas.



Westinghouse Two-Motor Direct Drive for Blooming Mill at South Works of Illinois Steel Co.

Distribution, Research, Workers

Topics Covered by Industrial Engineers Have Expanded —Wage Incentives and Mechanization—Many Skilled Men Still Needed

TRENDS in business was the major subject for discussion at the sixteenth national convention of the Society of Industrial Engineers, held at the Hotel Statler, Cleveland, Oct. 23, 24 and 25. Trends pointed out by some of the speakers covered broadening the field of the industrial engineer to include problems of distribution, merging distribution facilities, paying greater attention to research work, adoption of better business methods forced on manufacturers by economic pressure, the tremendous development of greatly improved machine tools and the more general adoption of wage incentive plans. Mechanization of industry, it was pointed out, is not eliminating skilled mechanics, but rather is causing changes in skills and the shifting of skilled labor from some industries to others. Although some industries do not require as many skilled workers as formerly because of the increase of machinery and greater unit production, it was declared that there is a shortage of skilled labor.

Wider Conception of Field of Industrial Problems

THE broadened scope of the field of industrial engineers was stressed by Dr. W. F. Rittman, Carnegie Institute of Technology, president of the society, in a brief opening address. The society's activities, he said, were formerly limited to problems of production but now the members devote their attention to production, distribution and finance. Referring to the important problems of distribution, he mentioned the wide spread between the cost of production and the cost of the product to the ultimate consumer.

Distribution is a tangible engineer's problem and will be solved by engineers, declared Irving S. Paull, president Institute of Carpet Manufacturers of America, Inc., in a talk on trends in distribution and their effect on the future of industry. Years ago, he said, it was claimed that the cost of production could not be determined but it was determined. Now it is said that we cannot know the cost of distribution, but he believes this will be solved. He divided the making and marketing of merchandise into three functions — manufacturing, wholesaling and retailing. The manufacturer has completed his function when he has delivered his product to the wholesaler. Some manufacturers assume the function of wholesaling and others also assume the function of retailing. However, if they take over these functions they assume the expenses of wholesaling and retailing, but perhaps may be able to effect some economies.

Merging Distribution Facilities

The trend in distribution, according to the speaker, is toward merging distribution facilities as a relief from economic pressure. Pressure is being applied for precision in management. Broadest knowledge of its own industry is not enough for present-day management, he held. Management must have knowledge of other industries, because of the competition between industries.

There is a trend in the direction of vertical merging under one management, with two outstanding problems, manufacturing and distribution. Many manufacturers have no conception of the cost of wholesaling, and they do not save by assuming the duties of wholesaling.

He referred to the manufacture of goods which are inferior, because of adulteration, poor workmanship or for some other reason, to meet the pressure of competition, and said that this can be carried to a point which would result in abuse of the consumer. Establishment of minimum standards of quality, he declared, is one of the big problems of industry.

There is a tremendous waste in distribution; if that waste is taken from the cost to the consumer, the buying power of the latter would be increased in other directions. In 1900 48 per cent of production was in the essentials of living; this has been reduced to 32 per cent, in 1923. He believes that at present not over 28 per cent of production is for the bare necessities of existence. Physical requirements are now well supplied and he believes that future progress in industry will be in the matter of supplying the metal requirements.

Application of Intelligence to Management

Trends in industrial production and management were discussed by L. P. Alford, vice-president Ronald Press Co., New York. Various facts brought out by the Hoover report on recent economic changes, such as increase in production and decrease in number of wage workers, were referred to by the speaker. Never before, he said, has there been so much application of intelligence to the management of industry and to research.

He attributed one-half of the advancement in industry to the utilization of industrial management. Returns from industrial research could be placed at ten-fold. This has been devoted largely to the improvement of present production, rather than bringing out new products. No doctrine has spread so fast as that of high wages; high wages and high production go together.

Among trends in industry are mechanization, simplification, shorter hours and reduction in working forces, the surplus labor being absorbed in other fields without hardship. The automotive industry, he said, shows the greatest gain in increase in production, the increase in this industry per man-hour being 139 per cent. Industries which are decadent will disappear, he declared. Executives out of step with modern conditions will be forced out. Others will continue to progress. Outside economic pressure will keep them on their toes.

Making It Pay to Work Well

WAGE incentive was the subject of one general session. A committee to study compensation methods and incentive plans was appointed by the society a year ago; this committee's report was submitted in three papers. In addition, Adolph Langsner, Eugene Dietzgen Co., Chicago, who presided, gave a summary of a report on an independent study that he had made of compensation methods and financial incentive plans.

He found that plants making the same products often use different incentive plans. He discovered 36 different plans in operation, and declared that a classification of various plans is necessary. Incentive plans should not be a tool to make work hard, he said, but rather a tool to eliminate

waste and develop a cordial relationship with the management.

Nearly Half Are On Time Rates

Forty per cent of employees are still working on day or hour rates. He classed other methods of paying as piece rate, premium or bonus and profit sharing—including in the latter pensions and life insurance. The speaker showed in a series of charts the extent of compensation methods in various industries. Piece rate is far in the lead in the automotive industry. In the metal-working industry the day rate is somewhat ahead of piece rate and bonus system.

Human factors of wage incentives were discussed in a report by Eugene E. Brey, Wilson Western Sporting Goods Co., Chicago. He treated the subject largely from the standpoint of the psychological effect that incentive plans have on workers. Wages, he said, are only one incentive. The appeal of the plan to the worker should be wider than the mere financial reward. The relation between production and reward should be definitely established.

An incentive plan among other features should be simple and equitable; the base rate should not be below the going wage rate, the reward should be direct, sure and permanent, there should be a proper ratio between the reward and production, workers should be able to compare earnings with performance and payments for reward should be made separate from the regular wage payments.

Taking The Worker Into The Business

There is a tendency, he said, toward making workers parties to the administration of an incentive plan, and this has its advantages. As a definite trend in industry, he said that wage incentive plans are being adopted by those companies which are forging ahead.

A careful examination of various incentive plans should be made before one is adopted, said Alfred G. Trembly, Telletype Corporation, Chicago, in a report on wage incentive formulæ compared and evaluated. The manager, he said, is confused as to the system it would be best for him to adopt. The speaker's recommendation was that the manager analyze each plan in connection with conditions in his own plant. He showed on charts a proposed method of making wage plan comparisons.

Supervisory Force and Its Bonus

Incentives for office workers, supervisors and executives were discussed by John Paul Jones, Standard Oil Co. of Indiana, Whiting, Ind. He said measuring devices could be devised for executives, office help, employment managers and maintenance men. These measuring devices would include psychological principles. The same sets of principles followed in the shops would apply.

There are two plans for applying incentives to supervisors. One plan is based on departmental efficiency and the other on cost bonuses, the latter being more generally applied. He referred to a Chicago steel plant that had adopted a cost bonus system with very satisfactory results. Incentives for executives, he said, are usually based on profits and are successfully used in many plants. He believes there will be an increasing tendency to adopt incentive plans for office workers and executives.

Automatic Manufacturing

The machine age and its effect on industry was discussed by Richard H. Lansburgh, professor of industry, University of Pennsylvania, at a session presided over by C. E. Knoeppel, Cleveland. The new mechanization of industry, Professor Lansburgh said, is unlike any previous move in that direction. It has come about largely through the application of science to industrial problems.

In addition to replacing men by the development of improved machines, a large amount of unskilled labor has been displaced by conveyor equipment. Skill has been displaced by machines and scientific recording instruments. The speaker referred to the textile, pottery and cigar-making industries as among those which have reduced labor by improved machinery and handling equipment.

Machine Tools Revolutionized

Turning to the metal industry, he said that today, when a new part is to be produced, the manager's first thought is as to whether an automatic machine can be developed to do the work. Professor Lansburg reviewed some of the developments of machine tools and pointed out their effect. The machine tool industry has seen its product revolutionized, he declared, and the productivity of tools has been increased two to four times. Not only have special machines been developed, but standard tools have been greatly improved. Fully automatic machines have become commonplace.

Among the improvements which have increased production which he mentioned are increase in speeds and feeds, the hydraulic feed, which he said is now used on 70 lines of tools, and centerless grinders. He mentioned also new developments in attachments, jigs and fixtures and the possibility of further speeding up by the use of the new tungsten-carbide cutting tools.

We Still Need Skilled Men

Skilled men, he said, are not being eliminated by the substitution of machines, but skills are changing and new skills are being developed in handling machines. Numerous new sources have been opened up for metal workers and the industry is in a healthy condition, except for a dearth of high-grade mechanics. Temporary maladjustments of labor must be fixed by managements.

Another problem that confronts managers is the obsolescence of machinery due to frequent changes. Unless profits are high, good machinery used only for a short time cannot be thrown out for other tools having greater output. Executives of today, he said, must be in the forefront of machinery development, and must also be able to visualize the development of machines that have not yet been produced. He also must realize the social effect of shifting men from one industry to another.

Discussion of the machine age was led by Clifton Reeves, vice-president Mullins Mfg. Co., Salem, Ohio, who referred to the economic and other problems that have developed. The reallocation of labor, which must find new avenues of employment, he said, is a great problem.

Apprentice Training an Urgent Necessity

"Trend in Industry Demands More Skilled Mechanics" was the subject of a talk by C. J. Freund, apprentice supervisor of the Falk Corporation, Milwaukee. He could not tell whether there had been a reduction in skilled mechanics, because there has been no recent survey. He pointed out that, while a machine operator in a production shop is not a skilled workman, there are numerous other jobs in the shop requiring skilled labor, such as foremen, inspectors, repair men, time-study men, who together make the machine operator's job possible.

The speaker pointed to the danger in making a survey in two or three plants in which the mechanical processes are highly developed, and drawing conclusions therefrom. He presented a classification of workers in the plant of the A. O. Smith Co., Milwaukee, which showed that 33 per cent of the shop employees are skilled mechanics. In the shop department of the Falk corporation 26 per cent are skilled mechanics. He warned managers that they are not training enough apprentices. Every manufacturer, he said, should train its proper quota of apprentices.

Discussion of Mr. Freund's talk was led by W. E. Odom, director of the Department of Industrial Relations, National Metal Trades Association, who declared that a shortage exists in skilled mechanics. Shops of the association are now training 5000 to 6000 apprentice boys, but he said that this number must be greatly increased to overcome the shortage. Foremen are being recruited from the ranks of skilled mechanics and more supervision is needed than ever before. The solution of the problem, he said, is apprenticeship training.

Relations with Entering Employees

How applicants for work are handled in the employment department of the Frigidaire Corporation, Dayton, Ohio, was told in an interesting talk by Dr. Harry Myers, director of personnel of that corporation. His subject was "A New Concept of Personal Relations in Industry."

Bigness in mass production, he said, is squeezing out the human relationship. The first hard job in the employment department is to change the

attitude of men toward work and to teach them how to work. A large share of the applicants do not want to work; they simply want to get on the payroll. An attempt is made to change their viewpoint regarding work before they are interviewed. The company has laid down six rules, which are impressed upon job applicants:

1. Be clean and orderly.
2. Take good care of property, equipment and materials.
3. Follow instructions willingly.
4. Work well from whistle to whistle.
5. Work every day and tell your foreman when you cannot.
6. Work well with others.

Dr. Myers declared that many plant managers do not know where their employment departments are except from seeing the location on blue prints. In his opinion they could very profitably spend an occasional hour or two in the employment department, where they would get some direct information on the problems of the employment manager. Discussion was led by Glenn Forrester, personnel manager DuPont Rayon Co., Buffalo.

Age Limits and Pensions

A report prepared by the committee on research was made by Myron T. Jones, personnel consulting engineer, Cleveland, on limiting ages of industrial workers. It was brought out in the survey that the solution of the problem of age limits was made more difficult because industrial pension systems and joint insurance would put heavy loads on some companies if they applied no age limit.

A questionnaire on the subject was sent to a selected list of employees. Of the replies received, four were in favor of definite age limit for employment, one in favor of a qualified limit, 104 were against any limit and three were for a qualified no limit. Fifty-five per cent were in favor of and 45 per cent against a scientific pension system under state control. The necessity of providing for the support of aged men was stressed. They must have means of earning a living or be put on an old age pension. The committee declared that there is no one solution of the problems involved, and recommended further research of the subject.

George T. Trundle, Jr., Trundle Engineering Co., Cleveland, who led the discussion, said that there is another group to worry about besides the factory workers. That group consists of factory managers, superintendents, production men and others from 45 to 60 years of age, who have been squeezed out of their places of employment by mergers and for other reasons, and who often have great difficulty in finding new openings.

Time Study by Cinema

Application of the motion picture camera to time-study work and analysis was discussed at a meeting of the time-study engineering standardization committee by Allen D. Jennings, Cleveland, who has been engaged in development work along this line. His talk was illustrated with motion pictures taken for time-study purposes in the packing department of a Cleveland department store.

The motion picture film, Mr. Jennings pointed out, can be made a valuable instrument for measuring time and motions and to bring out the intricacies in operations which can hardly be caught with the eye. Another use which he believes will prove of great value will be for the training of employees by photography. Instead of taking a new man directly in to the machine he is to operate, he would first be made familiar with the operation by motion pictures and see the right way of doing it.

Progress of the various sub-committees on time-study standardization was reported by Thomas R. Hough, Wilson & Co., Chicago, chairman of the committee, and by heads of some of the sub-committees. These reports indicated that the committees have done a great deal of research work and that their reports are well under way. These after editing will be published in book form, for the use of time-study men and as text books in colleges.

Accounting Methods Need Revision

A revolution in accounting methods was predicted by C. Charter Harrison, Stevenson, Harrison & Jordan, Chicago, who discussed "Is the Present-Day Accountant Doomed to Extinction?" The industrial accountant of tomorrow, he said, will be entirely different from the accountant of today, due to change in industrial conditions.

The factory formerly occupied the first position in the industrial structure, he declared. But the factory now has taken second place to the sales department, due to the fact that the production capacity of industries has been increased to such an extent that it is well in excess of the demand. Discussion was led by E. S. LaRose, Bausch & Lomb Optical Co., Rochester. Trends in supervision were discussed at the same session by G. E. Schultz, consulting engineer, New York.

The sessions included a fatigue-committee dinner meeting which was presided over by George H. Shepard, Purdue University, chairman of the committee on elimination of unnecessary fatigue. Fatigue and rest periods were discussed by A. B. Segur, consulting engineer, Oak Park, Ill., who gave a practical demonstration of motion time studies. Effects of noise on industrial workers were discussed by R. F. Norris, C. F. Burgess Laboratories, Inc., Madison, Wis.

A session was held by the maintenance group, presided over by Perry A. Fellows, city engineer, Detroit. Trends in maintenance planning were discussed by H. E. Ramsey, industrial engineer, Philadelphia Rubber Works, Akron, Ohio; better planning for plant alterations by Milton F. Wagnitz, engineer of public structures, Detroit; and smoke abatement practice for maintenance men by Charles J. McCabe, chief smoke inspector, Detroit.

The New Officers

At a meeting of the board of directors John M. Carmody, editor *Factory and Industrial Management*, Chicago, was elected president. Eugene A. Rummler, Rummler & Rummler, Chicago, was named as treasurer and George C. Dent as executive secretary, both being re-elected. The four vice-presidents were re-elected. They are Albion N. Doe, consulting industrial engineer, New York, vice-president in charge of promotion; Perry A. Fellows, city engineer, Detroit, vice-president in charge of research; John Calder, Springfield, Mass., director in charge of industrial relations of the International Y.M.C.A., Eastern regional vice-president; and C. H. Gullion, industrial engineer, Swift & Co., Chicago, regional vice-president for the Middle West.

President Rittman presided over the annual dinner, held Thursday evening. The principal speaker was the new president, John M. Carmody, who discussed the merger age in industry.

Morning and evening sessions were held, leaving the afternoons for plant visitations. Among the plants visited were Nela Park plant of the General Electric Co., White Sewing Machine Corporation, Industrial Rayon Co., Cleveland Electric Illuminating Co., and Allyne-Ryan Foundry Co., Cleveland, and B. F. Goodrich Co., and Goodyear Tire & Rubber Co., Akron.

Aircraft Lull Seasonal, Says Kinner Sales Head

"The present lull in aircraft production is no indication whatever in computing business for 1930 and the future," says R. Ernest Tucker, head of the sales and service department of the Kinner Airplane & Motor Corporation, Glendale, Cal.

"Many aircraft manufacturers," he says, "have held up production because of delay in receiving their approved type certificates; also the aircraft business has grown so rapidly that many manfacturers have not had adequate time to build up their sales organizations as they should.

"Although the aircraft business will be undoubtedly somewhat seasonal, as is the automobile business, foreign trade will offset this fall and winter decrease."

Foundrymen's Transactions to Appear Monthly

A monthly publication is to be issued by the American Foundrymen's Association commencing Jan. 15, 1930. The board of directors has unanimously approved a plan to print its *Transactions* each month instead of yearly. The monthly issue will displace the quarterly *Bulletin*, the last number of which will be issued in November. The *Transactions* will include papers and discussions at annual conventions.

Tool Builders to Hold Show in 1932

Association at Annual Meeting Decides Upon Three-Year Interval Between Expositions and Upon Expansion of Activities

THE next National Machine Tool Exposition will be held in Cleveland in 1932. This decision was reached by a majority of the delegates attending the twenty-eighth annual meeting of the National Machine Tool Builders' Association at Briarcliff Lodge, Briarcliff Manor, N. Y., Oct. 21, 22 and 23. Although a considerable minority favored an exposition two years hence, the advantages of a longer interval between shows made the three-year period seem preferable.

By a unanimous vote the delegates approved the expansion of the association's activities during the coming year. Numerous group meetings were conducted during the convention and much was accomplished looking toward a betterment of trade practices. Seventy-seven companies were represented at the convention by 135 delegates.

C. A. Johnson, president, Gisholt Machine Co., Madison, Wis., was elected president of the association by the board of directors. Howard W. Dunbar, works manager, Grinding Machine Division, Norton Co., Worcester, Mass., will serve as first vice-president; Robert M. Gaylord, president, Ingersoll Milling Machine Co., Rockford, Ill., second vice-president; and Frederick V. Geier, vice-president, Cincinnati Milling Machine Co., Cincinnati, treasurer. Directors named for a three-year period by the association are C. R. Burt, vice-president and general manager, Pratt & Whitney Co., Hartford, Conn.; George E. Randles, president, Foote-Burt Co., Cleveland; and Mr. Gaylord.

C. A. JOHNSON, newly-elected president of the association, has been head since 1908 of the Gisholt Machine Co., Madison, Wis., which was founded by his father, John A. Johnson

Industrial Statistics Discussed

An outstanding contribution to the convention was an address by Virgil Jordan, economist of the McGraw-Hill Publishing Co., New York, who took for his topic "Industrial Statistics as Tools of Business Management." He pointed out that business today is undergoing a rather marked reaction in some lines from the unwise and uncontrolled expansion during the past year. Mr. Jordan said, in part:

"The stock market set the pace for this reckless discounting of the future and is paying the price first and most emphatically. Creeping bears are an improvement on wild bulls. Automobiles, building and steel are showing the effects of excessive bullishness. But the general business situation remains fundamentally normal and sound. The growth of general trade is proceeding at its usual regular and steady rate, and some of the industrial weak sisters like coal and textiles, who have been pushed aside for some years by the rather wild rush of the heavier industries, are picking up courage to show what they can do.

"The unbalanced situation is due in large part to failure to make the best use of the statistical guides to business conditions which are now available. Despite the enormous mass of statistics available today, individual industries and business men make very little use of them in determining their business policies, and what use they do make of them is frequently wrong or misleading. Our knowledge of general business movements is far from complete, but it is sufficient to provide the individual concern with a fairly good guide in planning production and sales programs. If each industry would attempt more carefully to adjust its policies to the general rate of business growth instead of trying constantly to break step and steal a march on the country as a whole, such recurrent fluctuations, readjustments and disappointments as we are now experiencing could be avoided.

"The general and quite superfluous anxiety about the business situation at the present time is a striking illustration of the immature and unrealistic attitude which still prevails among business men and the general public toward economic conditions in this country. Despite all the solemn assurances we have been given about the increased stability and scientific control of American business, the fact is that American business psychology is still in the grip of a chronic boom and depression complex—a hangover from the glorious and terrible experiences of an economic childhood which it has not yet outgrown.

Business Does Not Seek Stability

"The fact is that we haven't had any greater stability in most important lines of industry since the war, because American business is not interested in stability. It is not satisfied with the steady and regular growth which general trade should normally have in a highly developed country like this. It is interested only in spectacular record-breaking performances. Unless things keep on going up forever at a dizzy pace year after year it feels that the country is going to the dogs. It forgets that every excessive expansion in any line beyond the normal expansion of the market has to be paid for by a corresponding falling off in some other field and finally in the record breaker's own line as well. There is no realization that sustained general prosperity depends upon control coordination and balance in our business activity as a whole."

In the gathering of industrial statistical information, said Mr. Jordan, trade organizations must be chiefly relied upon. They can secure, tabulate and disseminate the data more quickly than governmental agencies. The main reason why the individual company should contribute its share of information in regard to orders, shipments and cancellations is that it will not know what others in its own line of manufacture are doing without the collective data which cannot be gotten unless it participates in the effort.

Apprenticeship Training Urged

Henry Buker, vice-president, Brown & Sharpe Mfg. Co., Providence, R. I., in his address as president of the association, stressed the value of ap-

H. W. DUNBAR, works manager, Grinding Machine Division, Norton Co., Worcester, Mass., is the new first vice-president.

prenticeship training to the individual shop as well as to the industry in general. He said that it is especially desirable to have good apprenticeship courses in shops located in communities where there are few or no other shops offering such training. He suggested that a rigid schedule be laid out and followed carefully. The very rigidness of such a course would be much in its favor, for it would take a young man at the age when he is susceptible to influence and train him along definite lines.

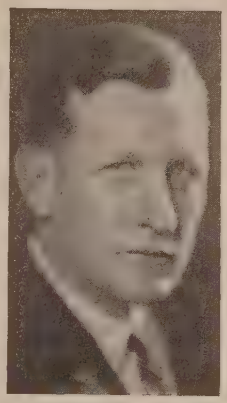
"You need as your assistant foremen and foremen," stated Mr. Buker, "men who have received a thorough training and whose habits and experiences have been such as to make them understand sympathetically the thoughts and habits of the men under them. An apprenticeship course, properly handled, is the very best school from which to draw future factory executives. Any concern, no matter how small, which does not have such a course is neglecting a real opportunity.

"I believe that the general manager of a business should either interview each apprentice at least two or three times during his apprenticeship training, or should delegate a committee of three, composed possibly of the factory manager, sales manager and chief engineer, to talk with the boys occasionally and find out, as far as possible, the boys' leanings and aspirations.

Apprentices Should Not Be Misjudged

"There have been many apprentice boys who have been failures in the shop, but who have proved to be exceptional designers or salesmen. The shop foreman is often inclined to judge a boy solely by his ability to produce work accurately and cheaply. Some of our most brilliant men are naturally clumsy with their hands, and we have all known good executives who could tell others what should be done and how to do it, but could not do the work themselves if called upon to do so. Frequently, the boy with initiative and a brilliant, inquiring mind causes more or less annoyance to his foreman, whereas the quiet, patient artisan type, who asks no questions and does his work methodically and well, wins very high praise, although he does not have the least trace of executive ability.

"Many concerns have remarkable executive material among their apprentices about which they never know, because the management does not actually seek for signs of such ability among the boys, but rather



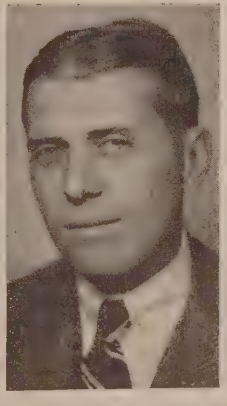
R. M. GAYLORD, president, Ingersoll Milling Machine Co., Rockford, Ill., will serve as second vice-president and a director.

leaves it to the men down the line to bring such ability to their attention. How can you expect an assistant foreman, who has always thought in terms of his own work, to point out to you a potential Ralph Flanders, a Clayton Burt or an Ambrose Swasey?

"Today many of our factories are coming gradually into the hands of the second generation, and unless they find an apprenticeship system already installed in their shop, some of them are likely, because of their own training or lack of it, to feel that such a course is not necessary. I am a very great believer in an apprenticeship training for every boy who expects to take a responsible position in the factory end of a machine tool busi-

H. BUKER, vice-president, Brown & Sharpe Mfg. Co., Providence, R. I., is the retiring president.

A. H. TUECHTER, president, Cincinnati-Bickford Tool Co., retiring as treasurer.



F. V. GEIER, vice-president, Cincinnati Milling Machine Co., is the new treasurer.

G. E. RANDLES, president, Foote-Burt Co., Cleveland, elected a director.

C. R. BURT, vice-president and general manager, Pratt & Whitney Co., Hartford, Conn., elected a director.

ness. Many have succeeded without such training, but you will find that in nearly all cases, they have had practical men associated with them."

Companies Hold To Published Prices

In discussing certain trade practices, Mr. Buker declared that "there is no reason why any manufacturer should offer any more for a used machine than it is actually worth to him, either in his own factory or for resale purposes. It speaks very highly of the progress we have made in recent years that today there are very few machine tool concerns in the country which would not feel cheapened in their own minds as well as in the minds of their competitors if they were deliberately to cut the published price of their machines in competition. When the industry as a whole can be brought to the same feeling in regard to cutting prices by the subterfuge of taking in used machinery at a loss, we shall have no further trouble because of this practice."

In his report as general manager of the association, E. F. DuBrul said that when the calendar year 1929 is completed, the order volume of this year will doubtless exceed the orders for 1920 and probably those for 1919. "We have only 400 more points to go to equal the 1919 figure; we have three months to do it in and our last quarter's orders ran better than 200 points per month. So in business booked, this year will most likely be the best in the 11 years covered by our index. The net earnings of the industry for the last 18 months should show up decidedly better than for any similar period since the war. Perhaps they may show better than for any similar period before."

Mr. DuBrul emphasized that although some recession is going on in business generally, it is not likely to reach the low point made in 1927. The interest displayed by visitors at the recent Cleveland Show indicates much "ability-to-pay and will-to-buy," which should be turned into sales during a number of months to come. He stressed the fact that some falling off in orders should give the industry a chance to relieve production pressure.

Many Groups Reporting Data

The association, said Mr. DuBrul, is now getting monthly sales figures from the following groups: engine lathes, shapers, planer type milling machines, die heads, surface grinders, tool and cutter grinders, turret lathes and planers. He urged the groups to push forward with standardization of their tool-holding and work-holding elements and pointed to the accomplishment of the milling machine group in standardizing spindle ends. He said that the turret lathe and automatic lathe groups also are close to an agreement on standardization.

Mr. DuBrul also touched upon the association's cost work, the value of its monthly index of orders as a business barometer and the higher standing of the industry in the eyes of its customers, the latter development being partially due to the two successful expositions held by the association. Mr. DuBrul said that users who saw the show at Cleveland this year were deeply impressed with it as a striking demonstration of the power of the association as an organized group. "We made them 'machine tool conscious,' as the advertising men express it."

Speaking on "Business Needs To Analyze Distribution Costs," W. B. Castenholz, Castenholz & Dittmar, certified public accountants, Chicago, declared that neither cost accountant nor general accountant has until recently given much thought to consolidation of expenditures for distribution of manufactured products. "Until such consolidation occurs, we will be unable to set much needed standards of performance and outlay in distribution activities. My plea is for the application of cost accounting principles to the manufacture of business as well as to the manufacture of goods. The monthly profit and loss statement of a manufacturer who has an adequate cost system will reflect a fairly true margin between sales and cost of sales, because only sales actually shipped each month are costed, but surely net profit or loss on present monthly profit and loss statements is entirely inaccurate, because distribution costs thereon bear positively no relation to specific shipments made."

Uniform Sales Contract Discussed

W. W. Tangeman, sales manager, Cincinnati Milling Machine Co., Cincinnati, submitted to the convention the preliminary report of the committee on uniform sales contract of which he is chairman. After pointing out some of the objections to a uniform sales contract, the committee agreed that "if member companies who sell direct and the representatives of those who sell through agents could agree to use a standard form with standard protective clauses for making all proposals, they could protect themselves against the few unscrupulous buyers as effectively as by contract, inasmuch as a proposal made in combination with a purchase order placed against it really is a contract and is so interpreted."

The committee recommended that the printed proposal form which should accompany all quotations should cover such matters as delivery, terms of payment, shipment, estimated time of shipment, production estimates and cancellations, with amplifications where needed to cover the situation properly. The committee further stated that the form should be free from technical language, if possible, the meaning of the conditions should be clear and the conditions should not appear too formidable, but at the same time should give the protection required.

Exposition Committee Reports

J. Wallace Carrel, vice-president and general manager, Lodge & Shipley Machine Tool Co., Cincinnati, made the report of the committee in charge of the Cleveland exposition. Colonel L. S. Horner, president, Niles-Bement-Pond Co., New York, described the work that the committee in charge of the United States Census of Manufactures proposes to do. The financial condition of the association was set forth by August H. Tuechter, president, Cincinnati Bickford Tool Co., retiring treasurer.

Resolutions were adopted by the association paying tribute to the following members who died during the past year: Worcester R. Warner, founder of the Warner & Swasey Co., Cleveland; Henry W. Wendt, president, Buffalo Forge Co., Buffalo; and Joseph E. Hubinger, president, Eastern Machine Screw Corporation, New Haven, Conn. At the opening session the convention unanimously passed a resolution to send a cablegram of felicitations to Oscar Harmer, formerly of Alfred Herbert, Ltd., London, England, on his eightieth birthday.

General sessions, at which Mr. Buker presided, were held on the afternoon and evening of Oct. 21, and the morning and afternoon of Oct. 22. The members were especially gratified by the announcement at the last session that the board of directors had recognized the services of Mrs. F. F. Selbert by appointing her secretary of the association.

Republic Acquires Union Drawn Steel Co.

Formal Announcement of Purchase Made by E. T. McCleary, President of Youngstown Company

PRESIDENT E. T. McCLEARY of the Republic Iron & Steel Co. Monday announced that terms have been arranged for acquisition of the Union Drawn Steel Co., Beaver Falls, Pa., the largest interest of its kind in the country. The purchase is subject to an appraisal and audit, to be conducted at once by the Republic company. The latter assumes immediate charge of the properties.

The Union Drawn Steel Co. has a net worth of $14,000,000. Its capital structure consists entirely of common stock, and it has no outstanding bonds. The company operates plants at Beaver Falls, Pa., Massillon, Ohio, Hartford, Conn., Gary, Ind., and Hamilton, Ont. It manufactures cold-drawn stock, and consumes annually about 250,000 tons of steel products. It is the largest buyer of merchant steel bars in the country.

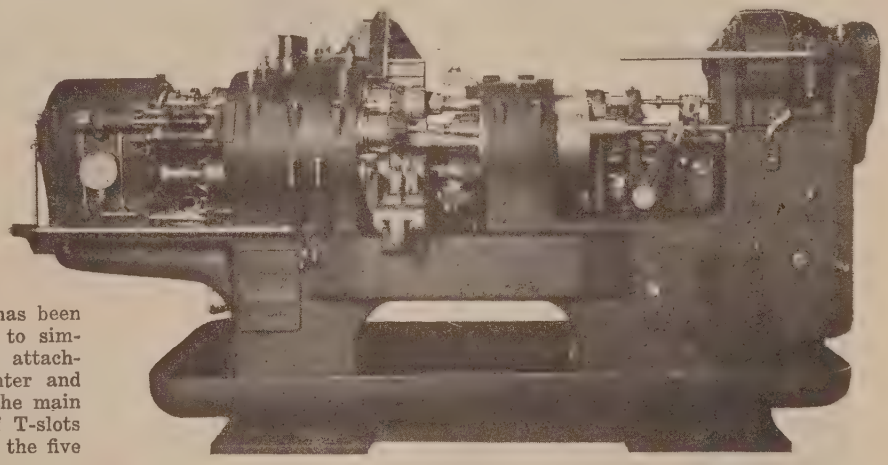
It is the plan of Republic to continue Union Drawn as a subsidiary company, under the present management, headed by E. S. Hoopes, president.

Large Hydraulic Chucking Machine

Five-Spindle Self-Contained Automatic Features Convenience of Operation and Tooling

A SEVEN-INCH model M five-spindle hydraulic chucking machine for first and second operation work has been added to the line of the Cleveland Automatic Machine Co., Cleveland. The machine is entirely self-contained, and is provided with a hydraulic chucking mechanism that is simple and positive. Accessibility, permitting the work of tooling to be performed from the front of the machine, is also a feature.

Of barrel type, the tool turret follows the conventional design of the company's model A and M machines. It moves back and forth in wide bearings on the tool turret housing, and is kept in alinement by a large key in the housing. Double clamping bushings, one on each side of the turret holes, assure positive grip on the tools. An extra attachment has been provided for the tool turret to simplify tool combinations; this attachment is mounted in the center and extends beyond the face of the main tool turret, with a series of T-slots that extend lengthwise along the five sides.



THE Hydraulic Chucking Mechanism Is Adjustable for Heavy and Light Gripping, to Suit the Nature of the Work. All tooling may be done from the front of the machine

Tooling sequence provides for standard tools in the No. 1 and 2 positions that advance with the turret at the same feed. In the No. 3 and 4 positions, upper and rear top, the tools are clamped in independent revolving spindles, moving longitudinally in the tool turret but individually controlled by levers actuated from a drum and cams mounted on the upper camshaft. The loading station, at the upper front or fifth position, is also independently controlled but does not revolve. Spindles No. 3, 4 and 5 can be cammed to complete their operation ahead of, or at the same time, as the other cutting tools. Threading, tapping or extra revolving spindles can be arranged.

Hydraulic Chucking Unit

The hydraulic unit consists of a high-pressure variable-delivery pump, a low-pressure gear pump, a stroke control lever, a pressure changing mechanism and a built-in control valve. These parts are mounted as a unit in the oil reservoir located at the right-hand rear of the machine. The drive is by silent chain from the feed bracket.

The high-pressure pump is of five-piston type; when the maximum pressure is reached delivery of oil is reduced automatically. The low-pressure pump provides the back pressure on the high-pressure pump, and also serves to operate the stroke control lever, which regulates the delivery of the pump from 20 to 550 cu. in. per min. The pressure regulator, which can be adjusted while the machine is in operation, permits varying the pressure from 0 to 1000 lb. per sq. in. A control valve built into the body of the unit serves to control the action of the pump.

A single automatic valve, located at the rear of the spindle turret and between the work spindles, is connected directly to individual oil cylinders, one on each spindle, and controls the opening and the closing of the chucks. This five-way valve is designed so that pressure is maintained on four cylinders while the fifth cylinder is operated for opening and closing the chuck. Either hand or automatic operation of the oil cylinders is provided for.

Work spindles are made of alloy-steel forgings and are mounted in Timken roller bearings, two at each end. The spindles are driven by hardened alloy-steel gears from the main driveshaft, which passes through the center of the tool and spindle turrets to the main drive bracket at the right-hand end of the machine and is covered by a steel sleeve. The indexing cam is located on the lower camshaft.

The stop spindle mechanism is entirely automatic and is controlled from an independent oil cylinder mounted between the spindle turret and the hydraulic unit. It is operated by an independent oil line connected to the low-pressure pump, engaging and disengaging the spindle drive clutch, and at the same time applying the spindle brake mechanism to stop the spindle rotation. Spindle change gears provide for 20 speeds, ranging from 61 to 756 r.p.m. The gears are mounted on the end of the driveshafts and may be changed conveniently.

Bed and Housings Cast Integral

The main bed casting, with spindle and tool turret housings are cast integral to assure rigidity and maintain permanent alinement between the work spindles and turret tools. The pan and oil reservoir are also in one piece, and ample space is provided for chips.

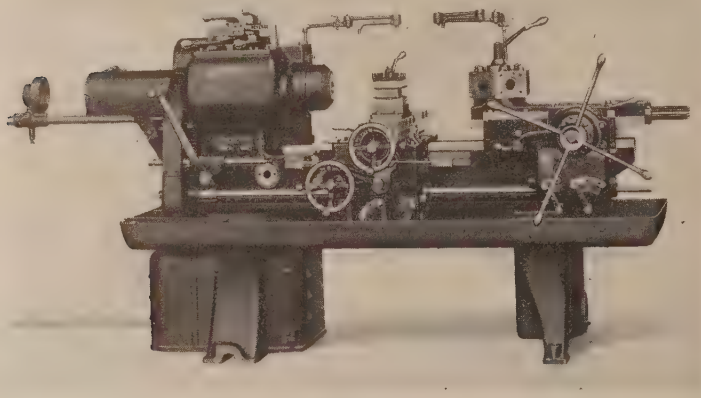
There are two camshafts; the upper camshaft carries the wormwheel and drum for accelerated spindles, tool turret and cross-slide drums, while the lower camshaft carries the indexing and wedge operating cams, spindle brake and chucking control cams. The wormwheel, mounted on the extreme end of the upper shaft, has T-slots in its outer face, and carries the adjustable feed trip pins for shifting from slow, or working feed, to the high or indexing movement.

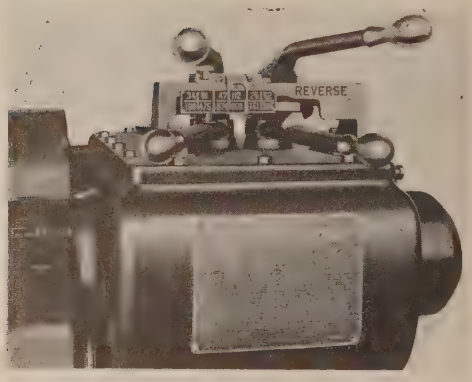
Three forming slides are provided. The two lower slides, front and rear, operate independently of each other. They are controlled by cams on the periphery of the operating drums, and are accelerated by bell cranks connected directly to the slides. A double top-slide, mounted on the spindle turret cap, provides two forming stations in the third and fourth positions. Movement of this slide is from a cam box. Tool feed is independent of the high-speed indexing movement, and is controlled by trip pins carried in T-slots in the face of the worm wheel that can be adjusted to suit the length of cut. The pins engage a pawl on the trip liver, shifting the clutch from high to low, or vice versa.

General Electric Co. sales billed during the first nine months of 1929, announced by Gerard Swope, president, amounted to $301,812,808, compared with $242,676,762 for the corresponding period last year, an increase of 24 per cent. Profit available for dividends on common stock for the first nine months of 1929 was $47,965,831, compared with $36,910,649 for the corresponding nine months last year.

Adds New No. 5 Universal to Turret Lathe Line

A NEW No. 5 universal with a 12-speed all-geared head has been added to the line of ram-type turret lathes manufactured by the Warner & Swasey Co., Cleveland. The machine has bar capacity of 2 in. round stock, and 13 in. effective turning movement of the turret slide for any one setting of the saddle along the bed. The maximum swing over the bed is 19 in. and over the cross-slide, 9¼ in.





THE New Hexagon Turret Unit Incorporates Features That Prolong Its Accurate Life. Head and bed are cast in one piece, and head walls are of box construction, eliminating the split at center line of spindle bearings. Direct-reading speed indicator may be seen in close-up view at left

The head and bed are cast in one piece, this casting being of nickel semi-steel. The head walls are of box construction eliminating the split at the center line of the spindle bearings, which are set in solid metal. In general design the head follows closely that of the company's heavier "A" type machines. The 12 spindle speeds range from 26 to 658 r.p.m., and are obtained through hardened alloy-steel gears sliding on hardened multiple-splined shafts. A patented speed indicator, shown in the close-up illustration, instantly shows the spindle speeds for the various position of the levers. The working spindle and head gear shafts are mounted on Timken roller bearings, and the entire head mechanism runs in a bath of oil.

Forward and reverse multiple-disk clutches are mounted on a high-speed driving shaft. The single pulley on this shaft is conveniently positioned for motor driving, either by a motor placed in a pedestal leg at the head end of the bed, or fastened to vertical plate at the rear of the headstock.

The universal cross-slide carriage has six power longitudinal and cross feeds. All feeds are contained in the apron and can be reversed. There are four cutter positions on the square turret and one on the rear tool post. The square turret can be quickly indexed and clamped by a quarter turn of the lever. Six independent adjustable stops carried on a stop roll are employed to throw out the longitudinal feed.

Lubrication of the cross slide unit has been concentrated at three points and made convenient for the operator. Two large reservoirs, one at each side of the apron, hold sufficient oil to supply all the apron bearings. At the third point a plunger pump, located at the front of the cross-slide, forces oil to the cross-feed screw, nut, and bearings, as well as to the dovetail slide and those portions of the bed ways under the cross carriage.

A new type of hexagon turret unit incorporates several features which tend to prolong its accurate life and add to its rigidity. First, the slide moves on hardened steel ways attached to the saddle; these hardened steel ways relieve the tendency of the saddle to "wear forward." Secondly, the top caps have been made heavy and are fitted with horizontal taper gibs to secure better adjustment for wear at the top surface of the slide. Taper gibs placed at the sides of the slide also permit reestablishing the original alinement as wear occurs on the sides of the slide.

Six power feed changes are contained in an apron mounted at the front of the saddle and are independent of those in the cross-slide apron. Independent adjustable stops for each turret face may be set to throw out the feed at any point.

For bar work, the machine is furnished with an improved automatic chuck and bar feed. The operating lever actuates a pivoted yoke equipped with rollers which fit into the circular groove of the stepped wedge, the fingers being also equipped with rollers. This construction is intended to reduce substantially the effort required to operate the chuck. Oil pan and pump are standard equipment. The oil pan has been made wide at the front to better protect the operator from cutting compound and chips. The oil pot is built into the foot end leg, the opening being in such a position that chips do not fall directly into the strainer. A taper attachment that can be fitted to the rear of the cross-slide carriage will cut tapers up to 3 in. per ft. in lengths of 8 in. The chasing attachment for the cross carriage, also furnished special, can be used to cut from 4 to 32 threads per in. The leader is clamped on the carriage feed rod and the follower nut is bolted to the chasing lever.

Efficiency of Machinists' Vises

Operating efficiencies of machinists' vises are discussed in research paper 91 of the United States Bureau of Standards. An investigation was undertaken to determine the relationship between the size of a vise and its efficient working in typical shop operations on material held in it. Sawing, bending and riveting of steel specimens were carried out under carefully standardized conditions. Twelve vises of the stationary-bottom type were used, having jaw lengths from 2 in. (9-lb. vise) to 9 in. (282-lb. vise).

Static tests, such as sawing, in which the movement of the tool is large compared with the movement of the vise, showed no appreciable difference in the efficiency with which the work was performed. Dynamic tests, on the other hand, including riveting and some of the bending on large specimens, showed that the weight or inertia of the vise has an appreciable effect on the efficiency of work done in it. This efficiency seemed to reach a maximum with 5½-in., 102-lb. vise, which operated better than any of the lighter vises. From this size upward, however, there was little, if any, gain in efficiency.

By-Products Recoveries, Inc., New York, manufacturer of dust collectors, has opened a Chicago office at 608 South Dearborn Street. Frank Trott is in charge.

This Issue in Brief

Cuts production cost by simple, inexpensive material control system, adapted especially to needs of small plant. The "heart" of the system is a "supply and demand" sheet, which is essentially a perpetual inventory record showing material ordered, invoiced, stocked and sold.—Page 1153.

* * *

"Spoiled goods" report to management reduces scrap. Inspectors must make out a report, giving name of the department responsible and reason for scrapping.—Page 1155.

* * *

Continuous heat-treating process solves problem of making stainless tubing with uniform physical properties. Soft strips are formed on a drawbench, on which is fitted an electric tube furnace. The tubing passes through the furnace, where it is soaked for at least 2 min. before emerging into the air. It is then drawn through a water-cooled die.—Page 1159.

* * *

Hollow ingots are used for making seamless steel tubes. Ingots are cast with a collapsible core. They are then elongated in a special rolling mill.—Page 1160.

* * *

Fire hazard reduced by equipping dipping vat with hinged cover held open by a rope. In case of fire, the rope will burn through and let the cover drop on the tank.—Page 1163.

* * *

Low maintenance cost is obtained by laying out repair shop with the same forethought used in planning production departments. Electrical repair shop in big plant is designed to eliminate lost motion.—Page 1161.

* * *

C. M. Schwab says fundamentally sound condition is largely responsible for uniform prosperity.—Page 1166.

Chromium-plating failure "mysteries" are usually due to lack of experience. Each chromium-plating job presents its own problem. The expert can usually predict where trouble will occur.—Page 1164.

* * *

For high fatigue resistance, homogeneity of the metal should be striven for, as fatigue failure can not occur, it is believed, unless the stress on the entire piece is sufficient to start the fracture at some point where stresses are concentrated by a flaw.—Page 1169.

* * *

If the tungsten-carbide tip comes off the shank, too rigid welding is to blame. The carbide and the steel have different rates of heat expansion. Copper brazing affords a soft cushion to absorb the stresses.—Page 1173.

* * *

Rate cutting may prove expensive. Bad psychological effects may nullify the money saving, for the ardor of the worker may be dampened, and the fear engendered that the rate may be cut again.—Page 1175.

* * *

Group bonus has real dangers. "It represents a deliberate shifting of the responsibilities of management to the employees," says Taylor Society head. It may easily result in the gang boss driving the group or individual members driving out weaker members.—Page 1175.

* * *

Wage incentive plan investigation reveals little uniformity. Thirty-six different plans are in operation. Many plants in the same industry use different plans. 40 per cent of employees are still working on time rates.—Page 1180.

Where scrap comes from, where it goes and how it gets there will be known when $50,000 survey is completed. Scrap Institute will unearth working facts concerning the growing scrap industry. —Page 1177.

* * *

"If you take business that belongs to somebody else, somebody else is going to take business that belongs to you," says James A. Farrell. Good business at a fair profit will be maintained if sellers curb their cupidity.—Page 1167.

* * *

Faulty design or surface corrosion is responsible for fatigue failure in three-quarters of the cases, says authority. Failures due to poor materials are in the minority.—Page 1170.

* * *

In grinding tungsten carbide, pressure on the wheel should be light, and grinding should be away from the cutting edge, to avoid chipping.—Page 1173.

* * *

"Fussiness" in attempting to value inventory down to the last penny is both foolish and wasteful. Why bother to determine within a few cents the worth of a lot of material costing only a few dollars, when it is a matter of judgment whether a machine costing $1000 shall be depreciated $50, $100 or $150?—Page 1156.

* * *

Export business shrinks. September machinery exports, valued at close to 47 million dollars, were more than 6 per cent under August, but 40 per cent over September, 1928. Total iron and steel tonnage shipped out of country in September was 9 per cent under August, but the loss was all in scrap. Rolled and finished steel gained.—Page 1215.

A. I. FINDLEY
Editor

THE IRON AGE

W. W. MACON
Managing Editor

ESTABLISHED 1855

The Long Late Reckoning

THREE crashes in stock market prices in five days, each marked by an outpouring of securities on a scale almost beyond belief, make the reckoning for the bull movement of 1929 fairly staggering. Repeatedly in the past year it has been pointed out that the bidding up of stock prices to a basis of 1 or 2 per cent yield and the paying of 8 per cent on debit balances were conditions that could not continue for long. Yet so many counsels of experience had been cast aside, with apparent success, by the new-era prophets and so many predictions of disaster had been belied as new heights were reached, that the belief in an indefinite continuance of the bull market seemed to grow by the very illusion on which it fed.

In the confusion and semi-panic of a week so unparalleled in Wall Street history, no adequate appraisal is possible of the precipitating causes and of the extent to which business will suffer in the months ahead. Faith in a new era, in which business had been freed from major fluctuations and the fruits of increasing efficiency would pile up in dividends, was undisturbed so long as industry continued at a peak rate and corporate earnings showed an uninterrupted rise. But when the foundations of this faith began to be shaken—in part by evidence of overproduction in the automobile industry, one that touches the lives of more people than any other—the boundless enthusiasm that supported the securities boom gave way to an equally exaggerated spirit of pessimism and of distrust of stock values.

Mob psychology, as the *Guaranty Survey* points out, was accentuated by the fact that securities were in the hands of many thousands of inexperienced speculators, who were impelled into buying and selling en masse without a clear understanding of the reasons for doing so.

If advances in securities prices overdiscounted the excellent operations of industry in the first eight months of the year, it is equally true that the wholesale dumping of stocks is out of keeping with the moderate slackening of business now evident. While there is no gainsaying that the motor car industry, and possibly a few smaller activities, such as radio manufacture and airplane building, overreached themselves and are in a corrective period, business as a whole has continued at a highly satisfactory level. Moreover, cash reserves of corporations are large, the Federal Reserve ratio is double the legal minimum and unemployment is negligible.

The most unfortunate side of such a Wall Street disaster is that liquidation in stocks tends to slow up business. Much of the purchasing of consumer goods that was based on real or computed profits in securities will stop, and in many cases those who bought commodities in view of paper profits now find themselves in debt. The buoyancy of the securities market over many months has heightened the optimistic spirit that has been so outstanding in industry. It would not be surprising if under the same influence, and the prevalent confidence in the stability of commodity prices, there should have been some relaxing of the long-maintained limitation of inventories. The rate of new buying by industry in the immediate future will be closely watched for the light it will throw on this important point.

New Eyes and New Ways

NOT long ago two wide-awake members of a manufacturing firm went through a large establishment devoted to making wire. Both were surprised to find that one of the supplementary processes was done by hand and required the labor of six men. Being of an inventive bent, the two visitors at once set to work to develop a machine for doing what the six laborers had been seen to do. Resulting from this, the operation is now performed much more rapidly than before, at a mere fraction of the outlay for labor, and in the last analysis with probably little higher overhead, because the capital cost of the machine is largely offset by the release of floor space for other work.

The case is one that has been paralleled many times in American industry. All too frequently men are so occupied with thoughts of routine or so little accustomed to observing carefully and practically that golden opportunities are missed, in part, through lack of concentration or failure to challenge the existing order.

However much the man in the plant may resent the implication that some one not deeply steeped in his own lore can help him in his work, the fact remains that the independent viewpoint has been often responsible for improved practice. This does not depreciate in any way the intensive study of their problems which all managers of plants constantly make; it does very definitely suggest the value of outside thinking. Many important economies have come through the application to an industry of methods originally developed in another, and perhaps on their face not relevant to the processes of industry number one.

THROUGH the efforts of the Institute of Iron and Steel Scrap, the better element of the scrap industry, at least, appears determined to bring about better trading conditions and better practices in the marketing of this commodity, which in various ways has troubled the steel industry for many years. The

scrap institute has been functioning a little more than a year, and too much must not be expected in so short a time. Human nature can not be changed over night, nor can practices which have grown up during a generation be wiped out by any magic formula. It is a wholesome sign that the scrap industry thinks well enough of its program of self-improvement to appropriate $50,000 in addition to annual dues to undertake a rather ambitious program of research. This will take in a complete survey of the production, consumption and distribution of scrap. Some steel companies have already shown a disposition to forward the work of the institute. They have long wanted to see the buying and selling of scrap made more amenable to the standards that for the most part obtain in the market for the finished products of the steel mill.

Coal Trade Ills Not Cured

FIVE years have brought very little of the expected readjustment in the bituminous coal trade. A survey is appropriate, as reports have just been issued for 1928 on proportionate production of different sized mines and on production by districts. The convenient comparison is with 1923, the year after the great strike. The United States Coal Commission made an exhaustive report on conditions and what might be done to right the coal trade, but nothing was done by Congress and the information now available for 1928 shows that adjustment by economic laws has not gone far.

The two principal complaints were that we had "too many coal mines and too many miners" and that the United Mine Workers held the union fields up to altogether too high wages to permit competition with the non-union fields. There was a connection between the two complaints, as the excess of miners arose partly from the fact that the non-union fields had trained many men while in the union fields there was much idleness of union men who, accordingly, demanded high rates per ton to give them an annual income when they were idle about one-third of the time.

Some adjustment in the supply of miners has taken place, many union men having sought other employment. The Pittsburgh district has had a near-scarcity of miners in the last few months, although in the summer of 1927 it had the union miners idle and many new open-shop men working.

The expectation of some was that the overworking of coal properties would be corrected in time; that the large mines would thrive through economy while the small mines would die out. The report just issued, however, shows that there has been no more than a small readjustment of that sort. The percentage of the total output coming from mines producing over 100,000 tons a year has been as follows: 1913, 75.4 per cent; 1923, 70.4 per cent; 1926, 79.1 per cent; 1928, 80.1 per cent. That represents progress, but not a great deal, for five years, particularly when one considers that production decreased 11.1 per cent from 1923 to 1928, which in itself would make some small mines inactive. Mines producing 50,000 to 100,000 tons annually, really very small mines, decreased merely from 1176 in 1923 to 725 in 1928.

As to wage conditions, one finds that in general the districts complaining about high wages have lost farther in proportionate production while the districts complained about have gained. The statement is not true in all particulars, but the general swing has been that way. Below are given sets of losses and gains respectively, for districts which produced almost exactly three-fourths of the total bituminous coal in both 1923 and 1928. The total decreased 11.1 per cent and allowance for that general change is made in computing the percentages.

Pittsburgh	—27	Belleville, Illinois	—31
Westmoreland-Ligonier	—15	Southern Illinois	—13
Freeport	—31		—
Central Pennsylvania	—18	Connellsville	+ 3
Pan Handle - Pittsburgh No. 8	—31	Fairmont, W. Va.	+18
Pomeroy	—25	Pocahontas, W. Va.	+29
Indiana	—29	Other West Virginia	+57
Central Illinois	—31	Western Kentucky	+68
		Other Kentucky	+59

The United Mine Workers was largely but not wholly eliminated. It appears that there are industrial and economic conditions in the districts where it formerly thrived that keep coal mining wages far above those in the fields long non-union. In some of the formerly union fields the operators feel that they would be greatly aided by a readjustment of freight rates to a mileage basis. Long ago the railroads gave the so-called "Southern fields" low rates, on a mileage basis, in order to develop them.

Steel Demand and Automobiles

WHILE the steel industry is looking for a large total demand for its product next year, it is not entertaining any very definite expectations of the automobile industry in particular. For instance, Mr. Farrell remarked at the Institute meeting that there was probably not a fabricating shop in the country that was not booked four or five months ahead. The official statistics had already suggested such a condition; for the shops were comfortably booked at the beginning of last year, and the figures for orders and shipments in 21 months since then show an excess of more than 400,000 tons in the bookings. Lately there has been reassuring rail and freight car buying news.

Proposals involving new construction, with fabricated steel, are carefully considered and ordinarily such activity is fairly steady. Railroads aim to replace about the same amount of rails year by year and they maintain their rolling stock in much the same manner. When it comes to automobiles, however, that is a matter of popular taste if not whim. While a railroad may buy cars at a given time because it sees the shops need the business and will quote close figures, it is more likely to be the other way about with automobiles. Many men, particularly with wifely influence, are likely to buy when others are buying.

What we know definitely about automobiles is that production underwent a considerable increase in the second half of last year and had a great increase in the first half of this year. The first half of last year failed to make a new first-half record by 6 per cent, but the second half made a new second-half record by 4 per cent. Then the first half of this year made a new first-half record by 37 per cent.

On the other hand it has been impossible to develop, from the statistics of production over a period of many years, any definite cyclical behavior. Just a

few years ago there was a notion that every third year was particularly good, but there is no support for that, nor for an idea that the years merely alternate.

While the automobile industry nearly always makes sanguine predictions as to new business, it has also been stressing the fact of a large replacement market, and just at this time that argument undermines predictions of a specially large demand next year. Obviously if there is an unusually large number of replacements in one year the public has got that far ahead and will have correspondingly less occasion to replace in the following year. The accepted method of computing average life of cars, carried out in a diagram in the annual official presentation of the trade, shows average life at 7 years for cars scrapped through 1923, and 6¾ years for cars scrapped last year, involving very little difference. Replacements this year have evidently been very heavy. That does not prove that they will not be heavy next year but it raises a doubt.

It is too early to attempt to measure the effect of the stock market crash on automobile buying, but plainly it will be a factor, especially in the demand for higher priced cars.

The steel industry feels it is on safer ground in expecting a substantial continuance of general demand for steel than in counting upon anything very precise from the automobile trade.

Billion in Export Surplus

EXPORTS of merchandise from the United States in the first nine months of this year are reported by the Department of Commerce at 3849 millions of dollars, and imports at 3362 millions. This shows an export excess of 487 millions.

It happens, however, that monthly exports customarily average much heavier in October to December than in January to September. During the six years last completed the final quarters have furnished 29.6 per cent of the six years' total. On this basis the 12 months this year should furnish approximately 5450 millions in exports.

Monthly imports, on the other hand, run at about the same rate in the last three months as in the first nine months of the year, for the average for the past six years shows 25.2 per cent coming in in October-December. On this basis imports for 1929 would total 4500 millions, leaving a probable excess of exports of nearly $1,000,000,000, of which one-half will have been accumulated in one-fourth of the year.

ALONG with a domestic demand which has kept American steel mills running through the summer at a rate unprecedented in that season, there has been a growth in exports of iron and steel which has made the total the highest since 1920. Rolled and finished steel and semi-finished steel together, in the first nine months of the year, have accounted for 1,804,000 tons of outgoing product, compared with 1,568,000 tons to Sept. 30 last year, a gain of 15 per cent. Figuring tonnage of rolled products at 74 per cent of the ingot output, production of the former in the nine months has been about 32,200,000 tons. Hence, the exports have amounted to 5.6 per cent of production, a larger proportion than we have seen for some time.

Better Industrial Relations

SO much has been written of the admirable work of large corporations in the industrial relations field that the public does not realize how much some of the small companies have done. The National Industrial Conference Board, New York, in a recent survey shows that industrial relations activities have made excellent headway in smaller establishments.

Nearly as prevalent in small plants as in large ones, it appears, are the giving of bonuses for special accomplishments, profit sharing plans, group life insurance, vacations with pay, first aid and safety committees, recreational activities, employee education, and various plant conveniences. All of these can be administered without setting up special machinery and can be financed without too severe a drain upon company finances.

Company housing, lodging and home purchasing plans, however, are seldom found in small establishments, as their financial resources do not allow participation in such ventures. Because of the risk involved in operating mutual benefit societies, these organizations are found in relatively few small companies; on the other hand, many of the latter have gone into group insurance.

The survey gives convincing proof that wherever finances have permitted small plants have not hesitated to introduce activities beneficial to their employees, even though the cost per wage earner is much higher than in the large plant. Among the reasons the Industrial Conference Board gives for such work in small or medium-sized establishments are the competition with large plants for competent labor, the increased productive efficiency of a satisfied working force and the belief that it is the part of enlightened policy to keep in step with prevailing practice.

In part, at least, the rapid growth of cooperation in small plants is significant of a changed attitude of many employers toward their employees. In 1921 there was a great falling away from the unusual cultivation of employees through the elaborate personnel bureaus of the war period and some that flourished in the post-war boom of 1919-20. But there came later an appreciation that no policy could be more mistaken than that of treating the employer-employee relation as a fair weather one. The weight of evidence is plainly with the view that we have come into an era of better feeling between industrial workers and their employers.

Modern developments in the methods of microscopic investigation of metallurgical problems have consisted mainly in improvements leading to the use of high magnifications, improved methods of preparation of the surfaces, and a very much larger variety of etching reagents, which render possible discrimination between phases, which, formerly, could not be readily distinguished, according to Dr. Walter Rosenhain of the British National Physical Laboratory.

Patent Bills Reviewed by Engineering Board

At a meeting of the administrative board of the American Engineering Council, at the Hotel Mayflower, Washington, Oct. 24 and 25, more than 30 bills and resolutions pending before Congress were considered.

The board voted-to oppose the Cramton Bill, which would allow only licensed attorneys to practice before the Patent Office. Members of the board charged that the bill was an attempt on the part of lawyers to restrict the proper activities of engineers and scientists in acting as technical advisors and in other non-legal capacities in connection with applications for patents.

It was decided to favor the bill if an amendment were added to the effect that the objectionable provisions "shall not apply to engineers, chemists or other scientific persons when performing scientific, technical or other non-legal service in connection with applications for patents."

The board voted to oppose the King Bill to provide compulsory licenses for unused patents, and to indorse a bill offered by Senator King to investigate procedure in the Patent Office and offer recommendations to remedy the conditions which are responsible for the more than 100,000 patents awaiting consideration.

The board approved the recommendation of the committee on research that a group of experts be appointed to cooperate with the Bureau of Aeronautics and the Department of Commerce in making a study of the problems involved in the designing of airports.

The resolution offered in the House by Representative McLeod that a commission be appointed to study the causes and remedies of business cycles and unemployment was approved with the recommendation that the proposed committee should be under the supervision of the Department of Commerce. Other measures approved included a resolution for the establishment of a commission to plan a National Museum of Engineering and Industry, and a bill creating a Safety Division in the Bureau of Labor Statistics.

The annual meeting of the council will be held in Washington on Jan. 9-11, 1930.

Testing Society to Hold 1931 Meeting in Chicago

For some time the American Society for Testing Materials has been considering the holding of its annual meeting somewhere in the Middle West. At a meeting of the executive committee on Oct. 8, on recommendation of the committee on annual meetings, a decision was reached to hold the 1931 meeting in Chicago, June 22 to 26. The 1930 meeting will be held, as usual, at Haddon Hall, Atlantic City, N. J., June 23 to 27.

A regional meeting of the society will probably be held in March, next year, under the auspices of the Detroit members of the society. The Detroit district committee, of which Vice-President Frank O. Clements is chairman, has suggested this meeting partly for the purpose of extending knowledge and appreciation of the value and significance of the A.S.T.M. work among the automotive and related industries. For this reason a one-day meeting is planned which is to be devoted to a discussion of what the society has done and is organized to do for the automotive industry. A number of papers discussing the many activities of the society in the testing and specifying of materials used in the automotive industry will be presented at morning and afternoon sessions, followed by a dinner.

Consideration is also being given to the possibility of holding the spring group meeting of committees at Detroit for the three or four days immediately following the Detroit regional meeting.

Bar Iron Rate Unchanged

The bi-monthly examination of the books of companies subscribing to the wage agreement with the Amalgamated Association of Iron, Steel and Tin Workers discloses that the rate on bar iron for the next two months will be unchanged at 2c. a lb.

The Week in Business

Drift of Current Financial and Economic Opinion

THE "hidden" bear market rushed out of hiding, "selective" buying gave way to indiscriminate selling and "blue chip" stocks were dumped overboard with less favored issues in three days of record-breaking liquidation in Wall Street.

On Oct. 29, sales on the New York Stock Exchange were the largest in history, totaling 16,410,030 shares, and virtually wiping out all the price advances of the year. Only second to this volume was that of Oct. 25, when 12,894,600 shares changed hands, while the total for Oct. 28 took third rank, with 9,212,800 shares.

Mob Psychology at Work

Commenting on last Thursday's sharp break in values, Jules S. Bache, J. S. Bache & Co., New York, said it was "almost entirely due to the inordinate craze on the part of an indiscriminating public to buy whatever any one told them there was a profit in."

Mob psychology has always been a factor in the stock market, asserts the *Guaranty Survey*, New York, but the changed character of the investing public in recent years has greatly exaggerated psychological reactions.

"The philosophy that stocks may just as well be valued at 30 times earnings as at 10 has been for the time irreparably damaged," in the view of Alexander D. Noyes, New York *Times*.

Business Fundamentals Sound

Business is on a sound basis, although the stock market crash has sobered sentiment, according to the First National Bank of Boston. "Credit resources are ample, with interest rates on the decline. The Federal Reserve system and the member banks are in a strong position. Corporations have large cash holdings. Industrial earnings for the first nine months were higher than in any previous corresponding period. The purchasing power of the general public continues on a high level, although the stock market break may lessen the demand for luxuries. Furthermore, inventories with the exception of a few lines are on a conservative basis, and the trend of commodity prices has been gradually downward."

The absence of commodity price inflation and swollen inventories, together with a high Federal Reserve ratio, are among the most important factors distinguishing the present situation from that of 1920, in the eyes of the Alexander Hamilton Institute. The Reserve ratio, at 74.5 per cent (Oct. 23), is nearly double the legal minimum, which it virtually reached in 1920.

Some Slowing Down of Trade Predicted

A growing realization that abundant credit is available for industrial or financial purposes and that business conditions are generally sound will limit further liquidation of the stock market, in the opinion of the Harvard Economic Service.

While agreeing that underlying conditions are good, the *Commercial and Financial Chronicle* points out that stock market profits led to extravagant spending and extravagant living. "All this will have to be changed and unquestionably will involve a considerable slowing down of trade."

Iron and Steel Markets

Steel Trade Calm After Stock Crash

Adverse Effects Not Overlooked But Compensating Factors Are Seen—Fabricating Awards Large—Pittsburgh Scrap Unchanged for Third Week

STOCK market liquidation has not materially disturbed sentiment in the iron and steel trade. Feeling secure in the knowledge that it has been free from inflation, in sharp contrast with the securities market, the industry shares the confidence of its leaders, Messrs. Schwab and Farrell, in the fundamentally sound condition of business.

Although aware that steel demand may be affected by Wall Street losses, particularly in requirements of manufacturers of consumer goods, the trade is not disposed to exaggerate that possibility. In the same calm spirit the situation is being carefully surveyed with an eye to favorable results that may ensue, with particular attention to the release of construction work of the type that has been held back by high money rates.

Heavy construction, which has been at a record rate throughout the year, had another good week in terms of fabricated steel awards, which totaled 55,500 tons, compared with 58,000 tons a week ago. Fabricating shops are booked for four to five months and, although the season is near when lettings normally decline, the list of pending projects has been augmented by inquiries for 43,000 tons.

Mill bookings in ship steel have been increased 25,000 tons by the award of two Matson Line vessels to the Fore River yards of the Bethlehem Steel Corporation. Atlantic Coast shipbuilding yards, according to James A. Farrell's recent address before the American Iron and Steel Institute, have enough work to occupy them for six months.

Rail orders for the week total 45,000 tons, of which 40,000 tons was placed by one large Western road. The railroad equipment market is featured by an inquiry from the Rock Island for 5000 cars, calling for 45,000 tons of steel, a purchase of 400 refrigerator cars by the Pacific Fruit Express and orders for 100 locomotives distributed by the Pennsylvania.

Steel specifications from railroad equipment builders are improving as a result of recent purchases by the carriers, and manufacturers of tillage machinery are making heavier drafts on the mills. A relatively uniform flow of steel orders is coming from a wide circle of miscellaneous buyers, although in a few lines, such as radio manufacture, curtailment is reported.

Some slight improvement over present steel shipments to the automobile industry is indicated for November, but signs of a general stepping up in motor car production next month are still lacking.

Price developments in finished steel are unimportant, aside from a decline in plates to their customary position of parity with bars and structural shapes.

Heavy melting steel scrap for a third week is unchanged at Pittsburgh and old material markets generally are lethargic, although heavy melting grade has receded 25c. a ton at Chicago.

Steel ingot production seems to be reaching a point of equilibrium. The operations of both the United States Steel Corporation and the Bethlehem Steel Corporation are at 82 per cent of capacity. The output of independents chiefly dependent on the automobile industry has given further ground, this being notably true in the Valleys, where operations now range from 65 to 70 per cent. The general average for the Pittsburgh, Chicago and Birmingham districts is 80 per cent.

Among finishing mills, sheet plants have further reduced their output to an average of 60 per cent. On the other hand, rail mill schedules have been increased at both Pittsburgh and Chicago.

Pig iron buyers are not yet manifesting much interest in first quarter needs. More surplus steel company iron is finding its way into the market, although as yet it has not seriously disturbed prices. Shipments to automobile foundries remain light, but deliveries to other melters are fairly well sustained. The Ford Motor Co., which recently bought 17,000 tons of basic iron and 16,000 tons of high-silicon malleable, is in the market for 10,000 tons additional of the latter grade.

October sales of machine tools will exceed the September total by a comfortable margin.

Machinery exports in September, at $46,984,546, were 6.2 per cent lower than in August. Iron and steel exports last month, at 222,408 tons, showed a decline of 8 per cent from August and 2½ per cent from September a year ago.

Our European reports indicate that foreign steel markets are quiet, with prices weakening.

THE IRON AGE composite price for finished steel has declined to 2.362c. a lb., a new low mark for the year, comparing with 2.369c. last week and a year ago. This is the first time in 1929 that the composite has been below its level on the same date in 1928. Pig iron is unchanged at $18.38 a ton.

A Comparison of Prices

Market Prices at Date, and One Week, One Month and One Year Previous, Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron, Per Gross Ton:	Oct. 29, 1929	Oct. 22, 1929	Oct. 1, 1929	Oct. 30, 1928
No. 2 foundry, Philadelphia	$21.26	$21.26	$21.26	$20.76
No. 2, Valley furnace	18.50	18.50	18.50	17.50
No. 2 Southern, Cin'ti	17.69	17.69	17.19	19.94
No. 2, Birmingham	14.50	14.50	14.50	16.25
No. 2 foundry, Chicago*	20.00	20.00	20.00	19.50
Basic, del'd eastern Pa	19.75	19.75	19.75	19.75
Basic, Valley furnace	18.50	18.50	18.50	17.50
Valley Bessemer, del'd P'gh	20.76	20.76	20.76	19.76
Malleable, Chicago*	20.00	20.00	20.00	19.50
Malleable, Valley	19.00	19.00	19.00	18.00
Gray forge, Pittsburgh	19.76	19.76	19.76	18.76
L. S. charcoal, Chicago	27.04	27.04	27.04	27.04
Ferromanganese, furnace	105.00	105.00	105.00	105.00
Rails, Billets, Etc., Per Gross Ton:				
Rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Light rails at mill	36.00	36.00	36.00	36.00
Rerolling billets, Pittsburgh	35.00	35.00	35.00	33.00
Sheet bars, Pittsburgh	35.00	35.00	35.00	33.00
Slabs, Pittsburgh	35.00	35.00	35.00	33.00
Forging billets, Pittsburgh	40.00	40.00	40.00	38.00
Wire rods, Pittsburgh	40.00	40.00	40.00	42.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb	1.85	1.85	1.85	1.90
Finished Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Bars, Pittsburgh	1.90	1.90	1.90	1.95
Bars, Chicago	2.00	2.00	2.05	2.00
Bars, Cleveland	1.90	1.90	1.95	1.90
Bars, New York	2.24	2.24	2.24	2.29
Tank plates, Pittsburgh	*1.90*	1.95	1.95	1.90
Tank plates, Chicago	2.05	2.05	2.05	2.00
Tank plates, New York	2.22½	2.22½	2.22½	2.22½
Structural shapes, Pittsburgh	1.90	1.90	1.90	1.90
Structural shapes, Chicago	2.00	2.00	2.05	2.00
Structural shapes, New York	2.14½	2.14½	2.19½	2.19½
Cold-finished bars, Pittsburgh	2.30	2.30	2.30	2.20
Hot-rolled strips, Pittsburgh	1.90	1.90	1.90	1.90
Cold-rolled strips, Pittsburgh	2.75	2.75	2.75	2.75

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

Finished Steel,	Oct. 29, 1929	Oct. 22, 1929	Oct. 1, 1929	Oct. 30, 1928
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 24, P'gh	2.75	2.75	2.85	2.75
Sheets, black, No. 24, Chicago dist. mill	2.95	2.95	2.95	2.85
Sheets, galv., No. 24, P'gh	3.50	3.50	3.50	3.50
Sheets, galv., No. 24, Chicago dist. mill	3.60	3.60	3.60	3.60
Sheets, blue, No. 13, P'gh	2.35	2.35	2.35	2.10
Sheets, blue, No. 13, Chicago dist. mill	2.45	2.45	2.45	2.20
Wire nails, Pittsburgh	2.40	2.40	2.45	2.55
Wire nails, Chicago dist. mill	2.45	2.45	2.50	2.60
Plain wire, Pittsburgh	2.40	2.40	2.40	2.40
Plain wire, Chicago dist. mill	2.40	2.40	2.45	2.45
Barbed wire, galv., P'gh	3.05	3.05	3.10	3.20
Barbed wire, galv., Chicago dist. mill	3.15	3.15	3.15	3.25
Tin plate, 100 lb. box, P'gh	$5.35	$5.35	$5.35	$5.25
Old Material, Per Gross Ton:				
Heavy melting steel, P'gh	$17.25	$17.25	$17.75	$17.75
Heavy melting steel, Phila	15.50	15.50	16.00	16.00
Heavy melting steel, Ch'go	*14.00*	14.25	14.50	14.50
Carwheels, Chicago	14.00	14.00	14.00	14.25
Carwheels, Philadelphia	16.50	16.50	16.50	16.50
No. 1 cast, Pittsburgh	15.50	15.50	15.50	15.50
No. 1 cast, Philadelphia	16.00	16.00	16.00	17.50
No. 1 cast, Ch'go (net ton)	14.50	14.50	14.50	15.50
No. 1 RR. wrot., Phila	16.00	16.00	16.00	15.50
No. 1 RR wrot., Ch'go (net)	14.00	14.00	14.00	12.75
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$2.65	$2.65	$2.65	$2.90
Foundry coke, prompt	3.75	3.75	3.75	3.75
Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	18.12½	18.12½	18.12½	16.25
Electrolytic copper, refinery	17.75	17.75	17.75	15.75
Tin (Straits), New York	*40.75*	41.37½	44.25	49.25
Zinc, East St. Louis	*6.60*	6.70	6.80	6.25
Zinc, New York	*6.95*	7.05	7.15	6.60
Lead, St. Louis	*6.55*	6.70	6.70	6.32½
Lead, New York	*6.75*	6.90	6.90	6.50
Antimony (Asiatic), N. Y.	8.75	8.75	8.50	10.50

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Pittsburgh

Steel Industry Still Curtailing Operations—Ingot Output Averages Below 80 Per Cent

PITTSBURGH, Oct. 29.—The steel industry in this district is still in a process of curtailment. The serious break in the stock market has had a temporarily paralyzing effect on business, even though it would be difficult to distinguish any signs of basic disorder. October has been a bad month for most steel makers, and no mills have been able to avoid sharp declines in operations.

Ingot operations in the district average less than 80 per cent this week and in the Valleys the rate has dropped to about 70 per cent. Finishing mills are also running slower, with the most marked curtailment in the sheet departments. A 50 per cent rate is not uncommon with companies making high-finished and special sheets. However, stepping up of rail mills is improving the rate of one mill in the district, and structural and plate units are still on comparatively high schedules.

The automobile industry continues to occupy the attention of many sellers of steel, but it is not easy to see any general improvement in that direction. Specifications for November are already sufficient to promise a slight improvement over October in shipments. Other consuming industries continue to take material at a good rate. The railroads served by mills in this district have not been active buyers in the past week, but heavy tonnages placed earlier in the month aided mill order books materially at a time when they needed business rather badly.

In the face of the present unsatisfactory conditions, prices have been fairly well maintained, and, where definite reductions have come about, recent quotations seem to be fairly strong. Bars and shapes and finally plates are becoming established at 1.90c., Pittsburgh, but on all three products 1.95c. is still asked on carload lots, and some business is being taken at that figure. On wire and wire nails, which have declined most sharply, price levels established last week have been successfully tested on small lots. Sheet prices are fairly firm, weakness being reported only on galvanized material in sales to jobbers. Some large makers have definitely stopped allowing the $2 differential to the jobbing trade on galvanized sheets, and 3.50c., Pittsburgh, is still representative of the market. Makers of strip steel are resisting the pressure of buyers for lower prices, and quotations on cold-finished steel bars do not seem to be in question.

The pig iron market is unusually quiet, but shipments are fairly good and prices are not definitely lower.

Scrap is also dull, but conditions are somewhat better than they were at the beginning of the month and prices are unchanged for the third week.

Pig Iron.—Recent sales of basic iron in this district have disturbed the market slightly, but investigation tends to confirm that the Valley furnace price is still quotable at $18.50. A Verona, Pa., steel foundry is reported to have bought 2000 tons of

basic iron at a delivered price of $19.76, which would amount to a slight concession on the part of local sellers. However, Valley furnaces did not share in this tonnage, and one seller definitely refused to meet that price. The Edgewater Steel Co., Oakmont, Pa., apparently has not yet bought iron, although the company has been reported in the market for two or three weeks. Sales of foundry iron are few and far between, and there is little or no inquiry. The same thing might be said of malleable and Bessemer, and lots of car loads or slightly more, which have recently been sold, have brought the full price of $19, Valley, and $19.50, local furnace. Shipments during October have been fairly good, but in nearly all cases have exceeded sales. This is causing furnaces to accumulate a larger yard surplus than they carried during the summer, but stocks are still comparatively low.

Prices per gross ton, f.o.b. Valley furnace:

Basic	$18.50
Bessemer	19.00
Gray forge	18.00
No. 2 foundry	18.50
No. 3 foundry	18.00
Malleable	19.00
Low phos., copper free	27.00

Freight rate to Pittsburgh or Cleveland district $1.76.

Prices per gross ton, f.o.b. Pittsburgh district furnace:

Basic	$19.00
No. 2 foundry	19.00
No. 3 foundry	18.50
Malleable	19.00

Freight rates to points in Pittsburgh district range from 63c. to $1.13.

Semi-Finished Steel. — Sales are practically at a standstill, although occasional spot tonnages are being bought from time to time by small users. On business of this kind the price on billets, slabs and sheet bars is holding at $35, Pittsburgh or Youngstown, but it seems that the list of preferential customers who ordinarily buy at a slight advantage in price has been extended for this quarter. In some cases, customers who have been paying the full market price were never forced to pay $35 for their steel when the market was advanced to this price last summer, and these buyers are still getting their old price. Forging billets are unchanged at $40 a ton, and this price seems to be holding fairly well. Wire rods are quiet at $40, Pittsburgh or Cleveland.

Rails and Track Accessories.—Following a week of considerable activity, this market is now quieter. As most of the larger roads served by Pittsburgh mills have bought their rails and track accessories, market interest is again centered on the rate of specifications. The Baltimore & Ohio has not announced its 1930 requirements, and may come into the market in the near future. Operations are rather light, but rail mills are stepping up their schedules and will be at capacity within another month.

Bars, Shapes and Plates.—Plates and shapes are still finding a good demand, but bar business is not improving as much as had been expected. Cold-finishing mills are at a low rate, and, with their hot bar requirements considerably curtailed, one of the best outlets for merchant bars is seriously hindered. Business in reinforcing bars is also declining seasonally, and deliveries are now rather prompt. On plates and shapes deliveries average from two to three weeks, with a month required for some special rollings. Railroad car builders in this district are beginning to step up their requirements, although recent buying of cars will not increase their operations to any great extent for several weeks. Barge builders need business, but prospects are very good and most barge builders feel that new orders will be placed before present work is completed. Fabricating shops are well engaged, but large jobs in this territory are slow in coming out. Prices are still somewhat unsettled, but bars and shapes are holding at 1.90c., and the tendency toward shading prices is not so pronounced as it was a few weeks ago. Plate prices are still somewhat stronger than those on bars and shapes, but the 1.90c. figure is appearing more frequently.

Wire Products.—Nail prices are better established as a result of the recent reduction of $1 a ton, and the $2.40, Pittsburgh, quotation to large buyers is now being adhered to on new business. Some companies have contracts on their books at lower figures, but are determined to hold the price on new tonnage. Demand for manufacturers' wire is unfavorably influenced by lack of buying by automobile companies, and jobbers are taking annealed wire only in small tonnages. The wire price is unchanged at 2.40c. to 2.50c., Pittsburgh, the higher figure applying on carload lots.

Tubular Products.—Pipe mills are still reasonably active, but backlogs are low, and, with current demand seemingly on the decrease, it is likely that further curtailment in operations will soon be necessary. During the month operating schedules have been stepped down as much as 10 points, principally in the butt-welding departments. The trade is still interested in the large line pipe projects which are being talked of and there is a possibility that the proposed line from the Texas fields into Chicago may be let early next month. If not, the project will likely be postponed until after the first of the year. Demand for seamless pipe is holding up better than for the welded products. Shipments of mechanical tubing have declined sharply during the month, but there are prospects of some improvement in November.

Sheets.—Sheet mills curtailed operations last week, and with the leading interest running at about 75 per cent of capacity, the average for the industry has fallen under 70 per cent. Mills making high finished and special sheets are most affected, and one company is only running one of its plants every other week. However, metal furniture sheets are moving steadily, with most consumers operating their plants at close to capacity. Automobile tonnage for late November shipment is coming to local mills and, as most of this is material which will go into new models, the prospects for resumed activity in Michigan plants is somewhat better. This is not a busy season for makers of electric refrigerators, but their requirements have held up better than in former years. Prices seem to be established at recent levels, but there is still occasional shading where large buyers are concerned. Black sheets are selling in the Detroit area at less than 2.75c., Pittsburgh, in some instances, but most of this material takes heavy extras and is hardly a price criterion for the market. Jobbers are able to buy galvanized sheets at 3.40c., Pittsburgh, but the 3.50c. quotation to the

The Iron Age Composite Prices

Finished Steel

Oct. 29, 1929, 2.362c. a Lb.

One week ago	2.369c.
One month ago	2.384c.
One year ago	2.369c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products make 87 per cent of the United States output of finished steel.

	High	Low
1929	2.412c., April 2;	2.362c., Oct. 29
1928	2.391c., Dec. 11;	2.314c., Jan. 3
1927	2.453c., Jan. 4;	2.293c., Oct. 25
1926	2.453c., Jan. 5;	2.403c., May 18
1925	2.560c., Jan. 6;	2.396c., Aug. 18

Pig Iron

Oct. 29, 1929, $18.38 a Gross Ton

One week ago	$18.38
One month ago	18.29
One year ago	18.25
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High	Low
1929	$18.71, May 14;	$18.25, Aug. 27
1928	18.59, Nov. 27;	17.04, July 24
1927	19.71, Jan. 4;	17.54, Nov. 1
1926	21.54, Jan. 5;	19.46, July 13
1925	22.50, Jan. 13;	18.96, July 7

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base per Lb.
F.o.b. Pittsburgh mill	1.90c. to 1.95c.
F.o.b. Chicago	2.00c. to 2.05c.
Del'd Philadelphia	2.22c. to 2.27c.
Del'd New York	2.24c. to 2.29c.
Del'd Cleveland	1.90c.
F.o.b. Cleveland	1.90c.
F.o.b. Lackawanna	2.00c. to 2.05c.
F.o.b. Birmingham	2.10c.
C.i.f. Pacific ports	2.35c.
F.o.b. San Francisco mills	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills, 40, 50, 60-ft.	2.05c.
F.o.b. Pittsburgh mills, cut lengths	2.30c.
F.o.b. Birmingham, mill lengths	2.10c.

Rail Steel

F.o.b. mills, east of Chicago dist.	1.85c. to 1.90c.
F.o.b. Chicago Heights mill	1.95c.
Del'd Philadelphia	2.27c.

Iron

Common iron, f.o.b. Chicago	2.00c. to 2.05c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	2.12c.
Common iron, del'd New York	2.14c.

Tank Plates

	Base per Lb.
F.o.b. Pittsburgh mill	1.90c. to 1.95c.
F.o.b. Chicago	2.05c.
F.o.b. Birmingham	2.10c.
Del'd Cleveland	2.09c. to 2.14c.
Del'd Philadelphia	2.15c.
F.o.b. Coatesville	2.05c.
F.o.b. Sparrows Point	2.05c.
F.o.b. Lackawanna	2.05c.
Del'd New York	2.22½c.
C.i.f. Pacific ports	2.35c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh mill	1.90c. to 1.95c.
F.o.b. Chicago	2.00c. to 2.05c.
F.o.b. Birmingham	2.10c.
F.o.b. Lackawanna	2.05c.
F.o.b. Bethlehem	2.05c.
Del'd Cleveland	2.09c. to 2.14c.
Del'd Philadelphia	1.96c. to 2.06c.
Del'd New York	2.14½c.
C.i.f. Pacific ports	2.35c.

Hot-Rolled Hoops, Bands and Strips

	Base per Lb.
6 in. and narrower, P'gh	2.00c.
Wider than 6 in., P'gh	1.90c.
6 in. and narrower, Chicago	2.20c.
Wider than 6 in., Chicago	2.10c.
Cooperage stock, P'gh	2.20c.
Cooperage stock, Chicago	2.30c.

Cold-Finished Steel

	Base per Lb.
Bars, f.o.b. Pittsburgh mill	2.30c.
Bars, f.o.b. Chicago	2.30c.
Bars, Cleveland	2.30c.
Bars, Buffalo	2.30c.
Shafting, ground, f.o.b. mill	*2.65c. to 3.60c.
Strips, P'gh	2.75c. to 2.85c.
Strips, Cleveland	2.75c. to 2.85c.
Strips, del'd Chicago	3.05c. to 3.15c.
Strips, Worcester	2.90c. to 3.00c.
Fender stock, No. 20 gage, Pittsburgh or Cleveland	4.25c.

*According to size.

Wire Products

(Carload lots, f.o.b. Pittsburgh and Cleveland, to jobbers and retailers.)

	Base per Keg
Wire nails	$2.40 to $2.50
Galvanized nails	4.40 to 4.50
Galvanized staples	3.10 to 3.20
Polished staples (per lb.)	2.85c. to 2.95c.
Cement coated nails	$2.40 to $2.50
	Base per 100 Lb.
Bright plain wire, No. 6 to No. 9 gage	$2.40 to $2.50
Annealed fence wire	2.55 to 2.65
Spring wire	3.50 to 3.60
Galv'd wire, No. 9	3.00 to 3.10
Barbed wire, galv'd	3.05c. to 3.15c.
Barbed wire, painted	2.80c. to 2.90c.
Woven wire fence (per net ton to retailers)	65.00

Cut Nails

	Per 100 Lb.
Carloads, Wheeling, Reading or Northumberland, Pa.	$2.70
Less carloads, Wheeling or Reading	2.80

Light Plates

No. 10, blue annealed, f.o.b. P'gh.	2.10c. to 2.20c.
No. 10, blue annealed, f.o.b. Chicago dist.	2.30c.
No. 10, blue annealed, del'd Phila.	2.42c. to 2.52c.
No. 10, blue annealed, B'ham	2.35c.

Sheets

Blue Annealed

	Base per Lb.
No. 18, f.o.b. P'gh	2.25c. to 2.35c.
No. 18, f.o.b. Chicago dist.	2.45c.
No. 18, del'd Philadelphia	2.57c. to 2.67c.
No. 18, blue annealed, B'ham	2.50c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh	2.75c.
No. 24, f.o.b. Chicago dist. mill	2.95c.
No. 24, del'd Philadelphia	3.07c.
No. 24, f.o.b. Birmingham	3.00c. to 3.10c.

Metal Furniture Sheets

No. 24, f.o.b. P'gh	4.10c.

Galvanized

No. 24, f.o.b. Pittsburgh	3.40c. to 3.50c.
No. 24, f.o.b. Chicago dist. mill	3.60c. to 3.70c.
No. 24, del'd Cleveland	3.59c. to 3.69c.
No. 24, del'd Philadelphia	3.82c. to 3.92c.
No. 24, f.o.b. Birmingham	3.75c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.90c. to 3.00c.
No. 28, f.o.b. Chicago dist. mill	3.00c. to 3.10c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh	4.00c.

Long Ternes

No. 24, 8-lb. coating, f.o.b. mill	4.00c. to 4.10c.

Vitreous Enameling Stock

No. 24, f.o.b. Pittsburgh	3.90c.

Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills	$5.35
Standard cokes, f.o.b. Gary	5.45

Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)
(Per Package, 20 x 28 in.)

8-lb. coating I.C. $11.20	25-lb. coating I.C. $16.70
15-lb. coating I.C. 14.00	30-lb. coating I.C. 17.75
20-lb. coating I.C. 15.30	40-lb. coating I.C. 19.85

Alloy Steel Bars

(F.o.b. makers' mill)

Alloy Quality Bar Base, 2.65c. to 2.75c. per Lb.

S.A.E. Series Numbers	Alloy	Differential
2000	(1½% Nickel)	$0.25
2100	(1½% Nickel)	0.55
2300	(3½% Nickel)	1.50
2500	(5% Nickel)	2.25
3100	Nickel Chromium	0.55
3200	Nickel Chromium	1.35
3300	Nickel Chromium	3.80
3400	Nickel Chromium	3.20
4100	Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50
4100	Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600	Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel)	1.05
5100	Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100	Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100	Chromium Spring Steel	0.20
6100	Chromium Vanadium Bars	1.20
6100	Chromium Vanadium Spring Steel	0.95
9250	Silicon Manganese Spring Steel (flats)	0.25
	Rounds and squares	0.50
	Chromium Nickel Vanadium	1.50
	Carbon Vanadium	0.95

Above prices are for hot rolled steel bars, forging quality. The differential for cold-drawn bars is ¾c. a lb. higher, with standard classification for cold-finished alloy steel bars applying. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis.

Billets under 4 x 4 in. carry the steel bar base. Slabs with a sectional area of 16 in. or over carry the billet price. Slabs with sectional area of less than 16 in. or less than 2½ in. thick, regardless of sectional area, take the bar price.

Rails

	Per Gross Ton
Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	36.00
Light (from rail steel), f.o.b. mill	34.00
Light (from billets), f.o.b. Ch'go mill	36.00

Track Equipment

	Base per 100 Lb.
Spikes, ⅝ in. and larger	$2.80
Spikes, ½ in. and smaller	2.80
Spikes, boat and barge	3.00
Tie plate, steel	2.15
Angle bars	$2.75
Track bolts, to steam railroads	$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel Inches	Black	Galv.	Iron Inches	Black	Galv.
⅛	45	19½	¼ and ⅜	+11	+36
¼ to ⅜	51	25½	½	28	5
½	56	42½	¾	28	11
¾	60	48½	1 and 1¼	31	15
1 to 3	62	50½	1½ and 2	35	18

Lap Weld

2	55	43½	2	23	9
2½ to 6	59	47½	2½ to 3½	28	13
7 and 8	56	43½	4 to 6	30	17
9 and 10	54	42½	7 and 8	29	16
11 and 12	53	40½	9 to 12	26	11

Butt Weld, extra strong, plain ends

⅛	41	24½	¼ and ⅜	+13	+48
¼ to ⅜	47	30½	½	23	7
½	53	42½	¾	28	12
¾	58	47⅞	1 to 2	34	18
1 to 1½	60	49½			
2 to 3	61	50½			

Lap Weld, extra strong, plain ends

2	53	42½	½	29	13
2½ to 4	57	46½	2½ to 4	34	20
4½ to 6	56	45½	4½ to 6	33	19
7 to 8	52	39½	7 and 8	31	17
9 and 10	45	32½	9 to 12	21	8
11 and 12	44	31½			

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discounts of 5% and 2½%, and on galvanized by 1½ points, with supplementary discounts of 5% and 2½%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Steel		Charcoal Iron	
2 in. and 2¼ in.	38	1½ in.	1
2½ in.—2¾ in.	46	1¾ in.	8
3 in.	52	2 in.—2¼ in.	13
3¼ in.—3¾ in.	54	2½ in.—2¾ in.	16
4 in.	57	3 in.	17
4½ in. to 6 in.	46	3¼ in. to 3½ in.	18
		4 in.	20
		4½ in.	21

On lots of a carload or more, the above base discounts are subject to a preferential of two fives on steel and of 10 per cent on charcoal iron tubes. Smaller quantities are subject to the following modifications from the base discounts:

Lap Welded Steel—Under 10,000 lb., 6 points under base and one five; 10,000 lb. to carload, 4 points under base and two fives. Charcoal Iron—Under 10,000 lb., 2 points under base; 10,000 lb. to carload, base and one five.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	61	3 in.	46
1¼ to 1½ in.	53	3¼ to 3½ in.	48
1¾ in.	37	4 in.	51
2 to 2¼ in.	32	4½, 5 and 6 in.	40
2½ to 2¾ in.	40		

Hot Rolled

2 and 2¼ in.	38	3¼ to 3½ in.	54
2½ and 2¾ in.	46	4 in.	57
3 in.	52	4½, 5 and 6 in.	46

Beyond the above base discounts a preferential discount of 5 per cent is allowed on carload lots. On less than carloads to 10,000 lb., base discounts are reduced 4 points with 5 per cent preferential; on less than 10,000 lb., base discounts are reduced 6 points, with no preferential. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage take the mechanical tube list and discounts. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30%, base (carloads)	55
Carbon, 0.30% to 0.40% base	50

Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

manufacturing trade is holding. Large makers of blue annealed sheets have not recognized reported price shading on this product and are still quoting 2.35c., Pittsburgh, for the No. 13 gage and 2.20c. for the No. 10. Wide strip competition continues to be troublesome, but sheets rolled on the continuous mills cannot always be substituted for the jobbing mill product, and on this business the prices mentioned above are holding.

Tin Plate.—Conditions have not changed materially in the last week, but the leading interest has curtailed its operations rather sharply, and the average for the industry is now not above 60 per cent. Further slowing down is not expected, as most companies will begin to roll 1930 tonnage some time next month.

Strip Steel.—Sentiment in the strip industry is slightly better, but business has failed to show any marked improvement. A few makers of automobile parts and accessories have increased their specifications, but the automobile industry as a whole is not yet coming back to the extent which was expected earlier in the month. Other large users of strip steel are still taking normally heavy shipments, although one exception is the radio industry, which is ordinarily a fairly large consumer. Hardware makers are busy. Strip mills are operating between 50 and 60 per cent of capacity. The price situation continues fairly satisfactory. Shading on both hot and cold-rolled material is reported occasionally, but makers usually have difficulty in checking up on irregularities. Not many attractive tonnages are coming out on which price concessions might be expected and lower quotations on small tonnages would force the smaller independent makers of strip to operate at a loss. Hot-rolled strip is unchanged at 1.90c. to 2c., Pittsburgh, and cold-rolled at 2.75c.

Coal and Coke.—The coke market continues to show some improvement, but prices have not advanced and the furnace grade is still quotable at $2.65 to $2.75, Connellsville. An increasing volume at the higher figure is reported. The H. C. Frick Coke Co. is now operating less than 100 ovens in the Connellsville region, having put out about 3000 in the last month or six weeks. Demand for domestic coke is not so strong as it was a week or two ago, but is expected to improve with colder weather. Foundry coke is not active, but shipments are keeping up fairly well and prices have developed no further weakness.

Old Material.—The scrap market is exceedingly quiet and, although sentiment is not particularly good, prices are not quotably lower on the principal grades. No sales of heavy melting steel to mills have been reported, and dealers are sometimes paying as much as $17 to cover old contracts. Carload lots are occasionally picked up at lower prices. Hydraulic compressed sheets are nominally unchanged, although a bid of $17 at a Michigan automobile plant last week failed to take the tonnage offered. Occasional small sales to mills are reported. The light grades are very quiet, and the rather brisk market for short shoveling steel turnings, which existed during the summer, is now a thing of the past. Specialties are comparatively strong, as steel foundry operations are heavy and shipments are keeping up regularly. The same can hardly be said of shipments to steel plants, as operations are not improving and hold-ups are still effective at least two points. The monthly scrap list of the Baltimore & Ohio Railroad contains 23,000 tons, including 5000 tons of heavy melting steel and 6000 tons of rails.

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.25c.
Hoops	4.25c.
Black sheets (No. 24), 25 or more bundles	3.80c. to 3.90c.
Galv. sheets (No. 24), 25 or more bundles	4.45c. to 4.55c.
Light plates, blue annealed (No. 10), 1 to 24 plates	3.35c. to 3.45c.
Blue annealed sheets (No. 13), 1 to 24 sheets	3.50c. to 3.60c.
Galv. corrug. sheets (No. 28), per square	$4.43
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count,	60 per cent off list
Machine bolts, 100 count,	60 per cent off list
Carriage bolts, 100 count,	60 per cent off list
Nuts, all styles, 100 count,	60 per cent off list
Large rivets, base per 100 lb.	$3.50
Wire, black soft ann'l'd base per 100 lb	$2.90 to 3.00
Wire, galv. soft, base per 100 lb.	2.90 to 3.00
Common wire nails, per keg	2.80 to 2.90
Cement coated nails, per keg	2.95 to 3.05

Prices per gross ton delivered consumers yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$17.00 to $17.50
No. 2 heavy melting steel	15.00 to 15.50
Scrap rails	16.00 to 16.50
Compressed sheet steel	16.75 to 17.25
Bundled sheets, sides and ends	15.50 to 16.00
Cast iron carwheels	15.50 to 16.00
Sheet bar crops, ordinary	18.50 to 19.00
Heavy breakable cast	12.00 to 12.50
No. 2 railroad wrought	17.00 to 17.50
Hvy. steel axle turnings	16.00 to 16.50
Machine shop turnings	11.50 to 12.00
Acid Open-Hearth Grades:	
Railr. knuckles and couplers	20.50 to 21.00
Railr. coil and leaf springs	20.50 to 21.00
Rolled steel wheels	20.50 to 21.00
Low phos. billet and bloom ends	21.50 to 22.00
Low phos., mill plates	21.50 to 22.00
Low phos., light grades	20.50 to 21.50
Low phos., sheet bar crops	21.50 to 22.00
Heavy steel axle turnings	16.00 to 16.50
Electric Furnace Grades:	
Low phos., punchings	19.50 to 20.50
Hvy. steel axle turnings	16.00 to 16.50
Blast Furnace Grades:	
Short shoveling steel turnings	12.00 to 12.50
Short mixed borings and turnings	12.00 to 12.50
Cast iron borings	12.00 to 12.50
Rolling Mill Grades:	
Steel car axles	21.50 to 22.00
Cupola Grades:	
No. 1 cast	15.00 to 16.00
Rails 3 ft. and under	19.00 to 20.00

Reinforcing Steel

Awards of 5600 Tons and New Inquiries for 900 Tons

REINFORCING steel awards in the week totaled about 5600 tons, the largest job, 1300 tons for grade elimination work for the Long Island Railroad, going to the National Bridge Works. Only a few new projects, totaling about 900 tons, were reported. Awards follow:

BOSTON, 300 tons, hotel, to Northern Steel Co.

WILMINGTON, DEL., 100 tons for Homeopathic Hospital, to McClintic-Marshall Co.

CAMBRIDGE, MASS., 200 tons, Harvard University tunnels, to Concrete Steel Co.

EVERETT, MASS., 100 tons, Warren Foundry & Pipe Co. foundry, to Barker Steel Co.

LONG ISLAND RAILROAD, 1300 tons, grade crossing elimination work in Newark, N. J., to National Bridge Works.

NEWARK, N. J., 250 tons, building for National Biscuit Co., to White Construction Co.

BUFFALO, 103 tons, part of new City Hall job, to Buffalo Steel Co.

SOUTH BEND, 150 tons, I. & M. garage, to Concrete Engineering Co.

MUNDELEIN, ILL., 150 tons, seminary building, to an unnamed bidder.

CHICAGO, 900 tons, Wieboldt store and apartment building, to Concrete Steel Co.

CHICAGO, 400 tons, apartment building at Fifty-second and Blackstone Streets, to an unnamed bidder.

RACINE, WIS., 100 tons, apartment building, to Calumet Steel Co.

PORT ANGELES, WASH., 600 tons, pulp plant for Olympic Forest Products Co., to Pacific Coast Steel Co.

OLYMPIA, WASH., 101 tons, bridge over North River, to Pacific Coast Steel Co.

LOS ANGELES, 800 tons, office building, Wilshire and La Brea Avenues, to Blue Diamond Co.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

CINCINNATI, 130 tons for new St. Williams' Congregational Church; bids are being received.

CHICAGO, 160 tons, Howard Trust & Savings Bank building.

CHICAGO, 100 tons, Swedish Engineers' Club building.

CHICAGO, 400 tons, footings for Lawson Memorial Y. M. C. A. building.

WHITTIER, CAL., 100 tons, mausoleum; bids being taken.

SEATTLE, 200 tons, Fourteenth Avenue South bridge; Puget Sound Bridge & Dredging Co., low bidder on general contract.

SEATTLE, 363 tons, approach to West Spokane Street bridge; general contract to General Construction Co.

Lumber for the bulkhead and dock on the Chelsea River being built for the projected cast iron pipe foundry of the Intercontinental Pipe & Mining Co. at Chelsea, Mass., is to be delivered next week. The dock and dredging in the river are expected to be completed by the end of November to permit the landing of barges with building material and equipment for the proposed foundry.

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and under 10-in., Pittsburgh	$35.00
Rerolling, 4-in. and under 10-in., Youngstown	35.00
Rerolling, 4-in. and under 10-in., Cleveland	35.00
Rerolling, 4-in. and under 10-in., Chicago	37.00
Forging quality, Pittsburgh	40.00

Sheet Bars

(Open Hearth or Bessemer)

	Per Gross Ton
Pittsburgh	$35.00
Youngstown	35.00
Cleveland	35.00

Slabs

(8 in. x 2 in. and under 10 in. x 10 in.)

	Per Gross Ton
Pittsburgh	$35.00
Youngstown	35.00
Cleveland	35.00

Skelp

(F.o.b. Pittsburgh or Youngstown)

	Per Lb.
Grooved	1.85c. to 1.90c.
Universal	1.85c. to 1.90c.
Sheared	1.85c. to 1.90c.

Wire Rods

(Common soft, base)

	Per Gross Ton
Pittsburgh	$40.00
Cleveland	40.00
Chicago	41.00

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.80
Old range non-Bessemer, 51.50% iron	4.65
Mesabi Bessemer, 51.50% iron	4.65
Mesabi non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.40

Foreign Ore, c.i.f. Philadelphia or Baltimore	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algerian	12.00c.
Iron ore, low phos., Swedish, average 68% iron	12.00c.
Iron ore, basic Swedish, average 65% iron	10.00c.
Manganese ore, washed, 52% manganese, from the Caucasus	30.00c.
Manganese ore, Brazilian, African or Indian, basic 50%	30.00c.
Tungsten ore, high grade, per unit, in 60% concentrates	$15.50 to $16.50

	Per Gross Ton
Chrome ore, 45 to 50% Cr_2O_3, crude, c.i.f. Atlantic seaboard	$22.00 to $24.00

	Per Lb.
Molybdenum ore, 85% concentrates of MoS_2, delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$2.65 to $2.75
Foundry, f.o.b. Connellsville prompt	3.75 to 4.75
Foundry, by-product, Ch'go ovens	8.00
Foundry, by-product, New England, del'd	11.00
Foundry, by-product, Newark or Jersey City, delivered	9.00 to 9.40
Foundry, by-product, Phila.	9.00
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry by-prod., del'd St. Louis	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.25 to $1.75
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, ¾-in. f.o.b. Pa. mines	1.90 to 2.00
Mine run gas coal, f.o.b. Pa. mines	1.65 to 1.75
Steam slack, f.o.b. W. Pa. mines	80c. to 90c.
Gas slack, f.o.b. W. Pa. mines	1.00 to 1.10

Ferromanganese

	Per Gross Ton
Domestic, 80%, seaboard	$105.00
Foreign, 80%, Atlantic or Gulf port, duty paid	105.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$31.00 to $34.00
Domestic, 16 to 19%	29.00 to 32.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$83.50
75%	130.00

	Per Gross Ton Furnace		Per Gross Ton Furnace
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	45.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		Per Gross Ton
10%	$30.00	12%	$34.00
11%	32.00		

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		Per Gross Ton
6%	$22.00 to $23.00	10%	$26.00 to $28.00
7%	23.00 to 24.00	11%	28.00 to 30.00
8%	24.00 to 25.00	12%	30.00 to 32.00
9%	25.00 to 26.00		

Other Ferroalloys

Ferrotungsten, per lb. contained metal del'd	$1.40 to $1.50
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.15 to $3.65
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	$160.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton	$91.00
Ferrophosphorus, electric 24%, f.o.b. Anniston, Ala., per gross ton	$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silicon, gravel, f.o.b. Illinois and Kentucky mines	$18.00
No. 2 lump, Illinois and Kentucky mines	20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	$18.25 to $18.75
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines	32.50

Fire Clay Brick

	Per 1000 f.o.b. Works	
	High-Heat Duty Brick	Intermediate Heavy Duty Brick
Pennsylvania	$43.00 to $46.00	$35.00 to $38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	.....
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00
Standard size	45.00

Chrome Brick

	Per Net Ton
Standard size	$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts, blank or tapped, hexagons	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	7.00c. to 6.75c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled thread up to and including ⅛ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagon nuts	70
Semi-finished hexagon castellated nuts, S.A.E.	70
Stove bolts in packages, P'gh.	75, 20, 10 and 5
Stove bolts in packages, Chicago	75, 20, 10 and 5
Stove bolts in packages, Cleveland	75, 20, 10 and 5
Stove bolts in bulk, P'gh.	75, 20, 10, 5 and 2½
Stove bolts in bulk, Chicago	75, 20, 10, 5 and 2½
Stove bolts in bulk, Cleveland	75, 20, 10, 5 and 2½
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55, 60 per cent apply.

Large Rivets

(½-in. and larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$3.10
F.o.b. Chicago	3.20

Small Rivets

(⅞-in. and smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70 and 10
F.o.b. Cleveland	70 and 10
F.o.b. Chicago	70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10 and 5
Milled standard set screws, case hardened,	80 and 5
Milled headless set screws, cut thread	75 and 10
Upset hex. head cap screws, U.S.S. thread	85
Upset hex. cap screws, S.A.E. thread	85
Upset set screws	80, 10 and 5
Milled studs	70

Chicago

Railroad Needs and More Liberal Orders from Farm Equipment Makers Help to Steady Steel Demands

CHICAGO, Oct. 29.—Railroad needs in rails and car equipment again feature the Western iron and steel market. Additional rail tonnages are in the making, and, in the meantime, releases against recent contracts have reached producers, who have stepped up rail production to 80 per cent of capacity. The Rock Island will make use of 45,000 tons of steel for the superstructures of 5000 freight cars, which will soon be purchased. The Missouri Pacific and other Southwestern railroads are named as probable buyers of new equipment.

New orders for finished steel are well balanced among the various products, and the total is little affected by new rail business. Releases against past obligations portray a steady inflow of specifications which assures continuance, for the time being, of operations at 80 per cent of ingot capacity. Sentiment in the local market leans toward a uniform demand for steel over the remainder of the year.

Increased use of car materials, heavier releases for rails and more liberal requisitions by farm implement manufacturers give promise of steadying demand at a time when inventory-taking threatens to curtail shipments. An encouraging feature of current business is the relatively uniform flow of orders from miscellaneous manufacturers, who individually are not large purchasers. Farm implement manufacturers are finding demand for tillage machinery well above expectations.

Pig Iron.—Melters of Northern foundry iron are coming into the market more freely, some making commitments for November, December and January shipment, while a few are placing orders for delivery over the first quarter of next year. The curve representing shipments by local sellers is tending upward. The charcoal iron market is spotty, with occasional tonnages being taken below $24 a ton, furnace. Scattered lots of Southern iron are said to have been disposed of at $13 to $13.50 a ton, Birmingham. It is reported that some sellers are willing to consider first quarter tonnages at $13.50 a ton, Birmingham. A Joliet melter will buy 1000 tons, part of which will be Southern and part Northern iron.

Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	$20.00
N'th'n No. 1 fdy., sil. 2.25 to 2.75	20.50
Malleable, not over 2.25 sil.	20.00
High phosphorus	20.00
Lake Super. charcoal, sil. 1.50	27.04
So'th'n No. 2 fdy. (all rail)	$19.01 to 19.51
Low phos., sil. 1 to 2, copper free	29.50
Silvery, sil. 8 per cent	$28.79 to 29.79
Bess. ferrosilicon. 14-15 per cent	46.29

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Sheets.—Hot mills in this district are operating at 85 per cent of capacity, and current specifications are ample to support this rate. New buying at present quotations is less active than a week ago, and order books are shrinking. Few orders are being entered beyond the immediate needs of consumers. Deliveries of blue annealed sheets range from three to four weeks, while other grades may be had promptly. Jobbers are finding a well sustained demand for all grades of sheets. Container manufacturers are ordering freely, but the roofing trade has passed the peak of its fall production schedule and specifications from this source are tapering sharply.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 3c.; No. 24 galv., 3.65c. to 3.75c.; No. 10 blue ann'l'd, 2.35c. Deliv'd prices at other Western points are equal to the freight from Gary, plus the mill prices, which are 5c. per 100 lb. lower than Chicago delivered prices.

Cast Iron Pipe.—New contracts for cast iron pipe are measurably larger from widely scattered points in this district. The National Cast Iron Pipe Co. will furnish 44,000 ft. of 8-in., 2500 ft. of 6-in. and 6000 ft. of 4-in. for O'Fallon, Ill. James B. Clow & Sons will ship a tonnage of cast iron pipe to Grosse Isle, Mich., and the McWane Cast Iron Pipe Co. will furnish 18,000 ft. of 6-in., 500 ft. of 8-in., 5000 ft. of 4-in. and 3000 ft. of 2-in. pipe for Cedarville, Ohio. Among fresh inquiries are 300 tons of 6 and 12-in. pipe for Glenview, Ill., and 8600 ft. of 6 and 8-in. for Birmingham, Mich. Genoa, Neb., will open bids Nov. 8 on 9000 ft. of 8-in. pipe. The C. W. Rolling Co., Des Moines, Iowa, has been awarded a general contract to lay 5000 ft. of 6-in. pipe at Indianola, Iowa.

Prices per net ton, deliv'd Chicago: Water pipe, 6-in. and over, $43.70 to $45.70; 4-in., $47.70 to $49.70; Class A and gas pipe, $3 extra.

Plates.—The outlook for increasing demand for plate mill products is brighter than it has been in the last four or five weeks. The railroad equipment field continues strong and prospects for added business in the oil producing centers of the West are bright. The Rock Island has come into the market for 5000 cars, which will require about 45,000 tons of steel. The Burlington announced a week ago that it would buy 600 cars and build a like number in its own shops. It is now reported that the car program being undertaken by this railroad calls for 2200 cars, of which about half will be let out on contract and the remaining 1100 will be built in the railroad's shops. The Missouri Pacific, which early in the year placed large orders for cars, expects to enter the market again about Dec. 1, when it will take figures on cars that are specified in the 1930 budget. Inquiries are out for 18 baggage and mail cars for the St. Louis-San Francisco and the Wabash. It is reported from St. Louis that inquiries for cars are being shaped by several Southwestern railroads. Greater interest in the conservation of oil and gas reserves gives promise that the petroleum industry will draw more heavily against steel mill commodities. Several odd-lot orders for tankage plates total 1500 tons for shipment to fabricators in the Southwest. Fresh inquiry from the same direction totals 7500 tons. It is interesting that current business of this kind is coming from widely scattered sources and in smaller individual lots than has been characteristic of oil producers' and refiners' needs in recent months. Manufacture of electrically welded pipe continues to take sizable tonnages of plates. Prices for plates remain steady at 2.05c. a lb., Chicago. Deliveries range from three to four weeks except when orders match rolling schedules.

Rails and Track Supplies.—After a delay of one week, releases against 1930 contracts for standard-section rails have reached mills and output has been advanced to 80 per cent of capacity. As to sales, this market is drifting quietly while sellers await inquiries which are expected from several Western railroads. Orders for track fastenings cover only needs for current maintenance programs. Demand for light rails is improving. The bulk of the tonnage placed is reported to have been taken by mills in Pennsylvania.

Prices f.o.b. mill, per gross ton: Standard section open-hearth and Bess. rails, $43; light rails, rolled from billets, $36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.15c.; angle bars, 2.75c.

Ferroalloys.—This market is quiet. a carload of spiegeleisen, in the 19 to 21 per cent grade, has been sold at $34 a ton, Hazard, Pa. Quotations on 50 per cent ferrosilicon are $83.50 a ton for future and $88.50 a ton for spot business.

Prices delivered Chicago: 80 per cent ferromanganese, $112.56; 50 per cent ferrosilicon, $83.50 to $88.50; spiegeleisen, 19 to 21 per cent, $39.76 to $41.76.

Bolts, Nuts and Rivets.—Releases for these commodities are larger from manufacturers of farm machinery, the railroads and car builders. After several months, in which producers have been balancing stocks, they now find that, at 60 to 65 per cent of capacity, shipments about match output. Total shipments in October are smaller than in the same month a year ago.

Reinforcing Bars.—Awards of reinforcing bars total above 1600 tons for the week. Fresh inquiry is not large and dealers are not entertaining high hopes as to the volume of business that will be closed this fall. Nevertheless, the thought is expressed by sellers that the strengthening of the bond market is a factor which can be expected to stimulate building programs and in turn increase demand for reinforcing bars. Sales for the first 10 months of 1929 are variously reported at 10 to 20

per cent below the corresponding period a year ago. Order books are a shade lighter than in October, 1928, and inquiries hold less promise than at this time a year ago. Lower levels of prices through most of this year have narrowed profits. Quotations remain mixed as competition waxes keen for tonnages that are active.

Cold-Rolled Strip.—Prices for this commodity are steady in a market which is unusually dull both in sales and releases against old commitments. Consumers have given no indications that their needs will be greater in the near future.

Wire Products.—Output of wire mill products ranges from 50 to 60 per cent of capacity in the various mills in this district. Demand from jobbers is holding steady, even in the Northwest, where winter weather is soon to be expected. Shipments of woven wire fencing are a shade larger to widely scattered parts of the country. The manufacturing trade as a whole specified a smaller aggregate tonnage of wire and wire products than it did in the previous week. The disposition of most consumers is to buy at close range. Stocks in the hands of users and jobbers are small, this evidently being a satisfactory situation in view of the prompt service being given by mills.

Old Material. — Specialties and heavy tonnage grades of scrap are tending to pull away from each other both in volume of demand and strength of prices. Consumers of the heavy tonnage grades are curtailing shipments at a time when supplies are expanding. Strict inspections by mills have forced dealers to pay close attention to the preparation of scrap and, by the same token, there is accumulating in this district a sizable tonnage of scrap steel which will not meet the rigid regulations imposed by consumers. Some large buyers give evidence of having accumulated satisfactory stocks. Dealers continue to press for sales and, meeting stiff resistance from consumers, are accepting prices that range from 25c. to 50c. a ton below quotations of a week ago.

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars	3.00c.
Reinforc'g bars, billet steel	1.90c. to 2.25c.
Reinforc'g bars, rail steel	2.00c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Bands (⅜ in. in Nos. 10 and 12 gages)	3.20c.
Hoops (No. 14 gage and lighter)	3.75c.
Black sheets (No. 24)	4.05c.
Galv. sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.35c.
Spikes, ⅜ in. and larger	3.55c.
Track bolts	4.55c.
Rivets, structural	4.00c.
Rivets, boiler	4.00c.

	Per Cent Off List
Machine bolts	60
Carriage bolts	60
Coach or lag screws	60
Hot-pressed nuts, sq., tap. or blank	60
Hot-pressed nuts, hex., tap. or blank	60
No. 8 black ann'l'd wire, per 100 lb.	$3.45
Com. wire nails, base per keg	2.95
Cement c't'd nails, base per keg	2.95

Several thousand tons of heavy melting steel has been taken by a mill at $14.50 a gross ton, delivered. Hydraulic bundles have sold off 25c. The cast iron boring market is dull. Tonnages are accumulating at points of production and consumers show little interest even when offered this grade at $10 a gross ton, delivered, which is 50c. a ton below the figure established on the last tonnage sale. The specialty market is active and prices are well supported by a substantial volume of quiet buying. Stocks in the hands of some users are of fair size, and shipments are being closely watched. Gray iron and malleable shops are taking more scrap, the latter finding an active demand for castings by railroad equipment manufacturers. Both inquiries and purchases of electric furnace low phosphorus grades are active.

Prices deliv'd Chicago district consumers:

	Per Gross Ton
Basic Open-Hearth Grades:	
Heavy melting steel	$14.00 to $14.50
Shoveling steel	14.00 to 14.50
Frogs, switches and guards, cut apart, and misc. rails	15.75 to 16.25
Hydraul. compressed sheets	12.25 to 12.75
Drop forge flashings	10.75 to 11.25
No. 1 busheling	12.25 to 12.75
Forg'd cast and r'l'd steel carwheels	18.50 to 19.00
Railroad tires, charg. box size	18.50 to 19.00
Railroad leaf springs cut apart	18.50 to 19.00
Acid Open-Hearth Grades:	
Steel couplers and knuckles	17.00 to 17.50
Coil springs	19.00 to 19.50
Electric Furnace Grades:	
Axle turnings	14.25 to 14.75
Low phos. punchings	16.50 to 17.00
Low phos. plates, 12 in. and under	16.50 to 17.00
Blast Furnace Grades:	
Axle turnings	12.00 to 12.50
Cast iron borings	9.50 to 10.00
Short shoveling turnings	9.50 to 10.00
Machine shop turnings	7.00 to 7.50
Rolling Mill Grades:	
Iron rails	16.00 to 16.50
Rerolling rails	16.75 to 17.25
Cupola Grades:	
Steel rails less than 3 ft.	17.50 to 18.50
Steel rails less than 2 ft.	19.50 to 20.00
Angle bars, steel	17.00 to 17.50
Cast iron carwheels	14.00 to 14.50
Malleable Grades:	
Railroad	17.00 to 17.50
Agricultural	15.50 to 16.00
Miscellaneous:	
*Relaying rails, 56 to 60 lb.	23.00 to 25.00
*Relaying rails, 65 lb. and heav.	26.00 to 31.00

	Per Net Ton
Rolling Mill Grades:	
Iron angle and splice bars	15.00 to 15.50
Iron arch bars and transoms	20.50 to 21.00
Iron car axles	26.00 to 26.50
Steel car axles	17.00 to 17.50
No. 1 railroad wrought	13.50 to 14.00
No. 2 railroad wrought	12.50 to 13.00
No. 1 busheling	9.00 to 9.50
No. 2 busheling	7.00 to 7.50
Locomotive tires, smooth	14.50 to 15.00
Pipes and flues	10.00 to 10.50
Cupola Grades:	
No. 1 machinery cast	14.50 to 15.00
No. 1 railroad cast	14.00 to 14.50
No. 1 agricultural cast	13.25 to 13.75
Stove plates	12.25 to 12.75
Grate bars	11.75 to 12.25
Brake shoes	10.75 to 11.25

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Bars.—Both specifications and sales of mild steel bars have made good accounts of themselves in the last week. New business is coming from a wide circle of miscellaneous buyers. Manufacturers of tillage machinery are finding demand in excess of expectations and their tendencies are to expand operations. Prices for iron bars are quotable at 2c. to 2.05c., Chicago. Demand is steady from manufacturers of railroad equipment. Output of alloy steel bars ranges from 60 to 65 per cent of capacity. This commodity is rapidly gaining favor with manufacturers of farm implements, who are steadily taking larger quantities. For the first time in over a month, specifications for rail steel bars have fallen below shipments. New sales are dull, but on going business prices are holding at 1.95c., Chicago Heights.

Structural Material.—Greater activity in this market is indicated more by the volume of new work in architects' offices than by actual awards and new inquiries. Contracts for the week total 3400 tons, and fresh requests for prices aggregate 8600 tons. Specifications for structural materials are well ahead of the volume a week ago. The bulk of this material was ordered out by car builders. Prices obtained by fabricators still reflect a highly competitive market. Mills are asking 2c. to 2.05c., Chicago.

Mill prices on plain material, per lb.: 2.00c. to 2.05c. base, Chicago.

Detroit Scrap Unchanged

DETROIT, Oct. 29.—There have been no changes in prices on old material in this district.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Hvy. melting and shov. steel	$13.75 to $14.25
Borings and short turnings	8.25 to 8.75
Long turnings	8.00 to 8.50
No. 1 machinery cast	12.50 to 13.00
Automobile cast	13.00 to 13.50
Hydraul. comp. sheets	13.75 to 14.25
Stove plate	9.00 to 9.50
New No. 1 busheling	11.75 to 12.25
Old No. 1 busheling	10.25 to 10.75
Sheet clippings	8.00 to 8.50
Flashings	12.25 to 12.75

Railroad Orders Car and Ship Unloaders

Hocking Valley Railroad Co. has awarded contracts to Wellman-Seaver-Morgan Co., Cleveland, for three 17-ton stiff-leg ship ore unloaders, and to Industrial Brownhoist Corporation, Cleveland, for two 120-ton lifting turning car dumpers, for installation at Presque Isle, Ohio.

The dumpers will be located on one side of a slip and will be capable of handling over 60 120-ton cars an hour, and the ship unloaders will be on other side of slip. Electric pusher locomotives will be installed on both coal and ore piers for handling empty and loaded cars. The ore and coal dock will provide a new channel for the flow of Great Lakes ore and West Virginia coal.

Three large substations will be installed for supplying power to the development. A contract for electrical equipment has been let to Westinghouse Electric & Mfg. Co., East Pittsburgh.

New York

Pig Iron Inquiry for First Quarter—Steel Buying Shows No Recovery—Structural Awards Large

NEW YORK, Oct. 29.—Pig iron sales for the week, at 9000 tons, compare favorably with recent totals, although one transaction — the purchase of 5000 tons by a Connecticut melter—accounted for more than half of the aggregate. The Thatcher Co., Newark, N. J., has not yet closed on its inquiry for 3000 tons. The A. P. Smith Mfg. Co., East Orange, N. J., is in the market for 300 tons of No. 2X and No. 2 plain for first quarter, and another inquiry for that delivery calls for 1000 tons. Otherwise, interest in first quarter is confined mainly to tentative inquiries. Melt is holding up well and pressure for shipments of iron is unabated. The price situation shows some unsteadiness along the seaboard, where Buffalo, eastern Pennsylvania and Southern water-borne irons meet in competition.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	$22.41 to $22.91
*Buf. No. 2, del'd east. N. J.	20.78 to 21.28
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	19.89 to 21.02
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	20.39 to 21.52

Freight rates: $4.91 from Buffalo, $1.39 to $2.52 from eastern Pennsylvania.
*Prices delivered to New Jersey cities having rate of $3.28 a ton from Buffalo.

Cast Iron Pipe.—Northern foundries are endeavoring to maintain pressure pipe prices at $32 to $34 a ton, f.o.b. foundry, but occasional sales are still made at delivered prices figuring back to about $31, f.o.b. foundry. The Sinclair Refining Co., New York, has awarded about 450 tons of pipe for a new refinery at Wellsville, N. Y., to the National Cast Iron Pipe Co. The Federal Water Service Corporation, New York, has closed on 200 tons of 24, 30 and 36-in. water pipe for Chester, Pa., and the West Virginia Pulp & Paper Co., New York, has bought 100 tons of 12 to 24-in. pipe and fittings for Piedmont, W. Va. Municipal buying is limited to lots of a carload or less and not much activity is expected until after election, when some of the usual purchasing for winter delivery is expected by sellers.

Prices per net ton deliv'd New York: Water pipe, 6-in. and larger, $34.60 to $36.60; 4-in. and 5-in., $37.60 to $39.60; 3-in., $44.60 to $46.60. Class A and gas pipe $3 extra.

Finished Steel.—Recovery in steel buying may be hampered by the effects of the startling break in security values. While business conditions remain fundamentally sound, the steel trade does not overlook the fact that buying of the substantial character necessary to support high steel works operations is based to a considerable degree on confidence, which may be shaken by the events of the past week. It is too early to say that stock market happenings have had an effect on steel buying, but the situation is being watched closely. The past week has brought no improvement in the volume of steel bookings. Some local sales offices have done better in October than in September, but with others the total tonnage this month will fall below that of last month. Plate mills, which until recently have been well buttressed with orders, are now working almost hand-to-mouth. Building construction remains one of the outstandingly favorable factors, and it should be helped by the easier money conditions now prevailing, although the season is near at hand when lettings normally fall off. Awards of structural steel in the New York district, however, were high during the week at about 35,500 tons and almost 20,000 tons of new inquiry appeared. Of the awards, 13,200 tons was for subway construction, which also contributes 12,300 tons to prospective business. The Salmon Tower Building, Fifth Avenue and Forty-second Street, requiring 9300 tons, has been awarded. Both of the largest awards of the week, totaling 22,500 tons, went to the McClintic-Marshall Co. Two apartment buildings totaling upward of 11,000 tons have come into the market.

Mill prices per lb., deliv'd New York: Soft steel bars, 2.24c. to 2.29c.; plates, 2.22½c.; structural shapes, 2.14½c.; bar iron, 2.14c.

Reinforcing Bars.—The National Bridgeworks will supply 1300 tons of bars for grade crossing elimination work on the Long Island Railroad at Jamaica, N. Y. The volume of small jobs ranging from 25 to 75 tons has fallen off considerably. However, prices are firm and unchanged.

Warehouse Business.—Buying continues small, but prices are stable except for the tendency to grant concessions of $1 to $2 a ton on black and galvanized and as much as $5 and $6 a ton on blue annealed sheets. Demand for structural material is fair, but tonnages being sold from stock are beginning to decrease in size.

Coke.—Prices are unchanged in a quiet market. Standard furnace coke is quoted at $2.75 a net ton, Connellsville, and special brands of beehive coke are unchanged at $4.85 a net ton, ovens. Beehive foundry grade is quoted at $8.56, delivered to northern New Jersey, Jersey City and Newark and $9.44 to New York and Brooklyn. By-product foundry coke is quoted at $9 to $9.40 a net ton, Newark or Jersey City, and $10.06, New York or Brooklyn.

Old Material.—Stocks of scrap in consumers' yards are not believed to be large, but in most cases mills are confining their purchases to a few carloads at a time, or are pressing for delivery of scrap due them on old contracts. Prices are substantially unchanged, with No. 1 heavy melting steel being bought at $15 to $15.50 a ton, delivered eastern Pennsylvania, and No. 2 steel at $11.50 to $13.50, de-

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.30c.
Soft steel bars, small shapes	3.25c.
Iron bars	3.24c.
Iron bars, Swed. charcoal	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Cold-roll. strip, soft and quarter hard	5.15c. to 5.40c.
Hoops	4.25c.
Bands	3.75c.
Blue ann'l'd sheets (No. 10)	3.50c. to 3.90c.
Long terne sheets (No. 24)	5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galv. annealed	5.15c.
Tire steel, ½ x ½ in. and larger	3.40c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.75c.
Open-hearth spring steel, bases	4.50c. to 7.00c.

	Per Cent Off List
Machine bolts, cut threads:	
¾ x 6 in. and smaller	60
1 x 30 in. and smaller	50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	60
¾ x 20 in. and smaller	50 to 50 and 10
Coach screws:	
½ x 6 in. and smaller	60
1 x 6 in. and smaller	50 to 50 and 10

	Per 100 Ft.
Boiler Tubes—	
Lap welded, 2-in.	$17.33
Seamless steel, 2-in.	20.24
Charcoal iron, 2-in.	25.00
Charcoal iron, 4-in.	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
½-in. butt	46	29
¾-in. butt	51	37
1-3-in. butt	53	39
2½-6-in. lap	48	35
7 and 8-in. lap	44	17
11 and 12-in. lap	37	12
Wrought Iron—		
½-in. butt	5	+19
¾-in. butt	11	+ 9
1-1½-in. butt	14	+ 6
2-in. lap	5	+14
3-6-in. lap	11	+ 6
7-12-in. lap	8	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box	$6.45	$6.20
Charcoal, per Box—	A	AAA
IC	$9.70	$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating	$10.00 to $11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets, Box Annealed—Black, C. R. One Pass

	Per Lb.
Nos. 18 to 20	3.75c. to 3.80c.
No. 22	3.90c. to 3.95c.
No. 24	3.95c. to 4.00c.
No. 26	4.05c. to 4.10c.
No. 28*	4.20c. to 4.25c.
No. 30	4.45c. to 4.50c.

Sheets, Galvanized

	Per Lb.
No. 14	4.20c. to 4.40c.
No. 16	4.15c. to 4.25c.
No. 18	4.20c. to 4.40c.
No. 20	4.30c. to 4.50c.
No. 22	4.40c. to 4.60c.
No. 24	4.65c. to 4.75c.
No. 26	4.90c. to 5.00c.
No. 28*	5.15c. to 5.25c.
No. 30	5.55c. to 5.65c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

livered, depending upon the mill to which it is shipped.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel	$12.00 to	$12.35
Heavy melting steel (yard)	8.00 to	9.50
No. 1 hvy. breakable cast.	10.25 to	11.00
Stove plate (steel works).		8.00
Locomotive grate bars....		8.25
Machine shop turnings....	7.50 to	8.00
Short shoveling turnings..	7.50 to	8.00
Cast borings (blast fur. or steel works)	7.00 to	7.75
Mixed borings and turnings	6.75 to	7.75
Steel car axles	18.00 to	18.50
Iron car axles	22.50 to	23.00
Iron and steel pipe (1 in. dia., not under 2 ft. long)		10.25
Forge fire	9.50 to	10.00
No. 1 railroad wrought...	12.00 to	12.50
No. 1 yard wrought, long..	11.00 to	11.50
Rails for rolling	12.75 to	13.25
Stove plate (foundry)....	8.25 to	8.50
Malleable cast (railroad).	13.50 to	14.00
Cast borings (chemical)..	9.50 to	10.00

Prices per gross ton, deliv'd local foundries:

No. 1 machry. cast.....	$16.00
No. 1 hvy. cast (columns, bldg. materials, etc.), cupola size.....	14.00
No. 2 cast (radiators, cast boilers, etc.)	13.50

Aluminum Cans Being Tried in Norway

An experiment with the object of replacing tin with aluminum in the canning of foods is being made in Norway, according to information from Norwegian sources transmitted to the Department of Commerce by Commercial Attaché Marquard H. Lund at Oslo. At present the experiment is limited to canned fish. Fifty thousand aluminum cans have been made up and used for canned fish balls and other fish products, part of which has been exported.

Against a price that is considerably higher than tin, mention is made of saving the expense of a printed label, as aluminum may be embossed because it does not rust.

A Norwegian aluminum company is supplying the aluminum for these experiments and is backing the project. Plans are being made for the installation of rolling equipment at the company's plant at Hoyanger for the special gage sheets required.

With sales already 20 per cent greater than in all of 1928, itself a record year, the Electric Tramrail division of the Cleveland Crane & Engineering Co., Wickliffe, Ohio, expects 1929 to surpass 1928 by about 50 per cent. The heavy crane division and the welding department are both running considerable night forces.

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and struc. shapes.....	3.00c.
Soft steel bars	3.00c.
Reinforc. steel bars.....2.25c. to	2.50c.
Cold-fin. rounds and hex.....	3.65c.
Cold-fin. flats and sq.....	4.15c.
Hoops and bands, No. 12 to ¼ in., inclusive	3.25c.
Hoops and bands, No. 13 and lighter	3.65c.
Cold-finished strip.....*5.95c.	
Black sheets (No. 24).....3.70c. to	3.90c.
Galvanized sheets (No. 24).4.60c. to	4.75c.
Blue ann'l'd sheets (No. 10).....	3.25c.
No. 9 ann'l'd wire, per 100 lb.....	$2.65
No. 9 gal. wire, per 100 lb.....	3.00
Com. wire nails, base per keg.....	2.65

*Net base, including boxing and cutting to length.

Cleveland

Further Slowing Down in Mill Operations, Particularly in Sheets—No General Automotive Upturn in Sight

CLEVELAND, Oct. 29.—Demand for finished steel during the past week held up to about the recent volume except for sheets, which are unusually slow following a recent rather limited spurt of orders from the automotive industry. Manufacturing plants not affected by the slowing down of the automotive industry are keeping up their operations at a fair rate, but practically all their orders for steel are for small lots.

While the automotive industry has made some purchases of steel bars, strip and sheets for November requirements, the demand from that source continues to drag. There are as yet no indications of a general increase in production schedules by automobile manufacturers during November.

There has been some further slowing down of mill operations. Some of the sheet mills in this territory are operating at not over 25 per cent of capacity, although the average is probably around 50 per cent. Some of the hot-rolled strip mills are somewhat under 50 per cent. Local bar mills have not reduced operations materially.

There is very little of interest in the price situation. Steel bars have settled to the recently quoted minimum Cleveland base, and there is some pressure against the 1.95c., Pittsburgh base on structural shapes and plates.

Pig Iron.—Foundries, as a rule, are taking little interest in the market. Consumers in general have enough iron under contract for the remainder of the year and are not ready to buy for the first quarter. Sales fell off sharply the past week, during which Cleveland interests took orders for 10,000 tons of foundry and malleable iron, practically all in small lots. An upward trend in shipments has not materialized this month. While one producer will ship a little more iron than during September, shipping orders by other furnace interests will be about the same as last month. Consumers in manufacturing industries aside from the automotive industry are taking iron in about the usual quantities, but shipping orders from the automobile foundries continue light. There has been a slowing down recently by jobbing foundries in this territory. However, their operations are spotty, some being well filled with work and others having very little business. Prices show no change. Cleveland furnaces quote foundry and malleable iron at $19, furnace, for local delivery, and at $18.50 for outside shipment. A central Ohio foundry purchased 500 tons of foundry iron from a Valley producer during the week at $18.50, indicating that that price is being well maintained in the Valley district. In Michigan, the range from $19.50 to $20, furnace, for foundry and malleable iron still exists.

Prices per gross ton at Cleveland:

N'th'n fdy., sil. 1.75 to 2.25	$19.50
S'th'n fdy., 1.75 to 2.25...$20.50 to	21.00
Malleable	19.50
Ohio silvery, 8 per cent...	28.00
Basic Valley furnace.....	18.50
Stand. low phos., Valley.. 26.50 to	27.00

Prices except on basic and low phosphorus are delivered Cleveland. Freight rates: 50c. from local furnaces; $3 from Jackson, Ohio; $6 from Birmingham.

Strip Steel.—Little new business is coming out for either hot or cold-rolled strip, and specifications against outstanding contracts continue light. Mills are operating from hand-to-mouth. There is not enough activity to arouse any particular interest in prices, and the market appears to be very well maintained at 1.90c., Pittsburgh, for wide strip and 2c. for narrow and 2.75c., Cleveland, for cold-rolled strip.

Semi-Finished Steel.—Specifications from some consumers are fair and others are greatly reduced. There is no new inquiry. Shipments are being made against contracts at $35, Cleveland and Youngstown, for sheet bars, billets and slabs. A local mill continues to operate 11 of its 14 open-hearth furnaces. Wire rods are firm at $40, Cleveland.

Bolts, Nuts and Rivets.—Orders for bolts and nuts are still rather light, principally because of the rather small amount of business that is coming from the automotive industry. The October volume will be about the same as during September. The industry is operating at about 60 per cent of capacity. Rivets are in moderate demand. Prices on both lines appear to be firmly maintained.

Bars, Plates and Shapes.—Structural shapes are in fairly good demand. Plates are quiet and steel bars continue to move very slowly. Orders generally are for small lots. While there is not much inquiry for steel in the building field, small fabricators are getting considerable work in small lots and their shops are well filled. Considerable structural work is in prospect, but is being held up, evidently because of the present financial situation. Steel bars are now generally quoted at 1.90c., Cleveland.

Sheets.—The volume of sheet business the past week was the lightest in several months. However, with the recent releases of auto body sheets, some of the mills have better order books than a few weeks ago. Black sheets are moving fairly well in small lots. The market appears well stabilized at the recent range of quotations, although no lots came out during the week of sufficient size to test prices. Blue annealed sheets show ir-

regularities, being affected by both strip mill and continuous sheet mill competition. Continuous mills quote blue annealed sheets at 2.10c. and 2.25c. for No. 10 and No. 13 gage respectively, although some buyers in the automotive industry have covered at $2 a ton lower. Black sheets are firm at 2.75c., Pittsburgh, and galvanized at 3.50c.

Wire Products.—Mills have closed contracts with jobbers for nails for the remainder of the year at $2.40 a keg, Cleveland. Retailers recently have been able to buy at as low as $2.45, but an attempt is being made to stabilize prices to retailers at $2.50. Demand, which has been very slow, shows a little improvement, and mills report a slightly firmer price tone. Wire is holding to 2.40c., Cleveland. Demand is slow.

Coke.—A Valley producer has advanced by-product coke prices 50c. a ton to $5.25, furnace, for egg and to $5 for nut size. However, the nut grade is still available at $4.75. October prices have been reestablished for November on by-product foundry coke. These are $8.25, Painesville, and $6.50, Ashland. Prices on Connellsville foundry coke are unchanged. A slowing down in the foundry industry is reflected in a decline in coke specifications.

Old Material.—The market is almost at a standstill. A local consumer has suspended shipments on both steel-making and blast furnace scrap, and there is no new buying by the mills. Prices are weak but untested. While quotations are unchanged, they are regarded as nominal. Small lots of No. 1 busheling were purchased in Detroit by a Cleveland dealer at $12.25 to $12.50 for delivery to an Ohio mill.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$14.75 to $15.00
No. 2 heavy melting steel	14.25 to 14.50
Compressed sheet steel	14.75 to 15.25
Light bundled sheet stampings	12.00 to 12.50
Drop forge flashings	13.00 to 13.25
Machine shop turnings	10.00 to 10.50
Short shoveling turnings	11.50 to 12.00
No. 1 railroad wrought	13.50 to 14.00
No. 2 railroad wrought	16.00 to 16.50
No. 1 busheling	13.25 to 13.75
Pipes and flues	9.00 to 9.50
Steel axle turnings	12.50 to 13.00
Acid Open-Hearth Grades:	
Low phos., forging crops	17.75 to 18.00
Low phos., billet, bloom and slab crops	18.50 to 18.75
Low phos., sheet bar crops	18.00 to 18.50
Low phos., plate scrap	18.00 to 18.50
Blast Furnace Grades:	
Cast iron borings	10.50 to 11.00
Mixed borings and short turnings	10.50 to 11.00
No. 2 busheling	10.00 to 10.50
Cupola Grades:	
No. 1 cast	17.50 to 18.00
Railroad grate bars	11.00 to 12.00
Stove plate	12.00 to 12.50
Rails under 3 ft.	18.50 to 19.50
Miscellaneous	
Railroad malleable	18.00 to 18.50
Rails for rolling	16.25 to 16.50

Philadelphia

Plate and Shape Business Fair—Steel Buying Generally At Low Level—Pig Iron Quiet

PHILADELPHIA, Oct. 29.—Steel buying is limited to small orders for current requirements. Shape mills are well engaged with tonnage from fabricating shops, which are booking some good contracts despite the advanced season. Bars and sheets continue quiet, as a result of inactivity in the automotive field, and it is suggested that the recession in the stock market will be a factor in retarding recovery of the automobile business. Announcement that the plant of the Victor Talking Machine Co., Camden, N. J., is to be expanded to manufacture all radios for a new corporation, which includes the Victor Talking Machine Co., General Electric Co. and Westinghouse Electric & Mfg. Co., leads sheet sellers here to expect a considerable sales increase in this district of sheets and other material for radio building.

Pig Iron.—Prices are lacking in strength, but, with consumers of foundry iron buying only small lots, actual test of the market is lacking. The quotation of $21, furnace, however, is occasionally shaded 50c. a ton, even on small lots. Although demand is light, especially from the larger companies such as soil and pressure pipe and radiator manufacturers, shipments on old contracts are reported by sellers to be going forward without requests for delay. Basic iron is inactive, but a consumer at Claymont, Del., is showing interest in prices and is expected to inquire for a tonnage soon. The Virginia producer of pig iron goes into blast today and has booked 16,000 tons of foundry iron for shipment to the Virginia cast iron pipe makers at $17.75 a ton, furnace. On this basis, the furnace is preparing to compete for tonnage in the Cumberland Valley, to points in which it has a freight rate of $3.63 a ton.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil.	$21.26 to $21.76
East. Pa. No. 2X, 2.25 to 2.75 sil.	21.76 to 22.26
East. Pa. No. IX	22.26 to 22.76
Basic (del'd east. Pa.)	19.75 to 20.25
Gray forge	20.00 to 20.50
Malleable	21.25 to 21.75
Stand. low phos. (f.o.b. N. Y. State furnace)	22.00 to 23.00
Cop. br'g low phos. (f.o.b. furnace)	23.50 to 24.00
Va. No. 2 plain, 1.75 to 2.25 sil.	24.04
Va. No. 2X, 2.25 to 2.75 sil.	24.54

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces; $4.54 from Virginia furnaces.

Bars.—Specifications on contracts are small and new business is usually for less than carload lots. The price on contracts and spot business is 1.90c. a lb., Pittsburgh, or 2.22c., delivered Philadelphia.

Reinforcing Bars.—New projects in reinforced concrete involve only small tonnages of bars. One hundred tons of bars for a building for the Homeopathic Hospital, Wilmington, Del., has been awarded to the McClintic-Marshall Co. Prices of reinforcing bars are unchanged, with distributers quoting 1.95c. to 2c., Pittsburgh, or 2.27c. to 2.32c., delivered Philadelphia, with no extra for cutting to length, for billet steel bars, and 1.85c. to 1.95c., Franklin, Pa., or Tonawanda, N. Y., or 2.17c. to 2.27c., Philadelphia, for rail steel bars.

Plates.—Mills are maintaining fair operating rates and have some good business in prospect from shipbuilders and the railroads. The Pennsylvania Railroad, which placed 50 locomotives with the Baldwin Locomotive Works and 25 with the Lima Locomotive Works, is to build 25 in its Altoona shops, also 100 tenders. The price of plates is unchanged at 2.05c., Coatesville, or 2.15c., delivered Philadelphia.

Shapes.—Despite a steady flow of business from fabricating shops, which are well engaged on contracts, prices of shapes show no tendency to become firmer. Quotations are unchanged at 1.90c. to 1.95c. per lb., f.o.b. nearest mill to consumer, or 1.96c. to 2.01c., delivered Philadelphia, and these prices are occasionally shaded slightly.

Sheets.—Local consumers of sheets are operating on curtailed schedules, but in the case of automobile body builders, increased output is expected when the designs for new models of two leading makes of motor cars are received. A leading radio manufacturer in this district is still operating at only a small percentage of total capacity, but sheet sellers are looking forward to increased radio consumption with expansion next year of the Victor Talking Machine Co. plant in Camden, N. J. Sheet prices are unchanged at 2.75c., Pittsburgh, or 3.07c., Philadelphia, for black sheets, and

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.70c.
Plates, ⅜-in.	2.90c.
Structural shapes	2.70c.
Soft steel bars, small shapes, iron bars (except bands)	2.80c.
Round-edge iron	3.50c.
Round-edge steel, iron finished 1½ x 1½ in.	3.50c.
Round-edge steel planished	4.30c.
Reinforc. steel bars, sq. twisted and deform.	2.60c. to 2.80c.
Cold-fin. steel, rounds and hex.	3.60c.
Cold-fin. steel, sq. and flats	4.10c.
Steel hoops	3.55c.
Steel bands, No. 12 to ⅜-in. inclus.	3.30c.
Spring steel	5.00c.
*Black sheets (No. 24)	4.10c.
†Galvanized sheets (No. 24)	4.85c.
Light plates, blue annealed (No. 10)	3.25c.
Blue ann'l'd sheets (No. 13)	3.40c.
Diam. pat. floor plates—	
¼-in.	5.30c.
⅜-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

*For 50 bundles or more; 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.
†For 50 bundles or more; 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

3.50c., Pittsburgh, or 3.82c., Philadelphia, for galvanized sheets. Blue annealed sheets, No. 13 gage, are quoted at 2.35c., Pittsburgh, or 2.67c., delivered Philadelphia, and blue annealed plates, No. 10 gage, at 2.20c., Pittsburgh, or 2.52c., Philadelphia. On sales to automobile builders and other preferred buyers, or when competition is encountered from the product of the continuous mill, the blue annealed sheet price is usually shaded about $2 a ton.

Imports.—In the week ended Oct. 26, a total of 1945 tons of pig iron arrived at this port from British India. Steel imports consisted of 51 tons of steel bars from France, 37 tons from Germany and 7 tons from Belgium, 44 tons of steel bands from France and 16 tons from Germany, 50 tons of structural shapes from Belgium, 10 tons from France and 7 tons from Germany, 8 tons of steel scrap from France and 2 tons from the United Kingdom.

Old Material.—All grades of scrap are quiet and prices are unchanged. Buyers of No. 1 heavy melting steel are pressing for shipments on old orders and claim to be able to buy in the present market at $15.50 a ton, delivered. Heavy breakable cast, after receding to $14.50 a ton, delivered, is slightly firmer, and consumers have been unable to buy at a lower price.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	$15.50 to $16.00
Scrap T rails	15.00 to 15.50
No. 2 heavy melting steel	12.50 to 14.00
No. 1 railroad wrought	16.00 to 16.50
Bundled sheets (for steel works)	11.50
Hydraulic compressed, new	14.50 to 15.00
Hydraulic compressed, old	12.00 to 12.50
Machine shop turnings (for steel works)	12.00
Heavy axle turnings (or equiv.)	14.00 to 14.50
Cast borings (for steel works and roll. mill)	11.00 to 11.50
Heavy breakable cast (for steel works)	14.50 to 14.75
Railroad grate bars	12.00 to 12.50
Stove plate (for steel works)	12.00
No. 1 low phos., hvy., 0.04% and under	22.00 to 23.00
Couplers and knuckles	19.50 to 20.50
Rolled steel wheels	19.50 to 20.50
No. 1 blast f'nace scrap	10.50 to 11.00
Wrot. iron and soft steel pipes and tubes (new specific.)	14.50
Shafting	19.00 to 19.50
Steel axles	22.75 to 23.25
No. 1 forge fire	14.00
Cast iron carwheels	16.50
No. 1 cast	16.00 to 16.50
Cast borings (for chem. plant)	14.50
Steel rails for rolling	16.50 to 17.00

Hyman-Michaels Co., Peoples Gas Building, Chicago, has incorporated the Hyman-Michaels Tank Line, Inc., to be run in connection with the present railroad equipment, rail, scrap iron and steel business. The new company will lease on a rental basis class 11 tank cars of all sizes. Maintenance plants will be established at East Chicago, Indiana, St. Louis, and Fort Worth, Tex. Officers of the Hyman-Michaels Tank Line, Inc., are: Joseph Michaels, president; S. E. Purdy, vice-president; E. B. Michaels, secretary; T. E. Tennis, general manager, and J. P. Morrissey, traffic manager.

Manganese Ore from Montana

Manganese dioxide, which is used in making dry batteries, has since 1918 been obtained in the United States chiefly from the Philipsburg district in Montana. The district has also produced more or less manganese oxide ore suitable for use in steel making, and recently a small shipment of Philipsburg ore was used at Silver King, Idaho, in the Tainton process of zinc extraction. The process of beneficiating the dioxide ore has produced a large quantity of manganiferous tailings, which is valuable either for reconcentrating or for fluxing. It is now being used as a flux at the blast furnace of the Columbia Steel Corporation at Provo, Utah, in the manufacture of high-manganese pig iron.

Statistics compiled by the United States Geological Survey, supplemented by figures from the Bureau of Mines, show that to the end of December, 1928, shipments of manganiferous material from Philipsburg amounted to 442,482 tons, classified as follows:

	To End of 1918, (War Period) Tons	1919-1928, Tons	Total, Tons
Crude ore (35 per cent or more of manganese)	200,079	30,700	230,779
Concentrate (about 70 per cent of manganese dioxide)	1,450	188,550	190,000
Tailings (about 20 per cent of manganese)	....	21,488	21,488
Low-grade crude ore (about 20 per cent of manganese)	....	215	215
Total shipments	....	....	442,482

On the assumption that 2¼ tons of crude ore was required for each ton of concentrate produced, it appears that in round figures 427,500 tons of ore was milled. This amount, added to the crude ore shipped, gives a grand total of 658,500 tons mined.

Electric Sponge Iron Plant in Canada

Robert Turnbull, president of the Volta Mfg. Co., Welland, Ont., who has developed a process for the reduction of iron ore by electrometallurgical methods, has with his associates, F. A. J. FitzGerald and J. Kellener, of the FitzGerald Laboratories at Niagara Falls, N. Y., secured a site at Sault Ste. Marie for the establishment of a plant to manufacture sponge iron and steel.

Two furnaces are to be built at once at a cost of $75,000, and it is understood further expenditure is contemplated. The site was secured from the Algoma Steel Corporation and construction will commence in the next few weeks.

Since the Government of Ontario plans to pay a bonus of 1c. a unit on all iron ore mined in the province and will introduce legislation at the next session of the legislature to give effect to this bonus, Mr. Turnbull's experimental work has an immediate practical interest, it is pointed out. His process would convert the ore at the mine into what he terms sponge iron. He claims that steel made from sponge iron in the open-hearth or electric furnace is of much higher quality than steel made from a mixture of ordinary steel scrap and pig iron. The proponent of the project states:

> Our work to date leads us to believe that we are working in the right direction. We have made sponge iron and we have made it from refractory ores of Canada. Our furnace design will, I believe, lend itself to a satisfactory solution of what today I think is the most important problem confronting the iron and steel manufacturer—a method of producing iron cheaply and from ore which today the blast furnace cannot handle.

The new process is said to reduce, by electricity, the low-grade iron ores to sponge iron without the use of carbon, by melting the iron content without affecting the impurities. The ore would be reduced in two separate chambers—one heated by electric resistors and the other a preheating chamber. It is claimed by those interested that not only will the process handle magnetite iron, but it will utilize all the present scrap iron, now shipped out of Canada for treatment. The reducing units are designated to be built in units of 30 tons. Definite information as to the details of the plan are not available.

Thomson and Gibb Welding Machine Companies Merge

A consolidation of the Thomson Electric Welding Co., Lynn., Mass., and the Gibb Welding Machines Co., Bay City, Mich., has been announced, the new company to be known as the Thomson-Gibb Electric Welding Co. Both plants will continue in operation.

The Thomson company was formed in 1886 to exploit the basis resistance welding patents of Prof. Elihu Thomson of Lynn, Mass. Professor Thomson has always been an officer and director of the Thomson company and will continue with the new company in both capacities. The Gibb company has specialized in seam welding.

The Thomson-Gibb Electric Welding Co. will offer a full line of butt, flash, seam, spot, protection, and wire fabric welders. It will maintain service engineers in all leading production centers.

"Methods of Test Relating to Electrical Insulating Materials" is the title of a pamphlet issued by the American Society for Testing Materials, Philadelphia. It contains all of the methods of testing such materials prepared by the society's committee D-9 and also contains the annual report of this committee, presented at the regular yearly meeting of the society at Atlantic City last June. The pamphlet also contains a few specifications prepared by other committees of the society which are of interest in electrical insulations. It contains approximately 200 pages.

Pacific Coast

Cast Iron Pipe Order of 3000 Tons Goes to France—Steel Demands Hold Up Fairly Well

SAN FRANCISCO, Oct. 26 (*By Air Mail*).—Awards of 1100 tons of structural steel shapes for an office building in Los Angeles, 600 tons of plates for a pipe line at Ashland, Ore., and 3000 tons of cast iron pipe for Ladner, B. C., were the outstanding developments of the week. Demand is holding up well and prices in most lines are well maintained.

Pig Iron.—Little of importance has occurred in the pig iron market. Prices are unchanged.

Prices per gross ton at San Francisco:

*Utah basic	$25.00 to $26.00
*Utah fdy., sil. 2.75 to 3.25	25.00 to 26.00
**Indian fdy., sil. 2.75 to 3.25	25.00 to 26.00

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Bars.—Reinforcing steel bar orders exceeded 1500 tons. The Blue Diamond Co. secured 800 tons for an office building in Los Angeles and the Pacific Coast Steel Co. took 600 tons for a pulp plant at Port Angeles, Wash., for the Olympic Forest Products Co. and 100 tons for a bridge over the North River at Olympia, Wash. Bids were opened on three bridge projects in Washington calling for more than 1400 tons. Bids are being taken on 100 tons for a mausoleum at Whittier, Cal. Prices on out-of-stock material in Los Angeles continue at 2.40c., base, on carload lots and at 2.70c. on smaller tonnages, while quotations in the San Francisco territory are $2 a ton lower. Merchant bar steel holds at 2.35c., c.i.f. coast ports.

Plates.—The only important award of the week went to the Beall Tank & Pipe Co., Portland, Ore., and called for 600 tons of 24-in. welded steel pipe for Ashland, Ore. During the past several weeks, demand for plates has fallen off, and the only large inquiry now before the trade involves 1400 tons for a 36 to 48-in. welded steel pipe line at Everett, Wash., bids on which were opened this week. Prices continue general at 2.35c. on the usual run of the market, with $1 to $2 a ton lower quoted on sizable tonnages.

Shapes.—Among the larger structural lettings of the week were 1100 tons for the Los Angeles Stock Exchange Building, placed with the Consolidated Steel Corporation; 400 tons for a power house at North Bend, Ore., booked by the Minneapolis Steel & Machinery Co.; and 156 tons for an apartment house at Palo Alto, Cal., taken by McClintic-Marshall Co. Numerous small projects, ranging from 30 to 60 tons, were also placed. The largest pending inquiry calls for 2400 tons for the Eleventh Street viaduct, Tacoma, Wash., bids on which have been opened. Bids were also opened on 1000 tons for the Fourteenth Avenue South bridge, Seattle, and on 243 tons for the West Spokane Street bridge approach, Seattle. Prices remain unchanged and firm at 2.35c., c.i.f.

Cast Iron Pipe.—Demand for cast iron pipe has again fallen off. Only one award of importance was reported. French interests secured 3000 tons of 2 to 12-in. Class B pipe for Ladner, B. C. The R. E. Hazard Contracting Co. was low bidder on 112 tons of 4 to 8-in. Class B pipe for Estelle Street, San Diego. No action has been taken by Burbank, Cal., on its inquiry for 261 tons of 6 and 8-in. Class B pipe, bids on which were opened Oct. 15. The University of California, Berkeley, has taken bids on 287 tons of 4 to 10-in. Class 150 pipe for delivery at Redwood City, Cal. Santa Ana, Cal., will open bids on Nov. 5 for 449 tons of 2 to 8-in. Class B pipe for the improvement of Dana Point.

Steel Pipe.—Movement of standard steel pipe is restricted, and stocks in distributers' hands are well rounded out. Los Angeles opened bids this week on 243 tons of 1 to 8-in. black and galvanized steel pipe. Pipe line inquiries have been few and far between of late.

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and struc. shapes	3.30c.
Soft steel bars	3.40c.
Small angles, ⅞-in. and over	3.15c.
Small angles, under ⅞-in.	3.55c.
Small channels and tees, ¾-in. to 2¾-in.	3.75c.
Spring steel, ¼-in. and thicker	5.00c.
Black sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.80c.
Galv. sheets (No. 24)	5.30c.
Struct. rivets, ½-in. and larger	5.65c.
Com. wire nails, base per keg	$3.40
Cement c't'd nails, 100 lb. keg	3.40

Boston

Pig Iron Buying Light—Scrap Business Marking Time—Structural Steel Awards of 5000 Tons

BOSTON, Oct. 29.—A Rhode Island foundry divided an order for 1000 tons of malleable pig iron for December and first quarter delivery with two Eastern furnaces at prices equivalent to about $17.50 a ton, Buffalo. Otherwise, sales of foundry iron were largely in car lots, and indications are that business during the remainder of 1929 will be comparatively light, owing to recent large buying of Southern iron for last quarter delivery. Buffalo district furnaces have obtained a further concession in the rail and water freight to $4.05 a ton. Eastern iron, however, is offered at sufficiently low prices to meet the new rail and water rate that obtains only to the close of navigation, which probably will be around Nov. 15. While Alabama furnaces are holding to $14.50 a ton, base furnace, for business in their immediate territory, as low as $14 is being done in outside territories.

Foundry iron prices per gross ton deliv'd to most New England points:

†Buffalo, sil. 1.75 to 2.25	$21.55 to $22.05
†Buffalo, sil. 2.25 to 2.75	22.05 to 22.55
*Buffalo, sil. 1.75 to 2.25	22.41 to 22.91
*Buffalo, sil. 2.25 to 2.75	22.91 to 23.41
East. Penn., sil. 1.75 to 2.25	22.65 to 23.15
East. Penn., sil. 2.25 to 2.75	23.15 to 23.65
Va., sil. 1.75 to 2.25	25.21
Va., sil. 2.25 to 2.75	25.71
*Ala., sil. 1.75 to 2.25	24.11
*Ala., sil. 2.25 to 2.75	24.61
†Ala., sil. 1.75 to 2.25	20.25
†Ala., sil. 2.25 to 2.75	20.75

Freight rates: $4.91 all rail from Buffalo, and $4.05 rail and water; $3.65 all rail from eastern Pennsylvania; $5.21 all rail from Virginia; $9.61 all rail from Alabama and $5.75 rail and water from Alabama to New England seaboard.
*All rail rate.
†Rail and water rate.

Cast Iron Pipe.—Few municipalities are openly placing pipe orders, but quite a number of them are privately buying for late 1929 and early 1930 delivery. Tonnages involved in all instances, however, are small. Swampscott, Mass., placed 100 tons of 6 and 8-in. pipe with the United States Pipe & Foundry Co., and Ayer, Mass., bought 150 tons of 8 in. from the Warren Foundry & Pipe Co. Several New England utility companies are sounding out the market on large tonnages for spring delivery. Prices quoted openly on domestic pipe are: 4-in., $44.10 to $45.10 a ton, delivered common Boston freight rate points; 6 to 12-in., $40.10 to $41.10; 16 to 20-in., $39.60. A $4 differential is asked on Class A and gas pipe.

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars, small shapes	3.265c.
Flat, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway rounds	6.60c.
Norway squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tie steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold-rolled steel—	
Rounds and hex	*3.55c. to 5.55c.
Squares and flats	*4.05c. to 7.05c.
Toe calk steel	6.00c.
Rivets, structural or boiler	4.50c.

	Per Cent Off List
Machine bolts	50 and 5
Carriage bolts	50 and 5
Lag screws	50 and 5
Hot-pressed nuts	50 and 5
Cold-punched nuts	50 and 5
Stove bolts	70 and 10

*Including quantity differentials.

Warehouse Business. — Wire nails nave been reduced another 10c. per keg, making a total cut during October of 20c., and the price from stock today is $3.20, base. Staples also have been reduced 10c. to $6.05 a keg from stock. Aggregate weekly warehouse shipments are moderately large, but individual orders are small. Owing to continued competition from foreign material, list prices are not rigidly maintained.

Reinforcing Bars. — Business in billet steel bars is by no means brisk, but it is more active than recently. The largest award of the week was 300 tons for a local hotel to the Northern Steel Co., and the next largest was 200 tons for tunnel work in Cambridge, Mass., to the Concrete Steel Co. The Barker Steel Co. took 100 tons for the Warren Foundry & Pipe Co. foundry at Everett, Mass. Prices quoted openly are 2.61½c. a lb., base, from stock on large tonnages and 3.16c. for small lots, but large-lot prices have had to be shaded before buyers would place orders. The rail steel bar market is quiet at 2.26½c. a lb., base, delivered common Boston freight rate points.

Structural Steel.—Fabricated structural steel lettings the past week approximated 5000 tons, 1300 tons of which is for a 1000-ft. radio tower at South Dartmouth, Mass., and 1050 tons is for a Boston bridge. The 5000 tons does not include numerous jobs amounting to less than 100 tons each.

Coke.—Effective Nov. 1, New England by-product foundry coke ovens will accept contracts for first half 1930 delivery on a sliding price scale basis, the price to be determined the first of each month. The prevailing price, $11 a ton, delivered within a $3.10 freight rate zone, will obtain in November. Foundry coke shipments are slightly in excess of those for September, but about 20 per cent less than those for October, 1928. August was the peak month in shipments so far this year.

Old Material.—Scrap prices appear steadier, although there is scarcely enough business to test prices. Dealers' stocks are small, and manufacturing plants are disinclined to sell scrap at prevailing prices. A Worcester, Mass., mill is buying some long bundled skeleton on a basis of $9 to $9.50 a ton, on cars shipping point, and No. 1 heavy melting steel on a basis of $13.25 a ton, delivered. Comparatively little material is moving into the Pittsburgh territory. The Boston Elevated Railway closes bids Oct. 31 on miscellaneous material, the largest item being 500 tons of girder rails, and the Boston & Albany Railroad will sell a small list of miscellaneous material on Nov. 1. An Italian steamer cleared here the past week with 6500 tons of light rails, of which 1500 tons was loaded here and 5000 tons at a Southern port. The rails will be cut into short lengths and will be used as boundary markers in Egypt.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$10.75 to $11.25
Scrap T rails	10.50 to 10.75
Scrap girder rails	9.50 to 10.00
No 1 railroad wrought	10.50 to 11.00
No. 1 yard wrought	9.00 to 9.50
Machine shop turnings	6.50 to 7.00
Cast iron borings (steel works and rolling mill)	6.00 to 6.50
Bundled skeleton, long	9.00 to 9.50
Forge flashings	9.50 to 10.00
Blast furnace borings and turnings	6.00 to 6.25
Forge scrap	8.50 to 9.00
Shafting	14.00 to 14.25
Steel car axles	17.50 to 18.00
Wrought pipe 1 in. in diameter (over 2 ft. long)	9.00 to 9.50
Rails for rolling	12.00 to 12.50
Cast iron borings, chemical	9.50 to 9.75

Prices per gross ton deliv'd consumers' yards:

Textile cast	$14.00 to $14.50
No. 1 machinery cast	15.00 to 15.25
No. 2 machinery cast	13.00 to 13.25
Stove plate	11.00 to 11.50
Railroad malleable	18.50 to 19.00

St. Louis

Pig Iron Sales for First Quarter Total 2000 Tons—Further Declines in Scrap Prices

ST. LOUIS, Oct. 29.—An improvement in buying of pig iron was noted during the last week, although the market is still quiet as a result of the heavy purchases made by melters more than a month ago. Melters' requirements for the remainder of the year seem to be well taken care of. Of the week's sales of 4500 tons by the St. Louis Gas & Coke Corporation, two lots of 1000 tons each were for first quarter shipment, one lot being for a local jobbing foundry and the other for an Iowa melter. Sales also included 2000 tons of basic to a local company for prompt shipment, 200 tons of foundry iron to an Iowa implement manufacturer and 100 tons each to a local stove manufacturer, a car builder and a jobbing foundry. Business is good with the foundries, except those catering to the automotive industry. The pig iron market is firm, with improvement in the Southern situation noticeable.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill.	$19.50 to $20.00
Malleable, f.o.b. Granite City	20.00
N'th'n No. 2 fdy., deliv'd St. Louis	22.16
Southern No. 2 fdy., deliv'd	16.92 to 18.92
Northern malleable, deliv'd	22.16
Northern basic, deliv'd	22.16

Freight rates: 75c. (average) Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

Finished Steel.—Although new business in plates, shapes and bars for mill shipment is dull, warehouse buying is better, and October will show an increase over the preceding month. Other warehouse lines also are said to be fairly good. Structural fabricators and rolling mills specializing in reinforcing bars are complaining of poor business. No sizable contracts have been placed in some time and only one project is being figured on.

Coke.—The movement of domestic coke continues heavy, and piles at by-product ovens in the district are being reduced considerably. There is a good demand for foundry grades, and smelters continue to take full schedules of furnace coke.

Old Material.—Consumers in the St. Louis industrial district are buying very little old material. One large mill gives as a reason that prices are too high, while others state that their order files do not justify additional purchases at this time. The movement of old material from the country dealers is small because of the low prices. Miscellaneous standard-section rails and bundled sheets are off 25c. a ton, while steel car axles and railroad malleable are 50c. a ton lower. Railroad lists: Union Pacific, 2250 tons; Big Four Lines, 950 tons; Chicago, Milwaukee, St. Paul & Pacific, 360 tons and 120 carloads; St. Louis-San Francisco, 40 carloads.

Dealers' buying prices per gross ton, f.o.b. St. Louis district:

No. 1 heavy melting or shoveling steel	$13.50 to $14.00
No. 2 heavy melting or shoveling steel	13.00 to 13.50
No. 1 locomotive tires	15.50 to 16.00
Misc. stand.-sec. rails including frogs, switches and guards, cut apart	15.00 to 15.50
Railroad springs	16.75 to 17.25
Bundled sheets	10.00 to 10.50
No. 2 railroad wrought	13.50 to 14.00
No. 1 busheling	10.00 to 10.50
Cast iron borings and shoveling turnings	9.50 to 10.00
Iron rails	13.00 to 13.50
Rails for rolling	15.75 to 16.25
Machine shop turnings	7.50 to 8.00
Heavy turnings	9.50 to 10.00
Steel car axles	19.00 to 19.50
Iron car axles	27.50 to 28.00
Wrot. iron bars and trans.	21.50 to 22.00
No. 1 railroad wrought	13.75 to 14.25
Steel rails, less than 3 ft.	18.00 to 18.50
Steel angle bars	15.25 to 15.75
Cast iron carwheels	14.50 to 15.00
No. 1 machinery cast	15.25 to 15.75
Railroad malleable	15.00 to 15.50
No. 1 railroad cast	14.50 to 15.00
Stove plate	12.25 to 12.50
Agricult. malleable	15.25 to 15.75
Relay. rails 60 lb. and under	20.50 to 23.50
Relay rails 70 lb. and over	26.50 to 29.00

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-fin. rounds, shaftings, screw stock	3.75c.
Black sheets (No. 24)	4.25c.
Galv. sheets (No. 24)	5.10c.
Blue ann'l'd sheets (No. 10)	3.45c.
Black corrug. sheets (No. 24)	4.30c.
Galv. corrug. sheets	5.15c.
Structural rivets	4.15c.
Boiler rivets	4.15c.
	Per Cent Off List
Tank rivets, ⅞-in. and smaller, 100 lb. or more	65
Less than 100 lb	60
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-pressed nuts, sq., blank or tapped, 200 lb. or more	60
Less than 200 lb	50
Hot-pressed nuts, hex., blank or tapped, 200 lb. or more	60
Less than 200 lb	50

Cincinnati

Pig Iron Buying Cautious as Melt Declines, But Prices Are Steady—Cast Grades of Scrap Weaker

CINCINNATI, Oct. 29.—With district consumers of pig iron apparently either well supplied with material for the fourth quarter or withholding purchases until the demand for finished products increases, sales of pig iron in this district declined noticeably last week. The largest order reported among the 2500 tons of iron sold was from a Dayton, Ohio, consumer for 200 tons of Northern foundry for fourth quarter. The remainder of the business was in carload and 100-ton lots. Although pig iron is being sold daily, there are no large tonnages. District sellers report that the melt, particularly in the automobile foundries, is easing off. Prices on both Northern and Southern iron are steady, with Southern still quoted at about $14 to $14.50, base Birmingham.

Prices per gross ton, deliv'd Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25	$19.89 to $20.39
Ala. fdy., sil. 1.75 to 2.25	17.69 to 18.19
Ala. fdy., sil. 2.25 to 2.75	18.19 to 18.69
Tenn. fdy., sil. 1.75 to 2.25	17.69 to 18.19
S'th'n Ohio silvery, 8 per cent	26.89

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

Finished Materials.—The anticipated increase in production schedules of district sheet mills was realized last week. Although specifications from the automotive field are still below normal, the general sheet demand is being sustained at a good rate. Accordingly, fresh bookings last week were about equal to capacity. With the backlogs of district mills substantially reduced and the delivery situation easier than it has been for months, district consumers are not overspecifying as they did during the summer. While the sheet demand is again reaching normal proportions, interest in cold and hot-rolled strip is still sharply reduced.

Coke.—The total amount of by-product foundry coke moved on contract during October was noticeably less than the total during September. District oven representatives say that a slackening of the automotive demand has caused foundries to specify more cautiously. Specifications last week were a trifle less than the week before and no new business of any size was reported. Prices for the next month on by-product foundry coke will continue at about $10.05, delivered in Cincinnati.

Old Material.—While some mills are still taking scrap on contract at a fair rate, others, particularly in the Valley, are reducing specifications, and in several instances dealers have received cancellations. The market is weaker this week than last. This is shown by the reduction of prices 25c. on 10 items, for the most part in the cast iron grades. The steel grades, however, are still selling at unchanged prices, because the supply is still none too large.

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel	$13.00 to $13.50
Scrap rails for melting	14.00 to 14.50
Loose sheet clippings	8.50 to 9.00
Bundled sheets	10.75 to 11.25
Cast iron borings	8.75 to 9.25
Machine shop turnings	8.00 to 8.50
No. 1 busheling	10.50 to 11.00
No. 2 busheling	7.00 to 7.50
Rails for rolling	14.25 to 14.75
No. 1 locomotive tires	14.25 to 14.75
No. 2 railroad wrought	13.00 to 13.50
Short rails	18.50 to 19.00
Cast iron carwheels	12.50 to 13.00
No. 1 machinery cast	18.75 to 19.25
No. 1 railroad cast	15.00 to 15.50
Burnt cast	10.25 to 10.75
Stove plate	10.25 to 10.75
Brake shoes	10.00 to 10.50
Agricultural malleable	14.00 to 14.50
Railroad malleable	15.00 to 15.50

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and struc. shapes	3.40c.
Bars, soft steel or iron	3.30c.
New billet reinforc. bars	3.15c.
Rail steel reinforc. bars	3.00c.
Hoops	4.05c.
Bands	3.50c.
Cold-fin. rounds and hex. Squares	3.85c. 4.35c.
Black sheets (No. 24)	4.05c.
Galvanized sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.45c.
Structural rivets	3.85c.
Small rivets	65 per cent off list
No. 9 ann'l'd wire, per 100 lb	$3.00
Com. wire nails, base per keg	2.85
Cement c't'd nails, base 100 lb. keg	2.85
Chain, per 100 lb	8.75
	Net per 100 Ft.
Lap-weld steel boiler tubes, 2-in.	$16.50
4-in.	34.50
Seamless steel boiler tubes, 2-in.	17.50
4-in.	36.00

Birmingham

Advance on Alabama Iron for First Quarter Talked of—Good Business in Finished Steel

BIRMINGHAM, Oct. 29.—The pig iron market was quieter during the past week than for some time. Sales are for small fill-in tonnages confined to the local trade. There have been no local inquiries for first quarter iron. Inquiries from outside districts continue to filter in, but producers are not quoting on first quarter business. Talk of an advance in prices is frequently heard, and it is generally predicted that quotations will be 50c. or $1 a ton higher when books are opened for the next period. The base price is now $14.50. There has been a further reduction of stocks this month, though the volume of shipments has fallen a little short of that of September. Current shipments still exceed the make. Fifteen furnaces are active, the same as in the past two weeks. Of this number, seven are on foundry, seven on basic and one on recarburizing iron.

Prices per gross ton, f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil.	$14.50
No. 1 fdy., 2.25 to 2.75 sil.	15.00
Basic	14.50

Finished Steel.—The past week was the best of the month in new business. This business is coming from the regular trade and is shared in by bars, plates, structural shapes, sheets and railroad accessories. Operations are now above 80 per cent of ingot capacity and are considerably higher than one year ago. The market has a firm tone, with prices unchanged. The fabricated structural steel market is regaining some of its former strength. The Gulf States Steel Co. has placed an order with the Ingalls Iron Works Co. for 1000 tons for its new plate mill at Alabama City and expects to place a larger order shortly for its new sheet mill. The Tennessee company is working all eight open-hearths at Fairfield, an increase of one over last week. Eight of nine are active at Ensley. The Gulf States Steel Co. continues to work all six at Alabama City.

Cast Iron Pipe.—An improvement in inquiries and small spot orders during the last three or four days has produced a little better feeling in the market. Sales for the two weeks preceding had been considered the lightest for any comparable period this year. Shipments continue to approximate the make, and backlogs are slender. Dallas, Tex., opened bids Oct. 28 on 4000 tons of pipe. Kansas City, Mo., opens bids today on 2000 tons of large diameter pipe. If the decision pending at St. Petersburg, Fla., is decided in favor of cast iron pipe, about 1000 tons will be required. Bids to be opened by Murfreesboro, Tenn., on Nov. 5 call for one mile of 12-in. and two miles of 8-in. pipe. Greenville, Ala., is taking bids until Nov. 1 for 6000 ft. of 6-in. pipe. Base prices remain at $37 to $38.

Coke.—Industrial coke is quiet in new business. The movement on contracts is considered fair. Prices remain at $5 a net ton, Birmingham.

Old Material.—Demand for important steel grades is holding up well, though mills are placing spot orders and keeping stocks low. Consumer interest is still lacking in iron scrap. Quotations are unchanged. In the iron grades they are nominal.

Prices per gross ton, deliv'd Birmingham dist. consumers' yards:

Heavy melting steel	$13.00 to $13.50
Scrap steel rails	14.00
Short shoveling turnings	9.00
Cast iron borings	9.00
Stove plate	11.50 to 12.00
Steel axles	21.00
Iron axles	23.00
No. 1 railroad wrought	10.00 to 10.50
Rails for rolling	15.50
No. 1 cast	13.00
Tramcar wheels	12.50
Cast iron carwheels	13.00 to 13.50
Cast iron borings, chem	13.50 to 14.00

Buffalo

With Fourth Quarter Needs Well Covered, Pig Iron Buying Declines—No Recovery in Steel Operations

BUFFALO, Oct. 29.—Fourth quarter requirements for pig iron have been well covered, and inquiries have dropped off. A New Jersey foundry which sought 3000 tons of foundry is understood to be still in the market. It is also said that an agricultural implement maker is in the market for 1000 tons of foundry and malleable. Other inquiries are of a minor character. Furnace men report that the melt throughout the district is good and that shipments are steady. A survey shows that the locomotive plants are busy and that the heater industry is fairly active.

Prices per gross ton, f.o.b. furnace:

No. 2 fdy., sil. 1.75 to 2.25	$19.50
No. 2X fdy., sil. 2.25 to 2.75	20.00
No. 1 fdy., sil. 2.75 to 3.25	21.00
Malleable, sil. up to 2.25	20.00
Basic	$17.50 to 18.00
Lake Superior charcoal	27.28

Old Material.—Aside from the purchase by the largest consumer of upward of 5000 tons of No. 1 heavy melting steel at $15, the most important event of the past week was the suspension of shipments by another steel company. This mill will not receive any scrap until Nov. 4, and after that time will place its receipts on a quota basis. Almost all of the commodities in the list show a sentimental weakening and the entire market is softer. Steel castings plants appear to be busy.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$15.00 to $16.00
No. 2 heavy melting steel	13.50 to 14.50
Scrap rails	15.00 to 15.50
Hydraul. comp. sheets	13.50 to 14.50
Hand bundled sheets	11.00 to 11.50
Drop forge flashings	13.75 to 14.00
No. 1 busheling	13.50 to 14.50
Hvy. steel axle turnings	13.50 to 14.00
Machine shop turnings	7.50 to 8.00
No. 1 railroad wrought	13.00 to 13.50
Acid Open-Hearth Grades:	
Knuckles and couplers	17.00 to 17.50
Coil and leaf springs	17.00 to 17.50
Rolled steel wheels	17.00 to 17.50
Low phos. billet and bloom ends	18.00 to 18.50
Electric Furnace Grades:	
Short shov. steel turnings	11.25 to 11.75
Blast Furnace Grades:	
Short mixed borings and turnings	11.25 to 11.75
Cast iron borings	11.25 to 11.75
No. 2 busheling	9.50 to 10.00
Rolling Mill Grades:	
Steel car axles	17.00 to 17.50
Iron axles	20.00 to 21.00
Cupola Grades:	
No. 1 machinery cast	15.00 to 15.50
Stove plate	12.50 to 12.75
Locomotive grate bars	11.00 to 11.50
Steel rails, 3 ft. and under	18.75 to 19.00
Cast iron carwheels	13.00 to 13.50
Malleable Grades:	
Industrial	17.50 to 18.00
Railroad	17.50 to 18.00
Agricultural	17.50 to 18.00
Special Grades:	
Chemical borings	12.50 to 13.50

Finished Iron and Steel.—Operations of Buffalo mills have not receded during the past week, neither have they increased. Activity in the fabricated structural field has declined to the point where no sizable tonnages have been placed or are in immediate prospect. A contract was awarded for 103 tons of rail steel bars for the new City Hall. There will be about 1000 tons of reinforcing bars in the City Hall, but this contract will be let piecemeal. Reinforcing bar makers report a considerable volume of small lots placed.

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and struc. shapes	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.95c.
Cold-fin. flats, sq. and hex	4.45c.
Rounds	3.95c.
Cold-rolled strip steel	5.85c.
Black sheets (No. 24)	4.20c.
Galv. sheets (No. 24)	4.85c.
Blue ann'l'd sheets (No. 10)	3.50c.
Com. wire nails, base per keg	$3.60
Black wire, base per 100 lb.	3.75

Canada

Pig Iron Demand Is Holding at High Level

TORONTO, ONT., Oct. 29.—As a result of the continued heavy pig iron melt by foundries and other consumers in Ontario and Quebec, the demand for merchant iron is holding at a good level, with shipments near the high point for the year. Future buying continues to dwindle, but the spot demand is showing improvement. Hand-to-mouth buyers are showing rather keen interest in the market, and, due to the fact that they are carrying only small tonnages in stock, are forced into the market at regular intervals. Prices are unchanged.

Prices per gross ton:

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75	$23.60
No. 2 fdy., sil. 1.75 to 2.25	23.10
Malleable	23.60
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75	$25.00
No. 2 fdy., sil. 1.75 to 2.25	24.50
Malleable	25.00
Basic	23.50
Imported Iron, Montreal Warehouse	
Summerlee	$33.50
Carron	33.00

Structural Steel.—A decline in demand has set in, with only small tonnage orders reported for the week. Some substantial tonnages, however, are pending and will swell sales later in the year. Fabricators state that unfilled orders will maintain capacity operations for about a year.

Old Material.—A stronger market has developed in iron and steel scrap during the past week or 10 days. Consumers are buying more extensively for immediate needs, and there is also a better flow of forward delivery business. Mill requirements are comparatively small at the present time, but these consumers are taking scheduled delivery against contracts and also placing spot orders for special grades. In the Montreal district the domestic demand has strengthened and shipments to United States points are holding at a satisfactory level. Purchases are being made at unchanged prices.

Dealers' buying prices:

	Per Gross Ton	
	Toronto	Montreal
Heavy melting steel	$10.00	$8.50
Rails, scrap	11.00	9.00
No. 1 wrought	10.00	12.00
Machine shop turnings	7.50	5.00
Boiler plate	7.50	6.00
Heavy axle turnings	8.00	7.50
Cast borings	7.50	5.00
Steel borings	7.50	6.50
Wrought pipe	6.00	6.00
Steel axles	15.00	20.00
Axles wrought iron	17.00	22.00
No. 1 machinery cast	....	17.00
Stove plate	....	13.00
Standard carwheels	....	16.00
Malleable	....	13.00
	Per Net Ton	
No. 1 mach'ry cast	$16.00	....
Stove plate	12.00	....
Standard carwheels	15.00	....
Malleable scrap	14.00	....

Youngstown

Valley Mills at Low Point of the Year

YOUNGSTOWN, Oct. 29.—Executives of leading steel companies advise that new business is showing improvement, especially from the automobile industry and they expect this betterment to be manifested in broader production schedules in November. Both the volume of inquiries is stronger and the tonnage involved is larger.

In the meantime, however, production has declined in the Mahoning Valley to the lowest point of the year, averaging about 65 per cent. Of 51 independent open-hearth furnaces, only 30 are active, while 80 of 120 Valley sheet mills are operating. Pipe departments present the strongest schedulings, with 15 of 21 mills running, but tube backlogs are being depleted. Tin mill schedules are also reduced, but it is expected 1930 buying will develop in November, and will serve to stimulate this market.

Some departments at the Ohio works of the Carnegie Steel Co. are completely idle. In this complement, four of six blast furnaces are active.

The Republic Iron & Steel Co. is operating its small-diameter tube mill, producing pipe up to 7 in. by the electric welding process, regularly on commercial production. The company has secured a number of orders for feeder lines to larger pipe line projects. At its Warren works, Republic has completed the conversion of sheet mills to tin mills, and has started construction of its new mechanical tubing plant.

Bantam Ball Bearing Co., South Bend, Ind., has completed a brass foundry in which castings required in the manufacture of ball and roller bearings are made. C. O. Hiler is in charge.

Corporation Declares Extra Dividend

Strong Third Quarter Earnings Statements of United States, Bethlehem and Other Companies

AN extra dividend of $1 a share on the common stock, payable with its regular quarterly dividend of 1¾ per cent, was declared by the directors of the United States Steel Corporation at its meeting in New York, Oct. 29. Earnings for the first nine months of 1929 were equivalent to 15.82 per cent on the common shares outstanding as compared with 8.17 per cent for the same period of 1928. In the light of these earnings the directors voted the extra dividend.

Total earnings for the third quarter were roughly $70,174,000, or close to the nearly $72,000,000 of the second quarter. The principal figures of the earnings statement are given in the accompanying table.

The quarter's net earnings available for common dividends amounted to $45,270,431, or nearly $5.87 per share of the 8,131,071 shares outstanding on Oct. 29. The earnings per share on 8,030,304 shares in the second quarter amounted to $5.92. To express further the comparisons between this year and last, it may be mentioned that total earnings for nine months were $202,274,555 in 1929 and $140,015,494 in 1928.

Action on the proposed purchase of the properties of the Columbia Steel Corporation was postponed, and the option expiring Oct. 29 was extended to Oct. 31.

Bethlehem's Third Close to Second Quarter

The Bethlehem Steel Corporation reported net income for the third quarter of $11,384,720, or nearly three times the net income for the corresponding quarter last year and only 3.2 per cent less than the total of $11,766,473 for the second quarter of 1929.

Earnings for the third quarter, after deducting all charges and dividends on the preferred stock, were equivalent to $4.01 a share on the 2,400,000 shares of common outstanding during the period, compared with $4.17 a share for the second quarter.

In presenting the report Eugene G. Grace, president, declared that business conditions are sound and that current pessimism in the stock market is unwarranted. Billing prices for the company were 10c. a ton lower in the third quarter than in the previous quarter, but $1.56 a ton higher than in the third quarter of last year. Orders on hand, however, showed improvement, amounting to $61,070,000 at the end of the third quarter, compared with $56,830,000 at the end of the preceding period, a gain of 7.5 per cent.

Operations in the third quarter averaged 97.8 per cent of rated capacity, compared with 100.6 per cent in the quarter ended on June 30 and 82.3 per cent in the third quarter of 1928. At present, he said, production is at 82 per cent of capacity.

The company's railroad car bookings are the best in eight years, and the Bethlehem shipyards will enter 1930 with the best schedule in years.

Bethlehem's Expansion Program

President Grace announced an expansion program that will increase the company's ingot capacity 1,250,000 tons annually and its by-product coke oven capacity 1,000,000 tons. Improvements will be mainly at the Sparrows Point and Lackawanna plants. Additions will be made to plate, sheet and roughing mills at the former plant and to the roughing and billet mills at Lackawanna. An important part of the improvements to be undertaken will be a system of cleaning and distributing by-product coke and blast furnace gas at various plants, thereby reducing the company's coal consumption. The expansion program will cost $50,000,000.

Directors declared the usual quarterly dividend of $1.50 a share on the common stock and $1.75 a share on the preferred stock.

Republic and Gulf States Report Earnings

The Republic Iron & Steel Co. reports net profits, after all deductions, of $2,527,094 for the third quarter, as compared with $3,263,309 for the June quarter and $2,877,127 for the March quarter and $1,280,775 in the September quarter of 1928. The total profit for nine months is $8,667,530.

The Gulf States Steel Co. had net profit of $326,975 in the third quarter, compared with $405,630 in the preceding quarter and $139,850 in the September quarter of 1928. Net profit for nine months of this year is $1,086,860.

The Virginia Iron, Coal & Coke Co. reports a net loss for the third quarter of $11,929. Net loss for nine months is $39,893.

Earnings of United States Steel Corporation

Earnings for Third Quarter, 1929

	Total Earnings	
July, 1929	$24,303,058	
Aug., 1929	24,687,089	
Sept., 1929	21,183,566	
Total earnings after deducting expenses, taxes and interest		$70,173,713
Less charges and allowances for depletion, depreciation and obsolescence		16,819,393
Net income		$53,354,320
Deduct: Interest corporation bonds		1,778,970
Balance		$51,575,350
Dividends:		
Preferred, 1¾ per cent	$6,304,919	
Common, 2¾ per cent	22,360,984	
		28,665,903
Surplus for the quarter		$22,909,447

Recasts Steel Founders' Organization

CHICAGO, Oct. 29.—Large attendance and a high degree of enthusiasm marked the meeting held today by the Steel Founders' Society of America at the Hotel Sherman, Chicago. Granville P. Rogers, Graybar Building, New York, managing director of the society, read a survey-report of the industry. This report was unanimously adopted. New by-laws, designed to permit the right mechanical structure for carrying on the work of the society and to add flexibility to membership participation in affairs of the society, were read and adopted.

New officers elected are: President, J. E. McCauley, Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.; vice-president, Eastern Division, W. H. Worrilow, Lebanon Steel Foundry, Lebanon, Pa.; vice-president, Central Atlantic Division, John E. Galvin, Ohio Steel Foundry, Lima, Ohio; vice-president, Midwest Southern Division, Arthur Simonson, Falk Corporation, Milwaukee; vice-president, Mid-Continental Division, E. H. Cornelius, Oklahoma Steel Castings Co., Tulsa, Okla.

New directors are: Eastern Division, R. J. Doty, Reading Steel Casting Co., Reading, Pa.; W. M. Faison, Atlantic Steel Castings Co., Chester, Pa.; G. R. Casey, Treadwell Engineering Co., Easton, Pa. Central Altantic Division, H. J. Koch, Fort Pitt Steel Casting Co., Pittsburgh; Clarence W. Howatt, Pittsburgh Steel Foundry Co., William Powell, Mesta Machine Co., Pittsburgh. Midwest Southern Division, S. W. Utley, Detroit Steel Casting Co.; J. T. Oster, Hubbard Steel Foundry Co., East Chicago, Ind., and L. S. Peregoy, Sivyer Steel Casting Co., Milwaukee.

Two Large Ships to Be Built at Fore River

WASHINGTON, Oct. 29.—Two combination passenger-cargo vessels of 11,300 deadweight tonnage will be built in the Fore River, Mass., yard of the Bethlehem Shipbuilding Corporation for the Oceanic Steamship Co. They will be among the largest ships ever to be built in an American yard and will have a 20-knot speed and will be superior in type to others engaged in the San Francisco - Australian trade for which they have been designed. Contracts covering loans of $11,700,000 to apply on the cost of construction of the two vessels have been signed by Chairman T. V. O'Connor of the Shipping Board, W. P. Roth of the Oceanic company and E. P. Hill of the Bethlehem corporation.

Non-Ferrous Metal Markets

All Markets Inactive—Lead and Zinc Lower—Copper Unchanged—Tin Erratic

NEW YORK, Oct. 29.

DRASTIC declines in the New York stock market have had their effect abroad so as to cause declines in some metals in the London and other markets. Not only has this retarded buying in this country, but it has held up purchases from abroad. Lead and zinc have both declined in the last week or so and tin fell precipitately a little earlier. Copper is the metal that has been least affected.

Copper.—Buying of copper is almost at a standstill except possibly from abroad, and this has been decidedly retarded in the last few days. While sellers here do not expect a decline in the price, consumers are aware of the fact that it will not advance and they are also uncertain as to the effect of the stock market on future business. Domestic buying is only of the hand-to-mouth variety. November requirements are not yet covered and very little has been bought for December. Consumers abroad have still considerable to buy for early consumption, but are in no hurry to cover. Copper is the only metal that has not declined during the stock market upheaval. Electrolytic copper is quoted at 18c., delivered in the Connecticut Valley, and the price of Copper Exporters, Inc., is still 18.30c., c.i.f. European ports. Lake copper is unchanged at 18c. to 18.12½c., delivered.

Tin.—Sales of spot Straits tin were not over 400 tons for the week ended Oct. 26, the inactivity being traced largely to the stock market. Strange to say, tin has remained fairly steady in the past week, it having had its first precipitate decline about two weeks ago, with another a week ago. There is, however, no confidence, and consumers are buying only a little as they need it, mostly spot metal. Dealers are doing nothing. October shipments from the Straits are again revised lower, the estimated total being now put at 8500 tons, as against about 10,000 tons early in the month. Prices in London today were about £2 a ton higher than a week ago, with spot standard quoted at £184 5s., future standard at £188 5s. and spot Straits at £188 10s. The Singapore market today was £189 2s. 6d. In the New York market today, spot Straits tin was quoted at 40.75c., which is only a little higher than the low point of 40.25c. on Oct. 21, the lowest level

THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY

	Oct. 29	Oct. 28	Oct. 26	Oct. 25	Oct. 24	Oct. 23
Lake copper, New York	18.12½	18.12½	18.12½	18.12½	18.12½	18.12½
Electrolytic copper, N. Y.*	17.75	17.75	17.75	17.75	17.75	17.75
Straits tin, spot, N. Y.	40.75	40.75	....	41.37½	41.87½	42.25
Zinc, East St. Louis	6.60	6.60	6.65	6.70	6.70	6.70
Zinc, New York	6.95	6.95	7.00	7.05	7.05	7.05
Lead, St. Louis	6.55	6.65	6.70	6.70	6.70	6.70
Lead, New York	6.75	6.90	6.90	6.90	6.90	6.90

*Refinery quotation; price ¼c. higher delivered in the Connecticut Valley.

Rolled Products

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—
- High brass ..... 23.25c.
- Copper, hot rolled ..... 26.75c.
- Zinc ..... 10.25c.
- Lead (full sheets) ... 11.00c. to 11.25c.

Seamless Tubes—
- High brass ..... 28.25c.
- Copper ..... 29.25c.

Rods—
- High brass ..... 21.25c.
- Naval brass ..... 24.00c.

Wire—
- Copper ..... 19.87½c.
- High brass ..... 23.75c.

Copper in Rolls ..... 26.75c.
Brazed Brass Tubing ..... 30.87½c.

Aluminum Products in Ton Lots

The carload freight rate is allowed, to destinations east of Mississippi River and also to St. Louis on shipments to points west of that river.

- Sheets, 0 to 10 gage, 3 to 30 in. wide ..... 33.00c.
- Tubes, base ..... 42.00c.
- Machine rods ..... 34.00c.

Chicago Warehouse

(Prices Cover Trucking to Customers' Doors in City Limits)

Sheets— Base per Lb.
- High brass ..... 23.25c.
- Copper, hot rolled ..... 27.75c.
- Copper, cold rolled, 14 oz. and heavier ..... 30.00c.
- Zinc ..... 10.75c.
- Lead, wide ..... 11.35c.

Seamless Tubes—
- Brass ..... 28.25c.
- Copper ..... 29.25c.

Brass Rods ..... 21.25c.
Brazed Brass Tubes ..... 31.00c.

New York or Cleveland Warehouse

Delivered Prices, Base per Lb.

- High brass ..... 21.12½c. to 22.12½c.
- Copper, hot rolled, base sizes ..... 27.75c. to 28.75c.
- Copper, cold rolled, 14 oz. and heavier, base sizes ..... 30.00c. to 31.00c.

Seamless Tubes—
- Brass ..... 26.00c. to 27.00c.
- Copper ..... 29.12½c. to 30.12½c.

Brazed Brass Tubes .. 29.12½c. to 30.12½c.
Brass Rods ..... 18.87½c. to 19.87½c.

New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets (No. 9), casks ..... 10.75c. to 11.25c.
Zinc sheets, open ..... 11.50c. to 12.00c.

Metals from New York Warehouse

Delivered Prices, Per Lb.

- Tin, Straits pig ..... 43.00c. to 44.00c.
- Tin, bar ..... 45.00c. to 46.00c.
- Copper, Lake ..... 19.50c.
- Copper, electrolytic ..... 19.25c.
- Copper, casting ..... 19.00c.
- Zinc, slab ..... 7.75c. to 8.25c.
- Lead, American pig ... 7.62½c. to 8.12½c.
- Lead, bar ..... 9.62½c. to 10.12½c.
- Antimony, Asiatic ..... 10.50c. to 11.00c.
- Aluminum No. 1 ingots for remelting (guaranteed over 99% pure) ... 25.00c. to 26.00c.
- Alum. ingots, No. 12 alloy ..... 24.00c. to 25.00c.
- Babbitt metal, commercial grade ..... 25.00c. to 35.00c.
- Solder, ½ and ½ ..... 29.00c. to 30.00c.

Metals from Cleveland Warehouse

Delivered Prices, Per Lb.

- Tin, Straits pig ..... 46.50c.
- Tin, bar ..... 48.50c.
- Copper, Lake ..... 19.50c.
- Copper, electrolytic ..... 19.25c.
- Copper, casting ..... 18.75c.
- Zinc, slab ..... 8.00c. to 8.25c.
- Lead, American pig ..... 7.55c. to 7.75c.
- Lead, bar ..... 9.75c.
- Antimony, Asiatic ..... 16.00c.
- Babbitt metal, medium grade ..... 18.75c.
- Babbitt metal, high grade ..... 50.50c.
- Solder, ½ and ½ ..... 29.50c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged consumers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	15.00c.	16.25c.
Copper, hvy. and wire	14.50c.	16.00c.
Copper, light and bottoms	12.75c.	13.75c.
Brass, heavy	8.25c.	9.25c.
Brass, light	7.00c.	8.00c.
Hvy. machine composition	12.00c.	13.00c.
No. 1 yel. brass turnings	9.75c.	10.50c.
No. 1 red brass or compos. turnings	11.25c.	12.25c.
Lead, heavy	5.50c.	6.00c.
Lead, tea	4.25c.	5.25c.
Zinc	3.50c.	4.00c.
Sheet aluminum	13.25c.	15.50c.
Cast aluminum	11.75c.	13.75c.

since Aug. 21, 1923. The market today was exceedingly inactive.

Lead.—Today the American Smelting & Refining Co. reduced its contract price from 6.90c. to 6.75c., New York. As a result, leading producers in the West reduced their price to 6.55c., St. Louis. As in the case of other metals, buying has been very light and largely hand-to-mouth.

Zinc.—Due to lower prices at London, quotations for prime Western zinc fell again yesterday from 6.70c. to 6.60c., East St. Louis, under much the same conditions as a week ago. Of course, the decline this week and last has not stimulated buying, which continues spasmodic. The price for ore continues unchanged at $44, Joplin, and sales were light at 8970 tons for the week ended Saturday, Oct. 26. Production was fairly large at 13,600 tons for the week, leaving the surplus still high at 43,620 tons.

Antimony.—Consumers and dealers have been active, and the price of Chinese metal is unchanged at 8.75c., New York, for all positions. Cables to importers here indicate that the revolutionary disturbances in China are affecting freight rates, and higher prices are probable.

Nickel.—Wholesale lots of ingot nickel are quoted at 35c. per lb., with shot nickel at 36c. and electrolytic nickel in cathodes at 35c.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at the published price of 23.90c. per lb., delivered.

Non-Ferrous Metals at Chicago

CHICAGO, Oct. 29.—Prices for tin are quoted up ¼c. at the end of a week in which fluctuations were frequent. Sales of non-ferrous metals are in small volume. The old metal market is quiet and prices are nominal.

Prices per lb., in carload lots: Lake copper, 18.50c.; tin, 41.50c.; lead, 6.80c.; zinc, 6.80c.; in less-than-carload lots, antimony, 9.75c. On old metals we quote copper wire, crucible shapes and copper clips, 14c.; copper bottoms, 11.50c.; red brass, 11.50c.; yellow brass, 8c.; lead pipe, 4.50c.; zinc, 3.25c.; pewter, No. 1, 24.50c.; tin foil, 26c.; block tin, 36c.; aluminum, 12.87½c.; all being dealers' prices for less-than-carload lots.

Gulf States Steel Co. and the Central Iron & Steel Co. have appointed the new firm of Pittman & Squires, Los Angeles and San Francisco, their California representatives. Frank Pittman and G. F. Squires are both well known on the Pacific Coast, Mr. Pittman having been associated for some years with C. W. Pike & Co. in Los Angeles and Mr. Squires was with the same company in San Francisco up to a few years ago, when he resigned to become sales manager for the Pacific Sheet Steel Co. Offices in Los Angeles have been opened in the Western Mutual Life Building and in San Francisco at 39 Natoma Street.

To Consider Depreciation on Equipment

Uniformity Desired in Computing Income Tax—Standards Being Compiled as a General Guide

WASHINGTON, Oct. 28.—The fourth annual conference of machinery and equipment associations will be held at the Chamber of Commerce of the United States here on Nov. 11. In announcing the conference, Secretary Philipp P. Gott said that among the subjects to be discussed will be those relating to depreciation on machinery and equipment, the Senate Finance Committee amendment in the tariff bill prohibiting American trademarked imports, and discounts on motor equipment.

Concerning depreciation, the announcement stated that the trade associations, at the suggestion of the Treasury Department, undertook the study of rates of depreciation of machinery and equipment and that the department recently stated that it would discontinue such studies and would issue within a few months a publication containing rates of depreciation. Members of the associations, it was suggested, should examine the rates affecting their respective industries. The Bureau of Internal Revenue hopes to have the publication available by Jan. 1, though it may be delayed.

The publication will cover depreciation rates for all industries and will be the first of the kind ever prepared. The field work has been completed and the data compiled, and the material is now being edited. The undertaking required an enormous amount of work and has been made possible only through the cooperation of the industries of the country. The study, in the form in which it will appear, was begun last May. Particular interest has been shown in the matter of depreciation by the machinery and equipment manufacturers and users. The rates to be presented in the bulletin will be used as a guide for industries, but their adoption will be in no way compulsory. The purpose of the Bureau of Internal Revenue is to determine rates of depreciation on as nearly correct a basis as possible and to give uniformity to the rates.

To Discuss Trademarks on Imports

The announcement of the forthcoming meeting of the machinery and equipment associations explained that the House tariff bill continues the provision in the existing Fordney-McCumber tariff act, making it unlawful to import merchandise of foreign manufacture if it bears a trademark owned by a citizen, corporation or association of the United States, unless a written consent of the owner of the trademark is produced at the time of making customs entry. The Senate committee amendment, however, struck out the consent provision so that prohibition of such imports is made unconditional.

Members of the associations have been asked if they have considered the effect on their industries if foreign governments retaliated by enacting similar provisions. They were also asked to give consideration as to the customs of the trade regarding discounts on products sold to those engaged in the manufacture of other products.

Midvale Co. Buys Chrome Alloy Foundry

Purchase of the Chrome Alloy Products, Inc., Conshohocken, Pa., by the Midvale Co., Nicetown, Philadelphia, is announced, marking the definite entry by the Midvale Co. into the field of high-grade chrome and chrome-nickel alloy castings. T. Holland Nelson, developer of the Conshohocken foundry, has been retained as consulting engineer and in an advisory capacity to work out problems of construction of materials resistant to heat and corrosion. This makes it possible for the process industries to have at their command the experience of the personnel of the Midvale Co. in securing special compositions in the most marketable form.

A battery of induction furnaces has recently been installed to furnish castings in any size from the smallest up to the capacity of the furnaces. The Midvale company meanwhile has obtained exclusive rights to manufacture in the United States those patented compositions of chrome and nickel with other alloys held by Commentry-Fourchambault et Decazeville of Paris, France, commonly known as ATV-1, ATV-2, ATV-3, AMF, BTG, etc. It is also licensed under patents to Sir Robert Hadfield to produce steel of the composition of the Era ATV and Era HR grades.

Central Alloy to Install 25-Ton Electric Furnace

Plans for construction of a new 25-ton electric melting furnace by the Central Alloy Steel Corporation, Massillon, Ohio, have been announced by F. J. Griffiths, chairman of the company. The new equipment is required to provide for rapidly expanding demand for Nirosta, the new stainless steel manufactured by the company under Krupp license.

The new furnace will be located at the Canton works and its cost will approximate $200,000. The company also has authorized an expenditure of new circle cutting equipment to provide increased facilities for special steel.

Fabricated Structural Steel

Awards of About 55,500 Tons Largely for Work in New York District—43,000 Tons in Inquiries

FABRICATED structural steel awards, at about 55,500 tons, again hit a good stride, but about two-thirds of the tonnage is for the New York district, making a comparatively small showing for the rest of the country. Likewise, the major part of the 43,000 tons in new projects emanates from the New York district. The largest job awarded was 13,200 tons for New York subway work. A New York office building takes 9300 tons, Long Island Railroad grade elimination work, 6000 tons, and a Brooklyn hospital, 5850 tons. New subway sections call for bids on 12,300 tons, two New York apartment buildings will require upward of 11,000 tons, an apartment building in Chicago, 4000 tons, and a St. Louis building, 4000 tons. Awards follow:

BELLE, W. VA., 100 tons, building for Du Pont Engineering Co., to Virginia Bridge & Iron Works.

PHILADELPHIA, 1560 tons, bridge at Henry Avenue on which Francis A. Canuso is contractor, to Phoenix Bridge Co.

ATLANTA, GA., 880 tons, railroad viaduct, to Virginia Bridge & Iron Co.

ASHLAND, KY., 300 tons, building for American Rolling Mill Co., to unnamed fabricator.

BOSTON, 1050 tons, Congress Street bridge, to McClintic-Marshall Co.

SOUTH DARTMOUTH, MASS., 1300 tons, radio tower, to International Derrick & Equipment Co.

JEWETT CITY, CONN., 468 tons, bridge, to American Bridge Co.

ENWOOD, VT., 280 tons, trash racks and trash rack supporters, Connecticut River Development Co., to two unnamed fabricators.

CONCORD, N. H., 200 tons, hospital unit, to F. P. Lyons & Co.

PROVIDENCE, R. I., 300 tons, hardware warehouse, to James H. Tower Iron Works.

SPRINGFIELD, MASS., 125 tons, Court House, to Harrmann Steel Co.

PITTSFIELD, MASS., 150 tons, school, to unnamed fabricator.

NEW YORK, 1000 tons, public school 105 in Bronx, to Easton Structural Steel Co.

NEW YORK, 13,200 tons, section 5, route 108 of subway in Queens, to McClintic-Marshall Co.

NEW YORK, 9300 tons, Salmon Building at Fifth Avenue and Forty-second Street, to McClintic-Marshall Co.

NEW YORK CENTRAL RAILROAD, 2300 tons, commissary building at 161st Street, New York, to McClintic-Marshall Co.

BROOKLYN, 5850 tons, King's County Hospital, to Harris Structural Steel Co.

LONG ISLAND RAILROAD, 6000 tons, grade crossing elimination, to American Bridge Co.

STATE OF NEW YORK, 450 tons, highway marker supports, to Buffalo Steel Co.

MOHAWK, N. Y., 150 tons, highway bridge, to American Bridge Co.

PASSAIC, N. J., 800 tons, United States Rubber Co. building, to American Bridge Co.

PHILADELPHIA, 450 tons, Stanley Film Exchange Building, to Cantley Co.

PENNSYLVANIA RAILROAD, 500 tons, electric transmission towers for electrification work at Morristown, N. J., to American Bridge Co.

STATE COLLEGE, PA., 480 tons, power house for Pennsylvania State College, to Pittsburgh Bridge & Iron Co.

BIG SANDY & CUMBERLAND RAILROAD, 275 tons, bridge at Devon, W. Va., to Virginia Bridge & Iron Co.

ALABAMA CITY, ALA., 1000 tons, plate mill for Gulf States Steel Co., to Ingalls Iron Works.

SAN ANTONIO, TEX., 300 tons, Curtis Flying Field building, to McClintic-Marshall Co.

MILWAUKEE ROAD, 100 tons, bridge, to an unnamed bidder.

CHICAGO, 950 tons, Wieboldt department store, to American Bridge Co.

CHICAGO, 1400 tons, Ruth garage, to American Bridge Co., previously reported to an unnamed bidder.

ST. LOUIS, 4500 tons, bridge for Missouri Pacific across Merrimac River, to American Bridge Co., previously reported to an unnamed bidder.

OMAHA, NEB., 1500 tons, Union Station, to McClintic-Marshall Co.

OMAHA, 700 tons, train shed, to American Bridge Co.

OMAHA, 300 tons, railroad station concourse, to Baxton Vierling Iron Works, local.

PALO, ALTO, CAL., 156 tons, apartment building on Forest Avenue, to McClintic-Marshall Co.

LOS ANGELES, 1100 tons, Los Angeles Stock Exchange office building, to Consolidated Steel Corporation.

SEATTLE, 100 tons, two buildings for Pacific Telephone & Telegraph Co., to Hofius Steel & Equipment Co. and Wallace Bridge & Structural Steel Co.

OLYMPIA, WASH., 118 tons, bridge over North River, to Poole & McGonigle.

MARSHFIELD, ORE., 400 tons, H. M. Bylesbee Co. power house, to Minneapolis Steel & Machinery Co.

ASHLAND, ORE., 600 tons plates, 24-in. welded steel pipe line, to Beall Pipe & Tank Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

NEW YORK, 5050 tons, apartment building for San Remo Towers, Inc., Seventy-fourth Street and Central Park West.

NEW YORK, 1100 tons, apartment building for Massasoitt Corporation at 50 East Seventy-ninth Street.

NEW YORK, 12,300 tons, section 10, route 107 of subway in Brooklyn.

NEW YORK, 6000 tons, apartment building and hotel at 981 Madison Avenue.

BROOKLYN, 1200 tons, New York *Times* plant.

STATE OF NEW YORK, 300 tons, highway bridges.

PASSAIC AND BERGEN COUNTIES, N. J., 600 tons, bridge across Passaic River.

STATE OF PENNSYLVANIA, 350 tons, four highway bridges.

AKRON, OHIO, 700 tons, building for Akron *Times*.

INDIANAPOLIS, 6270 tons, White River bridge for Indianapolis Union Railway, new bids to be asked for.

HARRISBURG, PA., 1700 tons, Farm Show building, general contract to Sinclair & Grigg, Philadelphia.

SOUTHERN RAILWAY, 500 tons, bridge over Savannah River near Augusta, Ga.

CHICAGO, 800 tons, apartment building at 1200 Stone Street; Smith & Brown, architects.

CHICAGO, 500 tons, Hugolet apartments; Schmidt, Gardner & Erickson, architects.

CHICAGO, 4000 tons, George W. Griffiths apartment building; Holabird & Roche, architects.

CHICAGO, 2100 tons, Lawson Memorial Y. M. C. A. building.

WAUKEGAN, ILL., 500 tons, building for Johns-Manville Corporation.

STATE OF MINNESOTA, 600 tons, highway bridges.

ST. LOUIS, 4000 tons, Wenzlick Tower building.

TACOMA, WASH., 2400 tons, Eleventh Street viaduct; bids opened.

SEATTLE, 1000 tons, Fourteenth Avenue South bridge; Puget Sound Bridge & Dredging Co., low bidder.

SEATTLE, 243 tons, approach to West Spokane Street bridge; general contract to General Construction Co.

MONTEREY, CAL., 109 tons, bridges; bids opened.

Railroad Equipment

Rock Island In the Market for 5000 Cars

THE Chicago, Rock Island & Pacific has inquired for 5000 freight cars, the Pacific Fruit Express has ordered 400 refrigerator cars and the Pennsylvania has ordered 100 locomotives. The Chesapeake & Ohio will buy 100 to 130 locomotives. Details of the week's business follow:

Pacific Fruit Express has ordered 400 refrigerator cars from Pacific Car & Foundry Co.

Pennsylvania has ordered 100 locomotives, of which 50 will be built by Baldwin Locomotive Works, 25 by Lima Locomotive Works and 25 in railroad's own shops at Altoona, Pa. Company's shops will build 100 tenders also.

Rock Island will buy 1000 gondola, 1500 automobile, 2000 box, 250 stock and 250 flat cars.

Wabash will buy three baggage and mail cars.

Chesapeake & Ohio will buy 100 to 130 locomotives; one-half will be eight-wheel switching locomotives and the remainder 2-10-4 type.

Ford Motor Co. has ordered one 600-hp. and one 300-hp. oil-electric locomotive from Ingersoll-Rand Co. for its River Rouge plant. These locomotives will be furnished with General Electric equipment and will be built at the Erie works.

Five million cubic yards of earth are being carried on belt conveyors from Denny Hill to Elliott Bay in Seattle, Wash., in the regrading of Denny Hill. The earth is transported for over half a mile on conveyors which run overhead, clearing street car trolley wires and avoiding interference with general business and traffic. Belts are 36 in. wide, operate at a speed of 500 ft. a min. and have a capacity of 600 cu. yd. an hour. The various conveyor sections are 1360 ft., 920 ft. and 600 ft. long. The conveying system was furnished by the Link-Belt Co., Chicago.

PERSONAL

Weirton Steel Co. Changes; J. C. Williams President

As a result of the combination of the Weirton Steel Co., Weirton, W. Va., the Great Lakes Steel Corporation, Detroit, and the iron ore, blast furnace and steamship interests of the M. A. Hanna Co., Cleveland, the following changes have been made in the executive personnel of the Weirton company, and were announced by E. T. Weir, who will be chairman and chief executive of the new National Steel Corporation which results from the merger.

Mr. Weir becomes chairman of the board of directors of the Weirton company, and has been succeeded as president by J. C. Williams, heretofore first vice-president. In addition to H. D. Westfall, two new vice-presidents were elected: F. A. Hanlin, who has been secretary, and W. F. Morris, Jr., who has been general traffic manager. C. H. Hunt, chief engineer, was elected assistant to the president, and W. A. Murphy, who has been purchasing agent, was made secretary, succeeding Mr. Hanlin.

J. C. Williams was born at Kidwelly, Wales, March 31, 1876, and attended school in that country. His early experience in the steel business was obtained in Welsh mills and also in Italy. He came to the United States in 1897 and became superintendent of the Champion Iron & Steel Co., Muskegon, Mich. In 1903 and 1904 he was assistant superintendent at the National works, Monessen, Pa. In 1905, with E. T. Weir and others, he helped to organize the Phillips Sheet & Tin Plate Co., which purchased the Jackson Iron & Steel Works, Clarksburg, W. Va. He has been associated with Mr. Weir since that time. He is also president and a director of the Weirton Improvement Co. and a director of the Bank of Weirton, and is prominently identified with financial that time has occupied positions in various departments of the Weirton Steel Co., which succeeded the Phillips organization. He is vice-president and a director of the Weirton Improvement Co., secretary and a director of the Weirton Coal Co., vice-president and a director of the Oak Hill Supply Co., and a director of the Bates Iron Co., besides holding directorships in various civic and financial organizations in Weirton and and civic organizations in Weirton and Steubenville, Ohio.

Mr. Hanlin was born in Midway, Washington County, Pa., Aug. 12, 1888, and attended schools of the North Side, Pittsburgh. His early business experience was obtained with Charles E. Pope and the Pope Tin Plate Co., with whom he became connected in 1904. When the Pope company was purchased by the Phillips Sheet & Tin Plate Co. in 1912, Mr. Hanlin went to Weirton and since Steubenville.

Mr. Morris was born at Mahoning, Pa., Aug. 23, 1877, and attended school in Pittsburgh. His early business experience was gained with the Pennsylvania Railroad, the Great Northern Railway, and the Crucible Steel Co. of America. He became associated with the Weirton company as traffic manager in 1920, and has made his headquarters in the Pittsburgh office.

Clinton H. Hunt was born at Cleveland, Dec. 14, 1883, and attended school at Ravenna, Ohio. He gained his early steel mill experience with the William Tod Co., Pittsburgh, the Morgan Engineering Co., Alliance, Ohio, the Carnegie Steel Co. and the Youngstown Sheet & Tube Co. He went with the Weirton company as chief engineer in 1915, and has held that position continuously since.

Wilmer A. Murphy was born at Barnesville, Ohio, Feb. 22, 1899, and attended school in that city. He was employed for a time by the La Belle Iron Works, Steubenville, Ohio, now a part of the Wheeling Steel Corporation, and went with the Weirton company in 1922 as assistant purchasing agent.

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J. K. MERWIN, formerly of the Cleveland office of the Chain Belt Co., Milwaukee, has been placed in charge of the newly-opened Boston office of the company.

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P. J. HALE has been appointed resident engineer for Freyn Engineering Co., Chicago, in connection with the blast furnace to be built near London for the Ford Motor Co. He sailed on Oct. 25 for England.

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E. G. JONES, formerly of the Canadian Brake Shoe Co., Ltd., has become superintendent of the plant of the Joliette Steel, Ltd., Joliette, Que. J. CRITCHLEY has been appointed sales engineer.

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HERBERT E. FENNER, general service manager of the American Bosch Magneto Corporation, Springfield, Mass., sailed from New York on an extended tour of the principal cities of South America.

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C. R. BURT, vice-president and general manager of Pratt & Whitney Co., Hartford, Conn., will address a joint meeting of the Providence section of the American Society of Mechanical Engineers and the management section of the Providence Engineering Society, Nov. 5, at the rooms of the latter society, on "Modernizing an Old New England Industry."

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GEORGE R. ROBERTS has been placed in charge of the newly-established Los Angeles office of Alexander Milburn Co., manufacturer of welding and cutting apparatus, Baltimore.

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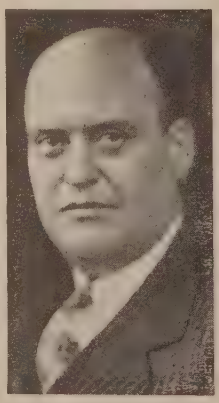
HENRY J. FREYN, president, Freyn Engineering Co., Chicago, returned Oct. 26 on the Aquitania from a two months' business trip in Russia, England, Germany and France.

J. C. Williams, new president, Weirton Steel Co.



F. A. Hanlin, former secretary, now vice-president, Weirton Steel Co.

J. F. Morris, former general traffic manager, now a Weirton vice-president

C. H. Hunt, former chief engineer, named assistant to president of Weirton

R. J. WYSOR

R. J. WYSOR, since January, 1928, general manager of the Jones & Laughlin Steel Corporation, Pittsburgh, has resigned and, with his former chief, T. M. GIRDLER, recently president of the Jones & Laughlin company, will become associated with the Otis & Co.-Eaton-Mather group in Cleveland. Mr. Wysor was born in Dublin, Va., and attended the Virginia Polytechnic Institute, Blacksburg, Va., from which he was graduated in 1906. For the next four years he was chemist and assistant chief chemist at the Duquesne works, Carnegie Steel Co. In 1910 he became metallurgist for the Panama Canal Commission, and in 1912 went with the Bethlehem Steel Co., serving as chief chemist and engineer of tests from 1912 to 1916, superintendent of blast furnaces from 1916 to 1918, superintendent of the service division, Bethlehem plant, from 1918 to 1919, assistant general manager, Sparrows Point, Md., plant, from 1919 to 1923, and assistant general manager, Cambria plant, Johnstown, Pa., from 1923 to 1925. He went to the Jones & Laughlin company in 1925 as assistant general manager.

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KURTH J. PAPKE, sales manager of Durant Mfg. Co., Milwaukee, has resigned to organize K. J. Papke Co., 290 Third Street, Milwaukee, manufacturers' representative, which will handle Durant line of counting and measuring machines in Wisconsin and also represent Precision Thermometer & Instrument Co., Philadelphia; Divine Brothers Co., Utica, N. Y., casters and truck wheels; Universal Engineering Co., Frankenmuth, Mich., drill bushings; Welded Products Mfg. Co., Cudahy, Wis., factory stools, platforms, trucks, and the Wright Machine Co., Worcester, Mass., screw machine products and metal specialties.

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ARTHUR KANE, formerly with Giddings & Lewis Machine Tool Co., Fond du Lac, Wis., has resigned to take charge, as vice-president, of the newly-organized pattern engineering and service division for Middle Western States of John Ehne & Son Co., Milwaukee, manufacturer of metal and wooden patterns, which has recently increased its capitalization. J. ARTHUR EHNE is president and general manager.

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WILLIAM E. CRAWFORD, electrical engineer with the A. O. Smith Corporation, Milwaukee, since 1920, has been elected president of the Engineers Society of Milwaukee. Secretary E. W. RHODE and treasurer WALTER R. MUELLER were reelected. T. CHALKLEY HATTON, consulting engineer and formerly chief engineer of the Milwaukee Sewerage Commission, was elected vice-president, and BRUNO V. NORDBERG, W. D. BLISS and E. H. MACK, directors.

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C. F. KELLEY, president, Anaconda Copper Mining Co., has been awarded the gold medal of the Mining and Metallurgical Society of America "for expansion and stabilization of the mining industry."

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CHARLES LE GEYT FORTESCUE, chief consulting transmission engineer for the Westinghouse Electric & Mfg. Co., East Pittsburgh, was recently given the honorary degree of Doctor of Laws by Queens University, Kingston, Ont.

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EDWARD B. NEWILL has resigned as manager of the control engineering department of the Westinghouse Electric & Mfg. Co., East Pittsburgh, to become associated in an executive capacity with the radio manufacturing company, which is being formed jointly by the General Motors Corporation and the Radio Corporation of America. Mr. Newill entered upon his new position Oct. 16, with the title of assistant to the president of the Delco Products Co., and will have headquarters temporarily at Dayton, Ohio. When the organization of the new radio company is completed Mr. Newill will be assigned executive duties in connection with either engineering or manufacturing. He was graduated from the Georgia School of Technology, Atlanta, Ga., in 1915, and has been associated with the Westinghouse company since that time.

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F. E. FIEGER, assistant general manager, Jones & Laughlin Steel Corporation, Pittsburgh, has been appointed general manager, succeeding R. J. WYSOR, who has resigned as noted elsewhere in these columns. Mr. Fieger went with the Jones & Laughlin company in 1917 as superintendent of the wire department, Aliquippa works, and the next year was made superintendent of steel works. He was made assistant superintendent at

F. E. FIEGER

Aliquippa in 1920, general superintendent of that plant in 1923 and assistant general manager of the company in January, 1928. J. Z. COLLIER and J. G. WEST, JR., have been appointed assistant general managers. Mr. Collier was formerly general superintendent, Aliquippa works, and Mr. West, general superintendent, North Side works, Pittsburgh. C. M. WHITE, who has been assistant to Mr. Collier, succeeds him at Aliquippa, and HARRY SAXER, superintendent of blast furnaces and coke works at that plant, becomes assistant general superintendent at the Aliquippa works. S. S. MARSHALL, JR., general superintendent, South Side works, Pittsburgh, has been made general superintendent of all Pittsburgh plants. H. D. STARK continues as assistant general superintendent in charge of South Side works, and J. C. MURRAY, who has been superintendent of the Eliza blast furnaces, becomes assistant general superintendent in charge of North Side works.

Round Table on Test Data Presentation

In any systematic investigation into the properties of materials—or, in fact, in any extended series of experiments—it becomes a problem to appraise properly the mass of numerical data accumulated. Methods of presentation of such test data will be discussed in a round table conference in New York during the first week in December, held by a committee of the American Society for Testing Materials in conjunction with the annual meeting of the American Society of Mechanical Engineers. The discussion will be open to all those interested.

R. E. Hess, 1315 Spruce Street, Philadelphia, is in charge of preliminary arrangements for holding this conference.

OBITUARY

FRANCIS A. J. FITZGERALD, past-president of the American Electrochemical Society, died of pneumonia on Oct. 27 at his home in Niagara Falls, Ont., aged 59 years. He was born in Dublin, Ireland, and came to

F. A. J. FITZGERALD

America in 1893. He was a graduate of Massachusetts Institute of Technology, was one of the founders of the Acheson Graphite Co., and for many years conducted the FitzGerald Laboratories in Niagara Falls.

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WILLIAM J. STOOP, for 35 years prominently identified with the iron and steel industry in Pittsburgh and nearby districts and most recently general manager of the Morgan Engineering Co., Alliance, Ohio, died on Oct. 3 at his home in Pittsburgh, following a long illness. He began his business career with the Mackintosh-Hemphill Co., Pittsburgh, of which he later became general superintendent. He then went with the Mesta Machine Co. Homestead, Pa., in a similar capacity. He was next associated with the Portsmouth Steel Co., Portsmouth, Ohio, which later became a part of the Whitaker-Glessner Co., and served for several years as general superintendent of that plant. When the company was merged with others to form the Wheeling Steel Corporation, Mr. Stoop went to Wheeling, W. Va., as vice-president and chief of construction. Upon leaving that company about three years ago he was made general manager of the Morgan Engineering Co., having held that position until November, 1928, when he retired on account of ill health.

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RICHARD H. TYNER, president, National Marking Machine Co., Cincinnati, died suddenly on Oct. 24, aged 61 years. He helped found the company in 1911.

ERNEST F. HARDER, assistant to the vice-president Westinghouse Electric & Mfg. Co., Newark, N. J., works, died at his home in East Orange, N. J., on Oct. 13. He was born in Germany in 1858 and came to the United States 25 years later.

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EDWARD PAYSON BAIRD, president of the Baird Lock Co., Chicago, died on Oct. 24. He had been engaged in the clock and lock manufacturing business for 50 years. He went to Chicago in 1893 and in 1900 established the Baird Mfg. Co., and in 1915 the Chicago Cabinet Lock Co.

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GEORGE ROW, managing director and secretary of the Upper Forest & Worcester Steel & Tinplate Works, Ltd., Morriston, Swansea, Wales, died Oct. 25, aged 75 years. He was one of the founders of the Welsh Plate and Sheet Manufacturers Association and had been a member of the Iron and Steel Institute (British) since 1910.

Nine-Month Record in By-Product Coke

WASHINGTON, Oct. 28. — Although the daily output of by-product coke, like that of pig iron, declined somewhat from the unusually high level maintained in August, it fell only slightly short of the high record established earlier in the year, according to the Bureau of Mines. The total output of by-product coke for the 30 days of September amounted to 4,413,011 tons, an average of 147,100 tons a day. In comparison with the daily average of 149,767 in the previous month, this was a decrease of 1.8 per cent. The decrease, however, was confined to the furnace plants, for at the merchant ovens the daily output increased slightly.

There were 86 by-product plants in operation during the month and they produced 92 per cent of their capacity. Beehive coke production for September was estimated at 504,300 tons, a decrease of 10.2 per cent from the preceding month. The combined output of both kinds of coke was 4,917,311 tons.

A new high record was set by both the coke and pig iron industries during the first nine months of this year. The output of by-product coke was 40,363,248 tons and of beehive coke, 4,786,600 tons, a total of 45,149,848 tons; while the production of pig iron was 32,648,371 tons. The nearest approach to the current production was in 1923, when the nine-month output of coke amounted to 44,205,000 tons and that of pig iron to 31,094,873 tons.

Stocks of by-product coke on hand at producers' plants at the end of September amounted to 2,201,508 tons, an increase of 4.8 per cent from Aug. 31. The furnace plants, with 932,264 tons, showed an addition of 46,520 tons. The merchant plants, with 1,269,244 tons, added 54,870 tons during September.

August Immigration Above That in July

WASHINGTON, Oct. 28.—Making an increase of 2710 over July, 22,778 immigrant aliens were admitted to the United States in August, according to the Bureau of Immigration. Females (11,932) outnumbered males (10,846) among the immigrants admitted in August. Europe provided 11,879 of the immigrants, Germany leading with 2301, followed by Italy with 2030. Great Britain was third with 1906, while 1551 came from the Irish Free State.

While more newcomers now come directly from Germany than from Great Britain, fewer immigrants from all countries were charged to the former's quota than to the latter's. This is due to a number of natives of Great Britain entering the United States by way of the northern land border, who give Canada as their last permanent residence.

During August 3156 immigrants charged to the quota for Great Britain and Northern Ireland were admitted to the United States; and of this number 1263 or 40 per cent came in over the Canadian border. In the same month, 2332 immigrants charged to the quota for Germany were admitted, more than 96 per cent of whom came directly from overseas. Of the 29,294 aliens departing from the United States, 5571 left permanently.

Chicago Employment Gain

Most of the industrial groups reporting on employment in the seventh Federal Reserve District showed a larger volume on Sept. 15 than a month earlier, according to a recent report of the Federal Reserve Bank of Chicago. The aggregate gain amounted to 0.7 per cent—the same rate of increase as reported for the preceding period. Workers in the metals and metal products, other than vehicles, increased 0.1 per cent, while employment in vehicle manufacturing plants decreased 0.6 per cent.

Although the volume of employment has been maintained at a satisfactory level, payroll amounts at industrial plants reflect a less favorable condition. All but one of the reporting industries showed a decrease in payroll totals from the preceding month.

September shipments of enameled sanitary ware totaled 314,862 pieces, against 395,542 pieces in August, according to reports received by the Department of Commerce from 22 manufacturers, comprising practically the entire industry.

Exports of Iron and Steel Lower

Despite Drop in September, Nine-Month Total Was Highest Since 1920—Imports of Finished Steel Off 20 Per Cent

WASHINGTON, Oct. 25.—Exports of iron and steel products in September were 222,408 gross tons, the lowest since last December, with a total of 221,810 tons, and 20,448 tons under the 242,856 tons exported in August, the previous low mark of the current year. Imports also declined in September, amounting to 60,974 tons, the smallest since last April, with a total of 54,337 tons, and 22,995 tons under August imports of 83,969 tons.

The sharpest decline in exports in September was in scrap, which dropped to 32,803 tons from 62,857 tons in August. Scrap was the largest item of exportation during each of the two months. Exports of black steel sheets in September decreased to 11,822 tons from 15,890 tons. Tin plate exports declined to 19,910 tons from 21,367 tons; fabricated material to 10,170 tons from 12,926 tons and steel rails to 10,070 tons from 12,926 tons.

Among the increases were those in steel bars, which rose to 16,999 tons from 11,936 tons; galvanized sheets, to 13,454 tons from 11,336 tons; plain structural material, to 21,187 tons from 5278 tons, the sharpest gain made, and black and galvanized pipe, which rose to 13,482 tons from 11,497 tons.

Only three items in the import list showed gains and all of them were light. As in the case of exports, the largest drop was in scrap, which fell to 6399 tons from 12,033 tons. The next to largest decline was in cast iron pipe, which decreased to 3478 tons from 8397 tons. Little change was reflected in the incoming movement of structural shapes, the September figure being 15,525 tons as against 15,695 tons for August. Pig iron imports decreased to 11,013 tons from 12,377 tons.

For the nine months ended with September exports totaled 2,327,635 tons, an increase of 201,573 tons over those for the corresponding period of last year, and the largest total for nine months since the abnormal movement in 1920. Imports showed a downward trend, decreasing 15,410 tons to 574,166 tons from 589,576 tons.

Of the September scrap exports, 10,891 tons went to Japan; 9961 tons to Canada; 7532 tons to Italy, and 3000 tons to Poland.

Canada was the sole buyer of 12,136 tons of skelp in September, and took

Exports of Iron and Steel from the United States

(In Gross Ton)

	September		Nine Months Ended September	
	1929	1928	1929	1928
Pig iron	1,806	10,228	42,624	52,559
Ferromanganese	98	1,253	1,355	8,292
Scrap	32,803	58,511	392,398	424,112
Pig iron, ferroalloys and scrap	*34,707*	*69,992*	*436,377*	*484,963*
Ingots, blooms, billets	2,450	2,761	32,144	19,110
Skelp	12,136	14,298	94,869	87,225
Wire rods	2,247	3,324	34,098	29,111
Semi-finished steel	*16,833*	*20,383*	*161,111*	*135,446*
Steel bars	16,999	11,735	158,738	108,865
Alloy steel bars	395	1,282	12,791	11,107
Iron bars	192	453	3,231	2,947
Plates, iron and steel	12,868	10,989	153,763	109,562
Sheets, galvanized	13,454	8,701	125,364	112,748
Sheets, black steel	11,822	12,038	138,734	140,518
Sheets, black iron	1,313	1,285	12,050	11,425
Hoops, bands, strip steel	4,509	4,249	56,886	42,054
Tin plate; terne plate	19,910	16,471	194,273	185,472
Structural shapes, plain material	21,187	13,377	202,277	132,116
Structural material, fabricated	10,170	4,272	87,880	65,405
Steel rails	10,070	16,466	118,561	160,668
Rail fastenings, switches, frogs, etc.	1,704	1,518	24,704	34,277
Boiler tubes	1,761	1,729	14,451	13,116
Casing and oil line pipe	6,540	6,721	95,845	86,517
Black and galvanized welded pipe	13,482	7,578	108,643	86,389
Malleable iron screwed pipe fittings	784	936	8,978	7,316
Plain wire	3,347	3,056	36,069	33,859
Barbed wire and woven wire fencing	5,548	4,634	50,932	54,091
Wire cloth and screening	156	101	1,341	1,401
Wire rope	437	378	5,671	3,851
Wire nails	813	791	10,756	11,728
Other nails and tacks	838	460	8,092	7,309
Horseshoes	35	34	287	340
Bolts, nuts, rivets and washers, except track	1,483	916	12,431	9,716
Rolled and finished steel	*159,817*	*130,220*	*1,642,748*	*1,432,797*
Cast iron pipe and fittings	6,993	2,171	29,672	25,019
Car wheels and axles	1,250	2,345	16,466	12,391
Iron castings	582	545	9,004	8,901
Steel castings	671	379	8,804	7,223
Forgings	483	770	9,699	8,228
Castings and forgings	*9,979*	*6,210*	*73,645*	*61,762*
All other	1,072	1,193	13,754	11,094
Total	222,408	227,998	2,327,635	2,126,062

Imports of Iron and Steel into the United States

(In Gross Tons)

	September		Nine Months Ended September	
	1929	1928	1929	1928
Pig iron	11,013	10,437	103,594	104,777
Ferromanganese*	2,525	4,660	48,818	34,677
Ferrochrome†	48	79	522	569
Ferrosilicon‡	966	123	7,306	2,582
Scrap	6,399	5,727	70,806	37,653
Pig iron, ferroalloys and scrap	*20,951*	*21,026*	*231,046*	*189,258*
Steel ingots, blooms, billets and slabs	2,360	2,193	20,901	16,619
Wire rods	1,401	1,076	12,608	12,130
Semi-finished steel	*3,761*	*3,269*	*33,509*	*28,749*
Rails and splice bars	258	891	5,902	12,982
Structural shapes	15,525	12,207	118,574	131,325
Boiler and other plates	215	606	3,033	4,668
Sheets and saw plates	2,771	2,347	19,109	19,912
Steel bars	3,693	7,358	28,952	70,966
Bar iron	161	161	2,446	1,614
Hoops, bands and cotton ties	5,580	9,911	34,253	39,840
Tubular products (wrot.)	2,470	3,084	30,584	31,513
Nails, tacks, staples	857	1,365	7,190	7,122
Tin plate	29	34	237	817
Bolts, nuts, rivets and washers	47	16	274	176
Round iron and steel wire	551	378	4,629	3,230
Barbed wire	217	762	4,486	3,121
Flat wire; strip steel	199	217	1,663	1,780
Steel telegraph and telephone wire	11	.....	14	168
Wire rope and strand	93	98	1,779	1,255
Other wire	17	78	402	451
Rolled and finished steel	*32,694*	*39,513*	*263,527*	*330,940*
Cast iron pipe	3,478	1,778	44,532	47,314
Castings and forgings	90	163	1,552	2,315
Total	60,974	65,749	574,166	589,576
Manganese ore*	13,123	15,063	260,168	146,657
Iron ore	246,917	211,494	2,314,124	1,887,201
Magnesite	12,292	.....	31,915	38,391

*Manganese content only.
†Chromium content only.
‡Silicon content only.

UNITED STATES IMPORTS OF IRON AND STEEL PRODUCTS
(In Gross Tons)

	September	August	July
Austria	17	28	50
Azores, Madeira	.....	2	.....
Belgium	13,238	18,131	15,497
Bulgaria	.....	.....	170
Czechoslovakia	98	95	.....
France	8,756	11,423	13,556
Germany	10,933	14,225	13,163
Italy	345	367	217
Netherlands	791	908	837
Norway	460	4,874	1,668
Sweden	3,063	3,140	3,491
Switzerland	19	.....	40
United Kingdom	3,791	6,725	4,034
Europe	*41,511*	*59,920*	*52,723*
Canada	12,917	16,648	13,305
Mexico	30	109	33
Cuba	.....	.....	195
Dominican Rep.	24	.....	.....
British India	6,485	7,227	5,120
Japan	7	30	2
Canary Islands	.....	30	.....
Miscellaneous	.....	7	.....
Total	60,974	83,969	71,378

3566 tons of the 6540 tons of casing and oil line pipe exported. Of the 9910 tons of welded black pipe exported in September, 1793 tons went to Japan; 1315 tons to Canada; 1214 tons to the United Kingdom, and 777 tons to Mexico.

Total exports to Canada in September were 87,608 tons, while 29,117 tons went to Japan, 11,581 tons to the Philippine Islands, and 8922 tons to Mexico.

Of the structural shapes imported in September, 8183 tons came from Belgium, 3876 tons from Germany, and 3158 tons from France. France provided 3222 tons of the September cast iron pipe imports. Of the 2470 tons of "other pipe" imported during that month, 836 tons came from Germany, 691 tons from Canada, 542 tons from the United Kingdom, and 382 tons from Sweden. Sweden was the largest source of incoming shipments of steel bars in September, furnishing 1313 tons, while 1116 tons came from Belgium, 695 tons from France, and 324 tons from Germany.

Canada led as the source of supply of ferromanganese imports, providing 1968 tons out of the total of 2525 tons, while 312 tons came from the United Kingdom. Of the 13,123 tons of manganese ore concentrates imported in September, 7200 tons came from Soviet Russia, 2600 tons from India, 2439 tons from the Gold Coast of Africa, and 839 tons from Brazil.

Belgium was the greatest source of imports in September, supplying a total of 13,238 tons, while Canada was a close second, with 12,917 tons. Germany furnished 10,933 tons, and France, 8756 tons.

Further Reduction in Iron Ore Imports

September imports of iron ore are reported by the Department of Commerce at 246,917 gross tons, a drop of 17 per cent from the 298,013 tons of August. The current figure is, however, 17 per cent higher than the 211,494 tons of September, 1928. The August total was the third largest in more than six years.

In the elapsed portion of the year an increase over last year is shown of 427,000 tons, which represents 22.5 per cent. This makes the year, so far, the heaviest in our history, as it has exceeded the previous high record, made in 1923, by a fraction of 1 per cent. The 1923 total in nine months was 2,297,144 tons, which now is bettered by 17,000 tons.

Chile continues to supply the largest share of the imports, which, however, dropped in September for the first time in some months to a little less than one-half the total. For the nine months, however, Chile's proportion was about 52 per cent. Cuba, Sweden, French Africa and Spain followed in that order, both for September and for the nine months. This is somewhat different from the line-up of a year ago, when Sweden supplied no ore during the month and a low amount in the nine months, owing to an extensive strike in the Swedish mines.

SOURCES OF AMERICAN IMPORTS OF IRON ORE
(In Gross Tons)

	September		Nine Months Ended September	
	1929	1928	1929	1928
Chile	114,930	130,800	1,198,553	1,079,100
Cuba	47,000	31,000	486,350	265,786
Spain	6,028	5,461	44,259	22,208
Sweden	28,463	.....	238,330	19,614
French Africa	13,320	27,525	141,795	362,130
Canada	43	167	3,403	45,359
Other countries	37,133	16,541	200,934	93,004
Total	246,917	211,494	2,314,124	1,887,201

To Air Steel Window Trade Practices

WASHINGTON, Oct. 28.— Commissioner Charles H. March of the Federal Trade Commission will preside at a trade practice conference which has been authorized for the solid-section steel window industry, the time and place of which have not been scheduled.

Applicants for the conference, according to the commission, represent 100 per cent of the manufacturers of solid-section steel windows east of the Rocky Mountains. Several manufacturers on the Pacific Coast have not yet indicated a desire to take part.

Among practices proposed for discussion are: Publication of prices, proper handling of commodity and engineering sales, inducing breach of contract, misbranding and misrepresentation, secret rebates, dumping and making less-than-carload sales at carload prices.

Thomas Process Jubilee by British Steel Company

Bolckow, Vaughan & Co., Middlesbrough, England, have issued a booklet in commemoration of the fiftieth anniversary of the successful completion of a series of experiments at their Cleveland steel works by Sydney Gilchrist Thomas and Percy Carlyle Gilchrist. These experiments, which resulted in the development of the basic-Bessemer process of steel-making, were revolutionary and have affected the industry ever since.

The story of the two inventors is one of difficulty and poverty. Thomas was to be a physician, but his father's death when he was only 17 years old made such a career impossible. He became assistant master at a private school in Essex, and then a junior clerk in the metropolitan police courts. His salary was £90 ($450) a year, and he remained in that position for 12 years. Probably few suspected that the young police court clerk had inventive ability.

A chance phrase about the Bessemer converter heard at a Birkbeck Institute lecture when he was 20 fired his imagination. He attended classes in mineralogy, and after a little while enlisted the help of his cousin, Gilchrist, who was a chemist at a South Wales works. Out of his small salary as a clerk, Thomas managed to save £800 ($4,000). This the two men spent on research, and finally patented their process. The results were embodied in a paper which came to the notice of the manager of Bolckow, Vaughan & Co., with the result that the new process was given a trial. The revolution of steel manufacture was thus begun. Thomas did not live long to enjoy the fruits of his success, for he died when he was only 35 years old.

Canton Rolling Mills to Make Coated Alloy Sheets

The Canton Rolling Mills Corporation, Canton, Ohio, which some months ago bought the plant of the Falcon Tin Plate Co., announces that the mill is now being electrified and new equipment, including continuous heating furnaces and Streine automatic shearing equipment, is being installed. The mill is being changed over from tin plate and black plate sizes so that it will roll full finished and coated alloy sheets up to 48-in. wide and 168-in. long. Officers of the company are: President, Alvin L. Bear; secretary-treasurer, Godfrey M. Cohn; vice-president, Charles M. Easterly. In addition to the above, the directors are: William H. Lotts, Milo C. Hagen, Theodore E. Rein and William T. Martersteck. Mr. Martersteck is plant engineer and works manager.

The Internal Revenue Bureau has announced the refund of an income and profits tax of $294,141 to the Youngstown Sheet & Tube Co.

Machinery Exports Decline Further

But Nine-Month Total Is Nearly $100,000,000 Above Previous High Record—Imports Up in Nine Months

WASHINGTON, Oct. 25.—Continuing their downward trend, exports of machinery of all kinds declined to a value of $46,984,546 in September from $50,178,881 in August, a drop of $3,194,335, or 6.2 per cent. For the nine months ended with September, however, exports of machinery were valued at $462,554,128, against $365,342,219 for the corresponding period of last year, an increase of $97,211,909, or 26.9 per cent. When compared with September, 1928, with a value of $33,457,410, exports last month showed a gain of $13,527,136, or 40 per cent.

For the third quarter a total of $154,139,000 was made, second only to the $155,939,000 in the first quarter of this year and far higher than in any quarter of any preceding year. The nine-month total is a new record, exceeding the previous high, that of 1928, as above.

Exports of machinery and vehicles in September were valued at $85,314,591, against $90,453,070 in August, a decline of $5,138,479, but an increase of $16,666,796 over similar exports of $68,647,795 in September of last year. For the nine months ended with September exports of machinery and vehicles were valued at $955,120,919, an increase of $188,356,938 over similar exports ($766,782,012) for the corresponding period of 1928.

Exports in September of industrial machinery, as classified by the Division of Statistics, Department of Commerce, were valued at $23,248,731, a slight increase over those in August, valued at $23,154,869, and a gain of $8,532,413 over similar exports in September of last year. For the nine months ended with September industrial machinery exports were valued at $210,291,813, compared with $163,026,202 for the corresponding period of last year, an increase of $47,265,611, or 29 per cent.

Exports of power-driven metal-working machinery, as listed in THE IRON AGE table, numbered 944 units, valued at $1,595,716, in September, against 894 units, valued at $1,342,908, in August.

Nine-Month Imports Show Sharp Gain

Imports of machinery and vehicles in September were valued at $3,115,744, against $3,493,152 in August, a decline of $377,408. Compared with $2,226,411 in September of last year, there was a gain of $889,333. For the nine months ended with September imports of machinery and vehicles were valued at $32,505,207, compared with $21,194,772, reflecting the sharp gain of $11,310,435, or 53.4 per cent. Imports of industrial, office and printing machinery in September were valued at $1,985,300, an increase of $98,420 over those in August, valued at $1,886,880, and a gain of $540,630 over similar imports for September of last year, valued at $1,444,670. For the first nine months of 1929, imports of industrial, office

Machinery Exports from the United States

(By Value in Thousands of Dollars)

	September		Nine Months Ended September	
	1929	1928	1929	1928
Locomotives	$470	$555	$3,032	$2,548
Other steam engines	55	26	598	707
Boilers	150	194	1,463	995
Accessories and parts	60	39	710	463
Automobile engines	625	919	9,461	11,511
Other internal combustion engines	1,021	712	7,723	6,577
Accessories and parts	274	215	3,377	2,740
Electric locomotives	46	16	308	1,128
Other electric machinery and apparatus	1,148	507	10,028	5,824
Excavating machinery	538	291	6,335	2,242
Concrete mixers	151	68	1,154	795
Road-making machinery	201	210	2,431	2,245
Elevators and elevator machinery	623	266	4,070	3,208
Mining and quarrying machinery	1,809	1,014	13,459	10,116
Oil-well machinery	1,878	872	18,882	10,891
Pumps	835	520	8,798	5,916
Bending and power presses	272	363	2,610	1,732
Forging machines	86	73	1,113	610
Machine tools*	2,341	832	21,336	12,219
Other metal-working machinery and parts	592	383	5,696	4,494
Textile machinery	1,035	756	9,915	9,733
Sewing machines	951	495	7,918	6,387
Shoe machinery	147	95	1,503	1,339
Flour-mill and Gristmill machinery	120	317	500	334
Sugar-mill machinery	770	510	3,194	3,295
Paper and pulp-mill machinery	394	158	2,941	2,244
Sawmill machinery	72	48	68	672
Other woodworking machinery	192	115	1,785	1,389
Refrigerating and ice-making machinery	1,000	659	11,578	7,083
Air compressors	646	401	587	5,008
Typewriters	1,649	1,363	17,894	15,660
Power laundry machinery	73	122	1,505	877
Typesetting machines	588	347	4,547	3,371
Printing presses	369	374	5,163	4,453
Agricultural machinery and implements	9,250	8,498	109,721	90,182
All other machinery and parts	16,554	11,124	161,151	126,354
Total	$46,985	$33,457	$462,554	$365,342

*Principal details in another table.

Imports of Machinery into the United States

(By Value)

	September		Nine Months Ended September	
	1929	1928	1929	1928
Metal-working machine tools	$95,200	$35,516	$904,410	$433,247
Agricultural machinery and implements	502,797	245,791	7,460,388	3,751,352
Electrical machinery and apparatus	232,302	255,520	2,131,267	1,897,683
Other power-generating mach'ry.	87,063	48,376	957,061	538,073
Other machinery	329,301	780,238	9,059,672	7,270,990
Vehicles except agricultural	392,535	280,430	4,260,727	2,323,625
Total	$2,138,908	$1,645,871	$24,773,525	$16,215,470

Exports of Power-Driven Metal-Working Machinery

	September, 1929		August, 1929	
	No.	Value	No.	Value
Engine lathes	86	$210,856	59	$139,664
Turret lathes	47	140,537	23	55,169
Other lathes	110	183,492	89	177,632
Vertical boring mills and chucking machines	11	19,974	13	25,505
Thread-cutting and automatic screw machines	80	99,179	89	121,082
Knee and column-type milling machines	53	141,800	54	111,596
Other milling machines	60	173,097	42	94,321
Gear-cutting machines	32	125,234	31	93,792
Vertical drilling machines	39	49,465	45	43,863
Radial drilling machines	7	21,798	9	23,221
Other drilling machines	155	44,620	192	57,672
Planers and shapers	53	64,595	47	96,473
External cylindrical grinding machines	89	185,962	60	150,444
Internal grinding machines	37	100,482	33	103,125
Metal-working tool-sharpening machines	85	34,625	108	49,349
Total	944	$1,595,716	894	$1,342,908

and printing machinery were valued at $18,648,152, representing the high increase of $5,426,540, or 24.4 per cent over similar imports for the corresponding period of last year.

Imports of machinery, as listed in THE IRON AGE table, were valued at $2,138,908 in September, compared with $2,602,309 in August, a decrease of $463,401, but an increase of $493,037 over similar imports in September of last year. For the first nine months of 1929 they were valued at $24,773,525, an increase of $8,558,055, over the same period of last year.

Where Steel Exports Went in Nine Months

Canada Took 550,679 Tons of Nine Leading Items—Japan Retains Second Position with 115,654 Tons, Followed by Argentina, 41,392 Tons; Philippines, 38,370 Tons; Mexico, 35,027 Tons

Exports from United States, by Countries of Destination

(*In Gross Tons*)

	Steel Plates				Galvanized Sheets				Black Steel Sheets			
	—September—		Nine Months Ended September		—September—		Nine Months Ended September		—September—		Nine Months Ended September	
	1929	1928	1929	1928	1929	1928	1929	1928	1929	1928	1929	1928
Totals	*12,868*	*10,989*	*153,763*	*109,562*	*13,454*	*8,701*	*125,364*	*112,748*	*11,822*	*12,038*	*137,734*	*140,518*
Canada	10,589	9,034	129,950	91,730	1,611	2,449	26,282	24,922	5,391	6,694	74,165	63,494
Japan	151	91	2,625	1,442	316	599	2,434	2,432	1,556	2,137	20,588	55,628
Cuba	52	56	947	894	712	254	4,603	4,230	122	33	1,082	1,622
Philippine Islands	95	170	1,455	1,974	2,748	531	21,024	17,066	20	326	2,483	2,374
Mexico	27	71	370	589	2,180	675	10,704	6,273	171	198	2,447	1,932
Argentina	....	....	....	....	433	370	4,874	5,418	754	29	5,041	1,221
Chile	....	....	....	....	....	....	....	....	8	1,483	3,437	1,786
Colombia	....	....	....	....	291	546	4,082	1,414	25	....	368	315

	Steel Rails				Barbed Wire				Plain and Galvanized Wire			
	—September—		Nine Months Ended September		—September—		Nine Months Ended September		—September—		Nine Months Ended September	
	1929	1928	1929	1928	1929	1928	1929	1928	1929	1928	1929	1928
Totals	*10,070*	*16,466*	*118,561*	*160,668*	*5,548*	*4,634*	*50,932*	*54,091*	*3,347*	*3,056*	*36,079*	*34,859*
Canada	1,842	4,548	20,141	22,434	245	78	2,070	2,876	390	1,131	10,030	11,411
Japan	2,117	3,190	9,134	14,255	....	....	....	....	91	114	1,097	1,286
Cuba	686	....	6,504	2,396	602	462	2,493	3,868	96	67	900	798
Philippine Islands	97	202	7,665	3,332	834	118	5,198	1,534	26	11	545	219
Mexico	710	276	5,672	5,429	639	230	5,223	4,998	149	84	1,809	1,749
Argentina	....	....	3,740	3,012	745	1,636	5,995	11,830	815	889	6,125	7,361
Chile	110	121	15,625	21,613	....	....	....	....	96	55	....	....
Colombia	96	66	4,043	9,989	210	....	4,840	3,282	....	....	....	....
Brazil	1,623	....	9,174	18,290	664	392	....	11,474	153	51	1,068	911

	Tin Plate				Steel Bars				Heavy Plain Structural Material			
	—September—		Nine Months Ended September		—September—		Nine Months Ended September		—September—		Nine Months Ended September	
	1929	1928	1929	1928	1929	1928	1929	1928	1929	1928	1929	1928
Totals	*19,910*	*16,471*	*194,273*	*185,472*	*16,999*	*11,785*	*158,738*	*108,865*	*21,187*	*13,377*	*202,277*	*132,116*
Canada	4,337	4,344	36,468	38,107	6,350	9,392	78,892	71,737	17,294	10,661	172,681	109,345
Japan	3,566	6,888	45,254	42,403	3,490	82	25,633	808	1,904	31	8,889	1,550
Cuba	225	238	4,339	3,259	294	215	3,497	3,783	142	711	1,928	4,539
Mexico	859	761	6,880	9,335	219	63	1,183	574	135	127	739	804
Argentina	1,593	386	13,728	15,677	....	....	....	....	28	49	1,889	332
Chile	220	426	3,531	2,924	....	....	....	....	....	....	....	2,842
Brazil	176	227	10,777	4,898	....	....	....	....	....	....	....	....
China	4,537	798	21,805	13,475	....	....	....	....	....	....	....	....
British India	347	....	4,061	3,491	....	....	....	....	....	....	....	....
United Kingdom	....	....	844	....	3,029	1,042	18,777	12,957	....	....	....	....
Italy	205	....	5,149	3,950	....	....	....	....	....	....	....	....

Destination of Iron and Steel Exports, September, 1929

(In Gross Tons)

Country of Destination	September, 1929	January Through September 1929	1928
North and Central America and West Indies	*111,433*	*1,178,757*	*1,027,606*
Canada and Newfoundland	88,107	968,821	857,961
Cuba	5,939	52,586	47,251
Guatemala	481	5,693	6,418
Honduras	364	8,020	4,917
Mexico	8,922	77,871	61,162
Panama	2,864	15,732	11,705
Salvador	127	5,454	2,670
British West Indies	1,288	15,008	5,919
Other West Indies	2,703	22,252	22,705
Other Central America	638	7,320	6,898
South America	*27,446*	*297,589*	*321,150*
Argentina	6,145	71,504	72,162
Brazil	6,240	52,655	60,553
Chile	2,898	44,209	52,761
Colombia	2,424	33,372	49,068
Peru	6,949	29,955	19,151
Uruguay	372	6,560	6,762
Venezuela	2,042	54,924	56,916
Other South America	376	4,410	3,777
Europe	*25,332*	*295,219*	*234,385*
Belgium	303	2,320	12,175
France	1,059	15,829	3,825
Germany	246	18,106	21,090
Italy	7,888	93,472	81,613
Netherlands	382	2,408	1,703
Poland and Danzig	3,002	75,081	53,718
Rumania	649	3,419	3,646
Soviet Russia	2,249	7,635	2,601
United Kingdom	7,825	51,798	39,074
Other Europe	1,729	25,151	14,940
Far East	*56,014*	*538,952*	*532,732*
British Malaya	490	7,550	5,454
China	6,356	57,070	76,386
Netherlands East Indies	3,544	51,360	30,450
India and Ceylon	1,004	15,013	18,657
Japan	29,117	287,767	302,399
Kwantung	566	9,282	12,356
Philippine Islands	11,581	76,908	64,625
Australia	1,348	17,413	12,243
New Zealand	736	3,691	1,801
Other Asia and Far East	1,272	12,898	7,861
Africa	*2,183*	*17,118*	*10,189*
Union of South Africa	813	6,760	4,401
Egypt	444	6,288	3,430
Mozambique	892	2,656	1,006
Other Africa	34	1,414	1,352
Total	222,408	2,327,635	2,126,062

European Steel Markets Less Active

Forward Business Slower and Exports Fall—Reduced Output in Germany—Turkey to Make Steel

(*By Cable*)

LONDON, ENGLAND, Oct. 28.

WHILE Cleveland furnaces are satisfactorily engaged for the next few weeks, forward business is not developing very well and producers are somewhat pessimistic, as costs are not decreasing and lower pig iron prices are impracticable at present.

Continental material is being offered in restricted quantities, but consumers are cautious in buying. Hematite iron is moderately active, but furnaces are not pressing for business, asserting that the price should be fully £4 ($19.40) a ton. As a result, some pig iron is now going into stock.

Domestic business in finished steel has increased slightly, but export is still generally quiet. Foreign competition abroad is hampering expansion, but British makers are unable to reduce prices and in some cases are considering advances.

Tin plate is active, but prices are easier, as tin has declined in price. Mills are well booked for several months and export markets are inquiring for considerable tin plate. An Eastern oil can tin plate order for about 1,000,000 boxes is expected to be placed here at an early date.

Galvanized sheets are quiet and prices have declined further based on low priced foreign steel. Spelter makers are meeting Friday to discuss the market situation. Black sheets continue inactive.

The Continental market is disorganized by lack of buying and continually receding prices and makers are meeting today to discuss the question of stabilization through a central sales office.

Belgian production in September was 347,000 metric tons of pig iron, 337,000 tons of raw steel and 288,000 tons of rolled steel products. On Sept. 30, 57 furnaces were in blast.

German output in September was 1,230,000 metric tons of raw steel and 906,000 tons of rolled steel products. Luxemburg production in September was 240,000 metric tons of pig iron and 223,000 tons of raw steel.

Agreement Reached For British Steel Merger

LONDON, ENGLAND, Oct. 19.—A provisional agreement for the acquisition of assets and liabilities of Bolckow, Vaughan & Co., Ltd., by Dorman, Long & Co., Ltd., has been signed by both parties. Under its terms stockholders of Bolckow, Vaughan & Co. will exchange their shares for securities in Dorman, Long & Co. In the announcement of the provisional agreement it is stated by the companies that they have identical iron, steel and engineering interests, equipment, raw materials and steel production and supply the same markets, so that the merger offers both considerable benefit. Directors of the companies have recommended acceptance of the agreement.

When the merger is completed the new corporation will have a share capital stock of £11,248,146 ($54,553,508) and debenture stock of £5,855,773 ($28,400,499). The permanent name of the merged companies will be Dorman, Long & Co., Ltd., but for a time it will appear with the phrase, "incorporating Bolckow, Vaughan & Co., Ltd."

British Light Their Largest Coke Oven

LONDON, ENGLAND, Oct. 19.—The largest coke oven in the United Kingdom has been placed in operation at Chapeltown, Sheffield, by Thorncliffe Coal Distillation, Ltd. It will use 1200 tons of coal a day and produce 840 tons of coke, 8,000,000 cu. ft. of gas, 12,000 gal. of tar, 17 tons of ammonia sulphate and 3000 gal. of benzol. Half the gas will be conveyed by a six-mile main to the Sheffield Gas Co.

Sir Samuel Roberts, M. P., speaking at the plant when the oven was lighted, said that surplus gas could also be used for generating electricity and that there is a great future for colliery companies which generate electricity on a large scale.

British and Continental European Export Prices per gross ton, f.o.b. United Kingdom Ports, Hamburg and Antwerp, with the £ at $4.85

British Prices, f.o.b. United Kingdom Ports

Cleveland No. 3 foundry	£3	12½s.	to	£3	13½s.	$17.58	to	$17.82
East Coast hematite...	3	16½	to	3	17	18.51	to	18.63
Ferromanganese, export	13	10	to	14	0	65.47	to	67.90
Billets, open-hearth....	6	5	to	6	7½	30.31	to	30.92
Sheet bars, open-hearth	6	5	to	6	10	30.31	to	31.52
Black sheets, Japanese specifications	12	12½				61.22		
Tin plate, per base box	0	18¾	to	0	19	4.54	to	4.60
Rails, 60 lb. and heavier	7	15	to	8	15	37.59	to	42.43
						Cents per Lb.		
Steel bars, open-hearth	7	15	to	8	10	1.67	to	1.84
Beams, open-hearth....	7	2½	to	7	12½	1.55	to	1.65
Channels, open-hearth..	7	7½	to	7	17½	1.60	to	1.71
Angles, open-hearth....	8	2½	to	8	12½	1.76	to	1.86
Ship plates, open-hearth	7	12½	to	8	2½	1.66	to	1.76
Black sheets, No. 24 gage	10	0	to	10	5	2.17	to	2.21
Galvanized sheets, No. 24 gage	12	17½	to	13	5	2.78	to	2.87

Continental Prices, f.o.b. Antwerp or Hamburg

Foundry iron, 2.50 to 3.00 per cent sil., 0.50 to 0.90 per cent. phos.	£3	8s.	to	£3	11½s.	$16.49	to	$17.33
Foundry iron, 2.50 to 3.00 per cent sil., 1.00 per cent and more phos.	3	8	to	3	10	16.49	to	16.97
Billets, Thomas	4	13	to	4	13½	22.65	to	22.77
Sheet bars, Thomas....	4	11	to	4	12	22.06	to	22.30
Wire rods low C., No. 5 B.W.G.	6	3	to	6	5	29.82	to	30.30
Black sheets, No. 31 gage, Japanese	12	6	to	12	7½	59.65	to	60.02
Rails, 60 lb. and heavier	6	8½	to	6	10*	31.16	to	31.52
Rails, light	6	1½				29.46		
						Cents per Lb.		
Steel bars, merchant...	5	2	to	5	3	1.10	to	1.11
Steel bars, deformed...	5	1	to	5	2	1.09	to	1.10
Beams, Thomas, British standard	4	17	to	5	3	1.05	to	1.11
Channels, Thomas, American sections ...	5	14	to	5	18	1.24	to	1.27
Angles, Thomas. 4-in. and larger, over ⅜-in. thick	4	19				1.07		
Angles, Thomas, 3-in...	5	6				1.14		
Ship plates, open-hearth inspected	7	5				1.61		
Hoop and strip steel over 6-in. base.....	5	7½	to	5	10	1.15	to	1.19
Wire, plain, No. 8 gage	7	2½	to	7	3½	1.54	to	1.55
Wire, galvanized, No. 8 gage	8	16				1.89		
Wire, barbed, 4-pt. No. 12 B.W.G.	11	3½				2.41		
Wire nails, base.....	7	10	to	7	10½	$1.62	to	$1.63 per keg
Wire nails, assortments, 1 to 6-in. keg.....	10	6½				2.23		

*Open-hearth steel, 10s. ($2.42) per ton extra.

German Beryllium Output Increases

Further Price Reduction Expected Soon — Alloyed with Copper It Has Unusual Strength and Elasticity

HAMBURG, GERMANY, Oct. 14.—In recent months the price of beryllium has been reduced to 1000 m. ($238) per kg., or $108 per lb., a little more than half the present price in the United States. The reduction was made possible by improvements in production by the Siemens & Halske A. G., the leading German maker. The company is now planning a new beryllium plant with a capacity of 100 kg. a month, and it is expected that the price will be further reduced to 700 or 800 m. ($167 to $190) per kg., or $76 to $86 per lb.

The Siemens & Halske A. G. is producing beryllium electrolytically by using beryllium double fluoride. The product is 98 per cent Be, 1 per cent Fe and 1 per cent impurities; it is hard but brittle. Beryllium, 99.5 per cent pure, is used for X-ray equipment. Its principal use, however, is as an alloy of steel, aluminum, copper or other metals. The chief alloy being produced in Germany today is copper-beryllium with 2.50 per cent Be. It is claimed by its makers to have six times the hardness and five times the fatigue resistance of copper, and by proper heat treatment, it is said, these properties can be greatly increased. Beryllium bronze, with 2.50 per cent Be, is claimed by producers to compare favorably with the best chromium spring steel.

An important quality claimed for the beryllium alloys is their extreme elasticity, exceeding that of other elastic metals. Tests are said to show that beryllium bronze springs will withstand two to three times the use of high-quality steel springs without showing fatigue. Flat springs of beryllium-bronze have been tested up to 15,000,000 vibrations without breaking, it is stated. Beryllium bronze springs are claimed to have shown under test that they are four and a half times stronger than brass springs and two and a half times stronger than nickel steel or phosphor bronze springs. Copper wire alloyed with 2.50 per cent Be is said to have greater electrical conductivity than other non-ferrous metal alloys.

Tests have shown that beryllium alloys can be welded, rolled or drawn into any required shapes, it is reported. Investigation is now being made of beryllium alloyed with nickel and cobalt, and the Friedrich Krupp A. G. is investigating it as an alloy of Nirosta. Beryllium alloys are being used in Germany by the electrical and spring manufacturing industries.

German Export Trade Quiet

Affected by Depression in Other Continental Markets— Locomotive Builders Report Better Business

BERLIN, GERMANY, Oct. 10.—Steel activity has declined somewhat in the past fortnight, partly in sympathy with the weakness evident in other Continental markets. While the total number of unemployed in Germany is 170,000 more than at the same date in 1928, there has been the usual fall increase in industrial personnel and the surplus of unemployed is considered as a normal result of increasing population.

Production continues high. Coal output in the first eight months of this year was 107,300,000 metric tons, 6,000,000 tons more than in the same period of 1928. Pig iron production in the first nine months of this year was 10,049,048 tons, compared with 9,638,384 tons in nine months of last year. The continued high production of iron and steel, despite a weaker market, is believed to be the result of many mills producing for stock rather than to curtail operations and reduce their personnel. Certain mills, however, have begun to curtail, among the leaders being the Friedrich Krupp A. G. and the Gutehoffnungshütte.

Export trade is decidedly inactive and the latest returns, which are for August, show net exports of 355,000 tons of heavy iron and steel. This is larger than the monthly average for 1928 of 219,000 tons, but new business is coming in slowly. The Hamburg Steel Export Association complains that Belgian and French sellers are shading prices, but it is noteworthy that German mills also have reduced export quotations by several shillings a ton in some instances. While there have been some sizeable foreign orders for heavy-gage sheets and the prices have not been reduced, the demand is declining.

The Friedrich Krupp A. G., Essen, reports good business in locomotives and has under construction 75 steam-driven engines, of which 60 are for export to India. In addition the works is building a number of Diesel-driven locomotives. Other locomotive builders also report improved foreign business. Exports of locomotives this year show increased shipments to France, Holland, British South Africa, Denmark, Spain, Bolivia and Colombia. Deliveries to Russia have declined.

While exports of steam boilers for locomotives have declined, shipments of boilers for other purposes show an increase. The total weight of all boilers shipped in the first seven months of this year was 11,700 tons, compared with 8400 tons in the same period of 1928. Shipments to Russia and the Dutch East Indies and to France on reparations have been better.

The Railroads Corporation is generally limiting its purchases of materials to equipment for replacement only, and the financial condition of municipalities has checked demand for street cars and equipment.

Leading manufacturers of cable have formed a corporation in which all are shareholders. The companies included are C. J. Vogel Draht und Kabelwerke, Deutsche Kabelwerke, Deutsche Telefonwerke und Kabelindustrie, Norddeutsche Kabelwerke, Kabelwerk Rheydt and Hackethal Draht und Kabelwerke of Hanover.

Krupp Builds Brass Foundry in India

HAMBURG, GERMANY, Oct. 14.—The Grusonwerk of the Friedrich Krupp A. G., Essen, is executing a contract for construction and equipment of a brass foundry and rolling mill in Bengal, India. The new plant, the first of its kind in India, will have a rated capacity of 400 to 500 tons a month.

India Buys Car Axles in Belgium

HAMBURG, GERMANY, Oct. 14.—While steel rail prices are controlled by the International Rail Makers' Association, other railroad material prices are decidedly weak. Recently the India Stores Department inquired for several thousand tons of railroad car axles and other material for cars. The British bidder quoted £13 10s. ($65.47) per ton, f.o.b. port, the German bid was £11 2s. 6d. ($53.95) per ton, f.o.b. port, a works in the Saar quoted £10 ($48.50) per ton, f.o.b., and a Belgian maker received the order at £8 ($38.80) per ton, f.o.b. Antwerp.

Contract Awarded for New Turkish Steel Mill

HAMBURG, GERMANY, Oct. 14.—A contract for the construction and equipment of a new steel plant for the Turkish Government near Angora has been awarded to three German companies. The designs of the buildings and the material will be furnished by the Gutehoffnungshütte A. G., the machinery by DEMAG and the electrical equipment by the Allgemeine Electricitäts Gesellschaft. The cost of the plant, exclusive of the cost of construction, will be about 17,000,000 m. ($4,046,000). It will be ready for operation by April, 1931, and payment will be made in six annual instalments. Bars, beams, hoops and pig iron will be produced. A wire mill is to be built later. The new

works will use Anatolian iron ore of high quality and will obtain coal from the Eregli mines.

German Steel Works Report Shows Reduced Output

DÜSSELDORF, GERMANY, Oct. 14.—The report of the Vereinigte Stahlwerke A. G. for its fiscal year ended Sept. 30 shows a total production for the 12 months of 6,007,739 metric tons of pig iron, 6,419,796 tons of steel ingots, 27,241,000 tons of coal and 9,604,032 tons of coke. While coal and coke output showed an increase from the previous 12 months, pig iron registered a decline of 500,000 tons and steel of 550,000 tons.

The total number of employees at the end of September was 176,716, and the value of all products sold was 1,433,338,000 m., of which 529,038,000 m. was received from export trade. On this basis exports of the company were 37 per cent of the total business, compared with 31 per cent in the previous year. Orders on books represented a decrease from a year ago, being 81.9 per cent of the total at the end of September, 1928.

Pig Iron Imports Decline in September

Imports of pig iron into the United States in September were 11,013, gross tons, a reduction of about 10 per cent from the August total of 12,377 tons, but more than 5 per cent higher than the incoming shipments of September, 1928.

For the nine elapsed months of the year the incoming shipments, at 103,594 tons, were about 1 per cent higher than a year ago and represented the largest such total since 1926, when about 394,000 tons came in in that period.

British India again supplied the lion's share, with Canada in second position and Netherlands and United Kingdom, which usually are large shippers of pig iron, far below the two leaders. This is in sharp contrast with the situation in September, 1928, when Netherlands stood first, British India second and United Kingdom third, while Canada supplied no pig iron whatever.

In the nine months British India has taken away from the United Kingdom the leadership which the latter had in 1928. Netherlands stands third in both years.

Canadian Lignite Mines May Buy German Equipment

HAMBURG, GERMANY, Oct. 14.—Manufacturers of mining equipment in Germany are negotiating with the companies in Canada planning to begin operations in the lignite mines in Ontario. Earlier this year the new Australian lignite mines and briquetting plants installed German equipment following inspection of the mines in central Germany.

To Build Russian Ships

HAMBURG, GERMANY, Oct. 14.—The Russian trade delegation at Berlin has placed contracts with German yards for 14 ships, including six coastal vessels placed with the Nordseewerke, controlled by the Vereinigte Stahlwerke A. G., six vessels awarded to the Schichauwerft and two cargo steamers ordered from another German yard. In addition, contracts have been placed for machinery and other equipment for a new aluminum plant to be constructed at Nowosibirisk.

86 Per Cent Adherence to Simplified Schedules

Average adherence to recommendations for 27 simplified practice programs reviewed by the Division of Simplified Practice during the fiscal year 1929 was 86 per cent. The average adherence obtained through 79 resurveys made since 1922, when the Department of Commerce, under Herbert Hoover, then its secretary, organized the work, was 83 per cent. The total number of individual firm acceptances to June 30, 1929, amounted to about 20,790.

Fourteen typical industries which have cooperated with the department in establishing simplified practice recommendations estimate their total savings at approximately $240,000,000, according to the Bureau of Standards.

UNITED STATES IMPORTS OF PIG IRON BY COUNTRIES OF SHIPMENT
(In Gross Tons)

	September		Nine Months Ended September	
	1929	1928	1929	1928
United Kingdom	651	2,225	31,338	39,552
British India	6,485	3,758	44,271	38,027
Germany	.....	.....	103	95
Netherlands	693	4,159	19,722	21,832
Canada	2,709	.....	3,472	378
France	.....	.....	101	300
Belgium	.....	.....	184	202
Norway	420	263	1,861	675
Sweden	25	.....	1,440	2,143
All others	30	32	602	1,573
Total	11,013	10,437	103,594	104,777

Large Savings Attributed to Simplified Practice

Industry's own evaluation of the results that have attended its effort to eliminate avoidable waste through adherence to the principles of simplified practice shows that 10 of the 105 active simplified practice recommendations are producing an annual saving of $300,000,000, Edwin W. Ely, chief, Division of Simplified Practice, Department of Commerce, Washington, said in an address recently before the manufacturers' section of the American Gas Association at Atlantic City.

Uses of Abrasives Depicted in Film

Grinding and polishing operations are pictured in an educational motion picture film, "Manufactured Abrasives," produced by the United States Bureau of Mines, in cooperation with a large industrial concern.

While natural abrasives, such as sandstone, flint and emery, formerly served, modern industry must have harder, sharper and more efficient grinding materials, it is pointed out. This need is largely met by manufactured abrasives such as are made in electric furnaces operated by power generated at Niagara.

Several widely used abrasives are featured. Their utilization in a wide variety of industrial operations is shown in some detail.

Copies of the film may be obtained for exhibition purposes by schools, churches, clubs, civic and business bodies, miners' unions, engineering societies and others interested, by applying to the Pittsburgh Experiment Station of the United States Bureau of Mines, Pittsburgh. No charge is made for the use of the film, but the exhibitor is asked to pay transportation charges.

Manufacture of snow traveling devices for automotive use will be concentrated in the New Holstein, Wis., plant of the Snow Flyer Co., following the purchase by that concern of the plant, patents and other assets of the Snowmobile Mfg. Co., West Ossippi, N. H. The New Hampshire plant will continue in operation throughout the winter busy season before the consolidation of production is finally completed. The New Holstein officers, including A. L. Langenfeld, president, and Paul Langenfeld, secretary-treasurer, will continue in the same capacities in the consolidated company.

The Youngstown Sheet & Tube Co. has contracted with the Semet-Solvay Engineering Corporation, New York, for the installation of equipment for refining light oil and producing motor benzol, toluol and solvent naphtha at its by-product coke oven plant at Indiana Harbor, Ind. Equipment will be housed in a new building, the construction of which is now under way.

Machinery Markets and News of the Works

Tool Orders Trend Upward

October Bookings Are Likely To Exceed Those of September by Comfortable Margin

ALL machine tool centers report an improvement in sales the past week with the result that October bookings are likely to exceed those of September by a comfortable margin.

Inquiries also are in larger volume and give promise of a steady demand for equipment during the remainder of the year. The collapse in the stock market has not been discernible in business as it affects machine tool buying and in some quarters the opinion prevails that the good effects of easier money conditions may counterbalance whatever adverse results there may be.

Members of the National Machine Tool Builders' Association, assembled in annual convention last week at Briarcliff Manor, N. Y., were optimistic about the outlook and are confident that the months ahead will bring a steady flow of orders.

Although sales have been distributed among a wide range of industries and individual transactions have largely been confined to one to three tools each, the market has not been entirely devoid of buying on a sizable scale.

A New Jersey machinery manufacturer has bought a number of radial drills as well as other equipment and the Amtorg Trading Corporation has contracted for 26 lathes with a Cincinnati builder.

The Hercules Motor Co., Canton, Ohio, is expected to purchase a list of tools for expansion purposes. The general purchasing officer for the Panama Canal Zone is asking for bids on a planer, several drilling machines and lathes and miscellaneous mechanical supplies. Another user is in the market for six planers.

Business from the automobile industry has been of negligible proportions.

New York

NEW YORK, Oct. 29.—Machine tool business for October in the New York district will surpass that of September, when orders declined somewhat, presumably because of the National Machine Tool Exposition in Cleveland. The collapse in the stock market has not yet been discernible in business as it affects machine tool buying. In some quarters the opinion prevails that the good effects of easier money conditions may counterbalance whatever adverse results there may be.

A large order for radial drills and other equipment has been placed by a New Jersey machinery manufacturer. Otherwise, business has been in small, scattered lots, but the aggregate has been good. Inquiries are numerous, giving rise to expectations that the volume of machine tool buying will be well sustained over the remainder of the year.

Kohler Co., 711 Fifth Avenue, New York, manufacturer of sanitary ware, with main plant and headquarters at Kohler, Wis., has asked bids on general contract for a six-story factory branch, storage and distributing plant at Long Island City, to cost over $200,000 with equipment. Buchman & Kahn, 2 Park Avenue, New York, are architects.

Hudson Wire Co., Water Street, Ossining, N. Y., has begun superstructure for a one-story addition, 100 x 125 ft., for which general contract recently was let to Delfino & Sylvester, North Highland Avenue, to cost about $75,000 with equipment.

M. J. Ort, 424 East 149th Street, New York, architect, has plans for a six-story automobile service, repair and garage building, to cost about $200,000 with equipment. Same architect has filed plans for two-story service, repair and garage building, 150 x 160 ft., to cost about $100,000 with equipment.

Tomkins Brothers, 74 Passaic Street, Newark, N. J., building materials and supplies, have asked bids on general contract for a branch storage and distributing plant at Mount Vernon, N. Y., two stories, to cost about $70,000 with conveying and mechanical-handling equipment. Robert Bolton, 45 Branford Place, Newark, is architect.

General Baking Co., 420 Lexington Avenue, New York, will install traveling ovens, power, conveying and other equipment in connection with an expansion program during 1929-30, to cost $8,000,000, including construction of six new baking plants and modernization of 12 other plants.

Third Avenue Railroad Co., 2396 Third Avenue, New York, has awarded general contract to J. D. Clermont, 145 East Forty-fifth Street, for two-story addition to motor bus parts and repair shop on West Farms Road, near 172nd Street, to cost about $35,000. E. H. Faile & Co., 441 Lexington Avenue, are architects.

Board of Education, Park Avenue and Fifty-ninth Street, New York, is considering installation of manual training equipment in new Walton High School in Bronx, for which plans will be completed by W. C. Martin, school architect, Flatbush Avenue Extension and Concord Street, Brooklyn, to cost $2,250,000.

Research Corporation, 25 West Forty-third Street, New York, manufacturer of air and gas cleaning apparatus, etc., has awarded general contract to Y. D. Bakker Co., Bound Brook, N. J., for one-story and basement addition to plant at Bound Brook, 50 x 80 ft., to cost about $30,000 with equipment. John N. Pierson, 196 Jefferson Street, Perth Amboy, N. J., is architect.

Officials of General Motors Corporation, Broadway and Fifty-seventh Street, New York, and its affiliated organization, Fokker Aircraft Corporation, Hasbrouck Heights, N. J., have formed Dornier Corporation of America, Inc., a subsidiary, capitalized at 50,000 shares of stock, no par value, to manufacture Dornier flying boats, now being produced by Dornier Metallbauten, Friedrichshafen, Germany, and for which American rights have been secured. Plans are being considered for construction of aircraft plant for Dornier flying boats in New York district, including parts and assembling departments, to cost more than $100,000 with equipment. Dr. Claude Dornier, head of Germany company, will be identified with new organization.

Steel Equipment Corporation, Avenel, N. J., manufacturer of steel shelving and other steel products, has plans for a two-story addition, to cost about $45,000 with equipment.

Pennsylvania Dock Co., 25 Church Street, New York, affiliated with Pennsylvania Railroad Co., Pennsylvania Terminal, has awarded general contract to F. H. McGraw, Inc., 51 East Forty-second Street, for eight-story cold and dry storage and refrigerating plant, 230 x 900 ft., at Jersey City, N. J., to cost $1,200,000 with equipment. George F. Bial, 147 Summit Avenue, Union City, N. J., is associate architect.

Accurate Engineering & Mfg. Co., 750 Summer Avenue, Newark, manufacturer of radio equipment and parts, has leased part of four-story building at Murray and Austin Streets for expansion.

National-Harris Co., 195 Verona Avenue, Newark, manufacturer of fine wires, etc., occupying part of former plant of

Heller Brothers File Works, Inc., has taken over another building for expansion in rolling division, increasing floor space to 30,000 sq. ft. Negotiations are under way for purchase of entire plant for wire manufacture. Early next year offices will be removed to building at Mount Prospect and Verona Avenues and vacated space equipped as new experimental laboratory. Francis R. Harris is president.

Seither & Ellis, Inc., 313 Halsey Street, Newark, heavy mill and hardware equipment and supplies, has purchased three-story and basement building, 50 x 100 ft., and will remodel for new storage and distributing plant. Possession will be taken in about 30 days. Present plant will be removed to new location.

Eastern Tool & Mfg. Co., 129 Bloomfield Avenue, Bloomfield, N. J., manufacturer of tools, wire goods, etc., has taken option on local property and contemplates new plant to cost more than $70,000 with equipment.

Arcoil Oil Burner Co., 124 Commerce Street, Newark, manufacturer of oil burning equipment, aluminum fans, etc., has leased one-story factory at 81-83 Pennington Street, with option to purchase, for new plant.

Contract for operating mechanism of new Hackensack River freight line bridge has been awarded to Gears & Forgings, Inc., Cleveland. Bridge is of Waddell-Hardesty vertical lift type and is being erected for Pennsylvania Railroad.

South Atlantic

BALTIMORE, Oct. 28.—Plans are being considered by Williamsport Wire Rope Co., Williamsport, Pa., for one-story addition to plant at Sparrows Point, Baltimore, to cost about $35,000 with equipment.

Baltimore Paper Box Co., Key Highway, Baltimore, manufacturer of corrugated paper boxes and containers, is planning establishment of branch factory at Salisbury, Md., and will take over existing building and install machinery during November, to cost about $30,000.

Benedict Coal Co., St. Charles, Va., will carry out expansion at mining properties to cost about $200,000, including addition to tipple, and surface and underground machinery.

Virginia Public Service Co., Charlottesville, Va., has acquired 12,000-acre tract at Greaver's Mill, near Covington, Va., as site for hydroelectric power development, for which plans will be placed under way at once. Plant will be equipped for capacity of 100,000 hp., and will cost about $2,000,000 with transmission system. A. W. Higgins is president.

General Motors Corporation, Detroit, has plans for two-story service, repair and sales building at Baltimore, to cost over $100,000 with equipment. Albert Kahn, Inc., Marquette Building, Detroit, is architect and engineer.

Schofield Co., 2 East Saratoga Street, Baltimore, manufacturer of silverware, metal plated goods, etc., is considering new three-story plant unit, to cost about $65,000 with equipment.

In connection with electrification program in Philadelphia district, Pennsylvania Railroad Co., Philadelphia, has arranged with city of Baltimore for continuation of work in that section, extending from Wilmington, Del. Development will include construction of two large warehouses with mechanical-handling facilities in Baltimore. Entire program will cost $30,000,000.

Byars Mfg. Co., Thomasville, N. C., recently formed by George W. Byars, Thomasville, and associates, with capital of $100,000, is planning operation of local factory to manufacture patented window screens and kindred products. L. C. Ripple, Thomasville, will be an official of new company.

Sylvania Corporation, Fredericksburg, Va., has superstructure in progress for local mill to manufacture transparent paper products, and expects to have initial unit ready for service in 60 to 90 days. Project will include a machine shop, power house and other mechanical divisions, and will cost about $1,000,000 with equipment.

Appalachian Electric Power Co., Roanoke, Va., is planning extensions and improvements in steam-operated electric power plant at Logan, W. Va., including installation of boiler, stoker, mechanical fans and auxiliary equipment.

Haywood County Board of Education, Waynesville, N. C., is considering installation of manual training equipment in new high school at Canton, N. C., to cost about $140,000, for which plans will be prepared by V. W. Breeze & Co., Castanea Building, Asheville, N. C., architects.

D. A. Stickell & Sons, Inc., Hagerstown, Md., plans rebuilding five-story flour mill and grain elevator destroyed by fire Oct. 19, loss including hoisting, conveying and other mechanical equipment.

The Crane Market

INQUIRY for overhead traveling cranes is light and buying in the past week has been small. In the locomotive crane field the Baltimore & Ohio Railroad has closed on two more 25-ton, Diesel-engine-driven locomotive cranes with the Industrial-Brownhoist Corporation, bringing the total number of this type of crane it has purchased this year to 10. The New York Central Railroad still has a 150-ton wrecking crane, 50-ton steam driven locomotive crane and 25-ton gasoline driven crane, pending award. The Chicago, Milwaukee & St. Paul has bought a 25-ton gantry crane for use in Chicago and will later order a duplicate for Milwaukee.

Among recent purchases are:

Sauerman Brothers, Chicago, 10-ton, 2-motor, overhead crane through H. C. Sturman & Co., from H. D. Conkey & Co.

Chicago, Milwaukee & St. Paul, 25-ton, 58-ft. span, gantry crane for Chicago, from Milwaukee Electric Crane & Mfg. Corporation.

Philadelphia

PHILADELPHIA, Oct. 28.—Morris Wheeler & Co., Inc., Thirtieth and Locust Streets, Philadelphia, iron and steel products, has plans for new one-story steel fabricating plant, 240 x 420 ft., to cost more than $200,000 with equipment. Julian Simsohn, Broad Street and Girard Avenue, is architect and engineer.

Mack Machine Co., Inc., 1708 North Front Street, Philadelphia, manufacturer of ice and refrigerating machinery, has leased additional space at address noted and will use as an assembling plant.

Standard Oil Co., Sixth and Chestnut Streets, Philadelphia, has awarded general contract to Lutz & Co., Inc., 2218 Chestnut Street, for one-story storage and distributing plant at West Chester, Pa., to cost about $40,000 with equipment.

I. Fischman & Sons, Inc., Tenth Street and Allegheny Avenue, Philadelphia, manufacturer of soda fountains and equipment, has leased part of former plant of Baldwin Locomotive Works, Fifteenth and Spring Garden Streets, for storage and distributing plant. Mechanical handling and other equipment will be installed.

Empire Art Metal Mfg. Co., Philadelphia, has been organized with capital of $100,000 to take over and expand company of same name with plant at 3036 North Broad Street. Clarke D. and M. W. Hunter head new organization.

Stanley S. Cramer, Copewood and Thorne Streets, Camden, N. J., has filed plans for a one-story foundry, 40 x 85 ft., to cost about $25,000 with equipment.

Pennsylvania Power & Light Co., Allentown, Pa., will build an addition to machine shop on Cedar Street, Harrisburg, Pa., and will make other improvements in equipment storage and distributing plant at that location, to cost about $25,000.

City Council, Atlantic City, N. J., has plans for a two-story municipal equipment storage and distributing plant, with service, repair and garage building, to cost about $75,000 with equipment. A. F. Amodio, New York and Atlantic Avenues, is architect.

Board of Education, Yardley, Pa., is considering installation of manual training equipment in new high school, to cost $160,000, for which plans will be drawn by Heacock & Hokanson, 1211 Chestnut Street, Philadelphia, architects.

New England

BOSTON, Oct. 28.—Machine tool business is better than in the previous few weeks, but no intimation is given as to when equipment under negotiation is likely to be closed. This is generally attributed to a falling off in manufacturing schedules of metal-working plants, the uncertainty of the automotive situation and to over-production in the airplane industry. Demand for used tools of certain types continues good, but sales are comparatively small, due to the scarcity of such equipment. New England machine tool dealers in general report that October sales were from a third to a half under those in September.

Small tool sales hold up well, but business is more or less handicapped by deliveries.

Bridgeport Boiler Works, Bridgeport, Conn., has plans for a one-story, addition, 146 x 100 ft.

Dupont Viscoloid Co., Leominster, Mass., has closed bids on six plant units. Motors and miscellaneous equipment will be purchased.

Electric Specialty Co., Stamford, Conn., is taking bids on a two-story addition, 44 x 120 ft. Bench and other small equipment will probably be purchased.

Brownsville Maine Slate Co., Brownsville, Me., has plans for revamping its plant and installation of new equipment at a cost of $100,000.

Connecticut Department of Institutions has plans for a power house at State training school, Mansfield, Conn.

Fairfield County Ice Co., Stamford, Conn., is taking bids on a one-story ice

plant, 124 x 220 ft., requiring miscellaneous electrical and conveying equipment.

Terry Steam Turbine Co., Hartford, Conn., closed bids Oct. 29 on a boiler plant, 50 x 50 ft.

Norman Hoffman Bearing Corporation, Stamford, Conn., has closed bids on a manufacturing plant.

Chamber of Commerce, Bellows Falls, Vt., E. O. Squires, secretary, is at head of project to construct airport at North Charlestown, N. H., for service at first noted place, including hangar, repair and reconditioning shop and other field units, to cost more than $60,000 with equipment.

Congdon & Carpenter Co., 155-73 Canal Street, Providence, R. I., iron and steel products, heavy hardware, etc., has awarded general contract to Charles B. Maguire Co., Grosvenor Building, for multi-story storage and distributing plant, 246 x 325 ft., to cost $250,000 with equipment. Jenks & Ballou, New Industrial Trust Building, are architects and engineers.

Municipal Airport Committee of City Council, New Haven, Conn., has plans for municipal airport, with hangars, repair shops, oil storage and other units, to cost $300,0000 with equipment. Westcott & Mapes, 139 Orange Street, are architects and engineers.

International Silver Co., Meriden, Conn., is considering multi-story addition adjoining factory K, to cost more than $100,000 with equipment.

Hood Rubber Co., Nichols Avenue, Watertown, Mass., has asked bids on general contract for a two-story addition, to cost about $45,000 with equipment.

Bird Machine Co., South Walpole, Mass., manufacturer of paper mill machinery, parts, etc., has plans for one-story addition to cost about $40,000 with equipment.

Pittsburgh

PITTSBURGH, Oct. 28.—Machinery business in this district is keeping up well. The problem of making deliveries, however, is still serious with some dealers, particularly on special tools. Railroad budgets for next year's purchases are being made up and local sales offices are taking keen interest in view of the fact that railroad tool purchases this year have not been nearly so large comparatively as those of industrial companies.

Sizable new inquiries have come out in the past week, and the aggregate of miscellaneous needs has been large. Purchases are also being made from time to time, but small orders predominate. The Westinghouse Electric & Mfg. Co. is buying against its fourth quarter list, but purchases probably will be scattered over the remainder of the year.

Plans are being considered by Columbia Radiator Co., Walnut Street, McKeesport, Pa., manufacturer of radiators, boilers, etc., for one-story foundry and machine shop, 100 x 200 ft., to cost over $150,000 with equipment.

Allegheny River Mining Co., Kittanning, Pa., is planning early rebuilding of coal tipple at its Furnace Run mining properties, destroyed by fire Oct. 18.

Officials of Westinghouse Air Brake Co., Westinghouse Building, Pittsburgh, are organizing Westinghouse Automotive Brake Co., to take over and expand automobile brake division of parent company. Increased production will be carried out.

Waddingham Tractor & Equipment Co., Webster Street, Bradford, Pa., manufacturer of motor tractors, parts, etc., has asked bids on general contract for two-story addition, 35 x 60 ft., to cost about $40,000 with equipment. Hendryx & Benton, Tidewater Building, are architects.

Holgate Brothers Co., Holbros Building, Kane, Pa., manufacturer of broom blocks and kindred products, has awarded general contract to Hyde-Murphy Co., Ridgeway, Pa., for three-story addition, to cost about $70,000 with equipment.

Officials of Randolph Planing Mill Co., Elkins, W. Va., have arranged for change of company name to West Virginia Flooring Co., increasing capital to $350,000. Expansion will be carried out at hardwood flooring mill, including installation of electrically-operated equipment.

National Airways & Aircraft Co., Weirton, W. Va., recently formed by Danzil Martin, Weirton, and associates, is planning establishment of airport in Marland Heights district, including hangars, repair shops and other field units, to cost about $70,000 with equipment. It is proposed to establish flying school later.

Pennsylvania Fireproofing Co., St. Marys, Pa., has awarded general contract to Truscon Steel Co., Youngstown, Ohio, for one-story addition, 40 x 175 ft., to be used in part for storage and distribution, to cost about $50,000 with equipment.

Buffalo

BUFFALO, Oct. 28.—Consolidated Aircraft Corporation, 2050 Elmwood Avenue, Buffalo, is considering establishment of new plant to manufacture flying boats near Hampton Roads or Norfolk, Va., consisting primarily of assembling and testing works, to cost over $100,000 with equipment. Lawrence D. Bell is general manager.

New York Central Railroad Co., Central Terminal, Buffalo, and 466 Lexington Avenue, New York, has awarded general contract to E. P. Muntz, Inc., Lehigh Valley Terminal Building, for engine terminal with repair and reconditioning facilities at Gardenville, N. Y., to cost about $55,000 with equipment.

Board of Trustees, Cornell University, Ithaca, N. Y., has authorized construction of addition to steam power plant, including smokestack and equipment, to cost $180,000.

Edwin R. Cooney, 762 Crescent Avenue, Buffalo, and associates have organized Cooney Refrigeration Co. and plan early operation of local factory for production of refrigerating equipment and devices. James L. Cooney, 221 Walton Street, Syracuse, N. Y., is interested in new organization.

Harrison Radiator Corporation, Washburn Street, Lockport, N. Y., a subsidiary of General Motors Corporation, is contemplating new plant in Ferndale district, Detroit, to manufacture automobile radiators and kindred automotive products, to cost more than $200,000 with equipment. Site has been purchased.

Universal Wireless Communication Co., Inc., Liberty Bank Building, Buffalo, is arranging for increase in capital from 750,000 to 4,000,000 shares of stock, part of fund to be used for construction of wireless broadcasting and receiving stations. G. Morton Wolfe, 1377 Main Street, is engineer.

Colonial Motor Coach Corporation, 133 West Water Street, Syracuse, N. Y., has plans for a one-story service, repair and garage building, to cost $160,000 with equipment. F. F. Dressler, 140 South Dearborn Street, Chicago, is architect.

Samson-United Corporation, Rochester, N. Y., cutlery manufacturer, has bought local plant of Selden Truck Corporation and has started to equip for its main manufacturing plant. A. O. Samuels is president of Samson-United Corporation.

Detroit

DETROIT, Oct. 28.—Plans are under way by Dare Airplane Co., Detroit, for new aircraft manufacturing plant at Milan, Mich., where 400-acre tract has been secured, large part of site to be developed as airport. Factory unit will be two stories, 80 x 130 ft., for parts manufacture and assembling, to cost about $65,000 with equipment. Executive offices will be maintained at Detroit. F. G. Dunn is vice-president.

Gar Wood, Inc., Algonac, Mich., manufacturer of speed motor boats, etc., will build new plant at Marysville, Mich., where 6-acre tract, with waterfront of 650 ft. on St. Clair River, has been secured through cooperation of Chamber of Commerce. Plans will be drawn for two one-story buildings, 70 x 550 ft. and 70 x 350 ft., to cost more than $100,000 with equipment. Work is scheduled for completion in 90 days. Present plant will be removed to new location.

Board of Trustees, University of Detroit, Livernois Avenue and Six-Mile Road, will soon take bids for two-story addition to engineering building, to cost over $90,000 with equipment. Malcolmson & Higginbotham, 1219 Griswold Street, Detroit, are architects.

Reynolds Spring Co., Jackson, Mich., has purchased Premier Cushion Spring Co., 5171 Bellevue Avenue, Detroit, manufacturer of automobile springs, and will consolidate. It is understood that Detroit plant will be continued. Purchasing company is arranging for increase in capital from 500,000 to 1,000,000 shares of stock, no par value, part of proceeds to be used for purchase and for expansion.

Bennett Pump Co., Muskegon, manufacturer of pumping machinery and parts, is planning one-story addition, totaling about 28,000 sq. ft. floor space, and will have unit ready for occupancy near end of year. Work is under way on another one-story extension providing about 24,000 sq. ft. floor area, entire project to cost about $100,000 with equipment.

Pere Marquette Railroad Co., Grand Rapids, is planning to rebuild local car repair shops and equipment storage and distributing plant destroyed by fire Oct. 18. General offices are in Union Depot, Fort Street, Detroit.

Officials of Consolidated Cabinet Corporation, Greenville, have organized Consolidated Soda Fountain Corporation to take over and expand present organization. Company will use former local plant of Taplin Furnace Co. and remodel for early occupancy. Work on one-story addition will start at once, entire project to cost more than $70,000 with equipment. Company will specialize in production of electrically-operated soda fountains and soda fountain equipment. Harold A. Hawn is president; and E. J. Thome, secretary and treasurer.

Detroit Show Case Co., 1654 West Fort Street, Detroit, manufacturer of show cases, store fixtures, etc., has plans for two-story addition, 60 x 125 ft., to cost more than $60,000 with equipment. B. C. Wetzel & Co., Dime Bank Building, are architects.

American Forging & Socket Co., Pontiac, Mich., will build a larger and more modern plant at a location not yet determined. Because of development of new products, company expects a large expansion in its business during coming year. Directors on Oct. 21 declared a dividend of 35c. a share on common stock, bringing total for year to 80c. a share.

Norge Corporation, manufacturer of electric rotary refrigerators, a division of Borg-Warner Corporation, has moved into Detroit plant of Morse Chain Co., another Borg-Warner subsidiary. It will be in production Nov. 1.

Eclipse Interchangeable Counterbore Co., Detroit, has recently expended $150,000 in adding to its manufacturing space and equipment at 7410 St. Aubin Avenue. A finished stock room has been completed in which a stock of counterboring tools valued at $150,000 is carried. R. G. Mitchell is general manager.

O. L. Anderson Co., Inc., Detroit, manufacturer of metal stampings and gasoline tanks for motor cars and motor boats, has purchased about 65,000 sq. ft. in B. E. Taylor industrial area as site for new plant, for which plans are being drawn.

Cleveland

CLEVELAND, Oct. 28.—Machine tool sales were fair the past week. The volume of business during October will show a gain over September. With some manufacturers, however, it will not be quite up to August. Business is mostly in single tools and is well distributed among various industries except the automotive industry. Automobile manufacturers are not expected to be in the market for much equipment during the remainder of the year. The Hercules Motor Co., Canton, Ohio, is inquiring for a round lot of machine tools for extensions. A fair amount of business is coming from the oil field industry.

Euclid Crane & Hoist Co., Cleveland, has awarded a contract to Truscon Steel Co. for an addition, 47 x 213 ft., one-fifth of space to be used for offices and remainder for manufacturing.

Columbia Metal Stamping & Die Co., Cleveland, has placed contract with J. L. Hunting Co. for a two-story plant, 90 x 200 ft. at Harvard Avenue and East 116th Street.

A 30 acre tract has been acquired by City Machine & Tool Co., Toledo, Ohio, for new plant, to cost more than $150,000 with equipment.

Columbia Metal Stamping & Die Co., 1536 East Forty-ninth Street, Cleveland, has awarded general contract to H. K. Ferguson Co., Hanna Building, for one-story plant unit, 90 x 225 ft., to cost about $100,000 with equipment.

National Washboard Co., 310 South Michigan Avenue, Chicago, is negotiating for purchase of washboard manufacturing works of Monarch Mfg. Co., Tiffin, Ohio, and its affiliated interest, Federal Washboard Co., Tiffin. It is proposed to remove plant to Chicago or other point. Monarch company will be reorganized and will develop local plant for another line of production. Fred C. Cramer is president of Monarch company.

Stahli Auto Body Wagon & Spring Co., 5366 St. Clair Avenue, Cleveland, manufacturer of automobile bodies, springs, etc., is considering one-story addition, to cost more than $40,000 with equipment.

Ric-Wil Co., Barberton, Ohio, manufacturer of door hangers and other hardware products, will build one-story addition, 60 x 80 ft., to cost about $30,000 with equipment.

Sterling Grinding Wheel Co., Tiffin, Ohio, subsidiary of Cleveland Stone Co., Union Trust Building, Cleveland, has awarded general contract to Hossler Brothers, Tiffin, for two one-story additions. Work will be carried out in connection with an expansion program to cost $100,000. George S. Rider Co., Century Building, Cleveland, is engineer.

Curtiss Flying Service, Inc., 39 Broadway, New York, has awarded general contract to A. M. Higley, Plymouth Building, Cleveland, for one and two-story hangar, with repair facilities, at Richmond Heights airport, near Cleveland, to cost about $100,000 with equipment. Kenneth Franzheim, 345 Madison Avenue, New York, is architect.

Milwaukee

MILWAUKEE, WIS., Oct. 28.—Orders and pending business are well distributed throughout the metal-working industries. Automotive demand, however, is falling off, although local manufacturers of automotive parts have not curtailed generally. There is good demand from small machine shops and a revival of activity among makers of woodworking and sawmill machinery with considerable plant expansion projected. Export orders for large tools has increased from northern European countries. Deliveries threaten to become more remote.

Wrought Washer Mfg. Co., 46-54 South Bay Street, Milwaukee, will add three new one-story structures to building, 250 x 450 ft., recently purchased, which will include $150,000 rerolling mill, 65 x 500 ft.; raw material storehouse, 65 x 385 ft., and shipping department building, 100 x 250 ft. Present equipment will be moved and new equipment, including cranes up to 15 tons capacity, added. Washers, stamping tools and dies will be produced at new plant. Fred Doepke, Sr., is president and in charge.

Giddings & Lewis Machine Tool Co., Fond du Lac, Wis., manufacturer of horizontal boring, milling and drilling machines, is planning to have German plants manufacture heavy parts of its machinery for European delivery. Only lighter and intricate parts will be shipped from Fond du Lac under this arrangement. H. B. Kraut, president and chairman of board, and K. F. Gallimore, chief engineer, are en route to Europe.

Pressed Steel Tank Co., Milwaukee, is building one-story addition to plant, 53 x 192 ft., at 5701 Greenfield Avenue, West Allis.

Filer & Stowell Co., 219 Becher Street, Milwaukee, have begun erection of one-story addition, 53 x 107 ft., to cost $12,000.

J. G. Busch Co., 136 Ferry Street, Milwaukee, general machinist, is building shop addition, 31 x 62 ft.

Wausau Iron Works, 738 South Tenth Avenue, Wausau, Wis., snow plow manufacturer and fabricator of structural steel, is erecting an addition, 100 x 148 ft.

Central Chevrolet Agency, Hartford, Wis., has begun construction or garage and service building, two-stories, 74 x 118 ft.

Chain Belt Co., Milwaukee, will handle all foreign distribution of steel tubular towers and masts manufactured by Archer Iron Works, Chicago, which will retain its selling rights for United States and Alaska. Archer line will be sold abroad under Chain Belt Co.'s trade name Rex.

Parker Pen Co., Janesville, Wis., has acquired site at Toronto, for new Canadian plant. Present Toronto plant is leased. Work on the new plant will begin early in 1930.

Chicago

CHICAGO, Oct. 28.—Sales of machine tools are in larger volume, but dealers are still dependent for current business on covering a wide territory and centering on buyers who are seeking individual tools. The Milwaukee road is in the market for a coach wheel lathe, and the general purchasing officer for the Panama Canal Zone will buy a planer, a number of drilling machines, several lathes and miscellaneous mechanical supplies. Farm implement manufacturers are in the market for odd tools, some of which were not purchased when lists were closed earlier in the year. More extensive buying by this industry is said to be near at hand.

Supplies of used machines are more plentiful and demand is large. Dealers from the Pacific Coast are still making purchases in this market.

Uchtorff-Weiser Co., Davenport, Iowa, designer and manufacturer of dies and sheet metal products, will remove from 319 North Howell Street to Independent Products Co. building 209 North Howell Street, where a department for handling general machine repair work will be installed. Manufacture of metal cabinets will be added to company's lines.

Peoples Gas Light & Coke Co., 122 South Michigan Avenue, Chicago, will build a two-story compression building to cost $25,000. R. Schenck, 122 South Michigan Avenue is architect.

Babson Mfg. Co., 2851 West Nineteenth Street, Chicago, manufacturer of barn equipment, dairy machinery, etc., has plans for immediate erection of one-story plant at St. Charles, Ill., to cost about $70,000 with equipment.

Peoria Casket Co., Peoria, Ill., has awarded general contract to C. H. Tapping Construction Co., Jefferson Building, for two-story addition, to cost about $70,000 with equipment. Jameson & Harrison, Peoria Life Building, are architects.

International Harvester Co., 606 South Michigan Avenue, Chicago, has awarded general contract to W. A. Klinger, Inc., Warnock Building, Sioux City, Iowa, for two-story and basement factory branch, service and sales building at Sioux City, 150 x 225 ft., to cost about $150,000 with equipment.

Peoria Malleable Castings Co., Alexander Street, Peoria, Ill., is considering three-story addition to cost about $45,000 with equipment. It is understood that L. Eugene Robinson, Jefferson Building, architect and engineer, will prepare plans.

Northern Pacific Railway Co., Railroad Building, St. Paul, Minn., has plans for an addition to engine house at Mandan, N. D., with additional repair and machine shop facilities, to cost about $40,000. O. M. Rognan, address noted, is company engineer.

Central Lime & Cement Co., 228 North LaSalle Street, Chicago, has acquired a 7-acre tract on Ninety-fifth Street, heretofore held by American Brake Shoe & Foundry Co., for establishment of storage and distributing plant, to cost more than $100,000 with equipment.

Smith & Richardson Mfg. Co., Geneva, Ill., manufacturer of foundry supplies, etc., has awarded general contract to Wilson Brothers, Geneva, for one-story addition, to cost about $25,000 with equipment.

Midwest Canning Corporation, Rochelle, Ill., is considering construction of new plant at Sleepy Eye, Minn., to cost over $250,000 with automatic canning, conveying, sealing and other equipment.

Great Northern Railway Co., Railroad Building, St. Paul, Minn., is considering steam power plant at Great Falls, Mont., to use pulverized fuel, to cost about $85,000 with equipment. Work will probably begin next year.

Firestone Tire & Rubber Co., Akron, Ohio, has plans for factory branch, service and distributing plant at Chicago, where site, 107 x 174 ft., has been acquired, to cost about $150,000 with equipment. Harold E. Gallup, 646 North Michigan Avenue, Chicago, is architect.

Royer Mfg. Co., Janesville, Wis., has leased, with option to buy, Caward-Dart building, Waterloo, Iowa, containing 20,000 sq. ft. floor space, for production of its Hawkeye maintainer and road equipment. Janesville plant will be continued for production of concrete mixers. Operations in Waterloo plant will start about Jan. 1.

Rockford Die & Tool Works, Rockford, Ill., has been incorporated with $75,000 capital, and will establish plant at 1816 Seventeenth Avenue containing 5000 sq. ft. factory space. C. A. Dahlberg, J. R. Jernberg and A. F. West are organizers. Mr. Dahlberg has recently been elected president of Rockford Stamping & Tool Co.

Mattson Mfg. Co., will start work at once on branch factory at Manchester, Iowa, to extend its facilities in manufacture of highway snow fences. Company operates plants at Williamsport, Pa.; Joliet, Ill., and St. Paul, Minn.

Indiana

INDIANAPOLIS, Oct. 28.—Indiana & Michigan Electric Co., West Colfax Street, South Bend, has awarded general contract to H. G. Christman Co., 306 Notre Dame Avenue, for one-story addition to equipment storage and distributing plant, including repair division and remodeling of power house unit, to cost about $80,000 with equipment.

Lilly Varnish Co., 670 South California Street, Indianapolis, has awarded a contract to Mothershead & Fitton, 960 North Pennsylvania Street, for one-story addition to raw material grinding mill, to cost about $40,000 with equipment.

Studebaker Mail Order Co., South Bend, operating Colin B. Kennedy Corporation, manufacturer of radio equipment and other interests, has purchased substantial interest in Marvin Radio Tube Corporation, Irvington, N. J., manufacturer of radio apparatus, with four factories in East and plant at Chicago. Plans are under way for a consolidation of plants at South Bend, where production will be concentrated and expanded. F. H. Wellington is vice-president and treasurer of purchasing company.

Board of Education, Terre Haute, is considering installation of manual training equipment in two-story addition to McLean Junior High School to cost $200,000, for which bids will soon be asked on general contract. George J. Stoner & Co., Inc., Chanticleer Building, is architect.

Board of Trustees, Indiana Soldiers and Sailors Orphans' Home, Knightstown, has plans for new power house for central service, to cost about $60,000 with equipment. McGuire & Shook, 941 North Meridian Street, Indianapolis, are architects.

Rubush & Hunter, American Central Life Building, Indianapolis, architects, have awarded a general contract to A. V. Stackhouse Co., 2611 Cornell Avenue, for seven-story and basement automobile service, repair and garage building, 68 x 200 ft., to cost more than $400,000 with equipment.

Servel, Inc., Evansville, manufacturer of electric and gas-operated refrigerating equipment, is arranging for increase in capital from 1,600,000 to 2,000,000 shares of stock, no par value, part of proceeds to be used for expansion in output. Company has purchased manufacturing rights for Electrolux refrigeration system.

Highland Iron & Steel Co., Terre Haute, is planning construction of new mill, 120 x 400 ft., to manufacture wrought iron window frame sections, to cost about $150,000. Work will probably start early next spring.

Cincinnati

CINCINNATI, Oct. 28.—Demand for machine tools in this district increased the past week, dispelling the quietness that has prevailed recently. New business was well diversified, but orders were mostly for one or two standard machines. Production is being well maintained at capacity and in many instances factories are working night shifts in an effort to catch up on unfilled orders. Inquiries have also increased, with special tools in greater demand than heretofore. An unnamed buyer is inquiring for six planers.

The Russian Government placed an order the past week with a local builder for 26 lathes of various sizes. This inquiry has been pending for sometime, following a tour of inspection by a Russian commission early last summer.

Delco Products Co., 329 East First Street, Dayton, Ohio, manufacturer of isolated electric-lighting plants, automobile lighting and starting equipment, etc., has awarded general contract to Charles H. Shook, Third National Bank Building, for seven-story plant, to cost $200,000 with equipment.

City Council, Middletown, Ohio, is considering a municipal airport, with hangar, repair shop and other field buildings, to cost about $120,000 with equipment. City engineering department, City Hall, will be in charge.

Hill Auto Body & Metal Works, Inc., 822 Reedy Street, Cincinnati, is contemplating new one-story plant near Lunken municipal airport, to cost over $40,000 with equipment.

Universal Steam Motors, Inc., Guaranty Bank Building, Lexington, Ky., John R. Humphrey, president, is planning construction of new one-story plant, including divisions for parts production and assembling, to cost over $85,000 with equipment. It is expected to begin work early next year. George W. Hadden is general manager and chief engineer.

Dealers' Equipment & Implement Co., 1434 Riverside Avenue, Memphis, Tenn., farm and agricultural equipment, tools, etc., has plans for a one-story storage and distributing plant, 60 x 315 ft., to cost about $30,000 with equipment. R. H. Rust is general manager.

Board of Education, Delaware, Ohio, is considering installation of manual training equipment in two-story high school to cost $300,000, for which bids have been asked on general contract. Glass & Ramsey, 186 East Broad Street, Columbus, Ohio, are architects.

Procter & Gamble Co., Gwynne Building, Cincinnati, has plans for a steam power house at its St. Bernard plant, to cost about $65,000 with equipment.

Clarksville Aviation Corporation Clarksville, Tenn., Collier W. Goodlett, president, has plans for hangar, 80 x 100 ft., with repair facilities, to cost about $50,000 with equipment.

Tipton County Board of Education, Covington, Tenn., has approved plans for two-story vocational and agricultural building at Byar-Hall high school, to cost about $70,000 with equipment. Anker F. Hansen, Shrine Building, Memphis, Tenn., is architect.

Gulf States

BIRMINGHAM, Oct. 28.—American Can Co., 602 North Cortez Street, New Orleans, has taken out a permit for a one-story addition, to cost about $30,000 with equipment.

Texas & Pacific Railroad Co., Dallas, Tex., has work under way on ice-manufacturing plant at Lancaster yards, Fort Worth, Tex., to cost about $200,000 with equipment.

Central Texas Refining Co., Dallas, Tex., a subsidiary of Cranfill-Reynolds, Inc., 1013 Commerce Street, Dallas, is contemplating new oil storage and distributing plant, to cost about $45,000 with equipment.

Crane Co., 836 South Michigan Avenue, Chicago, has plans for three-story factory branch, storage and distributing plant, 100 x 105 ft., at Jacksonville, Fla., to cost more than $80,000 with equipment. Marsh & Saxelby, Consolidated Building, Jacksonville, are architects.

Southern United Ice Co., McComb, Miss., has plans for extensions and improvements in plant, including installation of electrical equipment to replace present steam-operated machinery, entire project to cost more than $50,000. Eugene Loch is local manager, in charge.

Laredo Truck & Implement Co., Laredo, Tex., recently organized by W. C. Lonquist, Laredo, and associates, plans storage and distributing plant, with repair and service department, to cost over $40,000 with equipment.

Pan-American Aero Corporation, San Antonio, Tex., recently organized by Joseph Palmer, San Antonio, is negotiating with local Chamber of Commerce for site for local plant to manufacture air planes and parts, largely tri-motored passenger aircraft, designed by Mr. Palmer, to cost more than $65,000 with

equipment. E. A. Reilly, San Antonio, is interested in new organization.

St. Louis-Southwestern Railway Co., Tyler, Tex., will soon begin construction of one-story car repair shop at local yards, to cost about $40,000 with equipment. W. S. Hanley is chief engineer.

Board of City Trustees, Lafayette, La., is planning extensions and improvements in municipal electric light and power plant, including installation of new engine unit and auxiliary equipment. J. Frank Ard is chief engineer, in charge.

Dallas Power & Light Co., Dallas, Tex., has work under way on extensions and improvements in steam-operated electric generating plant, with installation of additional equipment, to cost more than $1,000,000 with transmission lines.

International Flying Service, Inc., 521 Ingraham Building, Miami, Fla., is planning erection of several hangars at local airport, with shop and reconditioning facilities, units to be 100 x 100 ft., to cost about $75,000 with equipment. Edward O. Smith is company engineer.

Board of Education, Hattiesburg, Miss., is planning installation of manual training equipment in new junior high school to cost about $275,000, for which bids will be asked on general contract in about 30 days. Hull & Malvaney, Merchants Bank Building, Jackson, Miss., are architects.

Southern Air Transport, Inc., Fort Worth, Tex., will soon begin construction of two hangars, repair shops, oil storage and other field units at Grosvenor Field, near San Antonio, Tex., to cost more than $100,000 with equipment. Company engineering department is in charge.

St. Louis

ST. LOUIS, Oct. 28.—Woods Brothers, Inc., 407 Security Building, Kansas City, Mo., manufacturer of airplanes and parts, has engaged Charles A. Smith, Finance Building, architect, to prepare plans for one-story plant at Rosecrans Field, St. Joseph, Mo., including parts manufacture and assembling departments, to cost about $55,000 with equipment.

Thomas Poultry Car Co., a subsidiary of North American Car Co., 327 South LaSalle Street, Chicago, manufacturer of railroad cars, has leased property, 75 x 500 ft., at Springfield, Mo., for branch plant, including repair department, to cost about $90,000 with equipment.

Pittsburgh Equitable Meter Co., Kennedy Building, Tulsa, Okla., with headquarters at 400 Lexington Avenue, Pittsburgh, manufacturer of gas and water meters, parts, etc., has plans for one-story factory branch and distributing plant, 50 x 150 ft., to cost about $50,000 with equipment. Rush, Endacott & Goff, New Wright Building, Tulsa, are architects.

McCarthy Chevrolet Co., 6320 Delmar Boulevard, St. Louis, local representative for Chevrolet automobile, has acquired property, 110 x 185 ft., as site for new two-story service, repair and sales building, to cost over $100,000 with equipment.

Board of Education, Coffeyville, Kan., is considering installation of manual training equipment in two and three-story high school, 185 x 390 ft., to cost $400,000, for which bids will be asked on general contract early in November. Glen H. Thomas, Wheeler-Kelly-Hagny Building, Wichita, Kan., is architect.

Famo Feed Milling Co., 429 Cherokee Street, St. Joseph, Mo., has leased grain elevator to be erected by local interests and will install conveying, hoisting, screening and other mechanical equipment, to cost about $50,000. Horner & Wyatt, Board of Trade Building, Kansas City, Mo., are architects and engineers.

City Council, Russellville, Ark., has plans for new municipal electric light and power house, including installation of three Diesel engines, generators and accessory equipment, to cost about $200,000 with machinery; fund has been approved. W. L. Winters, Merchants' National Bank Building, Fort Smith, Ark., is engineer.

Piston Ring Castings Co., Inc., St. Louis, recently formed by Henry Haacke, 5544 Maze Place, and associates, is arranging for new local plant to manufacture piston rings for automobile engines, etc., to cost about $80,000 with machinery. Mr. Haacke will be president of new organization.

Pacific Coast

SAN FRANCISCO, Oct. 24.—Reliance Truck & Trailer Co., 1217 Stanyan Street, San Francisco, has filed plans for one-story plant, to cost about $25,000 with equipment.

United States Electrical Mfg. Co., 200 East Slauson Avenue, Los Angeles, manufacturer of motors and other electrical equipment and supplies, has engaged Hamm, Grant & Bruner, Inc., Ferguson Building, architect and engineer, to prepare plans for one-story addition, 140 x 150 ft., to cost about $60,000 with equipment.

Compton Union High School District, Compton, Cal., has authorized construction of a vocational shop at new high school group at Clearwater, to cost about $125,000. Frank M. Goodwin, Stockwell Building, Compton, is architect. A similar shop unit will be constructed at high school group to be located at Willowbrook, to cost close to like amount, for which plans will be prepared by same architect.

General Electric Co., Schenectady, N. Y., has acquired 50-acre tract near San Carlos, San Mateo County, Cal., and is considering new plant for Pacific Coast trade, to cost more than $1,000,000. Company is now operating two plants at Oakland, Cal. James A. Cranston is Pacific Coast manager.

Board of Public Works, Oakland, Cal., has plans for one-story municipal machine and repair shops, 200 x 200 ft., to cost about $75,000 with equipment. L. C. and D. D. Stone, Great Western Power Building, Oakland, are architects.

General Electric Supply Co., Los Angeles, has leased a two-story building to be erected at Long Beach, Cal., 46 x 120 ft., and will use for equipment storage and distributing plant, to cost about $25,000. W. Horace Austin, Pacific Southwest Bank Building, Long Beach, is architect.

Washington Electric Co., Seattle, a subsidiary of Puget Sound Power & Light Co., has secured Federal permission for hydroelectric power project on Columbia River, near Wenatchee, Wash., to develop total capacity of 84,000 hp., to cost about $10,000,000 with steel tower transmission system and substations. Work is scheduled to begin soon. A. W. Leonard is president.

Hamilton Aero Mfg. Co., Los Angeles, has awarded general contract to Austin Co. of California, Inc., for one-story aircraft manufacturing plant at United Airport, Burbank, with parts and assembling departments, to cost about $27,000 with equipment.

Shaffer Tool Works, Brea, Cal., is erecting one-story addition to local plant, to cost about $25,000 with equipment.

City Council, Fallon, Nev., is considering municipal electric light and power plant, to cost about $100,000 with equipment. Work will be in charge of city engineering department.

Foreign

PLANS are under way by E. F. Houghton & Co., 240 West Somerset Street, Philadelphia, manufacturer of industrial oils, greases, etc., for new plant near Birmingham, England, to cost about $100,000 with equipment. George Edwards, managing director, Edgar Vaughan & Co., Birmingham, British sales agents and distributers for Houghton company, will be active in new plant.

Edison General Italian Electric Co. (Societa Generale Italiana Edison di Elettricita), Milan, Italy, has arranged for increase in capital from $57,750,000 to $70,875,000, part of proceeds to be used for expansion, including hydroelectric power developments and transmission line construction. A block of 140,000 shares of stock will soon be placed on market in United States.

Opel Motor Car Works, Russelheim, Germany, controlled by General Motors Corporation, Detroit, is planning expansion, including facilities for production of new type of car. It is said that parent company will expend more than $1,000,000 for development of plant. I. J. Reuter, heretofore president and general manager of Olds Motor Works, Inc., Lansing, Mich., a division of General Motors Corporation, has been appointed managing director of Opel works.

United Sugar Co., Los Mochis, Mexico, has authorized expansion program to cost about $500,000, including new units at cane sugar mill and installation of equipment for large increase in capacity.

Kreuger & Toll Co. (Aktiebolaget Kreuger & Toll), Stockholm, Sweden, operating Swedish Match Co., controlling International Match Co. and affiliated interests, and identified with Grangesberg Co., Stockholm, with extensive iron ore properties, is arranging for increase in capital covering a bond issue of 37,916,660 kroner (about $9,480,000) and stock issue of 10,833,400 kroner (about $2,710,000), a considerable part of fund to be used for acquisition of lumber and pulp-wood properties in northern Sweden, comprising several going plants. Extensions will be carried out in last-noted line for wood supply for match interests and for pulp-wood production for other lines.

New Trade Publications

Twist Drills.—New Process Twist Drill Co., Taunton, Mass. Catalog No. 29, listing dimensions and prices of hot-forged carbon and high-speed steel twist drills, bonding drills, track bits, jobbers drills, wire gage drills and other types. Manufacture of these drills is illustrated; useful information includes the proper grinding of drill points.

Turret Lathes and Balancing Machines.—Gisholt Machine Co., Madison, Wis. Service bulletins Nos. 1-15, with binder, describing and illustrating various production set-ups on the tur-

ret lathes and other machines built by the company. Bulletin No. 9, for example, shows an unusual forged-steel flywheel job on the Simplimatic, while others picture the machining of large elevator sheaves on the No. 4-L turret lathe and the cutting threads and other operations on airplane engine cylinders on the No. 1-L lathe. A five-position fixture for machining gate valves at one chucking on the Gisholt 3AL lathe is another job shown. The bulletins are issued at intervals.

Automatic Chucking Machine.—Goss & DeLeeuw Machine Co., New Britain, Conn. Eight-page folder illustrating and describing the new Quad-Radial work-rotating chucking machine, which combines a number of new features that exploit the possibilities of tungsten carbide cutting tools. Large illustrations show various details of the machine which was brought out at the Machine Tool Show and described in THE IRON AGE of Sept. 12.

Ball Bearing Manual.—Gurney Ball Bearing Division, Marlin-Rockwell Corporation, Jamestown, N. Y. Second edition of condensed handbook, 202 pages, 5 x 7½ in., intended to aid engineers in the selection and application of Gurney ball bearings. Dimensions and list prices are given on single row, radio thrust, duplex, double row and other types of ball bearings such as clutch throw-out, adapter type, narrow type and extra small radial bearings. A section is also devoted to thrust bearings. Engineering data include information required for computing loads on bearings, formulas for bearing loads, safety factors, limiting speeds, and the selection of type and size of bearings.

Squirrel-Cage Motors.—Louis Allis Co., Milwaukee. Bulletin 508 of 12 pages illustrates and describes a line of explosion-proof self-ventilated squirrel-cage motors of ¼ to 25 hp. designed for individual motor drive in hazardous industries. Illustrations include a number of installation views where there is an explosive atmosphere.

Electroplating Generator.—Columbia Electric Mfg. Co., 1292 East Fifty-third Street, Cleveland. Bulletin of 16 pages, illustrating and describing motor-generator sets for electroplating, electrotyping and electrochemical processes. These are made with ampere ratings from 300 to 10,000. Motor and generator are mounted on a common base and have flexible coupling.

Firebrick.—Laclede-Christy Clay Products Co., St. Louis. Folder of 4 pages referring to the 85 years of activity of this company, and showing some happenings in 1844, at the time the company was founded.

Electric Control Apparatus.—Allen-Bradley Co., Milwaukee. Four-page bulletin 740, devoted to a starting device for squirrel-cage motors in industrial use.

Motor Drives for Rolling Mills.—General Electric Co., Schenectady, N. Y. Bulletin 151-B of 64 pages lists motors supplied by this company for driving main rolls, to a total of 767 units, rated at 1,105,490 hp. The list is divided into groups according to type of mill and drive and the illustrations show a number of the units as installed.

Japanning, Enameling and Baking Ovens.—Despatch Oven Co., Minneapolis, Minn. Revised bulletins featuring gas and electric ovens for high-speed baking and drying of finishes of all kinds have been published.

The Week's News Quickly Told

Current Events That Bear on the Course of Business

STOCKS declined violently in "speculators' panic," halted on worst day only by organized buying of representative issues by leading New York banks. Bonds, however, move to higher levels, and money rates are steady.

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WHEAT declined 8c. during a week of rapid and disorderly selling. The Federal Farm Board, convinced that prices are lower than the world's supply of grain warrants (this year's harvest is 500,000,000 bushels smaller than last), has placed $100,000,000 at the disposal of Farmers' National Grain Corporation, to insure that any grower can borrow a total of $1.15 per bushel on grain delivered to cooperative elevators.

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COTTON has received similar support which virtually pegs the price at about 16c. . . . A downward trend of most agricultural prices began early in October, responsive to heavy shipments and liberal stocks in storage. . . . Corn prices are firm.

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BUSINESS generally is on a sound basis, President Hoover said, since commodity prices are stationary and inventories low despite a high rate of production and consumption and an upward trend in wages . . . Retail trade is somewhat slower, wholesale and jobbing trade is fairly well maintained, and industry is improved, when compared with last week, although most lines are moderately slower than a year ago.

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HEAVY engineering contracts totaled $60,000,000, only two-thirds of corresponding week last year. However, structural fabricators are operating at practical capacity and shipyards are busiest since the war. . . . The Pennsylvania Railroad will extend its electrified zone south to Baltimore, but also has ordered 100 large steam locomotives for fast freight service.

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INLAND waterways, intercoastal canals and St. Lawrence ship canal should be developed as a coordinated system, said President Hoover, during the celebration of the completion of the 9-ft. stage on the Ohio River. The annual cost of a 10-year program, in addition to current expenditures on rivers and harbors, will be about equal to half the cost of a battleship.

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NINE fast trans-Atlantic liners are projected by six nations, the total cost being $180,000,000. F. C. Munson, president Munson Steamship Lines, calls this wasteful and uneconomic, as compared with what the same sum would do toward improving existing ships. . . . Freighters belonging to U. S. Shipping Board cut costs of voyage one-third by using cheap coal, pulverized. . . . Sale of operating lines and laid-up ships enables Government-owned Merchant Fleet Corporation to reduce next year's budget $4,000,000. . . . The Russian ice-breaker Krassin returns with a convoy of 26 vessels from a 104-day cruise to Kara Sea, to trade with posts in northern Siberia.

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FLYING records were broken by the Do-X. Its 12 500-hp. motors carried it for an hour 1200 ft. above Lake Constance, Switzerland, with 169 persons seated in a three-galleried fuselage and within the wings. . . . General Motors organizes a subsidiary to build such all-metal flying boats under Dornier license. . . . A Soviet-built plane arrives in the United States after an eventful trip from Russia. Another flies across the Himalayas on the Afghan border at an elevation of 17,500 ft. and temperature 70 below. . . . Air mail reaches New York from Buenos Aires, via west coast of South America, in 11 days, six days shorter than the fastest ship and rail time.

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INDEPENDENT cigar makers and packers form an association to purchase raw materials and modern manufacturing machinery, as well as to conduct a national advertising campaign. . . . Paper and pulp industry in Wisconsin finances a graduate school at Lawrence College for advanced technical training, industrial research, and informational service on paper products. . . . A $125,000,000 holding company acquires control of Kraft-Phenix Cheese Corporation, Hershey Chocolate Corporation and Colgate-Palmolive-Peet Co.

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PETROLEUM production remains near its peak figure, despite a 20-per cent voluntary restriction by Oklahoma producers. . . . California crude was reduced about 75c. per barrel, since the gas conservation law did not restrict the production of oil as expected. In that State 800,000,000 cu. ft. of natural gas is blown into the air daily, twice as much as is used. . . . Utilization of natural gas is increasing throughout the country at the rate of 8 per cent a year; 4,500,000 customers now use it for fuel.

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A Revolution in Machinery Design

Affecting Industrial Machinery Particularly, It Represents a Breaking with Tradition and Is Economic Rather Than Technical

BY WALTER STUART KELLEY*

OUR industrial age is by no means past; in fact, it appears about to take a new lease of life because of epochal changes that can now be forecast. The industrial characteristics of the nineteenth century, however, are beginning to be less evident as factors in shaping social development. Evidence is apparent that economic values are shifting, that a new appraisal is close at hand. New factors are shaping that will accentuate and hasten the action of present tendencies toward low cost production and its invariable concomitant, higher wages.

Since time immemorial, power, whether it was ox-power, horse-power, water-power, steam-power, or the first of all, man-power, has been used to make machinery productive. Note clearly this fact: it is power that makes a machine productive, regardless of whether it be humanly directed, or automatic in its operation. The machine itself is powerless to produce. This point is emphasized as it affords a clue to what follows.

It has been necessary in the past to apply power in a stereotyped manner, after a certain inescapable fashion. Because of this fact and the handicaps inseparable from it, machines as now built will in retrospect appear clumsy and inefficient, therefore expensive to build and to operate. To overcome the mechanical handicaps so far as humanly possible has been the province of the designer and the inventor.

Two considerations, one objective and one subjective, have determined the type, or character, mechanically of any machine, of every machine. The latter has not changed, it has been invariable since machinery, as we now know it in industry, was first made. This was because of a fixed, inescapable condition, that is, the character of the

*Consulting engineer, Boston. Mr. Kelley draws from an experience in mechanical design dating from about 1890 and in electrical design from 1906, becoming chief engineer in that year of an electrical manufacturing company.

Electricity Will Be Responsible for This Century's Advancement

TO orient to readers the sweeping character which he ascribes to the new epoch in machinery construction, Mr. Kelley contributed the following historic background:

Industry, defined as "productive labor employed in any manufacture," dates from the improvement of the steam engine by Watt in the latter part of the eighteenth century. Then for the first time power could be developed anywhere that fuel was available. With increasing industrial development water power likewise began to assume prominence. With advancing civilization the domestic manufacture of commodities became insufficient, and with the advent of the steam engine factories sprang up in populous centers. The spinning wheel gave place to the "spinning jenny," and that in turn to the "spinning mule"; the hand loom to the power loom, and the machine shop appeared to supplement the work of the blacksmith and the foundry.

Early in the nineteenth century the necessity for transportation for the increasing output of factory products brought the steam locomotive into being, and railroad construction went steadily forward despite opposition to it as "a device of satan."

In the case of each of these twin agents of civilization, transportation and manufactures, the steam engine was and still is the dominant factor; it is, however, one of those things to which reference was made at the outset whose influence is beginning to wane. Steam controlled and put to work was mainly responsible for the remarkable industrial development of the nineteenth century. Electricity controlled and put to work in a multitude of ways will be responsible for what will prove a more remarkable economic development and a much greater advance in civilization.

power, that made it necessary to apply it at a definite point, with a definite movement as to direction and speed.

Factors in Initiating Design

AS to the first of the two considerations: A person is given the task of designing a machine that will take in material of a certain sort and deliver a certain definite product. The one machine may take in raw material and deliver a finished product, as the machine that receives paper from a roll and turns out an envelope, gummed, folded and stamped, and printed with return card; or a monster printing press that is also fed paper from a roll and turns out a newspaper, printed, folded and counted, at an almost incredible speed. Or the machine, as is more usually the case, may be one of a series, each performing a certain process, as with textile machinery. In the manufacture of ordinary cotton cloth the material passes through 18 machines from the raw baled cotton to the bale of cloth, each machine representing a separate and distinct process.

In starting out to design any machine it is essential for the designer to know

(a) The material to be worked, its character and texture;

(b) Its condition and the form in which it enters the machine;

(c) The condition and shape in which it must be delivered;

(d) The weight or mass of material to be worked while passing; and finally,

(e) The rate of production, which fixes the speed of different parts of the machine.

Before putting pencil to paper the designer must study the problem from A to Z, must make a mental estimate of the different movements and changes of motion, the number of parts, their general shape and size. In assembling these into a connected whole the machine takes form in his mind's eye.

When his mental picture has taken on a definite shape, he takes up his pencil and makes a free-hand sketch, usually several before one is satisfactory; then with this as a starting point he begins a more particular sketch, in which each feature takes its proper position, with some attention given to proportion; at this point the separate design of each is begun. In drawing details to scale, determining the number of parts, the shape, size, strength, movement and speed of each part, the designer continually meets the same handicaps, change of speed or direction of rotation, or character of motion.

With the details of each part settled the machine as a whole is drawn to scale, but not infrequently there results an impossible combination and the design must be revised.

Inhibitions in Providing for Power

AS to the second consideration: Heretofore, in working out the details of any machine, the designer has repeatedly been obliged to devise means to overcome the inescapable condition that power and motion came from a single source. Therefore, it must be initially applied at a single point (except in rare situations) and at a fixed speed. The power, usually with rotary motion, may be applied to the machine by means of a belt, chain, gear or shaft. Within the machine it may be necessary to vary the speed at several points, to change motion from rotary to rectilinear, to provide reciprocal motion, to provide rotary motion with varying angular velocity, etc., and the designer has been obliged to devise mechanical (and sometimes clumsy) means to obtain all these various movements so that each functions positively and in order from the single movement initially applied.

In designing and constructing a new machine of an original type, a manufacturer must start with a long purse, for the expense of the completed machine not infrequently runs into six figures, occasionally into seven. The designing may take months of an expensive force; much research may be required. Then it may be found necessary to rebuild the first one finished. Then comes experimental operation, which may develop the necessity for additional redesign. Sometimes the whole machine has to be scrapped and a new start made.

With the machine perfected and the machine builder's worries over, the purchaser and user begins to have his; first, the machine represents a large investment; second, mechanical complications require expert attention; third, maintenance cost is high; fourth, in the light of present possibilities use of power is inefficient; and fifth, possibly large space is occupied. These conditions spell high cost of product.

Mental Bondage to Established Custom

The adverse conditions enumerated for both builder and user of the machine are due in large part to consideration No. 2, that has rigorously prevailed until lately; yet even to date very little advantage has been taken of the greater technical freedom in machine design, increasingly possible. Mental bondage to established custom has so far proved stronger than technical freedom of action.

The real badness of the mechanical complication heretofore made necessary by the inhibitions imposed by that one fundamental condition (consideration No. 2, the method of applying power and motion) has never been properly sensed, even by the machine builder. There has, till recently, been no other way, so the conditions have been accepted as inevitable and little thought given to them or much said about it.

But the time has arrived when the designer of machinery is in reality emancipated (if he will be) from the necessity of applying power at one point, and motion likewise, of a single character and speed. Will he accept emancipation? He appears to be very slow in doing so. The inexorable character of former conditions governing the application of power and motion to a machine has so powerful a hold—mental attitude with regard to it has become so fixed—that mechanical designers find it difficult to escape its thraldom. Only occasionally will one become so emancipated as to be fully and freely motivated by the—to him—new idea.

Another reason for slow acceptance of the new freedom is that mechanical designers have rarely had any considerable electrical experience. They are more or less in awe of the intricacies of electrical design and so fight shy of it. When of late there has been indicated a close combination of machine and electric drive, the mechanician has used a standard motor, or the electrical feature has been left to the electrical manufacturer.

Since electric motors became a factor to be reckoned with in applications of power some 30 years ago, electrical and mechanical designers have followed parallel though, as a rule, quite distinct courses. Whenever electric drive seemed to be indicated as a more desirable motive power, the electric motor has been used by the mechanical designer, but he has applied this form of power precisely as he would have done power directly from an engine or a water wheel. He has not sensed the basic fact that electric power (the phrase is a misnomer) is not power at all, just a means of transmitting power, the most convenient, serviceable, flexible and controllable in existence.

Electric Motor No Longer an Adjunct

Here now is the great idea. It is possible by the means electricity offers to apply directly at one or several points, without the intervention of mechanical means, rotative movement of 10,000 hp. or 0.001 hp. through a wide choice of speed; also rectilinear motion through a wide range.

And by simple mechanical aids these two basic movements can be varied to obtain other characteristic movements, reciprocating, varying angular velocity, etc.

Although not formulating the present freedom in design till quite recently, the extended experience of the writer in both mechanical and electrical design, made it quite natural to combine the results of such experience more intimately than others have done and then to sense the real situation.

The design of electrical forms and movements is no longer a closed book to all but a few; they are almost as much common property of technicians as the particular features of mechanical design. There is therefore little of a technical character to prevent manufacturers of machinery from combining electrical with mechanical production.

Very distinct changes in method, however, will take place. These are likely to be more complete than is at once apparent. This revolution in manufacturing methods will not come in a day, or a year, but should be much in evidence in ten years. The limiting factor as to time will be the supply of competent designers available.

There are two wise sayings that will throw light on this situation.

"How use doth breed a habit in a man,"

and,

"Habit with him was all the test of truth;
It must be right. I've done it from my youth."

This is the point of view that—with rare exceptions—prevails with experienced technicians. It is because of mental attitude that a mechanical engineer, or master mechanic, is rarely competent to organize the most efficient electric drive, where it is only a question of placing electric motors. This is not an evidence of any lack of ability in his line; it is a matter of mental attitude. He is simply unable properly to interpret a concept of power transmission, not merely different from, but actually at variance with, his regular line of thought. Therefore, there must be time for the demand for electro-mechanicians to develop a new crop of engineers. The only other supply is from the few who have not become rutted in the traditions, precedents and methods of either electrical or mechanical design, per se.

[*In a following article the author proposes to be more specific regarding the implications herein set forth, with an attempt to supply suggestions of practical interest to machinery builders.*]

Pittsburgh Bridge Selected as Most Beautiful Built in 1928

THE most beautiful steel bridge completed during 1928 is the Sixth Street bridge over the Allegheny River in Pittsburgh, according to a jury of awards appointed by the American Institute of Steel Construction.

This bridge was designed by the Bureau of Bridges, Department of Public Works, Pittsburgh, under the supervision of V. R. Covell, chief engineer. It was constructed by the American Bridge Co. and the Foundation Co.

The structure is of the self-anchored suspension type and is 884 ft. long, having a roadway 37 ft. 6 in. wide between curbs in addition to two cantilever sidewalks.

A jury of five made the selection. Two of the jury were named by the American Institute of Architects, two by the American Society of Civil Engineers and one by the American Institute of Steel Construction. This jury was made up as follows:

George H. Pegram, past president of the American Society of Civil Engineers, chief engineer Interborough Rapid Transit Co., New York.

William A. Delano, fellow of the American Institute of Architects, and member of the firm of Delano & Aldrich.

Ralph T. Walker, member of the American Institute of Architects, and member of the New York firm of Voorhees, Gmelin & Walker.

Charles Evan Fowler, member of the American Society of Civil Engineers, consulting engineer, New York.

Dr. J. Horace McFarland, president of the Art Commission of Pennsylvania, Harrisburg, Pa.

It is the intention of the American Institute of Steel Construction to decorate this bridge with a suitable bronze tablet, and certificates containing a reproduction of this tablet and the names of those interested in the construction of the bridge will be awarded. Plans for the ceremonies incident thereto will be discussed at the annual meeting of the institute at Biloxi, Miss., Nov. 12 to 16.

Other bridges came in for honorable mention, among them the High Bridge over the Harlem River in New York, the Cottage Farm bridge over the Charles River in Boston and the Thirty-first Street bridge over the Allegheny River in Pittsburgh.

Thermit Welding and the Steel Mill

Superheated, Gas-Free Steel Carrying a Little Aluminum Solidifies Into Metal Tough as a Forging—Proper Procedure Necessary for Success

BY J. H. DEPPELER

ASIDE from a series of illustrations of repair work done by the well-known thermit process (such as building up worn wabblers, welding breaks in heavy axles, crankshafts, frames, cylinders and bed plates) Mr. Deppeler's paper consisted of a discussion of the nature of the metal in the joint. From this portion the following is abstracted.

In considering the physical quality of thermit steel, the first question is, will not the strength of the welded part be only that of a similar cast steel part and not that of the original forging? As a matter of fact, forgings that have been thermit welded and tested to destruction will just as often fail completely outside of the welded area as they will in the weld or in the metal adjacent to the weld.

Steel, as cast, differs from forged or worked steel not in its chemical composition but only physically. Commercial cast steel on solidifying throws to the grain boundaries many impurities, and these, forming part of the cementing medium between the grains, are weaker than the grains themselves so that fractures of cast steel are usually intergranular. Forging, rolling, or working of these grains distorts them, so that the strength of the piece is then that of the material itself and not of the weaker grain boundary.

Weld Metal Quite Different from Cast Steel

Thermit steels, instead of being a refinement of relatively impure materials, are the result of the reduction of pure iron oxide by pure aluminum, with the result that they, although cast, invariably fracture through the grains.

From a paper read at the annual fall meeting of the American Iron and Steel Institute, New York, Oct. 25.

AFTER being graduated from the Stevens Institute of Technology in 1906 with the degree of mechanical engineer, J. H. Deppeler was associated with the New York Central Railroad in the electrification of its New York terminal. In 1909 he became interested in acetylene welding and worked in the research and development of this until 1912, when he became associated with the Goldschmidt Thermit Co., now the Metal & Thermit Corporation, New York. He is now chief engineer and works manager of that company.

This question was thoroughly investigated during the war, when Lloyds' Register of Shipping was asked to approve the use of stern frames made by welding together several simple forgings. Cast steel frames had been approved, but this request was refused on the consideration that, if a customer was willing to pay the extra cost of a forged steel frame, it would not be right to furnish him a forged steel frame with cast steel welds, because this would be no stronger than a cheaper cast steel frame of similar design. This contention started a series of tests on 10 x 10 in. sections of forged steel approved by Lloyds, some of the welds being between sections with free ends and others between sections not free to move. The results of this test are available in detail to anyone who may desire them, and resulted in Lloyds' approval of the thermit welding of forged steel frames.

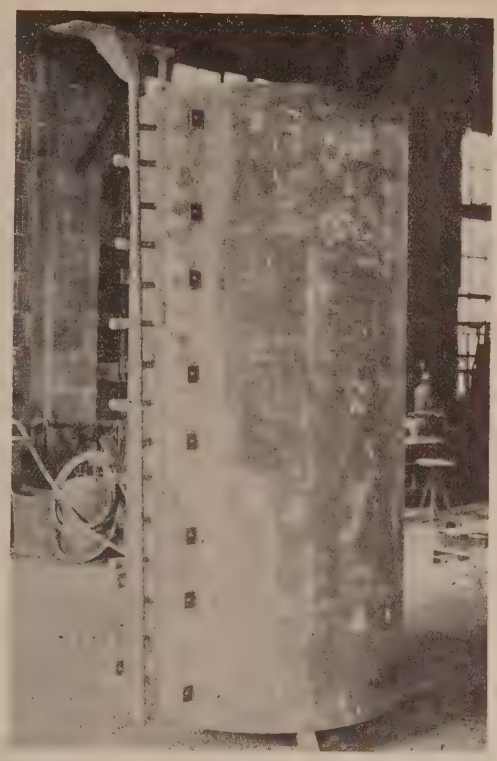
One impact test was quoted; where a 10 x 10 in. billet welded at the center and supported on 5-ft. centers was struck by a tup weighing 3290 lb. falling nine times from a height of 18 ft. This resulted in a permanent bend of 1¼ in. but no sign of fracture. The specimen was then turned over and straightened out by continuing the blows.

After this, Lloyds' engineer suggested that the weld be sectioned and examined internally rather than to continue the impact testing, which might be prolonged.

Since the approval of Lloyds' Register of Shipping and by the American Bureau of Shipping hundreds of stern frames of steamers have been thermit welded and, although in one or two cases these frames have again broken, the breaks have never been closer than 3 ft. from the weld. This, of course, is not a true test of the comparative strength of thermit steel and forged steels, because in the case of these ship welds the excess metal at the weld is usually not machined off; but it is indicative of the fact that the metal next to the weld is not harmed to any appreciable extent by re-crystallization or otherwise.

All the common alloying elements are easily reduced from their oxides by powdered aluminum, and these reductions have been carefully studied to determine the efficiency of the reactions. By properly mixing of the various thermits it is therefore possible to produce a steel of a given analysis. By such means, we have at our control the tensile strength, the ductility, and the hardness of the resulting steels. The tensile strength can be varied from about 50,000 lb. per sq. in. to 110,000 lb. per sq. in., and the corresponding ductility from over 40 per cent elongation in 2 in. down to zero.

Those familiar with the casting of ordinary steels must realize the difficulties we encounter at the extremely high temperatures so necessary for the welding operation. Thermit steels, however, have one very great advantage: they are perfectly deoxidized. In fact, all



LONG Seam in 2-in. Boiler Plate. Ordinarily such a long thin seam would be uneconomical because the volume of metal in the gates and risers is such a large proportion of the whole, but in heavy drums the advantage of simultaneously welding the entire seam and thus minimizing the internal thermal strains is obvious

of them show a very slight aluminum content. Here again, the steel man is suspicious, because an excess of aluminum to him usually means trouble, but the troubles that he has experienced are due more to entrapped particles of alumina rather than metallic aluminum alloyed with the iron. Even though, in the thermit reaction, great quantities of alumina are formed, the heavy metal is as liquid as water and separates from the lighter slag completely and almost instantaneously.

For these reasons, thermit steels do not have to be poured at low temperatures to cause them to solidify into dense, sound castings, and the presence or absence of defects in the steels will depend entirely upon the mold itself and the material from which it is made. To avoid contamination from the latter, it is necessary to select the best silica sands and clays and make a synthetic molding material containing a minimum of clay so thoroughly mulled with the sand grains as to coat each grain with the thinnest possible layer of clay. Such a molding material not only generates much less gas when the thermit steel comes in contact with it, but also remains so porous that the little gas generated easily passes out through the walls of the mold and not through the liquid steel. Loose grains of sand trapped in the superheated steel will completely volatilize.

The elimination of defects was aided by a condition inherent in thermit welding, that is, that the weld solidifies from the inside toward the outside; this, of course, tends to promote density and soundness in the weld itself. Before this fact was thoroughly realized, it was customary to use large risers, which were not only wasteful but actually harmful. It must be obvious why this shrinkage is so different from that in ordinary foundry practice; in the foundry, the heat from the molten steel passes out slowly through the mold, and solidification of the casting occurs first on the surface in contact with the mold and progresses toward the core of the casting, whereas in the welding operation the parts being welded act as enormous chills in the casting and extract the heat of the molten steel more rapidly from the center or core than from any other point. Freezing, therefore, occurs first approximately along the axis of the parts. The realization of this fact introduced a radical change in the design of welds, which fortunately at the same time greatly lowered the cost of the welding operation. This decrease in cost in turn has increased the applications of welding until now it is more economical to weld almost anything in the steel mill than to substitute a new part.

Four Precautions Necessary in Practice

Describing his experiences with thermit welding for steel mill repairs, L. F. Coffin, mechanical engineer, Bethlehem Steel Corporation, Sparrows Point, Md., noted four vital factors for success, viz., the set up, mold ramming, preheating, and release of the parts after welding. Since many repairs are not simple butt welds, but occur in irregular sections partially or wholly fixed by surrounding metal, the design of proper clamps and the provision of proper movement consistent with changing temperature are most important. Each repair merits close study of its individual peculiarities. Sometimes the supports or clamps may be mounted on rollers; at other times the parts must be initially jacked apart, and the jacks gradually released on cooling. Thermit welding of hollow cylinders also requires the best molder's skill to make a satisfactory core. For this and other reasons, Mr. Coffin prefers to do the thermit welding in the steel foundry. Lack of adequate preheating spoils more welds than any other cause. The joint should be uniformly and deeply heated to a high temperature with a reducing flame. Cooling after welding should be under control. In most cases a full annealing will be justified to reduce internal thermal strains. Annealing also increases machineability, although the speaker advocated leaving all excess metal in place as an extra factor of safety, wherever clearances would permit.

David Arnott, chief surveyor, American Bureau of

COMPARISON of the Amounts of Thermit Used in the Old and in the New Practice. This reduction greatly lowered the cost of the welding operation, but the reason for it was primarily the improvement of the internal quality of the weld

Shipping, New York, defended the marine authorities for being so cautious in approving new methods of construction or repair. A failure at sea is much more fraught with danger of great monetary and human loss than one on shore. Tests made 10 years ago and cited by Mr. Deppeler are unable to explain certain recent failures. For instance, if a stern frame breaks and is repaired, why should it fail again? In one instance a new forging replaced a part which broke away and was lost; the second fracture occurred in this new metal. In his opinion, the paramount consideration is the procedure in making the weld; there should be complete freedom for the parts to move during the temperature changes so as to reduce internal strains to the minimum. Control of such residual contraction stresses is, in Mr. Arnott's opinion, the most important problem now before those who are repairing ship frames and other massive parts by thermit welding.

Improper design of the part is sometimes responsible for original fracture, in the opinion of J. W. Owens, welding supervisor, Newport News Shipbuilding & Dry Dock Co., Newport News, Va. In such cases a second fracture may be expected, since obviously a repair by welding does not cure the fundamental defect. He had found one fracture of a stern frame immediately alongside a weld, but ascribed this to a concentration of stress caused by a heavy collar of weld metal around a relatively small cross section.

Small Shops Need a Superintendent

This Official Would Relieve Pressure on Manager and Foreman and Increase Production Efficiency

BY ARTHUR MUMPER*

THE general run of machine and die jobbing shops would gain much in efficiency if sound principles of industrial management were adopted. Too many of them are operated in a haphazard fashion. The business is transacted by an owner-manager, a shop foreman and a man in the office who is a combination bookkeeper, stenographer and time-keeper.

The owner-manager, of course, is the head of the company and usually does the work of three or four men. He makes all important 'phone calls, dictates answers to letters that require his attention, reads a large number of letters that are laid on his desk by a too-hurried office girl or man, quotes on a considerable amount of pending work, makes hurried business calls to various parts of the city by automobile, looks over requisitions for material and supplies, sees salesmen, goes out after new contracts and checks up on shop activities of the previous day and on work in process. Since the owner-manager in most cases is a former mechanic, he generally fills in his spare time by trying to help an over-burdened foreman.

So far as salaries go, the owner-manager of a jobbing shop employing an average of 30 men should rank fairly high, for he conducts a business amounting to about $125,000 annually. During an exceptionally good year, such as the shops in Cleveland enjoyed in the year ended last August, the annual business may go as high as $180,000. Thus, it would seem that the manager of such an establishment is too valuable a man to attend to any but strictly executive duties, leaving the lesser activities to someone else.

The foreman, on the other hand, is overburdened also. He must quote prices and deliveries on new work, make out material requisitions for various jobs, do considerable designing, plan the program for his 30 men, see that the material and blueprints are got together at the proper place and are so arranged that any one man or any number of men finishing a job at one time can turn to something else without delay; he must give his men individual attention as they need it, plan his work for the night turn, see that the men understand the blueprints thoroughly, take up with the inspector mistakes made in the shop and help decide what is to be done about them, and assume as many of the details as possible so as to relieve the manager. It is not surprising that, with these duties to look after, the foreman has no time for reflection or for studying his plant with an eye to improvements.

There should be provision for an assistant foreman, but the management seldom wants to pay enough for this job to make it attractive, in view of the great amount of detail involved. A good tool maker can earn about as much money on the bench without any responsibilities except those in connection with his own work.

To relieve the pressure upon the manager and the foreman there should be a superintendent, who ranks between the manager and the foreman. His duties should include quoting on prospective business, ordering materials, supervising the work of the designer in laying out his work, going over the shop inspector's reports and making decisions in regard to mistakes. He also should act as a buffer between the manager and the foreman, settle all matters that do not demand the manager's personal attention, interview all salesmen, see that no one gets in to the manager whose business he can handle, direct the activities of the office force, decide the precedence of orders in the shop and choose the materials to be used when they are not specified on the customer's blueprints.

If this plan were followed, the inspector would not be responsible to the foreman, but to the superintendent. However, he would work in close cooperation with the foreman. The designer, who would report to the superintendent, would do all drafting, thus relieving the manager and foreman of this job.

Many benefits would result from the operation of such a system. No longer being bothered with details that formerly required about 30 per cent of his time, the foreman could give efficient supervision to shop activities, a job that should be his first duty. Production would be increased, scrap losses would be reduced, savings would come from reclaiming waste matter and the mental and physical strain on the manager would be lessened. It is not an exaggeration to say that the superintendent, if he measured up to the proper standard, would earn his salary many times in increased efficiency throughout the entire personnel, from the manager down through the ranks.

*10,919 Glenview Avenue, Cleveland.

Solid Tests of Open-Hearth Slags

Condition and Composition of the Bath Judged by Color, Shape and Other Characteristics of Solid Slag

BY E. J. JANITZKY

IN the making of basic open-hearth steel, process control, as exercised by the practical furnace operator, is governed largely by his observation and interpretation of slag conditions. "Make the slag right and the steel will be right" is a widely prevalent slogan, and yet scientific studies of slags are to this day meager when compared with the knowledge gained through research on the behavior of the steel bath.

Such slag studies as have been published are concerned primarily with variations in chemical analysis. As applied to practical steel making these studies might be considered as "post mortem examinations" which are of little use in the treatment of a live subject, that is, while the heat is in the furnace. The present study has attempted therefore to correlate such indications of physical and chemical variables as are almost instantaneously discernible by the experienced practical melter, to be applied by him currently toward closer control of the steel melting process. Slag control, based upon observation of solidified basic open-hearth slag samples, is being practiced in many European works. Used in conjunction with metal tests for red shortness, this practice renders a service of distinct and practical value.

A preliminary study has been undertaken at the South Chicago plant of the Illinois Steel Co., and a general correlation made of the readily observed characteristics of similarly solidified basic open-hearth slag samples in respect to their chemical analysis, color, surface design, conformation and texture. No attempt has been made as yet in this preliminary study to connect the characteristics of the solidified slag samples under consideration with the inherent quality of the steel. The data obtained, however, reveal that for steel within similar carbon ranges and like conditions of charge there exists in present day practice a pronounced heterogeneity in chemical composition, color, surface design and texture of the slag.

Slag samples were taken with the ordinary melter's spoon, poured into shallow circular moulds 3 in. in diameter, ½-in. deep and cooled in air. The essential characteristics in the solidified slag cake thus formed are:

(1) Color of surface,
(2) Design on surface,
(3) Conformation of surface,
(4) Texture of cake.

Abstract of a paper before the annual fall meeting of the American Iron and Steel Institute, New York, Oct. 25.

BORN in Austria, E. J. Janitzky was graduated as metallurgical engineer from the Metallurgical Institute of Leoben, Austria. He has been successively in the employ of the Carnegie Steel Co., the Republic Iron & Steel Co., the Lackawanna Steel Co., the Jones & Laughlin Steel Co., the Minnesota Steel Co., and the South Works of the Illinois Steel Co., where he has been metallurgical engineer since 1915. He was the Henry Marion Howe medalist of the American Society for Steel Treating in 1922.

The surface of the slag samples were of a dull or lustrous black color (shade), as illustrated in Fig. 1, which shows both types, A being the dull surface and B the lustrous black.

In some cases, the slag surface contained a design or pattern which we speak of as spider-webbed, see Fig. 2. It should here be noted that the spider-web design varied from a very coarse to a fine web, as typified in Fig. 2B.

The conformation of the surface of the slag cake shows considerable variations which are classified as concave (note the sunken center of the slag cakes in Figs. 1 and 2), flat, convex or "puffed-up." All convex and "puffed-up" samples contain small gas holes, in the former case principally in the upper portion of the slag cake, in the latter, throughout the whole matrix; the flat and concave samples are very generally free of gas holes. A "puffed-up" slag is of course very gassy and represents a frothy condition of slag. Fig. 3 illustrates the "puffy" slag. The fractured slag cake is classified as dense or porous, in respect to gas holes, and as of columnar crystalline or stony structure. Fig. 4 illustrates the structural condition, A being a columnar crystalline and B a stony one. Both are dense. If piping is present, the shrinkage cavity is parallel to the base of the slag cake and is located approximately midway between the top and bottom surfaces. It is essential to have the slag free from metallic globules; cavities containing metallic inclusions (which have fallen out on fracturing the slag cake) are not to be interpreted as gas holes which would classify the sample as porous. Slags which contain large steel nuggets are useless, as by their reaction with the metal during solidification the appearance of the slag test is so changed that no interpretation is possible.

Data Analyzed

Twenty-five open-hearth heats were carefully observed and slag samples were taken, as herein described, just before deoxidizing or alloying additions were made to the bath. This moment should represent the nearest approach to equilibrium in the reactions between metal and slag of any period in the heat. The carbon content of the bath for the 25 heats studied at the time of taking the slag samples varied from 0.04 to 0.18 per cent. The present study has been confined to this (approximately) one grade of steel in order to simplify the interpretation of

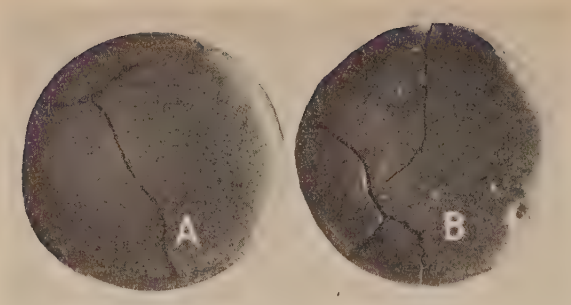


Fig. 1.—Dull (A) and Lustrous Black (B) Surface of Slag Cake

the results. All slag and metal analyses, together with the classification of slag characteristics as herein outlined, are given in Table 1.

To illustrate graphically the observed relations between the physical characteristics of the slag samples as noted and their chemical composition, triangular diagrams have been prepared of the type customarily employed in the charting of three-component systems. In this way, it has been possible to select at will from the various oxides comprised by these basic open-hearth slags, various groups of three and to plot the observed characteristics of the solidified slag cakes in relation to the variations of chemical composition for each of these groups. That temperature conditions may materially affect the visible characteristics of the solidified slag test is a possibility which it was necessary to neglect in this preliminary study.

The first choice of variables was the total acids (SiO_2 and P_2O_5), earthy bases (CaO and MgO) and iron oxides (FeO and Fe_2O_3). The composition of the 25 slags, as given in Table 1, was converted to give SiO_2, P_2O_5, CaO, MgO, FeO and Fe_2O_3 as 100 per cent. The converted values, as given in Table 2, were plotted on a triangular diagram, Fig. 6. It is immediately apparent that the dull slags, 1 to 8 inclusive, separate themselves from the lustrous black slags as shown by the line A_1-A_2.

Thus one of the physical characteristics listed in Table 1 has been associated with the composition of the slag. We can now definitely say that basic open-hearth slags in heats of 0.04 to 0.18 carbon containing less than 16 per cent. $SiO_2 + P_2O_5$ (on a converted basis of SiO_2, P_2O_5, CaO, MgO, FeO, Fe_2O_3 equaling 100 per cent) will have a dull surface when a solidified sample is taken, as earlier described.

A factor of importance in its bearing on the reactivity of the slag is the amount of excess base carried in solution in the molten mass over and above the quantities required for forming with the acids present those definite molecular combinations which have been identified as typical for the ground-mass in slags of the type here discussed ($2RO \cdot SiO_2$ and $4RO \cdot P_2O_5$).*

Calculated values of excess base for the 25 slags are given [in Table 3 in the paper] in terms of molecules of excess base. It seemed advisable to plot this variable against the silica and ferrous oxide content to determine a possibly different grouping of slag characteristics as related to variations in composition. After calculating the FeO and SiO_2 on a molecular basis, the excess base together with these were recalculated to a 100 per cent basis, and the 25 slags were then plotted.

Notable Conclusions Possible

Several notable conclusions are apparent from this chart [No. 7 in the paper]. The dull and lustrous black slags again group themselves as in Fig. 6. A low silica content in the slags is accompanied by a high excess base and an increase in the ferrous oxide content. We found that the lustrous black slags comprised those of comparatively low excess base and high silica content. Thus we may conclude that the lustrous black slags are associated with low FeO content. This phase will be brought up again in relation to a discussion of cleanliness.

Fig. 3.—"Puffed-Up" Slag Cake, Full of Blow Holes

Fig. 4.—Crystalline (A) and Stony (B) Structure of Slag Cake

In an attempt to correlate the composition with the surface design on the slag cakes termed "spider-web," the variables P_2O_5, SiO_2 and excess base, all from molecular analyses converted to 100 per cent of these three variables, were plotted. Here we find that these slags showing the spider-web design separate themselves from the balance of the slags. Thus a high P_2O_5 content seems to influence the appearance of the spider-webbed slag surface. It is important to find that the dull and the lustrous black slags are again easily separated, as are the columnar crystalline from the stony dull slags, showing that crystalline slags occur with low phosphoric acid content.

Thus are related all the observed physical characteristics of the solidified slag cake which seem to be related to the composition of the slag. It is understood that all

Fig. 2.—Spider-Web Design of Slag Cake (Cake Has Been Broken and Heavy Black Lines Are Not Part of Surface Design). A medium web; B fine web

*Colclough, The Physical Chemistry of Steel Making Processes, The Faraday Society and the Journal Iron and Steel Institute, June, 1925, p. 203.

Table 2—Chemical Analyses of Slags and Values Converted to 100 Per Cent for Fig. 6

Heat No.	Slag Analyses, Per Cent $SiO_2+P_2O_5$	$CaO+MgO$	$FeO+Fe_2O_3$	Total	Values Converted to 100 Per Cent for Fig. 6 $SiO_2+P_2O_5$	$CaO+MgO$	$FeO+Fe_2O_3$
1	10.05	54.55	27.95	92.55	10.9	58.9	30.2
2	11.09	49.01	28.48	88.58	12.5	55.3	32.2
3	11.55	52.00	23.33	86.88	13.3	59.9	26.8
4	12.63	52.16	21.73	86.52	14.6	60.3	25.1
5	12.82	54.43	18.18	85.43	15.0	63.7	21.3
6	13.47	50.26	23.87	87.60	15.4	57.4	27.2
7	13.35	55.95	19.41	88.70	15.1	63.0	21.9
8	14.10	53.92	21.58	89.60	15.7	60.2	24.1
9	14.96	52.80	21.13	88.89	16.8	59.4	23.8
10	15.23	52.90	19.50	87.63	17.4	60.3	22.3
11	15.67	50.94	19.48	86.09	18.2	59.2	22.6
12	16.39	52.05	16.71	85.15	19.3	61.1	19.6
13	15.87	53.07	17.45	86.39	18.4	61.4	20.2
14	16.05	53.91	18.15	88.11	18.2	61.2	20.6
15	17.06	50.75	18.52	86.33	19.8	58.8	21.4
16	16.99	52.18	16.85	86.02	19.7	60.7	19.6
17	16.80	50.40	19.69	86.89	19.3	58.0	22.7
18	17.47	50.12	17.38	84.97	20.5	59.0	20.5
19	17.25	48.72	21.29	87.26	19.8	55.8	24.4
20	17.96	48.33	20.17	86.46	20.8	55.9	23.3
21	17.92	50.59	17.50	86.01	20.8	58.8	20.4
22	17.81	51.59	18.18	87.58	20.3	58.9	20.8
23	17.64	54.70	18.09	90.43	19.5	60.5	20.0
24	19.21	53.88	13.79	86.38	22.2	61.8	16.0
25	19.61	48.78	19.72	88.11	22.2	55.4	22.4

these groupings can be explained on the basis of the mineral composition of the different slags, but it has not been possible as yet to broaden the present work so as to include a study of mineral variations.

It is apparent that any practical application of slag samples entails relating the conclusions drawn from the slag study to the properties of the steel. One such steel property may be mentioned briefly, the matter of cleanliness. It seems apparent that low FeO in the steel will be conducive to a cleaner final steel. Thus a low FeO content of the slag is a desirable feature and the furnace operator can control his heat better by aiming to obtain a lustrous black slag surface on a test cake.

It is also probable that those slags which show the most dense structure in respect to gas cavities usually represent a condition of diminished gaseous reaction between metal and slag. It is not, however, inferred that in all cases this dense condition can be used for the determination of complete equilibrium between metal and slag, but it is believed that this density which is always accompanied by concavity be taken as an index of diminishing reactivity. For example, it is well known that the addition of iron ore to a molten steel bath results in a notable increase in reactivity which subsequently decreases and it is of interest to note that the solidified slag samples taken at intervals subsequent to ore addition exhibit

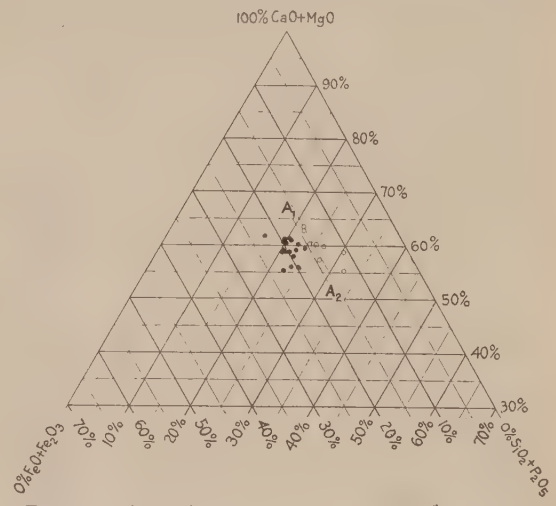


Fig. 6.—Relationship of surface coloration of slag cake to the three variables, acids ($SiO_2+P_2O_5$), earthy bases ($CaO+MgO$) and iron oxides ($FeO+Fe_2O_3$) plotted as chemical percentages. Note separation of dull from lustrous black slags. Data given in Table 2

diminishing degrees of convexity and porosity and if no further ore additions are made they become relatively dense and concave. Thus these slag tests may be employed practically and usefully as indicating the degree of

Table I—Slag and Steel Analyses and Physical Characteristics of Slags

Heat No.	Slag Analyses before Additions, Percent SiO_2	Al_2O_3	TiO_2	FeO	Fe_2O_3	MnO	CaO	MgO	P_2O_5	S	Steel Analyses before Additions, Percent C	Mn	P	S	Physical Characteristics Color	Surface Design	Conformation	Texture Density	Structure
1	8.68	1.99	.24	22.05	5.90	5.25	44.7	9.85	1.37	.29	.05	.05	.006	.031	Dull		Concave	Dense	Crystalline
2	9.30	1.47	.26	22.35	6.13	9.59	40.94	8.07	1.79	.23	.07	.21	.010	.029	Dull		Concave	Dense	Stony
3	10.00	1.32	.30	15.15	8.18	11.04	42.53	9.47	1.55	.18	.15	.22	.009	.030	Dull		Concave	Dense	Crystalline
4	10.98	1.72	.36	16.73	5.00	11.33	41.45	10.71	1.65	.22	.11	.32	.012	.027	Dull	Rippled	Concave	Dense	Stony
5	11.20	1.76	.30	13.79	4.39	11.06	43.99	10.44	1.62	.23	.18	.30	.010	.029	Dull		Concave	Dense	Crystalline
6	11.32	2.73	.30	16.54	7.33	9.23	41.56	8.70	2.15	.24	.15	.17	.009	.022	Dull	Rippled	Concave	Porous	Stony
7	11.70	1.28	.38	14.87	4.54	8.70	46.59	9.36	1.65	.20	.15	.20	.007	.025	Dull		Convex	Porous	Crystalline
8	12.48	1.96	.28	16.08	5.50	7.86	43.20	10.72	1.62	.20	.05	.12	.006	.026	Dull		Concave	Dense	Crystalline
9	13.20	2.27	.38	15.53	5.60	8.64	43.49	9.31	1.76	.17	.05	.19	.008	.027	Black Lustrous		Concave	Dense	Stony
10	13.22	1.92	.36	14.16	5.40	9.10	43.98	8.92	2.01	.24	.08	.22	.010	.027	Black Lustrous	Spiderweb	Concave	Dense	Stony
11	13.84	2.36	.40	14.70	4.78	10.51	39.92	11.02	1.83	.21	.05	.19	.011	.034	Black Lustrous		Concave	Dense	Stony
12	14.04	2.18	.44	13.14	3.57	11.80	40.35	11.70	2.35	.16	.15	.33	.014	.030	Black Lustrous	Spiderweb	Convex	Porous	Stony
13	14.04	2.26	.38	12.87	4.58	7.93	42.35	10.72	1.83	.16	.06	.21	.010	.034	Black Lustrous		Flat	Dense	Stony
14	14.20	2.06	.32	13.97	4.18	8.08	42.85	11.16	1.85	.17	.06	.16	.007	.027	Black Lustrous		Convex	Porous	Stony
15	14.66	2.00	.40	13.02	5.50	10.56	41.92	8.83	2.40	.18	.06	.24	.010	.030	Black Lustrous	Spiderweb	Concave	Dense	Stony
16	14.70	2.17	.42	12.78	4.07	10.44	42.54	9.64	2.29	.16	.04	.20	.014	.028	Black Lustrous	Spiderweb	Concave	Dense	Stony
17	14.90	2.46	.36	14.90	4.79	10.16	40.78	9.62	1.90	.20	.07	.15	.009	.028	Black Lustrous	Spiderweb	Concave	Dense	Stony
18	15.02	2.68	.44	12.40	4.98	11.97	42.42	7.70	2.45	.20	.08	.22	.010	.033	Black Lustrous	Spiderweb	Concave	Porous	Stony
19	15.24	2.75	.40	15.41	5.88	10.06	40.25	8.47	2.01	.21	.04	.18	.011	.025	Black Lustrous	Spiderweb	Concave	Dense	Stony
20	15.74	2.25	.36	14.99	5.18	11.28	41.57	6.74	2.24	.16	.04	.16	.009	.034	Black Lustrous	Spiderweb	Concave	Dense	Stony
21	15.90	2.55	.44	15.26	2.24	10.55	41.55	9.04	2.02	.19	.06	.22	.009	.030	Black Lustrous		Flat	Porous	Stony
22	16.00	2.02	.38	12.68	5.50	9.80	41.78	10.31	1.81	.17	.05	.23	.012	.031	Black Lustrous		Flat	Dense	Stony
23	16.04	3.12	.40	13.05	5.04	6.32	45.13	9.57	1.60	.16	.15	.18	.009	.030	Black Lustrous		Convex	Porous	Stony
24	16.74	2.60	.46	11.03	2.76	9.78	45.46	7.92	2.47	.17	.15	.26	.012	.030	Black Lustrous		Flat	Porous	Stony
25	17.62	2.51	.38	15.48	4.24	10.75	38.86	9.72	1.99	.12	.05	.12	.008	.043	Black Lustrous		Flat	Dense	Stony

approach toward equilibrium conditions. In other words, by taking slags during the period after the charge is melted one can gather a frozen evidence of the magma in different stages during the process. From the foregoing reasoning one may conclude that slags which show a black lustrous and concave surface are the most desirable.

It should be emphasized that the desirable slag characteristics and composition must be determined for each plant, as local variations in the analysis of the charge and fluxes used will undoubtedly affect the coloration, surface design and texture of the slag tests. Undoubtedly a viscosity test as proposed by Herty and Gaines, which is handy and may also be executed at the furnace platform, would be useful in combination with the slag solidification test.

Petrological studies will still further enhance the knowledge and define more clearly the variation in the texture of the slag specimens. It is apparent that useful information can be obtained by the study of slags in solidified form and that much work is still required in this direction. The foregoing notes are derived essentially from the observation of solidified slag tests, and it is hoped that they may be found useful in actual furnace operation and also promote thought along the lines on which this paper has been written.

Some Exceptions Taken to the Author's Calculations

Mr. Janitzky has presented a very interesting paper on a most interesting subject, basic open-hearth slags, in the opinion of Dr. C. H. Herty, Jr., Bureau of Mines, Pittsburgh. The method of studying slags is much more comprehensive than is usually attempted by the average operator and should, with some additional information, be of great help to the open-hearth operator.

One common method of judging open-hearth slags, not mentioned in the paper, is to chill the slag on the spoon and examine the color of this solidified slag. If this solidified slag is crushed and the color noted, it is possible to predict the phosphorus content of the metal very closely, provided that the phosphorus in the charge is not so high that an abnormally high percentage of P_2O_5 is present in the slag. Deep chocolate browns indicate under 0.010 per cent, phosphorus, browns and light browns indicate 0.010 to 0.015 per cent, and black slags indicate above 0.020 per cent. Many a heat of steel has been tapped out by slag color in contradiction to preliminary results from the floor laboratory.

In treating certain parts of the slag composition as ternary systems and charting on ternary diagrams, Mr. Janitzky has brought out several interesting facts. However, it is safe to assume that the originators of the ternary diagram are groaning in their graves at the method of preparing Fig. 10 [in the original paper]. In preparing this plot the author multiplied the percentage of P_2O_5 in the slag by 10 and then divided the percentage of each component by the sum of SiO_2, P_2O_5 and excess base. To multiply one component of a ternary system by 10 before calculating the ternary composition is entirely incorrect, and had the author prepared this diagram by obtaining the ternary diagram with the molal percentages as calculated and then increased the percentage of P_2O_5 by some multiplying factor such as 10, drawing lines from the apex 100 per cent P_2O_5 to the point in question, he would have obtained a diagram showing the relations between the different types of slags more plainly than shown on Fig. 10, and, furthermore, he would have been correct mathematically. In this particular case no large error was involved, but had the percentage of P_2O_5 averaged 4 per cent, instead of about 2 per cent, very serious errors would have been made in plotting.

It is to be regretted that the author did not include more ideas on the effects of different types of slags, as shown by his tests, on the quality of the steel produced. Furthermore, it is somewhat dangerous to group 0.04 per cent with 0.15 per cent carbon heats as a single type of steel, as the rate of carbon elimination was undoubtedly entirely different in heats caught at 0.15 carbon and in those at 0.04 per cent carbon.

It is to be hoped that Mr. Janitzky will later present papers on the correlation of the slag tests with the quality of the steel produced, as this would be most interesting to every open-hearth man.

German Tests of Acids During Pickling

ARGUMENTS as to the relative merits of HCl and H_2SO_4 for picking steel are summarized by Dr. Fritz Eisenkolb in *Stahl und Eisen*. Hydrochloric acid etches more rapidly and more cleanly, operates effectively at a lower temperature and leaves a residue which does not react with ammonium chloride or zinc chloride. Disadvantages are the necessity for special containers (pottery or glass), low content of acid per unit weight, and the harmful vapors coming from the bath. Furthermore, the ferric chloride formed increases the action on the steel. It should also be pointed out that the waste liquors are useless and their annihilation is therefore a matter of considerable expense.

In the case of sulphuric acid, favorable factors are its high degree of concentration, absence of noxious fumes, and the retardation of attack by formation of sulphate of iron. Baths may thus be used nearly to the saturation point. On the other hand, the bath must be heated to give sufficiently rapid action. The cleansing action is not so marked due to the lower solubility of oxides than in HCl. Baths which have been long in use tend to deposit sulphate crystals when cooled down, and these must be removed by washing.

Most harmful of impurities in acid baths is arsenic. Acids rapidly lose their strength in the presence of arsenic and the steel is covered with an arsenical deposit. The tolerance on arsenic is 0.01 per cent in 66 deg. Be H_2SO_4 and 0.005 per cent in 22 deg. Be HCl. A qualitative test can be made by diluting to 45 and 20 deg. Be respectively and adding a few cubic centimeters of a 30 per cent KI solution. The formation of a yellow colloidal precipitate indicates only traces of arsenic. A yellow flocculent precipitate indicates larger quantities and the sample should be analyzed.

Of greater importance in operation of pickling baths are periodical data on the temperature and acid strength. While thermometers serve adequately for temperature measurement, the determination of free acid in the presence of iron salts presents certain chemical difficulties.

A method now in use in Germany consists, in principle, of allowing a definite amount of the acid sample to react in a closed vessel with a weighed amount of potassium carbonate. The volume of CO_2 thus liberated is read off on a burette calibrated directly in per cent of free acid.

The taking of tests at 2-hr. intervals is recommended. It is also pointed out that the analysis of the waste liquor in this same way will frequently disclose the wastage of considerable amounts of useful acid.

Waste Prevention and Salvage

How the Steel Industry Can Save in Inventories—What It Costs to Carry Larger Stocks of Parts

BY FRANK PARRISH

CERTAIN railroads and other large users of iron and steel products report impressive salvage or reclamation savings (equivalent to waste prevention) from the disposal of scrap. Iron and steel scrap is not an incidental item in steel making. It is rather a necessary and very important raw material. Even assuming that a steel works could not itself use the scrap it produced, its volume would be such that it could not be regarded as anything other than regular product, to be disposed of as such.

In handling scrap, however, there is opportunity for prevention of expense that is unnecessary and consequently wasteful. Furnace plants must keep this expense to a minimum, as it is directly reflected in costs, but in detached or outlying operations not making ingots or castings, nor regularly handling heavy steel products, the handling of scrap does become somewhat incidental.

Industries represented by membership in this institute consume yearly a total of not less than 25,000,000 tons of scrap. Much of it has to be handled several times in its journeys from the pick-up points, by way of scrap yards, cars, etc., to the steel furnaces. Each ton of scrap entering into ingots or castings is probably handled, on the average, as much as three times. If an average saving of as much as 5c. a ton for each handling could be made, the aggregate annual saving would be nearly $4,000,000.

[Mr. Parrish told of a campaign conducted last year by the Carnegie Steel Co. in an effort to avoid waste along many lines.]

Among the common items of waste which could be mentioned are:

Leakage in pipe lines;

Extravagant use of lubricants, waste and other mill supplies, and failure to reclaim such materials when profitable to do so;

Unnecessary burning of lights, use of heat, or running of water;

Saving of fuel in cleaning furnaces;

Unnecessary use of power, by failing to turn off motors, or to use belt shifts;

Unnecessary delays to locomotives, trucks or other motive equipment;

Utilization of unused laboratory samples of fuel, etc.;

Unnecessary telephone or telegraph expense;

Waste of office supplies;

Use of discarded forms or the backs of old reports for scratch pads, rather than new paper;

Reclamation of broken or worn tools;

Salvage of containers, packing materials, etc.;

Elimination of useless reports or failure to combine into one report information required by several different officials or departments, thereby making one report do for all.

Among the suggestions either offered or developed during the campaign, and dealing with the somewhat larger operating processes more or less peculiar to the steel industry and its allied or affiliated raw material, transportation or service companies, might be mentioned the following:

Cutting down the thickness of hot saws used for a certain operation by $\frac{1}{8}$ in., whereby the production of saw chips was reduced 2000 tons annually;

Platform between two blowing engines, allowing one man to run both engines. Estimated saving $5,000 a year;

Reduction of labor required for taking and preparing samples of ore. Estimated savings $3,500 a year for one works only;

Certain changes in limestone rescreening plant, which would make a return of $8,250 yearly;

Installation of distant or secondary signals, connection of additional switches with interlocking plants and other practices leading to fewer slow-ups and stops of heavy trains carrying ore. Annual saving difficult to estimate.

A perplexing salvage problem in the steel industry is the economical disposal of machinery or power plant units which have become obsolete for economical use where installed. In many cases such equipment could put in years of useful life at some other place, where its economical capacity would meet the requirements. But, for various reasons, it is often hard to get any dismantled piece of equipment released for transfer or outside sale. It is possible that the salvage return quickly available is not so high as that which was estimated when replacement was being considered, and the impulse may be to wait for a better prospect.

The superintendent or manager may feel that it is a good thing to have it around, but it is rarely put back into use at the plant which it formerly served. The result often is that it eventually becomes so far behind the times, or depreciates so much by reason of its idleness, that no one wants it. The longer it is held, the greater the ex-

THE first position of Frank Parrish was in 1893 at the American plant of the American Bridge Co. in Chicago. He was associated with this company in Chicago and at Pittsburgh until 1917, his last position being assistant purchasing agent. From 1917 to 1921 he was purchasing agent of the Canadian Steel Corporation, Ltd., Ojibway, Ontario. Since 1921 he has been supervisor of inventories, United States Steel Corporation, 71 Broadway, New York.

This article is an abstract of a paper read Oct. 25 before the American Iron and Steel Institute, at New York.

pense of holding it and, except in extremely few cases, the less it is worth.

Heavy Costs Involved in Inventory Expense

Cost of carrying doubtful materials in inventory, not counting market price changes, amounts to several times the bare cost of the money tied up. In the expense column such items as taxes, insurance, storage, extra handling and added accounting contribute to the burden, their total being practically as heavy as that represented by interest. In the depreciation column such pillagers as deterioration, obsolescence, shrinkage and uneconomical use take their heavy toll.

By 1925 these heavy carrying costs were getting considerable attention. In an address at Atlantic City, in June of that year, R. M. Hudson of the Department of Commerce said, in part:

> One good reason for this increasing attention to better stores control is the cost of carrying too many varieties. When it is found that the average cost of carrying or maintaining supply stocks is 25 per cent of their value, and that obsolescence accounts for nearly one-half of that cost, the only logical course open is the elimination of the slow-moving, the non-standard and the excessive varieties so largely responsible for the obsolescence.

The given division of this 25 per cent total was as follows:

Storage facilities	0.25 per cent
Insurance	0.25 per cent
Taxes	0.50 per cent
Transportation	0.50 per cent
Handling and distribution	2.50 per cent
Depreciation	5.00 per cent
Interest	6.00 per cent
Obsolescence	10.00 per cent
Total	25.00 per cent

For the use of our own organization a table was prepared similar to that below. It will be noted that this contemplates annually reduced net rates of expense and depreciation, which reduced rates are due to the declining asset values on which both are based. This point is not covered by the 25 per cent set of figures. The inference is that the same net rates continue year after year, and this is another reason why the rates of 10 per cent and 20 per cent, as used in the table, are considered extremely conservative.

Average Expense and Depreciation Costs in Carrying Undesirable Materials

Year	Expense Per Cent of Original Cost	Total Cost Per Cent (Original Cost Plus Accrued Expense)	Depreciation Per Cent of Original Cost	Asset Value Per Cent (Original Cost Less Accrued Depreciation)	Per Cent of Total Cost to Asset Value
First	10	110	20	80	137.5
Second	8	118	16	64	184.4
Third	6.4	124.4	12.8	51.2	243.0
Fourth	5.12	129.52	10.24	40.96	316.0
Fifth	4.1	133.62	8.2	32.76	410.0

Expense includes interest, insurance, taxes, storage, accounting, extra handling, etc.

Depreciation includes deterioration, obsolescence, shrinkage and any other factor which reduces value, impairs efficiency, or induces the illogical or uneconomical use of material.

Surplus, obsolete or discarded materials are undesirable materials; materials ordered for contingent use become undesirable materials in the majority of cases.

Depreciation stops when the scrap or salvage value is reached.

Expense continues to accrue so long as material is held.

The full cost of material cannot be determined until it has been used or liquidated.

Experience in liquidating undesirable materials will show the rates as given to be low rather than high. It will also show that many items are held longer than five years before being used or discarded.

It has been found that insistence on putting replacement parts in service at the first good opportunity and carrying the used parts in inventory at their lower value, rather than the new parts at cost, has induced much more careful analysis of the actual need for additional procurements.

Emergency Spares Often a Costly Luxury

It is believed that there has often been too high a value placed on the advantage of carrying a surplus quota of emergency spares. The person or department responsible for unit costs frequently seeks to avoid assuming the cost of this advantage, if possible.

Various factors, among them the development of welding and the trend toward heavier and improved equipment, suggest caution in procurement of emergency spares. Should a mining or quarry operation buy one or more steam shovels there would be no good reason for putting in emergency spares, in the expectation that the next steam shovel bought would be of exactly the same size and specifications. Should any particular part develop undue tendencies to break or wear out, it would be changed or strengthened to remedy the defect; and a spare part like the one proving defective would not again be used even were it on hand waiting.

Economists have divided the responsibility for industrial waste under recent conditions as follows:

Waste for which management is responsible, 67.3 per cent;

Waste for which labor is responsible, 17.1 per cent;

Total for which management and labor together are responsible, 84.4 per cent;

Waste due to external causes, 15.6 per cent.

Trend in Dirigible Design

Rear Admiral William A. Moffett recently predicted that the framework of airships of the future, like their predecessors, will consist of duralumin with steel wire bracing.

The girders will be of a new type, stronger and more efficient than hitherto used. The outside will be covered with the characteristic aluminized fabric, drawn smooth and tight. Buoyant helium will be contained in separate cells of gas-tight fabric. Engines will be inclosed in the hull, and the latter will be strong enough to resist storm or squall conditions approximately twice as severe as the Los Angeles can successfully encounter.

Improvements in airships along technical lines are, at present, "just around the corner." Specifically he mentioned larger and speedier airships of 10,000,000-cu. ft. displacement and 100-miles speed; oil burning engines; improved sheds and terminal facilities; better weather informational service; and, finally, the development of mechanical aids for handling airships.

Protecting Buried Steel Pipe

Buried steel pipe may be adequately protected from corrosion with asphalt and asphalt saturated fabric, in the opinion of A. Saunders, research engineer Lewis Asphalt Engineering Corporation, New York. He recommends two coatings of emulsified asphalt on the cleaned steel. Before the second coat is dry, the pipe should be wrapped spirally with fabric impregnated with pure bitumen, and then finished with two more coatings of emulsion, applied either with spray gun, brush or trowel. If the pipe must be handled after covering, the sticky surface can be dusted with talc or slate powder. This procedure will produce a covering of great durability and elasticity, capable of resisting rough handling and impact of earth and small rocks when the trench is filled.

CARNEGIE LIBRARY OF ATLANTA

BOOK REVIEWS

Mergers, Modified by Competition and Law

Mergers in Industry. 205 pages, 6 x 9¼ in., illustrated. National Industrial Conference Board, Inc., New York. Price $3.

Mergers and the Law. 153 pages, 6 x 9¼ in. National Industrial Conference Board, Inc., New York. Price $3.

Combinations and mergers in manufacturing industry commenced about 30 years ago. The movement has gained rapidly in the years since the European war. A comprehensive compilation of data and study of the results of mergers has been brought together in these two books. The mergers discussed are those of large scale production units, combined into enterprises of nation-wide scope; public utility and bank combinations are not considered.

The merger movement is due to two causes: the increase in transportation facilities for industrial products, and the development of electric power transmission and individual motor drives, which made possible the construction of indefinitely large factories. These two developments were accompanied by the development of corporate enterprise, and this in turn was supported by a widening public interest and market for corporate securities.

Tables of stock prices, earnings and other important data have been compiled for many large combinations. The conclusions drawn from analysis of these tables are that whereas the earlier mergers or "trusts" were projected in the expectation of making large profits, the prewar mergers did not generally show larger earnings than the individual concerns had previously produced. While there were a few exceptions, many of the earlier mergers failed and were dissolved. The conclusion sponsored by the Advisory Committee of Thirteen on the anti-trust laws and their enforcement, which is the authority for publication, is that industrial consolidations in general have not provided a safe, easy and sure way to business success. They have achieved some superiority in productive efficiency; they have actually repressed to some extent the tendency to rising prices, as compared with prices in industries which are not consolidated; and they have steadied the markets and the tendency to seasonal variations in the price of products.

Their principal advantage to the nation has been in lower prices and steadier employment, which they have been able to attain; but this was forced principally by the constant pressure from small and vigorous trade rivals outside the combinations. No merger has ever completely dominated an industry to the extent of crushing out the smaller concerns.

The second volume gives a brief summary of all the important and typical cases which have been brought against combinations under the Sherman and Clayton laws. It was early decided by the United States Supreme Court that the Sherman law merely defined the economic evils which it was intended to prevent, namely arbitrary price manipulation, and restriction of opportunity of producers in the choice and conduct of their business. It was left to the courts to define the particular practices which might bring about these economic evils.

The rule of reason was early introduced by the Supreme Court, and the cases were decided with respect to the intent evidenced by the combination, including the intents previously evidenced by the members and managers of the combine. Decisions adverse to combinations were rendered where the intent was to exclude others from the trade and oppress the public; and where such intent was not in evidence, the consolidations were allowed to proceed. On these grounds 436 suits were instituted under anti-trust laws between 1890 and 1927. Sixty per cent of these were by private individuals or corporations claiming oppression by consolidations, and 40 per cent were brought by the Government against combinations, but half of these were against labor organizations which by concerted effort were attempting to interfere with interstate trade. That is, about 75 per cent of all the suits were brought for individual liberty, thus proving the necessity of the anti-trust laws.

Mergers in general are not unlawful unless they evidence an intent to acquire a monopoly and to keep down competition from those outside of the consolidation.

The two books are critical rather than constructive. They are manifestly not intended to give advice and instruction in the formation of successful mergers, but merely to record the history of mergers in the United States, the results of the important mergers, and the legal restrictions which have thus far been defined by the courts under the anti-trust laws.

STERLING H. BUNNELL.

Student Guide to Micrography

Photomicrographs of Iron and Steel. By Everett L. Reed. 253 pages, 6 x 9¼ in., 218 figures, consisting of photomicrographs; seven appendices. John Wiley & Sons, Inc., New York. Price $4.

The main value of this book is to students of metallography interested in microscopic work. It opens with a graceful and characteristic introduction by Professor Sauveur giving a brief review of micrographic work in this country. The body of the book consists of reproductions of photomicrographs. There are 218 of these reproductions, divided into 18 main groups, starting with pure iron, commercially pure iron, wrought iron, cast steel, rolled steels, various heat-treated steels, alloy steels and various kinds of cast iron.

In general the photographs are good; some are exceedingly beautiful and reflect great credit on Mr. Reed's skill and care, both in preparation of the specimens and in the photography. In some respects the structures are not described with enough detail. Since this is a book for students, the structures that are not simple and fairly obvious should have had a little more description. The author is in a position to carry this out and should do it in succeeding editions.

A few suggestions may be made. Fig. 7 on page 7 with 0.62 per cent sulphur hardly comes under the class of commercially pure iron. Fig. 45 on page 31 of high-carbon cast steel may show lamellar pearlite on high magnification but looks more like sorbitic pearlite as given. The micrographs of hot-rolled steel should state whether they are transverse or longitudinal sections; some are transverse but the banded structures are probably longitudinal. The hardened hot-rolled steels on page 63 should be described more fully, and Fig. 93 of a 0.35 per cent carbon hardened and drawn steel would seem to show ferrite as well as sorbite. Also Fig. 117 on page 90 looks more like martensite than austenite. Fig. 129 on page 103 looks rather strange for a 0.50 per cent carbon steel slowly cooled in the furnace; there is little ferrite and the ground mass is sorbitic pearlite—probably the

steel is quite high in manganese. The semi-steels on page 207 are not so clear or good as most of the other photographs, and it is hard to distinguish the steadite mentioned.

The last 38 pages of the book consist of appendices covering the preparation of microscopic specimens, definitions of terms, identification of non-metallic inclusions, developing of films and plates, and printing of photographs. They add greatly to the value of the book.

G. B. WATERHOUSE.

How Surface Damage Affects Fatigue

Der Einfluss von Oberflächenbeschädigungen auf die Biegungsschwingungsfestigkeit. By W. Zander. 65 pages, 6 x 9 in., illustrated. Published by NEM, Matthäikirchstrasse 10, Berlin, W. 10, Germany.

This publication records the results of an investigation made by the author under the direction of Professor Föppl, and is a distinct contribution to the study of the effect of surface defects on the fatigue strength of metals. Fatigue specimens were made of duralumin, low-carbon steel, oil-quenched chrome-nickel steel, and oil-quenched molybdenum-tungsten steel, and artificial defects then produced by needle-point scratches, files, lathe tools, grinding disks, diamond point scratches, razor blade cuts, friction saws, chisel marks, and indentations of round steel points under pressure.

Fatigue tests were then made on a rotating-beam type of machine, and the amount of damage done was estimated by the percentage of reduction of endurance limit for damaged specimens. Detailed methods of getting stress values for endurance limits at the section where the specimen fractured are given in the article.

A large amount of test data is presented, and many photographs of damaged surfaces and of fatigue cracks. The length and depth of the various scratches and cuts are carefully recorded, but no attempt has been made to record radius of curvature at the bottom of scratch or cut.

The reduction of fatigue strength by the various artificial surface injuries varied all the way from 15 to 73 per cent. The damage caused by indentation of steel points under pressure seemed to be very severe, and, in general, duralumin seemed to be somewhat less affected by defects than were the steels. These general results are not out of harmony with the results of other studies of the effect of surface defects on fatigue strength.

H. F. MOORE.

Human Side of the Railroad

The Story of the Baltimore & Ohio Railroad. By Edward Hungerford. Two illustrated volumes; Vol. I, 372 pages; Vol. II, 351 pages. G. P. Putnam's Sons Co., New York. Price $10.

This book is in reality a romantic chronicle of the human side of a great transportation system. A vivid portrayal of the first meeting, the chartering of the road, the ready response of the populace to subscribe funds, and the laying of the "cornerstone," places a picture of confidence and determination squarely before the reader. Doubt soon replaced confidence, as difficulties of construction, quarrels, animosity and depletion of funds caused the work to lag. But the pioneers were determined and won, rallying again the spirits of their supporters, and we see great parades, celebrations and rejoicing as the first unit was completed and service commenced.

From a novelty and a pleasure jaunt, this new creation became a thing of utility. It was destined to be a time and money saver, and have a powerful influence on the productivity and the expansion of the country.

The pioneers exerted remarkable ingenuity in their tasks of construction. Crude tools were available, but their resourcefulness conquered many a difficulty. The solidity of many bridges, fashioned by hand and not by formula, rugged character of the first rail roadbed, and the inventive spirit of mechanical minded men toward creation of steam power truly shows the thoroughness of these ambitious men. In power alone we see a steady stream of remarkable changes from the horse to the sailboat, the introduction of steam power, with its numerous queer creations, stimulation of improvement through trials and prizes, and the early culmination of success, exemplified in Peter Cooper's "Tom Thumb."

While these developments were proceeding, the little official family directing the property was brought face to face with the fierce struggle being waged by the interests backing canals and waterways. Factions in the Federal and State Governments fought to eliminate or hedge in the iron horse, as the very existence of the canal system was at stake. Needless to say, the iron horse was in the ascendency and practically superseded its rival in less than two decades. Guidance of the road from its inception was transferred frequently from one master to another as new energy and vision were necessary to accelerate progress and to cope with the delicate problems of finance and expansion and to thwart attempts of lobbyists to strangle this growing and valuable public servant.

There was rich commerce to be reached both west and south, and far-seeing prophets in the management were quickly discerning their opportunities. Through panics and trials, difficult financing problems, bickerings and injustice of State officials, and in the face of almost insurmountable natural obstacles to construction, they moved on steadily.

Improvements in power, equipment and operation kept a steady pace with expansion, and we witness a marked increase in efficiency, shortening of delivery time and travel, and reduction in rates and fares. This is ascribed in no small measure to the thoroughness and infinite care applied in directing the road and its operations. Every item was carefully scrutinized; the operating rules were models in outlining details for the movement of trains and the duties of employees.

It was a stroke of fortune that the destinies of the Baltimore & Ohio were placed in the hands of John W. Garrett in 1858 for the trying days and years ahead. He continued in power for a quarter of a century. The opening drama of the Civil War involved the road through John Brown's raid at Harper's Ferry. The energy of the road and its resourceful leader was of tremendous aid in the long struggle that ensued, even though the road bore the brunt of many disastrous conflicts and devastations. Reconstruction came as an aftermath of warfare, followed in sequence by hard times, poverty and difficulties of financing. But Garrett had the will and forcefulness to carry on, building up the property as he went, overseeing even the minutest details personally, combating the powerful interests of competing lines, expanding the facilities and reaching out toward rich goals of commerce, so that his name is indelibly carved in railroad annals as one of its greatest figures.

In the succeeding years strenuous efforts were made to carry on the tremendous work initiated by John W. Garrett. But his successors were not entirely equal to the task until a receivership was necessary to right the financial structure. While this was of short duration, a powerful rival gained control, and for years the Pennsylvania railroad was involved in the destinies of the road.

The quick recovery added confidence in the soundness of the plans and policies of the road, which proceeded with new impetus. Correction of line, improvements in

power, equipment and shop facilities, terminals for more rapidly expediting shipments, double-tracking, and expansion into territory controlled by rival interests, added greatly to the power and efficiency of the road. Several able presidents directed this work until finally Daniel Willard took command after the beginning of the new century and has been responsible for the tremendous improvements which have occurred in the past 18 years. Oddly enough, two men, John W. Garrett and Daniel Willard, directed the destinies of the road for a combined service of nearly half its existence.

Labor difficulties occurred at various times, but the loyalty of the vast army of employees always won. The most serious difficulty perhaps was that following the close of the World War. But good has developed from that, as frank discussion leads to better understanding, and mutual problems are adjusted by peaceful means.

The present Baltimore & Ohio, through the period of Mr. Willard's administration, is too well known and respected to need much comment. Its financial structure is sound, and the physical character of the property is of the highest order. By acquisition of numerous smaller roads and its own expansion, it now serves a population far beyond the highest dreams of its founders.

Mr. Hungerford's book is devoid of the usual drab details of railroad statistics, just sufficient being introduced to carry the imagination of the reader into the picture of the progress being made. The keynote of the book is the power of the human being in conceiving, building, expanding and directing the destinies of that all-important link in the transport of life and the products of commerce—the railroad. C. B. BRONSON.

Rolling Mill Encyclopedia

Handbuch des Eisenhüttenwesens Gruppe Walzwerkswesen. Edited by J. Puppe and G. Stauber. 777 pages, 7½ x 10½ in., with 946 illustrations. Verlag Stahleisen, Düsseldorf, Germany. Price 85 marks.

"Walzwerkswesen" is to be a collection of books on rolling mill engineering and rolling mill practice, the first volume of which has now been published. The plan and scope of the complete work on rolling mill practice and rolling mill engineering is monumental, if we may judge from the contents of the first volume, which consists of 12 sections dealing with steel rolling mills and their economic importance, with the history of rolling mills, with constitution and properties of steel, the constitution of non-ferrous metals, the testing of materials, with specifications and tolerances, with cost accounting in rolling mills, operating statistics of rolling mills, superintending and operating problems, with the nature of the rolling process, with the roll and its arrangement in the housing, and with the combinations of roll trains in their formation of rolling mills.

Many of the steel works statistics and the description of economic conditions are, quite naturally, of much greater interest to European engineers and mill superintendents than to those located in the United States. They will, however, be of value to those who make a study of the possibilities of exporting iron and steel to European countries.

In a similar manner the sections dealing with accounting will be of greater interest to European works managers than to American, unless it be for the purpose of comparing our methods with those used on the other side of the Atlantic.

The historical development of rolling mill practice is of universal interest, and so are the sections dealing with the constitution and properties of ferrous and non-ferrous metals. The last two sections, namely those dealing with the rolling process as such, with the rolls and their arrangement in the housing and with the combination of roll trains into rolling mills, are of the most importance.

The preface states that the beginnings of the book have their origin in the time before the World War, and that it was the latter that has kept the book from being published sooner, and which at times made its publication rather problematical. We are promised that the second volume will contain the rolling of ingots and slabs into blooms and billets and the rolling of heavy sections, such as beams, rails, ties, special beams, wire rods, wire, plate and sheets. The third volume is to contain special rolling mills and also mills for the production of tubes, the rolling of alloy steels, cold rolling, the rolling of non-ferrous metals, rolling mill engines and electric drives, also auxiliary equipment of rolling mills. The fourth volume is intended to contain conveying and finishing machinery, rolling mill furnaces, the power required by roll trains, the supporting and lubrication of rolls, making of rolls, roll turning and grinding, and an appendix on roll pass design.

The publishers as well as the editors are to be congratulated upon what has been accomplished.

W. TRINKS.

A 60-page booklet entitled "Ten Years of the Iron and Steel Industry in Independent Poland," has been printed in English by the Committee of the Polish Mining and Founding Industry for the National Exhibition at Warsaw. A rapid expansion of the steel industry since the war is graphically shown by tables and charts. Production is still less than the pre-war output of iron and steel in Poland, but with the exception of open-hearth steel. The number of employees has increased steadily since 1924; in 1928 the total reached 52,753. Figures on distribution of output show that Poland consumed about 90 per cent of the total production.

New Books Received

Seven Iron Men. By Paul de Kruif. 241 pages, 6 x 9 in., illustrated. Harcourt, Brace & Co., 383 Madison Avenue, New York. Price $3.

Trends in Foundry Production in the Philadelphia Area. By Anne Bezanson and Robert Gray. 77 pages, 6 x 9½ in., illustrated. University of Pennsylvania Press, 3438 Walnut Street, Philadelphia. Price $1.50.

Formulas and Tables for Engineers. Third edition. By C. A. Peirce, W. B. Carver and C. E. O'Rourke. 228 pages, 4¾ x 7¼ in., illustrated. McGraw-Hill Book Co., 370 Seventh Avenue, New York. Price $2.50.

Blueprint Reading. By Joseph Brahdy. 199 pages, 6 x 9¼ in., illustrated. McGraw-Hill Book Co., New York. Price $2.

The Soviet Union Looks Ahead—The Five-Year plan for Economic Construction. 275 pages, 5¼ x 7¾ in., illustrated. Horace Liveright, 61 West Forty-eighth Street, New York. Price $2.50.

Forty Years with General Electric. By John T. Broderick. 220 pages, 5¼ x 8 in., illustrated. Fort Orange Press, Albany, N. Y. Price $2.50.

Journal of the Institute of Metals. Vol. 41. 825 pages, 5½ x 8½ in., illustrated. The Institute of Metals, 36 Victoria Street, London, S.W.1., England. Price 31s. 6d.

Mineral Industry During 1928. Vol. 37. 802 pages, 6½ x 9½ in. McGraw-Hill Book Co., New York. Price $12.

Oxy-Acetylene Welder's Handbook. By M. S. Hendricks. 208 pages, 4½ x 6¾ in., illustrated. Acetylene Journal Publishing Co., Chicago. Price $3.

Carnegie Scholarship Memoirs. Vol. 18. 94 pages, 5½ x 8½ in., illustrated. The Iron and Steel Institute, 28 Victoria Street, London, S.W.1, England.

Journal of the Iron and Steel Institute. Vol. 119. 916 pages, 5½ x 8½ in., illustrated. The Iron and Steel Institute, London, S.W.1, England.

Steel Corporation Buys Coast Plants

Purchases Assets of Columbia Steel Corporation for Some $23,000,000 Par Value of Its Own Common Stock

THE United States Steel Corporation announced Oct. 31 the exercise of the option which it had held for the past several months on the properties of the Columbia Steel Corporation. The statement was as follows:

"For several years the United States Steel Corporation has had under consideration the location of manufacturing operation on the Pacific Coast, the better to serve its existing trade, as well as to prepare for the future growth of both domestic and foreign trade, by service from coast plants. It is economically logical that the corporation should establish itself in the Far West. Its nearest present manufacturing operations of any substantial character in the North are in Illinois, in the Chicago District, and at Gary, in the Indiana District; and in the South at Birmingham, Ala.

"The purchase of Columbia's properties has been determined upon by the United States Steel Corporation after an extended and exhaustive examination, inspection and study of the properties and their possibilities. The growing demands for steel of various kinds in Pacific Coast territory and the greater demands of customers for improved service make it desirable that the corporation have its own producing plants located there.

"This purchase of Columbia properties affords a nucleus from which it is confidently believed the productive capacity on the Coast can be expanded from time to time, both to the interests of consumers and the territory. The present annual steel ingot capacity of Columbia is 340,000 gross tons, which is converted into a relatively narrow range of finished products. This will increase the United States Steel Corporation's proportion of the total annual steel ingot production of the United States, based on 1928 output, from 39.02 to 39.52 per cent, an increase of one-half of one per cent.

"The properties are to be purchased at approximately $46,630,000 on Feb. 1, 1930, payment to be made wholly in common stock of the United States Steel Corporation."

From a supplementary statement made by Myron C. Taylor, chairman of the finance committee of the Steel Corporation, it would appear that the cost of the Columbia Steel purchase in terms of the par value of the common stock of the United States Steel Corporation will be somewhat in excess of $23,000,000. This statement came in answer to a question respecting a report from San Francisco that the Columbia stock was to be exchanged at 17 for United States Steel at 199.75, making an exchange ratio of 11.75 shares of Columbia for one share of United States Steel. Mr. Taylor replied:

"That is not quite accurate. Columbia's assets are sold for our stock, and in the liquidation of the Columbia company they may calculate a resulting price per share for their shares through the liquidation. But that is their matter and does not concern us at all, our purchase being of assets for stock. The price basis at which our stock is taken is approximately correct."

From the foregoing it will be seen that the $46,630,000, mentioned as approximately the purchase price, would represent $23,344,000 par value disbursed at 199.75.

The Properties Purchased

The properties of the Columbia Steel Corporation include a modern blast furnace near Provo, Utah, together with a by-product coke oven plant of 850 tons daily capacity; rolling mills at Pittsburg, Cal., and at Torrance (Los Angeles), making steel bars, sheets, wire, nails and tin plate, and steel castings at Pittsburg, Cal., and Portland, Ore., besides raw material properties, including coal, iron and limestone in Utah. The latest development of the Columbia Steel Corporation was the building of a tin plate plant at Pittsburg, of 40,000 tons annual capacity, which was put into operation on March 12, this year. It also increased its open-hearth capacity this year at that plant by the addition of two 65-ton furnaces. The Columbia corporation, owned jointly with the McWane Cast Iron Pipe Co., Birmingham, a cast iron pipe plant at Provo, Utah, of 20,000 tons annual capacity, operated as the Pacific States Cast Iron Pipe Co.

It is believed that an expansion in the tin plate plant is an early likelihood, seeing that the Pacific Coast consumes, largely in the food packing industries, 350,000 to 400,000 tons a year.

Pacific Coast Consumption

Consumption of the Pacific Coast States, including British Columbia in Canada, is now probably of the order of 2,500,000 net tons a year. In round numbers 400,000 tons comes from the Pacific Coast plants, leaving something over 2,000,000 tons to come from other sections of the country. It is estimated that the bar and rod tonnage is 450,000 tons, probably 60 per cent of local origin. Rail tonnage may be put at 200,000 gross tons. The next largest class of steel in point of consumption is tin plate, amounting to as much as 425,000 net tons, less than 10 per cent made on the coast. Structural steel may account for 225,000 tons, 20 per cent of coast manufacture; sheets for 175,000 tons, 30 per cent of coast manufacture; plates for 175,000 tons and pipe, including seamless tubes, 400,000 tons. Between 300,000 and 400,000 tons covers a miscellaneous classification.

Aircraft Symposium Planned By Testing Society

A symposium on aircraft materials is being planned for two sessions of the 1930 annual meeting of the American Society for Testing Materials. The committe on papers and publications has secured the cooperation of an advisory committee which will assume the responsibility for soliciting the papers and authors. This committee is made up of the following members:

H. C. Knerr, chairman, consulting metallurgical engineer, Philadelphia; E. P. Warner, editor, *Aviation*, McGraw-Hill Publishing Co., Inc., New York; Dr. G. W. Lewis, Washington, representing the National Advisory Committee for Aeronautics; Commander R. D. Weyerbacher, manager, Naval Aircraft Factory, U. S. Navy Yard, Philadelphia, representing the Bureau of Aeronautics, U. S. Navy; J. B. Johnson, chief material section, Air Corps, Wright Field, Dayton, Ohio, representing the Army Air Service; Major Clarence E. Young, chief, aeronautics branch, U. S. Department of Commerce, Washington, representing the Department of Commerce; H. L. Whittemore, chief, engineering mechanics section, VI-5; Dr. H. S. Rawdon, chief, metallurgical division, U. S. Bureau of Standards; Dr. Alexander Klemin, consulting engineer, school of aeronautics, New York University, representing the Guggenheim Foundation; Dr. J. S. Newell, representing the Massachusetts Institute of Technology; Harold Backus, materials engineer, Berliner-Joyce Co., Baltimore; Captain H. C. Richardson, director of engineering, Great Lakes Aircraft Corporation, Cleveland; T. P. Wright, engineer, Curtiss Aeroplane & Motor Corporation, Garden City, Long Island, N. Y., and R. R. Moore, metallurgist, Wright Aeronautical Corporation, Paterson, N. J., representing aircraft and engine manufacturers; R. S. Archer, director of research, Aluminum Co. of America, Cleveland, and Dr. J. A. Mathews, vice-president and metallurgist, Crucible Steel Co. of America, New York, representing materials manufacturers.

From 12 to 15 paper will be secured, each definitely limited in size so as to constitute a résumé and a summary of existing knowledge on the subject.

For Officers of Institute

The following candidates have been nominated to fill seven vacancies on the council of the American Institute of Weights and Measures, 33 Rector Street, New York, to serve until December, 1932: George M. Bond, specialist in precision measurement, Hartford, Conn.; E. F. DuBrul, general manager, National Machine Tool Builders' Association; J. B. Ennis, vice-president, American Locomotive Co.; A. R. Erskine, president, Studebaker Corporation; Otto H. Falk, president, Allis-Chalmers Mfg. Co.; Robert H. Irons, president, Central Iron & Steel Co., and Charles D. Rice, vice-president, Underwood Typewriter Co.

American Scrap Exports Gain Heavily

Shipments During Eight Months This Year Averaged 44,949 Tons Monthly Against 43,012 Tons in 1928—Shortages Abroad

BY LUTHER BECKER*

THE unprecedented shipment of iron and steel scrap by the United States to foreign markets during the past two and a half years has created an unusual interest among the domestic dealers of this country, indicated by numerous inquiries as to the economic reasons behind the sudden and phenomenal growth of this trade. The use of scrap iron and steel abroad has increased steadily during the past few years in the making of raw steel. In some instances furnaces are now being charged with as much as 60 per cent scrap and only 40 per cent pig iron. This trend has been particularly true in several of the European and Asiatic countries where there is a scarcity of domestic iron ore, notably such countries as Italy, Poland and Japan, and, to a lesser extent, Germany and Belgium. Due to this increased demand and the resultant relative scarcity of scrap, the prices of this commodity abroad have risen until it is now profitable to ship this material from the United States great distances to a market.

The accompanying table showing the principal countries to which scrap has been shipped during the past six years should prove an interesting study. The trade in scrap during the period since March, 1927—the beginning of this large movement—has been very erratic, increasing from a total of 15,416 gross tons shipped during that month to 30,124 tons shipped in September, 1927. Fluctuations during 1928 were even more pronounced, varying from a total of 70,538 tons shipped during the record month of August, 1928, to only 16,306 tons shipped in the following November. Shipments during the first eight months of the current year have averaged 44,949 tons monthly as compared to the 43,012 tons monthly average maintained during 1928, a slight increase despite the fact that there have been no unusual months during the current year such as August, 1928.

Canada's Imports Increasing

There have been several other contributing causes to our increased shipments of scrap during the past two years. Canada, the largest purchaser of this material from the United States, experienced great difficulty in effecting a readjustment of its steel industry following the war

Luther Becker, Chief of Iron and Steel Division, Bureau of Foreign and Domestic Commerce

but during the past two or three years conditions in its steel mills have improved and it has increased its purchases of scrap from the United States until during 1928 it took 178,528 tons of this commodity, more than four times the amount of its purchases in 1923 and almost six times those of 1925.

Japanese purchases of scrap from the United States have increased tremendously during this period, due almost entirely to the unsettled conditions prevailing in China. The iron ore resources of Japan are extremely small, as is also its domestic supply of scrap, making it almost entirely dependent upon foreign sources for supplies of raw materials. China, which has for many years been the chief supplier of Japanese imports of iron ore, has been suffering from civil wars during the past few years and the resulting disturbed conditions in that country have practically eliminated it as a source of Japan's imports. Upon finding itself cut off from its usual supply of raw materials, Japan turned to the United States for a large proportion of its scrap and has increased its purchases from this source from 8670 gross tons in 1923 to 160,427 tons in 1928 and 97,160 tons through the January-August period of the current year.

Shipments to European countries have also increased and have been greatly aided, first by the strike in the Swedish iron ore mines in 1927, and second, by restrictions placed upon the exportation of scrap by the governments of Sweden, France, Italy and Germany. Other contributing causes have been the increase in the Polish production of steel, the partial exhaustion of Spanish iron ore and the completion of the recovery of scrap from the battle fields of Europe.

Italy, our largest European purchaser of steel melting scrap, draws mainly for its iron ore supplies from the island of Elba, Greece and Russia, and to a lesser extent Spain, and because of the paucity of its domestic ore resources, supplements these with a considerable use of scrap purchased abroad. France has been, until the current year, Italy's chief source of supply for this commodity, but since the French Government has greatly restricted the export of scrap to Italy it has turned to other countries for these purchases, and as a result of which the United States has increased its participation until, during the first six months of 1929, it became the chief supplier of this market followed in order by Argentina, France, the United Kingdom and Egypt. The United States' trade with Italy in scrap during 1926 amounted to only 12,147 tons, which increased to 73,348 tons last year and 65,710 tons during the first eight months of 1929.

Poland is the second largest market for American scrap in Europe and while, unlike Italy, it has a fairly extensive domestic ore supply, its resources are not sufficient to meet the demand of the Polish steel industry, and is mainly of a low grade. All high-grade ore is imported, chiefly from south Russia and partly from Germany and Sweden. In order to supplement its ore supplies to an extent where they will be sufficient to meet the tremendously increased production of the steel industry—an increase which has risen from 70,000 metric tons of raw steel produced during 1920 to 1,436,901 metric tons produced during 1928—Poland has found it necessary to import large quantities of scrap material. Difficulties experienced in the amicable settlement of its trade agreement with Germany and the restrictions on the exportation of French and Swedish scrap have been largely responsible for the opening of this market to American scrap, our exports having increased to this country from 14,858 gross tons shipped in 1927, the first year we participated in this trade, to 63,274 tons

*An address delivered to the Institute of Scrap Iron and Steel in New York City, Oct. 24, by Luther Becker, chief of Iron and Steel Division, Department of Commerce.

United States Exports of Iron and Steel Scrap 1923-1929

(In Gross Tons)

	Year						First 8 Mos.,
	1923	1924	1925	1926	1927	1928	1929
Belgium	.....	.....	.....	.....	12	243	552
France	25	45	.....	.....	.....	1,648	.....
Germany	20	.....	2	385	9,367	18,984	16,681
Italy	.....	17,051	31,626	12,147	30,185	73,348	65,710
Poland and Danzig	.....	.....	.....	.....	14,858	63,274	68,103
United Kingdom	200	2,036	1,533	2,120	3,163	1,740	2,170
Canada	46,875	55,438	31,017	66,212	92,514	178,528	81,452
Mexico	30	405	261	819	2,983	4,711	5,827
Argentina	.....	.....	5	.....	.....	410	.....
China	7,333	13,206	5,627	3,824	4,017	9,222	6,695
Hong Kong	1,630	1,273	1,035	194	724	1,022	329
Japan	8,670	6,920	8,066	18,868	71,087	160,427	97,160
Kwantung	100	20	.....	25	9	1,110	2,093
Philippine Islands	.....	18	108	73	429	925	619
Netherlands	.....	.....	.....	.....	9,402	93	24
Spain	.....	.....	3,194	.....	.....	.....	7,627
Other countries	1,097	1,336	99	71	409	454	4,553
Total	65,980	97,748	82,573	104,738	239,159	516,139	359,595

in 1928 and 68,103 tons during the first eight months of 1929.

Trade with Germany Increasing

With the exception of Poland and Italy, the only other important market in Europe, at the present time, for American scrap is Germany. Our trade with this country last year was more than double that of 1927, while shipments during the first eight months of 1929 indicate that the current year will show a large increase over the shipments of 1928. China has always been a fair market for scrap material, most of her purchases, however, being of mild steel in the form of plate cuttings, old horse shoes, wire shorts, etc., which are more easily worked in her small shops and are used in the making of all kinds of forged tools and simple steel manufactures.

Import Trade in Scrap Steady

In contrast to our export trade in scrap, imports of this material into the United States have remained practically stationary since 1924, there having been 66,841 gross tons of this material brought into the United States that year as compared to 63,314 tons during 1928. Indications are that the current year will show a substantial gain over last year as receipts during the first eight months are slightly in excess of the total tonnage received during 1928. Canada, the largest supplier of scrap to the United States, usually takes from two-thirds to nine-tenths of this trade, while Cuba makes sporadic shipments of large quantities of scrap. The United Kingdom, the only other country which has participated to any great extent in the movement of scrap to this country, has fallen off in its shipments during the current year, our purchases from this source having amounted to only 636 tons during the January-August period as compared to total purchases of 8190 tons last year.

What Is Quality in Wrought Iron?

Committee A-2 on wrought iron, of the American Society for Testing Materials, of which H. W. Faus, engineer of tests of the New York Central lines, is chairman, and G. H. Woodroffe, manager of the boiler tube department of the Reading Iron Co., is secretary, is engaged in the study of what constitutes quality in wrought iron. The information gathered by the committee on this subject should be of importance to the entire wrought iron industry. The committee has also completed physical and chemical tests to determine the effect of phosphorus on the physical properties of staybolt iron. The results of these tests will appear in the annual report of the committee for 1930.

The committee is engaged in the preparation of a definition for wrought iron. With the adoption of this definition it is expected that the process clauses of the various A. S. T. M. specifications covering wrought iron products will be revised to include wrought iron made by any process so long as the other requirements of the specifications are complied with.

A revision is under consideration of the specifications for staybolt, engine bolt and extra-refined wrought iron bars and of the specifications for hollow rolled staybolt iron to consist of a change of the definition of "box pile," and an increase in the requirements for reduction in area in the latter specifications from 42 to 48 per cent.

United States Imports of Iron and Steel Scrap 1923-1929

(In Gross Tons)

	Year						First 8 Mos.,
	1923	1924	1925	1926	1927	1928	1929
Belgium	.....	200	600	83	724	6	19
France	2,511	186	2,775	.....	.....	216	378
Germany	853	1,388	1,434	974	232	1,053	706
Italy	2	100	.....	.....	4	385	763
Denmark	.....	.....	.....	2,326	25	.....	.....
Sweden	1,540	845	1,671	520	455	840	776
United Kingdom	16,940	5,239	333	8,869	8,754	8,190	636
Canada	97,469	49,043	58,017	45,838	42,689	49,974	59,056
Panama	880	505	16	7,748	.....	381	.....
Mexico	1,989	600	1,406	8,004	75	93	44
Jamaica	.....	.....	.....	2	.....	628	.....
Dominican Republic	5,637	2	.....	.....	366	438	125
Ecuador	.....	.....	.....	.....	.....	700	.....
Cuba	30,775	6,721	32,230	10,400	6,196	.....	1,635
Barbados	.....	.....	.....	.....	.....	.....	140
British India	.....	.....	921	.....	520	300	.....
Peru	850	1,015	.....	.....	.....	.....	.....
Netherlands	.....	983	.....	1,500	11	.....	13
Chile	2,562	4	.....	11	.....	.....	.....
Other countries	50	10	412	450	158	110	116
Total	162,058	66,841	99,815	86,725	60,209	63,314	64,407

Iron and Steel at Chicago Fair in 1933

One hundred years of development in the iron and steel industry is to be a feature of the Chicago World's Fair Century of Progress Celebration to be held in 1933. Recommendations to the science advisory committee of the National Research Council have been made by W. H. Eisenman, national secretary of the American Society for Steel Treating, a member of the committee. He is collaborating with other members in working out a basic plan for the Chicago fair authorities which will enable them to present to the public advances made in pure and applied science from 1833 to 1933. Dr. Frank B. Jewett, president of the Bell Telephone Laboratories, New York, is chairman.

Commenting on the part that iron and steel should play in the forthcoming exposition, Mr. Eisenman says: "Progress of the iron and steel industry during the last century provides some of the most remarkable developments since the first use of iron by man. Introduction of the Bessemer, open-hearth and electric methods for the manufacture of steel constitute epoch-making events during the century. Not less remarkable in the progress of the metal industry has been the development during the past 25 years of high-speed steel, stainless steel, corrosion-resisting and heat-resisting alloys, tungsten carbides, and their effective influence on industry in general."

During the past year and a half $5,444,137 in life insurance policies has been taken out by employees at Hawthorne (Ill.) works of the Western Electric Co. Altogether some 2500 persons have taken out policies under a plan which enables them to pay by weekly deductions from salaries.

Magnetic Tables to Handle Steel

Bars, Pipe and Other Sections Pulled Along by Magnetized Rollers—Omits Long Gear Shaft

A DEVELOPMENT now attracting considerable interest is the use of magnetic tables for handling steel. A magnetic table consists of idlers and a number of driven rollers whose traction is increased magnetically. When handled on tables of this type the material is drawn to the rollers, producing the same effect as pinch rolls but without any top roll to interfere with handling the steel or to mar it.

Tables with magnetic rollers can be used for handling steel in mill lengths in about all forms, either cold or after rolling, when the temperature has been reduced well below the critical point. A cooling bed for handling steel bars, which has a number of new features in design, and a shear approach table of the magnetic type were developed recently by Willis McKee, engineer and contractor, Terminal Tower Building, Cleveland.

Either the magnetic shear table or one of standard line-shaft construction can be used in connection with the hot bed. Applying the same principle, a table with magnetic rollers has just been installed by an Ohio mill for handling electrically welded pipe.

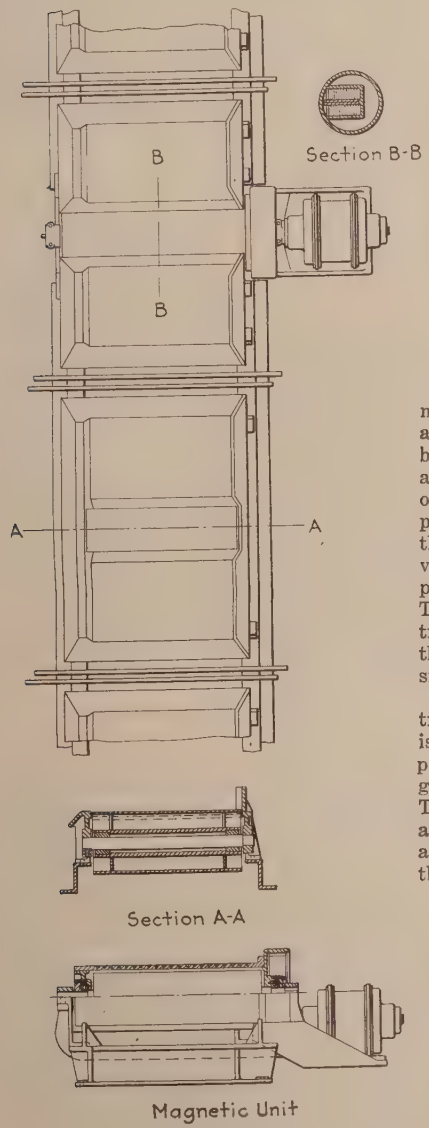
The runout is designed for the use of Schloemann Motor-Rollers, which units are totally inclosed. The shafts of the alternating-current motors are held against rotation and the rollers are mounted outside the rotor of the motor. The motors are mounted on two bars, which can be moved in opposite directions by a beam.

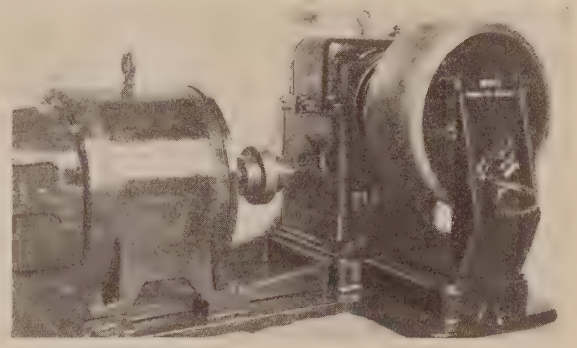
tendency for the bar to run off the rollers.

It is pointed out that, by discharging the material from the rollers by the skewing motion, there is eliminated the tendency to distort the bars which exists when kickoffs or lifting aprons are used. The material is delivered from the rollers to machined troughs which are so designed as to straighten the bars further when they are thrown against the sides of the troughs.

Balanced Hot Bed, Delivering to Either Side

On each side of the runout are two sets of notched machined supports, one set moving and the other fixed. On a line shaft under the bed are, at regular intervals, two sets of eccentrics, one of which controls the horizontal motion of the moving supports and the other, the vertical movement, through walking beams. With this design it is stated that any desired





MAGNETIC Roller for Table to Handle Welded Pipe (at Right)

Sections of the Magnetic-Roller Table, with Idler Intermediate Rollers

Above the central point of the motor rollers that form the runout is a guide, against which the bar is held by a slight skewing of the rollers, as the material runs down the runout. After the piece is in the proper position for discharge from the runout the angularity of the rollers is reversed, causing the discharge of the piece from the rollers on to the bed. This reversal draws against the central guide the next succeeding piece that is delivered on to the opposite side of the central guide.

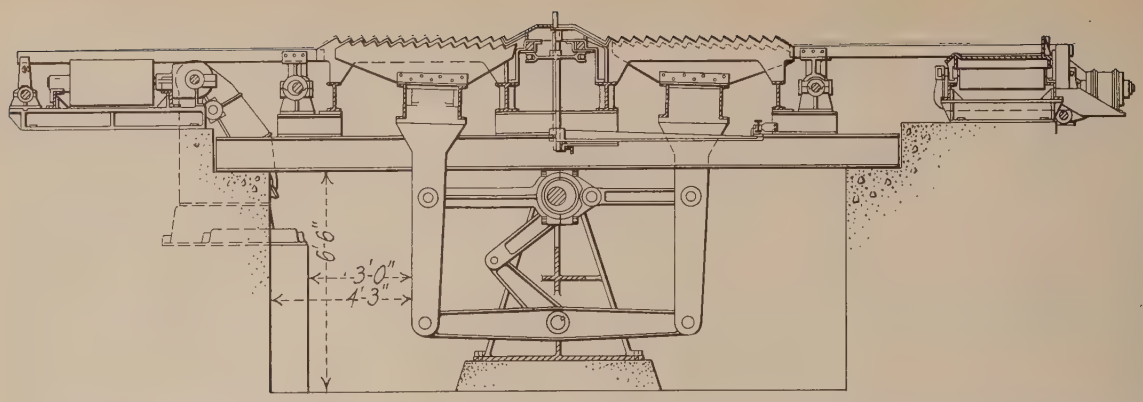
An advantage claimed for this central runout construction is that there is very little off-lead, the paths of the pieces on the two sides of the central guide being only a few inches apart. The use of the skewed rollers to cause a slight pressure of the material against the guide tends to straighten the bar and to eliminate any possible

elliptical motion can be imparted to the moving supports. These are in a normal position when the two sets of moving supports are at the same elevation of about 1 in. below that of the fixed supports.

Motion of the bed usually will be interlocked with a skewing of the rollers, so that the bed will advance the material on one side one notch automatically as soon as a bar is delivered into one of the troughs. When it is desired to advance the material the motor is started, either automatically or manually, and the shaft makes one-half revolution, then is automatically stopped. Each set of moving supports moves through one-half of the elliptical orbit and stops, one set moving below the fixed supports toward the central runout, while the other moves above the fixed supports and away from the runout.

Thus, as one side of the bed returns to a position from which it can pick up the bars, the pieces on the other side of the bed are being carried one notch farther from the runout. The bed can be designed so as to deposit the bars directly into the grooves of the fixed supports, or to one side, from where they will slide into the groove.

The magnetic shear table consists of magnetic rollers placed on 30 to 40-ft. centers, with idlers located as



Central Guide for Runout Shows at Center of Top, the Roller Immediately Beneath It Being of the Skewed Type. Table is arranged at left end with standard line-shaft drive. At right end is shown the alternate design, involving magnetic and idler rollers for the magnetic shear table

required between the live rollers. A cross-section of this table is shown at the right side of the bed in the sectional view, the table on the left being of standard line-shaft construction. The magnetic rollers have fixed magnets positioned within non-magnetic cylindrical shells.

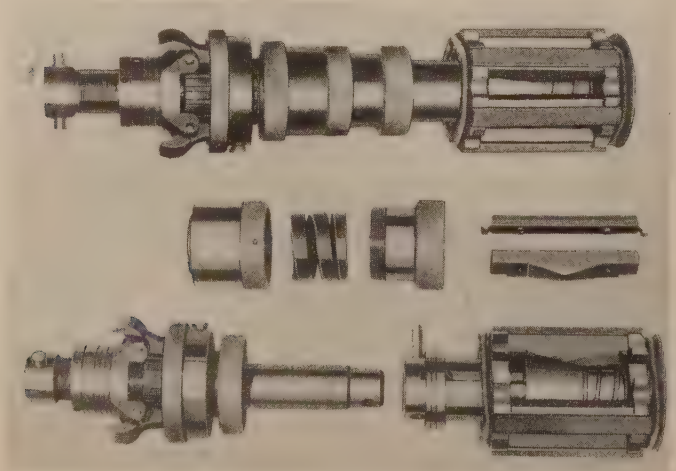
Cylinder Hone Arranged to Expand Automatically

HIGH production and close accuracy are claimed for the cylinder hone here illustrated, which has been put out by the Micromatic Hone Corporation, 5057 Woodward Avenue, Detroit. A feature is the automatic expanding head mechanism, which eliminates the hand expanding operation.

This tool is of single-cone type and has one central supporting point for the stone holders, which permits individual compensation for uneven wear. The cone is of a determined angle (beyond the angle of reversibility) which maintains positive expansion, assuring straight and round holes. The stones are mounted in light metal stampings.

A hardened and ground bushing mounted directly above the cylinder bore operates the expansion mechanism; it controls size and acts as a guide for the hone while entering and leaving the cylinder bore. Expanding fingers, when entering the bushing, expand the abrasive members automatically to a predetermined size. The abrasive members are then rotated and reciprocated in the cylinder bore for a given number of strokes, and when the operation is completed, a throw-out attachment on the machine raises the honing tools out of the cylinder automatically. As the expanding fingers leave the bushing the abrasive members automatically collapse, leaving the tools in position to enter the next bore. The compression spring cushions the pressure of the stones against the cylinder wall, eliminating stone breakage, and is caged to limit the expansion to a predetermined size.

For plants having comparatively small production, which is divided between bores of different sizes, a brake-type tool designated as the model B can be supplied. With this tool interchangeable hone bodies of various sizes are used with one brake head tool, investment being thus kept at a minimum. This hone may be used for either single or multiple operation, and the stones are interchangeable with those of the model A tool. The model B has a positive screw expansion with micrometer set and stop. The simple push-button adjustment can be regulated to an expansion of 0.0005 in., which assures accurate work and permits quick setting.



The Head Expanding Mechanism Eliminates the Hand Operation

Elkonite Tips for Etchograph Marking Pencils

ELKONITE marking points, which are said to eliminate the frequent dressing and replacement necessary with copper points and to permit clearer and deeper marking, are being offered by the William Brewster Co., 50 Church Street, New York, for use with its Etchograph electric marking machines. These points mark a sharp, deep line, and may be used on oily and greasy surfaces. Their life is said to be from 15 to 20 times that of the copper tips, the points being used in some cases for more than a month without resharpening.

The company has also brought out an "Etchograph Junior" machine which is the same as the larger equipment except that it has only two marking heats and is not intended for heavy work. Both machines may be used for marking iron, steel, stellite and tungsten carbide, the larger unit, with six heats, being adapted for marking a wide range of work, from light pieces, such as razor blades and feeler gages, up to heavy pieces, such as gears and shafts. This marking is done without any preparation, except connecting the machine to the lighting circuit. The machines are furnished for connection to a 110 or 220-volt 60-cycle single-phase a.c. circuit, but can be furnished for current of other frequencies. If 110 or 220 volts d.c. current only is available, a d.c. to a.c. rotary converter can be used.

New Horizontal Chucking Machine

Six-Spindle Unit May Be Set Up for Several Operations on One Piece or for Work Requiring Two Chuckings

FOR high-production chucking work up to 7 in. in diameter requiring a number of separate operations, such as turning, chamfering, forming, drilling, boring, reaming and threading, the Baird Machine Co., Bridgeport, Conn., has brought out the six-spindle horizontal chucking machine here pictured.

Simple tooling is a feature, and low maintenance cost is attributed to fully-inclosed flood-lubricated mechanism and Timken roller spindle bearings. In addition to a multiplicity of different operations on one piece, the machine is adapted for work requiring two chuckings, such as roughing and semi-finishing operations on gear blanks and other pieces. In this case the turret is indexed a distance of two spindles for each cycle.

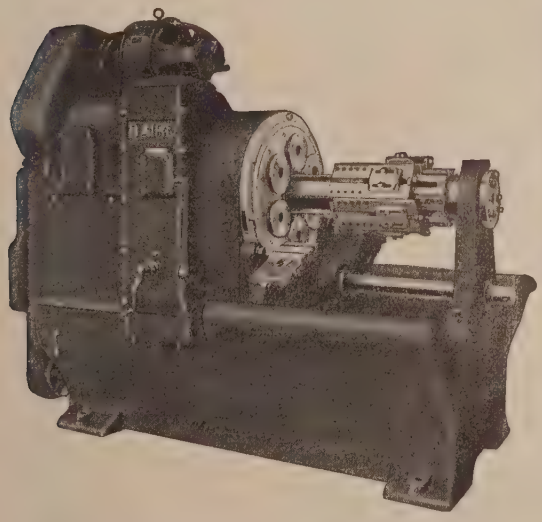
Parts and mechanisms common to all adaptations of the machine are the bed, containing the coolant and lubricating oil sumps and force feed pumps; the head, containing the turret; spindles and their clutches; the turret indexing mechanism and its driving spindle; the camshaft and cam drum, and the driving mechanism. Spindle and driving gears and the longitudinal feed cams are furnished to suit particular speed and feed requirements.

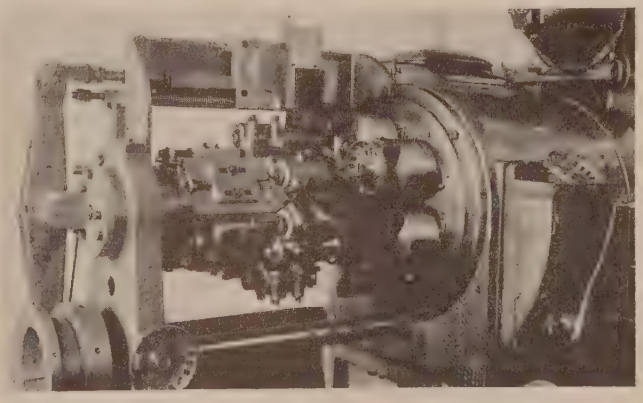
There are five longitudinal tool slides, three transverse or facing, and combination longitudinal and transverse tool slides. A large number of attachments, for drilling, angular or irregular turning, recessing, tapping, threading, drill speeding, etc., can be furnished. The chucks or work-holding fixtures may be either hand or mechanically operated, the latter being by means of a cam, lever and rod arrangement. A "work locator," operated by a foot treadle, has been designed for locating and holding the work until the chuck jaws take hold. Control levers, including cranks for turning the mechanism by hand, are provided at both front and rear of the machine.

With a pulley speed of 800 r.p.m., spindle speeds ranging from 19 to 800 r.p.m. are obtainable through a minimum number of change gears. The spindles may be run at varying speeds in relation to one another, and any spindle can be held stationary for cross drilling, longitudinal drilling of several holes, drilling off-center, or for milling. The driving spindles are in alinement with the work spindles when in the working position but are disengaged when indexing. A feature claimed for the driving mechanism is that it does not set up side strains on the work spindles or turret.

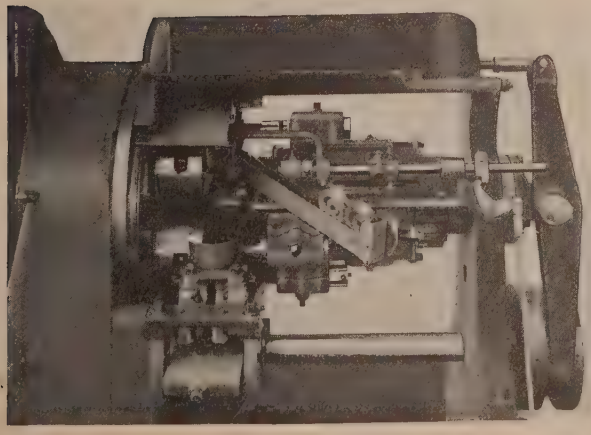
Turret indexing is smooth and is accomplished by means of an improved Geneva motion and 60-deg. movement of the camshaft. Indexing, as well as for tool return, is at high speed, and the rate of indexing remains the same regardless of spindle speeds or tool feeds. The turret is locked by means of a hardened steel bolt.

All tool-slides are adjustable and have a graduated dial for close setting. Two rates of feed are obtainable from the large cam drum at the head end of the machine, and a third rate of feed may be had by use of a reducing motion attachment, which is made up of a slotted lever and rod,

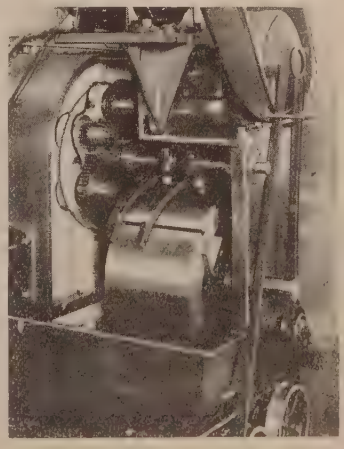




THE Machine Is Designed for High Production of a Wide Variety of Work. Several of the different types of tool-heads and tool-holders that can be used are shown in the close-up view above; the arrangement of the tool feed cam drum is shown at the right, below



SET-UP for Finishing Cast Iron Automobile Generator Pulleys Is Shown at Left. The extra length hub that permits chucking is cut off at the last operation, and a magazine catches the finished pulleys as they drop from the chuck. The front cross-slide is provided with a "generating motion," and a vertical cross-slide with form tool is employed. A work locator is also used



the latter having connection with the cam on the drum and the longitudinal slide in which the tools affected are carried.

Two of the three cross tool-slides are located below and one, a vertical slide, above the spindles. They are intended for turning and facing operations at the first, third and fifth working stations respectively. The lower slides are actuated by cams shaped to suit the particular job, and may be furnished with a "generating motion," by means of which roughing tools are advanced for angular facing of such surfaces as the vee in cast iron pulleys. The vertical cross tool-slide is mounted in a bracket that extends from the head of the machine to the tail support, and is operated by a rack and pinion. The rack receives its motion from a horizontal rod, lever and cam arrangement, the cam being mounted on the main camshaft outside of the tail support of the machine. The combination slides provide tool motion at right angles to the regular motion, and are used for making recess cuts inside of a hole, or facing the inside end of a piece. A combination slide arranged to permit using a reamer at the center of the work has also been devised. Holders and operating mechanisms can be furnished for self-opening dies or collapsible taps, as well as a backing-off mechanism for solid taps and dies.

The chip pan is large and has an overhanging lip under which a barrow or other conveyance may be placed to facilitate removal of chips. A dust hood for connection to an exhaust system can be provided. The initial drive may be by belt or motor, a 7½-hp. motor being recommended. Floor space occupied by the machine is 54 x 92 in. The net weight is approximately 12,000 lb.

Cold Saw Equipped with Oilgear Hydraulic Feed

FLEXIBILITY of feed range, rapid traverse in both directions, and simplification of feed drive are features of the Newton cold saw cutting-off machine with Oilgear hydraulic feed, brought out recently by the Consolidated Machine Tool Corporation of America, Rochester, N. Y. Ten sizes of the machine, with capacity for cutting rounds from 5¼ to 25¾ in. in diameter, and other sections in proportion, are built.

For the feed, a type QSA Oilgear feed and rapid traverse pump, driven by a separate motor through Texrope or silent chain at the rear of the machine, is employed. Oil under pressure is carried through piping to a cylinder bolted to the rear end of the base. The piston-rod of this unit is anchored in the spindle saddle in line with the saw blade, bringing the feed pressure in line with the cut. Any variation in feed from 0 to 23 in. per min. is readily obtainable, as well as quick traverse in both directions at the rate of 90 in. per min. The feed and rapid traverse lever is located conveniently at the front of the work table. Adjustable stops are provided for controlling the length of feed travel and the automatic quick return, making the machine semi-automatic in operation. With one movement of the single lever, the machine completes the cutting cycle, the saw carriage stopping at its original position.

In addition to flexible feed range, the hydraulic carriage drive provides even and smooth cutting; the oil, acting somewhat as a cushion, equalizes the feed pressure for cutting through hard spots. The condition of the saw blade may be checked, a dullness of the blade being shown by the building up of working pressure on the gage. The hydraulic feed also makes possible the elimination of feed shafts, gears, reversing clutches, feed worms and wheels, and their lubrication problems.

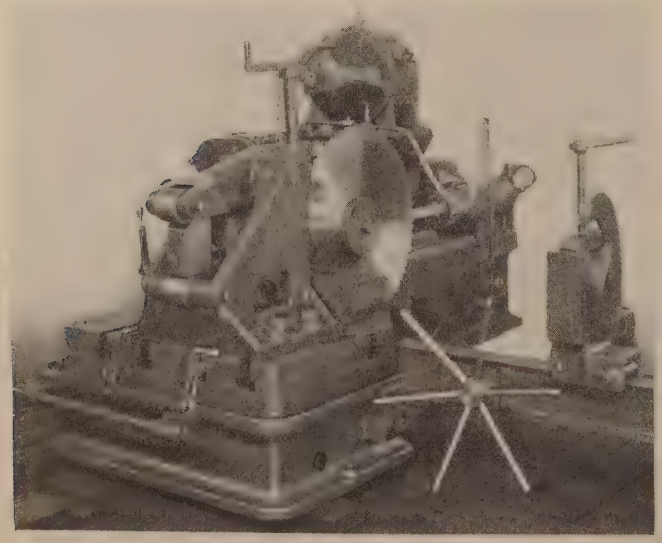
Another feature of the machine is that the saw blade cuts up, so that the thrust of the saw carriage is directly down on the base. This, together with the hydraulic feed, is stressed as markedly increasing the productive possibilities of the machine.

Direct-Connected Motor Drive

The spindle drive is by means of a direct-connected constant-speed or a variable-speed motor, which is mounted on top of a bracket directly on the spindle saddle, and pick-off gears. From this point the drive is through a hardened steel worm which meshes with a large phosphor bronze worm wheel on the pinion shaft, which has herringbone teeth cut from the solid. This pinion meshes with a large herringbone gear which is also integral with the spindle.

Except for the spindle, anti-friction bearings are used throughout the drive. All bearings on the machine are lubricated from a centralized oiling system, a Farval type lubricator supplying oil under pressure to each bearing. Extra equipment includes special holding chucks, air clamps or hydraulic clamps. The hydraulically operated clamp is piped to the Oilgear pump, making the machine entirely self-contained. Stock feed trolleys can be furnished so that bars 20 ft. or longer can be fed into the cutting position. These stock trolleys are hand adjustable by means of a pilot wheel either on the trolley saddle or located at the operator's position.

In demonstrating the machine at the recent Machine Tool Show, 9½-in. diameter S. A. E. 1040 steel bars were cut in 3½ min. Specifications for the largest and smallest machines respectively are: Diameter of saw blade, 20 in. and 90 in.; length of feed, 7⅞ in. and 48 in.; size of work table, 14 x 22¼ in. and 60 x 88 in.; and driving motor, 5 hp. and 50 hp.



HYDRAULIC Clamps Operated by the Oilgear Pump May Be Used. S.A.E. 1040 9½-in. steel bars are cut in 3½ min.

Open-Hearth Men Meet in Chicago

Practical Steel-Making Problems Taken Up In Two Days of Technical Sessions—Visit Laclede Steel Co.

PROGRAM for the autumn meeting of the open-hearth committee of the American Institute of Mining and Metallurgical Engineers, at the Hotel Stevens, Chicago, Nov. 5 and 6, follows. As has been the case for some years at these semi-annual meetings, no set papers were prepared. Instead, definite topics for open discussion were arranged for, covering four half-day sessions, and members were asked, in advance, to be prepared to talk on specified items.

For Tuesday morning, open-hearth mechanical equipment was the general topic. Pugh ladles vs. metal mixers, automatic couplers on stock buggies, automatic tongs for handling molds and ingots, best size of mold for large slab ingots to avoid excessive segregation in rimming steel, and furnace control equipment were the specific subjects.

Reports of standing committees had the floor at the beginning of the afternoon session; committees on combustion, furnace design, refractories, organization, quality control—rimming steel and killed steel separately—steel melting, pouring practice, combustion control and auxiliary equipment being on the schedule.

Fuels constituted the major topic of the Tuesday afternoon session, the discussion going into relative B.t.u. consumption of various fuels for each ton of ingots, methods of metering fuels, limiting factors in use of low-grade fuels and several items relating to control of melting and refining conditions.

Furnace design was considered on Wednesday morning. Specific topics included insulation of furnace bottoms and checker chambers, dampers, soaking pits, Venturi ports and inclined port roofs. Design of a standard furnace to burn a specified fuel most economically was the closing item for this session.

Operations and quality control were two general subjects scheduled for the last session. Drying ladles and stopper rods, checker removal on rebuilding furnaces, handling basic slag (in the pit), ladle trunnions and cables, nozzles and corrugated vs. plain-wall molds were listed under the first head. Quality control included report on last six-months progress, by Dr. C. H. Herty, Jr., United States Bureau of Mines. Other topics were use of silicon-spiegeleisen, of aluminum and of ferro-manganese, handling of slags in the furnace, soaking-pit heating and blooming mill work, rolling of high-sulphur steel and of sheet bar steel, and heavy, loose scale on ingots as drawn for rolling.

On Wednesday evening a joint session was scheduled at the Chicago Engineers Club with the Chicago branch of the American Institute of Mining and Metallurgical Engineers.

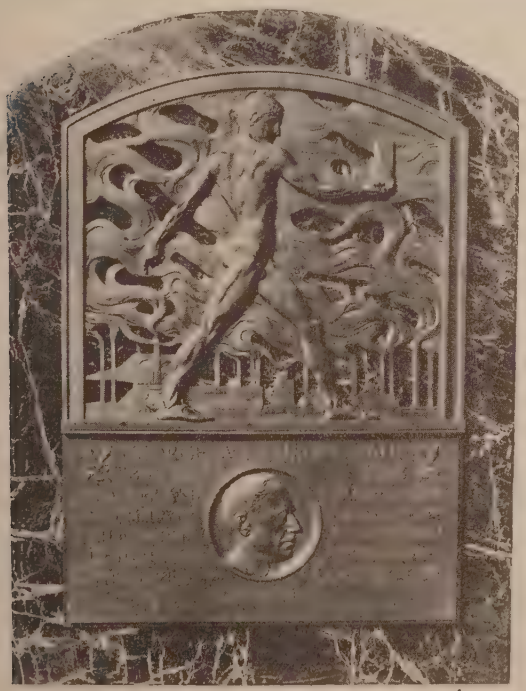
Thursday the members of the committee are to be guests of the Laclede Steel Co. at its works in Alton, Ill. Here the chief point of immediate interest is a new 100-ton open-hearth furnace built and operated on the Stevens principle. This unit is said to be averaging below 30 gal. of fuel oil to the ton of ingots, melting a cold-metal charge.

Newport News to Build Two Dollar Line Ships

WASHINGTON, Nov. 4.—Two 20-knot combination passenger cargo vessels of about 33,000 tons displacement each will be built for the Dollar Steamship Line by the Newport News Shipbuilding & Dry Dock Co., Newport News, Va. Contracts covering construction loans of $5,287,500 for each of these large vessels have been signed by Chairman T. V. O'Connor of the Shipping Board, Vice-President H. M. Lorber of the Dollar company and President Homer L. Ferguson of the shipbuilding company. The vessels are to be engaged in the round-the-world service and will be the largest and most modern in that service. The first is to be ready for service by Oct. 1, 1931, and the second is to be completed by Feb. 1, 1932.

Contracts covering the loans recently awarded the Motor Tank Corporation of Philadelphia, to be used in aid of constructing five 11-knot Diesel tankers of about 18,900 tons displacement each, also have been signed. The loans aggregate $6,304,687. The vessels will be built by the Sun Shipbuilding & Drydock Co., Chester, Pa.

Triumph Electric Corporation, Cincinnati, manufacturer of electric motors, has appointed Garrett Burgess, Inc., 5050 Joy Road, Detroit, as sales representatives in the Detroit district.



A BRONZE plaque in honor of the late George W. Niedringhaus, pioneer steel manufacturer in the St. Louis industrial district, was unveiled on October 25 in the rotunda of the new city hall in Granite City, Ill., which he founded. The plaque, 4 x 5 ft. in size, is mounted on marble. It shows at the top a figure of a young worker against a background of factories and smoke, and below is a relief profile of Mr. Niedringhaus, and the words: "George W. Niedringhaus, 1864-1928. Pioneer and great leader. An employer of many whose personality won the hearts of his fellow men. Whose vision and energy built a city."

The plaque was designed by Victor S. Holm, of the Washington University School of Fine Arts, St. Louis, and is the gift of a group of Granite City citizens. A similar tablet was installed in the Granite City National Bank last July and others are to be placed in the Young Men's Christian Association and St. Elizabeth's Hospital.

The address presenting the plaque to the city was made by L. Warrington Baldwin, president of the Missouri Pacific Railway. Mayor M. E. Kirkpatrick, whose first job was in the steel mills, accepted it. Philip Stremmel, superintendent of the Granite City Steel Co. and for 40 years an employee of Mr. Niedringhaus, acted as chairman. The tablet was unveiled by Mrs. Nathaniel B. Randolph, youngest sister of Mr. Niedringhaus.

High-Production Hobbing Machine

Simplified Gearing and Drives, Anti-Friction Bearings and Hob Spindle Drive Outside of Bed Are Features

FOR roughing and finishing spur gears, spline shafts and similar forms on a manufacturing basis the Barber-Colman Co., Rockford, Ill., has brought out a new hobbing machine, designated as the type B.

Features include simplified gearing and drives, extensive use of ball and roller bearings, including Timken roller bearings on the hob and work spindles; worm-gear final drive to the hob; a hob spindle drive outside of the bed, permitting the hob to be swiveled on a center under the work; and a work-spindle housing mounted fast to the base, the work diameter being controlled by an elevating bed. Also, a unit pressure oiling system; automatic continuous lubrication of the feed box; hob slide power rapid traverse; centralized interlocking controls; use of hardened spiral bevel gears throughout; screw and micrometer dial for positioning the hob, and direct-connected motor drive.

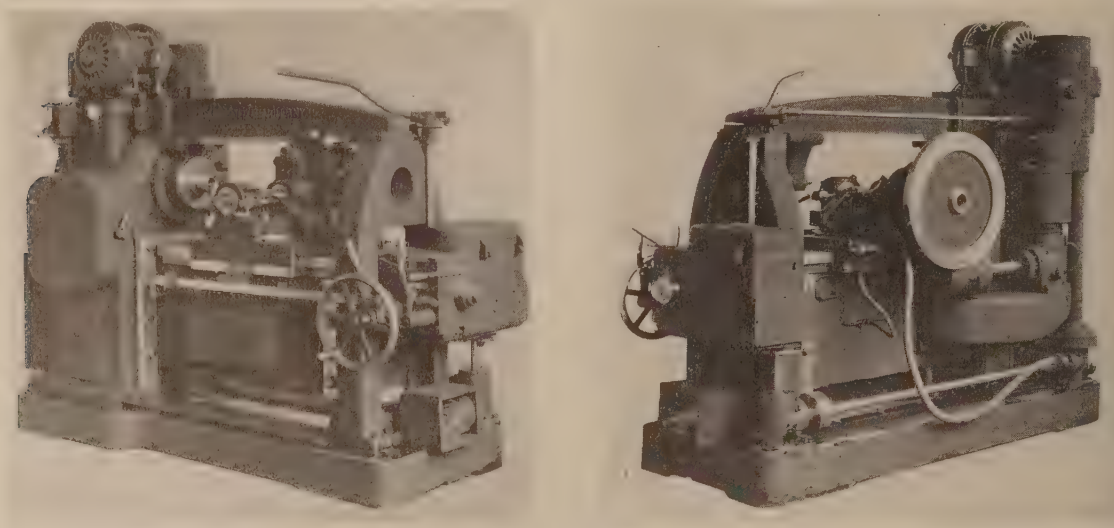
A departure from usual practice has been made in the framework and adjustment of the machine. At one end of the base casting, which serves also as an oil reservoir, is mounted the main upright which carries the driving and indexing elements, as well as the main work-spindle, as a complete unit. This upright is tied to the outer upright by a cast-iron overarm or bridge, as shown. The inner faces of both uprights are machined and form a parallel open-sided box in which the hob-carriage main bed is raised and lowered. This construction is intended to permit accurate adjustments for diameter of work and to provide unusual rigidity for production operations.

The front end of the standard work-spindle has a No. 12 B & S taper, but the hole through the spindle and the spindle face can be made to permit holding and driving a wide variety of work. The outer support for the work may be a center or a bushing sleeve, which is carried in an outer tail-center bracket that is adjustable along the overarm of the machine. Indexing of the work spindle is accomplished by a hardened steel worm and large diameter bronze-rimmed worm-gear.

The hob slide is accurately adjusted by means of a screw to position the hob endwise, and is then clamped in place. The drive to the hob-spindle is through worm gearing. It is desirable that the swivel for setting the proper angle of hob to work be approximately under the center of the hob, and this is accomplished by separating the worm-gear case and the bevel-gear case and joining them with a heavy swivel fit. With this arrangement, it is claimed that, regardless of the hob setting, the worm-gear case maintains its alinement with the hob spindle and the bevel-gear case with the man drive-shaft, the entire unit then being clamped to form a heavy hob swivel slide driven by a shaft outside of the bed ways.

Two elevating screws support the bed on which the hob carriage travels, and graduations are provided to permit adjusting the height of bed to 0.0005 in. The feed box is driven by an independent shaft that runs continuously. This shaft provides power through the feed change gears for any selected feed, or through the reversing gears for quick traverse of the hob slide in either direction, the feed and quick traverse movements being selective by a lever on the feed box. In addition to motor controls, an automatic stop on the machine operates a friction driving clutch located between the motor gears and the drive change-gears. All bevel gears are of spiral type.

Specifications include: Maximum and minimum center distance between work-spindle and hob, 8 in. and 2 in.; maximum travel of hob carriage, 16 in.; maximum diameter of hob, 4½ in.; feed, 0.081 to 10.72 in. per min.; range of the eight hob speeds, 55.1 to 159.4 r.p.m.; motor, 7½-hp., 1750 r.p.m.; and floor space occupied, 42 x 92½ in.



Work-Spindle Housing Is Mounted Fast to the Base, the Work Diameter Being Controlled by the Elevating Bed. The hob spindle drive is outside of the bed, but the hob may be swiveled on a center under the work

Data on "Battledeck Floors"

A technical bulletin describing the "battledeck floor" construction has just been issued by the American Institute of Steel Construction. This is a floor made of steel plates welded to I-beams. A few experimental floors of this type have been installed during the past year, and special automatic welders designed to handle the work. A demonstration of the proper method of construction will be staged at the convention of the institute at Biloxi, Miss., on Nov. 14. Complete engineering data on the floor is contained in the bulletin just issued.

Society Forms Division of Sales Engineers

A sales engineers' division of the Cleveland Engineering Society, Cleveland, has been organized with the following officers: Chairman, C. E. Hague, Dayton-Dowd Co.; vice-chairman, J. L. Finnicum, Allen-Bradley Co.; recorder, F. W. Kessler, Lincoln Electric Co.; member executive committee, G. L. Blomquist, Strom Ball Bearings Co. E. J. Lund was appointed to serve with the officers on the executive committee of the division.

This Issue in Brief

Stock market collapse will be followed by a period of hesitation and watchful waiting, machine tool industry expects. But the liquid and prosperous condition of industry is expected to act as a bulwark for a continuing satisfactory volume of business.—Page 1286.

* * *

Don't overburden the foreman with paper work or with anything else that takes much of his time away from his primary duty of supervising if you want low manufacturing costs. Allowing him time for efficient supervision will inevitably result in reduced scrap losses and greater shop economy in general.—Page 1234.

* * *

How many of the 13 major sources of waste are not receiving attention in your plant? A specialist in waste prevention lists these sources on Page 1239.

* * *

Merger movement is due in considerable measure to the development of electric power transmission, says National Industrial Conference Board. Individual motor drives have made possible the construction of infinitely larger factories. Another major factor is the increase in transportation facilities for industrial products.—Page 1241.

* * *

"Mental bondage to established custom" has so far prevented machine designers from taking full advantage of the technical freedom granted by electric power. The habit of restricting the application of power to one point of the machine is a heritage of older days.—Page 1230.

* * *

Even the small shop needs a superintendent. He can earn his salary many times over by relieving the owner of those duties which take his time away from company management problems. —Page 1234.

Strength of forgings repaired by thermit welding process is not limited to the strength of steel castings. Tests "to destruction" reveal that the fracture occurs as often completely outside the welded area as in the weld or adjacent to it.—Page 1232.

* * *

Better steel results from observation of physical characteristics of the slag specimens. Lustrous black slags are associated with low FeO content in basic open-hearth steels. Spider-webbed slag surface indicates high P_2O_5 content.—Page 1237.

* * *

For pickling, is hydrochloric superior to sulphuric acid? HCl etches more rapidly and more cleanly, but special containers are needed, and the vapors arising from the bath are harmful. —Page 1238.

* * *

Habit of saving replaced equipment for emergency use usually results in loss. Better get rid of the old equipment as quickly as you can. Experience shows that it is rarely put back into service in the plant in which it formerly served. It depreciates so much more in idleness that eventually no one wants it.—Page 1239.

* * *

Few machine designers are making use of the great flexibility of the electric motor. Power, ranging from 0.001 hp. to 10,000 hp. or higher, is available through a wide choice of speeds, without the intervention of mechanical means.—Page 1230.

* * *

You can predict very closely the phosphorous content of molten open-hearth steel by observing the color of a sample of solidified slag (crushed). Many a heat of steel has been tapped out by slag color in contradiction to preliminary results from the floor laboratory.—Page 1238.

Your supply stocks cost you 25 per cent of their value each year for maintenance. At least that is the average figure revealed by a survey. The major portions of this 25 per cent are interest 6 per cent, depreciation 5 per cent and obsolescence 10 per cent.—Page 1240.

* * *

Emergency spare equipment is often a costly luxury. Caution in procuring spares is suggested, now that welding makes quick repairs possible, and with the trend toward heavier and improved equipment.—Page 1240.

* * *

Phenomenal gains in scrap exports are due partly to trade restrictions on scrap exports in some foreign countries. Another factor is the increase in proportion of scrap charged. Outside of Canada, Italy and Poland are our largest customers. — Page 1245.

* * *

Failures in thermit welds are due more to inadequate preheating than to any other cause. The joint should be uniformly and deeply heated to a high temperature with a reducing flame.—Page 1233.

* * *

Pig iron output sets new October record. Daily average production was 115,745 gross tons, which was ¾ of 1 per cent under September. On Nov. 1 there were 203 furnaces in blast, a net loss of two for the month.—Page 1258.

* * *

Correction of the speculative orgy will have some adverse effect on business. The degree will depend largely upon industrial behavior yet to come. If producers refuse to recognize that anything has happened and continue to produce carelessly they may quickly begin to build up inventories.—Page 1254.

A. I. FINDLEY
Editor

THE IRON AGE

W. W. MACON
Managing Editor

ESTABLISHED 1855

Hopeful Disillusionment

IN commenting last week upon the successive crashes in the stock market, THE IRON AGE suggested that the wholesale and at times frantic dumping of securities was out of keeping with the very moderate slackening in business that had come in September and October. The highest authorities, including the experienced and erudite President of the United States, agree that business conditions are now good. Are they going to continue good? Nobody is now looking at the stock market as a barometer. We are thinking of it as a prime mover and of its débris possibly becoming grit in our machinery. Let us therefore review what fundamentally has happened.

We started with certain physical assets, represented largely by certificates of corporate stock. We have added to those assets and represented the addition by more stock. On the whole those additions have been well conceived. We do not think of any major miscalculation, implying loss or lock-up of capital and long delayed realization of earnings. So far so good. We then proceeded to write up the value of all this property through its paper and now we have written it down again. These processes have been attended by great changes in personal ownership, and by much change of status from that of mortgagees to partners, but fundamentally there has been neither gain nor loss. Elementally it would have been merely a bookkeeping record of rise and fall. There are many conservative individuals whose affairs find themselves in precisely that position.

There have been, however, disturbing interventions. In the first place the Federal and State governments have abstracted a large slice in their taxes computed on an inflated basis. Some persons holding stock A at $100 and selling it at $200 and buying stock B at $200 now find themselves with stock B at $100 and are out 12.5 per cent of $100 that they handed over to the Federal tax gatherer. The executors of persons who have died during the last three years have paid inheritance taxes on inflated valuations. Besides giving the tax-gatherer his cut, some persons who have realized profits on the rise have bought automobiles, jewelry, furs and other unproductive goods, not to speak of purchases from bootleggers and expenditures in night clubs that represent immediate consumption, even profligacy. Such events may follow not merely from realization, but also from the borrowing of credit against securities at inflated value. Margin calls by brokers are not the only thing that may force selling in a declining market. There are men who can read this recital and reflect that all of these things have happened in their own experience during the last two years.

It is evident, therefore, that all of the national savings that are made during a bull speculative period do not go into new capital goods and that there is an increased diversion of them via the tax-gatherer, the purveyor of amusements, etc., into consumption goods; all of which makes for activity in business, but in ways that are bound to wither when winter comes. Therefore it is idle to argue that the correction of the speculative orgy will not have some adverse effect upon business. The only question is how bad will be its effect.

The last is something that no one can foretell, for it will depend largely upon industrial behavior yet to come. In any event we should not naturally look for anything more than one of the minor depressions that result from the accumulation of unsold stocks of goods. But if producers refuse to recognize that anything has happened and continue to output carelessly they may quickly begin to build up inventories. If on the other hand they be cautious and aim to adjust themselves in advance to a curtailed consumptive demand they will save themselves much worry later on.

A no inconsiderable factor in our present situation is the psychological; in many respects, one of which is the attitude of labor. The mass of industrial workers had imbibed the notion that we were in an era in which money had become easy to get; and even if they did not try to play the stock market they had thought the time opportune to insist on advances in wages. If the idea can be made to seep into the halls of the labor unions that everybody else has awakened from a great illusion, and if it can be made easier to build houses and other things, there will be an improved demand for materials that will be a substantial amelioration.

Manufacturers who have been under such pressure to produce that they have postponed plant changes or given less than due thought to new economies should now be in position to use some of their working force in other than regular production lines. In such ways unemployment will be minimized and the interval before the resumption of full prosperity materially shortened.

Steel Prices Did Not Advance

DURING this 1929 period of exceptionally heavy demand for steel, taxing for a time the mill capacity and throwing deliveries behindhand, steel prices did not advance. It is well to state this fact definitely for men are prone to assume that steel did what might be expected of it. At this time it is of no great moment to consider why prices did not advance. The mills were indisposed to press their advantage as they wanted stability above all things.

What prices did in the last two years—and we are of course simply considering the market as a whole, represented by THE IRON AGE'S finished steel composite—was to cease declining as they had been doing for years preceding. Our composite stood last week at 2.362 cents per pound of products representing seven-eighths of the total steel output. The low for many years came on Oct. 25, 1927, at 2.293 cents. There is an advance from that point of $1.38 per net ton, but a low is not an average. There had been a long period of declining prices, as shown by the following annual averages of our composite, in cents per pound:

1923	2.738
1924	2.609
1925	2.465
1926	2.439
1927	2.357
Average	2.522

With some slight declines in the past few months last week's level was just at the average of 1927, the low year in many years. The mills have not been able to make much reduction in costs in the last two years, relative to reductions in previous years. Their recent large earnings have been due to high operating rates, distributing overhead in an industry so highly mechanized that with full operation the last 10 or 20 per cent of output adds but little to total cost. With a lighter operation unit costs increase and mills should not be expected to make the matter worse by cutting prices.

Steel Corporation-Columbia Deal

TWENTY-TWO years, almost to a day, after its purchase of the Tennessee Coal, Iron & Railroad Co., in the midst of the panic of 1907, the United States Steel Corporation announces that it has bought the assets of the Columbia Steel Corporation, the leading producer of steel on the Pacific Coast. Back in 1907 it was estimated that the Steel Corporation owned close to 60 per cent of the steel-making capacity of the country and that the Tennessee company purchase increased this by about 4 per cent. By the official statistics for 1928 the Steel Corporation produced 39.1 per cent of the country's output of steel ingots and castings last year, showing a marked downward change in its relation to the independent companies in the 22 years. Also by contrast with the transaction of 1907, the acquisition of the Columbia Steel Corporation properties adds scarcely 1½ per cent to the steel-making capacity of the leading interest, putting the latter at about 24,000,000 gross tons of ingots at the close of 1928.

In its comment on the Tennessee company purchase of 22 years ago THE IRON AGE observed that in spite of all that was said about the 700,000,000 tons of ore in the ground and the 2,000,000,000 tons of coal, any success the Steel Corporation might have in its future operations in Alabama would be largely due to what it carried southward in its own hands—to the money, the experience, the talent and the organization which it brought to the attack of the problem of steel making in the South. Much the same is now to be said of the corporation's future as a producer of steel on the Pacific Coast.

There will be different opinions in the steel trade on the question whether buyer or seller gained the more by the transaction just concluded. It is fair to say that neither the Steel Corporation nor any leading independent producer of steel has been looking with covetous eyes on any Pacific Coast steel property. It would appear that the bankers and other leading investors in the securities of the Columbia company were sooner and better convinced of the desirability of selling to the Steel Corporation than was the latter of the desirability of buying. They had found, as had those who owned the Tennessee company properties in the 20 years before the Steel Corporation regime, that steel manufacture is fairly insatiate in its demands upon capital. Creditable as the expansion of the industry on the Pacific Coast has been, and excellent as the condition of the leading plants, only a beginning has been made, and to cope with what is ahead may well call for greater resources than have yet been brought to bear on the problem.

No doubt the Steel Corporation judged that it stood to benefit by identifying itself with the future development of the Pacific Coast. That factor has probably counted for more in the recent negotiation than did the hope of Southern buying of Alabama steel in the deal of 1907. The completion of the Boulder Dam, the coming prosperity of the Imperial Valley, and the millions to be added to the Pacific Coast's population in the next decade are an alluring prospect.

Steel works operation under the even climatic conditions of the western coast also has some advantages, in escaping the costly mid-winter handicaps at most of the country's steel-making centers and the mid-summer limitations of the same districts. In respect to labor conditions, Pacific Coast steel makers have for some years been free from such union restrictions and militant methods as from time to time have plagued other industries there.

With the large and growing consumption of tin plate in the coast States it is to be expected that that product will have special consideration in the future extensions to which reference is made in the Steel Corporation's announcement of the Columbia purchase. Counting in Canada, not far from 400,000 tons of tin plate a year is now represented in the annual pack of food products on the Pacific Coast.

Employment in Consuming Steel

THERE is a complete reversal of conditions of 20 or 30 years ago in the relative amounts of labor involved in making and consuming steel. In the old days we heard much about possible labor shortage in the steel industry when demand was heavy, and much about unemployment when demand was light. In a time of rising steel demand it required some courage to suggest that perhaps if there were a labor shortage it would restrict the consumption of steel as much as the production. Comments made on the state of general business paid much attention to employment in the making of steel as if steel once made and shipped from the mill passed immediately into ultimate consumption without any further work being involved.

Now we have a complete reversal. The iron and steel industry has become highly mechanized and employs much less labor per ton of output. Even in the exceptional case, the rolling of sheets and black plates for tinning, still done by hand, outputs per man are

very considerably increased. Blast furnaces employ relatively little labor and there are large rolling mills with widely varying output from time to time but practically the same labor employment.

It might be countered that the consumers of steel have also introduced mechanization. True, for the same operations, but the operations are different. Probably freight cars are built with considerably fewer men per car than 20 years and more ago but we are not building as many freight cars although making much more steel. Even in the old days there was not much labor per ton in making freight cars. It requires little labor to lay rails but we are making scarcely as many rails as 20 years and more ago. In fabricating and erecting steel there may be less labor per ton than formerly but there never was much and the character of buildings erected nowadays requires much more labor for the other work.

The doubling in steel tonnage in 20 years has been largely along the line of steel being employed in smaller forms, where much more labor per ton is required to work up the mill product into the final thing for actual consumption. Witness the fact that sheet production has quadrupled in 20 years while the strip has risen from nothing to an item of more than two million gross tons. In the same time seamless tubing has risen from less than a hundred thousand to more than a million tons.

It is true that these light steel mill products which have grown so greatly go largely into apparently automatic machinery; but then there is the machinery itself, the building of which must be taken into account. We build a great deal more machinery than formerly and employ much labor in doing so, relative to the amount of steel consumed in making the machinery.

For the automobile industry figures are presented in the annual handbook of the trade, setting forth 1928 employment in automobile plants at 402,138 and in parts and accessory factories (not including tire factories) at 200,000, making, say, 600,000 workers, while according to the finding of THE IRON AGE 18 per cent of the steel made in 1928 went to the industry.

Putting Waste to Use

MORE and more of a factor in recent years in cutting manufacturing costs in the United States has been the use of what previously was waste material. It is not alone that a thing once called waste is now made useful, but the old-time expense of getting rid of it is entirely obviated. Long familiar in the iron industry is the turning of blast furnace slag into cement. Then we have had the conversion of crushed sugar-cane stalks (bagasse) into insulating material for buildings, as is done in the South; the making of refractories from broken firebrick, etc. Toy manufacturers use sheet steel scrap from automobile body plants. Among prepared shingle roofings a new product is surfaced by crushing the waste taken from coal mine dumps.

One of the most recent examples of salvage has been the putting of fine abrasive dust into useful employment in the building industry. This dust is mixed with marble flakes, concrete, terrazzo composition and other materials, is molded into tiles or such other shapes as may be required and, after being properly fired, is ground to final condition. The hard, abrasive particles resist both slipping and wear.

At first it was thought that preventing a floor or stair from becoming slippery, thus promoting safety, was the important factor in the new product. As is often the case, however, in practice it was found that the most useful quality was something else. This is its resistance to wear and its consequently greater durability, compared with some other materials.

Cost reduction through multiplying machine power behind the worker may often have more incentive and be more spectacular than preventing waste or turning it into a by-product. But the latter has the merit of being frequently attained by relatively small outlay and of enlisting more minds in its pursuit than do intricate problems of mass production.

CORRESPONDENCE

Cost Factors in Diesel Engine Plant

To the Editor: In your issue of Oct. 10, there was an article on a Diesel equipped plant by Edgar J. Kates, consulting engineer, New York.

It seems to me there were one or two important factors omitted from this article—the interest on the investment and the depreciation. These two facts we would like to learn about, and hope you may procure this information.

J. B. CLAY,
President, Clay Equipment Co.

Cedar Rapids, Iowa.

To the Editor: The cost of the 160-kw. Diesel power plant installed under my supervision at the plant of the Vulcan Rail & Construction Co., completely installed, was $24,000. Instead of including estimates of interest on investment and depreciation, a simpler and quite common method of presenting the facts was adopted in my article.

The actual outlays for operating the private power plant for 17 months were $1,513.77, while purchased current would have cost $8,065.29 for the same amount of power. This is an average saving in cash outlay of $385 per month, which if applied to paying off the initial investment will amortize it in less than six years. After the investment has been paid off, the $385 per month will be net profit, at the rate of over 19 per cent on the original capital.

If the other system of accounting is preferred, i. e., to assume fixed charges and include them in the current costs, these charges may be figured as follows:

Interest on initial investment ...	6.00 per cent
Depreciation, based on 20 year life and depreciation fund earning 6 per cent interest	2.72
Taxes and insurance, say,.....	1.28
Total fixed charges .....10.00 per cent	

These fixed charges amount to $200.00 per month. For the 7 months ended July 31, 1929, the generating cost averaged $153.41 per month, thus making an overall cost of Diesel power of $353.41 per month as compared with $489.67 for purchased current. When the load on the plant increases the saving will become still larger, as the cost of the additional power will be merely that of the extra fuel oil, which is only 0.63 c. a kwhr.

EDGAR J. KATES.

570 Seventh Avenue, New York

A Confident View of the Future in Steel

A Pennsylvania steel company sent the following telegram to its sales offices and sales representatives last week, following the stock market crash of Oct. 29. Its tenor is representative of the confident spirit in which the steel industry faces the business developments of the weeks just ahead:

"The trip home from a fool's paradise has been a hurried one and return tickets will only be given those failing to concentrate on their jobs. Work hard and rely on the great natural resources and the growth of the country and the common sense of the American people. We may be facing some temporary let-down in business, and the only way to minimize this effect is to redouble your efforts to secure sufficient tonnage to keep us running to a profitable capacity. You have back of you a company with low costs, no funded debt and an organization whose entire energies are devoted to the production and distribution of high grade products. You will find this an asset in securing orders, as the reduction of inventories and quick deliveries for emergency jobs will intensify the need for quick service, and we are here to serve. Do not waste your energy and typewriter ribbon writing us hard luck stories of work suspended and stock market losses. We can match these with experiences of conservative investors refusing to be stampeded and a list of impending projects for new building and expansion that will far outweigh the temporary effect of the financial debauch."

Micromatic Hone Company Organized

The Micromatic Hone Corporation, recently organized to take over the Jeschke Tool Corporation, will maintain offices at 5057 Woodward Avenue and plant at 14220 Mack Avenue, Detroit. The reorganization was brought about through the H. W. Holmes Corporation, Detroit, industrial engineers, which owns and operates the Detroit Machine Tool Co. and other companies.

Officers of the Micromatic corporation are: K. W. Connor, president and general manager; H. W. Holmes, vice-president in charge of engineering; R. M. McGuire, sales manager; F. M. Kern, factory manager; R. E. Allport, director of purchases, and G. E. Eyestone, treasurer. These officers, together with H. A. G. Jeschke, comprise the board of directors. Development and field engineering work will be headed by Frank Jeschke and G. M. Calvert.

The Week in Business

Drift of Current Financial and Economic Opinion

"A BIG blister has burst on the skin of America. It looks uglier than an internal ulcer but is not nearly so dangerous," says the Manchester (England) *Guardian* in commenting on the recent collapse of the New York Stock Market.

This view emphasizes the superficial character of the crash, in contrast with previous major Wall Street crises, when readjustment was more sweeping, affecting industry and trade with the same force with which it shook the securities market. Moreover, deflation of the speculative boom, in the opinion of leading analysts, was necessary to relieve business of the burden of tight money. "Most experienced people," writes Alexander D. Noyes, New York *Times*, "believe that continuance of prosperity was in the long run best guaranteed by the bursting of the Wall Street bubble."

"One thing is assured—namely that no scarcity of funds for the industrial and commercial world will now ensue," asserts Bache *Review*. Brokers' loans shrunk $1,096,000,000 last week, while the New York Federal Reserve Bank cut its rediscount rate from 6 per cent to 5 per cent and rate reductions were announced by the Bank of England and other central banks in Europe.

Immediate Effect on Business

But the first effect of the market break on business is likely to be adverse, in the opinion of the Alexander Hamilton Institute. "A sound banking situation and the prospect of easier money will not, of itself, bring about a revival of business, but its normal effect is to contribute to a more speedy recuperation than would otherwise be likely."

The Institute agrees with other commentators that commodity prices are not inflated, but believes that inventories, although presenting no such problem as in 1921, are larger in some lines than is generally realized. Even without this possible factor the psychological effect of the securities crash on business will probably be increased hesitancy and caution, leading to closer than normal buying.

The extent that the buying power of the public has been reduced by stock market losses is an unanswered question. Dr. Julius Klein, Assistant Secretary of Commerce, estimates that speculative accounts numbered about a million and that these would involve less than 4 per cent of all the families of the nation.

Reduction in Buying Power Exaggerated

It is pointed out also that in many cases only paper losses were sustained. A further consideration is that the securities values wiped out did not represent anything like the same reduction in the demand for goods. When speculative profits were taken, during the late boom, they were frequently shifted to some other form of investment, according to the Hamilton Institute.

The sharp recovery of the stock market on Oct. 30 and Oct. 31 also indicates that the impairment of consumer purchasing power should not be overestimated. The wild rush to sell on Oct. 28 and Oct. 29 deflated securities 20 to 30 billion dollars, but 80 to 90 per cent of the losses were made up in the succeeding two days, the New York *Herald Tribune* points out.

Federal Reserve Turned Tide

The turn in the market is generally ascribed to purchases by a banking pool and to reassuring public statements by John D. Rockefeller and others; but Norman Merriman, economist, Ungerleider Financial Corporation, declares that the main factor in stemming the decline was the release by the Federal Reserve banks of the largest amount of credit ever to set free in one week in the history of the Reserve system ($312,000,000). This was reflected in a reduction in margins required on brokerage loans to 25 per cent, from a previous minimum of 40 to 60 per cent. Speculators who were about to throw their stocks overboard found their margins adequate. Prospective buyers were chase securities.

"All told," Mr. Merriman asserts, "it was merely the freeing of credit on a large scale which prevented the disastrous break from becoming the most severe panic in financial history."

A Record October in Iron Output

Daily Rate Less Than September by ¾ Per Cent or 840 Tons—Ten Months' Total 6 Per Cent Over Next Largest—Net Loss of Two Furnaces

WITH actual production reported from all operating furnaces, the October coke pig iron output declined less than one per cent from the revised data for September. Because of errors in estimates and transmission on Oct. 1, September production was revised upward. The October production was a new total for that month and for 10 months a new high was attained.

Output in October was at the rate of 115,745 gross tons per day, a decline of 840 tons or 0.72 per cent from the September rate of 116,585 tons per day. The nearest approach to this for the same month was 113,189 tons per day in October, 1916. The October daily rate was the smallest since March, this year, when it was 114,507 tons. In October, 1928, the daily rate was 108,832 tons.

Operating Rate on Nov. 1

Evidently there was a sharp decline in the operating rate of the furnaces active on Nov. 1. The 203 furnaces blowing on that day had an estimated operating rate of 113,600 tons daily compared with 116,405 tons per day for the 205 furnaces blowing on Oct. 1. The large difference for a loss of only two furnaces is

Daily Average Production of Coke Pig Iron in the United States by Months Since Jan. 1, 1925—Gross Tons

	1925	1926	1927	1928	1929
Jan.	108,720	106,974	100,123	92,573	111,044
Feb.	114,791	104,408	105,024	100,004	114,507
Mar.	114,975	111,032	112,366	103,215	119,822
Apr.	108,632	115,004	114,074	106,183	122,087
May	94,542	112,304	109,385	105,931	125,745
June	89,115	107,844	102,988	102,733	123,908
½ year	105,039	109,660	107,351	101,763	119,564
July	85,936	103,978	95,199	99,091	122,100
Aug.	87,241	103,241	95,073	101,180	121,151
Sept.	90,873	104,543	92,498	102,077	116,585
Oct.	97,528	107,553	89,810	108,832	115,745
Nov.	100,767	107,890	88,279	110,084	.....
Dec.	104,853	99,712	86,960	108,705	.....
Year	99,735	107,043	99,266	103,382	.....

**Pig Iron Production by Districts, Gross Tons*

	Oct. (31 days)	Sept. (30 days)	Aug. (31 days)	July (31 days)
New York and Mass.	243,702	235,317	253,889	256,697
Lehigh Valley	84,676	82,623	88,395	95,571
Schuylkill Valley	75,303	69,373	74,871	71,350
Lower Susq. and Lebanon Valleys	37,405	37,900	37,706	37,775
Pittsburgh district	772,236	770,222	827,285	815,045
Shenango Valley	93,928	131,052	139,835	144,455
Western Pennsylvania	154,451	144,394	150,272	146,886
Maryland, Va. and Ky.	120,428	114,181	115,804	123,447
Wheeling district	130,217	125,009	130,296	127,136
Mahoning Valley	371,718	354,446	368,609	373,181
Central and North'n Ohio	370,967	359,420	377,604	387,383
Southern Ohio	48,835	46,973	54,842	52,232
Illinois and Indiana	706,489	703,228	773,150	772,276
Mich., Minn., Mo., Wis., Colo. and Utah	148,837	131,329	147,992	146,304
Alabama	219,015	182,427	205,209	225,513
Tennessee	9,911	9,670	9,921	9,869
Total	3,588,118	3,497,564	3,755,680	3,785,120

**Revised.*

Daily Rate of Pig Iron Production by Months—Gross Tons

	Steel Works Iron	Merchant Iron*	Total
October, 1928	88,051	20,781	108,832
November	88,474	21,610	110,084
December	85,415	23,290	108,705
January, 1929	85,530	25,514	111,044
February	89,246	25,261	114,507
March	95,461	24,361	119,822
April	95,680	26,407	122,087
May	100,174	25,571	125,745
June	99,993	23,915	123,908
July	98,044	24,056	122,100
August	98,900	22,251	121,151
September	95,426	21,159	116,585
October	93,644	22,101	115,745

**Includes pig iron made for the market by steel companies.*

Coke Furnaces in Blast

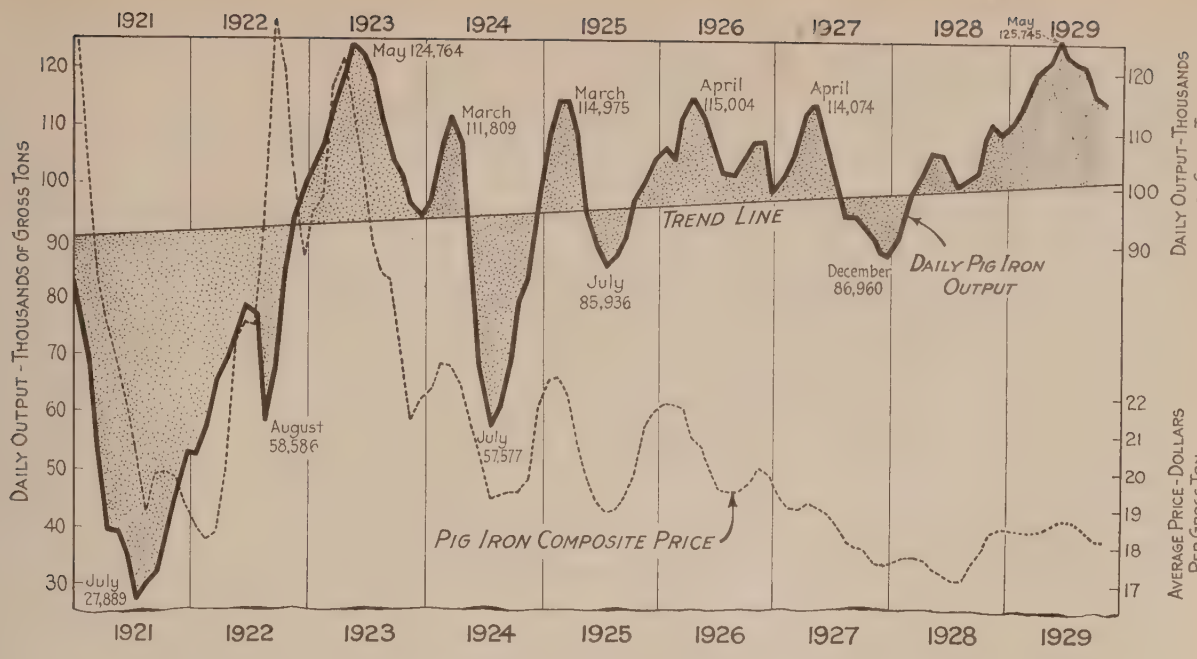
Furnaces	Nov. 1 Number in Blast	Nov. 1 Gross Tons per Day	Oct. 1† Number in Blast	Oct. 1† Gross Tons per Day
New York:				
Buffalo	14	7,085	14	7,230
Other New York	3	1,065	2	615
New Jersey	0	....	0	....
Pennsylvania:				
Lehigh Valley	7	2,730*	7	2,750*
Schuylkill Valley	5	2,430	5	2,310
Susquehanna Valley	2	1,205	2	1,260
Ferromanganese	0	....	0	....
Lebanon Valley	0	....	0	....
Ferromanganese	0	....	0	....
Pittsburgh District	36	23,600	39	25,050
Ferro. and Spiegel	3	495	3	460
Shenango Valley	5	2,270	8	4,370
Western Pennsylvania	8	4,390	9	4,415
Ferromanganese	2	400	2	395
Maryland	5	2,940	5	2,980
Wheeling District	6	3,520	7	4,165
Ohio:				
Mahoning Valley	18	11,500	20	12,600
Central and Northern	19	12,080	18	11,425
Southern	4	1,570	4	1,565
Illinois and Indiana	33	23,000	32	22,980
Mich., Wis. and Minn.	6	2,915	6	2,820
Colo., Mo. and Utah	4	1,400	4	1,860
Ferromanganese	1	70	0	....
The South:				
Virginia	1	250	0	....
Ferromanganese	1	95	1	90
Kentucky	2	850	2	725
Alabama	16	7,420	13	6,020
Ferromanganese	0	....	0	....
Tennessee	2	320	2	320
Total	203	113,600	205	116,405

**Includes spiegeleisen. †Revised.*

Production of Coke Pig Iron in United States by Months Beginning Jan. 1, 1927—Gross Tons

	1927	1928	1929
Jan.	3,103,820	2,869,761	3,442,370
Feb.	2,940,679	2,900,126	3,206,185
Mar.	3,483,362	3,199,674	3,714,473
Apr.	3,422,226	3,185,504	3,662,625
May	3,390,940	3,283,856	3,898,082
June	3,089,651	3,082,000	3,717,225
½ year	19,430,678	18,520,921	21,640,960
July	2,951,160	3,071,824	3,785,120
Aug.	2,947,276	3,136,570	3,755,680
Sept.	2,774,949	3,062,314	3,497,564
Oct.	2,784,112	3,373,806	3,588,118
10 mos.	30,888,175	31,165,435	36,267,442
Nov.	2,648,376	3,302,523	.....
Dec.	2,695,755	3,369,846	.....
Year*	36,232,306	37,837,804	.....

**These totals do not include charcoal pig iron. The 1928 production of this iron was 142,960 gross tons.*



For Eight Months Production of Pig Iron Has Exceeded the Peak of Five Preceding Years

Inclined line represents the gradually increasing theoretical needs of the country, ascertained by a balancing of the ups and downs in production. It shows an average yearly increase in consumption of about 423,000 tons

due to a marked lowering of the rate toward the end of the month with a number of furnaces shut down on Oct. 31 and Nov. 1. Eight furnaces were blown in and 10 were shut down by Nov. 1—a net loss of two. In September there was a net loss of 5 furnaces.

The Steel Corporation blew out seven furnaces and blew in two while independent steel companies blew in three and shut down two—a net loss of four steel-making stacks. Three merchant furnaces were blown in and one was blown out—a net gain of two. Thus the net loss for the month was two steel-making stacks.

New Record for Ten Months

For the ten months ended with October a new high for any such period was recorded—36,267,442 tons. The nearest approach to this was 34,244,031 tons to Nov. 1, 1923, an increase this year of 2,023,411 tons, an increase of almost 6 per cent.

Steel-Making Iron Declines

Loss in steel-making iron was 1782 tons per day from September with the production 93,644 tons per day against 95,426 tons per day in September. Merchant iron gained in October at 22,101 tons per day compared with 21,159 tons each day in September.

Large Gain in Ferromanganese

At 31,108 tons as the production of ferromanganese in October, the month's total was the second largest this year. The high for the year was 33,363 tons in June. A Western steel company blew in a furnace on ferromanganese last month.

Possibly Active Stacks Reduced

With the dismantling of the Big Stone Gap furnace of the Intermont Coal & Iron Corporation in Virginia, the possibly active stacks in the United States has been reduced from 318 to 317.

Furnaces Blown In and Out

Among the furnaces blown in during October were one furnace of the Witherbee-Sherman Co., Port Henry, N. Y.; the Pulaski furnace in Virginia; one Toledo furnace in northern Ohio; No. 5 Iroquois furnace of the Youngstown Sheet & Tube Co. in the Chicago district; one furnace of the Colorado Fuel & Iron Co., in Colorado; one Pioneer furnace of the Republic Iron & Steel Co. and one Bessemer and one Ensley furnace of the Tennessee Coal, Iron & Railroad Co. in Alabama.

Among the furnaces blown out or banked during October were one Carrie and one Edgar Thomson furnace of the Carnegie Steel Co. and one Eliza furnace of the Jones & Laughlin Steel Corporation in the Pittsburgh district; the Colonial furnace in western Pennsylvania; one furnace of the Carnegie Steel Co. in the Mahoning Valley; two Newcastle and one Farrell furnace of the Carnegie Steel Co. in the Shenango Valley and No. 2 Weirton furnace of the Weirton Steel Co. in the Wheeling district.

Production of Steel Companies for Own Use—Gross Tons

	Total Pig Iron Spiegel and Ferromanganese			Ferromanganese*		
	1927	1928	1929	1927	1928	1929
Jan.	2,343,881	2,155,133	2,651,416	31,844	22,298	28,208
Feb.	2,256,651	2,274,880	2,498,901	24,560	19,320	25,978
Mar.	2,675,417	2,588,158	2,959,295	27,834	27,912	24,978
Apr.	2,637,919	2,555,500	2,826,028	24,735	18,405	22,413
May	2,619,078	2,652,872	3,105,404	28,734	29,940	25,896
June	2,343,409	2,448,905	2,999,798	29,232	32,088	33,363
½ year	14,876,355	14,675,448	17,040,842	166,939	149,963	160,836
July	2,163,101	2,464,896	3,039,370	26,394	32,909	31,040
Aug	2,213,815	2,561,904	3,065,874	21,279	24,583	28,461
Sept.	2,090,200	2,477,695	2,862,799	20,675	22,278	27,505
Oct.	2,076,722	2,729,589	2,902,960	17,710	23,939	31,108
10 mos.	23,420,293	24,909,532	28,911,845	252,997	254,672	278,950
Nov.	1,938,043	2,654,211	.....	17,851	29,773	.....
Dec.	1,987,652	2,647,863	.....	20,992	28,618	.....
Year	27,345,888	30,211,606	.....	291,840	312,061	.....

*Includes output of merchant furnaces.

Iron and Steel Markets

Buying Becomes More Cautious

Initial Effect of Stock Market Break Is a Decline in New Business—Specifications Hold Up Well—Cold-Finished Bars Cut $2 a Ton

THE initial effect of the stock market break on the iron and steel industry has been to accentuate caution on the part of buyers. New business has been light and the placing of some prospective tonnage has been delayed, indicating that purchasers wish to obtain a better appraisal of the influence of the securities debacle on their own businesses before making further commitments in raw materials.

Cancellations reported, however, are almost negligible and specifications against unfilled orders have held up well, with reductions chiefly of the kind that would have been made regardless of developments in Wall Street.

The low iron and steel inventories of large consuming industries are one of the favorable features of the situation. Many companies that use steel in a big way have no more than a fortnight's supply. Jobbers' stocks, also, are reported to be low.

If there is an inventory problem among manufacturing users of iron and steel, it is due more largely to an accumulation of finished product than to the stocking of materials. Supplies of manufactured goods that have heretofore been regarded as normal might easily become excessive if the buying power of ultimate consumers were seriously curtailed.

Thus far few evidences of reduced popular demand for consumption goods have appeared except in the automobile industry. Motor car manufacture was suffering from the effects of overproduction before the stock market collapse, being one of the few outlets for steel in which excessive activity developed, but the period of readjustment, if present indications are borne out, has been prolonged by the Wall Street crash. Automobile makers generally are revising production schedules downward.

Consumer demand for goods outside of the luxury or semi-luxury class is expected to hold its own unless serious unemployment should develop. Farm implement manufacturers have not altered their production programs, which remain at a high rate. The output of stove manufacturers in the St. Louis district is one-third greater than a year ago. Operations of a leading radiator manufacturer are the highest since February.

Although carefully appraising possible unfavorable effects from stock market liquidation, the iron and steel trade is not closing its eyes to the benefits that will accrue, especially from easier money. Chicago reports that a more active bond market will release a large accumulation of public improvement work, and that the floating of mortgage loans will have a stimulating effect on private building within six or eight weeks. According to more conservative opinion, based on past experience, lower money rates are unlikely to result in any general acceleration of building activity for four or five months.

A quicker reaction is looked for in the demand for railroad equipment, since lower money rates will enable the carriers to market equipment trust certificates more easily. Demand for rolling stock was active even before the stock market break, but more favorable buying terms are expected to speed up action on pending inquiries and to bring out new equipment programs. Freight cars now in the market number 14,000, including 2300 on which the Missouri Pacific has just asked for figures. Inquiries from Eastern lines for 20,000 additional cars are looked for before Jan. 1. The Missouri Pacific, the St. Louis-San Francisco, the Rock Island and the Wabash have asked for tenders on a total of 125 locomotives.

Rail contracts have been swelled by an order from the Missouri Pacific for 61,000 tons, reported anonymously a week ago as only 40,000 tons. The Southern Pacific has entered the market for 122,000 tons.

Iron and steel prices remain relatively steady. Cold-finished bars and shafting have been marked down $2 a ton and black sheets at Chicago have receded by a similar amount, but with these exceptions no general reductions have been made. Scrap markets are weaker. Although no price reductions are reported at Pittsburgh, heavy melting steel has dropped 25c. a ton at Chicago, with declines in other grades ranging up to $2.50 a ton. At St. Louis consumer buying of scrap has practically ceased and cancellations and suspensions are reported.

Steel ingot output has receded to 60 per cent in the Valley district and to 75 per cent at Pittsburgh and Cleveland, but remains at 80 per cent at Chicago. The average for Steel Corporation subsidiaries and for the Bethlehem plants is estimated at 82 per cent. October output of steel was held up, in part, by the stocking of ingots and semi-finished steel, but this cannot be continued.

Pig iron production in October totaled 3,588,118 tons, the largest output for that month on record. At 115,745 tons, the daily rate showed a decline of only 0.72 per cent from that of September. There was a net loss of two active stacks in the month, eight having been blown in and ten having been put out. The operating rate Nov. 1 was 113,600 tons, compared with 116,405 tons on Oct. 1.

THE IRON AGE composite prices are unchanged, finished steel at 2.362c. a lb. and pig iron at $18.38 a ton.

A Comparison of Prices

Market Prices at Date, and One Week, One Month and One Year Previous, Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron, Per Gross Ton:	Nov. 4, 1929	Oct. 29, 1929	Oct. 8, 1929	Nov. 5, 1928
No. 2 fdy., Philadelphia	$21.26	$21.26	$21.26	$20.76
No. 2, Valley furnace	18.50	18.50	18.50	17.50
No. 2 Southern, Cin'ti	17.69	17.69	17.19	19.94
No. 2, Birmingham	14.50	14.50	14.50	16.25
No. 2 foundry, Chicago*	20.00	20.00	20.00	20.00
Basic, del'd eastern Pa.	19.75	19.75	19.75	19.75
Basic, Valley furnace	18.50	18.50	18.50	17.50
Valley Bessemer, del'd P'gh.	20.76	20.76	20.76	19.76
Malleable, Chicago*	20.00	20.00	20.00	20.00
Malleable, Valley	19.00	19.00	19.00	18.00
Gray forge, Pittsburgh	19.76	19.76	19.76	18.76
L. S. charcoal, Chicago	27.04	27.04	27.04	27.04
Ferromanganese, furnace	105.00	105.00	105.00	105.00
Rails, Billets, Etc., Per Gross Ton:				
Rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Light rails at mill	36.00	36.00	36.00	36.00
Rerolling billets, Pittsburgh	35.00	35.00	35.00	33.00
Sheet bars, Pittsburgh	35.00	35.00	35.00	33.00
Slabs, Pittsburgh	35.00	35.00	35.00	33.00
Forging billets, Pittsburgh	40.00	40.00	40.00	38.00
Wire rods, Pittsburgh	40.00	40.00	40.00	42.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.85	1.85	1.85	1.90
Finished Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Bars, Pittsburgh	1.90	1.90	1.90	1.95
Bars, Chicago	2.00	2.00	2.05	2.00
Bars, Cleveland	1.90	1.90	1.95	1.90
Bars, New York	2.24	2.24	2.24	2.29
Tank plates, Pittsburgh	1.90	1.90	1.95	1.90
Tank plates, Chicago	2.05	2.05	2.05	2.00
Tank plates, New York	*2.17½*	2.22½	2.22½	2.22½
Structural shapes, Pittsburgh	1.90	1.90	1.90	1.90
Structural shapes, Chicago	2.00	2.00	2.05	2.00
Structural shapes, New York	2.14½	2.14½	2.19½	2.19½
Cold-finished bars, Pittsburgh	2.30	2.30	2.30	2.20
Hot-rolled strips, Pittsburgh	1.90	1.90	1.90	1.90
Cold-rolled strips, Pittsburgh	2.75	2.75	2.75	2.85

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

Finished Steel,	Nov. 4, 1929	Oct. 29, 1929	Oct. 8, 1929	Nov. 5, 1928
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 24, P'gh	2.75	2.75	2.75	2.75
Sheets, black, No. 24, Chicago dist. mill	*2.85*	2.95	2.95	2.85
Sheets, galv., No. 24, P'gh	3.50	3.50	3.50	3.50
Sheets, galv., No. 24, Chicago dist. mill	3.60	3.60	3.60	3.60
Sheets, blue, No. 13, P'gh	2.35	2.35	2.35	2.10
Sheets, blue, No. 13, Chicago dist. mill	2.45	2.45	2.45	2.20
Wire nails, Pittsburgh	2.40	2.40	2.45	2.55
Wire nails, Chicago dist. mill	2.45	2.45	2.45	2.60
Plain wire, Pittsburgh	2.40	2.40	2.40	2.40
Plain wire, Chicago dist. mill	2.40	2.40	2.40	2.45
Barbed wire, galv., P'gh	3.05	3.05	3.10	3.20
Barbed wire, galv., Chicago dist. mill	3.15	3.15	3.15	3.25
Tin plate, 100 lb. box, P'gh	$5.35	$5.35	$5.35	$5.25
Old Material, Per Gross Ton:				
Heavy melting steel, P'gh	$17.25	$17.25	$17.25	$17.50
Heavy melting steel, Phila	15.50	15.50	16.00	15.50
Heavy melting steel, Ch'go	*13.75*	14.00	14.50	14.50
Carwheels, Chicago	14.00	14.00	14.00	14.25
Carwheels, Philadelphia	16.50	16.50	16.50	16.50
No. 1 cast, Pittsburgh	15.50	15.50	15.50	15.50
No. 1 cast, Philadelphia	16.00	16.00	16.00	16.75
No. 1 cast, Ch'go (net ton)	*14.00*	14.50	14.50	15.50
No. 1 RR. wrot., Phila	16.00	16.00	16.00	15.50
No. 1 RR. wrot., Ch'go (net)	*13.00*	14.00	14.00	13.25
Coke, Connellsville,				
Per Net Ton at Oven:				
Furnace coke, prompt	$2.65	$2.65	$2.65	$2.90
Foundry coke, prompt	3.75	3.75	3.75	3.75
Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	18.12½	18.12½	18.12½	16.12½
Electrolytic copper, refinery	17.75	17.75	17.75	15.75
Tin (Straits), New York	*40.12½*	40.75	43.37½	49.25
Zinc, East St. Louis	*6.50*	6.60	6.80	6.25
Zinc, New York	*6.85*	6.95	7.15	6.60
Lead, St. Louis	*6.35*	6.55	6.70	6.32½
Lead, New York	*6.50*	6.75	6.90	6.50
Antimony (Asiatic), N. Y.	*8.62½*	8.75	8.50	10.50

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Pittsburgh

Curtailment of Orders for Steel Follows Stock Market Break—Production is Moderately Lower

PITTSBURGH, Nov. 4.—While steel companies in this and nearby districts felt an immediate adverse effect from the recent sharp decline in stock prices, no signs of an extended period of depression are yet in evidence. New buying last week was exceedingly light, but tonnage releases came in at about the same rate as they did during October. In some cases, specifications were reduced somewhat, but such curtailment was generally to be expected and would have undoubtedly occurred in spite of the trend of the financial markets. On the other hand, buyers of steel who had contemplated increasing their steel needs or had planned to place orders in the near future, have now postponed their action.

Curtailment in steel works operations continues in this and nearby districts, but there is no evidence that it is being hastened by uncertainty in financial markets.

The Steel Corporation subsidiary took off four blast furnaces at its Valley plants during October, but reduced its active stacks in the Pittsburgh district by only one furnace. This is in line with the trend of open-hearth operations in the two districts, as the rate in the Valleys is not far above 60 per cent this week, while Pittsburgh plants are still above 75 on the average. The latter figure is possible, however, largely because of the comparatively high rate of the leading interest, which is benefiting by recent rail tonnage and heavy backlogs of structural shapes and plates.

While the principal independent steel producer in the Pittsburgh area is not so well supplied with advance work, its operating rate is above the average and compares favorably with the operations of the smaller independent companies, some of which are at at low as 50 per cent of capacity.

Finishing mills, especially in the Youngstown area, are running somewhat better than the open-hearth departments, as many companies accumulated stocks of crude steel during October and are now anxious to reduce their inventories as rapidly as possible.

The very low inventories of the large steel-consuming industries offer the most certain indication of the healthy state of the steel industry. Scarcely any company which uses steel in a large way could operate for two weeks if its steel supply were to be cut off. Stocks of steel jobbers are also low and nothing short of a complete paralysis of the country's business would force makers of steel into really serious difficulties. For this reason, the attitude of Pittsburgh companies is still hopeful and the extreme pessimism which accompanied the sharp break in stock prices last week has been changed to a feeling of confidence in the basic soundness of the business situation.

Steel company executives have not lost sight of the fact that the remainder of the year may be rather quiet from a business standpoint, with the automobile industry taking less than half its usual tonnage of steel, but other consumers, notably the railroads, are helping to fill in the breach. In

fact, it is expected that large Eastern roads may add about 20,000 freight cars to the pending list before the first of the year.

The price situation is still generally satisfactory, although the reduction of $2 a ton in the price of cold-finished steel bars and shafting last week was considered ill-timed by some makers. Bars, shapes and plates are holding at 1.90c., Pittsburgh, although this figure has not been widely tested on large tonnages. This is true with a number of present quotations, but sellers have no difficulty in maintaining prices on small tonnages which are being closed from day to day. It is generally admitted by both buyers and sellers that lower prices would not stimulate buying to any extent at the present time.

The pig iron market is hardly as strong as it has been. Although definite reports of shading the Valley furnace prices are lacking, recent sales of basic iron by Pittsburgh district furnaces have been subject to question from the price standpoint.

Scrap is not quotably lower, but the trend of the market is toward weakness. A recent sale of railroad heavy melting steel brought close to $17.50 at a nearby steel plant, but the Pennsylvania Railroad steel, which closes this week, may not bring such a high figure.

Pig Iron.—The pig iron market lacks strength, and prices are holding largely because of a lack of heavy tonnage buying. Most sellers freely admit that a large tonnage of basic or foundry iron would bring out quotations under $18.50, Valley, but recent buying has offered no such situation. Purchases are still confined to small lots, which command the full market quotations on basic and foundry as well as on malleable and Bessemer. The Edgewater Steel Co. is reported to have bought a tonnage of basic iron, but information is lacking as to the amount involved and the price paid. The Elliott Co., Jeannette, Pa., has closed with several makers for about 600 tons of foundry iron and 150 tons of Bessemer. This business is reported to have brought the full market price. Iron shipments from both Valley and Pittsburgh furnaces are now somewhat lighter than production, and makers are watching the trend of business very closely in an effort to decide whether or not to blow out furnaces. Unless conditions improve in the next two weeks, it is likely that at least one less merchant stack will be operating. The Weirton Steel Co., which was a buyer of basic iron during the summer months, has blown out one of its furnaces for relining.

Prices per gross ton, f.o.b. Valley furnace:

Basic	$18.50
Bessemer	19.00
Gray forge	18.00
No. 2 foundry	18.50
No. 3 foundry	18.00
Malleable	19.00
Low phos., copper free	27.00

Freight rate to Pittsburgh or Cleveland district $1.76.

Prices per gross ton, f.o.b. Pittsburgh district furnace:

Basic	$19.00
No. 2 foundry	19.00
No. 3 foundry	18.50
Malleable	19.50

Freight rates to points in Pittsburgh district range from 63c. to $1.13.

Semi-Finished Steel. — Occasional spot sales of billets, slabs and sheet bars are reported in this district, and one seller, most of whose business is done under long-time contracts, is having no difficulty getting $35, Pittsburgh or Youngstown, with full extras for this material. Concessions might be obtained if a fair inquiry came out, but, as a great percentage of semi-finished steel to be used this quarter is already contracted for, the spot market can still be quoted at the above figure. Considerable tonnage is undoubtedly moving at lower prices, but as large buyers seldom, if ever, pay the full quoted price for their material, there seems to be no reason to recognize this tonnage as establishing the market now. Shipments of semi-finished steel during October declined somewhat from those of the previous month, but the decline has been very gradual. The early days of November have brought no decrease in shipments, although some companies which had contemplated increasing their takings are now inclined to wait for a time. This is particularly true in the case of makers of strips and sheets, who have failed to see any marked improvement in their business in the last few days and who wish to maintain supplies of crude steel at a minimum. The price of forging billets is open to question on occasional transactions, but no sales at less than $40, Pittsburgh, are reported. The $40 price on wire rods seems to be well established, although business is exceedingly quiet.

Rails and Track Accessories.—Business has been rather quiet in the last week. This district did not participate in the recent order for 61,000 tons of rails placed by the Missouri Pacific. Specifications for accessories are beginning to improve somewhat, particularly from roads which placed rails early in the season. Demand for light rails is improving seasonally, as the coal industry is rather active at this time. Rail mill operations are continuing to improve, but have not yet reached capacity rate.

Bars, Shapes and Plates.—Business has been exceedingly quiet during the week, but the larger companies have received no orders for hold-ups or cancellations of shipments. Demand for plates is comparatively strong, although quick deliveries are possible from most of the leading mills. Specifications from the car builders are coming in regularly, but shipments to barge yards in this district are declining as most of the barges ordered in the spring and summer have now been completed. However, the prospects in this field are exceedingly good, and, with one large inquiry for barges still pending and several others in process of negotiation, there is every reason to believe that this industry will be a large user of steel over the next few months. Fabricating shops are busy, and shape mills have curtailed operations very little as compared with other departments. Bars are quiet, as many of the large consuming industries are operating at a low rate. The price on bars, shapes and plates has settled to 1.90c., Pittsburgh, and this now represents the maximum on all but occasional small orders. This price seems to be reasonably firm, although large buyers undoubtedly obtain the usual differentials.

Wire Products.—The wire mill situation is essentially unchanged, but if there is any noticeable tendency it is toward further price stabiliza-

The Iron Age Composite Prices

Finished Steel

Nov. 4, 1929, 2.362c. a Lb.

One week ago	2.362c.
One month ago	2.369c.
One year ago	2.369c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products make 87 per cent of the United States output of finished steel.

	High	Low
1929	2.412c., April 2;	2.362c., Oct. 29
1928	2.391c., Dec. 11;	2.314c., Jan. 3
1927	2.453c., Jan. 4;	2.293c., Oct. 25
1926	2.453c., Jan. 5;	2.403c., May 18
1925	2.560c., Jan. 6;	2.396c., Aug. 18

Pig Iron

Nov. 4, 1929, $18.38 a Gross Ton

One week ago	$18.38
One month ago	18.29
One year ago	18.34
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High	Low
1929	$18.71, May 14;	$18.25, Aug. 27
1928	18.59, Nov. 27;	17.04, July 24
1927	19.71, Jan. 4;	17.54, Nov. 1
1926	21.54, Jan. 5;	19.46, July 13
1925	22.50, Jan. 13;	18.96, July 7

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base per Lb.
F.o.b. Pittsburgh mill	1.90c.
F.o.b. Chicago	2.00c. to 2.05c.
Del'd Philadelphia	2.22c.
Del'd New York	2.24c.
Del'd Cleveland	1.90c.
F.o.b. Cleveland	1.90c.
F.o.b. Lackawanna	2.00c.
F.o.b. Birmingham	2.10c.
C.i.f. Pacific ports	2.35c.
F.o.b. San Francisco mills	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills, 40, 50, 60-ft.	2.05c.
F.o.b. Pittsburgh mills, cut lengths	2.30c.
F.o.b. Birmingham, mill lengths	2.10c.

Rail Steel

F.o.b. mills, east of Chicago dist.	1.85c. to 1.90c.
F.o.b. Chicago Heights mill	1.95c.
Del'd Philadelphia	2.27c.

Iron

Common iron, f.o.b. Chicago	2.00c. to 2.05c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	2.12c.
Common iron, del'd New York	2.14c.

Tank Plates

	Base per Lb.
F.o.b. Pittsburgh mill	1.90c.
F.o.b. Chicago	2.05c.
F.o.b. Birmingham	2.10c.
Del'd Cleveland	2.09c. to 2.14c.
Del'd Philadelphia	2.10c. to 2.15c.
F.o.b. Coatesville	2.00c. to 2.05c.
F.o.b. Sparrows Point	2.00c. to 2.05c.
F.o.b. Lackawanna	2.00c. to 2.05c.
Del'd New York	2.17½c. to 2.22½c.
C.i.f. Pacific ports	2.35c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh mill	1.90c.
F.o.b. Chicago	2.00c. to 2.05c.
F.o.b. Birmingham	2.10c.
F.o.b. Lackawanna	2.05c.
F.o.b. Bethlehem	2.05c.
Del'd Cleveland	2.09c. to 2.14c.
Del'd Philadelphia	1.96c. to 2.06c.
Del'd New York	2.14½c.
C.i.f. Pacific ports	2.35c.

Hot-Rolled Hoops, Bands and Strips

	Base per Lb.
6 in. and narrower, P'gh	2.00c.
Wider than 6 in., P'gh	1.90c.
6 in. and narrower, Chicago	2.20c.
Wider than 6 in., Chicago	2.10c.
Cooperage stock, P'gh	2.20c.
Cooperage stock, Chicago	2.30c.

Cold-Finished Steel

	Base per Lb.
Bars, f.o.b. Pittsburgh mill	2.20c.
Bars, f.o.b. Chicago	2.20c.
Bars, Cleveland	2.20c.
Bars, Buffalo	2.20c.
Shafting, ground, f.o.b. mill	*2.55c. to 3.50c.
Strips, P'gh	2.75c.
Strips, Cleveland	2.75c. to 2.85c.
Strips, del'd Chicago	3.05c. to 3.15c.
Strips, Worcester	2.90c. to 3.00c.
Fender stock, No. 20 gage, Pittsburgh or Cleveland	4.25c.

*According to size.

Wire Products

(Carload lots, f.o.b. Pittsburgh and Cleveland, to jobbers and retailers.)

	Base per Keg
Wire nails	$2.40 to $2.50
Galvanized nails	4.40 to 4.50
Galvanized staples	3.10 to 3.20
Polished staples (per lb.)	2.85c. to 2.95c.
Cement coated nails	$2.40 to $2.50
	Base per 100 Lb.
Bright plain wire, No. 6 to No. 9 gage	$2.40 to $2.50
Annealed fence wire	2.55 to 2.65
Spring wire	3.50 to 3.60
Galv'd wire, No. 9	3.00 to 3.10
Barbed wire, galv'd	3.05c. to 3.15c.
Barbed wire, painted	2.80c. to 2.90c.
Woven wire fence (per net ton to retailers)	65.00

Cut Nails

	Per 100 Lb.
Carloads, Wheeling, Reading or Northumberland, Pa.	$2.70
Less carloads, Wheeling or Reading	2.80

Light Plates

No. 10, blue annealed, f.o.b. P'gh	2.10c. to 2.20c.
No. 10, blue annealed, f.o.b. Chicago dist.	2.30c.
No. 10, blue annealed, del'd Phila.	2.42c. to 2.52c.
No. 10, blue annealed, B'ham	2.35c.

Sheets

Blue Annealed

	Base per Lb.
No. 13, f.o.b. P'gh	2.25c. to 2.35c.
No. 13, f.o.b. Chicago dist.	2.45c.
No. 13, del'd Philadelphia	2.57c. to 2.67c.
No. 13, blue annealed, B'ham	2.50c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh	2.75c.
No. 24, f.o.b. Chicago dist. mill	2.85c. to 2.95c.
No. 24, del'd Philadelphia	3.07c.
No. 24, f.o.b. Birmingham	3.00c. to 3.10c.

Metal Furniture Sheets

No. 24, f.o.b. P'gh	4.10c.

Galvanized

No. 24, f.o.b. Pittsburgh	3.40c. to 3.50c.
No. 24, f.o.b. Chicago dist. mill	3.60c.
No. 24, del'd Cleveland	3.59c. to 3.69c.
No. 24, del'd Philadelphia	3.82c. to 3.92c.
No. 24, f.o.b. Birmingham	3.75c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.90c. to 3.00c.
No. 28, f.o.b. Chicago dist. mill	3.00c. to 3.10c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh	4.00c.

Long Ternes

No. 24, 8-lb. coating, f.o.b. mill	4.00c. to 4.10c.

Vitreous Enameling Stock

No. 24, f.o.b. Pittsburgh	3.90c.

Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills	$5.35
Standard cokes, f.o.b. Gary	5.45

Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)
(Per Package, 20 x 28 in.)

8-lb. coating I.C.	$11.20
15-lb. coating I.C.	14.00
20-lb. coating I.C.	15.30
25-lb. coating I.C.	$16.70
30-lb. coating I.C.	17.75
40-lb. coating I.C.	19.35

Alloy Steel Bars

(F.o.b. makers' mill)

Alloy Quality Bar Base, 2.65c. to 2.75c. per Lb.

S.A.E. Series Numbers	Alloy	Differential
2000	(½% Nickel)	$0.25
2100	(1½% Nickel)	0.55
2300	(3½% Nickel)	1.50
2500	(5% Nickel)	2.25
3100	Nickel Chromium	0.55
3200	Nickel Chromium	1.35
3300	Nickel Chromium	3.80
3400	Nickel Chromium	3.20
4100	Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50
4100	Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600	Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel)	1.05
5100	Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100	Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100	Chromium Spring Steel	0.20
6100	Chromium Vanadium Bars	1.20
6100	Chromium Vanadium Spring Steel	0.95
9250	Silicon Manganese Spring Steel (flats)	0.25
	Rounds and squares	0.50
	Chromium Nickel Vanadium	1.50
	Carbon Vanadium	0.95

Above prices are for hot rolled steel bars, forging quality. The differential for cold-drawn bars is ¾c. a lb. higher, with standard classification for cold-finished alloy steel bars applying. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis.

Billets under 4 x 4 in. carry the steel bar base. Slabs with a sectional area of 16 in. or over carry the billet price. Slabs with sectional area of less than 16 in. or less than 2½ in. thick, regardless of sectional area, take the bar price.

Rails

	Per Gross Ton
Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	36.00
Light (from rail steel), f.o.b. mill	34.00
Light (from billets), f.o.b. Ch'go mill	36.00

Track Equipment

	Base per 100 Lb.
Spikes, ⅝ in. and larger	$2.80
Spikes, ½ in. and smaller	2.80
Spikes, boat and barge	3.00
Tie plate, steel	2.15
Angle bars	$2.75
Track bolts, to steam railroads	$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel Inches	Black	Galv.	Iron Inches	Black	Galv.
⅛	45	19½	¼ and ⅜	+11	+36
¼ to ⅜	51	25½	½	23	5
½	56	42½	¾	28	11
¾	60	48½	1 and 1¼	31	15
1 to 3	62	50½	1½ and 2	35	18

Lap Weld

2	55	43½	2	23	9
2½ to 6	59	47½	2½ to 3½	28	13
7 and 8	56	43½	4 to 6	30	17
9 and 10	54	42½	7 and 8	29	16
11 and 12	53	40½	9 to 12	26	11

Butt Weld, extra strong, plain ends

⅛	41	24½	¼ and ⅜	+13	+48
¼ to ⅜	47	30½	½	23	7
½	53	42½	¾	28	12
¾	58	47½	1 to 2	34	18
1 to 1½	60	49½			
2 to 3	61	50½			

Lap Weld, extra strong, plain ends

2	53	42½	½	29	13
2½ to 4	57	46½	2½ to 4	34	20
4½ to 6	56	45½	4½ to 6	33	19
7 to 8	52	39½	7 and 8	31	17
9 and 10	45	32½	9 to 12	21	8
11 and 12	44	31½			

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Steel		Charcoal Iron	
2 in. and 2¼ in.	38	1½ in.	1
2½ in.—2¾ in.	46	1¾ in.	8
3 in.	52	2 in.—2¼ in.	13
3¼ in.—3¾ in.	54	2½ in.—2¾ in.	16
4 in.	57	3 in.	17
4½ in. to 6 in.	46	3¼ in. to 3½ in.	18
		4 in.	20
		4½ in.	21

On lots of a carload or more, the above base discounts are subject to a preferential of two fives on steel and of 10 per cent on charcoal iron tubes. Smaller quantities are subject to the following modifications from the base discounts:

Lap Welded Steel—Under 10,000 lb., 6 points under base and one five; 10,000 lb. to carload, 4 points under base and two fives. Charcoal Iron—Under 10,000 lb., 2 points under base; 10,000 lb. to carload, base and one five.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	61	3 in.	46
1¼ to 1½ in.	53	3¼ to 3½ in.	48
1¾ in.	37	4 in.	51
2 to 2¼ in.	32	4½, 5 and 6 in.	40
2½ to 2¾ in.	40		

Hot Rolled

2 and 2¼ in.	38	3¼ to 3½ in.	54
2½ and 2¾ in.	46	4 in.	57
3 in.	52	4½, 5 and 6 in.	46

Beyond the above base discounts a preferential discount of 5 per cent is allowed on carload lots. On less than carloads to 10,000 lb., base discounts are reduced 4 points with 5 per cent preferential; on less than 10,000 lb., base discounts are reduced 6 points, with no preferential. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage take the mechanical tube list and discounts. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30%, base (carloads)	55
Carbon, 0.30% to 0.40% base	50

Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

tion. In the immediate Pittsburgh district wire nails are holding at $2.50 to the trade, and jobbers are unable to get more than their regular $2 concession. The same is true as to plain wire to jobbers, and the price on wire to the manufacturing trade is unchanged at 2.40c. a lb., Pittsburgh. Demand is quiet. Shipments by some makers last month declined very sharply.

Bolts, Nuts and Rivets.—Business in bolts and nuts has experienced some decline in the last few weeks, but this was to be expected in view of the gradual tapering off of steel business in general. Jobbers' stocks of bolts, nuts and rivets are ample and they are now inclined to wait for further reduction in inventories before reordering. The car builders are still very good customers, as are fabricating shops and barge yards, and railroad demand is good. The average operating rate of the industry has declined to about 65 per cent of capacity, and the figure is lower in some plants. Prices are well established at 70 per cent off list for bolts and nuts, and $3.10 a 100 lb., Pittsburgh or Cleveland, for large rivets. Small rivets are quoted at 70 and 10 per cent off list.

Warehouse Business.—October was a fairly good month for local warehouses, although price weakness developed in some lines, and tonnage tapered off slightly in others. Generally speaking, business was about equal to the total of the same month last year. Both wire and wire nails are quotably lower, although a tendency toward strength in these products has developed in the last two weeks. Sheet steel is also weak, but local jobbers are maintaining their quotations in the face of occasional shading. Bars, plates and shapes are still holding fairly well.

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.25c.
Hoops	4.25c.
Black sheets (No. 24), 25 or more bundles	3.80c. to 3.90c.
Galv. sheets (No. 24), 25 or more bundles	4.45c. to 4.55c.
Light plates, blue annealed (No. 10), 1 to 24 plates	3.35c. to 3.45c.
Blue annealed sheets (No. 13), 1 to 24 sheets	3.50c. to 3.60c.
Galv. corrug. sheets (No. 28), per square	$4.43
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count,	60 per cent off list
Machine bolts, 100 count,	60 per cent off list
Carriage bolts, 100 count,	60 per cent off list
Nuts, all styles, 100 count,	60 per cent off list
Large rivets, base per 100 lb.	$3.50
Wire, black soft ann'l'd base per 100 lb	$2.90 to 3.00
Wire, galv. soft, base per 100 lb.	2.90 to 3.00
Common wire nails, per keg	2.80 to 2.90
Cement coated nails, per keg	2.95 to 3.05

Tubular Products.—Pipe mill operations are gradually declining, although the present rate is still somewhat higher than the year's average, and had declined only about five points from the maximum reached a few weeks ago. The average for the entire industry is estimated at somewhere between 60 to 65 per cent of capacity, with seamless mills at a slightly higher rate and butt-weld units somewhat lower. Demand for the latter product is expected to decline seasonally, and demand for seamless material is also experiencing a slight decline in the oil country. Large orders for lap-weld tubing have practically all been executed and mills are now operating on a hand-to-mouth basis, with business made up largely of feeder lines and other small tonnage business. There are good orders for boiler tubes and locomotive tubing, but declining operations in the automobile industry have brought about a marked decrease in the movement of mechanical tubing. Prices are reasonably firm.

Prices on black and galvanized steel butt-weld pipe and also on iron pipe have been advanced slightly by the elimination of the extra 2½ per cent discount, which had recently been extended to include the smaller jobbers. The 2½ per cent discount is now given only to the larger buyers.

Tin Plate.—Tin plate operations have not declined further in the last week, and the average for the industry continues at about 60 per cent of capacity. The leading interest is operating at a slightly higher rate, as it has been able to begin work on anticipated tonnage for 1930 before the independent companies. The price for next year has not yet been announced, and opinion varies as to what it may be. It does seem rather certain that there will be no advance.

Strip Steel.—Any improvement expected in the automotive trade this week was evidently postponed by the financial situation, and demand has generally been light. Operations continue at about 50 per cent of capacity and this rate is just about sufficient to meet current requirements. Consumers are generally thought to be without stock accumulations and no sharp decline in shipments is expected over the next few weeks. In fact, any improvement in demand from the automobile industry would be reflected immediately in shipments and rollings. Prices lack strength, but shading is confined to occasional sales where outside considerations have had a prominent influence. Cold-rolled material is now quotable at 2.75c., Pittsburgh, and hot-rolled at 1.90c. and 2c., Pittsburgh, depending upon the width.

Cold-Finished Steel Bars.—A rather sudden reduction of $2 a ton in the price of cold-finished bars has been met by producers in this district, although weakness was apparent heretofore principally in the Chicago district. The decrease was apparently prompted by recent reduction in the price of hot-rolled bars. The lower price has not stimulated business, which remains very quiet. However, the industry is in a favorable position. Most cold-finishing mills have little more than a two-weeks' supply of hot-rolled bars on hand and are constantly reducing this tonnage. The price is now 2.20c., Pittsburgh.

Prices on turned and ground shafting have also been reduced $2 a ton, and are now quoted at 2.55c. to 3.50c., base Pittsburgh, according to size.

Sheets.—The new month has failed to bring any improvement in the buying of sheets, and operations continue to taper. The average for the industry is probably not more than 60 per cent of capacity, with specialty mills at a lower rate, and the leading interest at about 70 per cent. Specifications last week were extremely light, although the stocks of some consumers are so low that they are forced to place rolling orders every few days if they are to keep their plants running. Demand from the automobile industry is still disappointing, and the largest maker of cars in the low-priced field has met with some delay in re-tooling its plants for slight model changes. Although this company's schedule formerly called for slightly less than 200,000 cars in the remaining two months of the year, this figure may have to be reduced. Other automobile makers, which had stepped up their production on new models, have curtailed again. The automobile industry is watching the trend of the security markets more carefully than any other large steel consumer. Other buyers of sheets are taking material at a fair rate, and many metal furniture makers are operating at close to capacity. Under such conditions, demand for metal furniture sheets is very strong, while the reverse is true with automobile body sheets. Auto sheet makers are also meeting with considerable price pressure, although the 4c. Pittsburgh price has not yet been broken. Black sheets are also holding at 2.75c., Pittsburgh, and concessions of $1 a ton are all that have been developed by large Michigan buyers. Galvanized sheets are still quotable at 3.50c., Pittsburgh, although the $2 preferential to jobbers is being given by a number of mills. Blue annealed sheets and light plates are holding fairly well.

Coal and Coke.—This market has seen little change, but the price tendency in furnace coke is toward weakness rather than strength. The steel companies are doing no buying and have reduced shipments rather sharply in recent weeks. Warm weather has had an adverse effect on the movement of domestic coke, and the foundry grade is only fairly active. Prices are unchanged on coke, while

(*Concluded on page* 1271)

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and under 10-in., Pittsburgh	$35.00
Rerolling, 4-in. and under 10-in., Youngstown	35.00
Rerolling, 4-in. and under 10-in., Cleveland	35.00
Rerolling, 4-in. and under 10-in., Chicago	37.00
Forging quality, Pittsburgh	40.00

Sheet Bars

(Open Hearth or Bessemer)

	Per Gross Ton
Pittsburgh	$35.00
Youngstown	35.00
Cleveland	35.00

Slabs

(8 in. x 2 in. and under 10 in. x 10 in.)

	Per Gross Ton
Pittsburgh	$35.00
Youngstown	35.00
Cleveland	35.00

Skelp

(F.o.b. Pittsburgh or Youngstown)

	Per Lb.
Grooved	1.85c. to 1.90c.
Universal	1.85c. to 1.90c.
Sheared	1.85c. to 1.90c.

Wire Rods

(Common soft, base)

	Per Gross Ton
Pittsburgh	$40.00
Cleveland	40.00
Chicago	41.00

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.80
Old range non-Bessemer, 51.50% iron	4.65
Mesabi Bessemer, 51.50% iron	4.65
Mesabi non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.40

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algerian	12.00c.
Iron ore, low phos., Swedish, average 68% iron	12.00c.
Iron ore, basic Swedish, average 65% iron	10.00c.
Manganese ore, washed, 52% manganese, from the Caucasus	30.00c.
Manganese ore, Brazilian, African or Indian, basic 50%	30.00c.
Tungsten ore, high grade, per unit, in 60% concentrates	$15.50 to $16.50

	Per Gross Ton
Chrome ore, 45 to 50% Cr_2O_3, crude, c.i.f. Atlantic seaboard	$22.00 to $24.00

	Per Lb.
Molybdenum ore, 85% concentrates of MoS_2, delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$2.65 to $2.75
Foundry, f.o.b. Connellsville prompt	3.75 to 4.75
Foundry, by-product, Ch'go ovens	8.00
Foundry, by-product, New England, del'd	11.00
Foundry, by-product, Newark or Jersey City, delivered	9.00 to 9.40
Foundry, by-product, Phila.	9.00
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry by-prod., del'd St. Louis	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.25 to $1.75
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, ¾-in. f.o.b. Pa. mines	1.90 to 2.00
Mine run gas coal, f.o.b. Pa. mines	1.65 to 1.75
Steam slack, f.o.b. W. Pa. mines	80c. to 90c.
Gas slack, f.o.b. W. Pa. mines	1.00 to 1.10

Ferromanganese

	Per Gross Ton
Domestic, 80%, seaboard	$105.00
Foreign, 80%, Atlantic or Gulf port, duty paid	105.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$31.00 to $34.00
Domestic, 16 to 19%	29.00 to 32.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$83.50
75%	130.00

	Per Gross Ton Furnace		Per Gross Ton Furnace
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	45.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		Per Gross Ton
10%	$30.00	12%	$34.00
11%	32.00		

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		Per Gross Ton
6%	$22.00 to $23.00	10%	$26.00 to $28.00
7%	23.00 to 24.00	11%	28.00 to 30.00
8%	24.00 to 25.00	12%	30.00 to 32.00
9%	25.00 to 26.00		

Other Ferroalloys

Ferrotungsten, per lb. contained metal del'd	$1.40 to $1.50
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.15 to $3.65
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	$160.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton	$91.00
Ferrophosphorus, electric 24%, f.o.b. Anniston, Ala., per gross ton	$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silicon, gravel, f.o.b. Illinois and Kentucky mines	$18.00
No. 2 lump, Illinois and Kentucky mines	20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	$18.25 to $18.75
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines	32.50

Fire Clay Brick

	Per 1000 f.o.b. Works	
	High-Heat Duty Brick	Intermediate Heavy Duty Brick
Pennsylvania	$43.00 to $46.00	$35.00 to $38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	.....
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00
Standard size	45.00

Chrome Brick

	Per Net Ton
Standard size	$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts, blank or tapped, hexagons	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	7.00c. to 6.75c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled thread up to and including ⅛ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagon nuts	70
Semi-finished hexagon castellated nuts, S.A.E.	70
Stove bolts in packages, P'gh.	75, 20, 10 and 5
Stove bolts in packages, Chicago.	75, 20, 10 and 5
Stove bolts in packages, Cleveland.	75, 20, 10 and 5
Stove bolts in bulk, P'gh.	75, 20, 10, 5 and 2½
Stove bolts in bulk, Chicago.	75, 20, 10, 5 and 2½
Stove bolts in bulk, Cleveland.	75, 20, 10, 5 and 2½
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55, 60 per cent apply.

Large Rivets

(½-in. and larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$3.10
F.o.b. Chicago	3.20

Small Rivets

(⅞-in. and smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70 and 10
F.o.b. Cleveland	70 and 10
F.o.b. Chicago	70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10 and 5
Milled standard set screws, case hardened,	80 and 5
Milled headless set screws, cut thread.	75 and 10
Upset hex. head cap screws, U.S.S. thread	85
Upset hex. cap screws, S.A.E. thread	85
Upset set screws	80, 10 and 5
Milled studs	70

Chicago

Steel Demand Has Tapered in Some Directions But Mill Output Remains at About 80 Per Cent

CHICAGO, Nov. 4.—Steel demand in some directions has tapered, but the increased movement of car materials and the prospect that this tonnage will gain larger proportions lend support to the belief in the local trade that production of steel in nearby weeks will be supported at about 80 per cent of ingot capacity, the current rate.

Farm implement manufacturers are holding to production schedules made early in the fall. It is not improbable that mortgage loans for building construction will, in the course of six to eight weeks, again support a more general and a larger demand for structural materials, and a more active bond market will afford the means of releasing a large amount of public improvement work which has been accumulating in and near Chicago.

Tendencies as to prices still lean to the weak side. Mild steel bars at 2c. to 2.05c. a lb., Chicago, are lacking in strength, and quotations on galvanized and black sheets have given ground in the last week. Cold-finished bars have been marked down $2 a ton, effective Nov. 1, for distribution from all basing points.

The local scrap market is wholly in the hands of buyers, who in many cases have accumulated sizable stocks and who will no longer listen to overtures by sellers. The stress of this situation appears not to have reached a culmination for the reason that supplies at points of production and in yards, both country and city, are accumulating at a rapid rate.

Current specifications for finished steel are well up to the average of recent weeks. Sales, though in good aggregate tonnage, are largely influenced by new business in rails and therefore do not give a clear picture of the market as a whole.

Pig Iron.—The Northern foundry iron market remains steady, with shipments practically equal to the full output of local furnaces. Shipments, which started to climb late in October, are still on the upswing. This situation leaves local producers with no opportunity to stock iron. Prices remain firm at $20 a ton, local furnaces. Scattered and small sales of charcoal iron are reported at $24 a ton, furnace. Among boat shipments which have arrived at Chicago docks in the last week are a cargo of silvery and one of low phosphorus iron. The Southern iron market remains at $13 to $13.50 a ton, Birmingham; the freight rate to Chicago is $6.01 a ton.

Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	$20.00
N'th'n No. 1 fdy., sil. 2.25 to 2.75	20.50
Malleable, not over 2.25 sil	20.00
High phosphorus	20.00
Lake Super. charcoal, sil. 1.50	27.04
So'th'n No. 2 fdy. (all rail)	$19.01 to 19.51
Low phos., sil. 1 to 2, copper free	29.50
Silvery, sil. 8 per cent	$28.79 to 29.79
Bess. ferrosilicon, 14-15 per cent	46.29

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Cast Iron Pipe.—New orders for cast iron pipe are confined to a few scattered tonnages in nearby towns. Municipalities find little need for this commodity at this time of the year, and private buying is of small proportions. Public utilities have completed their programs for this year, and it will be December or January before they make known their wants for 1930. October sales were a shade under the volume in September and smaller than in the tenth month a year ago. Prices remain steady and deliveries on most sizes are prompt.

Prices per net ton, deliv'd Chicago: Water pipe, 6-in. and over, $43.70 to $45.70; 4-in., $47.70 to $49.70; Class A and gas pipe, $3 extra.

Ferroalloys.—It is reported here that buyers of 50 per cent ferrosilicon will be offered 1930 contracts in the course of the next three weeks. No announcement has been made concerning next year's prices. New demand for other ferroalloys is dull.

Prices delivered Chicago: 80 per cent ferromanganese, $112.56; 50 per cent ferrosilicon, $83.50 to $88.50; spiegeleisen, 19 to 21 per cent, $39.76 to $41.76.

Structural Material.—Preliminary estimates of the need for steel for buildings to be constructed for the Chicago World's Fair are in excess of 50,000 tons. While there will be many structures of temporary type, it is planned to construct some buildings with the thought in mind that they can be put to practical use after the close of the fair. In addition to the steel needed for buildings, there will also be a large tonnage used in bulkheads and steel piling. Fresh inquiry and lettings of structural projects are light. Fabricators west of the Mississippi River have fair backlogs of highway bridge work, and similar new projects are taking shape. Indiana shops are in need of work, while local operations are spotty, with several shops in need of additional tonnage.

Mill prices on plain material, per lb.: 2.00c. to 2.05c. base, Chicago.

Plates.—Fully 30,000 tons of steel will be needed for new cars to be purchased by the Missouri Pacific. Steel needs for other car construction total more than 170,000 tons, including the tonnage for the recent Santa Fe orders. It is reported here that several sizable orders for tank plates have been placed with mills to the east of Chicago. Deliveries on plates are improved, as additional suspension orders reach the manufacturer of electrically welded pipe.

Bars.—Chicago bar mills continue to operate at 80 per cent of capacity and specifications fully match current shipments. Deliveries on mild steel bars are prompt on most sizes, and prices are steady at 2c. to 2.05c. a lb. Farm implement manufacturers are taking uniform quantities of steel, while, on the other hand, forgers' needs are spotty and small. Some improvement is noted in specifications for alloy steel bars. Consumption, however, is spotty and the small upturn in releases is not taken by the trade as an indication that demand is on the mend.

Cold-Finished Steel Bars.—Prices for this commodity have been marked down $2 a ton, effective Nov. 1. Specifications from sources other than automobile manufacturers are ample to support output at 75 per cent of capacity at local plants.

Bolts, Nuts and Rivets.—Demand from railroads, car shops and manufacturers of farm machinery shows further growth. Prices are holding.

Wire Products.—Specifications entered at mills by the manufacturing trade show some improvement, but the character of this business is spotty and is not taken by sellers as foretelling a continued increase in demand from this direction. Forward contracting also has gained ground, but it is pointed out that this business is not represented by fresh inquiries, but is largely resulting from the placing of business which has been before the trade for many weeks. Jobbers continue to take wire products at a steady rate. Some easing in demand is noted from the Northwest, where conditions were not generally so good from the point of view of crops as in other parts of the country. Orders for woven wire fencing are unusually large. This is accounted for in part by open fall weather, which is favorable for the repair and extension of fences. Most of the fencing shipments are from mill stocks, which were expanded through the summer and early fall. Reports from the trade, as well as the character of current orders, tend to confirm the view that

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars	3.00c.
Reinforc'g bars, billet steel	1.90c. to 2.25c.
Reinforc'g bars, rail steel	2.00c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Bands (⅛ in. in Nos. 10 and 12 gages)	3.20c.
Hoops (No. 14 gage and lighter)	3.75c.
Black sheets (No. 24)	4.05c.
Galv. sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.35c.
Spikes, ⅜ in. and larger	3.55c.
Track bolts	4.55c.
Rivets, structural	4.00c.
Rivets, boiler	4.00c.

	Per Cent Off List
Machine bolts	60
Carriage bolts	60
Coach or lag screws	60
Hot-pressed nuts, sq., tap. or blank	60
Hot-pressed nuts, hex., tap. or blank	60

No. 8 black ann'l'd wire, per 100 lb.	$3.45
Com. wire nails, base per keg	$2.75 to $2.95
Cement c't'd nails, base per keg	2.75 to 2.95

stocks in the hands of buyers are small. Jobbers are ordering at frequent intervals and in mixed lots, while manufacturers are taking wire at extremely close range in their efforts to hold stocks on hand to a minimum as the inventory season approaches. Stocks at mills are said to be normal for this time of the year. Prices are stable in a market which does not afford a real test of the situation.

Warehouse Business.—Recent sales of common and cement coated nails from warehouses establish prices in the range of $2.75 to $2.95, base, a keg. Quotations on other commodities are steady, and demand shows little change from the rate in the previous month. Judged by past performances, November is not expected by warehouses to measure up in volume of shipments to October, which often is the best month in the year. Several months in 1929 showed a surprisingly large movement of steel from warehouses, and it therefore has been no surprise that October this year has not stood out as has the same month in previous years.

Rails and Track Supplies.—The purchase of standard-section rails by the Missouri Pacific, which last week was named as a large Western railroad, is about 61,000 tons, rather than 40,000 tons, as previously reported. Fresh inquiry for 122,000 tons has come from the Southern Pacific. It is not clear in the minds of local sellers whether this tonnage covers the entire needs of this railroad and its subsidiaries or whether the needs of the latter will be sought at a later date. The Southern Pacific usually places separate tonnages for its affiliated companies. Local mills estimate that about 55 per cent of the fall buying of rails in Western territory has been completed. Releases against new contracts are only in such volume as to support rail mill output at 80 per cent of capacity. In fact, there are some indications that the railroads have revised their plans for releases this fall, and possibly shipments from now to the end of the year will not gain much. The track accessory market is quiet, but inquiries are taking shape for tonnages needed to go with recent rail purchases. The light rail market is dull.

Prices f.o.b. mill, per gross ton: Standard section open-hearth and Bess. rails, $43; light rails, rolled from billets, $36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.15c.; angle bars, 2.75c.

Old Material.—The price structure of the Chicago scrap market is breaking down under pressure of over supplies of many grades and the insistent efforts of sellers to place tonnages in a market which is wholly in the hands of consumers. Heavy melting steel is being purchased freely by brokers at $13.75 a gross ton, delivered, and consumers have refused offers of this grade at $14. One local steel mill is said to have a heavy stock, while another large buyer gives the same impression to dealers as he steadfastly refuses to accept shipments. Incoming tonnages are giving much trouble to dealers, and accumulations are growing in local scrap yards. The cast iron boring market is unusually dull. Sellers who name new low prices are surprised to find that consumers are completely without interest in the market and decline to make counter offers. Notable among price changes this week is a drop of $1.25 a ton for frogs, switches and miscellaneous rails and $2.50 a ton for iron arch bars and transoms.

Prices deliv'd Chicago district consumers:

Per Gross Ton

Basic Open-Hearth Grades:	
Heavy melting steel	$13.75 to $14.25
Shoveling steel	13.75 to 14.25
Frogs, switches and guards, cut apart, and misc. rails	14.50 to 15.00
Hydraul. compressed sheets	12.00 to 12.50
Drop forge flashings	10.75 to 11.25
No. 1 busheling	12.00 to 12.50
Forg'd cast and r'l'd steel carwheels	18.50 to 19.00
Railroad tires, charg. box size	18.00 to 18.50
Railroad leaf springs cut apart	18.50 to 19.00
Acid Open-Hearth Grades:	
Steel couplers and knuckles	16.50 to 17.00
Coil springs	19.00 to 19.50
Electric Furnace Grades:	
Axle turnings	13.50 to 14.00
Low phos. punchings	16.00 to 16.50
Low phos. plates, 12 in. and under	16.00 to 16.50
Blast Furnace Grades:	
Axle turnings	11.50 to 12.00
Cast iron borings	9.50 to 10.00
Short shoveling turnings	9.50 to 10.00
Machine shop turnings	7.00 to 7.50
Rolling Mill Grades:	
Iron rails	15.50 to 16.00
Rerolling rails	16.00 to 16.50
Cupola Grades:	
Steel rails less than 3 ft.	16.50 to 17.50
Steel rails less than 2 ft.	19.50 to 20.00
Angle bars, steel	16.25 to 16.75
Cast iron carwheels	14.00 to 14.50
Malleable Grades:	
Railroad	16.50 to 17.00
Agricultural	14.50 to 15.00
Miscellaneous:	
*Relaying rails, 56 to 60 lb.	23.00 to 25.00
*Relaying rails, 65 lb. and heav.	26.00 to 31.00

Per Net Ton

Rolling Mill Grades:	
Iron angle and splice bars	15.00 to 15.50
Iron arch bars and transoms	18.00 to 18.50
Iron car axles	26.00 to 26.50
Steel car axles	16.50 to 17.00
No. 1 railroad wrought	13.00 to 13.50
No. 2 railroad wrought	12.25 to 12.75
No. 1 busheling	9.00 to 9.50
No. 2 busheling	7.00 to 7.50
Locomotive tires, smooth	14.50 to 15.00
Pipes and flues	10.00 to 10.50
Cupola Grades:	
No. 1 machinery cast	14.00 to 14.50
No. 1 railroad cast	13.00 to 13.50
No. 1 agricultural cast	12.25 to 12.75
Stove plates	12.25 to 12.75
Grate bars	11.75 to 12.25
Brake shoes	10.75 to 11.25

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Sheets.—Prices for black and galvanized sheets are giving ground in this district. Black sheets are now quotable in the range of 2.85c. to 2.95c. a lb., Gary, and the galvanized product is bringing 3.60c. a lb., Gary, on the bulk of current business. Shipments of most grades from Western mills are little changed from a week ago, but recent releases are lighter and forecast a revision downward in the rate of operations from the 85 per cent of capacity mark. Many manufacturers are close to the period of inventory taking, and the character of their orders indicates not only that stocks on hand are small, but that they are paring down incoming supplies as closely as possible. Sellers, believing that stocks are close to the minimum, feel that the loss in specifications is a direct reflection of the general business situation. Local mills are beginning to accumulate stocks, which have been negligible for several months.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 2.85c. to 2.95c.; No. 24 galv., 3.65c.; No. 10 blue ann'l'd, 2.35c. Deliv'd prices at other Western points are equal to the freight from Gary, plus the mill prices, which are 5c. per 100 lb. lower than Chicago delivered prices.

Reinforcing Bars.—Buyers' interest in this market is confined almost wholly to a moderate tonnage composed of miscellaneous small orders. Most promising among fresh inquiries is the 500 tons needed for the Henrotan Hospital, Chicago. Among the more active projects is the steel for the buildings which will be erected by Illinois at various institutions scattered throughout the State. Prices show no improvement, as they rest at the lowest level so far this year. The rail steel commodity seems well established at 2c. a lb., but billet steel reinforcing bars are weak, when quotations are made on attractive tonnages. Bending shops remain active at a normal fall rate.

Commissioner Charles H. March of the Federal Trade Commission will preside at the solid-section steel-window trade practice conference, which has been scheduled for Nov. 18 at the Chamber of Commerce of the United States.

Large Tonnages of Steel in Chicago Building

THE Merchandise Mart of Chicago, now in course of construction, which will be the world's largest building, will require 60,000 tons of structural steel, including 61,000 columns, girders and beams; 142 miles of pipe for the sprinkler system; 32½ miles of pipe for the steam heating system; 40 miles of plumbing pipe; 9,504,000 sq. ft. of steel wire reinforcement for floors, enough for a 100-mile highway 18 ft. wide; 60 tons of wire for 30,000 lighting fixtures, besides many other materials in similarly large quantities, such as 29,000,000 bricks and 132,000 sq. ft. of glass. Contracts for material were let some time ago.

New York

Pig Iron and Steel Buyers Cautious, and Sales are Light—Structural Steel Activity Outstanding

NEW YORK, Nov. 4.—Aside from accentuating the hesitancy of buyers, who had been cautious for some time, the stock market collapse has had little effect on the pig iron market. No suspensions of shipments are reported; on the contrary, pressure for deliveries has increased in some cases where melters allowed their stocks to drop even lower than recent low levels. Pig iron consumption is well sustained, though sales for the week, at 7000 tons, were below normal. In fact, excluding 3000 tons bought by the Thatcher Co., Newark, N. J., they were exceedingly light. The A. P. Smith Mfg. Co., East Orange, N. J., has closed against its inquiry for 300 tons. Very little fresh tonnage has come before the trade. In general, the price situation is unchanged, with $17.50, Buffalo, and $18.50, eastern Pennsylvania furnace, available on No. 2 plain. At points close to seaboard, competition with Southern iron has become more of a factor, with the result that Northern producers have been forced to shade their quotations at times. A tonnage of Northern barge iron stocked at a New Jersey port was recently sold at $19, yard, to meet the Southern price of $19 to $19.50, on docks, New York harbor. Stocks of iron on Northern furnace banks are not excessive; in fact, at Buffalo they are reported to be below normal. Offerings of surplus steel company iron have not increased materially, notwithstanding the recent recession in steel production.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	$22.41 to $22.91
*Buf. No. 2, del'd east. N. J.	20.78 to 21.28
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	19.89 to 21.02
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	20.39 to 21.52

Freight rates: $4.91 from Buffalo, $1.39 to $2.52 from eastern Pennsylvania.

*Prices delivered to New Jersey cities having rate of $3.28 a ton from Buffalo.

Reinforcing Bars.—The Jones & Laughlin Steel Corporation will furnish 1300 tons of bars for the new building of the United States Rubber Co. in Passaic, N. J., for which the Turner Construction Co. has the general contract. Five hundred tons for the Rockaway Beach boardwalk will be supplied by Carroll & McCreary. An award of 1000 tons for the new assembly plant of the Ford Motor Co. at Edgewater, N. J., is expected in the immediate future. Prices are fairly steady at 2.05c., New York.

Finished Steel.—There has been a noticeable hesitancy on the part of buyers in the past week, who are apprehensive in regard to the industrial outlook because of the unsettled condition of the stock market and the disturbing effect of the recent break in stock prices. Specifications and orders have been only fair and have receded somewhat from the level of the previous week. The rather confused situation has contributed to the weakening of prices in some items. Cold-finished bars are down $2 a ton to 2.20c., Pittsburgh, and plates are being sold at 2.17½c. to 2.22½c., New York. The black sheet price remains fairly steady at 2.75c., Pittsburgh. In galvanized sheets, some business is being booked at 3.40c. and 3.45c., but considerable sales are reported at 3.50c., Pittsburgh. Blue annealed stock is firm at 2.10c., Pittsburgh, for No. 10 gage. In an otherwise colorless market, structural steel activities continue a feature. The leading Eastern producer declares that structural business in October "was substantially greater than the bookings of recent months." The October tonnage of fabricated awards in metropolitan New York, compiled by the Structural Steel Board of Trade, is expected to be close to that of August, which was one of the best months of the year.

Mill prices per lb., deliv'd New York: Soft steel bars, 2.24c. to 2.29c.; plates, 2.17½c. to 2.22½c.; structural shapes, 2.14½c.; bar iron, 2.14c.

Warehouse Business.—The past week has brought a slight improvement in the volume of buying from stock, especially in sheets. Prices, however, are still subject to concessions of $1 to $2 a ton on black and galvanized and as much as $5 a ton and more on blue annealed. Demand for structural material from stock continues fair, but tonnages are not so large as a few weeks ago.

Cast Iron Pipe.—Although this is usually a quiet season, sellers of pressure pipe report that buying is even smaller than normal for the fall. With election approaching, municipalities are not inclined to cover requirements until results are known, and private buyers have been less active than usual. It is suggested in some quarters that lower money rates and a better market for municipal bonds may result in the undertaking of needed improvements, including extensions of gas and water service. Both Northern and Southern producers of pipe have but little tonnage booked ahead, and prices are still rather irregular. The city of New York is asking for contractors' bids for furnishing and laying several hundred tons of pipe. About 200 tons of water pipe has been booked by a large Northern maker for export to the Dutch West Indies.

Prices per net ton deliv'd New York: Water pipe, 6-in. and larger, $34.60 to $36.60; 4-in. and 5-in., $37.60 to $39.60; 3-in., $44.60 to $46.60. Class A and gas pipe $3 extra.

Coke.—New Jersey and New England by-product coke producers have opened their books for the first half of 1930 and have renewed a large number of foundry coke contracts subject to prices ruling at time of delivery. New England requirements for

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.30c.
Soft steel bars, small shapes	3.25c.
Iron bars	3.24c.
Iron bars, Swed. charcoal	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Cold-roll. strip, soft and quarter hard	5.15c. to 5.40c.
Hoops	4.25c.
Bands	3.75c.
Blue ann'l'd sheets (No. 10)	3.50c. to 3.90c.
Long terne sheets (No. 24)	5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galv. annealed	5.15c.
Tire steel, ½ x ½ in. and larger	3.40c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.75c.
Open-hearth spring steel, bases,	4.50c. to 7.00c.

	Per Cent Off List
Machine bolts, cut threads:	
¾ x 6 in. and smaller	60
1 x 30 in. and smaller	50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	60
¾ x 20 in. and smaller	50 to 50 and 10
Coach screws:	
½ x 6 in. and smaller	60
1 x 6 in. and smaller	50 to 50 and 10

	Per 100 Ft.
Boiler Tubes—	
Lap welded, 2-in.	$17.33
Seamless steel, 2-in.	20.24
Charcoal iron, 2-in.	25.00
Charcoal iron, 4-in.	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
⅛-in. butt	46	29
¼-in. butt	51	37
1-3-in. butt	53	39
2½-6-in. lap	48	35
7 and 8-in. lap	44	17
11 and 12-in. lap	37	12
Wrought Iron—		
⅛-in. butt	5	+19
¼-in. butt	11	+ 9
1-1½-in. butt	14	+ 6
2-in. lap	5	+14
3-6-in. lap	11	+ 6
7-12-in. lap	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box	$6.45	$6.20
Charcoal, per Box—	A	AAA
IC	$9.70	$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating	$10.00 to $11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets, Box Annealed—Black, C. R. One Pass

	Per Lb.
Nos. 18 to 20	3.75c. to 3.80c.
No. 22	3.90c. to 3.95c.
No. 24	3.95c. to 4.00c.
No. 26	4.05c. to 4.10c.
No. 28*	4.20c. to 4.25c.
No. 30	4.45c. to 4.50c.

Sheets, Galvanized

	Per Lb.
No. 14	4.20c. to 4.40c.
No. 16	4.15c. to 4.25c.
No. 18	4.20c. to 4.40c.
No. 20	4.30c. to 4.50c.
No. 22	4.40c. to 4.60c.
No. 24	4.65c. to 4.75c.
No. 26	4.90c. to 5.00c.
No. 28*	5.15c. to 5.25c.
No. 30	5.55c. to 5.65c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

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the first half are estimated at 150,000 tons. The stock market break has not affected coke specifications; in fact, shipments are showing their usual seasonal expansion. Standard furnace coke is unchanged at $2.75 a net ton, Connellsville, while beehive foundry grade ranges from $3.75 to $4.75, Connellsville. By-product foundry coke is quoted at $9 to $9.40 a net ton, Newark or Jersey City, and $10.06, New York or Brooklyn.

Old Material.—The larger consumers of scrap are still receiving sufficient tonnage on old contracts to satisfy their immediate needs and have not yet shown an inclination to cover their future requirements. Meanwhile, a substantial volume of material is available and brokers have reduced their buying price on No. 1 heavy melting steel to $15 a ton, delivered eastern Pennsylvania. Steel car axles are also off slightly and brokers have been able to buy recently at $21.25 a ton, delivered, on a $3.78 per ton freight rate to eastern Pennsylvania. Prices of other grades are unchanged, but lacking in strength.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel	$11.50 to $12.35
Heavy melting steel (yard)	8.00 to 9.50
No. 1 hvy. breakable cast	10.25 to 11.00
Stove plate (steel works)	8.00
Locomotive grate bars	8.25
Machine shop turnings	7.50 to 7.75
Short shoveling turnings	7.50 to 7.75
Cast borings (blast fur. or steel works)	7.00 to 7.75
Mixed borings and turnings	6.75 to 7.75
Steel car axles	17.50 to 18.00
Iron car axles	22.50 to 23.00
Iron and steel pipe (1 in. dia., not under 2 ft. long)	10.25
Forge fire	9.50 to 10.00
No. 1 railroad wrought	12.00 to 12.50
No. 1 yard wrought, long	11.00 to 11.50
Rails for rolling	12.75 to 13.25
Stove plate (foundry)	8.25 to 8.50
Malleable cast (railroad)	13.50 to 14.00
Cast borings (chemical)	9.50 to 10.00

Prices per gross ton, deliv'd local foundries:

No. 1 machry. cast	$16.00
No. 1 hvy. cast (columns, bldg. materials, etc.), cupola size	14.00
No. 2 cast (radiators, cast boilers, etc.)	13.50

Cleveland

Steel Consumers Ordering More Sparingly and Some Prospective Business Has Been Held Up—Output Curtailed

CLEVELAND, Nov. 4.—The steel market has been affected by the break in the stock market to the extent that consumers are ordering more sparingly than heretofore and the placing of some prospective business has been held up. As buying had already been greatly curtailed, the immediate effect of the decline in stocks probably was much less than it would have been had the steel market been more active. A feeling of hesitancy and caution has developed, which likely will have an influence on buying for some time.

A favorable factor of the situation is that steel prices have not suffered to any appreciable extent from conditions that developed during the week. There has been some further curtailment in this territory in open-hearth operations, which are down to about 75 per cent. Sheet and strip mill operations are spotty, the average by independent mills being 60 to 65 per cent.

There has been some further curtailment in the automotive industry, which is expected to move at a rather slow pace during the remainder of the year. However, the Ford Motor Co. continues to purchase steel in fair volume and the Chevrolet Motor Co. this week began to take shipments of body sheets for its new models, enabling some of the mills to increase operations.

Pig Iron.—Buying is limited to small lots for early shipment. Sales by Cleveland interests during the week aggregated 9500 tons, or about the same as during the previous week. Consumers are taking no interest in first quarter contracts and producers are making no effort to make sales for that delivery. November has started with a light volume of shipping orders. Producers do not look for much improvement in the demand from the automotive industry before December. Stove and radiator foundries are taking a fair amount of iron. Jobbing foundries are not doing so well as recently. Ohio foundries maintained 102 per cent of normal operations during September, as compared with 109 per cent in August and 90 per cent in September, last year, according to the monthly report of the Ohio Foundries Association, based on returns from 39 foundries. Prices are steady and unchanged at $18.50, Cleveland, for foundry and malleable iron for outside shipment and at $19, furnace, for local delivery and $19.50 to $20 for Michigan delivery.

Prices per gross ton at Cleveland:

N'th'n fdy., sil. 1.75 to 2.25	$19.50
S'th'n fdy., sil. 1.75 to 2.25	$20.50 to 21.00
Malleable	19.50
Ohio silvery, 8 per cent	28.00
Basic Valley furnace	18.50
Stand. low phos., Valley	26.50 to 27.00

Prices except on basic and low phosphorus are delivered Cleveland. Freight rates: 50c. from local furnaces; $3 from Jackson, Ohio; $6 from Birmingham.

Iron Ore.—Water shipments of Lake Superior ore up to Nov. 1 amounted to 61,253,954 gross tons, an increase of 11,534,023 tons over the total for the same period last year. Shipments during October were 7,989,127 tons, a decrease of 464,825 tons as compared with October last year. Bad weather interfered somewhat with the October movement. Shipments to Nov. 1 broke all previous records of water shipments for the season except in 1916 and 1917. The peak was reached in the former year with a water movement of 64,734,198 tons. Whether this record will be broken this year depends to a considerable extent on weather conditions this month. The November movement, according to present estimates, will be about 3,500,000 tons, and if that tonnage is moved, water shipments for the year will slightly exceed the former high record.

Semi-Finished Steel.—With curtailment of the demand, some producers would like to take on additional business, but inquiry is lacking. Specifications for sheet bars are fair, but slabs are moving slowly because of the light operations by the hot-rolled strip mills. The leading local producer is still operating 11 of its 14 open-hearth furnaces, with enough orders on its books to keep operating seven days. Prices are steady at $35, Cleveland and Youngstown, for sheet bars, billets and slabs.

Bars, Plates and Shapes.—Structural shapes continue in fair demand, being more active than steel bars and plates. However, plate inquiries have improved, being largely for tank work in lots up to 400 tons. The Cleveland water pipe inquiry requiring 3000 tons is still pending. Steel bar tonnage is fair except from the automotive industry. In the building field a 3300-ton award for an Akron department store has been made. Steel bars are unchanged at 1.90c., Cleveland. Shapes and plates range from 1.90c. to 1.95c., Pittsburgh, the lower price being named by some mills to large tonnage buyers.

Sheets.—New orders are scarce for all grades. Most consumers have fair stocks and are reducing their inventories. The aggregate tonnage coming from the automotive industry is light. Local plants making miscellaneous stampings are operating at about 55 per cent, while those making automobile stampings are running at not above 30 per cent of capacity. Business is slow with manufacturers of metal partitions and other building material. Weakness in blue annealed sheets has become more pronounced and quotations of 2.25c. for No. 13 and 2.10c. for No. 10 are more common. Some of the continuous mills are naming a 10c. per 100 lb. differential below the

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and struc. shapes	3.00c.
Soft steel bars	3.00c.
Reinforc. steel bars	2.25c. to 2.50c.
Cold-fin. rounds and hex	3.65c.
Cold-fin. flats and sq	4.15c.
Hoops and bands, No. 12 to ¼ in., inclusive	3.25c.
Hoops and bands, No. 13 and lighter	3.65c.
Cold-finished strip	*5.95c.
Black sheets (No. 24)	3.70c. to 3.90c.
Galvanized sheets (No. 24)	4.60c. to 4.75c.
Blue ann'l'd sheets (No. 10)	3.25c.
No. 9 ann'l'd wire, per 100 lb	$2.65
No. 9 gal. wire, per 100 lb	3.00
Com. wire nails, base per keg	2.65

*Net base, including boxing and cutting to length.

regular quotations, and some of the jobbing mills are meeting this concession. Weakness has developed in galvanized sheets, which range from 3.40c. to 3.50c., Pittsburgh. Black sheets are firm at 2.75c.

Strip Steel.—Very little new business is coming out in either hot or cold-rolled strip. The automotive industry is ordering only in small lots for early needs. Regular quotations on hot-rolled material are being well maintained, although these have not been tested recently on round lots. Concessions to 2.65c., Cleveland, are reported on cold-rolled strip, but these are not common.

Wire Products.—The nail market has a firmer tone than recently. While sales are light, the $2.40 per keg price is being adhered to. Demand for wire continues dull, and the regular price is well maintained.

Cold-Finished Steel Bars.—A price reduction of $2 a ton to 2.20c., Cleveland and other basing points, is announced, effective Nov. 10. Fourth quarter contracts will be revised to the new price. Specifications continue light.

Old Material.—Activity is at a minimum because mills are taking very little scrap. Dealers are having difficulty in disposing of material they are anxious to move, and prices on some grades are weaker. One local mill is now taking no scrap of any grade, having cut off on blast furnace material during the week. Valley district mills have cut down on scrap shipments materially. Machine shop turnings have declined 25c. a ton. Short shoveling turnings are holding to recent quotations, one fair-sized lot having been sold during the week at $12. A small lot of low phosphorus forging crops brought $18. Cast scrap declined 50c. a ton. Heavy melting steel has been offered in the Valley district at $16.75.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$14.50 to $15.00
No. 2 heavy melting steel	14.25 to 14.50
Compressed sheet steel	14.75 to 15.25
Light bundled sheet stampings	12.00 to 12.50
Drop forge flashings	13.00 to 13.25
Machine shop turnings	10.00 to 10.25
Short shoveling turnings	11.50 to 12.00
No. 1 railroad wrought	13.50 to 14.00
No. 2 railroad wrought	16.00 to 16.50
No. 1 busheling	13.25 to 13.75
Pipes and flues	9.00 to 9.50
Steel axle turnings	12.50 to 13.00
Acid Open-Hearth Grades:	
Low phos., forging crops	17.75 to 18.00
Low phos., billet, bloom and slab crops	18.50 to 18.75
Low phos., sheet bar crops	18.00 to 18.50
Low phos., plate scrap	18.00 to 18.50
Blast Furnace Grades:	
Cast iron borings	10.50 to 11.00
Mixed borings and short turnings	10.50 to 11.00
No. 2 busheling	10.00 to 10.50
Cupola Grades:	
No. 1 cast	17.00 to 17.50
Railroad grate bars	11.00 to 12.00
Stove plate	12.00 to 12.50
Rails under 3 ft	18.50 to 19.50
Miscellaneous	
Railroad malleable	18.00 to 18.50
Rails for rolling	16.25 to 16.50

Philadelphia

Concessions of $1 On Plates—High-Finished Sheet Prices Lack Strength—Jobbers Reduce Sheets

PHILADELPHIA, Nov. 4.—Plate prices show a tendency to sag $1 a ton, but eastern Pennsylvania producers are still quoting 2.05c., Coatesville, with concessions for desirable business. Shape mills continue well engaged, but prices lack strength. Among the smaller buyers of iron and steel, a considerable degree of caution has developed as a result of the unsettled condition of the stock market, and there is a strong inclination to delay purchasing to determine what reaction, if any, has developed in their particular lines. Consumers of high-finished sheets report having received concessions in the usual extras charged for these grades. Jobbers in this district have reduced warehouse prices for black and galvanized sheets $4 a ton and cold-finished steel prices $2 a ton.

Pig Iron.—Shipments on contracts are going forward with few requests by consumers for delay, but buyers show no inclination to cover forward requirements. One local consumer of foundry iron, in the market for 1000 tons of foundry iron for more than two months, has been covering immediate needs by purchasing carload lots and expects to continue this policy for the remainder of the year. Eastern Pennsylvania furnaces quote $21, base furnace, for foundry iron, occasionally shading this price 50c. a ton on desirable orders.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil.	$21.26 to $21.76
East. Pa. No. 2X, 2.25 to 2.75 sil.	21.76 to 22.26
East. Pa. No. IX	22.26 to 22.76
Basic (del'd east. Pa.)	19.75 to 20.25
Gray forge	20.00 to 20.50
Malleable	21.25 to 21.75
Stand. low phos. (f.o.b. N. Y. State furnace)	22.00 to 23.00
Cop. br'g low phos. (f.o.b. furnace)	23.50 to 24.00
Va. No. 2 plain, 1.75 to 2.25 sil.	22.29
Va. No. 2X, 2.25 to 2.75 sil.	22.79

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces; $4.54 from Virginia furnaces.

Bars.—Buying is limited to small lots and specifications against current contracts, which have been revised to 1.90c. a lb., Pittsburgh, or 2.22c., delivered Philadelphia.

Reinforcing Bars.—Projects involving substantial bar tonnages are pending award, including about 200 tons for the Farm Show Building, Harrisburg, Pa., and 400 tons for the Convention Hall, Philadelphia. A proposed hydroelectric development, including a $4,300,000 dam at Safe Harbor, Pa., will require a sizable tonnage of reinforcing bars. The general contractor is the Arundel Corporation, Baltimore. Prices are unchanged, with billet steel bars quoted at 1.95c. to 2c., Pittsburgh, or 2.27c. to 2.32c., delivered Philadelphia, and no extra for cutting to length. Rail steel bars range from 1.85c. to 1.95c., Franklin, Pa., and Tonawanda, N. Y., or 2.17c. to 2.27c., delivered Philadelphia, with no extra for cutting to length.

Shapes.—Fabricators are well engaged and in some instances have enough tonnage on their books to carry them through the winter. The Pottstown, Pa., fabricating shop of the McClintic-Marshall Co. made a record output of steel in October, with more than 20,000 tons shipped. Despite the good volume of business in the market, fabricators' quotations and prices of plain material lack strength. The market on shapes ranges from 1.90c. to 2c., f.o.b. nearest mill to consumer, or 1.96c. to 2.06c., delivered Philadelphia. Occasionally the lower price is shaded on desirable business.

Plates.—Desirable tonnages have recently brought out concessions of $1 a ton from 2.05c. a lb., Coatesville, Pa., but the old price is being maintained by eastern Pennsylvania mills on most of the current small business. Some substantial plate business is in prospect, including 5000 tons or more for locomotives for the Pennsylvania Railroad to be built by the Baldwin Locomotive Works and in the railroad's shops at Altoona, Pa., and about 12,000 tons each for two passenger vessels for the United States Lines, bids on which will be opened Nov. 15.

Sheets.—Local consumers of sheets are providing only a small volume of business, but prices are substantially unchanged. Black sheets are generally quoted at 2.75c., base Pittsburgh, or 3.07c., delivered Philadelphia, but buyers of high-finished sheets say they are able to obtain reductions in the usual extras. Galvanized sheets are quiet at 3.50c., Pittsburgh, or 3.82c., Philadelphia. Blue annealed sheets are quoted at 2.35c., Pitts-

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.70c.
Plates, ⅜-in.	2.90c.
Structural shapes	2.70c.
Soft steel bars, small shapes, iron bars (except bands)	2.80c.
Round-edge iron	3.50c.
Round-edge steel, iron finished 1½ x 1½ in.	3.50c.
Round-edge steel planished	4.30c.
Reinforc. steel bars, sq. twisted and deform.	2.60c. to 2.80c.
Cold-fin. steel, rounds and hex	3.50c.
Cold-fin. steel, sq. and flats	4.00c.
Steel hoops	3.55c.
Steel bands, No. 12 to ⅜-in. inclus.	3.30c.
Spring steel	5.00c.
*Black sheets (No. 24)	3.90c.
†Galvanized sheets (No. 24)	4.65c.
Light plates, blue annealed (No. 10)	3.25c.
Blue ann'l'd sheets (No. 13)	3.40c.
Diam. pat. floor plates—	
¼-in.	5.30c.
⅜-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

*For 50 bundles or more; 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.
†For 50 bundles or more; 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

burgh, or 2.67c., Philadelphia, for No. 13 gage and blue annealed plates, No. 10 gage are quoted at 2.20c., Pittsburgh, or 2.52c., delivered Philadelphia. To automotive and other preferred buyers, or when competition is encountered from the product of the continuous mill, concessions of about $2 a ton are offered.

Warehouse Business.—October buying was limited to small tonnages of material, but the total compared favorably with that of September, and in profits the month was one of the best of the year for certain jobbers. Effective Nov. 1, black and galvanized sheet prices were reduced $4 a ton to 3.90c. a lb., base, for black and 4.65c., base, for galvanized. On Nov. 2, cold-finished steel prices were reduced $2 a ton to 3.50c. a lb. for rounds and hexagons and 4c. for squares and flats.

Imports.—In the week ended Nov. 2, 615 tons of chrome ore arrived at this port from British South Africa and 76 tons of pig iron was received from Sweden. Steel arrivals consisted of 224 tons of structural shapes from Germany, 66 tons from Belgium and 11 tons from France, 45 tons of chrome steel rods from Sweden, 42 tons of steel bars from Belgium and 54 tons from Sweden, 4 tons of steel bands from Belgium, 48 tons of steel billets from Sweden, 17 tons of steel scrap from the United Kingdom and 4 tons from Germany.

Old Material.—Prices of all grades lack strength, but there have been no transactions of consequence with consumers to test the market. Mills are receiving heavy melting steel on old contracts and show no haste to cover future requirements. Machine shop turnings are off 50c. a ton to $11.50 a ton, delivered, and heavy breakable cast is not quotable at more than $14.50 a ton.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	$15.50 to $16.00
Scrap T rails	15.00 to 15.50
No. 2 heavy melting steel	12.50 to 14.00
No. 1 railroad wrought	16.00 to 16.50
Bundled sheets (for steel works)	11.50
Hydraulic compressed, new	14.50 to 15.00
Hydraulic compressed, old	12.00 to 12.50
Machine shop turnings (for steel works)	11.50
Heavy axle turnings (or equiv.)	14.00 to 14.50
Cast borings (for steel works and roll. mill)	11.00 to 11.50
Heavy breakable cast (for steel works)	14.50
Railroad grate bars	12.00 to 12.50
Stove plate (for steel works)	12.00
No. 1 low phos., hvy., 0.04% and under	22.00 to 23.00
Couplers and knuckles	19.50 to 20.50
Rolled steel wheels	19.50 to 20.50
No. 1 blast f'nace scrap	10.50 to 11.00
Wrot. iron and soft steel pipes and tubes (new specific.)	14.50
Shafting	19.00 to 19.50
Steel axles	22.75 to 23.25
No. 1 forge fire	14.00
Cast iron carwheels	16.50
No. 1 cast	16.00 to 16.50
Cast borings (for chem. plant)	14.50
Steel rails for rolling	16.50 to 17.00

Railroad Equipment

Missouri Pacific Inquiring for 2304 Cars

INQUIRIES appeared the past week for 125 locomotives of which 30 are for the Missouri Pacific, 30 for the St. Louis-San Francisco, 40 for the Rock Island and 25 for the Wabash. The Missouri Pacific also is asking for bids on 2304 cars. Although car orders have been light, there are total outstanding inquiries for 14,000 freight cars, for which contracts are expected to be placed before the end of the year. Details of the week's business follow:

Missouri Pacific will buy five Mountain type locomotives, 25 freight locomotives, 1250 50-ton box cars, 1000 70-ton hopper cars, 10 all-steel parlor coaches, six dining parlor cars, three dining-club cars and 35 steel underframe caboose cars.

Chicago & North Western has ordered 100 underframes from American Car & Foundry Co.

St. Louis-San Francisco will buy 30 Mikado type locomotives.

Rock Island is in the market for 40 4-8-4 locomotives.

Wabash is asking for prices on 25 4-8-4 type locomotives.

Nashville, Chattanooga & St. Louis has ordered five 4-8-4 type locomotives from the American Locomotive. Co.

Newburgh & South Shore has placed an order for one six-wheel switching locomotive with the Baldwin Locomotive Works.

Baltimore & Ohio has ordered 50 passenger cars from the Pullman Car & Mfg. Corporation.

New York, Chicago & St. Louis has bought 10 caboose cars from the Canton Car Co.

Transcontinental Oil Co. is reported to have ordered 100 tank cars from the American Car & Foundry Co.

United Fruit Co. has ordered 100 banana cars and 80 superstructures from the Magor Car Corporation.

Pittsburgh Iron and Steel Market

(*Concluded from Page* 1264)

coal quotations are very low on the average.

Old Material.—A weaker tone is in evidence in the scrap market this week, but No. 1 heavy melting steel is not quotable at less than last weeks' range of $17 to $17.50. A tonnage of railroad steel bought this week by a mill in the district brought within a few cents of the higher figure, but weakness is still shown by the ability of dealers to pick up scrap against recent orders at as low as $16.50. A small sale of hydraulic compressed sheets brought about $17, and this commodity is probably stronger at $16.75 to $17.25 than heavy melting steel at the higher figures. The lighter grades are quoted at unchanged prices. Specialties are fairly strong, as shipments to steel foundries are keeping up and business on the books of these companies promises a good operation over the remainder of the year. One large steel company has held up shipments against all its scrap contracts, and others are taking steel only in limited tonnages. This position is justified in view of the continued downward trend of open-hearth operations.

Prices per gross ton delivered consumers yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$17.00 to $17.50
No. 2 heavy melting steel	15.00 to 15.50
Scrap rails	16.00 to 16.50
Compressed sheet steel	16.75 to 17.25
Bundled sheets, sides and ends	15.50 to 16.00
Cast iron carwheels	15.50 to 16.00
Sheet bar crops, ordinary	18.50 to 19.00
Heavy breakable cast	12.00 to 12.50
No. 2 railroad wrought	17.00 to 17.50
Hvy. steel axle turnings	16.00 to 16.50
Machine shop turnings	11.50 to 12.00
Acid Open-Hearth Grades:	
Railr. knuckles and couplers	20.50 to 21.00
Railr. coil and leaf springs	20.50 to 21.00
Rolled steel wheels	20.50 to 21.00
Low phos. billet and bloom ends	21.50 to 22.00
Low phos., mill plates	21.50 to 22.00
Low phos., light grades	20.50 to 21.50
Low phos., sheet bar crops	21.50 to 22.00
Heavy steel axle turnings	16.00 to 16.50
Electric Furnace Grades:	
Low phos., punchings	19.50 to 20.50
Hvy. steel axle turnings	16.00 to 16.50
Blast Furnace Grades:	
Short shoveling steel turnings	12.00 to 12.50
Short mixed borings and turnings	12.00 to 12.50
Cast iron borings	12.00 to 12.50
Rolling Mill Grades:	
Steel car axles	21.50 to 22.00
Cupola Grades:	
No. 1 cast	15.00 to 16.00
Rails 3 ft. and under	19.00 to 20.00

Production of Pig Iron and Steel in Canada

	September, 1929	August, 1929	September, 1928
Pig iron, gross tons	98,816	112,528(a)	90,516
Pig iron, gross tons, nine months	829,687	.....	745,473
Ferroalloys, gross tons	7,131	7,178	.....
Ferroalloys, gross tons, nine months	57,932	.....	23,414
Steel ingots, gross tons	93,584	113,422	.....
Steel ingots, gross tons, nine months	1,033,854	.....	.....
Steel castings, gross tons	5,416	6,860	.....
Steel castings, gross tons, nine months	54,097	.....	.....
Total steel, gross tons, nine months	1,087,951	.....	919,710

(a) High record production.

Beginning with January, 1930, the *National Waste Review* will be published monthly by the National Association of Waste Material Dealers, Times Building, New York. Beginning as a publication of about 60 pages, it will combine all the present publications of the association, including the Salvage and Reclamation Bulletin. The new publication will be available to members and non-members.

Pacific Coast

Pipe Line in Oregon Takes 2000 Tons of Plates—Structural Steel Market Continues Active

SAN FRANCISCO, Nov. 2 (*By Air Mail*).—Outstanding developments in the Pacific Coast iron and steel markets this week were the absorption by the United States Steel Corporation of the properties of the Columbia Steel Corporation, the award of 2000 tons of plates for a pipe line in Oregon, the placing of 800 tons of structural shapes for an office building addition in Los Angeles, and the letting of 1200 tons of reinforcing steel bars for a pulp plant addition at Camas, Wash.

Plans for the development of the Columbia properties by the Steel Corporation have not been announced, but it is said here that the Pittsburg, Cal., plant will be enlarged to twice its present capacity. Now that this deal has been consummated, more is heard on all sides regarding the possibility of the Pacific Coast Steel Co., with plants at Seattle, San Francisco and Los Angeles, selling out to an independent producer.

Pig Iron.—Demand for foundry pig iron has shown little sign of improvement. Upward of 2000 tons of Indian iron arrived recently. About two-thirds was taken by Los Angeles district melters and a third by San Francisco users. Prices are unchanged.

Prices per gross ton at San Francisco:

*Utah basic	$25.00 to $26.00
*Utah fdy., sil. 2.75 to 3.25	25.00 to 26.00
**Indian fdy., sil. 2.75 to 3.25	25.00 to 26.00

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Bars.—Merchant bar steel demand remains quiet, with the majority of sales and inquiries involving small tonnages. Prices continue fairly firm at 2.35c., c.i.f., Coast ports. Important lettings included 1000 tons for a warehouse and 550 tons for a pier, both in San Francisco, and 1200 tons for a pulp plant addition for the Crown Willamette Paper Co., in Washington, all placed with the Pacific Coast Steel Co. A theater in Stockton, Cal., involving 150 tons, a nurses' home in Portland and a factory at St. Helens, Ore., the latter two involving 200 tons and 300 tons, respectively, were placed with the Truscon Steel Co. Pending business is of fair proportions, and new inquiries include 400 tons for a veterans' memorial at Yountville, Cal. No change in out-of-stock prices has occurred.

Plates.—Demand for plates has shown signs of improvement, and awards this week totaled more than 3000 tons. The Steel Tank & Pipe Co. took 2000 tons for a pipe line to be laid between Salem and Portland, Ore. The Willamette Iron & Steel Works booked 170 tons for a digester for the Crown Willamette Paper Co., Camas, Wash., and the Commercial Boiler Works secured 425 tons for five digesters for the Olympic Forest Products Co., Port Angeles, Wash.; 375 tons for drum gates and 550 tons for a penstock for the Lake Cushman dam project, Tacoma, Wash. No action has yet been taken on 1400 tons for the Everett, Wash., pipe line. Seattle is calling for bids on 370 tons for the Cedar River No. 2 pipe line. Prices are not firm at 2.35c., c.i.f.

Shapes. — Demand for structural steel shapes continues undiminished, and some fair-sized lots were placed during the week. The McClintic-Marshall Co. secured 335 tons for an apartment house in San Francisco; the Judson-Pacific Co. took 100 tons for a skating rink in Oakland, and the Consolidated Steel Corporation booked 800 tons for the California Bank addition, Los Angeles. Bids will soon be called for on 14,000 tons for the Lake Union bridge at Aurora Avenue, Seattle, and on 300 tons for an addition to the Southern Pacific Co.'s hospital in San Francisco. Plain material is firm at 2.35c., c.i.f.

Cast Iron Pipe.—Sales of cast iron pipe this week involved only two projects in excess of 100 tons. Los Angeles awarded P. P. Janich 100 tons of 4 to 10-in. Class B pipe for Olive Street, and San Diego placed 112 tons of 4 to 8-in. Class B pipe with the R. E. Hazard Contracting Co. for Estelle Street. The East Bay Municipal Utility District, Oakland, Cal., will open bids on Nov. 13 for 147 tons of 8 and 16-in. Class B and 150 pipe. The American Cast Iron Pipe Co. was low bidder on 261 tons of 6 and 8-in. Class B pipe for Burbank, Cal.

Steel Pipe.—Little of importance took place in the market for standard steel pipe, line pipe and oil country goods during the week. The Santa Fe Pipe & Supply Co. secured 243 tons of 1 to 8-in. black and galvanized steel pipe for Los Angeles.

Coke.—A shipment of 6000 tons of English beehive and by-product coke is due to arrive on the Coast about Jan. 5.

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and struc. shapes	3.30c.
Soft steel bars	3.30c.
Small angles, ⅞-in. and over	3.15c.
Small angles, under ⅞-in.	3.55c.
Small channels and tees, ¾-in. to 2½-in.	3.75c.
Spring steel, ¼-in. and thicker	5.00c.
Black sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.80c.
Galv. sheets (No. 24)	5.30c.
Struct. rivets, ½-in. and larger	5.65c.
Com. wire nails, base per keg	$3.40
Cement c't'd nails, 100 lb. keg	3.40

Canada

Spot Pig Iron Buying in Good Volume

TORONTO, Ont., Nov. 4.—Spot pig iron buying continues in good volume in the Canadian markets. Melters are taking in large shipments. Forward buying has virtually ceased, most melters who buy in this way being covered to the end of the year. There has been very little curtailment in the daily iron melt. Foundries are mostly running close to capacity. Local blast furnace representatives point out that business is about 10 per cent in excess of that done last year. Prices are firm.

Prices per gross ton:

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75	$23.60
No. 2 fdy., sil. 1.75 to 2.25	23.10
Malleable	23.60
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75	$25.00
No. 2 fdy., sil. 1.75 to 2.25	24.50
Malleable	25.00
Basic	23.50
Imported Iron, Montreal Warehouse	
Summerlee	$33.50
Carron	33.00

Structural Steel.—While the demand for building steel is on the decline, fabricators are still carrying large tonnages of unfilled orders, and all plants are running at capacity. Shipments on contract account are at a high average, and there is sufficient new business, in small tonnages, to maintain good shipments on spot account.

Old Material.—Mills continue to buy sparingly, with the result that the demand for steel grades is quiet both in the Toronto and Montreal markets. Iron grades have a steady call, but tonnages involved are smaller than those of a month or six weeks ago. Dealers are accumulating supplies against winter needs. Prices are unchanged.

Dealers' buying prices:

	Per Gross Ton	
	Toronto	Montreal
Heavy melting steel	$10.00	$8.50
Rails, scrap	11.00	9.00
No. 1 wrought	10.00	12.00
Machine shop turnings	7.50	5.00
Boiler plate	7.50	6.00
Heavy axle turnings	8.00	7.50
Cast borings	7.50	5.00
Steel borings	7.50	6.50
Wrought pipe	6.00	6.00
Steel axles	15.00	20.00
Axles wrought iron	17.00	22.00
No. 1 machinery cast	....	17.00
Stove plate	....	13.00
Standard carwheels	....	16.00
Malleable	....	13.00
	Per Net Ton	
No. 1 mach'ry cast	$16.00	....
Stove plate	12.00	....
Standard carwheels	15.00	....
Malleable scrap	14.00	....

Boston

Pig Iron Sales for Week Not More Than 3000 Tons—Scrap Buyers Staying Out of Market

BOSTON, Nov. 5.—With the gyrations of the stock market uppermost in the minds of most people, scant attention was given to pig iron the past week. Sales, most of them in car lots, in the aggregate did not exceed 3000 tons, and were fairly well divided among the Mystic Iron Works, Buffalo, and New York and Alabama stacks. It is more apparent that fairly recent sales by Alabama furnaces were sufficiently large to take care of some melters' requirements until Jan. 1 at least. It is now reported that the Rhode Island melter that bought 1000 tons of malleable iron paid less than the equivalent of $17 a ton, Buffalo.

Foundry iron prices per gross ton deliv'd to most New England points:

†Buffalo, sil. 1.75 to 2.25	$21.55 to $22.05
†Buffalo, sil. 2.25 to 2.75	22.05 to 22.55
*Buffalo, sil. 1.75 to 2.25	22.41 to 22.91
*Buffalo, sil. 2.25 to 2.75	22.91 to 23.41
East. Penn., sil. 1.75 to 2.25	22.65 to 23.15
East. Penn., sil. 2.25 to 2.75	23.15 to 23.65
Va., sil. 1.75 to 2.25	25.21
Va., sil. 2.25 to 2.75	25.71
*Ala., sil. 1.75 to 2.25	24.11
*Ala., sil. 2.25 to 2.75	24.61
†Ala., sil. 1.75 to 2.25	20.25
†Ala., sil. 2.25 to 2.75	20.75

Freight rates: $4.91 all rail from Buffalo, and $4.05 rail and water; $3.65 all rail from eastern Pennsylvania; $5.21 all rail from Virginia; $9.61 all rail from Alabama and $5.75 rail and water from Alabama to New England seaboard.
*All rail rate.
†Rail and water rate.

Cast Iron Pipe.—Current buying of pipe is largely private and in car lots. The Warren Foundry & Pipe Co. will furnish 150 tons of 6 and 8-in. pipe for a State job at Westfield, Mass., the largest individual order of the week. The Watertown Arsenal will close bids Nov. 7 on 100 tons of pipe and fittings. Indications are that welded steel pipe will be used for the Associated Gas & Electric Co.'s 25-mile line between Sherborn and Shrewsbury, Mass. Because of the sizable tonnages placed the past month in the New York territory, foundries are holding prices more firmly in New England. Prices quoted openly on domestic pipe are: 4-in., $44.10 to $45.10 a ton, delivered common Boston freight rate points; 6 to 12-in., $40.10 to $41.10; 16 to 20-in., $39.60. A $4 differential is asked on Class A and gas pipe. Imported pipe has not been much of a factor in this market of late.

Warehouse Business. — Following the recent cut of 20c. a keg in wire nail prices, the market has recovered 5c., making the stock price $3.25 a keg, base. In car lot shipments from mill the base price is $2.50 a keg, and less than car lots, $2.75. Staples and other wire products also have been advanced 5c. per 100 lb. Individual orders for iron and steel placed with warehouses continue small, but the weekly aggregate tonnage involved is representative. Prices remain more or less unsettled owing to keen competition for business.

Old Material.—The feature of the old material market the past week was the announcement that a steamer will start to load 3000 tons here Nov. 5, presumably for Danzig, and that between Nov. 15 and 20 another steamer will load 3000 to 3500 tons for Czechoslovakia. Pennsylvania steel mills are still staying out of the market, and owners of scrap are not interested in prevailing prices; consequently the market is more or less deadlocked.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$10.75 to $11.25
Scrap T rails	10.50 to 10.75
Scrap girder rails	9.50 to 10.00
No 1 railroad wrought	10.50 to 11.00
No. 1 yard wrought	9.00 to 9.50
Machine shop turnings	6.50 to 7.00
Cast iron borings (steel works and rolling mill)	6.00 to 6.50
Bundled skeleton, long	9.00 to 9.50
Forge flashings	9.50 to 10.00
Blast furnace borings and turnings	6.00 to 6.25
Forge scrap	8.50 to 9.00
Shafting	14.00 to 14.25
Steel car axles	17.50 to 18.00
Wrought pipe 1 in. in diameter (over 2 ft. long)	9.00 to 9.50
Rails for rolling	12.00 to 12.50
Cast iron borings, chemical	9.50 to 9.75
Prices per gross ton deliv'd consumers' yards:	
Textile cast	$14.00 to $14.50
No. 1 machinery cast	15.00 to 15.25
No. 2 machinery cast	13.00 to 13.25
Stove plate	11.00 to 11.50
Railroad malleable	18.50 to 19.00

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars, small shapes	3.265c.
Flat, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway rounds	6.60c.
Norway squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tie steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold-rolled steel—	
Rounds and hex	*3.55c. to 5.55c.
Squares and flats	*4.05c. to 7.05c.
Tool steel	6.00c.
Rivets, structural or boiler	4.50c.

	Per Cent Off List
Machine bolts	50 and 5
Carriage bolts	50 and 5
Lag screws	50 and 5
Hot-pressed nuts	50 and 5
Cold-punched nuts	50 and 5
Stove bolts	70 and 10

*Including quantity differentials.

Birmingham

Steel Business Continues Fairly Good—21 of 23 Open-Hearths in District Active

BIRMINGHAM, Nov. 4.—The pig iron market has experienced another quiet week. Liberal orders for the fourth quarter, placed some weeks ago by many local consumers, have taken care of their probable requirements, so current sales are confined largely to foundries that usually buy on a hand-to-mouth basis. Inquiries are light. Furnace interests have given no indication as to when books will be opened for the first quarter. A further reduction in stocks was effected during October by the large shipments on previous sales to Eastern and Middle Western points. Quotations remain firm at $14.50. No change in furnace operations has occurred in the past three weeks. Of the 15 active furnaces, seven are on foundry iron, seven on basic and one on recarburizing iron.

Prices per gross ton, f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil	$14.50
No. 1 fdy., 2.25 to 2.75 sil	15.00
Basic	14.50

Finished Steel.—There was a slight increase in backlogs during October despite the high rate of mill operations. Backlogs are sufficient to extend operations into December at the present rate without the addition of further tonnage. The present activity in bars, plates and structural shapes has been unequaled for some time. The sheet business is considered extra good for this time of the year. Specifications on contracts continue at a brisk rate. Tonnage on books of structural steel fabricators is the best in several weeks. New bookings of the Virginia Bridge & Iron Co. include 1400 tons for the Louisiana Steam Products power plant at Baton Rouge, La., and 860 tons for a passenger station for the Nashville, Chattanooga & St. Louis Railway Co. at Atlanta, Ga. Twenty-one of the 23 open hearths in the district are active.

Cast Iron Pipe.—Several good tonnages are up for awards, but buyers are slow in placing contracts. Tonnages for which bids were opened last week and other contracts still pending include 4000 tons for Dallas, Tex.; 2000 tons for Kansas City, Mo.; three miles of 8 to 12-in. pipe for Murfreesboro, Tenn., and small projects at Dayton and Jonesboro, Tenn. Inquiries have been received on two or three fair-sized projects for distant points. Backlogs were greatly reduced during October, and immediate tonnage is needed in some cases to support operations. Prices are unchanged from $37 to $38, base, for 6-in. and larger diameters.

Coke.—New business in the foundry coke market has been quiet for several weeks. Shipments on contracts are steady. Prices are unchanged.

Old Material.—There was a marked drop in the volume of new business

last week. This was felt mostly in the steel grades, as iron scrap was already inactive. There are no changes in quotations, the steel lines being fairly firm and iron very soft.

Prices per gross ton, deliv'd Birmingham dist. consumers' yards:

Heavy melting steel	$13.00 to $13.50
Scrap steel rails	14.00
Short shoveling turnings	9.00
Cast iron borings	9.00
Stove plate	11.50 to 12.00
Steel axles	21.00
Iron axles	23.00
No. 1 railroad wrought	10.00 to 10.50
Rails for rolling	15.50
No. 1 cast	13.00
Tramcar wheels	12.50
Cast iron carwheels	13.00 to 13.50
Cast iron borings, chem	13.50 to 14.00

Youngstown

Valley Mills on Lowest Schedules of Year

YOUNGSTOWN, Nov. 4.—For the first full week in November, operating schedules of Mahoning Valley steel companies are the lowest of the year, though losses in some directions are offset by gains in others. Tinplate schedules, for example, which declined to 60 per cent, have rebounded and are reported at 75 per cent. The Republic Iron & Steel Co. has started its tin mills at Leavittsburg, which have been idle. Steel bar output by the independents has gained to between 70 and 75 per cent, while 15 of 21 pipe mills are working. Tinplate buying for the first half of 1930 is expected to start in November.

The Carnegie Steel Co. has blown out No. 1 blast furnace in its Ohio Works group, leaving three of six in this complement in blast, and reducing the number of active furances in the Youngstown district to 25, of 35.

Of 51 independent open-hearth furnaces, 27 are scheduled, the smallest number in 15 months. Of 120 independent sheet mills, 79 are scheduled, and some of these only part time. The Sharon Steel Hoop Co. is again operating nine sheet mills, which have been idle, but losses in other directions produce a net loss for the district in sheet mill schedules.

The Republic Iron & Steel Co., because of business conditions, has deferred plans for installation of three additional sheet mills at its Warren works, to replace two jobbing units. The company now operates seven sheet mills at Warren and 18 at Niles. A number of sheet mills at the Warren plant have been converted into tin mills.

Average production for the district is not above 65 per cent.

Tonnage rates paid sheet and tin mill workers in Midwestern mills continue unchanged for November-December, as compared with the September-October rate, as a result of the bimonthly examination of sales sheets. The average selling price of Nos. 26, 27 and 28-gage black sheets shipped by subscribing mills for the 60 days ending Oct. 31, was disclosed at 3.05c. a lb., or unchanged from the preceding examination.

St. Louis

Missouri Pacific Orders 61,000 Tons of Rails—Scrap Buying Comes to a Standstill

ST. LOUIS, Nov. 4.—The past week was quiet in the pig iron market. The St. Louis Gas & Coke Corporation sold 1400 tons, including 1000 tons of malleable, to a local melter for first quarter delivery, and four 100-ton lots of foundry iron for prompt shipment, including 100 tons of special iron to a Nashville, Tenn., melter. Shipments by the local maker totaled 32,000 tons in October, about equal to September shipments. Southern iron sales for the week were between 1000 and 1200 tons, including three orders of 300 tons each. Books of Southern makers for first quarter have not been opened, but there is some talk of naming a base price of $14.50, Birmingham. Production by stove manufacturers is said to be about one-third greater than a year ago, plants here and at Belleville, Ill., working at full capacity. The implement trade also is said to be improving.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill.	$19.50 to $20.00
Malleable, f.o.b. Granite City	20.00
N'th'n No. 2 fdy., deliv'd St. Louis	22.16
Southern No. 2 fdy., deliv'd	16.92 to 18.92
Northern malleable, deliv'd	22.16
Northern basic, deliv'd	22.16

Freight rates: 75c. (average) Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

Rails.—The Missouri Pacific Railway has purchased 61,000 tons of 110-lb. and 90-lb. rails for 1930 use. It is understood that the tonnage was divided among the Illinois Steel Co., Colorado Fuel & Iron Co., Tennessee Coal, Iron and Railroad Co. and Inland Steel Co. on approximately an equal basis.

Finished Steel.—The Granite City Steel Co. reports that all units are operating at full capacity, and that enough business has been booked to operate the plate and galvanized sheet mills four weeks and blue annealed department about three weeks. The Laclede Steel Co. received the contract for 1700 tons of reinforcing bars for a building at Randolph Field, San Antonio, Tex., but there is no business of consequence pending locally for either reinforcing bars or structural steel.

Coke.—The demand for domestic coke is heavy, dealers buying more freely as their piles are reduced by demands resulting from colder weather. Industrial grades are in good demand.

Old Material.—Buying by consumers in the St. Louis district, which has been exceedingly light in the last few weeks, was brought to a stop early last week, purchasing agents reporting that they had been instructed to buy no more until the conditions in the stock market had become settled. Dealers also have been asked in some instances to withhold shipments against contracts, and cancellations have been received for most shipments due on expired contracts. Dealers are buying only against contracts. The amount of distress material is said to be small. Heavy melting steel is down 50c. a ton. Railroad lists: Pennsylvania, 53,360 tons; Baltimore & Ohio, 23,015 tons; Missouri-Kansas-Texas, 250 tons; Missouri Pacific, 122 carloads; Mobile & Ohio, 17 carloads; St. Louis Southwestern, 15 carloads.

Dealers' buying prices per gross ton, f.o.b. St. Louis district:

No. 1 heavy melting or shoveling steel	$13.00 to $13.50
No. 2 heavy melting or shoveling steel	12.50 to 13.00
No. 1 locomotive tires	15.00 to 15.50
Misc. stand.-sec. rails including frogs, switches and guards, cut apart	14.50 to 15.00
Railroad springs	16.50 to 17.00
Bundled sheets	10.00 to 10.50
No. 2 railroad wrought	13.50 to 14.00
No. 1 busheling	9.75 to 10.25
Cast iron borings and shoveling turnings	9.25 to 9.75
Iron rails	13.00 to 13.50
Rails for rolling	15.25 to 15.75
Machine shop turnings	7.25 to 7.75
Heavy turnings	9.50 to 10.00
Steel car axles	19.00 to 19.50
Iron car axles	27.00 to 27.50
Wrot. iron bars and trans.	21.50 to 22.00
No. 1 railroad wrought	13.00 to 13.50
Steel rails, less than 3 ft.	17.50 to 18.00
Steel angle bars	14.00 to 14.50
Cast iron carwheels	14.00 to 14.50
No. 1 machinery cast	15.25 to 15.75
Railroad malleable	14.50 to 15.00
No. 1 railroad cast	14.50 to 15.00
Stove plate	12.00 to 12.25
Agricult. malleable	14.00 to 14.50
Relay rails 60 lb. and under	20.50 to 23.50
Relay rails 70 lb. and over	26.50 to 29.00

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-fin. rounds, shaftings, screw stock	3.75c.
Black sheets (No. 24)	4.25c.
Galv. sheets (No. 24)	5.10c.
Blue ann'l'd sheets (No. 10)	3.45c.
Black corrug. sheets (No. 24)	4.30c.
Galv. corrug. sheets	5.15c.
Structural rivets	4.15c.
Boiler rivets	4.15c.

	Per Cent Off List
Tank rivets, 7/8-in. and smaller, 100 lb. or more	65
Less than 100 lb	60
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-pressed nuts, sq., blank or tapped, 200 lb. or more	60
Less than 200 lb	50
Hot-pressed nuts, hex., blank or tapped, 200 lb. or more	60
Less than 200 lb	50

Hudson Valley Fuel Corporation is the name adopted for the former Hudson Valley Coke & Products Corporation, Troy, N. Y., which recently was purchased by the Niagara & Hudson Power Co. The Hudson Valley company owns a blast furnace and by-product coke ovens at Troy.

Buffalo

Southern Pig Iron Competition in East Affects New York State Furnaces—Scrap Market Dull

BUFFALO, Nov. 4.—The market for pig iron is very quiet. The largest order placed here during the past week was for 600 tons of foundry. Several lots of 100 tons each have been taken for district and Eastern delivery. Placing of Buffalo iron in the East has been somewhat disturbed by the competition of Southern furnaces, which have been quoting an equivalent of $16, Buffalo, and taking a good deal of the business that has been offered. One furnace lost in competition more than 10,000 tons to Southern furnaces in the past month. Most of the iron taken is for prompt shipment. First quarter books have not been opened, except that buyers have been told, in some instances, that they will be carried along for first quarter requirements. Shipments are remarkably good.

Prices per gross ton, f.o.b. furnace:

No. 2 fdy., sil. 1.75 to 2.25	$19.50
No. 2X fdy., sil. 2.25 to 2.75	20.00
No. 1 fdy., sil. 2.75 to 3.25	21.00
Malleable, sil. up to 2.25	20.00
Basic	$17.50 to 18.00
Lake Superior charcoal	27.28

Finished Steel.—Operation of Buffalo mills continues at last week's gait. The Lackawanna plant of the Bethlehem Steel Co. is operating 20 open-hearths and Donner Steel Co. is down to four. The Seneca Iron & Steel Co. is at approximately 70 per cent of capacity.

Old Material.—Buying has slackened to a minimum, although the market seems to have steadied and is no softer than a week ago. One of the large plants has practically suspended shipments, and this condition is now expected to prevail until Nov. 15. On shipments to another large plant, rejections are becoming very common. While mill operations have fallen off to some extent, stocks of scrap in dealers' yards are said to be only fair. A few sales of No. 1 machinery cast and rolled steel wheels have been made at the market. Production of scrap, due to lessened operation of automobile plants, has fallen off accordingly.

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and struc. shapes	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.95c.
Cold-fin. flats, sq. and hex.	4.45c.
Rounds	3.95c.
Cold-rolled strip steel	5.85c.
Black sheets (No. 24)	4.20c.
Galv. sheets (No. 24)	4.85c.
Blue ann'l'd sheets (No. 10)	3.50c.
Com. wire nails, base per keg	$3.60
Black wire, base per 100 lb	3.75

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades:		
No. 1 heavy melting steel	$15.00 to	$16.00
No. 2 heavy melting steel	13.50 to	14.50
Scrap rails	15.00 to	15.50
Hydraul. comp. sheets	13.50 to	14.50
Hand bundled sheets	11.00 to	11.50
Drop forge flashings	13.75 to	14.00
No. 1 busheling	13.50 to	14.50
Hvy. steel axle turnings	13.50 to	14.00
Machine shop turnings	7.50 to	8.00
No. 1 railroad wrought	13.00 to	13.50
Acid Open-Hearth Grades:		
Knuckles and couplers	17.00 to	17.50
Coil and leaf springs	17.00 to	17.50
Rolled steel wheels	17.00 to	17.50
Low phos. billet and bloom ends	18.00 to	18.50
Electric Furnace Grades:		
Short shov. steel turnings	11.25 to	11.75
Blast Furnace Grades:		
Short mixed borings and turnings	11.25 to	11.75
Cast iron borings	11.25 to	11.75
No. 2 busheling	9.50 to	10.00
Rolling Mill Grades:		
Steel car axles	17.00 to	17.50
Iron axles	20.00 to	21.00
Cupola Grades:		
No. 1 machinery cast	15.00 to	15.50
Stove plate	12.50 to	12.75
Locomotive grate bars	11.00 to	11.50
Steel rails, 3 ft. and under	18.75 to	19.00
Cast iron carwheels	13.00 to	13.50
Malleable Grades:		
Industrial	17.50 to	18.00
Railroad	17.50 to	18.00
Agricultural	17.50 to	18.00
Special Grades:		
Chemical borings	12.50 to	13.50

Detroit

Further Recession in Automobile Output Over Remainder of the Year Is Expected

DETROIT, Nov. 4.—Whatever hopes the automobile industry may have entertained for a gradual recovery in the volume of motor car buying during the remainder of the year have been dissipated by the recent events in Wall Street.

Automobile manufacturers generally are revising production schedules downward to meet new sales conditions. Some motor car companies now have no definite schedules for this month and next, and are operating on a hand-to-mouth basis and cutting inventories to the bone. They anticipate a general reaction from the stock market collapse which will affect sales of new cars.

While there would have been some year-end shutdowns for inventory under any circumstances, the present situation is believed to have hastened such cessation of productive activities. A number of automobile manufacturers have temporarily shut down some units. This includes at least one body plant and some foundries.

The Ford Motor Co. schedule this week is 7600 motors per day for five days. The Chevrolet Motor Co., which had a schedule of 150,000 cars for November-December, is said to have cut this to about 50,000 for the two months. Steel and parts had been ordered for the original schedule, and suspension orders have been sent to the steel companies and parts manufacturer which were to have supplied the material.

The view of some sales executives of automobile companies is that sales of new cars over the remainder of the year will be at low ebb.

The Ford Motor Co. last week advertised a reduction in the prices of its cars, and at the same time lowered the discount to dealers from 20 per cent to 17½ per cent, the effect of which is that the dealers must absorb half of the reductions.

The low production schedules of automobile manufacturers have brought a corresponding decrease in the output of iron and steel scrap. The old material being released is no more than enough to cover current orders. Prices are unchanged, though the market is weak.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Hvy. melting and shov. steel	$13.75 to $14.25
Borings and short turnings	8.25 to 8.75
Long turnings	8.00 to 8.50
No. 1 machinery cast	12.50 to 13.00
Automobile cast	13.00 to 13.50
Hydraul. comp. sheets	13.75 to 14.25
Stove plate	9.00 to 9.50
New No. 1 busheling	11.75 to 12.25
Old No. 1 busheling	10.25 to 10.75
Sheet clippings	8.00 to 8.50
Flashings	12.25 to 12.75

Great Lakes Steel Orders Electrical Equipment

The Great Lakes Steel Corporation, Detroit, now a part of the National Steel Corporation, has placed orders for the greater part of the electrical equipment for its new steel plant. The General Electric Co. will supply for the drive for the 20-in. mill three 5000-kw., 600-volt motor generator sets, one 1200, one 1600, one 2200, one 3000 and six 2000 hp. motors with necessary control equipment, and for the 14-in. mill one 5000-kw. motor generator set, four 1000, two 2000 and one 1600 hp. motors with control equipment. This company will also furnish two 2000 hp. d.c. motors, a.c. general purpose motors and small mill type motors. The Westinghouse Electric & Mfg. Co. will furnish a 7000-hp. reversing motor for the blooming mill, two 2000-kw., 250-volt d.c. motor generator sets, one 2000 kva. transformer and a 4000 and 5000 hp. synchronous motor. Direct current motors for general purposes will be supplied by the Reliance Electric & Mfg. Co. The Cutler-Hammer Co. will supply the control equipment for the cranes.

International Acetylene Association, in its meeting scheduled for Nov. 13 to 15 at Congress Hotel, Chicago, will listen to series of papers on aircraft construction, cutting and welding of structural steel, welded piping, and testing of welds.

Cincinnati

Pig Iron, Coke and Scrap Quiet—Marked Slackening in Demand from Automobile Foundries

CINCINNATI, Nov. 4.—The district pig iron market is quiet and featureless. Sales during the last week about equaled those of the preceding week, approximately 2500 tons being the total reported. While this tonnage is not unusually small for the middle of the quarter, the fact that district consumers did not buy in the usual quantities at the opening of the quarter is causing concern to furnace representatives. A marked slackening in the demand from automobile foundries is noted, while on the other hand jobbing foundries are taking iron at about the usual rate, but they are not anticipating their requirements for any length of time. The largest order last week was for 600 tons of Northern foundry iron from a central Indiana consumer, while the remainder of the week's business was in small lots. Price schedules are steady, with Northern iron at about $18.50, base Lake furnace, and Southern iron at $14 to $14.50, base Birmingham. Inquiry is small.

Prices per gross ton, deliv'd Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25	$19.89 to $20.39
Ala. fdy., sil. 1.75 to 2.25	17.69 to 18.19
Ala. fdy., sil. 2.25 to 2.75	18.19 to 18.69
Tenn. fdy., sil. 1.75 to 2.25	17.69 to 18.19
S'th'n Ohio silvery, 8 per cent	26.89

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

Finished Material.—Current orders for sheets are almost entirely for immediate needs. The nearness of inventory periods is causing buyers to hesitate in anticipating their needs for any length of time. The demand for galvanized sheets is still good, but mill operators express dissatisfaction with the price situation, current schedules not being high enough to insure good profit in competitive markets where concessions are imperative to obtain business. Backlogs are shrinking daily and deliveries are almost immediate.

Coke.—The coke market reflects the same situation as the pig iron market. Specifications for by-product foundry coke from automobile foundries are noticeably off, while specifications from other consumers are being sustained at a fair rate. With virtually all consumers under contract for the remainder of the year, new business is light.

Old Material.—While there is virtually no activity in the scrap iron and steel market, price schedules have not changed in the last week. While there is no superabundance of steel scrap, the light grades are in better supply than the heavy grades. Dealers are buying carefully and are not accumulating stock. Consumers, too, are taking scrap only as it is needed.

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel	$13.00 to $13.50
Scrap rails for melting	14.00 to 14.50
Loose sheet clippings	8.50 to 9.00
Bundled sheets	10.75 to 11.25
Cast iron borings	8.75 to 9.25
Machine shop turnings	8.00 to 8.50
No. 1 busheling	10.50 to 11.00
No. 2 busheling	7.00 to 7.50
Rails for rolling	14.25 to 14.75
No. 1 locomotive tires	14.25 to 14.75
No. 2 railroad wrought	13.00 to 13.50
Short rails	18.50 to 19.00
Cast iron carwheels	12.50 to 13.00
No. 1 machinery cast	18.75 to 19.25
No. 1 railroad cast	15.00 to 15.50
Burnt cast	10.25 to 10.75
Stove plate	10.25 to 10.75
Brake shoes	10.00 to 10.50
Agricultural malleable	14.00 to 14.50
Railroad malleable	15.00 to 15.50

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and struc. shapes	3.40c.
Bars, soft steel or iron	3.30c.
New billet reinforc. bars	3.15c.
Rail steel reinforc. bars	3.00c.
Hoops	4.05c.
Bands	3.50c.
Cold-fin. rounds and hex	3.85c.
Squares	4.35c.
Black sheets (No. 24)	4.05c.
Galvanized sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.45c.
Structural rivets	3.85c.
Small rivets	65 per cent off list
No. 9 ann'l'd wire, per 100 lb	$3.00
Com. wire nails, base per keg	2.85
Cement c't'd nails, base 100 lb. keg	2.85
Chain, per 100 lb	8.75
	Net per 100 Ft.
Lap-weld steel boiler tubes, 2-in.	$16.50
4-in.	34.50
Seamless steel boiler tubes, 2-in.	17.50
4-in.	36.00

To Investigate Working Week in Industry

Census to Disclose Number of Days in Normal Plant Week; Also Industrial Migration

WASHINGTON, Nov. 5.—Marking the first time such information has been sought, the Census of Manufacturers to be taken early in 1930 will require manufacturers to state their practice with respect to the number of days that constitute the normal working week of their plants. There has been much speculation during the past two or three years on this subject and the advisory committee on the Census of Manufactures, headed by Col. L. S. Horner, president, Niles-Bement-Pond Co., New York, has announced its purpose to obtain exact facts of a nation-wide scope.

Manufacturers will be asked not only to state whether their plants are on a six, five-and-one-half or a five-day basis per week but also to indicate the number of shifts per day and hours of labor per week. There will be the usual questions on the number of wage earners and salaried persons, the seasonal variations of employment in lines of manufacturing that can be measured and on the growing use of power and power equipment.

As has been previously announced, migration of industry will be the subject of an inquiry that will be made for the first time. Movements of manufacturing that have been under way during the past decade have resulted in decreases in the requirements for skilled labor in one section of the country accompanied by increases in requirements for the same type of labor in other parts of the country. Again, a trend of manufacturing away from established centers and from the large cities has been reported. Such a diffusion of manufacturing, it was pointed out, would have an influence on the employment conditions surrounding industry. The purpose of the new census inquiry is to obtain reliable data on the subject.

The employment of women in industry again will be the subject of inquiry. While these data were available in the reports of previous decennial censuses, the employees in factories have not been divided according to sex since 1919 in the biennial censuses. Great changes other than geographical relocations have occurred in industry during the decade. Mechanization has brought about shifts in the character of workers required. It is desired to learn whether these changes have tended to increase or decrease the number of women in factories.

Blank forms for the forthcoming census will be distributed to the manufacturers early next year. The committee is interested in plans to bring about more expenditious and accurate completion of the schedules by manufacturers and prompt tabulation and publication of the data by the Bureau of Census. It therefore is seeking the cooperation of manufacturers.

Court Will Not Enjoin Interstate Steel Sale

Circuit Judge Philip L. Sullivan, at Chicago, has refused to grant an injunction restraining the sale of the Interstate Iron & Steel Co. to the Central Alloy Steel Corporation. Benjamin M. Morris, an attorney, brought suit on the ground that the deal constituted a merger of a type forbidden under Illinois laws. Judge Sullivan ruled that the complainant did not produce evidence that the stock transfer constituted a merger. The attorney said he would appeal from this decision.

Non-Ferrous Metal Markets

Further Decline in Lead and Zinc—Tin at New Low Level Since 1923—Copper Unchanged

NEW YORK, Nov. 4.

Copper.—There has been some improvement in copper buying from abroad, but very little in domestic demand. Sales for export have improved the last week, orders today totaling more than 1000 tons. Domestic consumers are buying as little as they can, which is not much, because orders received by fabricators are not coming in rapidly. October was one of the poorest months in some time in actual sales, those for export being estimated at not over 30,000 tons, while those for domestic shipment were considerably below totals which have lately been regarded as normal. It is reported that there will be further curtailment of production at the mines, supplementing that which occurred some months ago. The only bright spot in the picture is the fact that the price of copper is steady and it is the only one of the major nonferrous metals which has not changed during the collapse of the stock market. Foreign consumers are now in a position where they will have to buy November metal. Domestic consumers are not covered for all of their November needs. They probably will not purchase much December metal until conditions are more settled. Electrolytic copper is quoted at 18c., delivered in the Connecticut Valley, and the official quotation of Copper Exporters, Inc., is still 18.30c., c.i.f., usual European ports. Lake copper is unchanged at 18c. to 18.12½c., delivered.

Copper Averages.—The average price of Lake copper for October, based on daily quotations in THE IRON AGE, is 18.12½c., delivered New York. The average price of electrolytic copper is 17.75c., refinery, or 18c., delivered in the Connecticut Valley.

Tin.—Buying has been very light, with only about 200 tons of spot Straits tin sold for the week ended Nov. 2, the smallest for any week in a long time; of this 150 tons was sold on Nov. 1. Neither consumers nor dealers are showing interest, and the market is closely following fluctuations in London. When the Bank of England on Oct. 31 reduced its rediscount rate, tin prices shot up over £4 per ton, and the New York market also was stronger. With the announcement of October statistics on Nov. 1, the London market fell more than £3 at

THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY

	Nov. 4	Nov. 2	Nov. 1	Oct. 31	Oct. 30
Lake copper, New York	18.12½	18.12½	18.12½	18.12½	18.12½
Electrolytic copper, N. Y.*	17.75	17.75	17.75	17.75	17.75
Straits tin, spot, N. Y.	40.12½	....	40.75	41.75	41.25
Zinc, East St. Louis	6.50	6.50	6.50	6.50	6.60
Zinc, New York	6.85	6.85	6.85	6.85	6.95
Lead, St. Louis	6.35	6.35	6.35	6.35	6.55
Lead, New York	6.50	6.50	6.50	6.50	6.75

*Refinery quotation; price ¼c. higher delivered in the Connecticut Valley.

Rolled Products

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—
- High brass ..... 23.25c.
- Copper, hot rolled ..... 26.75c.
- Zinc ..... 10.25c.
- Lead (full sheets) ... 11.00c. to 11.25c.

Seamless Tubes—
- High brass ..... 28.25c.
- Copper ..... 29.25c.

Rods—
- High brass ..... 21.25c.
- Naval brass ..... 24.00c.

Wire—
- Copper ..... 19.87½c.
- High brass ..... 23.75c.

Copper in Rolls ..... 26.75c.
Brazed Brass Tubing ..... 30.87½c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also to St. Louis on shipments to points west of that river.

- Sheets, 0 to 10 gage, 3 to 30 in. wide ..... 33.00c.
- Tubes, base ..... 42.00c.
- Machine rods ..... 34.00c.

Chicago Warehouse

(Prices Cover Trucking to Customers' Doors in City Limits)

	Base per Lb.
Sheets—	
High brass	23.25c.
Copper, hot rolled	27.75c.
Copper, cold rolled, 14 oz. and heavier	30.00c.
Zinc	10.75c.
Lead, wide	11.35c.
Seamless Tubes—	
Brass	28.25c.
Copper	29.25c.
Brass Rods	21.25c.
Brazed Brass Tubes	31.00c.

New York or Cleveland Warehouse

Delivered Prices, Base per Lb.

High brass	21.12½c. to 22.12½c.
Copper, hot rolled, base sizes	27.75c. to 28.75c.
Copper, cold rolled, 14 oz. and heavier, base sizes	30.00c. to 31.00c.
Seamless Tubes—	
Brass	26.00c. to 27.00c.
Copper	29.12½c. to 30.12½c.
Brass Rods	18.87½c. to 19.87½c.
Brazed Brass Tubes	29.12½c. to 30.12½c.

New York Warehouse

Delivered Prices, Base Per Lb.

- *Zinc sheets (No. 9), casks* ..... 10.75c. to 11.25c.
- *Zinc sheets, open* ..... 11.50c. to 12.00c.

Metals from New York Warehouse

Delivered Prices, Per Lb.

- Tin, Straits pig ..... 42.50c. to 43.50c.
- Tin, bar ..... 44.50c. to 45.50c.
- Copper, Lake ..... 19.50c.
- Copper, electrolytic ..... 19.25c.
- Copper, casting ..... 19.00c.
- Zinc, slab ..... 7.50c. to 8.00c.
- Lead, American pig ..... 7.25c. to 7.75c.
- Lead, bar ..... 9.25c. to 9.75c.
- Antimony, Asiatic ..... 10.50c. to 11.00c.
- Aluminum No. 1 ingots for remelting (guaranteed over 99% pure) ... 25.00c. to 26.00c.
- Alum. ingots, No. 12 alloy ..... 24.00c. to 25.00c.
- Babbitt metal, commercial grade ..... 25.00c. to 35.00c.
- Solder, ½ and ½ ..... 28.50c. to 29.00c.

Metals from Cleveland Warehouse

Delivered Prices, Per Lb.

- Tin, Straits pig ..... 45.75c.
- Tin, bar ..... 47.75c.
- Copper, Lake ..... 19.50c.
- Copper, electrolytic ..... 19.25c.
- Copper, casting ..... 18.75c.
- Zinc, slab ..... 8.00c. to 8.25c.
- Lead, American pig ..... 7.15c. to 7.35c.
- Lead, bar 9.25c
- Antimony, Asiatic ..... 16.00c.
- Babbitt metal, medium grade ..... 18.50c.
- Babbitt metal, high grade ..... 50.00c.
- Solder, ½ and ½ ..... 29.00c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged consumers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	15.00c.	16.25c.
Copper, hvy. and wire	14.50c.	16.00c.
Copper, light and bottoms	12.75c.	13.75c.
Brass, heavy	8.25c.	9.25c.
Brass, light	7.00c.	8.00c.
Hvy. machine composition	12.00c.	13.00c.
No. 1 yel. brass turnings	9.75c.	10.50c
No. 1 red brass or compos. turnings	11.25c.	12.25c.
Lead, heavy	5.50c.	6.00c.
Lead, tea	4.25c.	5.25c.
Zinc	3.50c.	4.00c.
Sheet aluminum	13.25c.	15.50c.
Cast aluminum	11.75c.	13.75c.

the opening, with another break of £3 per ton later in the day. The statistics show an estimated increase in the world's visible supply of 1022 tons. Straits shipments which were estimated at 10,000 tons, turned out to be only about 8000 tons. There was thus a large amount of tin carried over. Supplies in the East, plus the estimated production, totaled upward of 14,000 tons available for shipment. This situation was the real cause of the break in London. Sales of tin in the East have been heavy in the last five days, totaling 1575 tons from Oct. 30 to Nov. 4, inclusive. London prices today were low at £181 15s. for spot standard, £185 for future standard and £185 15s. for spot Straits. The Singapore price today was £187. All of these prices are about £3 a ton lower than those of a week ago. In a very dull market, spot Straits tin was quoted today at 40.12½c., New York, the lowest level since Aug. 24, 1923.

Lead.—Another reduction was made on Oct. 31 by the American Smelting & Refining Co. in its New York contract price from 6.75c. to 6.50c., New York. With the first reduction made a week ago, the total decline in three days has been $8 a ton, or from 6.90c. to 6.50c. The decline has been largely due to lower prices in London, which reflect increased output and poor demand. Buying here has naturally been very light and consumers are awaiting developments. The quotation of the leading producer at St. Louis is now 6.35c.

Zinc.—Owing to further declines in London, the quotation for prime Western zinc declined on Oct. 31 from 6.60c. to 6.50c., East St. Louis, or 6.85c., New York. Naturally, buyers continue very cautious, and the market is by no means active. Sales for November delivery have been light, but it is felt that some buying must materialize soon. Even hand-to-mouth buying should be larger than it is.

Antimony.—Some antimony was sold during the week by holders, who apparently had to sacrifice it at 8.37½c., New York, duty paid. This has slightly unsettled quotations, which are now 8.62½c. for spot and 8.75c. for futures.

Nickel.—Ingot nickel in wholesale lots is quoted at 35c. per lb., with shot nickel at 36c. and electrolytic nickel in cathodes at 35c.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at the published price of 23.90c. a lb., delivered.

Non-Ferrous Metals at Chicago

CHICAGO, Nov. 4.—Prices for these commodities have fluctuated rapidly in the last week and quotations with the exception of copper are lower. Sales of both new and old metals are in small volume.

Prices per lb., in carload lots: Lake copper, 18.50c.; tin, 41.37½c.; lead, 6.45c.; zinc, 6.60c.; in less-than-carload lots, antimony, 9.50c. On old metals we quote copper wire, crucible shapes and copper clips, 14c.; copper bottoms, 11.50c.; red brass, 11.50c.; yellow brass, 8c.; lead pipe, 4.50c.; zinc, 3c.; pewter, No. 1, 24.50c.; tin foil, 24c.; block tin, 34c.; aluminum, 12.87½c.; all being dealers' prices for less-than-carload lots.

Fabricated Structural Steel

Lettings Amount to Only 22,500 Tons—Inquiries Include 14,000 Tons for Seattle Bridge

CONTRACTS placed for structural steel the past week totaled only 19,000 tons, as against 55,500 tons the previous week. The major portion of the tonnage will go into structures for industrial purposes. The largest award was 3300 tons for a department store at Akron, Ohio. Approximately 23,000 tons has been added to prospective business on which bids have been asked. Fourteen thousand tons is for a highway bridge at Seattle, Wash. Awards follow:

BOSTON, 146 tons, health unit, to New England Structural Co.

STATE OF CONNECTICUT, 400 tons, highway bridge, to American Bridge Co.

NEW YORK, 700 tons, bridge for New York Rapid Transit Commission on East Fourteenth Street, Brooklyn, to American Bridge Co.

NEW YORK, 900 tons, apartment house at Lexington Avenue and Eightieth Street, to Easton Structural Steel Co.

PHILADELPHIA, 1500 tons, building for Girard College, to Bethlehem Construction Co.

VIRGINIAN RAILWAY, 100 tons, car parts, to Virginia Bridge & Iron Co.

NASHVILLE, CHATTANOOGA & ST. LOUIS RAILROAD, 850 tons, bridge, to Virginia Bridge & Iron Co.

BATON ROUGE, LA., 1400 tons, power plant for Louisiana Steam Products, Inc., to Virginia Bridge & Iron Co.

ATLANTA, GA., 860 tons, Union station for Nashville, Chattanooga & St. Louis Railway Co., to Virginia Bridge & Iron Co.

AKRON, OHIO, 3300 tons, Polsky department store, to Berger Iron Works.

DETROIT, 1350 tons, plant for Kelsey Hayes Wheel Co., to Whitehead & Kales Co.

WHITING, IND., 150 tons, building for Standard Oil Co., to Vierling Steel Works.

HARRISBURG, PA., 1750 tons, Farm Show building, to Shoemaker Bridge Co.

NORTHERN PACIFIC, 1100 tons, bridge work, of which 250 tons was taken by McClintic-Marshall Co. and the remainder by an unnamed bidder.

ROCK ISLAND RAILROAD, 300 tons, truss span, to American Bridge Co.

CHICAGO, 900 tons, first section Lawson Memorial Y.M.C.A. building, to American Bridge Co.

CHICAGO, 1400 tons, Ruth Garage, to Gage Structural Steel Co.; previously reported to American Bridge Co.

OMAHA, NEB., 450 tons, steel for Union Station, to Omaha Steel Works; this is in addition to previous tonnages.

OMAHA, 350 tons, Thirteenth Street viaduct, to American Bridge Co.

LAMAR, COLO., 700 tons, highway bridge, to Minneapolis Moline Power Implement Co.

OAKLAND, CAL., 100 tons, skating rink on Grove Street, to Judson-Pacific Co.

SAN FRANCISCO, 335 tons, apartment building on Union Street, to McClintic-Marshall Co.

SALINAS, CAL., 109 tons, two bridges over San Lorenzo and Pancherico Creeks, to an unnamed bidder.

LOS ANGELES, 800 tons, California Bank building addition, to Consolidated Steel Corporation.

ST. HELENS, ORE., 475 tons, plant for Fir-Tex Insulating Board Co., to Truscon Steel Co.

PORTLAND, ORE., 2000 tons plates, pipe line between Portland and Salem, to Steel Tank & Pipe Co.

CAMAS, WASH., 170 tons plates, digester for Crown Willamette Paper Co., to Willamette Iron & Steel Works.

TACOMA, WASH., 375 tons plates, drum gates for Cushman Dam project, to Commercial Boiler Works.

TACOMA, 550 tons plates, penstock for Cushman Dam project, to Commercial Boiler Works.

PORT ANGELES, WASH., 425 tons plates, five digesters for Olympic Forest Products Co., to Commercial Boiler Works.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

WELLESLEY, MASS., 300 tons, college administration building.

GARDNER, MASS., 118 tons, theater.

BOSTON & MAINE RAILROAD, 500 tons, bridges.

NEW YORK CENTRAL RAILROAD, 200 tons, bridge at Nyack, N. Y.

NEW YORK, 2000 tons, apartment house at 201-209 East Seventy-eighth Street.

STATE OF PENNSYLVANIA, 200 tons, highway bridges.

PITTSBURGH, 500 tons, Falk Chemical Laboratory for University of Pittsburgh; Stone & Webster, Inc., general contractor.

PITTSBURGH, 290 tons, addition to Taylor Allderdice High School; Williams & Haas, general contractors.

TOLEDO, 650 tons, building for Electric Auto-Lite Co.; bids taken.

CLEVELAND, 300 tons, East Seventy-ninth Street bridge for Nickel Plate Railroad.

MAYWOOD, ILL., 400 tons, public school.

MADISON, WIS., 600 tons, mechanical engineering building for University of Wisconsin.

CHEYENNE, WYO., 1200 tons, highway bridge across Canadian River.

SAND SPRINGS, OKLA., 900 tons, highway bridge.

SEATTLE, 370 tons plates, Cedar River pipe line No. 2; bids Nov. 4.

SEATTLE, 14,000 tons, Lake Union bridge on Aurora Avenue; bids soon.

SAN FRANCISCO, 300 tons, addition to Southern Pacific Co. hospital; bids soon.

ALAMEDA, CAL., 175 tons, hangar; bids being taken.

Tramrail Company Conducts Sales Training Class

Saturday, Oct. 19, marked the close of the fifth annual sales training class for dealers and dealers' salesmen, held by the Cleveland Tramrail Division of the Cleveland Crane & Engineering Co., Wickliffe, Ohio. The class was given a week's instruction in the tramrail overhead method of lifting and conveying materials. The first two days were devoted to intensive instruction in the plant and office, supplemented by stereopticon slides of various tramrail installations. Two days were then spent in an inspection trip to industrial plants, where tramrail installations were seen under actual operating conditions. Then further instruction was given at the Cleveland Tramrail plant, followed by a banquet Friday evening. The sales training classes are in charge of A. F. Anjeskey, sales manager of the Tramrail Division.

Chicago-Milwaukee Rate Reduction is Opposed

WASHINGTON, Nov. 5.—Briefs for and against the proposed reduced rate of 8c. a 100-lb., 80,000-lb., minimum carload on iron and steel products from the Chicago switching district to the Milwaukee, Kenosha and Racine, Wis., districts have been filed with the Interstate Commerce Commission. The present rate is 9.50c., 36,000-lb., minimum carload. The carriers, which have filed the new schedules, now under suspension, declared that if the commission disapproved the 8c. rate large tonnages will move by water. They further contended that the rate has been shown to be remunerative.

A brief for the Green Bay Association of Commerce, the Northwest Engineering Corporation, Morley Murphy and other protestants in the Green Bay district declared that the proposed rate is less than a reasonable maximum, and that it would be unduly preferential of Milwaukee, Kenosha and Racine and unduly prejudicial to Green Bay and intermediate territory. The Green Bay brief said that the purpose of the railroads is to hold present steel tonnage, and that they had claimed that if the lower rate is not permitted to go into effect 20,000 tons will move annually by Lake Michigan from the Gary district to Milwaukee.

A brief for the East Side Manufacturers' Association, East St. Louis, Ill., and the Granite City Steel Co., Granite City, Ill., said that water competition such as to be a controlling influence in the reduction of the present rate has not been proved. If there is a possibility of the use of water transportation, the brief continued, the rail carriers are not justified in attempting to eliminate it. The reduced rate, it was contended, would bring about undue prejudice and unjust discrimination against shippers in the East St. Louis district and would be a severe departure from the rates approved in general steel case, affecting new rates throughout Official Classification territory. The products that would be affected by the reduced rate are structural material, plates, sheets and strip steel.

Inland Steel Earnings Gain in Third Quarter

The Inland Steel Co. reports a consolidated net income, after all charges, for the three months ended Sept. 30, of $3,158,967, equal to $2.63 a share on 1,200,000 shares of common stock. This compares with $3,126,909, or $2.60 a share, in the preceding quarter, and $2,089,439, or $1.74 a share, in the third quarter of 1928. Net income, after all charges, for the first nine months of this year totals $9,293,118, equal to $7.74 a share on the common stock. In the first nine months of 1928, this company earned $5.53 a share on the common stock. The directors have declared the regular quarterly dividends of 87½c. on the common stock and $1.75 a share on the preferred stock.

The Wheeling Steel Corporation, Wheeling, W. Va., had net profit in the quarter ended Sept. 30 of $1,775,382. Net earnings for the first nine months of the year amounted to $5,912,919 after depreciation and provision for taxes, as compared with $3,963,009 in the same period of 1928. The regular dividend of 1 per cent on common stock was declared.

By-Products Coke to Buy Three Furnace Companies

Stockholders of the By-Products Coke Corporation have voted an increase in the capitalization of the corporation from 800,000 shares to 2,500,000 shares. The proceeds from the sale of about 1,200,000 shares of stock will be used to acquire the Toledo Furnace Co., Toledo, Ohio, the Zenith Furnace Co., Duluth, Minn., and the Perry Iron Co., Erie, Pa. An interest in the ore properties of Pickands, Mather & Co. will also be purchased.

Hard Surfacing Alloy

An alloy welding rod for surfacing worn parts or new parts which must endure severe abrasion has been developed by the Oxweld Acetylene Co. It is called Hascrome and is a manganese-chromium-iron combination. It should be welded to a clean steel surface with an oxy-acetylene flame containing an excess of acetylene; the feathery cone indicating excess acetylene may be from half to fully as long as the inner cone of a truly neutral flame. Molten Hascrome absorbs carbon from this flame and its hardness is dependent upon the carbon absorbed and the rate of cooling. If quenched in water it is softer than if slowly cooled, in this being similar to other austenitic alloy steels developed for anti-corrosion and high-temperature uses.

Brinell Hardness of Hascrome

Fused with small excess of acetylene:	Brinell Hardness
Slowly cooled	250 to 300
Quenched	240 to 290
Heavy excess of acetylene:	
Slowly cooled	450 to 500
Quenched	350 to 450

The deposited metal has a tensile strength of about 40,000 lb. per sq. in., and can be forged hot but not machined when cold.

While the metal thus has a considerable degree of hardness, it is recommended primarily as an intermediate layer between steel and stellite. Frequently parts are worn so badly that the cost of sufficient stellite to bring the item back to shape is greater than that of a replacement part. In such an event, the less expensive Hascrome may be used for the bulk of the volume, finishing off with a relatively thin layer of the more durable stellite. It is said that the two are easily welded together, and that Hascrome has sufficient strength to prevent a mushrooming effect under impact.

The Central Alloy Steel Corporation, Massillon, Ohio, has placed in operation at its Canton plant a new electric induction reclaiming furnace for the reclaiming of stainless steel scrap.

COMING MEETINGS

NOVEMBER

Open-hearth Committee of American Institute of Mining and Metallurgical Engineers. Nov. 5 and 6. Annual meeting, Hotel Stevens, Chicago. Leo F. Reinartz, American Rolling Mill Co., Middletown, Ohio, chairman.

International Acetylene Association. Nov. 13 to 15. Annual meeting, Congress Hotel, Chicago. A. Cressy Morrison, 30 East Forty-second Street, New York, secretary.

American Institute of Steel Construction. Nov. 13 to 16. Annual meeting, Edgewater Gulf Hotel, Biloxi, Miss. Charles F. Abbott, 200 Madison Avenue, New York, executive director.

Foundry Equipment Manufacturers' Association. Nov. 19. Forty-eighth annual meeting, Hotel Van Curler, Schenectady, N. Y. H. W. Standart, Northern Engineering Works, Detroit, president.

National Founders' Association. Nov. 20 and 21. Annual meeting, Hotel Astor, New York. J. M. Taylor, 29 South LaSalle Street, Chicago, secretary.

DECEMBER

American Society of Mechanical Engineers. Dec. 2 to 6. Annual meeting, 29 West Thirty-ninth Street, New York. Calvin W. Rice, 29 West Thirty-ninth Street, New York, secretary.

National Exposition of Power and Mechanical Engineering. Dec. 2 to 7. Annual exposition, Grand Central Palace, New York. Charles F. Roth, Grand Central Palace, New York, manager.

PERSONAL

T. M. GIRDLER, who recently resigned from the presidency of the Jones & Laughlin Steel Corporation, has been elected a member of the advisory committee of Continental Shares, Inc., a steel stock holding company controlled by Otis & Co., Cleveland investment bankers.

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H. B. SCOTT, manager of the tin plate sales division of the Wheeling Steel Corporation, Wheeling, W. Va., and N. C. REED, manager of the company's Detroit office, have been appointed assistant general managers of sales with headquarters at Wheeling. Here their work will be under the supervision of W. B. HIGGINS, vice-president in charge of sales, and J. L. NEUDOERFER, general manager of sales. W. M. HALL, now manager of the company's Boston office, has been transferred to Wheeling to succeed Mr. Scott as manager of tin plate sales. S. H. WATERS, now in the Boston office, will succeed Mr. Hall there as acting manager. H. B. MILLER, now in charge of the company's Cincinnati office, will succeed Mr. Reed at Detroit. Mr. Miller was in the Detroit office before going to Cincinnati, and he will be replaced at the latter city by H. E. SMITH, who is now manager of the St. Louis office. B. M. SHARPE, assistant manager at St. Louis, succeeds Mr. Smith. O. I. STRICKLAND, recently an assistant manager in the tubular sales division at Wheeling, has been appointed manager of that division.

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HENRY M. KELLY, assistant general manager of the Youngstown district for the United Engineering & Foundry Co., Pittsburgh, has retired after almost 43 years of continuous service with the company. He entered the employ of Lloyd Booth & Co., Youngstown, when he was 19 years of age and continued with that organization after its acquisition by the United company. He has been succeeded by E. E. CROSS, who has been associated with the Carnegie Steel Co. ROBERT MCGHIE, foreman at the company's Youngstown plant, has also resigned.

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BENNETT CHAPPLE, director of publicity, American Rolling Mill Co., Middletown, Ohio, addressed the ninth annual Cleveland Foreign Trade Conference, Nov. 1, on advertising to increase foreign sales. The meeting was held under the auspices of the Foreign Trade Committee of the Cleveland Chamber of Commerce.

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PERCY W. LEE, Arthur Lee & Sons, Ltd., the Crown Steel & Wire Mills, Sheffield, England, has returned to England after a three weeks' visit to strip mills in the United States.

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DR. P. J. GIANI, metallurgical engineer, Fried. Krupp, A. G., Essen, Germany, sailed from New York, Nov. 2, for Germany, following an extended sojourn in the United States, studying processes and markets largely in tool steels and forgings.

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WALTER MICKELSON, factory manager of the Kempsmith Mfg. Co., Milwaukee, has been made manager of the Cleveland branch office, and is succeeded by H. L. LIVESEY, production manager. GERALD G. TOLLIGER, formerly superintendent of the Evinrude Motor Co.'s Milwaukee plant, has been made production manager.

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GEORGE L. HISE, of the Central Tube Co., Ambridge, Pa., has been appointed superintendent of pipe mills of the Republic Iron & Steel Co. He succeeds JOHN BAXTER, who had been with the Republic company for 20 years and largely supervised construction of new pipe capacity installed since the World War.

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WILLIAM L. WOODWARD has been elected vice-president of the Superior Steel Corporation, Pittsburgh. For several years he has been assistant to the president of the Eaton Axle & Spring Co., Cleveland, and previously was general manager of the Standard Welding Co., Cleveland. He was graduated from Massachusetts Institute of Technology in 1907.

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S. S. BUCKLEY, formerly president of the Onondaga Steel Co., Syracuse, N. Y., has become associated with Ekstrand & Tholand, 1 East Forty-second Street, New York, to promote the sale of Swedish sponge iron.

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J. J. MITCHELL, heretofore Cleveland sales manager of the Square D Co., Detroit, has been placed in charge of all of the company's panelboard sales, with headquarters in Detroit. M. W. PARMALEE succeeds him in Cleveland.

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H. M. DAVISON, who has been manager of excavator sales of the Harnischfeger Sales Corporation in the Eastern territory, with headquarters in New York, has been made general sales manager of the company, with offices at Milwaukee.

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W. C. HECKEROTH, for the past two years with the Fuel Efficiency Engineering Corporation, Birmingham, has been appointed Birmingham district sales agent of the Erie Iron Works, Erie, Pa.

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ALBERT J. SAMS, of Chicago, has been appointed railroad sales representative for the Little Giant Co., Mankato, Minn., manufacturer of power hammers.

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GEORGE H. FREERS, who has been assistant chief engineer of the Marmon Motor Car Co., Indianapolis, for the past five years, has been made chief engineer, succeeding THOMAS J. LITTE, JR., who has resigned.

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D. O. REARDON has been appointed representative in Iowa, with headquarters in Des Moines, for the Wagner Electric Corporation, St. Louis.

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BERNARD NAGELVOORT, formerly plant manager of the Murray Corporation of America, has joined the Rotor Air Tool Co., Cleveland, as sales engineer, with headquarters in Detroit.

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SAMUEL L. HOYT, research laboratories of the General Electric Co., Schenectady, N. Y., was the guest of the Boston branch of the National Metal Trades Association on Nov. 6 at the Hotel Essex, Boston. He discussed carboloy, dealing with its physical properties, hardness, and uses.

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ARTHUR J. SPEER, for 15 years industrial secretary of the National Council of the Young Men's Christian Association, has been made personnel director of the American Cast Iron Pipe Co., Birmingham.

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W. C. SUTHERLAND, assistant to the president of the Pittsburgh Steel Co., Pittsburgh, has been elected a director. Before promotion to his present position last July, Mr. Sutherland was general superintendent of the company.

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CHARLES M. SCHWAB, chairman of the board of the Bethlehem Steel Corporation, will deliver the principal address at the annual dinner of the Illinois Manufacturers Association, Dec. 10, at the Stevens Hotel, Chicago.

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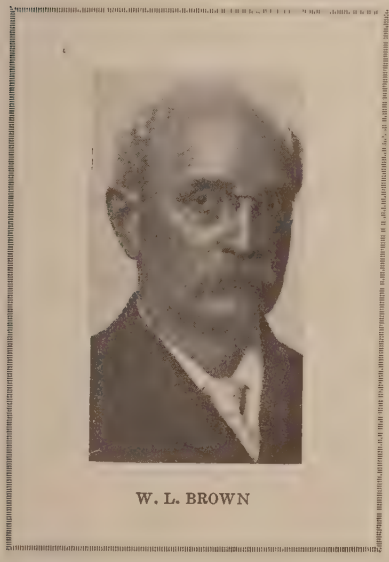
ALEXANDER CAMERON, assistant to F. H. GORDON, vice-president, Lukens Steel Co., Coatesville, Pa., has been placed in charge of the Philadelphia and New York offices of the company. F. L. SHANTS is assistant manager of sales in the Philadelphia office and HARRY LOEB continues in charge of the New York office. Mr. Cameron will make his headquarters in Philadelphia, but divide his time between the two offices. He joined the Lukens Steel Co. about three years ago, leaving the Michigan Steel Co. to become assistant to Mr. Gordon, who was at that time general manager of sales.

The eighth National Exposition of Power and Mechanical Engineering, known as the National Power Show, will be held in Grand Central Palace, New York, during the week of Dec. 2. The 420-odd booths already subscribed for will occupy approximately 130,000 sq. ft. of surface on three floors. Charles F. Roth and Fred W. Payne, Grand Central Palace, New York, are in charge.

OBITUARY

WILLIAM LISTON BROWN, formerly president of Pickands, Brown & Co., Chicago, died at his home in Pasadena, Cal., on Nov. 1, aged 87 years. He was born in St. Joseph, Mich. At the close of the Civil War, in which he served, he entered the pig iron and coal business as a clerk with A. B. Meeker & Co. and was made a partner



W. L. BROWN

in 1870. In 1883, he helped organize Pickands, Brown & Co. and seven years later, with others, formed the Chicago Shipbuilding Co., which was later merged with the American Shipbuilding Co. He was president of the latter until 1908. At one time he was chairman of the finance and executive committees of the Illinois Steel Co. He had also been president of the Federal Furnace Co. and director of the Lackawanna Steel Co. He retired from business about 10 years ago.

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FRANK SALOMON, report of whose death in Munich has reached this country, was for years interested in the sale of American machine tools. Early in his career he was identified for 12 years with the Brown & Sharpe Mfg. Co. and then went to Europe as sales engineer for the Schuchardt & Schutte Co. and later with Alfred H. Schutte in Cologne. Subsequently he became president of the Otto Gas Engine Co., Philadelphia, but returned to Germany in 1914.

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FRANK M. HAMILTON, president Thomas Hamilton's Son Co., Philadelphia, died on Oct. 12.

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ROBERT EMMET JENNINGS, formerly a vice-president of the Crucible Steel Co., died at his home in Montclair, N. J., on Oct. 30, aged 84 years. As a young man he entered the steel business with Atha & Illingsworth, Newark, N. J., and after a few years left to establish Spaulding & Jennings, Jersey City, N. J. This company was purchased by the Crucible Steel Co. in 1900, of which he was vice-president until 1904. He was later appointed receiver of the Carpenter Steel Co., Reading, Pa., and after the reorganization he was elected president. In 1917 he was made chairman of the board, and retired a few years later.

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ALEXANDER L. SCHUHL, manager of the Philadelphia office of the Independent Pneumatic Tool Co., Chicago, died of pneumonia on Oct. 20, aged 45 years.

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JOHN WILLIAM LIEB, vice-president of the New York Edison Co. and a pioneer in the electrical field in this country, died at his home in New Rochelle, N. Y., Nov. 1, aged 69 years. He was born in Newark, N. J., and after his graduation from the Stevens Institute of Technology in 1880, he became identified with the Edison Electric Light Co., and assisted in making plans for the dynamos and equipment of the first central station for the distribution of electricity in New York. The following year he was sent to Milan in connection with the installation of electric light and power service in Italy, and while he was in Italy, Mr. Lieb began his study of Leonardo da Vinci, that made him a da Vinci authority.

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HARRY I. ILLINGSWORTH, president, Boston Machine Works, Lynn, Mass., died on Oct. 31 at his home in that city, aged 63 years.

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PETER A. NEWTON, general superintendent at the South works of the Illinois Steel Co., died suddenly soon after he entered his office on Nov. 4, aged 56 years. On his graduation from Cornell University in 1894 in mechanical engineering, he entered the service of the Illinois Steel Co. at the Joliet works, where he was steam engineer and assistant master mechanic until 1899. Then he was made assistant superintendent of the billet and rod mills and in 1901 was appointed assistant general superintendent of Joliet works. He was transferred to the South works in 1906 as assistant general superintendent and the following year was made general superintendent.

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THERON I. CRANE died at his home in Philadelphia Nov. 2, aged 68 years. He was born in Indianapolis, but for most of his business career, or from 1880 to 1916, was identified with the pig iron trade of the East as a partner in Pilling & Crane, Philadelphia. In 1902, in association with W. S. PILLING, he organized the Northern Iron Co., which operated Northern furnace at Port Henry, N. Y., and later operated under lease the Standish furnace of the Delaware & Hudson Co. at Standish, N. Y. In 1906 Mr. Crane and others organized the Northern Ore Co., which for a time operated Keystone furnace at Island Park, Easton, Pa., formerly owned by the Thomas Iron Co. He was for a number of years a director of the Eastern Steel Co., Pottsville, Pa., and a director of the Bank of North America, Philadelphia.

Reinforcing Steel

Awards Total 9300 Tons and Inquiries 2700 Tons

REINFORCING steel lettings, at 9300 tons, include 1700 tons for barracks at San Antonio, Tex., 1300 tons for a rubber manufacturng plant at Passaic, N. J., and 1200 tons for an addition to a paper mill at Camas, Wash. Fresh inquiries amounted to 2700 tons. Awards follow:

HEMPSTEAD, N. Y., 250 tons, telephone building, to Carroll & McCreary.

NEW YORK, 125 tons, telephone building on Fiftieth Street, to Carroll & McCreary.

NEW YORK, 500 tons, board walk at Rockaway Beach, to Carroll & McCreary.

PASSAIC, N. J., 1300 tons, United States Rubber Co. building, to Jones & Laughlin Steel Corporation.

SPRINGFIELD, ILL., 1000 tons, State institutional buildings, to Inland Steel Co.

PITTSBURGH, 900 tons, McCann building, to Carlem Engineering Co.

SAN ANTONIO, TEX., 1700 tons, barracks at Randolph Field, to Laclede Steel Co.

CAMAS, WASH., 1200 tons, addition to Crown Willamette Paper Co. plant, to Pacific Coast Steel Co.

ST. HELENS, ORE., 300 tons, plant, Fir-Tex Insulating Board Co., to Truscon Steel Co.

PORTLAND, ORE., 200 tons, Nurses' Home, to Truscon Steel Co.

PORTLAND, 100 tons, addition Jantzen Knitting Mills, to Soule Steel Co.

SAN FRANCISCO, 1000 tons, warehouse for Pacific Gas & Electric Co., to Pacific Coast Steel Co.

SAN FRANCISCO, 550 tons, Pier No. 1, to Pacific Coast Steel Co.

STOCKTON, CAL., 150 tons, theater, to Truscon Steel Co.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

PROVIDENCE, R. I., 300 tons, Crawford Street bridge.

BROOKLYN, 300 tons, *New York Times* building.

ELMIRA, N. Y., 155 tons, new school.

PHILADELPHIA, 400 tons, Convention Hall; bids in.

ROCKFORD, ILL., 225 tons, factory for Mechanics Universal Joint Co.

SPRINGFIELD, ILL., 475 tons, State buildings; J. B. French & Co., general contractors.

CHICAGO, 500 tons, Henrotan Hospital.

YOUNTVILLE, CAL., 400 tons, Veterans' Home; bids Nov. 19.

SACRAMENTO, CAL., 147 tons, bridge over San Gabriel River; bids opened.

Recovery in Continental Steel Markets

Higher Prices Follow Reduction in Cartel Quotas—British Prices Firm Under Advancing Costs

(*By Cable*)

LONDON, ENGLAND, Nov. 4.

UNCERTAINTIES as to the Government's coal scheme have somewhat adversely affected the iron and steel business, but the decline in the bank rate has left consumers rather less anxious. Good pig iron inquiries are again circulating. Cleveland makers have sold moderately for November and their stocks are small, and being faced with a further increase in fuel costs, are holding prices firmly. Producers of hematite iron have already raised quotations 1s. following substantial sales for early next year.

Steel makers are meeting this week to discuss the 1930 program. It is regarded possible that official prices will be raised because of advanced costs, although opposition is strong in many quarters.

Business is generally quiet but good inquiries are looked for. Structural and metal-working plants are well occupied especially on domestic orders. Shipbuilders are slow to release tonnages to the mills, but new ship building is reported to be improving, so that the outlook in this direction seems healthy.

The International Raw Steel Cartel has proposed an immediate reduction of 10 per cent in output with the result that Continental makers are adopting a stiffer attitude and prices appear to have turned the corner. Business with Europe is dull except in semi-finished steel, but considerable quantities are arriving under old contracts.

Tin plates are steady in spite of weakness in tin. Makers are well supplied with orders so that there is no need to press for sales.

Consumers are in need of plates and good inquiries are expected, particularly as world consumption appears to be steadily increasing; certain it is that requirements of important users are now larger.

Demand for galvanized sheets has improved slightly and makers are less keen to accept lowest prices. Black sheets are quiet.

Clyde shipbuilding output in October was 20 vessels of 57,500 tons.

Nasmyth, Wilson & Co., Ltd., Manchester, has secured an order for six locomotives for the Kenya Uganda Railroad.

Quota Reductions Bring Higher Prices in Europe

(*By Radiogram*)

BERLIN, GERMANY, Nov. 4.

THE decree of the International Steel Cartel reducing production quotas of the member countries by 10 per cent has led to considerable recovery in the international market, with a sharp rise in prices.

Immediately before the decree, prices were the lowest since 1927. In the last few days prices of nearly all forms of steel, in particular bars, structural shapes and sheets, have advanced 1s. to 4s. a ton. Demand has increased and producers entirely dominate the market. Düsseldorf experts predict a further recovery and rise in prices. Domestic prices for November remain unchanged.

Steel Cartel Suggests Reduced Production

(*By Cable*)

PARIS, FRANCE, Nov. 1.

The executive committee of the International Steel Cartel, which is meeting here, has recommended that rolling schedules be reduced 10 per cent, effective Nov. 1, based on the present low prices and lack of buying in the steel markets.

British and Continental European Export Prices per gross ton, f.o.b. United Kingdom Ports, Hamburg and Antwerp, with the £ at $4.85

British Prices, f.o.b. United Kingdom Ports

Cleveland No. 3 foundry	£3	12½s.	to	£3	13½s.	$17.58	to	$17.82
East Coast hematite	3	17½	to	3	18	18.79	to	18.91
Ferromanganese, export	13	10	to	14	0	65.47	to	67.90
Billets, open-hearth	6	5	to	6	7½	30.31	to	30.92
Sheet bars, open-hearth	6	5	to	6	10	30.31	to	31.52
Black sheets, Japanese specifications	12	12½				61.22		
Tin plate, per base box	0	18¾	to	0	19	4.54	to	4.60
Rails, 60 lb. and heavier	7	15	to	8	15	37.59	to	42.43
						Cents per Lb.		
Steel bars, open-hearth	7	15	to	8	10	1.67	to	1.84
Beams, open-hearth	7	2½	to	7	12½	1.55	to	1.65
Channels, open-hearth	7	7½	to	7	17½	1.60	to	1.71
Angles, open-hearth	8	2½	to	8	12½	1.76	to	1.86
Ship plates, open-hearth	7	12½	to	8	2½	1.66	to	1.76
Black sheets, No. 24 gage	10	0	to	10	5	2.17	to	2.21
Galvanized sheets, No. 24 gage	12	17½	to	13	5	2.78	to	2.87

Continental Prices, f.o.b. Antwerp or Hamburg

Foundry iron, 2.50 to 3.00 per cent sil., 0.50 to 0.90 per cent phos.	£3	8s.	to	£3	11½s.	$16.49	to	$17.33
Foundry iron, 2.50 to 3.00 per cent sil., 1.00 per cent and more phos.	3	8	to	3	10	16.49	to	16.97
Billets, Thomas	4	12½	to	4	13	22.43	to	22.56
Sheet bars, Thomas	4	12	to	4	12½	22.31	to	22.43
Wire rods low C., No. 5 B.W.G.	6	3	to	6	5	29.82	to	30.30
Black sheets, No. 31 gage, Japanese	12	6	to	12	7½	59.65	to	60.02
Rails, 60 lb. and heavier	6	8½	to	6	10*	31.16	to	31.52
Rails, light	6	1½				29.46		
						Cents per Lb.		
Steel bars, merchant	5	4	to	5	5	1.13	to	1.14
Steel bars, deformed	5	3	to	5	4	1.12	to	1.13
Beams, Thomas, British standard	4	18	to	5	4	1.06	to	1.13
Channels, Thomas, American sections	5	14	to	5	18	1.25	to	1.27
Angles, Thomas, 4-in. and larger, over ⅝-in. thick	5	0	to	5	7	1.08	to	1.16
Angles, Thomas, 3-in.	5	6				1.14		
Ship plates, open-hearth inspected	7	5				1.61		
Hoop and strip steel over 6-in. base	5	7½	to	5	10	1.15	to	1.19
Wire, plain, No. 8 gage	7	2½	to	7	3½	1.54	to	1.55
Wire, galvanized, No. 8 gage	8	16				1.89		
Wire, barbed, 4-pt. No. 12 B.W.G.	11	10				2.49		
Wire nails, base	7	10	to	7	10½	$1.62	to	$1.63 per keg
Wire nails, assortments, 1 to 6-in. keg	10	6½				2.23		

*Open-hearth steel, 10s. ($2.42) per ton extra.

British Mills Need Tonnage

Steel Export Curtailed by Low Continental Prices—Some European Pig Iron Sold to British Users

LONDON, ENGLAND, Oct. 25.—Most steel mills are not particularly well situated with orders for the approach of the winter months. While blast furnaces are better engaged, many have but little business on their books for delivery beyond October. A desirable feature is that output is going directly into consumption and there is but little surplus iron for the open market.

Lack of business on the Continent has developed pressure by European mills for export tonnage, so that there has been some increase in foreign competition. Import of pig iron by British consumers, however, is not as a rule profitable, because of inland freight rates. In certain instances, however, basic iron has been sold to mills in Wales, and some French hematite is being shipped into the North of England, at the same time, it is difficult to sell Cleveland iron abroad at present prices, so that furnaces have been forced to rely on their domestic customers.

In semi-finished steel a certain proportion of business, particularly where a high grade steel is required, has been coming to British mills, but the renewal of severe Continental competition for billet and sheet-bar business has made it difficult for British works to secure even a fair share of this tonnage. Some good orders for foreign sheet bars have been placed by Welsh mills. British mills are unable to understand why the Continental makers should offer the drastic concessions in price that have been prevalent in the past few weeks. Sheet bars, for example, have declined about 7s. ($1.70) a ton in a month, and it is suggested that this may be the result of an effort to secure larger quotas in the International Steel Cartel.

Demand for finished material is light. Prior to the latest meeting of the Steel Makers' Association, considerable business was placed, particularly by the shipyards, in expectation of a rise in prices based on increased raw material costs. Specifications against these contracts are now being received and in a number of cases the steel mills are well occupied. Shipyards, however, are not receiving any large shipbuilding contracts, so that as these orders are completed there is but little to replace them. Various construction and electrical projects require a considerable tonnage of steel, but export trade is still restricted.

British consumers have the benefit of the steel makers' rebate plan, but on the Continent competition is difficult to meet. The tin plate trade is an exception, and a good tonnage has been shipped recently. World consumption of tin plate is increasing, but in the past few days, buyers have been deterred by the decline in the tin market. Most mills, however, are heavily engaged for some months.

According to *Lloyds Register*, vessels under construction in the United Kingdom at the end of September had decreased by about 5500 tons compared with June, although the total was more than 300,000 tons greater than in September, 1928. The total tonnage under construction was 1,448,000 tons. Abroad, 1,369,000 tons of shipping is being constructed, which is 15,000 tons less than in June. Tonnage laid down in the United Kingdom in the third quarter was 360,000 tons, a decrease of 68,000 tons and launchings totaled 370,000 tons. Abroad 300,000 tons of shipping was begun and 346,000 tons launched in the third quarter. A large part of the new contracting since the end of the third quarter has been in oil tank ships for Norway.

German Shipyards Seeking Tonnage

HAMBURG, GERMANY, Oct. 21.—At the end of September, German shipyards had a total of only 235,499 gross tons of shipping contracts compared with 406,982 tons in the first quarter of this year. New contracts have been limited and the shipyards are buying but little steel from the mills, so that plate and shape business is quieter.

Japanese Black Sheet Market Declines

Germany has developed into a close second to Great Britain in furnishing light gage black sheets to Japan, according to A. Cameron & Co., Kobe, Japan, in a report on Japanese market conditions for September. Of a total of 6420 tons of black sheets, arriving at Japanese ports of Kobe, Osaka and Yokohama in August, Great Britain furnished 2467 tons, Germony 2279 tons, the United States 1664 tons and Sweden 10 tons.

While there was some improvement in the Japanese black sheet market in September, a marked increase in the supply of sheets by the Kawasaki Dockyard Co. and other Japanese mills leaves rather large stocks on hand. Defective sheets, seconds and waste, offered by Japanese mills are promptly taken by consumers because of attractive prices, and there is an apparent increase in demand for sheet seconds from Japanese mills, buyers exhibiting less interest in defective sheets from abroad.

Recovery of the rate of exchange in the second half of September and reports that British sheets were being offered at £13 18s. 6d. ($67.80) per ton caused the market to sag toward the end of the month. A conference of the Kawasaki Dockyard Co. and accredited dealers in sheets has fixed the black sheet price for December delivery at 173 yen, based on £13 18s. ($67.68) per ton, a decline of 3 yen ($1.45) per ton. It is noteworthy that American black sheets are selling at about 1 sen (0.48c.) per sheet less than British. At the end of September British sheets were quoted at 65 sen (31.32c.) and American at 64 sen (30.84c.) per sheet.

Manganese Ore Prices Decline in Germany

HAMBURG, GERMANY, Oct. 21.—Manganese ore prices have registered a further decline and in the past week ore has been sold at 11¼d. (22½c.) per unit, c.i.f. German port. The lower grade Russian manganese ore from the Nikopol deposits in the Ukraine, which averages about 46 per cent manganese, has been sold at 10½d. (21c.) per unit, c.i.f. port.

Recently the South African manganese ore mines, controlled by the Manganese Ore Corporation, Ltd., at Postmasburg, have closed contracts for shipment of about 200 tons to France and more than 20,000 tons of ore to Germany, Belgium and Czechoslovakia. These sales are understood to have been on the basis of furnishing ore with 52 per cent Mn. and 0.15 per cent max. Phos.

Italy Inquires for Furnaces and Rolling Mills

HAMBURG, GERMANY, Oct. 21.—Recent Italian inquiries for steel mill equipment are sufficient to increase the output of the country by close to 200,000 tons a year. Inquiries include two blast furnaces, a number of open-hearth furnaces and considerable rolling mill equipment. German engineering companies bidding on this business expect orders to be placed soon.

EXPORTS OF AMERICAN ROCK DRILLS*

Destination	1925	1926	1927	1928
Union of South Africa	$184,979	$239,778	$310,937	$356,607
Canada	128,270	136,606	172,710	244,172
Spain	137,519	70,091	198,544	188,272
United Kingdom	97,628	160,399	216,263	180,320
Mexico	207,426	182,378	190,906	165,716
France	61,329	62,792	91,588	123,730
Australia	103,785	105,377	103,102	86,303
Japan	105,836	141,406	87,420	72,346
Chile	89,044	64,817	50,709	69,972
Total, including others.	$1,373,702	$1,505,833	$1,885,175	$2,023,293

*From report prepared by Industrial Machinery Division, Department of Commerce.

Germany's Exports Gain 50 Per Cent in Three Years

Recording an increase of almost a billion dollars in the export trade of 1928 over that of 1927, at current money values, the fourth annual accounting of international trade, issued by the National Foreign Trade Council, shows a steady growth of the world's exports and a rate of annual increase slightly greater than that prevailing before the war. The advance in the world's foreign trade since 1925 is fully 15 per cent, or an average annual increase of 5 per cent. Between 1900 and 1913 the aggregate growth of the world's exports was about 63 per cent, or slightly less than 5 per cent a year.

The latest figures for 91 nations whose trade represents 95 per cent of current international commerce, place the world's 1928 exports at $32,914,000,000, equivalent to $23,567,000,000 at the 1913 value of the dollar. This compares with 1913 exports for these same nations of $20,055,000,000. They reached their pre-war level again for the first time in 1925 with exports of $20,454,000,000, increased to $21,025,000,000 in 1926 and to $22,867,000,000 in 1927. All the council's figures have been adjusted to the 1913 value of the dollar in order to provide a comparison free from factors of inflation.

The restoration of the world to its pre-war rate of progress in export growth is largely due to the export trade development since 1925 of three nations—Germany, the United States and Canada. Within the past three years Germany has outstripped all other nations in the advance of her exports. In 1925, they were valued at $1,414,000,000, reckoned at the 1913 valuation of the dollar. In 1928, they reached $2,093,000,000, a gain of $679,000,000, or almost 50 per cent. The increase of the United States in the past three years has also been notable, mounting from $3,147,000,000 in 1925, at the rate of the 1913 dollar, to $3,663,000,000 in 1928, a gain of $516,000,000, or about 17 per cent. Canada has increased her exports in this period by $162,000,000, from $819,000,000 to $981,000,000, or about 18 per cent.

The three nations whose total advances since 1913 are the greatest in amount are the same as were recorded last year—the United States, Canada and Japan. American exports increased between 1913 and 1928 by $1,179,000,000, or 48 per cent, at the 1913 valuation of the dollar; Canada's increased by $520,000,000, or 113 per cent, and Japan's by $341,000,000, or 109 per cent. Although our quantity gain was twice that of Canada and three times that of Japan, their advance at more than twice our own rate of growth is a fact that should not escape attention.

The most significant general increase in export trade during the year was that of the 12 nations of western Europe. The aggregate export of these nations for 1928 was $9,670,000,000. This was 98½ per cent of the export trade they carried on in 1913, using the strictly realistic comparison of the 1913 value of the dollar. Germany's rapid progress has brought her up to within 87 per cent of her 1913 real exports, Great Britain up to 95 per cent and Belgium up to 86 per cent. All the other nations of western Europe are doing more export trade than they did before the war with the exception of Holland, whose change of method in computing statistics makes exact comparison impossible.

Wabana Ore Shipments to Reach 1,800,000 Tons

WASHINGTON, Oct. 31.—Shipments of iron ore from mines in Newfoundland amounted to 1,001,849 gross tons during the current year up to Sept. 23, according to Consul A. M. Warren, St. John's. Germany was the largest purchaser of Bell Island ore, taking 483,669 tons, while 468,910 tons was shipped to Sydney, Nova Scotia, 43,940 tons to the United States and 5330 tons to Scotland.

It is estimated that before the end of the shipping season, which terminates on Dec. 20, unless Conception Bay is frozen before that time, 1,800,000 tons of ore will have been shipped if the current rate of production is maintained.

The British Empire Steel Corporation, which operates the Bell Island mines, has agreed to pay an export tax on ore sold abroad amounting to 10c. a ton, up to an annual total of 1,500,000 tons. Shipments in excess of this quantity are tax-free.

Accident Prevention Contest Conducted at Springfield

The Gilbert & Barker Mfg. Co., P. P. Kellogg Co., Van Norman Machine Tool Co., New England Box Co., Standard Electric Time Co. and Bay State Elevator Co. were winners of banners for September in the Springfield, Mass., industrial accident prevention contest. Sixty-seven firms are enrolled in this contest. In September 65 firms, employing 26,155 people, operated 4,846,796 hr. with an accident frequency of 18.98 per million hours worked and a severity rate of 0.40 per thousand hours worked. Figured at the rate of $4 per day, the employees of these plants suffered a loss of $7,848. In September there was a decrease of 15 in the number of lost time accidents, as compared with August, with a larger reduction in the number of days lost.

Bethlehem Expansion at Johnstown

The Bethlehem Steel Co. has announced a further expansion program calling for an expenditure of $10,000,000 at its Cambria works, Johnstown, Pa., according to an announcement by Eugene G. Grace, president of the company, while on an inspection tour of the Cambria plant. The improvements will be undertaken as soon as the present $12,000,000 betterment program at the plant is completed, and will center in the lower works departments. The program will include the installation of a new Bessemer department and new open-hearth furnaces.

Practical Use of X-Ray in Industry

An attractive booklet of 24 pages has recently been issued by the Kelley-Koett Mfg. Co., Inc., Covington, Ky., entitled "The Practical Use of the X-Ray in Industry." This company has had considerable experience in the examination of various metals and other materials with the X-ray, and the booklet gives some illustrations of the results and discusses the application of the X-ray to industry in general. The company also furnishes equipment for such work.

Desch Supply & Equipment Co., Baltimore, has been appointed sales representative in the State of Maryland and Washington, D. C., for Grefco chrome high-temperature cement and standard silica bonding cement made by the General Refractories Co., Philadelphia.

Production, Orders and Sales—Steel Castings and Power Equipment

	September, 1929	August, 1929	September, 1928
Commercial Steel Castings(a):—			
Production, total, net tons	101,800	120,800	75,761
Production, nine months	1,011,282	.....	769,416
Production, railroad items	42,500	51,400	25,311
Production, miscellaneous	59,300	69,400	50,450
New orders, total, net tons	83,200	100,500	82,762
New orders, nine months	1,010,077	.....	740,308
New orders, railroad items	32,450	36,500	35,234
New orders, miscellaneous	50,750	64,000	47,528
Mechanical stokers sold, hp.(a)	44,485	54,929	65,060
Mechanical stokers, nine months	457,832	.....	401,319
Steel boilers ordered, No.(a)	1,909	1,859	1,425
Steel boilers heating surface, sq. ft.	1,958,307	1,781,489	1,257,000
Steel boilers heating surface, nine months	15,558,597	.....	13,417,132

(a) United States Department of Commerce.

Welded Steel Fabric Made Available for Wider Use

Truscon welded steel fabric, which has been used to reinforce concrete highways for several years, has recently been made available in sizes and weights suitable for general reinforcing work.

The fabric comes with 4-in. mesh, the main wires and cross wires being welded by an electrical process that results in positive fusion of the two wires. The fabric is shipped in coils or sheets in weights up to 97 lb. per 100 sq. ft. It is expected that the new product will be used in the construction of docks, bridges, levees, floor slabs, reservoirs, driveways, sewers, subways, stadiums, viaducts, flues, grandstands, pipe, sidewalks and sea-walls.

A pamphlet put out by the Truscon Steel Co., Youngstown, Ohio, contains a general description of the product, with tables of standard types and sizes, properties of the wire used and sectionel areas of the fabric, allowable load capacities for floor slabs of various spans, a tentative schedule of specifications for reinforced concrete sewer pipe and tables for estimating weight per 100 sq. ft. of welded steel fabric.

American Papers at Testing Congress in Zurich

Statements concerning developments which have taken place in specific fields in each country are planned by the permanent committee for the International Congress for Testing Materials to be held in Zurich in 1931. From these a number of subjects for discussion at the congress will probably be selected. The statements for the United States have been secured by W. H. Fulweiler, the representative of the American Society for Testing Materials on the permanent committee, through the cooperation of a number of so-called "reporters," each one an authority in the particular field covered. The complete list of statements, up to the present time, is as follows:

Cast Iron: "Alloy Cast Iron and High Strength Cast Iron in the United States of America," by F. B. Coyle, International Nickel Co., Inc., New York; *Materials at High Temperatures:* "Alloys of Iron, Nickel and Chromium," by Marcus A. Grossman, Central Alloy Steel Corporation, Massillon, Ohio; *Welding:* "Compression of Welded and Riveted Joints," by F. P. McKibben, consulting engineer, General Electric Co., Black Gap, Pa.; *Progress in Metallography:* "Thermal Analysis and Dilatometry," by Howard Scott, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.; *"Non-Metallic Inclusions in Metals,"* by G. F. Comstock, Niagara Falls, N. Y.; *"Advances in Microscopy,"* by F. F. Lucas, Bell Telephone Laboratories, Inc., New York.

Ryerson Buys Camden, N. J., Steel Jobbing Company

Joseph T. Ryerson & Son, Inc., has purchased, effective Nov. 16, the business, equipment and stock of the Penn-Jersey Steel Co., Camden, N. J. The Penn-Jersey company warehouses in the Philadelphia district a complete stock of steel shapes, plates, sheets, hot and cold finished bars and reinforcing bars. Ryerson & Son plans to enlarge the stock at Camden, and to increase facilities of distribution.

Stock Offer Withdrawn

The Sharon Steel Hoop Co., Sharon, Pa., which recently offered its stockholders rights to subscribe for 90,000 shares of no par common stock of the company, has withdrawn that offer on account of recent developments in the security market. It is stated that the offer may be renewed when and if the directors feel that such action is for the best interest of the company and the stockholders, and when the general situation is more stabilized.

Fabricated Steel Plate, Furniture and Boilers

	September, 1929	August, 1929	September, 1928
Fabricated steel plate orders, net tons(a)	40,432	39,702	40,281
do., nine months	412,716	.....	383,968
do., oil storage tanks	14,991	11,150	18,572
do., refinery materials	4,009	5,059(b)	5,021
do., tank cars	2,779(b)	720	684
do., gas holders	3,353	3,317(c)	1,642
do., blast furnaces	200	115(d)	386
do., stacks and miscellaneous	15,100(e)	19,341	13,976
Steel barrel production, number(a)	668,224	806,574(f)	593,255
do., nine months	6,515,997(g)	.....	5,627,004
do., shipments	658,583	809,860(f)	595,640
Steel furniture orders(a)	$2,278,575(h)	$2,417,725	$2,689,009
do., nine months	25,309,396	.....	26,494,881(g)
do., shipments	2,322,535(h)	2,482,594	2,754,135
do., unfilled orders(j)	2,067,742(h)	2,171,493	2,061,856
Steel shelving orders(a)	732,020(h)	931,468	799,850
do., nine months	8,942,474(g)	.....	6,938,397

(a) United States Department of Commerce.
(b) Largest since last March.
(c) Smallest since last April.
(d) Smallest since last February.
(e) Smallest since last January.
(f) Second largest ever made, exceeded only by last May.
(g) Largest ever reached.
(h) Lowest so far this year.
(j) End of month.

New Company Makes Gas-Fired Industrial Boilers

The Steam & Combustion Co., 205 West Wacker Drive, Chicago, has been incorporated for the production and sale of gas-fired boilers for industrial processing lines and kindred products. The company is owned and operated by the G. W. Dulany Trust, Chicago. G. W. Dulany, Jr., is chairman of the board; C. B. Page, president; William E. Eberhart, vice-president and treasurer, and James E. Moore, secretary and assistant treasurer.

The gas-fired boilers now being placed on the market are produced in association with the Freeman Mfg. Co., Racine, Wis., and the National Machine Works, Chicago. The former manufactures boilers and the latter specializes in gas combustion equipment. L. A. McDowell, a director of the new company, is president of the Freeman Mfg. Co., and W. R. Zitzowitz, also director, is president of the National Machine Works. Installations of the company's product have already been made in Chicago and plans are under way for introducing the line in other territories.

Electrical Equipment for Special Beam Mill Let

Electrical equipment for the main drive of a beam mill, to be installed at South works, Illinois Steel Co., Chicago, has been let to the Westinghouse Electric & Mfg. Co., East Pittsburgh. The mill will be used to produce a wide-flange section, which differs from the standard I-beam in that the flanges are of uniform thickness instead of being tapered, and the thickness of the metal in the flanges can be varied over a wide range. Due to its special features this section has come into heavy demand in building construction.

Special study has been given to this mill and several modifications have been made in the mill and electrical designs. An example of this is the two-motor, direct drive, for the blooming mill, which was described in THE IRON AGE of Oct. 31, page 1178.

Pittsburgh & West Virginia to Build Branch Line

The Pittsburgh & West Virginia Railway Co. has applied to the Interstate Commerce Commission for permission to construct a 6-mile branch line to connect Monessen and Donora, Pa., with the new Connellsville extension of that road now under construction.

The branch would connect the new extension at Charleroi, Pa., with the Donora Southern Railroad, a steel plant belt line. The Connellsville extension of the Pittsburgh & West Virginia extends from Cochran's Mills, Allegheny County, Pa., to Connellsville, where a connection is made with the Western Maryland and thence to tidewater at Baltimore.

Machinery Markets and News of the Works

October Tool Sales Large

Some Falling Off in Final Week—Effect of Stock Market Collapse Not Yet Gaged

MACHINE tool sales declined during the past week, although the totals for October are generally larger than those for the preceding month. To what extent the quieter business of the past week was caused by the widespread absorption in events in Wall Street cannot be estimated, but it is certain that routine business affairs in many quarters were neglected.

One of the largest machine tool distributers in the East reports that its October volume was the second largest for any month this year, and, when final footings are made, it may prove to have been the largest.

A falling off in machine tool demand during November and December would not be unusual in any circumstances, as such buying generally tapers off with the approach of the annual inventory season.

The automobile industry is not counted upon to supply its usual volume of machine tool orders for expansion and replacements, it being assumed that present equipment will suffice for a curtailed demand for passenger cars, at least until such time as the buying power of prospective car purchasers has become more definitely known.

Machine tool plants have large orders on their books, in many instances assuring present full production schedules through January and February. Deliveries on some tools extend into March. Since the experience of 1921, when wholesale cancellations of machine tool orders swamped the industry, sales of machine tools by virtually all factors in the industry have been non-cancellable, and such a clause appears in sales contracts.

The machine tool industry expects that the stock market collapse will be followed by a period of hesitation and watchful waiting, but it looks to the liquid and prosperous condition of industrial buyers as a bulwark for a continuing satisfactory volume of business.

New York

NEW YORK, Nov. 4.—Notwithstanding the fact that the attention of many people was riveted last week on the stock market, to the exclusion of routine business affairs, the volume of machine tool buying was fairly good. Some local sales offices report a falling off in the number of inquiries, and a few office experienced a somewhat quieter week in sales, but no special significance is attached at this time to this development. One of the largest machine tool distributers in the Eastern territory states that its October business will at least be the second largest for any month this year and, when final footings are made, it may take first place in total sales.

A noticeable feature of the current situation is widespread buying in New England. This comes from machinery companies catering to almost every line of industry. Even if machine buying should taper off during the remainder of the year, machine tool manufacturers would not feel the effects for some months, because nearly all leading tool builders are sold up through January, at least, and many have orders that will carry them through February and well into March. The only unfavorable development is that some orders for automobile parts have been temporarily held up.

F. L. Smith Machine Co., 633 West Forty-fourth Street, New York, has rejected bids recently received for extensions and improvements in five-story plant, to cost about $40,000, and will ask new bids soon. Russell G. Cory, 30 Church Street, is architect and engineer.

Prest-O-Lite Co., 30 East Forty-second Street, New York, manufacturer of acetylene gas, welding equipment, etc., has plans for a new branch plant at Casper, Wyo., to cost more than $75,000 with equipment. It is scheduled for completion early next year.

I. Kallich, 26 Court Street, Brooklyn, architect, has plans for a four-story automobile service, repair and garage building, to cost about $140,000 with equipment.

W. S. Barstow, Glendale, L. I., manufacturer of farm lighting equipment, heating apparatus, etc., has acquired plant of United Sash & Door Co., Glendale, on site 200 x 233 ft., and will improve for new plant.

Chevrolet Motor Co., 3044 West Grand Boulevard, Detroit, is contemplating early call for bids for one-story addition to assembling plant at Tarrytown, N. Y., to cost about $200,000 with equipment. Albert Kahn, Inc., Marquette Building, Detroit, is architect and engineer

Western Electric Co., 195 Broadway, New York, has purchased plants and business of Turner-Armour Corporation, Brooklyn and Queens, manufacturer of telephone booths and kindred telephone equipment. Properties consist of one-story plant, totaling 80,000 sq. ft. floor space at 6600 Metropolitan Avenue, Queens, and three-story factory at 1201 Flushing Avenue, Brooklyn, aggregating 60,000 sq. ft., used primarily for assembling operations, and will be operated in future as Queens Borough Works of Western Electric Co. New owner is said to be planning improvements and extensions.

Rubel Coal & Ice Corporation, 937 Fulton Street, Brooklyn, has plans for one-story ice-manufacturing plant, to cost about $100,000 with machinery. Henry J. Nurick, 44 Court Street, is architect.

Board of Education, Albany, N. Y., is considering installation of manual training equipment in new junior high school to cost more than $1,200,000, for which bids will soon be asked on general contract. A. L. Delehanty, 121 North Pearl Street, is architect.

Atlantic Basin Iron Works, Inc., 168 Van Brunt Street, Brooklyn, has engaged G. L. Slaight, 343 Columbia Street, architect, to prepare plans for rebuilding part of plant recently destroyed by fire; a new two-story shop will be built, to cost about $45,000 with equipment.

Sonatron Tube Co., 57-9 State Street, Newark, manufacturer of radio tubes and equipment, is having revised plans drawn for new six-story addition, 70 x 120 ft., to cost over $100,000 with equipment. Siegler & Greenberg, 164 Market Street, are architects.

Traveling ovens, power equipment, conveying machinery and other mechanical equipment will be installed in new four-story and basement plant, 170 x 200 ft., to be erected by National Biscuit Co., 85 Ninth Avenue, New York, at Newark, to cost $525,000 with equipment. General contract has been let to White Construction Co., 95 Madison Avenue, New York. Louis Wirsching, Jr., is company architect.

Juno Fasteners, Inc., 202 Penn Avenue, Hillside, N. J., manufacturer of radio tube parts and kindred equipment, has acquired former plant of J. M. Quimby Co., 24-34 Sterling Street, East Orange, N. J., for a new plant, and will remove to new location.

Eaton Kent Co., Academy Building, Newark, Coal-handling equipment and de-

vices, has leased one-story building at Harrison, N. J., for mechanical works, storage and distributing service.

New Jersey Art Foundry Co., 433 Tonnele Avenue, Jersey City, N. J., has awarded general contract to Frank Crahay, 3572 Hudson Boulevard, for one and two-story addition to foundry, to cost about $35,000 with equipment. Leo Feinen, 3697 Hudson Boulevard, is architect.

Spanjer Brothers, Inc., 198 Badger Avenue, Newark, manufacturer of signs and displays, is planning immediate rebuilding of part of plant destroyed by fire Oct. 29.

Francis P. Friedman, 395 Springfield Avenue, Newark, architect, is asking bids on general contract until Nov. 15 for a one-story automobile service, repair and garage building, 145 x 150 ft., at Passaic, N. J., to cost about $130,000 with equipment.

Oakley Valve & Foundry Co., 48 Ferguson Street, Newark, manufacturer of poppet valves for internal combustion engines, has been incorporated with capital stock of 5000 shares of no par value. Company's foundry work will consist chiefly of non-ferrous, nickel and monel metal castings. William E. Oakley is president.

McKiernan-Terry Drill Co., 15 Park Row, New York, has changed its name to McKiernan-Terry Corporation and has acquired ownership of National Hoisting Engine Co., Harrison, N. J., and Steele & Condict, Inc., Jersey City, N. J. Consolidation of these three companies whose products go into same fields has been effected to provide for business expansion. Work previously done at plant of Steele & Condict, Inc., will be divided between McKiernan-Terry plant at Dover, N. J., and National plant at Harrison. Arthur W. Buttenheim is president of McKiernan-Terry Corporation.

Buffalo

BUFFALO, Nov. 4.—International Business Machines Corporation, Endicott, N. Y., has plans for four-story addition, to cost more than $150,000 with equipment. C. H. Higgins, 101 Park Avenue, New York, is architect. Headquarters are at 50 Broad Street, New York.

Atlantic Refining Co., 260 South Broad Street, Philadelphia, has purchased oil storage and distributing plant and other properties of Empire State Oil Co., Binghamton, N. Y. Plans are under way for expansion in first noted unit, to cost about $100,000 with equipment.

Board of Education, Genesee Building, Buffalo, is considering installation of manual training equipment in new high school to cost over $1,350,000. D. G. McNeil, address noted, is architect for board.

American Locomotive Co., 30 Church Street, New York, has purchased plant and business of McIntosh & Seymour Corporation, Auburn, N. Y., manufacturer of Diesel engines. Plant will be continued under present name and operated as a subsidiary. Expansion is planned.

Irving Air Chute Co., 372 Pearl Street, Buffalo, has authorized immediate construction of new branch plant at Grand Central Air Terminal, Glendale, near Los Angeles, consisting of one-story unit for parts production and assembling, to cost about $100,000 including equipment.

The Crane Market

INQUIRY for overhead traveling cranes has decreased, but builders are well engaged on old orders and in most cases are quoting three to four months delivery. Following a delay caused by a threatened taxpayer's suit, contract of the Board of Transportation, New York, for six substations has been awarded to the General Electric Co., which has placed an order for six overhead cranes. The Standard Oil Co. of New Jersey, is asking prices on a small capacity hand power crane. Business in locomotive cranes is small in the East, but some fair orders have been placed in the Chicago district. Recent purchases have included: General Electric Co., Schenectady, N. Y., six 30-ton, 3-motor, overhead cranes for substations in New York for Board of Transportation, to Cleveland Crane & Engineering Co.; Sun Oil Co., Philadelphia, 15-ton crawl tread crane from unnamed builder.

New England

BOSTON, Nov. 4.—Platt Brothers & Co., Inc., Platts Mills, Waterbury, Conn., manufacturer of metals, metal stampings, aluminum products, etc., has plans for a one-story addition, 70x140 ft., to cost $40,000 with equipment. Fred A. Webster, Waterbury, is architect.

Buzzards Bay Gas Co., 1 State Street, Boston, is contemplating new artificial gas plant in Buzzards Bay district to cost about $550,000 with equipment. Cape Cod Gas Co., same address, an affiliated organization, has plans for a similar plant near Hyannis, to cost about $600,000 with machinery. S. B. Gallagher, 20 Hammatt Street, Ipswich, Mass., is engineer for projects.

Narragansett Electric Co., Providence, R. I., is arranging expansion over period of 36 months, in conjunction with similar program to be carried out by New England Power Association, Worcester, Mass., of which it is a subsidiary. Work will include extensions and betterments at South Street generating plant, extensions in underground conduit system and overhead lines, with installation of new equipment to cost $3,000,000; a new power substation will be built in East Providence district to cost $500,000, and number of smaller substations in different parts of city.

Scovill Mfg. Co., Waterbury, Conn., has awarded contract to Levering & Garrigues Co., 552 West Twenty-third Street, New York, for one-story addition to brass goods manufacturing plant, 62x391 ft., to cost more than $85,000 with equipment. Hugh L. Thompson, Waterbury, is architect.

William J. Hanna, Attleboro, Mass., manufacturer of cutlery, has started work on a one-story plant, 26x96 ft.

A. F. Robinson Boiler Works, Cambridge, Mass., has purchased local property, 100x200 ft., which will be developed for manufacturing purposes.

Providence Insulated Wire Co., Providence, R. I., is about to start work on a one and two-story, 24x100 ft., manufacturing plant and office addition.

H. E. Holbrook, Worcester, Mass., has started erection of a one-story foundry, to cost $12,000 without equipment.

Moore Drop Forge Co., Springfield, Mass., will build a one-story addition, 93x182 ft., to cost $35,000 without equipment.

Hemphill Co., Central Falls, R. I, manufacturer of hosiery machinery, has started work on a one-story addition, 60x200 ft.

Fairfield County Ice Co., Stamford, Conn., will build an ice manufacturing plant, 80x220 ft.

E. W. Carpenter Mfg. Co., Bridgeport, Conn., manufacturer of hardware supplies, has closed bids on a one-story addition, 52x132 ft.

United Electric Light Co., Springfield, Mass., contemplates erection of a one-story substation early next year.

Philadelphia

PHILADELPHIA, Nov. 4.—Plans have been filed by United States Gypsum Co., 1500 Walnut Street, Philadelphia, for two-story storage and distributing unit, to cost $80,000 with mechanical-handling and other equipment.

F. G. Vogt & Sons, Inc., Thirtieth and Race Streets, Philadelphia, meat packer, is asking bids on general contract until Dec. 2 for new three- and four-story plant, to cost about $1,000,000 with equipment. A refrigerating and power plant will be installed. C. B. Comstock, 110 West Fortieth Street, New York, is architect and engineer.

Gimbel Brothers, Ninth and Market Streets, Philadelphia, have plans for a two-story automobile service, repair and garage building, 124 x 230 ft., to cost about $170,000 with equipment. Abbott, Merkt & Co., 175 Fifth Avenue, New York, are architects and engineers.

Philadelphia Quartz Co., 121 South Third Street, Philadelphia, has acquired a 4-acre tract in Locust Point district, Baltimore, and is contemplating new plant on site to manufacture silicate of soda products, to cost more than $100,000.

Officials of Radio Corporation of America, Inc., Woolworth Building, New York, and affiliated organization, Victor Talking Machine Co., Camden, N. J., have formed R. C. A. Victor Corporation, a new subsidiary, for manufacture, research and sales of radio equipment, talking machines and other equipment heretofore produced by Radio Corporation, General Electric Co., and Westinghouse Electric & Mfg. Co. It is expected to complete new unified operation during next 60 days, with bulk of production to be carried out in future at Camden plant, which will be arranged for increased production. E. E. Shumaker, president of Victor Talking Machine division, will be president of new organization.

Marvel Oil Co., Shubert Building, Philadelphia, has leased three-story building at 2328 Fairmount Avenue, for new oil storage and distributing plant.

Curtis & Brothers Co., Newark, Del., Herbert W. Mason, president, operating a local paper mill, has purchased mill of Mount Holly Paper Co., Mount Holly Springs, Pa., and will take over property at once. Purchasing company has formed Curtis & Brothers Co. of Pennsylvania, Inc., a subsidiary, to operate mill and is planning expansion and complete modernization of plant, including installation

of equipment for production of book papers.

Penn Metal Co., Twenty-fifth and Wharton Streets, Philadelphia, has leased two-story and basement building, 115 x 250 ft., to be erected on Oregon Avenue, to cost about $75,000, exclusive of equipment, and will occupy for expansion.

Crew Levick Co., 219 North Broad Street, Philadelphia, is planning construction of oil storage and distributing plant near Perth Amboy, N. J., to cost more than $90,000 with equipment. A pumping plant will be installed.

Lebanon Steel Foundry Co., Lebanon, Pa., will soon begin superstructure for two-story addition to foundry, 150 x 182 ft., to cost more than $90,000 with equipment. Wilbur Watson & Associates, 4614 Prospect Avenue, Cleveland, are architects and engineers.

Steel Plate Products Co., Pottstown, Pa., announces a change in sales and purchasing policy effective Nov. 16, when these functions will be resumed by home organization. For some months sales and purchasing have been handled through agency of Plate Fabrications, Inc., with offices in New York and Philadelphia.

Pittsburgh

PITTSBURGH, Nov. 4.—October did not prove to be as good a month as was expected by some machine tool dealers in this district, but business was generally well ahead of the same month last year and there is more than enough inquiry before the trade to assure good showings for the remaining months of the year if it is all acted upon. Just now some buyers are inclined to postpone purchases in some lines, but it is not expected that any projects under active consideration will be entirely abandoned.

The only new inquiry of importance is that of the Pittsburgh Board of Education, which includes a fair-sized list of tools. Both the Westinghouse Electric & Mfg. Co. and the United States Aluminum Co. are placing tools regularly, but other purchases have included only single tools, or at least have been rather small.

Recent large industrial expansion projects which have been announced include improvements at Johnstown plant of Bethlehem Steel Corporation, where $10,000,000 will be spent, and at Etna, Pa., plant of Spang, Chalfant & Co., Inc.

Westinghouse Electric & Mfg. Co., East Pittsburgh, has plans for an eleven-story central engineering laboratory to cost about $350,000 with equipment, and will take bids soon on general contract. Bernard H. Prack, 119 Federal Street, Pittsburgh, is architect and engineer.

Pressed Steel Car Co., McKees Rocks, Pa., is considering a one-story addition. 60x140 ft., to cost about $50,000 with equipment. H. P. Hoffstat is vice-president.

Board of Education, Mount Lebanon, Pa., is considering installation of manual training equipment in new two-story high school to cost about $230,000, for which revised plans are being drawn by Ingham & Boyd, Empire Building, Pittsburgh, architects.

Pillsbury Flour Mills, Inc., Metropolitan Life Building, Minneapolis, Minn., has plans for new paper bag and paper sack manufacturing plant at Wellsburg, W. Va., to cost about $135,000 including machinery.

Chicago, Wilmington & Franklin Coal Co., 332 South Michigan Avenue, Chicago, Ill., will carry out expansion at mines Nos. 5 and 6, near Eccles, W. Va., including installation of new screening and cleaning equipment, conveying and other machinery, to cost more than $150,000.

United States Chain & Forging Co., Union Trust Building, Pittsburgh, has awarded a general contract to Fort Pitt Bridge Works, Inc., Oliver Building, for one-story addition to plant at McKees Rocks, 75x150 ft., for manufacture of automobile bumpers, to cost $45,000 with equipment.

South Atlantic

BALTIMORE, Nov. 4.—Bids will be asked on general contract this month by Levering Brothers, Inc., 200 Key Highway, Baltimore, manufacturer of sash weights and other iron castings, for one and two-story branch plant at Hanover, Pa., to cost about $100,000 with equipment. Part of structure will be used for storage and distribution.

Guilford Folding Box Co., Eager Street and Fallsway, Baltimore, has awarded general contract to Consolidated Engineering Co., 20 East Franklin Street, for new plant on Philadelphia Road, 160 x 205 ft., for manufacture of corrugated and other cardboard boxes and containers, to cost about $175,000 with equipment.

William A. Fingles, Inc., 29 South Howard Street, Baltimore, operating a sheet metal works, has awarded general contract to M. A. Long Co., 10 West Chase Street, for new two-story plant, to cost about $55,000 with equipment.

Rustless Iron Corporation of America, Inc., Loneys Lane and Pennsylvania Railroad, Baltimore, is considering new plant near Pittsburgh, to cost over $100,000 with equipment.

Parkway Motor Co., Inc., 1065 Wisconsin Avenue, N. W., Washington, local representative for Ford automobile, has plans for three-story service, repair and sales building, including body shop, on site recently acquired, to cost over $125,000 including equipment. David Stern, 1412 I Street, N. W., is architect.

Safe Harbor Water Power Corporation, a subsidiary of Pennsylvania Water & Power Co., Lexington Building, Baltimore, has awarded a general contract to Arundel Corporation, Knickerbocker Building, for power dam and power house for hydroelectric power project at Safe Harbor on Susquehanna River, to cost about $30,000,000 with steel tower transmission lines. Engineering design and purchase of equipment will be handled by company engineering department.

Simmons Co., Kenosha, Wis., manufacturer of metal bedsteads, springs, etc., has purchased plant and business of B. F. Huncley Furniture Co., Winston-Salem, N. C., and its subsidiary manufacturing interests. New owner will continue operation at present location and plans expansion program.

Mexican Petroleum Corporation of Georgia, Inc., Savannah, a subsidiary of Pan-American Petroleum & Transport Co., 122 East Forty-second Street, New York, has taken over a local 50-acre tract as site for a new refinery, with storage and distributing facilities, to cost about $850,000 with equipment. Superstructure for group of one-story units will soon be placed under way. A. M. McKeen is chief engineer, in charge.

American Loom Co., Greenville, S. C., recently formed with capital of $50,000 to manufacture textile machinery and equipment, plans early operation of local factory to cost about $40,000 with equipment. F. A. Lawton, 620 East McBee Avenue, Greenville, is president.

United Railways & Electric Co., Continental Building, Baltimore, will take bids early next year for one and two-story automobile service, repair and garage building for bus maintenance division, to cost about $250,000 with equipment. W. H. Emery, 18 East Lexington Street, is architect.

St. Louis

ST. LOUIS, Nov. 4.—Herman Body Co., Clayton and Newstead Avenues, St. Louis, manufacturer of automobile bodies, has awarded general contract to Murch Brothers Construction Co., Railway Exchange Building, for one-story plant, 130 x 160 ft., to cost about $40,000 with equipment.

Kansas Gas & Electric Co., Market Street, Wichita, Kan., has plans for one-story equipment storage and distributing plant, with general service, mechanical repair and other departments, to cost more than $300,000 with equipment. C. V. Waddington, Sedgwick Building, is engineer.

J. A. Werme Iron & Steel Co., North Indiana Street, Oklahoma City, Okla., will build a one-story addition, 100 x 300 ft., for storage and distribution, to cost about $30,000 with equipment.

Missouri-Pacific Railroad Co., Railway Exchange Building, St. Louis, is considering new engine house at Northern Kansas central branch division shops at Atchison, Kan., with machine and repair facilities, to cost about $140,000 with equipment. E. A. Hadley is chief engineer.

Missouri Valley Farmers' Association, Virginia Building, Columbia, Mo., has plans for three-story feed mill, with elevator, including screening, conveying and other mechanical equipment at Springfield, Mo., where site has recently been purchased, to cost about $100,000 with equipment. Southwestern Engineering Co., McDaniel Building, Springfield, is engineer.

Iowa-Nebraska Light & Power Co., Ninth and L Streets, Lincoln, Neb., has plans for new one-story steam-operated electric generating plant, to cost about $120,000, of which close to $80,000 will be used for equipment. Engineering department of company at Davenport, Iowa, is in charge.

North American Air Lines, Inc., Hunt Building, Tulsa, Okla., has secured 100-acre tract at Sapulpa, Okla., and plans airport with hangars, repair shop and other mechanical units, to cost more than $90,000 with equipment. W. L. Ives, Tulsa, is head.

Clay & Bailey Mfg. Co., Kansas City, Mo., and its subsidiary, Morgan Foundry Co., have purchased a 3½-acre site, between Gould Avenue and Frisco right-of-way for new plant. An existing building will house foundry, and a machine shop, warehouse and a cleaning room will be erected.

Chicago

CHICAGO, Nov. 4.—Sales of machine tools are steady to miscellaneous buyers. It is only the occasional purchaser who is interested in more than one piece of shop equipment. The Santa Fe will buy a 24-in. drill. The International Harvester Co. is shaping programs for several of its plants, but at present is taking only a few of its needs for its Farmall plant at Rock Island, Ill. A number of users in Milwaukee are in the market for individual tools. The Allis-Chalmers Mfg. Co., with tractor plants at Milwaukee and Springfield, Ill., has announced expansion programs and the trade is looking forward to lists from this source. It is stated that orders received by machine tool manufacturers closely match production schedules and as a result deliveries have not improved.

Fargo Foundry Co., Fargo, N. D., has started erection of two additions, 45x77 ft. and 35x37 ft., for fabrication of structural steel and tank work.

Hardinge Brothers, Inc., 4149 East Ravenswood Ave., Chicago, manufacturer of oil burners and oil burning equipment, has plans for a four-story addition, to cost more than $90,000 with equipment. Paul McGrath, 38 South Dearborn Street, is architect.

Robert Zwick, 1247 Blue Island Avenue, Chicago, manufacturer of plumbing equipment and supplies, has awarded general contract to M. L. Bein, 100 North LaSalle Street, for two-story plant, 120x125 ft. to cost about $55,000 with equipment.

Ostrander-Seymour Co., 1900 South Fifty-fourth Avenue, Cicero, Ill., manufacturer of photo-engraving machinery and equipment, has purchased adjoining site for a one-story addition, 50x270 ft., to cost about $60,000 with equipment. George P. Cullen, Inc., 2940 West Lake Avenue, is engineer and contractor.

Board of Education, Proviso Township High School District No. 209, 124 South Seventeenth Street, Maywood, Ill., is considering installation of manual training equipment in three-story addition to local high school to cost $1,000,000, for which bids are being asked on general contract. J. C. Llewellyn & Son, 38 South Dearborn Street, Chicago, are architects.

Department of Public Works, City Hall, St. Paul, Minn., will begin superstructure at once for an equipment storage and distributing plant, with mechanical and electrical repair departments, to cost about $200,000 with equipment. Harry S. Bronson, City Hall, is acting city architect.

Board of Works, Fort Dodge, Iowa, has approved plans for a one-story machine and repair shop for municipal waterworks department, to cost about $30,000 with equipment.

Merit Hardware Mfg. Co., 2125 West Rice Street, Chicago, manufacturer of casket hardware, etc., is contemplating three-story plant unit, to cost over $250,000 with equipment.

Northern Malleable Iron Co., Forest and Wells Street, St. Paul, Minn., has awarded a general contract to Romer Construction Co., 190 Ramsey Street, for a one-story addition.

Gears & Forgings, Inc., 1001 West Washington Boulevard, Chicago, has acquired a plant at 2108-20 North Natchez Avenue, for expansion, and will concentrate all local production at new location.

Indiana Limestone Co., Tribune Tower Chicago, states that report published in THE IRON AGE of Oct. 10, that it has organized Texas Quarries, Inc., was incorrect. Operations of Indiana Limestone Co. are confined to Monroe and Lawrence counties, Indiana.

Manco Mfg. Co., Bradley, Ill., manufacturer of wood-working machinery and hardware, is enlarging its plant at a cost of about $25,000 and is installing heating and ventilating equipment and new machinery. A new building will give about 10,000 sq. ft. of additional floor space.

Indiana

INDIANAPOLIS, Nov. 4.—Contract has been let by United States Radio & Television Co., 1340 South Michigan Avenue, Chicago, to Bowman Construction Co., Marion, for one-story engineering building, 115 x 125 ft., at Marion, part of structure to be used for administration purposes, to cost $60,000 with equipment.

Auburn Automobile Co., Auburn, has plans for two-story addition, to be used in part for storage and distribution, to cost $70,000 with equipment. A. M. Strauss, Cal-Wayne Building, Fort Wayne, is architect.

Utah Radio Products Co., 1615 South Michigan Boulevard, Chicago, manufacturer of radio equipment and parts, has acquired Caswell-Runyan Co., Huntington, manufacturer of kindred apparatus, and will consolidate. Plant will be continued at Huntington and expansion in output is planned. Purchasing company has also acquired Carter Radio Co., 300 South Racine Avenue, Chicago, and will merge with organization. Utah company has authorized increase in capital stock from 250,000 to 1,000,000 shares, part of proceeds to be used for acquisitions noted and expansion.

Hoosier Desk Co., Jasper, Ind., has awarded general contract to Carl Keller, 818 DuBois Street, for three additions, consisting of two production units, 60 x 85 ft., and 23 x 35 ft., and one-story power plant, 48 x 60 ft., to cost over $85,000 with equipment. Thole & Legeman, American Trust Building, Evansville, are architects. S. G. Norman is general manager.

Fire King Stoker Co., 1159 Roosevelt Avenue, Indianapolis, is considering one-story assembling plant addition, to cost about $100,000 including equipment.

Cincinnati

CINCINNATI, Nov. 4.—As a result of the spurt in fresh bookings of machine tool manufacturers and a steady demand the latter part of the month, the October volume of business was a trifle ahead of that of September. In fact, one leading manufacturer of lathes indicates that October will rate as one of the best months this year. Production continues at the high rate that has prevailed for the last six months, district manufacturers still having heavy backlogs. Inquiry has slackened somewhat the past week.

Plans have been filed by Burkett Closed Body Co., 541 Master Avenue, Dayton, Ohio, manufacturer of automobile bodies, for extensions and improvements in three-story factory, to cost about $25,000.

State Department, Columbus, Ohio, has plans for one-story and basement power plant, to cost over $200,000 with equipment. T. R. Ridley, Ohio Hartman Building, is architect, in charge.

Board of Education, Marion, Ohio, is contemplating installation of manual training equipment in new junior high school in Oakland Heights section to cost more than $250,000, for which bids will be asked on general contract this month. Garber & Woodward, 4 West Seventh Street, Cincinnati, are architects.

Dayton Power & Light Co., Dayton, Ohio, has filed plans for addition to steam-operated electric generating plant, to cost about $200,000 with equipment. Company is a subsidiary of Columbia Gas & Electric Co., Cincinnati, and engineering department of latter organization is in charge.

Tennessee Cereal Co., Franklin, Tenn., plans installation of electrically-operated drying equipment, conveying machinery, steam cookers, roller mills and other equipment in new one-story plant, 100x 200 ft., to cost about $100,000 with machinery. B. W. Ernst is president.

Pennsylvania-Dixie Cement Corporation, Kingsport, Tenn., is contemplating an expansion at local mill, including installation of machinery for wet process operation, to cost upward of $100,000. Headquarters of southern division are at Chattanooga, Tenn. W. H. Klein is general manager.

Frigidaire Corporation, Taylor Street, Dayton, Ohio, a subsidiary of General Motors Corporation, has awarded general contract to T. E. Patterson, Dayton, for one-story addition, 78x127 ft., and improvements in present plant, to cost about $40,000 with equipment.

Detroit

DETROIT, Nov. 4.—Plans are under way by McCord Radiator & Mfg. Co., 2587 East Grand Boulevard, Detroit, manufacturer of automobile radiators, etc., for a one-story top addition to present three-story plant, to cost about $50,000 with equipment. Smith, Hinchman & Grylls, Marquette Building, are architects and engineers.

Fitzjohn Mfg. Co., Muskegon, Mich., manufacturer of commercial automobile bodies, is planning a one-story addition, totaling 20,000 sq. ft. floor space, to cost about $55,000 with equipment.

Detroit Transfer Co., 1720 Twelfth Street, Detroit, has plans for a two-story automobile service, repair and garage building, 110 x 200 ft., for motor trucks and passenger cars, to cost about $120,000 with equipment.

Otis Steel Co., Jennings Road, Cleveland, is considering one and two-story factory branch at Detroit, for storage and distribution, to cost more than $65,000 with mechanical handling equipment.

Sheet Aluminum Corporation and affiliated organization, Hybinette Patents Corporation, Jackson, Mich., have acquired a local building and will remodel for early occupancy by last noted company as a metallurgical and experimental laboratory for work in aluminum alloys and other metals.

American Enameled Wire Co., Water Street, Muskegon, Mich., is said to be planning one-story addition to cost in excess of $45,000 with equipment. A. R. Thornton is manager.

White Star Refining Co., 903 West Grand Boulevard, Detroit, has begun con-

struction of a lubricating oil unit at Avery Avenue and Grand Trunk Railroad. A sign manufacturing plant, as well as storage and distributing plant will be built at Charles and Mount Elliott Avenues. Entire program will cost more than $100,000 with equipment.

United States Aluminum Co., 3311 Dunn Road, Detroit, has plans for one-story unit, 100 x 375 ft., to manufacture aluminum parts, etc., to cost about $80,000 with equipment.

Standard Steel Shelving Co., recently organized to manufacture steel shelving, is now in operation at its plant, 1326 Woodridge Avenue, Detroit.

A C Spark Plug Co., Flint, Mich., is planning a three-story addition, to cost about $100,000.

Milwaukee

MILWAUKEE, Nov. 4.—Sales of machine tools in October were a little less than in August, but equal to those in September. Some dealers report a slight recession toward the end of the month, but machine tool manufacturers have not experienced much falling-off in orders, with more business coming from the East than from this territory. Production of large automobiles has dropped considerably, but the manufacture of small and medium sized cars, while much below last year's high mark, is nevertheless fair.

Milwaukee Gray Iron Foundry Co., Thirty-ninth Avenue, Milwaukee, has begun work on one-story cleaning room, 35 x 130 ft., and core oven building, 25 x 40 ft.

Royal Airways Corporation, 614 East Gorham Street, Madison, Wis., is building a hangar, 100 x 135 ft., including machine and service shop. Flad & Moulton, Madison, are architects.

Wisconsin Cylinder Co., 1308 Eighteenth Street, Racine, Wis., manufacturer of motor blocks, is erecting two shop additions, 40 x 70 ft. and 28 x 60 ft.

Beloit Iron Works, 815 Second Street, Beloit, Wis., manufacturer of paper mill machinery and equipment, has begun work on one-story addition, to cost about $35,000.

Kiel Furniture Co., Milwaukee and Kiel, Wis., will build a three-story addition to factory at Kiel, 66 x 102 ft. J. B. Laun is in charge; Van Ryn & De Gelleke, 114 Wisconsin Avenue, Milwaukee, are architects.

Lakeside Malleable Casting Co., 23rd and Clark Streets, Racine, Wis., has begun work on one-story addition to its foundry, 60 x 80 ft., costing about $10,000 and one-story pattern storage vault, 40 x 60 ft.

Gulf States

BIRMINGHAM, Nov. 4.—Plans have been approved by Nichols Copper Co., 25 Broadway, New York, for one-story power plant at new refinery at El Paso, Tex., to cost about $100,000 with equipment.

Certain-teed Products Corporation, 100 East Forty-second Street, New York, is considering one-story addition to wallboard mill at Agatite, Tex., to cost more than $100,000 with equipment.

Hughes Tool Co., 300 Hughes Street, Houston, Tex., manufacturer of oil well tools and equipment, has taken out a permit for one-story addition, 35 x 180 ft., to cost about $50,000 with equipment.

Jacob E. Salie, Empire Building, Birmingham, architect, has plans for two-story automobile service, repair and garage building, 140 x 150 ft., to cost about $100,000 with equipment.

Day Mfg. Co., Sherman, Tex., manufacturer of corrugated paper boxes and containers, has leased one-story building to be erected at South Crockett and West Jones Streets, 65 x 145 ft., for new plant, to cost about $45,000 with machinery. Clyce & Rolfe, Sherman, are architects.

Universal Metal Mfg. Co., Tarrant, Ala., has awarded general contract to Price & Belcher, 2904 North Twenty-seventh Street, for one-story addition, 75 x 125 ft., to cost about $28,000 with equipment. Charles H. McCauley, Jackson Building, Birmingham, is architect.

J. N. McDonald, 714 First Bank & Trust Co. Building, Sarasota, Fla., and associates have secured permission to use water from Oklawaha River in Putnam and Marion Counties for hydroelectric power development, for which plans will be prepared by George L. Pratt, Citizens' & Southern Bank Building, Atlanta, Ga., engineer. Station will have capacity of about 15,000 hp., and will cost more than $900,000 with transmission system.

Board of Education, Texarkana, Tex., is considering installation of manual training equipment in new high school, to cost about $150,000 with equipment. Witt, Seibert & Halsey, Texarkana, are architects.

Cleveland

CLEVELAND, Nov. 4.—The spurt of buying that followed the National Machine Tool Exposition appears to have spent itself. At least sales declined the past week. However, with a good volume of business during part of the month, October sales showed some gain over September. Orders placed during the week were for single machines and were well distributed throughout various industries. Virtually no buying is being done by the automotive industry and very little business is expected from that source during the remainder of the year.

The Nickel Plate Railroad has purchased a 6-ft. radial drill. While some other railroad business is in prospect, it is not expected that it will be placed in the immediate future.

E. T. Pierce Co., 4903 Harlem Avenue, Cleveland, manufacturer of tools, dies, etc., has awarded general contract to Ray P. Adams, 975 Roanoke Road, for one-story plant, 65 x 100 ft., to cost about $45,000 with equipment. George A. Ebeling, 737 Prospect Avenue, is architect.

Electric Auto-Lite Co., Toledo, Ohio, manufacturer of automobile starting and lighting equipment, has plans for an addition, to cost $1,000,000 with equipment. Company also has plans for new branch plant at Sarnia, Ont., to cost about $3,000,000 with machinery. Fred A. Hahn, Gardner Building, is architect. C. O. Miniger is president.

Wheeler Metal Products Co., 1637 Collamere Road, Cleveland, has plans for one-story factory, 80 x 300 ft., to cost about $140,000 with equipment. Austin Co. is engineer.

Sinclair Auto Service Corporation, 2540 West Twenty-second Street, Chicago, M. J. Kirby, head, has plans for a one-story mechanical and repair shop at Cleveland, to cost about $85,000 with equipment. Shattuck & Layer, 134 North LaSalle Street, Chicago, are architects.

Tuscan Tire & Rubber Co., Carrollton, Ohio, is considering early rebuilding of plant destroyed by fire Oct. 29.

Acme Refining Co., 3591 West Fifty-sixth Street, Cleveland, manufacturer of greases, lubricants, etc., has plans for two-story addition, to cost about $150,000 including equipment.

Cleveland Heights Air Terminals, Inc., 1060 Quilliams Road, Cleveland, has plans for airport on Ridgebury Boulevard, comprising hangars, repair and reconditioning facilities, oil storage and other mechanical units, to cost more than $125,000 with equipment. James R. Gloyd, care of A. M. Allen Co., Marshall Building, is engineer.

Youngstown Steel Car Door Co. has transferred manufacturing operations from Cleveland to a new plant at Wickliffe, Ohio. Its product has heretofore been fabricated by Midland Steel Products Co. Officials advise that company has enough unfilled tonnage t ooperate at a capacity until next March.

Pacific Coast

SAN FRANCISCO, Oct. 31.—Heintz & Kaufman, Inc., 219 Natoma Street, San Francisco, manufacturer of radio equipment, etc., has awarded contract to Barrett & Hilp, 918 Harrison Street, for four one-story plant units at South San Francisco, to be used primarily for experimental work, to cost $70,000 with equipment. Company has a 6-acre site at location noted, and is said to be planning other units later. E. A. Neumarkel, 544 Market Street, is architect.

Western Pipe & Steel Co., 5717 Santa Fe Avenue, Los Angeles, is planning one-story addition, 130 x 345 ft., for forge and heavy plate shop, to cost about $50,000 with equipment.

Truscon Steel Co., Los Angeles, is planning one-story addition, 60 x 150 ft., to storage and distributing plant, to cost about $35,000. Headquarters are at Youngstown, Ohio.

Imperial Irrigation District, El Centro, Cal., is arranging an early election to vote bonds for $2,000,000, proceeds to be used for a new Diesel engine type electric generating plant in Imperial Valley district, including transmission lines, for which plans will soon be drawn by engineering department.

Rainier Pulp & Paper Co., Shelton, Wash., is planning an expansion program, with installation of additional equipment, to cost over $400,000. Main offices are at 354 Battery Street, San Francisco.

Little Pittsburgh Mining Co., Wallace, Idaho, Herman J. Rossi, in charge, is planning installation of new flotation mill, to cost more than $850,000 with machinery.

Overhead Door Co. of California, Inc., 1410 Madison Street, Oakland, Cal., manufacturer of metal garage doors, etc., has plans for a one-story plant to cost about $35,000 with equipment. G. L. Brown, American Bank Building, is architect.

Technical Glass Co., Vernon, near Los Angeles, has awarded a general contract to R. G. Brownell, 2528 East Slauson Avenue, for a one-story plant, 40 x 110 ft., at Vernon, to cost about $25,000 with equipment. H. W. Charlton, 2528 East Slauson Avenue, is architect.

Foreign

ERECTION of a cane sugar refinery has been authorized by Redo Sugar Co., Los Mochis, Mexico, at local properties, to cost over $200,000 with machinery.

Graham-Paige International Corporation, Paris, France, a subsidiary of Graham-Paige Co., Detroit, manufacturer of automobiles and motor trucks, is arranging for establishment of European headquarters at Antwerp, Belgium, under name of Société Anonyme Graham-Paige Belgique. Plans are under way for factory branch and parts plant at Antwerp, including storage and distributing facilities, to cost over $100,000.

Standard Sanitary Mfg. Co., Bessemer Building, Pittsburgh, subsidiary of American Radiator & Standard Sanitary Corporation, 40 West Fortieth Street, New York, has work under way on a new plant near Berlin, Germany, to manufacture brass goods and enameled ware, to cost more than $200,000 with machinery. It is expected to be ready for service early next year. Plant will supplement another works now being completed on adjoining site for manufacture of sanitary ware products.

H. V. McKay Pty., Ltd., Melbourne, Australia, manufacturer of a new type reaping and threshing machine, is arranging for early construction of new plant at Waterloo, Ont., in cooperation with Waterloo Mfg. Co., manufacturer of agricultural equipment, for exclusive production of new equipment, including parts and assembling departments, reported to cost more than $700,000 with machinery. It is proposed to organize a new company with capital of $2,500,000 to carry out project, to be controlled jointly by two organizations noted.

Canada

TORONTO, Nov. 4.—Machine tool sales have been slowing up the past week or ten days. Prospective demand, however, appears bright and local distributers and builders look upon this as but a temporary lull. Inquiries for new works are in good number, but the majority calls for single tools. The automotive industry is holding its purchases close to actual replacement needs and buying from this source is somewhat limited.

In Manitoba, Saskatchewan and Alberta, the recent expansion of domestic manufacturing has created a steadily increasing demand for industrial machinery. While machine tools are not so prominent in the sales lists to these provinces, mining equipment, pulp and paper mill and road building machinery have been quite active. One feature of the business in the West is that the greater part of the equipment is imported from the United States.

Plans are being prepared for a $2,000,000 linoleum manufacturing plant at Farnham, Que., for Barry, Ostlere & Shepherd, Ltd., Kirkcaldy, Scotland. J. M. Robertson, 1140 St. Catharine Street, Montreal, is consulting engineer. Work will start early in 1930.

Canadian Industries, Ltd., 1050 Beaver Hall Hill, Montreal, has started work on additions to its plants at Sandwich, Ont., which will represent an expenditure of $175,000.

Mill and equipment at Dome Mines, Ltd., South Porcupine, Ont., were recently destroyed by fire with a loss estimated at $750,000. It is planned to rebuild at once, at a cost of about $1,000,000.

Western Bridge Co., is planning to build an addition to its plant at Vancouver, B. C., to cost over $500,000. Company is affiliated with Hamilton Bridge Co., Hamilton, Ont., which recently acquired Coughlan Steel Plant, Columbia Street, Vancouver.

Western Mfg. Co., Regina, Sask., contemplates building a one-story addition, 64 x 173 ft., to cost $300,000.

United Mfg. Co., Cap de la Madeline, Que., has awarded contract to Charles Page Construction Co., Three Rivers, Que., for a three-story factory to cost $60,000, to be completed by Dec. 15.

Superior Alloys, Ltd., Hudson and Portage Streets, Sault Ste. Marie, Ont., has awarded additional contracts for a steel plant to cost $75,000

International Nickel Co., Port Colborne, Ont., is preparing to start work on an addition and has awarded steel contract to Standard Steel Construction Co., Welland, Ont.

International Harvester Co., Burlington Street East, Hamilton, Ont., has awarded contract to Humphrey Brothers, 214 Burlington Street East, for a one-story factory addition.

B. H. & Fred Prack, Pigott Building, Hamilton, Ont., have plans for a four-story addition to plant of B. Greening Wire Co., Hamilton.

New Trade Publications

Rotary Displacement Meters.—Connersville Blower Co., Connersville, Ind. Bulletin No. 305 illustrates different installations of Connersville rotary displacement meters for the measurement of gas. The fact is pointed out that the product is readily adaptable to unusual as well as ordinary requirements.

Lamp Hangers.—Thompson Electric Co., Cleveland. A 32-page catalog describing Thompson safety-lowering hangers and accessories, including the new lamp shock absorbers. Profusely illustrated and discusses such subjects as the design, construction and operation of hangers, dimensions and screw-hole specifications, spare-parts schedule, installing and wiring, electrical characteristics and mechanical load. A table of contents is given for easy reference.

Mine and Industrial Safety.—Mine Safety Appliances Co., Pittsburgh. No. 4 general catalog, consisting of 160 illustrated pages, many of them in color, describes the mine and general safety equipment manufactured by the company. Among the products are Edison electric safety cap lamps and accessories, permissible shot firing devices, Wolf flame safety lamps, gas and air measuring devices, rock dusting equipment, oxygen breathing apparatus, safety clothing, eye and head protective equipment and a complete line of first aid supplies. A classified index is published in the front of the catalog.

Steel Floor Grating.—Walter Bates Steel Corporation, Gary, Ind. In a 12-page folder the company sets forth information about its steel floor grating. The two pages in the center are given over to a table of safe loads and deflections for main bar grating.

Lock Washers. — Shakeproof Lock Washer Co., Chicago. Several practical applications of the Shakeproof principle of locking are shown in a four-page folder.

Blast Furnace Brick Lining.—North American Refractories Co., Cleveland. A folder describing a new world's record for production per brick in blast furnace service set at furnace No. 1 of the American Rolling Mill Co., Ashland, Ky. Ashland steam-pressed blast furnace brick, a product of the company, was used as lining for the furnace.

Armco Ingot Iron.—American Rolling Mill Co., Middletown, Ohio. The third architectural rotogravure issued by this company is a pictorial review of numerous buildings throughout the country in which Armco ingot iron has been used.

Conveyor Equipment. — Saginaw Stamping & Tool Co., Saginaw, Mich. Bulletin on conveyor equipment covering in detail a new belt conveyor idler design, an all-steel unit, fully rust-proofed to meet severe weather conditions. Bulletin also covers all of the customary types of overhead conveyor trolleys, trolley wheels, roller turns and chain hoist trolleys, with illustrations.

Precision Instruments. — Gaertner Scientific Corporation, 1201 Wrightwood Avenue, Chicago. Catalog M-130, 80 pages. Reading and micrometer microscopes, including workshop and inspectors types; spherometers, levels; laboratory reading telescopes; and reading scales are described and illustrated. Sections are devoted to Cathetometers, comparators and dividing machines for both linear and circular graduations. Standard meters and scales are also shown.

Milling Machines.—Ingersoll Milling Machine Co., Rockford, Ill. Folder of four pages, illustrated, and describing two types of milling machines and a cutter grinder, all of which were exhibited at the Cleveland Machine Tool Builders' Exposition.

Steam Pressures for Industrial Plants.—Combustion Engineering Corporation, 200 Madison Avenue, New York. Pamphlet of eight pages consisting of a paper by W. A. Shoudy on determination of steam pressures for industrial plants. This has been reprinted from *Combustion*, August issue.

Extruded Shapes.—Taunton-New Bedford Copper Co., Taunton, Mass. A four-page leaflet, illustrated, discusses the company's 'Eagle Brand' of extruded shapes and recommends that "if it cannot be stamped or pressed, consider an extruded shape."

Heat Resisting Alloys.—Driver-Harris Co., Harrison, N. J. An attractive booklet of some 28 pages has been issued by this company. There are 13 reproductions of photographs with appropriate captions showing various

installations of Nichrome castings for use by a number of American companies.

Drilling and Centering Machines.—Sundstrand Machine Tool Co., Rockford, Ill. Leaflet describing single and double-end drilling and centering machines.

Steel Castings.—Sivyer Steel Casting Co., Milwaukee. A four-page illustrated leaflet discusses "Fewer Dollars; Lower Inventories; Sivyer Castings." Data for the physical properties of a heavy drive pinion of chrome alloy steel are given.

Corrosion-Resistant Alloys.—International Nickel Co., New York. In a 16-page pamphlet entitled "Meeting the Metal Requirements of the Process Industries," corrosion data are given for a number of corrosion-resistant alloys into which nickel enters and the varied equipment into which they are incorporated. These are shown by illustrations and there is also a table giving known and established users of monel and nickel to overcome corrosive action.

Welding Rod for 18-8 Steels.—Fusion Welding Corporation, Chicago. Bulletin No. 4 gives physical characteristics of welding rod suitable for joints in high chromium-nickel steels, and welding technique is described.

Condulets, Groundulets, etc.—Crouse-Hinds Co., Syracuse, N. Y. Bound Catalog 2200 of 280 pages illustrates and describes a variety of condulets, groundulets and plugs and receptacles. This supersedes all previous listings. It is cross indexed and covers a great variety of items.

Gears.—Westinghouse Electric & Mfg. Co., East Pittsburgh. Folder 5223, containing pertinent facts about heat-treated gears and their use. Full description of BP, "tough-hard" and the EP processes, created and used in heat treating Westinghouse-Nuttall gears is included.

Water-Wheel Electric Generating Unit.—James Leffel & Co., Springfield, Ohio. Bulletin W207 illustrating and describing briefly a new self-contained water-wheel electric generating unit.

Rotary Positive Blowers.—Connersville Blower Co., Connersville, Ind. Bulletin 123 of 8 pages illustrating and describing the RSB and RBB series of rotary positive blowers. Principal features are the Boston type arrangement with double outer bearing supporting both shafts, use of renewable split-sleeve babbitt lined bearings or of anti-friction bearings. Tables of capacity and pressure ratings are given.

Self-Priming Centrifugal Pumps.—Duriron Co., Dayton, Ohio. Bulletin 155 of 4 pages illustrates and describes a series of Duriron centrifugal pumps with direct motor drive. Details concerning individual parts are covered.

Footlift Truck.—Lewis-Shepard Co., Watertown, Mass. Four-page folder No. 100 illustrating and describing a new lift truck constructed to operate by foot for loads up to 3500 lb. It is made in several sizes, weighing from 228 to 307 lb.

Jacklifts and Stackers.—Lewis-Shepard Co., Watertown, Mass. Four-page circular No. 57 illustrating and describing the Jack-Stack-Rack system for stacking many materials, including small castings and other parts, in bins.

The Week's News Quickly Told

Current Events That Bear on the Course of Business

SECURITIES were sold in such unprecedented volume that the New York Stock Exchange closed two days to enable brokers to straighten out their books. As a measure of the decline, the quotational value of 240 leading issues lost more in September and October than all their gains since January first. Banks were forced to assume two billions of loans called by out-of-town banks and others, even though the grand total of brokers loans was reduced a billion.

* * * * *

INSOLVENCIES show no unusual increase in number. Prominent among them are the Foshay companies of Minneapolis, which control a number of minor public utilities, and a Chicago bank which tied up its funds in a large building project.

* * * * *

MONEY continues at an easy rate. Federal Reserve rate to member banks was reduced from 6 to 5 per cent; Bank of England also dropped its rate ½ per cent.

* * * * *

RETAIL trade is considered fair—about equal to the same week in 1928—but reduced somewhat from the preceding week. The general level of wholesale prices is slowly decreasing; wholesale business generally is hesitant, commitments being deferred until the effect of the stock market's fluctuation can be appraised. Stocks of manufactured goods are reported slightly smaller than a month ago, but raw materials on hand are much larger.

* * * * *

COMMODITY prices have dropped steadily since July, Fisher's index then being 98.6, now 93.7. Wheat prices rebounded rapidly on active foreign buying, and on the absorption of most of the Argentine crop. . . . Brazilian business is acutely depressed in sympathy with coffee prices—the lowest since 1923. Proposals for a moratorium or a currency issue were rejected by the Government, which is advising orderly liquidation of accumulated stocks.

* * * * *

TEXTILES, especially cotton, have been overproducing, said Lincoln Baylies, president New England Mill Men's Association. Spindles made nearly as much in last eight months as during entire record-breaking year of 1927; insufficient demand has depressed prices of cotton cloth and reduced the mill margin by 5c. in two years. . . . Wool is quiet, but prices are steady. . . . Full-fashioned hosiery, reflecting the influence of short skirts, increased two-thirds in value since 1925, and the number of mills from 92 to 235. . . . A survey of New England industries shows that the losses in textiles and shoes have been counterbalanced by increasing manufacture of tools, typewriters, bicycles and tableware.

* * * * *

FORD MOTOR CO. reduced prices on all models an average of $30. . . . Exports of automotive products in September amounted to $35,000,000, about the same as 1928. . . . Responsive to the slump in automobile production, the plate glass industry is curtailing, although business in mirrors, window glass and wire glass continues in good volume and at higher prices. . . . All organized surface transit is decreasing in New York; even the busses are carrying 8 per cent fewer passengers than last year, they riding in subways, taxicabs and private cars. . . . Approval was given to the final link in the super-highway leading from the Hudson river tunnels across New Jersey to Camden, in the form of a $19,000,000 bridge and viaduct across the Hackensack meadows.

* * * * *

MORTGAGES on small homes in Philadelphia have been foreclosed in such a number that the Real Estate Board has requested all trust companies to extend due dates six months. . . . A trust fund of $10,000,000 has been bequeathed by T. E. Mitten to foster the cooperation between capital and labor, as exemplified by his management of the Philadelphia traction system. . . . Western Union increases the wages of minor employees a total of $2,000,000, according to a merit system judged by a joint committee of officials and employees. . . . Actuaries have worked out a pension plan for Westinghouse Electric & Mfg. Co., which will cost 1.2 per cent of the payroll and be administered by an independent trust company. . . . A. I. du Pont has instituted a pension system to meet the urgent needs of the aged in Delaware.

* * * * *

MILLION-DOLLAR or more yearly incomes were enjoyed by 290 Americans in 1927; this bracket of income returns has steadily increased since 1921, when there were 21 such persons. Total net incomes reported in 1927 was about equal to 1926; taxable corporation returns numbered the same, but the total of net earnings was off 7 per cent to nine billion.

* * * * *

CONSOLIDATIONS reported were Butler Brothers of Chicago with American Wholesale Corporation of Baltimore (combined mail order sales $100,000,000); and Stephen Sanford & Sons with Bigelow-Hartford Carpet Co. (combined annual sales $35,000,000).

* * * * *

PROHIBITION was abandoned by Nova Scotia, the last but one of Canadian provinces to adopt the plan of bulk sales of liquor in Government stores.

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THE IRON AGE

New York, November 14, 1929

ESTABLISHED 1855 VOL. 124, No. 20

Apprentice Training Pays Dividends

New High Standards Result in Developing Young Men for Responsible Executive and Technical Positions

BY F. L. PRENTISS*

HIGHER standards of apprenticeship training and entrance requirements which call for more extended preliminary public school education have been adopted by the Warner & Swasey Co., Cleveland, in its apprentice training school with a view to obtaining a higher goal in developing young men for responsible executive and technical positions in modern industry.

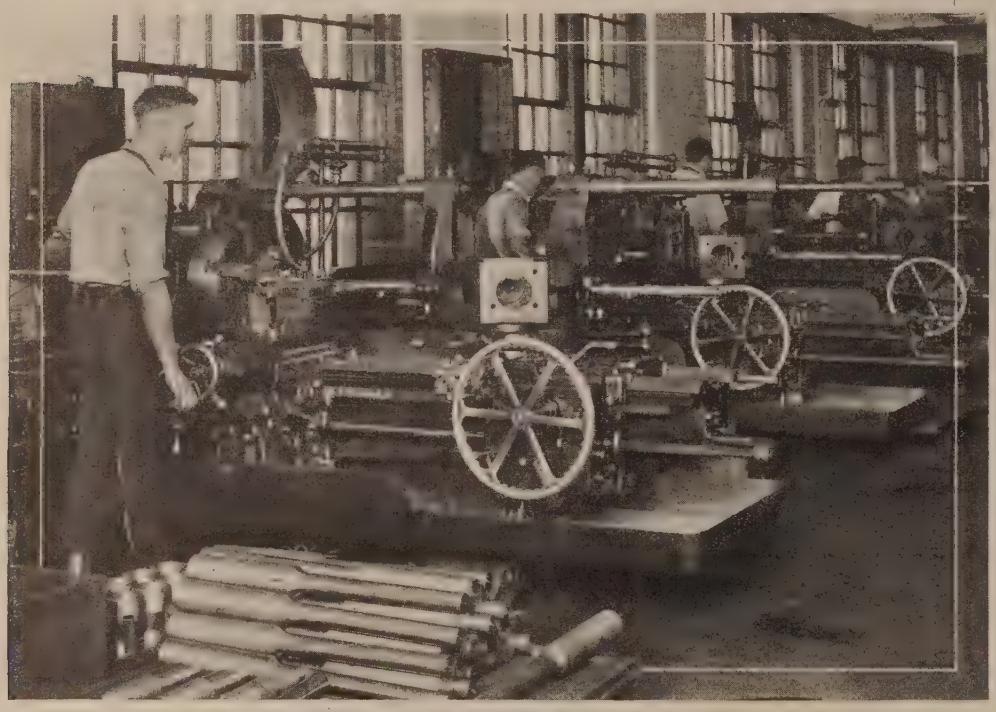
With changed conditions in production, men with specialized training have in large measure replaced skilled machinists as machine operators in production shops, usually working an indefinite time in repetitional opera-

*Resident editor, THE IRON AGE, Cleveland.

The Apprenticeship Training Class of the Warner & Swasey Co. Is Shown in the Upper Illustration. The lower illustration shows blackboard instruction in a class room

tions. While specialization, of course, has contributed to mass production, it has frequently been pointed out that the development of the man has been neglected except for his own routine operations and he has not been given an opportunity to broaden to an extent that he will become potential executive timber. On the other hand, with the growth of industries there has come an increase in the demand for men capable of filling the various supervisory and technical positions.

In successful operation for 45 years, the Warner & Swasey training school has made minor changes from time to time in its standard methods in order to keep pace with the changing conditions in industry. Whatever at times crept in the school organization that was regarded as too much red tape was speedily eliminated, and simplicity marks the operation of the school. It is run along practical and flexible lines with low overhead and very little clerical detail.



STUDENTS Are Put on Machines at the Start, the Shop Training Being Augmented by Class Room Work. There is no shop training room, but apprentices are assigned to the various production departments in rotation, each apprentice being under the direct supervision of a foreman. Usually four machines in each department are reserved for the use of apprentices

Plant Executives Are School Graduates

While the fundamental purpose of the Warner & Swasey training school—to give a good mechanical training as a stepping stone for higher positions—is not new, it is being emphasized by the raising of the standards. Its past success in this direction is shown by the fact that the works manager, two superintendents, the chief designer, metallurgist, estimators, time-study men, several foremen and assistant foremen, some branch office managers and several salesmen are graduates of the school. Other graduates hold important positions with other companies.

Formerly applicants who had passed through the eighth grade of the public school were admitted to the training school. Now the young men to be enrolled must have an education equivalent to at least two years' work in a Cleveland high school. However, a majority of the new pupils are high school graduates. The age limit of admission has been narrowed, now being 17 to 19 years, as compared with a former range of 16 to 20 years. It is desired that all apprentice supplement their work in the apprentice school by attending one of the various night schools in Cleveland, this being advised whether they are high school graduates or not. In making up a curriculum of night school studies, the apprentice is aided by the supervisor of the apprentice school in the selection of studies that will fit in well with his work. Night school attendance is also emphasized to the whole personnel of the company.

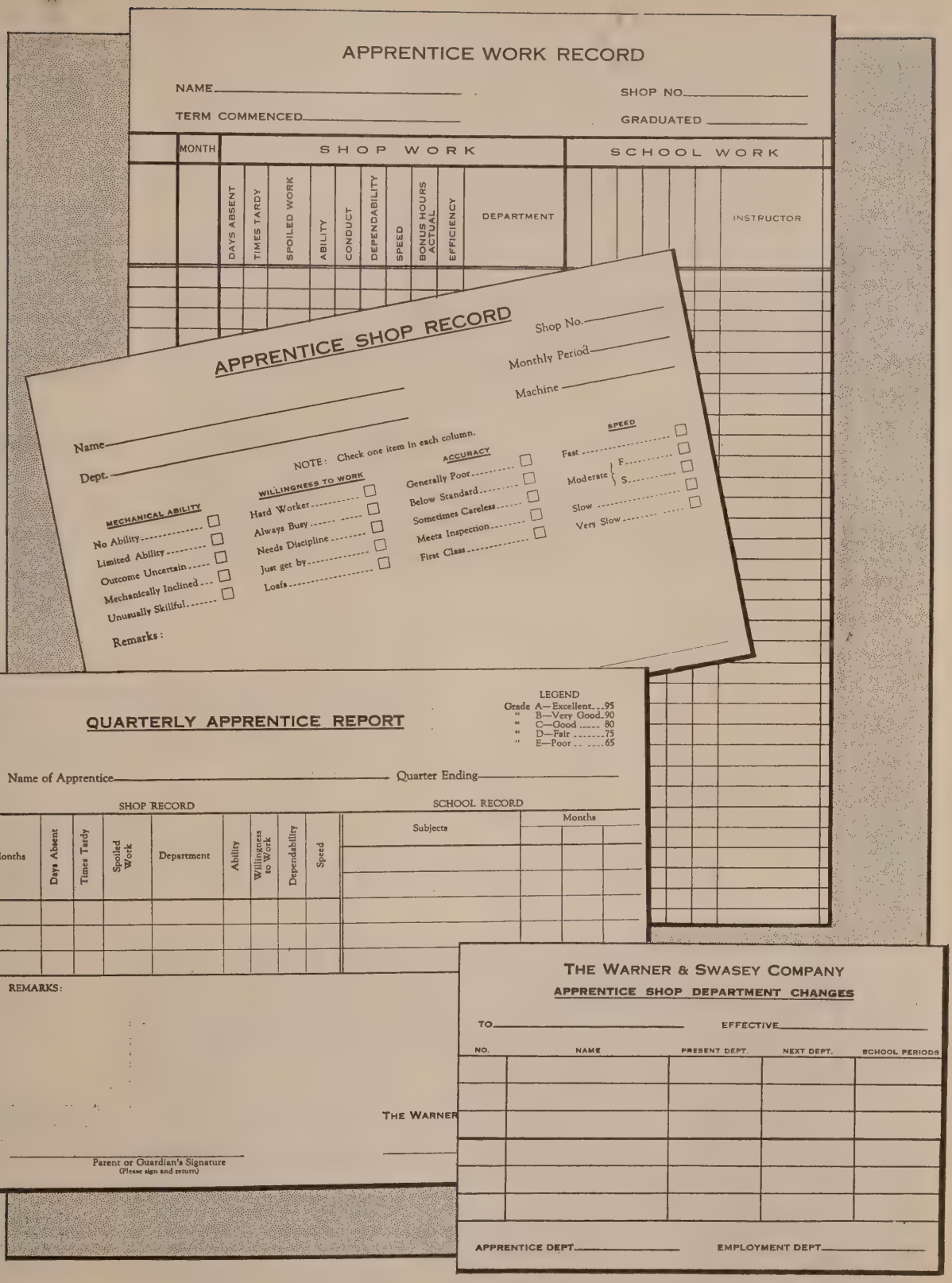
The applicant must be physically sound and of good habits and character. Extreme care is taken in the selection of apprentices in order to secure the right type of young men or those who give promise of having latent talent that will make them fitted for the mechanical field. To avoid the possibility of improper placement, the student who is admitted is taken for a six months' probationary period. That is regarded as a sufficient time to judge his adaptability.

Probationary Period the Important Test

During the trial or probation period the apprentice system is put to an important test. The work during that period must be of training value if the purpose of the trial period is to be fulfilled. The apprentice is given a class of work that is interesting and at the same time not too difficult or he will become discouraged. During this period it must be decided for the good of the young man and his employer whether the former has the ability to master the trade. If it is found that he has selected a vocation for which he is not fitted, it is only fair to him that he is not permitted to serve the four-year course.

A report of the applicant's progress and general deportment is made to the superintendent at the first of each month during the trial period. If at any time it is found that he is not qualified for his work, his services may be terminated. If the applicant is found satisfactory at the expiration of his trial term, he is engaged as a regular apprentice and signs an agreement to remain with the company 3½ years longer.

While there is no definite division of apprentices in their classroom and shop work, under the flexible arrangement that prevails they can be fairly well divided into two groups based on their preliminary education. Those with



APPRENTICE WORK RECORD

NAME _____ SHOP NO. _____

TERM COMMENCED _____ GRADUATED _____

MONTH	SHOP WORK										SCHOOL WORK	
	DAYS ABSENT	TIMES TARDY	SPOILED WORK	ABILITY	CONDUCT	DEPENDABILITY	SPEED	BONUS HOURS ACTUAL	EFFICIENCY	DEPARTMENT		INSTRUCTOR

APPRENTICE SHOP RECORD

Shop No. _____

Monthly Period _____

Machine _____

Name _____

Dept. _____

NOTE: Check one item in each column.

MECHANICAL ABILITY
- No Ability ☐
- Limited Ability ☐
- Outcome Uncertain ☐
- Mechanically Inclined ☐
- Unusually Skillful ☐

WILLINGNESS TO WORK
- Hard Worker ☐
- Always Busy ☐
- Needs Discipline ☐
- Just get by ☐
- Loafs ☐

ACCURACY
- Generally Poor ☐
- Below Standard ☐
- Sometimes Careless ☐
- Meets Inspection ☐
- First Class ☐

SPEED
- Fast ☐
- Moderate { F. ☐ S. ☐
- Slow ☐
- Very Slow ☐

Remarks:

QUARTERLY APPRENTICE REPORT

LEGEND
Grade A—Excellent...95
" B—Very Good..90
" C—Good 80
" D—Fair 75
" E—Poor 65

Name of Apprentice _____ Quarter Ending _____

SHOP RECORD									SCHOOL RECORD			
Months	Days Absent	Times Tardy	Spoiled Work	Department	Ability	Willingness to Work	Dependability	Speed	Subjects	Months		

REMARKS:

THE WARNER

Parent or Guardian's Signature
(Please sign and return)

THE WARNER & SWASEY COMPANY

APPRENTICE SHOP DEPARTMENT CHANGES

TO _____ EFFECTIVE _____

NO.	NAME	PRESENT DEPT.	NEXT DEPT.	SCHOOL PERIODS

APPRENTICE DEPT. _____ EMPLOYMENT DEPT. _____

COMPLETE Records Are Kept of the Work Done by Apprentices. A monthly record is made up by the foremen in the department in which an apprentice is working, and the data from this shop record are used in making up another record which includes grades for school work. A quarterly report is sent to the boys' parents. Still another blank is used in transferring a boy from one department to another

only two years in high school generally become shop employees and will fill positions as foremen, assistant foremen, inspectors and tool makers.

The apprentices who are high school graduates usually get more out of their apprentice course than the boys in the other group and are inclined to qualify for more responsible positions, including those of junior engineers. The training usually qualifies the apprentices in this group to hold positions of other usefulness than shop work and they probably would become discontented if kept in the shop an indefinite time. These apprentices in many cases are fitted to become designers, estimators, time-study men and to go into the sales department. Many develop into good designers because of their wide shop experience and advanced technical training accomplished by earnest application to night school efforts.

While not graduate engineers, they have a rather broad preliminary training in engineering, being given a good grounding of the fundamentals of engineering. However, all apprentices, regardless of their pre-apprenticeship education, are on the same footing. They are given the same opportunity to succeed whether they are high school graduates or not.

Aim Is to Train Production Experts

The school aims to train experts in production. The students are put on machines at the start and the shop training is augmented by class room instruction in such subjects as are applicable to the everyday shop experience of the boy. The curriculum has passed through an evolution founded on past experience. The week's schedule includes 45 hr. of shop work and 4 hr. in the class room, class room work being for 40 weeks of the year. This includes such subjects as shop mathematics, machine drawing, applied mechanics, materials of construction and organization. The curriculum follows:

First year: shop arithmetic, vernier reading, gearing speeds and feeds, taper measuring, etc.; algebra with practical applications; shop practice, machine tools, care and operation; mechanical drawing, principles of engineering drawing.

Second year: algebra, shop practice and mechanical drawing, continuation of the first year.

Third year: mechanics, practical and applied mechanics; trigonometry, practical application to shop problems, mechanical drawing, detail drawing.

Fourth year: metals, chemistry, manufacture and physical properties of materials of construction, etc.; metallography, heat treatment; machine design, gears, cams, etc.; shop electricity—a course for the non-electrical student.

A feature of the system is that there is no shop training room. Apprentices are assigned to the production departments, where they start production work on machines. Each apprentice is assigned to a foreman and is always under his jurisdiction. The foreman, however, is in part relieved of instruction by a shop instructor, who is an assistant to the school supervisor. Apprentices work on a production basis and are eligible to bonus.

Apprentices Routed Through Entire Plant

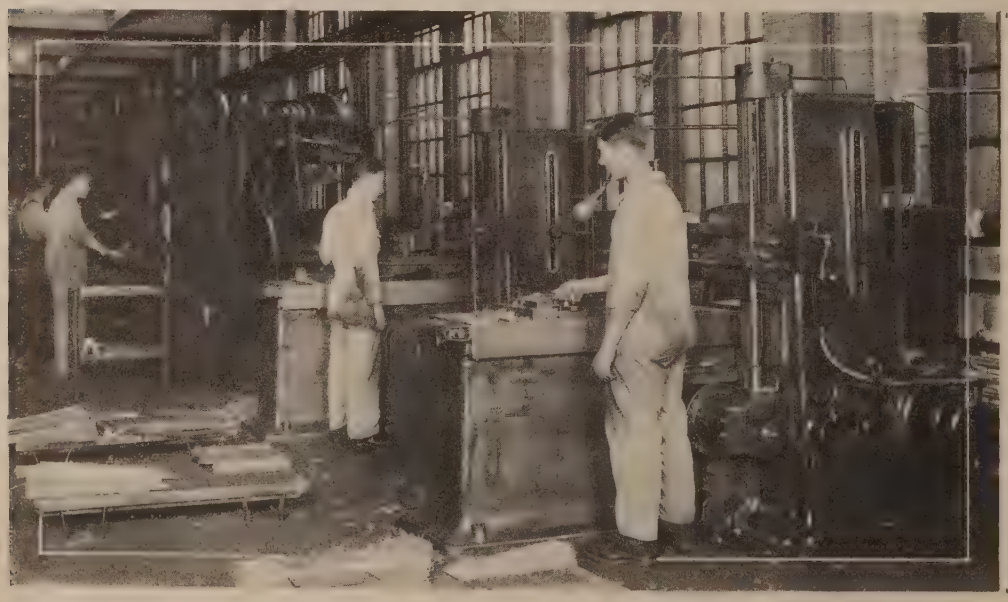
The boy is routed through the entire plant in a systematic way in order to give him an opportunity to gain complete knowledge of shop practice. This is accomplished by following a prescribed department schedule that was recently rearranged to eliminate work in departments that would mean a repetition of work already done and duplication of effort and at the same time to provide a logical sequence of training on various types of machines.

The method of scheduling fits in with the arrangement of equipment, which is grouped according to machines. Four apprentices are at work at a time in most departments and they spend four months in each of the 12 departments. An apprentice divides his time between different types of machines of the same general classification in each department and spends from one to two months on each machine except on a turret lathe, to which he devotes four months. For example, starting in the drilling department the apprentice spends two months on a vertical and two months on a radial drill. He follows the schedule through, being trained on the various types of machines in sequence and at the end of 40 months reaches the tool room. After leaving this he devotes four months to miscellaneous work. During the last four months he is given training along any special line that he may wish and may seem best fitted to follow. On the following page is the apprentice shop schedule.

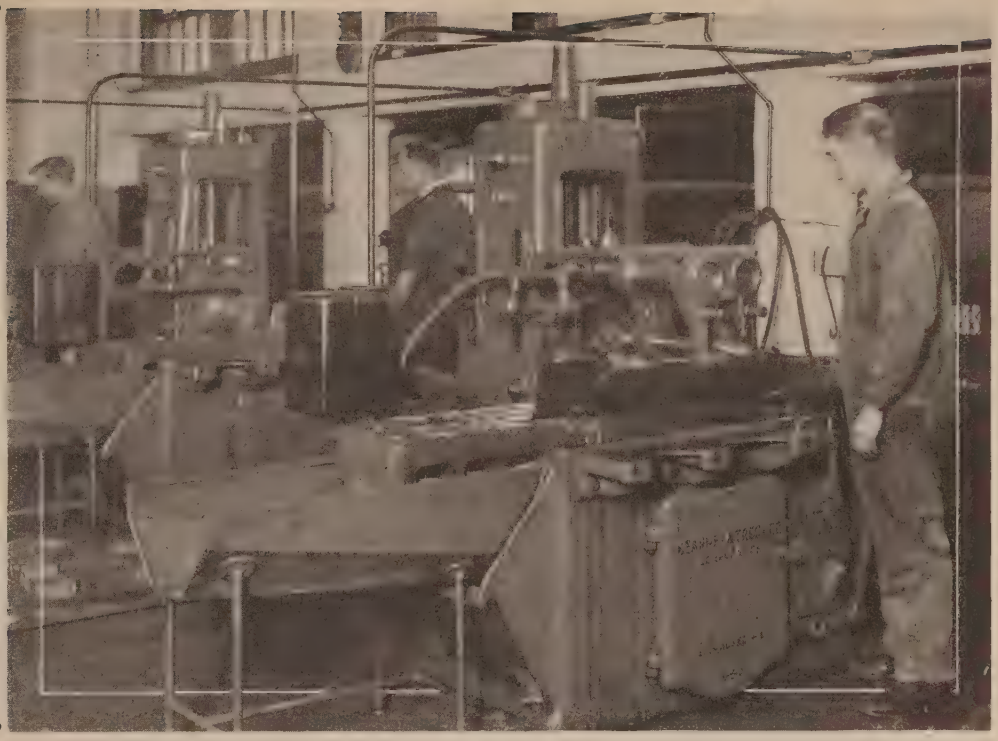
Machines, usually four in number, are reserved for the apprentices in most departments. With this plan an apprentice is always guaranteed a machine on which to work, and with four-month periods the scheduled changes become simplified.

Apprentices' Jobs Are Secure

An apprentice who is industrious, shows the proper capacity and complies with the rules and regulations is sure of holding his job, for he is never discharged because of curtailment of plant operations. There is an established



APPRENTICES at Work in the Planer Department. This and other pictures show that the apprentices are given their shop training on the best types of production equipment



APPRENTICES Operating Modern Type Simplex Milling Machines

rule that the number of apprentices in a department shall be limited to a maximum of 13 per cent of the total number of producers, but the number is usually kept below that percentage so that the danger is avoided of exceeding the percentage in case of a falling off in business.

Various activities are provided to interest the boys and encourage them to show their capacities. An annual essay contest is held, the boys competing in the writing of an essay or in the solving of a mechanical problem. Cash awards and trips to other industrial cities are the prizes. This contest has done much to stimulate interest, initiative and individual enthusiasm among the boys. Another activity is "The W. & S. Apprentice," a monthly publication edited by the apprentices. Material is prepared for the most part by the apprentices and the publication is distributed to the entire personnel of the company.

APPRENTICE SHOP SCHEDULE

Department	Apprentices in Department	Departmental Analysis	Machines Required	Months on Each Machine	Total Months in Department
Drilling	4	Vertical	2	2	..
		Radial	2	2	4
Screw machine	4	Nos. 4 and 6 mchs.	4	4	4
Heat treating, tool supply	4	Heat treating	..	2	..
		Tool supply	..	2	4
Milling	4	Horizontal	2	2	..
		Vertical	1	1	..
		Simplex	1	1	4
Lathe and grinding	4	Engine lathe	1	1	..
		Surface grinding	1	1	..
		External grinding	1	1	..
		Internal grinding	1	1	4
Assembly sub-unit	4	Ram type units	..	2	..
		Saddle type units	..	2	4
Planing	4	Planer shapers	2	2	..
		3 x 10 planer	1	1	..
		Horizontal boring mill	1	1	4
Assembly—Ram type	4	Main machine	..	..	4
Assembly—Saddle type	4	Main machine	..	..	4
Turret lathe operation saddle type	2	Bar machine	1	2	..
		Chuck machine	1	2	4
Tool room	4	General work	..	..	4
Miscellaneous	6		..	..	4

The Apprentice Club is an organization of graduates and apprentices and is carried on entirely by them. Meetings are held once a month and are preceded by a supper served in the company's cafeteria. The club's function is both educational and social.

Complete Records Kept of Boys' Work

A complete and accurate record is kept of each young man's work. A monthly apprentice shop record is made up by the foreman in the department in which he is located at the time. The data from the shop record is used in making up an apprentice work record, on which is also placed the grades for school work. A quarterly apprentice report is also made out and sent to the boys' parents. Letters are used for symbols in grading similar to the plan used in public schools. Another form provided is for the transfer of a boy from one department to another. This, signed by the apprentice and employment departments, gives complete authority for the transfer. In addition to these records, written reports of the workmanship, fitness and deportment of each apprentice, together with recommendations as to his future work, are made to the superintendent quarterly during the entire term of apprenticeship.

The boys are paid 25c. per hr. during the first six months of their apprenticeship and their pay is raised 2½c. per hr. at the end of each six months' period, so that during their last six months of training they are earning 42½c. per hr. They receive pay for the time spent in class room work. On completing his four years' training, each boy receives a gratuity of $100, a graduation pin and a certificate of apprenticeship in acknowledgment of his four years of faithful service.

School Pays Dividends in Production

Two questions frequently are asked in connection with an apprenticeship system. One is, "Does it pay?" and the other is, "Does a sufficient percentage of the apprentices remain with the company after graduation?" The Warner & Swasey Co. school is paying good dividends in produc-

tion. The work of the boys is satisfactory both in quality and volume. Apprentices having an average of three years' training are showing a shop efficiency of 85 per cent. In fixing the bonus for regular mechanics the shop efficiency is based at 75 per cent. The second question is also answered in the affirmative. Of the graduates of the school since 1915 more than 50 per cent are still in the employ of the company, and surely an important fact is that nearly all these hold responsible executive or technical positions and very few are in the ranks of machine operators. Of the 56 graduates since 1915 who are still employed by the company, four are tool makers, 11 are inspectors, one assembler, three estimators, one sales correspondent, six foremen, three assistant foremen, five machine operators, four designers, four demonstrators, two pattern makers, one tool room clerk, one purchasing clerk, one production clerk, six in sales department, one in cost department and two on time study.

The fact that the Warner & Swasey Co. has continued the practice of training apprentices for so many years is in itself evidence of the soundness of the policy. There is ample room—and indeed great need—for increasing the business of apprentice training throughout the metal-working industry.

Apprenticeships, in one form or another, have existed throughout the ages. Manufacturers have experimented from time to time to determine the most efficient way of training men for a given industry. At the present time many seem to believe that mass production has eliminated the need for trained men other than the specialized types. But, permit business to become active, and the lack of trained men becomes the same old complaint.

Chromium Plating on Brass or Iron

Chromium, when plated on brass or iron, is often faulty through errors in the preliminary deposition of nickel and not in the subsequent plating with chromium, according to W. Phanhauser, in a recent issue of *Chemiker Zeitung*. Evolution of hydrogen during deposition of chromium and its absorption in the metal cannot be avoided. As the hydrogen readily diffuses from the chromium into the nickel, the capacity of the latter for the gas may easily be exceeded. This results in brittleness, non-adhesion and in peeling, either during the plating of chromium or soon afterwards. To deposit a nickel coating as low in hydrogen as possible, the author recommends the use of baths which give a sufficiently strong and ductile product, low in hydrogen, which is adaptable for subsequent chromium plating, even with the use of high current densities. Insufficient removal of grease from brass before application of the nickel also causes blisters in the chromium plating.

Armstrong Seadrome Will Require 15,000 Tons of Steel

THE Armstrong seadrome, a floating landing field to aid transatlantic air navigation, will require about 15,000 tons of structural steel and plates. About 9000 tons of pig iron or other suitable ballast material also will be used. Estimates are now being taken on the cost of building the first of the Armstrong seadromes. It is possible that the work will be divided between the Sun Shipbuilding Co., Chester, Pa., and the Belmont Iron Works, Philadelphia.

An accompanying illustration shows a working model of the seadrome. This model has withstood tests in which heavy storm conditions have been simulated. The actual seadrome will be 1100 ft. long and 340 ft. wide. Its legs, which are for anchorage, will extend downward 252 ft. The platform will be 80 ft. above the normal water line.

During the tests, some of which effected conditions of waves up to 180 ft. high, the seadrome model remained practically level, without pitch or roll, according to the inventor, Edward H. Armstrong, an engineer with E. I. Du Pont de Nemours & Co., Wilmington, Del. Henry J. Gielow, Inc., naval architect, New York, has worked on the plans for the anchorage. An anchorage cable 21,150 ft. long will be used.

When the first seadrome has proved itself practical, others will be built so that a chain will provide landing fields about 400 miles apart across the Atlantic Ocean. The first one will be anchored midway between New York and Bermuda.

These seadromes will be equipped with various facilities such as small hotels, gasoline filling stations, repair shops, etc. They will also have radio apparatus, enabling them to keep in touch with airplanes at sea.

The designers say that these seadromes will remain virtually stationary during the heaviest storms at sea. Airplanes will be able to land on their decks, refuel and take off again.

Mr. Armstrong has been working on this project for years and has had the advice and cooperation of such organizations as the General Electric Co., Radio Corporation of America, John A. Roebling's Sons Co. and the Sperry Gyroscope Co.

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Lubricating Problems in Rolling

Water Introduces Detrimental Factors—How Various Types of Mills May Be Adequately Greased

DISCUSSION of lubrication in the presence of water occupied the September number of *Lubrication*, published monthly by the Texas Co., New York. Essential characteristics of lubricants were outlined and then their application to various types of equipment, with water splashing over the bearings, was entered into in some detail. What was said about conditions in steel mills is covered in the following paragraphs.

Water on Roll Drives Causes Trouble

In steel plant service hot water or steam conditions will frequently prevail in the blooming mill as well as on certain other rolling machinery. This is because it is often found necessary to run water constantly over the rolls and roll necks for the dual purpose of cooling and blowing off scale as ingots, bars or billets are broken down.

Some mills, in addition, blow steam directly on to the ingot during its first pass through the rolls, to remove the scale more effectively. Such conditions, coupled with the extreme heat which is constantly encountered, place a most exacting requirement upon the roll-neck and gear lubricants. These must, therefore, be compounded products, inasmuch as straight mineral lubricants cannot withstand the continued washing action of hot water.

The usual procedure is to compound the gear lubricant with definite percentages of certain substances which will give the final product the desired adhesive properties. Any rolling mill gearing, however, which does not come in contact with water can readily be lubricated with a straight mineral gear compound, of a viscosity ranging from 2000 to 5000 sec. Saybolt, according to temperature conditions and the manner of lubrication.

The pinions adjacent to the roll necks in the blooming mill are usually inclosed in an oil-tight casing. In this event they are run in a bath of specially prepared gear compound of high adhesive characteristics, having a viscosity of about 2000 sec. Saybolt at 210 deg. Fahr.

In some installations, however, these pinions may be only covered with shields which are not oil-tight. Where this is done there is often no bottom to the gear case; therefore, bath lubrication is out of the question. Hence the lubricant must be able to stick tenaciously to the pinions over the periods which intervene between applications, and maintain a sufficiently protective film. A viscosity of about 5000 sec. Saybolt at 210 deg. Fahr. has been found to be necessary to make the resultant lubricating film able to withstand the terrific pounding and hammering which occurs, especially when the mill is reversed.

Continuous Mills

Rolls of continuous mills are usually driven by herringbone pinions and a set of relatively heavy gears. These pinions in such a mill are often so constructed as to make it necessary to lubricate the bearings with grease and to maintain a continuous flow of cooling water over them.

Naturally this water will splash on to the pinions (where exposed), involving a condition and requiring a grade of lubricant such as was mentioned in discussing the blooming mill. Certain mills, however, may be built with oil-tight gear cases and suitable shields which will permit bath lubrication. This, of course, is the admirable condition, for the utmost of protection is afforded both the lubricant and the gear teeth.

Table Rollers

Bevel gears which drive the table rollers nearest to any rolling mill frequently operate exposed. They are, therefore, subject to water conditions, flying scale and the heat which radiates from the hot metal in its course through the plant. Here the gear lubricant is difficult to apply, in the first place, and, furthermore, after it has been applied, there is every obstacle put in the way of its functioning effectively. Centrifugal force will tend to throw it off, especially where it has suffered any extensive reduction in viscosity, due to overheating.

The washing action of the water which splashes over such gears is a detriment also. In addition, excessive contamination by solid foreign matter can hardly be avoided, unless precaution is taken to guard such gears effectively. Ultimate protection can be attained, therefore, only by frequent applications of a lubricant which has been so refined as to withstand these detrimental conditions.

Usually the same product as recommended for the blooming mill gears must be used, having a viscosity of from 1000 to 2000 sec. Saybolt at 210 deg. Fahr., according to weather and temperature conditions. It should be applied by pouring on to the teeth at the point of mesh while the gears are running inward.

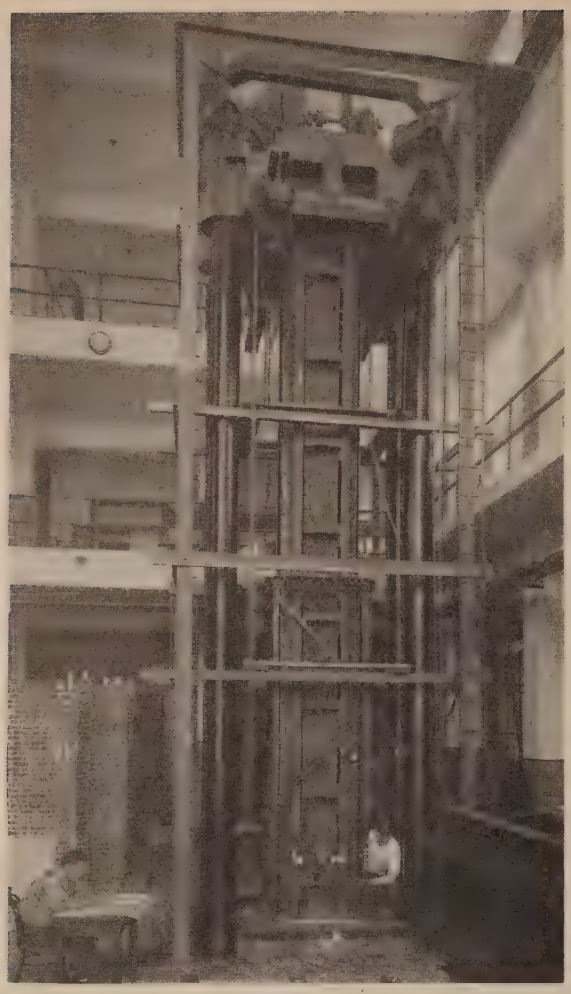
Salt on Plate Mills Detrimental

Plate mills present an additional detrimental condition, from the quantities of de-scaling salt which are thrown on the plates during rolling, and also from the red hot plates passing directly over bearings and gears of table rollers.

Often water is sprayed on the rolls in addition. These factors, coupled with flying scale and dust which is driven with considerable force when the hot gases explode, tend to destroy any lubricant used on the roll necks, table roller bearings and gears. Gear compounds as specified above, however, have been found to withstand these detrimental elements quite satisfactorily, if applied at frequent intervals and in sufficient quantities.

Here an additional property which the gear lubricant must possess is an ability to resist being thinned out by the oil which is used on the pinion bearings, inasmuch as a good deal of this latter will often work out and go on to the gear teeth, especially in older types of mills.

Roll necks must be lubricated with a specially compounded roll-neck grease that will not carbonize nor wash off when in contact with the water run over them to keep them cool. Lubricants used on such roll necks are termed cold-neck greases. In general, they are tallow-mineral oil compounds, often being so prepared as to emulsify on contact with water. Frequently, however, water is not used. Even where it is, the necks may run so hot as to melt down a cold-neck grease. In such cases a hot-neck grease must be substituted, despite added friction and wear.



Hudson River Bridge Column (Half Dimensional Size) in 10,000,000-lb. Testing Machine Ready for Test

Test on Large Structural

EXTENDED use of so-called structural silicon steel and of medium manganese structural steel by the Port of New York Authority has already been noted in THE IRON AGE.* Approximately 33,000 tons of the former has been bought for tower, floor and anchorage members of the 3500-ft. suspension bridge over the Hudson, and 5500 tons of the second named will go into the 1675-ft. arch to be built over Kill van Kull, nearly all into the bottom chord.

Extended studies of these steels (as well as other more common materials of construction) are being made by the bridge department of the Port Authority, including tests to destruction of half-size fabricated members. Some preliminary results on the strength of large columns fabricated of three types of steel are now available, and give a direct comparison of the different steels as they would be expected to behave in a bridge.

For this work the 10,000,000-lb. testing machine at the United States Bureau of Standards, Washington, was used. Six columns were 24 ft. long, about 160 sq. in. in cross section, and dimensionally one-half size specimens of the base columns of the towers of the Hudson River suspension bridge. Two others were dimensionally one-half size of a representative member of the lower chord of the Kill van Kull arch bridge. The six first mentioned were identical in size and make up, except that two were fabricated of ordinary structural steel, two of the so-called structural silicon steel, and two of a new type of medium manganese steel known as carbon-manganese structural steel. (The main web plates of the latter specimen columns were reduced in thickness slightly to keep within the capacity of the testing machine.) The Kill van Kull specimens were of the third type, viz., medium manganese steel.

*Aug. 25, 1927, page 466, and June 13, 1929, page 1643.

Specifications for the Three Types

Physical specifications for the three types contain the following principal requirements:

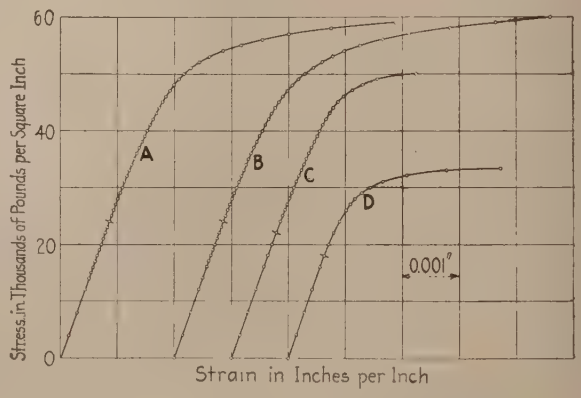
	Carbon Steel	Silicon Steel	Manganese Steel
Tensile strength	58,000 to 68,000	80,000 to 95,000	90,000 or more
Yield point, minimum	35,000	45,000(a)	55,000
Reduction in area, minimum(b)	42	30	30

(a) Average for each group of 10 heats must be at least 47,000 lb. per sq. in.

(b) Sections over ¾ in. thick may be slightly less ductile.

In all types the material, ¾ in. thick or less, must bend 180 deg. without fracture about a pin whose diameter is equal to the thickness of the test piece. Elongation in 8 in. must also be greater than the figure derived by dividing 1,500,000 by the ultimate strength, with certain allowances for plates or sections thicker than 1 in. for the silicon steel and ¾ in. for the other two varieties.

Chemical specifications for silicon structural steel are as follows: carbon less than 0.40 per cent, phosphorus less than 0.04 per cent, sulphur less than 0.04 per cent and silicon between 0.20 and 0.45 per cent.



Stress-Strain Curves of Large Compression Members

A is half dimensional model of section of Kill van Kull arch, made of medium manganese steel; proportional limit of model is at 24,000 lb. per sq. in.

B, C, and D are half dimensional models of columns for towers of Hudson River suspension bridge, identical except for type of steel used. B is of medium manganese steel; proportional limit of model is at 24,000 lb. per sq. in. C is of structural silicon steel; proportional limit of model is at 22,000 lb. per sq. in. D is of ordinary structural steel; proportional limit of model is at 18,000 lb. per sq. in.

Columns of Alloy Steel

Medium manganese steel is to analyze as follows, for shapes and rivets:

		Structural Steel	Rivets
Carbon	Preferably, not over	0.35	0.30
	Maximum	0.40	0.35
Manganese	not over	1.80	1.80
Phosphorus	Acid steel, not over	0.05	0.04
	Basic steel, not over	0.04	0.04
Sulphur	not over	0.05	0.045
Silicon		0.10 to 0.30	0.10 to 0.30

Check analyses are made by the Port Authority from finished material representing each melt. If the results of such check analyses show an excess beyond the limits specified of more than 10 per cent for carbon or silicon, 5 per cent for manganese and 25 per cent for phosphorus and sulphur, it is cause for rejection. The sum of the carbon and manganese content on check analyses should preferably be less than 2.05 per cent.

Large Columns Tested to Failure

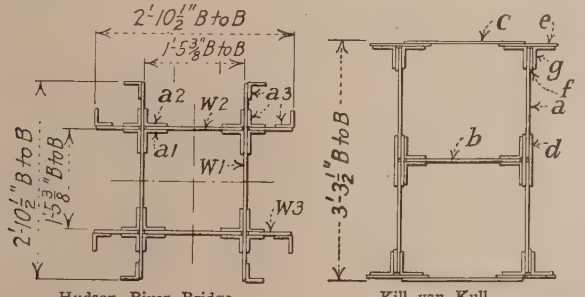
Cross sections of the columns (diaphragms not indicated) are shown herewith; also some representative views of the tests. One view of the test in progress shows the steel scaffold surrounding the entire testing machine to enable the observers to reach any part of the column, and a special latticed structure built close to the column, which served as base lines to determine deflections and any tendencies toward geometrical distortion during test.

Total compression was measured by a group of 16 micrometer dials, built into compressometers 20 ft. long, four for each face of the Hudson bridge columns. The picture shows two of them on the edges of the outstanding flanges and two on the reentrant angles (one obscured in the view). In testing, the load was increased by increments and held stationary until all observations were made. This routine was continued step by step until the total deformation overran the range of the measuring instruments, which approximated the maximum carrying capacity of the column.

Typical Failure After Severe Over Stressing All Test Columns of This Design, Irrespective of Material Used

At that time a series of load-time measurements were made to determine whether the "pick-up" phenomena were present. "Pick-up" is a term used to designate a progressive strengthening of a column after long continued loading beyond the stress which causes considerable deformation. It is associated with a change in the modulus of elasticity at stresses beyond the proportional limit. In these tests the carbon steel columns showed 3200 lb. per sq. in. "pick-up," the silicon steel columns 3000 and 1900 lb. per sq. in. respectively, and the manganese steel columns did not show the phenomenon.

Some results of the tests are tabulated. Stress-strain curves are shown; curves for duplicate columns are nearly identical.



Hudson River Bridge — Kill van Kull

Cross Section of Columns, Diaphragms Not Shown

MAIN MATERIAL				
2 Pls.	34⅜	x	⅝	w1
2 Pls.	17	x	⅝	w2
4 Pls.	7⅝	x	⅝	w3
4 Ls	4 x 4	x	9/16	a1
8 Ls	4 x 3	x	½	a2
12 Ls	3 x 3	x	½	a3

MAIN MATERIAL				
4 Pls.	19¼	x	9/16	a
1 Pl.	20¼	x	½	b
2 Pls.	21	x	⅜	c
4 Pls.	9	x	½	d
4 Pls.	10	x	⅜	e
4 Pls.	4	x	½	f
12 Ls	4 x 4	x	½	g

Elastic Limit of Columns Much Below Yield Point of Tension Specimens

It will be observed that the true elastic limit of the fabricated column (or at least that load where the linear relation between stress and strain undoubtedly ceases) is very much lower than the minimum yield point called for in the specifications. The latter figures are more nearly approximated by the stress at which failure as a column commenced. These columns were relatively short (ratio of length to least radius of gyration being 28.9 and 23.7 respectively), so there was no marked deflection of the

Summary of Results on Bridge Columns

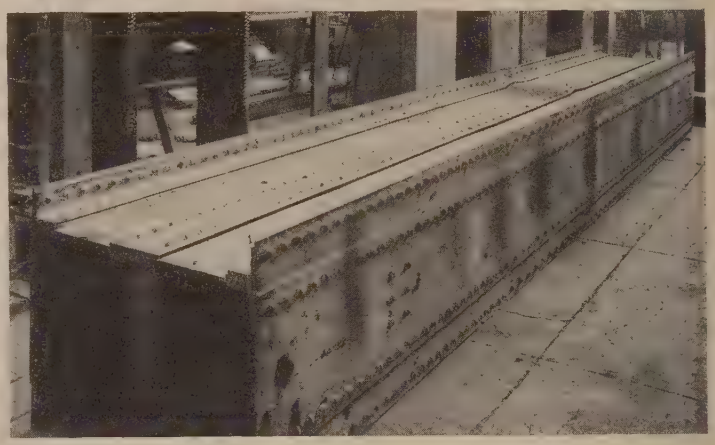
Material	Dimensions of Column: Length	Dimensions of Column: Area	Dimensions of Column: Least Radius of Gyration	Calculated Yield Points From Mill Tests, Lb. per Sq. In.	Column Test and Data: Proportional Limit (b), Lb. per Sq. In.	Column Test and Data: Stress at Failure (c), Lb. per Sq. In.
		Hudson River Bridge Columns				
Carbon steel	24 ft.	159 sq. in.	9.97	40,200	17,000	33,600
Carbon steel	24 ft.	159 sq. in.	9.97	40,200	18,000	33,500
Silicon steel	24 ft.	159 sq. in.	9.97	54,900	22,000	52,800
Silicon steel	24 ft.	159 sq. in.	9.97	54,900	20,000	53,000
Manganese steel	24 ft.	155 sq. in. (a)	9.97	59,300	24,000	61,560
Manganese steel	24 ft.	155 sq. in. (a)	9.97	59,300	22,000	62,280
		Kill van Kull Bridge Chords				
Manganese steel	20 ft. 9 in.	144 sq. in.	10.51	59,600	24,000	59,000
Manganese steel	20 ft. 9 in.	144 sq. in.	10.51	59,600	23,000	58,650

(a) Main webs reduced 1/16 in. to keep column strength within capacity of testing machine.
(b) Determined from stress-strain curve.
(c) Stress at failure is as understood in column testing procedure.

column as a whole until ample evidence had developed that the column was at the point of failure.

Mill test coupons were taken from each rolling of angles and plates used in the fabrication of the test columns, and the anticipated yield point of the whole column, as figured from the weighted average yield point of such test pieces, is given in the table. It will be noted that the carbon steel columns failed at about 84 per cent of the calculated yield point, the silicon steel columns at about 96 per cent, and the manganese steel columns at 99 per cent or better.

Careful observations during the tests indicated the plates or angles which failed first, and thus gave an opportunity to adjust the design of the bridge member to secure maximum efficiency of the sections. These details are beyond the scope of the present article, which is primarily written to show that the use of silicon and manganese steel in box-section columns will result in members having a much greater load-carrying ability than if made of the conventional carbon steel.



Buckling of Cover Plates in Medium Manganese Steel Column, Half Size Those to Be Used in Kill van Kull Arch Bridge

The investigation was supervised by O. H. Ammann, chief engineer of bridges, and Robert S. Johnston, engineer of research and tests for the Port of New York Authority, with the help of the United States Bureau of Standards, especially of Dr. A. H. Stang of the bureau staff.

Izett Steel—What It Is and How Made

WHEN the German liner, the Bremen, made its first appearance in New York, statements appeared in the daily press that the boilers were made of a new steel known as "Izett," coined from the German letters *I* and *Z* which stand for the two German words "immer zähe" which mean "always tough." The statement was also made that this steel is to be manufactured in the United States, under Krupp patents, exclusively by the Central Alloy Steel Corporation. Outstanding characteristics of this steel were pointed out that it does not become brittle when cold worked and that it prevents formation of cracks, especially in rivet holes and at rivet heads.

Investigation of boiler failures was traced to aging of the steel in the field; in other words, becoming brittle. This aging phenomenon reveals itself in a considerable decrease of the ability to withstand deformation. In numerous cases it was also found that the failures of boilers were aggravated by the influence of alkaline feed water. Investigations disclosed that the sensibility of the steel to brittleness under the influence of alkaline feed water was closely connected with this aging phenomenon. The process of aging presupposes that a steel sensible to aging has been submitted to cold deformation which, however, is obviously unavoidable in the manufacture of boilers.

When inquiries were instituted by THE IRON AGE to learn just what this new steel was and how it is made, immediate results were unsuccessful. As a result of further inquiries the following statement states the facts as near as they can be learned:

The new product is not an alloy steel; it is a carefully made open-hearth steel. In conjunction with exercising the utmost care in making a high-grade product, the steel is thoroughly "washed" with manganese during the melting process. It is then killed with aluminum so that in the final product there is about 0.02 per cent aluminum in the steel. Samples of this steel after rolling are tested in a tensile testing machine and annealed at 200 deg. C. The test should show stress lines after suitable etching and is used to show that steel so treated has the same notch toughness as the same steel untreated, thus indicating that the steel is anti-aging.

The story goes that when certain German metallurgists heard of some American and British boiler steels which had unusual properties as to cracking and resistance to boiler corrosion, comparisons were made of these steels with some of the German products. A distinct difference was found between the German steel and the American and British. As a result of careful studies, the new Izett steel was produced.

Flash Welding Simplifies Production

All-Steel Body Made of 17 Major Parts Instead of 300—Spot Welds Reduced from 1050 to 125 by Coordinating Design to New Manufacturing Method

A GREAT reduction in the number of welding operations required to build an all-steel automobile body is emphasized by Joseph W. Meadowcroft, assistant works manager, Edward G. Budd Mfg. Co., Philadelphia.* Some 15 years ago his company's production consisted entirely of touring car bodies, and the amount of welding required was:

Electric spot welds	1000 to 1100
Oxy-acetylene	70 to 80 in.
Metallic arc	10 to 12 in.

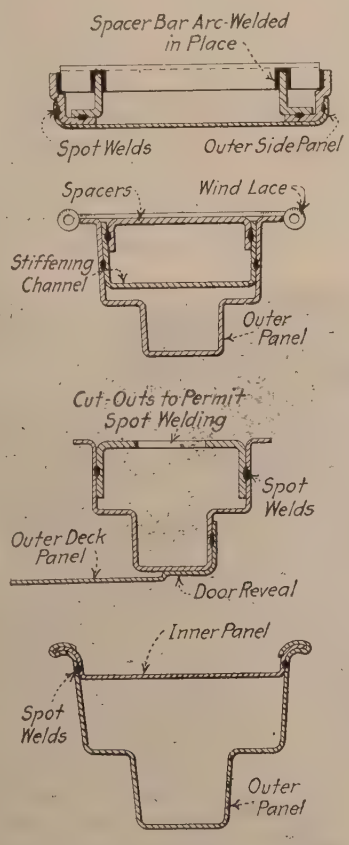
Continual study on simplification and adaptation of design to constantly improved machinery has changed these figures materially. At the present time the whole side of a sedan body is formed from a single sheet of steel, as described in THE IRON AGE, Sept. 13, 1928. The body, therefore, consists of four major units, viz., right side, left side, rear and cowl. The first three mentioned are joined in a large flash welding machine; views of it and the finished weld before smoothing are shown.

This new construction requires the following amount of welding for each complete closed body:

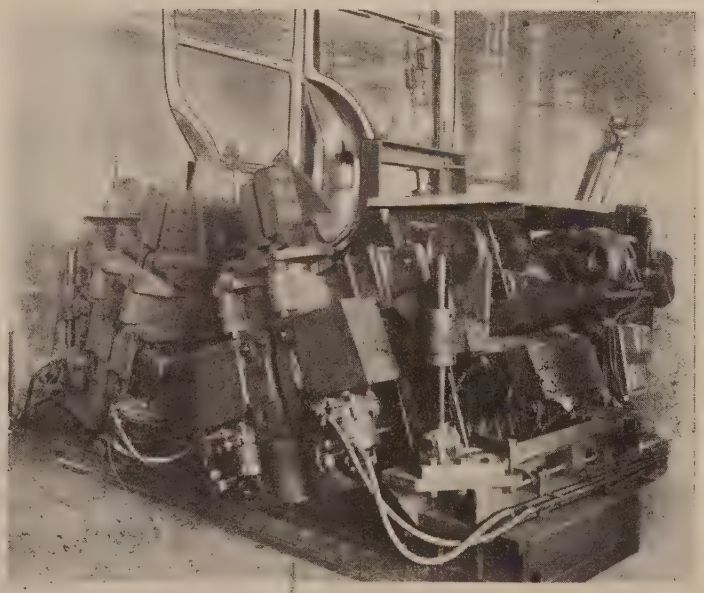
Spot welds	125
Gas welding	42 in.
Metallic arc weld	4 in.
Electric flash weld	216 in.

Evolution of the center door post from a part made up of a multiplicity of small pieces spot welded together, and at times difficult of access by the welding dies, to the modern one consisting of two pieces only with flanged edges spot welded and crimped over. The first design also shows the influence of the composite structure (wood skeleton and sheet steel cover) in the heavier load carrying members and the light sheet metal outside panels. The latest construction is so arranged that the highly finished sheathing takes its share of the stresses—in fact, is an integral part of the structure. This makes for economy in the welding and lessens the weight of steel.

*"The Importance of Welding in the Production of All-Steel Automobile Bodies," a paper read before the World Engineering Congress, Tokio, Japan.



EVOLUTION of Center Post of Automobile Body from Composite of Many Pieces, Thick and Thin, to Two Flanged Members Spot Welded and Crimped



FLASH Welding Machine for Joining Tonneau Back and Side Panels Into a Single Piece (Above)

FLASH of Extruded Metal Along Seams at Rear Corners of All-Steel Automobile Bodies (At Right)

Automatic Heat-Treating Unit

Three Interconnected Furnaces in Studebaker Plant Have Great Flexibility in Use—Save Much Labor Cost

BY W. M. HEPBURN*

A UNIVERSAL heat-treating unit has been installed at the recently expanded and modernized plant of the Studebaker Corporation, South Bend, Ind., for normalizing, hardening, quenching and drawing.† These functions may be separated for various heat treatments, according to the requirements of production.

Flexibility in a wide range of heat treatments is paralleled by flexibility as to size of work. All kinds of forgings, from the smallest to large axles, are treated interchangeably by altering the time cycles and temperature gradients of the various units. The range in size is possible because a standard grid type tray, of alloy steel and 14 in. wide, is used to carry the work through.

With this method the work will travel through all three furnaces and the quench automatically and continuously, with the attention of but two operators. One loads the work on to the trays at the charging end of the first furnace and the other reloads the work as it emerges from the quench, preparatory to going through the drawing furnace. This heat-treating unit was developed and built by Surface Combustion Co., Toledo, Ohio.

Brick construction throughout was used in the furnaces, 9 in. of firebrick and 9 in. of insulation being used. The drawing furnace is 26 ft. long and the other two 20 ft., all three being 6.5 ft. wide and 3.2 ft. high. The heat gradient is obtained in each furnace by dividing it into three zones, preheating, heating and soaking. A separate automatic temperature control is located in the heating and soaking zones of each, with recording pyrometers.

These furnaces are fired with both gas and oil, gas burners being used in the soaking zone, where accurate heat control and perfect heat distribution are necessary. The oil burners are in the heating zone, where maximum heat input is required. The products of combustion pass toward the charging end, giving up considerable heat to the cold incoming work, thereby increasing the efficiency of the furnace.

Another point of efficiency is the recuperator. Waste heat from the furnaces passes out through a vent in the roof, close to the loading end, in which the recuperator is placed. Fresh air for oil combustion is forced through a coil in this recuperator, where it is heated to about 600 deg. Fahr., and then delivered to the oil burners.

On the hearth of each furnace are four alloy steel rails. The trays of work are pushed through on these by a mechanical pusher, which is motor-driven through a bell-crank link drive. The length of the period the work

*Surface Combustion Co., Toledo, Ohio.

†This is similar in many particulars to the universal heat-treating unit in the Packard plant, described in THE IRON AGE of Sept. 12, page 663.

NORMALIZING, Hardening and Drawing Furnaces, in Line, Viewed from Charging End. Above will be noted the overhead conveyor for returning trays, delivering them at left of illustration.

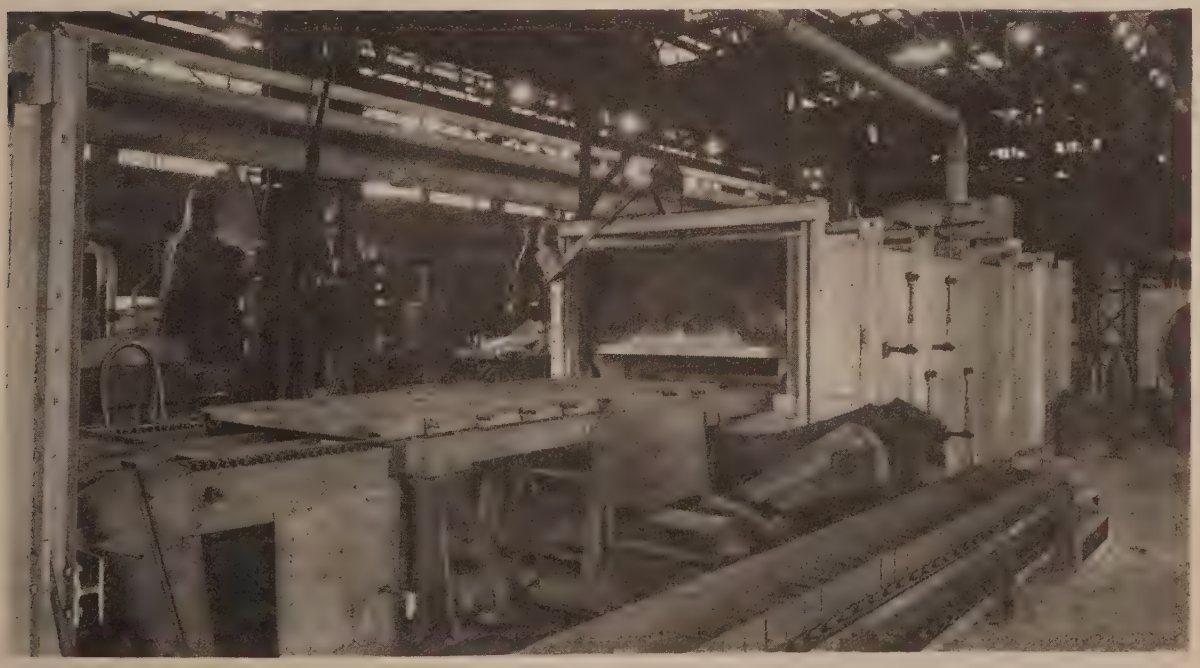
Drawing, Hardening and Normalizing Furnaces, from Discharge End. At right is noted the discharge of a cross-conveyor into tote box

remains in the furnace is regulated by the frequency with which the pusher operates; this, in turn, controlled by a time clock.

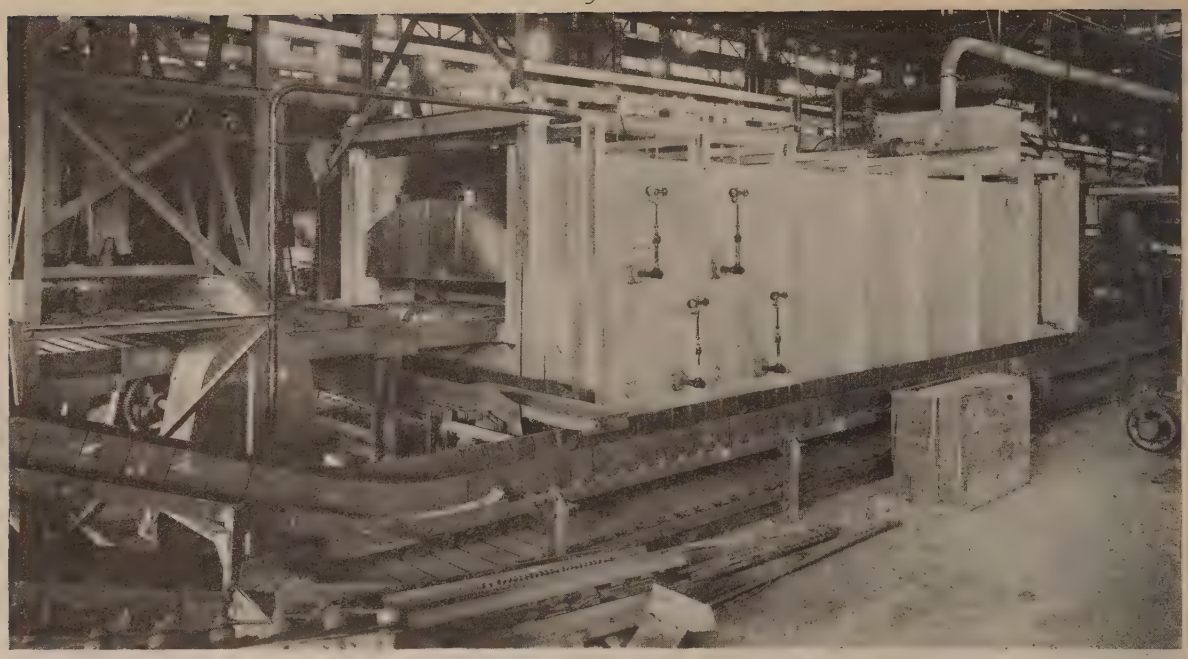
A mechanical puller reaches into the furnace at the discharge end, engages the trunnions on the trays and pulls them forward. This puller is operated by the same time clock as the pusher, in series with a relay to correct for the time lag between the two. The puller is auxiliary to the pusher, as it is not practical to put all the load on the latter. The pushers and pullers on all three furnaces can be controlled from the same time clock, with the relays mentioned, when all furnaces are being used in combination heat treatment.

When the normalizer is used alone, separately from the other furnaces, the work is automatically dumped on to a traveling cooling conveyor at the discharge end. It is carried along for about an hour, when it is dumped automatically into tote boxes for further handling.

If hardening and drawing are to follow the normalizing, the trays of work are pushed along the crossover conveyor between the normalizing and hardening furnaces, and into the latter. This crossover conveyor is of the



Discharge End of Normalizing Furnace. Several of the trays, on crossover conveyor, indicate their design, with trunnions at leading edge. The cross conveyor, delivering to cooling conveyor in foreground, is for work which does not require hardening or drawing



Discharge End of Drawing Furnace, With Elevator for Empty Trays at Left. Cooling conveyor is in foreground

roller type; its 22 ft. of length allows for proper cooling before hardening.

At the discharge end of the hardening furnace the work is dumped through a chute into the quench tank. A slat-type conveyor brings it out of the quench to the loading platform for the drawing furnace, where an operator reloads it again in the trays. These trays have trunnions, one on each end and both on the advancing side. The trays ride on the rails through the hardening furnace to the discharge end; here the trunnions ride up on to short rails in the side of the furnace. As the trays leave the supporting rails they upset and, swinging by the trunnions, allow the work to slide off into the quench.

The trunnions of the trays are engaged, before dumping, by the puller, which pulls the trays out on to another conveyor bridging the space between the hardening and drawing furnaces and places them in position to be reloaded.

Similar to the others except that it operates at lower temperature, the drawing furnace next receives the work, which is pushed through as described. At the unloading end of this furnace the trays are pulled out and the work is dumped on to a slat chain conveyor for cooling. At the end of this the work is dumped off into the boxes for further handling.

After dumping, the trunnions of the trays are caught by dogs on two parallel moving chains which carry them up and over the furnaces, back to the charging end of the normalizing furnace. Here they are dropped on to another dog chain conveyor which brings them up to the charging table.

These furnaces are used to heat treat such parts as connecting rods, steering knuckles, steering knuckle arms, steering arms, etc. Precise control over the material going into these parts and over the heat treatment of them is maintained through inspection and laboratory checks.

Does Overstress Increase or Decrease the Endurance Limit?

THERE seems to be doubt whether moderate overstressing will or will not decrease the endurance of steel to alternating stresses. Prof. H. F. Moore of Urbana, Ill., has cited tests to show that it will; Messrs. Smith, Connor and Armstrong described some experiments indicating the opposite in a paper entitled "Correlation of Fatigue and Overstresses" read before the recent meeting of the (British) Iron and Steel Institute.

The latter authors' experiments were of the "short-time" variety; a specimen is loaded in rapidly alternating tension and compression, a further direct stress is then superimposed upon it, and the relation between this direct stress and the resulting strain is measured. By increasing the superimposed strain gradually a definite yield point can be found, and experience with the method for 20 years convinces the authors that this yield point corresponds with the limiting fatigue range.

Samples cut from a 0.19 per cent carbon steel were placed under various alternating stresses, including those where the mean stress was zero and those where it mounted up to 30,000 lb. per sq. in. tension, and the same value in compression. For several such conditions the yield range was established. The work was then repeated on samples which had been overstressed 10,000 to 20,000 cycles, and the yield ranges on such overstressed samples were always greater than corresponding results for the steel in its primitive state.

The conclusion that overstress increases the endurance limit (yield range) of steel is fortified by experiments on a 6-in. steel railroad axle (0.37 per cent carbon), which failed by fatigue at each end after about 35 years' service. Samples cut from the surface had a yield range (zero mean stress) of plus or minus 36,000 lb. per sq. in., whereas samples cut from near the center, where the working stresses were quite moderate, yielded at 33,300 lb. per sq. in.

Steel Making Practices Reviewed

Many Questions of Quality Control, Combustion, Mechanical Equipment and Furnace Design Taken Up by Open-Hearth Men

MORE than 130 men were in attendance at the Open-Hearth Committee meeting of the American Institute of Mining and Metallurgical Engineers, held at the Hotel Stevens, Chicago, Nov. 5 and 6. This was much the largest representation of steel men which has been gathered together during the five years of these semi-annual meetings.

Four half-day sessions were held, each devoted to a "round-table" discussion of a general topic of importance to steel makers. Leo F. Reinartz, assistant general superintendent, American Rolling Mill Co., Middletown, Ohio, and chairman of the conference, presided. No set papers were presented, aside from a few committee reports, which were brief.

Preference Between Mixers and Mixer Ladles

METAL mixers were compared with Pugh mixer ladles in a number of ways by several speakers. In one instance two Pugh ladles of 125 tons capacity were used in an open-hearth department making 60,000 tons of ingots a month. These ladles were running about 50,000 tons of iron between linings, and the cost of the new lining was from $800 to $1,000. Practically no skull loss was experienced except a little around the neck, which amounted to about ½ per cent.

Preference was expressed in this case for a mixer, because it gives the opportunity to get a better mix in the metal. However, as the plant in question has only one blast furnace, the Pugh ladle is used, as it was cheaper than to install a mixer.

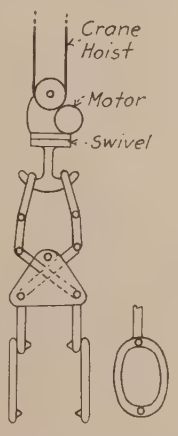
Another plant making 150,000 tons of steel a month uses four 100-ton Pugh ladles and also a mixer. The Pugh ladles give much less scrap loss, running to a difference of about 3 lb. of runner scrap and 17 lb. of ladle scrap for a ton of steel. This plant reported 83,000 tons of iron in the Pugh ladles between linings.

Carrying Molten Iron 11 Miles

Three Pugh ladles are used in one case to transport molten iron 11 miles from a 550-ton blast furnace, making six casts a day. There is very little heat lost and the skulls are a minimum, being not over ¼ per cent in the transfer ladle. To this must be added ½ per cent of kish, making a total loss of ¾ per cent. These ladles are running 40,000 tons of metal to the lining.

Another plant using four 60-ton Pugh ladles gets its molten pig iron from a separate company. Scrap loss is believed to be less with these ladles, but the independent source of iron makes it difficult to get hot metal at all times when wanted. It is impossible, under these conditions, to mix irons of different analyses. In this case the silicon limits are from 0.80 to 1.30 per cent. The belief was expressed that the Pugh ladle is ideal for small tonnages.

Cost of a 650-ton mixer in 1916 was reported by one operating man at $160,000. This did not include the building or the cranes. In another case a 600-ton mixer was installed for $150,000, including the building. No crane was installed, as the arrangement was such that the open-hearth crane could cover the mixer also.



ARRANGEMENT of Automatic Tongs with Auxiliary Loops and Extra Bits

Value of Automatic Couplers

AUTOMATIC couplers have been installed in some of the plants because of their greater safety in operation, compared with the open link and pin. This applies to both charging buggies and ingot cars. Some plants have used the automatic couplings from the beginning. Usually these are smaller than the standard railroad size. In one case where the scrap charged is light, and there is a great deal of switching and use of the buggies, the couplers are practically necessary in getting the work done.

Another plant, however, reported having gone back to the use of links and pins, after having used a number of cars some years ago with couplers on them. It was found that the two types would not work well together.

In another plant where the links gave some trouble it was found that they were too long. The difficulty was overcome by use of shorter links. With automatic links on ingot cars, it is customary to lay a wooden block across the couplers to take care of the possibility of trouble from a running stopper.

Use of Automatic Tongs

SEVERAL plants reported using one form or another of automatic tongs, similar to those used on a stripper, for picking up both ingots and molds. In some cases a special crane hook is employed which has both the sharp bits for handling ingots and loops for picking up molds by the ears.

This equipment has been found available for setting the molds on the ground as the ingots are stripped, for turning molds over to clean them and then for setting them back on the stools. This device saves a lot of labor in handling both molds and ingots, but is not fully automatic.

In general, the arrangement will be shown by the sketch. The hook is mounted on a swivel operated by a motor and capable of handling 14,000 lb. The loop for molds sets below the bits used for picking up ingots, and is in the way when ingots are lying flat on the ground. Hence a second pair of bits is inserted at the bottom of the loop, to take care of this emergency. The cable coming down in the center disengages the bits or the loops after they have done their work.

One plant reported that the men would not use automatic tongs, because of the time required to swing them into position. It was felt better to use a helper to put light tongs into place. Another plant, however, stated that the automatic tongs are absolutely essential for handling red-hot ingots which happen to be knocked

over at a point outside the building, where men cannot get close to them.

Best Size Mold for Large Slab Ingots

ANSWERING the question as to the size of mold best suited for making ingots of about 12,000 lb., for rimmed steel, one man reported the use of molds measuring 21½ x 40 in. in section for 14,000-lb ingots. He believes that 80 per cent yield is pretty good practice on these ingots. There is always more or less segregation in rimmed steel, but not enough to cause loss beyond that noted above. These molds have 1½-in. and 2-in. taper on the two sides, and a corner of 1½-in. radius.

Another plant making ingots of 14,500 lb. uses molds of 21 x 44 in. The ingots are very heavily cropped and no more segregation is obtained than in ordinary practice.

Corrugated ingots came up for attention, one speaker reporting the use of 22 x 24-in. molds for this purpose, with 1 3/16-in. corrugations. He said that these ingots clean up much better than those with flat sides and that they are free from cracks.

This was at variance with a report privately made from another source, in which the opinion was expressed very forcibly that cracks and seams are both almost sure to be present in corrugated ingots. They were said to follow the line of angularity between corrugations.

Furnace Control Equipment

ONE of the most important subjects before the open-hearth superintendent today is that of proper control of combustion. The plant represented by one speaker has only one furnace fitted with automatic equipment. He believes, however, that the operating men on the other furnaces have been helped by the experience obtained in this one case.

Proper amount of air for the fuel burned cuts the cost of operation and results in better steel. No guesswork need be employed with a furnace properly balanced. It is essential to have a fan to supply the air and this should be driven by a variable-speed motor. Under these conditions, analyses for CO_2 show that there is very little excess oxygen present.

This method of operation reduces the fuel consumption and, with less excess air, there is much less waste gas, less scouring of the outgoing end of the furnace by the outgoing gases and a better furnace life. A stack damper works automatically in connection with the air supply to balance the condition in the furnace.

Waste gas analyses are made for O, for CO and CO_2. The samples are taken from the furnace downtakes and the oxygen runs under 1 per cent, after the charging doors have been closed.

In a castings plant considerable auxiliary equipment was reported. An oil indicator gives the number of gallons burned each hour. This runs about 125 during the melting period and 95 while refining. There is also a recording gage with a 24-hr. chart. As the results are always visible to the operating men, there naturally follows a certain competition for low oil consumption between operators of different furnaces.

At the base of the stack the draft runs between 0.3 and 0.4 in. of water. A fan blows the air in and produces a balanced condition. A pyrometer records the stack-base temperature at about 1100 deg.

Some 12 per cent of CO_2 is found at the outgoing end of the regenerator. This is believed to be the wrong place for taking these samples, as they should be obtained from the downtake.

An air meter shows that 3200 to 3300 cu. ft. is used a minute on 8 to 10 Baumé oil, registering about 155,000 B.t.u. to the gallon. Oil consumption runs as low as 25 gal. to the net ton of charge, using cold metal. This is on a 25-ton basic furnace. An average of 26 heats showed 27.4 gal. to the ton, in place of 35 to 38 gal. used before the regulating equipment was installed.

This furnace is insulated and covered with steel plate, so that it is air-tight. Since the change was made it has been producing about 26 heats a week, against 24 previously.

Cost of instruments and their installation to give the results above outlined was placed by one speaker at about $3,500. Another man reported no benefit observed in using these instruments, compared with similar furnaces without them.

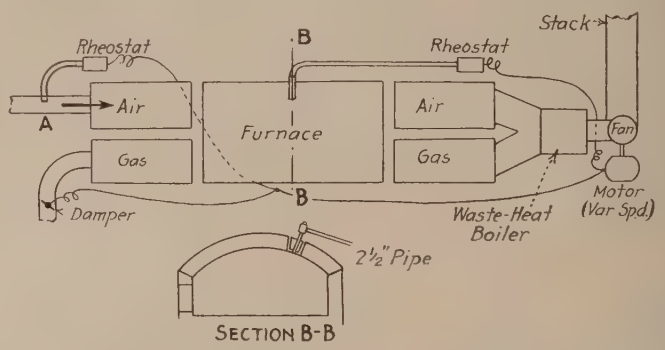
Mixing Two Dissimilar Gases

INSTALLATION of special combustion control equipment in a furnace in eastern Pennsylvania was reported by one speaker, in which a mixing device for blast furnace and coke oven gas has been adjusted to give a constant value of about 500 B.t.u. to the cubic foot. By volume the range of this system is up to 10 or 12 to 1 without changing the ratio between the two gases burned.

To equip one furnace costs about $6,000 to $7,000 for instruments and another $4,000 to make the installation. However, this results in increasing weekly production by about 10 per cent.

In the diagram is shown schematically the way this equipment is hooked up. All that is necessary after the controls have once been worked out and properly set is to change the amount of air coming into the furnace at *A*. The interconnection adjusts all the other elements for proper combustion control. The adjustment in each case is through a rheostat, balanced with a weight, to govern the operating motor.

With this equipment is a master controller consisting of a panel board with several mercury gages on it. Air pressure above the gages is connected with the various controls to the dampers. Below this board is a master wheel to work all of the mercury gages at once, after they have been properly set individually.



Schematic Representation of Furnace and Regenerators, with Control Apparatus. A change at A follows automatically through the system

Another speaker reported using equipment for keeping the regenerator chambers in balance with each other. The maximum-temperature method is employed, as in the Isley furnace control. When this temperature has been reached a bell rings and a light flashes, notifying the operator that the furnace should be reversed. With this system the difference between outgoing and incoming temperatures is about 85 deg.

Control Usually Advantageous

Local problems account for many differences in practice. One speaker reported, however, that in most cases something is to be gained by mechanical control. The effort is to get apparatus which is so nearly foolproof that the operations will be carried out exactly as the engineers desire.

The first step is to equip furnaces with instruments for automatic combustion control. Air supply, draft conditions and fuel must be cared for. Different plants making differing qualities of steel give varying requirements. As the men learn to use their instruments control can be taken away from the human factor.

One operator believes that balanced reversals do not necessarily balance the length of the flame. For this a flow-meter balance is required.

Two speakers reported the need of an oxidizing atmosphere in melting

down the charge. This produces an oxide of iron used later in reducing the bath. For the refining period, however, as well as for the lime boil, a neutral atmosphere is needed, or even a reducing atmosphere toward the end of refining, with the air practically shut off.

Indicating and recording instruments are reported to be giving good results on a 100-ton furnace started last May. They have helped the operators to maintain more uniform conditions. Fuel and air are so tied together that a satisfactory furnace atmosphere can always be had. The fuel is adjusted until the flue gas analysis is correct and then held there.

Combustion and Its Control

REPORT of the Combustion Committee was read by its chairman, Charles H. Moreland, of the Wheeling Steel Co. The report consisted mainly of extracts from letters received by the committee from the various plants where study has been under way.

Experiments in one plant in which one furnace is using a combination of coke oven and blast furnace gas have been inconclusive, as the management is not satisfied with present results.

On some oil furnaces, which have not had a complete rebuilding in 15 years, one unit made 732 heats and then required only 12 rows of checkers to be taken out. These furnaces are operating with waste-heat boilers. Steam at 130 lb. is used for atomizing. The oil is heated to 160 to 190 deg. Fahr., and with a pressure of 175 lb. The average consumption for the first nine months of 1929 was 47.9 gal. to the ton of ingots.

Sharp Reduction in Fuel Used

A steel castings plant, using oil of 145,000 B.t.u. to the gallon, reported a consumption of about 70 gal. to the gross ton of castings shipped. This represents approximately 10,150,000 B.t.u. to the ton. A definite campaign to reduce this consumption brought it down by about 20 per cent, going to 8,000,000 B.t.u., with no expense whatever for new equipment.

Changes which were made included going from a long, reducing flame to a short, oxidizing flame. There was a reduction in refractory costs and a smaller deposit in the slag pockets. Under these conditions there was a draft of about 0.75 in., leaving the furnace just about to blow out at the doors. The temperature at the outlet at the regenerator chambers was 1350 to 1400 deg. Fahr. On reducing this draft to 0.65 in., the temperature just mentioned went down to 1200 deg. and the fuel consumption was considerably reduced. Lowering the draft still further to 0.53 in., the fuel consumption was brought down to 41.6 gal. to the ton of charge.

Another furnace using producer gas, with a sloping backwall, reported consumption of 470 lb. of coal to the ton of ingots. This is the average from five furnaces using Venturi-type ports. Mechanical agitators in the producer plant were reported as giving much better gas than could be had with hand poking.

Another plant which has ten 75-ton furnaces, but is tapping 62-ton heats is using about 545 lb. of coal, or 7,250,000 B.t.u., for each ton of ingots.

Report on Furnace Design

DESIGN of furnaces according to latest practice was reported upon by G. D. Tranter, American Rolling Mill Co., Middletown, Ohio, as a result of answers to specific questions sent to various plants. It was found, on analyzing the answers, that local conditions in different plants require certain modifications of any general schedule.

Hearth areas were reported to vary from 4.5 to 6.75 sq. ft. for each ton of bath content. These baths range from 27 to 34 in. deep. Roofs vary in thickness from 12 to 18 in. There seems to be a movement toward the more general use of 15-in. roofs with 18-in. ribs at intervals across them.

Adjusting Flow of Burning Gases

Combustion control in furnaces is obtained by setting of the port nose in relation to the position of the knuckles. Water cooling is usual for producer gas ports, but is less common with other fuels.

Air uptakes seem to range for producer gas from 30 to 40 sq. ft. in sectional area, and gas uptakes from 8 to 12 sq. ft. This same total area, when oil is used, is put into a single uptake for the air.

Slag pockets for producer gas are now being made from 6 to 7 ft. in width in front of each regenerator chamber. For oil, a single slag pocket at each end of the furnace is made 10 to 12 ft. wide. The regenerator openings vary all the way from 4½ x 4½ in. to 10½ in. square.

Organization of a Working Force

NO standard working force can be offered for different plants on account of the difference in quality of steel made. High-quality alloy steel takes a considerably larger force for its production than the grades more commonly demanded.

As to a wage basis, however, a definite suggestion was offered by the Committee on Organization and reported by its chairman, H. B. Hubbard, Inland Steel Co., Indiana Harbor. Working it out on the basis of a shop containing 12 furnaces, there would be naturally two groups, each of six furnaces with its own set of melters.

Different Types of Bonus Payment

Salary for the foreman or melter would constitute one-half, approximately, of his earnings. A tonnage bonus for increase of production would constitute about one-half of the remainder, while the rest would be provided as a bonus for economy of operation and quality of product. Working conditions would affect both of the bonus figures so that the proportions, month by month, would not be uniform. These bonuses might be paid monthly or semi-monthly, or on the results of a complete furnace campaign.

For the first and second helpers, day wages would constitute the greater portion of the remuneration. A certain percentage here should be paid on the bonus basis, but it would be a much smaller proportion than for the melter. All other men in the open-hearth department would be paid a day rate, plus a bonus, the latter being a small proportion only of the total income.

Tonnage Basis in Large Use

In discussing this report one company reported that all men in its plant are paid on a combination of hourly and tonnage rates, about half being under each category. In another plant the operating men are paid on a straight tonnage basis, with a bonus for extra tonnage above a certain stipulated amount. The melter, however, has a definite monthly salary, on top of which a bonus is paid. This gives him a decent income, even under poor operating conditions.

Bonus on the life of the furnace roof is paid to the first helper in another plant, in which a tonnage-hour rate is the usual method of payment for both the melter and the first helper. Another plant pays the melter a combination salary and tonnage rate, of which the latter constitutes about 60 per cent of the total. In this plant the first helper and other furnace men are paid a tonnage rate only.

Great Need for Fundamental Research

IN conjunction with the Chicago division of the American Institute of Mining and Metallurgical Engineers, the Open-Hearth Committee held a dinner meeting at the Chicago Engineers' Club on Nov. 6.

After Dr. H. Foster Bain, secretary of the institute, had paid a tribute to metals and their predominant use as a distinguishing differential between the civilized man of the present and the primitive man of the past and of some lands at present, the speaker of the evening was introduced. This was Wilford P. Sykes, assistant general superintendent of the Inland Steel Co.

Mr. Sykes made a particular plea for appreciation of the need of research into fundamental principles. Especially he called attention to the fact that it is difficult to get management to take a long-sighted view of this matter. He stated that we shall make little progress toward better quality in steel making until we have technical men running the furnaces. While "the man at the fire" has done excellent work, he cannot be depended

upon for the finer refinements necessitated by modern demands.

Steel Maker Not Always to Blame

Relations of the open-hearth department to the other departments were brought out rather forcibly by Mr. Sykes in the first part of his talk. This had to do with the blast furnace operations and the coke ovens and, on the other side, with the blooming and finishing mills. Coke is not always good. Although the blast furnace man may complain about it, little is gained unless we can get tests of coke quality which can be made simply and quickly.

When it comes to the blast furnace, there are great variations of unknown origin in the iron, not only from one cast to the next, but between different portions of a single cast. The silicon may vary as much as ½ per cent in one cast. It has become known that the silicon - temperature curve does not hold good in ordinary practice. The open-hearth man should know more than he does about the quality of his pig iron.

In-Breeding of Scrap Not Desirable

There are large and unknown variables in the quality of scrap. If scrap is used over and over again it becomes a sort of in-breeding process, with resulting poor quality in the steel. A prominent English metallurgist claims that all heats of steel should be made with at least 70 per cent of virgin metal.

We may have to spend a much greater amount of money and time in segregating and classifying scrap before charging. This, however, will not be a total loss, as there will be heavy saving in chipping costs to offset this.

Slag Research Urgently Needed

We must learn much more about the properties of open-hearth slags. They are exceedingly complex mixtures of chemical materials and a comprehensive research is beyond the means of the average open-hearth laboratory. Such a task can be undertaken only by large research departments, such as those of the United States Steel Corporation, the Bureau of Mines, or the Bureau of Standards. This will cost a great deal and will take a long time; a ten-year program is not beyond reasonable expectations. It is a matter of great magnitude and requires scientific research of the highest quality.

We must have better tools to aid the melter in his work. One of these tools consists in rapid tests whereby he can learn quickly just what his bath is doing. This will reduce his guesswork on the basis of a fractured test-piece to a minimum. The effect of the temperature of steel when it is tapped is something about which we should know more. It will be necessary to get away from guessing at this temperature, through using pyrometers more generally. The eye is an uncertain temperature guide.

Handling of hot steel in soaking pits may cause grave defects in the finished product. Often these are blamed upon the open-hearth department in its making of the steel. Until we have more information as to how these defects are initiated, we shall have no uniformity of opinion as to what is good heating practice.

Rolling is largely a question of surface condition. The center of the ingot is pulled along by the outside under a definite but unknown tension. If the rolling is carried too far on one side of the ingot, this may cause defects which show up in the finished steel. It is bad practice to spread ingots, in rolling, to greater widths, as this often sets up seams or cracks.

At the Witkowitz plant in Czechoslovakia 10,000 steel plates from 380 heats of steel were analyzed. They showed a considerable quantity of snakes which were mainly caused, it was found, in heating, slabbing, reheating and finishing. The open-hearth department was responsible for very few of them.

User and Maker Should Work Together

Cooperation between the user of steel and its maker will help in obtaining the quality required. At present this cooperation, so far as any effective degree is concerned, is confined mostly to the grades of steel used in the automotive industry. If the steel man knows what the steel is to be used for, he often can work to the desired quality. Without this knowledge, and working from specifications written by metallurgists lacking knowledge of the steel man's problems, the specification may be met but the steel will not necessarily be just what was wanted.

One phase of the matter has had practically no attention. That is a proper statistical analysis and correlation of the results of experience and tests. It may be that the large laboratory of the future will employ competent statisticians to do this very thing. This ought to bring out factors which now we largely overlook.

Visit to Laclede Steel Co.

MORE than 30 of the men at the meeting were carried from Chicago to Alton, Ill., Wednesday night, in two special Pullmans, which were switched into the yard of the Laclede Steel Co. to a position near the open-hearth department. Breakfast and luncheon were served by the company. The visit was for the express purpose of inspecting the new 100-ton open-hearth furnace at that plant, built to the designs of the Arthur L. Stevens Corporation, Chicago. Owing to ladle limitations, the heats being tapped out of this furnace are somewhat below its rating.

Principal among the features is the control of the fuel and the air for its combustion. Once set, the ratio between air and oil is maintained at a constant figure, however much of a flame the operator may carry on his furnace. He has a certain amount of latitude with regard to this ratio, to take care of varying qualities of oil. Customarily, however, this factor can be ignored. The flame breaks at the center door.

How the Fuel Is Burned

Oil is used at a pressure of 50 lb. at the burner, and heated to 160 deg. Fahr. It is atomized by super-heated steam at a temperature of 480 deg. and a pressure at the furnace of 100 lb. The oil used is from 8 to 12 gravity and consumption is reported at about 27 gal. to the gross ton of ingots.

The furnace atmosphere is so well balanced that the draft gages for both ends of the furnace were reading about 0.07 in. of water, negative pressure. A by-pass air valve with a butter-fly valve operates to open up a passage to the stack whenever the stack draft becomes too great. This is continually changing its position slightly, to maintain the draft balance automatically.

This furnace has a bath 14 ft. wide and 36 ft. long at the slag line, and with 27-in. depth from the beginning of the taphole to the metal line. The roof is straight from end to end. The charge is running about 220,000 lb., all cold, to which is added 6800 lb. of burnt lime.

Even Control Easy on Roof

Refractories are running about 1190 lb. of dolomite and 800 lb. of Granite. More than 350 heats have been taken out of this furnace, averaging 10 hr. 24 min. each. Most of the speed is gained during the melting period. It is expected that this run will reach 60,000 tons of ingots. The roof is still in excellent condition, having had one hot patch above the taphole. A new front wall was put in at 27,000 tons.

The regenerator chambers are insulated with 4½ in. of Sil-o-cel brick and encased in steel plate, thus shutting off all infiltration of air. There are 39 courses of checker brick measuring 13½ x 6 x 3 in. The checkers are running at a good white heat, and are reported to be fairly clear of sediment, and there is a very small quantity of slag—about 6 in.—in the slag pockets.

Reversing is manual on a schedule of about 22 min. Record of the reversals is made on a recording instrument, while the temperature gradient in the regenerators is recorded on another Leeds & Northrup instrument.

The superheater for the steam consists, for this furnace, in coils within a drum between the regenerators and the stack. The temperature at this point is about 1100 deg. Fahr. A somewhat different type of superheater is employed in the three other furnaces. Each has a group of bent tubes inserted into the flue itself, and receiving heat as the gases pass through on the way to the stack. This arrangement is reported to give better results than the one on the Stevens furnace.

[*More of the technical discussion of the meetings will be published next week.*—EDITOR.]

Furnace Cooled by Double Auxiliary

Air is Circulated in Built-In Pipes—Further Cooling by Air Blast Through Chamber

BY R. E. COX*

DEMAND for quick turn-over of material in conjunction with modern production methods has necessitated annealing furnaces having variable but controllable heating and cooling cycles. A furnace meeting these conditions yet maintaining high thermal efficiency has been designed, and several are now under construction. It is heated electrically and the design embodies the following features:

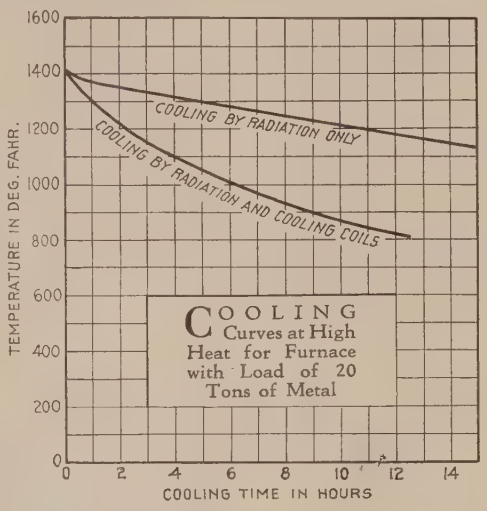
1. Even and efficient heating at such a rate as may be desired in the process.
2. Cooling periods either short or long controlled by the operator according to the method desired in the process.
3. Fast cooling without expensive honeycomb wall construction and without air in contact with work, thereby eliminating oxidation and decarburization.
4. A first grade product in a very short time with unusual economies per ton of material.

Even and efficient heating is accomplished by several points in furnace construction which lend themselves to fine temperature control. The furnace is heated electrically, an exceptionally good type of heat because the units are so distributed as to give uniform and even temperature throughout the furnace. It insures against hot spots and cold drafts and lends itself readily to close control. There are no flues or gas vents through which unnecessary air is admitted or heat lost. The furnace is sealed air-tight during the heating period.

Walls of the furnace are insulated like those being operated continuously at higher temperature. In most furnaces where a rapid cooling cycle is used the furnace walls are under-insulated; this aids cooling, yet gives the inevitable low economy during the heating cycle. With the present arrangement the walls are fully insulated, thus insuring high efficiency and economy of the heating cycle, and the standby losses of the furnace are cut to a minimum.

To reduce the heat capacity of the furnace structure, the chamber is lined with lightweight semi-refractory brick, allowing the walls to heat or cool very quickly, in nearly half the time consumed by ordinary refractories. Much flexibility to the heating and cooling cycle is thus secured and the furnace economy increased.

Adjustable cooling cycles are accomplished by cooling coils and an auxiliary ventilating system, the latter controlled by blast gates sealed tight by insulated doors during the heating period. The cooling coils consist of seamless alloy tubing, formed to allow for expansion and generally installed in the top of the furnace chamber. These coils may, however, be installed in the sides or bottom or both, according to the particular conditions. The tubes are so installed that both ends protrude through the furnace; the inlet end of each tube is connected to a header which in turn is connected to a blower. The outlet end is open to exhaust to the outside air. Thus none of this cooling air enters the furnace chamber. Rate of cooling can be controlled by the amount of air blown through the pipes and by the number of pipes per furnace.



COOLING Curves at High Heat for Furnace with Load of 20 Tons of Metal

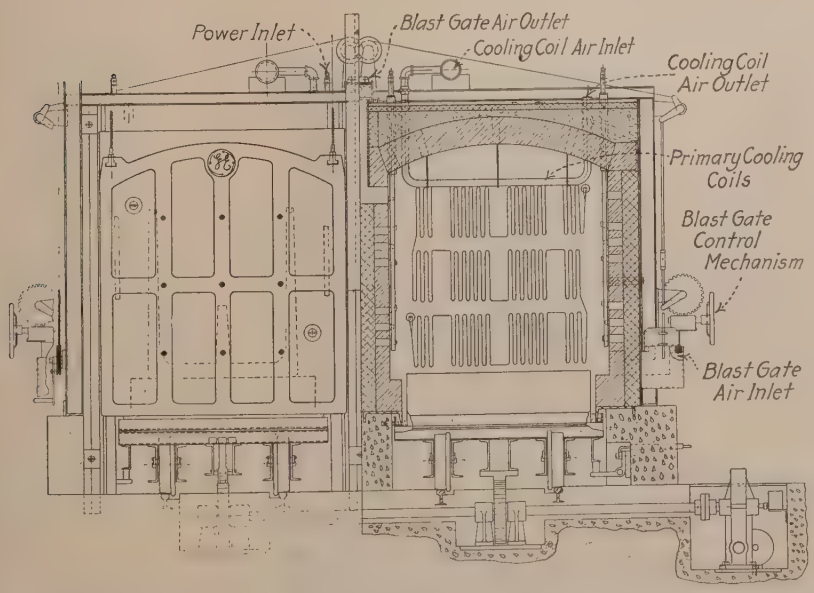
Fast cooling without oxidation or decarburization of the hot metal in the furnace is accomplished by using the cooling coils until the temperature of the load is reduced to about 900 deg. Fahr. Supplementary blast gates are then opened and the load is cooled swiftly to room temperature or to such a temperature that the material can be easily handled.

This supplementary system for rapid cooling in the non-scaling range comprises ventilation holes in the sides of the furnace near the bottom and in the roof. These holes are fitted with insulated covers seated in a sand seal. When closed they prevent heat leakage during the heating cycle and insure a thoroughly tight furnace. These covers or "blast gates" are operated through a system of levers and reduction gears by a hand wheel. This gives a single point control which can be installed at an easily accessible place on the furnace and assures the operator of the exact position of the covers at all times. When set for rapid cooling the outside air enters through the bottom holes, passes through the furnace chamber and out the top holes, the covers being in a raised position.

No special honeycomb wall construction is necessary with this design and, therefore, no complicated repair jobs are necessary.

Of course, the furnace may be left to cool by itself without using either coils or blast gates, but owing to the thickly insulated walls, this would

*Industrial Heating Engineering Department, General Electric Co., Schenectady, N. Y.



SECTIONAL Elevation of Double Furnace with Pipe Coolers for High Heat and Air Blast for Low Heat

require a very long period, as is shown by the curves.

The most interesting features to the manufacturer are doubtless unusual economy per ton of material, fast treating time, and a high grade product.

All the above is made possible by first, a scientific analysis of the steel to determine the best possible heating and cooling cycle, and second, a proper adjustment of the furnace, as described in this article, to the cycle desired.

Slat Conveyor to Turn Corners

Special Design for Use in Constricted Quarters—Handles Tote-Boxes of Materials

WHILE the slat conveyor is a type of equipment which has been in use for many years in handling materials along a straight run, it is an innovation to use that type in turning a sharp or right-angle corner. Such a device, however, has been put into use, as is here illustrated, in a plant manufacturing springs for upholstery purposes. As will be noted, the inner corners of the slats are cut away so that they may have clearance for making the turn.

Previously the work which this conveyor does would have been performed by two separate straight-line conveyors at right angles to each other, the one discharging upon the other. There has, however, been considerable difficulty and annoyance at transfer points of this type.

Taking Off the Corners of the Slats

Hence the idea was conceived, which has taken form in the new equipment, of beveling the slats at one end or at both ends. Instead of carrying them on two strands of chain, requiring both stands to have exactly the same distance to travel from one end to the other, the slats are attached here to a single strand of chain. Attachment is made near the center of the slat and the chain is carried in a vertical plane, with its pins up and down instead of crosswise.

This arrangement permits the slats to be carried around corners in their normal horizontal plane, and at the same time passes the chain over sprocket wheels with vertical axes, or over a series of rollers, permitting a curved path of any desired radius and to any angle which may be necessary.

In this manner the packages may be carried along a path of any amount of crookedness required by conditions, and, if desired, the circuit may be a closed one. A rectangular conveyor might run through a stockroom, going through or passing various bins, and come back to its starting point. An empty pan put on at one point would pass the bins and be loaded, and then returned to the same point where it was put on, filled with the parts necessary to take care of any required orders.

Openings Between Slat Ends Do Not Harm

It is obvious that the surface of this conveyor is not so solid or unbroken as in the case of a straight conveyor. With the latter the slats may be separated by as little as ⅛ in. However, for handling tote-pans, boxes or other packages with flat surfaces, and having sufficient length and width, the opening, as shown in the illustration, will not cause any difficulties in handling the material. Guides at the turning points serve to carry the load around the corners without spillage or piling up.

This equipment was designed and built and put into operation by Mechanical Handling Systems, Inc., Detroit.

New Machine to Polish Metal Specimens

METAL crystals are sometimes large enough to be seen with the unaided eye, but ordinarily they are so small that a microscope is required. Before the metal can be examined under the microscope it must be polished. This, with the hand methods ordinarily used, is a tedious task and requires long experience. It is important, in polishing metals for this purpose, that no pitting occur, since any pits thus produced may be mistaken for defects in the metal.

An automatic machine for polishing metal specimens for microscopic examination has been developed at the United States Bureau of Standards. The machine was designed primarily for use in a study of polishing methods, so as to get reproducible results free from human equation errors. It produces a high-grade polish and should prove of great value in metallographic laboratories.

Polishing is done on revolving cloth-covered disks with alundum powders and aluminum or magnesium oxide as abrasives. In the machine three specimens are polished on one disk so that with, say, three disks, nine can be polished at a time. When a large number of specimens have to be polished, a considerable saving of time compared with hand polishing can thus be obtained.

BY Cutting Away the Inner Corners of the Slats, a Flat Slat Conveyor May Be Made to Go Around a Corner of Any Desired Radius or Angle

New Shaper-Planer

Hydraulically-Actuated Table Drive and Feeds Provide Smooth and Rapid Operation

IN the new shaper-planer recently brought out by the Rockford Machine Tool Co., Rockford, Ill., both the table and the feeds are hydraulically actuated. Compared to the previous design, the new machine has greater power, rigidity and work capacity, as well as finger-tip convenience of control, and exact adjustment of speeds and feeds to suit the requirements of the work.

An Oilgear pump operates a hydraulic cylinder mounted in the bed close up under the table. The piston of this cylinder is connected directly to the table and exerts a maximum pull of 10,800 lb. Any cutting speed desired, up to 75 ft. per min. is instantly available, and the ratio of cutting speed to return is 1 to 3. Table reversal is smooth and shockless.

Hydraulic power for the feeds is provided by a separate pump. There are 20 horizontal feeds, ranging from 0.010 to 0.200 in., and an equal number of vertical feeds, ranging from 0.004 to 0.080 in. Feed takes place after the table returns and before the cut starts. The table and feed pumps, with the pump that supplies oil to the ways, are inclosed in a housing at the rear of the machine, and are accessible through a large door.

Power for raising and lowering the counterbalanced rail and for rapid traversing the head in either direction is supplied by a small motor at the top of the column. Interlocking mechanisms, automatic trips, and shear pins serve to protect the machine against damage. Centralized, sensitive and accurate control is a feature emphasized as contributing to increased productiveness.

The hydraulic table drive removes cross shafts and working parts from the interior of the bed, permitting it to be extra heavy in section and reinforced to withstand the heaviest loads. The ways are scraped to gages and are lubricated by filtered oil under pressure.

The column is keyed and bolted rigidly to the bed. The crossrail is L-shaped with long vertical bearing and narrow guide fitted and gibbed to the front face of the column. The side head and its rail are adjustably mounted on the front of this vertical section. A sturdy box-section brace is bolted and doweled to the crossrail; it reaches back to the rear of the column where it may be clamped on an accurately machined surface. Both rail and side heads are of graduated swiveling type, provided with tapered gibs. The rail head has horizontal and vertical power feeds in both directions, and rapid traverse to the right or left. The side head has vertical power feed and hand horizontal feed.

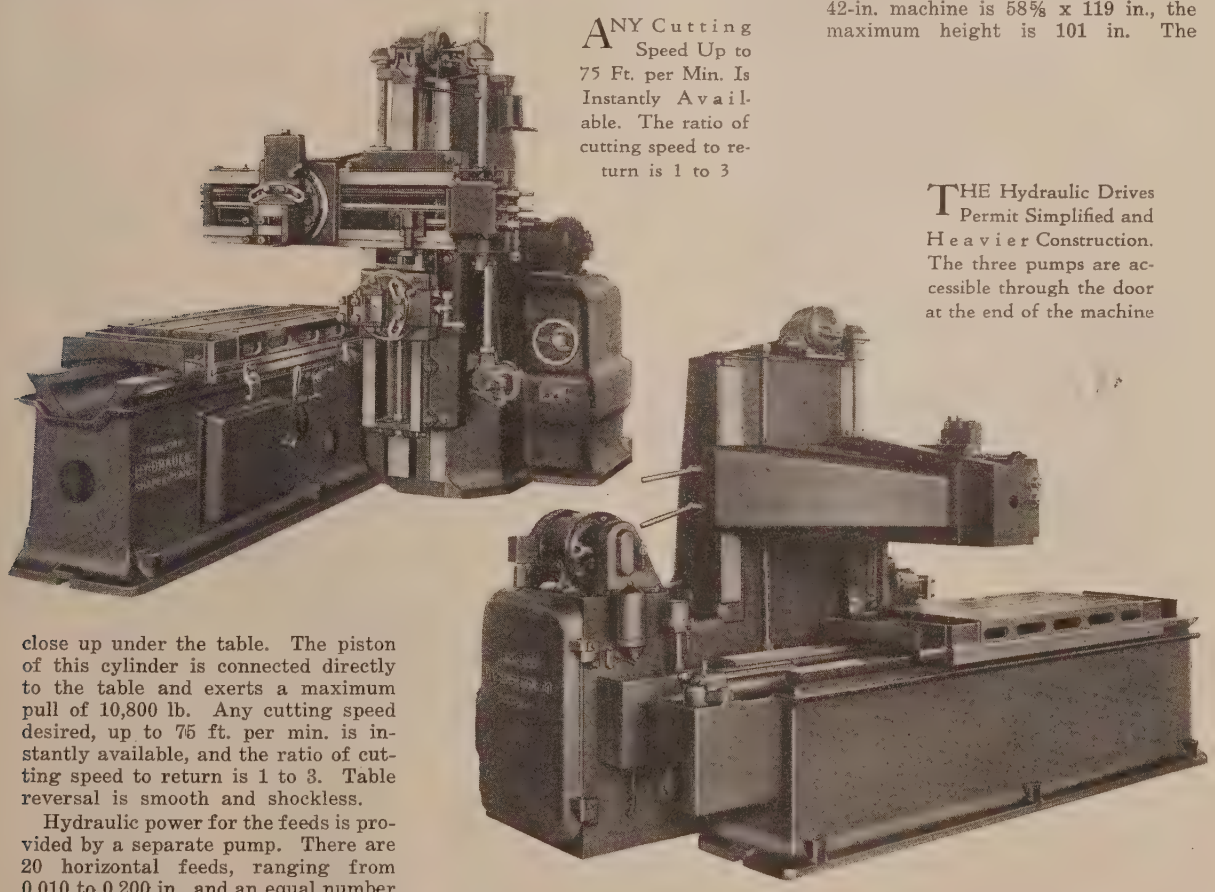
By mounting a grinding head on the crossrail, a reversing cam on the table, and making two simple adjustments the machine may be used for accurate surface grinding. Provision is made for the protection of all finished surfaces on the machine. The table speed, approximately the same in both directions, is correct for surface grinding, and the feed takes place at both ends of the stroke.

Extra equipment available for the machine includes a second rail head, side head, circular planing head, boom crane, shoe and wedge chuck, and driving rod brass planing fixture.

The stroke of table of the standard machine (42 in.) is 43 in., while that of the 66-in. machine is 67 in., and of the 90-in. machine, 91 in. The length of the table is 54, 78 and 102 in., respectively, and the width of table of all machines is 24 in. The maximum distance from table to crossrail is 24 in. Floor space occupied by the 42-in. machine is 58⅝ x 119 in., the maximum height is 101 in. The weight of the standard machine, 42-in., with side head but without motor, is approximately 14,000 lb.

ANY Cutting Speed Up to 75 Ft. per Min. Is Instantly Available. The ratio of cutting speed to return is 1 to 3

THE Hydraulic Drives Permit Simplified and Heavier Construction. The three pumps are accessible through the door at the end of the machine



Correct installation and maintenance of lathes are described and illustrated in a 20-page booklet issued by the Monarch Machine Tool Co., Sidney, Ohio. Subjects include methods of leveling, care and lubrication of the apron and the headstock, adjustment of the driving clutch and motor belts and chain, adjustment of the spindle, and the proper method of changing spindle speeds. A page is devoted to questions and answers to various unusual problems of lathe operation.

Six-Station Vertical Automatic

Adapted for Wide Variety of Work—Operations Speeded by Use of Multiple-Cutting Tools

A SIX-STATION five-operation vertical automatic for high production and long runs of a variety of work is being marketed by the Pratt & Whitney Co., Hartford. Operations performed include milling, drilling, sawing, facing, threading, tapping, hollow milling, reaming, serrating, knurling and boring. Parts to be machined can have holes off center and various machining operations on different center lines can be finished at the same set-up. In addition to flexibility, simplicity of operation is a feature, the only duty of the operator being to load and unload the work and keep the cutting tools in condition.

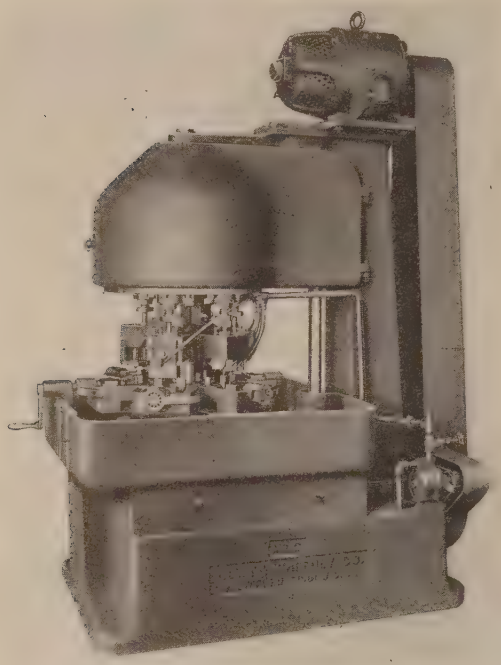
The machine is designed for individual motor drive, with full electrical equipment, including push-button control. A 7½-hp. 1150-r.p.m. motor mounted on top of the column is belted to the drive pulley at the rear of the bed. From the gear box in the bed, power is transmitted to the spindles through a large vertical shaft in front of the column, and a set of change gears in the head. From the gear box the power is also transmitted through a clutch and a worm-wheel to the table mechanism. By means of the two sets of change gears the speeds of the spindles and the table are controlled separately. A friction clutch operated by foot lever stops the movement of the table without stopping the spindle.

Completely inclosed, the gears in the gear box run in oil. Filling of the box is from an oiler at the side of the bed. A pump inside of the gear box supplies oil to the head, which is arranged to supply a drip oil feed to the spindle drive mechanism and the work tables. The same pump also supplies oil for the table driving parts. The only oiling attention required is filling the large gear box reservoir in the bed and the oil cup on each idler spindle. Removable covers at the side of the bed give access to the interior mechanism.

The work tables index progressively from one spindle to another and are locked in each position automatically. Vertical movements of the work during cutting are controlled by cams placed on an oscillating ring under the table. These cams move back and forth, each remaining under its particular spindle at all times. The cam followers are rollers on the lower ends of the six work-table elevating spindles, and move progressively from cam to cam as the work advances from spindle to spindle. The cams may be removed and replaced conveniently.

Power from the vertical shaft is taken to the spindles through bevel gearing, and a large central gear meshes with the separate gear trains for each spindle. Each work spindle has an idler spindle carrying compounding gears, which permits the speed of individual spindles to be controlled over a wide range. The spindles are carried in a large circular bracket and are supported rigidly in sleeves mounted in widely spaced ball bearings. Each spindle is threaded its entire length so that the tools it carries can be positioned vertically and locked in place. During operation the spindles revolve but do not move up and down.

Multiple-cutting tools, such as multiple drill units, combination facing and drilling devices, drills running inside a box mill, etc., can be used on each spindle. Specifications of the machine, which is designated as the No. 2 vertical automatic, are: Maximum distance from flange of work-holding spindle to flange of cutter spindle, with work-holding spindle in lowest position, 14⅛ in.; maximum travel of work, 3½ in.; maximum adjustment of the cutter spindle, 6½ in.; and maximum work diameter swing, 8⅞ in. The speed of the cutter spindles, which are independent of each other, ranges from 150 to 1500 r.p.m. Floor space occupied by the automatic is approximately 40 x 74 in., and the height, not including motor, is 81 in. The net weight, without motor and tooling, is 6750 lb.



(Left) The Vertical Automatic May Be Used for Quantity Machining of Valve Stems, Guide Bushings, Bibb Stems, Spark Plugs, Small Shafts and Numerous Other Parts. The work is advanced and withdrawn from the tools by cam action

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(Right) Control of the Furnace Atmosphere Prevents Pitting and Scaling of Material Being Heat Treated

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Atmosphere Controlled in Heating High-Speed Steel

A NEW patented device which controls the furnace atmosphere, thereby preventing the pitting and scaling of metal parts and tools during the heat-treating process, is a feature of the Hayes Globar electric furnace which is being manufactured and sold by C. I. Hayes, Inc., Providence, R. I. Furnaces are made in two general types, one for intermittent, light-duty purposes and the other for continuous, heavy-production operation.

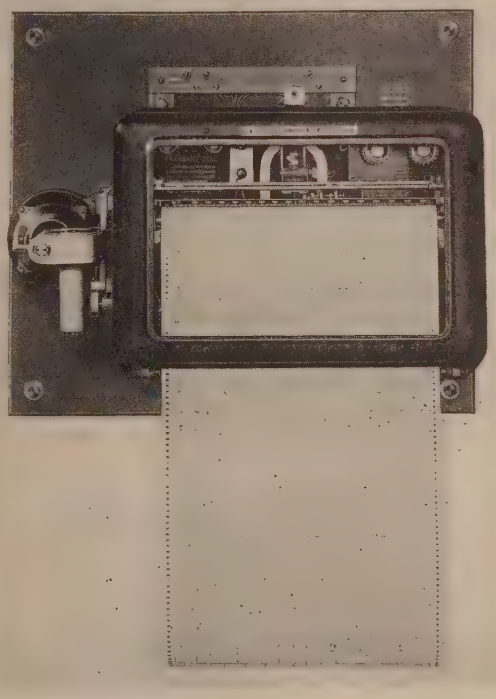
One of the most important uses of these furnaces is for heat treating high-speed steel tools. The method of controlling the temperature of the furnace's atmosphere is claimed to involve a new principle, which con-

sists of maintaining an unbroken curtain of burned gases across the furnace opening, forced through a slot in the throat of the furnace between the door and the heating chamber. The volume and mixture of the gases may be controlled to produce the ideal furnace atmosphere, which is neutral or slightly reducing. The curtain of gases, being transparent, does not interfere with the operator's judgment of color. It is maintained under sufficient pressure to prevent admission of air while the furnace is in operation. This permits the use of the furnace with the door open, if desired.

Furnace type HG 22 is of the light-duty or intermittent type with a heating chamber 3 in. high, 4 in. wide and 12 in. long and has a capacity of 12 kw. Type HG 32, also of the intermittent type, has a heating chamber 4 in. high, 6 in. wide and 12 in. long and a capacity of 16 kw. Types HG 42 to HG 72, five in number, are of the heavy - duty, production types. HG 42 has a heating chamber 4 in. high, 8 in. wide and 12 in. long and a capacity of 20 kw. These dimensions are increased in the other types until in type HG 72 the heating chamber is 12 in. high, 16 in. wide and 30 in. long and the capacity is 60 kw. All furnaces operate on 110 or 220 volts, either alternating or direct current.

Recording Pyrometer with Chart 12-In. Wide

USE of a 12-in. wide temperature record chart, automatic electric cold junction compensator, external electric motive power and three different chart speeds are features of a new potentiometer recording pyrometer which has been added to the line of the Wilson-Maeulen Co., 383 Concord Avenue, New York. The unusual chart width provides openness of scale and more exact readings; with the legible printing in ink of contrasting color it permits readings to be made at a distance from the instrument.



THE Chart Record Is Visible as Soon as Made. The pen never lifts from the paper, and, therefore, the record is continuous. Three chart speeds, ¾, 1½ and 3 in. per hr., are available to suit heating conditions. The temperature lines and figures are plain, and the record may be read at a distance from the instrument. The electric motor drive is externally located, as shown, and a group of recorders may be operated by one drive unit

In this instrument, designated as the No. 8201, when the measured voltage from the thermocouple changes as a result of temperature change at the thermocouple, the galvanometer pointer deflects in the corresponding direction. At intervals of 10 sec. a boom descends and grips the pointer firmly, while two sensing fingers, moving in a vertical plane, approach the pointer from each side, exploring for the location of the pointer. If either finger finds the pointer deflected and away from its central or null position, a roller ratchet dog is released by the finger, causing a drum to turn.

By means of a violin string, wound around the drum, passing over pulleys at each side of the chart and attached at opposite sides of a carriage, motion of the drum in either direction is transmitted to the carriage, which is arranged to travel back and forth across the entire instrument. The carriage carries the marking pen, and a contact brush that rides on the potentiometer slide wire. The selective operation of the drum's rotation, both in direction and extent, moves the contact on the slide wire to bring the galvanometer back toward its null or undeflected position; at the same time it moves the pen to record on the chart the temperature of the thermocouple.

The three chart speeds are ¾, 1½ and 3 in. per hr. On operations where temperature changes are slow and long periods of time are involved, the slow speed condenses the record and makes observation of trends and cycles easier. For rapidly fluctuating temperatures and short cycles of operation, the faster speeds allow more detailed analysis of changes.

Being integral, the recording pen and the slide wire contact cannot get out of relationship to each other. The pen has a metal tube siphon that can be cleaned and handled without breaking; the ink reservoir holds a supply sufficient for an entire record roll. The ink employed has a brilliant red color and dries before the chart emerges from the case.

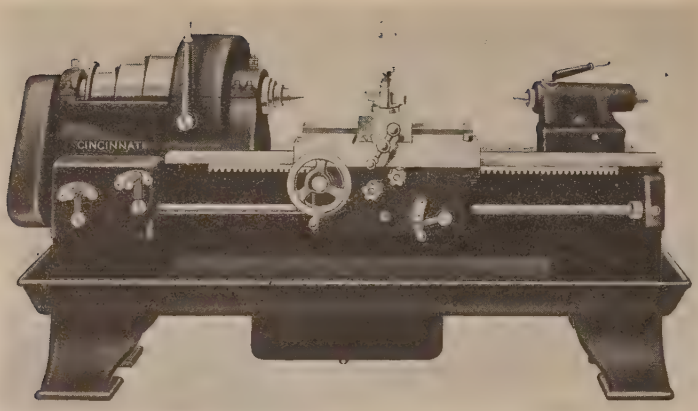
Provision for quickly adjusting the sprocket at one end of the paper roller as to distance from the sprocket at the other end of the roller permits adjustment for variation in the width of the chart paper due to atmospheric conditions.

The external drive unit, consisting of motor and double worm and gear speed reducer located outside the instrument case, is the same as that employed in connection with the company's automatic temperature controllers. It provides ample power for operating more than one instrument, and the arrangement is such that a group of recorders or a group combining this recorder and the company's automatic temperature control pyrometer, can be operated by one drive unit.

Charts are available for a wide selection of scale ranges, in both Fahrenheit and Centigrade. For low temperature operations, from 600 deg. Fahr. to 0 deg. Fahr. or lower, the recorder is supplied to operate as an electric thermometer employing resistance bulbs. The instrument case opens diagonally, making the entire mechanism easily accessible. A storage roll and holder that fits underneath the recorder is available for rolling up and holding the used portion of the chart.

American Steel Foundries reports, for the quarter ended Sept. 30, net profits of $1,053,842 after Federal taxes and depreciation, compared with $575,270 in the same period a year ago. Earnings are equivalent to 94c. a share for the 1929 period, as compared with 51c. a share in the corresponding quarter of 1928. Earnings for the nine months to Sept. 30 totaled $3,856,066, against $2,430,011 in the corresponding 1928 period.

Unfilled orders of Allis-Chalmers Mfg. Co., West Allis, Wis., on Nov. 1 were $13,900,000, against $13,446,000 on Oct. 1, an increase of $454,000. Unfilled orders Sept. 1 totaled $14,086,000. On Jan. 1, 1929, order books showed $9,639,000 of unfilled business.



New Line of High-Speed Lathes

TO permit economical use of tungsten-carbide cutting tools, the Cincinnati Lathe & Tool Co., Cincinnati, has developed a line of "Maxi-Production" lathes having speeds up to 1000 r.p.m. The machines are built in 17, 19 and 21-in. sizes, with 6-ft. and longer beds.

By operating a lever on the headstock, the spindle is started and stopped instantly through a positive friction clutch and brake, but the cone continues operating until stopped by the countershaft. The headstock is designed to assure adequate strength under severe conditions. The spindle is made from a high-carbon steel forging, has a 2⅜-in. hole for barstock, and is mounted in Timken roller bearings. The lathe can be furnished either with or without back-gears.

The tailstock construction permits a wide range of adjustments at different angles of the compound rest. Either a quick-acting or a standard screw feed tailstock can be furnished. The feed box gives a wide range, from very coarse to fine feeds; it may be replaced at any time with the company's quick-change gear unit for screw cutting. A plain rest is provided with the regular equipment, but any of the standard rests or turret attachments can be supplied.

Radial Drill Features Centralized Control

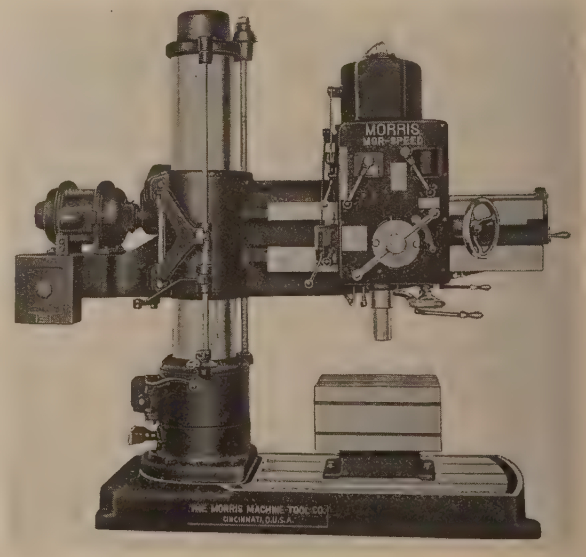
CENTRALIZED control and use of anti-friction bearings throughout are features of new 11-in. and 13-in. radial drills which have been added to the "Mor-Speed" line of the Morris Machine Tool Co., Cincinnati.

Only one constant-speed motor, mounted on the arm, is employed to drive the entire machine, including the elevating attachment. There are 27 speeds and 12 feeds. All speed and feed changes are located in the head, and changes may be made without leaving the operating position. The column clamp, elevating lever and head clamping lever are within easy reach.

All gears are hardened and have broached keyways, and shafts and spindles are heat treated and multiple splined. There are no loose keys, and clutches, tumbler gears or dive keys are not used in the making of speed and feed changes. The spindle can be started, stopped or reversed instantly at the highest speeds.

The arm is raised, lowered and clamped by means of a single lever. Both inner and outer columns are mounted on radial and thrust ball bearings to facilitate swinging and assure proper alinement. The head is clamped on both sides with one movement. An electrically actuated head-moving device and column clamp, operated from push buttons on the head, can be furnished. No part of the elevating device is in motion except when actually raising or lowering the arm. It is not necessary to stop or slow down the motor at any time, as the elevating lever is thrown to elevating or lowering position while the motor is running.

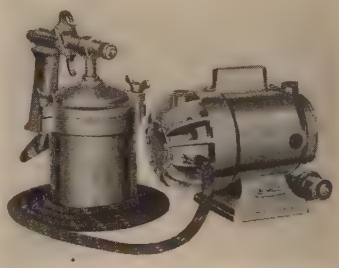
All moving parts of the machine are continuously lubricated. The entire head runs in oil, a ball-bearing pump delivering oil to the top of the head through a sight-feed oiler. Other parts are oiled from a central reservoir.



THE One Motor, on the Arm, Drives the Entire Machine, Including the Elevating Attachment. Twenty-seven speeds and twelve feeds are obtainable, all speed and feed changes being made at the head

Portable Electric Paint Spray

A NEW electric paint spray machine of the compressor type has been put on the market by the Breuer Electric Mfg. Co., 852 Blackhawk Street, Chicago. The equipment is designed for touch-up work, shading and light finishing and refinishing jobs, as well as semi-production and



maintenance industrial painting work. It has the trade name Tornado.

The sprayer, which is of the rotary compressor type, is built of aluminum castings and driven by a ⅓-hp. General Electric motor. The compressor unit weighs 7 lb. and develops a pressure of over 35 lb. to the square inch.

Two tips may be used with the spray-gun, one being slotted for a fan spray and the other a narrow spray. The area covered is from 2 to 14 in. A handy adjusting screw controls the amount of paint to be used. The spray-gun weighs 2 lb. and the container has capacity of 1 quart.

Tariff Bill May Be Killed

Opinion in Washington Is New Measure Will Never Become a Law—Coalition Group in Senate Reduces Pig Iron Duty, Restores Manganese Ore Rate

WASHINGTON, Nov. 12.—Slashing the duty on pig iron to 75c. a gross ton, restoring the duty on manganese ore to 1c. a lb. and making it apply on metallic content in excess of 10 per cent instead of 30 per cent, as in the present law, and making many other changes, the coalition of Democrats and irregular Republicans in the Senate completely dictated the draft of the metal schedule in the tariff bill. Administration forces were helpless, and offered no resistance. The metal schedule as a result has been greatly changed. The coalition at times had the support of regular Republicans. On the other hand, there were instances where Democrats stood with the Administration forces and went down to defeat with them. It was an exhibition of curious alinements, and difficult to explain, even when political expediency and sectional interest are kept in mind.

The prolonged debate on the metal schedule, begun on Thursday of last week, became heated at times, particularly during the dicussion on manganese ore. The Senate voted to place a duty of 1c. a lb. on the manganese content of 10 per cent or more, thus killing the committee amendment to place manganese ore on the free list and increasing the content range of manganese now dutiable when it grades 30 per cent or higher, a duty that was continued in the House bill. The manganese duty was voted upon an amendment by Sen-

Senate Action on Metal Schedule of Tariff Bill

Senate Bill Paragraph		Rate Adopted by Senate	Reported by Senate Finance Committee	House Bill Rate	Present Rate
301	Pig iron, ton	75c.	$1.50	$1.125	$1.125
301	Spiegeleisen, ton	75c.	$1.00	75c.	75c.
*214	Sponge iron	30 per cent	$2 ton	0.3c. lb.	30 per cent
301	Scrap, alloy, and hammer, roll and mill scale, alloy, ton	75c. and 3c. lb. on chromium in excess of 3/10 per cent	75c. and 3c. lb. on chromium in excess of 3/10 per cent	75c. and 4c. lb. on chromium in excess of 2/10 per cent	75c.
302	Manganese ore	1c. lb. in excess of 10 per cent. manganese content	Free	1c. lb. in excess of 30 per cent. manganese content	1c. lb. in excess of 30 per cent. manganese content
302	Tungsten ore, lb., metallic content		45c.	50c.	45c.
302	Ferromanganese, lb. manganese content, more than 1 per cent carbon	1⅞c.	.65c.	1⅞c.	1⅞c.
302	Ferromanganese, spiegel, etc., manganese content, not more than 1 per cent carbon	1⅞c. and 15 per cent	.65c. lb. and 15 per cent	1⅞c. lb. and 15 per cent	1⅞c. lb. and 15 per cent
302	Ferrotungsten, metallic tungsten, etc., per lb. tungsten content		60c. and 25 per cent	60c. and 25 per cent	60c. and 25 per cent
302	Silicon aluminum and aluminum silicon (aluminum not component material of chief value), lb.	3½c.	3½c.	5c.	5c. lb.
302	Ferrosilicon aluminum and ferroaluminum silicon (aluminum not component material of chief value)	25 per cent	25 per cent	5c. lb.	5c. lb.
302	Ferrochrome containing 3 per cent or more carbon, chromium content, lb.	2½c.	2½c.	3½c.	3½c.
302	Ferrochrome containing less than 3 per cent carbon	25 per cent	25 per cent	30 per cent	30 per cent
302	Tantalum	25 per cent	25 per cent	25 per cent	Free
302	Cerium metal, lb.		$1	$2	$2
302	Ferrocerium and all other cerium alloys		$1 lb. and 25 per cent	$2 lb. and 25 per cent	$2 lb. and 25 per cent
302	Ductile columbium or niobium metal	40 per cent	40 per cent	25 per cent	25 per cent
305	Vanadium steel or iron	8 per cent plus $1 lb. contained vanadium in excess of 1/10 per cent	8 per cent plus $1 lb. contained vanadium in excess of 1/10 per cent	8 per cent plus $1 lb. contained vanadium in excess of 1/10 per cent	8 per cent—no additional cumulative specific duty for vanadium
305	Tungsten iron or steel	8 per cent plus 72c. lb. contained tungsten in excess of 2/10 per cent	8 per cent plus 72c. lb. contained tungsten in excess of 2/10 per cent	8 per cent plus 72c. lb. contained tungsten in excess of 2/10 per cent	8 per cent plus 72c. lb. contained tungsten in excess of 6/10 per cent

*Earthenware Schedule (2).

(*Continued on page* 218)

ator Oddie of Nevada, who originally proposed to step up the rates to as high as 1½c. a lb. for 30 per cent manganese. The vote was 60 to 18. The only two Democrats voting to sustain the Finance Committee amendment were Senator Barkley of Kentucky and Senator Walsh of Massachusetts. Among regular Republicans who voted for the Oddie amendment was Senator Smoot of Utah, chairman of the Finance Committee.

Pig Iron Cut Carried 48 to 30

The amendment to cut the duty on pig iron to 75c. from the rate of $1.50 proposed by the committee was offered by Senator Barkley and was adopted by a vote of 48 to 30. The House bill continues the present duty of $1.125. The four Democrats who voted against the Barkley amendment were Senators Ransdell and Broussard of Louisiana; Senator Heflin of Alabama and Senator Kendrick of Wyoming. A number of regular Republicans voted for the Barkley amendment. These two record votes are typical of those made on other items. It is therefore not entirely true that the changes made in the schedule were dictated solely by the coalition, though its controlling position was manifest at all times.

One of the capricious turns taken in the course of action on the schedule was the retention of sponge iron in the earthenware schedule at the existing rate of 30 per cent ad valorem, or the specific equivalent of about $9, a rate apparently sought from no source. This product, so far made in the United States only experimentally, comes entirely from Sweden, and it was the purpose of the Senate Finance Committee to put the item in the first paragraph of the metal schedule with a rate of $2 a ton, as against the House bill rate of 0.3c. a lb. or $6.72 a ton.

Ferromanganese Duty 1⅞c. a Lb.

In voting the 1c. duty on manganese ore, the Senate found that it had automatically restored the compensatory duty of ⅞c. a lb. on ferromanganese so that the duty of 0.65c. a lb. on the alloy proposed by the Finance Committee was restored to 1⅞c. a lb. Likewise, it automatically eliminated the Finance Committee amendment reducing by 0.0087c. a lb. the duty on virtually all steel imports. The coalition left in the tariff bill the minimum of 1½c. a lb., as a base for applying steel duties. In the present tariff law the minimum is 1c. a lb., and the American Iron and Steel Institute urged the advance to the 1½c. minimum on the ground that steel, regardless of where it is made, can

Senate Bill Paragraph		Rate Adopted by Senate	Reported by Senate Finance Committee	House Bill Rate	Present Rate
305	Molybdenum steel or iron	8 per cent plus 65c. lb. contained molybdenum in excess of 2/10 per cent	8 per cent plus 65c. lb. contained molybdenum in excess of 2/10 per cent	8 per cent plus 65c. lb. contained molybdenum in excess of 2/10 per cent	8 per cent plus 65c. lb. contained molybdenum in excess of 6/10 per cent
305	Chromium steel or iron	8 per cent plus 3c. lb. contained chromium in excess of 3/10 per cent	8 per cent plus 3c. lb. contained chromium in excess of 3/10 per cent	8 per cent plus 4c. lb. contained chromium in excess of 2/10 per cent	8 per cent—no additional cumulative specific duty for chromium
312	Structural shapes, plain, lb.	1/5c.	3/10c.	1/5c.	1/5c.
312	Sheet piling	1/5c.	3/10c.	1/5c.	1/5c.
316	Tungsten and molybdenum wire, per cent		60	25 (up)	25 per cent
317	Wire fencing and netting (.03-.08 inch)	45 per cent	5/16 or 9/16c. sq. ft.	50 per cent	40 per cent
319	Reaction chambers, per cent	50	50	40	25 to 40 per cent
327	Molders' patterns	50	50	40	40
338	Iron or steel screws, per cent	25	45	25	25
338	Butts and hinges	40	50	50	40
344	Alloy steel cylindrical rolls, per cent	In excess of 1/10 per cent vanadium or in excess of 2/10 per cent tungsten, molybdenum or chromium, 40	In excess of 1/10 per cent vanadium or in excess of 2/10 per cent tungsten or molybdenum or in excess of 3/10 per cent chromium, 40	In excess of 1/10 per cent vanadium or in excess of 2/10 per cent tungsten, molybdenum or chromium, 40	25c. lb. plus 8 per cent
352	Alloy metal cutting tools, per cent	In excess of 1/10 per cent vanadium or in excess of 2/10 per cent tungsten, molybdenum or chromium, 60	In excess of 1/10 per cent vanadium or in excess of 2/10 per cent tungsten or molybdenum or in excess of 3/10 per cent chromium, 60	In excess of 1/10 per cent vanadium or in excess of 2/10 per cent tungsten, molybdenum or chromium, 60	In excess of 6/10 per cent of molybdenum, 60
353	Electrical products, per cent	30	30	40	30 to 40
369	Automobiles, motorcycles, light chassis, and body, per cent	10	10	25	25
372	Steam turbines	15	15	30	15
372	Full-fashioned knitting machines, per cent	40	40	45	40
372	Punches, shears and bar cutters per cent	30	30	40	30
372	Gear cutters and hobbers, per cent	40	40	40	30
372	Meat or food grinding or cutting machines, per cent	30 to 40	50	30 to 40	30 to 40
302	Tungsten ore	50c.			
302	Ferrotungsten	60c. and 25 per cent			
302	Cerium metal	$1	(Blank spaces indicate that no action was taken)		
302	Ferrocerium	$1 and 25 per cent			
316	Tungsten and molybdenum products, per cent	60			
372	Machine tools, per cent	30	30	30	30
398	Iron and steel not specially provided for (basket clause)	45	45	50	40

not profitably be sold at as low a price as 1c. and that therefore this base was absurdly low.

The amendment to reduce the committee duty on structural steel from 3/10c. to ⅛c. carried by a vote of 51 to 19 and it was by practically the same vote that the rate on sheet piling was reduced to ⅛c. The House and present rate on each product is ⅛c.

Alloy Steel Duties Changed

For the most part duties proposed by the Finance Committee on alloy steels were adopted and in some cases represented reductions under House rates. The Senate Committee increased from 2 per cent to 3 per cent the chromium content which was to be dutiable, thus having the effect of reducing the duties. After this change had been accepted in several cases by the Senate, Senator Walsh, Democrat, of Montana, oberved the change when it came to alloy cylindrical rolls and insisted that the 2 per cent be made applicable to chromium steel in this item as he did in the subsequent item of alloy metal-cutting tools. It was not clear whether Senator Walsh realized that he had actually voted for an increased duty, though he had been told by Senator Smoot that that would be the result. Nevertheless, the coalition accepted the Walsh amendment.

The application of the 1c. a lb. duty on 10 per cent manganese will, based on the 1928 movement, affect 15,000 additional gross tons of contained manganese which would be made dutiable over and above the 268,176 gross tons of contained manganese imported at a dutiable rate that year, and applying only to manganese grading 30 per cent or higher. The duties collected last year totaled $6,007,142. The duty on the additional 15,000 tons would be $33,600. The ad valorem equivalent of the 1c. duty on 1928 manganese imports was 88.8 per cent and it would be raised to 89.5 per cent under the amendment adopted by the Senate.

Bill May Be Killed

There is a growing belief that the bill will never emerge from conference. The prevailing opinion is that the Senate will pass the bill sometime during the forthcoming regular session. Senator Reed of Pennsylvania, in the Senate last week, reiterated the view that the bill is dead. He thinks the coalition intends to kill it. There are others who think that, since it is writing the bill, ostensibly in behalf of the agricultural interests, the coalition is anxious to have the bill enacted. The fact remains, however, that some irregular Republicans have openly expressed the hope that it will be killed. The view also prevails that the House conferees will not accept many of the changes made by the Senate and rather than yield to the latter will let it die. It is apparently clear that if the once rejected debenture bill is tied to the tariff, as proposed by the coalition, the House will not accept it, or, even if the House conferees did yield, it is assumed that the President would veto the bill. There is also a great deal of speculation as to whether the House conferees or the President will accept the flexible provision as written by the coalition. As drafted into the Senate bill the right of the President to increase or decrease rates, following investigation by the Tariff Commission, would be taken away and it would be vested in Congress. Those favoring retention of the Presidential authority claim that because of the always wide differences in Congress on tariff questions it would be impossible for it to put the flexible provision to practical use, either because of intolerable delays or complete deadlocks. One of the weak points of the flexible provision, as it now is operated, is the long time required for investigations. The House provision would eliminate this feature by permitting prices to be based upon invoices instead of calling for investigation abroad of costs.

Advantages of Mergers Discussed

Management Meeting Also Hears Talks on Bonuses Plans for Executives, Pension and Retirements Funds

MERGERS in business were discussed at the autumn meeting of the American Management Association, held Oct. 29 to Nov. 1, inclusive, at the Hotel Statler, Detroit. "Conditions That Bring About Mergers" was the subject of a talk by O. W. Visscher, editor of the *Business Bulletin* of La Salle Extension University. Mr. Visscher said that the country is going through the greatest merger development in its history, and that only two-thirds of the businesses of 1914 remain, the reduction being almost solely due to mergers. He pointed out that both political and public opposition to mergers is disappearing.

That mergers offer certain advantages to business, such as lessening competition, reducing selling overhead, more effective advertising and greater buying efficiency, was suggested by Mr. Visscher, who added that the human factor as exemplified in management is the greatest value. Often, he said, a better and more permanent management is gained through consolidations of companies.

Some disadvantages were pointed out, such as loss of incentive among valuable employees because of lesser opportunities for promotion and inefficient functioning of new associates due to lack of coordination in new surroundings.

A. D. Berning, partner in Ernst & Ernst, accountants, in a paper entitled "Factors to Consider in Working Out Mergers," said that the benefits to be derived from mergers are in the operation and not in the forming. He outlined various essential factors upon which a successful merger must be predicated.

W. E. Harris, United Fruit Co., Boston, contended that the need of American industry is not for new large combinations of productive capacity, but a more thorough search for new markets. Mr. Berning replied to this that he considered mergers to be a definite step toward the development of new markets because larger organizations are in a better position to undertake such work, which often involves expensive research and advertising.

At a session devoted to bonus systems for executives, S. R. Rectanus, American Rolling Mill Co., Middletown, Ohio, described the executive bonus methods of that company. He said that originally it was the company's belief that all salaried employees should receive bonuses in proportion to their salaries, but this idea has changed. In 1922, 900 salaried employees were compensated out of a fund set aside from the earnings. Length of service was taken into consideration, 1 per cent extra having been awarded for each ten years of service. From 1922 to 1928, 200 of the company's 1500 salaried employees received shares in a bonus fund of $200,000. The bonus plan is restricted to a fewer number now, it being believed that many of the company's employees are not interested in earnings and that those who are responsible for growth in business in profits should receive the rewards.

A. S. Rodgers, president, White Sewing Machine Co., Cleveland, explained the managerial profit sharing plan of that company, which is based on performance of duty over certain pre-determined standards.

Eastman Pension Plan

Employee pension plans were also discussed. M. B. Folsom, assistant to the chairman, Eastman Kodak Co., described the pension, retirement and benefit plan of that company. The company has created a fund of $6,500,000, two-thirds of which has been paid in. This money is administered by an insurance company, which pays a wage dividend of 10 per cent of a worker's salary after five years' service, a weekly salary of $26.50 during sickness, a year's salary in the event of death, besides life insurance and certain remuneration upon retirement. The employee pays nothing. When the full principal is paid in, which will be within the next few years, all employees of 10 years' service or more will be covered.

Disagree on Depreciation Rate

Machinery and Equipment Builders at Odds With Bureau of Internal Revenue—Proposed Schedules Held Unacceptable

WASHINGTON, Nov. 11.—Meeting here today at the Chamber of Commerce of the United States, the fourth conference of representatives of machinery and equipment associations expressed strong disapproval of depreciation rates which the Bureau of Internal Revenue Treasury Department, is reported to have set up for application in making income tax returns. The conference adopted a resolution to be forwarded to the Commissioner of Internal Revenue suggesting that basic rates should be established through cooperation between trade associations and the bureau, action which was prompted by the fact that the bureau no longer is receiving data from the trade associations.

John T. Keenan, one of the bureau's engineers, however, told the conference that material which had been received from the bureau would be used. At the same time the conference felt that there will be difficulty in convincing the bureau of the unfairness of the rates which, it is said, will be published early next year.

It was declared that the rate for one group of machinery items is listed at 5 per cent, while representatives of the industry are of the opinion that it should be at least 10 per cent. Many other rates were read to the conference by E. F. DuBrul, general manager, National Machine Tool Builders' Association, who presided as chairman.

Rates Not To Be Mandatory

Although Mr. Keenan said that the rates to be published will not be mandatory, and that the bureau had made an investigation for the purpose of helping all industries as well as the bureau in developing uniformity and establishing a guide for charging off depreciation, apprehension was expressed that the machinery and equipment interests would be unable to obtain proper allowances.

Mr. Keenan endeavored to assure the conference that the machinery and equipment manufacturers could charge whatever depreciation rates they thought were right, and that the bureau would give them fair consideration. He was told, however, that it would be more desirable to agree in advance upon basic rates, because such a policy would avoid conflicts and expense of litigation, etc., and also develop uniform accounting, a subject which has caused a great deal of difficulty to the industries.

When Mr. Keenan was told that the bureau had abandoned cooperation with the trade associations, he explained that the rates were arrived at after investigation among users of machine tools and equipment. He also pointed out that the field agents had found a broad difference of opinion among users as to the useful life of machinery.

Depreciation Charges Have Not Been Uniform

He said he realizes the position of the manufacturers of machine tools and equipment and that he is of the opinion that some makers are not charging off enough for depreciation, while in some instances he believes too much has been charged off. It is the hope of the bureau, he said, to point the way to make the proper depreciation charges. It is his opinion that no one can determine definitely the useful life of machinery and equipment, but it can be estimated.

In reply to a question by Mr. DuBrul, Mr. Keenan said that after the engineers have completed the work on fixing rates, the entire matter will be turned over to Treasury officials. Mr. DuBrul predicted that there would be a great deal of trouble encountered with field agents, an opinion voiced also by W. W. Nichols, Allis-Chalmers Mfg. Co., president of the Machinery Builders' Society. Mr. Nichols spoke of the differences of opinion among field agents regarding rates of depreciation.

Obsolescence, also, was discussed in connection with depreciation. The conference felt that the Treasury grants inadequate allowances for obsolescence.

Profits in Various Lines

Chairman DuBrul laid before the conference reports of the Bureau of Internal Revenue showing returns of machinery, equipment and other lines of metal manufactures for 1924-1927. The tabulation showed 8 per cent profit earned against the total gross income for both 1926 and 1927 for 10 lines of production.

The lowest return, 4 per cent, made in 1927, was reported for products of blast furnaces, steel mills and rolling mills. The highest, 12 per cent, made in 1927, was reported for agricultural machinery and equipment. For the 10 lines, 11,644 companies reported no net income in 1927, while 12,139 reported no net income in 1926.

Handling Motor Discounts

The varying policy in each manufacturing group with regard to handling electric motor and other discounts was discussed at some length, without any action being taken. The differing discounts allowed by motor manufacturers to machine tool and machinery equipment makers was held to be based largely on the status of the purchasers. They range from 5 to 25 per cent, depending on whether they are large or small buyers.

It was the opinion that competitive conditions in the market for machine tools and equipment play an important part in the policy of makers of these lines, as to charges made for motors bought from manufacturers. Generally, it was stated, the charge made for motors by machine tool and equipment manufacturers merely represents the list price and discounts allowed by motor manufacturers.

When buyers of equipment purchase their motors direct for installing on the equipment, it was stated, the only charge is that for installation of the motors. It was declared that motor manufacturers do not ordinarily offer machine tool and equipment makers sufficient discount to provide the latter with a profit in stocking the motors, involving handling and other charges.

Oppose Trade Mark Proposal

Individuals in the conference expressed opposition to the trade mark and patent notice features added to the tariff bill by the Senate Committee on Finance, which would unconditionally prohibit American trade-marked imports, and supported the position of the Merchants' Association of New York, seeking repeal of the amendment. Restoration of the present provision in the existing tariff act and continued in the House bill was urged by the Merchants' Association.

The Conference voted to hold its next meeting in Washington, on Feb. 3, 1930.

Those attending the present conference were:

Association of Manufacturers of Woodworking Machinery, Fred A. Collinge manager, Chicago; L. P. Monks, president Hermance Machine Co., Williamsport, Pa.; Bakery Equipment Manufacturers Association, Miss Olga Christianson; Compressed Air Society, C. H. Rohrbach, secretary, New York; Concrete Mixer Manufacturers Bureau, Clifford F. Messinger, Chain Belt Co., Milwaukee; Dairy and Ice Cream Machine and Supplies Association, C. E. Breece, assistant secretary, New York; Forging Manufacturers Association, G. H. Weiler, secretary-manager, New York; Foundry Equipment Manufacturers Association, Verne E. Minich, American Foundry Equipment Co., New York; Machinery Builders' Society, W. W. Nichols, president, Allis-Chalmers Mfg. Co., New York; Associated General Contractors, C. S. Embrey, secretary, Mixer Manufacturers Bureau, Washington; National Machine Tool Builders' Association, C. A. Johnson, president, Gisholt Machine Co., Madison, Wis.; Ernest F. DuBrul, general manager, Cincinnati; Pressed Metal Institute, Malcolm Baird, secretary-treasurer, Buffalo; Refrigerating Machinery Association, D. N. Benedict; also Hugh P. Baker, manager and Philip P. Gott, assistant manager, Trade Association Department, Chamber of Commerce of the United States, Washington; E. W. McCullough, manager, Department of Manufacture, Chamber of Commerce of the United States, Washington; W. H. Rastall, chief, Industrial Machinery Division, Department of Commerce, Washington; M. Bacher, manager, Foreign Commerce Department, Chamber of Commerce of the United States, Washington.

Rejuvenation of Gray Iron Planned

Gray Iron Institute to Undertake Campaign to Enhance Prestige of Castings

BY L. W. SPRING*

STEEL has been made in many varieties since its production in commercial quantities as a result of Bessemer's invention of 1856 —some soft and ductile as in fence wire, some hard and brittle as in needles and sharp edged tools. Cast iron has none of such properties, but it has others which make it well adapted for certain purposes for which steel will not answer.

In brief, these properties are high fluidity, which enables molten cast iron at comparatively low temperatures to fill intricate molds; low shrinkage while the metal is solidifying in the mold; easy machining, because of the natural cleavage or breaking up of the grain of cast iron by the soft graphite flakes and the natural lubrication of the tool which these flakes afford, and considerably greater resistance to rusting and ordinary corrosive influences than steel.

The natural objections to ordinary cast iron are its lower strength of 20,000 lb. against the 60,000 to 80,000 lb. per sq. in. which steel has and its great brittleness or likelihood of breaking under shock which introduces grave danger of complete collapse under overload. Steel, because of its ductility, simply distorts and gives warning before any great danger to life comes about.

It now appears that this lowliest of the ferrous alloys is undergoing rejuvenation. Although it has been overlooked for many years and by some given up for lost, certain metallurgists have insisted that a material of so many excellent qualities perhaps could be converted into a more adaptable product if a fraction of the brains and money could be put into it that had been put into the development of steel and the steel industry. The results of two or three experiments have been so encouraging that a considerable change in the attitude toward cast iron is coming about.

Perhaps the most interesting point just now is the formation of the Gray Iron Institute, Inc., which will follow the system used by the steel manufacturers, by the American Malleable Iron Castings Association (now the Malleable Iron Research Institute, Inc.) and by others, the foundry owners supporting jointly a campaign of development which it is hoped will improve the inferior properties of cast iron and standardize the better product produced, following which advertising and sales campaigns will endeavor to bring this material into the position that it deserves.

*From a paper read before the Chicago Section of the American Chemical Society. Mr. Spring is chief chemist and metallurgist of the Crane Co., Chicago.

Types of Cast Iron

To many people, cast iron is cast iron, and it will be of interest to those who have paid slight attention to this valuable alloy to know that there are several varieties of this material each of which has certain particular advantages for certain service.

Soft or Gray Cast Iron.—Soft cast iron with about 20,000 to 25,000 lb. per sq. in. tensile strength owes the greater part of its character to the 3 to 3.5 per cent of carbon which it contains. The amount of free graphite which we may call the dominating influence in cast iron is controlled by the manufacturer mainly through the amount of silicon that he puts into the cast iron, and, secondarily, by his rate of cooling the iron from the molten into and through the solid state. The higher the silicon, therefore, the softer the cast iron because of the greater advantage of graphitization induced; also, the slower the cooling after the iron enters the mold, the softer the iron will be. Ordinarily, gray iron such as is found in stove parts, engine beds, water mains and soil pipes, is of this type.

Semisteel or High Test Cast Iron.—For some purposes, a considerably stronger cast iron is desired. By reducing the silicon content used in the cupola from the usual 2.50 per cent for soft cast iron to such lower amount as, say 1.80 per cent, less graphite is precipitated. The iron is a little harder, slightly less machineable, but with tensile strength of something like 35,000 lb. per sq. in. instead of the 20,000 lb. which soft cast iron shows. This type of cast iron is known generally as semisteel, though certain foundries and scientific societies are endeavoring to banish the name, giving it the more significant name, high test cast iron, which, of course, it is, because of its 50 per cent greater tensile strength.

Chilling Irons.—The farmer for several decades has known the Oliver chilled plow and the railroads have used chilled car wheels, though now steel wheels are available. Such products, along with brake shoes, chilled iron rolls for rolling mill work, gears and other parts which must stand hard wear have been cast from iron containing much less silicon even than semisteel. These "chilling" irons contain from 1.50 to 0.09 per cent silicon or thereabouts, the amount depending on the depth of chill desired. When cast against a "chill" (cold piece of iron which is inserted to form part of the mold), the entering molten iron is made to freeze almost instantly into a white, extremely hard layer so hard as to resist wear and abrasion very definitely. The iron is white because the quick cooling allows the graphite flakes little or no time to crystallize out. Usually the chill is so arranged that the white or chilled layer will be backed by a heavier layer of iron, which is kept gray by slower cooling. This gray layer, while much softer, has much less brittleness and thus contributes to the strength of the casting.

Malleable Cast Iron.—We are all acquainted with malleable cast iron, the somewhat ductile metal of which the cast parts for agricultural machinery, railroad car bumpers and brake beams, pipe fittings, and even cheap hammers, tin snips, and some other tools are made. The composition of such iron, its pouring temperature and handling have to be regulated with extreme nicety. It is a highly chilling iron with from 0.75 to 1 per cent of silicon, which chills so readily that every part of every casting must come white in fracture after cooling in the mold. This is necessary because such brittle iron can be made malleable only after 40 hr. or more of continuous annealing at a temperature ranging between 1400 deg. and 1800 deg. Fahr. in closed pots, followed by very slow cooling of not more than 10 deg. Fahr. an hour, through the "critical" range (from 1400 deg. to 1200 deg. Fahr.). When taken from the mold, a slight blow from a machinist's hammer will shatter a small casting into many pieces, all with white fracture, but after this annealing process of approximately a week, the casting is soft and malleable and can be broken only with difficulty. While this material after annealing has a total carbon content of from 2 to 3 per cent, the metal remains malleable because by the annealing process the carbon separates not in flake form, as in gray iron, but rather in granular form in which it is seen under the microscope as little balls of "coke" lying among the grains of iron. There are no cleavage planes in annealed malleable iron and the continuity and adjacency of the iron

grains obviates the brittleness and makes for ductility.

Pearlitic Irons.—Besides these four very common varieties of cast iron, which of course are varied in composition somewhat for different purposes so that one class sometimes merges into the other, we now have a newcomer—a more aristocratic cast iron known as pearlitic cast iron. As explained already, cast iron has been noted for and used because of its good qualities—fluidity, easy machineability, high compressive strength, and comparative cheapness—but always it has been heavily penalized because of its brittleness or low shock strength and for its lack of sufficient tensile strength.

By the metallurgist, cast iron, theoretically, is considered as being steel into which an added constituent, flake graphite, has been introduced and distributed. It occurred to the metallurgist that during the casting process it might be possible to diffuse this graphite in a way somewhat analogous to the manner of its form and distribution in malleable iron—that is, better distributed and without the long, curly, fragile flakes which produce cleavage planes in cast iron. The result is pearlitic cast iron, which, under the microscope, is seen to have a somewhat greater amount of pearlite (the strength-giving constituent of steel) with almost a total absence of long flakes of graphite, these being replaced by graphite in very small rosettes or better in little stubs. On viewing the structure through the microscope, probably even the least experienced would decide that there would be less fragility in the alloy, and this is the case.

This very desirable strong and tougher pearlitic cast iron can be made by three main processes which are coming gradually into use. By the first of these, a low silicon or chilling iron, which would give white fracture castings if poured as usual, is poured instead into heated molds, the higher temperature being sufficient to overcome any tendency of the iron to chill, and the lack of silicon preventing separation of graphite.

A second process produces castings with this desirable pearlitic structure through careful proportioning of the charge, carefully regulated composition, and the use of comparatively high-pressure blast in the cupola.

The third process brings about the same result by superheating the molten metal to a high enough temperature so that, on pouring, the molds themselves in effect are automatically heated by the metal, and the still molten iron is allowed to cool in them. While the first two processes mentioned are cupola methods, the third uses the electric furnace, by means of which the iron can be highly superheated, sometimes to 3000 deg. Fahr. or more.

Warehousing Rustless Iron Sheets

Polished Surfaces Are Handled With Gloves and Protected By Paper When Sheared Or Corrugated On Order

DISTRIBUTION of rustless iron from stock has added a product to the warehouse that must be handled with more than the usual care given to a high grade steel. In its Jersey City, N. J., warehouse, Joseph T. Ryerson & Son, Inc., maintains a stock of 60 to 70 tons and more of Nos. 11 and 12 to 24-gage sheets of Alleghany metal and Ascoloy. While the Ascoloy can be handled easily, as it is not highly polished, distribution of Alleghany metal sheets necessitates special care.

As a rule, the warehouse ships orders every second day. The sheets, which are received from the mill wrapped in a heavy tissue and crated, are taken from the crates to the shears by workmen wearing gloves to prevent finger marks appearing on the polished surface. In the shear, heavy tissue is placed on the sheet under the clamps to prevent scratching the surface, and before the shear can be used all grease and oil is removed from exposed parts to prevent soiling the sheet. After cutting, the sheets are returned to the rustless iron stock-room, and are wrapped in a heavy crimped paper with a tarred center and placed in a new crate for delivery to the consumer.

Shearing to the required size leaves a quantity of small strips, which with ordinary sheets would unquestionably go to the scrap pile. With rustless iron, however, only the smallest scraps of metal are discarded, strips, sometimes of only a few inches in width being carefully wrapped in paper and returned to stock as possibly salable at a slight reduction in price to some other customer. The salesmen, knowing of an accumulation of such material in a certain size, are often able to dispose of it to a manufacturer who has not been using rustless iron.

Recently a number of long narrow strips had accumulated in stock from an order placed by a large user, and a manufacturer of show cases, who had been using other metals, became interested and purchased the strips at a reduction from the full market price.

When a piece of rustless iron is so small that it reaches the scrap pile it has decreased in value far more than ordinary steel scrap and seldom brings much more than 1c. per lb., although the original selling price of the new material ranged from 45c. to 66c. per lb. out of stock. Consequently, the scrap pile is kept at a minimum to prevent unnecessary loss.

The care with which such sheets are handled is exemplified in a small order recently executed by this warehouse for sheets used in decorating a modernistic room in the Metropolitan Museum of Art in New York. The ceiling of the room was sheathed with corrugated, rustless iron sheets and, in corrugating them, each sheet was covered with paper before passing it through the corrugating machine, to prevent damage to the surface.

Program of Annual Meeting of Taylor Society

The annual meeting of the Taylor Society will be held at Hotel Pennsylvania, New York, Dec. 4 to 6. The program follows:

Wednesday afternoon, Dec. 4, Edward Eyre Hunt, presiding:

Analysis of "Recent Economic Changes", with emphasis on subjects of practical interest to management, by R. W. Burgess, chief statistician, Western Electric Co., New York.

Wednesday evening, Dec. 4, Henry Bruere, presiding:

"Are There Practical Steps Toward an Industrial Equilibrium?" by Wesley C. Mitchell, National Bureau of Economic Research and Columbia University, New York.

"What Bearing Has Industrial Equilibrium on Regularity of Operations and of Employment?" by Leo Wollman, New School of Social Research, and director of research, Amalgamated Clothing Workers of America, New York.

Thursday morning, Dec. 5, Morris L. Cooke, presiding:

"What Are the Controllable and the Uncontrollable Factors in Management?" by Howard Coonley, president, Walworth Co., Boston.

"Is There an Optimum Size of Organization (Centralization vs. Decentralization)," by John H. Williams, consulting engineer, New York.

Thursday afternoon, Dec. 5: Roundtable discussions on industrial standardization, accounting for distribution costs, and marketing with special reference to planning, organization and supervision.

Thursday evening, Dec. 5: Annual dinner, with reports on management in Western Europe, Russia and Japan from returned travelers.

Friday morning, Dec. 6, Percy S. Straus, presiding:

"Is it Good Management Policy to Assume That Consumer Wants for Particular Goods Are Insatiable?" by Paul H. Nystrom, business and marketing consultant, Columbia University, New York.

"Is it Sound Assumption That Consolidation Results in Reduction of Distribution Expense?" by J. E. Judson, Ford, Bacon & Davis, New York.

Friday afternoon, Dec. 6, R. H. Lansburgh, presiding:

"The Technique of Methods of Study," by H. K. Hathaway, consulting engineer, New York.

Friday evening, Dec. 6, Henry P. Kendall, presiding:

"How Shall Large Groups Be Organized and Managed to Secure the Ability, Capacity and Energetic Effort of Each Individual as Though He Were in a Business of His Own? by Malcolm C. Rorty, president, International Telephone Securities Corporation, and vice-president, International Telephone & Telegraph Co., New York.

This Issue in Brief

Good dividends in production are paid by apprenticeship course in machine tool plant. No shop training room is used. Apprentices are assigned directly to production departments, and work on a production basis, under joint supervision of foreman and shop instructor. Fifty per cent of the graduates since 1915 are still with the company, and nearly all hold responsible positions.—Page 1293.

* * *

"Anti-aging" steel is not an alloy, but a carefully made open-hearth steel. The German product, Izett, adapted especially for boiler fabrication, as it resists embrittling influence of alkaline feed water, is thoroughly "washed" with manganese during the melting process, and then killed with aluminum. — Page 1302.

* * *

True elastic limit of structural steel columns proves to be much lower than minimum yield point. Carbon steel columns failed at about 84 per cent of calculated yield point, silicon steel at 96 per cent and manganese steel at 99 per cent or better.—Page 1302.

* * *

Heat treating costs reduced by preheating air for oil combustion. Air for combustion is forced through a coil in a recuperator, where it is heated to about 600 deg. Fahr. and then delivered to oil burners.—Page 1304.

* * *

Reduction in oil consumption in steel casting plant is obtained by installing an oil indicator showing number of gallons burned each hour. As results are visible to operators, competition for low oil consumption is promoted.—Page 1308.

* * *

Poor quality steel results from use of scrap over and over again. "Inbreeding" process is undesirable. A prominent metallurgist declares that all heats of steel should be made with at least 70 per cent virgin metal.—Page 1310.

Overstressing increases the endurance limit of steel, metallurgists believe. Tests reveal that the yield ranges on overstressed specimens are always greater than corresponding results for steel in its primitive state.—Page 1306.

* * *

Better steel at lower cost results from providing proper amount of air for the fuel burned. Automatic open-hearth furnace control eliminates guesswork. Less excess air reduces fuel consumption, and, with less excess air, there is much less waste gas and longer furnace life.—Page 1308.

* * *

Rustless iron sheets are handled with gloves, to protect polished surfaces. Sheets are protected by paper when sheared or corrugated. As scrap value is low, only the smallest scraps are discarded. Small pieces are sold at slightly reduced price to manufacturers producing small parts. —Page 1322.

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This slat conveyor turns corners. Inner corners of slats are cut away to allow clearance in making turns. Openings between slats do not interfere with handling tote pans, boxes and other packages with flat surfaces. —Page 1312.

* * *

Merger movement greatest in history of country, says economist. Only two-thirds of the businesses of 1914 remain, largely due to mergers. There is no economy merely in merging, but in cost reductions worked out after the merger.—Page 1319.

* * *

Cast iron is undergoing rejuvenation, says metallurgist. The lowliest of ferrous alloys is on the threshold of a new day, which would have dawned long before this if cast iron had received a fraction of the brains and money that have been put into the development of steel.—Page 1321.

Annealing costs cut and quality of product improved by controlling cooling as well as heating cycles. To reduce heat capacity of the furnace structure, the chamber is lined with light weight semi-refractory brick, which allows the walls to heat or cool in nearly half the time consumed by ordinary refractories. Cooling coils and auxiliary ventilating system permit the cooling cycle to be varied.—Page 1311.

* * *

Lubricating parts subjected to hot water or steam presents a difficult problem. Straight mineral lubricants will not withstand the washing action of hot water, so the lubricant is compounded with substances giving it adhesive properties. Bath lubrication is favored where conditions permit use of oil tight gear cases.—Page 1299.

* * *

Load-carrying strength of silicon structural steel and manganese structual steel box-section columns is much greater than that of carbon steel columns. Tests to destruction reveal that manganese steels will withstand almost twice the stress at which the carbon steel columns fail.—Page 1300.

* * *

Heat-treating labor cost cut by use of interconnected furnaces. Normalizing, hardening and drawing furnaces are in line, connected by automatic mechanical-handling system. The unit is flexible as to range of heat treatment and size of work.—Page 1304.

* * *

Increases open-hearth furnace output 10 per cent by installing special combustion control equipment to mix blast furnace and coke oven gas so as to give a constant value of about 500 B.t.u. to the cubic foot. Cost of equipping one furnace is about $10,000.—Page 1308.

A. I. FINDLEY
Editor

THE IRON AGE

W. W. MACON
Managing Editor

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Some Things That Will Help

IT is too early to foresee the full effects of the securities crash on business. That a shock to industry and trade is unescapable is well understood, but it is also appreciated that the shock will be much more severe if narrow, selfish motives are permitted to dominate business policy.

The force of circumstances is strong and the integrity of one's own business is perforce a prime consideration; but there is evidence that immediate private advantage is being subordinated to the general good to a greater extent than in other Wall Street crises. Business leaders have not forgotten the old alternations of feast and famine and in recent years have learned the benefits of stability. They realize that they are trustees of prosperity.

When the October hysteria in Wall Street was at its worst, the Rockefellers and others announced that the declines had gone too far and backed up that conviction by buying securities. Later, extra dividends were declared by the United States Steel Corporation, the American Can Co. and other companies.

What has been done to restore public confidence will be matched, it is hoped, by constructive measures to prevent trade reaction. A sharp increase in unemployment at this time would be a much more serious threat to business than Wall Street losses. While these losses will undoubtedly have an adverse effect on consumer buying, the importance of this factor may easily be overestimated. Granted that the speculative mania extended to virtually all classes of the population in New York and other large centers, there are many millions in the smaller towns and on the farms whom it did not reach. The total number of securities owners in this country is estimated at 4,000,000 by M. H. Hutchinson, secretary of the Conference of Statisticians in Industry. A large proportion of these own their shares outright or are paying for them out of their pay envelopes. Over 1,000,000 industrial employees hold stocks in the companies in which they work. Stockholders of this type are in the same position that they were before the stock market collapse except for the depressing knowledge that their holdings have declined in value. Even among those who speculated it is safe to say that paper losses outnumbered monetary losses.

But there is no blinking the fact that the disposition to buy consumer goods has been adversely affected, doubtless to a greater extent than purchasing power. This psychology should not lead business into short-sighted or hasty action. Happily the consequences of ill-considered moves that would seriously affect employment are now better understood than ever in our history. Even in the automobile industry, in which readjustment was under way before the securities debacle, part-time working schedules have been put into effect by certain companies in an effort to keep all employees on the payroll.

No longer are employees hired and fired with every fluctuation in business volume. Mass production depends on mass demand and the sources of mass demand must be protected. This fact not only tempers the attitude of business in times of stress like the present, but is becoming a fixture in the policy of a growing number of industrial companies. For example, a large manufacturer of heating equipment, whose business is highly seasonal, is now working under schedules which call for operations at an even rate throughout the year, to insure regular employment for its workers.

It is more and more appreciated that an executive's responsibility does not end with his stockholders; that his trusteeship extends to his employees and to the army of ultimate customers, the general public. Whatever we may think of some things that bear the New Era label, this more enlightened thinking of the heads of industry, in contrast with the old devil-take-the-hindmost policy, is one of the most favorable factors in the present situation.

Still a Great Year in Steel

BESSEMER and open-hearth steel ingot statistics for October have some interesting points. In daily rate of production there was almost as much decrease from September to October as there had been in the whole period May to September, which confirms what our market comments have brought out—that steel production was in an important decline before the crash in the stock market had time to become an influence. Beginning only on the afternoon of Oct. 23, the stock market disaster could not have affected the month's production materially. The September to October decrease in daily rate was 7.4 per cent, while the May to September decrease, in four months, was only 7.6 per cent. As to the recent movement being contrary to the usual seasonal swing, it is to be noted that in the last five years there has been an average increase in daily rate, September to October, of 3.9 per cent.

The monthly reports refer only to Bessemer and open-hearth ingots, electric and crucible ingot statistics being gathered only once a year. Last year electric and crucible ingots amounted to nine-tenths of one per cent of the Bessemer and open-hearth, while for this year an allowance of one per cent may be made. Total Bessemer and open-hearth for ten months

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is given at 47,758,054 tons. Adding one per cent would make 48,233,000 tons for the full total.

We may now appraise the probable error of forecasts of the year's total steel ingot production. To bring out a total of 55,000,000 tons for the year there would be required a producing rate in the 51 working days of November and December of only 67 per cent, against 85 per cent reported for October, while to make a total of 56,000,000 tons a 77 per cent rate would be required for these two months. The probability is that the fact will lie between these limits. A total of 55,500,000 tons would represent 10.3 per cent increase over 1928, which stood at 50,325,393 tons. From 1923 to 1928 there was a total increase of 16 per cent, averaging 3.2 per cent a year. From 1926 to 1928, two record years with an off year between, the increase was 7 per cent. In future years 1929 will stand out as one of large gain, while the facts of its exceptional first three quarters and its relatively lame ending may be forgotten.

Lotteries and Plant Morale

LOTTERIES which have sprung up in recent years, aiming to reach people of small means, have taken on proportions at many manufacturing plants that demand serious managerial attention. For one thing, management complains, employees spend altogether too much of their earnings in the effort to secure one of the large prizes. For another thing, when some employee wins a few hundred dollars, or, in case of a capital prize, a thousand dollars or more, the fever spreads like wildfire, men and women buying ticket after ticket without thought of the needs of their families.

One of the worst features of the evil is that the lottery operates continuously and every work day some thousands of dollars are distributed to the holders of winning tickets. The usual price of a ticket is 50 cents, which for the habitues, who constitute at least a large minority, means $3 a week. Where the gambling germ has taken a real hold one daily ticket is not enough. The result is that case after case is brought to the attention of the office through the action of creditors, since too little money is left in the pay envelope for current expenses. Naturally under such conditions the worker's mind is not on his work, morale is lowered and with it production.

Of course the lotteries are illegal. State and Federal statutes prohibit them. But the promoters know the laws and the ways of outwitting them, in which they are abetted by a certain code among their customers, so that betrayals are rare. The promoters avoid the mails. A lottery operating in one State is conducted from an office in another State. The tickets tell no tales. There is no drawing. The winners are determined from published facts or figures, which all may read, such as baseball scores and financial record figures, a favorite being the daily clearing house totals. The owner reads for himself whether or not he has won. He believes the game a square one. But the lotteries always profit hugely.

To the average plant manager the question is not one of ethics or law-breaking, but of the effect of this persistent gambling on his employees. Officials may overlook the milder forms of gambling, such as a baseball or football pool within a department, where none may profit but the winner, and none may stake more than some trivial sum. The professional lottery is another matter, conducted day after day throughout the year, now dwindling in interest, now, because of a winning, breaking out into a flood of ticket-buying. The evil may be cut off at its root for the time being, where it is discovered that some employee is the ticket-selling agent. But usually the solution is not so simple. Not a few managers are still studying the proper approach. They realize that too drastic action may result only in inducing a more crafty, underground system of continuing the business. How to bring to bear persuasion and an appreciation of the folly of the practice is a baffling problem.

Foresees Better Building Situation

"BEFORE many months a sufficient supply of mortgage money should become available to afford the building industry with a marked stimulant," says the Alexander Hamilton Institute in its *Business Conditions Weekly*. "A second favorable factor is the reduction in the supply of vacant buildings which is resulting from the current curtailment of construction. The downward trend of rents which characterized the situation from the middle of 1924 to the end of 1928 has not been in evidence this year. The rent index (1924=100), after declining from 184 in August, 1924, to 159 at the beginning of 1929, is still at the latter figure."

It is admitted, however, that curtailed purchasing power and the caution of buyers may hinder a recovery of building, and it is also pointed out that high wages may prove a retarding factor. The wage index (1913=100) is now 238 as against 233 a year ago and 179 in March, 1922, when the advance started. The advance in wages, according to the institute, has more than offset the decline in building material prices, the index for the two factors combined now being 195 as against 191 a year ago.

Our Economic Ignorance

STOCK market ups and downs during the last two or three years give economists, professional and amateur, much upon which to reflect. When stocks were rising to an unprecedented average and many persons were realizing profits, while a great many more viewed with satisfaction the rise in the quotational value of their possessions, it was easy for economists themselves to become the victims of illusion in respect to increase in the national wealth, the national income, the national surplus, etc. Promoters made use of such data in their essays for the temptation of customers. There were few philosophers who tried to point out how such calculations would look if things turned the other way around. Since things have so turned we might as well be honest and admit that no one knows enough about our national economy to give him a standing as a prophet.

A national economy is essentially the same as that of an individual person, but it is multiplied by something like 50 millions in the instance of the United States and is immensely more complicated than are

the affairs of the average person among 50 million. However, the basic element is the same, i.e., wealth, and by that term we mean the summary of the physical things that we possess rather than quotational valuations, although we are bound to adopt estimates of value in order to make an addition. The careful individual does this in an annual inventory.

The next thing that he has to know is the amount of his income, which he may subdivide into earned income and profit realized from appreciation in value of property, as indeed he is obliged to subdivide in making his income tax return. He may then figure his saving—his surplus of income over his expenses—and that will be an addition to his wealth, providing he has not had losses by fire, flood and tempest, by property becoming obsolescent, or otherwise, thus losing its value.

The intelligent individual will also examine his expense account and consider what wastes are included in it that may be curtailed. He furthermore will budget the estimates for new facilities that will be required in the future. With such methods he will be able to do some reasonable forecasting. The economists who essay to forecast our national future have scarcely any data of this nature. How then can they do anything but conjecture?

Other data that are necessary in an examination of our national affairs are: Population; number of workers; percentage of employment; occupational statistics (determination of the personnel attached to the several industries); consumption of commodities; percentage of manufacturing capacity in use; index of general price level; aggregate of taxation (national, State, county and town). This recital of needs is by no means comprehensive; rather is it merely suggestive.

Many of the subjects above mentioned, as well as others of major importance, are already under investigation by economic and statistical organizations, and by departments of the Federal Government. Unfortunately there is an absence of uniformity in their methods and theories, and consequently they offer only fragmentary data that cannot well be pieced together. There is a great need for a council that would collect and summarize what the many individual bodies are doing, would undertake to coordinate their work, would arrange cooperation among them, would establish principles, and in short would assume the functions of a statistical clearing house. With such a directing head, which ought to be of recognized authority (but no part of the Federal Government), there would be developed in the course of time a mass of practical information that would enable us to manage ourselves better than we do now; also it would build some firm ground for prophecy, which there is not now.

Old and New Strategy of Industrial Progress

BY DR. WILLIAM E. WICKENDEN*

SOME men are so significant that they mark an epoch; an era of history closes when they pass to their reward. Will we see another Edison? Probably not. To get perspective on his life and times we must go back to times before the idea of progress was invented. Medieval Europe, living on ideas borrowed from the ancients, fell into static ways. Men cared more for preserving than for improving traditional ways. The free labor of the guilds was more fertile than the slave labor of the ancients. In it a revolutionary idea germinated, that tools and processes could be made better by deliberate effort without waiting for slow evolution.

Early Pioneer Inventors Were Workingmen

The century beginning with Watt's engine in 1767 was the most amazing in all industrial history. Its pioneers were nearly all workingmen, trained by apprenticeship and self-taught in rudimentary science. Their work was so brilliant that men came to have almost boundless confidence in trial and error process of experiment and invention. This tradition was Edison's inheritance and he its most brilliant exemplar.

In a few months we are to celebrate the semi-centennial of the incandescent lamp. Edison did not invent the lamp; the basic ideas were old; but he reduced them to commercial practicality with prodigious experimental labor and resourcefulness. As Edison himself described his method:

> Through all those years of experimenting and research I never once made a discovery. All my work was deductive, and the results I achieved were those of invention pure and simple. I would construct a theory and work on it until I found it untenable, then it would be discarded at once and another theory evolved. This was the only possible way for me to work out the problem.

The New Strategy of Progress

In the old order of events the technical arts grew out of discovery and science followed after—usually long after—with her higher refinements. Two great modern industries have grown by reversing this order, the chemical and the electrical. The new plan has been found immensely fertile and time-saving. Thirty years after Faraday worked out the principle of electromagnetic induction, Paccinoti had his dynamo running, while less than ten years separated J. J. Thompson's work on the electrical conduction of gases and Fleming's vacuum tube valve. Three years later De Forest added the third element on which the radio art has been built.

Contrast this record with the 150 years which elapsed between Newcomer's engine and the study of the essential conditions of its efficiency by Carnot and Rankine and you have the case in a nutshell.

The new strategy of progress is the substitution of the orderly attack of the research laboratory for our old dependence on sporadic invention. As one modern philosopher says:

> The greatest invention of the nineteenth century was the invention of the method of invention. . . . That is the real novelty which has broken up the foundations of the old civilization.

*Abstract of an address, "An Epoch in the Making," at the annual banquet of the American Society for Steel Treating at Cleveland, Sept. 12. Dr. Wickenden is the new president of Case School of Applied Science, Cleveland.

National Founders to Meet Nov. 20 and 21

The National Founders Association announces that the program for its thirty-third annual meeting, to be held at the Hotel Astor, New York, Nov. 20 and 21 has been completed and will include the following addresses: "Business Policies and Business Information," by Roland P. Faulkner, chief statistician, National Industrial Conference Board; "Seven Years' Foundry Development," by D. R. Wilson, president, Wilson Foundry & Machine Co., Pontiac, Mich.; "Finance," by Frank F. Winans, Baker, Winans & Harden, New York; "The Legislative Situation," by Walter Gordon Merritt, League for Industrial Rights; "Third International Foundrymen's Congress," by S. Wells Utley, Detroit Steel Casting Co., Detroit; "Changing Ideas of Control," by Elton Mayo, professor of industrial research, Harvard University, Graduate School of Business Administration; "The Business of Selling," by R. C. Borden and Alvin C. Busse, professors of public speaking, New York University.

At the convention dinner Wednesday evening, Nov. 20, Thomas S. Hammond of the Whiting Co., Harvey, Ill., president of the association, will be toastmaster. E. H. Sothern, noted actor, will be the principal speaker, his subject to be, "Reminiscences of the Stage."

Recommends Study of Steel Construction

Charles N. Fitts of the New England Structural Co., in his presidential address to the American Institute of Steel Construction, meeting in convention at Biloxi, Miss., Nov. 13, attributed the satisfactory structural steel sales to the fact that the public is beginning to realize the economies, as well as the safety and security, of steel construction. Mr. Fitts recommended:

1. That preparations be made for a semi-centennial celebration in 1934 of the invention of the skyscraper.

2. That the Federal Government be petitioned to create in the Bureau of Standards a division to diagnose demolished buildings.

3. That an expert investigation be made of the effect of the tall building on taxation, health and society.

4. That the Bureau of the Census be requested to enlarge its current statistics so that trading areas be measured and established for basic commodities, such as structural steel.

Tidewater Rolling Mills is the name of a new company which has taken over the rerolling mill of the Walash & McGee Steel Co. at 646 Doremus Street, Newark, N. J. A New York office has been opened at 75 West Street. The company will make angles, bands, bars, metal lath and special shapes.

The Week in Business

Drift of Current Financial and Economic Opinion

BUSINESS statistics are commanding less interest than usual, for it is realized that the forecast value of past performance in industry and trade has been materially reduced by the stock market collapse. The outlook is further clouded by the fact that a moderate business reaction was already under way, making it difficult to distinguish between normal trade retrenchment and the consequences of Wall Street losses.

Huge "Paper" Losses Will Affect Real Values

"It is all very well to talk of the fundamental soundness of business," says the *Commercial and Financial Chronicle*, "but the disappearance in a month of 25 to 40 billions of *paper values* in the leading industries of the country cannot fail to affect the *real values* thereof. Of course the wheels will continue to turn, production of some volume will go on, but the buying power of the people must be less."

A similar view is held by Benjamin Baker of the *Annalist*, who writes: "The effects of the crash will have an abnormally large influence in slowing business, and will not impossibly make full recovery slower and more difficult than would be the emergence from a depression not aggravated by the existing financial 'hangover.'"

More conservative is the opinion of Alexander D. Noyes, New York *Times*, who says: "Only the course of time will show whether trade has actually been affected, and how greatly." In 1907 and in 1920, he recalls, industrial reaction was cause rather than consequence of events on the Stock Exchange. But an accurate analysis of the present position of business cannot be made until it is ascertained "how far, in some great industries, the rash use of credit from which producers carefully abstained was practised by consumers."

The very attitude of self-examination and caution that business has now assumed will, of course, tend to slow up trade temporarily, but no one doubts the economic soundness and growth of the United States. As Theodore H. Price, *Commerce and Finance*, sums it up: "Even those plants which grow most vigorously do not always grow constantly, and the greatest prosperity has its vicissitudes."

Likens America to England After Napoleonic Wars

Enthusiasm over our prosperity, which was suddenly chilled by the securities collapse, is still held by Lord Hindlip, a British observer, writing in the *Bache Review*. "I think that the low levels reached by the good securities is an incident," he declares, "just as the high levels reached at the peak were an incident. I think they are both stupid, and neither have anything to do with values, and I have not the slightest doubt that in the course of time, maybe six months, maybe one year, or two, the prices reached at the peak will look cheap.

"I think it is quite impossible to be anything but optimistic about America. Shortly, the situation seems to be, on an infinitely greater scale, the same as obtained in England after she recovered from the Napoleonic Wars, when she had some 80 years of great prosperity. . . . We had cheap coal, steam; manufactured for the world in iron, steel cotton, wool; we had the money; we had the shipping trade. Now apart from the shipping trade—and your cotton trade is no worse than ours—you have everything that we had."

Stocks Back on Investment Basis

This picture is in sharp contrast with the gloom that continues to hang over the stock market. Deflation has been so drastic that representative common stocks are already back to prices only slightly more than ten times earnings and are yielding 6 per cent, according to a compilation by the Midland Bank of Cleveland covering 120 dividend-paying issues in ten important industries.

Growth in Structural Steel Sales

Increased Use and New Markets, Despite a Decline in Total Building Construction

STRUCTURAL steel was never selling better in the history of the country, declared Charles F. Abbott, executive director, in his report to the seventh annual convention of the American Institute of Steel Construction, meeting at Biloxi, Miss., Nov. 13. He pointed out that in 1921 some 1,188,600 tons of structural steel was sold in the United States, whereas this year the tonnage will probably exceed 3,950,000. This growth in the business has resulted despite the fact that there has been a decline of some 9 per cent from 1928 in all building operations during 1929.

Standard specifications and more rational use of structural steel promoted by the institute have in part effected this great change. Furthermore, there has been a tremendous increase in bridge building and aggressive work is being done toward promoting the use of steel in hangars, residences and dams. The time is now ripe, he said, to "rationalize output."

Stabilized Production Must Prevail

"The structural steel industry must understand and accept the theory of stabilized production," said Mr. Abbott. "It is only by an adjustment of supply to demand that prices can be stabilized or maintained at a given point. It is certainly the part of wisdom to have our resources of steel judiciously used, rather than to sell it very cheaply in bulk, with widespread waste and confusion.

"Fortunately, the steel construction industry, through the institute, is making a direct approach to the problem by first studying consumer interests and then adopting measures to meet them, which means a constantly increased use. As markets are extended and new uses developed, consumption will gradually exceed production facilities and thereby bring about rationalized output."

Large Merchant Iron Company Formed

Grouping of Toledo, Perry, Zenith and By-Product Coke Gives 1,100,000 Tons Annual Pig Iron Capacity

WITH an annual pig iron capacity of about 1,100,000 tons, one of the largest merchant pig iron producing companies in the country will be formed by the merger of four important Lake furnace interests operating six merchant blast furnaces, the Toledo Furnace Co., Toledo, Ohio, and the Perry Furnace Co., Erie, Pa., both controlled by Pickands, Mather & Co., and the By-Product Coke Corporation, Chicago, and the Zenith Furnace Co., Duluth. Lake Superior ore mines operated by Pickands, Mather & Co., with sufficient output to supply the new company with all of its iron ore requirements, will be included in the merger.

The linking of organizations that have been closely allied for several years will result in a company with approximately $75,000,000 in resources. All the merged companies have by-product coke ovens which supply gas to municipalities and districts in which they are located and plants for the recovery of by-products. The output of the furnaces will continue to be sold by Pickands, Mather & Co., Cleveland, and Pickands, Brown & Co., Chicago.

The Toledo Furnace Co. has two merchant stacks at Toledo, both with a daily capacity of 1200 tons; the By-Product Coke Corporation has two Federal stacks with an annual capacity of 300,000 tons, the Perry Iron Co. has one stack with an annual capacity of 125,000 tons, and the Zenith Furnace Co.'s one stack has a daily capacity of 300 tons.

The recently announced authorization of an increase in the capital stock of the By-Product Coke Corporation from 800,000 shares to 2,500,000 shares was the first step in effecting the merger of the four companies. Other details will be worked out shortly.

H. G. Dalton, partner in Pickands, Mather Co., is president of the Toledo Furnace Co. and he and Elton Hoyt, II, a partner in Pickands, Mather & Co., and Fayette Brown, president, Harvey H. Brown & Co., Cleveland, are directors of the By-Product Coke Corporation, of which C. D. Caldwell is president. Pickands, Mather & Co. has for some time been supplying the Chicago company with its iron ore requirements under a long term contract.

Nominating Committee Named by Foundrymen

The 1930 nominating committee of the American Foundrymen's Association was completed recently with the election of four members by a letter ballot of the association membership. Election judges canvassed 816 votes, declaring the following elected to the committee:

M. J. Evans, vice-president, Whiting Corporation, Harvey, Ill.
R. J. Doty, plant manager, Reading Steel Casting Co., Reading, Pa.
Wm. J. Grede, president, Liberty Foundry, Inc., Milwaukee.
T. H. Addie, president, American Manganese Bronze Co., Philadelphia.

In addition to four members elected annually, the by-laws of the association also provide that the nominating committee shall include the last three living past presidents of the A. F. A. The past presidents thus automatically members of the 1930 committee are A. B. Root, Jr., Hunt-Spiller Mfg. Corporation, Boston, senior past president and chairman of the committee; S. W. Utley, Detroit Steel Casting Co., Detroit, and S. T. Johnston, S. Obermayer Co., Chicago.

A meeting of the 1930 nominating committee will be held shortly after the first of the year, according to announcement by C. E. Hoyt, executive secretary. At that time the committee will consider suggestions from members of the association as to candidates for officers and directors.

New England Council to Meet

Governors of the New England States, editors and industrial leaders will be among the speakers at the Fifth New England Conference, to be held in Boston, Nov. 21 and 22.

Col. E. A. Deeds, chairman of the board of the Niles-Bement-Pond Co., and director of the United Aircraft & Transport Corporation; Henry D. Sharpe, president of the Brown & Sharpe Mfg. Co.; Col. Frederick H. Payne, president of the Greenfield Tap & Die Corporation; Howard Coonley, president of the Walworth Co., and E. F. Gay, National Bureau of Economic Research, Harvard University, will be speakers. The Hon. Charles Francis Adams, Secretary of the Navy, will address the conference.

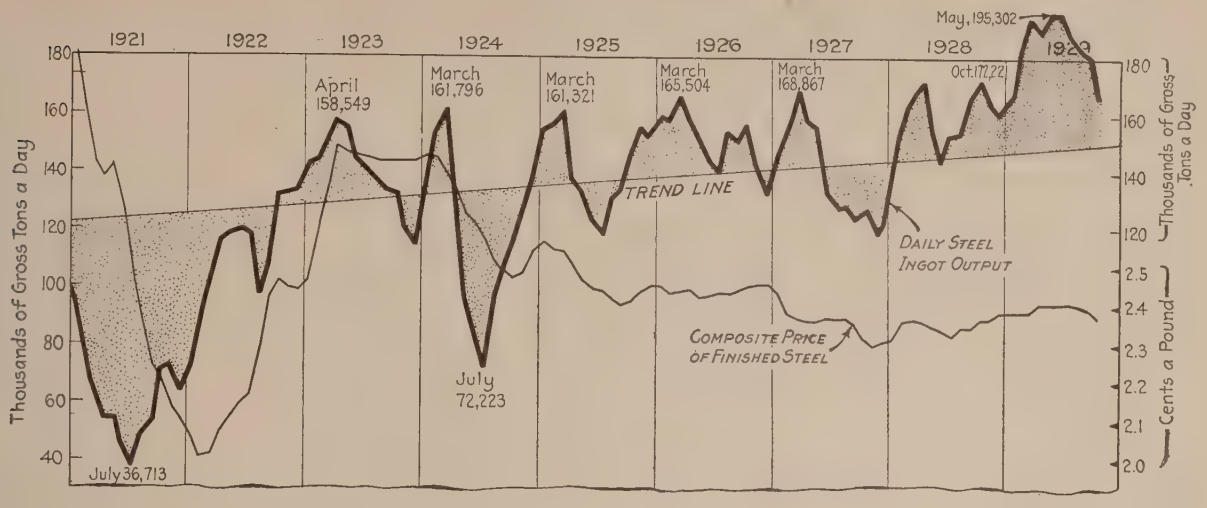
Electrochemists to Hear Address on Corrosion

Some of the fundamentals of corrosion, primarily from the viewpoint of the metallurgist, will be discussed by C. E. MacQuigg, manager, Union Carbide & Carbon Research Laboratories, Long Island City, N. Y., at the fall meeting of the New York Section of the American Electrochemical Society on Friday evening, Nov. 22. The meeting will be held at the Chemists' Club, 52 East Forty-second Street, New York, and will be preceded by a dinner at 6.45 p.m. The address will probably be supplemented by practical discussions from some of the leading metallurgists and electrochemists who have been interested in the solution of the corrosion problem.

Steel Founders to Meet

The Steel Founders' Society of America will hold its next regular meeting at Pittsburgh on Thursday, Dec. 12. This organization will also hold a regular meeting during the week of May 12, 1930, in Cleveland at the time the American Foundrymen's Association is having its annual convention there. Office of the society is at 932 Graybar Building, New York.

October Brings the Curve of Ingot Output Close to the Level of January, or More than 10 Per Cent Above Normal. Finished steel prices are about on parity with those a year ago



October Steel Ingot Output High

Ten Months' Production Exceeds Any Full Year Save 1928—Month's Daily Average Now Down Nearly to January Level

OCTOBER, with 27 working days, produced a tonnage of steel ingots slightly above September, with 25 working days. It brought the 10 months' total to a point nearly 15 per cent above the 10 months' output of 1928. This total for 10 months, in round numbers 47,755,000 gross tons, exceeds that for every full year save 1928.

The statistics are those of the American Iron and Steel Institute, and the calculations for the industry as a whole are based on the institute's returns from companies which made 94.51 per cent of the 1928 output. The accompanying table gives the figures for the past 22 months.

Last month there was a gain in output over September in Bessemer steel of about 1.4 per cent, which was not quite wiped out by the loss in the make of open-hearth steel. However, for the 10 months of this year the open-hearth production was some 15 per cent ahead of the same period of 1928 and the Bessemer output about 12.7 per cent ahead.

Daily averages, figured by eliminating Sundays from each month, show 167,098 tons for October, or 7.4 per cent off from the 180,435 tons of September. From the high point of May, exceeding 195,000 tons, the average daily output has now dipped nearly to the level of last January.

Electric and crucible ingots are not included in the current totals. Production of these two types of steel last year averaged about 1480 tons a day. Some such amount would have to be added to the daily figures in the table to obtain the total ingot output of the country.

The diagram traces the course of ingot production and finished steel prices over the period from the beginning of 1921.

PRODUCTION OF OPEN-HEARTH AND BESSEMER STEEL INGOTS
(GROSS TONS)

1928 Months	Reported by Companies Which Made 94.51 Per Cent of the Steel Ingots in 1928		Calculated Output of All Companies		No. of Working Days
	Open-Hearth	Bessemer	Monthly	Daily	
January	3,273,294	498,691	3,990,902	153,496	26
February	3,300,407	521,250	4,043,457	161,738	25
March	3,692,648	567,330	4,507,217	166,934	27
April	3,505,104	564,110	4,305,382	172,215	25
May	3,394,301	582,128	4,207,212	155,823	27
June	3,010,341	528,193	3,743,903	143,996	26
July	3,068,257	528,588	3,805,598	152,224	25
August	3,379,625	569,771	4,178,610	154,763	27
September	3,375,654	544,710	4,147,893	165,916	25
October	3,795,800	599,098	4,649,968	172,221	27
Ten months	33,795,431	5,503,869	41,580,142	159,924	260
November	3,442,112	590,669	4,266,835	164,109	26
December	3,301,114	496,679	4,018,208	160,728	25
Total	40,538,657	6,591,217	49,865,185	160,338	311
1929					
January	3,694,218	549,616	4,490,354	166,309	27
February	3,599,224	489,279	4,326,000	180,250	24
March	4,183,869	596,691	5,058,258	194,548	26
April	4,026,576	640,351	4,938,025	189,924	26
May	4,276,186	707,484	5,273,167	195,302	27
June	3,990,798	622,585	4,881,370	195,255	25
July	3,922,532	649,950	4,838,093	186,080	26
August	3,988,729	668,023	4,927,258	182,491	27
September	3,627,639	635,593	4,510,879	180,435	25
October	3,619,432	644,528	4,511,650	167,098	27
Ten months	38,929,203	6,204,100	47,755,054	183,673	260

Milwaukee Sheet Plant Makes Record

All previous shipping and production records were broken by the Inland Steel Co. of Wisconsin in October, when 7398 tons of finished material was turned out. This exceeded the August output of 7142 tons, the previous high mark.

Up to Oct. 31, this year, 2000 more tons had been produced than in all of 1928. A full time schedule is being maintained at the present time. The greater part of the sheet steel turned out goes to Wisconsin and Milwaukee industries.

Iron and Steel Markets

Railroad Buying Is Impressive

Large Orders for Rails and Equipment Placed As Caution Spreads Among Other Buyers—Steel Production Declines—Scrap Is Lower

HESITANCY is still marked among iron and steel buyers and both new business and production have undergone a further decline. In the main, apprehension regarding the consequences of the stock market collapse, rather than actual evidence of adverse effects, explains the attitude of the trade.

But this spirit is not universal. Railroad buying is conspicuously good and the requirements of farm equipment manufacturers continue to expand. Structural fabricating shops and shipyards, which are exceptionally well booked, are taking steel at a high rate. Manufacturers of steel pipe are bidding on an inquiry for 100,000 tons for a gas line to be laid by the Standard Oil Co. of California.

These indications of activity are counted on to restore general confidence and to release tonnage now held back. The present cautious policy of buyers is apparently not due to excessive inventories, because there is still pressure for deliveries against steel on order and suspensions of shipments are few and have come mainly from motor car builders.

The importance of railroad demand at this juncture is especially evident at Chicago, where 75 per cent of current specifications for finished steel are from the carriers and equipment builders. Rail buying came earlier than usual this year and much of the tonnage has been for fall shipment, tending to offset the reduced volume of business from other sources. The concentration of this rail tonnage, together with the large requirements of railroad car and locomotive builders, helps to explain the Steel Corporation's gain of 183,981 tons in unfilled orders in October.

The week's additions to rail bookings total 113,000 tons, of which 52,000 tons is for the Chicago & North Western, 23,000 tons for the Wabash, 15,000 tons for the Western Pacific, 8000 tons for the Kansas City Southern and the remainder miscellaneous lots. The Boston & Maine has entered the market for 10,000 tons, while the Southern Pacific is expected to take early action on its inquiry for 120,000 tons.

Freight cars ordered thus far in 1929 number 85,000, in addition to which railroads have placed 9000 cars with their own shops. Purchases for the year will probably run well over 100,000 cars, which would be the largest total since 1924. The Boston & Maine has bought 1500 cars, duplicating an order of a few weeks ago. The Union Tank Car Co. has purchased 1000. About 15,000 cars are pending, and additional inquiries for 20,000 cars are looked for before the end of the year. One large road has planned a three-year program, calling for the purchase of 10,000 steel box cars a year. Figures on the first 10,000 will be asked early in 1930.

Steel ingot production has declined to 60 per cent in the Valleys and to 75 per cent at Pittsburgh and Chicago. Eastern mills are operating at 65 to 80 per cent, the latter rate being that of the leading independent.

Finished steel prices show the strain of reduced demand, although in some lines the market remains untested because of the dearth of new business. Galvanized sheets are more commonly available at 3.40c., Pittsburgh, a decline of $2 a ton from the price heretofore quoted to others than jobbers. Sales of black sheets have been made at 2.70c., Pittsburgh, a concession of $1 a ton, while blue annealed sheets, which have been subject to severe competition from the continuous mill product, are openly quoted by some producers at 2.25c., Pittsburgh, for No. 13 gage and at 2.10c. for No. 10. Plates at Chicago have declined to a position of parity with bars and shapes.

Scrap, feeling the effects of curtailed consumption, is generally weaker. Heavy melting grade is $1 a ton lower at Pittsburgh and 50c. lower at Chicago.

Bookings in plates and shapes are important supports of mill operations in the East. Fabricating awards reported by the Structural Steel Board of Trade of New York for October were the second largest for any month on record, totaling 85,699 tons. Lettings reported from all districts this week aggregated 26,000 tons, which was slightly larger than the total for last week but below the average for the year.

In the pig iron market caution is as pronounced as among steel buyers. The prospect is that the beginning of next year will find melters with virtually no iron bought and producers with a minimum tonnage sold. Furnace stocks are low except in the Central West, where considerable deferred shipment iron, mainly for the automobile industry, is backing up. More surplus steel works iron is expected to reach the market and Alabama producers are not likely to abandon the Northern trade that they recently built up.

Steel ingot output in October, in terms of daily average, declined 7.4 per cent from the production of September. The rate, at 167,098 tons, was the lowest since January. October fell nearly 3 per cent below the corresponding month in 1928, being the first month of 1929 to have a smaller output than the same period last year.

THE IRON AGE composite prices are unchanged, pig iron at $18.38 a ton and finished steel at 2.362c. a lb.

A Comparison of Prices

Market Prices at Date, and One Week, One Month and One Year Previous, Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron, Per Gross Ton:	Nov. 12, 1929	Nov. 4, 1929	Oct. 15, 1929	Nov. 13, 1928
No. 2 fdy., Philadelphia	$21.26	$21.26	$21.26	$21.26
No. 2, Valley furnace	18.50	18.50	18.50	17.50
No. 2 Southern, Cin'ti	17.69	17.69	17.19	19.94
No. 2, Birmingham	14.50	14.50	14.50	16.25
No. 2 foundry, Chicago*	20.00	20.00	20.00	20.00
Basic, del'd eastern Pa.	19.75	19.75	19.75	19.75
Basic, Valley furnace	18.50	18.50	18.50	17.50
Valley Bessemer, del'd P'gh	20.76	20.76	20.76	20.01
Malleable, Chicago*	20.00	20.00	20.00	20.00
Malleable, Valley	19.00	19.00	19.00	18.25
Gray forge, Pittsburgh	19.76	19.76	19.76	18.76
L. S. charcoal, Chicago	27.04	27.04	27.04	27.04
Ferromanganese, furnace	105.00	105.00	105.00	105.00
Rails, Billets, Etc., Per Gross Ton:				
Rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Light rails at mill	36.00	36.00	36.00	36.00
Rerolling billets, Pittsburgh	35.00	35.00	35.00	33.00
Sheet bars, Pittsburgh	35.00	35.00	35.00	33.00
Slabs, Pittsburgh	35.00	35.00	35.00	33.00
Forging billets, Pittsburgh	40.00	40.00	40.00	38.00
Wire rods, Pittsburgh	40.00	40.00	40.00	42.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.85	1.85	1.85	1.90
Finished Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Bars, Pittsburgh	1.90	1.90	1.90	1.95
Bars, Chicago	2.00	2.00	2.05	2.00
Bars, Cleveland	1.90	1.90	1.95	1.90
Bars, New York	2.24	2.24	2.24	2.29
Tank plates, Pittsburgh	1.90	1.90	1.95	1.90
Tank plates, Chicago	*2.00*	2.05	2.05	2.00
Tank plates, New York	2.17½	2.17½	2.22½	2.22½
Structural shapes, Pittsburgh	1.90	1.90	1.90	1.90
Structural shapes, Chicago	2.00	2.00	2.05	2.00
Structural shapes, New York	2.14½	2.14½	2.14½	2.19½
Cold-finished bars, Pittsburgh	2.30	2.30	2.30	2.20
Hot-rolled strips, Pittsburgh	1.90	1.90	1.90	1.90
Cold-rolled strips, Pittsburgh	2.75	2.75	2.75	2.85

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

Finished Steel,	Nov. 12, 1929	Nov. 4, 1929	Oct. 15, 1929	Nov. 13, 1928
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 24, P'gh	2.75	2.75	2.75	2.75
Sheets, black, No. 24, Chicago dist. mill	2.85	2.85	2.95	2.85
Sheets, galv., No. 24, P'gh	*3.40*	3.50	3.50	3.50
Sheets, galv., No. 24, Chicago dist. mill	3.60	3.60	3.60	3.60
Sheets, blue, No. 13, P'gh	2.35	2.35	2.35	2.10
Sheets, blue, No. 13, Chicago dist. mill	2.45	2.45	2.45	2.20
Wire nails, Pittsburgh	2.40	2.40	2.45	2.55
Wire nails, Chicago dist. mill	2.45	2.45	2.45	2.60
Plain wire, Pittsburgh	2.40	2.40	2.40	2.40
Plain wire, Chicago dist. mill	**2.45**	2.40	2.40	2.45
Barbed wire, galv., P'gh	3.05	3.05	3.10	3.20
Barbed wire, galv., Chicago dist. mill	*3.10*	3.15	3.15	3.25
Tin plate, 100 lb. box, P'gh	$5.35	$5.35	$5.35	$5.25
Old Material, Per Gross Ton:				
Heavy melting steel, P'gh	*$16.75*	$17.25	$17.25	$17.25
Heavy melting steel, Phila	*15.00*	15.50	15.50	15.50
Heavy melting steel, Ch'go	*13.25*	13.75	14.25	14.50
Carwheels, Chicago	14.00	14.00	14.00	14.25
Carwheels, Philadelphia	*15.50*	16.50	16.50	16.50
No. 1 cast, Pittsburgh	*15.00*	15.50	15.50	15.50
No. 1 cast, Philadelphia	16.00	16.00	16.00	16.25
No. 1 cast, Ch'go (net ton)	*13.50*	14.00	14.50	15.50
No. 1 RR. wrot., Phila.	16.00	16.00	16.00	15.50
No. 1 RR. wrot., Ch'go (net)	*12.50*	13.00	14.00	13.00
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$2.65	$2.65	$2.65	$2.85
Foundry coke, prompt	3.75	3.75	3.75	3.75
Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	18.12½	18.12½	18.12½	16.12½
Electrolytic copper, refinery	17.75	17.75	17.75	15.75
Tin (Straits), New York	*39.37½*	40.12½	42.25	50.12½
Zinc, East St. Louis	*6.25*	6.50	6.80	6.25
Zinc, New York	*6.60*	6.85	7.15	6.60
Lead, St. Louis	*6.10*	6.35	6.70	6.20
Lead, New York	*6.25*	6.50	6.90	6.35
Antimony (Asiatic), N. Y.	8.62½	8.62½	8.50	10.37½

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Pittsburgh

Steel Orders Drop Further—Ingot Operations Reduced Also—Scrap Prices Break Sharply

PITTSBURGH, Nov. 12.—While steel orders have dropped off sharply in the last two weeks, specifications are reaching Pittsburgh and nearby mills in fair amount. In some cases, the tonnages released are somewhat smaller than they have been, but in few, if any, instances have shipments been entirely suspended. The importance of prompt delivery is being emphasized continually, but mills are in a position to meet such requirements and are inclined to regard the urgency for delivery as definite proof of low consumer inventories.

The sudden decline in steel demand is directly traceable to the recent stock market break and, in the absence of reliable estimates of just what the future course of general business will be, the steel industry is concerned with evaluating the potentialities of the large steel-consuming groups.

It is believed by some that the effect of the reduced automobile production is receiving overemphasis at this time. The two largest makers of cars in the low-priced field both expect to step up their production within the next month and will probably end the year with fairly heavy schedules. In both cases the cars to be produced represent model changes and the future course of production on these cars will depend upon public demand. Other automobile makers will probably maintain a sharply curtailed output for the remainder of the year.

Additional steel purchases by the railroads are not so certain, but car orders placed in the last 60 days have added a heavy tonnage to the backlogs of plate and sheet mills, against which shipment will be made well into the first quarter.

The agricultural implement industry continues to step up its production, and, as this is the season when peak production is reached, a good outlet for steel is promised. Implement makers generally feel that next year's demand from the farming industry has not been seriously impaired by recent financial happenings.

Shape and plate mills in this district are still fairly well occupied, and large construction projects on which fabricators are working will continue to require considerable steel. The Jones & Laughlin Steel Corporation has recently taken an order for 7000 tons of sheet steel piling for the Bonnett-Carre spillway in the lower Mississippi Valley and this is considered a forerunner of large steel tonnages which will be required for flood prevention work in that part of the country.

The pipe business has been dull in the last two weeks, but the Standard Oil Co. of California is inquiring for 80,000 tons of gas pipe in the larger sizes. Both lap-weld and seamless mills have thus far been able to maintain a fairly good operating rate.

Steel ingot operations continue to decline, with the average for the Pittsburgh district now about 75 per cent of capacity. The Valleys are at about 60 per cent and mills down the Ohio River are at no higher a rate.

Finishing mills generally average about the same as open-hearths, but the sheet industry as a whole is not above 60 per cent, with the leading interest about 10 points higher.

Tin plate production coincides roughly with sheets, but the 1930 price will probably be announced this

week and mills will soon begin to step up production on anticipated tonnage for next year. Strip mills are engaged at about half their capacity.

Prices are not strong, and concessions are reported in nearly all the principal lines. Upon investigation, most of these reports seem to emanate from buyers of steel. The hesitancy of these companies to place orders other than with their regular sources of supply indicates that prices are not as demoralized as they might seem and, with only small tonnages to quote on, the incentive for shading is lacking.

Makers of wire and wire nails have reaffirmed present quotations for first quarter business. Bars, shapes and plates seem to be holding at 1.90c., Pittsburgh, although this figure is not being tested by large tonnages. The 3.40c., Pittsburgh, price on galvanized sheets, which heretofore has been given only to jobbers, is growing more general, but otherwise sheet prices are not quotably lower. Cold-finishing mills have revised their contracts to meet the $2 a ton reduction announced last week. Strip prices are subject to some question, but are untested in a market of practically no buying.

Pig Iron.—Excepting a few sales of carload or slightly larger lots, this market is completely lifeless. Nevertheless, shipments are keeping up fairly well, and the leading merchant interest reports that its current output is all going into immediate consumption. Other merchant furnaces are piling very little iron, but two stacks are going out this week in order to keep stocks down. The Youngstown Sheet & Tube Co. is taking out one of its Hubbard furnaces, and one of the Shenango stacks is being banked. A large part of the output of both of these furnaces ordinarily goes to ingot mold plants, whose business has been sharply curtailed by reduced steel company operations. Prices are weak, but untested on large tonnages, with small lots bringing the full Valley furnace quotations of $18.50 on foundry and basic iron and $19 on malleable and Bessemer. The local merchant furnace is quoting prices 50c. a ton higher.

Prices per gross ton, f.o.b. Valley furnace:

Basic	$18.50
Bessemer	19.00
Gray forge	18.00
No. 2 foundry	18.50
No. 3 foundry	18.00
Malleable	19.00
Low phos., copper free	27.00

Freight rate to Pittsburgh or Cleveland district $1.76.

Prices per gross ton, f.o.b. Pittsburgh district furnace:

Basic	$19.00
No. 2 foundry	19.00
No. 3 foundry	18.50
Malleable	19.50

Freight rates to points in Pittsburgh district range from 63c. to $1.13.

Semi-Finished Steel.—Shipments of crude steel are lighter than they were during the greater part of October, as non-integrated steel companies are anxious to keep stocks at a minimum. Their operations are also rather light. Steel companies normally have large stocks of billets, slabs and sheet bars, and decreases in ingot production are being made in some plants to bring output in line with the lowest absolute needs. Prices are nominal, but the market on sheet bars, slabs and billets is still quotable at $35, Pittsburgh or Youngstown. Some users have contracts at this price, while large buyers are enjoying the usual differentials. Occasional sales of forging billets are reported, and the $40 price is holding on such transactions. Wire rods are also quotable at $40, Pittsburgh or Cleveland. Rod shipments are declining, as the requirements of bolt and nut makers are less than they were.

Bars, Shapes and Plates.—Demand for the heavy hot-rolled products leaves a good deal to be desired, but plate and shape mills are well engaged and extended rollings for large projects promise to hold output at close to the present level over the remainder of the year. Consumption of structural shapes by local fabricators is steady, and, while awards in the last two or three weeks have tended to slump, backlogs are satisfactory. Plate mills are not yet receiving specifications from the car builders in the amounts that had been expected, but, with freight cars on order approaching the highest total of the year, heavy specifications from this source are certain to appear. Shops served by Pittsburgh mills are booked for three or four months and reports persist that more large orders will be placed before the end of the year. Barge builders are now making deliveries regularly of barges booked early in the year and are reaching the point where they need additional orders. However, the shortage of barges on the rivers is self-evident and a number of interests are engaged in the formation of new lines which will take care of the growing river commerce. Railroads are mentioned as being interested in some of these projects and it seems certain that the barge business will benefit by this cooperative attitude. Bar mills are running at reduced rates and demand is not improving. The cold-finishing mills are taking a comparatively small percentage of their usual tonnage. Makers of farm implements are increasing their requirements, and builders of machinery and tools are still fairly large users. Prices are unchanged at 1.90c., Pittsburgh, on bars, shapes and plates, with occasional small lots bringing $1 a ton more.

Rails and Track Supplies. — Rail mill operations continue to improve and, as rail shipments gain, specifications for track accessories grow heavier. The Baltimore & Ohio has not yet made known its 1930 requirements for rails and track supplies, but most of the other Eastern roads have placed their business. Demand for light rails is keeping up and is particularly good in some of the coal regions where business is better than usual this year.

Wire Products.—With automobile and automotive parts makers taking only small tonnages, shipments of manufacturers' wire are less than they were during the corresponding October period. Other wire consumers are still taking their usual tonnage, but business is far from good, and demand from the jobbers is strictly of a hand-to-mouth character, involving very small lots. Prices seem to

The Iron Age Composite Prices

Finished Steel

Nov. 12, 1929, 2.362c. a Lb.

One week ago	2.362c.
One month ago	2.369c.
One year ago	2.369c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products make 87 per cent of the United States output of finished steel.

	High	Low
1929	2.412c., April 2;	2.362c., Oct. 29
1928	2.391c., Dec. 11;	2.314c., Jan. 3
1927	2.453c., Jan. 4;	2.293c., Oct. 25
1926	2.453c., Jan. 5;	2.403c., May 18
1925	2.560c., Jan. 6;	2.396c., Aug. 18

Pig Iron

Nov. 12, 1929, $18.38 a Gross Ton

One week ago	$18.38
One month ago	18.29
One year ago	18.50
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High	Low
1929	$18.71, May 14;	$18.25, Aug. 27
1928	18.59, Nov. 27;	17.04, July 24
1927	19.71, Jan. 4;	17.54, Nov. 1
1926	21.54, Jan. 5;	19.46, July 13
1925	22.50, Jan. 13;	18.96, July 7

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base per Lb.
F.o.b. Pittsburgh mill	1.90c.
F.o.b. Chicago	2.00c.
Del'd Philadelphia	2.22c.
Del'd New York	2.24c.
Del'd Cleveland	1.90c.
F.o.b. Cleveland	1.90c.
F.o.b. Lackawanna	2.00c.
F.o.b. Birmingham	2.10c.
C.i.f. Pacific ports	2.35c.
F.o.b. San Francisco mills	2.35c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills, 40, 50, 60-ft.	2.05c.
F.o.b. Pittsburgh mills, cut lengths	2.30c.
F.o.b. Birmingham, mill lengths	2.10c.

Rail Steel

F.o.b. mills, east of Chicago dist.	1.90c.
F.o.b. Chicago Heights mill	1.95c.
Del'd Philadelphia	2.27c.

Iron

Common iron, f.o.b. Chicago	2.00c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	2.12c.
Common iron, del'd New York	2.14c.

Tank Plates

	Base per Lb.
F.o.b. Pittsburgh mill	1.90c.
F.o.b. Chicago	2.00c.
F.o.b. Birmingham	2.10c.
Del'd Cleveland	2.09c. to 2.14c.
Del'd Philadelphia	2.10c. to 2.15c.
F.o.b. Coatesville	2.00c. to 2.05c.
F.o.b. Sparrows Point	2.00c. to 2.05c.
F.o.b. Lackawanna	2.00c. to 2.05c.
Del'd New York	2.17½c. to 2.22½c.
C.i.f. Pacific ports	2.25c. to 2.35c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh mill	1.90c.
F.o.b. Chicago	2.00c.
F.o.b. Birmingham	2.10c.
F.o.b. Lackawanna	2.05c.
F.o.b. Bethlehem	2.05c.
Del'd Cleveland	2.09c. to 2.14c.
Del'd Philadelphia	1.96c. to 2.06c.
Del'd New York	2.14½c.
C.i.f. Pacific ports	2.35c.

Hot-Rolled Hoops, Bands and Strips

	Base per Lb.
6 in. and narrower, P'gh	2.00c.
Wider than 6 in., P'gh	1.90c.
6 in. and narrower, Chicago	2.20c.
Wider than 6 in., Chicago	2.10c.
Cooperage stock, P'gh	2.20c.
Cooperage stock, Chicago	2.30c.

Cold-Finished Steel

	Base per Lb.
Bars, f.o.b. Pittsburgh mill	2.20c.
Bars, f.o.b. Chicago	2.20c.
Bars, Cleveland	2.20c.
Bars, Buffalo	2.20c.
Shafting, ground, f.o.b. mill	*2.55c. to 3.50c.
Strips, P'gh	2.75c.
Strips, Cleveland	2.75c.
Strips, del'd Chicago	3.05c.
Strips, Worcester	2.90c.
Fender stock, No. 20 gage, Pittsburgh or Cleveland	4.25c.

*According to size.

Wire Products

(Carload lots, f.o.b. Pittsburgh and Cleveland, to jobbers and retailers.)

	Base per Keg
Wire nails	$2.40 to $2.50
Galvanized nails	4.40 to 4.50
Galvanized staples	3.10 to 3.20
Polished staples (per lb.)	2.85c. to 2.95c.
Cement coated nails	$2.40 to $2.50

	Base per 100 Lb.
Bright plain wire, No. 6 to No. 9 gage	$2.40 to $2.50
Annealed fence wire	2.55 to 2.65
Spring wire	3.50 to 3.60
Galv'd wire, No. 9	3.00 to 3.10
Barbed wire, galv'd	3.05c. to 3.15c.
Barbed wire, painted	2.80c. to 2.90c.
Woven wire fence (per net ton to retailers)	$65.00

Cut Nails

	Per 100 Lb.
Carloads, Wheeling, Reading or Northumberland, Pa.	$2.70
Less carloads, Wheeling or Reading	2.80

Light Plates

No. 10, blue annealed, f.o.b. P'gh	2.10c. to 2.20c.
No. 10, blue annealed, f.o.b. Chicago dist.	2.30c.
No. 10, blue annealed, del'd Phila.	2.42c. to 2.52c.
No. 10, blue annealed, B'ham	2.35c.

Sheets

Blue Annealed

	Base per Lb.
No. 13, f.o.b. P'gh	2.25c. to 2.35c.
No. 13, f.o.b. Chicago dist.	2.45c.
No. 13, del'd Philadelphia	2.57c. to 2.67c.
No. 13, blue annealed, B'ham	2.50c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh	2.75c.
No. 24, f.o.b. Chicago dist. mill	2.85c. to 2.95c.
No. 24, del'd Philadelphia	3.07c.
No. 24, f.o.b. Birmingham	3.00c. to 3.10c.

Metal Furniture Sheets

No. 24, f.o.b. P'gh	4.10c.

Galvanized

No. 24, f.o.b. Pittsburgh	3.40c. to 3.50c.
No. 24, f.o.b. Chicago dist. mill	3.60c.
No. 24, del'd Cleveland	3.59c. to 3.69c.
No. 24, del'd Philadelphia	3.82c. to 3.92c.
No. 24, f.o.b. Birmingham	3.75c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.90c. to 3.00c.
No. 28, f.o.b. Chicago dist. mill	3.00c. to 3.10c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh	4.00c.

Long Ternes

No. 24, 8-lb. coating, f.o.b. mill	3.90c. to 4.00c.

Vitreous Enameling Stock

No. 24, f.o.b. Pittsburgh	3.90c.

Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills	$5.35
Standard cokes, f.o.b. Gary	5.45

Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)
(Per Package, 20 x 28 in.)

8-lb. coating I.C.	$11.20
15-lb. coating I.C.	14.00
20-lb. coating I.C.	15.30
25-lb. coating I.C.	$16.70
30-lb. coating I.C.	17.75
40-lb. coating I.C.	19.85

Alloy Steel Bars

(F.o.b. makers' mill)

Alloy Quality Bar Base, 2.65c. to 2.75c. per Lb.

S.A.E. Series Numbers		Alloy Differential
2000	(½% Nickel)	$0.25
2100	(1½% Nickel)	0.55
2300	(3½% Nickel)	1.50
2500	(5% Nickel)	2.25
3100	Nickel Chromium	0.55
3200	Nickel Chromium	1.35
3300	Nickel Chromium	3.80
3400	Nickel Chromium	3.20
4100	Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50
4100	Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600	Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel)	1.05
5100	Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100	Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100	Chromium Spring Steel	0.20
6100	Chromium Vanadium Bars	1.20
6100	Chromium Vanadium Spring Steel	0.95
9250	Silicon Manganese Spring Steel (flats)	0.25
	Rounds and squares	0.50
	Chromium Nickel Vanadium	1.50
	Carbon Vanadium	0.95

Above prices are for hot rolled steel bars, forging quality. The differential for cold-drawn bars is ¾c. a lb. higher, with standard classification for cold-finished alloy steel bars applying. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis.

Billets under 4 x 4 in. carry the steel bar base. Slabs with a sectional area of 16 in. or over carry the billet price. Slabs with sectional area of less than 16 in. or less than 2½ in. thick, regardless of sectional area, take the bar price.

Rails

	Per Gross Ton
Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	36.00
Light (from rail steel), f.o.b. mill	34.00
Light (from billets), f.o.b. Ch'go mill	36.00

Track Equipment

	Base per 100 Lb.
Spikes, ⅞ in. and larger	$2.80
Spikes, ½ in. and smaller	2.80
Spikes, boat and barge	3.00
Tie plate, steel	2.15
Angle bars	$2.75
Track bolts, to steam railroads	$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel Inches	Black	Galv.	*Iron* Inches	Black	Galv.
⅛	45	19½	¼ and ⅜	+11	+36
¼ to ⅜	51	25½	½	23	5
½	56	42½	¾	28	11
¾	60	48½	1 and 1¼	31	15
1 to 3	62	50½	1½ and 2	35	18

Lap Weld

2	55	43½	2	23	9
2½ to 6	59	47½	2½ to 3½	28	13
7 and 8	56	43½	4 to 6	30	17
9 and 10	54	42½	7 and 8	29	16
11 and 12	53	40½	9 to 12	26	11

Butt Weld, extra strong, plain ends

⅛	41	24½	¼ and ⅜	+13	+48
¼ to ⅜	47	30½	½	23	7
½	53	42½	¾	28	12
¾	58	47½	1 to 2	34	18
1 to 1½	60	49½			
2 to 3	61	50½			

Lap Weld, extra strong, plain ends

2	53	42½	½	29	13
2½ to 4	57	46½	2½ to 4	34	20
4½ to 6	56	45½	4½ to 6	38	19
7 to 8	52	39½	7 and 8	31	17
9 and 10	45	32½	9 to 12	21	8
11 and 12	44	31½			

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Steel		*Charcoal Iron*	
2 in. and 2¼ in.	38	1½ in.	1
2½ in.—2¾ in.	46	1¾ in.	8
3 in.	52	2 in.—2¼ in.	13
3¼ in.—3¾ in.	54	2½ in.—2¾ in.	16
4 in.	57	3 in.	17
4½ in. to 6 in.	46	3¼ in. to 3½ in.	18
		4 in.	20
		4½ in.	21

On lots of a carload or more, the above base discounts are subject to a preferential of two fives on steel and of 10 per cent on charcoal iron tubes. Smaller quantities are subject to the following modifications from the base discounts:

Lap Welded Steel—Under 10,000 lb., 6 points under base and one five; 10,000 lb. to carload, 4 points under base and two fives. Charcoal Iron—Under 10,000 lb., 2 points under base; 10,000 lb. to carload, base and one five.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	61	3 in.	46
1¼ to 1½ in.	53	3¼ to 3½ in.	48
1¾ in.	37	4 in.	51
2 to 2¼ in.	32	4½, 5 and 6 in.	40
2½ to 2¾ in.	40		

Hot Rolled

2 and 2¼ in.	38	3¼ to 3½ in.	54
2½ and 2¾ in.	46	4 in.	57
3 in.	52	4½, 5 and 6 in.	46

Beyond the above base discounts a preferential discount of 5 per cent is allowed on carload lots. On less than carloads to 10,000 lb., base discounts are reduced 4 points with 5 per cent preferential; on less than 10,000 lb., base discounts are reduced 6 points, with no preferential. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage take the mechanical tube list and discounts. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30%, base (carloads)	55
Carbon, 0.30% to 0.40% base	50

Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

be much better, with both wire nails and plain wire quotable at 2.50c., Pittsburgh, in carload lots to the trade, while jobbers are getting the usual $2 a ton concession. Manufacturers' wire is quoted at 2.40c., Pittsburgh.

Tubular Goods.—The Standard Oil Co. of California has come into the market for 80,000 tons of 20, 22, 24 and 26-in. line pipe which will be required for a gas line running from the California gas field into San Francisco. Other than this the line pipe business is quiet. The projected gas line from the Texas fields into Chicago seems to have been postponed for the time being. Other lines of pipe are also inactive, and demand has weakened perceptibly during the last two weeks. In the case of standard butt-weld pipe, this decline is seasonal. The oil country is still disturbed by numerous conservation projects, some of which are expected to be of considerable benefit to the industry. Advanced prices on black and galvanized steel butt-welded pipe have been adopted by all producers who had previously granted concessions, the extra 2½ per cent supplementary discount having been withdrawn on all business.

Sheets.—This market is now facing seasonal curtailment in the requirements of a few large consuming industries as well as greatly reduced buying from the automobile makers. On the other hand, agricultural implement companies are regularly increasing their specifications and have given no indication of a belief that their next year's business will not be fully up to the high levels of the last two years. Car builders are also showing added interest in their sheet purchases, but have not yet released rolling orders on the bulk of the tonnage which is expected to reach sheet mills by the first of the year. The Ford Motor Co. has not yet completed its model revisions and its sheet orders are being delayed. Other makers of automobiles in the low-priced field are also postponing their commitments and companies which had planned improved output in November have curtailed production instead. This condition has naturally influenced the sheet business adversely. Demand for galvanized sheets has also declined as the roofing business closes its active season. Makers of electric refrigerators have become less important consumers, their season reaching its height in midsummer. One of the few industries which continues its heavy demand for sheets is the metal furniture business. Prices show no strength. On black sheets, most mills are quoting 2.75c., Pittsburgh, but sales have been made at 2.70c. The 3.40c. price on galvanized sheets, which has until recently been extended only to jobbers, is now applying on a growing number of sales to consumers. Some mills are openly seeking business in blue annealed at 2.10c. for the No. 10 gage and 2.25c. for the No. 13 gage.

Tin Plate. — Business is dormant, but, as the price for 1930 may be announced before the end of the week, it will not be long before specifications for next year's tonnage begin to reach the mills. Operations of the leading interest have dropped under 70 per cent of theoretical capacity for the first time in many months and the average for the independents is not higher than 60 per cent.

Strip Steel.—Demand for hot and cold-rolled strip steel is extremely dull and the industry's operating rate is not much above 50 per cent of capacity. Occasionally, specifications are sufficient for a slightly higher rate for a short time, but no general improvement is reported. The Chevrolet Motor Co. is soon expected to make known its requirements for the remainder of the year, but other motor companies are cautious buyers and the same is true of the parts makers. Prices are not quotably lower, although occasionally they are subject to shading. On hot-rolled material, the usual price is 2c., Pittsburgh, for material less than 6 in. wide and 1.90c., for 6 in. and wider. Cold-rolled strip is quoted at 2.75c., Pittsburgh or Cleveland.

Cold-Finished Steel Bars and Shafting.—Mills have marked down contracts on cold-finished steel bars to 2.20c., Pittsburgh, effective Nov. 1, and new business is being taken at that figure. The $2 a ton reduction did not stimulate buying, but a steady flow of light specifications is still reaching the mills, assuring a constant though light operating rate.

Coal and Coke.—Weakness and inactivity are the prominent characteristics of this market. Furnace coke is occasionally bringing $2.75 a ton, Connellsville, but $2.65 applies on all sizable tonnages and lower prices have been quoted. Production is still being curtailed in the Connellsville region. Domestic coke has not developed much life, but cold weather would undoubtedly stimulate business. Shipments of foundry coke to steel foundries are holding up, but tonnage going to other plants is only fair. The coal business seems to be slightly better than it was at this time last year, but industrial consumption is constantly decreasing and the movement to the Lakes is about ended for this year.

Old Material.—After maintaining some semblance of strength for two or three weeks, the scrap market in this district has broken sharply. The Pennsylvania Railroad steel brought from $16.50 to $17 last week, and, although this must be considered the market on No. 1 heavy melting steel in the absence of other transactions, it is generally admitted that further decline in values cannot be avoided. With the possible exception of the blast furnace grades, all items on the list are off about 50c. a ton, as compared with last week. Machine shop turnings are weak as the principal consumer is expected soon to hold up shipments. Specialties are also quotably lower at $20 to $20.50, but are strong at this range in contrast with the weakness of other grades. Holdups continue at several important consuming points and others plan restricted shipments. Dealers have practically exhausted old orders on which they have been shipping for the last two or three months, and it would be difficult to say what price a mill might get which came into the market for a large tonnage of scrap.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$16.50 to $17.00
No. 2 heavy melting steel	14.50 to 15.00
Scrap rails	15.50 to 16.00
Compressed sheet steel	16.25 to 16.75
Bundled sheets, sides and ends	15.00 to 15.50
Cast iron carwheels	15.00 to 15.50
Sheet bar crops, ordinary	18.00 to 18.50
Heavy breakable cast	11.50 to 12.00
No. 2 railroad wrought	16.50 to 17.00
Hvy. steel axle turnings	15.50 to 16.00
Machine shop turnings	11.00 to 11.50
Acid Open-Hearth Grades:	
Railr. knuckles and couplers	20.00 to 20.50
Railr. coil and leaf springs	20.00 to 20.50
Rolled steel wheels	20.00 to 20.50
Low phos. billet and bloom ends	21.00 to 21.50
Low phos., mill plates	21.00 to 21.50
Low phos., light grades	20.00 to 21.00
Low phos., sheet bar crops	21.00 to 21.50
Heavy steel axle turnings	15.50 to 16.00
Electric Furnace Grades:	
Low phos., punchings	19.00 to 19.50
Hvy. steel axle turnings	15.50 to 16.00
Blast Furnace Grades:	
Short shoveling steel turnings	12.00 to 12.50
Short mixed borings and turnings	12.00 to 12.50
Cast iron borings	12.00 to 12.50
Rolling Mill Grades:	
Steel car axles	21.00 to 21.50
Cupola Grades:	
No. 1 cast	14.50 to 15.50
Rails 3 ft. and under	18.50 to 19.50

Warehouse prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.25c.
Hoops	4.25c.
Black sheets (No. 24), 25 or more bundles	3.80c. to 3.90c.
Galv. sheets (No. 24), 25 or more bundles	4.45c. to 4.55c.
Light plates, blue annealed (No. 10), 1 to 24 plates	3.35c. to 3.45c.
Blue annealed sheets (No. 13), 1 to 24 sheets	3.50c. to 3.60c.
Galv. corrug. sheets (No. 28), per square	$4.43
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count,	60 per cent off list
Machine bolts, 100 count,	60 per cent off list
Carriage bolts, 100 count,	60 per cent off list
Nuts, all styles, 100 count,	60 per cent off list
Large rivets, base per 100 lb.	$3.50
Wire, black soft ann'l'd base per 100 lb	$2.90 to 3.00
Wire, galv. soft, base per 100 lb.	2.90 to 3.00
Common wire nails, per keg	2.80 to 2.90
Cement coated nails, per keg	2.95 to 3.05

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and under 10-in., Pittsburgh	$35.00
Rerolling, 4-in. and under 10-in., Youngstown	35.00
Rerolling, 4-in. and under 10-in., Cleveland	35.00
Rerolling, 4-in. and under 10-in., Chicago	37.00
Forging quality, Pittsburgh	40.00

Sheet Bars

(Open Hearth or Bessemer)

	Per Gross Ton
Pittsburgh	$35.00
Youngstown	35.00
Cleveland	35.00

Slabs

(8 in. x 2 in. and under 10 in. x 10 in.)

	Per Gross Ton
Pittsburgh	$35.00
Youngstown	35.00
Cleveland	35.00

Skelp

(F.o.b. Pittsburgh or Youngstown)

	Per Lb.
Grooved	1.85c. to 1.90c.
Universal	1.85c. to 1.90c.
Sheared	1.85c. to 1.90c.

Wire Rods

(Common soft, base)

	Per Gross Ton
Pittsburgh	$40.00
Cleveland	40.00
Chicago	41.00

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.80
Old range non-Bessemer, 51.50% iron	4.65
Mesabi Bessemer, 51.50% iron	4.65
Mesabi non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.40

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algerian	12.00c.
Iron ore, low phos., Swedish, average 68% iron	12.00c.
Iron ore, basic Swedish, average 65% iron	10.00c.
Manganese ore, washed, 52% manganese, from the Caucasus	30.00c.
Manganese ore, Brazilian, African or Indian, basic 50%	30.00c.
Tungsten ore, high grade, per unit, in 60% concentrates	$15.50 to $16.50

	Per Gross Ton
Chrome ore, 45 to 50% Cr_2O_3, crude, c.i.f. Atlantic seaboard	$22.00 to $24.00

	Per Lb.
Molybdenum ore, 85% concentrates of MoS_2, delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$2.65 to $2.75
Foundry, f.o.b. Connellsville prompt	3.75 to 4.75
Foundry, by-product, Ch'go ovens	8.00
Foundry, by-product, New England, del'd	11.00
Foundry, by-product, Newark or Jersey City, delivered	9.00 to 9.40
Foundry, by-product, Phila.	9.00
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry by-prod., del'd St. Louis	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.25 to $1.75
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, ¾-in. f.o.b. Pa. mines	1.90 to 2.00
Mine run gas coal, f.o.b. Pa. mines	1.65 to 1.75
Steam slack, f.o.b. W. Pa. mines	80c. to 90c.
Gas slack, f.o.b. W. Pa. mines	1.00 to 1.10

Ferromanganese

	Per Gross Ton
Domestic, 80%, seaboard	$105.00
Foreign, 80%, Atlantic or Gulf port, duty paid	105.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$31.00 to $34.00
Domestic, 16 to 19%	29.00 to 32.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$83.50
75%	130.00

	Per Gross Ton Furnace		Per Gross Ton Furnace
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	45.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		Per Gross Ton
10%	$30.00	12%	$34.00
11%	32.00		

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		Per Gross Ton
6%	$22.00 to $23.00	10%	$26.00 to $28.00
7%	23.00 to 24.00	11%	28.00 to 30.00
8%	24.00 to 25.00	12%	30.00 to 32.00
9%	25.00 to 26.00		

Other Ferroalloys

Ferrotungsten, per lb. contained metal del'd	$1.40 to $1.50
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.15 to $3.65
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	$160.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton	$91.00
Ferrophosphorus, electric 24%, f.o.b. Anniston, Ala., per gross ton	$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silicon, gravel, f.o.b. Illinois and Kentucky mines	$18.00
No. 2 lump, Illinois and Kentucky mines	20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	$18.25 to 18.75
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines	32.50

Fire Clay Brick

	Per 1000 f.o.b. Works	
	High-Heat Duty Brick	Intermediate Heavy Duty Brick
Pennsylvania	$43.00 to $46.00	$35.00 to $38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	.....
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00
Standard size	45.00

Chrome Brick

	Per Net Ton
Standard size	$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts, blank or tapped, hexagons	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	7.00c. to 6.75c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled thread up to and including ⅜ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagon nuts	70
Semi-finished hexagon castellated nuts, S.A.E.	70
Stove bolts in packages, P'gh	75, 20, 10 and 5
Stove bolts in packages, Chicago	75, 20, 10 and 5
Stove bolts in packages, Cleveland	75, 20, 10 and 5
Stove bolts in bulk, P'gh	75, 20, 10, 5 and 2½
Stove bolts in bulk, Chicago	75, 20, 10, 5 and 2½
Stove bolts in bulk, Cleveland	75, 20, 10, 5 and 2½
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55, 60 per cent apply.

Large Rivets

(½-in. and larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$3.10
F.o.b. Chicago	3.20

Small Rivets

(7/8-in. and smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70 and 10
F.o.b. Cleveland	70 and 10
F.o.b. Chicago	70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10 and 5
Milled standard set screws, case hardened,	80 and 5
Milled headless set screws, cut thread	75 and 10
Upset hex. head cap screws, U.S.S. thread	85
Upset hex. cap screws, S.A.E. thread	85
Upset set screws	80, 10 and 5
Milled studs	70

Chicago

Steel Orders Largely Supported by Rails and Car Requirements—Miscellaneous Buyers are Cautious

CHICAGO, Nov. 12.—The bulk of support given to the local iron and steel market is coming from the railroads. Fully 50 per cent of the volume of specifications for finished steel was issued by car builders and another 25 per cent is accounted for by new releases for standard-section rails. Western railroads have made definite inquiries for over 12,000 cars and there is in prospect, in some cases from railroads that bought cars earlier in the year, new requests for prices on 13,000 cars.

Changes in other phases of business are having no adverse bearing on equipment purchase programs. One instance of this is shown by the fact that the St. Louis-San Francisco, which originally asked for bids Nov. 17, accepted figures on the 11th of this month. New rail contracts have reached an impressive tonnage.

Taken as a whole, consumers of steel are using extreme caution in making commitments even for immediate use. This is reflected in the proportionately small part of current specifications entered by miscellaneous users this week. In some cases, consumers have cut too close and have had to supplement recent orders.

A leading radio manufacturer stopped all production activities last week with the intention of not resuming them until about the first of the year. This drastic move has already been modified and output has been started on a one-third capacity basis.

Several automobile manufacturers which recently swung into heavy production with new models have cut schedules to avoid overstocking new cars.

Structural awards, though light in the immediate vicinity of Chicago, are in substantial tonnage in the Central and Western States. Agricultural implement manufacturers are maintaining a high rate of production.

Ingot output at Chicago mills has failed to hold, and the average now is about 75 per cent of capacity. No. 4 stack at Gary has been banked, leaving 24 furnaces in blast out of a total steel mill count of 36.

Ferroalloys.—This market is quiet and tonnages placed are of such character as to afford little or no test of current quotations.

Prices delivered Chicago: 80 per cent ferromanganese, $112.56; 50 per cent ferrosilicon, $83.50 to $88.50; spiegeleisen, 19 to 21 per cent, $39.76 to $41.76.

Pig Iron.—Shipments of Northern iron have started to taper, but the rate is slow and as yet little opportunity has been afforded producers to enlarge furnace stocks that have been unusually small. Most users are showing caution both in making new commitments and in issuing releases against old contracts. Producers of Southern iron are taking a stand for higher prices. One furnace is said to have withdrawn all quotations and to have named prices at $13.50 to $14 a ton, Birmingham. Charcoal iron has moved in small lots at $24 a ton, furnace. Prices for silvery show no recovery from the recent low point. Sales this week have reaffirmed present quotations.

Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	$20.00
N'th'n No. 1 fdy., sil. 2.25 to 2.75	20.50
Malleable, not over 2.25 sil.	20.00
High phosphorus	20.00
Lake Super. charcoal, sil. 1.50	27.04
So'th'n No. 2 fdy. (all rail)	$19.01 to 19.51
Low phos., sil. 1 to 2, copper free	29.50
Silvery, sil. 8 per cent	$28.79 to 29.79
Bess. ferrosilicon, 14-15 per cent	46.29

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Sheets.—The effects of reduced tonnages of sheets released a week ago are now being felt at local mills, which have curtailed output to an average rate of 75 per cent of capacity. In view of the current rate of specifications, it is doubtful in the minds of some producers that this new rate of output can be maintained unless incoming business increases at an early date. Prices in the local market are holding moderately well, though competition is becoming increasingly severe, and there is a growing urge on local producers to reach out into a wider territory for business which must be taken at prices below local quotations. Deliveries show marked improvement and rolling schedules are more flexible than in many weeks. Galvanized sheets may be had in two to three weeks and other hot mill commodities are being promised in 10 days to two weeks. The manufacturing trade is taking sheets at extremely close range. Some believe this to be partly a reflection of the approach of the inventory period. Shipments of sheets to jobbers show little variation from the rate maintained in October.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 2.85c. to 2.95c.; No. 24 galv., 3.65c.; No. 10 blue ann'l'd, 2.35c. Deliv'd prices at other Western points are equal to the freight from Gary, plus the mill prices, which are 5c. per 100 lb. lower than Chicago delivered prices.

Cast Iron Pipe.—Inquiries and orders from municipalities are few, and there is little prospect of an early revival. Private buying is confined to small and scattered lots, but it is hoped by the trade that large inquiries for 1930 delivery to public utilities will develop in the early part of December. Current transactions do not afford tests of prices at $43.70 to $45.70 a net ton, delivered, Chicago, for diameters 6 in. and over. Genoa, Neb., has placed 10,000 ft. of 8-in. pipe with an unnamed bidder. Frank Wilsey, Hammond, Ind., will lay 7000 ft. of 6 and 8-in. gas pipe at Lowell, Ind.

Prices per net ton, deliv'd Chicago: Water pipe, 6-in. and over, $43.70 to $45.70; 4-in., $47.70 to $49.70; Class A and gas pipe, $3 extra.

Warehouse Business.—Orders received by warehouses continue to taper, but the rate downward is slow. In view of the total business already on books for this year and the general tendency at this time, warehouse operators do not expect that 1929 will show a volume of business equal to that of the previous year. Prices generally are steady, with the exception of quotations on nails.

Cold-Rolled Strips.—Prices have settled to 2.75c. a lb., Cleveland, or 3.05c., delivered, Chicago. New business is light and output is at the low point of the year.

Rails and Track Supplies.—New orders for standard-section rails total more than 80,000 tons. The Chicago & North Western has ordered 52,000 tons, of which 36,000 tons was taken by the Illinois Steel Co. and 16,000 tons by Inland Steel Co. The Western Pacific is reported to have placed 15,000 tons with the Colorado mill, and miscellaneous orders in the Chicago territory total 15,000 tons. A part of this last tonnage is an addition to a new contract and another part is tonnage which is being added to a 1929 rail contract. It is reported here that the Southern Pacific will buy its 120,000 tons of rails this week. It is expected that orders will be placed in Colorado and in the South. Local rail mill operations are steady, with sufficient tonnage lined up to sustain the current rate to the end of the year. Miscellaneous orders for track supplies total 6000 tons, the bulk of which is for immediate needs. Fresh inquiries total 20,000 tons for accessories that will go with 1930 rails now being rolled. Prices for tie plates are showing a variation of $1.50 a ton, the range in quotations being $41.50 a ton

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars	3.00c.
Reinforc'g bars, billet steel	1.90c. to 2.25c.
Reinforc'g bars, rail steel	1.85c. to 2.00c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Bands (¼ in. in Nos. 10 and 12 gages)	3.20c.
Hoops (No. 14 gage and lighter)	3.75c.
Black sheets (No. 24)	4.05c.
Galv. sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.35c.
Spikes, ⅜ in. and larger	3.55c.
Track bolts	4.55c.
Rivets, structural	4.00c.
Rivets, boiler	4.00c.
	Per Cent Off List
Machine bolts	60
Carriage bolts	60
Coach or lag screws	60
Hot-pressed nuts, sq., tap. or blank	60
Hot-pressed nuts, hex., tap or blank	60
No. 8 black ann'l'd wire, per 100 lb.	$3.45
Com. wire nails, base per keg	$2.75 to $2.95
Cement c't'd nails, base per keg	2.75 to 2.95

to $43. The lower prices are being quoted to meet competition which develops when the purchaser serves territory surrounding two steel producing centers. The light rail market is without feature.

Prices f.o.b. mill, per gross ton: Standard section open-hearth and Bess. rails, $43; light rails, rolled from billets, $36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.07½c. to 2.15c.; angle bars, 2.75c.

Reinforcing Bars.—Prices for reinforcing bars continue to drag bottom, with further weakness shown in quotations on rail steel. On attractive business new billet bars are commonly quoted at 1.90c. a lb., Chicago warehouse, and rail steel reinforcing bars can be had at 1.85c. a lb. Feeble attempts to bolster prices have been without effect. Shop backlogs are shrinking and operations by most bar benders are at a lower stage than at the beginning of the month. The credit situation is giving trouble, and sellers find collections considerably more difficult to make. Fresh inquiry is below normal for this time of the year.

Wire Products.—Demand from the manufacturing trade continues to grow lighter, and wire mill output has been cut to a range of 55 to 60 per cent of capacity. With open weather still prevailing over much of the country, the demand for wire goods by jobbers and retailers is heavier than usual at this time of the year. Shipment of electrical wires is steady except to manufacturers of radio equipment. Demand for wire rope is steady and order books for heavy electrical cables are well filled to the end of the year.

Plates.—Prices for this commodity have settled to a flat 2c. a lb., Chicago, except for small tonnages that are of the less desirable kind. Shipments have been cut rather sharply, owing in large measure to the lessened need of plates for the manufacture of steel pipe. A bright spot in this market is the demand for car material, which this week totaled 50 per cent of the aggregate of finished steel specifications. Much of the 85,000 to 100,000 tons of steel needed for the Santa Fe cars has been placed. Orders for tank plates are small, at not more than 1000 tons. Fresh inquiry from the Oklahoma fields is for 5000 tons in one lot. Deliveries are at close range and rolling schedules are flexible, so that most buyers' immediate needs can be met promptly. Pending railroad car business is moving slowly, but according to the view taken by the trade is steady.

Structural Material.—New contracts placed this week are largely for highway bridge work for erection at points widely scattered throughout the Western part of the country. Locally, there is little to brighten the outlook. New bids are being asked for the 5000 tons needed for a traction company's bridge at Indianapolis. Figures to be submitted this week are to include prices for erection. Plans for the $15,000,000 Chicago Postoffice are said to be nearing completion and soon will be submitted to Washington. Lake shore protection improvements, made necessary by the high water level in Lake Michigan, give promise of the use of much steel piling. Structural shapes are being quoted at 2c. a lb., Chicago.

Mill prices on plain material, per lb.: 2.00c. base, Chicago.

Bars.—Prices for bars have settled to the low figure of the range quoted a week ago. Mild steel bars will not bring above 2c. a lb., Chicago, except for the less desirable class of business. Specifications are lighter than a week ago and deliveries on most sizes are prompt. Common quotations for iron bars are 2c. a lb., Chicago. The bulk of new business, which is fairly steady in volume, is being placed by railroads and car builders. The alloy steel bar market is quiet, with prices untested at 2.65c. to 2.75c. a lb., base. New buying of rail steel bars is at close range, and the bulk of going tonnage is being taken at 1.90c. a lb., Chicago Heights. Specifications closely match shipments, which still afford double turn operations at local mills.

Bolts, Nuts and Rivets.—Specifications are a trifle lighter from builders of automobiles. Jobbers and manufacturers of farm implements find steady use for these commodities.

Coke.—Producers are being hard pressed for shipments of by-product foundry coke. Prices are steady at $8 a ton, local ovens.

Old Material.—Prices for scrap iron and steel have given ground in the last week and the tendency in many grades, in which the supplies are well above consumption, is still downward. Heavy melting steel, on business that aggregated close to 15,000 tons, has been sold at $14 a gross ton, delivered. Iron rails and 2-ft. steel rails are marked down $1 a ton. The cast iron borings market is at a standstill, with brokers being able to draw freely against available supplies at 25c. a ton below their prices of a week ago. It is evident that most heavy tonnage users have of late been accumulating stocks and their commitments are ample for immediate needs. Shipments of heavy melting steel to mills are about 25 per cent of the normal flow at this time of the year, while borings and hydraulic bundles are moving in even lighter proportionate tonnage. Small users and melters of specialties are buying with greater care and at closer range and also at lower prices. Few speculative transactions are being made by brokers, who prefer at this time to trade on an even basis for tonnages which they feel they can ship in the very near future. Prices paid for railroad scrap show variation, but the general level is well below that of several weeks ago. When bidders wish to rush through tonnages on orders which they fear may be cancelled, going prices to railroads are about equal to present market quotations. However, the bulk of tonnage is not for this purpose and prices generally are such that a fair margin of profit can be realized at the present market. Railroad scrap lists are impressive in aggregate tonnage. The Milwaukee road, the Chicago Great Western, Pere Marquette, Wabash, Rock Island and the Monon all have tonnages to sell.

Prices deliv'd Chicago district consumers:

	Per Gross Ton	
Basic Open-Hearth Grades:		
Heavy melting steel	$13.25 to	$13.75
Shoveling steel	13.25 to	13.75
Frogs, switches and guards, cut apart, and misc. rails	14.00 to	14.50
Hydraul. compressed sheets	11.50 to	12.00
Drop forge flashings	10.75 to	11.25
No. 1 busheling	11.50 to	12.00
Forg'd cast and r'l'd steel carwheels	18.00 to	18.50
Railroad tires, charg. box size	18.00 to	18.50
Railroad leaf springs cut apart	18.00 to	18.50
Acid Open-Hearth Grades:		
Steel couplers and knuckles	16.50 to	17.00
Coil springs	19.00 to	19.50
Electric Furnace Grades:		
Axle turnings	12.75 to	13.25
Low phos. punchings	15.25 to	15.75
Low phos. plates, 12 in. and under	15.25 to	15.75
Blast Furnace Grades:		
Axle turnings	11.50 to	12.00
Cast iron borings	9.25 to	9.75
Short shoveling turnings	9.50 to	10.00
Machine shop turnings	7.00 to	7.50
Rolling Mill Grades:		
Iron rails	14.50 to	15.00
Rerolling rails	15.50 to	16.00
Cupola Grades:		
Steel rails less than 3 ft.	16.50 to	17.50
Steel rails less than 2 ft.	18.50 to	19.00
Angle bars, steel	16.25 to	16.75
Cast iron carwheels	14.00 to	14.50
Malleable Grades:		
Railroad	16.50 to	17.00
Agricultural	14.50 to	15.00
Miscellaneous:		
*Relaying rails, 56 to 60 lb.	23.00 to	25.00
*Relaying rails, 65 lb. and heav.	26.00 to	31.00
	Per Net Ton	
Rolling Mill Grades:		
Iron angle and splice bars	15.00 to	15.50
Iron arch bars and transoms	17.50 to	18.00
Iron car axles	25.50 to	26.00
Steel car axles	16.00 to	16.50
No. 1 railroad wrought	12.50 to	13.00
No. 2 railroad wrought	11.75 to	12.25
No. 1 busheling	9.00 to	9.50
No. 2 busheling	7.00 to	7.50
Locomotive tires, smooth	14.50 to	15.00
Pipes and flues	10.00 to	10.50
Cupola Grades:		
No. 1 machinery cast	13.50 to	14.00
No. 1 railroad cast	12.50 to	13.00
No. 1 agricultural cast	12.00 to	12.50
Stove plate	12.25 to	12.75
Grate bars	11.75 to	12.25
Brake shoes	10.25 to	10.75

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Canadian Steel Is to Build Tin Plate Mill

The Canadian Steel Corporation, Ojibway, Ont., is contemplating the construction of a tin plate mill there to cost $1,000,000, according to a statement by Ward B. Perley, president of the corporation. Mr. Perley said that the Canadian organization had been planning such a unit for some time. The Canadian plant is operating chiefly a wire mill.

New York

Structural Steel Tonnage in October a Record—Sheet Prices Weaker—Pig Iron Buyers Cautious

NEW YORK, Nov. 12.—Pig iron sales for the week totaled less than 4000 tons, reflecting the extreme caution now prevalent among buyers. Merchant furnaces are not burdened with stocks, but, with consumers staying out of the market, it is not unlikely that Jan. 1 will find most buyers without any iron bought and producers with very little iron sold. Melters are disposed to defer action on their needs both because of the uncertainties introduced by the stock market crash and the possibility of larger offerings of surplus steel company iron. Steel producers operated throughout the first eight months of the year with virtually no reserves of pig iron. Now that they have had an opportunity to replenish these reserves there is reason to expect that more of their iron will find its way into the market. It is easier to put out open-hearth furnaces than blast furnaces; hence pig iron production is not so quick to adjust itself to reduced steel-making requirements. There are also indications that Alabama furnaces will not abandon the Northern trade they recently built up without attempting to keep pace with competition. The condition that prompted their invasion of the North, i.e., a slump in the requirements of Southern cast iron pipe shops, has not changed for the better. The American Locomotive Co. has bought 500 tons of foundry iron from a Buffalo furnace for spot shipment to its Schenectady, N. Y., plant. The activity of the railroad equipment plants is one of the bright spots of the present situation. Melt generally is rather well maintained and there have been few suspensions of pig iron shipments. Here and there some of the smaller jobbing shops are reducing operations and one large New York State manufacturer making domestic appliances has curtailed foundry production. With inquiries few, prices are getting very little test. On Buffalo foundry iron, $17.50, furnace, is still the usual minimum on No. 2 plain, although silicon differentials are occasionally waived on the higher grades. William R. Thropp & Sons, Trenton, N. J., are in the market for 200 tons of No. 2X.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	$22.41 to $22.91
*Buf. No. 2, del'd east. N. J.	20.78 to 21.28
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	19.89 to 21.02
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	20.39 to 21.52

Freight rates: $4.91 from Buffalo, $1.39 to $2.52 from eastern Pennsylvania.

*Prices delivered to New Jersey cities having rate of $3.28 a ton from Buffalo.

Finished Steel.—Orders for steel placed with local sales offices in the past week were generally in larger volume than in the previous week. While the steel demand is not active, there has been a smaller decline in business than some had expected. The Bethlehem Steel Co. continues to operate at about 80 per cent, orders for structural steel, plates and rails accounting in large measure for the maintenance of this rate. The Fore River yard of the Bethlehem Shipbuilding Corporation now has every one of its ways occupied by ships in course of construction, the first time that this has happened in years. Considerable steel for these ships is being rolled by Bethlehem mills. Building construction in the New York district is taking steel in large volume. Although awards in the past week were in lesser aggregate volume than in preceding weeks, the mills have large orders for plain material on their books resulting from the record-breaking tonnage awarded in October. The Structural Steel Board of Trade of New York reports that October bookings by members and non-members of all types of work exclusive of civil engineering projects totaled 85,699 tons, as compared with 54,119 tons in September and 50,264 tons in October, 1928. Previous high monthly records this year were 74,566 tons in August and 72,003 tons in March. Only once since the Structural Steel Board of Trade was organized has the October record been surpassed and that was due to special circumstances. In November, 1925, the total was 112,000 tons. Price developments, particularly in sheets, tend toward weakness. Although most sellers are quoting and getting 2.75c. for black sheets, some sales have been made at $1 a ton less. The 3.40c. price on galvanized sheets, hitherto rated as a special concession to jobbers, has been extended in many instances to manufacturing consumers. Blue annealed sheets, which have been subject to severe competition from the continuous mill product, are being openly quoted by some mills at 2.25c., Pittsburgh, for the No. 13 gage and at 2.10c. for No. 10, concessions of $2 a ton from the prices which prevailed for many months. Throughout the steel list other prices are holding fairly well, although a quotation of 2c., Coatesville, on plates is becoming commoner, but at the same time the Eastern mills are also getting orders at 2.05c., Coatesville base.

Mill prices per lb., deliv'd New York: Soft steel bars, 2.24c. to 2.29c.; plates, 2.17½c. to 2.22½c.; structural shapes, 2.14½c.; bar iron, 2.14c.

Reinforcing Bars.—The stock market crash has had no noticeable effect on reinforcing business and in the long run is expected to have a favorable influence. Numerous jobs that had been held on architects' boards pending an easing in money rates will probably now be released. Warehouse business is holding up and thus far this year has shown an appreciable gain over the same period in 1928. Prices remain at 2.05c., New York.

Warehouse Business.—Demand for sheets continues fairly active, but prices are still subject to shading. Structural steel buying is light.

Cast Iron Pipe.—While Northern makers of pressure pipe are maintaining a fairly high rate of operation on the large sizes, tonnage is needed in pipe 12-in. and smaller. Certain

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.30c.
Soft steel bars, small shapes	3.25c.
Iron bars	3.24c.
Iron bars, Swed. charcoal	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Cold-roll. strip, soft and quarter hard	5.15c. to 5.40c.
Hoops	4.25c.
Bands	3.75c.
Blue ann'l'd sheets (No. 10)	3.50c. to 3.90c.
Long terne sheets (No. 24)	5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galv. annealed	5.15c.
Tire steel, ⅛ x ⅛ in. and larger	3.40c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.75c.
Open-hearth spring steel, bases	4.50c. to 7.00c.

	Per Cent Off List
Machine bolts, cut threads:	
¾ x 6 in. and smaller	60
1 x 30 in. and smaller	50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	60
¾ x 20 in. and smaller	50 to 50 and 10
Coach screws:	
½ x 6 in. and smaller	60
1 x 6 in. and smaller	50 to 50 and 10

Boiler Tubes—	Per 100 Ft.
Lap welded, 2-in.	$17.33
Seamless steel, 2-in.	20.24
Charcoal iron, 2-in.	25.00
Charcoal iron, 4-in.	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
⅛-in. butt	46	29
¼-in. butt	51	37
1-3-in. butt	53	39
2½-6-in. lap	48	35
7 and 8-in. lap	44	17
11 and 12-in. lap	37	12
Wrought Iron—		
⅛-in. butt	5	+19
¼-in. butt	11	+ 9
1-1½-in. butt	14	+ 6
2-in. lap	5	+14
3-6-in. lap	11	+ 6
7-12-in. lap	3	+16

Tin Plate (14 *x* 20 *in.*)

	Prime	Seconds
Coke, 100 lb. base box	$6.45	$6.20
Charcoal, per Box—	A	AAA
IC	$9.70	$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 *x* 20 *in.*).

IC—20-lb. coating	$10.00 to $11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets, Box Annealed—Black, C. R. One Pass

	Per Lb.
Nos. 18 to 20	3.75c. to 3.80c.
No. 22	3.90c. to 3.95c.
No. 24	3.95c. to 4.00c.
No. 26	4.05c. to 4.10c.
No. 28*	4.20c. to 4.25c.
No. 30	4.45c. to 4.50c.

Sheets, Galvanized

	Per Lb.
No. 14	4.20c. to 4.40c.
No. 16	4.15c. to 4.25c.
No. 18	4.20c. to 4.40c.
No. 20	4.30c. to 4.50c.
No. 22	4.40c. to 4.60c.
No. 24	4.65c. to 4.75c.
No. 26	4.90c. to 5.00c.
No. 28*	5.15c. to 5.25c.
No. 30	5.55c. to 5.65c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

Southern producers are barely able to maintain a low rate of operation and are seeking new business. Prices continue irregular, with most of the current small buying in this district at $32 to $33 a ton, f.o.b. foundry. No municipal inquiries are reported and not much buying from this source is expected until late this year or early in January.

Prices per net ton deliv'd New York: Water pipe, 6-in. and larger, $34.60 to $36.60; 4-in. and 5-in., $37.60 to $39.60; 3-in., $44.60 to $46.60. Class A and gas pipe $3 extra.

Coke.—Prices of standard furnace coke eased off slightly last week as a result of some substantial tonnages of this grade offered for prompt shipment at $2.65 a net ton and less by an operator in the Connellsville district who had received a request for postponement of delivery on a contract with a large user. Special brands of beehive foundry coke are quoted at $4.85 a net ton, ovens. By-product foundry coke is quoted at $9 to $9.40 a net ton, Newark or Jersey City, and $10.06, New York or Brooklyn.

Old Material. — Dealers' buying prices on No. 1 heavy melting steel have been reduced to $14.50 a ton, delivered eastern Pennsylvania, based on an order for upward of 10,000 tons at $15, delivered Bethlehem, Pa. Meanwhile, brokers with old contracts for No. 2 heavy melting steel, which they have not yet completed, are paying up to $13.50 a ton, delivered, although most of the tonnage moving is at $12.75 a ton, Harrisburg, Pa., and $13 a ton, delivered Phoenixville, Pa. Specification pipe is off 50c. a ton, with dealers paying $13.50 a ton, delivered. Most other grades have declined 25c. to $1 a ton on the basis of recent purchases by brokers and a minimum volume of consumer buying.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel	$11.00 to	$11.85
Heavy melting steel (yard)	8.00 to	9.50
No. 1 hvy. breakable cast.	10.25 to	11.00
Stove plate (steel works)		8.00
Locomotive grate bars		8.25
Machine shop turnings	7.00 to	7.50
Short shoveling turnings	7.25 to	7.50
Cast borings (blast fur. or steel works)	7.00 to	7.50
Mixed borings and turnings	6.75 to	7.50
Steel car axles	16.75 to	17.25
Iron car axles	22.00 to	22.50
Iron and steel pipe (1 in. dia., not under 2 ft. long)		9.75
Forge fire	8.50 to	9.00
No. 1 railroad wrought	12.00 to	12.50
No. 1 yard wrought, long	11.00 to	11.50
Rails for rolling	12.00 to	12.50
Stove plate (foundry)	8.25 to	9.00
Malleable cast (railroad)	13.50 to	14.00
Cast borings (chemical)	9.00 to	9.50

Prices per gross ton, deliv'd local foundries:

No. 1 machry. cast	$15.50 to	$16.00
No. 1 hvy. cast (columns, bldg. materials, etc.), cupola size	13.50 to	14.00
No. 2 cast (radiators, cast boilers, etc.)	13.00 to	13.50

Cleveland

Further Slowing Down in Steel Demand—Outlook in Automotive Industry Has Not Brightened

CLEVELAND, Nov. 12.—There was a further slowing down in the demand for finished steel the past week, and some of the mills again curtailed operations. The automotive industry continues to mark time and its view of the outlook is not very optimistic. Because of various unfavorable factors that have developed, the time that that industry expects a revival in production has now been extended until February.

Hesitancy prevails in the industry, and some of the motor car manufacturers that had planned to start manufacturing their new models this month apparently have not yet decided when they will go ahead. Shipments have been deferred on considerable steel for this industry scheduled for November delivery, although one maker of low-priced cars continues to take sheets for the manufacture of 160,000 cars according to its November-December schedule.

Motor car manufacturers are still confronted with unsold stocks of old models, which are moving very slowly, their sale having been seriously affected by the stock market collapse. Probably the brightest spot in the present unfavorable situation in respect to the motor car industry is that inventories are exceedingly low. This is also true of industries outside of the automotive field.

Consumers needing steel are ordering only in very small lots for immediate requirements. Hesitancy that prevails in the automotive industry has spread to other industries in the metal-working field, resulting in some curtailment in plant operations.

Pig Iron.—A little interest has developed in first quarter contracts, one producer having received inquiries during the week for a few lots aggregating 3000 tons for that delivery. Current sales are light and confined mostly to small lots, coming from foundries that had not previously bought enough iron to carry them through the year. Sales by Cleveland interests during the week totaled 8700 tons, or slightly less than during the previous week. One producer has shipped a little more iron so far this month than during the corresponding period in October, but another reports a falling off in shipments this month. While there has been a slight increase in shipping orders from one or two automobile foundries, the movement of iron to this industry is still very light and considerable deferred shipment iron is backing up at the blast furnaces. There has also been a slowing down in shipments to other industries. The market is holding steady at regular quotations of $18.50, Cleveland, for foundry and malleable grades for out-of-town shipment and $19, furnace, for local delivery. In Michigan, there is a spread of from $19.50 to $20.

Prices per gross ton at Cleveland:

N'th'n fdy., sil. 1.75 to 2.25	$19.50
S'th'n fdy., sil. 1.75 to 2.25	$20.50 to 21.00
Malleable	19.50
Ohio silvery, 8 per cent	28.00
Basic Valley furnace	18.50
Stand. low phos., Valley	26.50 to 27.00

Prices except on basic and low phosphorus are delivered Cleveland. Freight rates: 50c. from local furnaces; $3 from Jackson, Ohio; $6 from Birmingham.

Iron Ore.—Ore firms are cleaning up their shipments for the season, and the movement will be light the latter part of the month. Ore on Lake Erie docks Nov. 1 amounted to 6,365,342 tons, compared with 6,472,840 tons on the same date last year. Receipts at these docks for the season to Nov. 1 were 42,627,849 tons, compared with 33,343,785 tons during the same period last year. Shipments from Lake Erie docks to Nov. 1 were 30,886,416 tons, against 23,526,093 tons during the corresponding period in 1928. Receipts at Lake Michigan and other receiving ports other than Lake Erie ports until Nov. 1 were 17,105,832 tons, against 14,900,813 tons during the same period a year ago.

Semi-Finished Steel.—Specifications against contracts, which have been light for some time, show no improvement. Some of the mills would be glad to make sales, but there is no demand. The leading local producer continues to operate eight of its 14 open-hearth furnaces. Shipments are being made against $35 contracts for sheet bars, billets and slabs.

Bars, Plates and Shapes.—Steel bars are in very light demand, and local mills are operating at not over 60 per cent of capacity. Plates are moving fairly well in small lots. Detroit will take bids this week for a pipe line requiring 1500 tons, cutting its original inquiry from 4500 tons, having decided to do only a portion of its pipe line extension work at present. Structural shapes are quiet, and there is not much building work up for figures. Inquiries are out for highway bridge work in Ohio, western New York and Pennsylvania requiring several hundred tons. While a 1.85c., Cleveland, price is occasionally reported on steel bars, 1.90c. is

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and struc. shapes	3.00c.
Soft steel bars	3.00c.
Reinforc. steel bars	2.25c. to 2.50c.
Cold-fin. rounds and hex	3.65c.
Cold-fin. flats and sq.	4.15c.
Hoops and bands, No. 12 to ¼ in., inclusive	3.25c.
Hoops and bands, No. 13 and lighter	3.65c.
Cold-finished strip	*5.95c.
Black sheets (No. 24)	3.70c. to 3.90c.
Galvanized sheets (No. 24)	4.60c. to 4.75c.
Blue ann'l'd sheets (No. 10)	3.25c.
No. 9 ann'l'd wire, per 100 lb.	$2.65
No. 9 gal. wire, per 100 lb.	3.00
Com. wire nails, base per keg	2.65

*Net base, including boxing and cutting to length.

being maintained by most mills. Pressure is being encountered for concessions to 1.90c., Pittsburgh, on structural shapes and plates. However, the 1.95c. price is being pretty generally adhered to.

Sheets.—Mills entered very little tonnage during the week either in new business or in specifications against contracts. Automobile body sheets are the quietest item on the list. One automobile manufacturer sent out an inquiry during the week for a good-sized lot and later withdrew it. Independent mills have further reduced production and are operating at the most from 50 to 65 per cent. Mills making common black and galvanized sheets are running better than those that specialize on high-finished sheets. Orders are not of sufficient size to test prices. Black sheets are holding at 2.75c., Pittsburgh. Blue annealed sheets are not firm, concessions being made to 2.10c. for No. 10 and 2.25c. for No. 13. Galvanized sheets are generally quoted at 3.50c.

Strip Steel.—The tendency in the demand still appears to be downward, and little improvement is looked for until there is a revival in orders from the automotive industry. Operations are spotty. Some mills are running at about 50 per cent of capacity and others are near the closing down point. While hot-rolled strip is holding to regular quotations, it is not improbable that a good inquiry might bring out a concession. Shading to 2.65c., Cleveland, is reported occasionally on cold-rolled strip.

Warehouse Business.—Sales have fallen off in about all lines this month, as compared with the early part of October. This reflects a slowing down of consuming industries. Prices are well maintained. Jobbers have not followed the mills in making a $2 a ton reduction on cold-finished steel bars and it seems improbable that a change will be made.

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.70c.
Plates, ⅜-in.	2.90c.
Structural shapes	2.70c.
Soft steel bars, small shapes, iron bars (except bands)	2.80c.
Round-edge iron	3.50c.
Round-edge steel, iron finished 1½ x 1½ in.	3.50c.
Round-edge steel planished	4.30c.
Reinforc. steel bars, sq. twisted and deform.	2.60c. to 2.80c.
Cold-fin. steel, rounds and hex.	3.50c.
Cold-fin. steel, sq. and flats	4.00c.
Steel hoops	3.55c.
Steel bands, No. 12 to ⅜-in. inclus.	3.30c.
Spring steel	5.00c.
*Black sheets (No. 24)	3.90c.
†Galvanized sheets (No. 24)	4.65c.
Light plates, blue annealed (No. 10)	3.25c.
Blue ann'l'd sheets (No. 13)	3.40c.
Diam. pat. floor plates—	
¼-in.	5.30c.
⅜-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

*For 50 bundles or more; 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.
†For 50 bundles or more; 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

Bolts, Nuts and Rivets.—Bolt and nut orders so far in November have been in about the same volume as in October, which, because of the reduced orders from the automotive industry, was the poorest month of the year. Prices are being well maintained, although there is some shading on special bolts for the automotive industry. Rivet demand shows a slight gain over last month due to better orders from shipbuilders. The industry is operating at about 60 per cent of capacity.

Coke.—Mild weather has interfered with shipments of domestic coke and has checked new buying. Foundry coke is not moving very well owing to some curtailment by the foundry industry. Prices are unchanged. Ohio by-product foundry coke is quoted at $8.25, ovens.

Old Material.—There has been further holding up of scrap shipments by Cleveland and Valley district consumers. Only one local mill is at present taking any scrap and that in steel-making grades in rather limited quantities. Inability to make shipments has driven dealers out of the market and they are not buying scrap of any grade. The existing situation is reflected in a weak market. However, in the absence of transactions quotations are nominal.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$14.50 to $15.00
No. 2 heavy melting steel	14.25 to 14.50
Compressed sheet steel	14.75 to 15.25
Light bundled sheet stampings	12.00 to 12.50
Drop forge flashings	13.00 to 13.25
Machine shop turnings	10.00 to 10.25
Short shoveling turnings	11.50 to 12.00
No. 1 railroad wrought	13.50 to 14.00
No. 2 railroad wrought	16.00 to 16.50
No. 1 busheling	13.25 to 13.75
Pipes and flues	9.00 to 9.50
Steel axle turnings	12.50 to 13.00
Acid Open-Hearth Grades:	
Low phos., forging crops	17.75 to 18.00
Low phos., billet, bloom and slab crops	18.50 to 18.75
Low phos., sheet bar crops	18.00 to 18.50
Low phos., plate scrap	18.00 to 18.50
Blast Furnace Grades:	
Cast iron borings	10.50 to 11.00
Mixed borings and short turnings	10.50 to 11.00
No. 2 busheling	10.00 to 10.50
Cupola Grades:	
No. 1 cast	17.00 to 17.50
Railroad grate bars	11.00 to 12.00
Stove plate	12.00 to 12.50
Rails under 3 ft.	18.50 to 19.50
Miscellaneous:	
Railroad malleable	18.00 to 18.50
Rails for rolling	16.25 to 16.50

Philadelphia

Steel Prices Lack Strength—Heavy Melting Scrap Declines —Pig Iron Market Quiet

PHILADELPHIA, Nov. 12.—Consumers of steel show no inclination to alter their attitude of delaying purchases to determine, if possible, what effect the unsettled stock market may have upon their business. Meanwhile, mill backlogs are steadily decreasing and operating rates of eastern Pennsylvania mills range from about 65 per cent to 80 per cent. Prices generally lack strength, but sellers are endeavoring to maintain the market on small tonnage buying, which constitutes most of the present business, offering concessions only to the larger, preferred buyers.

Eastern Pennsylvania shipbuilders are well engaged and are bidding on some new contracts for ship construction, but railroad buying is on a smaller scale than earlier in the fall. The Boston & Maine Railroad is expected to close shortly on 10,000 tons of 100-lb. and 130-lb. rails.

The pig iron market is quiet, and most prices of iron and steel scrap show a tendency toward further decline.

Pig Iron.—Foundry iron buying is limited to small lots, few consumers showing any desire to provide for their requirements beyond a few weeks. On such business, prices are being fairly well maintained at $21, furnace, with only occasional small concessions in the immediate Philadelphia district. On business outside this territory, however, where competition is encountered from furnaces in other districts, concessions range up to several dollars a ton. The Baldwin Locomotive Works is in the market for 750 to 1000 tons of cylinder iron for delivery beginning the second week in December at the rate of 50 to 100 tons a week. The Newport News Shipbuilding & Dry Dock Co. is inquiring for a carload of No. 2X foundry iron for shipment before the end of the month. The Brooklyn Navy Yard is asking for 200 tons of low phosphorus iron, and the New York Air Brake Co., Watertown, N. Y., is in the market for 400 tons of malleable and 250 tons of No. 2 plain foundry iron. The Virginia furnace, which has been offering foundry iron in the Cumberland Valley at competitive prices, has not closed any substantial business, as most consumers have already covered their requirements to the end of the year. Basic iron users in this district have not yet bought, but a Claymont, Del., mill has been obtaining prices. A Coatesville, Pa., consumer has about 3000 tons of Southern basic iron in transit by barge from the Birmingham district.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil.	$21.26 to $21.76
East. Pa. No. 2X, 2.25 to 2.75 sil.	21.76 to 22.26
East. Pa. No. 1X	22.26 to 22.76
Basic (del'd east. Pa.)	19.75 to 20.25
Gray forge	20.00 to 20.50
Malleable	21.25 to 21.75
Stand. low phos. (f.o.b. N. Y. State furnace)	22.00 to 23.00
Cop. br'g low phos. (f.o.b. furnace)	23.50 to 24.00
Va. No. 2 plain, 1.75 to 2.25 sil.	22.29
Va. No. 2X, 2.25 to 2.75 sil.	22.79

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces; $4.54 from Virginia furnaces.

Bars.—Buying is limited to occasional small lots of a carload or less. Since the reduction of price to 1.90c., Pittsburgh, or 2.22c. per lb., delivered Philadelphia, the market is being maintained, present orders being too small to bring any concession from this level.

Reinforcing Bars. — Some sizable tonnages of bars will be required for projects on which bids have been taken, but new business has been light. The price situation is unchanged, with billet steel bars quoted at 1.95c. to 2c., Pittsburgh, or 2.27c. to 2.32c., delivered Philadelphia, and usually no extra for cutting to length. Rail steel bars are quoted at 1.85c. to 1.95c., Franklin, Pa., and Tonawanda, N. Y., or 2.17c. to 2.27c., delivered Philadelphia, with no extra for cutting to length or bending.

Shapes.—Mills are still fairly well engaged and able to maintain fair operations, but the tonnage in the individual rollings is smaller than for some time. Prices show a slightly more definite trend toward a lower level, and one seller has been quoting 1.855c. per lb., Pencoyd, Pa., or 1.915c., delivered Philadelphia, on desirable business. On small lots, the market ranges up to 1.95c., Pencoyd, or 2.01c., Philadelphia. Bids were opened today on the general contract for the new convention hall in Philadelphia, which requires 7000 tons, and the low bidder for the building was McCloskey & Co., Philadelphia. The total bid was considerably in excess of the original estimate.

Plates.—Although 2c., Coatesville, Pa., or 2.10c., Philadelphia, is being quoted on plates, mills in this district are seeking to limit this concession to the more desirable orders, and are quoting 2.05c., Coatesville, or 2.15c., delivered Philadelphia, on the smaller lots, which represent a considerable part of present buying. Operating rates of plate mills are slightly better than the rates maintained by mills rolling other products, but the highest is not more than 75 per cent of capacity. Shipbuilding orders have provided some substantial tonnages on mill books and more business from this source is expected.

Sheets.—Operations of leading local consumers of sheets are still greatly restricted, but automobile body builders which have contracts with leading makers have recently been testing the market on blue annealed and high-finished sheets and expect to begin production of new models shortly. Radio manufacturers are entering their usual dull season and have curtailed their output accordingly. Sheet prices have been shaded on recent business, so that black sheets range from 2.70c. to 2.75c., Pittsburgh, or 3.02c. to 3.07c., Philadelphia, and galvanized are quoted at 3.40c., Pittsburgh, or 3.72c., Philadelphia. Blue annealed sheets have been sold at 2.25c., Pittsburgh, or 2.57c., Philadelphia, for No. 13 gage, and blue annealed plates at 2.10c., Pittsburgh, or 2.42c., Philadelphia, for No. 10 gage. Eastern Pennsylvania sellers are endeavoring to quote these prices only on the larger orders from automobile builders and other preferred buyers, maintaining 2.35c., Pittsburgh, for No. 13 gage sheets and 2.20c., Pittsburgh, for No. 10 gage plates, on small orders and the miscellaneous specifications of jobbers.

Imports.—In the week ended Nov. 9, a total of 3449 tons of pig iron arrived at this port, of which 1949 tons came from British India and 1500 tons from the United Kingdom. A total of 4650 tons of chrome ore was received from Portuguese Africa. Steel imports consisted of 11 tons of drill steel from Sweden and 4 tons of scrap from the United Kingdom.

Old Material.—No. 1 heavy melting steel has declined another 50c. a ton to $15, delivered eastern Pennylvania, following purchase of upward of 15,000 tons of this grade for delivery to Bethlehem, Steelton and Coatesville, Pa. Other grades of scrap are weaker. No. 2 automobile steel has been bought by a consumer at Pencoyd, Pa., at $13.75 a ton, delivered, and specification pipe is off 50c. a ton, following purchase of a small tonnage at $14, delivered by a Lebanon, Pa., user. A report that a Claymont, Del., mill bought a small tonnage of No. 1 steel is attributed to the fact that this consumer recently accepted shipments of steel by brokers with the price to be agreed upon when the mill was ready to buy. Settlement is understood to have been made for the total tonnage, which was small, at $15.50 a ton, delivered.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	$15.00 to $15.50
Scrap T rails	14.50 to 15.00
No. 2 heavy melting steel	12.50 to 13.75
No. 1 railroad wrought	16.00 to 16.50
Bundled sheets (for steel works)	11.50
Hydraulic compressed, new	14.50 to 15.00
Hydraulic compressed, old	12.00 to 12.50
Machine shop turnings (for steel works)	11.50
Heavy axle turnings (or equiv.)	14.00 to 14.50
Cast borings (for steel works and roll. mill)	11.00 to 11.50
Heavy breakable cast (for steel works)	14.50
Railroad grate bars	12.00 to 12.50
Stove plate (for steel works)	12.00
No. 1 low phos., hvy., 0.04% and under	21.00 to 22.00
Couplers and knuckles	19.50 to 20.50
Rolled steel wheels	19.50 to 20.50
No. 1 blast f'nace scrap	10.50 to 11.00
Wrot. iron and soft steel pipes and tubes (new specific.)	14.00
Shafting	19.00 to 19.50
Steel axles	22.50 to 23.00
No. 1 forge fire	13.50
Cast iron carwheels	15.50 to 16.00
No. 1 cast	16.00 to 16.50
Cast borings (for chem. plant)	14.50
Steel rails for rolling	16.50 to 17.00

National Steel Co. Is Incorporated

The National Steel Co., the organization recently formed by a merger of certain subsidiaries of the M. A. Hanna Co., Cleveland, and the Great Lakes Steel Corporation, Detroit, and the Weirton Steel Co., Weirton, W. Va., filed articles of incorporation in Delaware on Nov. 7.

The new company, which will have assets aggregating in excess of $150,000,000, will be effected through the exchange of securities. The stock tranfers are to be completed by Nov. 30. Properties involved in the merger will come under control of the new organization effective Dec. 1.

Lamson & Sessions Co. and Lake Erie Bolt Merge

Merger of the Lamson & Sessions Co. and the Lake Erie Bolt & Nut Co., Cleveland, has been approved by the directors of the two companies and shortly will be submitted to the stockholders for ratification. The combined business of the two companies is approximately $10,000,000 a year.

Under the terms of the merger the capital stock of the Lamson & Sessions Co. will be changed to no par value from $25 par and an increase authorized from 100,000 to 350,000 shares. There will be issued 172,500 shares to present shareholders of the Lamson & Sessions Co. in exchange for the present 100,000 shares and 70,000 shares to the stockholders of the Lake Erie company, one share to the latter for each share now held. In addition, Lamson & Sessions stockholders are to receive an extra cash dividend of $1 a share on present capital stock. On completion of the merger the Lamson & Sessions Co. will have 242,500 shares of no par common stock outstanding and $904,500 of 7 per cent preferred stock.

Westinghouse Radio Hour a Tribute to Steel

The steel industry was the subject of the first of a series of radio programs dedicated to the country's leading industries which are being broadcast by the Westinghouse Electric & Mfg. Co., East Pittsburgh, in an attempt to build up the good-will of the radio public for each particular industry. The series is being broadcast on Wednesday evenings at 7.30 over the country-wide network of the blue chain of the National Broadcasting Co., and other groups to be included are aviation, paper, food, textiles, pumping and irrigation and various phases of the electrical industry.

Detroit Scrap Prices Drop

DETROIT, Nov. 12.—Decided weakness in the market for old material has developed, declines in some instances running more than $1 a ton. There is very little buying, and some steel companies have suspended shipments.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Hvy. melting and shov. steel	$12.00 to $13.00
Borings and short turnings	8.00 to 8.50
Long turnings	7.75 to 8.25
No. 1 machinery cast	12.50 to 13.00
Automobile cast	11.50 to 12.00
Hydraul. comp. sheets	12.00 to 12.50
Stove plate	9.00 to 9.50
New No. 1 busheling	11.00 to 11.50
Old No. 1 busheling	9.50 to 10.00
Sheet clippings	8.00 to 8.50
Flashings	10.50 to 11.00

Pacific Coast

Standard Oil of California Seeks 300 Miles of Pipe—Southern Pacific Rail Inquiry for 120,000 Tons

SAN FRANCISCO, Nov. 9 (*By Air Mail*).—The recent stock market break apparently has had little effect on the iron and steel industry on the Pacific Coast, as bookings for the week compare favorably with the weekly average of the year and inquiries include some heavy tonnages. The Southern Pacific Co. is in the market for 120,000 tons of rails, together with a heavy tonnage of tie plates, track bolts and track spikes. The Standard Oil Co. is taking bids on upward of 300 miles of gas pipe, with an estimated weight of about 100,000 tons.

Building activity is well sustained, as shown by permits issued during the past month, and, from present indications, construction will continue unabated during the remainder of the year.

Pig Iron.—Demand for pig iron continues spotty, most consumers having fair-sized stocks. No change in quotations has occurred.

Prices per gross ton at San Francisco:

*Utah basic	$25.00 to $26.00
*Utah fdy., sil. 2.75 to 3.25	25.00 to 26.00
**Indian fdy., sil. 2.75 to 3.25	25.00 to 26.00

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Bars.—Among the larger lettings of reinforcing steel bars was 363 tons for approaches for the West Spokane Street bridge, Seattle, placed with the Pacific Coast Steel Co., and 100 tons for an apartment house in Sacramento, Cal., booked by the Truscon Steel Co. Pending business calls for a fair-sized total and includes 800 tons for the Eleventh Street viaduct in Tacoma and 325 tons for a power house for the Lake Cushman dam project, Tacoma. Out-of-stock prices in San Francisco continue unchanged at 2.30c., base, on carload lots and at 2.60c. on smaller quantities. Merchant bar prices are firm at 2.35c., c.i.f., but demand is limited to small lots.

Plates.—Bookings of plate material this week were confined to lots of less than 100 tons. The Steel Tank & Pipe Co. was low bidder on 100 tons of 24-in. welded steel pipe for the East Bay Municipal Utility District, Oakland. Bids were opened on 370 tons of 52-in. pipe for the Cedar River pipe line No. 2 at Seattle. While 2.35c., c.i.f., is the general quotation, this price has been shaded, at least in one instance, by $4 a ton, and desirable tonnages can be placed at 2.25c.

Shapes. — Structural steel shape bookings exceeded 2100 tons and included 800 tons for a power house for the Pacific Gas & Electric Co., San Francisco, placed with the Judson-Pacific Co.; 525 tons for a soundproof stage for the RKO studios, Los Angeles, booked by the Consolidated Steel Corporation, and 300 tons for a mill for the Hines Lumber Co., Burns, Ore., secured by the Minneapolis Steel & Machinery Co. Lindstrom & Feigenson, Portland, got the general contract for the 2400-ton Eleventh Street viaduct at Tacoma, but have not yet awarded the sub-contract for the structural steel. Other pending business includes 830 tons for an office building in Phoenix and 600 tons for the Bremerton bridge, Seattle. Prices on domestic material continue firm at 2.35c., c.i.f.

Cast Iron Pipe.—Awards and new inquiries were not of heavy proportions this week. The National Cast Iron Pipe Co. took 297 tons of 10-in. Class B pipe for El Segundo, Cal., and the American Cast Iron Pipe Co. booked 200 tons of 6 and 8-in. Class 150 pipe for Burbank, Cal. Santa Ana, Cal., placed 449 tons of 2 to 8-in. Class B pipe with the Western Construction Co. The University of California, Berkeley, has abandoned the project at Redwood City on which it recently requested bids for 287 tons of 4 to 10-in. Class 150 pipe. The Los Angeles County Water Works District No. 16 will open bids Nov. 25 on 477 tons of 4 to 10-in. Class B pipe. San Diego, Cal., will open bids Nov. 14 on 293 tons for the improvement of La Mesa Colony and on Nov. 25 on 230 tons of 4 and 6-in. Class C pipe for Coronado Avenue.

Steel Pipe.—The Standard Oil Co. has an inquiry out for 44 miles of 18-in., 46 miles of 20-in., 82 miles of 22-in., 100 miles of 24-in. and 72 miles of 26-in. gas line pipe. Bids are being asked on several weights of pipe totaling approximately 100,000 tons. Foreign interests have been asked to quote on the pipe, but English and Continental mills are not able to make deliveries in the time specified.

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and struc. shapes	3.30c.
Soft steel bars	3.30c.
Small angles, ¾-in. and over	3.15c.
Small angles, under ¾-in.	3.55c.
Small channels and tees, ¾-in. to 2¾-in.	3.75c.
Spring steel, ¼-in. and thicker	5.00c.
Black sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.80c.
Galv. sheets (No. 24)	5.30c.
Struct. rivets, ½-in. and larger	5.65c.
Com. wire nails, base per keg	$3.40
Cement c't'd nails, 100 lb. keg	3.40

Boston

Export Demand for Scrap Grows as Call From Domestic Mills Declines—Pig Iron Dull

BOSTON, Nov. 12.—Current demand for pig iron is largely for car lots and for mixture purposes. The Mystic Iron Works reported the past week sales as 3000 tons, but other sellers did much less. While Buffalo district furnaces openly quote $18 a ton, furnace, for No. 2 plain and No. 2X, concessions of 50c. a ton are sometimes given. Foundries intimate they will buy first quarter iron next month, but there is no certainty on that point as many are covered into January.

Foundry iron prices per gross ton deliv'd to most New England points:

†Buffalo, sil. 1.75 to 2.25	$21.55 to $22.05
†Buffalo, sil. 2.25 to 2.75	22.05 to 22.55
*Buffalo, sil. 1.75 to 2.25	22.41 to 22.91
*Buffalo, sil. 2.25 to 2.75	22.91 to 23.41
East. Penn., sil. 1.75 to 2.25	22.65 to 23.15
East. Penn., sil. 2.25 to 2.75	23.15 to 23.65
Va., sil. 1.75 to 2.25	25.21
Va., sil. 2.25 to 2.75	25.71
*Ala., sil. 1.75 to 2.25	24.11
*Ala., sil. 2.25 to 2.75	24.61
†Ala., sil. 1.75 to 2.25	20.25
†Ala., sil. 2.25 to 2.75	20.75

Freight rates: $4.91 all rail from Buffalo, and $4.05 rail and water; $3.65 all rail from eastern Pennsylvania; $5.21 all rail from Virginia; $9.61 all rail from Alabama and $5.75 rail and water from Alabama to New England seaboard.

*All rail rate.

†Rail and water rate.

Reinforcing Steel.—Billet steel bar business is confined mostly to small lots, and the past week's aggregate was below average. Numerous prospects for round tonnages have either been abandoned or have shrunk to small proportions. Competition for business is keen, and quoted prices are often shaded. Prices quoted openly are 2.61½c. a lb., base, from stock on large tonnages and 3.16c. for small lots. The rail steel bar price is 2.26½c. a lb., base, delivered common Boston freight rate points, but concessions can be obtained.

Fabricated Steel.—No large ton-

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars, small shapes	3.265c.
Flat, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway rounds	6.60c.
Norway squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tie steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold-rolled steel—	
Rounds and hex	*3.55c. to 5.55c.
Squares and flats	*4.05c. to 7.05c.
Toe calk steel	6.00c.
Rivets, structural or boiler	4.50c.

	Per Cent Off List
Machine bolts	50 and 5
Carriage bolts	50 and 5
Lag screws	50 and 5
Hot-pressed nuts	50 and 5
Cold-punched nuts	50 and 5
Stove bolts	70 and 10

*Including quantity differentials.

nages were taken by fabricators the past week. Although pending jobs are relatively small, the aggregate is larger than a year ago. Competition among fabricators is still keen and some low prices are being made.

Cast Iron Pipe.—Chelsea, Mass., will close bids Nov. 14 on 100 tons of 6 and 8 in. pipe, and Keene, N. H., early next year will buy 3600 ft. of 12 in. No other open business developed the past week, but a fair tonnage was bought privately. Use of welded pipe by gas companies is materially cutting into New England sales of cast iron pipe. Prices quoted openly on domestic pipe are: 4-in., $44.10 to $45.10 a ton, delivered common Boston freight rate points; 6 to 12-in., $40.10 to $41.10; 16 to 20-in., $39.60. A $4 differential is asked on Class A and gas pipe.

Coke.—Virtually every New England foundry that makes a practice of contracting ahead for its fuel supply has done so for the first half of 1930 on a sliding price scale. According to coke makers, there is no indication that the present delivered price, $11 a ton, within a $3.10 freight rate zone, is likely to be changed soon. Current specifications against contracts hold about on a level with those for October.

Old Material.—The scrap market, so far as domestic consumption is concerned, is in the doldrums. Steel mills apparently want little scrap. Dealers' yard stocks are comparatively small, while scrap owners are reluctant to sell at prevailing prices. Values continue to seek new low levels, materials usually active being 25c. to 50c. a ton lower than a week ago. Quotations on girder rails, railroad and yard wrought, car axles and shafting are nominal. While domestic demand for scrap is lacking, that for foreign shipment is increasing. The 3000 tons of scrap reported as being loaded here for Danzig will go to Genoa instead. The freight is $6 a ton. Another boat will shortly load 3000 tons of rails and miscellaneous scrap for Danzig, with a $5.25 a ton freight rate. Negotiations are going on for other foreign shipments, aggregating about 10,000 tons.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$10.00 to $10.25
Scrap T rails	10.00 to 10.25
Scrap girder rails	9.00 to 9.50
No. 1 railroad wrought	10.00 to 10.50
No. 1 yard wrought	9.50 to 10.00
Machine shop turnings	6.00 to 6.50
Cast iron borings (steel works and rolling mill)	6.00 to 6.50
Bundled skeleton, long	8.75 to 9.00
Forge flashings	9.00 to 9.50
Blast furnace borings and turnings	6.00 to 6.25
Forge scrap	8.50 to 9.00
Shafting	14.00 to 14.25
Steel car axles	17.00 to 17.50
Wrought pipe 1 in. in diameter (over 2 ft. long)	9.00 to 9.50
Rails for rolling	11.50 to 12.00
Cast iron borings, chemical	9.50 to 9.75

Prices per gross ton deliv'd consumers' yards:

Textile cast	$14.00 to $14.50
No. 1 machinery cast	15.00 to 15.25
No. 2 machinery cast	13.00 to 13.25
Stove plate	11.00 to 11.50
Railroad malleable	18.50 to 19.00

Youngstown

Valley Open-Hearth Operations Down to 60 Per Cent But Finishing Mills Are Doing Slightly More

YOUNGSTOWN, Nov. 12.—Steel operations in the Valleys are considerably lower than they have been this year, but further curtailment, at least in the rate of open-hearth operations, now seems unlikely. Only a few more than half of the total available open-hearth furnaces in the district are operating, although production is not less than 60 per cent of capacity. Finishing mills are running at a slightly higher rate, as the output of raw steel was not reduced as rapidly as rolling mill operations during October, and at this time steel companies are anxious to reduce their stocks of steel to the absolute minimum.

Last week pipe mills were running at a slightly better rate than sheet and strip units, a rather unusual occurrence in this district. Bar mill operations were also low, averaging between 50 and 60 per cent. However, the rate for bar mills is no longer fixed at the beginning of the week, and a plant which began the week at 50 per cent might end up at close to 70. The same thing is true with strip mills, although some strip units, as well as sheet mills, are being closed down occasionally for an entire week. In this manner a more economic operation is assured for the active weeks. Makers of automobile body and other special sheets are particularly hard hit, although the output of metal furniture sheets is still comparatively high.

Valley sheet mills are receiving slightly improved specifications from the Chevrolet Motor Co. for shipment during the last week of the month, but more conservative opinion does not interpret this as an indication of greater activity in the automobile industry during the remainder of this year. Further curtailment in the requirements of the Ford Motor Co. is expected, and other large users of steel in Michigan are tending to curtail rather than step up their production schedules during this month and December. The automobile industry has been the first to suffer definite adverse effects from the recent sharp decline in stock prices, but there is yet nothing to indicate that this will seriously interfere with production during the first half of 1930. Large users of steel in the immediate Youngstown district have also curtailed production slightly, but these companies are admirably located to maintain low stocks of steel, and have always taken advantage of their position in order to reduce inventories. Consequently Youngstown and nearby companies feel that they can count on a fairly good demand from this source over the remainder of the year.

Prices are fairly satisfactory for a period of such light demand. Although sheet quotations are $2 or more below those of the second quarter, they seem to be holding better at present levels than at any time during the last three months. Black sheets may be considered firm at 2.75c., Pittsburgh, and galvanized material is still generally quoted at 3.50c. However, jobbers are able to purchase material at $2 under this figure. Blue annealed sheets and light plates are still quoted at 2.35c. and 2.20c., Pittsburgh, respectively, and on the small tonnages, which constitute the bulk of business being placed at this time, these figures are holding fairly well. Wide strip competition occasionally develops sharp concessions, but sellers of the jobbing mill product are not inclined to meet such prices. Automobile body sheets are holding at 4c., Pittsburgh, and metal furniture at 4.10c. Reports that the auto body sheet price is meeting with considerable pressure in the Michigan territory are scouted in this district, as sellers say that no tonnages are coming out which could be considered attractive enough to invite price shading. Bars and plates are holding at 1.90c., Pittsburgh, and wire and wire nail prices are not as weak as they have been.

Pig iron demand is very light. Shipments have declined and curtailment in operations is expected to follow. The Youngstown Sheet & Tube Co. soon expects to blow out one of its Hubbard, Ohio, furnaces, which is generally considered a merchant stack, and another Valley producer may soon take similar action. The Carnegie Steel Co. has recently reduced its furnace operations rather sharply in the Valleys, and is now operating only three of its six stacks at Youngstown, one of three at New Castle and one of three at Farrell. The Republic Iron & Steel Co. is operating all four of its Haselton furnaces, while the Sheet & Tube company has four on at the Campbell works, and one at Brier Hill.

The scrap market is weak, and dealers would sell No. 1 heavy melting steel at $17. Hydraulic compressed sheets might bring almost as much, as the supply is limited, but there is little on which to base quotations in the absence of mill buying.

General Refractories Co., Philadelphia, has appointed as high-temperature cement representative in the Pittsburgh district the Harris Pump & Supply Co., 321 First Avenue, Pittsburgh. The territory will cover the western half of Pennsylvania, northern part of West Virginia, the eastern edge of Ohio and the extreme western end of Maryland. The commodities to be handled are Grefco, chrome high-temperature cement and standard silica bonding cement.

Cincinnati

Pig Iron Sales, at 3900 Tons, Largest in Four Weeks—Sheet Demand Declines

CINCINNATI, Nov. 12. — Although the district pig iron market is quiet and buyers are adhering to a conservative purchasing policy, the total sales last week were approximately 3900 tons, the largest amount sold in this district for about four weeks. Despite this apparent good tonnage, the break in stock market prices and the slackening of automotive production are having a depressing effect on the local market. Among the orders last week was one from a southern Ohio consumer for 200 tons of Southern foundry iron. This is the first fair-sized order since the return of Southern furnaces to formal price schedules, and the furnace representative indicates that this tonnage was taken at $14.50, base Birmingham. Southern furnaces are said to be adhering to this quotation. There is talk among furnace representatives here of a movement to increase the Southern price schedules. Other sizable orders were 300 tons of Northern iron from a Chattanooga, Tenn., buyer; 600 tons of Northern foundry from a Zanesville, Ohio, consumer and 250 tons of the same grade from a Kokomo, Ind., buyer. The rest of the week's business was in small quantities. Except for an inquiry from a Hamilton, Ohio, consumer for 1250 tons of Northern foundry iron, there is no pending business.

Prices per gross ton, deliv'd Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25	$19.89 to $20.39
Ala. fdy., sil. 1.75 to 2.25	17.69 to 18.19
Ala. fdy., sil. 2.25 to 2.75	18.19 to 18.69
Tenn. fdy., sil. 1.75 to 2.25	17.69 to 18.19
S'th'n Ohio silvery, 8 per cent	26.89

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

Finished Material.—The recent stock market break has brought an attitude of caution among district consumers of sheets. District mills report that specifications are lighter than a week or two ago. A leading interest in this district indicates that bookings last week were only slightly more than 50 per cent of capacity. Not only is this true of the automotive demand, but the general sheet demand also shows easing. Although a number of large construction projects are under way or contemplated, no movement has been made to cover for fabricated materials. The district fabricated steel market is dull.

Coke.—The movement of coke on contract has slackened noticeably this month. By-product oven representatives report that during the last week automotive foundries refused most of their shipments and, while other foundries took some coke, their specifications were not so large as usual. Beehive oven representatives, on the other hand, report that shipments are going forward at a fair rate. New business is virtually negligible.

Old Material.—Although mills in the South are taking scrap on contract and even in some instances making new purchases, local mills and those in the Valley are curtailing both shipments and purchases. The local old material market is feeling the pinch of the lessened demand and dealers are bidding 25 to 50c. less on the leading grades of scrap than they were a week ago. Dealers are exercising caution in their purchases. The Louisville & Nashville Railroad is offering a list of 7500 tons, of which 1600 tons is rails. The Southern Railway and the Chesapeake & Ohio are offering their usual lists.

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel	$12.75 to $13.25
Scrap rails for melting	14.00 to 14.25
Loose sheet clippings	8.50 to 9.00
Bundled sheets	10.75 to 11.25
Cast iron borings	8.50 to 9.00
Machine shop turnings	8.00 to 8.50
No. 1 busheling	10.25 to 10.75
No. 2 busheling	7.00 to 7.50
Rails for rolling	14.25 to 14.75
No. 1 locomotive tires	14.25 to 14.75
No. 2 railroad wrought	12.75 to 13.25
Short rails	18.00 to 18.50
Cast iron carwheels	12.50 to 13.00
No. 1 machinery cast	18.50 to 19.00
No. 1 railroad cast	15.00 to 15.50
Burnt cast	10.00 to 10.50
Stove plate	10.00 to 10.50
Brake shoes	10.00 to 10.50
Agricultural malleable	14.00 to 14.50
Railroad malleable	15.00 to 15.50

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and struc. shapes	3.40c.
Bars, soft steel or iron	3.30c.
New billet reinforc. bars	3.15c.
Rail steel reinforc. bars	3.00c.
Hoops	4.05c.
Bands	3.50c.
Cold-fin. rounds and hex.	3.85c.
Squares	4.35c.
Black sheets (No. 24)	4.05c.
Galvanized sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.45c.
Structural rivets	3.85c.
Small rivets	65 per cent off list
No. 9 ann'l'd wire, per 100 lb.	$3.00
Com. wire nails, base per keg	2.85
Cement c't'd nails, base 100 lb. keg	2.85
Chain, per 100 lb.	8.75
	Net per 100 Ft.
Lap-weld steel boiler tubes, 2-in.	$16.50
4-in.	34.50
Seamless steel boiler tubes, 2-in.	17.50
4-in.	36.00

Birmingham

Pig Iron Shipments Large but New Business Is Light—Steel Orders Decline Slightly

BIRMINGHAM, Nov. 12. — A good movement of iron on contract is the chief activity in the pig iron market. A continuation of this active rate of shipments is expected for the remainder of November, at least. There has been only a small amount of forward coverage in the past few weeks. Inquiry for first quarter iron that began to develop in late October has subsided, and buyers appear satisfied to await developments. It is now predicted that the present quietness will delay the opening of books for the first quarter longer than had been expected. Prices show no change, the base being $14.50 for district sales. The number of active furnaces remains at 15.

Prices per gross ton, f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil.	$14.50
No. 1 fdy., 2.25 to 2.75 sil.	15.00
Basic	14.50

Finished Steel. — Last week was quieter than any of the three weeks preceding. There was a drop in the number of large orders and a small decrease in specifications. There has been very little change in the volume of inquiries. Prices are unchanged. The Tennessee company has booked upward of 10,000 tons of rails for the Missouri Pacific Railroad. The Bessemer plant of the Pullman Car & Mfg. Co. is bidding on the large car inquiry of the St. Louis - San Francisco Railroad Co. Structural steel fabricators have booked several small orders. The tendency in the reinforcing bar market is toward slowness in placing contracts. The Tennessee company is operating seven open-hearths at Ensley and six at Fairfield, a decrease of two for the latter works. The Gulf States Steel Co. continues to work all six at Alabama City.

Cast Iron Pipe.—The National Cast Iron Pipe Co. has booked 2000 tons of 30 to 36-in. pipe for Kansas City, Mo. The project at Murfreesboro, Tenn., requiring three miles of 8 to 12-in. pipe was let to the American Cast Iron Pipe Co. The 4000-ton project at Dallas, Tex., is expected to be awarded this week. Several smaller projects have also been awarded, making the total bookings last week the highest for any week since September. With the development of "feelers" from public utilities on their requirements for next year, the market has a better outlook. Pressure pipe makers are keeping stocks light. Prices continue at $37 to $38, base.

Old Material.—Steel grades have rallied somewhat, following the slump about 10 days ago and they are now moving in fairly good volume. Iron scrap remains inactive. Steel axles are now quoted at $22, an increase of $1. All other prices are unchanged.

Prices per gross ton, deliv'd Birmingham dist. consumers' yards:

Heavy melting steel	$13.00 to $13.50
Scrap steel rails	14.00
Short shoveling turnings	9.00
Cast iron borings	9.00
Stove plate	11.50 to 12.00
Steel axles	22.00
Iron axles	23.00
No. 1 railroad wrought	10.00 to 10.50
Rails for rolling	15.50
No. 1 cast	13.00
Tramcar wheels	12.50
Cast iron carwheels	13.00 to 13.50
Cast iron borings, chem.	13.50 to 14.00

Buffalo

Pig Iron Shipments Hold Up but New Business Is Slack —Steel Mill Operations Reduced

BUFFALO, Nov. 12.—Shipments of pig iron are holding up well, but new business is slack. Current buying is in small lots for prompt shipment. The price of $19.50, base, is firm in the district, but the Eastern price of $18 is being shaded to $17.50. Barge canal shipments of pig iron will cease between Nov. 15 and 20. The "X" furnace of the Wickwire-Spencer Steel Corporation will go out within a short time and will be replaced by a "Y" furnace, which will resume operation on foundry iron.

Prices per gross ton, f.o.b. furnace:

No. 2 fdy., sil. 1.75 to 2.25	$19.50
No. 2X fdy., sil. 2.25 to 2.75	20.00
No. 1 fdy., sil. 2.75 to 3.25	21.00
Malleable, sil. up to 2.25	20.00
Basic	$17.50 to 18.00
Lake Superior charcoal	27.28

Finished Steel.—Mill operation is slightly lower than a week ago. The Lackawanna plant of the Bethlehem Steel Co. is now operating 18 open-hearths, the lowest number in some time; the Donner Steel Co. is operating four open-hearths, and the Wickwire-Spencer Steel Corporation is operating three out of its four. The Seneca Iron & Steel Co. is operating at 65 to 70 per cent. The structural steel market is quiet, with one inquiry out from Albany for 800 tons. The small structural tonnage has dropped off, though most fabricators report business booked sufficient to run shops for two months.

Old Material.—The latest purchase of No. 1 heavy melting steel was made about a week ago at $15. The tonnage is understood to have been comparatively small, but a considerable amount of No. 2 heavy melting steel was taken by the same consumer at $13.50. There has been a small sale of rolled steel wheels and railroad knuckles and couplers at about $18. Cast iron borings have become scarce. Production of turnings and borings is off, and there is a fair demand for turnings. General production of scrap has dropped off almost as much as shipments. One large mill here continues to hold up shipments, although some relief is in prospect for the dealers. The market is no weaker. One mill in this territory has received so far this year 200,000 tons of railroad and structural scrap, hydraulic compressed and drop forge flashings by boat shipment from West.

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and struc. shapes	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.95c.
Cold-fin. flats, sq. and hex.	4.45c.
Rounds	3.95c.
Cold-rolled strip steel	5.85c.
Black sheets (No. 24)	4.20c.
Galv. sheets (No. 24)	4.85c.
Blue ann'l'd sheets (No. 10)	3.50c.
Com. wire nails, base per keg	$3.60
Black wire, base per 100 lb.	3.75

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades:		
No. 1 heavy melting steel	$15.00 to	$16.00
No. 2 heavy melting steel	13.50 to	14.50
Scrap rails	15.00 to	15.50
Hydraul. comp. sheets	13.50 to	14.50
Hand bundled sheets	11.00 to	11.50
Drop forge flashings	13.75 to	14.00
No. 1 busheling	13.50 to	14.50
Hvy. steel axle turnings	13.50 to	14.00
Machine shop turnings	7.50 to	8.00
No. 1 railroad wrought	13.00 to	13.50
Acid Open-Hearth Grades:		
Knuckles and couplers	17.00 to	17.50
Coil and leaf springs	17.00 to	17.50
Rolled steel wheels	17.00 to	17.50
Low phos. billet and bloom ends	18.00 to	18.50
Electric Furnace Grades:		
Short shov. steel turnings	11.25 to	11.75
Blast Furnace Grades:		
Short mixed borings and turnings	11.25 to	11.75
Cast iron borings	11.25 to	11.75
No. 2 busheling	9.50 to	10.00
Rolling Mill Grades:		
Steel car axles	17.00 to	17.50
Iron axles	20.00 to	21.00
Cupola Grades:		
No. 1 machinery cast	15.00 to	15.50
Stove plate	12.50 to	12.75
Locomotive grate bars	11.00 to	11.50
Steel rails, 3 ft. and under	18.75 to	19.00
Cast iron carwheels	13.00 to	13.50
Malleable Grades:		
Industrial	17.50 to	18.00
Railroad	17.50 to	18.00
Agricultural	17.50 to	18.00
Special Grades:		
Chemical borings	12.50 to	13.50

Canada

Pig Iron Demand Eases; Structural Steel Quieter

TORONTO, ONT., Nov. 12.—The demand for merchant pig iron in the Canadian markets continues to ease off. Spot buying in small tonnages is responsible for practically the entire business done during the week, with sales totaling about 1500 tons. No forward delivery orders were taken, but producers are heavily booked to the end of the year and are making regular and large tonnage shipments against contract. The daily melt has been slightly reduced as a result of curtailed operations among some of the automotive plants, but, taken as a whole, mills, foundries, radiator plants, etc., are running only slightly under the capacity mark. Backlogs are sufficient to maintain the present rate of operations for some time to come. It is reported that agricultural implement plants are now running under 50 per cent capacity. While the slowing down in this industry has some reaction on the Canadian iron and steel industry, its chief effect is on the importation of pig iron and other raw materials. Pig iron imports have been materially reduced during the past month or six weeks. The recent reduction in Canadian iron prices has brought the local quotations under the price quoted by United States furnaces for delivery in this market, with the result that there is little merchant iron coming into Canada other than that for use in the agricultural implement industry. Canadian iron prices are firm.

Prices per gross ton:

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75	$23.60
No. 2 fdy., sil. 1.75 to 2.25	23.10
Malleable	23.60
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75	$25.00
No. 2 fdy., sil. 1.75 to 2.25	24.50
Malleable	25.00
Basic	23.50
Imported Iron, Montreal Warehouse	
Summerlee	$33.50
Carron	33.00

Structural Steel. — With winter weather only a short way off, building activities in Canada are gradually declining, and a slowing down in structural steel demand has resulted. Only small tonnages were awarded during the week. Fabricators, however, are well supplied with orders and are assured of capacity operations well into the new year. Deliveries against contract are going forward on schedule.

Old Material—Little or no interest developed in the Canadian markets during the week. Buying by both Ontario and Quebec consumers appears to be held to a minimum, with the result that only small tonnages were closed. Consumption, however, is well sustained. Prices are unchanged.

Dealers' buying prices:

	Per Gross Ton	
	Toronto	Montreal
Heavy melting steel	$10.00	$8.50
Rails, scrap	11.00	9.00
No. 1 wrought	10.00	12.00
Machine shop turnings	7.50	5.00
Boiler plate	7.50	6.00
Heavy axle turnings	8.00	7.50
Cast borings	7.50	5.00
Steel borings	7.50	6.50
Wrought pipe	6.00	6.00
Steel axles	15.00	20.00
Axles, wrought iron	17.00	22.00
No. 1 machinery cast	....	17.00
Stove plate	....	13.00
Standard carwheels	....	16.00
Malleable	....	13.00
	Per Net Ton	
No. 1 mach'ry cast	$16.00	....
Stove plate	12.00	....
Standard carwheels	15.00	....
Malleable scrap	14.00	....

Change Reinforcing Steel Trade Practice

WASHINGTON, Nov. 11.—The Federal Trade Commission has reconsidered and modified Rule 8, adopted by the reinforcing steel fabricating and distributing industry in its recent trade practice conference. The rule, which came under Group II, was changed to read as follows:

> The industry approves the practice of each individual member of the industry independently publishing and circulating to the purchasing trade his own price lists.

The rule formerly provided for circulating an individual member's current price lists and also notices of advances, declines or other changes in prices. Group II rules are those which are accepted by the commission as expressions of the trade, and which may or may not concern practices in violation of the law.

St. Louis

Pig Iron Sales, 23,000 Tons, Include 10,000 Tons of Basic —Two Roads Buy 31,000 Tons of Rails

ST. LOUIS, Nov. 12.—The principal transaction in a week which showed a marked improvement over the preceding period was the sale of 10,000 tons of basic pig iron by the St. Louis Gas & Coke Corporation to an East Side melter for shipment during the remainder of 1929 and the first quarter of next year. The local maker, whose total sales for the week exceeded 23,000 tons, also sold 2000 tons of foundry iron to an Illinois implement manufacturer for shipment during the remainder of the year, 500 tons to an Illinois car builder for prompt shipment, and 200 tons and 300 tons respectively to jobbing foundries in St. Louis for first quarter shipment, the remainder being for prompt delivery. The melt in the St. Louis district is reported to be holding up well. Foundries catering to the automobile trade show a decrease in business, while the stove plants are exceedingly busy.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill.	$19.50 to $20.00
Malleable, f.o.b. Granite City	20.00
N'th'n No. 2 fdy., deliv'd St. Louis	22.16
Southern No. 2 fdy., deliv'd	16.92 to 18.92
Northern malleable, deliv'd	22.16
Northern basic, deliv'd	22.16

Freight rates: 75c. (average) Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

Rails.—The Wabash Railway purchased 23,000 tons of 110-lb. rails for January, February and March delivery, allocated as follows: Illinois Steel Co., 11,000 tons; Inland Steel Co., 9000 tons and Bethlehem Steel Co., 3000 tons. The Kansas City Southern Railway has purchased 8000 tons of rails from the Illinois Steel Co., Bethlehem Steel Co. and Inland Steel Co., the exact division not being known here.

Finished Steel.—Warehouse business for October is said to have been about 5 per cent better than that of the same month last year and slightly better than that of September. The increase has been on virtually all lines except structural. Structural fabricators are looking elsewhere for business, now that there is very little doing in St. Louis. The Mississippi Valley Structural Steel Co. got the order for 3500 tons for the Biltmore Hotel in Oklahoma City, Okla. The Missouri Highway Commission has opened bids for road and bridge work calling for 500 to 700 tons of reinforcing bars and 400 tons of structural steel.

Coke.—By-product ovens in the district report heavy shipments of domestic grades, and one factor reports stocks are lower than at any time in its history. Foundry and furnace coke also are in good demand.

Old Material.—The market for old material continues weak, as a result of the continued lack of buying by mills in the district, although two mills have indicated they will take supplies at their own prices, which dealers say are far too low. Dealers are buying only against contracts. There is some "distressed" material. No. 2 heavy melting steel, miscellaneous standard-section rails are 25c. lower, while railroad springs, bundled sheets, No. 2 railroad wrought, steel car axles, short steel rails and railroad malleable are 50c. lower. Railroad lists: Wabash, 3335 tons; Texas & Pacific, 1500 tons; Chicago, Rock Island & Pacific, 200 carloads; Great Northern, 106 carloads; St. Louis-San Francisco, 60 carloads, and Chicago & Eastern Illinois, 25 carloads.

Dealers' buying prices per gross ton, f.o.b. St. Louis district:

No. 1 heavy melting or shoveling steel	$13.00 to $13.50
No. 2 heavy melting or shoveling steel	12.25 to 12.75
No. 1 locomotive tires	15.00 to 15.50
Misc. stand.-sec. rails including frogs, switches and guards, cut apart	14.25 to 14.75
Railroad springs	16.00 to 16.50
Bundled sheets	9.50 to 10.00
No. 2 railroad wrought	13.00 to 13.50
No. 1 busheling	9.75 to 10.25
Cast iron borings and shoveling turnings	9.25 to 9.75
Iron rails	13.00 to 13.50
Rails for rolling	15.25 to 15.75
Machine shop turnings	7.25 to 7.75
Heavy turnings	9.50 to 10.00
Steel car axles	18.50 to 19.00
Iron car axles	27.00 to 27.50
Wrot. iron bars and trans.	21.50 to 22.00
No. 1 railroad wrought	13.00 to 13.50
Steel rails, less than 3 ft.	17.00 to 17.50
Steel angle bars	14.00 to 14.50
Cast iron carwheels	14.00 to 14.50
No. 1 machinery cast	15.25 to 15.75
Railroad malleable	14.00 to 14.50
No. 1 railroad cast	14.50 to 15.00
Stove plate	12.00 to 12.25
Agricult. malleable	14.00 to 14.50
Relay, rails 60 lb. and under	20.50 to 23.50
Relay, rails 70 lb. and over	26.50 to 29.00

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-fin. rounds, shaftings, screw stock	3.75c.
Black sheets (No. 24)	4.25c.
Galv. sheets (No. 24)	5.10c.
Blue ann'l'd sheets (No. 10)	3.45c.
Black corrug. sheets (No. 24)	4.30c.
Galv. corrug. sheets	5.15c.
Structural rivets	4.15c.
Boiler rivets	4.15c.
	Per Cent Off List
Tank rivets, ⅞-in. and smaller, 100 lb. or more	65
Less than 100 lb.	60
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-pressed nuts, sq., blank or tapped, 200 lb. or more	60
Less than 200 lb.	50
Hot-pressed nuts, hex., blank or tapped, 200 lb. or more	60
Less than 200 lb.	50

Canadian Tariff Board Schedules Hearings

WASHINGTON, Nov. 12.—All items bearing upon the iron and steel industry of Canada, together with machinery and other lines, will be covered at hearings to be held at Ottawa by the Canadian Advisory Board on Tariff and Taxation, to begin Nov. 26, according to a telegram received by the Department of Commerce from Commercial Attache Lynn W. Meekins. Instructions to this end have been issued to the board by the Minister of Finance, who also asked that the hearings include a review of the various applications for duty changes on iron and steel products and machinery. The Minister of Finance likewise has requested the board to investigate relative prices of automobiles in Canada and in the United States, as well as the percentage of Canadian material and labor used in each model upon which Canadian manufacturers are now claiming exemption from excise tax. The final date of hearing has been set for Dec. 12, when motor vehicles will be the subject under discussion and when also the board will consider an application by a Canadian company for reduced duties on axles, bolts, shafts, radiators, and other parts for motor trucks.

The schedule of hearings follows:

Nov. 26.—Scrap, pig iron, ferroalloys, ingots, blooms, and billets, bars, and rods.

Nov. 27 and 28.—Sheets, plates, hoop, band, strip, skelp, structural steel, railroad track equipment.

Nov. 29.—Alloy provisions, special steel provisions, castings and forgings.

Dec. 3.—Pipes and tubes, chains, wire springs.

Dec. 4 and 5.—Machinery (agricultural, mining, printing and all other); engine and boilers, not including aeroplane engines.

Dec. 6.—Cutlery, hardware, tools, stamped and coated products, including enameled ware.

Dec. 10 and 11.—Railroad rolling stock, vehicles other than automobiles; stoves, and miscellaneous products.

Dec. 12.—Automobiles and motor trucks, including engines and parts.

Steel Corporation's Orders Gain 183,981 Tons

Another gain in the unfilled orders of the United States Steel Corporation was registered in October—183,981 tons. The gain in September was 244,370 tons. These two gains contrast with losses in the previous four months, the August decline having been 429,966 tons. The total on Oct. 31 was 4,086,562 tons as against 3,751,030 tons on Oct. 31, 1928.

Unfilled tonnage at the end of each month for the past three years follows:

	1929	1928	1927
October	4,086,562	3,751,030	3,341,000
September	3,902,581	3,698,368	3,148,113
August	3,658,211	3,624,043	3,196,037
July	4,088,177	3,570,927	3,142,014
June	4,256,910	3,637,000	3,053,246
May	4,304,167	3,416,822	3,050,941
April	4,427,763	3,872,133	3,456,132
March	4,410,718	4,335,206	3,553,140
February	4,144,341	4,398,189	3,597,119
January	4,109,487	4,275,947	3,800,177
	1928	1927	1926
December	3,976,712	3,972,874	3,960,696
November	3,673,000	3,454,441	3,807,447

Non-Ferrous Metal Markets

Lead and Zinc Again Decline —Tin at New Low—Copper Steady

NEW YORK, Nov. 12.

Copper. — Despite the sharp declines in prices of tin, lead and zinc, no marked weakness has yet appeared in copper. Within the week a few lots of so-called distress metal have been offered as low as 17.75c., delivered in the Connecticut Valley, but all producers, both primary and custom smelters, are rigidly adhering to 18c. and do not see any reason for a lower price for some time to come, if at all. Actual buying of copper is extremely light. Domestic consumers are taking only hand-to-mouth lots, although they admit that orders on their books for fabricated material are not all covered by copper contracts. Foreign consumers are also buying sparingly. There is some talk that the situation may reappear which prevailed during the summer when primary producers were entirely out of the market and left such business as there was to custom smelters. Copper exporters continue to hold their quotation to 18.30c., c.i.f. usual European ports, although in the last week electrolytic copper in London has sold at an equivalent of 18.15c. Production is being curtailed at the mines, one company announcing a reduction of 25 per cent in its output, with others reported to be planning reduction. October statistics out today were quite favorable to producers. Refined stocks were reduced 6350 tons, and total stocks about 5000 tons, which means an increase in blister copper stocks of about 1350 tons. Shipments in October were the second best total at 105,729 tons, compared with 105,860 tons in March. Foreign shipments in October were 53,000 tons against 59,000 tons also in March. Lake copper is very quiet and steady at 18.12½c., delivered.

Tin.—Spot Straits tin yesterday at 39c., New York, is the lowest price since Aug. 14, 1923. Lower prices have been the rule since last week, due largely to weakness in London. Sales have been larger, however, at these prices, the total for the week ended Saturday, Nov. 7, having been about 800 tons. Yesterday, 200 tons was sold, but the most active day was Thursday, Nov. 7, when 400 tons changed hands. This single day of activity was due largely to a stronger stock market and a heavy reduction in brokers' loans. In yesterday's

THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY

	Nov. 12	Nov. 11	Nov. 9	Nov. 8	Nov. 7	Nov. 6
Lake copper, New York	18.12½	18.12½	18.12½	18.12½	18.12½	18.12½
Electrolytic copper, N. Y.*	17.75	17.75	17.75	17.75	17.75	17.75
Straits tin, spot, N. Y.	39.37½	39.00	....	39.50	39.62½	39.50
Zinc, East St. Louis	6.25	6.25	6.25	6.25	6.40	6.50
Zinc, New York	6.60	6.60	6.60	6.60	6.75	6.85
Lead, St. Louis	6.10	6.10	6.10	6.10	6.10	6.35
Lead, New York	6.25	6.25	6.25	6.25	6.25	6.50

*Refinery quotation; price ¼c. higher delivered in the Connecticut Valley.

Rolled Products

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—
- High brass ..... 23.25c.
- Copper, hot rolled ..... 26.75c.
- Zinc ..... 10.50c.
- Lead (full sheets) ..... 10.25c.

Seamless Tubes—
- High brass ..... 28.25c.
- Copper ..... 29.25c.

Rods—
- High brass ..... 21.25c.
- Naval brass ..... 24.00c.

Wire—
- Copper ..... 19.87½c.
- High brass ..... 23.75c.

Copper in Rolls ..... 26.75c.
Brazed Brass Tubing ..... 30.87½c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also to St. Louis on shipments to points west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide ..... 33.00c.
Tubes, base ..... 42.00c.
Machine rods ..... 34.00c.

Chicago Warehouse

(Prices Cover Trucking to Customers' Doors in City Limits)

	Base per Lb.
Sheets—	
High brass	23.25c.
Copper, hot rolled	27.75c.
Copper, cold rolled, 14 oz. and heavier	30.00c.
Zinc	10.75c.
Lead, wide	11.35c.
Seamless Tubes—	
Brass	28.25c.
Copper	29.25c.
Brass Rods	21.25c.
Brazed Brass Tubes	31.00c.

New York or Cleveland Warehouse

Delivered Prices, Base per Lb.

High brass	21.12½c. to 22.12½c.
Copper, hot rolled, base sizes	27.75c. to 28.75c.
Copper, cold rolled, 14 oz. and heavier, base sizes	30.00c. to 31.00c.
Seamless Tubes—	
Brass	26.00c. to 27.00c.
Copper	29.12½c. to 30.12½c.
Brass Rods	18.87½c. to 19.87½c.
Brazed Brass Tubes	29.12½c. to 30.12½c.

New York Warehouse

Delivered Prices, Base per Lb.

Zinc sheets (No. 9), casks	10.75c. to 11.25c.
Zinc sheets, open	11.50c. to 12.00c.

Metals from New York Warehouse

Delivered Prices, Per Lb.

Tin, Straits pig	41.50c. to 42.50c.
Tin, bar	43.50c. to 44.50c.
Copper, Lake	19.50c.
Copper, electrolytic	19.25c.
Copper, casting	19.00c.
Zinc, slab	7.50c. to 8.00c.
Lead, American pig	7.00c. to 7.50c.
Lead, bar	9.00c. to 9.50c.
Antimony, Asiatic	10.50c. to 11.00c.
Aluminum No. 1 ingots for remelting (guaranteed over 99% pure)	25.00c. to 26.00c.
Alum. ingots, No. 12 alloy	24.00c. to 25.00c.
Babbitt metal, commercial grade	25.00c. to 35.00c.
Solder, ½ and ½	28.00c. to 28.50c.

Metals from Cleveland Warehouse

Delivered Prices, Per Lb.

Tin, Straits pig	44.25c.
Tin, bar	46.25c.
Copper, Lake	19.50c.
Copper, electrolytic	19.25c.
Copper, casting	18.75c.
Zinc, slab	8.00c. to 8.25c.
Lead, American pig	7.00c. to 7.20c.
Lead, bar	9.25c.
Antimony, Asiatic	16.00c.
Babbitt metal, medium grade	18.00c.
Babbitt metal, high grade	48.00c.
Solder, ½ and ½	28.50c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged consumers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	14.75c.	16.00c.
Copper, hvy. and wire	14.50c.	15.50c.
Copper, light and bottoms	12.50c.	13.50c.
Brass, heavy	8.00c.	9.00c.
Brass, light	6.75c.	7.75c.
Hvy. machine composition	11.75c.	12.75c.
No. 1 yel. brass turnings	9.25c.	10.00c.
No. 1 red brass or compos. turnings	11.00c.	12.00c.
Lead, heavy	5.00c.	5.50c.
Lead, tea	4.00c.	4.50c.
Zinc	3.25c.	3.75c.
Sheet aluminum	13.00c.	14.00c.
Cast aluminum	11.25c.	13.25c.

market, prices ranged from 39.25c. down to 38.87½c., for spot and November shipment, both positions selling at the same price. At the close of the day there were more buyers than sellers. Tin closed today at 39.37½c. in a very dull market. Consumers are not buying far ahead, but dealers are more active than for some time. London prices today were £174 15s. for spot standard, £178 for future standard and £178 15s. for spot Straits. The Singapore price today was £180 12s. 6d. A week ago the London prices were about £7 a ton higher.

Lead.—Another reduction by the American Smelting & Refining Co. on Nov. 7, the third in the last 10 days, has brought the New York contract price down from 6.50c. to 6.25c. Here also the decline is largely due to weakness in the London market. Buying is a little more active, but by no means heavy, and is confined to November and December shipment. Some inquiry has appeared for January, but producers are not quoting. At St. Louis, the price is down to 6.10c.

Zinc.—Still further declines in London have forced the quotation of prime Western zinc from 6.50c. to 6.25c., East St. Louis. A little business is reported each day, but buyers continue extremely cautious. Two reductions in the price of ore at Joplin, Mo., have been made in the last two weeks and the quotation now stands at $40, a decline of $4 a ton. The corresponding decline in the metal has been about 55 points. Production was fairly large at 13,000 tons for the week ended Saturday, Nov. 7, and the surplus is now estimated at 58,010 tons. Sharp curtailment is reported planned during the present month.

Antimony.—Prospects that the duty on antimony may be higher because of action this week by the Senate has caused some anxiety and prices are a little higher than they were during the week. Chinese metal for spot and early delivery is quoted at 8.62½c., duty paid. Should the Senate's view prevail, the duty would be 4c. instead of at 2c. as at present.

Nickel.—Wholesale lots of ingot nickel are quoted at 35c. per lb. with shot nickel at 36c. and electrolytic nickel in cathodes at 35c.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at the published price of 23.90c. per lb., delivered.

Non-Ferrous Markets at Chicago

CHICAGO, Nov. 12.—Sales in this market are quiet as prices, except for copper, continue to sag. The old metal market is dull and prices are untested.

Prices per lb., in carload lots: Lake copper, 18.50c.; tin, 40.12½c.; lead, 6.20c.; zinc, 6.35c.; in less-than-carload lots, antimony, 9.35c. On old metals we quote copper wire, crucible shapes and copper clips, 14c.; copper bottoms, 11.50c.; red brass, 11.50c.; yellow brass, 8c.; lead pipe, 4.50c.; zinc, 3c.; pewter, No. 1, 24.50c.; tin foil, 24c.; block tin, 34c.; aluminum, 12.87½c.; all being dealers' prices for less-than-carload lots.

Railroad Equipment

Boston & Maine Orders 1500 Additional Cars

THE outstanding railroad equipment order of the week was placed by the Boston & Maine, calling for 1000 steel box cars and 500 steel hopper cars, which is a duplicate of an order placed by this road a few weeks ago. Both orders went to the Standard Steel Car Co. The Union Tank Car Co. has ordered 1000 tank cars.

Prospects for continued buying of cars is regarded by the car building trade as exceedingly bright. About 15,000 cars are pending, and action on these is expected before the end of the year. The Rock Island inquiry for 5000 and that of the St. Louis-San Francisco for 3800 may be decided within a week or two. Inquiries are also pending for more than 200 locomotives.

Inquiries that are expected before the end of the year make a total of about 20,000 cars. One large road is said to have planned a car-building program for the next three years that will call for the purchase of 10,000 steel box cars a year.

Car orders thus far in 1929 total about 85,000 units, in addition to which railroads have ordered 9000 cars to be built in their own shops. It is probable that car purchases for the year will run well over 100,000, which would be the largest total since 1924.

Boston & Maine on Tuesday announced the purchase of 1000 steel box cars and 500 steel hopper cars from Standard Steel Car Co., duplicating an order placed with the same car builder a few weeks ago.

Seaboard Air Line is now inquiring for a total of 20 locomotives.

Western Electric Co. is inquiring for 15 flat cars.

National Railways of Mexico have ordered 600 standard gage box cars, 200 gondola cars and 240 sets of trucks from Standard Steel Car Co.

New York, Chicago & St. Louis has ordered 10 steel underframes from Canton Car Co.

Chevrolet Motor Co. has ordered 20 hopper cars from Standard Steel Car Co.

Anglo-Mexican Petroleum Co., Ltd., has ordered six tank cars from General American Tank Car Corporation.

Montour Railroad is inquiring for two locomotives.

Georgia, Ashburn, Sylvester & Camilla is inquiring for one locomotive.

Milwaukee Road is considering coming into the market for 5000 cars.

Union Tank Car Co. has ordered 1000 tank cars from American Car & Foundry Co.

Reinforcing Steel

Awards, at 4000 Tons, Show Decline—Inquiries 4300 Tons

THE total of reinforcing steel awards, at slightly more than 4000 tons, was the smallest for any week since Oct. 17. The outstanding contracts were 1500 tons of bars for an industrial building and warehouse in New York and 350 tons for a building in Newark, N. J. New projects totaling about 4300 tons were larger than in the two previous weeks and included 1000 tons in a building for the Pennsylvania Terminal & Warehouse Co., Hoboken, N. J. Awards follow:

NEWBURY, MASS., 180 tons, bridge, to McClintic-Marshall Co.

NEW YORK, 1500 tons, industrial building and warehouse in Varick Street, to McClintic-Marshall Co.

NEWARK, N. J., 200 tons, plant building for National Biscuit Co., to Faitoute Iron & Steel Co.

NEWARK, 135 tons, vaults for National Newark & Essex Bank, to Faitoute Iron & Steel Co.

NEWARK, 350 tons, Monoservice Building, to Igoe Brothers.

SAYREVILLE, N. J., 100 tons, in addition to previous contract, power house, Eastern New Jersey Power & Light Co., to Concrete Steel Co.

CLEVELAND, 250 tons, Film Exchange Building for Warner Brothers Pictures, Inc., to Patterson-Leitch Co.

CINCINNATI, 195 tons, building for Hamilton County Tuberculosis Sanitarium, to West Virginia Rail Co.

CHICAGO, 150 tons, building for Norton Co., to Concrete Engineering Co.

CHICAGO, 350 tons, 124th Field Artillery Armory, to Olney J. Dean & Co.

SACRAMENTO, CAL., 100 tons, apartment building, Fourteenth and N Streets, to Truscon Steel Co.

SACRAMENTO, 147 tons, bridge over San Gabriel River, to unnamed bidder.

PORTLAND, ORE., 100 tons, warehouse on East Oak Street, to Mercer Steel Co.

SEATTLE, 363 tons, approach to West Spokane Street bridge, to Pacific Coast Steel Co.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

NEW HAVEN, CONN., 500 tons, sewage disposal plant.

NEW YORK, 200 tons, battery tower, West Washington Street.

HOBOKEN, N. J., 1000 tons, additional unit, Pennsylvania Terminal & Warehouse Co.

BROOKLYN, 200 tons, bridge for Brooklyn-Manhattan Transit Co.

PROVIDENCE, R. I., 150 tons, Crawford Street bridge.

MAYWOOD, ILL., 150 tons, high school.

SPRINGFIELD, ILL., tonnage being estimated, Centennial building.

WAUKEGAN, ILL., 230 tons, power house.

AURORA, ILL., 127 tons, building for Illinois Bell Telephone Co.; Goertz Construction Co., general contractor.

JEFFERSON CITY, MO., 500 to 700 tons, bridge and road work for Missouri Highway Commission.

TACOMA, WASH., 800 tons, Eleventh Street viaduct; general contract to Lindstrom & Feigenson, Portland, Ore., reinforcing steel subcontract not yet placed.

TACOMA, 325 tons, power house No. 2, Lake Cushman dam project; bids opened.

Fabricated Structural Steel

Awards of 26,000 Tons Exceed Previous Week But New Business Is Smallest Since June

AWARDS of the past week, totaling close to 26,000 tons, were slightly larger than in the previous week, but below the average for the year. Outstanding contracts were 5000 tons for an apartment building in New York, 3000 tons for a hotel in Oklahoma City, Okla., and 1800 tons for State buildings at Springfield, Ill.

The tonnage of new projects reported was the smallest since June 20, totaling about 19,000 tons. The largest project calls for 3500 tons for a power plant at Waukegan, Ill., and 2500 tons is required for a bank building in Philadelphia. Awards follow:

BOSTON, 370 tons, draw span Congress Street bridge, to Boston Bridge Works, Inc.

BOSTON, 200 tons, banking house addition, to Palmer Steel Co.

CAMBRIDGE, MASS., 200 tons, Vanderbilt Hall, Harvard College, to New England Structural Co.

NEW YORK, 2500 tons, apartment building at 895 Park Avenue, to Levering & Garrigues Co.

NEW YORK, 1800 tons, apartment building at Seventy-eighth Street and Third Avenue, to Harris Structural Steel Co.

NEW YORK, 650 tons, apartment building on East Twenty-first Street, to Paterson Bridge Co.

BROOKLYN, 800 tons, Nurses' Home for Methodist Hospital, to George A. Just Co.

NEW YORK, 5000 tons, San Remo Towers apartment building, Seventy-fourth Street and Central Park West, to Harris Structural Steel Co.

NEW YORK CENTRAL RAILROAD, 400 tons, to American Bridge Co.

SPRINGFIELD, ILL., 1800 tons, State buildings, to Mississippi Valley Structural Steel Co.

BALTIMORE & OHIO RAILROAD, 150 tons, to McClintic-Marshall Co.

KALAMAZOO, MICH., 550 tons, building for Checker Cab Co., to Indiana Bridge Co.

CLEVELAND, 300 tons, East Seventy-ninth Street bridge for Nickel Plate Railroad, to American Bridge Co.

AKRON, OHIO, 700 tons, building for Akron *Times-Press*, to American Bridge Co.

TOLEDO, OHIO, 500 tons, addition for Electric Auto-Lite Co., to Whitehead & Kales Co.

KOKOMO, IND., 410 tons, telephone exchange, to Insley Mfg. Co.

FORT WAYNE, IND., 400 tons, Publix Theater, to McClintic-Marshall Co.

STURGEON BAY, WIS., 1000 tons, highway bridge, to Wausau Iron Works.

CHICAGO, 150 tons, Frederick H. Hild Library, to Wendnagel & Co.

CHEYENNE, WYO., 1200 tons, highway bridge across Canadian River, to Lakeside Bridge & Steel Co., Milwaukee.

SAND SPRINGS, OKLA., 900 tons, highway bridge across Arkansas River, to Clinton Bridge Co.

OKLAHOMA CITY, 3000 tons, Biltmore Hotel; 2500 tons to Mississippi Valley Structural Steel Co. and 500 tons to Kansas City Structural Steel Co.

SAN FRANCISCO, 140 tons, hotel, Turk and Polk Streets, to Judson-Pacific Co.

SAN FRANCISCO, 800 tons, power house for Pacific Gas & Electric Co., to Judson-Pacific Co.

OAKLAND, CAL., 110 tons, addition to Pier No. 2, Oakland Port Commission, to Pacific Coast Engineering Co.

LOS ANGELES, 525 tons, sound stage for R. K. O. Studios, to Consolidated Steel Corporation.

BURNS, ORE., 300 tons, mill for Hines Lumber Co., to Minneapolis Steel & Machinery Co.

SEATTLE, 243 tons, approach to West Spokane Street bridge, to Pacific Car & Foundry Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

PHILADELPHIA, 2500 tons, Market Street Bank, Juniper & Market Streets; William Steel & Sons, general contractors.

PHILADELPHIA, 7000 tons, convention hall; McCloskey & Co., Philadelphia, low bidders on general contract.

STATE OF VERMONT, 900 tons, New England Power Co. units.

BOSTON & MAINE RAILROAD, 350 tons, signal bridges.

FAIRFIELD, CONN., 200 tons, State bridge.

WATERTOWN, MASS., 175 tons, Hood Rubber Co. vulcanizing plant.

BOSTON, 180 tons, Lafayette Theater.

PROVIDENCE, R. I., 160 tons, United States Rubber Co. vulcanizing plant.

BOSTON & ALBANY RAILROAD, 150 tons, power house in Allston district.

NEW YORK, 2000 tons, apartment building at Eighty-ninth Street and Park Avenue.

NEW YORK, 1500 tons, Union League Club building, Park Avenue.

PHILADELPHIA, 500 tons, Jewelers' Building; up again for bids.

BALTIMORE & OHIO RAILROAD, 500 tons, bridges.

ALBANY, N. Y., 800 tons, county jail; bids Nov. 25.

CLEVELAND, 110 tons, Dudley H. Blossom swimming pool.

WAUKEGAN, ILL., 3500 tons, power house for Public Service Co. of Northern Illinois; bids to be asked soon.

PROVISO, ILL., 535 tons, township high school; Union Foundry Co., Chicago, low bidder.

JEFFERSON CITY, MO., 400 tons, bridge and road work for Missouri Highway Commission.

WICHITA, KAN., 800 tons, highway bridge.

SUBIACO, ARK., 600 tons, church.

PHOENIX, ARIZ., 830 tons, office building on First Avenue; bids being taken.

RIVERSIDE, CAL., 1250 tons, highway bridge.

SACRAMENTO, CAL., 168 tons, bridge over Corte Madera Creek; bids Nov. 27.

OAKLAND, CAL., 100 tons plates, 24-in. welded steel pipe line, East Bay Municipal Utility District; Steel Tank & Pipe Co., low bidder.

SEATTLE, 600 tons, Bremerton, bridge; bids being taken.

SEATTLE, 370 tons, Dumas Bay bridge; bids Nov. 12.

TACOMA, WASH., 2400 tons, Eleventh Street viaduct; general contract to Lindstrom & Feigeson, Portland, subcontract for steel not yet placed.

Sees Curtailed Demand for Machine Tools

Commenting on the probable effect of the stock market crash on machine tool business, Ernest F. DuBrul, general manager, National Machine Tool Builders' Association, writing in that body's monthly review, says:

On the whole, the near term prospect is not particularly bright. We should always remember that we feel the effects of business movements much more violently both on the upswing and the downswing than the consumer goods industries. That is one of the risks of the machine tool business which must be assumed by anyone who has the ambition to engage in this industry. . . . With the falling off of demand will come some laying off of workmen, and that restricts further demand.

It would seem to be prudent for the machine tool builder to beware of increasing inventory. Inventory that is now on hand, whatever its extent, has been accumulated to fill unfilled orders that have been on the books for some months. But some cancellations have already developed from the over-enthusiastic aircraft industry and perhaps such cancellations might develop in other industries, due to lack of business confidence.

Philadelphia Steel Club Elects Officers

At a luncheon meeting on Nov. 12, the Steel Club of Philadelphia elected its officers for the coming year. Paul M. King, Worth Steel Co., who was vice-president, is the new president, succeeding Willard S. Haring, Alan Wood Steel Co. W. W. Deal, American Steel & Wire Co., was elected vice-president, and S. H. Baker, Sharon Steel Hoop Co., was reelected secretary. John E. Wetzel, Superior Steel Corporation, and Robert J. McCracken, Central Iron & Steel Co., were elected directors.

Higher Freight Rates from South Suspended

WASHINGTON, Nov. 12.—The Interstate Commerce Commission today announced suspension until June 12 of tariff schedules proposing to cancel existing commodity rates on iron and steel products in carloads from points in Alabama, Georgia, Tennessee and Mississippi to points in Trunk Line and New England territories and the substitution of eighth class rates.

Under the proposed schedules, the rate from Birmingham to New York would be increased from 49c. to 65c. per 100 lb. and the rate from Birmingham to Boston would be increased from 51c. to 69c. The suspended schedules will be the subject of a hearing to be held in Birmingham on Dec. 16 before Examiner McChord.

PERSONAL

FREDERICK M. BECKET, president, Union Carbide & Carbon Research Laboratories, was among the distinguished alumni receiving the honorary degree of Doctor of Science at the 175th anniversary of Columbia University. WILLIAM CAMPBELL, Howe Professor of Metallurgy at Columbia University, also was awarded the honorary degree of Doctor of Science.

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WILLIAM HUTTON BLAUVELT, consulting engineer, New York, has been appointed manager of gas engineering of the Columbia Engineering & Management Corporation, a subsidiary of Columbia Gas & Electric Corporation, New York. CHARLES R. BELLAMY, who has been associated with Mr. Blauvelt in consulting practice, has joined the Columbia organization as gas engineer.

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R. L. COLLIER has been made assistant to GRANVILLE P. ROGERS, managing director of the Steel Founders' Society of America. Mr. Collier is a graduate of Ohio State University. For some time he conducted special work for a public utility company at Cleveland, and for the past three years has been engaged in trade organization work in the electrical field. He will be located in the executive offices of the society, 932 Graybar Building, New York, these offices having been moved from Pittsburgh.

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GLENN MUFFLY, engineer in charge of aircraft engine production for the Union Switch & Signal Co., Swissvale, Pa., during the war, has been added to the executive staff of American Cirrus Engines, Inc., Marysville, Mich., a unit of Allied Motor Industries, Inc.

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JAMES BRYDEN, works manager of Smith & McLean, Ltd., sheet and bar makers and galvanizers, Glasgow, Scotland, sailed for England on the Mauretania, Nov. 6, after a stay of several weeks in this country.

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J. P. GILL, metallurgist for the Vanadium-Alloys Steel Co., Latrobe, Pa., addressed the Hartford chapter of the American Society for Steel Treating on "Alloys and Their Effects in Tool Steels" in the Hartford Electric Co. assembly hall, Nov. 12.

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JOSEPH P. FLETCHER, heretofore manager of the Buffalo office of the Independent Pneumatic Tool Co., Chicago, has been appointed manager of the Philadelphia office, succeeding A. L. Schuhl, deceased. W. O. BECKER, who has been in the Toronto office, has been named manager in Buffalo.

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GORDON THORNTON has been added to the Clevland staff of the United States Electrical Tool Co., Cincinnati.

E. D. COWLIN, formerly New York manager of the Reliance Mfg. Co., manufacturer of spring washers and cold-drawn alloy steel, Massillon, Ohio, has been made general sales manager of the company and will make his headquarters at Massillon about Jan. 1.

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ARTHUR C. ALLSHUL, formerly manager of the Buffalo plant of Joseph T. Ryerson & Son, Inc., has been appointed manager of its new unit in

A. C. ALLSHUL

the Philadelphia district. As previously announced, the Ryerson company has purchased the business, equipment and good will of the Penn-Jersey Steel Co., Camden, N. J. CLARENCE S. GEDNEY has been appointed manager of the Buffalo plant, succeeding Mr. Allshul. Mr. Gedney has been connected for many years with the specialty sales division of the Ryerson business in the Chicago territory.

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H. BORNSTEIN, who is in charge of the testing and research laboratory of the Deere Co., Moline, Ill., spoke on "Problems in Cast Iron Metallurgy" at the monthly meeting of the Wisconsin Gray Iron Foundry Group, held at the Hotel Schroeder, Milwaukee, Nov. 6.

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L. E. ROARK, secretary of the Peoria Manufacturers' and Merchants' Association, has been elected president of the Illinois Industrial Council. The council consists of secretaries of associations of industrial communities in Illinois. A program of accident prevention is planned, as well as one of university training by the University of Illinois of promising students in the industrial field.

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NORMAN LEONHARD, superintendent of the pattern-making department of the Kissel Motor Car Co. for the last nine years, has resigned and has taken an interest in the Waukesha Pattern Works, Waukesha, Wis., established since 1926, but which has just been incorporated.

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WILLIAM H. TEXTER, who has been in charge of market survey work for the National Association of Flat Rolled Steel Manufacturers, Cleveland, has been appointed assistant to R. J. KAYLOR, director of publicity for the Youngstown Sheet & Tube Co., Youngstown. Mr. Texter has been identified with the steel industry since 1913 in various capacities, and has been with the Flat Rolled Steel makers for a year and a half.

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WILLIAM C. REITZ, HENRY J. MILLER, CHARLES E. BEESON and WILLIAM C. SUTHERLAND have been elected vice-presidents of the Pittsburgh Steel Co., Pittsburgh. Mr. Reitz continues as treasurer of the company and Mr. Miller as secretary. Mr. Beeson has charge of raw materials, and Mr. Sutherland, who was formerly assistant to the president, will remain in charge of the company's manufacturing activities. He was made a director of the company a short time ago. EMIL WINTER continues as first vice-president.

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ROBERT M. KANIK has been named a director of the Appleton Steel Tube Co., Appleton, Wis. He is president and general manager of the Moloch Foundry & Machine Co., Kaukauna, Wis.

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J. R. MORRIS, chief metallurgist of the Central Alloy Steel Co., Massillon, Ohio, was the speaker at the Nov. 5 meeting of the Tri-City chapter of the American Society for Steel Treating. He explained new developments in the process of nitriding steel.

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F. J. HEPP, manufacturing engineer, Westinghouse Electric & Mfg. Co., East Pittsburgh, will speak at a meeting of the Pittsburgh Foundrymen's Association at the Fort Pitt Hotel, Pittsburgh, on Nov. 18. Mr. Hepp, who has spent approximately 55 years of his life in the foundry industry, will speak on "Memoirs of Patterns and Castings."

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CHARLES O. HADLY, formerly vice-president in charge of sales of the Alan Wood Steel Co., Philadelphia, has joined the executive staff of the United States Steel Corporation at 71 Broadway, New York. For many years he has been prominent in the working out of distribution problems in the sheet steel industry.

A. M. Castle & Co. report net earnings of $666,402 for the nine months ended Sept. 30, after all charges and taxes, equal to $5.55 a share on the common stock. This compares with $489,470 net, or $4.15 a share, in the same period of 1928.

OBITUARY

CHARLES S. LE POER TRENCH, editor of the *American Metal Market* since 1899 and senior partner in C. S. Trench & Co., dealers in non-ferrous metals, New York, died in St. John's Hospital, Brooklyn, on Nov. 8, aged 75 years. He was born at Stadbroke, England, and came to the United States as a young man, identifying himself with White & Haskell, metal brokers, New York. In 1881, he organized C. S. Trench & Co. and was an outstanding figure in the metal trade during his entire business career. During the war, Mr. Trench was chairman of the British Red Cross and later was active in the British Great War Veterans of America. He was also president of the British Empire Chamber of Commerce in America.

C. S. LE POER TRENCH

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JOSEPH W. DONNER, vice-president in charge of operations of the Donner Steel Co., Buffalo, died at his home in that city on Nov. 9, following a long illness, aged 35 years. He was born at Columbus, Ind., and was educated at private schools. After his graduation from Princeton University in 1917, he became identified with the Donner Steel Co., where he held various positions in the operating end of the business. He became general superintendent in January, 1926, and was made vice-president in May of this year.

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HARRY C. HAIGHT, president, American Forge & Machine Co., Canton, Ohio, died on Nov. 4. He had been associated with the company since 1909.

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W. E. GERLINGER, president of the Gerlinger Aluminum and Brass Foundry Co., Milwaukee, and founder in the same city of the Gerlinger Electric Steel Casting Co. in 1902, from which he later withdrew, died at his home in Milwaukee, Nov. 3, aged 55 years.

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W. J. RATTLE, who established the first firm of analytical iron ore chemists in Cleveland, died Nov. 5, aged 77 years. He was graduated from Sheffield Scientific School of Yale University in 1874 and opened offices in Cleveland four years later. Before the war he was called to Russia by the Imperial Government to consult on the developments of the Russian iron ore industries and he was engaged at various times in other foreign countries as a consultant. He retired about a year ago because of poor health.

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HENRY AYLETT COLES, Atlanta, Ga., district manager for the Westinghouse Electric & Mfg. Co., East Pittsburgh, died recently at New Orleans. He was born in Virginia in 1870 and attended Roanoke College and the University of Virginia. He joined the Westinghouse company more than 30 years ago, and has been stationed at Atlanta since 1897.

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CLARENCE R. CRAIN, superintendent of the Mattison Machine Works, Rockford, Ill., and president of the Rockford branch of the American Society for Steel Treating, died Oct. 29, aged 38 years.

Smaller Coal Production In 1928

Total production of bituminous coal last year is reported by the United States Bureau of Mines at 500,745,000 net tons, which is a decline of 3.3 per cent from the 517,763,000 tons mined in 1927. Maximum output was made in October, with 51,176,000 tons, and minimum in April, with 32,710,000 tons. The average number of working days in the year was 307, giving an average output of 1,631,000 tons each working day.

Anthracite production in 1928 is reported at 75,348,000 tons, a decline of 5.9 per cent from the 80,096,000 tons of 1927. Maximum production for the year was in October, with 8,400,000 tons, while the smallest month's output was that of July, with 4,394,000 tons. Working days amounted to 303½ in the year.

Production of bituminous coal in the 1929 calendar year to Nov. 2 is reported by the United States Bureau of Mines at 436,568,000 net tons. This is 8.8 per cent more than the 406,707,000 tons up to the same date in 1928, but is about the same as the 1927 output at the corresponding date.

Automobile Sales Adversely Affected in Large Cities

Automobile sales in metropolitan sections have declined as a consequence of stock market slump, and some cancellations of orders and a definite loss of interest by prospects have been reported. Sections of the country not directly affected by security trading apparently have felt no reaction, however, unless possibly a favorable one, according to *Automotive Industries*.

Some timidity has been exhibited by certain manufacturers, who have abandoned production schedules for the rest of the year, but too much importance should not be attached to this condition in view of the fact that schedules for production in many of these plants are naturally very low at this time pending the introduction of new models.

It is difficult to accept the argument that automobile factories in the United States and Canada will be able to match the production of 512,450 units turned out during the last two months of 1928, particularly as operating schedules as announced by a number of factories indicate a considerable recession from the October program.

Large Order Placed for Steel Office Equipment

The General Fireproofing Co., Youngstown, has received a contract to supply complete steel office equipment for the new $8,000,000 office building which is being constructed at Hartford, Conn., by the Aetna Life Insurance Co.

W. H. Foster, chairman of the General Fireproofing Co.'s board of directors, says this is the largest single order of the kind ever placed. It includes hundreds of steel desks, filing equipment pieces, steel shelving, chairs, racks, cabinets and safes. It is to be completed by Jan. 1, 1931.

The fireproofing company is bringing to completion at Warren, Ohio, a new department to manufacture aluminum office chairs.

The Youngstown Pressed Steel Co. has started an addition to produce enameled ware, which will involve an expenditure of nearly $500,000.

New Electrolytic Zinc Plant Started at St. Louis

Announcement has been made by the Evans-Wallower Lead Co., of the successful operation of its electrolytic zinc plant at East St. Louis, Ill. The roasters were started early in September and power was switched on the cellroom on Sept. 23. Output of cathode zinc at the beginning was 25 tons per day and production has been increased to the rated capacity of 50 tons daily. The new reagent developed by U. C. Tainton has been effective in preventing excessive atmospheric spray in the cellroom.

Varying Movements in European Markets

British Pig Iron Recovery and German Dullness—Japan to Make Steel Piling—French Scrutinize Wages

(*By Cable*)

LONDON, ENGLAND, Nov. 11.

PIG IRON is rather more active on domestic buying for forward delivery and some small lots of Cleveland iron have been sold for export. Output of pig iron is likely to be restricted temporarily, as Bolckow, Vaughan & Co. are blowing out two furnaces for repairs and arranging to resume operation of two others shortly.

At present, furnaces are generally well engaged through November, but are faced with continually increasing costs. Hematite iron is strong, with good domestic and export demand and East Coast, mixed numbers, has sold at £3 18s. ($18.94) per ton for prompt shipment and £4 1s. ($19.68) a ton for January delivery. The Steel Makers Association is leaving prices unchanged, contrary to the expectations of domestic users, who have bought heavily in anticipation of advances. Mills are now fairly well booked, but still lack export orders.

Tin plate is moderately active and prices are being maintained despite weakness in the tin market. Mills are well occupied and world consumption of tin plate is considered to be increasing steadily. Consequently, producers are optimistic of the future.

There is slightly more activity in galvanized sheets, but, with lower costs, makers have accepted £12 15s. per ton (2.76c. per lb.), f.o.b., for No. 24 gage corrugated sheets in bundles, although the market is slightly higher. Black sheets are quiet.

A lockout of shipyard joiners, involving more than 10,000 men, has been declared by employers, effective Nov. 23.

The Stanton Ironworks Co., Nottingham, is starting a new plant for production of De Lavaud centrifugal cast iron pipe, which will increase its output by 15 miles a week.

Continental iron and steel prices are steadier as a result of the International Steel Cartel's decision to reduce production. The situation is complicated, however, by increased export demand experienced by British traders, while mills report cancellations.

German Steel Business Declines

Buyers Await Renewal of Syndicates—Exports Suffer From Belgian and American Competition

BERLIN, GERMANY, Oct. 25.—The business outlook is uncertain. Steel production is still at a higher rate than in 1928, but buying has fallen off considerably. Domestic steel prices for November are unchanged, but further weakness has developed in the export market. As a result, the Ingot Steel Syndicate has made another increase in its price rebates to exporting manufacturers on certain steel products. For November these rebates are, per metric ton: ingots, 12 m. ($2.86); billets, blooms and slabs, 19 m. ($4.52); structural shapes, 36 m. ($8.57); steel bars, 33 m. ($7.85); bands, 42 m. ($10); wire rods, 21.50 m. ($5.12); and heavy-gage sheets, 20 m. ($4.76). There has been considerable discussion of rebates during recent negotiations for renewal of the domestic syndicates, and manufacturing consumers generally agree that the system is materially aiding export trade in machinery and electrical equipment.

Some of the caution now being shown by iron and steel buyers is at-

British and Continental European Export Prices per gross ton, f.o.b. United Kingdom Ports, Hamburg and Antwerp, with the £ at $4.85

British Prices, f.o.b. United Kingdom Ports

Cleveland No. 3 foundry	£3	12½s.	to	£3	13½s.	$17.58	to	$17.82
East Coast hematite	3	18	to	3	18½	18.94	to	19.15
Ferromanganese, export	13	10	to	14	0	65.47	to	67.90
Billets, open-hearth	6	5	to	6	7½	30.31	to	30.92
Sheet bars, open-hearth	6	5	to	6	10	30.31	to	31.52
Black sheets, Japanese specifications	12	12½				61.22		
Tin plate, per base box	0	18¾	to	0	19	4.54	to	4.60
Rails, 60 lb. and heavier	7	15	to	8	15	37.59	to	42.43
						Cents per Lb.		
Steel bars, open-hearth	7	15	to	8	10	1.67	to	1.84
Beams, open-hearth	7	2½	to	7	12½	1.55	to	1.65
Channels, open-hearth	7	7½	to	7	17½	1.60	to	1.71
Angles, open-hearth	8	2½	to	8	12½	1.76	to	1.86
Ship plates, open-hearth	7	12½	to	8	2½	1.66	to	1.76
Black sheets, No. 24 gage	10	0	to	10	5	2.17	to	2.21
Galvanized sheets, No. 24 gage	12	15	to	13	5	2.76	to	2.87

Continental Prices, f.o.b. Antwerp or Hamburg

Foundry iron, 2.50 to 3.00 per cent sil., 0.50 to 0.90 per cent. phos.	£3	8s.	to	£3	11½s.	$16.49	to	$17.33
Foundry iron, 2.50 to 3.00 per cent sil., 1.00 per cent and more phos.	3	7	to	3	8	16.24	to	16.49
Billets, Thomas	4	13	to	4	13½	22.56	to	22.80
Sheet bars, Thomas	4	12	to	4	12½	22.31	to	22.43
Wire rods, low C., No. 5 B.W.G.	6	3	to	6	5	29.82	to	30.30
Black sheets, No. 31 gage, Japanese	12	6	to	12	7½	59.65	to	60.02
Rails, 60 lb. and heavier	6	8½	to	6	10*	31.16	to	31.52
Rails, light	6	1½				29.46		
						Cents per Lb.		
Steel bars, merchant	5	5	to	5	7½	1.14	to	1.16
Steel bars, deformed	5	3	to	5	4	1.12	to	1.13
Beams, Thomas, British standard	4	19	to	5	5	1.07	to	1.14
Channels, Thomas, American sections	5	14	to	5	18	1.25	to	1.27
Angles, Thomas, 4-in. and larger, over ⅝-in. thick	5	2	to	5	7½	1.09	to	1.16
Angles, Thomas, 3-in.	5	6				1.14		
Ship plates, open-hearth inspected	7	5				1.61		
Hoop and strip steel over 6-in. base	5	12½				1.20		
Wire, plain, No. 8 gage	7	2½	to	7	3½	1.54	to	1.55
Wire, galvanized, No. 8 gage	8	15	to	8	16	1.87	to	1.89
Wire, barbed, 4-pt. No. 12 B.W.G.	11	10				2.49		
Wire nails, base	0	7¼				$1.75	per	keg
Wire nails, assortments, 1 to 6-in. keg	10	6½				2.23		

*Open-hearth steel, 10s. ($2.42) per ton extra.

tributed to the doubtful outlook for both domestic and foreign business and also to the uncertainty about the renewal of many of the syndicates. Within a month meetings will be held of the Ingot Steel Syndicate, the "A" Products Syndicate and the Steel Bar Syndicate. To simplify the negotiations it has been agreed that all these syndicates, including the Wire Rod Syndicate, shall expire simultaneously, probably Jan. 31.

The demand of the Friedrich Krupp A.G. for a 175,000-ton quota in the Ingot Steel Syndicate is reported to have been withdrawn. This move is expected to pave the way for an agreement among the Krupp works, the Mannesmann Tube Co. and the United Steel Works. However, the plan of the Friedrich Krupp A.G. to establish a new tube mill of large capacity has not yet been abandoned and constitutes a serious threat to renewal of the German Tube Syndicate. Negotiations in the Ingot Steel Syndicate will involve redistribution of quotas, and a decision on separation of export from domestic allotments. On this latter question there is a wide divergence of opinion between producers selling largely in the domestic market and mills producing almost exclusively for export.

The prospect of renewal of the International Steel Cartel has improved, following the reported abandonment by Belgium of opposition to the establishment of price-fixing, selling organizations for separate products. This change in attitude is said to have resulted from a decline in prices and business in Belgian export trade.

Foreign Trade Threatened

It appears doubtful that the present high rate of steel production will be maintained much longer, as trade is declining slowly. Curtailed exports will probably be reflected in reduced German purchases of American cotton, copper and other materials. The situation in the export market is illustrated by a comparison of German and Belgian prices. Although German mills state that they are selling abroad at present quotations without profit, German prices are still higher than Belgian. German blooms, for example, are quoted at £4 14s. 6d. ($22.95), and Belgian at £4 5s. 6d. ($20.78) per metric ton, f.o.b. Antwerp; German billets at £4 15s. 6d. ($23.21) per ton and Belgian at £4 11s. 6d. ($22.23), Antwerp; German shapes at £5 1s. per ton (1.11c. per lb.) and Belgian at £4 18s. per ton (1.08c. per lb.); German steel bars at £5 4s. per ton (1.15c. per lb.) and Belgian at £5 3s. per ton (1.13c. per lb.).

German steel exports can apparently be maintained only by further reductions in prices. Recently certain producers, including the mills at Essen, have reported increasing competition in South American markets from American mills and a resultant decline in German business. Exports to the Far East have receded, also, Chinese buying being at a minimum.

Japan to Roll Steel Piling

German Design Considered — Government Works May Install Rail Steel Bar Mill to Reroll Short Rails

YOKOHAMA, JAPAN, Oct. 15.—The Seitetsu Jo (Government Works) is increasing its steel making capacity and adding new products to its output. It is planned to build a new plant at Horaoka, replacing the company's No. 1 mill, which is to be removed from Yawata and rebuilt. Present plans call for an annual output of 500,000 metric tons of steel ingots from either seven or eight furnaces of not less than 100 metric tons capacity.

Recently the various designs of sheet steel piling imported by Japan have been investigated by the company with a view to developing a special Japanese design. Japan imported 22,000 metric tons of the various types of steel piling in 1928. It has now been decided to obtain the patent rights for Japan on the most desirable design, and Larssen piling, manufactured by the Vereinigte Stahlwerke A.G. in Germany, is understood to have been selected.

For some months the Seitetsu Jo has been trying to find an outlet for short-length and other waste rails, an increasing tonnage of which has become available as output of the rail mills has mounted. Part of these off-grade rails has been purchased by the Imperial Government Railways, but there is still a considerable tonnage, which cannot be economically charged into the open-hearth furnace as heavy melting steel. In certain districts small quantities of these waste rails have been used by cutlery makers. Recently the possibility of installing a mill to roll rail steel reinforcing bars, fence posts and similar material, as in the United States, has been considered, and it has been suggested also that these rails might be rolled flat for use in manufacturing scoops and shovels.

The Vereinigte Stahlwerke, A. G., recently licensed the Cargo Fleet Iron Co., Litd., Middlesbrough, England, to roll Larssen steel piling for distribution in Great Britain and the British dominions and colonies.

New British Steel Merger Being Considered

LONDON, ENGLAND, Nov. 2.—Merger of the Pearson & Knowles Coal & Iron Co., Ltd., Warrington, with Sir W. G. Armstrong, Whitworth & Co., Ltd., is contemplated. The latest report from the latter interests is that the iron and steel business of the Pearson & Knowles group of companies is being carefully studied with this end in view. The Pearson & Knowles group has a weekly capacity of about 2700 tons of finished iron and steel from 45 puddling furnaces, six bar mills, four hoop mills and one wire rod mill. It draws its steel supplies from the Partington Steel & Iron Co., Ltd., which it controls.

In 1920 Sir W. G. Armstrong, Whitworth & Co., Ltd., acquired a controlling interest in the Pearson & Knowles Coal & Iron Co., by purchase of its stock. With the exception of two of its coal properties all the companies in the group have shown a general improvement in earnings.

American Motor Car Builder Studies French Wages

BORDEAUX, FRANCE, Nov. 1.—Investigations of wage rates paid by the automobile industry in various Continental countries, now being made by a leading American automobile manufacturer, have attracted considerable attention in France. There is much conjecture as to the use that will be made of this information and a belief in some quarters that it portends large production operations by this manufacturer in some European country, possibly France.

It is pointed out that, if American automobile builders start production in the French market and offer a higher rate of wages than the standard in France, French producers can follow their lead and also advance the wage level. It is argued, however, that, if higher wages should prove unprofitable in France, the first to be forced to suspend them would be the French factories, since they have less capital than the American builders.

Russia Suggests Manganese Agreement

HAMBURG, GERMANY, Nov. 1.—The Russian Government, which controls the Georgian Manganese Ore Co., has approached producers in South Africa, India and Brazil with an offer to negotiate an agreement to prevent further price reductions, according to the official Government trade publication *Ekonomitscheskaja Shin.* It is believed that negotiations will result in stabilized world prices of manganese ore.

Italian Steel Companies to Be Merged

The Societa Altiforni & Acciaierie D'Ilva, a leading Italian steel company, with capital stock totaling 300,000,000 lire ($15,705,000), will absorb the Societa Anonima Franchi Gregorini of Brescia, with capital of 90,000,000 lire ($4,711,500), and the Societa Anonima Ferriere di Veltri of Genoa, with capital of 45,000,000 lire ($2,355,750), according to a report to the Department of Commerce. Financing is to be through the Banco Commerciale and Credito Italiano.

Machinery Markets and News of the Works

Tool Sales Drop Slightly

Machinery Business Feels Some Effects of Stock Market Crash—Outlook Still Uncertain

WHILE orders and inquiries for machine tools are described as "better than fair," there has been some falling off in the past week. Most significant, perhaps, is the fact that some prospective business will not be placed because of curtailment of manufacturing programs of the companies which were to buy. This is most noticeable in aircraft, radio and electric refrigerator lines. Deliveries on a few machine tool orders recently placed have been held up, at least temporarily.

On the other hand, some companies are going ahead with plans for 1930 without regard for any possible effect on business that the recent stock market break may have. Within the past week sales of tools have been made with deliveries extending as far ahead as April.

Machine tool plants are well filled with orders, and few are able to make shipments of tools until after Jan. 1.

The effect which the collapse in security values may have is discussed by the National Machine Tool Builders in its November bulletin, which says that "we are pretty sure to find a goodly recession in demand on account of the stock market smash."

This report says that some cancellations have already developed from "the over-enthusiastic aircraft industry and perhaps such cancellations might develop in other industries due to lack of business confidence."

The association adds, however, that "a period of falling demand will not be entirely unhealthy."

"Unfortunately for the machine tool industry," says the report, "the motor industry is the sore spot in the whole business structure at this time, and the motor industry has been the largest single source of machine tool orders for many years past. As the motor industry is quite close to its saturation point, we need not expect in the future as many orders from the motor industry as a whole because that industry is stopping its expansion."

New York

NEW YORK, Nov. 12.—As expected, the recent stock market collapse has had an almost immediate effect on the manufacturing programs of companies engaged in the so-called luxury class of goods. Curtailment has occurred in the production of electric refrigerators and radios. A large manufacturer of radio tubes has postponed contemplated purchases of machine tools because of the probability of a reduced demand for its product. Spotty conditions are developing in the local machine tool trade, though some sellers declare that sales and inquiries are still "better than fair." Others report a decline in volume of orders booked thus far in November, as compared with October volume. In contrast with this situation, it is significant that within the week tools have been sold for shipment as far ahead as next April. During the remainder of the year machine tool sales will undoubtedly be governed to a large extent by the business prospects of individual companies and to a lesser extent than usual by inventory considerations which ordinarily are a factor at the end of every year. Scarcely any machine tools purchased now can be delivered until after Jan. 1, and most inventories are completed by that time.

Keystone Foundry Co., Essex Street, Brooklyn, manufacturer of iron castings, has engaged E. M. Edelson, 26 Court Street, architect, to prepare plans for two one-story foundry units, 95 x 100 ft., to cost about $60,000 with equipment.

Board of Education, Amsterdam, N. Y., is considering installation of manual training department in high school in Northampton Park, to cost $600,000, for which plans are being drawn by H. F. Daly, 15 East Main Street, architect.

Following recent acquisition by Western Electric Co., 195 Broadway, New York, of Turner-Armour Corporation, 1201 Flushing Avenue, Brooklyn, with branch plant at 6600 Metropolitan Avenue, Queens, manufacturer of telephone booths, etc., purchasing company is arranging to increase production of new type metal-lined telephone booths from 1600 to 2000 units per month. F. A. MacNutt is works manager.

Leviton Mfg. Co., 226 Newell Street, Brooklyn, manufacturer of electrical porcelain specialties, has awarded general contract to W. P. McGarry Co., 2929 Freeman Avenue, for four-story plant, 105 x 160 ft., to cost more than $135,000 with machinery, presses, etc.

Board of Education, Park Avenue and Fifty-ninth Street, New York, has plans for a power house for institutional building at Jerome Park reservoir, project to cost $750,000 with equipment. Thompson, Holmes & Converse, 101 Park Avenue, New York, are architects.

Nevins Shipyard, City Island, New York, has plans for two-story shop addition, to cost about $30,000 with equipment. Franklin, Bates & Heindsman, 2526 Webster Avenue, are architects.

Claude Neon Electrical Products Corporation of Delaware, affiliated with Claude Neon Lights, Inc., 41 East Forty-second Street, New York, manufacturer of tube electric lights, etc., has arranged for consolidation with Claude Neon Electrical Products Corporation of Oregon, Inc., and will consolidate with organization. It is planned to expand production on Pacific Coast.

Van Wart & Wein, 347 Madison Avenue, New York, architects, have plans for a one-story machine shop, 100 x 215 ft., at Long Island City, to be occupied by a company whose name is temporarily withheld, represented by T. Steele, 482 Vernon Boulevard, Long Island City.

William Shary, 22 East Seventeenth Street, New York, architect, has filed plans for a multi-story automobile service, repair and garage building at 12-16 East Thirteenth Street, to cost about $125,000 with equipment.

United States Nickel Co., at North Brunswick Township, near New Brunswick, N. J., has arranged for dissolution of company, and plant will be discontinued. Production will be continued by parent organization, Usines De Nickel De La Nethe, with plant at Duffel, Belgium. Walter C. Kerrigan, Highland Park, N. J., is secretary and treasurer of United States Nickel Co., and is said to be planning to place company plant on market.

Driver-Harris Co., Middlesex Street, Harrison, N. J., manufacturer of wire products, will soon take bids for about seven two and three-story additions, to cost over $350,000 with equipment. J. A. Finegan, 776 Broad Street, Newark, is architect.

Kirchhof Patent Co., Newark, manufacturer of tin toys and other metal novelties, has removed its plant from 30 Stirling Street to a larger factory at 60-64 Union Street, where production will be expanded.

Warren Foundry & Pipe Co., Sitgreaves

Street, Phillipsburg, N. J., is considering rebuilding one-story unit destroyed by fire Nov. 2.

Tung Sol Lamp Works, Inc., 95 Eighth Avenue, Newark, manufacturer of radio tubes and equipment, has taken bids on general contract for a four-story addition, 100 x 150 ft., to cost more than $125,000 with equipment. Fougner & Gautier, 103 Park Avenue, New York, are architects.

Beaver Mfg Co., 625-45 North Third Street, Newark, manufacturer of electric wiring devices, switches, etc., has completed a two-story addition, 50 x 100 ft., and will use in part for a new assembling department.

Hackensack Water Co., Park Avenue, Weehawken, N. J., has plans for an equipment storage and distributing plant on Hackensack Avenue, Hackensack, with automobile service, repair and garage building for company cars and trucks, to cost over $85,000. C. V. R. Bogert, 210 Main Street, Hackensack, is architect.

Charles Miller & Co., Secaucus Road, North Bergen, N. J., have superstructure under way on two-story addition, 38 x 110 ft., to be equipped as a cooling and freezing department for adjoining three-story meat-packing plant, with part to be used as an engine room, to cost over $70,000 with equipment. Otto S. Schlick, 136 Liberty Street, New York, is architect and engineer.

New England

BOSTON, Nov. 11.—Although machine tool dealers report sales larger than a week ago, the trade in general describes the market as dull. Some prospects have signified intentions of closing in December, but more have postponed purchases until after Jan. 1. Dealers have figures out on a large number of tools, however, and buying, when resumed, in all probability will be good. New England machine tool builders report a further falling off in bookings, but deliveries are still unsatisfactory to a majority of users. Metal-working plants are not so busy as in October, but more active than in November last year. The present let-down in operations is seasonable.

New England Fuel & Transportation Co. will build coal elevators at 140 Ballou Avenue, Dorchester district, Boston; also a coke storage plant at 140 Abattoir Avenue, Brighton district.

Fairfield County Ice Co., Stamford, Conn., has awarded a contract for a one-story plant, 80 x 220 ft., for which miscellaneous electrical and other equipment is required.

Boston & Maine Railroad will soon begin work on a locomotive coaling plant at Worcester, Mass. Conveying equipment will be purchased.

William E. Arnold Co., Malden, Mass., will erect a machine shop to cost $25,000 without equipment.

International Silver Co., Meriden, Conn., closed bids Nov. 8 on one, two and three-story additions and alterations. Company has under consideration purchase of drop hammers.

Electric Specialty Co., Stamford, Conn., has awarded a general contract for a two-story addition, 44 x 120 ft.

N. D. Cass Co., Athol, Mass., maker of toys, has purchased International Toy Corporation, New Bedford, Mass., and will move machinery to Athol. New metal-working equipment will be purchased later.

Stanley Electric Tool Co., New Britain, Conn., a subsidiary of Stanley Works, has been incorporated. New company has acquired Unishear Co. and Ajax Electric Hammer Co., both of New York, and will manufacture products of these concerns together with electric machinery formerly made by Stanley Rule & Level Co. at New Britain.

City Council, New Britain, Conn., is planning purchase of property for a municipal airport, to include hangar, repair shop, oil storage and other structures, to cost more than $75,000 with equipment. R. W. Whitman, councilman, is member of committee in charge.

Boston Ice Co., 11 Deerfield Street, Boston, has acquired property on East Eagle Street, and contemplates new plant, to cost more than $90,000 with machinery.

Fenn Mfg. Co., 1841 Broad Street, Hartford, Conn., manufacturer of special machinery, tools, etc, has awarded general contract to R. G. Bent Co., Inc., 93 Edwards Street, for one-story top addition, to cost about $30,000 with equipment.

The Crane Market

NEW inquiry for locomotive cranes has improved in the past week, and the market for used equipment is showing increased activity. The Tide Water Oil Co., 11 Broadway, New York, is inquiring for a 25-ton locomotive crane, the Standard Oil Co. of New Jersey for two 25-ton locomotive cranes for Bayway, N. J., and the Anglo-Chilean Consolidated Nitrate Corporation, New York, for a 25-ton and a 35-ton locomotive crane for export. The Bethlehem Shipbuilding Corporation, Bethlehem, Pa., has not yet closed on a 50-ton locomotive crane. Overhead crane inquiry continues rather limited. Among inquiries expected to close soon is a 25-ton, 1-motor overhead crane for the Phoenix Utility Co., 71 Broadway, New York.

Among recent purchases are:

Magnolia Petroleum Co., New York, 35-ton, 32-ft. 11¾-in. span, overhead crane for Beaumont, Tex., from Box Crane & Hoist Corporation.

E. I. du Pont de Nemours & Co., Wilmington, Del., 10-ton, 27-ft. span electric traveling crane from Shepard Niles Crane & Hoist Corporation.

Sinclair Refining Co., New York, 10-ton, 42-ft. span, electric crane for new refinery at Wellsville, N. Y., from Maris Brothers.

General Electric Co., Schenectady, N. Y., four 2-ton electric cranes for Bloomfield, N. J., from Shepard Niles Crane & Hoist Corporation.

Chicago, Rock Island & Pacific, 10-ton, 30-ft. span, 2-motor stationary gantry crane from Whiting Corporation.

Navy Department, Mare Island, Cal., 30-ton, steam-driven locomotive crane from Orton Crane & Shovel Co.

St. Louis River Mercantile Co., Cloquet, Minn., 30-ton oil driven locomotive crane from Orton Crane & Shovel Co.

Monessen Southwestern Railroad, Monessen, Pa., 30-ton, gasoline operated locomotive crane from Orton Crane & Shovel Co.

United States Rubber Co., Providence, R. I., has asked bids on general contract for addition to mill on Valley Street, to cost over $50,000 with equipment. Lockwood Greene Engineers, Inc., 24 Federal Street, Boston, is architect and engineer. Headquarters of company are at Broadway and Fifty-eighth Street, New York.

duPont Viscoloid Co., Leominster, Mass., has awarded contract to Wiley & Foss, Fitchburg, Mass., for addition to plant for manufacture of new type of safety glass for automobiles, to cost about $1,000,000 with machinery. Company will rebuild small unit at plant recently damaged by fire.

Philadelphia

PHILADELPHIA, Nov. 11.—Wicaco Screw & Machine Works, Inc., 4801 Stenton Avenue, Philadelphia, has awarded general contract to Paul Brosz, 2515 West Huntingdon Street, for a one-story addition, to cost about $30,000 with equipment.

Tilden, Register & Pepper, 1608 Walnut Street, Philadelphia, architects, have filed plans for a multi-story automobile service, repair and garage building at 1616-26 Walnut Street, to cost more than $350,000, of a gross expenditure of $2,000,000 to be made for other building at same location.

Shell Eastern Petroleum Products, Inc., 122 East Forty-second Street, New York, a subsidiary of Shell Union Oil Co., Shell Building, St. Louis, has purchased 4½-acre tract on Schuylkill River, near Grays Ferry Bridge, Philadelphia, and plans early construction of oil storage and distributing plant, to cost more than $125,000 with equipment. Property was formerly occupied by Philadelphia Rubber Co.

Mechanical handling equipment will be installed in new one-story loading station to be built by Freihofer Baking Co., Twentieth Street and Indiana Avenue, Philadelphia, to cost about $75,000. General contract has been let to Philip Haibach Contracting Co., 1261 North Twenty-sixth Street.

Brockway Motor Truck Corporation, 4500 Woodland Avenue, Philadelphia, with plant at Cortland, N. Y., has awarded general contract to Nelson Pedley Construction Co., 9 South Sixteenth Street, for a service, repair and sales building, to cost over $90,000 with equipment. Eugene A. Stopper, Fuller Building, is architect.

Ralph B. Bencker, Horn Building, Philadelphia, architect, has plans for a six-story and basement factory, 90 x 95 ft., to be known as the Jewelry Trade Building, for precision and light manufacturing in this industry, to cost $250,000.

Public Service Electric & Gas Co., Trenton, N. J., with headquarters at Public Service Terminal Building, Newark, N. J., has plans for an equipment storage and distributing plant, with mechanical and electrical repair departments, to cost $100,000 with equipment. Work will be in charge of Public Service Production Co., same address, an affiliated organization.

Central Transportation Co., Broad Street Bank Building, Trenton, has plans for a one-story motor bus service, repair and garage building, 100 x 250 ft., for company use, reported to cost about $85,000 with tools and equipment.

School Board of Lower Wakefield Township, Yardley, Pa., is considering installation of manual training equipment in new two-story high school to cost $160,000, for which plans will be drawn

by Heacock & Hokanson, 1211 Chestnut Street, Philadelphia, architects.

Autocar Co., Ardmore, Pa., manufacturer of motor trucks, has approved increase in capital from 100,000 shares of stock, $100 par value each, to 600,000 shares, no par value, part of proceeds to be used for expansion.

State Board of Education, Trenton, N. J., will have plans drawn soon for power plant for new school group at Hillwood Lake, entire project to cost $985,000, which amount has been authorized by State.

Stacy Paper Box Co., Ewing and Ogden Streets, Trenton, N. J., manufacturer of corrugated and other paper folding boxes and containers, has leased local factory units held by Trent Corporation, and will occupy what is known as Building No. 1 for new plant. Present factory will be removed to new location and capacity increased. Expansion will cost more than $40,000 with equipment.

South Atlantic

BALTIMORE, Nov. 11.—Victor Cooler Door Co., Inc., First National Bank Building, Hagerstown, Md., manufacturer of insulated refrigerator doors, etc., has awarded general contract to J. B. Ferguson Co., 39 West Washington Street, for one-story addition to plant on Frederick Street, to cost over $100,000 with equipment.

Baltimore & Ohio Railroad Co., Baltimore, has awarded general contract to Olga Construction Co., Chicago, for new coal tipple at Fairmont, W. Va., with electric hoists and other mechanical handling equipment, to cost over $60,000. H. A. Lane is chief engineer.

Webb Packing Co., Crisfield, Md., meat packer, has authorized immediate erection of new branch plant at Salisbury, Md., on site recently acquired, to include refrigerating department, mechanical-handling equipment, etc., to cost about $140,000.

H. Warwick, Vermont Avenue, N. W., Washington, architect, has plans for a three-story automobile service, repair and garage building, to cost about $100,000 with equipment.

Virginia Electric & Power Co., Richmond, Va., has acquired local property and plans construction of two-story equipment storage and distributing building, with mechanical and electrical repair divisions, 125 x 300 ft., to cost more than $150,000 with equipment. Carneal, Johnson & Wright, Electric Building, are architects.

Dominion Oil Co., Richmond, Va., has plans for oil storage and distributing plant, to cost $125,000 with equipment.

Horace E. Dodge Boat & Plane Corporation, 3 East Fifty-second Street, New York, Horace E. Dodge, president, recently organized to take over Horace E. Dodge Boat Works, Inc., 614 Lycaste Avenue, Detroit, has awarded general contract to Virginia Engineering Co., First National Bank Building, Newport News, Va., for new plant at Newport News, where 100-acre tract was lately purchased. Plant will consist of several units for parts manufacture and assembling of motor boats, flying boats and amphibian planes, with power substation, boiler house, dock and other miscellaneous structures, to cost about $1,000,000. It is proposed to construct additions later to more than triple this investment. Plant at Detroit will be removed to new location. Philip L. Small & Associates, Terminal Tower Building, Cleveland, are architects and engineers.

Maryland Bolt & Nut Co., Mount Washington, Baltimore, has awarded general contract to Consolidated Engineering Co., 20 East Franklin Street, for two-story addition, 30 x 60 ft., to cost about $20,000 with equipment.

Curtiss Airports Corporation, 27-29 West Fifty-seventh Street, New York, has begun construction of two hangars, with repair facilities at new airport at Baltimore, where 260-acre tract will be laid out for this purpose. Oil storage and distributing building and other units will be built, followed by administration building in spring. Entire project will cost more than $100,000. Kenneth Franzheim, 345 Madison Avenue, New York, is architect. General contract is in charge of Stone & Webster Engineering Corporation, 49 Federal Street, Boston, engineer and contractor.

Boland Mfg. Co., Greenville, S. C., manufacturer of shuttles and other textile mill equipment, has taken over property on Old Ensley Road, and will operate temporary plant at that location. New plant will be built later.

Pittsburgh

PITTSBURGH, Nov. 11.—Dealers report sufficient business in prospect to keep local offices well occupied. New inquiry is appearing daily, but lists of more than a few tools are exceptional. Purchases are being made in the same way, although awards are expected in the next few days on the Pittsburgh Board of Education's list which closed last week and included a considerable number of tools.

Many large steel companies whose operations have been considerably reduced in the last few weeks are taking advantage of the opportunity to make additions and repairs to equipment. Builders of heavy machinery are well occupied and the time of delivery is often the deciding factor in placing an order.

Edgewater Steel Co., Oakmont, Pa., has asked bids on general contract for two-story addition, to cost about $45,000 with equipment. Part of unit will be used for testing.

Semler Co., Jeannette, Pa., manufacturer of steam and water pipe fittings, flanges and flange unions, etc., has awarded general contract to J. E. Myers, Jeannette, for one-story addition, totaling about 10,000 sq. ft. floor space, primarily for manufacture of brass fittings, to cost about $35,000 with machinery.

Firestone Tire & Rubber Co., Akron, Ohio, will soon call for bids for three-story factory branch, storage and distributing plant at Pittsburgh, to cost more than $225,000 with equipment. Lockwood Greene Engineers, Inc., Hanna Building, is architect and engineer.

Austin Motor Car Co., Butler, Pa., recently organized to take over part of plant of Standard Steel Car Co., has plans by A. J. Brandt Co., 412 Stormfeltz Building, Woodward Avenue and Grand Boulevard, Detroit, engineer, for extensions and improvements, to cost about $100,000. List of equipment is being arranged. Mr. Brandt is interested in Austin company.

Dunbar Flint Glass Co., Dunbar, W. Va., has plans for extensions and improvements, including installation of batch-mixing, mechanical-handling and other apparatus, to cost about $200,000.

Globe Brick Co., Kenilworth, W. Va., has awarded general contract to Austin Co., Euclid Avenue, Cleveland, for two additions, one-story, 65 x 225 ft., and two-stories, 40 x 60 ft., for production of glazed face brick, to cost about $100,000 with machinery.

K. Simon, 160 Fullerton Street, Pittsburgh, operating a wagon building and repair works, will soon take new bids on revised plans for a two-story addition, 45 x 65 ft., to cost $45,000 with equipment. A. R. Douglass, Benedum Trees Building, is architect.

Acme Steel Co., Glassmere, Pa., manufacturer of electric steel castings, is making additions to its foundry buildings, 80 x 200 ft. and 40 x 80 ft., and will install additional crane, annealing oven, core ovens, air compressor and other equipment. Capacity will be increased 60 per cent.

Buffalo

BUFFALO, Nov. 11.—Sterling Engine Co., 1250 Niagara Street, Buffalo, manufacturer of gas engines, parts, etc., has filed plans for one-story addition, to cost about $80,000 with equipment.

Walker Lee, Jr., Powers Building, Rochester, N. Y., architect, has awarded general contract to William Kenny, 86 Frost Avenue, for five-story automobile service, repair and garage building, to cost about $100,000 with equipment.

Officials of Houdaille-Hershey Corporation, 537 East Delavan Avenue, Buffalo, manufacturer of automobile shock absorbers, have organized Houdaille Co. of Canada, Ltd., a subsidiary, to construct and operate a branch plant at Bridgeburg, Ont., initial unit to cost more than $75,000 with equipment.

Rochester Button Co., 300 State Street, Rochester, has leased property at Akron, N. Y., and will install machinery early in December for a branch plant. Equipment will be provided for employment of about 100 persons. Joseph D. Tonkin is general manager.

Sun Oil Co., 1609 Walnut Street, Philadelphia, is asking bids on general contract for a new storage and distributing plant at Tonawanda, N. Y., including automobile service, repair and garage building for company trucks and cars, to cost about $200,000 with equipment.

Board of Education, Fayetteville, N. Y., is considering installation of manual training equipment in new senior and junior high school in Wellwood section, to cost about $300,000. Carl C. Ade, 89 East Avenue, is architect.

Erie Railroad Co., 50 Church Street, New York, is considering addition to locomotive repair shops at Hornell, N. Y., 150 x 150 ft., to cost more than $85,000 with equipment. R. C. Falconer, address noted, is chief engineer.

Quisenberry Feed Mfg. Co., 95 Kentucky Avenue, Buffalo, has filed plans for six-story addition to mill, including grain elevator with screening, conveying, hoisting and other equipment, to cost about $100,000. S. T. Edwards, 110 South Dearborn Street, Chicago, is engineer.

Westcott Chuck Co., Oneida, N. Y., has appointed G. L. Hunt, Bourse Building, Philadelphia, its representative in that territory, which includes eastern Pennsylvania, Maryland, Delaware and southern New Jersey. Other recent appointments are: Buffalo, Noxsel-Stroman Co., 14 East Tupper Street; Chicago, S. A. Dinsmore, 327 South La Salle Street; Los Angeles and San Francisco, K. D. Carl-

son Co., 268 Market Street, San Francisco; Pittsburgh, F. A. O'Donnell, 1509 First National Bank Building.

Universal Pressing Machine Co., Inc., recently organized at Utica, N. Y., with Cambell B. Hodges, president, will establish a plant in former Otis Boiler works, Oswego, N. Y. Operations are expected to begin about Jan. 1.

Detroit

DETROIT, Nov. 11.—Following recent consolidation with Thomson Electric Welding Co., Lynn, Mass., Gibb Welding Machines Co., Bay City, has secured three-acre tract for expansion, to cost over $75,000 with equipment. Consolidated company will be known as Thomson-Gibbs Electric Welding Co.

Detroit Die-Casting Co., 442 East Jefferson Avenue, Detroit, has asked bids on general contract for one and two-story plant unit, to cost about $70,000 with equipment.

National Utilities Co., Monroe, Mich., operating electric and gas properties, has purchased 22-acre tract about two miles from city, as site for new artificial gas plant, with a capacity of 1,000,000 cu. ft. daily. New storage and distributing facilities will be provided with capacity of 300,000 cu. ft. Present gas generating plant will be used for auxiliary service. Entire project will cost over $700,000.

Kelsey Wheel Co., 3600 Military Avenue, Detroit, manufacturer of steel automobile wheels, etc., has asked bids on general contract for a one-story addition, 130 x 320 ft., to cost about $100,000 with equipment. Albert Kahn, Inc., Marquette Building, is architect and engineer.

Board of Trustees, University of Detroit, Livernois Avenue and Six-Mile Road, Detroit, has plans for a new two-story engineering building, adjoining present structure, to cost more than $100,000 with equipment. Malcolmson & Higginbotham, 1219 Griswold Street, are architects.

Evans Auto Loading Co., Union Trust Building, Detroit, manufacturer of automobile loading devices and equipment, is completing new branch plant at Marshfield, Ore., to cost about $400,000.

Thompson Aeronautical Corporation, Union Trust Building, Cleveland, manufacturer of aircraft and automobile equipment and parts, has plans for new plant at Pontiac, Mich., including one-story shop and office, 40 x 120 ft.; hangar, 120 x 120 ft., with repair and reconditioning facilities; one-story engine-testing house, 15 x 24 ft.; boiler house and other units, to cost $375,000 with equipment.

White Star Refining Co., 903 West Grand Boulevard, Detroit, has begun construction of new lubricating oil plant, to cost more than $90,000 with equipment. It will also build a storage and distributing plant, and sign-manufacturing unit, to cost over $75,000 with equipment. A new oil refinery at Trenton, Mich., representing an investment of more than $2,000,000, was recently completed.

Wayne County Board of Commissioners, Barlum Tower, Detroit, will soon take bids on revised plans for one-story county power plant, to cost about $70,000 with equipment. Giffels & Vallet, Marquette Building, are architects and engineers.

Yellow Sleeve Valve Engine Works, Inc., East Moline, Ill., a subsidiary of General Motors Corporation, manufacturer of engine valves and other equipment, is planning early removal of plant to Pontiac, Mich., where part of engine works of parent organization has been taken over. Additional facilities will be installed for enlarged output.

Chicago

CHICAGO, Nov. 11.—In general, the past week has been rather quiet for the machine tool trade. Scattered orders have been added to books, but the bulk of this business is of old standing. New inquiries are at the lowest point in many weeks. Contrary to the trend of the general market, there have been a few orders for duplicates of machines purchased earlier in the year. Salesmen reporting to home offices do not find that recent rapid changes in the security market have resulted in dropped programs or in cancellations. Tool and die shops having contracts with the Western Electric Co. are still busy. However, jobbing shops that have been doing work for radio manufacturers have had some contracts cancelled, and it is reported that several automobile manufacturers east of Chicago have held up delivery of machine tools recently ordered.

The Burlington is in the market for a portable lathe, and the Louisville & Nashville will buy a turret lathe. Additional requests have come from railroads for estimates to be used in preparing budgets for 1930.

W. J. Korber, 263 North California Avenue, Chicago, will build a two-story machine shop, 52 x 127 ft., to cost $37,000. L. M. Mitchell, 127 North Dearborn Street, is architect.

Factory of Rich Toy Co., Morrison, Ill., was badly damaged by fire Nov. 8.

B. D. and H. D. Adams, owners of Adams Mfg. Co., Galesburg, Ill., have purchased Meyer-Foley Co., same city, and will consolidate operations. Automotive accelerators, footrests, pressed steel pulleys, metal stampings for washing machines and similar special machinery are manufactured.

Willis Motor Corporation, Maywood, Ill., has acquired property near Batavia, Ill., and contemplates erection of a large plant to manufacture motors.

Foote Gear Works, Chicago, has moved from 430 North Oakley Boulevard to 1301 South Cicero Avenue.

Compressed Industrial Gases, Inc., 19 North Sheldon Street, Chicago, through its subsidiary, Burdett Oxygen & Hydrogen Co., Chicago, manufacturer of oxygen, hydrogen and acetylene, has plans for a dissolved acetylene plant at Summit, Ill., industrial suburb of Chicago, to cost, with equipment, about $100,000.

Factory addition of Gardner-Denver Co. at Quincy, Ill., is nearing completion. Company manufactures slush and mud pumps, air compressors, rock drills, drill sharpeners and high pressure drill steel forges. Its other two plants are at Denver and LaGrange, Mo.

Schlangen Brothers Co., 2435 Irving Park Boulevard, Chicago, manufacturer of builders' hardware, etc., is considering multi-story plant addition, to cost over $200,000 with equipment.

G. F. Wright Steel & Wire Co., 13 West Ohio Street, Chicago, manufacturer of wire goods, wire cloth, etc., has leased four floors in building at 22 West Austin Avenue for new plant. Present capacity will be increased.

Kling Brothers Engineering Works, Inc., 1300 North Kostner Avenue, Chicago, operating a general machine plant, has filed plans for a two-story addition, 50 x 60 ft., to cost about $45,000 with equipment.

Illinois Cork Co., 1450 West Forty-third Street, Chicago, contemplates early rebuilding of part of plant destroyed by fire Nov. 3, with loss reported close to $100,000, including equipment.

Chicago, St. Paul, Minneapolis & Omaha Railroad Co., 275 East Fourth Street, St. Paul, Minn., has awarded general contract to J. B. Nelson Construction Co., Mankato, Minn., for new engine house and shops at Mankato, to cost more than $60,000 with equipment. H. E. Barlow, address noted, is chief engineer.

Christy Mfg. Co., Pueblo, Colo., A. B. Christy, Vail Hotel, head, has plans for new two-story and basement plant to manufacture juvenile furniture and kindred products, to cost about $100,000 with equipment.

Bureau County Board of Supervisors, Princeton, Ill., E. L. Schoenberger, American Hotel Building, in charge, has plans for a one-story machine and repair shop, to cost about $30,000 with equipment.

Northwest Airways, Inc., Merchants National Bank Building, St. Paul, Minn., has awarded general contract to Paul Steenberg Construction Co., Builders' Exchange Building, for hangar, 130 x 200 ft.; machine and repair shop, 30 x 200 ft., and other units at St. Paul airport, to cost $100,000 with equipment. L. H. Brittin is vice-president and general manager.

Spanjer Brothers, Inc., 1160 Chatham Court, Chicago, manufacturer of signs, displays, etc., has awarded general contract to B. J. Regnall Co., 19 South LaSalle Street, for three-story addition, 25 x 150 ft., to cost about $60,000 with equipment. H. Ronneberg, 10 South LaSalle Street, is architect.

Northern Pacific Railroad Co., St. Paul, Minn., is planning extensions and improvements in repair shops and yards at Glendive, Mont. Present car repair shop at Dickinson, Mont., will be removed to Glendive and capacity increased. Program will cost about $70,000 with equipment.

Cleveland

CLEVELAND, Nov. 11.—Machine tool sales were rather light the past week and were limited to single items. The liquidation in the stock market has had an effect on the machine tool market in that some companies that had been figuring on buying a little additional equipment have decided to postpone purchases until they can draw more definite conclusions as to the future prospects for business. The recent slowing down in plant operations that has caused curtailment in plants making automobile parts appears to have extended to some plants making airplane parts.

New York, Chicago & St. Louis Railroad Co., Terminal Tower, Cleveland, has plans for one-story car repair shop at local yards, to cost about $60,000 with equipment. A. C. Harvey is chief engineer.

Cleveland Wax Paper Co., 2217 Scranton Road, Cleveland, manufacturer of processed papers, has awarded general contract to S. W. Emerson Co., 1836 Euclid Avenue, for one-story addition, to cost about $50,000 with equipment.

Atlas Steel & Supply Co., 4401 Trumbull Avenue, Cleveland, will soon take bids on general contract for three-story addition to storage and distributing plant, to cost over $65,000 with equipment. W. J. Wefel, 5716 Euclid Avenue, is architect.

Alliance Drop Forge Co., Alliance, Ohio, is considering one-story addition to cost about $50,000 with equipment.

Toledo Scale Co., Monroe and Albion Streets, Toledo, Ohio, has plans for new unit, to cost over $75,000 with equipment. Norman Bel Geddes, 128 East Thirty-seventh Street, New York, is architect.

Dill Mfg. Co., 684 East Eighty-second Street, Cleveland, manufacturer of screw machine products, etc., has awarded general contract to D. C. Hamel Construction Co., Plymouth Building, for plant unit, to cost more than $65,000 with equipment. Roberts-Wright Co., Swetland Building, is architect and engineer.

Fate-Root-Heath Co. (Plymouth Locomotive Works), Plymouth, Ohio, manufacturer of industrial and railroad locomotives, has completed a large new factory unit. Equipment, which is now being installed, will double present output of Plymouth gear-drive gasoline and Diesel locomotives. Company also manufactures gas-electric and Diesel-electric locomotives from 20 to 100 tons.

Sterling Grinding Wheel Co., Tiffin, Ohio, has plant expansion program which will include construction at once of a building with 18,000 sq. ft. of floor space, and another of like size to be started as soon as the first is completed. Company will also purchase new shop equipment. Expenditures will total about $100,000.

Milwaukee

MILWAUKEE, Nov. 11.—While a few machine tool dealers report a falling off in sales and inquiries, manufacturers of machine tools, have not yet felt a recession. Demand is general, with the exception of the automotive industry, a good share coming from small machine shops. Expansion of metal working plants appears to have been unaffected by the collapse in the stock market, and no abandonment of pending programs is reported. A surplus of metal workers in the local labor market is attributed mainly to depression in the automotive lines.

George H. Smith Steel Casting Co., 500 Clinton Street, Milwaukee, will begin construction next spring of a one-story plant on 21-acre tract, recently purchased, to provide for foundry expansion and consolidation of units of Trackson Co., a subsidiary. Trackson Co. manufactures crawler tracks, loaders, bulldozers and cranes for tractor mounting largely marketed through the United Tractor & Equipment Corporation.

Board of School Directors, Milwaukee, has ordered plans from G. E. Wiley, architect, for a four-story addition to Girls' Technical and Trade High School, to cost $350,000. Frank M. Harbach is secretary and business manager of board.

Snap-On Wrench Co., 1270 South Pierce Street, Milwaukee, will start immediate construction of new shop, 200 x 330 ft., and office, 80 x 100 ft., at Kenosha, Wis., to cost $175,000, exclusive of $125,000 which the company will spend for machinery. Frank D. Chase, Inc., 720 North Michigan Avenue, Chicago, engineer, closed bids Nov. 7.

Cary Co., Waupaca, Wis., manufacturer of oil burners, has completed removal of plant and headquarters from Minneapolis, Minn., to Waupaca, following acquisition of Jorgenson Mfg. Co. plant and 20-acre tract, and has completed a hydroelectric plant on Crystal River to supply all power needs.

Indiana

INDIANAPOLIS, Nov. 11.—Leader Specialty Co., 515 East Walnut Street, Indianapolis, manufacturer of plumbing equipment and supplies, has asked bids on general contract for one-story plant, 45 x 112 ft., to cost about $25,000 with equipment. Bacon & Tislow, Architects' & Builders' Building, are architects. Claude J. Mick is general manager.

Inca Mfg. Corporation, Fort Wayne, recently organized to manufacture copper wire products for radio, electric and other service, has work nearing completion on initial unit of new plant, one story, 200 x 300 ft., to cost more than $100,000. George A. Jacobs, formerly president of Dudlo Mfg. Co., with local plant in same line, is president of new organization.

Buhner Fertilizer Co., Seymour, is planning to rebuild fertilizer manufacturing plant destroyed by fire Nov. 4.

Bendix Brake Corporation, South Bend, manufacturer of automobile brakes, etc., has filed plans for three one-story units, 200 x 300 ft., 150 x 220 ft., and 150 x 350 ft., each to cost about $150,000 with equipment. Units will be used as a tool room, screw machine shop, and for storage and distribution.

Midwestern Petroleum Co., Indianapolis, recently organized, will erect new storage and distributing plant at Twenty-first and Yandes Streets, to cost $50,000 with equipment. Other units will be built later. Eugene W. Fields is president, and Charles E. Foreman, secretary and treasurer.

Plant and property of Henry Weis Mfg. Co., Elkhart, manufacturer of steel partitions, crucibles, etc., has been transferred by Henry Weis, founder, and his son, William M. Weis, to a group of seven veteran employees, who will own and operate business in future. Mr. Weis and his son are retiring from active business. Paul W. Kerr, heretofore vice-president, will be president of reorganized company.

Time-O-Stat Controls Co., Elkhart, will soon use 79,000 sq. ft. of additional floor space. Plant, which manufactures heat regulating devices, is a consolidation of several scattered factories. Company states that further additions will be necessary in near future.

Plans for a new airplane factory to be built at Connersville by Corman Aircraft Corporation of Indiana have been announced by Ellis W. Ryan, resident director of company. Plant is to be completed by Feb. 1 and will manufacture tri-motor transport planes. Corman company is owned by Cord Corporation, which also controls Stinson Aircraft Corporation, Wayne, Mich.

W. C. Fletcher Co., Inc., 502 Illinois Building, Indianapolis, has been appointed sales representative for central Indiana by Bradley Washfountain Co., Milwaukee. For southern Indiana and Kentucky, J. F. Shouse & Co., 1197 Stark Building, Louisville, has been placed in charge of Bradley Washfountain sales.

Benjamin H. Rhynearson Co., dealer in new and used machine tools, is occupying a new warehouse at 516 West McCarty Street, Indianapolis, where new and used tools will be carried in stock.

Capitol Stampings Co., 516 West McCarty Street, Indianapolis, a new organization, will engage in manufacture of light stampings, tool and die work. It will be under management of C. R. Swenson, formerly connected with Oakes Mfg. Co. and later Indiana Press & Steel Co.

Gulf States

BIRMINGHAM, Nov. 11.—Contract has been let by Electric Belle Range Co., Huntsville, Ala., to G. A. Rogers, Huntsville, for a two-story addition, 52 x 144 ft., for enameling, to cost about $27,000.

Lufkin Foundry & Machine Co., Lufkin, Tex., has plans for a two-story addition, to cost close to $21,000.

Grayburg Oil Co., San Antonio, Tex., is considering new oil refinery and by-products plant on local site, with steam power plant, machine shop and other units, to cost over $2,000,000 with equipment. A storage and distributing plant will be installed.

Lockhart & Co., Pecos, Tex., operating oil properties in Loving County oil field north of city, have authorized surveys for a new pipe line with terminus at Pecos, to cost about $100,000 with booster stations. It is expected to begin work early in January.

Seaboard Soap Corporation, Hialeah, Fla., is considering rebuilding part of plant recently destroyed by fire with loss reported over $100,000 including equipment.

Curtiss Flying Service, Inc., 27-29 West Fifty-seventh Street, New York, is considering purchase of site at South Jacksonville, Fla., about 1500 x 1800 ft., for airport, to include hangars, repair shops and other field units, as well as facilities for seaplanes, to cost more than $100,000 with equipment.

Border Foundry & Machine Co., Corpus Christi, Tex., has expansion program under way at boat repair plant, including runway for drawing vessels from water, with hoisting, elevating and other equipment. Blucher Engineering Co., Corpus Christi, is engineer.

Under direction of a committee of Oak Cliff-Dallas Commercial Association, Dallas, Tex., plans will soon be drawn for a new vocational school in Oak Cliff district, where 20-acre tract has been secured. Project will include shops for mechanical, electrical, automobile mechanics and other trade instruction. Initial units will cost $100,000 with equipment. T. E. Jackson is chairman of committee in charge.

Texas & Pacific Railway Co., Dallas, Tex., plans rebuilding part of ice-manufacturing plant at Fort Worth, Tex., destroyed by fire Nov. 5, with loss reported close to $100,000 with equipment. Plant was in course of construction and was nearing completion; destroyed unit was designed primarily for refrigerator car service. Entire project will represent investment of $250,000.

City Council, Austin, Tex., is planning fund of about $85,000 for establishment of municipal airport, including hangars, repair shops and other field units. Following completion, airport will be leased to Southern Air Transport, Inc., Fort Worth National Bank Building, Fort Worth, Tex.

Swift & Co., Union Stock Yards, Chicago, have acquired a 10-acre tract at Montgomery, Ala., for new plant, including refrigerating and cold storage department, to cost more than $250,000 with

equipment. Latter will include elevating, conveying and other mechanical-handling facilities.

Interstate Natural Gas Co., Natchez, Miss., is planning new pipe line from Natchez to Woodville, Miss., to cost more than $750,000 with compressor stations and other equipment.

St. Louis

ST. LOUIS, Nov. 11.—Western Supplies Co., 2129 Pine Street, St. Louis, manufacturer of shoemaking machinery, parts, etc., has awarded general contract to F. F. Meckfessel Construction Co., 6625 Delmar Boulevard, for one and two-story plant, 100 x 325 ft., to cost about $35,000 with equipment. Julius Tarling, 2806 North Grand Boulevard, is architect.

Specialty Tool Corporation, Oklahoma City, Okla., has filed plans for a one-story machine shop, 35 x 100 ft., to cost about $21,000 with equipment.

Missouri-Pacific Railroad Co., Railway Exchange Building, St. Louis, has awarded general contract to T. H. Johnson, 107 Ohio Street, Sedalia, Mo., for one-story spring shop at Sedalia yards, to cost more than $40,000 with equipment. E. A. Hadley is chief engineer.

City Council, Ellis, Kan., has authorized construction of new municipal electric light and power plant to replace present unit, including installation of additional equipment, to cost $70,000. E. R. Gibson is city clerk.

Muskogee Iron Works, Inc., Muskogee, Okla., has plans for a one-story machine shop, 25 x 160 ft., to cost about $25,000 with equipment. H. H. Niemann, Barnes Building, is architect. Company will also build two-story office, 40 x 105 ft., on adjoining site.

Guardian Aircraft Corporation, 2504 Texas Avenue, St. Louis, has awarded general contract to Bell Brothers, Inc., Moberly, Mo., for aviation school at Moberly, including one-story aircraft repair and reconditioning shop, to cost over $60,000 with equipment. Ludwig Abt, Reigle Building, St. Louis, is architect.

Carter-Waters Co., 2049 Main Street, Kansas City, Mo., road-building materials and supplies, has plans for a four-story storage and distributing plant, 75 x 100 ft., including road oil and asphalt distributing division, to cost about $70,000 with equipment. Archer & Gloyd, Pioneer Building, are architects.

Red Bird Aircraft Co., Hiawatha, Kan., is considering one-story airplane manufacturing plant, with parts and assembling departments, to cost about $30,000 with equipment.

Board of Education, Crawford, Neb., has authorized installation of manual training department in new three-story and basement high school to cost about $130,000, for which bids are being asked on general contract. Meginnis & Schaumberg, Federal Trust Building, Lincoln, Neb., are architects.

Public Service Co. of Oklahoma, Tulsa, has plans for addition to steam-operated electric power plant at Weleetka, Okla., to cost more than $800,000 with equipment. Company will also build transmission lines in different parts of State, to cost over $200,000.

DeCamp Consolidated Glass Casket Co., Muskogee, Okla., is building two-story and basement addition, 75 x 150 ft., to cost close to $45,000 with equipment. H. H. Niemann, Barnes Building, is architect.

Cincinnati

CINCINNATI, Nov. 11.—Demand for machine tools so far this month has been fairly good, much better, in fact, than was anticipated following the stock market collapse and the slackening of activity in the automobile industry. No let up in production schedules has been reported, and machine tool manufacturers in this district indicate that the present high rate of operations will continue well into next year. Inquiry, generally, is good, with a noticeable increase in requests for quotations from Canada. An automobile manufacturer placed an order with a local maker for five new crankshaft lathes and for rebuilding 15 others.

It is reported that further inquiries are pending from the Russian Government for machine tools; these are expected to be closed in the near future.

City Council, City Hall, Cincinnati, has awarded general contract to William Miller & Son, 1952 Central Parkway, for hangar at Lunken airport, with reconditioning and repair shop facilities, to cost $100,000 with equipment. Truckemeyer & Strong, St. Paul Building, are architects.

Estate Stove Co., Hamilton, Ohio, has filed plans for one-story addition, including extensions in power plant, to cost about $60,000 with equipment. Carl J. Kiefer, Schmidt Building, Cincinnati, is engineer.

City Council, Nicholasville, Ky., is contemplating extensions in municipal electric light and power plant, including installation of additional equipment.

Allen Mfg. Co., Tenth Avenue, North, Nashville, Tenn., manufacturer of stoves, ranges, etc., has awarded general contract to Roberts Construction Co., Birmingham, for grading, foundations, etc., for new plant at Franklin, Tenn., and to Nashville Bridge Co., Nashville, for steel frame superstructure. Unit will have about 150,000 sq. ft. floor space and will cost $200,000 with equipment. Robert & Co., Bona Allen Building, Atlanta, Ga., are architects and engineers.

D. X. Murphy, Louisville Trust Building, Louisville, architect, has plans for three-story automobile service, repair and garage building, to cost about $120,000 with equipment.

Coca-Cola Bottling Co., Memphis, Tenn., has filed plans for one and two-story plant, to include installation of elevating, conveying and other mechanical-handling equipment, to cost about $35,000. H. E. Brooks, 63 South Third Street, is architect and engineer.

Conway Clutch Co. is moving its plant to larger quarters at 1543 Queen City Avenue, Cincinnati.

Pacific Coast

SAN FRANCISCO, Nov. 7.—Aircraft Industries, Ltd., 935 East Fourteenth Street, Oakland, has awarded general contract to George Beard, 726 Tenth Street, Modesto, Cal., for new airplane parts manufacturing and assembling plant at Modesto, to cost $65,000 with equipment. H. S. Thorpe is one of heads of company in charge.

Fresno-Madera Ice Co., Fresno, Cal., is considering one-story ice-manufacturing plant at Stockton, Cal., to cost about $80,000 with machinery.

Link Belt, Meese & Gottfried Co., 3100 Nineteenth Street, San Francisco, manufacturer of elevating, conveying and other transmission equipment, has engaged Austin Co. of California, Russ Building, to prepare plans for new plant group, to cost about $400,000 with equipment.

Botchford Steel Co., San Francisco, recently organized, has taken over plant and business of Judson Mfg. Co., Emeryville, Cal., manufacturer of steel products, including castings, etc., and will operate in future. Plans are under way for expansion and installation of additional equipment.

Arizona Edison Co., Phoenix, Ariz., is considering construction of ice-manufacturing plant at Coolidge, Ariz., with all equipment electrically operated, to cost about $100,000.

St. Paul-Tacoma Lumber Co., Tacoma, Wash., is planning mill at Bellingham, Wash., consisting of three-story units for shingle mill, planing mill and saw mill, to cost about $200,000 with equipment. All machinery will be electrically operated.

Northwest Terminals, Inc., Seattle, has plans for first unit of new oil storage and distributing plant on Harbor Island, to cost about $300,000 with equipment. A similar unit will be built at Linton, Wash., to cost about $200,000 with equipment.

Firestone Tire & Rubber Co., Akron, Ohio, has awarded general contract to Clinton Campbell, 90 West Moreland Street, Phoenix, Ariz., for a factory branch, service and distributing plant at Phoenix, to cost about $150,000 with equipment.

Martinez Junior High School District, Martinez, Cal., plans installation of manual training shop at new junior high school group to cost about $250,000, for which plans are being completed by W. H. Weeks, Hunter-Dulin Building, San Francisco, architect.

H. H. Knowles, Pacific Coast representative of Reading Chain & Block Corporation, Reading, Pa., has announced appointment of Murry Jacobs Co., 554 South Pedro Street, Los Angeles, to represent Reading Chain & Block Corporation in southern California.

W. A. Jones Foundry & Machine Co., Chicago, has moved its Los Angeles office to 342 Towne Avenue. Warren C. Webb is Pacific Coast sales manager.

Canada

TORONTO, Nov. 11.—The slowing down of automobile production has materially affected machine tool sales in this territory. At present the smaller shops are responsible for the bulk of new business, with the call principally for single tools. Used and rebuilt tools are quite active. Although there has been a falling off in demand recently, business as a whole is fairly good. Small tools have also been affected by the decline in the automotive industry. Sales of mining machinery are holding at a good level.

Sackville Shops, Ltd., recently formed, has purchased plant and business of G. E. Bilton Furniture Co., 27 Sackville Place, Toronto. It is understood that some improvements will be made, including installation of new equipment. Col. W. R. Patterson is manager of new company.

Bids will be called soon for erection of a $70,000 addition to plant of the Hoyt Metal Co., 721 Eastern Avenue, Toronto. Company's own engineer is in charge.

Additional contracts have been awarded for erection of a $200,000 plant addition for McKinnon Industries, Ltd., St. Catharines, Ont. Construction is under way, but equipment has not yet been purchased.

Smelting & Refining Co., Ltd., Smith's Falls, Ont., has let contract to D. Dignan, Russell Street, for alterations and improvements to plant.

Bids are being received by Frank T. Adams, engineer, City Hall, Brantford, Ont., for two or three Diesel engine units, two of 450 to 500 hp. each, or three of 300 to 350 hp. each. Motor-driven pumps with capacity of four to six million gal. each also will be purchased. W. S. and R. S. Lea, 1226 University Avenue, Montreal, are consulting engineers.

Bids are being received, no closing date, by Alward & Gilles, architects, Market Square, St. John, N. B., for a $10,000 factory addition to Brantford Carritte Co., Ltd., Coldbrook Street, manufacturer of builders' paper, etc.

A number of contracts have been awarded for an airplane manufacturing plant at Longueuil, Que., to cost $300,000, for Fairchild Aircraft, Ltd., 1253 McGill College Avenue, Montreal, St. George & Gauvreau, Ltd., 4820-4th Avenue, Rosemount, Que., have general contract.

Western Canada

Powell River Co., Ltd., Vancouver, B. C., is receiving bids and will continue into December to award contracts for a $6,000,000 power development plant on Lois River, 14 miles south of town of Powell River, to develop 18,000 hp. Company also proposes to build a second paper mill on Powell River site. A. E. McMaster is general manager.

Foreign

PROPERTY near Havana, Cuba, has been acquired by Atlas Portland Cement Co., 25 Broadway, New York, as site for new mill, with power house and other mechanical buildings, to cost over $1,000,000 with equipment.

Societe des Produits Chimiques de Saint-Cobain, Paris, France, manufacturer of sulphuric acid, etc., is reported planning construction of new plant near La Bessee, France, to cost more than $3,500,000 with equipment.

Swedish Cellulose Co., Stockholm, Sweden, recently formed as subsidiary of Kreuger & Toll Co. (Aktiebolaget Kreuger & Toll), Stockholm, to acquire wood pulp companies with mills in northern part of Sweden, has purchased Sundsvalls Cellulose Co., with mill in same district, having rated capacity of 35,000 tons a year. Extensions and betterments are planned. Plans are under way for new centralized sulphite pulp mill to develop capacity of 100,000 tons of finished material a year, to cost more than $2,500,000 with equipment. Hammorsfornes Water Power Co., another subsidiary of parent company noted, operating hydroelectric generating plants of 85,000 hp. capacity, is considering expansion for additional hydroelectric power facilities for pulp mills. Ivar Kreuger is head.

Southern Cities Utilities Co., 1612 Market Street, Philadelphia, operating electric light and power properties, has purchased properties of Compagnie D'Eclairage Electrique, operating two generating plants and systems at Port-au-Prince and Cape Haitien, Republic of Haiti, and will consolidate properties. Plans are under way for expansion in generating plants and transmission facilities.

The Week's News Quickly Told

Current Events That Bear on the Course of Business

STOCKS sold under heavy pressure, the composite average of 100 leading issues declining 11 points during shortened trading sessions. Bonds also were active and gradually increased in price. Extra dividends were declared by a number of industrial corporations, banks and insurance companies.

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FAILURES last week numbered 402 as compared with 414 the preceding week. An investment trust, Banker's Capital Corporation, which showed large earnings from bank stocks in 1927 and 1928, was unable to meet its pressing obligations. . . . A proposed merger of big New York banks has been abandoned because so many stockholders elected to receive cash for their holdings at a price agreed upon before the recent decline.

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TRADE and industry are going forward generally in volume about equal to this date last year. Retail trade has not been affected much by the stock market's decline, but wholesale and jobbing trade is on a "small order, prompt shipment" basis. October was a banner month for mail order and chain stores. To quote Julius Rosenwald, of Sears, Roebuck & Co.: "I do not say that future business is going to be good, but it should be."

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COMMODITIES continue to decline; Fisher's index is down from 93.7 to 93.3. Grains, live stock, cotton, sugar, coffee and rubber all registered sizeable decreases in price. . . . A leading carpet maker (M. J. Whittall Associates) has reduced prices on Wilton rugs $10 to $15 on the 9 x 12 size.

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RADIO prices have been reduced from $15 to $60 by four of the leading manufacturers to aid dealers in disposing of large accumulations of unsold sets. Manufacturing schedules are sharply reduced. . . . Radio Corporation of America, which earned $7.50 per share during nine months in 1928, reports $1.30 for the corresponding period this year, based on additional stock of Victor Talking Machine Co.

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LUMBERING, both hard wood and soft wood, is producing at about 10 per cent higher rate than new orders are coming in. . . . While forest products are less active in the Pacific Northwest, all factories in Washington are employing 5000 more men than the peak figures, registered in 1928.

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PETROLEUM production has decreased slightly. In one California field, where operators have agreed to curtail production 30 per cent, the price of crude oil has been advanced 50c. per barrel. . . . A similar curtailment in other California fields, matching that achieved in Kansas and Oklahoma, will balance production against consumption for the first time in years, according to E. B. Reeser, president American Petroleum Institute. . . . Oil held in storage tanks now totals 700,000,000 barrels, almost half of which is fuel oil (which is selling at prices lower than the equivalent in coal). Remainder equals four months' production of crude.

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SAVINGS deposits and depositors decreased for the first time in 20 years. On June 29, 1929, total deposits were $195,000,000 less than on June 29, 1928. (During the preceding year the increase was $2,250,000,000.) Deposits of individuals, both time and demand, shrunk even more during the last fiscal year, despite an increase of $500,000,000 in the total amount of currency in circulation. . .

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GYROSCOPIC control of rudders, elevators and ailerons, proved successful in long test flights across the Allegheny mountains in fog. . . . Construction of giant dirigible for the Navy commenced at Akron. . . . A 40-passenger Junkers land plane of the "all wing" type, powered with four self-starting engines, flew for 30 min. in Germany. Dr. Claude Dornier said that an airplane can be built to carry 100 tons useful load as soon as engine designers can produce the necessary power plant. . . . Army air corps, which had authorized a five-year developmental program, but for which appropriations have been lagging, is awarded a full fifth of the total in next year's budget. . . . Annual deficit of the air mail is about $5,000,000. Postmaster General says the air mail should not be used promiscuously, but be regarded as a special service for business men. . . . In the last 12 months 82 aviation companies have offered $250,000,000 par value of new securities. . . . Daniel Guggenheim Fund for the promotion of aeronautics, having spent $2,500,000 in three years, will go out of existence on New Year's, since various institutes and universities are now equipped to carry on its research and development work.

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BARGE canal across New York should not be deepened to 14 ft., in the opinion of a board of Army engineers, because the present facilities can handle twice as much as the existing tonnage, and traffic conditions will soon be altered by improvements to the Welland Canal and the Hudson River. . . . Completion of the Dixie Highway, from Sault Ste. Marie, Mich., to Miami, Fla., started in 1915, was celebrated by opening a hard surfaced road from Chattanooga, Tenn., to Atlanta, Ga. . . . Pennroad Corporation, allied to the Pennsylvania Railroad, bought stock control of Pittsburgh & West Virginia Railway, a line claimed by two rival rail consolidations.

THE IRON AGE

New York, November 21, 1929

ESTABLISHED 1855 VOL. 124, No. 21

White Metal Used in Architecture

Modern Edifices Show Extensive Use of White, Corrosion-Resisting Metals for Exterior Decoration

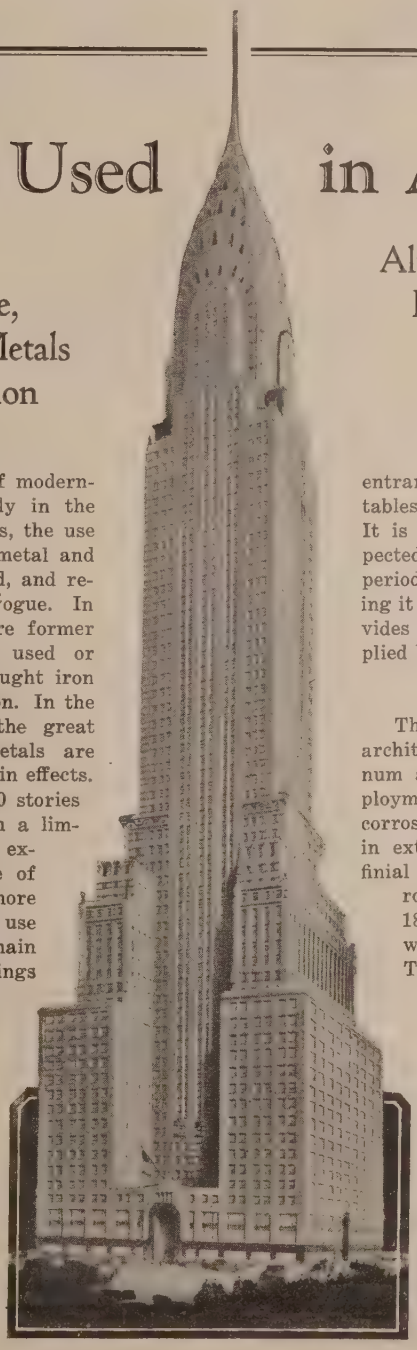
Aluminum Alloys and Rustless Iron Provide for Easy Fabrication

BY GEORGE S. HERRICK*

WITH the rapid development of modernism in architecture, especially in the design of large office buildings, the use of iron, copper, bronze, brass, monel metal and aluminum and its alloys has increased, and recently rustless iron has come into vogue. In residences and public buildings, where former periods of architecture are widely used or adapted to modern requirements, wrought iron and bronze are still used for decoration. In the modernist buildings, however, and the great skyscrapers in particular, white metals are popular with architects to obtain certain effects. As these structures rise from 40 to 60 stories and more above the street level, even a limited decorative use of metal on the exterior requires a substantial tonnage of material worth from 25c. to 60c. and more a pound. In addition to the exterior use of metals on the upper stories, the main entrances and lobbies of modern buildings are usually luxuriously decorated, and when the modernistic style is used, white metal often predominates, sometimes in combination with bronze, brass or wrought iron and at other times without contrasts.

Use of Monel Metal

Monel metal is used in small quantities, but because of its weight and price it has not been extensively specified, except in the case of the Pennsylvania Terminal in New York, where about 150,000 lb. of No. 22 gage monel metal sheets were used for the roof. Recently monel metal was used for interior metal decoration in the Union Trust Building, Detroit, a total of about 60,000 lb. being required for the grill of the main entrance, frames of tellers' windows, and for tables, elevator doors and minor decorations. It is effective as a white metal and is expected to retain its white appearance with periodic cleaning. On the exterior of a building it corrodes to a lustrous green, which provides a protective coating and is usually applied by architects with this end in view.



ABOUT 55,000 Sq. Ft. of Krupp-Nirosta Sheets Will Sheath the Tower of the Chrysler Building and More Will Be Used in Store Fronts and Decorative Features

Aluminum Widely Popular

The leading white metal in use today by architects of modernist buildings is aluminum and its alloys, two factors in its employment being lightness and resistance to corrosion. An instance of its extensive use in exterior decoration is on the tower and finial of the St. Louis Civil Courthouse. The roof is pyramidal, fabricated from No. 18 gage aluminum sheets of No. 3S alloy, which contains 1.25 per cent manganese. There are 11 steps and the base measures 92 ft. x 119 ft. 6 in. Each of the steps is 3 ft. 6 in. high and 3 ft. 9 in. wide. This sheathing required about 40,000 lb. of alloy. On the apex are two cast aluminum sphinxes resting upon cast facia. Both figures and facia were cast in sand from No. 43 alloy, which contains 5 per cent silicon. Each of the sphinxes measures 12 ft. x 12 ft. x 20 ft., but has a wall thickness of only ½ in. These, with the facia, required about 15,000 lb. of alloy.

New Building Has 42-Foot Wings

Another building, on which there is a considerable use of aluminum for exterior decoration, is being constructed for the Genesee Valley Trust Co., Rochester, N. Y., Voorhees, Gmelin & Walker, New York, architects. As a deco-

*THE IRON AGE, New York.

rative finial, the architects have specified four wings, 42 ft. high and 14 ft. wide by 4 ft. 6 in. in thickness at the widest flare of the wings. They taper to about 6 in. at the tips, which are 256 ft. 6 in. above the level of the first, or street, floor of the building. Set separately, the wings leave a circle in the center 10 ft. in diameter.

The wings are fabricated from No. 10 gage, No. 3S aluminum alloy sheets and are braced with extruded angles on the inside, which are of No. 17 ST alloy. A total of about 13,000 lb. of aluminum alloy will be used in this finial. In addition, the building is decorated with 125 spandrels, cast from No. 43 aluminum alloy, which are 4 ft. x 5 ft. and with a wall thickness of ¼ in. The total weight of the spandrels alone is between 12,000 and 15,000 lb. Exterior grill work, which is of No. 43 alloy, will require 5000 to 8000 lb. of No. 43 alloy.

Koppers Building Has 926 Alloy Spandrels

Aluminum alloy has come into extensive use for spandrels on buildings and in the Koppers Building, Pittsburgh, 926 spandrels, measuring 5 ft. square and ¼ in. thick, were used. The average weight of each spandrel was 115 lb., so there is a total of 106,590 lb. of alloy. The alloy is No. 43, an aluminum-silicon combination with 5 per cent silicon. After casting, the spandrels were deplated, a process similar to anodic treatment of aluminum, which gives various shades of gray. In the Koppers Building a leaden shade was used.

Development of rustless iron and its easy working properties has provided a new white metal as a contender with aluminum for architectural use, especially on the exterior of buildings. It has been used in small quantities for store fronts and minor decorative purposes, and some months ago was adopted for the construction of a pedestrian bridge over the street between the Chicago *Daily News* building and the building of the Chicago & North Western Railroad, as illustrated in THE IRON AGE of July 18. The exterior of the bridge, which is entirely of Alleghany metal, required 10,000 lb. all told. In addition, rustless iron was used throughout the kitchens of the cafeteria and restaurants in both buildings. Recently a modernist room was decorated in the Metropolitan Museum of Art, New York, and rustless iron sheets, highly polished, were used on the ceiling and walls, the ceiling sheets being corrugated.

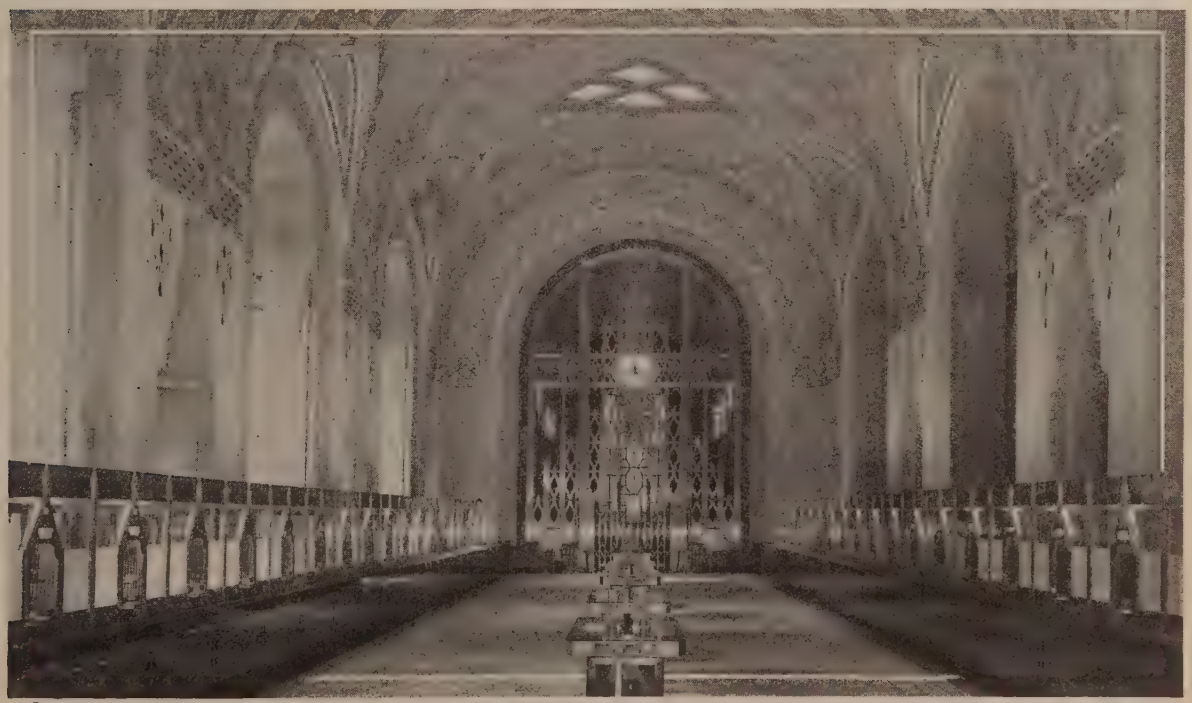
AN Aluminum Pyramid Surmounted by Two Sphinxes Is the Effect of the Roof of the St. Louis Civil Court House, Which Required 15,000 Lb. of No. 43 Aluminum Alloy. Inset shows the steps forming the pyramidal roof being sheathed with aluminum alloy

Rustless Iron Becoming a Factor

Although rustless iron has been used for some time in small and medium sized quantities for architectural decoration, especially store fronts, it was not until the exterior decorative metal for the Chrysler Building in New York was decided upon that this alloy was used as the principal feature of a large building's exterior. Tests of various metals were made by the Chrysler organization

in Detroit before a decision was reached and, with the inaccessibility of a considerable portion of the exterior in mind, a metal with the greatest resistance to corrosion was considered necessary, as cleaning will be practically impossible after completion of the building. Aluminum alloy was considered and aluminum alloy spandrels are already in place between the floors of the first set-back.

Contracts for other decorative features of the exterior are being awarded and a considerable portion of the material thus far decided upon will be Nirosta, to be furnished by the Crucible Steel Co. of America, Ludlum Steel Co. and Central Alloy Steel Co., three of the licensees under the Krupp-Nirosta patents. When completed, the tower of the building will be roofed with about 55,000 sq. ft. of No. 24 gage Nirosta sheets, and rustless iron is also planned for decorative features, which include 24 hub caps, four radiator caps with the Chrysler wings, eight gargoyles and seven pineapple urns. An estimate of the size of these decorations is possible from the fact that the urns are 7 ft. 6 in. high and 3 ft. in diameter. While 24-gage sheets are to be used on the roof, No. 14 gage sheets will be used on the store fronts, window frames, moldings and other trim on the street and first and second stories. For the first two stories above the street, about 50,000 lb. of Nirosta will be used in the form of sheets, strips and casement window sections. Rustless iron for the grillwork of the main entrance and lobby is being considered. As a desirable decoration to balance the extensive use of this material on the tower, it is planned to install etched and enameled, rustless iron elevator doors in the lobby.



IN the Large Screen, Which Fills the Archway of the Lobby, in Counter Screens and Desks in the Union Trust Co., Detroit, 60,000 Lb. of ⅛ to ¼-In. Monel Metal Sheets Were Used with a Cathedral-like Result. Spandrels on the Koppers Building, Pittsburgh, required 106,590 lb. of No. 43 aluminum alloy, deplated to obtain a leaden gray shade (above)

Railing of Malleable Iron Castings on the Lincoln Avenue Bridge, Pittsburgh

Making Large Malleable Castings

Field No Longer Restricted to Small Product— Posts and Railings for Large Pittsburgh Bridges Stand Severe Tests

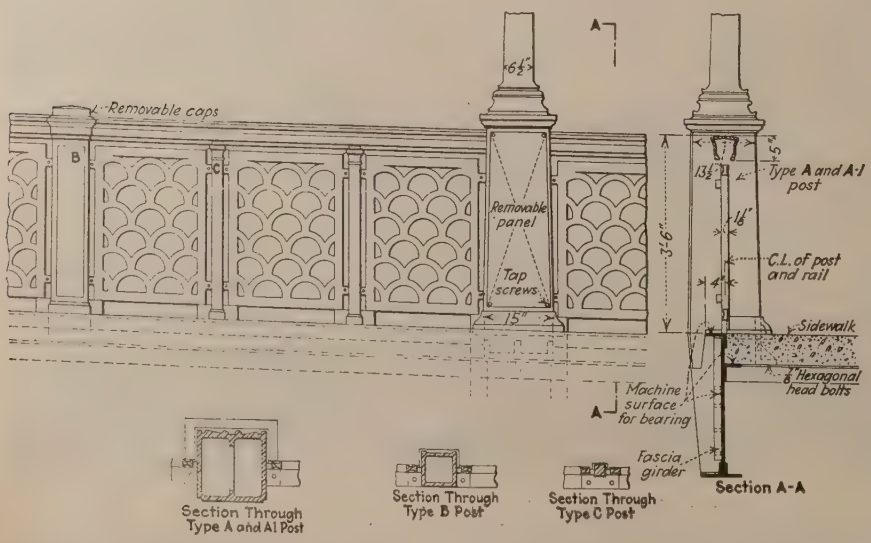
BY EDWIN F. CONE

NO longer is the field for malleable iron restricted to the production of small or medium weight castings. It has been demonstrated on a large scale that castings can now be successfully made of weights and dimensions that heretofore were deemed impossible.

Malleable iron castings have entered a new field. They have been incorporated in the railings for the new Liberty Bridge which spans the Monongahela River in the down town district of Pittsburgh. The production of such castings is regarded as a decided departure from customary practice and has been successfully undertaken by the Fort Pitt Malleable Iron Co. of Pittsburgh. The bridge, in which large malleable iron castings have been incorporated, connects Forbes Street and the Boulevard of the Allies on the north side of the Monongahela River with the new Liberty tubes on the south side.

Built of steel, the bridge is 2663 ft. long, exclusive of approaches. It rises to the height of 125 ft. above the channel of the river. It is, therefore, evident that for a bridge of this size the hand rails should not only be large, to harmonize with the general appearance of the structure, but also have sufficient strength to afford adequate protection to vehicles passing over the bridge. The engineers after careful consideration selected malleable iron as entirely suited to the requirements. It is claimed that this is the first use of this metal for bridge railing in the Pittsburgh district, and probably in the country.

From information furnished by F. W. Groh, engineer of steel inspection, Allegheny Department of Public Works, Pittsburgh, the specification requirements for malleable iron castings on this undertaking called for a tensile strength of 50,000 lb. per sq. in. with an elongation of 10 per cent. The Fort Pitt company had no trouble in meeting these specifications, and takes pride in exhibiting physical tests on a large number of heats which are rather remarkable for their uniformity. The actual physical results of the material incor-



Details of the Railing and Posts of Malleable Iron Castings in the Liberty Bridge at Pittsburgh

porated in the posts and railings approximated 59,000 lb. per sq. in. with a yield point of close to 39,000 lb. per sq. in. The elongation in 2 in. was about 25.5 per cent, with a reduction of area practically the same.

Impact tests upon the malleable iron showed some interesting results. They were made on cast wedges, ½ x 1 in. at the base, and tapered down to what was practically a knife edge, over a length of 6 in. The method of making the test was to clamp the base of the wedge in a vise, holding it in a vertical position while a weight was repeatedly dropped upon it, which produced a blow of about 70-ft. lb. The result was that the wedge curled in the form of a scroll in almost every case and an average of 33 blows was obtained in these tests. No fracture was detected in the wedges. Both tensile and impact tests were made on every heat which was incorporated in the castings for this bridge.

To determine the impact which some of the castings would withstand, other tests were made on various parts of the railing. The type of casting used and the general dimensions is shown in one of the illustrations. Another illustration represents the testing of a malleable iron post used in the railing. The test consisted in dropping a weight of 2750 lb. a distance of approximately 15 ft. as shown. In another illustration engineers of Allegheny County, who supervised the installation of the railings, are shown measuring deflections on these posts after the weight had been dropped. In still another illustration, an engineer is measuring the deflections of a section of the railing after it had been bent under the ram of a 50-ton Lucas press. After these tests, none of the castings showed any sign of fracture.

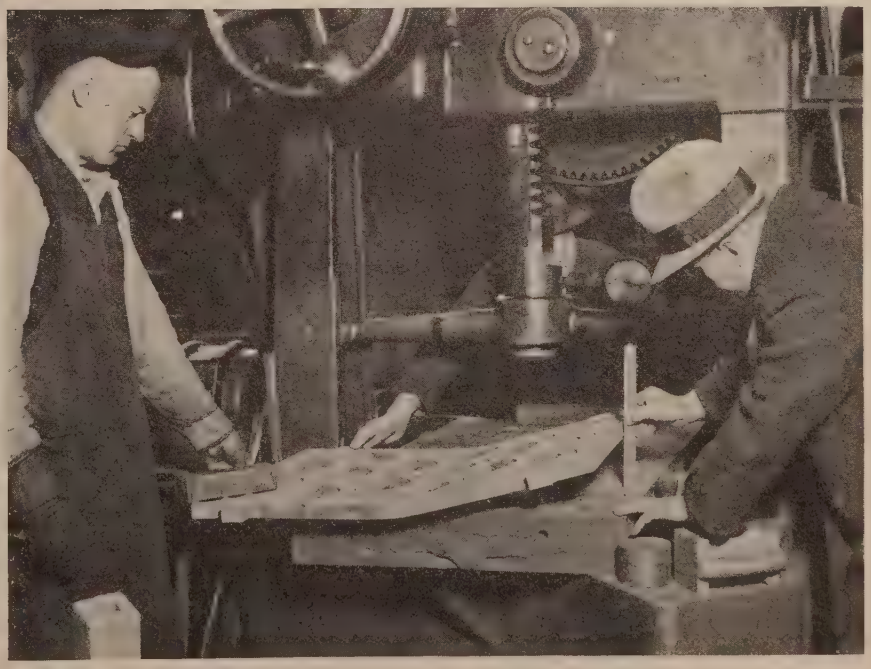
The castings are described as highly suitable from an ornamental viewpoint and it is stated that the engineers are satisfied with the excellent physical qualities and the severe impacts which the castings have withstood in all the tests. Highway and guide rails of the Ramsay and similar types have been installed at numerous places and have proved satisfactory and efficient in service. Among other installations than the Liberty Bridge, the castings recently placed on the Lincoln Avenue Bridge in the East Liberty section of Pittsburgh may be cited.

Some rather striking examples of the utility of these castings have come to light as the result of automobile

TESTING the Impact Strength of One of the Malleable Iron Posts by Dropping a 2750-lb. Weight from a Height of 15 Ft. (Above)

MEASURING the Deflection in One of the Posts After the Drop Test (At Right)

DETERMINING the Deflection in a Section of One of the Railings After Bending It Under a 50-Ton Press (Below)



accidents. A touring car with the full number of passengers was crossing the Lincoln Bridge at a speed in excess of 50 miles an hour and in some manner jumped the curb and collided with the railing. A special tee part construction of this railing, located at the height of the hub cap of the car, bore the brunt of the impact and so straightened out the car that it proceeded on its way under full control. Upon investigation and check-up of the panel which withstood the collision, it was found that the metal had been deflected only 17/32 inch.

A similar accident occurred on the Liberty Bridge. In this case the car was practically ruined, but the railing suffered little or no damage. In another accident on the Liberty Bridge a large car, full of people, jumped the curbing and ran into a railing with sufficient force to bend it about 14 in., totally wrecking the car with no injury to the passengers.

It is felt by people interested in the future of malleable iron castings that a new field has been opened up whereby this material can find extensive use in large castings instead of being confined, as in the past, to small ones.

About 800,000 Rails Tested Electrically for Flaws

CONSIDERABLE success has been attained in the non-destructive internal testing of steel rails for the detection of flaws, particularly transverse fissures. This was brought out in a paper on non-destructive testing presented at the annual meeting of the American Society for Steel Treating at Cleveland, during the National Metal Congress in September. The paper was written by Elmer A. Sperry, president, Sperry Development Co., Inc., Buffalo, N. Y., and read by H. C. Drake of that company. The method was described in THE IRON AGE, Nov. 15, 1928, in an abstract of a paper presented by Mr. Sperry before the American Iron and Steel Institute.

Direct current of high amperage is passed through the specimen and any minute crack or inclusion produces a deviation in the axis of current flow. This deviation is detected and amplified to a value suitable for operating recording equipment. The equipment used for testing consists of a standard track maintenance trailer car carrying a power plant, radio apparatus and recording mechanism. This car is operated at a speed of 5 miles per hr., being hauled by a separate motor car.

Contact brushes go on the top surface of the rail and between these the current flows. Small potential brushes or equivalent searching equipment pick up the difference in potential. The microvoltage is carried to a set of four radio tubes. A paint spraying device is provided, a relay controlling the release of the spray of paint against the side of the rail whenever a defect is found. Fissures are indicated on the friction driven moving strip of paper.

Two detector cars have made permanent records of about 800,000 rails showing the condition of their internal structure and the paper stated that hundreds of transverse fissures have been accurately located and the rails removed from the track. Although the detection of transverse fissures was the primary object of the test cars, the paper stated that they are also locating compound and horizontal fissures, piped rails, split heads and other discontinuities in the rail head. From the data obtained it was found that the number of fissures per mile varies widely, the minimum being about 0.2 and the maximum 3.1 per mile. The device, it was stated, has been successfully adapted to the inspection of a great variety of parts such as new rails at mills, bars, car axles, boiler plate and welded joints.

Not a Cure-All for Transverse Fissures

E. W. Carruthers, Pennsylvania Railroad, Altoona, Pa., said that in a test of over 14,000 rails 21 were removed because of indications of interior defects. Drop tests, in a laboratory, on rails which the detector indicated had transverse fissures, showed that the detector was not always accurate. In his opinion the detector, in its present state of development, cannot be called highly successful, although he said the method is promising and its results are encouraging. He pointed out that there are various factors in actual operation which prevent the detector from working as satisfactorily in the field as in the laboratory.

Results of his experiences in detecting rail flaws with the apparatus were given by W. C. Barnes, engineer of tests of the rail committee of the American Railway Engineering Association. He said that a detector car had been operated continuously under his supervision since last fall. During eight months 1800 miles of rails were tested on 17 railroads and 145 transverse and compound internal fissures were located in addition to other defects. In the opinion of his committee, defects that develop into transverse fissures under service stresses exist in rails when received from the mill. The original defect is so small that only a very sensitive form of the Sperry method could locate it. He hoped that the apparatus would be used for testing rails at the rail mills. Many fissures, he said, are being removed by the use of the Sperry tester, probably all that are immediately dangerous, but he said it is not yet possible with the device to detect minor fissures which will later develop into menaces.

Mr. Drake in closing the discussion said that the criticism made by Mr. Carruthers was based on observations from the use of the first detector car. Since this one was placed in operation some changes have been made, resulting in an improvement in the efficiency of the testing method.

Iron Oxide in Steel Higher Than Supposed

During the past three years numerous writers and investigators have attempted to estimate the amount of iron oxide in open-hearth steel by calculation and by analysis. Experimental work conducted by the members of the metallurgical section of the Pittsburgh Experiment Station of the United States Bureau of Mines, in cooperation with Carnegie Institute of Technology and the Metallurgical Advisory Board, has shown that the amount of iron oxide dissolved in liquid steel in the open-hearth is very much higher than had been thought heretofore.

Apparently, reaction between carbon and oxygen is slow enough so that the metal is essentially saturated with iron oxide with respect to the slag under a rather wide range of conditions in the open-hearth furnace. This fact changes the concept of methods of working open-hearth heats to a considerable extent in that it emphasizes the importance of chemical composition and physical properties of the slag and the necessity for an even more careful study of deoxidizers than has been carried out up to the present time.

An Appraisal of Carbide Tools

Discovery of Tungsten Carbide, Method of Manufacturing Carbide Tools, Representative Performance in Various Uses, and Future Influence

BY DR. ZAY JEFFRIES*

THE base metal of cemented tungsten carbide is tungsten. The hard component is tungsten carbide. It has long been known that ferrotungsten containing large percentages of carbon is excessively hard and also very brittle. About 1898, Moissan produced in the electric furnace a material from tungsten oxide and carbon which he described as a carbide of tungsten. There were no very accurate methods for determining hardness in those days, but the hardness was sufficient to attract Moissan's attention.

About 1904 Just and Hanamann of Budapest, Austria, invented the squirted, or pressed, filament of tungsten for incandescent lamps. They produced, in one stage, tungsten containing a small amount of carbon. Such filaments were so brittle and fragile that it seemed doubtful whether they could become commercial. In fact, as little as 0.10 to 0.25 per cent carbon in such filaments rendered them not only brittle, hot and cold, but so fragile that a large percentage were broken at the touch.

Tungsten Carbide Itself Is Extremely Brittle

Tungsten filaments, therefore, engaged in a battle against carbon from about 1904 until the present time. Even now, at times, carbonaceous material gets into the lamp and a little tungsten carbide forms at the grain boundaries near where the tungsten filament is joined to the leading-in wires. The filament then becomes so fragile that a slight jar on the lamp breaks it and destroys the lamp.

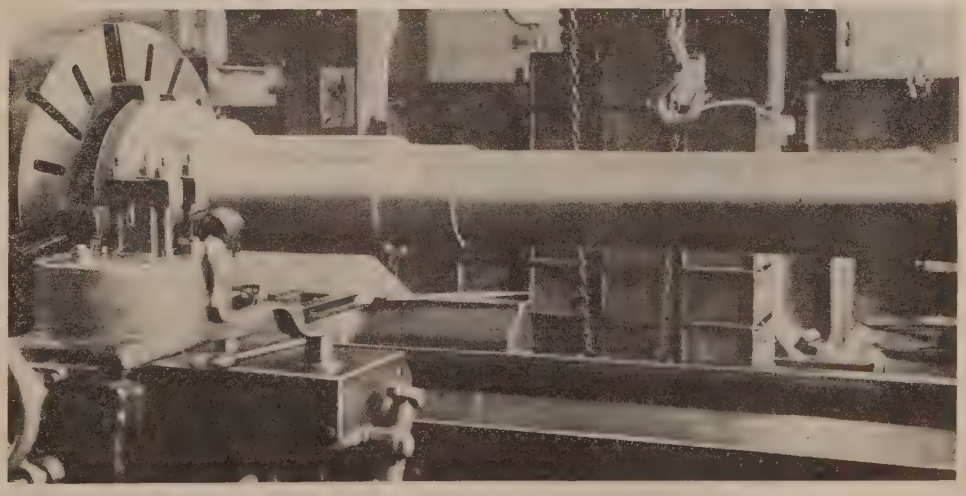
In another process of treating tungsten wire, the filament is heated to a temperature of around 1200 deg. C., usually in an atmosphere of hydrogen. It was early learned that if any hydrocarbon were present (such as by introducing a little kerosene, alcohol or fuel gas), within one second the filament became so brittle and fragile that it could be broken to pieces in the fingers. This, notwithstanding the fact that the filament before heat treatment had a tensile strength of 600,000 lb. per sq. in., and was quite ductile. The percentage of carbon which produced this effect was so small that at times it was difficult to detect it by chemical analysis.

Massive or fused tungsten carbide has been known since the time of Moissan, or for more than 30 years. It may seem rather strange that a material so fragile as tungsten containing a little carbon could be transformed into the tough cutting tool which does not resemble, in any physical property except hardness, the brittle tungsten carbide which was considered worthless for so many years.

Manufacture of Carbide Tools

Creation of these new tools represents a new metallurgy. The old metallurgy, especially of tools, was essentially one of fusion. The tool was either used in the cast condition, with or without heat treatment, or after forging plus heat treatment. The present cemented tungsten carbide is produced by first manufacturing a very fine powder of tungsten carbide; the fine powder is mixed with metallic cobalt and the mixture is then ground in a ball-mill and the ductile cobalt, as Doctor Hoyt has shown, is smeared over the surface of the microscopic particles of carbide. The mixture is then pressed into any desired shape and size. It may then be partially sintered by heating to a low temperature, after which it can be handled

*Consulting metallurgist, Cleveland. This article is abstracted from an address to the Machine Shop Practice Division of the American Society of Mechanical Engineers, Cleveland, Oct. 1.



IN Turning Nickel - Chromium Billets, Carboloy Tools Have Been Used for Four to Five Hours Without Perceptible Wear

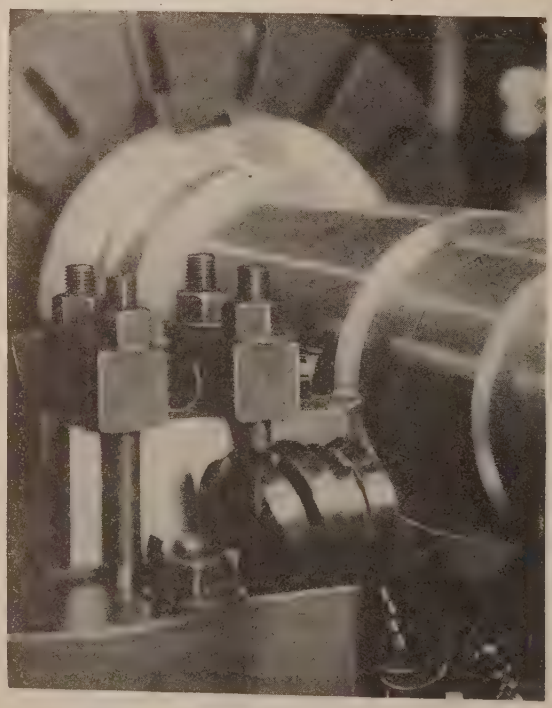
without breaking, but it is not machinable in the sense that the metal can be cut by an ordinary tool. It can be shaped with an ordinary knife or simple steel tool because the partially sintered powder can be removed with ease from the remaining material until the main mass is shaped to the form desired.

This mass of material which is left, after scraping or grinding off what is not wanted, is then reheated to a brilliant white heat in an electric furnace with a hydrogen atmosphere. That is the true cementing operation and the cobalt is the cementing material. The cobalt does not remain pure because it takes up a little of the tungsten carbide in the process, but essentially the finished product consists of minute particles of tungsten carbide cemented together with cobalt or with cobalt containing some tungsten and carbon in solution.

Commercial Development of the Idea

Development took place in Germany by the Osram lamp works of Berlin, and the two men who are given the major credit are Baumhauer and Schroeter. First it was used in dies for drawing tungsten and molybdenum wire at elevated temperatures. Dr. S. L. Hoyt of the research laboratory, General Electric Co., started work several years ago along these lines; he added a number of things to the development, and others have added still different things. Cemented tungsten carbide of today, therefore, represents the work of many people in Germany and in this country as well.

While I am associated with one of the companies manufacturing and selling cemented tungsten carbide in America, namely, the Carboloy Co., Inc., there are three other main channels of manufacture or distribution in the United States. One is Thomas Prosser & Son, who deal with imported cemented tungsten-carbide material made by the Krupp company in Germany. Others are Firth-Sterling Steel Co., which manufactures and sells a similar material under the trade name "Dimondite," and Ludlum Steel Co., dealing in a similar material known as "Strauss metal." I have obtained certain information from them and their opinion of the present status of this industry in America, so that I may present a composite picture. No distinction will be made nor implied as between one brand of cemented tungsten carbide and another.



CLOSE-UP of Rugget Tool and Support for Heavy Cut On Nickel-Chromium Test Log. Speed is 70 ft. per min., twice that expected of high-speed tools

Physical Properties of Cemented Tungsten Carbide

In density cemented tungsten carbide ranges between 14 and 15, a relatively high figure. It is difficult to appraise its true hardness. It has a very high resistance to abrasion. Its resistance to indentation is relatively less than one might expect from this fact. Tungsten carbide itself has a hardness comparable to sapphire or corundum. Scratch hardness of the cemented material is equal to the hardness of the hardest constituent, hence is equal to the hardness of tungsten carbide. Indentation is perhaps a little easier due to the presence of cobalt and hence is relatively low. Rockwell hardness measurements on the C scale will not suffice; a smaller load is used, and a special hardness scale has been developed for these carbide materials.

There is perhaps no test for wear quite equal to the service of tools in use, so that the appraisal of that factor is left to the user.

Whereas high-speed steel requires a special heat treatment to develop its hardness and its red hardness, cemented tungsten carbide is fully hard after cooling to room temperature from the high temperature sintering operation. It can be reheated to a very high temperature and cooled either rapidly or slowly, and it is still hard. Its red hardness surpasses that of any other metallic substance used by industry. No one knows just how hard it is at the high temperature, nor at what rate its hardness decreases at very high temperatures. It appears that temperatures ordinarily reached even in severe industrial operations are not high enough to affect materially the hardness at that temperature.

There are several ways of making this material and there are two or three different grades now available to the trade. These grades differ both in composition, in treatment during preparation, and in physical properties as well.

One of the grades contains about 87 per cent of tungsten carbide and 13 per cent of cobalt. It is tough, having a calculated tensile strength (as determined by the transverse test) of 300,000 lb. per sq. in. It has a high compressive strength, one determination being 540,000 lb. per sq. in., the highest of any material which has been measured in our laboratory.

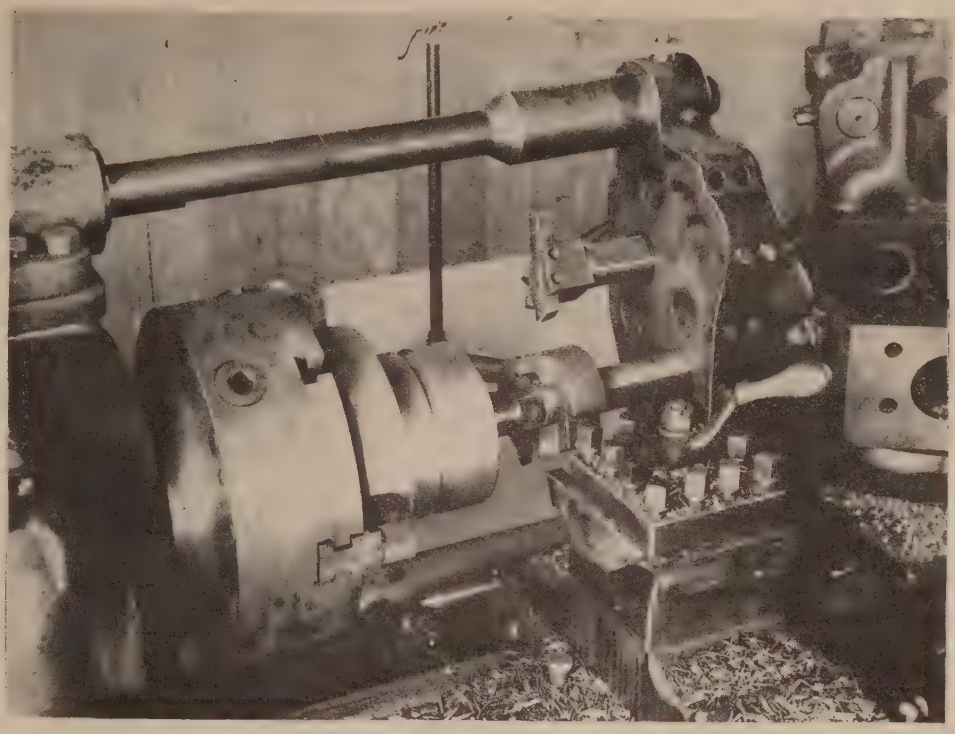
Another grade, containing about 6 per cent of cobalt, is somewhat harder to the indentation test; considerably harder as measured by the abrasion or wear test, and not so strong as measured by the transverse breaking test.

The industry is so new that the multiplication of grades has not reached the public. It is possible, however, by slight changes in composition and in methods of manufacture to produce quite a range of properties, and it seems practically certain that as time goes on the industry itself will select from these possibilities what best suits its own purposes.

High Price Does Not Prevent Savings from Use

Cemented tungsten-carbide material is now offered to the trade at a relatively high price. It is, in round numbers, $450 per lb. It is a price which none of us expect will be maintained; it is now justified by the fact that the industry is in the process of development, and development costs a great deal of money. In spite of the price, we find that the customer uses the material at a distinct saving to himself.

If you are using the tools at a saving to yourselves then, of course, you don't need to have the price come down to effect some saving, and if you are waiting for the



CARBOLOY Tools Set Up for Cast Iron Bushing. Note particularly the boring tool, which has a ½-in. square tool bit. It is operated at an average depth of cut of 7/16-in. by 0.020-in. feed and speed of 179 ft. per min. It made cuts totalling a depth of 5451 ft. without showing sign of wear. Rigidity of mounting is visible in the 4-in. standard cutter head

price to come down before starting the use of the tools, that is your own loss, provided at present prices you can effect a saving. Everyone knows that in the course of time the price of this material will be brought into a range commensurate with the cost of exploitation.

Being a high-priced material, it is utilized by the insertion of a piece of cemented tungsten carbide on a bit of a cheaper material, usually some grade of steel. This has given rise to what is known as the tipping problem. This problem has been taken care of in a number of ways. It may not be all that is desired at the present time, and you can expect improvements in the future. But in most cases it has been entirely satisfactory to put the cemented tungsten-carbide tips on steel shanks by copper brazing in an atmosphere of hydrogen.

There seems to be a preference for the welded tip for larger tools. Welding is attended by the hazard of cracking the cemented tungsten carbide itself, but when properly manipulated this hazard can be overcome.

Both the welded-on tips and the brazed tips have given satisfactory service. An insufficient number of people are conversant with the art of tipping, however, to insure that individual pieces can be distributed haphazard and anything like success can be achieved in the attempts to braze or tip these pieces to steel shanks in the users' tool rooms. On the other hand, some shops have tackled this problem and are in a position to mount their own tools. If a concern has only a little of the tipping to do it is probably best to permit the manufacturer of the tool material to make the tools.

The next problem in connection with the manufacture of a tool is grinding. Several companies in the United States sell suitable grinding wheels. Those which have given the best results familiar to me are artificial abrasives of the silicon-carbide family, such as carborundum or crystolon. A year ago, the matter of grinding these tools was a serious problem, but at the present time it may be said that almost anyone can grind these tools.

It seems to have a tremendous field for wiredrawing dies. Two examples may be cited, one drawing screen wire 0.0108 in. diameter, the other drawing larger wire 0.105 in. diameter. In one field it competes with the diamond die, and in the other with the chilled iron die. In the first case the cemented tungsten-carbide die drew 57,800,000 ft. of 0.0108-in. wire, with a wear of 0.0007 in. In this size the performance was approximately equivalent to that of a diamond die, but its usefulness was not completely exhausted. The overall improvement in cost on a performance basis over the diamond die was 6 to 1.

The second example is drawing the larger steel wire. In a 12-day period, 264 chilled iron dies were used in this duty. Over the same period one cemented tungsten-carbide die performed without "drawing out," i.e., going off size. We had, therefore, one cemented tungsten-carbide die taking the place of 264 chilled iron dies. On a basis of die cost alone, the carbide was cheaper than the chilled iron by a ratio of 36.6 to 18. In addition, more wire was produced during the 12-day period the cemented tungsten-carbide die was in use.

In more specialized service cemented tungsten-carbide dies are being used for hot-drawing fine wires of tungsten and molybdenum, and we will perhaps hear more in the future about its use in hot-drawing other materials.

Tungsten carbide is also used in blanking dies, particularly by the General Electric Co., in punching out transformer disks. It produces a shape free from burrs; after cutting 200,000 parts, the first one and the last one appeared to be just alike.

Cutting on Hard or Abrasive Non-Metallics

It is also used for cutting materials which no other metallic material has been able to cut. In that sense cemented tungsten carbide is opening up a new field for machining. It can machine glass, porcelain and compounds used in the electrical industry such as micalex and ivory. It machines various fibrous non-metallic materials which are abrasive, those containing mixtures of asbestos and other materials used in brake-linings, for example, and molded products of the bakelite type. In some instances it replaces diamond tools, but in other instances it

can machine parts which heretofore could not be shaped economically with any known tool. Just where that will lead in the future no one really knows.

The material is also used to saw rock, replacing saw teeth of other material, so that, outside of the machine tool industry itself, cemented tungsten carbide has potentially a wide application.

A saw with insert teeth, 16 in. diameter, when cutting artificial lumber made of magnesia, asbestos and wood shavings, could be increased in speed from 900 to 1600 r.p.m. The steel saw cut 80 ft. of board between grinds and cemented tungsten carbide 1520; these figures represent a 78 per cent increase in speed, and 1800 per cent increase in footage between grinds.

Ivory is turned at 6000 ft. a minute, hand feed, with only a skin cut, but the result is about the same as that obtained with the diamond tool.

Extraordinary Production on Metal Work

Let me give a few examples of tool replacement when cutting metal. It should be obvious that machines designed to use tools with different physical properties might not be able to take full advantage of this new material. Nevertheless it is interesting to see what performance one actually gets.

For example, when turning armatures, one armature per grind with the best steel tool. With cemented tungsten carbide we get 40 armatures per grind; the speed is 700 ft. a minute, and 1/64-in. cut. In rough and finished turning on commutators, the old record was 150 commutators per grind; with cemented tungsten carbide, 30,000 per grind.

In a cut-off tool, the old performance was 100 cuts per grind; with cemented tungsten carbide, 15,000 per grind.

For an example of profiling 1020 S. A. E. steel at very high speed, take the old practice of 60 pieces between grinds and compare with cemented tungsten carbide, 25,000 pieces.

When boring a main transmission bearing in cast iron, 4½-in. diameter, 100 to 125 pieces could be produced per grind with the old tools; 950 with cemented tungsten carbide.

An interesting thing developed when finish boring bronze bushings to a tolerance of 0.0005 in. The old record with existing tools was 150 pieces per grind, and 7000 with carbide. In addition to this economy, there were only 5 per cent as many pieces rejected as was usual with the older tools. That is a very significant point, namely, that in machining to close tolerances the longer the life of the tool the less will be the machine scrap, because the more nearly the piece will be machined to a dimension within the tolerances.

When reaming a malleable iron differential carrier with 3¾-in. hole, it is cut at 70 ft. a minute with 1/64-in. cut and hand fed. With the old tools there were one or two adjustments per day, and with cemented tungsten carbide one tool has been running for eleven weeks without change.

A high-silicon alloy of aluminum, useful for gas engine pistons, can be machined only with the greatest difficulty with the ordinary tools; after about ten pistons the tools are too dull for use. With the new tools some of the operations will run 300 to 500 between grinds, and on other operations as many as 2500. Over three years ago Doctor Hoyt brought one of his new tools to Cleveland where we had been trying to machine pistons of somewhat similar composition to this with the ordinary tools and had given it up. The cemented tungsten-carbide tool proved so satisfactory that we waited for a couple of years before putting this type of alloy on the market, waiting, that is, for a commercial supply of satisfactory tools with which to finish it.

Another example (not a machine tool but a nozzle for a sand blast): The performance, compared with the chilled iron nozzle, is on the ratio of 120 to 1.

I could go on naming such examples for some time, but the order of results already quoted is now obtainable with existing tools and machine tool equipment.

There are some other features in connection with these results which have not been mentioned. In nearly every case, without change of labor, the production of the entire plant has been increased by carbide tools. It is seldom that the improvement is not 15 per cent, and sometimes the actual production has been more than doubled.

Tools for Intermittent or Jump Cuts

The art of making tungsten-carbide tools to stand up better under intermittent cuts is improving daily. Whereas a few months ago an attempt to use cemented tungsten carbide on a certain job resulted in failure, today some of those same jobs yield to the improved art. There may be some improvement in the material itself, but that is secondary as compared with the improvement in the mounting. It has been found that this material with relatively low tensile strength as compared with high-speed steel has a higher compressive strength, and it is essential to utilize the material in compression, and to develop as much rigidity in the whole tool mounting as possible. Those improvements represented mostly increase in rigidity, obtained by increasing the size of the shank, by increasing the size of the piece of cemented tungsten carbide itself, and by so mounting the piece in the shank as to receive a maximum of support in portions which ordinarily would be in tension in the tool.

This matter of rigidity has been carried to the extreme in a type of tool where the cemented tungsten-carbide insert is surrounded and reinforced on all sides (where it would normally be in tension) in a plain steel shank. Such a tool is capable of performing intermittent cuts and otherwise behaves much like one would expect of a very rugged tool.

Published literature and experience emphasize that the angles of these tools are very important. The top side rake angle is usually four degrees less than for high-speed steel for the same job, and also the side and front angles should be relatively low, usually between four and six degrees. The tool should also be set very near to center in order to reduce the tensile stresses, and to reduce chattering as far as possible.

Rapid Developments in the Art

Fifteen months ago one tool was sold to a large manufacturer in the United States, and that tool is still working. In the meantime it has replaced 2450 lb. of the type of tool material which was being used previously. That is the record so far.

But broadly speaking, about one year ago the whole country became conscious that there was such a material as cemented tungsten carbide. Naturally, the machine tool builders had to make some tests of their own to warrant expenditures for machines to develop the properties of cemented tungsten carbide.

To the keener observer, one who is familiar with the horsepower of motors which have been mounted on machine tools in the past, the machine tool congress now in session in Cleveland suggests quite a revolution. We have some records of performance of carbide tools on machines which have been designed to utilize fully the inherent characteristics of the material. One of the workers in that field asserts that the true results will probably not be believed by a good share of the readers.

When cemented tungsten carbide was given a good deal of publicity about a year ago, there was a clamor for tools, and for months the imported material and the material made in this country were not sufficient in quantity, or could not be made into tools rapidly enough, to fill this

demand. The first orders were naturally trial orders, and no great amount of business came from any one source. The expense of trying to serve that sort of a demand, of course, was tremendous, and also it put quite a tax on the organizations. But since the middle of this summer the companies promoting this material have been in a position to supply tools and tool bits on short delivery for most of the ordinary tool requirements. There are a number of desired tools which it has not been found practical or expedient to make at the present time, such as very large-sized dies for drawing tubing, but that demand will be taken care of in the not distant future.

The advent of high-speed steel was a great thing, not only for the steel industry, but for all industry; it was a great thing for mankind. It has played a major role in what we might call our economic civilization, and it has done perhaps more than any other one development in the last 25 years to help make men economically independent, to help make the expenditure of a given amount of human energy produce more of the necessities and luxuries of life.

Its advent, however, did not reduce the amount of carbon steel tools used. There are apparently being made every year more carbon steel tools than were made in the year 1905, the year when high-speed steel began to get into production. In the same way we don't anticipate that cemented tungsten carbide, even though it be sold very much more cheaply than it is today, will eliminate high-speed steel or carbon steel tools. I strongly suspect that in 1935 there will be as much or more high-speed steel made per year as in 1929, and this is a big year.

Furthermore, we do not regard this material as a cure-all for everything in the tool industry. Some applications have met with very indifferent success; some attempted applications can be branded at the present time as absolute failures. We do not know where this material will lead us, especially from the standpoint of tool substitutions. It seem, however, that we have gone far enough so that we can definitely say that cemented tungsten carbide or its approximate equivalent is destined not only to have a definite place in the future of industry, but a most important place. That it will be used in large quantities and for a great variety of purposes in the future there can be no question.

One of the results is going to be to carry the economies initiated by high-speed steel and stellite toward greater economic benefits for mankind. It seems reasonable to expect that the material can increase the average production in machine shops by 20 per cent, or will make possible the production in five days what now takes six. If that is true it cannot help but benefit all of the people, because machined goods will cost less, and it will benefit the metal industries because more metal can be used.

Treatment with Chemicals Improves Metal-Sprayed Surfaces

PROBLEMS pertaining to metal spraying were discussed by a group of interested persons meeting in Brussels early in the year, according to the Swiss *Welding Journal*. Zinc spraying is now strongly competing with galvanizing. Thriving plants spraying up to 60 tons of metal per week exist in Holland, Belgium, France and England. Whereas hot galvanizing practice tends toward minimizing the thickness of the zinc coat, spraying puts on from 0.10 to 0.18 lb. per sq. ft.

Rapid formation of a protective skin of zinc oxide on a sprayed coating is of great importance. Treating with sodium chloride speeds up the formation of this layer and produces zinc coatings which resist the action of sea water and air extraordinarily well.

Since, in the metal spraying process, a liquefied metal wire is atomized into fine particles by a compressed air jet, it is not to be expected that the deposited metal will form a homogeneous mass. Even if the particles should hit the surface in a completely liquid state, instead of in a plastic state, it would not only be impossible to hold the molten metal together on account of the compressed air jet, but the liquid metal would flow down vertical surfaces during the application. The alternative is to fill the sprayed coatings by chemical or mechanical means. Nature performs this task for zinc; oxide and carbonate are formed which close up all pores of the coated layer. This natural protective layer either does not occur or is insufficient in coatings of other metals such as aluminum, tin, copper and lead. Painting with all sorts of preparations has been unsatisfactory, as they were too easily dissolved or worn off.

Far better results are had when the metal layer is treated with certain chemicals which react with the metal. Durable aluminum coatings are produced, for instance, by treating the layer with acids and carbonates. Containers for breweries, sugar refineries and laundries have been so treated and have stood up well in service.

Spraying with aluminum as a protection against high temperature has given divergent results. One German plant preheats the steel to a red heat before spraying with aluminum; a French concern heats the object after coating with aluminum and after a treatment with borax and soda to about 930 deg. Fahr. In England aluminum coatings are applied to iron or steel specially alloyed for this purpose.

Spraying with tin has also given more satisfactory results when subsequent chemical treatments have been applied. Tin coatings treated with acids and silicates are very satisfactory for food and oil containers and for vessels and machines used in oleomargarine manufacture, baking ovens and cooking utensils. In Belgium tank cars for shipping acids have been sprayed with lead inside and zinc outside.

Larger Stock Lines Require Larger Charges

It is a matter of common knowledge that, in a pile of unsized material, the larger pieces roll to the outside due to their greater inertia. This is not the whole explanation of size segregation in the blast furnace. The difference in the angles of repose of ore and coke is an important item in stock distribution with respect to size. Observations made by the North Central Experiment Station of the United States Bureau of Mines, in cooperation with the University of Minnesota, Minneapolis, indicate that the angles of repose of ore and coke in the blast furnace are about 34 and 27.5 deg., respectively.

Calculations based upon these angles indicate that the ore layer is about one ft. thicker at the walls than at the center. Unless the size of the ore charge is increased, the effect of larger stock lines will be to decrease the amount of ore thrown toward the center of the furnace. In order to prevent an unnecessary increase in the porosity of the center of the furnace the size of the charge should be increased in about the same proportion as the stock line area.

No Serious Depression in Sight

Consumption Has Not Exceeded Country's Income and Productive Capacity Has Been Free from Undue Strain—Capital Created No Faster Than Savings

BY DR. CHARLES O. HARDY

DURING the past month one item of news has completely overshadowed every other element in the business situation. Developments which would ordinarily have been regarded as omens of fairer business weather, such as increases of dividends, foreshadowings of tax reduction and declines in money rates, have been interpreted as stock market propaganda rather than as business indexes. On the other hand, unfavorable news, such as declines in car loadings, in prices of basic raw materials and in the level of activity of the steel, automobile and building industries, all have been interpreted in their bearing on the future of the stock market, and on general business activity through the stock market channel of influence.

In view of this concentration of interest it may be worthwhile to recall the relationship of the fluctuations of stock prices and of business activity during the period since the completion of the debacle of 1921. During this eight-year period the trend, both of business and of the stock market, has been more strongly upward than in any previous period of our history. This fact is the more remarkable because the period has been one of very great economic strain for all the other leading nations of the world. Pre-war experience pointed to the conclusion that the prosperity of the leading commercial and industrial nations was interdependent to a much greater extent than appears to have been the case during recent years.

This upward movement of business activity in the United States has been accompanied by a similar upward trend in the level of stock prices, but the relationship of the year-to-year fluctuations of stock prices and of business activity has been less uniform. In 1922 both curves moved strongly upward; both turned down in the latter part of 1923 and in early 1924; then they turned still more sharply upward in the fall of the latter year and through 1925.

¶ Real values are not made in the stock market; they are only registered there.

¶ Prosperity is not made or unmade by errors and correction of errors in the registration.

¶ The pace of business in the last two years has not exceeded country's capacity to produce without overstraining its resources or to consume without overdraft on its income.

¶ Nor has the country been creating capital above its capacity to finance through the current rate of saving.

¶ Decline in business appears to conform to three-year cycle.

¶ A reaction like that of 1927 would not be a catastrophe.

Stock Prices Diverge from Business Trend

But in 1926 the movement of stock prices diverged from that of business. A sharp break in stock prices in the spring was more than made up by the end of the year, whereas productive activity and business profits broke all records. In 1927 the curves again diverged. Most business indexes registered lower levels than in 1926 or in 1925, profits were unsatisfactory, and the unemployment situation occasioned more concern than in any year since 1921. Stock prices, on the other hand, moved upward with only minor reactions through the year.

Stock Market Boom Out of Line With Corporate Income

Since 1927 the two series have coincided in direction but not in slope. The business world has once more enjoyed prosperity. In the spring and early summer of 1929 signs of overproduction appeared in some basic lines, but prices did not reflect inflation. This upswing in business, however, was completely overshadowed by the Wall Street boom. Ever since the summer of 1927 the upward surge of stock prices has been out of all proportion to the increases of corporate income, though the latter have been impressive.

In general it may be said that from 1921 to the summer of 1926 stock prices went up roughly in proportion to the improvement in the actual income of the corporations whose shares were traded in; for the next year the increase of stock prices reflected an increase of dividends rather than of earnings, while for the last two years the upswing of stock prices has represented chiefly a willingness to capitalize industrial earnings at lower and lower rates. By the spring of 1928 the average of a long list of good corporate stocks were selling on a basis which capitalized their dividends at a lower rate than the bonds of companies of similar standing—a phenomenon never seen before.

Suddenness of Crash Due to Lack of "Short" Interest

The decline of the last few weeks has been unparalleled in its suddenness, though not in its extent. The suddenness of the smash may plausibly be explained by the lack of a "short" element. It has long been a commonplace of speculative markets that in a panic the first buyers are those who have already sold at higher prices, and that this sort of buying provides a cushion to break the force of the panic. Price declines which terminate real estate booms are sharper and of shorter duration than stock market liquidations because there are no short sales of real estate. Apparently in the stock market boom of 1929 the persistent upward course of prices in the face of adverse money conditions, official disfavor and the dictates of common sense had substantially driven the short seller out of the field.

Probable reactions of the stock market crisis on economic life are just now being painted in the blackest colors. "Christmas trade will be hard hit, automobile sales for several months will be cut to the minimum, luxury trades will go to pieces, building is already on the downswing, the only ray of light is the hope that stock

prices will resume their upward course." It would be rash indeed to predict that none of these things will materialize. Undoubtedly the effect of the boom is to make thousands of people poorer and to make thousands of others think themselves poorer, and trade will be affected. Nevertheless, it seems safe to surmise that this picture of the situation is overtinged with Wall Street psychology. Real values are not made in the market place; they are only registered there, and prosperity is not made or unmade by errors and corrections of errors in the registration. The losses which the country has suffered on account of the stock market collapse are not comparable with those which it suffered on account of the Mississippi flood or the Southeastern hurricane. The storm and the flood took wealth away from individuals and destroyed it, they did not transfer it to others.

Nevertheless, a stock market collapse does in the short run have some depressing effect on business. It was pointed out in these columns a month ago that a collapse in stock values must result in some improvement in bond values (which would facilitate some types of business and impede others), but that such an improvement can be expected only with a time lag. Precisely the same thing applies to the effect on individual buying power. Those speculators, big and small, who have been wiped out by the collapse of paper values at once go out of the market as buyers of luxuries; those who profit by the fall of prices are not likely to expand their purchases immediately by a corresponding amount. It takes time to show who are the gainers. The purchasers of stocks even at the bottom prices of the recent declines are not yet sure whether they have shown foresight or rashness by refusing to wait still longer.

Business Outlook Not Alarming

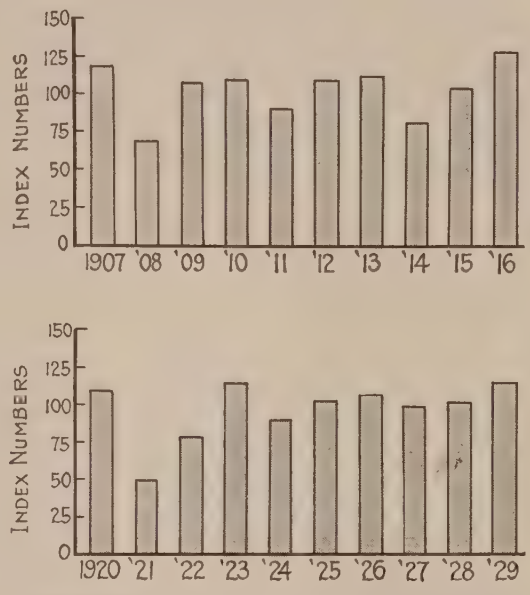
Developments outside the stock market must be regarded as mildly unfavorable, but not alarming. The money market has eased, partly because of the liquidation of stock market obligations, but chiefly because the Federal Reserve System has pumped a large amount of credit into the market in the hopes of allaying the panic. The rediscount rate has been lowered twice at New York and once at London. However, the long continued efforts of the Federal Reserve System to drive capital out of the stock market were of so little avail as to inspire skepticism regarding their probable success in pumping it in again. Industry and trade need new money no worse than they did a month or two ago.

Money rate cuts, dividend increases, bankers' pools, assurances of public officials and prominent business men that "business is fundamentally sound," public announcements that X, Y, and Z are buying stocks, widely advertised supporting orders under the market—all these are part of a propaganda designed to check or stop the downward sweep of stock prices. Such efforts are commendable in so far as they aim to prevent the bottom from dropping out of the market so fast that banks and other lenders cannot protect their loans and customers of brokerage houses cannot get information as to what their holdings are actually worth. They are commendable too in so far as they tend to check the depressing psychological effect of the stock situation on business planning. But in so far as they rest on the assumption that the country is wealthier or in any sense better off with the common stocks of its corporations valued at 30 times earnings, than when valued at 10 times earnings, they are discreditable to the wisdom of the community.

Three-Year Cycle at Work?

Outside the security market the situation is readily summarized. The moderate downward trend noted a month ago continues, and it looks as though 1930 is to fall below the records of 1928 and 1929. There is little evidence that the decline of production in basic lines has been accelerated by the doings in Wall Street, but it has not been checked. Prices of raw materials are weakening, and there is evidence of a slight curtailment of retail demand. Automobiles and building are the weakest spots; the automobile situation will probably be made worse by the stock market's collapse and building, better.

This decline raises the question whether we have developed a normal cycle of two good years and one poor one. Such a cycle appeared in late pre-war years, and since we got out of the war and the post-war boom it seems to have reappeared. The years from 1921 to 1927



THREE-YEAR Cycle of Two Good Years, Followed by One Bad Year, as Illustrated by Pig Iron Production (Index for 1929 Based on Nine Months' Performance)

repeated the sequence of one very bad year followed at three-year intervals by two moderately bad ones, which was established in 1908, 1911, and 1914. The accompanying chart shows how this cycle has appeared in pig iron production; numerous other indexes could be used to show a similar sequence. It is a temptation for the forecaster to predict that such a cycle will continue until it is again interrupted by an unpredictable cataclysm. But this is hypothetical. Perhaps the sequence of two good years and one poor one has a rational basis in the technique of our productive process—and perhaps it is merely a coincidence.

In any case there is no reason as yet to forecast a serious business depression. The pace of business in the last two years has not exceeded the country's capacity to produce without overstraining its resources or to consume without overdraft on its income. Neither has the country been creating capital above its capacity to finance through its current rate of saving. Should we have in 1930 such a recession as occurred in 1927, or even in 1924, it would not be a catastrophe. Most of our industries can earn reasonable profits if two years out of three are good, provided the third is no worse than have been the poorest years since 1921. There is no more reason why such moderate reactions should lead to downward revisions in the value of permanent investments than that mild booms, like those of 1923, 1926 and 1929, should cause those values to be revised upward.

Progressive Conveyor Assembly

Durant Cars Advance without Their Own Wheels Until Nearly Complete—More Rapid Work Gives Production Economies

PRODUCTION economies are provided in an automobile body manufacturing plant recently placed in operation by Durant Motors, Inc., Lansing, Mich. This, adjoining the car assembly department, occupies a new two-story building, the outstanding features of which are good ventilation and the excellent lighting provided by an abundance of continuous window surface.

Bodies are assembled on a conveyor on the first floor and cleaned and painted on the second floor. The wooden frame members made in a Louisville, Ky., mill, are shipped into the plant ready for assembly. This cuts down transportation charges on lumber, a considerable percentage of which becomes scrap in the making of body members.

The body assembly conveyor is approximately 400 ft. long. Near the loading end is a jig in which the sub-assemblies are put together, forming the frame. On removal from the jig, the frame is placed on a truck on which it remains through all the assembly and cleaning and painting operations, until the completed body is ready to be mounted on the chassis. Then the truck returns to the loading end of the body assembly conveyor. Each truck is mounted on four wheels, two running on a flat rail track and two on a channel track.

The wooden sections of the body are fastened together as the frame moves along the conveyor. Drills and screw drivers used in this work are electrically driven, power for these tools being taken from a trolley line directly above the conveyor. The trolley through which the current is supplied to the tools slides along on the trolley wire, permitting moving the tool along the assembly line.

When the frame leaves the jig and goes on the assembly line, the floor boards are the only wooden members that are not in place. The sheet steel panels are put on as the bodies move along the lower part of the line, after the frame assembly. Polishing on the metal sections is done along the line with air-operated polishing wheels.

Assembled bodies on leaving the line are pushed sideways on to an automatic hoist, which carries them to the cleaning and painting department on the floor above. The hoisting requires only one man, who trips the mechanism and pulls truck and body from hoist to upper floor.

Bodies Move Along Three Lines

There are three parallel conveyor lines in the cleaning and painting department. First the body is cleaned with gasoline in a spray booth, then cleaned by hand and wiped and, finally, any spots that may be left are cleaned off with emery paper mounted on wheels. Then the bodies are dried for about 20 min. at a temperature of 250 deg. Fahr.

After drying they are given a priming coat of paint. Then they move to the second conveyor line and through an oven, where the priming coat is baked. File marks and other metal spots are then removed, after which two surface coats are applied. These are dried in an oven in the third line, after which the bodies are rubbed with fine sandpaper. A clean-up operation follows and then the lacquer is applied.

The enameling department is conveniently arranged for cleaning and enameling various parts. There are two Crescent machines for cleaning parts before enameling; one is for small chassis parts and the other for hoods, fenders and aprons. Parts are first washed in an alkali solution, after which they are rinsed in water at near boiling temperature. Then they are dried in an oven at a temperature of approximately 400 deg. Fahr.

On leaving the oven the parts are moved along on a table for various hand cleaning operations. These include sanding to remove rough spots, scratches, etc., cleaning with high-test gasoline, removal, by means of air blowers, of any moisture that may be remaining, wiping inside and out and finally wiping with alcohol. Then they go to the adjoining enameling department, where they are again wiped, this time with tack rags.

There are two enameling ovens, side by side, one electrically heated and the other gas heated, each used for different classes of work. Each oven has thermostatic control. Parts that require the finest finish, such as fenders, aprons, hood sills and gas tank covers, go through an A-type oven. In this they are given two coats of enamel and are drained and baked after each dipping operation. The tunnel-type oven is used for small parts such as trunk racks, wheel carriers and other parts that do not require the finest finish.

Final assembly is done on two main assembly lines. The frame parts are received from the stamping plant and assembled at the side of the final assembly lines. Other parts are stored along these lines at points where they will be needed. The bodies are placed on the line through an opening from the floor above.

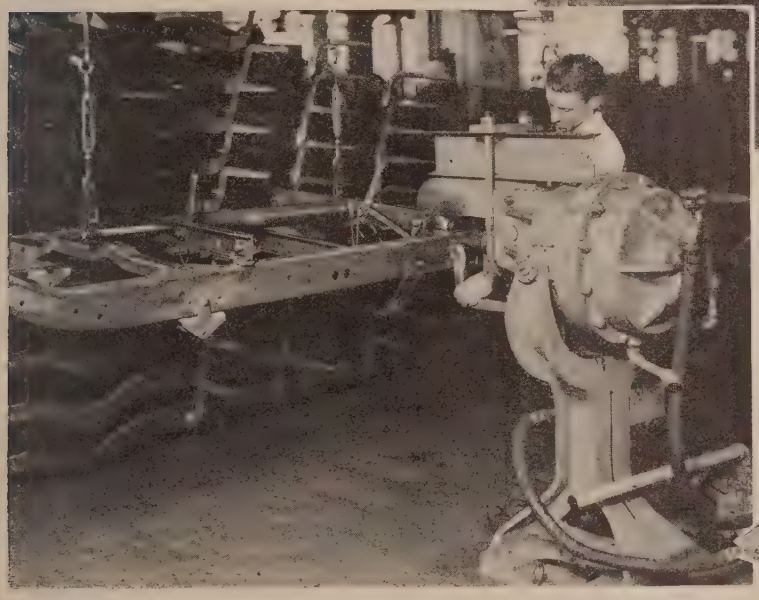
A feature of the assembling is that the wheels are not put on until the car has reached near the end of the line, and until after the body has been put on the chassis and practically all the assembly work has been done. Consequently the chassis, instead of moving on the car wheels, remains attached to the assembly conveyor until the car is about ready to leave the line. It is found that assemblers can do more rapid work in putting on various parts if the wheels are not in their way.

After the springs and axles are assembled to the chassis, the latter is turned over and set on carriers that form a part of the conveyor. Nearly all the remainder of the assembling is done while the chassis is moving on the carriers. All that remain to be assembled after the wheels are mounted are the radiators, head lamps and a few other parts, whose assembly is not interfered with by the wheels.

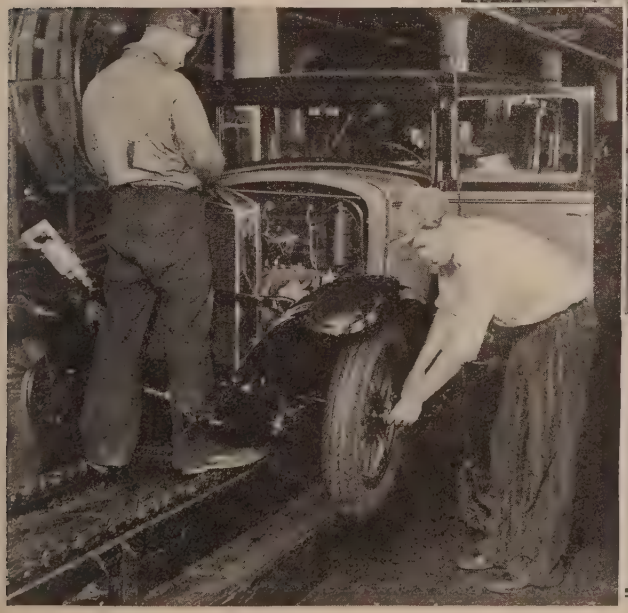
Each car is tested after assembling, by operating the motor with the rear wheels setting on two heavy cast iron wheels, the faces of which reach slightly above the floor level. The car is held in position by blocks in front of the front wheels and when the motor is started the cast iron wheels revolve with the rear wheels. The energy required to operate both the car in this position and the heavy wheels on which the rear wheels rest is said to be approximately the same as the energy required in a road test. The cast iron wheels are 40 in. in diameter, have an 8-in. face and weigh 850 lb. each. The shaft carrying the two wheels revolves on four groups of roller bearings, one set of bearings on each side of each wheel.

ASSEMBLING Panels and Other Metal Parts on the Body Assembly Conveyor (Right). This moves at a predetermined speed and the work is carried forward at a speed to match

FRAME Sections Are Shipped Knocked Down (Below) and Are Assembled in a Bay Adjoining the Final Assembly Lines. This picture of a riveter at work shows the frame suspended from an overhead carrier



DEPARTING from Usual Practice, Wheels Are Not Put on a Car Until Practically All the Other Parts Are Assembled (Below). Consequently, they are not in the way to interfere with other assembling work



ONE of the Machines for Washing the Parts (above). Both gasoline and boiling hot water are used in the several cleaning operations

Parts After Washing Are Given Several Hand Cleaning Operations (in circle above) Before Enameling

Fabricators Adopt Business Code

Trade Practice Conference Followed by Annual Meeting of American Institute of Steel Construction—Studies Financial Status of the Industry

FABRICATORS of structural steel held a trade practice conference Nov. 11 and 12 at the Edgewater Gulf Hotel, Edgewater Park, Miss., and adopted provisionally, under the chairmanship of Hon. W. E. Humphrey, of the Federal Trade Commission, a code of trade practice. All of the large fabricators, save the largest of them all, were present, and opinion expressed in the succeeding few days was unanimous that the industry in this meeting had taken a long step forward and one which would prove a matter of growing importance as time goes on.

In these following days was held the annual convention of the American Institute of Steel Construction, Inc. The sessions of this body, the seventh annual, were marked, in contrast with previous meetings, by an aggressive rather than a defensive attitude toward the problems of the industry. Reports of the officers were impressive, both with respect to the expansion of the organization in numbers and in activities and with respect to the research work in progress and planned, including the technical side as well as that of markets. There were intimations that the institute could put to good use for hastening research projects an income substantially equal to its present one, or roughly $300,000 a year additional.

Annual Meeting of Steel Constructors

AN outstanding address was made by Alexander Wall of the Robert Morris Associates, Lansdowne, Pa., emphasizing the importance of any one company's determining its true position, financially (and inferentially industrially), in comparison with the industry as a whole. So well received was this address (which is reported in another column), that a committee was ordered appointed to cooperate with Mr. Wall for the further development of the subject.

An inspiring contribution was made by Dr. D. B. Steinman, consulting engineer, New York, who traced with the aid of lantern photographs "fifty years of progress in bridge engineering." He detailed in somewhat popular language the tremendous strides that have been made in the length of span and carrying capacity, particularly in recent years, and also in making utility and beauty more or less synonymous. His views included designs for longer structures than now exist, such as the proposed Liberty Bridge across the Narrows at New York.

One session of the convention was given over to construction matters, with the so-called battledeck floor as a main item. Among other topics were welding, riveting and fireproofing. A demonstration of the steel deck floor featured the conclusion of the session. In a yard at the rear of the hotel a simple frame of steel, supplied from the New Orleans warehouse of the Lukens Steel Co., had been erected to show how the plates of the floor may be arc welded to each other and to the underlying beam. The exhibit also covered the easy application of molded gypsum fireproofing material, made by the Rockwood Corporation of America, St. Louis, for column protection and ceiling construction.

Among papers and addresses of the convention were these: "Industrial Cooperation," by Hon. W. E. Humphrey, Federal Trade Commission, "International Cooperation," by Hon. Vincent Massey, Minister from Canada to Washington, "Woman's Influence on Steel Purchases," by Mrs. Christine Frederick, director, Applecroft Home Experiment Station, Greenlawn, L. I. (these three at the banquet), "Steel Dams, Lock Gates, Caissons, Etc.," by Henry Goldmark, consulting engineer, New York, and an address on the geographical distribution of capacity and bookings of the fabricated steel industry, by L. Seth Schnitman of the Bureau of the Census, Washington. From Tuesday evening, following the trade practice conference of Monday and Tuesday, until late Friday night, when a hilarious get-together dinner, in a hallowe'en atmosphere, was concluded, the attendance of some 290, including ladies, was well occupied with scheduled sessions, allowing only Thursday for a golf tournament.

Growth of Steel Construction Institute

	1924	1929
Income	$30,000	$324,000
Members	114	220
Paid employees	4	50
Office rental, monthly	$225	$1,050
Literature mailed, pieces daily	....	100
Standard handbooks, daily	....	100*
Items of literature on hand for active distribution	....	108
Calls by district engineers, daily	....	45
Mailing list, arch., engr., contrs., etc.	....	3,500
Addresses by representatives	few	70
Sales manual bulletins	....	65
Technical service bulletins, monthly	....	2
Advertising inquiries, daily	....	15

*$55,000 in 18 months.

Officers Were Reelected

The directors whose terms were expiring with the meeting were returned for another three years, and the directors subsequently reelected the officers, as tabulated in another column. Also elsewhere will be found the report of the committee on mill relations. The discussion in this connection included the expression of a wish that the producers of shapes had an organization or that there could be a group of them who could be met by the fabricators in future negotiations, instead of a group approach in each case, as it now is, with a given mill.

Some time was spent in discussing a practice recently established apparently of having one contract, in Federal aid road projects, cover the bridge work as well as the foundations and road work proper. Efforts are to be made, largely through the engineering department of the institute, to reinstate the former separation of the bridge contract from the rest of the work. The investigation is likely to cover also any practice there may be of holding the steel structure of a Federal building project as part of one general contract.

Reports were submitted in printed form, as follows:

Code of Standard Practice, by C. M. Denise, McClintic-Marshall Co., Pittsburgh, chairman.

Fireproofing as Related to Structural

Steel, by E. W. Krueger, Worden-Allen Co., Milwaukee, chairman.

Uniform Method of Cost Accounting, by W. S. Mosher, Mosher Steel & Machinery Co., Dallas, Tex., chairman.

Publicity and Advertising, by George E. J. Pistor, Hay Foundry & Iron Works, New York, chairman.

Standard Handbook, by D. H. Wood, Converse Bridge & Steel Co., Chattanooga, Tenn., chairman.

Artistic Bridge Designs, by Clyde MacCornack, Phoenix Bridge Co., Phoenixville, Pa., chairman.

Wind Bracing and Technical Research, by Aubrey Weymouth.

Committee for Making Complaints

IN another column are enumerated the practices defined as unfair and practices to be condemned, all as compiled by the trade practice conference held prior to the meeting of the American Institute of Steel Construction and independently of it. The conference also voted the appointment of a committee to draft standard proposal and contract forms and it set up a committee on trade practices. This committee is "empowered to investigate and determine whether these resolutions are being observed, to make complaints concerning alleged violations, to cooperate with the Federal Trade Commission, and generally to perform such other acts as may be reasonably necessary and proper to put these resolutions into effect and accomplish the objects and purposes of this conference. The American Institute of Steel Construction, Inc., is empowered by this conference to appoint said committee."

Against Much Change in Anti-Trust Laws

Federal Trade Commissioner Humphrey, at the banquet of the institute, touched on his views respecting repealing or materially amending the anti-trust laws. He believes it best for American business to rely on an ever continuing series of decisions of the Supreme Court, or as he put it, "at last, after the lapse of forty years, lawyers and courts are able to give with reasonable certainty the law applicable to any given state of facts. Is it advisable to again travel this long and burdensome road of discouragement, confusion and business disturbance?

"The Supreme Court by precedent after precedent slowly but steadily and wisely is telling us what they [Sherman law, Federal Trade Commission act, Clayton act] mean. To now adopt a series of new statutes would cast doubt upon the applicability of this long line of judicial decisions. It would again bring upon the business of the country the legislative and judicial chaos from which we have so slowly and painfully emerged. In other words, to repeal or radically amend the anti-trust laws in my opinion would be to largely destroy all we have gained in forty years of experience."

Composite Balance Sheet for a Given Industry

THE burden of Mr. Wall's address was that a bank needs to have more information of a company than shown on the balance sheet; that this is insufficient at times even if the volume of sales and the percentage of profit are available. It is essential, he asserted, to have a composite statement of each industry and then the individual company's statement may be compared with the composite. Such a comparison is valuable not alone to the bank but to the company. Cases are known in which a given company, in the opinion of accountants, appeared to have a favorable ratio of current assets to current liabilities but its position in respect to other items, such as receivables, payables, and the like, was bound to spell receivership, unless discovered and corrected in time.

Mr. Wall had succeeded in getting statements of 54 steel fabricating concerns and presented to the meeting a compilation of the so-called common size statement, reproduced elsewhere in this report. By comparing a given company's showing with this standard for the same year, he would be able to suggest where the company is strong and where it is weak and also could indicate measures which should be taken for improvement. The common size statement, it will be noted, shows for every $100 of assets how much is cash and how much is receivables, etc.

"If we find," said Mr. Wall, "that it is usual in a particular industry for the sales to run to an amount six times the inventory and we find a single unit in that industry whose sales are only four times its inventory, we can be pretty sure that something is out of line in the processes of that single company, in connection with its inventory. It is carrying more merchandise on its books, per dollar of sale, than are its competitors, and it is an expensive matter to carry merchandise in greater quantity than is economically necessary because of the carrying charges."

After the session adjourned, THE IRON AGE asked Mr. Wall for figures which would show roughly where the fabricating industry stands in relation to a number of other industries. A few of the ratios are here tabulated:

Structural Steel Industry Compared with Other Industries

Industries	Current Assets to Current Liabilities	Net Worth to Fixed Assets
Fabricated steel	270	150
Passenger automobiles	340	400
Motor trucks	500	400
Wholesale heavy hardware	340	255
Hardware manufacture	370	625
Machine tools	250	370

The Robert Morris Associates, represented by Mr. Wall, is an association of the credit officers of banks. It was organized in 1915. It has accumulated statements numbering between 7000 and 8000, covering 70 different branches of industry, and it compiles statements of each business

American Institute of Steel Construction, Inc.

OFFICERS

President, Charles N. Fitts, New England Structural Co., Boston.

First vice-president, C. M. Denise, McClintic-Marshall Co., Pittsburgh.

Second vice-president, Clyde MacCornack, Phoenix Bridge Co., Phoenixville, Pa.

Treasurer, George E. J. Pistor, Hay Foundry & Iron Works, New York.

Executive director, Charles F. Abbott.

Chief engineer, Lee H. Miller.

DIRECTORS

*H. B. Hirsh, Belmont Iron Works, Philadelphia.

George E. J. Pistor, Hay Foundry & Iron Works, New York.

J. L. Kimbrough, Indiana Bridge Co., Muncie, Ind.

*L. L. Gadd, Levering & Garrigues Co., New York.

C. M. Denise, McClintic-Marshall Co., Pittsburgh.

W. M. Wood, Mississippi Valley Structural Steel Co., Decatur, Ill.

A. J. Dyer, Nashville Bridge Co., Nashville, Tenn.

*Charles N. Fitts, New England Structural Co., Boston.

Karl E. Vogel, Omaha Steel Works, Omaha.

G. E. Klingelhofer, Pittsburgh Bridge & Iron Works, Pittsburgh.

Reese Llewellyn, Consolidated Steel Corporation, Los Angeles.

*N. W. Warren, Dominion Bridge Co., Ltd., Montreal.

*W. S. Mosher, Mosher Steel & Machinery Co., Dallas, Tex.

*H. A. Fitch, Kansas City Structural Steel Co., Kansas City, Kan.

J. J. Duffin, Duffin Iron Co., Chicago.

Clyde MacCornack, Phoenix Bridge Co., Phoenixville, Pa.

James T. Whitehead, Whitehead & Kales Co., Detroit.

J. E. Miller, Bellefontaine Bridge & Steel Co., Bellefontaine, Ohio.

*Re-elected for another term.

Structural Steel Fabricators

Common Size Statement
As of about Dec. 31, 1928
Composite of 54 Names

ASSETS

Cash	5.21
Receivable	21.73
Merchandise	22.26
Marketable securities	3.44
Miscellaneous	0.03
Total current	52.67
Total fixed	47.33
Total	100.00

LIABILITIES

Payables	18.53
Taxes	0.69
Miscellaneous	1.14
Total current	20.36
Funded debt	4.03
Total debt	24.39
Reserves, bad debts, etc.	1.94
Net worth	73.67
Total	100.00

Percentage in Relation to Total Assets

No. reporting sales	24
Sales	127.42
No. reporting profits	18
No. reporting losses	4
Net profit and loss, per cent.	6.07

Selected Ratios

Current	270
Worth-fixed	150
Worth-debt	310
Sales-rec.	625
Sales-mdse.	640
Sales-fixed	265
Sales-worth	170
Profits on net worth, per cent	7.0
Profits on sales, per cent	4.0

AT the banquet of the American Institute of Steel Construction the chief speaker was Hon. Vincent Massey, minister from Canada to Washington. From left to right: N. W. Warren, Dominion Bridge Co., Ltd., Montreal; Mr. Massey and Charles N. Fitts, president of the institute.

under the various ratios for each year. Statements are submitted to the association on a standard form. The plan serves, he emphasized, to give individual banks the courage and the basis to help clients, through the opportunity to compare a client's status with the composite of his industry. As suggested, from the industrial standpoint, it is calculated to save a company from slipping into a dislocated situation with respect to others in the same industry.

Recommends Several Association Activities

IN his address as president, Charles N. Fitts made some recommendations which were enumerated in THE IRON AGE of Nov. 14, page 1327. Elaborating on them the subjoined extracts give the basis of his suggestions:

The effect of taxation and government revenue in cities and localities where height restrictions are imposed by legislation, the cost of housing in localities where buildings are allowed to take full advantage of construction economies, the question of congestion, (whether the skyscraper is a *cause* or a *result*) are problems that should be analyzed by experts and "the American Institute of Steel Construction is the proper body to initiate the investigation."

The demolition of structures will undoubtedly afford the best of opportunities for discovering the effects of time on the various materials. "To make adequate diagnoses of demolished buildings we would have to enter into an investigation of the condition of all the various materials which entered the structure originally.

Trade Practice Conference on Structural Steel

THE trade practice conference of the structural steel industry, held Nov. 11 and 12, defined the industry to include "any person, firm or corporation herinafter designated the distributer, engaged in manufacturing, selling, distributing or erecting structural steel for construction purposes." Its further definitions were:

A distributer is a mill, a warehouse, a fabricator or an erector, or any or all of them.

For the purpose of these proceedings a mill is a manufacturer of structural materials for construction purposes, which sells to a warehouse or fabricator.

A warehouse is a concern that carries a well selected stock of plain materials, buys in suitable quantities and re-sells to fabricators, erectors and others and assumes the credit risks and such other obligations as are common to such sales.

A fabricator is a concern that maintains a shop for the fabrication of plain materials for construction purposes and assumes the credit risk and such other obligations as are common to such sales.

An erector is one that generally contracts with buyers to furnish and erect structural steel fabricated by himself or others and assumes the credit risk and such other obligations as are common to such sales.

Unfair Practices Enumerated

The resolutions passed by the conference, later to be acted upon by the Federal Trade Commission and segregated into its groups 1 and 2, defined the following as unfair practices:

GROUP 1

To use or to substitute materials inferior in quality to those specified or required by the applicable governmental regulations.

In manufacture and erection, to use methods not in accord with governmental regulations obtaining.

The sale of material below cost to injure a competitor or with the effect of lessening competition.

For steel distributers to sell below cost or beyond usual marketing territory, with the effect of lessening competition. (Dumping.)

The secret payment or allowance or acceptance of rebates, commissions, credits, discounts, or like concessions, in money or other valuable thing, or any secret understandings or agreements to do work or to furnish material on terms other than those set forth in the contract between the parties. (Commercial Bribery.)

Dissemination of information, false or misleading, relative to competitors' products, selling prices, credit standing, ability to perform work, or labor conditions. (Defamation of Character.)

Knowingly to submit a bid after a contract has been awarded to a distributer.

Any discrimination in price between purchasers, whether subsidiaries of the manufacturers or otherwise, in violation of the Clayton Act.

Practices Condemned

As group 2 the following practices are condemned:

To recognize uneconomic or an unsafe structural design. In the matter of regulations of manufacture and erection, in territories where no governmental laws, rules, or regulators as to manufacture and erection of buildings prevail, the conference voted that the standard specifications and code of standard practice of the American Institute of Steel Construction, Inc., shall be used.

When lump sum bidding is impracticable, figuring the final weight in any other way than the accepted practice of the industry as set forth in the standard specifications and code of standard practice of the institute, unless otherwise specifically set forth in the invitation to bidders, is condemned.

Misleading promises of delivery and performance that cannot reasonably be fulfilled.

To submit a bid without having been requested or invited to do so.

To condone reopened bidding, commonly known as "shopping."

THE battledeck floor being pushed by the American Institute of Steel Construction leaves space underneath for carrying piping, with molded fire-proofing, such as gypsum, to enclose the conduits and form the ceiling. The self-propelling electric arc-welding machine, taking the welding rod from a coil mounted on the machine, welds together the edges of two plates and the plates to the supporting beam.

Among those witnessing the welding performance are: (1) C. T. McLoughlin, General Electric Co.; (2) James N. Keenan, engineer at New York for the institute; (3) J. E. Waugh and (4) D. H. Deyoe, welding engineers of the General Electric Co.; (5) F. H. Frankland, technical service department of the institute; (6) Charles N. Fitts, New England Construction Co., president of the institute; (7) Lee H. Miller, chief engineer; (8) George E. J. Pistor, Hay Foundry & Iron Works, New York, treasurer; (9) W. M. Wood, Mississippi Valley Structural Steel Co., Decatur, Ill., a director. According to Chief Engineer Miller, the steel plate flooring structure "will reduce the dead floor load by about one-half and make it possible to add 25 or 30 per cent more stories without increasing foundation loads."

An investigation would disclose answers to some of the economic problems which are constantly presented us in the erection of structures.

"The work if done properly embraces much more than an examination of the structural steel. It covers more facts than would be sought by any one industry. The Bureau of Standards should be empowered to direct the work if not actually to make the investigations for us."

By promotional efforts frequently displayed by local chambers of commerce in their endeavors to extend the industrial importance of their various cities, businesses are invited to construct new plants and to engage in a manufacturing activity in localities that are sometimes more than adequately supplied. "There should exist some adequate means to check such unwarranted enthusiasm."

The collection and dissemination of the necessary statistics "is distinctly the province of the United States

Report on Mill Relations With Steel Constructors

FOLLOWING are the main items of the report of the committee on mill relations of the American Institute of Steel Construction, presented by H. A. Fitch, Kansas City Structural Steel Co., chairman:

The activities of your committee have, during the past year, been confined to the question of financial support on the part of the rolling mills to the institute's program. The treasurer's report shows that the amounts received from the mills during the fiscal year ended Sept. 30 was approximately the same as was contributed during the previous year. This result is, of course, not equal to our hopes or expectations.

We respect the opinion and conclusions of the officials of the various mills, with whom we have conferred during the year. Our interpretation of the attitude of the mills is that they intend to continue and augment their support as the conditions and facts pertaining to our proposed activities may warrant.

Our interests and our problems are so closely related to the interests and problems of the mills—where these problems pertain to structural steel—that almost we are partners. The ultimate attainments hoped for, whether specific or general, are identical.

Let us remember that we may not always know the facts in the case. Business is complex—our organizations are large and extended—the structural steel business is not conducted by fixed rules and instructions. Every transaction has its own complexion. The members of our own organization, who must of necessity be given discretionary powers, do not always reflect our interpretation or judgment in a transaction.

The types of buildings being erected today are not the types that will be common ten years from today. There is going to be a revolution in the types of building construction. These future buildings certainly will be of steel frame. Can this industry sit calmly by and allow other interests, often unfriendly interests, to guide the trend of building development? We must come to a realization that we are builders as well as fabricators, and we must assume the responsibility attendant thereto.

We must know more about structural design, and floor design, and fireproofing, than any other one agency. We must approach this from a scientific and impartial viewpoint. We must obtain and appropriate the necessary funds to develop the scientific facts in a conclusive manner. We must, of necessity, do this collectively. No individual concern is qualified to do this. The work and the results must be done in such a manner as to inspire confidence by the public.

The American Institute of Steel Construction has assumed the responsibility and is sponsor for the structural steel industry. The mills have recognized that the institute is the logical agency for this development, and have confidence in the competency of our organization. As we plan our constructive program and determine our requirements, we have every confidence of the cooperation of the mills to the fullest extent.

Government. We have no means of knowing what the shop capacity is within well defined trading zones, nor has there been established any uniform basis for measuring that capacity. Neither do we know how active the business is in competitive areas. These defects could be easily remedied to the great benefit of the structural steel industry.

"The officials of the Bureau of the Census have shown a decided willingness to accommodate us to the full extent of their ability. In return I recommend that we individually and collectively assist the Bureau of the Census in the compilation of their studies by complying fully with all their requests for information and data."

Semi-Centennial of the Skyscraper

"The American skyscraper has certainly left a deep impress in the industrial, commercial and social life of this country, and is synonymous with American business supremacy. It has been an agency of greatest importance to the structural steel industry, so much so, in fact, that we should be the sponsors and the leaders in a proper celebration of its inception.

"Possibly no better means could be devised than an engineering and architectural exhibit to be held in Chicago in 1934 coincident with an international conference on skyscraper building."

Mr. Fitts, at the outset of his address, expressed satisfaction that while a recession in the sale of steel in general began in August, bookings of structural steel continued to gain. The fact, he said, means that "we have begun at last to demonstrate the true merits of structural steel. Our cooperative campaign is at last convincing those responsible for important structures that if strength and security are to be achieved this material must be specified."

Expansion of the Institute

THE report of Charles F. Abbott, executive director of the institute, whose headquarters are 200 Madison Avenue, New York, was presented in the form of a 70-page illustrated pamphlet. It was a convincing document on the notable expansion made by the association in its short period of existence. Elsewhere are enumerated some items illustrative of the institute's development.

In addition it appears that 217 cities have adopted in whole or in substance the standard specification making for economies in design, that wider use is now made of the institute's code of standard practice, that numerous foreign countries have commended favorably the standard handbook. The institute now has eleven district engineers, one having been added to the staff, with headquarters in Dallas. Mr. Abbott asks for five more for a needed reallocation of districts. He describes how sales representatives of member companies have been drafted into the service of the national organization. The institute's bureau of engineering service, advertising and advertising returns, the use of the standard sign on buildings in course of erection, and educational literature came in for special consideration.

The steel plate floor construction, which Mr. Abbott mentions as demonstrating the possibilities of applied research, offers according to estimates a potential market that would consume plates to a greater tonnage than that going for railroad cars and shipbuilding combined. The use of steel in dam construction, he adds, is another undeveloped opportunity awaiting a similar effort. Considerable work has already been accomplished and the possibilities have been well charted. Much also has been accomplished in establishing the merits of steel in hangar construction in connection with the development of airports.

Needs of the Institute

From the last section of Mr. Abbott's report the following has been taken:

The institute should engage in a more extended activity—additional field engineers, more enlarged advertising and other extensions are advisable in order that the present momentum may be fully sustained. It should not be handicapped when its record entitles it to enlarged support. It should grow with the demands being made upon it for service. It should not be forced into a position incapable of meeting a natural growth. The present organization should be kept together, which is possible only when ambition can become satisfied with future prospects.

The individual concern, no matter how large, has found itself totally unable to cope with the new struggle for markets. The forces that can be marshalled against it are too great. The battle line is too far flung. The ability to understand that the individual concern can prosper only as

Distribution of Fabricated Steel Capacity and Bookings in 1928

THE accompanying tables were presented to the Steel Constructors' meeting by L. Seth Schnitman, United States Bureau of the Census. In 1909, he said, fabricators with monthly plant capacity of 2500 tons or over had 65 per cent of the total capacity of the industry; in 1925, 58 per cent; in 1929, 60 per cent. Plants with capacities of 500 to 2499 tons represented in 1909, 25 per cent of the total capacity, in 1925 and 1929, 32 per cent. Plants with capacities of less than 500 tons have only once since 1909 reached a ratio of 11 per cent, in 1923; it now stands at its lowest point of the entire period, at about 8 per cent. Fifty-one per cent of the number of structural plants have capacities of 500 tons or more and together these firms have 92 per cent of the entire capacity of the industry.

The Western division has for its Eastern boundary the north and south line of States of New Mexico to Montana. The Southwestern comprises Texas, Oklahoma, Arkansas and Louisiana. The Southern lies east of the Mississippi and south of the Ohio.

Distribution in Each Section by Size of Plant

	Under 500 Tons		500-2499 Tons		2500 Tons and Over	
	Capacity	Bookings	Capacity	Bookings	Capacity	Bookings
New England	17 2	13.0	82.8	87.0	...	...
Middle Atlantic	3.9	3.6	15.0	13.8	81.1	82.5
Southern	3.9	3.2	39.7	33.0	56.4	63.8
Midwestern	15.2	14.2	40.4	40.5	44.4	45.3
Southwestern	12.6	18.3	87.4	81.7	...	...
Western	15.3	15.2	57.7	51.6	27.0	33.2
Total	8.7	8.3	31.2	28.7	60.1	63.0

Distribution in Each Group of Plant Sizes

	Under 500 Tons		500-2499 Tons		2500 Tons and Over	
	Capacity	Bookings	Capacity	Bookings	Capacity	Bookings
New England	5.4	4.4	7.3	8.1	...	...
Middle Atlantic	21.6	23.1	23.3	24.3	65.0	66.4
Southern	4.1	3.2	11.5	9.3	8.6	8.2
Midwestern	56.6	57.1	42.3	45.5	24.0	23.2
Southwestern	3.1	4.1	6.0	5.1	...	...
Western	9.2	8.1	9.6	7.7	2.4	2.2
Total	100.0	100.0	100.0	100.0	100.0	100.0

Geographical

	Capacity	Bookings	Ratio of Bookings to Capacity, Per Cent
New England	2.8	2.7	70.0
Middle Atlantic	48.3	50.7	74.5
Southern	9.2	8.2	63.0
Midwestern	32.4	32.3	70.0
Southwestern	2.1	1.8	60.0
Western	5.2	4.3	58.0
	100.0	100.0	

the industry prospers offers the sole hope of survival.

The institute has the support of all elements of the industry, the approbation of the public, the confidence of the architect, the engineer, the contractor and the public official.

Discussion on Welding and Riveting

IN the session devoted to construction matters, progress in electric welding was discussed by Dr. F. P. McKibben, of the General Electric Co., and J. C. Lincoln, president, Lincoln Electric Co., Cleveland. Dr. McKibben exhibited lantern photographs showing details of the work done on the General Electric building in West Philadelphia, the Chalfonte Hotel at Atlantic City and a General Electric building at Pittsfield, Mass. He said that 58 towns and cities now allow structural welding. He opposed a present move to require licensing of welders, partly on the ground that it leaves workmen more or less under the undue supervision of municipal boards. Some 40,000,000 lb. of steel are welded annually, he added. His lantern slides also included some automatic welding of steel pipe 48 in. in diameter for a 7-mile line.

Mr. Lincoln devoted himself in large part in speaking for the carbon arc as against the metallic arc. He also showed machine welding; this applied to a 60-mile line of 66-in. pipe of ⅜-in. and ⅝-in. steel for Oakland, Cal. He regarded his machine as well adapted for erecting the steel deck floor. He placed considerable emphasis on the use of welding as being the best single method of promoting an increased use of steel.

R. W. Boggs, Union Carbide Co., New York, touched briefly on the gas welding of a building for the company at Niagara Falls, N. Y., described at the time of its completion in THE IRON AGE.

What A. F. Jensen, president Hanna Engineering Works, Chicago, had to say on riveting is reviewed elsewhere in this issue.

What Is Happening in Structural Riveting

Speed With Easy Handling—Portable Yoke Riveters, Alloy Rivets and Cold Riveting Likely

BY A. F. JENSEN*

A CONSUMPTION of more than 35 million rivets per month conveys some idea of the rivet's important place in the structural steel industry. The first yoke riveters, built about 1865, were steam actuated, the hydraulic riveter following in 1873. A patent covering a pneumatic riveting hammer was issued two years later, to be followed by the plain toggle yoke riveter in 1877 and by the toggle lever pneumatic yoke riveter in 1903.

Today we see portable pneumatic riveters driving 700 ¾-in. rivets an hour in small columns and giant portable pneumatic riveters weighing 30 tons driving 1¼-in. rivets, 6¾ in. long, in hydroelectric penstocks and spiral shells at rate of 60 an hour. The challenge of ever increasing boiler pressures has been met by stationary hydraulic riveters exerting 275 tons on the rivet.

The industries joining lighter thicknesses of metal reflect similar progress. An automatic line, producing 360 automobile chassis frames per hour, drives approximately 700,000 rivets a day. The efficiency of the riveting process also finds a place in our infant industry—aviation. The gas-tight sheathing of the all-metal dirigible ZMC-2 contains about 3½ million rivets which were driven at the rate of 5000 an hour.

Next Advances in Riveting

We may look forward to the introduction of portable yoke riveters (much lighter than machines now in use), alloy steel rivets and acceptance of cold riveting. Standardization of design and the constant increase in the volume of fabricated steel may justify power-actuated mechanical devices for the manipulation of riveters on straight run work whereby the bucker-up is eliminated and the operator controls two or more riveters merely by the manipulation of valves, making it possible for a crew of four men to drive at least 50 rivets a minute and the introduction of multiple riveting machines which will drive at least a dozen rivets for each operation cycle.

Structural shop methods of the past have been superseded by an exactness almost equal to that of the machine shop. The quality of the riveted joint is better than that of a decade or two ago and with the development of spacing tables, gang punches, riveters, etc., labor costs have been constantly reduced. It is still more economical to rivet the major part of our structural steel tonnage.

The five-story welded steel building erected at Sharon, Pa., by the American Bridge Co. for the Westinghouse company cost $5,800 in excess of the amount a riveted structure of similar design would have cost. The increased cost per ton of this welded structure over the riveted seems to be confirmed by the price of the 12-story Homestead Hotel addition erected at Hot Springs, Va., by the American Bridge Co. It was contracted for at $8 a ton in excess of what would have been bid for a riveted structure. Actual costs left them with a heavy investment in the welded structure.

The use of the pneumatic riveting hammer has created a clamor for the elimination of the noise prior to the development of sufficient evidence that it can be done. Perhaps Dr. Donald A. Laird, director, psychological laboratory, Colgate University, has forecast what may be the accepted procedure in structures of the future. Dr. Laird says: "Build a room with sound-proof walls and enough sound will come through the keyhole and reflect back and forth upon those walls to create a din. What modern buildings need is something upon those walls to absorb sound. Then people can leave the windows open even if riveters are working across the avenue."

There is a field of usefulness for both welding and riveting and we believe the advancement of both processes lies not in competition but in their supplementing each other. We cite a few examples:

Combined Use of Riveting and Welding

Six-mile pipe line for Springfield, Mass., water supply. Longitudinal seams were welded, girth joints field riveted.

Tube segments for the Detroit-Windsor vehicular tunnel. Longitudinal joints were welded, circumferential joints riveted and calk-welded.

The Mokelumne water supply project serving Oakland, Cal. Longitudinal seams were welded, circumferential joints field riveted.

An extension to the power house of the Haddon Hall and Chalfonte Hotels, Atlantic City, N. J. Columns were shop welded, beams and girders shop riveted, field connections bolted and welded.

Addition to the Ohio Valley General Hospital, Wheeling, W. Va. The shop fabrication was riveted, field connections bolted and welded.

Welding will replace riveting only when proved more economical, less dependent on skilled labor and assuring equal safety.

The American Society of Mechanical Engineers has set itself to the task of reviewing the present state of knowledge of riveted joints together with an extensively abstracted bibliography on the subject. This is a commendable undertaking and will be of material assistance in determining the lines along which research should be conducted.

Driving Special Head Rivets Cold

The forming of the head requires the greatest part of the pressure necessary to drive a rivet. In the construction of gas holders, where rivets as large as 3 in. in diameter are being driven cold, a flat driven head is accepted; holes are filled, there is no distortion and there is a saving in rivet stock. A comparison of pressures necessary to drive rivets (structural quality) cold with both standard button head and special head is here tabulated.

Tonnage to Drive Rivets

Rivet Diam., In.	Button Head		Special Head, Cold	Size of Special Head, In.
	Hot	Cold		
⅝	20	50	30	5/32 x 15/16
¾	30	70	40	3/16 x 1 1/8
⅞	50	100	60	7/32 x 1 5/16

*President, Hanna Engineering Works, Chicago. From an address before the American Institute of Steel Construction, Nov. 14.

Getting Open-Hearth Steel Quality

Operators Discuss Methods of Achieving Specified Characteristics—Heating and Rolling of Ingots and Blooms—Control of Slags

LAST week we carried on pages 1307 to 1310 the first portion of the discussions of the open-hearth committee meeting of the American Institute of Mining and Metallurgical Engineers. The story is continued in the paragraphs below. As in all of these sessions for several years, there were no prepared papers. The meeting took more the form of a round-table discussion and each topic was attacked by several men, representing varying practices in different plants.

Quality Control for Rimmed Steel

REPORT of one of the two Quality Control Committees was made by its chairman, J. M. Hughes, Sharon Steel Hoop Co. Quality improvement in rimmed steel was reported to be obtainable largely by controlling the evolution of gas in the steel and its escape from the ingot before solidifying. Along with this goes control of the carbon in the furnace operations. The pig iron used has a definite bearing on the subject. A hot slag of uniform composition is required, to hold the sulphur within limits.

As a result of tests extending over a year, slag analyses have shown fairly consistent results. Silica and alumina combined have fallen for the most part (79.5 per cent of the cases) between 48.1 and 49 per cent. Three-fifths of the remainder fell between 47 and 48 per cent, and the rest between 49 and 50.

Fairly Uniform Results

As to the iron content, about 1860 tests showed 43.7 per cent between 1.01 and 1.20 per cent FeO. Half of the remainder—29.6 per cent of the total—were between 1.21 and 1.35 per cent. None of the tests ran above 1.50 per cent. Sulphur showed more than half of the total tests between 0.021 and 0.030 per cent, this range accounting for 57.4 per cent of all. Another 38.4 per cent ran from 0.031 to 0.040 per cent sulphur, while the remainder were outside these limits.

Low iron oxide content in the steel represents good quality in the steel. An analysis was given for averages for 317 successive heats, ranging between 0.07 and 0.13 per cent carbon content, with the following results in the slag: 12.26 per cent silica; 17.34 per cent FeO; 5.01 per cent Fe_2O_3; 44.21 per cent lime and 9.07 per cent MnO. Of these heats about two-fifths represented 0.10 per cent carbon. The remainder were above and below this limit, with only 26 of the total below 0.09 per cent and the same number above 0.11 per cent.

Operating Requirements

Furnace bottoms must be kept in good shape if trouble is to be avoided. The charging rate of scrap in tons an hour has a bearing. The metal in the ladle may be profitably treated with some super-deoxidizer. Tapping temperatures should be about 2850 deg. Fahr.

With a 1¾-in. nozzle an ordinary heat should be teemed in about 45 min. If the nozzle is 1½ in., about 10 min. longer will be required. If the heat is charged into the soaking pits within 70 min. after the first ingot is stripped, the steel should remain in the pits about 2 hr. 15 min.

In discussing this report, Dr. C. H. Herty, Jr., of the United States Bureau of Mines, expressed the opinion that we can make as clean steel with 22 per cent FeO in the slag as with 16 per cent, if the steel has been properly deoxidized.

Quality in Killed Steel

KILLED steel was reported upon by William C. Kitto, Pittsburgh Steel Co., chairman of the committee on that subject. It was stated that pig iron is wanted with silicon between 0.90 and 1.25 per cent. This iron is wanted hot and from as smoothly working a blast furnace as possible.

The particular furnaces reported on have capacities from 140 to 250 tons, with bath depths from 26 to 36 in. It is customary in these cases to add one half of the ferromanaganese in the furnace and the remainder in the ladle, when making steel for tin bar. For all other heats, all of the ferromanganese is added in the ladle. These heats are poured into molds measuring 16 x 38 in. and 22 x 24 in.

For high-carbon seamless tubing with 0.35 to 0.50 per cent carbon, and for bars and billets having from 0.40 to 0.75 per cent carbon, in 93-ton heats, it was reported desirable to melt so that about 5000 lb. of molten iron can be added one hour before tapping. These heats are made with 12.5 per cent limestone additions. In this case both ferromanganese and ferrosilicon are added in the ladle, the pouring temperature being such that a skull of 1000 to 1500 lb. is left in the ladle. This steel is teemed slowly for the first 6 in. of the ingot and again for the top 12 in.

Avoiding Too Hot a Furnace

Discussing the reports on steel quality one company reported working the furnace on the cool side for rimming steel until almost at the desired tapping carbon; then the temperature is raised and the heat is stirred with rods. The air supply is shut off a few minutes before tapping, for two reasons: One is to relieve the pressure on the surface and thus facilitate removal of the oxides from the bath; the other is to prevent thinning of the slag by too much air.

Another speaker referred to the half-inch skin on rimming ingots extending up 14 to 18 in. from the base. Above that point the ingot is likely to be practically solid.

In another plant, making killed steel of 0.55 to 0.80 per cent carbon, in 75-ton furnaces, it is customary to take out the heat in from 2 to 2½ hr. after an ore addition. This heat is tapped at the high temperature of 2950 deg. and then held for 8 or 10 min. in the ladle, during which period it drops about 100 deg. The steel is bottom poured at the rate of about 3 tons in 4 min. Ferromanganese is added in the furnace and 50 per cent ferrosilicon is added in the ladle.

Steel Melting Practice

IN the absence of Roy L. Leventry, Republic Iron & Steel Co., Youngstown, chairman of the Steel Melting Committee, the report was read by Howard McClelland, of the same company. Plants using cold stock can regulate the iron charge by proper mixing of irons of known analyses. In a hot-metal plant, however, a mixer is necessary. If the blast furnace is not running evenly, the open-hearth furnace will need an extra charge of lime or limestone and more time will be required to make the heat. Ideal conditions call for silicon of about 0.90 to 1.25 per cent and managanese 1.75 to 2 per cent.

Changing the proportion of hot

metal in the charge from 45 per cent to 70 per cent has been found to decrease the production of ingots at the rate of about 1 per cent for each 4 per cent increase in the metal charge. Correspondingly, the bottom costs on the furnace will be increasing.

Gain from Larger Heats

Increasing the charge in a furnace by 100 per cent will increase the daily output about 50 per cent, with the same working force. The most desirable depth of furnace bath was reported between 2 and 3 ft. There is less bad bottom trouble on a deep bath and good steel can be made with the depth as great as 40 in., according to this report.

Charging delays have an important bearing on tonnage; these must often be met, because of the poor general quality of scrap now obtainable, a condition which is not likely to improve. A small amount of alloy in the scrap may have a disproportionately disastrous effect on the quality of the finished bar.

Lime additions increasing from 8 to 11 per cent of the weight of the metallic charge were found to result in a loss in ingot tonnage, amounting to about 1 per cent for each ½ per cent of lime addition. Deep furnaces and, to a less extent, large furnaces of standard proportions will take less lime than will shallow or smaller furnaces. This follows from the fact that there is less surface area, in the large or deep furnace, for each ton of metal to be covered.

Characteristics of Charge and Yield

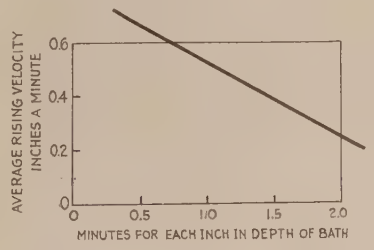
Discussing this report, one member reported that both busheling scrap and hydraulic scrap are good, but with the qualification that the latter must be from a reliable dealer and well compressed. With 118-ton furnaces his plant charged, in the first nine months of 1929, a total of 42.7 per cent of metal and 57.3 per cent scrap. This included 31 per cent hot metal, 10.1 per cent cold pigs; 1.6 per cent molds and stools, as the pig iron charge. The scrap charge was 1.6 per cent furnace and pit scrap; 31.8 per cent heavy melting scrap, No. 1 and No. 2; 16 per cent busheling scrap, 3.3 per cent hydraulic compressed scrap and 4.6 per cent bundling scrap.

On these furnaces the limestone charge was 8.9 per cent. The yield in ingots was reported as 92.5 per cent, with 0.4 per cent butts; 1.6 per cent pit scrap and 5.5 per cent loss. These furnaces are making about 7200 tons of steel each, in a month. They have averaged about 5½ min. loss to the heat, because of bottom trouble. Speed of making heats has averaged 9.85 tons an hour from tap to tap and 10.5 tons from charge to tap.

Pouring Practice

REPORT of the Pouring Practice Committee was made by its chairman, Kenneth C. McCutcheon, American Rolling Mill Co., Ashland, Ky. The report recommended the use of as shallow a ladle as possible, both to limit the hydrostatic head and consequently the force of the stream entering the mold, and to allow the impurities a chance to rise easily through the metal. Nozzles should be selected with regard to consideration of all conditions to be met. These include both the type and temperature of the steel, the size of the mold and whether pouring is to be top cast or bottom cast.

Rate of rise of steel in the mold is an important matter. It should be as slow as can be arranged, with due regard for other considerations. Tests made on 30 x 70-in. molds showed that 9 in. a minute rise gives better all-around results than either 6 in. or 15 in. There are fewer snakes and cracks



Rate of Clearing of Silicates from Open-Hearth Bath

in the surface under these conditions. Comparison of chipping costs of a ton of steel with varying rates of rise in the molds showed $3.16 average where the rise was less than 5 in.; $1.21 for a rise of 5 to 10 in.; $1.08 for a rise of 10 to 15 in., and $2.21 where the rise was 15 in. or more.

Control of the rate of rise in bottom pouring is had by the number and size of ingots in each group poured. To get a good surface on narrow slab molds, bottom pouring should be practiced whenever the molds are small.

One operating man expressed the opinion that a shallow ladle does not need a long nozzle to avoid spraying the sides of the mold in teeming. A deep ladle, on the other hand, does require a long nozzle to get away from this trouble, because of the great ferrostatic head back of the stream of steel entering the mold.

Progress on Open-Hearth Investigation

NEW methods of determining iron oxide and silicates were reported upon by Dr. C. H. Herty, United States Bureau of Mines, Pittsburgh, who has been engaged for several years in a study of open-hearth furnace reactions and changes in the slags and bath constituents, with a view to improving the quality of steel manufactured. Dr. Herty reported that under certain conditions the Dickenson method of measuring these metalloids caused incorrect results, with a residual manganese of about 0.20 per cent, unless we have also in the steel from 0.10 to 0.15 per cent of silicon.

A new method for determining the ratio of inclusions depends upon a scale on the microscope eye-piece. Particles showing up in the field of the microscope are usually readily identifiable and are practically circular in shape. The scale permits measuring the diameters, upon which the areas are computed and added up. Then, by applying the ratio of density for the inclusions to that for steel (2.3 or 2.5 to 7.8) the percentage of inclusions for cast steel may be obtained.

Method of Calculation

For iron oxide the practice is to deoxide with aluminum in the testing spoon. When this is analyzed for Al_2O_3 it may be noted that about 0.4 per cent aluminum will take care of all the FeO in the steel. Anything more than this is wasted except for a little excess so as to be sure of having enough, and to care for what may be slopped over. The remainder burns and makes a scum on the surface. The atomic weight relation between 3FeO and Al_2O_3 is 2.11. If, therefore, we multiply the amount of Al_2O_3 from analysis by 2.11 we obtain a figure which is three times the FeO in the steel.

Thus are determined the silicates on the wild sample and the iron oxide on a sample killed with aluminum. To make a silicate particle rise out of the bath it is necessary to have sizable particles. Doubling the diameter increases the speed of coming out about fourfold. The rate of cleaning of the bath for each inch of depth is proportional to the rising velocity of the particles. A characteristic curve covering this point is given at the left.

Much more rapid cleaning of the bath is obtained with ferromanganese added ahead of the ferrosilicon than with ferrosilicon alone. With shallow baths, ranging from 17 to 22 in., the time required for rising of silicates figures out at about 1.5 min. for each inch of depth, whereas with deep baths, up to 41 in., the time is 1.6 min., as found by a test, which is substantially the same rate. With the deep bath Dr. Herty thought it might be better to kill the steel in the ladle, instead of in the bath.

Agreement with this idea was expressed by one metallurgist. Another man, some of whose furnaces have about a 36-in. depth of bath, reported that these take about 10 per cent less ferromanganese to each ton of steel than similar qualities of steel made in a 24-in. bath. This applies particularly to steel having a residual of 0.25 to 0.30 per cent manganese, the quantities used being respectively 10 lb. and 11 lb. to the ton of steel made.

Less Oxidation on Deep Bath

This phenomenon was explained by Dr. Herty on the theory that the deeper bath has much less oxidation to the ton, because the area of the surface is less for each cubic foot of volume, and it is that top surface which absorbs the FeO and passes it down through a gradient toward the

bottom. Part of the bath near the bottom may be virtually inert.

One operator expressed the opinion that the open-hearth bath for economy in practice should be 30 or 36 in. deep, rather than 24 in. Dr. Herty, however, dissented from this opinion in the case of such furnaces as have the steel deoxidized in the bath.

It is common practice to add a box of lime about 30 min. before the tapping, to thicken the slag near the tapping time on killed steel. Some, however, try to keep the slag all along at such consistency that lime will not have to be added at that time.

Use of Purifiers for Iron and Steel

ALKALIES in cast irons have now reached a commercial basis, according to one of the operating men. Soda ash and limestone seem to be much alike in their results. Small amounts of soda ash are capable of increasing the chemical activity of open-hearth slags, according to this speaker. Fused soda ash is still in the experimental stage.

Considerable soda ash is used in the Aston process in making wrought iron, said Dr. Herty. This is put into the cupola before blowing and the purpose is to get the sulphur down.

Reactions of this type require a reducing condition, according to another speaker. The material would have no effect on steel in the ladle. It might make the slag in the furnace more fluid, but, according to this man's opinion, this result could be achieved otherwise more cheaply.

One operator uses a purifier on deep-drawing strip steel of characteristics similar to automobile body sheets. His practice is to use about 125 lb. in a ladle of iron from the mixer and to put 350 lb. on top of the lime in the furnace. This makes the steel pour in rather oily fashion; it rims in better and rolls better into slabs.

Manganese Vs. Aluminum as Deoxidizer

FOR rimming steel the question was discussed as to the quantity of manganese replaced by one pound of aluminum to the ton of ingots. One operator stated that the higher the manganese is the poorer will the steel rim. He said that it is necessary to cut down the aluminum addition as the manganese is increased. What is added goes into the ladle. On a sheet bar heat, with 15 lb. of aluminum in the ladle, he had a beautiful rimming action; on a heat of Armco steel, on the other hand, 100 lb. of aluminum in the ladle caused an equally beautiful rimming action.

Another operator reported making no aluminum additions on a steel of 0.08 to 0.11 per cent carbon, with the manganese 0.35 to 0.40 per cent. Still another man making 0.08 per cent carbon steel said he uses 20 lb. of aluminum in the ladle when the manganese is 0.35 per cent. It takes 30 lb. of aluminum, however, for the same rimming action when the manganese is 0.25 per cent.

He thinks that more aluminum is required to take care of gas evolution. As the manganese analysis is not known until after the steel is in the ladle, the excess quantity of aluminum is put into the molds. This same experience was reported from another plant, where no aluminum is used for rimming steel of 0.08 to 0.10 per cent carbon when the manganese is 0.45 per cent. When the manganese is 0.25 per cent, however, one ounce of aluminum to the ton of steel is put into the mold.

Proper Time for Adding Ore

SEVERAL men stated that no harm has been experienced through adding ore to the heat before the lime is all up, unless the ore is in large lumps. In this case it may kill the lime boil. A better quality of steel is customarily obtained, however, when the ore is added later than when it is put in with a high metal charge. To avoid bottom trouble, however, it was generally the opinion that it is better to get the lime all up before the ore is added.

Atomizing Oil Fuel with Superheated Steam

SUPERHEATING the steam for atomization to 700 or 800 deg. Fahr. reduces the oil consumption by about 2 gal. to the ton, compared with a low superheat, according to one operator. This high temperature, however, is bad on the valves. To offset this condition, one plant has built its own valves of Monel metal to take care of the high temperature.

Use of low-gravity oil makes it necessary to put in a water-cooled burner. A three-way valve may be used to reverse the oil. During reversal there is then no pressure in the line between the valve and the burner. There may be a momentary surge of oil accompanied by smoke as the oil lights at the other end.

In a large steel casting plant, which does not use reversing valves for this purpose, the oil is shut off at one end and then turned on at the other. There is thus no loss of oil or of heat going to the stack. Another plant reported the use of a relief valve in the pump house to keep the oil pressure uniform, while a steam manifold regulates the steam pressure.

Low-pressure oil of 46 Baumé, with a pressure of only 23 lb. at the standpipe, was said by one speaker to need a temperature of at least 175 deg. Fahr. at the burner. Trouble results if the oil temperature drops below 150 deg. Oil is heated customarily in the storage tank before it is pumped to the furnace.

One plant uses a temperature regulator with a motor-operated valve to hold the oil hot in the suction system. There is also an individual heater at each furnace, which is used to get 8 to 10 gravity oil up to 250 deg. Fahr.

Storage tanks in this case have a capacity of 3,900,000 gal. One tank of 1,500,000 gal. capacity has been cleaned out about once a year, the deposit of sludge in the bottom being about 2 ft. deep. This condition has been largely remedied through the use of an oil which is heavy enough to pick up sludge and foreign particles and float them in through the furnace, where they are burned.

Soaking Pit Heating and Chipping Costs

OVERHEATING or a long soak in an oxidizing atmosphere was reported to result in a lot of fine hair-like seams in the surface of a billet. These have to be chipped out. In the plant from which this report was made, comparison was instituted between oxidizing and reducing atmospheres in pits, the latter being found to result practically in freedom from seams.

Heating of cold ingots was suggested as resulting sometimes in a center harder than the surface and likely to produce trouble. Much difficulty was reported in one plant both from soaking pit heating and in the reheating furnaces for the finishing mills. Another man stated that considerable difficulty is experienced whenever the ingots are overheated.

Splash or mechanical trouble on one side of the mold was given as the probable cause of surface defects and pits.

Rolling Temperatures

Temperature for heating soft sheet bar steel in soaking pits was recommended variously from 2200 to 2400 deg. Fahr. Rephosphorized ingots should not have so much heat applied, according to one authority, as those which are not rephosphorized.

High-sulphur ingots, however, seem to make no difference, according to one operator, who stated that he is getting 87 per cent yield from ingots to billets containing 0.08 to 0.16 per cent sulphur, 0.05 per cent phosphorus and 0.70 per cent manganese. This man stated that when a heat melts with 0.045 to 0.05 per cent sulphur he will not use it for screw stock. He wants sulphur as low as 0.03 per cent, and then the steel is resulphurized in the ladle. Unless this precaution is adopted the steel will not roll so well.

(*To be concluded*)

Chicago Engineers Obtain Large Soviet Contract

The MacDonald Engineering Co., Chicago, has obtained from the Soviet government a $110,000,000 contract for the construction of a chain of cement plants, grain elevators, flour mills and miscellaneous industrial enterprises throughout the Soviet Union. The government will supply the capital, material and labor, while the designs of the plants will be made and the work directed and supervised by a staff of 45 American engineers.

Oxy-Acetylene Welders Review Progress

Pipe Joints, Both in Trunk Lines and in Industrial and Office Buildings, Aircraft and Steel Fabrication, Expand Materially

HEALTHY, normal growth of the industry, successful competition with competitive methods and progress in research and development work were reported at the thirtieth convention of the International Acetylene Association, held Nov. 13 to 15 at the Congress Hotel, Chicago. Statements of advancement, both technically and in application and expansion clearly indicated the progress made by the industry in the past year. No doubt exists in the mind of Bennett Chapple, vice-president, The American Rolling Mill Co., Middletown, Ohio (who delivered the keynote address), concerning the future use of steel products and the important part which welding will play in fabrication. Industry, he said, depends on having iron and steel in such forms as engineers can make use of them. Welding of thin sheets offers great possibilities, and in this connection he mentioned the fact that the automobile industry uses from 35 to 40 per cent of the output of American sheet mills. He predicted steel elevated highways, bathroom fixtures made from fabricated steel and greater use of steel in road and sidewalk construction. Programs for making rivers navigable will result in orders for thousands of steel barges. He foresees steel producers making greater efforts to promote the use of their products for many new purposes.

Pipe Line Construction More and More Important

THE report of the Oxy-Acetylene Committee pictures the progress of the industry both technically and in its numerous applications.

Among the important subjects covered is that of pipe lines for oil and gas. Oxy-acetylene welding has sometimes been carried on by owners of the lines and sometimes by contractors; the results have varied decidedly, particularly where there has been a question of speed of completion. Companies contracting to do oxy-acetylene welding must be able to assure the owners of the lines of their ability to weld at a reasonably low cost and with a large enough force.

Some means of reducing the cost of making a joint are indicated, notably by teaching welders to make a thoroughly satisfactory weld at a faster rate by using larger flames, by decreasing the angle of the vee, and by keeping the weld as narrow as consistent with good workmanship.

Unquestionably, workmanship on recent lines has been better than it was even a year or two ago. This has been due to improvement in methods of testing welds and to the introduction of higher grades of filler rods. Several large organizations have constructed their lines in accordance with the strictest procedures outlined by experienced welding engineers.

Workmanship Improved By Testing

A recent important development in test methods has been a portable testing machine for making tensile tests in the field upon specimens which have been removed from pipe lines under construction. In this way the essentials of a testing laboratory are brought directly into the field for continued sampling of workmanship on the job, where the workman can, if necessary, see the result.

A recent example of the successful use of regular check inspections to raise the standard of welding was on a 20-in. pipe line belonging to the Empire Co. In the first period of a few days, the average strength of welds selected as apparently inferior ones and cut from the line averaged between 45,000 and 50,000 lb. per sq. in. In the next period, selected apparently inferior welds ranged from 50,000 to 55,000 lb. per sq. in. The third set ran 55,000 to 60,000. New welds cut at random averaged above 60,000 lb. per sq. in., which is the minimum specification for the pipe steel; three-quarters of the joints outpulled the pipe.

This report stressed the need for standardized methods of testing and qualifying welders for specific tasks. This need has already been recognized by the American Welding Society and a committee has been appointed to prepare standard specifications for the qualification of welders. This will enable employment managers to know what to expect from welders who claim they are expert in specific fields, and will also enable training schools to keep in mind definite standards for qualification of welders before granting a certificate.

Demand for pipe welders and desire of plumbers' and steamfitters' unions that their members be trained to fabricate and weld pipe has greatly increased vocational school activities in some districts. Certain engineering schools that work closely with the industries are cooperating in manual training, including welding, and thus are extending their work in a way quite satisfactory to the welding interests.

Welding in Power Plants

While engineers are not now specifying welding to a very great extent, because they can never be sure about the welding ability of the sub-contractor, they are nevertheless allowing responsible contractors employing trained pipe welders to weld wherever it is economical, at the option of the contractor, for working steam pressures up to 250 lb. Above that pressure many engineers are still skeptical of its advisability. On the other hand, it is not uncommon for the pipe fabricating concerns to weld steam headers for pressures of 400 to 600 lb.

Aircraft Industry Uses Welding Exclusively

WELDING in this industry is now being extended from fuselage construction, where it is quite common—almost universal—to work on other parts of the structure and engine.

Re-inspection of welded steel fuselages which have been in service for six or seven years have noted that welded joints are in perfect condition; tests to destruction of some of the joints have given just as satisfactory strengths as was predicted.

The Waco Aircraft Co. has found, as reported by Russell F. Hardy, chief engineer, that highest efficiency in any welding department is obtained only through the employment of a capable and conscientious personnel, working under the most favorable conditions, with efficient equipment and first class materials.

Five papers were devoted to the subject of welding in the aircraft industry. J. B. Johnson, chief metal branch, War Department, Wright Field, Dayton, Ohio, reported on a recent inspection of a number of welded steel fuselages which were built in 1924 and which have been in practically continuous service in the United States since that date. These fuselages had been through an average number of overhauls of 2.4, and the average number of hours between overhauls was 291. The reason was usually deterioration of the fabric-covered wooden wings.

The amount of repairing on the fuselage skeletons was small and con-

sisted principally of straightening bent tubes or replacing members in the engine section which had failed due to vibration, when the original mount contained members which were too light in weight.

A representative fuselage was surveyed by cutting out the joints at the principal stations and pickling them in acid for 24 hr. The pickled joints were examined with a magnifying glass for cracks, seams, lack of bond, or other weaknesses. There was no evidence of any deterioration or fatigue cracks. The joints, as far as could be determined, were in excellent condition. Tension tests on a few of the joints corroborated the visual examination—the joints developed their rated strength.

Notable Piping Installations in Buildings

One of the greatest problems for heating and plumbing contractors is the attitude of labor toward new methods and processes, continues the Report of the Oxy-Acetylene Committee. The industry is now established for threaded and flanged work, and labor is trained along the same lines; therefore, it is obvious that a turnover to welding involves problems in both equipment and man power. So far, it appears that there will be no serious invasion of this field by welders from the outside, but rather that the steam fitters will be trained for the new work. This is logical, as the skilled steamfitter is thoroughly familiar with the problems of steam flow, water flow, drainage, friction losses and insulation requirements, and all he needs to know is the essentials of the new art in order to adapt it to his work.

Perhaps the best evidence of the possibilities of welding in this field may be obtained from a review of what has already been accomplished. During the past year or two there have been some outstanding installations of welded piping that are worthy of note. In New York, piping systems have been welded throughout the New York Central Building, in the Cathedral of St. John the Divine, in the new office building of the New York Life Insurance Co., occupying the old site of Madison Square Garden, and in several public school buildings; in Chicago, the 37-story Carbide & Carbon Building; in Detroit, the massive Fisher Building; in Cleveland, the B. F. Keith Building and the Union Terminal Building.

Machine Cutting an Essential to Fabrication

MACHINE cutting has progressed materially in the direction of mass fabrication, or as it may better be called, replacing of castings by steel elements shaped by automatic cutting machines and fabricated by welding and perhaps bending.

The subject was discussed by Otto C. Voss and G. E. Matters, of Allis-Chalmers Mfg. Co. The automatic cutting torch is now used at their plants on almost all products, including parts for crawler and wheel type tractors, bases, yokes and rotors for electric generators and motors, transformer covers and tanks, drums and operating levers for hoists, guards for steam engines, parts for cement grinding mills and kilns, and steady plates for condensers.

After the shape cutting machines had been in service a short time, considerable economies developed in using up smaller pieces of plate steel. The volume of scrap has thus been greatly reduced by using it for valve rings, flanges and similar small parts.

Fabrication based on steel plates, shapes, and roughly preforged billets simplifies purchasing, stock-keeping and storage. In Europe, cutting machines have been made with a number of fine adjustments. They may fit purposes where mass fabrication is not essential, but their cutting range is limited, and it takes much time to adjust the machines for the various shapes. In the United States, simple machines with considerable cutting range have been adapted to diversified fabrication.

A tendency to use machines with more than one torch is noted. Many machines already run with two torches, some with four; recently a machine with six blowpipes has been put in operation. This means that, after some training, one operator and helper can produce six times the work with one machine and cut up a large plate without further handling.

Structural Steel Welding Is Expanding

Welding in the fabrication of structural steel has rapidly come to be an adjunct of the riveting process, according to H. M. Priest, American Bridge Co., New York. For certain types of industrial and tier buildings it offers possibilities in reducing the weight of steel required, in the simplification of details and a more flexible adaptation of the steel to architectural requirements. Repairs or additions to existing structures can often be carried out most advantageously by employing the welding process; numerous bridges have been reinforced to carry the increased locomotive loadings.

Mr. Priest noted that it is well to consider how welding affects shop procedure. In the first place, it does away with riveting and consequently with the punching operation. However, a certain amount of punching will still be required for bolting the members together in the field. One principle of economic fabrication follows quite obviously that punching of main material should be avoided and holes be kept in the small details, since the latter can be handled much more readily and cheaply at the punches. In other words, once a saving of one or more operations becomes possible, that saving should be utilized by proper arrangement of the details. Material in the shop should be segregated and as far as possible the number of different operations to be performed on each piece should be limited. With a reduction of punching there is a corresponding decrease in template work and an increase of work of laying out directly on the steel. Whenever there is sufficient duplication to warrant the expense, it is desirable to construct jigs for locating and holding the parts in their proper relation until welded. Clamps replace bolts in assembling and some thought should be given to reducing the number required.

Hard-Facing Metals, a New Development

During the current year considerable progress has been made in the development of hard alloys and metals for wearing surfaces and in their effective applications. The usefulness of some of these materials is based on inherent hardness at room temperatures; others are hard at elevated temperatures.

Allied to this group there have been important developments during the year in materials used as diamond substitutes in oil well drilling and for machine tools. On rock drilling tools the hard metals or carbides must be applied to material of shock-resisting qualities, usually with the oxy-acetylene welding blowpipe.

These diamond substitute materials have given long life to fishtail bits, machine tools, chutes, conveyor flights and other equipment. These expensive materials must be applied in small units effectively and economically.

New Officers Elected

Officers elected for the coming year are: President, C. A. McCune, director of research, American Chain Co., Bridgeport, Conn.; vice-president, W. E. Flannery, vice-president K-G Welding & Cutting Co., Inc., New York; and A. Cressy Morrison, New York, secretary-treasurer.

Award of the Morehead medal for 1928 was made to the late Samuel Wylie Miller, for research in metallurgical and mechanical engineering phases of welding. Mr. Miller was consulting engineer for the Union Carbide & Carbon Research Laboratories, Inc., Long Island City, New York.

Sheet and Tube Company to Sell Zanesville Property

The Youngstown Sheet & Tube Co. has given an option to the Zanesville Chamber of Commerce, Zanesville, Ohio, for the purchase of its plants at that point. The company's Zanesville properties are inactive, the machinery having been dismantled and removed to Youngstown. A plan is under way to form a new company to manufacture steam shovels and road building machinery, and the Sheet & Tube company has agreed to take, as part of the purchase price, $150,000 of stock in the new company which plans to occupy the Zanesville plant.

Electric Heating and Welding

Both Steel and Non-Ferrous Metals Covered in Pittsburgh Conference—Direct "Fuel" Cost Is No Criterion

ADVANTAGES of electric heating in the manufacture of steel and iron and steel castings, as well as recent developments in the electric arc-welding of metals, were outlined at a conference on electric heating and welding held in Pittsburgh on Nov. 13 and 14, under the auspices of the Pennsylvania State College, State College, Pa., and the Association of Iron and Steel Electrical Engineers.

Among the uses of electric heat which were discussed, annealing furnaces, steel melting furnaces, salt bath furnaces and electric galvanizing tanks were emphasized. A special feature of the conference was a talk at the dinner meeting on the closing day by Lieutenant-Commander C. E. Rosendahl, United States Navy, describing his flight around the world on the Graf Zeppelin.

Welding Heavy Materials

A potential market for between 2,500,000 and 3,000,000 tons of steel a year was suggested by J. F. Lincoln, vice-president Lincoln Electric Co., Cleveland, in describing the possibility of replacing steel castings for many purposes by units built up of welded structural steel. He pointed out that the patterns for many steel castings cost more than the first casting made from the mold, thus adding considerable expense. He showed a number of slides tending to illustrate the difference in appearance between steel castings and electrically-welded units and pointed out that objection to welded articles on the ground of appearance is unwarranted.

Discussion of this paper included several inquiries regarding the method of electrically welding steel pipe used by the A. O. Smith Corporation, Milwaukee. Mr. Lincoln said that that company used steel of high tensile strength and that the entire seam is welded at once under the Smith plan.

Methods of building up metal by welding on materials which are subject to abrasion in use were emphasized in a talk on recent developments in electric arc-welding by K. L. Kansen, Northwestern Mfg. Co., Milwaukee. He explained that bits for oil well drilling are now being improved by building up metal and that this process is finding use also in repairing worn spots on steel rails.

In the non-ferrous field Mr. Hansen pointed out that considerable progress had been made recently in welding copper alloys, particularly on the rotor bars of a.c. motors. Other fields in which arc-welding is gaining ground are in stainless steel and in the fabrication of steel tanks and annealing pots.

Advantages of Electric Heating

Pointing out that the high cost of installing electric heat as compared with other fuels often prevents its adoption, Wirt Scott, special engineer, Westinghouse Electric & Mfg. Co., Mansfield, Ohio, cited a number of advantages of electric heat in actual performance. Among them were uniformity of quality, dependability of product, lower cost of rejections, decreased floor space, decreased cost of labor, elimination of rigid testing and inspection on account of confidence in product, decreased cost of labor after heat treating, saving of labor in starting up furnaces, better working conditions and consequent reduced labor turnover, less handling of materials, less accessory equipment required, reduction in accidents, reduction in fire hazard, reduced maintenance, lower scrappage of product, reduction of replacements after goods have been shipped and better shop appearance.

By attaching a monetary value to each of these items, Mr. Scott reached the conclusion that an average plant might save $986 a month by the use of electricity while the excess cost of installation over other fuels is only $180.

Outlining the use of the electric annealing furnace, James Kniveton, Ryan, Scully & Co., Philadelphia, pointed out that it should be utilized principally on items where quality is uppermost and which can stand the higher production cost. He stated that absolute control of oxidizing gases during annealing is possible with the electric furnace, and that, contrary to former belief, slight oxidation is sometimes advantageous.

Mr. Kniveton advised companies operating electric annealing furnaces to forget operating costs for a time, and concentrate on the metallurgical results obtained. The furnace is especially adapted to continuous operation and, although the cost is often higher, the superiority of the product offsets this.

It was brought out in the discussion of this paper that the increased costs could easily be added to the selling price of the finished product if the sales department were fully instructed as to methods of emphasizing to the trade this superiority in product.

Similarity of the electric melting furnace now used most commonly to the first steel-making furnaces was pointed out by Frank W. Brooks, chief engineer, William Swindell & Brothers, Pittsburgh, in a paper on electric furnaces for steel melting. Mr. Brooks outlined the growth of the electric steel-melting furnace over the last 20 years and described the four principal types in use at present—the direct arc-induction, the indirect arc-induction, the core-type induction and the coreless-type induction furnace.

He illustrated the various types by photographic slides, pointing out the principal differences. Recognizing that European electric furnace practice is often considered superior to that of this country, Mr. Brooks stated that labor in those countries is more painstaking in securing quality of product, while quantity as well as quality is considered in this country.

Discussing electric salt bath furnaces, A. E. Bellis, president, Bellis Heat Treating Co., Branford, Conn., emphasized the importance of the chemistry of the bath preparation to insure uniformity of quality. The operation of the bath is also highly important in protecting the surface of the article being treated, and the rate of heating demands considerable attention. Mr. Bellis described the operation of the salt bath at considerable length, illustrating his paper with slides showing successful installations.

Cost of Electric Galvanizing Justified

ADVANTAGES of electric galvanizing were described as self evident at the beginning of a paper on that subject by R. M. Cherry, General Electric Co., Schenectady, N. Y., but he admitted that its costs are somewhat higher than on other methods of galvanizing. The cost is accounted for largely by the cost of the heat, the zinc coating, maintenance, labor and quality.

Zinc coating makes up the largest part of this cost, but its thickness depends entirely on the temperature and accuracy of control, which can be regulated nicely. The cost of the zinc averages about $12 a ton of product, while the cost of electric power is $1 to $1.20 a ton. Maintenance and continuity of service are governed largely by the plant set-up, but the tank will last longer if it is uniformly heated.

Quality depends largely upon constancy of temperature, but the operator must be considered also and he is able to regulate the temperature

much more closely in the electric process. Mr. Cherry concluded his paper by citing a number of results of active operations.

Tool Steel Development

Owen K. Parmiter, metallurgical engineer, Firth-Sterling Steel Co., McKeesport, Pa., gave a general outline of the use of electricity in the development of tool steel. He said the electric furnace really made high-speed steel possible, because by its use alloys with high melting points can be melted. It also practically eliminated the human element in steel making of this sort.

Some of the advantages of electric furnace steel were enumerated as follows: Greater uniformity in chemistry, closer adherence to limits, greater purity physically, practicability of adding alloys in furnace rather than in ladle and adaptability to recovery of valuable alloy scrap. There also are a number of mechanical advantages, such as tilting for the pouring of steel and the fact that melting can be resumed at any time without long preliminary heating.

Develops New Cincinnati Cutter Grinder

SENSITIVE anti-friction table mounting, rigid bed with ample cross-sliding saddle support, and wide range are features of the new No. 2 cutter grinder recently announced by the Cincinnati Milling Machine Co., Cincinnati.

The box-type bed has three point support on the floor and contains an accessible motor compartment. The working table is of fixed height and operation is further facilitated by mounting the table on a sensitive roller bearing support—a new feature. As evidence of the effectiveness of this mounting, it is stated that, if a man of average size were to stand on the table, the movement would still be easy and free. The table slide rides on two long roller chains guided by four ball bearings, two on each end. Accurate cross-adjustment of the saddle up to 10 in. is obtainable by means of handwheel *A*, which is duplicated at the rear of the machine. The saddle is supported by two inverted Vee guides that are never exposed. The table can be swiveled and has the regular graduated swivel dial, a scale reading taper in in. per ft., also a means for fine adjustment.

Fine handwheel movement of the table, desirable for cylindrical and surface grinding, is obtained by engaging the knurled knob *B* and then turning the adjacent crank. Engagement of the knob, *B*, prevents table traverse except by means of the crank, which is an advantage when setting up a job. The knurled knob at the rear is used for ordinary cutter grinding. The table working surface measures 5¼ x 36 in. and the table movement in line with the centers is 18 in. Work 10 in. in diameter can be swung between centers. Work 27 in. long can be held between the ends of the table, while work 21 in. long can be handled between the regular head and tailstocks.

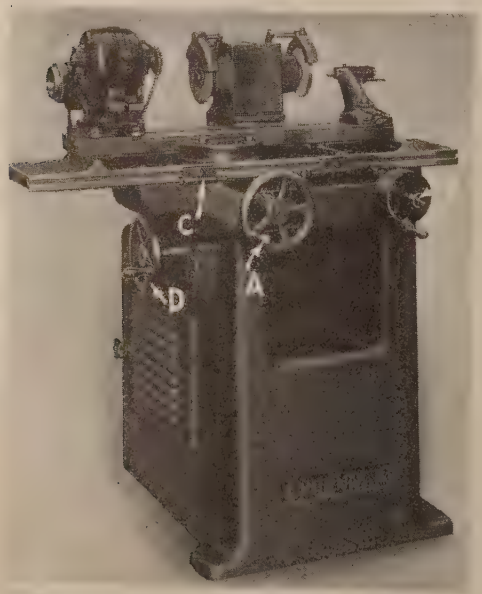
Facilities have been provided for attaching the new style tooth rests for any kind of cutter grinding, and cushioning dogs, shown at *C*, are attached to the side of the table for controlling the table movement. Alinement of tailstock and workhead is made by means of clamps and thumbscrews rather than by means of tongues that fit in the table T-slots.

The grinding wheel head is mounted on a column that can be adjusted vertically and swiveled in its bearings. Swiveling is facilitated by a lever which extends from the grinding wheel head, and column graduations from 0 to 240 deg. are provided. Vertical adjustments, up to 7½ in. maximum, are made by means of handwheel *D*, which has a dial graduated in 0.001 in. The grinding wheel spindle is driven by a special ½-hp. 3425-r.p.m. motor mounted at the lower end of the column. Motor shaft and spindle are parallel and the drive is through a straight belt. Provision is made for taking up belt stretch. A two-step cone pulley provides spindle speeds of 3850 and 5735 r.p.m. The wheel spindle is large and is mounted in anti-friction bearings. The grinding wheels are fitted on collets.

Lubrication of the wheel spindle bearings is from an oil reservoir on the back of the head. The saddle itself forms an oil reservoir in which the roller chains, upon which the table slides, are immersed. From this reservoir, wicks carry oil to the two Vee bearings. Centralized oiling is provided for the column elevating mechanism.

The workhead, which receives the shanks of end and face mills, swivels in a vertical and a horizontal plane, both having degree graduation. The company's patented clearance setting dial is employed. The spindle has the new standard taper hole on one end and a No. 12 B.&S. taper hole on the other end. Four taper collets are supplied for reducing the No. 12 B.&S. taper hole to Nos. 11, 10, 9 and 7 B.&S. taper holes.

The machine is furnished as plain or universal, the latter being the plain machine plus attachments for cylindrical, surface and internal grinding and a fourth attachment for gear cutter sharpening. The workhead of the universal machine is driven by a ¼-hp. 1750-r.p.m. motor. The operating floor space required for the machines is 4 ft. 10 in. x 5 ft. 10½ in. The plain machine weighs 1600 lb. and the universal machine 1750 lb.

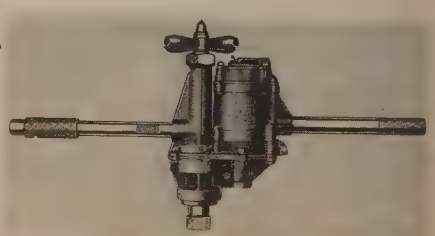


EASE of Operation Combined with Accuracy Are General Features of the New Cutter Grinder Shown at Left

New Pneumatic Drill

THE Independent Pneumatic Tool Co., 600 West Jackson Boulevard, Chicago, has developed a new rotary pneumatic drill, designated as the Thor 275, which has capacity for drilling holes up to 1½ in., and for reaming holes up to 1⅛ in. Its governed free speed is 350 r.p.m. The machine will carry a 50-lb. load at the free running speed and a 100-lb. load at a speed reduction of only 30 per cent. Smooth operation is a feature emphasized.

The machine weighs 35 lb., and may



THE Pneumatic Drill at Right Has Drilling Capacity of 1½ In. and Reaming Capacity of 1⅛ In.

be handled by one man. The construction is such that it can be used close on the side without removing the dead handle. The cylinder is made of nickel cast iron to withstand rotor blade wear, and ball bearings are used throughout the tool, including the spindle and gear.

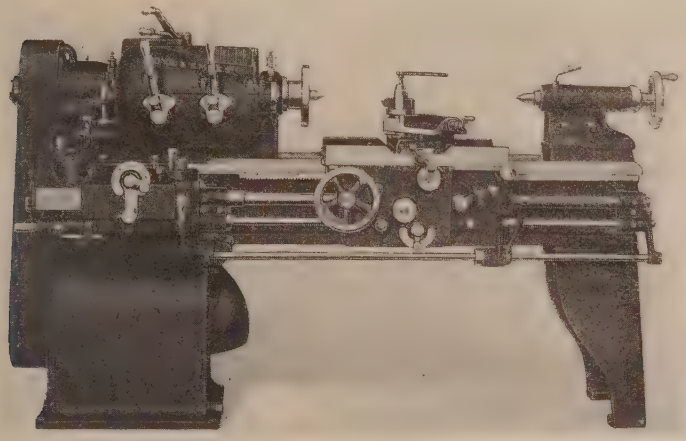
New Coneless Engine Lathes

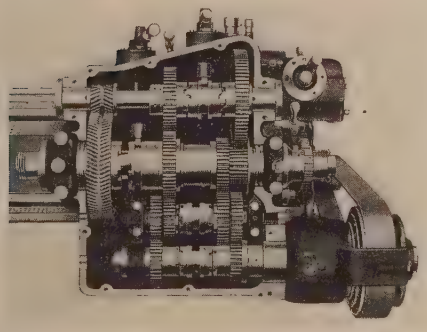
THE Boye & Emmes Machine Tool Co., Cincinnati, has placed on the market new 14 in. and 16 in. selective headstock "coneless" lathes. All gears in the headstock are constantly in mesh, and 12 spindle feeds are obtainable through 13 gears. Gears and clutches are of alloy steel, heat treated and all shafts are made of S.A.E. 3250 steel, and heat treated. The gears are of wide face and the clutches slide on shafts having multiple spline milled from the solid. Anti-friction bearings are used throughout, with the exception of the spindle, which has lapped bronze bearings, although anti-friction bearings can be furnished. The driving pulley with its multiple disk clutch is supported at each side by bearings. Thrust collars are hardened, ground and lapped.

Back gears are mounted in front of the spindle and are used for eight of the 12 speeds. Placing the backshaft and gears in this position is intended to bring the spindle pressure down against the headstock, instead of upward on the bearing caps. This arrangement also counteracts the upward lift of the tool. The face gear and pinion are of herringbone type. The quick-change gear box furnishes 40 changes of thread leads or feeds, the changes being made instantly without binding action on the levers. By changing two gears on the quadrant odd or metric threads are cut.

All gears in the apron, which is of box section, are of alloy steel and are supported on both sides. Cross feed and longitudinal feed frictions are of the cone type and are self-adjusting. An interlocking arrangement prevents engaging of the half nuts while the feed is engaged. The entire apron is lubricated from one oil reservoir. The carriage is of heavy construction and slides on two Vee ways. It is drilled and tapped to receive the follow rest at any time. Mounting the motor on an adjustable plate in the cabinet leg provides for tensioning the belt or chain. Either flat or multiple-Vee belt or chain drive can be furnished. The machines can also be equipped for single pulley drive from a line or countershaft.

The 14 in. lathe swings 16½ in. over the bed and the 16 in. lathe, 18½ in. Spindle speeds range from 15 to 402 r.p.m., and feeds from 0.004 to 0.112 per revolution of the feed-rod. From 2 to 56 threads per in. can be cut. The weight of the smaller lathe is 2850 lb., and of the larger 3000 lb.





ALL Gears in the Headstock Are Constantly in Mesh. Back gears are mounted in front of the spindle, bringing spindle pressure down against the headstock rather than upward on the bearing caps

Gages Made to Design Committee Standards

PLUG and ring gages that conform in design to the standards specified by the American Gage Design Committee have been brought out by the Brown & Sharpe Mfg. Co., Providence. Each type of gage is made in both "go" and "not go" styles.

Designated as the No. 659, the plug gages are furnished with either single or double-end handles, and in any size or combination of sizes from 0.241 in. to 1.510 in. The "go" gages are easily distinguished from the "not go" gages by their longer measuring surface. All the handles are of hexagonal shape and are finished in black.

The ring gages, known as the No. 664, are available in any size or combination of sizes, from 0.241 to 1.510 in. Rings ranging from 0.241 to 0.510 in. are of two-piece construction with a hardened, ground and lapped bushing inserted in a soft gage body, while the larger rings, sizes 0.511 to 1.510 in., are of solid stock, hardened, ground and lapped to size. The "not go" ring is easily distinguished from the "go" ring by the groove around the outside knurling.

"Go" and "Not Go" Plug Gages in the Double-End Handle Are Shown Below. The "not go" ring gage has a groove to facilitate identification

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To perpetuate the name Revere in the industry and in the very business which Paul Revere founded in 1801, the Republic Brass Corporation has been renamed Revere Copper & Brass, Inc. The company's plants are located at Rome, N. Y., Baltimore, Chicago, Detroit, and Taunton, and New Bedford, Mass.

During August and September the consumption of gas coal at 125 steel plants was 1,258,053 net tons, against 1,184,448 tons during the corresponding period of last year, an increase of 73,607 tons, or 6.2 per cent, according to the Bureau of Mines.

Portable Air Drills for Production Work

PROVIDED with speeds of 1000, 1500 and 2000 r.p.m., the new E-O portable air drills recently added to the line of the Rotor Air Tool Co., Cleveland, are intended for production operations. They are manufactured in capacities of ¼, 5/16 and ⅜ in.

Unusually light in weight, less than 4 lb. in all models, the machine may be used continuously with minimum fatigue on the part of the operator. The motor develops more than ½ hp.

Unusually Light Weight Minimizes Fatigue

and the compound gearing gives high torque. All models are furnished with grip throttle and a Jacobs chuck.

New 2½-In. Pitch Roller Chain

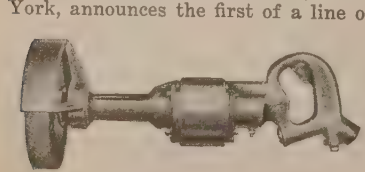
FOR large conveyors, industrial locomotives and other heavy-duty applications the Diamond Chain & Mfg. Co., Indianapolis, has brought out a 2½-in. pitch roller chain.

The Chain Is Made in Single and Multiple Strands

This chain is similar to all of the company's roller chain and conforms to standards sponsored by the American Society of Mechanical Engineers, the Society of Automotive Engineers, and the American Gear Manufacturers Association. The average tensile strength is 95,000 lb. per sq. in., the maximum power rating is 97 hp., and the maximum r.p.m. is 240.

Rotary Pneumatic Grinder

IN the No. 88 grinder illustrated, the Chicago Pneumatic Tool Co., 6 East Forty-fourth Street, New York, announces the first of a line of C.P. pneumatic tools employing the rotary principle.



Either Straight or Pistol-Grip Handle Can Be Furnished

A series of four vanes rotates on a spindle in a casing having suitable opening for the admission and escape of compressed air. High efficiency is attributed to even distribution of air upon the vanes, while reduction of weight is due to simplicity of construction. The machine is governor controlled and is equipped with a removable air strainer. It has a heavy-duty radial and thrust ball bearing on the wheel-end, a removable hardened rotor liner, a ball-bearing rotor, and an automatic oiler in the rotor housing, with adequate grease plugs in the handles and the gear case ends.

The machine is designed to carry an 8 x 1 in. rubber or elastic bonded wheel or a 6 x 1 in. vitrified wheel. Equipped with straight handle, the overall length, with wheel guard, is 22½ in., and the weight 15¾ lb. The pistol grip type grinder is 21 in. long overall and weighs 16¼ lb. The rated speed of both machines is 4250 r.p.m.

Synchronous Motors for Tube Mills

What is said to be the largest single installation of synchronous motors in steel mills is to be made at National works, National Tube Co., McKeesport, Pa., to drive the two seamless tube mills. The motors are being made by the Westinghouse Electric & Mfg. Co., East Pittsburgh.

One mill will have two 3500-hp. synchronous motors to drive the piercing mill and the expanding mill and one 2000-hp. synchronous motor to drive the tube rolling mill. The other mill will have two 2000-hp. motors driving the piercing mill and the expanding mill and one 1000-hp. motor for the tube rolling mill.

The motors will be designed with inclosing covers to prevent dirt and dust from getting into the windings. The covers will be connected with an air-filtering equipment which will clean the air and force it into the motor at a pressure of ⅝ oz.

These motors will be designed with very high peak load ratings, each one capable of a 350 per cent load at frequent intervals. Their windings will be insulated for high temperatures and their load-carrying capacity will be far in excess of any machine that has been used for driving any similar mill.

The trustees of Great Northern Iron Ore Properties have declared a distribution of $2 a share on trustees' certificates of beneficial interest in Great Northern Iron Ore Properties, payable Dec. 28 to holders of certificates of record at the close of business Dec. 6, which will make their aggregate distributions for 1929 total $3.25 a share, as compared with $2.75 a share for 1928 and $1.50 a share for 1927.

Device for Stapling Heads in Barrels and Kegs

MARKED savings in labor as compared with hand nailing are claimed for the Staplit machine illustrated, which is being offered by E. H. Titchener & Co., Binghamton, N. Y., for stapling heads in barrels and kegs. The device is lever-operated and quickly drives nail-pointed square-top staples through the hoop (wood or steel) into the head of a slack barrel or keg. It can be used on a 9-in. keg or a 19-in. barrel without adjustment, and by means of a longer rest (the lower bar), it may be employed on barrels of larger diameter.

In addition to savings in labor, assurance that all staples are driven in the head, the driver being set

permanently to locate the staples at the correct level relative to the top of the head, and elimination of the necessity for head liners are advantages claimed for the device. Pliers or a long handled screw driver may be used to open barrels, the heads being removed without damage, thereby assuring maximum salvage value from barrels and kegs.

The staples employed are made from No. 11 gage steel wire, and are ¾ in. wide and 1 in. long on the inside. They are contained in a vertical magazine which is opened by swinging back the cover, using the short lever at the top, and are fed into position automatically. The staples are cemented together in blocks of 25, and four of these blocks represent a full load—sufficient for stapling the heads in 25 barrels or 50 kegs. The operator can staple the heads from one position, and the staples are driven flush with the hoop, both prongs into the head the same depth.

Paasche Airbrush Co., Chicago, has enlarged its New York sales and service branch, which is now located at 103 Lafayette Street. L. J. Dagon continues as district manager.

Railroads Pledge Heavy Buying

Executives Tell President Hoover They Will Help in Business Stimulation—Large Shipbuilding Work Planned

WASHINGTON, Nov. 19.— Railroad executives of the country at the first of the White House business conferences today gave assurance that they would proceed with full programs of construction and betterments without any reference to the recent stock market decline, it was announced by President Hoover following the meeting.

They informed the President that they would canvass the situation as to further possibilities of expansion and that among the railroads represented, including 11 of the largest lines in the country, it appeared that the total volume of such construction work already indicated an increase during the next six months over the similar period a year ago.

Expressing unanimous determination to cooperate in the maintenance of employment and business progress, the statement said, the railroad executives agreed that the whole question should be taken up at their meeting in Chicago next Friday with a view to securing cooperation of all railroads in the United States in the program.

At that time steps will be taken to canvass the railroads to determine the exact amount of construction and betterments which can be undertaken over the forthcoming year and particularly during the next six months.

The railroad executives, it was added, felt that it was desirable that similar conferences should be called in other industrial groups and that some method of coordination of their different activities should be developed.

While no announcement has as yet been made regarding the shipbuilding program, it is expected that something definite will be arrived at within a few days. Indications are that the Postoffice Department soon will advertise for bids for mail contracts and that these contracts will call for the construction of 15 to 20 ships, with a wide range of capacity, running from 8000 to perhaps 40,000 deadweight tons or more. It is not possible to estimate with accuracy the amount of steel which will be required for these ships, but the tonnage will reach large proportions. Rough estimates have been made that it will approximate 150,000 tons or more, of which about 75 per cent will be plates.

These proposed activities, fitting in with the White House business conferences, are looked to as building up public confidence by expansion of industry and employment and thereby assuring a large purchasing power and continued prosperity. The point has been made that there has been no vital interruption in the economic system of the country. Emphasis also has been placed on the fact that the present situation, unlike previous ones, involves no credit crisis and that capital can be readily turned back into commerce.

Members of the Federal Advisory Council representing the 12 Federal Reserve banking districts in the United States, at a meeting with the President, reported business and banking throughout the country in each district are in a sound condition and that prospects are that money will be available at lower rates, according to a statement issued by Governor Young of the Federal Reserve Board.

Today's conference was the first of a series called by the President to consider the business situation. On account of the death of Secretary of War Good, the second has been postponed from Wednesday to Thursday, while the agricultural group meeting, originally scheduled for Thursday, will take place Friday. The conference with representatives of labor, planned for Friday, has been deferred a few days until a time to be announced shortly by the White House.

These conferences will be followed by others as a means of keeping under way the program of "coordinating business and governmental agencies in concerted action for continued business progress," as stated by the President in his announcement on Friday of last week. It is understood that discussions may be held also with State and municipal authorities whose public works program, together with that of the Federal Government, has been surveyed by the Department of Commerce, the purpose being to release highway, building and other construction contracts along with the awarding of contracts by private industry as a means of stimulating both domestic and foreign business. The President is understood to have been in contact with business leaders of the country ever since the crash in the stock market.

It is believed that reserves of private, as well as public contracts, will be released at somewhat earlier dates than had been contemplated, but it has been made clear that none of the undertakings will be of an emergency character. There have been indications, however, that budgets may be enlarged for public works, that of the Government relating to such activities as building construction, highway development and rivers and harbors work, while State and municipal activities also will deal with the first two lines. It is estimated that total expenditures for public work, as originally planned by the various governmental divisions, would be $1,125,000,000, but it is likely that under the impetus of the present movement to aid the industrial situation the outlay will mount to double that figure. Release of private business contracts is expected to involve a widespread range of activities, affecting all lines of industry and necessarily stimulating capital, employment, and agriculture. Greater shipbuilding activity also is expected to develop.

The delay in proceeding with important undertakings has been held by the President to provide "a substantial reserve for prompt expanded action," which can well be used now that the speculative era has passed and capital has been made available at lower rates of interest for constructive lines. The country has reacted with unanimous and hearty agreement to the view of the President that "any lack of confidence in the economic future of the basic strength of business in the United States is foolish."

That money may now be turned back to business activity was brought out by the President when he said:

"The magnificent working of the Federal Reserve System and the inherently sound condition of the banks have already brought about a decrease in interest rates and an assurance of abundant capital—the first time such a result has been so speedily achieved under similar circumstances."

In connection with the building program, Secretary of the Treasury Mellon announced plans to ask Congress for an increase from the original $238,000,000 to $432,000,000 for the Federal Government construction work to be spread over 10 years. The Treasury's plan calls for the use of $15,000,000 within the District of Columbia and the remainder throughout the rest of the country annually.

The Facts About Pig Iron

J. V. W. Reynders Writes of the Tariff Situation and the Status of the Blast Furnace Industry

SOME of the daily newspaper comment on portions of the pending tariff bill has gone wide of the mark. It was fortunate that the New York *World* editorial of Nov. 9 on the pig iron tariff came under the eye of John V. W. Reynders, 120 Broadway, New York. His comment, addressed to the editor of the *World* and given below, covers the ground admirably, while the original editorial illustrates how far the average reader may be led astray in his judgment of conditions in industry:

"The *World* editorial Nov. 9 entitled 'Pig Iron and Protection' is based on so complete a misconception of the relation of the pig iron duty to the steel industry that a correction seems in order.

"You say that 'this is the most important reduction yet voted and is one on which the coalition may well go before the country.' As a matter of fact the argument of the coalition would not be against the steel industry but against certain isolated blast furnaces located in the seaboard States that have to meet not only the competition of foreign iron but also the surplus production of steel works which regard pig iron made for other than their own use merely as a by-product.

"Of the production of 36,700,000 tons in 1925 mentioned in your editorial, 27,700,000 tons was converted into steel in the plants of the makers, invariably in a molten state. This metal is in no wise affected by the duty, as foreign iron could not be put into a molten state at anything like the amount of the duty.

Of the remaining 9,000,000 tons 75 per cent is produced in the interior, where freight charges from the seaboard afford more than ample protection. Therefore the imports of Indian iron—viz., 184,000 tons—constitute a decidedly greater 'menace' than one-half of 1 per cent. The total imports in 1925 from all countries, including India, exceeded 500,000 tons, being more than 22 per cent of the production of so-called merchant iron made in seaboard States.

"Specifically, the duty determines the successful operation of furnaces located at such points as Port Henry, Standish and Troy, N. Y.; others at Everett, Mass.; Chester, Pa., and Ironton, Utah, etc. There could have been no appeal to Mr. Coolidge in 1927 on behalf of steel companies to increase the pig iron duties by 37½ cents a ton. This amount would be insignificant from the point of view of disposing of a by-product. On the other hand, the independent furnaces had every reason to appeal for help, and the fact that their appeal was heard is far from involving a 'rebuke to Mr. Coolidge.' Each ton of merchant pig iron requires nearly two tons of coal in its production and a like amount of iron ore. It provides protection indirectly to these related industries, as well as supplying traffic to the railroads in the relation of five tons to every ton of iron produced.

"Nothing is gained in the building up of our industrial activities by creating erroneous impressions in so involved a subject as the tariff. The pig iron duty was not instituted to increase the profits of the big interests. It is one of the molehills out of which politicians make mountains."

Weirton Steel Plans $7,000,000 Expansion

Program Includes New Type Mill to Roll Diversified Hot-Rolled Products—Ingot Capacity to Be Enlarged

THE Weirton Steel Co., Weirton, W. Va., subsidiary of the recently formed National Steel Corporation, will begin the manufacture of heavy hot-rolled steel products with the completion of a new diversified continuous mill, plans for which are now being completed by Weirton engineers.

According to an announcement by E. T. Weir, chairman of the board of both the Weirton and National companies, the mill will be part of a $7,000,000 expansion program now being inaugurated at Weirton, which will be largely completed by the end of 1930.

The new mill, which will have a monthly capacity of from 25,000 to 30,000 tons, depending upon material being rolled, will embrace many innovations in design, most of which are calculated to give it greater diversity. It will be capable of rolling rails, structural shapes, rounds and squares, and railroad track accessories, including splice bars, tie plates, etc.

The expansion program also includes the addition of about 40 by-product coke ovens, which will increase the Weirton coke capacity by about 50 per cent. The No. 2 blast furnace at Weirton, which is now out for relining, is being enlarged slightly and, when blown in on Nov. 28, it will have a capacity of about 900 tons daily. The older No. 1 blast furnace will be blown out in the near future for rebuilding, and, when completed, will have a capacity of 1100 tons daily, making it probably the largest furnace in the United States.

The company's open-hearth capacity will also be gradually increased with the enlargement and modernization of the first five open-hearths that were erected at Weirton. Their capacity will be increased from around 175 tons daily to between 250 and 300 tons, which is the capacity of the seven more modern furnaces at Weirton. This will give the plant at Weirton an annual capacity of approximately 800,000 tons of by-product coke, 700,000 tons of pig iron and 1,300,000 tons of steel ingots.

Mr. Weir states that the new plant of the Great Lakes Steel Corporation, another subsidiary of the National Steel Corporation, at Ecorse, Mich., near Detroit, probably will be in operation by July 1, 1930. In the meantime, the Detroit blast furnaces of the company's Hanna furnace division are being enlarged and modernized and will be equipped to supply hot metal to the open-hearth furnaces at Ecorse.

Alan Wood Steel Co. Leases New Jersey Mines

The Alan Wood Steel Co. has leased from the Warren Foundry & Pipe Co., for 15 years, the Replogle and Oxford iron mine properties in New Jersey. The purpose of the lease is the establishment of a source of iron ore supply for the steel company's blast furnaces at Swedeland, Pa. It is the intention to put these mines on a production basis as soon as the necessary repairs and modifications in the milling arrangements can be completed. The actual operation of these properties will be carried on by Alan Wood Mining Co., a corporation recently organized for this purpose.

Bethlehem-Steel Corporation Suit Settled

James A. Farrell, president, United States Steel Corporation, and E. G. Grace, president, Bethlehem Steel Corporation, have announced that the suits recently brought by Bethlehem Steel Co. against United States Steel Corporation and certain of its subsidiaries, involving an alleged infringement of patents covering the manufacture and sale of broad-flange sections, have been settled under an arrangement by which United States Steel Corporation and its subsidiaries have been licensed to manufacture and sell such sections under the Bethlehem patents for the remainder of their terms—from 12 to 16 years. The suits are to be discontinued.

Iron and Steel Basket Clause Rate 40 Per Cent

WASHINGTON, Nov. 19.—In its table on page 1318, THE IRON AGE of Nov. 14 gave the iron and steel basket clause tariff rate adopted by the Senate as 45 per cent. It should have read 40 per cent, the Senate having cut the Finance Committee rate of 45 per cent. On page 1319 of the same issue the increased revenue on manganese ore arising from the Senate action of reducing the dutiable grade to 10 per cent was given as $33,600 annually, based on imports of 1928. This should have read $336,000.

Westinghouse Initiates New Pension Plan

Annuity Payment System Guarantees Substantial Incomes for Retired Employees

EMPLOYEES of the Westinghouse Electric & Mfg. Co., East Pittsburgh, who retire at the age of 65 years or older, will be guaranteed substantial incomes for the remainder of their lives as the result of the institution of a new and scientific annuity payment plan, which will affect all of the 50,000 workers on the Westinghouse payroll. Its coverage, reckoned after the manner of group insurance, will be $54,000,000 at the start and $14,500,000 annually thereafter.

Under the Westinghouse plan, which was drafted by Dr. Henry E. Jackson of the Social Engineering Institute, New York, an employee not only receives from the company an earned reward for length of service, but also has an opportunity to buy additional retirement income for himself at a favorable rate. One of its distinctive features is that it offers no obstacle to the employment of older workers, as every employee reaching his retirement age receives his proportionate retirement income. The company's part of the plan's cost will be paid as a regular operating expense, the same as wages and repair costs. The plan sets up a contractual agreement which binds the company to do its part irrespective of what employees may do. Employees will be encouraged, but by no means obliged, to participate in the plan.

At the expiration of every year of service, the employee will receive an annuity certificate entitling him to a number of units of income after retirement. Every retirement income unit will yield one dollar a month beginning at retirement age and lasting for life. The number of units the employee receives annually will depend on his salary or wage. If he wishes, the employee can make his annuity income payable to himself and wife as long as either may live.

"A notable result achieved by this method of drafting the plan," according to Frank A. Merrick, president of the company, is that the hitherto unsolved problem of accrued liability has been eliminated and the uncertain and increasing future cost has been replaced by a known level maximum cost for the entire future. The retirement problem has been solved permanently and inexpensively. The net annual cost of the plan to the company is estimated to be 1.2 per cent of the payroll and by the use of a new budget method the net cost is automatically exhibited every month."

The company's part of the plan will be operated under a deed of trust administered by a board of trustees, with a bank acting as custodian of the funds. This board is composed of Mr. Merrick; J. D. Callery, director of the Westinghouse company and president of the Diamond National Bank, Pittsburgh; T. P. Gaylord and J. C. Bennett, vice-presidents of the Westinghouse company, and J. W. Thompson, vice-president and trust officer of the Union National Bank, Pittsburgh. The employee part of the program will be underwritten by the Equitable Life Assurance Society of the United States.

A striking feature of the plan is that no matter what might happen to the company in the future, those employees who have been retired are assured of receiving their retirement income for life, because cash for this purpose is irrevocably turned over by the company annually to the board of trustees, and in addition a reserve is built up by annual payments to the trustees for those approaching retirement age. With this retirement income system supplementing relief and insurance systems, Westinghouse employees are now protected to a large degree from the three great economic hazards of death, disability and dependence in old age.

No Time to Force Business, Says George M. Verity

"As regards business, the recent drastic decline in the stock market will naturally affect business as a whole to a greater or less extent. Some lines will, of course, be affected more than others. It is certainly not a time to attempt to force business," said George M. Verity, president, American Rolling Mill Co., when interviewed by THE IRON AGE on the current status of the steel trade.

"If industry really wanted to help itself at this time it could not do better than to call off all its salesmen and send them off on a vacation, if necessary. This would aid the consumer in quietly using his inventories and in gradually reaching a time when he has to buy.

"I have never known it to fail, when a business depression occurred, no matter what the cause, that in proportion to the length and depth of the recession a reaction is in due course sure to follow. It usually comes stronger than is expected, for the simple reason that stocks have been depleted and, when business begins to be active again, the buyer must not only cover his current needs, but must build up his inventories again.

"This is no time for pessimism. It is a time for courage and a display of our confidence in the fundamental soundness of things.

"The world moves on irrespective of life and death, of the immediate curve of business activity or the gyrations of our securities markets.

"Business activity, like water, always seeks, and sooner or later finds its level. Nothing short of a five-year period shows the general trend."

Atlantic Steel Reports Sound Conditions in South

The Atlantic Steel Corporation, Atlanta, Ga., has declared an extra dividend of $2 a share on the common stock at a meeting of directors on Nov. 13. This is in addition to the regular dividend of $1.50.

"This action was taken after a careful review of the operating results obtained in the first 10 months of this year," said Robert Gregg, president. "It was the view of the directors that conditions in the company's trade territory were on a sound basis, as shown by the volume of buying for current and near-future needs. Inventories throughout the territory seem to be low and at very reasonable prices, making for a thoroughly sound position of all buyers and users of steel products. The directors were of the opinion that the present sound economic conditions in this territory would not be adversely affected by current fluctuations in the New York stock market."

Production and Shipment of Raw Materials and Finished Products

	October, 1929	September, 1929	October, 1928
Railroad locomotives shipped(a)	96	75	36
do., ten months	688	.....	471
do., unfilled orders(b)	423(c)	429	170
Bituminous coal mined(d), net tons	51,200,000	44,515,000	51,176,000
Anthracite(d), net tons	8,235,000	6,792,000	8,400,000
Beehive coke made(d), net tons	465,600	504,400	431,000
	September, 1929	**August, 1929**	**September, 1928**
Electric power production(e)(f)	7,997,814	8,284,592	7,276,000
do., by water-power	2,479,066	2,839,137	.....
Sheet-metal ware shipments:(a)			
Galvanized, dozens	173,267	163,321	189,789
do., value	$676,841	$673,665	$742,180
Enameled, dozens	338,169	335,162	352,484
do., value	$1,414,995	$1,371,354	$1,372,242

(a) United States Department of Commerce.
(b) End of month.
(c) Lowest since February.
(d) United States Bureau of Mines.
(e) Thousands of kw.-hr. made by public utility power plants.
(f) United States Geological Survey.

Plans Perfected for Manufactures Census

Cooperation of Industry to Be Sought Through 17 District Conferences, Which Will Be Broadcast

PLANS are being laid to insure prompter and more accurate returns in the coming decennial census of manufacturing operations. Under the chairmanship of Col. L. S. Horner, president, Niles-Bement-Pond Co., New York, the Advisory Committee on Manufacturers appointed by Secretary Lamont last summer has arranged to make a thorough-going campaign to arouse general interest in the work.

The United States has been divided into 17 districts. Every community of any size in each of these districts will be card-indexed, and the local trade association and service clubs within 100 miles of a central city will be asked to send delegates representing local manufacturers and distributers to a conference. Communities outside the 100-mile limit will be reached through correspondence.

To Confer on Friday

The first of these conferences, which are being arranged under the direction of John E. Palmer, will take place Nov. 22 at the Pennsylvania Hotel, New York. Addresses will be delivered by Dr. Julius Klein, Assistant Secretary of Commerce; Col. L. S. Horner; F. M. Feiker, chairman of the Advisory Committee on Distribution, and W. M. Steuart, director of the Bureau of Census. The speeches will be broadcast over the Columbia-National network. Conferences will be held in other cities as follows:

Nov. 25—Bellevue Stratford Hotel, Philadelphia.
Nov. 27—Atlanta-Biltmore Hotel, Atlanta.
Nov. 29—Statler Hotel, Detroit.
Nov. 30—Hotel Statler, Buffalo.
Dec. 2—Hotel William Penn, Pittsburgh.
Dec. 4—Statler Hotel, Cleveland.
Dec. 5—La Salle Hotel, Chicago.
Dec. 7—St. Charles Hotel, New Orleans.
Dec. 9—Jefferson Hotel, Dallas, Tex.
Dec. 11—Statler Hotel, St. Louis.
Dec. 12—Fontenelle Hotel, Omaha, Neb.
Dec. 14—Brown-Palace Hotel, Denver.
Dec. 17—Olympic Hotel, Seattle, Wash.
Dec. 19—Claremont Hotel, San Francisco.
Dec. 20—Los Angeles Biltmore, Los Angeles.
Jan. 4—Boston Chamber of Commerce, Boston.

Representatives at the conferences will learn the practical value of the censuses to their communities and the methods used by other communities in assembling data both on manufactures and distribution. They will be asked in turn to do five things: First, give the local papers a report of the district conference; second, keep the local papers informed of local and national developments of the census work; third, organize a meeting of local manufacturers about the middle of January, to be addressed by a speaker furnished by Mr. Palmer; fourth, organize a meeting of local wholesalers and distributers about the middle of April, to be addressed on the census of distribution, and, fifth, to deliver a short talk over the local radio.

Cooperation to Speed Results

Through these methods the Bureau of Census hopes to expedite action so that reports on production operations will be available to the bureau at Washington by the middle of February. This would enable the bureau to deliver the basic data back to manufacturing industry within six months. In addition, the bureau believes that many thousands of dollars will be saved to the Government through more accurate returns and a reduction in field work.

Contractors See Benefits from Stock Deflation

Stabilization of the stock market at moderate levels and a recession in the volume of stock speculation should have a beneficial effect on the volume of construction contracts awarded, in the opinion of the Associated General Contractors of America. This organization says:

"The decline in contract awards evidenced so far this year by a 25 per cent reduction in the commitments for residential construction, as shown by the statistics of the F. W. Dodge Corporation, is seen as a result of difficulties in arranging for financing. With funds from all over the country actively employed in stock speculation, financing for local construction has been difficult to secure, especially for apartment house and hotel construction, it is claimed.

"This recession in residential construction contract commitments has only just begun to affect the demand for labor and construction materials, according to a statistical study just completed by the Associated General Contractors. The volume of construction job activities during October as indicated by shipments of basic construction materials declined 26 points to index number 233. Despite this drop in October the level of job activities during the first 10 months of 1929 was only one half of 1 per cent less than the volume of activities for the same period in 1928.

Carry-Over of Contracts

"The maintenance of job activities in the face of a recession of contract awards is accounted for by the existence of the carry-over of uncompleted contracts into this year. Unless financing soon becomes available for contemplated residential construction that is being held up it is believed that the volume of construction activities will recede to levels proportionate to the volume of contract awards.

"Outside the residential field contract awards are shown to be slightly above the totals of last year so that recovery in this one field of the industry will allow construction activities to be maintained at levels equal to those of the past. As recovery in residential contract awards is seen to be dependent upon the stabilization of the stock market and the release of funds for building financing, construction circles do not view the recent collapse of the stock market as an unmitigated calamity."

Foundry Equipment Makers Busy

Foundry equipment orders for October are reported at 245.3 on the basis of 100 as the average monthly shipments for 1922-1923-1924. Deducting cancellations, the net orders are 240.3, as reported by the Foundry Equipment Manufacturers Association. Shipments are given as 214.1 and unfilled orders as 492.5. The three-month average of gross orders was 230.3.

The index of gross orders for October was the highest since August, 1928. With the further exception of May, 1928, it was the highest on record. The three-month average was the highest ever recorded, exceeding the 218.7 of a month earlier by 5 per cent.

Shipments were the highest since last May, but were considerably lower than in October of last year. Unfilled orders were, with one exception, the largest on record. That exception was September, 1928, when 529.5 was indicated. September, 1929, had shown the previous second highest record in unfilled orders.

Employment and Payroll Totals in Identical Plants in September and August (a)

	Establishments	Number on Payroll		Weekly Payroll (b)	
		September	August	September	August
Iron and steel	201	280,559	284,312	$9,085	$9,239
Foundry and machine shop	1,065	290,719	289,499	8,860	8,929
Machine tools	150	42,577	41,418	1,387	1,326
Hardware makers	69	31,951	30,965	821	800
Steam and hot-water appliances	109	32,581	32,311	961	936
Stoves	114	20,982	19,771	587	539
Structural ironwork	173	30,068	29,795	930	916
Cast iron pipe	38	11,954	11,926	286	286
Automobiles	217	435,914	442,989	14,355	15,280

(a) United States Bureau of Labor Statistics.
(b) Thousands of dollars.

This Issue in Brief

Two good years, then one bad. The cycle that appeared in the late pre-war years has reappeared since the post-war boom. Economist says 1930 looks like a dull year, but there is "no reason as yet to forecast a serious business depression."—Page 1373.

* * *

Welding costs can be cut by teaching welders to work faster, using larger flames, decreasing the angle of vee, and keeping the weld narrow.—Page 1385.

* * *

Reduces oil consumption about 2 gal. to the ton of steel by superheating the steam for atomization to 700 or 800 deg. Fahr.—Page 1384.

* * *

Annealing improved sometimes by slight oxidation, says engineer. Oxidizing gases are under absolute control with electric furnace. Superiority of results, he says, offsets higher cost.—Page 1387.

* * *

Zinc spraying competes strongly with galvanizing in Europe. Protective skin of zinc oxide is formed speedily by treating sprayed coat with sodium chloride. Resistance to sea water and air corrosion is very high.—Page 1371.

* * *

Welded building cost $8 a ton more than riveted, says riveting machine manufacturer. Make walls sound absorbent, to escape din of riveting.—Page 1381.

* * *

New market for malleable castings. Withstand successfully both laboratory and service tests, proving that uses for malleable iron need not be restricted to small castings.—Page 1364.

Discovery may cause important change in open-hearth practice. Amount of iron oxide dissolved in liquid steel is much higher than heretofore supposed. Emphasizes necessity for more careful study of deoxidizers.—Page 1366.

* * *

Tungsten carbide "tipping problem" solved. Copper brazing in hydrogen atmosphere has proved satisfactory in most uses. If welded on, the tungsten carbide may crack. Better let the tool material manufacturer do the tipping if you have little to do. —Page 1369.

* * *

Stock crash due to absence of "short" cushion, economist suggests. Persistent upward course of prices drove the short seller out of the market, so there was no cushion to break the force of the panic.—Page 1372.

* * *

Metal-spraying with aluminum, tin, copper and lead presents problem of pores in the coated layer. Best results are obtained by treatment with chemicals which react with the metal.—Page 1371.

* * *

Flaw detector not always accurate, says railroad man. Can not be called highly successful, he says, but method is promising. He used early model, says detector maker; present model is better.—Page 1366.

* * *

Intermittent cuts can be made with tungsten-carbide tools if extreme rigidity prevails. Surround and reinforce the carbide insert on all sides, where it would normally be in tension. It has great compressive strength, but little tensile strength.—Page 1370.

Assemblers work faster if wheels are put on last. Durant waits until all assembly work is done before adding wheels, so that assemblers are not hindered. —Page 1374.

* * *

Lone manufacturer will lose in business struggle, says trade association manager. Urges fabricators to unite forces and extend facilities in battle for markets. —Page 1380.

* * *

Architects "discover" white metal. Large quantities are used in new business buildings. Monel and rustless iron are used, but aluminum and its alloys lead.—Page 1361.

* * *

Grinding tungsten-carbide tools no longer a problem. Best results, Dr. Jeffries believes, are obtained by using artificial abrasives of the silicon-carbide family, such as carborundum or crystolon.—Page 1369.

* * *

To speed the cleaning of the molten steel, add ferromanganese ahead of the ferrosilicon. With deep bath, it might be better to kill the steel in the ladle instead of in the bath.—Page 1383.

* * *

Aircraft fuselege welds, pickled in acid for 24 hr., get 100 per cent rating. No cracks or other weaknesses visible under magnifying glass. Tension tests of joints showed full rated strength. —Page 1386.

* * *

Wire-drawing die costs cut in half by tungsten carbide. Ratio in saving in die cost better than 2 to 1. With smaller wire, overall improvement in cost compared with diamond die was 6 to 1.—Page 1369.

A. I. FINDLEY
Editor

THE IRON AGE

W. W. MACON
Managing Editor

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Propaganda Out of Order

THE present is no time for propaganda. Publicity and advertising containing obvious misstatements regarding the current state of business do not delude; they may only accentuate the lack of confidence they are intended to dispel.

The aftermath of the stock panic has enough encouraging features without drawing on the imagination. There is no credit strain; on the contrary the Federal Reserve ratio is high and New York discount rates have been reduced twice since the stock market landslide started. Commodity prices are not inflated and business is not burdened with swollen inventories built up at high prices.

These fundamentally strong factors help explain why the country has remained free from wholesale cancellation of orders, sharp breaks in commodity markets, widespread closing down of plants and correspondingly large increases in unemployment, such as were immediate sequels of other stock market crashes.

The situation has much in it that is heartening; but business men know that nothing is to be gained by ignoring the unfavorable side of it. Among the adverse factors are the large quantities of frozen funds tied up in securities, and recently increased to save margins, which will reduce consumer buying power as effectively as actual monetary losses in speculation. Some of these accounts, moreover, threaten to cause further liquidating movements, so that an uncertain, fluctuating stock market may persist for some time to come.

It is also recognized that installment buying will be subjected to severe test, although conservative opinion is that defaults on payments will not become serious unless unemployment assumes alarming proportions. Happily, constructive measures set in motion by President Hoover will do much to ward off that danger. Corporations with large cash reserves—and there are many of them—are able, and with Government encouragement are expected, to initiate undertakings that will provide work for large numbers of men. Similarly Federal public work is likely to be accelerated, and there are indications that State and municipal projects will be expanded and expedited.

Much can and will be done to tide the country over the period of readjustment that it faces. There is no reason for pessimism. On the other hand, it would be too much to expect a continuation of flush times, which got so much support from lavish purchases out of stock market profits.

Reappraising the "New Era"

DURING the last seven years of activity it has been said repeatedly that we were in a new era. The catastrophe of the stock market raises several questions about this. Was it really a new era and if so has the era ended? No categorical answer can be given to either of these questions. There is much that is new, easily distinguished as such; but the problem is to distinguish between the new things that seem permanent and those about which there is either doubt or a certainty that they have dropped out or will.

The public was disposed to take it that nearly everything new that appeared in the industrial and economic situation was permanent and now it has found that one thing in which it took great interest, advancing stock market values, was not permanent. A reappraisal is accordingly necessary.

In the reappraisal we can reduce various things to fundamentals and thereby segregate what is permanent from what is not. The efficiency we attained in the war and the enlarged views of what we can do are permanent. The better understanding between employers and employees and the better treatment are permanent. So also is the belief that well paid labor is a first essential to maintain consumption. Realization of the value of research is permanent. The higher standard of living is permanent, and no error can be made about that because we have the testimony even of the past. Burton, in his classical "Crises and Depressions" published in 1902, says that the people always emerged from a period of depression with a higher standard of living than they had previously enjoyed. There was no going backward except temporarily even in the old order of things which we know is largely altered.

Next we have a matter not so simple. We do learn something by experience. It was before the war that there came recognition of a periodicity in our ups and downs in business. Foreseeing that there might be a panic in 1913, following those of September, 1873, and June, 1893, some men made preparations. There was already some recognition that the cycle was not necessary; the accuracy of this statement is indicated by reference to editorials in THE IRON AGE, Dec. 4, 1913, "The Cycle and the Iron Trade," pointing out that a previous parallelism had broken down; Sept. 17, 1914, "Cyclical Depression—an Obituary"; Oct. 1, 1914, "The Lost Panic of 1913."

Since the war much more statistical and other information has been available and there has been more

thinking. We may assume, if not as an absolute fact at least as a good working hypothesis, that business men avoided excesses and that thus the familiar cause of reaction and depression was avoided. That carries us up to the recent portion of this seven-year period of activity. The boom in the stock market and its influence upon general trade is the new thing that is not permanent, for it is even now gone; it is also chief of the unfavorable economic features of the "new era." Thus there must come a readjustment following the speculative excesses of these many months. From giving thought on a scale wholly without precedent to getting gains by stock speculation, millions of our people will now have a new respect for the old-time practice of working and saving and of buying for investment.

In Dispraise of Corrugated

SIGNS multiply that architects, artists and designers are paying more and more attention to metal and are developing the aesthetic possibilities of this medium at a rapid rate. Of course we have inherited many beautiful objects worked in metal in years gone by, such as bronze statues and ornamental iron grilles, not to mention productions of silversmith, armorer and jeweler. But we are now discovering that inlaid or embossed metal can enrich the interiors of public buildings and offices; that even so prosaic a thing as a kitchen sink can be good-looking as well as convenient.

No little credit for this is due to progress in the metallurgical industries. New metals and alloys, ductile yet stainless steels, have been produced at a moderate cost and with beautiful and durable surfaces. Gas welding and metal spraying enable the artisan to execute readily designs formerly all but impossible.

Secretary of the Treasury Mellon recently summarized very aptly the reasons underlying this trend toward art in industry when dedicating a monumental structure to be used as a railroad station. He said, "It is a bad investment to build anything that does not conform to those standards of good taste that have stood the test of time." Such sentiments would probably be pooh-poohed by a group of emancipated artists of the modern school. A cubist given free rein erects a building like the glass and metal church at Cologne, which really looks like a fantastic greenhouse. If he built a bridge, it would probably violate so many principles of engineering that it would rapidly emulate the celebrated London bridge of our childhood game. Yet bridges, even of steel, can be harmoniously blended to the surrounding landscape without relying upon the newest of the new art, as is proved by a series of photographs recently published by the American Institute of Steel Construction. A glance through them indicates that they are nearly all low sweeping arches or suspension bridges, suggestive of the lines of the Allegheny River bridge at Pittsburgh, recently voted the most beautiful bridge built during 1928.

A bridge builder must use his metal practically without ornamentation; an architect has the opportunity not only to achieve a distinctively American form for tall buildings, but is able to use new materials for their ornamentation. He wishes to accentuate the vertical lines, so he uses lead or aluminum spandrels between the windows. Bold ornamentation of the structure he reserves for the top; so he uses gigantic figures cast in bronze or aluminum, or sheathes a tower in glittering white metal. Façades, extending up a few stories, entry halls and elevators —parts of his building seen close up—he trims with copper, bronze, monel, or stainless steels, either in plain moldings, fret work, inlay, or bas relief. Costly woods he replaces by more durable yet equally appropriate metals for interior decoration and even for furniture.

Enthusiastic though we are about this new trend in architecture, an involuntary protest arose recently when called upon to admire a pedestrian bridge in Chicago, sheathed entirely with a polished iron alloy, for all the world like shiny corrugated iron. And now comes a drawing of the 100-story office building proposed by the Metropolitan Life Insurance Co. It looks as though some one had got an enormous roll of corrugated strip and pulled the central coils out to get an ascending spiral, as Doré would have conceived the Tower of Babel, but with surfaces fluted vertically. "Instead of placing windows occupying, as is customary, less than 50 per cent of the whole surface of the building and recessing these windows within masonry reveals," says the architect, "the entire surface between the steel supports will be made of metal and glass, these surfaces being projected somewhat like a shallow bay window, glass being carried to ceiling level to give the maximum light."

We can admire corrugated iron on a roof for its durability, or on the siding of a mill building for its utility, or a corrugated building for the amount of metal on its surface; but something prevents us from seeing anything beautiful in it. Perhaps it is a case of artistic astigmatism.

An Instrument of Market Expansion

AS an agency for the development of markets, including the discovery of new fields of consumption, the trade association has well proved itself in the case of the steel fabricators' organization. As brought out in the report elsewhere of the annual meeting of this body, the short space of seven years has shown an astonishing growth of influence. City after city has accepted, in whole or in part, its recommendations for steel building work. The professional and business world likely to be interested has been fairly flooded with steel building literature. The stamp of authority based on results seems unquestioned. Aggressive studies to find new uses for structural steel have uncovered definite items. Steel deck floors, even for residences as well as multi-storied buildings, promise an outlet for even a greater tonnage of plates than is absorbed for railroad cars. The attitude of the institute's staff is that steel is an excellent material for many forms and sizes of dams, or it intends to know why not.

In respect to business practice, the association has composed many differences among the member companies. It has established standard specifications and a code for the industry and it has published a sales manual and directed sales meetings of member representatives. Its membership was instrumental in furthering a trade practice conference instituted under

the auspices of the Federal Trade Commission. In a word, the institute has done all that could reasonably be expected from a trade association, especially considering its short existence.

One outstanding problem which it has not solved is a basis of relations with the producers of structural shapes—the suppliers of its major raw material. The signs are that the steel makers have come to regard highly the efficacy of the institute and are in a mood to cooperate more fully than in the immediate past, and this means, of course, in the way of a sizable money contribution to further the work of promoting consumption. The immediate need seems to be for group action by the steel producers for an equitable apportionment of the support. That they are favorable to some joint action is taken for granted. What seems to be lacking is the machinery to set up a negotiating organism; but as the will grows to foster the movement, the way will be found.

Prospects for Exports of Capital

FOLLOWING the decline in interest rates and the reduction in collateral loans it is natural to expect an increase in the flow of American capital into foreign investments. This, however, would be merely a reversion to the practice prior to about the middle of 1928, which means two things—that it is likely to occur and that it will have no great long-range significance.

At the beginning of last year interest rates were low. They advanced somewhat during the first half and sharply in the second half while the stock market underwent a great advance. The offering of foreign securities showed a great decrease at the middle of last year, and that was not seasonal. Of the total offerings in 1926, 45 per cent were in the first half and 55 per cent in the second half; in 1927 there was a 50-50 division, and in 1928 the division was 70 per cent first half and 30 per cent second half. Thus far this year the offerings have undergone a further decrease.

In 1923 there was a sharp dip in these offerings, there being a fairly steady increase thereafter. Offerings in the first half of 1928 were at a rate 32 per cent above the 1927 total and 59 per cent above the 1926 total. In the second half of 1928 they were only 55 per cent of the rate during the preceding two and a half years, and this year have been running lighter still.

During this former period there was much criticism of our lending so much money abroad and now if the practice grows again there may be repetition of the criticism. There is an outstanding fact in this matter observable without analysis in detail—that whereas the critics predicted cumulative ill effects the passage of time with increasing loans abroad did not strengthen their case.

The exhaustive compilations and estimates of the Department of Commerce published annually in "The Balance of International Payments of the United States," the last issue covering data through 1928, show how many offsetting items there are, whereby the billions of dollars frequently cited as representing our loans abroad are greatly scaled down. How large and complicated is our account with the outside world is shown by the fact that for 1928 the debits and credits each totaled over ten billion dollars, whereas the net capital movement is computed at only 962 millions.

With the cumulative experience of several years it is found that the thing has not become top-heavy, for it is fair to assume that the decrease in lending abroad which occurred at the middle of last year was due to money rates and stock speculation. Without going into details of various counterbalancing items, the finding of the Department of Commerce in the last presentation, up to the end of last year, may be cited: "The American nation having now seen five or six successive years in which the par value of foreign capital issues was over a billion, it is rather surprising that during the seven years ended with 1928 our net export of capital was only $3,253,000,000" as estimated, and this would be reduced to $2,982,000,000 if receipts of principal on the war debts to the United States Treasury were considered.

Both by reason of the change in money rates and stock speculation and of the need for stimulating exports the prospect is that there will now be a return to the practice of lending what seem like large sums abroad. Even at this late date harmful results have not become visible. True, it might look better if we had need for all our capital at home, but we seem to have a sufficient supply for both home and foreign interests.

Suggests Remedy for Enamel Blisters on Cast Iron

INVESTIGATION of a problem which has caused a good deal of worry to manufacturers of enameled cast iron ware has been completed by the Bureau of Standards after several years' study. It had been found for a long time by different manufacturers that certain irons showed a pronounced tendency to the formation of blisters in the enamel. This had come to be associated finally with different kinds of cast iron. For example, Southern cast iron was said to be "non-blistering," whereas Northern cast iron of essentially the same composition was classed as "blistering." The problem has been a very obscure one and a great many false leads have been followed.

According to the report, the blistering tendency cannot be ascribed to any particular composition. Blistering is dependent upon the presence of a thin surface film of chilled metal which may exist even in ordinary castings. The carbon in such a "micro" chilled layer is in a condition very favorable to the formation of the gas which gives rise to the blisters in the enamel when it is fired. The remedy is simple and efficient. It consists in the removal of the surface of the casting before enameling, preferably by sand blasting.

Central Alloy Increasing Stainless Steel Capacity

Current output of stainless steel by the Central Alloy Steel Corporation is the highest since production of the new material was started under Krupp license, it is announced by Chairman F. J. Griffiths. Notwithstanding larger production, deliveries of stainless are from six to nine weeks behind orders. Demand has been increasing rapidly with the development of new markets in the automotive, pipe, building and many miscellaneous lines.

In order to supply demand for stainless steel, the company is expanding productive facilities as rapidly as possible, Mr. Griffiths said. Latest steps in the expansion program include installation of an automatic pack furnace, five double cabinet sand blasting machines, a double tank mechanical pickling machine and a 2500 cu. ft. air compressor. In addition, a new 25-ton electric furnace is being constructed. Completion of these improvements around the first of the year will enable the company greatly to increase production.

Newport Naval Station to Sell Scrap Tonnage

Bids will be opened Dec. 5 by the United States Naval Torpedo Station, Newport, R. I., on a tonnage of iron, steel and non-ferrous metal scrap. Material to be sold includes 150 net tons of mixed borings and turnings, 100 tons of miscellaneous iron, steel and non-ferrous metal scrap, 110 metal drums of 50 to 55-gal. capacity, 73,000 lb. of brass, copper and bronze scrap, 4000 lb. of monel metal scrap, 1000 lb. of bronze dross and skimmings and 123 grinding wheels.

Record Iron Ore Shipments Through Sault Locks

Shipments of iron ore through the Sault locks this year has set an all-time record, according to the monthly statistical report of the United States Engineer's office. The total to Nov. 1 was 17,457,000 tons greater than during the entire season's total of any previous time, including shipments during the period of the World War.

To Build Suspension Bridge of 4500-Ft. Span

A bridge with towers exceeding the height of the Woolworth Building in New York will be constructed in commemoration of the American soldiers who fought in France, according to D. B. Steinman, consulting engineer, in an address Nov. 13 before the seventh annual convention of the American Institute of Steel Construction, meeting at Biloxi, Miss. Doctor Steinman reviewed the past 50 years of bridge building, years during which steel has been available, and described some of the most massive bridge structures in the world.

The Liberty Bridge, across the Narrows on New York Harbor, he said, will be 4500 ft. between the main piers and 235 ft. above high water. The main span of the proposed bridge will be 1000 ft. longer than the main span of the Hudson River Bridge, now building, which, in turn, is nearly twice the span of the next greatest bridge.

Each tower will be 800 ft. high. The main cables from which the bridge is to be suspended will measure 48 in. in diameter, each containing 48,000 wires, and the strength of the wire will be 240,000 lb. to the sq. in. The towers will be artistically designed in steel and unadorned, he said, and the whole structure will express the "Spirit of Steel." Observation platforms will crown the towers, which will be equipped with a carillon of bells and with beacon lights.

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Doubt has been expressed that such a bridge would ever be built, inasmuch as the city has authorized construction of a tunnel under the Narrows to carry traffic between Staten Island and Brooklyn.—EDITOR.

The Week in Business

Drift of Current Financial and Economic Opinion

INTEREST in post-mortems is waning. With marked adaptability the American public is readjusting itself to the conditions imposed by a major stock market panic and is already seeking practical ways of minimizing their effects on business.

That serious havoc has been wrought is commonly recognized. As observed by Col. Leonard P. Ayres, a shrinkage in stock market values exceeding our entire expenditures and loans during the World War cannot fail to cause widespread and serious actual losses to thousands of people, wiping out large savings and creating a vast volume of unproductive indebtedness.

But, as is well put by Theodore H. Price, *Commerce and Finance*, "Business in America has become an enormous force. Any serious diminution in its volume seems to be unlikely, and the distress that the recent panic has caused will be forgotten just as soon as hope again takes possession of this hopeful people."

Government Action Salutary

Nothing has done more to inspire hope and restore confidence than the constructive measures undertaken by the Federal Government. The assurance of prompt action to reduce income taxes 1 per cent on both corporations and individuals is hailed as a welcome measure of relief by the *Commercial and Financial Chronicle*. The tax cuts, it declares, "are sure to prove a stimulus to trade, whether trade is to remain good or take a turn for the worse."

Of far greater immediate promise are the conferences of business leaders called this week by the President to formulate plans for offsetting business reaction. The cash position of important corporations is excellent, warranting the release of projects to provide employment. What is more, the Government itself is preparing to speed up Federal work and to encourage shipbuilding through loans and mail contracts.

No Disastrous Sequel of Crash

With this organized remedial effort under way, it is gratifying to note that results of the stock market collapse to date have not been alarming.

"We are already able to say," writes Alexander D. Noyes, New York *Times*, "that there has been no shutting down of business houses, no crash in prices of manufactured products, no sweeping reduction of working forces, such as occurred in immediate sequence to nearly all of the older Wall Street panics. Prices of staple goods fell 10 per cent in the weeks of the 1920 panic; a week or two after the panics of 1907 and 1893, manufacturers were discharging employees by regiments."

Credit Easy, Commodities Uninflated

Freedom from credit strain and absence of commodity price inflation are the two outstanding characteristics distinguishing the recent stock market break from other Wall Street crises, and they indicate a basically sounder condition of finance and industry at the present time, according to the Alexander Hamilton Institute.

"This year the banking situation is sound," it observes. In place of increased credit stringency after stock prices broke, as in 1919-1920, "the end of the first week of the break this fall witnessed a reduction in the rediscount rate at New York."

Iron and Steel Markets

Steel Trade Regaining Confidence

Output Declines Further But Buoyancy of Demand in Certain Lines Allays Fear of Drastic Slump —Scrap Continues to Weaken

THE manner in which business has withstood the shock of the Wall Street panic has done much to restore confidence among buyers and sellers of iron and steel. While the output of furnaces and mills has undergone a further decline, consumption has shown no general curtailment and in a number of leading lines has held its own or has gained.

Entirely apart from the heartening effect of President Hoover's conferences, the news of the week is favorable. The large demand for fabricated structural steel is being maintained, 107,000 tons has been added to rail mill backlogs, farm machinery plants have further expanded their operations, there has been another impressive increase in prospective railroad equipment business and large tin plate contracts have been closed for 1930. The outlook in electrically-welded pipe has been brightened by the placing of an order for a California gas line and the reinstatement of line pipe contracts suspended several weeks ago.

These evidences of sustained activity are not interpreted as indicating an early increase in steel output, but rather as an assurance that drastic general curtailment of consumption is not in prospect. With inventory-taking approaching, business will soon feel the effects of the year-end lull, although releases for January rolling of some products will reach the mills in December.

Steel ingot production of Steel Corporation subsidiaries now ranges from 72 to 74 per cent and it is doubtful whether any producer is operating at more than 75 per cent of capacity. Operations of Valley plants have declined to 50 per cent and the rate in the Pittsburgh district is down to 70 per cent, while Chicago output holds at 75 per cent.

Specifications for steel from the automotive industry have continued to recede, and further curtailment is in prospect. However, it is understood that the Ford company will get under production on its new models as quickly as possible and will shortly release sizable tonnages of sheets and other mill products. Two or three Detroit makers of higher-priced cars are now operating at a good rate on new models, while in the Chicago district an important motor car builder has resumed output at 65 per cent of capacity and a large parts maker is ordering steel.

Scrap markets have given further ground in keeping with the reduced requirements of steel plants. Heavy steel scrap has declined 75c. at Pittsburgh and 25c. at Chicago.

Mills have reaffirmed prices on tin plate, wire products and strip steel for first quarter. Specifications for tin plate are beginning to show improvement and the tonnage released prior to Nov. 15 for January rolling was of encouraging proportions. Blue annealed sheets are now generally quotable at 2.25c., Pittsburgh, for No. 13 gage and 2.10c. for No. 10, or $2 a ton lower than prices recently asked by jobbing mills.

Rail orders for the week include 57,000 tons for the Rock Island, 40,000 tons for the Illinois Central and 10,000 tons for the Boston & Maine. Purchases of rails to date for 1930 laying total 1,500,000 tons, and it is estimated that 750,000 tons still remains to be placed. The Southern Pacific has bought 18,000 tons of track supplies. Locomotives ordered during the week total 64, and inquiries for 250 are pending. The Chesapeake & Ohio and the Pere Marquette are expected to ask for figures shortly on 10,000 cars. The New York Central's program for next year calls for the purchase of 15,000 cars.

Shipbuilding plants, already heavily booked, have much additional work in prospect. The United States Lines have taken bids on two ships of the Leviathan type, requiring 20,000 tons of plates and shapes each. The Export Steamship Corporation plans to build two additional vessels. Indications are that the Post Office Department will soon advertise for bids for mail contracts which will result in the construction of 15 to 20 ships, requiring a total of 150,000 tons of steel.

Fabricated structural steel contracts for October, as reported by the Department of Commerce, totaled 342,650 tons, compared with 319,550 tons in September. Awards for the past week, at 41,000 tons, were fairly large. Fresh inquiries aggregate 60,000 tons, including 40,000 tons for a Cincinnati railroad terminal. The release of both private and public work, as a result of the President's conference, will further stimulate building. Federal, State and municipal construction budgets for 1930, originally estimated at $1,125,000,000, are likely to be doubled, according to Washington advices.

Pig iron melt has fallen off in some lines outside of the automotive industry, but this recession is offset, at least in part, by the increased requirements of foundries serving the railroad car builders and the farm equipment makers. Prices are softer in some districts, but producers of merchant iron evidently plan to avoid accumulating surplus stocks by reducing their output. Three Valley stacks have been blown out or banked in the past 10 days, and a Buffalo furnace may go out this week.

THE IRON AGE composite prices are unchanged, pig iron at $18.38 a gross ton and finished steel at 2.362c. a lb. Pig iron is 16c. a ton lower than a year ago; finished steel, 14c. a ton lower.

A Comparison of Prices

Market Prices at Date, and One Week, One Month and One Year Previous, Advances Over Past Week in Heavy Type, Declines in Italics

	Nov. 19, 1929	Nov. 12, 1929	Oct. 22, 1929	Nov. 20, 1928
Pig Iron, Per Gross Ton:				
No. 2 fdy., Philadelphia	$21.26	$21.26	$21.26	$21.26
No. 2, Valley furnace	18.50	18.50	18.50	17.50
No. 2 Southern, Cin'ti	17.69	17.69	17.69	20.19
No. 2, Birmingham	14.50	14.50	14.50	16.50
No. 2 foundry, Chicago*	20.00	20.00	20.00	20.00
Basic, del'd eastern Pa	19.75	19.75	19.75	19.75
Basic, Valley furnace	18.50	18.50	18.50	17.50
Valley Bessemer, del'd P'gh	20.76	20.76	20.76	20.01
Malleable, Chicago*	20.00	20.00	20.00	20.00
Malleable, Valley	19.00	19.00	19.00	18.25
Gray forge, Pittsburgh	19.76	19.76	19.76	18.76
L. S. charcoal, Chicago	27.04	27.04	27.04	27.04
Ferromanganese, furnace	105.00	105.00	105.00	105.00
Rails, Billets, Etc., Per Gross Ton:				
Rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Light rails at mill	36.00	36.00	36.00	36.00
Rerolling billets, Pittsburgh	35.00	35.00	35.00	33.00
Sheet bars, Pittsburgh	35.00	35.00	35.00	33.00
Slabs, Pittsburgh	35.00	35.00	35.00	33.00
Forging billets, Pittsburgh	40.00	40.00	40.00	38.00
Wire rods, Pittsburgh	40.00	40.00	40.00	42.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.85	1.85	1.85	1.90
Finished Steel, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Bars, Pittsburgh	1.90	1.90	1.90	1.95
Bars, Chicago	2.00	2.00	2.00	2.00
Bars, Cleveland	1.90	1.90	1.90	1.90
Bars, New York	2.24	2.24	2.24	2.29
Tank plates, Pittsburgh	1.90	1.90	1.95	1.90
Tank plates, Chicago	2.00	2.00	2.05	2.00
Tank plates, New York	2.17½	2.17½	2.22½	2.22½
Structural shapes, Pittsburgh	1.90	1.90	1.90	1.90
Structural shapes, Chicago	2.00	2.00	2.00	2.00
Structural shapes, New York	*2.09½*	2.14½	2.14½	2.19½
Cold-finished bars, Pittsburgh	2.30	2.30	2.30	2.20
Hot-rolled strips, Pittsburgh	1.90	1.90	1.90	1.90
Cold-rolled strips, Pittsburgh	2.75	2.75	2.75	2.85

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

	Nov. 19, 1929	Nov. 12, 1929	Oct. 22, 1929	Nov. 20, 1928
Finished Steel, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Sheets, black, No. 24, P'gh	2.75	2.75	2.75	2.75
Sheets, black, No. 24, Chicago dist. mill	2.85	2.85	2.95	2.85
Sheets, galv., No. 24, P'gh	3.40	3.40	3.50	3.50
Sheets, galv., No. 24, Chicago dist. mill	*3.50*	3.60	3.60	3.60
Sheets, blue, No. 13, P'gh	*2.25*	2.35	2.35	2.10
Sheets, blue, No. 13, Chicago dist. mill	2.45	2.45	2.45	2.20
Wire nails, Pittsburgh	**2.40**	**2.40**	2.40	**2.55**
Wire nails, Chicago dist. mill	2.45	2.45	2.40	2.65
Plain wire, Pittsburgh	2.40	2.40	2.40	2.40
Plain wire, Chicago dist. mill	2.45	2.45	2.40	2.45
Barbed wire, galv., Pittsburgh	3.05	3.05	3.05	3.20
Barbed wire, galv., Chicago dist. mill	3.10	3.10	3.15	3.25
Tin plate, 100 lb. box, P'gh	$5.35	$5.35	$5.35	$5.25
Old Material, Per Gross Ton:				
Heavy melting steel, P'gh	*$16.00*	$16.75	$17.25	$17.00
Heavy melting steel, Phila	15.00	15.00	15.50	15.50
Heavy melting steel, Ch'go	*13.00*	13.25	14.25	14.50
Carwheels, Chicago	14.00	14.00	14.00	14.25
Carwheels, Philadelphia	15.50	15.50	16.50	16.50
No. 1 cast, Pittsburgh	15.00	15.00	15.50	14.50
No. 1 cast, Philadelphia	16.00	16.00	16.00	16.25
No. 1 cast, Ch'go (net ton)	13.50	13.50	14.50	15.50
No. 1 RR. wrot., Phila	16.00	16.00	16.00	15.50
No. 1 RR. wrot., Ch'go (net)	*12.25*	12.50	14.00	13.00
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$2.65	$2.65	$2.65	$2.85
Foundry coke, prompt	3.75	3.75	3.75	3.75
Metals, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Lake copper, New York	18.12½	18.12½	18.12½	16.12½
Electrolytic copper, refinery	17.75	17.75	17.75	15.75
Tin (Straits), New York	**39.75**	39.37½	41.37½	51.12½
Zinc, East St. Louis	6.25	6.25	6.70	6.25
Zinc, New York	6.60	6.60	7.05	6.60
Lead, St. Louis	6.10	6.10	6.70	6.17½
Lead, New York	6.25	6.25	6.90	6.35

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Pittsburgh

Steel Operations Continue to Decline, Though Tonnage Releases in Some Lines are Improved

PITTSBURGH, Nov. 19.—Although one or two Pittsburgh district steel companies report somewhat better specifications, the general situation has changed very little in the last week, and it cannot be denied that business is very dull. Operations continue their downward trend, with companies in the immediate district running this week at approximately 70 per cent of theoretical capacity. Only two or three of the larger interests which make a diversified line of products are at this or a better rate and much of the steel now being made is going into heavier products.

It is significant, however, that present specifications completely justify the comparatively higher rates of the larger companies. In these cases, the increasing tonnage releases of the railroads, car builders and agricultural implement makers have helped to offset the declining requirements of the automobile industry.

The business of companies which depend on the automotive industry for a considerable part of their tonnage is seriously affected. In the Valleys, the average operating rate is not above 50 per cent, and producers elsewhere which make a preponderance of flat-rolled steel products, are no better off. Strip operations have not been so low in at least two years and the same is true with automobile body sheet mills.

Sheet production in general is somewhat higher this week because of a sharp increase in the schedules of the leading producer, but as the announced operating rate of this company also includes the Chicago district, where rather heavy specifications from the railroad car builders and implement makers have been coming in during the last two weeks, it is doubtful whether the output of Pittsburgh and tributary districts will show any increase.

Tin mills are beginning to feel the effects of usual seasonal betterment. Following the reaffirmation of the present price of $5.35 per base box, Pittsburgh, on 1930 business, specifications are beginning to show improvement, and the tonnage released prior to Nov. 15 for January rolling was encouraging.

Strip makers have opened their books for first quarter at unchanged prices. Although buyers are showing little interest in their requirements for that period, the early price announcement seems to have given the market a slightly stronger tone and has helped to offset the pressure of a few comparatively large buyers for lower prices.

In some cases, sheet makers have failed to withstand this pressure and a little business has been taken at concessions. Lower prices on blue annealed sheets and light plates are now more general. However, the majority of companies are maintaining a comparatively firm price stand and the extent to which they have curtailed operations offers support to their growing belief that little business would be driven in by price concessions. The same is true in the case of the heavy hot-rolled products, on which many companies are doing little to stimulate sales, at least in the way of price inducement. The market on

bars, shapes and plates is still reasonably firm at 1.90c., Pittsburgh.

Well sustained shipments are the feature of a very quiet pig iron market. New buying has been negligible in the last few weeks, but consumers continue to take iron on contract at a satisfactory rate. Merchant producers are translating their reluctance to accumulate iron into curtailment of output and another stack in the Valleys has been banked. This is the third to be blown out or banked in a little more than a week.

The decline in scrap prices is unchecked, and No. 1 heavy melting steel is quotable at 50c. to $1 lower than last week, depending upon the opinion of the dealer or consumer. In the absence of any significant mill buying and with the uncertainty of the market, any quotation is nominal and the same gage must be applied to the declines in other grades of scrap.

Semi-Finished Steel.—Little change in the demand for semi-finished steel is noticeable in this market, although the smaller independent steel companies are curtailing their requirements further. This is particularly true of sheet and strip makers, whose operations in many cases have fallen under 50 per cent of capacity in the last few weeks. The market offers little test for prices, but leading sellers are quoting $35, Pittsburgh or Youngstown, for billets, slabs and sheet bars, and $40 for forging billets. The price is subject to little pressure, as most buyers have enough tonnage under contract to last them the remainder of the year. Wire rods are unchanged at $40 a ton, Pittsburgh or Cleveland, and the market is very dull.

Pig Iron.—In the face of little or no buying of pig iron in the Pittsburgh and Valley districts, shipments this month have held up unusually well, and the leading merchant interest has been moving more iron than it has produced. This is not true in the case of all makers, but it is certain that the pig iron melt in this vicinity has not declined very much in the last few weeks. One exception is the mold foundries, which are operating at a very low rate, but steel foundries serving the railroad equipment makers are growing more active, offsetting decreases elsewhere to a certain extent. The lack of buying may be attributed partly to the present uncertainty of business conditions, but many consumers have their needs over the next few weeks covered by contract and can scarcely be expected to commit themselves further. The price situation is rather uncertain and, in the absence of inquiries for more than 100 to 200 tons, there is nothing to test the present quotations of $18.50, Valley, for foundry and basic iron and $19 for malleable and Bessemer. In the immediate Valley district, these prices seem to be stronger than they are in Pittsburgh, where competition with local furnaces has developed concessions in the past. Merchant producers are apparently determined not to stock pig iron at this time, and, following the blowing out of two merchant stacks in the Valleys last week, the Davison Coke & Iron Co. has banked its Sharpsville furnace. This leaves only three strictly merchant stacks operating in the Valleys and one in Pittsburgh. Steel companies in the Pittsburgh district, which sometimes sell iron, are also said to be considering blowing out furnaces.

Prices per gross ton, f.o.b. Valley furnace:

Basic	$18.50
Bessemer	19.00
Gray forge	18.00
No. 2 foundry	18.50
No. 3 foundry	18.00
Malleable	19.00
Low phos., copper free	27.00

Freight rate to Pittsburgh or Cleveland district $1.76.

Prices per gross ton, f.o.b. Pittsburgh district furnace:

Basic	$19.00
No. 2 foundry	19.00
No. 3 foundry	18.50
Malleable	19.50

Freight rates to points in Pittsburgh district range from 63c. to $1.13.

Bars, Shapes and Plates.—Mills are still receiving a fair amount of plate specifications, but not as much can be said for bars and shapes. In the case of bars, mill operations are still being curtailed, while structural shape units are being run at a fairly high level because of the well sustained demand from the large fabricating shops which have heavy backlogs. The bulk of the plate specifications now being released are coming from car builders in this territory, although there is still some demand from barge yards. However, barge requirements will be considerably reduced in a short time unless some orders are booked. A few inquiries are before the trade and more business is under negotiation, but barge lines are slow to take action on additional capacity at this time. Prices are holding at 1.90c., Pittsburgh, but the market can scarcely be called strong at that figure.

Rails and Track Accessories.—Interest in this market is centered at Washington, where the conference of railroad executives, to be followed later in the week by the regular meeting of the American Railway Association in Chicago, is expected to stimulate considerable railroad buying. The New York Central will take bids on Nov. 27 on the track accessories for its recent rail order, but otherwise the market is inactive. The Baltimore & Ohio is not yet inquiring for its rail tonnage, but something is expected from this source in the near future.

Bolts, Nuts and Rivets.—Declining demand from the automobile industry has been offset to some extent by increased business from the railroads, so the bolt and nut industry has been able to maintain a fair operation, that is, approximately 60 per cent of capacity. Jobbers' stocks are not excessive. Prices are holding well.

Wire Products.—Wire makers have opened their books for first quarter, with prices unchanged, and the market is developing a stronger trend at these figures. They are 2.40c. a lb., Pittsburgh, for manufacturers' wire; $2.40 to $2.50 a keg on nails, and 2.55c. to 2.65c. a lb. on annealed fence wire for the jobbing trade. Business is very quiet, but this is seasonal in some lines.

Tubular Goods.—Light demand for pipe and tubular products has not seriously interfered with the operations of mills in this territory, and seamless and lapwelded units are still running at 60 per cent of capacity.

The Iron Age Composite Prices

Finished Steel

Nov. 19, 1929, 2.362c. a Lb.

One week ago	2.362c.
One month ago	2.369c.
One year ago	2.369c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products make 87 per cent of the United States output of finished steel.

	High	Low
1929	2.412c., April 2;	2.362c., Oct. 29
1928	2.391c., Dec. 11;	2.314c., Jan. 3
1927	2.453c., Jan. 4;	2.293c., Oct. 25
1926	2.453c., Jan. 5;	2.403c., May 18
1925	2.560c., Jan. 6;	2.396c., Aug. 18

Pig Iron

Nov. 19, 1929, $18.38 a Gross Ton

One week ago	$18.38
One month ago	18.38
One year ago	18.54
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High	Low
1929	$18.71, May 14;	$18.25, Aug. 27
1928	18.59, Nov. 27;	17.04, July 24
1927	19.71, Jan. 4;	17.54, Nov. 1
1926	21.54, Jan. 5;	19.46, July 13
1925	22.50, Jan. 13;	18.96, July 7

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base per Lb.
F.o.b. Pittsburgh mill	1.90c.
F.o.b. Chicago	2.00c.
Del'd Philadelphia	2.22c.
Del'd New York	2.24c.
Del'd Cleveland	1.90c.
F.o.b. Cleveland	1.90c.
F.o.b. Lackawanna	2.00c.
F.o.b. Birmingham	2.10c.
C.i.f. Pacific ports	2.35c.
F.o.b. San Francisco mills	2.35c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills, 40, 50, 60-ft.	2.05c.
F.o.b. Pittsburgh mills, cut lengths	2.30c.
F.o.b. Birmingham, mill lengths	2.10c.

Rail Steel

F.o.b. mills, east of Chicago dist.	1.90c.
F.o.b. Chicago Heights mill	1.95c.
Del'd Philadelphia	2.27c.

Iron

Common iron, f.o.b. Chicago	2.00c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	2.12c.
Common iron, del'd New York	2.14c.

Tank Plates

	Base per Lb.
F.o.b. Pittsburgh mill	1.90c.
F.o.b. Chicago	2.00c.
F.o.b. Birmingham	2.10c.
Del'd Cleveland	2.09c. to 2.14c.
Del'd Philadelphia	2.10c. to 2.15c.
F.o.b. Coatesville	2.00c. to 2.05c.
F.o.b. Sparrows Point	2.00c. to 2.05c.
F.o.b. Lackawanna	2.00c. to 2.05c.
Del'd New York	2.17½c. to 2.22½c.
C.i.f. Pacific ports	2.25c. to 2.35c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh mill	1.90c.
F.o.b. Chicago	2.00c.
F.o.b. Birmingham	2.10c.
F.o.b. Lackawanna	2.00c. to 2.05c.
F.o.b. Bethlehem	1.95c. to 2.00c.
Del'd Cleveland	2.09c. to 2.14c.
Del'd Philadelphia	1.96c. to 2.06c.
Del'd New York	2.04½c. to 2.14½c.
C.i.f. Pacific ports	2.35c.

Hot-Rolled Hoops, Bands and Strips

	Base per Lb.
6 in. and narrower, P'gh	2.00c.
Wider than 6 in., P'gh	1.90c.
6 in. and narrower, Chicago	2.10c.
Wider than 6 in., Chicago	2.00c.
Cooperage stock, P'gh	2.20c.
Cooperage stock, Chicago	2.30c.

Cold-Finished Steel

	Base per Lb.
Bars, f.o.b. Pittsburgh mill	2.20c.
Bars, f.o.b. Chicago	2.20c.
Bars, Cleveland	2.20c.
Bars, Buffalo	2.20c.
Shafting, ground, f.o.b. mill	*2.55c. to 3.50c.
Strips, P'gh	2.75c.
Strips, Cleveland	2.75c.
Strips, del'd Chicago	3.05c.
Strips, Worcester	2.90c.
Fender stock, No. 20 gage, Pittsburgh or Cleveland	4.25c.

*According to size.

Wire Products

(Carload lots, f.o.b. Pittsburgh and Cleveland, to jobbers and retailers.)

	Base per Keg
Wire nails	$2.40 to $2.50
Galvanized nails	4.40 to 4.50
Galvanized staples	3.10 to 3.20
Polished staples (per lb.)	2.85c. to 2.95c.
Cement coated nails	$2.40 to $2.50

	Base per 100 Lb.
Bright hard wire, No. 6 to No. 9 gage, to manufacturing trade	$2.40
Annealed fence wire	2.55 to 2.65
Spring wire	3.50 to 3.60
Galv'd wire, No. 9	3.00 to 3.10
Barbed wire, galv'd	3.05c. to 3.15c.
Barbed wire, painted	2.80c. to 2.90c.
Woven wire fence (per net ton to retailers)	$65.00

(Carload lots f.o.b. Chicago.)

Wire nails	$2.45 to $2.55 (keg)
Bright hard wire to manufacturing trade	2.45c. (lb.)
Annealed fence wire	2.60c. to 2.70c.

Cut Nails

	Per 100 Lb.
Carloads, Wheeling, Reading or Northumberland, Pa.	$2.70
Less carloads, Wheeling or Reading	2.80

Light Plates

No. 10, blue annealed, f.o.b. P'gh	2.10c. to 2.20c.
No. 10, blue annealed, f.o.b. Chicago dist.	2.30c.
No. 10, blue annealed, del'd Phila.	2.42c. to 2.52c.
No. 10, blue annealed, B'ham	2.35c.

Sheets

Blue Annealed

	Base per Lb.
No. 13, f.o.b. P'gh	2.25c. to 2.35c.
No. 13, f.o.b. Chicago dist.	2.45c.
No. 13, del'd Philadelphia	2.57c. to 2.67c.
No. 13, blue annealed, B'ham	2.50c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh	2.75c.
No. 24, f.o.b. Chicago dist. mill	2.85c.
No. 24, del'd Philadelphia	3.07c.
No. 24, f.o.b. Birmingham	3.00c. to 3.10c.

Metal Furniture Sheets

No. 24, f.o.b. P'gh	4.00c. to 4.10c.

Galvanized

No. 24, f.o.b. Pittsburgh	3.40c. to 3.50c.
No. 24, f.o.b. Chicago dist. mill	3.50c. to 3.60c.
No. 24, del'd Cleveland	3.59c. to 3.69c.
No. 24, del'd Philadelphia	3.72c. to 3.82c.
No. 24, f.o.b. Birmingham	3.75c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.90c. to 3.00c.
No. 28, f.o.b. Chicago dist. mill	3.00c. to 3.10c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh	4.00c.

Long Ternes

No. 24, 8-lb. coating, f.o.b. mill	3.90c. to 4.00c.

Vitreous Enameling Stock

No. 24, f.o.b. Pittsburgh	3.90c.

Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills	$5.35
Standard cokes, f.o.b. Gary	5.45

Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)
(Per Package, 20 x 28 in.)

8-lb. coating I.C.	$11.20
15-lb. coating I.C.	14.00
20-lb. coating I.C.	15.30
25-lb. coating I.C.	$16.70
30-lb. coating I.C.	17.75
40-lb. coating I.C.	19.85

Alloy Steel Bars

(F.o.b. makers' mill)

Alloy Quality Bar Base, 2.65c. to 2.75c. per Lb.

S.A.E. Series Numbers		Alloy Differential
2000	(½% Nickel)	$0.25
2100	(1½% Nickel)	0.55
2300	(3½% Nickel)	1.50
2500	(5% Nickel)	2.25
3100	Nickel Chromium	0.55
3200	Nickel Chromium	1.35
3300	Nickel Chromium	3.80
3400	Nickel Chromium	3.20
4100	Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50
4100	Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600	Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel)	1.05
5100	Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100	Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100	Chromium Spring Steel	0.20
6100	Chromium Vanadium Bars	1.20
6100	Chromium Vanadium Spring Steel	0.95
9250	Silicon Manganese Spring Steel (flats)	0.25
	Rounds and squares	0.50
	Chromium Nickel Vanadium	1.50
	Carbon Vanadium	0.95

Above prices are for hot rolled steel bars, forging quality. The differential for cold-drawn bars is ¾c. a lb. higher, with standard classification for cold-finished alloy steel bars applying. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis.

Billets under 4 x 4 in. carry the steel bar base. Slabs with a sectional area of 16 in. or over carry the billet price. Slabs with sectional area of less than 16 in. or less than 2½ in. thick, regardless of sectional area, take the bar price.

Rails

	Per Gross Ton
Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	36.00
Light (from rail steel), f.o.b. mill	34.00
Light (from billets), f.o.b. Ch'go mill	36.00

Track Equipment

	Base per 100 Lb.
Spikes, ⅝ in. and larger	$2.80
Spikes, ½ in. and smaller	2.80
Spikes, boat and barge	3.00
Tie plate, steel	2.15
Angle bars	$2.75
Track bolts, to steam railroads	$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel Inches	Black	Galv.	*Iron* Inches	Black	Galv.
⅛	45	19½	¼ and ⅜	+11	+36
¼ to ⅝	51	25½	½	23	5
½	56	42½	¾	28	11
¾	60	48½	1 and 1¼	31	15
1 to 3	62	50½	1½ and 2	35	18

Lap Weld

2	55	43½	2	23	9
2½ to 6	59	47½	2½ to 3½	28	13
7 and 8	56	43½	4 to 6	30	17
9 and 10	54	42½	7 and 8	29	16
11 and 12	53	40½	9 to 12	26	11

Butt Weld, extra strong, plain ends

⅛	41	24½	¼ and ⅜	+13	+48
¼ to ⅝	47	30½	½	23	7
½	53	42½	¾	28	12
¾	58	47½	1 to 2	34	18
1 to 1½	60	49½			
2 to 3	61	50½			

Lap Weld, extra strong, plain ends

2	53	42½	½	29	13
2½ to 4	57	46½	2½ to 4	34	20
4½ to 6	56	45½	4½ to 6	33	19
7 to 8	52	39½	7 and 8	31	17
9 and 10	45	32½	9 to 12	21	8
11 and 12	44	31½			

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Steel		*Charcoal Iron*	
2 in. and 2¼ in.	38	1½ in.	1
2½ in.—2¾ in.	46	1¾ in.	8
3 in.	52	2 in.—2¼ in.	13
3¼ in.—3¾ in.	54	2½ in.—2¾ in.	16
4 in.	57	3 in.	17
4½ in. to 6 in.	46	3¼ in. to 3½ in.	18
		4 in.	20
		4½ in.	21

On lots of a carload or more, the above base discounts are subject to a preferential of two fives on steel and of 10 per cent on charcoal iron tubes. Smaller quantities are subject to the following modifications from the base discounts:

Lap Welded Steel—Under 10,000 lb., 6 points under base and one five; 10,000 lb. to carload, 4 points under base and two fives. Charcoal Iron—Under 10,000 lb., 2 points under base; 10,000 lb. to carload, base and one five.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	61	3 in.	46
1¼ to 1½ in.	53	3¼ to 3½ in.	48
1¾ in.	37	4 in.	51
2 to 2¼ in.	32	4½, 5 and 6 in.	40
2½ to 2¾ in.	40		

Hot Rolled

2 and 2¼ in.	38	3¼ to 3½ in.	54
2½ and 2¾ in.	46	4 in.	57
3 in.	52	4½, 5 and 6 in.	46

Beyond the above base discounts a preferential discount of 5 per cent is allowed on carload lots. On less than carloads to 10,000 lb., base discounts are reduced 4 points with 5 per cent preferential; on less than 10,000 lb., base discounts are reduced 6 points, with no preferential. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage take the mechanical tube list and discounts. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30%, base (carloads)	55
Carbon, 0.30% to 0.40% base	50

Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

Buttweld operations are not quite so high, but have not slumped off as much as might be expected at this time of the year. Some oil companies have inquiries out for seamless goods, but are slow to take action on these projects. Shipments of mechanical tubing this month are considerably behind those of October, but boiler tubes have held up.

Cold-Finished Steel Bars.—Business is very quiet, with automotive demand practically negligible, and other consuming lines taking material at a moderate rate. Cold-finished steel makers have low inventories and have been able to keep their stocks of steel in line with finishing mill requirements. The price of 2.20c., Pittsburgh, is not subject to question.

Sheets.—Specifications were heavier last week with most of the larger companies and some new business was taken. A large part of this tonnage came from railroad car builders and farm implement makers. Automobile tonnage showed little improvement. Demand for metal furniture sheets is still fairly good and electrical sheets continue active. Operations are rather spotty, particularly in the Valleys, where only about 40 per cent of the available mills were rolling last week. The figure is slightly higher this week, and the country's leading sheet maker, whose operations were well under 70 per cent last week, has scheduled its mills at a considerably better rate this week. In contrast to this, one large Valley interest is practically idle, and the average for the industry is not above 60 per cent. No marked improvement is expected before the first of the year, but many believe that the low point has about been reached. Prices are still very weak. The leading interest has opened its books for the first quarter on tin mill black plate, reaffirming the present quotation of 3c., Pittsburgh, although the market is still quotable at 2.90c. to 3c. Galvanized sheets are now rather generally being sold at 3.40c., Pittsburgh, although some mills continue to quote 3.50c. Black sheets are holding in this territory at 2.75c., but lower quotations have come out in a few cases. Some makers are being forced to recognize shading on blue annealed sheets and light plates, and the jobbing mill product is now quotable at 2.10c. to 2.20c., Pittsburgh, and 2.25c. to 2.35c. for the No. 10 and No. 13 gage respectively. Even the minimums of these ranges are not effective in taking business against competition of the wide strip mills.

Tin Plate.—The American Sheet & Tin Plate Co. has opened its books for 1930, reaffirming the present price on standard coke tin plate of $5.35 a base box, Pittsburgh. Leading independents generally have taken the same action. The last week brought better specifications, as material for January rolling is expected to be released before the 15th of the second month preceding, and one large maker reported the heaviest specifications for any week since July. Operations have not been stepped up very much, although improvement is assured next month.

Strip Steel.—Leading makers of strip steel have opened their books for the first quarter with prices unchanged at 1.90c. and 2c., Pittsburgh, for hot-rolled material and 2.75c., Pittsburgh or Cleveland, on cold-rolled in carload lots or more. For less than carload lots, the price is 2.85c. In a few cases, makers have had an opportunity to quote on first quarter business, but the great majority of users are showing little interest in their requirements for that time. However, the price announcement has given the market a slightly stronger tone. Specifications are very light, but in a few cases new orders are reported as somewhat better this week. Hot-rolling mills capacity, but cold-rolling units are are engaged at about 40 per cent of not even this busy, and the average for the strip industry as a whole is below 40 per cent.

Coal and Coke.—Furnace coke is weaker, but, in view of the fact that demand is not expected to improve until after the first of the year, curtailment in production is likely in an effort to maintain prices at present levels. The $2.65 to $2.75, Connellsville, quotations now in effect, are said to allow a very small margin of profit. Foundry coke demand is also light, and prices are very weak. Even the premium brands are subject to considerable pressure, but most makers continue to quote $3.85, ovens. Demand for coal is only fair, as the weather is not yet cold enough to stimulate sales of the domestic grades, and industrial consumption is declining in this district.

Old Material. — Further weakness has developed in the scrap market, and, although today's quotations must be considered as only nominal, No. 1 heavy melting steel is quotable at 50c. to $1 a ton less than it was last week. A small tonnage was sold to a local steel company last week at $15.50, while a sale of strictly railroad steel was reported at $16.50. In view of this, the market seems quotable between those figures, with an average of $16 and a net decline of 75c. from last week. However, this figure is so indefinite that it is hard to determine whether a dealer would be willing to sell a large tonnage at this figure, while it is certain that no mill is willing to buy. Hold-ups are in effect at a number of principal consuming points and others are definitely limiting shipments. With no prospect of increase in steel plant operations until at least the first of the year, there is nothing to bring out scrap purchases, and consequently little to bolster the market. Hydraulic compressed sheets are nominally quotable on the same basis as the heavy melting grade, and declines are recognized on nearly all the other items. Specialties have held better than other grades because of the comparatively good operating rates of steel foundries, but the blast furnace grades are off this week as a result of curtailed shipment to principal consuming points.

Warehouse prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.25c.
Hoops	4.25c.
Black sheets (No. 24), 25 or more bundles	3.80c. to 3.90c.
Galv. sheets (No. 24), 25 or more bundles	4.45c. to 4.55c.
Light plates, blue annealed (No. 10), 1 to 24 plates	3.35c. to 3.45c.
Blue annealed sheets (No. 13), 1 to 24 sheets	3.50c. to 3.60c.
Galv. corrug. sheets (No. 28), per square	$4.43
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count,	60 per cent off list
Machine bolts, 100 count,	60 per cent off list
Carriage bolts, 100 count,	60 per cent off list
Nuts, all styles, 100 count,	60 per cent off list
Large rivets, base per 100 lb.	$3.50
Wire, black soft ann'l'd base per 100 lb	$2.90 to 3.00
Wire, galv. soft, base per 100 lb.	2.90 to 3.00
Common wire nails, per keg	2.80 to 2.90
Cement coated nails, per keg	2.95 to 3.05

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$15.50 to $16.50
No. 2 heavy melting steel	13.50 to 14.00
Scrap rails	14.50 to 15.00
Compressed sheet steel	15.50 to 16.00
Bundled sheets, sides and ends	14.00 to 14.50
Cast iron carwheels	14.00 to 14.50
Sheet bar crops, ordinary	17.50 to 18.00
Heavy breakable cast	11.00 to 11.50
No. 2 railroad wrought	15.50 to 16.50
Hvy. steel axle turnings	15.00 to 15.50
Machine shop turnings	10.50 to 11.00
Acid Open-Hearth Grades:	
Railr. knuckles and couplers	19.50 to 20.50
Railr. coil and leaf springs	19.50 to 20.50
Rolled steel wheels	19.50 to 20.50
Low phos. billet and bloom ends	20.50 to 21.00
Low phos., mill plates	20.50 to 21.00
Low phos., light grades	19.50 to 20.50
Low phos., sheet bar crops	20.50 to 21.00
Heavy steel axle turnings	15.00 to 15.50
Electric Furnace Grades:	
Low phos., punchings	18.50 to 19.00
Hvy. steel axle turnings	15.00 to 15.50
Blast Furnace Grades:	
Short shoveling steel turnings	11.00 to 11.50
Short mixed borings and turnings	11.00 to 11.50
Cast iron borings	11.00 to 11.50
Rolling Mill Grades:	
Steel car axles	20.00 to 21.00
Cupola Grades:	
No. 1 cast	14.50 to 15.50
Rails 3 ft. and under	17.50 to 18.50

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and under 10-in., Pittsburgh	$35.00
Rerolling, 4-in. and under 10-in., Youngstown	35.00
Rerolling, 4-in. and under 10-in., Cleveland	35.00
Rerolling, 4-in. and under 10-in., Chicago	37.00
Forging quality, Pittsburgh	40.00

Sheet Bars

(Open Hearth or Bessemer)

	Per Gross Ton
Pittsburgh	$35.00
Youngstown	35.00
Cleveland	35.00

Slabs

(8 in. x 2 in. and under 10 in. x 10 in.)

	Per Gross Ton
Pittsburgh	$35.00
Youngstown	35.00
Cleveland	35.00

Skelp

(F.o.b. Pittsburgh or Youngstown)

	Per Lb.
Grooved	1.85c. to 1.90c.
Universal	1.85c. to 1.90c.
Sheared	1.85c. to 1.90c.

Wire Rods

(Common soft, base)

	Per Gross Ton
Pittsburgh	$40.00
Cleveland	40.00
Chicago	41.00

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.80
Old range non-Bessemer, 51.50% iron	4.65
Mesabi Bessemer, 51.50% iron	4.65
Mesabi non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.40

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algerian	12.00c.
Iron ore, low phos., Swedish, average 68% iron	12.00c.
Iron ore, basic Swedish, average 65% iron	10.00c.
Manganese ore, washed, 52% manganese, from the Caucasus	30.00c.
Manganese ore, Brazilian, African or Indian, basic 50%	30.00c.
Tungsten ore, high grade, per unit, in 60% concentrates	$15.50 to $16.50

	Per Gross Ton
Chrome ore, 45 to 50% Cr_2O_3, crude, c.i.f. Atlantic seaboard	$22.00 to $24.00

	Per Lb.
Molybdenum ore, 85% concentrates of MoS_2, delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$2.65 to $2.75
Foundry, f.o.b. Connellsville prompt	3.75 to 4.75
Foundry, by-product, Ch'go ovens	8.00
Foundry, by-product, New England, del'd	11.00
Foundry, by-product, Newark or Jersey City, delivered	9.00 to 9.40
Foundry, by-product, Phila.	9.00
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry by-prod., del'd St. Louis	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.25 to $1.75
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, ¾-in. f.o.b. Pa. mines	1.90 to 2.00
Mine run gas coal, f.o.b. Pa. mines	1.65 to 1.75
Steam slack, f.o.b. W. Pa. mines	80c. to 90c.
Gas slack, f.o.b. W. Pa. mines	1.00 to 1.10

Ferromanganese

	Per Gross Ton
Domestic, 80%, seaboard	$105.00
Foreign, 80%, Atlantic or Gulf port, duty paid	105.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$31.00 to $34.00
Domestic, 16 to 19%	29.00 to 32.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$83.50
75%	130.00

	Per Gross Ton Furnace		Per Gross Ton Furnace
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	45.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		Per Gross Ton
10%	$30.00	12%	$34.00
11%	32.00		

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		Per Gross Ton
6%	$22.00 to $23.00	10%	$26.00 to $28.00
7%	23.00 to 24.00	11%	28.00 to 30.00
8%	24.00 to 25.00	12%	30.00 to 32.00
9%	25.00 to 26.00		

Other Ferroalloys

Ferrotungsten, per lb. contained metal del'd	$1.40 to $1.50
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.15 to $3.65
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	$160.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton	$91.00
Ferrophosphorus, electric 24%, f.o.b. Anniston, Ala., per gross ton	$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silicon, gravel, f.o.b. Illinois and Kentucky mines	$18.00
No. 2 lump, Illinois and Kentucky mines	20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	$18.25 to 18.75
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines	32.50

Fire Clay Brick

	Per 1000 f.o.b. Works	
	High-Heat Duty Brick	Intermediate Heavy Duty Brick
Pennsylvania	$43.00 to $46.00	$35.00 to $38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	.....
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00
Standard size	45.00

Chrome Brick

	Per Net Ton
Standard size	$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts, blank or tapped, hexagons	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	7.00c. to 6.75c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled thread up to and including ⅛ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagon nuts	70
Semi-finished hexagon castellated nuts, S.A.E.	70
Stove bolts in packages, P'gh	75, 20, 10 and 5
Stove bolts in packages, Chicago	75, 20, 10 and 5
Stove bolts in packages, Cleveland	75, 20, 10 and 5
Stove bolts in bulk, P'gh	75, 20, 10, 5 and 2½
Stove bolts in bulk, Chicago	75, 20, 10, 5 and 2½
Stove bolts in bulk, Cleveland	75, 20, 10, 5 and 2½
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55, 60 per cent apply.

Large Rivets

(½-in. and larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$3.10
F.o.b. Chicago	3.20

Small Rivets

(⅞-in. and smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70 and 10
F.o.b. Cleveland	70 and 10
F.o.b. Chicago	70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10 and 5
Milled standard set screws, case hardened,	80 and 5
Milled headless set screws, cut thread	75 and 10
Upset hex. head cap screws, U.S.S. thread	85
Upset hex. cap screws, S.A.E. thread	85
Upset set screws	80, 10 and 5
Milled studs	70

Chicago

Western Steel Industry Senses a Return of Confidence—Miscellaneous Orders Gain—Rail Tonnage Heavy

CHICAGO, Nov. 19.—Foremost among developments in the Chicago iron and steel market is a clear indication that confidence is returning to business as a whole. A week ago little could be said of specifications and new purchases outside of the needs of railroads and car builders. In the past week this situation has changed and, without taking into account rail business, releases for finished steel have again reached a volume closely matching current ingot output, which stands at 75 per cent of capacity.

New orders are individually small and the pressure for immediate delivery is insistent, giving indication of the condition of stocks in the hands of users. There is also the fact that many buyers, having been too cautious in recent weeks, now find that their supplies of steel are inadequate for immediate needs.

The impulse to speed production is being felt in several industries. Farm implement manufacturers are entering into a higher rate of production on tractors and are putting new schedules in operation for the manufacture of combines. Automobile frame makers are sending in larger specifications for hot-rolled strips, and automobile and parts manufacturers are finding slightly greater needs for alloy steel bars. The award of a new gas line for a California company and releases against line pipe contracts, which were temporarily suspended several weeks ago, are bringing large buyers of plates into the market, and the effect on plate shipments is already noticeable. Specifications for car material are heavy, and there is a growing impression that car shops are preparing to expand output in anticipation that equipment purchases will be in good volume after the turn of the year.

Several large industrial plants, which closed down soon after the collapse in the stock market, have resumed operations on scales ranging from 40 to 60 per cent of capacity.

Bolts, Nuts and Rivets.—Some improvement is noted in specifications from automobile manufacturers. Shipments to car builders, the railroads and farm implement makers are steady.

Ferroalloys.—Several contracts for ferromanganese for future delivery have been closed at $105 a ton, seaboard. Clauses protecting buyers against declines in prices are being attached. It is reported here that contracts for 50 per cent ferrosilicon will not be offered to consumers until late in December. The spiegeleisen market is quiet except for spot orders of small size, which bring $34 a ton, Hazard, Pa.

Prices delivered Chicago: 80 per cent ferromanganese, $112.56; 50 per cent ferrosilicon, $83.50 to $88.50; spiegeleisen, 19 to 21 per cent, $39.76 to $41.76.

Pig Iron.—Shipments of Northern foundry iron about equal the output of merchant stacks, though there has been some redistribution of tonnage in recent days. Iron not being taken by industries adversely affected by business conditions is readily being absorbed by manufacturing plants which have larger orders on hand. Farm implement manufacturers are drawing more heavily against contracts for pig iron, and railroad equipment makers are taking larger shipments. Several orders from automobile plants that until recently were marked for indefinite suspension have been changed to releases for delivery about Dec. 1. A cargo of pig iron has been unloaded at a Chicago dock and another boat-load is expected in a few days. The Southern iron market is quiet, with quotations ranging from $13 to $14 a ton, Birmingham.

Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	$20.00
N'th'n No. 1 fdy., sil. 2.25 to 2.75	20.50
Malleable, not over 2.25 sil.	20.00
High phosphorus	20.00
Lake Super. charcoal, sil. 1.50	27.04
So'th'n No. 2 fdy. (all rail)	$19.01 to 19.51
Low phos., sil. 1 to 2, copper free	29.50
Silvery, sil. 8 per cent	$28.79 to 29.79
Bess. ferrosilicon, 14-15 per cent	46.29

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Sheets.—New business continues to taper, and prices are giving ground. Galvanized sheets are now quotable at 3.50c. to 3.60c. a lb., Gary, and black sheets at 2.85c. Output ranges from 60 to 70 per cent of capacity at local hot mills, and schedules are not complete for a week in advance. A part of the slowing down in demand can be attributed to a customary seasonable lull, but it is also partly the result of extreme caution on the part of many consumers. Stocks in the hands of buyers are small, and mills are being pressed for prompt deliveries on numerous small orders.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 2.90c.; No. 24 galv., 3.55c. to 3.65c.; No. 10 blue ann'l'd, 2.35c. Deliv'd prices at other Western points are equal to the freight from Gary, plus the mill prices, which are 5c. per 100 lb. lower than Chicago delivered prices.

Cast Iron Pipe.—New business and fresh inquiry are very quiet. The outlook, however, is not wholly discouraging in view of the fact that this is usually a dull season and that much work held in abeyance this year is being considered for 1930. On this score, sellers are hopeful that public work will revive near the end of this year. Genoa, Neb., has ordered 180 tons of 8-in. pipe from the Central Foundry Co. Royal Oak, Mich., is in the market for 100 tons of 8-in. pipe.

Prices per net ton, deliv'd Chicago: Water pipe, 6-in. and over, $43.70 to $45.70; 4-in., $47.70 to $49.70; Class A and gas pipe, $3 extra.

Structural Material.—This market remains quiet in the immediate vicinity of Chicago. In outlying centers, especially at Milwaukee, fabricators are comfortably booked. Many sizable projects are talked of for Chicago, but the trade has little expectation that steel prices will be asked before the turn of the year. The Illinois Steel Co.'s expansion program is making steady progress and plans for several buildings are now in the shop. Several public utility projects, including a large power house addition at Waukegan, Ill., are rapidly taking shape. The aggregate tonnage of steel for highway bridges is large and many Western States are planning sizable bridge programs for the coming year. New railroad work is moderately active, but individual requests for prices are for small tonnages, usually about 25 to 75 tons each.

Mill prices on plain material, per lb.: 2.00c. base, Chicago.

Rails and Track Supplies.—New orders for standard-section rails total more than 100,000 tons, the bulk of which will be rolled by Chicago mills. The Rock Island has placed 39,200 tons with the Illinois Steel Co., 11,000 tons with the Colorado company and 6900 tons with the Inland Steel Co. The Illinois Central has ordered 25,000 tons from the Tennessee company, 10,000 tons from Inland and 5000 tons from Illinois. Of the 23,000 tons placed by the Wabash a week ago, about two-thirds will be rolled at Chicago. Chicago producers estimate that for the country as a whole about 1,500,000 tons of rails has been ordered for 1930 programs. It is estimated that somewhat more than 750,000 tons still remains to be placed. The bulk of the

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars	3.00c.
Reinforc'g bars, billet steel	1.90c. to 2.25c.
Reinforc'g bars, rail steel	1.85c. to 2.00c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Bands (¾ in. in Nos. 10 and 12 gages)	3.20c.
Hoops (No. 14 gage and lighter)	3.75c.
Black sheets (No. 24)	4.05c.
Galv. sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.35c.
Spikes, ⅜ in. and larger	3.55c.
Track bolts	4.55c.
Rivets, structural	4.00c.
Rivets, boiler	4.00c.

	Per Cent Off List
Machine bolts	60
Carriage bolts	60
Coach or lag screws	60
Hot-pressed nuts, sq., tap. or blank	60
Hot-pressed nuts, hex., tap or blank	60

No. 8 black ann'l'd wire, per 100 lb.	$3.45
Com. wire nails, base per keg	$2.75 to $2.95
Cement c't'd nails, base per keg	2.75 to 2.95

tonnage normally expected from Western railroads is already on the books of producers, there being miscellaneous lots aggregating about 80,000 tons which may be placed in the next few weeks. Releases against new contracts are larger, and standard-section rail output is now close to 85 per cent of capacity. Demand for light rails is more active, but the bulk of tonnage is for use in anthracite coal fields and orders are being placed with mills to the east of Chicago. Miscellaneous orders for track supplies total 15,000 tons, a large part of which is to accompany shipments of rails on new contracts. Inquiry for these commodities is turning upward, and requests for prices total 25,000 tons.

Prices f.o.b. mill, per gross ton: Standard section open-hearth and Bess. rails, $43; light rails, rolled from billets, $36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.07½c. to 2.15c.; angle bars, 2.75c.

Bars.—Demand for soft steel bars has come back sharply after dragging for several weeks. Specifications for the week are fully equal to shipments, which represent about 75 per cent of local bar mill capacity. Farm implement manufacturers account for a large share of the increase as they step up production on tractors and tillage machinery and start output of combines, which are to be delivered in the early part of the new year. The price of soft steel bars remains steady at 2c. a lb., Chicago. There is a steady use of iron bars by car builders and the railroads, and output is at a good fall rate. The price is well established at 2c. a lb., Chicago. Specifications for alloy steel bars are a trifle heavier, and it is interesting that a fair part of this change is due to larger needs by automobile manufacturers. Output in this district is close to 60 per cent of capacity. Shipments of rail steel bars are lighter, as barn equipment manufacturers come to the end of their busy season. Output has been adjusted downward by shortening hours rather than a change from the practice of double turn operation. Demand for fence posts is seasonably dull.

Hot-Rolled Strips.—Quotations in this market are on the basis of 2c. a lb., Chicago, for strips wider than 6 in., and 2.10c. for strips 6 in. and narrower. Demand from most users remains at the low level of recent weeks, but encouragement comes from manufacturers of automobile frames, which now are making schedules for increased deliveries in December.

Cold-Rolled Strips.—Prices in this district remain on the basis of 2.75c. a lb., Cleveland, or 3.05c., delivered Chicago. Interest on the part of consumers is lacking and output is low.

Wire Products.—Changes in this market in the past week have been confined to slight shifts of demand from one commodity to another, with the aggregate tonnage of all wire products remaining practically unchanged. New orders from the jobbers are spotty, some sections of the country showing increases while in other sections needs are lighter. Producers are looking for smaller shipments to distributers as the inventory period approaches. No change is reported in the rate of consumption by the manufacturing trade. Prices for plain wire remain steady at 2.45c. a lb. The slow pace of the building industry is reflected in light demand for nails. Producers are attempting to hold local prices at $2.45 a 100-lb. keg and are meeting with success in the absence of large orders such as would give satisfactory tests of prices. Wire mill output is holding in the range of 55 to 60 per cent of capacity.

Plates. — Increased specifications from car builders reflect, according to sellers of plates, the thought that car building programs will be put through without hesitation and that car builders are anticipating a substantial rate of operations in the first part of the new year. Tank building programs are less active than in October. One new inquiry from the Southwest is for 2500 tons and one order from that territory is for 400 tons. Old projects that at this time are dormant afford the only indication of what oil producers have in mind in the way of new construction if business conditions warrant expansion of facilities. The Milwaukee pipe manufacturer is reported to have taken a contract for a round tonnage of gas pipe for a Pacific Coast company. This tonnage, which is for immediate shipment, and releases against old contracts are serving to stimulate the local plate market. Although production of most sizes of plates is not at the rate of early October, the outlook for this commodity, for oil field and car use especially, is promising. Prices at Chicago are steady at 2c. a lb.

Reinforcing Bars.—New orders for reinforcing bars are scarce, and shop backlogs have been reduced to the point where within a week or 10 days output will of necessity be reduced. The total volume of quotations up for consideration is impressive, but there is no indication that contracts will be placed in satisfactory volume in the near future. An encouraging feature of the market is that recent lettings of small tonnages reflect a strengthening in prices, in some cases as much as $2 a ton. However, tests on attractive business are lacking, and therefore it cannot be assumed the general price level is above that of a week ago. The only award of note this week is for 450 tons for buildings at Illinois State institutions.

Coke.—Contracting for 1930 is under way at $8 a ton, f.o.b. local ovens. Delivered price in Chicago for by-product foundry coke is $8.75 a ton. Shipments are at the rate of local oven capacity.

Old Material.—Prices continue to sag as demand wanes and those who have accumulated scrap try to place it in the market. Close to 10,000 tons of heavy melting steel has been taken by a local mill at $13.50 a gross ton, delivered, a reduction of 25c. a ton since the last large sale to a consumer. Brokers are being offered tonnages freely at 50c. to 75c. a ton below this figure. It is rather commonly believed that most large consumers have comfortable stocks on hand and that restricted shipments closely represent current needs as buyers unload from cars to furnaces. Although some in the trade look to winter weather to check the flow of new scrap and tend to steady the market, there are many who look for light trading throughout the remainder of the year and for lower prices. Some resistance to low prices has developed among producers of scrap who threaten to accumulate this commodity rather than sell it at prevailing quotations. On the other hand, many yard dealers, both local and in the country, are trying to press sales rather than let their yards freeze in for the winter or operate at high cost in cold weather.

Prices deliv'd Chicago district consumers:

Per Gross Ton

Basic Open-Hearth Grades:	
Heavy melting steel	$13.00 to $13.50
Shoveling steel	13.00 to 13.50
Frogs, switches and guards, cut apart, and misc. rails	13.50 to 14.00
Hydraul. compressed sheets	11.25 to 11.75
Drop forge flashings	10.75 to 11.25
No. 1 busheling	11.50 to 12.00
Forg'd cast and r'l'd steel carwheels	17.75 to 18.25
Railroad tires, charg. box size	18.00 to 18.50
Railroad leaf springs cut apart	18.00 to 18.50
Acid Open-Hearth Grades:	
Steel couplers and knuckles	16.50 to 17.00
Coil springs	19.00 to 19.50
Electric Furnace Grades:	
Axle turnings	12.75 to 13.25
Low phos. punchings	15.25 to 15.75
Low phos. plates, 12 in. and under	15.25 to 15.75
Blast Furnace Grades:	
Axle turnings	11.50 to 12.00
Cast iron borings	9.25 to 9.75
Short shoveling turnings	9.50 to 10.00
Machine shop turnings	7.00 to 7.50
Rolling Mill Grades:	
Iron rails	14.50 to 15.00
Rerolling rails	15.50 to 16.00
Cupola Grades:	
Steel rails less than 3 ft.	16.50 to 17.50
Steel rails less than 2 ft.	18.50 to 19.00
Angle bars, steel	16.25 to 16.75
Cast iron carwheels	14.00 to 14.50
Malleable Grades:	
Railroad	16.50 to 17.00
Agricultural	14.50 to 15.00
Miscellaneous:	
*Relaying rails, 56 to 60 lb.	23.00 to 25.00
*Relaying rails, 65 lb. and heav.	26.00 to 31.00

Per Net Ton

Rolling Mill Grades:	
Iron angle and splice bars	15.00 to 15.50
Iron arch bars and transoms	17.50 to 18.00
Iron car axles	25.50 to 26.00
Steel car axles	16.00 to 16.50
No. 1 railroad wrought	12.25 to 12.75
No. 2 railroad wrought	11.50 to 12.00
No. 1 busheling	9.00 to 9.50
No. 2 busheling	7.00 to 7.50
Locomotive tires, smooth	14.50 to 15.00
Pipes and flues	9.50 to 10.00
Cupola Grades:	
No. 1 machinery cast	13.50 to 14.00
No. 1 railroad cast	12.50 to 13.00
No. 1 agricultural cast	12.00 to 12.50
Stove plate	11.75 to 12.25
Grate bars	11.25 to 11.75
Brake shoes	10.25 to 10.75

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

New York

Structural Steel Lettings in District 18,000 Tons—Prices Weaker—Pig Iron Buying Light

NEW YORK, Nov. 19.—Pig iron buying is exceedingly light, amounting to only 3000 tons for the week, but sentiment in the trade has improved. Suspensions of shipments have been negligible and in the past few days pressure for deliveries has increased, suggesting that foundries are getting over the effects of the stock market scare. Melters have very little iron on their yards, but they are not disposed to buy ahead. Business pending before the trade does not exceed 3000 tons, which is largely accounted for by two inquiries. The Worthington Pump & Machinery Corporation is in the market for 365 tons of Bessemer and 650 tons of malleable or No. 1X for its Harrison, N. J., plant for deliveries extending from December into the first quarter, and the New York Air Brake Co. wants 400 tons of malleable and 250 tons of foundry for shipment over a similar period to its Watertown, N. Y., works. Stocks on blast furnace yards are still relatively low, and at least one important merchant interest plans to blow out capacity if melt shows material curtailment. Prices, however, are showing the strain of a quiet market. On Buffalo foundry iron, $17.50, base furnace, is a general quotation and remains to be tested on an attractive tonnage. Eastern Pennsylvania foundry iron is more readily available at $18.50, base furnace, and this price was shaded in one important recent transaction. Prices on Alabama iron are uncertain in view of its inactivity in this market. However, Buffalo furnaces are prepared to meet a renewal of Southern competition, having accumulated stocks of barge-borne iron at New Jersey ports. Barge iron is still moving on the State canal, but the season of navigation will close in a week or two.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	$22.41
*Buf. No. 2, del'd east. N. J.	20.78
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	$19.89 to 21.02
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	20.39 to 21.52

Freight rates: $4.91 from Buffalo, $1.39 to $2.52 from eastern Pennsylvania.

*Prices delivered to New Jersey cities having rate of $3.28 a ton from Buffalo.

Finished Steel.—Although some local steel sales offices find encouragement in the fact that orders in the past week have been slightly better than in the preceding week, other offices have suffered a loss in business. On the whole, the volume is probably no less, but gains in one direction are offset by a slowing up in others. Business in bars, sheets and strip is noticeably light, but in structural shapes and plates it is fairly good, while the past week has brought a fairly substantial tonnage in tin plate on contract, following the reaffirmation of the current price of $5.35 a base box. Price developments otherwise are toward weakness. The structural steel market locally is subject to keener competition, and quotations on plain material are lower. The usual range is 2.04½c. to 2.14½c. a lb., delivered, New York, but the bottom price has been shaded on large jobs. The maximum price, obtainable only on ordinary lots, is usually 2.14½c. While all of the larger producers of soft steel bars are maintaining a quotation of 1.90c., Pittsburgh, some outside competition has developed at prices which figure back to 1.85c., Pittsburgh. Blue annealed sheets have definitely settled to 2.25c., Pittsburgh, for No. 13 gage and to 2.10c. for No. 10 gage. Some jobbing mills are now recognizing these prices on desirable orders, though $1 or $2 higher is frequently quoted on small lots. Railroad equipment and building construction still offer the most encouraging prospects for nearby bookings of tonnage lots. Structural steel lettings in the New York district during the week, at 18,000 tons, compared favorably with those of any recent week. The largest award, 12,300 tons, for a subway section in Brooklyn, went to the American Bridge Co. Although a fair amount of structural work is pending, some projects now on the architects' boards are not being put out for bids until the industrial situation and the mortgage money market have become clarified. The railroad equipment market is stimulated by the expectation that the Chesapeake & Ohio and the Pere Marquette railroads will shortly come into the market for 10,000 cars and the probability that the New York Central will announce a program calling for the purchase of about 15,000 cars for 1930 delivery. Following the conference of railroad executives with President Hoover on Tuesday and the meeting of the American Railway Association in Chicago on Friday, it is expected that the equipment purchasing programs of the railroads will be accelerated. In addition to about 15,000 cars now pending, it is expected that inquiries will soon come into the market for 40,000 to 50,000.

Mill prices per lb., deliv'd New York: Soft steel bars, 2.24c.; plates, 2.17½c. to 2.22½c.; structural shapes, 2.04½c. to 2.14½c.; bar iron, 2.14c.

Cast Iron Pipe.—The usual buying at this season of gas pipe for spring delivery has not yet developed, and municipal business continues light. The Federal Water Service Corporation, New York, is in the market for about 300 tons of water pipe for Girard, Ohio, and 500 tons for Salem, Ore. Prices continue irregular, ranging from $31 to $34 a ton, f.o.b. foundry. Northern producers are still fairly well engaged on large sizes of pipe, but Birmingham foundries are at low operating rates and are in need of business, as stocks on their yards are increasing.

Prices per net ton deliv'd New York: Water pipe, 6-in. and larger, $34.60 to $36.60; 4-in. and 5-in., $37.60 to $39.60; 3-in., $44.60 to $46.60. Class A and gas pipe $3 extra.

Warehouse Business.—Cold-finished shafting and screw stock has been reduced by jobbers $2 a ton to 3.50c. a lb. for rounds and hexagons and 4c. a

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.30c.
Soft steel bars, small shapes	3.25c.
Iron bars	3.24c.
Iron bars, Swed. charcoal	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons	3.50c.
Flats and squares	4.00c.
Cold-roll. strip, soft and quarter hard	5.15c. to 5.40c.
Hoops	4.25c.
Bands	3.75c.
Blue ann'l'd sheets (No. 10)	3.50c. to 3.90c.
Long terne sheets (No. 24)	5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galv. annealed	5.15c.
Tire steel, ½ x ½ in. and larger	3.40c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.75c.
Open-hearth spring steel, bases,	4.50c. to 7.00c.

	Per Cent Off List
Machine bolts, cut threads:	
¾ x 6 in. and smaller	60
1 x 30 in. and smaller	50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	60
¾ x 20 in. and smaller	50 to 50 and 10
Coach screws:	
½ x 6 in. and smaller	60
1 x 6 in. and smaller	50 to 50 and 10

Boiler Tubes—	Per 100 Ft.
Lap welded, 2-in.	$17.33
Seamless steel, 2-in.	20.24
Charcoal iron, 2-in.	25.00
Charcoal iron, 4-in.	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
½-in. butt	46	29
¾-in. butt	51	37
1-3-in. butt	53	39
2½-6-in. lap	48	35
7 and 8-in. lap	44	17
11 and 12-in. lap	37	12
Wrought Iron—		
½-in. butt	5	+19
¾-in. butt	11	+ 9
1-1½-in. butt	14	+ 6
2-in. lap	5	+14
3-6-in. lap	11	+ 6
7-12-in. lap	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box	$6.45	$6.20
Charcoal, per Box—	A	AAA
IC	$9.70	$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating	$10.00 to $11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets, Box Annealed—Black, C. R. One Pass

	Per Lb.
Nos. 18 to 20	3.70c.
No. 22	3.85c.
No. 24	3.90c.
No. 26	4.00c.
No. 28*	4.15c.
No. 30	4.40c.

Sheets, Galvanized

	Per Lb.
No. 14	4.15c.
No. 16	4.00c.
No. 18	4.15c.
No. 20	4.25c.
No. 22	4.35c.
No. 24	4.50c.
No. 26	4.75c.
No. 28*	5.00c.
No. 30	5.40c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

lb. for flats and squares. Effective Nov. 15, black sheets have been reduced $2 a ton to 3.90c. a lb., base, and galvanized sheets $5 a ton to 4.50c. a lb., base. Orders continue in good volume, but are individually small, so that the month is not expected to prove so satisfactory as October.

Coke.—Producers of beehive foundry coke have opened their books for first quarter and first half contracts. The price is unchanged at $4.85 a net ton, ovens, for special brands, or $8.56, delivered to northern New Jersay, Jersey City and Newark, and $9.44 to New York and Brooklyn. Standard furnace coke is quiet, with the usual quotation $2.75 a net ton, Connellsville, but distress carloads are occasionally going at $2.65 to $2.70 a ton. By-product foundry coke is quoted at $9 to $9.40 a net ton, Newark or Jersey City, and $10.06, New York or Brooklyn.

Reinforcing Bars.—The volume of small-lot buying has diminished somewhat in the past week, largely on account of seasonal conditions. Although sales are falling considerably behind those of October, they are about on a par with those in November of last year. Prices are fairly steady at 2.05c., New York.

Old Material.—Consumer buying of scrap continues limited. Brokers with contracts report a good supply of old material at present buying prices. No. 1 heavy melting steel is quoted at $14.50 a ton, delivered eastern Pennsylvania. The buying price of No. 2 heavy melting steel, delivered to Phoenixville or Harrisburg, Pa., has been reduced to $12.50 a ton, a decline of 50c. The consumer of No. 2 automobile steel at Pencoyd, Pa., has placed some small tonnages with brokers at $13.75 a ton, delivered. Steel car axles have declined $1 a ton on the basis of a recent sale at $20 a ton, delivered, on a freight rate of $3.78 a ton, the broker offering $15.75 a ton, delivered, to fill the order.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel	$11.00 to $11.85
Heavy melting steel (yard)	8.00 to 9.00
No. 1 hvy. breakable cast.	10.25 to 11.00
Stove plate (steel works).	8.00
Locomotive grate bars....	8.25
Machine shop turnings....	7.00 to 7.50
Short shoveling turnings..	7.25 to 7.50
Cast borings (blast fur. or steel works).....	7.00 to 7.50
Mixed borings and turnings	6.75 to 7.50
Steel car axles.....	15.75 to 16.75
Iron car axles.....	22.00 to 22.50
Iron and steel pipe (1 in. dia., not under 2 ft. long)	9.75
Forge fire	8.50 to 9.00
No. 1 railroad wrought...	12.00 to 12.50
No. 1 yard wrought, long..	11.00 to 11.50
Rails for rolling.....	12.00 to 12.50
Stove plate (foundry)....	8.25 to 9.00
Malleable cast (railroad).	13.50 to 14.00
Cast borings (chemical)..	9.00 to 9.50

Prices per gross ton, deliv'd local foundries:

No. 1 machry. cast.....	$15.50 to $16.00
No. 1 hvy. cast (columns, bldg. materials, etc.), cupola size	13.50 to 14.00
No. 2 cast (radiators, cast boilers, etc.)	13.00 to 13.50

Cleveland

Automobile Industry Curtails Further But Ford Is Expected to Release Orders Soon for New Program

CLEVELAND, Nov. 19.—A further curtailment of the automotive industry is in prospect as two or three motor car manufacturers in Detroit are scheduled to close down Nov. 23 for inventory. The Ford Motor Car Co. has sharply curtailed operations preparatory to starting on its new models, and has cut off shipments from some of its parts makers and automobile body plants. However, it is understood that the Ford company plans to get under production on its new cars as quickly as possible and will shortly release some good-sized orders for sheets and other mill products. Two or three of the Detroit automobile plants making higher-priced cars are under good production on new models. However, the industry as a whole is not expected to show much of a pick-up until after the automobile shows.

Building work is light, but lower interest rates are expected to stimulate activity. The first inquiry for steel for the Cincinnati Union Terminals project has come into the market. It is stated that this development will require 40,000 tons of steel.

The volume of business in finished steel continues very light. There has been a further reduction in operations by some of the finishing mills that are particularly affected by the lack of a demand by the automotive industry and a rather sharp curtailment in ingot production in this territory. While a few sheet mills increased operations this week, the aggregate output by sheet and strip mills has been further reduced. Some new business in steel bars, plates and structural shapes was placed by consumers whose stocks have become depleted. However, buying is of a cautious character for early shipment.

While business in most lines outside the automotive industry has slowed down, it is still fair, and orders entered by some of the mills making the heavier rolled products have been as good so far this month as during the corresponding period of October. Agricultural implement manufacturers continue to operate well.

Present prices on black and automobile body sheets and hot and cold-rolled strip steel have been reaffirmed by some of the mills for the first quarter.

Scrap prices are weak and shipments have been quite generally suspended by Cleveland and Valley district mills. The last cargo of boat scrap to be sent from Detroit to Cleveland this season was shipped during the week.

Pig Iron.—A few small-lot sales of foundry iron for the first quarter totaling 1000 tons were sold by one Lake furnace interest during the week at the current prices. The market continues rather quiet, buying for the most part being of a hand-to-mouth character. Sales by Cleveland interests during the week aggregated 10,500 tons. These included a cargo of boat iron for shipment to Chicago before the close of the season of navigation. Shipments during the first half of November were about the same as in the corresponding period of October, but a falling off is looked for during the remainder of the month. While a few foundries in the automotive industry are taking a little more iron than last month, the total shipments to that industry show no gain. There has been some further slowing down of operations by jobbing foundries in the northern Ohio territory. Prices are unchanged at $18.50, Cleveland, for out-of-town shipment and $19, furnace, for local delivery. New weakness has developed in Southern iron, which is now being offered at $13.50 to $14, Birmingham, and these prices are being named for first quarter delivery.

Prices per gross ton at Cleveland:

N'th'n fdy., sil. 1.75 to 2.25	$19.50
S'th'n fdy., sil. 1.75 to 2.25	$19.50 to 20.50
Malleable	19.50
Ohio silvery, 8 per cent...	28.00
Basic Valley furnace.....	18.50
Stand. low phos., Valley..	26.50 to 27.00

Prices except on basic and low phosphorus are delivered Cleveland. Freight rates: 50c. from local furnaces; $3 from Jackson, Ohio; $6 from Birmingham.

Semi-Finished Steel.—A local mill was given a 1000-ton release of slabs during the week, but aside from this spurt specifications continue light. The leading local producer is still operating eight of its 14 open-hearth furnaces, but is running from hand to mouth. There is no new inquiry. Shipments are being made against contracts at the quoted prices.

Strip Steel.—A Cleveland mill has opened its books for the first quarter at the current prices of 1.90c., Pittsburgh, for hot-rolled wide strip and 2c. for narrow, and 2.75c., Cleveland and Pittsburgh, for cold-rolled strip and 4.25c. for fender stock. A few inquiries have come out for that delivery from consumers in the automotive field that evidently are planning to line up their requirements with a

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and struc. shapes.....	3.00c.
Soft steel bars.....	3.00c.
Reinforc. steel bars.....	2.25c. to 2.50c.
Cold-fin. rounds and hex.....	3.65c.
Cold-fin. flats and sq.....	4.15c.
Hoops and bands, No. 12 to ¼ in., inclusive	3.25c.
Hoops and bands, No. 13 and lighter	3.65c.
Cold-finished strip	*5.95c.
Black sheets (No. 24).....	3.70c. to 3.90c.
Galvanized sheets (No. 24).	4.60c. to 4.75c.
Blue ann'l'd sheets (No. 10).....	3.25c.
No. 9 ann'l'd wire, per 100 lb.....	$2.65
No. 9 galv. wire, per 100 lb.....	3.00
Com. wire nails, base per keg.....	2.65

*Net base, including boxing and cutting to length.

view of getting under production on new models in January. Current orders continue very light, and the tendency in mill operations was downward during the week. Although all mills are in need of business, there seems to be little disposition to shade regular quotations.

Bars, Plates and Shapes.—Structural shapes are in fair demand, largely from small fabricating shops that are well filled with work. The largest local award during the week was 800 tons for a building for the Grasselli Chemical Co. The assembly plant for the Ford Motor Co. at Edgewater, N. J., requiring 6500 tons, was placed in Detroit. Plates are not moving so well as recently, but small-lot inquiry has improved. Bars are dull and local mills need orders. Weakness is still in evidence in the local bar market, with quotations of 1.85c., Cleveland, or lower. However, outside mills generally are holding to 1.90c., Cleveland. Structural shapes and plates are firm at 1.90c., Pittsburgh, with small lots bringing 1.95c. The higher price is being well maintained on boiler plates.

Sheets.—Present regular quotations of 2.75c. on black and 4c. on auto body sheets have been reaffirmed for the first quarter by two or three mills. While conditions do not indicate any urgency in placing contracts, some consumers in the automotive field have shown interest in what the prices will be for the quarter and some business in auto body sheets for January shipment will probably be placed within the next two weeks. Current demand continues very dull. While a few fair-sized releases came from the automotive industry during the week, enabling a few mills to increase operations, aggregate orders from this industry are still very light. Demand from other consumers has slowed down and is confined to small lots. The market is weak. A local inquiry for 1500 tons of black sheets in various finishes and metal furniture sheets for electric refrigerators brought out rather sharp concessions and only 280 tons was placed. On blue annealed sheets, prices of 2.10c., Pittsburgh, for No. 10 and 2.25c. for No. 13 have become rather common. On black sheets, 2.75c. seems to be holding on most small lots. Galvanized sheets range from 3.40c. to 3.50c., the lower price having become more general. Metal furniture sheets appear to have settled to 4c., and it is reported that this price has been shaded.

Wire Products.—Nails are moving slightly better than recently. The price situation is regarded as somewhat improved, the $2.40 per keg price to jobbers now being maintained in this territory. Bolt wire is in light demand because of the inactivity of the automotive industry. Wire prices are well maintained.

Warehouse Business. — Jobbers' sales have shown a rather steady decline this month in practically all products, business having been affected both by the slowing down of manufacturing industries and by the ability of buyers to secure prompt mill shipments. Prices are firm.

Coke.—Domestic coke is moving only moderately well, as weather conditions have not stimulated consumer demand. The market lacks firmness and one Valley producer which recently advanced to $5.25 for the egg size has reduced its price to $5. Connellsville heating coke ranges from $2.75 to $3. Foundry coke is quiet and prices are unchanged. Ohio by-product foundry coke is quoted at $8.25, ovens.

Old Material.—In the absence of any demand to support the market, prices here declined 50c. a ton or more on heavy melting steel, compressed sheet steel, machine shop turnings and blast furnace grades. The market has a weak tone and there is considerable uncertainty as to what prices would be quoted should an inquiry come out of sufficient size to furnish a test. Shipments to local mills are still suspended, with the exception of a small quantity that is being taken by one consumer, and shipments have been held up in the Valley district. Most consumers have large stocks.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$14.00 to $14.50
No. 2 heavy melting steel	13.50 to 13.75
Compressed sheet steel	14.00 to 14.50
Light bundled sheet stampings	12.00 to 12.50
Drop forge flashings	12.00 to 12.50
Machine shop turnings	9.00 to 9.75
Short shoveling turnings	11.50 to 12.00
No. 1 railroad wrought	13.50 to 14.00
No. 2 railroad wrought	16.00 to 16.50
No. 1 busheling	13.25 to 13.75
Pipes and flues	9.00 to 9.50
Steel axle turnings	12.50 to 13.00
Acid Open-Hearth Grades:	
Low phos., forging crops	17.75 to 18.00
Low phos., billet, bloom and slab crops	18.50 to 18.75
Low phos., sheet bar crops	18.00 to 18.50
Low phos., plate scrap	18.00 to 18.50
Blast Furnace Grades:	
Cast iron borings	10.00 to 10.50
Mixed borings and short turnings	10.00 to 10.50
No. 2 busheling	10.00 to 10.50
Cupola Grades:	
No. 1 cast	17.00 to 17.50
Railroad grate bars	11.00 to 12.00
Stove plate	12.00 to 12.50
Rails under 3 ft.	18.50 to 19.50
Miscellaneous:	
Railroad malleable	18.00 to 18.50
Rails for rolling	16.25 to 16.50

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.70c.
Plates, ⅜-in.	2.90c.
Structural shapes	2.70c.
Soft steel bars, small shapes, iron bars (except bands)	2.80c.
Round-edge iron	3.50c.
Round-edge steel, iron finished 1½ x 1½ in.	3.50c.
Round-edge steel planished	4.30c.
Reinforc. steel bars, sq., twisted and deform.	2.60c. to 2.80c.
Cold-fin. steel, rounds and hex.	3.50c.
Cold-fin. steel, sq. and flats	4.00c.
Steel hoops	3.55c.
Steel bands, No. 12 to ⅜-in. inclus.	3.30c.
Spring steel	5.00c.
*Black sheets (No. 24)	3.90c.
†Galvanized sheets (No. 24)	4.65c.
Light plates, blue annealed (No. 10)	3.25c.
Blue ann'l'd sheets (No. 13)	3.40c.
Diam. pat. floor plates—	
¼-in.	5.30c.
⅜-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

*For 50 bundles or more; 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.
†For 50 bundles or more; 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

Philadelphia

Steel Orders Small and Prices Lack Firmness—Boston & Maine Places Rails—Scrap Weak

PHILADELPHIA, Nov. 19.—The cautious attitude of buyers following the recent decline in the stock market is apparently relaxing and steel mills are beginning to receive some inquiries for early requirements. Actual business, however, is confined to small orders, fairly well distributed in the various consuming fields. Steel prices still lack firmness, and sellers are inclined to grant concessions on desirable tonnages of plates, shapes or sheets.

Shipyards look forward to continued active operation, with a number of ocean ships in prospect from the award of Government mail-carrying contracts.

The Boston & Maine Railroad has placed 10,000 tons of 100 and 130-lb. rails for next year's requirements with the Bethlehem Steel Co.

Pig Iron.—Current buying is almost entirely of carload lots of foundry iron, on which the current price range of $20.50 to $21 a ton, furnace, is fairly well maintained. Railroads are prominent among the consumers at present inquiring for small lots of iron. The Baltimore & Ohio is in the market for 300 tons of foundry grade and a carload of charcoal iron, the Norfolk & Western for a carload of low phosphorus, the Southern Railway and the Delaware, Lackawanna & Western for a carload each of foundry iron. Foundry melt in this district is small, especially among cast iron pipe foundries, but stocks of iron on consumers' yards are not large. Basic iron is inactive, with a Claymont, Del., consumer still testing the market before issuing a formal inquiry. Demand for low phosphorus is limited to occasional carload lots.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil.	$21.26 to $21.76
East. Pa. No. 2X, 2.25 to 2.75 sil.	21.76 to 22.26
East. Pa. No. 1X	22.26 to 22.76
Basic (del'd east. Pa.)	19.75 to 20.25
Gray forge	20.00 to 20.50
Malleable	21.25 to 21.75
Stand. low phos. (f.o.b. N. Y. State furnace)	22.00 to 23.00
Cop. br'g low phos. (f.o.b. furnace)	23.50 to 24.00
Va. No. 2 plain, 1.75 to 2.25 sil.	22.29
Va. No. 2X, 2.25 to 2.75 sil.	22.79

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces; $4.54 from Virginia furnaces.

Reinforcing Bars.—Projects requiring reinforced concrete have begun to decrease, but there is still some pending business in this district, calling for small lots of bars, including a vehicular underpass in Camden, N. J., for the Delaware River bridge, and a bulkhead on the Schuylkill River being built jointly by the Pennsylvania Railroad and the city of Philadelphia. Prices are unchanged, with billet steel bars quoted at 1.95c. to 2c. a lb., Pittsburgh, or 2.27c. to 2.32c., delivered Philadelphia, and the extra for cutting to length usually waived. Rail steel bars are quoted at 1.85c. to 1.95c., Franklin, Pa., and Tonawanda, N. Y., or 2.17c. to 2.27c., delivered Philadelphia, with no extra for cutting to length.

Shapes.—Fabricating shops are well occupied, but are bidding on a smaller volume of new business. Recent bids on fabricated and erected material have been keenly competitive, and the smaller shops say that the present level leaves them little or no profit. Shape mills continue to maintain a fair rate of operation, but prices are lacking in firmness at 1.90c. to 1.95c. a lb., f.o.b. nearest mill to consumer, or 1.96c. to 2.01c., delivered Philadelphia.

Plates.—Shipyards, boiler shops, car and tank builders have provided a substantial part of the tonnage on mill books and, with a number of shipbuilding contracts still to be placed, continued buying is expected from this source. Bids on two ships of the Leviathan type for the United States Lines have been postponed from Nov. 15. A total of about 20,000 tons of plates and shapes will be required by the shipbuilder receiving this contract. The Export Steamship Co., which recently awarded four ships, is contemplating the construction of two more. Prices of plates range from 2c. to 2.05c., Coatesville, Pa., or 2.10c. to 2.15c., delivered Philadelphia. The minimum quotation is applied by most sellers to the larger orders and, as a considerable part of present buying is limited to small lots and miscellaneous specifications, 2.05c., Coatesville, is quoted.

Sheets.—A local automobile body builder has closed for a fair tonnage of high finished and blue annealed sheets, and a radio manufacturer has bought small lots of sheets in excess of estimated requirements to manufacture additional radio sets. On the basis of recent sales of blue annealed sheets, 2.35c., Pittsburgh, or 2.67c., delivered Philadelphia, for No. 13 gage applies only on small, miscellaneous specifications. Preferred buyers, such as automobile manufacturers, are usually quoted $2 to $4 a ton lower. No. 10 gage blue annealed plates are quoted at 2.20c., Pittsburgh, or 2.52c., delivered Philadelphia, with reductions of $2 a ton and more to preferred buyers. Black sheets are quoted at 2.75c. a lb., Pittsburgh, or 3.07c., delivered Philadelphia, but certain preferred buyers claim to have bought at a concession from this price. Galvanized sheets continue at 3.40c., Pittsburgh, or 3.72c., delivered Philadelphia.

Imports.—In the week ended Nov. 16, 10,674 tons of chrome ore arrived at this port, of which 5000 tons was from Portuguese Africa, 4824 tons from Cuba and 850 tons from Greece. Steel imports consisted of 99 tons of steel bands from France and 10 tons from Belgium, 81 tons of steel bars from Belgium, 29 tons of hoop steel from the United Kingdom, 311 tons of structural shapes from Belgium and 38 tons from Germany, 7 tons of steel scrap from the United Kingdom and 4 tons from Germany.

Old Material.—Consumer buying is limited, and the tendency of prices on all grades is downward. Brokers report no difficulty in securing sufficient material to fill current contracts and are unable to interest consumers in further purchases, as many are maintaining a low inventory of materials on their yards.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel.	$15.00 to	$15.50
Scrap T rails	14.50 to	15.00
No. 2 heavy melting steel.	12.50 to	13.75
No. 1 railroad wrought	16.00 to	16.50
Bundled sheets (for steel works)		11.50
Hydraulic compressed, new	14.50 to	15.00
Hydraulic compressed, old.	12.00 to	12.50
Machine shop turnings (for steel works)		11.50
Heavy axle turnings (or equiv.)	14.00 to	14.50
Cast borings (for steel works and roll. mill)	11.00 to	11.50
Heavy breakable cast (for steel works)		14.50
Railroad grate bars	12.00 to	12.50
Stove plate (for steel works)		12.00
No. 1 low phos., hvy., 0.04% and under	21.00 to	22.00
Couplers and knuckles	19.50 to	20.50
Rolled steel wheels	19.50 to	20.50
No. 1 blast f'nace scrap	10.50 to	11.00
Wrot. iron and soft steel pipes and tubes (new specific.)		14.00
Shafting	19.00 to	19.50
Steel axles	21.00 to	22.00
No. 1 forge fire	13.50 to	14.00
Cast iron carwheels	15.50 to	16.00
No. 1 cast	16.00 to	16.50
Cast borings (for chem. plant)		14.50
Steel rails for rolling	16.50 to	17.00

Further Reduction in Wholesale Prices

October wholesale prices are reported by the United States Bureau of Labor Statistics at 96.3 compared with 97.5 in September, and with 97.8 a year ago. There has been a steady and accelerating decline for several months. Sharpest among the declines in October compared with September were those for farm products and foods.

Metals and metal products dropped from 104.1 to 103.6 between September and October, but both figures are well above the 101 of October, 1928. The reduction was participated in by the iron and steel component, nonferrous metals, agricultural implements and automobiles, but the item "other metal products" showed a fractional rise. Only in agricultural implements were the drops more than fractional. Among building materials, however, the item of structural steel dropped from 99.6 in September to 97 in October, both being compared with 94.5 last year.

J. W. Brainard Steel Co. Plans $300,000 Expansion

E. Theodore Sproull, president, J. W. Brainard Steel Co., Warren, Ohio, manufacturer of cold-rolled strip steel, galvanized strips and hoops, announces a program of expansion involving expenditure of $300,000. Two new buildings are to be added, on which work is to be started at once, while a new office building is to be erected in the spring. On May 23, 1929, Mr. Sproull and associates took over the Brainard company. He was at one time general sales manager of the Trumbull Steel Co., and later was vice-president of the National Association of Flat-Rolled Steel Manufacturers.

Factory Wages Highest Ever Recorded

Average weekly earnings in representative New York State factories in September are reported by the State Industrial Commissioner at $30.47, including all employees in both office and shop. This is the highest monthly figure ever recorded, replacing the previous record of $30.35 made last month.

The new figure compares with $30.09 last August and with $29.72 in September, 1928. Until last December no month had ever shown as high as $30.

Motor Car Output Still Declining

Automobile manufacturers will probably continue their curtailing of production for the remainder of the year and some of them now look for the resumption of activity along about the end of February, says *Automotive Industries*.

The level of operations thus far in November appears to be well under the October level. It is extremely difficult to make any estimates of November production at this time, but any guess exceeding 200,000 for the total of the industry might well be considered beyond conservatism. In November of last year factories of the United States and Canada turned out about 268,909.

Stock Sizes of Sheet Steel Have Been Reduced

The variety of stock sizes of sheet steel has been reduced from 1819 to 261 as a result of the simplified practice recommendation of the Division of Simplified Practice, Department of Commerce, Washington. The committee in charge of these practices has reaffirmed without change its recommendations for the coming year. Simplified practices in eaves trough and conductor pipe and in metallic cartridges also will be governed by the same recommendations which have governed during the past year.

Pacific Coast

Structural Steel Awards Largest in More Than Two Months—Demand for Other Products Fair

SAN FRANCISCO, Nov. 16.—(*By Air Mail.*)—Pacific Coast interest in iron and steel products continues and, while there has been some letup in demand, indications point to a good volume of business during the remainder of the year. Cast iron pipe and reinforcing steel bar bookings fell off this week, but structural steel awards were the largest in more than two months. Important lettings called for 2400 tons for the Eleventh Street viaduct, Tacoma, placed with Poole & McGonigle, and 738 tons for the Shasta River bridge in California, booked by the Minneapolis Moline Power Implement Co.

Pig Iron.—Sales and inquiries for foundry pig iron involve unimportant lots. Consumers appear little inclined to anticipate their requirements. Prices are unchanged.

Prices per gross ton at San Francisco:

*Utah basic	$25.00 to $26.00
*Utah fdy., sil. 2.75 to 3.25	25.00 to 26.00
**Indian fdy., sil. 2.75 to 3.25	25.00 to 26.00

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Bars. — Bookings of reinforcing steel bars were the smallest in more than five weeks. Among the more important lettings were 155 tons and 100 tons respectively for a store in Seattle and a penstock at Tacoma, placed with the Northwest Steel Rolling Mills, and 100 tons for an apartment in San Francisco, taken by W. C. Hauck & Co. A fair volume of business is pending and includes 800 tons for the Eleventh Street viaduct, Seattle, and 400 tons for a veterans' home in California. Los Angeles prices on out-of-stock material remain at 2.40c., base, on carload lots and at 2.70c. in smaller quantities. Prices in the bay district are $2 a ton lower.

Plates.—Plate prices remain weak and while 2.35c., c.i.f., is the usual quotation on small lots, as low as 2.15c. has recently been quoted on fairly large lots. The only award of importance went to the Steel Tank & Pipe Co. and involved 1400 tons for a 36 to 48-in. welded steel pipe line at Everett, Wash. Awards will most likely be made next week on 100 tons for a pipe line in Oakland and on 370 tons for one in Seattle.

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and struc. shapes	3.30c.
Soft steel bars	3.30c.
Small angles, ⅞-in. and over	3.15c.
Small angles, under ⅞-in.	3.55c.
Small channels and tees, ¾-in. to 2¾-in.	3.75c.
Spring steel, ¼-in. and thicker	5.00c.
Black sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.80c.
Galv. sheets (No. 24)	5.30c.
Struct. rivets, ½-in. and larger	5.65c.
Com. wire nails, base per keg	$3.40
Cement c't'd nails, 100 lb. keg	3.40

Shapes. — Demand for structural steel in the Pacific Northwest has been exceptionally good during the past few weeks. Activity in the San Francisco district has fallen off somewhat, but bookings in the Los Angeles territory continue to involve some fair-sized lots. The McClintic-Marshall Co. took 100 tons and 150 tons for two apartments in San Francisco and 185 tons for an office building at Bakersfield, Cal. The Pacific Coast Engineering Co. secured 300 tons for a factory in San Francisco for the Link-Belt Co., and the Consolidated Steel Corporation booked 175 tons for a warehouse in Los Angeles for the Crane Co. The Wallace Bridge & Structural Steel Co. was awarded 625 tons for the Bremerton bridge in Washington and 120 tons for a bridge at Woodland, Wash. New inquiries were confined to small lots. Plain material is firm at 2.35c., c.i.f.

Cast Iron Pipe.—Demand for cast iron pipe remains quiet, and no lots of more than 100 tons were noted. Bids will be opened Dec. 2 on 293 tons of 6 to 10-in. Class B pipe for the improvement of La Mesa Colony, San Diego. C. G. Claussen & Co. were low bidders on 147 tons of Class B pipe for the East Bay Municipal Utility District, Oakland. Compton, Cal., has opened bids on 118 tons of 4 to 10-in. Class B pipe for Olive Street.

Steel Pipe.—With the exception of the 100,000-ton inquiry of the Standard Oil Co., San Francisco, for gas pipe, inquiries are for unimportant lots. Standard steel pipe is in fair demand and stocks in distributers' warehouses are well rounded out.

Track Material.—No action has yet been taken by the Southern Pacific Co. on its inquiry for 120,000 tons of 90 to 130-lb. T-rails. This company has placed with unnamed interests 14,000 tons of tie plates, 4000 tons of track spikes and 390 tons of track bolts.

St. Louis

Pig Iron Sales Drop to 2000 Tons—Large Scrap Consumers Hold Back Shipments

ST. LOUIS, Nov. 19.—Sales of pig iron fell off during the last week to about 2000 tons. The St. Louis Gas & Coke Corporation sold 1650 tons, including 500 tons of foundry grades to an implement manufacturer for shipmment this month and next; 250 tons to an Illinois melter for the same delivery, and five 100-ton lots for prompt shipment, all foundry iron, and 300 tons of malleable to a specialty maker for shipment before Dec. 31. A leading Southern maker sold 300 tons for shipment the remainder of the year. Southern makers have not yet opened their books for 1930 deliveries. Stove and implement interests continue to enjoy a heavy melt, but foundries catering to the automobile trade have slowed down somewhat. Pig iron prices continue firm.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill.	$19.50 to $20.00
Malleable, f.o.b. Granite City	20.00
N'th'n No. 2 fdy., deliv'd St. Louis	22.16
Southern No. 2 fdy., deliv'd	18.42 to 18.92
Northern malleable, deliv'd	22.16
Northern basic, deliv'd	22.16

Freight rates: 75c. (average) Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

Coke.—Domestic coke continues in good demand, and piles at by-product ovens have been reduced materially. Smelters are increasing their orders for both breeze and large sizes. Demand for foundry coke has declined.

Finished Steel.—The demand for plates, shapes and bars is said to be fair. Schedules against contracts are being well maintained, although new business is light. The structural trade continues dull, with no local projects of sizable tonnage in sight.

Old Material.—Instructions to withhold shipments against contracts have been issued to dealers of old material by three of the largest consumers in the district, further depressing an already weak market. Lack of orders is the reason given by the mills for their action. No. 2 heavy melting or shoveling steel, miscellaneous standard-section rails, rails for rolling and stove plate are 25c. off, while No. 1 locomotive tires, railroad springs, steel car axles, railroad malleable are down 50c. Railroad lists: Louisville & Nashville, 7500 tons; Chesapeake & Ohio, 5240 tons; Chicago, Burlington & Quincy, 4370 tons; Missouri-Kansas-Texas,

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-fin. rounds, shaftings, screw stock	3.75c.
Black sheets (No. 24)	4.25c.
Galv. sheets (No. 24)	5.10c.
Blue ann'l'd sheets (No. 10)	3.45c.
Black corrug. sheets (No. 24)	4.30c.
Galv. corrug. sheets	5.15c.
Structural rivets	4.15c.
Boiler rivets	4.15c.
	Per Cent Off List
Tank rivets, ⅞-in. and smaller, 100 lb. or more	65
Less than 100 lb.	60
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-pressed nuts, sq., blank or tapped, 200 lb. or more	60
Less than 200 lb.	50
Hot-pressed nuts, hex., blank or tapped, 200 lb. or more	60
Less than 200 lb.	50

2200 tons, including 500 tons of wheels and 200 tons of axles; Chicago & Alton, 1820 tons; Chicago, Indianapolis & Louisville, 1000 tons; Southern Pacific, 670 tons; New York, Chicago & St. Louis, 75 carloads; Chicago, Milwaukee, St. Paul & Pacific, 50 carloads; Nashville, Chattanooga & St. Louis, 15 carloads; and Pullman Co. (St. Louis), 5 carloads.

Dealers' buying prices per gross ton, f.o.b. St. Louis district:

No. 1 heavy melting or shoveling steel	$13.00 to $13.50
No. 2 heavy melting or shoveling steel	12.00 to 12.50
No. 1 locomotive tires	14.50 to 15.00
Misc. stand.-sec. rails including frogs, switches and guards, cut apart	14.00 to 14.50
Railroad springs	15.50 to 16.00
Bundled sheets	9.50 to 10.00
No. 2 railroad wrought	13.00 to 13.50
No. 1 busheling	9.75 to 10.25
Cast iron borings and shoveling turnings	9.25 to 9.75
Iron rails	13.00 to 13.50
Rails for rolling	15.00 to 15.50
Machine shop turnings	7.25 to 7.75
Heavy turnings	9.50 to 10.00
Steel car axles	18.00 to 18.50
Iron car axles	27.00 to 27.50
Wrot. iron bars and trans.	21.50 to 22.00
No. 1 railroad wrought	13.00 to 13.50
Steel rails, less than 3 ft.	17.00 to 17.50
Steel angle bars	14.00 to 14.50
Cast iron carwheels	14.00 to 14.50
No. 1 machinery cast	15.25 to 15.75
Railroad malleable	13.50 to 14.00
No. 1 railroad cast	14.50 to 15.00
Stove plate	11.75 to 12.25
Agricult. malleable	14.00 to 14.50
Relay. rails 60 lb. and under	20.50 to 23.50
Relay. rails 70 lb. and over	26.50 to 29.00

Canada

Curtailment in Automobile and Implement Lines

TORONTO, ONT., Nov. 19.—A slackening in business is apparent in two or three groups allied with the iron and steel industry in this country. The automotive industry appears to have been hit hardest as a result of the recent crash in the stock markets. The agricultural implement industry has also received a setback. This, however, is principally due to the reduced Canadian crop yield and the low price prevailing for wheat. It is understood that implement plants throughout Canada are now running from 30 to 50 per cent of capacity, compared with near-capacity operations a year ago.

The curtailed activities of these two industries alone have had a telling effect on the Canadian iron and steel industry as a whole. In most instances, however, steel plants are still running at capacity and have sufficient backlogs to carry them along for some time. Railroad orders have had a stimulating effect on the industry this year, with the result that plants have been able to maintain almost capacity operations, while at the same time balance sheets show much more substantial earnings than in other postwar years.

While business is fairly good at present, leading iron and steel interests of this country are unable, or reluctant, to make any statement with regard to 1930.

Pig Iron.—From hand-to-mouth buyers slight improvement in demand has developed, but in all instances tonnages are small, ranging from one to two cars to an occasional order of 200 tons. Shipments against contracts are going forward on schedule. Prices are unchanged.

Prices per gross ton:

Delivered Toronto

No. 1 fdy., sil. 2.25 to 2.75	$23.60
No. 2 fdy., sil. 1.75 to 2.25	23.10
Malleable	23.60

Delivered Montreal

No. 1 fdy., sil. 2.25 to 2.75	$25.00
No. 2 fdy., sil. 1.75 to 2.25	24.50
Malleable	25.00
Basic	23.50

Imported Iron, Montreal Warehouse

Summerlee	$33.50
Carron	33.00

Structural Steel.—Recent orders were chiefly in lots under 500 tons, but inquiry includes some large tonnages. Fabricating plants are running at full time, with backlogs sufficient to keep them at the present rate well into 1930.

Old Material.—New business was in better volume during the past week or 10 days. A few future delivery contracts for machinery cast had a stimulating effect on the market. Spot buying is the strong feature at the moment, however, and it is from the smaller consumers that the bulk of new business is coming. Steel scrap is moving slowly in both Toronto and Montreal markets, but a better demand has developed in the iron grades. No change has been made in buying prices.

Dealers' buying prices:

	Per Gross Ton	
	Toronto	Montreal
Heavy melting steel	$10.00	$8.50
Rails, scrap	11.00	9.00
No. 1 wrought	10.00	12.00
Machine shop turnings	7.50	5.00
Boiler plate	7.50	6.00
Heavy axle turnings	8.00	7.50
Cast borings	7.50	5.00
Steel borings	7.50	6.50
Wrought pipe	6.00	6.00
Steel axles	15.00	20.00
Axles, wrought iron	17.00	22.00
No. 1 machinery cast	....	17.00
Stove plate	....	13.00
Standard carwheels	....	16.00
Malleable	....	13.00
	Per Net Ton	
No. 1 mach'ry cast	$16.00	....
Stove plate	12.00	....
Standard carwheels	15.00	....
Malleable scrap	14.00	....

Cincinnati

Slackening in Demand for Pig Iron, Coke, Scrap and Finished Steel—Old Material Prices Decline

CINCINNATI, Nov. 19.—District buyers of pig iron are displaying extreme caution toward entering the market and are marking time to watch the trend in their own businesses. Sales in this district declined sharply last week, with district furnace representatives reporting approximately 2300 tons as the week's total. All of this was in small quantities, the largest orders having been for two cars. Not only is the current demand easing, but specifications against contracts are showing signs of slackening. In fact, several furnace representatives indicate that during the last week several consumers had requested delay on their usual shipments. While the cut in the automotive demand is most noticeable, specifications from other foundries also are being reduced. The quietness of this market is further reflected by the total absence of any sizable inquiry.

Prices per gross ton, deliv'd Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25	$19.89 to $20.39
Ala. fdy., sil. 1.75 to 2.25	17.69 to 18.19
Ala. fdy., sil. 2.25 to 2.75	18.19 to 18.69
Tenn. fdy., sil. 1.75 to 2.25	17.69 to 18.19
S'th'n Ohio silvery, 8 per cent	26.89

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

Finished Steel.—The local steel market is quiet and dull. Operating schedules of district sheet mills, which had been advanced about two weeks ago in anticipation of an improved automotive demand, have again been curtailed. Buyers are cautious. The one bright spot in the sheet market is the continued good demand for galvanized sheets for roofing purposes. One interest here indicates that this grade is contributing a large portion of the current bookings. Fabricated structural steel continues dull, and district fabricators are in need of business.

Coke.—So far this month, specifications for by-product foundry coke are well below the level of October, when a decline from September was reported. In fact, several oven representatives say that shipments on contracts are approximately 30 per cent under the October volume, and a

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and struc. shapes	3.40c.
Bars, soft steel or iron	3.30c.
New billet reinforc. bars	3.15c.
Rail steel reinforc. bars	3.00c.
Hoops	4.05c.
Bands	3.50c.
Cold-fin. rounds and hex	3.85c.
Squares	4.35c.
Black sheets (No. 24)	4.05c.
Galvanized sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.45c.
Structural rivets	3.85c.
Small rivets	65 per cent off list
No. 9 ann'l'd wire, per 100 lb.	$3.00
Com. wire nails, base per keg	2.85
Cement c't'd nails, base 100 lb. keg	2.85
Chain, per 100 lb.	8.75
	Net per 100 Ft.
Lap-weld steel boiler tubes, 2-in.	$16.50
4-in.	34.50
Seamless steel boiler tubes, 2-in.	17.50
4-in.	36.00

further decline on the total month's business is anticipated.

Old Material.—With mills curtailing shipments on contracts and refusing to renew as contracts terminate, the district old material market is very weak. Dealers are bidding 25c. less on heavy melting steel, No. 1 busheling and No. 2 wrought and 50c. less on No. 2 busheling than a week ago. The supply of scrap appears to be fairly good, but dealers are having difficulty in moving what they have.

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel	$12.50 to $13.00
Scrap rails for melting	13.50 to 14.00
Loose sheet clippings	8.50 to 9.00
Bundled sheets	10.75 to 11.25
Cast iron borings	8.50 to 9.00
Machine shop turnings	8.00 to 8.50
No. 1 busheling	10.00 to 10.50
No. 2 busheling	6.50 to 7.00
Rails for rolling	14.25 to 14.75
No. 1 locomotive tires	14.25 to 14.75
No. 2 railroad wrought	12.50 to 13.00
Short rails	18.00 to 18.50
Cast iron carwheels	12.50 to 13.00
No. 1 machinery cast	18.50 to 19.00
No. 1 railroad cast	15.00 to 15.50
Burnt cast	10.00 to 10.50
Stove plate	10.00 to 10.50
Brake shoes	10.00 to 10.50
Agricultural malleable	14.00 to 14.50
Railroad malleable	15.00 to 15.50

Youngstown

Valley Mills at Lowest Point in Two Years

YOUNGSTOWN, Nov. 19.—Production schedules announced by Mahoning Valley steel companies indicate that activity this week is at the low point for the past two years.

The sheet mills at Haselton of the Sharon Steel Hoop Co. are completely idle for the week, as is the company's open-hearth furnace plant at Lowellville. Its strip mills at Sharon are operating on reduced schedules.

In the Mahoning Valley, only 46 of 120 sheet mills are scheduled, and only 19 of 51 independent open-hearth furnaces. Bessemer steel operations are being carried on at 75 to 80 per cent. In other departments, such as tin plate, strips, steel bars, plates and steel pipe, operations range between 60 and 65 per cent.

Fabricators are maintaining much higher schedules than the primary steel producers.

Buying by the automobile industry has been smaller than anticipated. Expected improvement this month in the buying by Chevrolet Motor Co. and the Ford Motor Co. has failed to develop.

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and struc. shapes	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.95c.
Cold-fin. flats, sq. and hex.	4.45c.
Rounds	3.95c.
Cold-rolled strip steel	5.85c.
Black sheets (No. 24)	4.20c.
Galv. sheets (No. 24)	4.85c.
Blue ann'l'd sheets (No. 10)	3.50c.
Com. wire nails, base per keg	$3.60
Black wire, base per 100 lb.	3.75

Buffalo

Pig Iron Buying Light, but Shipments Are Well Sustained —Steel Mill Operations Curtailed Further

BUFFALO, Nov. 19.—A demand for prompt shipment on old orders continues to be the feature of the local pig iron market. New business is scarce, but there is a steady flow of requests for iron from melters. Some melters have taken their entire November quota and have dipped into their December tonnage. Stocks of pig iron in producers' yards are the lowest in years, and, at the present rate of operation and consumption, they will be considerably lower by the first of the year. Inquiry is light, with an aggregate of 3000 or 4000 tons, most of which is reported from Canada and which may not be converted into Buffalo business. From lower New York comes an inquiry for 700 tons of foundry and malleable and from New England there is an inquiry for 1000 tons of foundry and malleable. The Eastern base has been cut to $17.50 in some instances. One of the stacks of the Hanna furnace Co. may go out this week, and this, along with the scarcity of stock iron, is expected to keep the market firm.

Prices per gross ton, f.o.b. furnace:

No. 2 fdy., sil. 1.75 to 2.25	$19.50
No. 2X fdy., sil. 2.25 to 2.75	20.00
No. 1 fdy., sil. 2.75 to 3.25	21.00
Malleable, sil. up to 2.25	20.00
Basic	$17.50 to 18.00
Lake Superior charcoal	27.28

Finished Steel.—Operating rates of Buffalo mills are somewhat less than a week ago. The Donner Steel Co. is operating three open-hearths, a reduction of one, and the Lackawanna plant of the Bethlehem Steel Co. is operating at about 65 to 70 per cent. Structural business is quiet, though most of the shops are busy. One lot of 575 tons for a school in the town of Amherst, Erie County, has been placed with a Buffalo fabricator, and a few 50-ton lots have been placed. The market for reinforcing bars is dull, with nothing sizable placed and no volume of small tonnage. About 200 or 250 tons of reinforcing bars will be required for the new county jail at Albany, N. Y.

Old Material.—The market is still trending downward, with heavy supplies of scrap coming out and buying at a minimum. The latest important purchase was last week, when a mill bought a considerable tonnage of No. 1 heavy melting steel at $14.50. It was a direct purchase, and it is believed that a reciprocal arrangement entered into the transaction. The last sale of No. 1 heavy melting steel by a dealer was made at $15. The recent Michigan Central Railroad list brought $14.61, f.o.b. Black Rock, for heavy melting steel. Dealers are paying $14 for No. 1 steel. One of the larger plants, which had held up shipments, has increased its quota to three cars per week from each dealer. Another mill is understood to be offering $14 for heavy melting steel in 500-ton lots. A dealer with an order out for stove plate was able to purchase at $11.75.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$14.50
No. 2 heavy melting steel	13.00
Scrap rails	15.00 to 15.50
Hydraul. comp. sheets	13.00
Hand bundled sheets	11.00 to 11.50
Drop forge flashings	13.75 to 14.00
No. 1 busheling	13.00
Hvy. steel axle turnings	13.50 to 14.00
Machine shop turnings	7.50 to 8.00
No. 1 railroad wrought	13.00 to 13.50
Acid Open-Hearth Grades:	
Knuckles and couplers	17.00 to 17.50
Coil and leaf springs	17.00 to 17.50
Rolled steel wheels	17.00 to 17.50
Low phos. billet and bloom ends	18.00 to 18.50
Electric Furnace Grades:	
Short shov. steel turnings	11.25 to 11.75
Blast Furnace Grades:	
Short mixed borings and turnings	11.25 to 11.75
Cast iron borings	11.25 to 11.75
No. 2 busheling	9.50 to 10.00
Rolling Mill Grades:	
Steel car axles	17.00 to 17.50
Iron axles	20.00 to 21.00
Cupola Grades:	
No. 1 machinery cast	15.00 to 15.50
Stove plate	12.50 to 12.75
Locomotive grate bars	11.00 to 11.50
Steel rails, 3 ft. and under	18.75 to 19.00
Cast iron carwheels	13.00 to 13.50
Malleable Grades:	
Industrial	17.50 to 18.00
Railroad	17.50 to 18.00
Agricultural	17.50 to 18.00
Special Grades:	
Chemical borings	12.50 to 13.50

Birmingham

Southern Furnaces Name $14 Base for First Quarter Delivery in Outside Territories—Steel Buying Improves

BIRMINGHAM, Nov. 19.—Southern furnaces have offered to take orders in St. Louis and other Middle West points at $14 for first quarter delivery, which is the same price that has applied on recent fourth quarter contracts in those territories. It is generally understood that district furnaces will actively solicit first quarter business in competitive territories where a trade has been established in recent months. No district business has been booked beyond the fourth quarter. Current district sales are very light, consisting of small spot orders taken at $14.50, base. A marked decline in shipments occurred last week and some iron is again going into stock piles. The several previous weeks of active shipments reduced backlogs to a low point. The No. 1 Ensley furnace of the Tennessee company was changed from basic to foundry iron on Nov. 9. Of the 16 active

furnaces, nine are on foundry iron, six on basic and one on recarburizing iron.

Prices per gross ton, f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil.	$14.50
No. 1 fdy., 2.25 to 2.75 sil.	15.00
Basic	14.50

Finished Steel.—The market as a whole recovered fairly well last week from the drop in the previous week, and orders are again developing at a good rate. New business in bars, plates and sheets showed a decided improvement in the past few days. Sales of wire products are considered fair for the season. Orders are followed by requests for prompt shipments, as has been the case for some time. There have been no changes in prices during the past three weeks. Structural steel fabricators report a good volume of prospective business for the remainder of the year. No large orders have been booked in the last two weeks. Several important projects requiring reinforcing bars have been withdrawn from the market, and both sales and prospective business are at the low point of the year. The Tennessee company is operating seven open-hearths at Ensley and seven at Fairfield, an increase of one at the latter works. All six continue active at the Alabama City works of the Gulf States Steel Co.

Cast Iron Pipe.—The only new order of importance reported last week was 3000 tons of 12 to 24-in. pipe for St. Petersburg, Fla., let to the United States Pipe & Foundry Co. Bids were opened for small projects at Mendenhall and Tiplersville, Miss. The 4000-ton project at Dallas, Tex., is still pending. Aside from this project, the immediate tonnage in prospect is very light. Less business is coming in from distant territories than in several months. Municipalities have shown no interest in contracting for their 1930 requirements. Shipments are somewhat lighter than two or three weeks ago. Makers are maintaining base prices of $37 to $38.

Coke.—The unconsumed balance of fourth quarter coke contracts is plentiful, consequently there has been very little first quarter contracting so far. Prices remain at $5 a net ton, Birmingham.

Old Material.—Heavy melting steel, steel axles and scrap rails continue to maintain a fair rate of activity considering conditions. Prices are unchanged. Iron scrap prices are nominal owing to lack of trading.

Prices per gross ton, deliv'd Birmingham dist. consumers' yards:

Heavy melting steel	$13.00 to $13.50
Scrap steel rails	14.00
Short shoveling turnings	9.00
Cast iron borings	9.00
Stove plate	11.50 to 12.00
Steel axles	22.00
Iron axles	23.00
No. 1 railroad wrought	10.00 to 10.50
Rails for rolling	15.50
No. 1 cast	13.00
Tramcar wheels	12.50
Cast iron carwheels	13.00 to 13.50
Cast iron borings, chem.	13.50 to 14.00

Boston

Pig Iron Buying Light—Scrap Prices Drop—Warehouses Reduce Nail Quotations

BOSTON, Nov. 19.—Pig iron buying dropped to small proportions the past week. A Massachusetts machinery maker bought 500 tons for first quarter delivery, the Sullivan Machinery Co., Claremont, N. H., 250 tons, and there were numerous smaller lots sold. There is no important inquiry in the market. Prices apparently remain as heretofore. Buffalo stacks report foundries as taking iron on schedule and in some cases anticipating shipments. Other furnaces, however, note some holding up of shipments. While there are some bright spots in New England, the foundry industry in general is not so busy as a month ago, and some plants have laid off men in the past fortnight. Indian iron continues to arrive regularly in small tonnages, but receipts of Dutch iron have gradually tapered off.

Foundry iron prices per gross ton deliv'd to most New England points:

†Buffalo, sil. 1.75 to 2.25	$21.55 to $22.05
†Buffalo, sil. 2.25 to 2.75	22.05 to 22.55
*Buffalo, sil. 1.75 to 2.25	22.41 to 22.91
*Buffalo, sil. 2.25 to 2.75	22.91 to 23.41
East. Penn., sil. 1.75 to 2.25	22.65 to 23.15
East. Penn., sil. 2.25 to 2.75	23.15 to 23.65
Va., sil. 1.75 to 2.25	25.21
Va., sil. 2.25 to 2.75	25.71
*Ala., sil. 1.75 to 2.25	24.11
*Ala., sil. 2.25 to 2.75	24.61
†Ala., sil. 1.75 to 2.25	20.25
†Ala., sil. 2.25 to 2.75	20.75

Freight rates: $4.91 all rail from Buffalo, and $4.05 rail and water; $3.65 all rail from eastern Pennsylvania; $5.21 all rail from Virginia; $9.61 all rail from Alabama and $5.75 rail and water from Alabama to New England seaboard.

*All rail rate.

†Rail and water rate.

Warehouse Business.—Wire nails and poultry staples have been reduced 5c. a 100 lb., making nails $3.20 a keg, base, from stock, and staples $6.05. Domestic mills are meeting more or less competition from German-made nails along the Atlantic seaboard, consequently prices today are 20c. a 100 lb. lower than a month ago. Demand for iron and steel in general is quite good for this time of the year, but individual orders are small.

Fabricated Steel.—The Boston Bridge Works, Inc., was low bidder on the Crawford Street bridge, Providence, R. I., involving 1000 tons of steel. Other bridge work pending includes eight bridges for the Boston & Maine Railroad, another New England railroad bridge, a private project in Vermont, a Boston & Maine Railroad bridge at East Northfield, Mass., and a municipal bridge at Fitchburg, Mass. It is expected that at least 4000 tons of steel for various other projects will be placed before Dec. 1. Competition among fabricators for work is keen, and some low prices are being made.

Old Material.—Further price concessions of 25c. to 50c. a ton are noted in No. 1 heavy melting steel, T and girder rails, forge flashings, blast furnace borings and turnings and chemical borings. The market for steel axles apparently is off $1 a ton, but there is so little doing it is difficult to establish prices. The status of business is the same as a week ago. That is, many owners of material will not sell at prevailing prices, and steel mills apparently require little scrap. Brokers are endeavoring to clean up a few old small orders. The export market is fairly active, but here again low prices quoted have a tendency to discourage offerings.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$9.75 to $10.00
Scrap T rails	9.50 to 10.00
Scrap girder rails	8.75 to 9.00
No. 1 railroad wrought	10.00 to 10.50
No. 1 yard wrought	9.50 to 10.00
Machine shop turnings	6.00 to 6.50
Cast iron borings (steel works and rolling mill)	6.00 to 6.50
Bundled skeleton, long	8.75 to 9.00
Forge flashings	8.50 to 9.00
Blast furnace borings and turnings	5.50 to 6.00
Forge scrap	8.50 to 9.00
Shafting	14.00 to 14.25
Steel car axles	16.00 to 16.50
Wrought pipe 1 in. in diameter (over 2 ft. long)	9.00 to 9.50
Rails for rolling	11.00 to 11.50
Cast iron borings, chemical	9.00 to 9.50

Prices per gross ton deliv'd consumers' yards:

Textile cast	$14.00 to $14.50
No. 1 machinery cast	15.00 to 15.25
No. 2 machinery cast	13.00 to 13.25
Stove plate	11.00 to 11.50
Railroad malleable	18.50 to 19.00

Cast Iron Pipe.—The Watertown Arsenal has awarded 150 tons of 6 and 8-in. pipe and fittings to the Warren Foundry & Pipe Co., and Wayland, Mass., 100 tons of 6-in. to the same foundry. Salem, Mass., has placed 100 tons with the United States Pipe & Foundry Co. No other open municipal business is reported, but a sizable aggregate tonnage was placed privately the past week. There is an especially good demand for 4-in. pipe,

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars, small shapes	3.265c.
Flat, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway rounds	6.60c.
Norway squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tie steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold-rolled steel—	
Rounds and hex	*3.55c. to 5.55c.
Squares and flats	*4.05c. to 7.05c.
Toe calk steel	6.00c.
Rivets, structural or boiler	4.50c.

	Per Cent Off List
Machine bolts	50 and 5
Carriage bolts	50 and 5
Lag screws	50 and 5
Hot-pressed nuts	50 and 5
Cold-punched nuts	50 and 5
Stove bolts	70 and 10

*Including quantity differentials.

and prices are up about $1 a ton from their recent level. Most foundries are holding to a $4 differential on Class A and gas pipe, but at least one is securing $5 extra. Prices quoted openly on domestic pipe are: 4-in., $45.10 to $46.10 a ton, delivered common Boston freight rate points; 6 to 12-in., $40.10 to $41.10; 16 to 20-in., $39.60.

Detroit

Automobile Production Trend Continues Downward—Some Plants Shut Down Temporarily for Inventory

DETROIT, Nov. 19.—The production trend in the automotive industry is still downward as inventory time is approached. Some of the plants have already shut down temporarily for inventory taking. It is thought that no change in the curve's present course will occur during the remainder of the year.

Except for the Auburn Automobile Co., which estimates a November output of 1500 cars, as compared with 1251 in October and 1867 in September, no official estimates of the probable production this month by various automobile companies are available.

Schedules are on a hand-to-mouth basis, and are influenced by the volume of retail sales, stocks of new and used cars in dealers' hands and other factors, at present somewhat intangible, which may grow out of the situation resulting from the stock market collapse.

The Chevrolet Motor Co., at Flint, recently shut down its motor and sheet metal departments temporarily for inventory and will soon stop work for a week in its assembly department. The Oakland Motor Car Co., Pontiac, Mich., has resumed operations after a short shutdown for inventory.

Owing to the present condition of the industry, automotive steel demand has been almost negligible. Until first quarter requirements are decided upon, the steel price situation will not become clarified. Steel companies apparently have little disposition to push sales at present, and price concessions probably would be of no avail.

The structural steel market is fairly active for this time of year. Plans are under way for a building for the Detroit *News* which will call for about 5000 tons of steel. The Union League Club of Detroit has started work on a new building in which 1800 tons of steel will be used. There is a fair volume of medium-size projects in the market. Some fabricators are busy, while others are in need of work.

Metal Goods Makers Meet To Form Association

An organization committee has been formed by contract metal goods manufacturers, tool and die makers to work on the establishment of a trade association. A preliminary meeting was held on Oct. 17, and a second organization meeting will be held Nov. 20, at Masonic Hall, 71 West Twenty-third Street, New York, at 7.30 p. m. Heading the committee is Adolph Hopp, 390 Second Avenue, New York.

Automobile Production Declines

WASHINGTON, Nov. 19.—Production of motor vehicles in the United States in October totaled 379,942 units, the lowest output since last December, when the total was 234,116 vehicles, according to reports received by the Department of Commerce from 149 manufacturers. The output in September was 415,697 units. In October, 1928, it was 397,284.

Production of passenger cars in October was 320,327, compared with 364,786 in September, while truck production went up to 58,747, compared with 50,046 in September, and production of taxicabs was 868, against 865.

In the first 10 months, production of motor vehicles in the United States totaled 5,017,806 units, against 3,867,503 for the same period of last year. The increase was 30 per cent.

Output of passenger cars was 4,325,504, compared with 3,399,425, a gain of 27 per cent. Truck production was 677,842, against 463,101 (up 46 per cent) and taxicab production was 14,460, compared with 4,977.

Henry & Wright Mfg. Co. Passes to New Hands

A controlling interest in the Henry & Wright Mfg. Co., Hartford, Conn., has been purchased by executives connected with Stone & Webster, Inc., Boston. At a meeting in Boston on Nov. 14 the following officers and directors were elected: C. J. Sorrells, chairman of board; J. F. Funk, president; W. J. Henry, vice-president; F. H. Farnham, treasurer; D. C. Jewett, secretary. Directors: Richard Harte, W. J. Hopkins, H. G. Philbrook, W. A. Ready, W. J. Henry.

The Henry & Wright Mfg. Co., manufacture the high-speed automatic punch press known to the trade as the Henry & Wright dieing machine. The company is manufacturing presses ranging from 10 to 200-ton capacity, and it contemplates expanding the line to take in presses up to 1000-ton capacity.

Railroad Equipment

Van Sweringen Roads Expected To Inquire for 10,000 Cars

ALTHOUGH railroad car orders the past week were meager and inquiries appeared for only 900 cars, the outlook is promising. The Chesapeake & Ohio and the Pere Marquette are expected to ask for bids on 10,000 cars within a week and the New York Central may pass soon upon its car-building program for next year, which is believed to call for the purchase of about 15,000 cars. The Texas Corporation is taking bids on 500 tank cars, while the St. Louis-San Francisco is inquiring for 300 underframes and a like number of superstructures.

Orders have been placed in the past week for 64 locomotives, of which 20 of the Mikado type are for the St. Louis-San Francisco and 25 are for the Pennsylvania. The Southern Pacific is in the market for 40 locomotives. Details of the week's business follow:

St. Louis-San Francisco is asking for bids on 300 underframes and a like number of superstructures. This road has purchased 20 Mikado type locomotives from Baldwin Locomotive Works.

Texas Corporation is inquiring for 300 insulated tank cars of 10,000-gal. capacity, 150 tank cars of 12,000-gal. capacity and 50 insulated tank cars of 10,000-gal. capacity.

Michigan Central has ordered four oil-electric locomotives from American Locomotive Co.

North American Car Corporation has ordered five tank cars from American Car & Foundry Co.

Pennsylvania Railroad has ordered 25 locomotives from Lima Locomotive Works, Inc.

Boston & Albany is taking bids on 10 locomotives in addition to five ordered from Lima Locomotive Works, Inc.

Kentucky & Indiana Terminal has ordered eight heavy switching locomotives from Lima Locomotive Works.

Southern Pacific is inquiring for 25 mallet type and 15 4-8-4 type locomotives, 300 automobile cars and 100 gondola cars.

Texas South-Eastern has ordered one locomotive from Baldwin Locomotive Works.

Illinois Terminal Co. has ordered one 90-ton combination electric locomotive from St. Louis Car Co.

Baltimore & Ohio has ordered 50 coaches from Pullman Car & Mfg. Corporation.

New York Central is inquiring for 12 rail motor cars.

Great Northern has ordered two dining cars from Pullman Car & Mfg. Corporation.

Northern Pacific will buy nine dining cars.

An inquiry for 10,000 cars for two Van Sweringen roads, the Chesapeake & Ohio and Pere Marquette, is expected within a week.

New York Central is expected soon to pass upon its car-building program for next year. It is believed in the car industry that about 15,000 cars will be on the budget.

Non-Ferrous Metal Markets

Copper Buyers, Expecting Lower Prices, Stay Out of Market—Tin Drifting—Zinc and Lead Firmer

NEW YORK, Nov. 19.

Copper.—In the expectation that prices will decline, as have those of tin, lead and zinc recently, buying by both domestic and foreign consumers continues in light volume both here and abroad. Melters are buying from hand to mouth. Despite this situation, prices continue firm at 18c. for electrolytic copper, delivered in the Connecticut Valley. Sellers continue to be optimistic that the price will stay at the present level. They feel that the matter of inventories alone will have some weight against a lower price in the case of some fabricators. They also feel that, because stocks abroad are at a vanishing point, any betterment in demand will first come from that source. Copper exporters continue to quote 18.30c., c.i.f. usual European ports, and Lake copper is firm at 18c. to 18.12½c., delivered. Curtailment of production at the mines is progressing, but it will be at least two months before its effect is a factor.

Tin.—In a quiet market about 700 tons of spot Straits tin changed hands during the week. Prices have been quite steady, but the market is drifting, with little interest shown by consumers or dealers. The new price for tin plate announced last week, which in the past has generally been the cause of considerable buying of tin, has been without effect thus far. It is possible that consumers are well covered for some time ahead. An interesting item of news is that the official shipments of tin from the Straits from Nov. 1 to 16, inclusive, were 6449 tons, tending to confirm estimates early this month of November shipments of 10,000 tons. The London market has turned stronger, with prices today about £4 to £5 per ton higher than a week ago, with spot standard quoted at £179 7s. 6d., future standard at £182 and spot Straits £183 7s. 6d. The Singapore price today was £185 2s. 6d. In a very quiet market here today, spot Straits was quoted at 39.75c., New York.

Lead.—Inquiry is somewhat better, with sales a little heavier. Prices have remained unchanged for the first week in the last three. Producers in St. Louis are asking 6.10c., and the price of the leading interest is unchanged at 6.25c., New York, as the contract price.

Zinc.—Possibly because belief is growing that the bottom in prices has

THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY

	Nov. 19	Nov. 18	Nov. 16	Nov. 15	Nov. 14	Nov. 13
Lake copper, New York	18.12½	18.12½	18.12½	18.12½	18.12½	18.12½
Electrolytic copper, N. Y.*	17.75	17.75	17.75	17.75	17.75	17.75
Straits tin, spot, N. Y.	39.75	40.00	39.87½	39.75	39.87½	39.25
Zinc, East St. Louis	6.25	6.25	6.25	6.25	6.25	6.25
Zinc, New York	6.60	6.60	6.60	6.60	6.60	6.60
Lead, St. Louis	6.10	6.10	6.10	6.10	6.10	6.10
Lead, New York	6.25	6.25	6.25	6.25	6.25	6.25

*Refinery quotation; price ¼c. higher delivered in the Connecticut Valley.

Rolled Products

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—
- High brass ..... 23.25c.
- Copper, hot rolled ..... 26.75c.
- Zinc ..... 10.50c.
- Lead (full sheets) ..... 10.25c.

Seamless Tubes—
- High brass ..... 28.25c.
- Copper ..... 29.25c.

Rods—
- High brass ..... 21.25c.
- Naval brass ..... 24.00c.

Wire—
- Copper ..... 19.87½c.
- High brass ..... 23.75c.

Copper in Rolls ..... 26.75c.
Brazed Brass Tubing ..... 30.87½c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also to St. Louis on shipments to points west of that river.

- Sheets, 0 to 10 gage, 3 to 30 in. wide ..... 33.00c.
- Tubes, base ..... 42.00c.
- Machine rods ..... 34.00c.

Chicago Warehouse

(Prices Cover Trucking to Customers' Doors in City Limits)

Sheets—	Base per Lb.
High brass	23.25c.
Copper, hot rolled	27.75c.
Copper, cold rolled, 14 oz. and heavier	30.00c.
Zinc	10.75c.
Lead, wide	11.35c.
Seamless Tubes—	
Brass	28.25c.
Copper	29.25c.
Brass Rods	21.25c.
Brazed Brass Tubes	31.00c.

New York or Cleveland Warehouse

Delivered Prices, Base per Lb.

High brass	21.12½c. to 22.12½c
Copper, hot rolled, base sizes	27.75c. to 28.75c.
Copper, cold rolled, 14 oz. and heavier, base sizes	30.00c. to 31.00c.
Seamless Tubes—	
Brass	26.00c. to 27.00c.
Copper	29.12½c. to 30.12½c.
Brass Rods	18.87½c. to 19.87½c.
Brazed Brass Tubes	29.12½c. to 30.12½c.

New York Warehouse

Delivered Prices, Base per Lb.

- *Zinc sheets (No. 9), casks* ..... 10.75c. to 11.25c.
- *Zinc sheets, open* ..... 11.50c. to 12.00c.

Metals from New York Warehouse

Delivered Prices, Per Lb.

- Tin, Straits pig ..... 41.50c. to 42.50c.
- Tin, bar ..... 43.50c. to 44.50c.
- Copper, Lake ..... 19.50c.
- Copper, electrolytic ..... 19.25c.
- Copper, casting ..... 19.00c.
- Zinc, slab ..... 7.50c. to 8.00c.
- Lead, American pig ..... 7.00c. to 7.50c.
- Lead, bar ..... 9.00c. to 9.50c.
- Antimony, Asiatic ..... 10.50c. to 11.00c.
- Aluminum No. 1 ingots for remelting (guaranteed over 99% pure) ... 25.00c. to 26.00c.
- Alum. ingots, No. 12 alloy ..... 24.00c. to 25.00c.
- Babbitt metal, commercial grade ..... 25.00c. to 35.00c.
- Solder, ½ and ½ ..... 28.00c. to 28.50c.

Metals from Cleveland Warehouse

Delivered Prices, Per Lb.

- Tin, Straits pig ..... 45.00c.
- Tin, bar ..... 47.00c.
- Copper, Lake ..... 19.50c.
- Copper, electrolytic ..... 19.25c.
- Copper, casting ..... 18.75c.
- Zinc, slab ..... 8.00c. to 8.25c.
- Lead, American pig ..... 7.00c. to 7.20c.
- Lead, bar ..... 9.25c.
- Antimony, Asiatic ..... 16.00c.
- Babbitt metal, medium grade ..... 18.00c.
- Babbitt metal, high grade ..... 48.00c.
- Solder, ½ and ½ ..... 28.50c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged consumers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	14.75c.	16.00c.
Copper, hvy. and wire	14.50c.	15.50c.
Copper, light and bottoms	12.50c.	13.50c.
Brass, heavy	8.00c.	9.00c.
Brass, light	6.75c.	7.75c.
Hvy. machine composition	11.50c.	12.50c.
No. 1 yel. brass turnings	9.25c.	9.75c.
No. 1 red brass or compos. turnings	10.75c.	11.75c.
Lead, heavy	4.75c.	5.25c.
Lead, tea	3.75c.	4.25c.
Zinc	3.25c.	3.75c.
Sheet aluminum	13.00c.	14.00c.
Cast aluminum	11.25c.	13.25c.

been reached, domestic demand for prime Western has been better in the last week, but it is still of a hand-to-mouth character. Consumers' stocks are known to be very low, but they continue to hesitate to commit themselves for the future. A meeting of the European cartel is slated for today, and this may have a sympathetic effect on prices at London so as to strengthen them; if so, this may tend to further stiffen the market here. Prime Western is quoted at 6.25c., East St. Louis, or 6.60c., New York, with concessions for small lots reported here and there. The ore price is again $40, Joplin, but sales last week were light at 5690 tons. Production was still high at 12,000 tons, leaving the surplus estimated at 54,052 tons. Rather drastic curtailment of ore production is reported from the Tri-State district, some properties shutting down for the remainder of the year and some for a shorter period.

Antimony.—In a quiet market Chinese metal for spot and future delivery is quoted at 8.62½c., New York, duty paid.

Nickel.—Ingot nickel in wholesale lots is offered at 35c. per lb., with shot nickel at 36c. and electrolytic nickel in cathodes at 35c.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at the published price of 23.90c. per lb., delivered.

Non-Ferrous Metals at Chicago

CHICAGO,—Few orders for non-ferrous metals have been taken in the week. Prices for copper, lead and zinc are holding while advances are shown for tin and antimony. A substantial volume of inquiry is developing in the old metal market.

Prices per lb., in carload lots: Lake copper, 18.50c.; tin, 41c.; lead, 6.20c.; zinc, 6.35c.; in less-than-carload lots, antimony, 9.50c. On old metals we quote copper wire, crucible shapes and copper clips, 14c.; copper bottoms, 11.50c.; red brass, 11.50c.; yellow brass, 8c.; lead pipe, 4.50c.; zinc, 3c.; pewter, No. 1, 24.50c.; tin foil, 24c.; block tin, 34c.; aluminum, 12.87½c.; all being dealers' prices for less-than-carload lots.

Non-Ferrous Ingot Metal Unfilled Orders

On Nov. 1, unfilled orders for brass and bronze ingots and billets on the books of the members of the Non-Ferrous Ingot Metal Institute amounted to a total of 12,735 net tons. On Oct. 1 the unfilled orders were 16,246 tons and on Sept. 1 they were 15,065 tons.

Stockholders of the Allis-Chalmers Mfg. Co., Milwaukee, have approved an increase in the common stock to 2,000,000 no-par shares, from 500,000 shares of $100 par value. It is proposed to exchange the present outstanding stock on the basis of four new shares for each common share.

Witherow-Donner Merger Arranged

T. M. Girdler and R. J. Wysor Elected to Donner Board—W. P. Witherow Is Chairman

WITH the acquisition of the Witherow Steel Co. of Pittsburgh by the Otis & Co.-Eaton-Mather group of Cleveland, a merger has been arranged between this company and the Donner Steel Co. of Buffalo, against which company the Witherow company had pending a suit for $1,000,000 damages for alleged patent infringements. The Cleveland group bought control of the Donner company two months ago.

W. P. Witherow will continue as executive head of the Witherow company and will become chairman of the board of the Donner company. William H. Donner, president, and Robert Donner, vice-president of the Donner company, have resigned, severing all connections with the company.

T. M. Girdler, former president of the Jones & Laughlin Steel Corporation, and R. J. Wysor, who was general manager of that company, who resigned recently to join the Otis & Co.-Eaton-Mather interests, have been named members of the Donner board of directors, together with Christopher Baldy, a Buffalo attorney. Until such time as a president for the Donner company is appointed, F. K. Smith, vice-president and treasurer, is the chief executive officer.

The Donner-Witherow merger will be financed without public sale of stock. The Donner company will issue $5,022,000 in new 6 per cent preferred stock to provide for the exchange of securities.

Average Non-Ferrous Ingot Prices in October

CHICAGO, Nov. 16.—The Non-Ferrous Ingot Metal Institute reports the average prices per pound received by its membership on commercial grades of the six principal mixtures of ingot brass during the 28-day period ended Nov. 8. As there are, as yet, no generally accepted specifications for ingot brass, each item listed below is a compilation representing numerous sales of metal known to the trade by the designation shown, but each item, in reality, includes many variations in formulas. Until the program of standardizing the principal specifications, now progressing in cooperation with the American Society for Testing Materials, is completed, the following specifications will be understood to refer to "commercial grades":

	Cents
Commercial 80-10-10 (1% impurities)	17.105
Commercial 78%-metal	14.814
Commercial 81%-metal	15.483
Commercial 83%-metal	15.795
Commercial 85-5-5-5	15.936
Commercial No. 1 yellow brass ingot	12.739

COMING MEETINGS

NOVEMBER

National Founders' Association. Nov. 20 and 21. Annual meeting, Hotel Astor, New York. J. M. Taylor, 29 South LaSalle Street, Chicago, secretary.

New England Council. Nov. 21 and 22. Fifth annual conference, Hotel Statler, Boston.

DECEMBER

American Society of Mechanical Engineers. Dec. 2 to 6. Annual meeting, 29 West Thirty-ninth Street, New York. Calvin W. Rice, 29 West Thirty-ninth Street, New York, secretary.

Taylor Society. Dec. 4 to 6. Annual meeting, Hotel Pennsylvania, New York. H. S. Person, 29 West Thirty-ninth Street, New York, managing director.

National Exposition of Power and Mechanical Engineering. Dec. 2 to 7. Annual exposition, Grand Central Palace, New York. Charles F. Roth, Grand Central Palace, New York, manager.

Steel Founders' Society of America. Dec. 12. William Penn Hotel, Pittsburgh. Granville P. Rogers, 932 Graybar Building, New York, managing director.

Fabricated Steel Makes New High Record

WASHINGTON, Nov. 19.—Orders for fabricated structural steel in October, reported to the Department of Commerce by 180 firms, totaled 265,472 tons, representing 89 per cent of their monthly capacity of 298,725 tons. This compares with orders of 258,984 tons reported by 218 firms in September, representing 83 per cent of their capacity of 313,255 tons.

Computed tonnage booked in October was 342,650 tons, against 319,550 tons in September and 257,950 tons a year ago. Computed shipments were 354,200 tons, or 92 per cent of capacity, against 319,550 tons or 83 per cent of capacity. October shipments were the largest on record, displacing the previous record of 342,650 tons, made last August. In October, 1928, the computed total was 319,550 tons.

For the first 10 months computed bookings were 3,299,450 tons, or 86 per cent of capacity, against 2,798,950 tons or 72 per cent of capacity for the like period of last year. The 10-month total this year is just ahead of the 3,287,900 tons booked in 12 months of 1928, the previous annual record.

Computed shipments in 10 months were 3,022,250 tons, or 79 per cent of capacity, against 2,571,800 tons, or 67 per cent of capacity, last year.

PERSONAL

GEORGE L. DANFORTH, JR., has been made general superintendent at South works of the Illinois Steel Co., succeeding the late Peter A. Newton, whose death was reported in this column Nov. 7. Mr. Danforth, who has been assistant general superintendent at South works since 1918, entered the service of the United States Steel Corporation at its inception.

—

S. H. SLAYMAKER, of Fairbanks, Morse, & Co., Beloit, Wis., has been appointed to head the metals and foundry section of the Rock River Valley Safety Conference, which will meet at Madison, Wis., May 6, 1930, at which it is expected 1200 or more shop foremen and factory and construction executives and safety experts will attend from central Wisconsin and northern Illinois.

—

THOMAS FULLER, formerly manager of the Charlotte, N. C., office of the Westinghouse Electric & Mfg. Co., East Pittsburgh, has been named manager of the company's Atlanta district office, succeeding the late H. A. Coles. He was graduated from the Georgia School of Technology in 1905 and has been identified with the Westinghouse company since 1906.

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R. L. BINDER, president, Metals Coating Co. of America, Philadelphia, spoke before the New England Railroad Club on Nov. 13, at the Copley-Plaza Hotel, Boston.

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FREDERICK C. CRAWFORD, for seven years manager of the Detroit plant of the Thompson Products Co., Inc., Cleveland, has been made general manager and first vice-president of the company.

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O. E. HARDER, professor of metallography, University of Minnesota, addressed the Milwaukee chapter of the American Society for Steel Treating, Nov. 12, on the fundamentals of micrographs.

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H. S. WARWICK, formerly secretary of the Youngstown Real Estate Board, has been added to the industrial expansion department of the Youngstown Sheet & Tube Co., Youngstown.

—

G. L. SIMPSON, of the Pittsburgh Electric Furnace Corporation, was the guest at the November meeting of the New England Foundrymen's Association, held at the Exchange Club, Boston, Nov. 13.

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LEON M. LAMB, controller of the Greenfield Tap & Die Corporation, Greenfield, Mass., has been made secretary of a newly-created Massachusetts Industrial Commission by the governor of that State.

W. L. RANIS, of the Union Malleable Iron Co., East Moline, Ill., spoke on sand control in the foundry at the monthly meeting of the Quad-City Foundrymen's Association, held at the LeClaire Hotel, Moline, Nov. 18.

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RALPH H. CLORE, heretofore in charge of Cincinnati district sales for the United States Electrical Tool Co., has been made sales manager, succeeding GEORGE M. LAWRENCE, who has resigned to become vice-president of the General Radial Drill Co., Cincinnati.

RALPH H. CLORE

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FRANK FRY has been appointed manager of the New York office of Hausman & Wimmer Co., Pittsburgh, dealer in scrap iron and steel. He has been identified with the company since last July, and previously was with the E. B. Leaf Co., Philadelphia.

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HALLOWAY KILBORN, treasurer, Kilborn & Bishop Co., New Haven, Conn., will speak at the November meeting of the New Haven chapter of the American Society for Steel Treating at Hammond Laboratory, New Haven, on Nov. 21, on "Forging and Forge Die Design."

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CARL C. GIBBS, who has been manager of the Indianapolis plant of the National Malleable & Steel Castings Co., Cleveland, has been made assistant to Henry F. Pope, president of the company. He has been succeeded in Indianapolis by STOWELL C. WASSON, who has been sales agent of the company in Indianapolis for the past eight years.

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FRANK P. WALSH, for the past 14 years in the estimating and sales departments of the Whiting Corporation, Harvey, Ill., has been appointed manager of the newly-opened St. Louis office of the company at 1442 Syndicate Trust Building.

Obituary

LESTER S. CARROLL, vice-president in charge of purchases of the American Locomotive Co., died of a heart attack on a subway train in New York, Nov. 14, aged 61 years. He had been with the company since 1920, after years of experience in the purchasing field with various railroads, having been general purchasing agent for the Chicago & Northwestern at one time.

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CHARLES B. MOORE, for many years connected with railway supply manufacturing concerns, died Nov. 11. Mr. Moore was chairman of the board of directors of the Oxweld Railroad Service Co., and president of the Ajax Brake Co. He was also a trustee of Lake Forest University, from which he was graduated in 1896.

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EZRA EDWARD CLARK, for many years identified with the Dean Steam Pump Works, Holyoke, Mass., as designer and construction engineer, and previously associated with E. P. Allis & Co., Milwaukee, died on Nov. 11, at the Newton, Mass., hospital. He was born in Palmer, Mass., Jan. 27, 1858.

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RICHARD CUSHMAN, formerly superintendent of the Cushman Chuck Co., Hartford, Conn., died at New London, Conn., Nov. 10, aged 41 years. In 1909 he became associated with the chuck company and in 1916 resigned to engage in the musical profession.

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ROBERT W. FERGUSON, who succeeded to the managership of the New Orleans branch of the Lukens Steel Co., Coatesville, Pa., when Robert W. Wolcott, formerly its manager, was made president of the Lukens company a few years ago, died suddenly Nov. 13.

—

LEE R. FARRELL, aged 45, secretary-treasurer of the Industrial Silica Co., Youngstown, died Tuesday at Tucson, Ariz., where he went several months ago in an effort to regain his health. He was also secretary-treasurer of the Portage Silica Co., and held the same capacities with the Kent Sand & Gravel Co. Mr. Farrell had been identified with the silica business of the Middle-West throughout all of his business career.

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FRANK A. HUNTER, president, Hunter Saw & Machine Co., Pittsburgh, died at his home in that city on Nov. 19, aged 57 years. With his brother, Harry A. Hunter, he organized that company, and since the death of the former several years ago, had been its president. He had been in ill health for about two years, and a son, F. A. Hunter, Jr., has had charge of the business.

Fabricated Structural Steel

Awards Total 41,000 Tons—Cincinnati Union Terminal Will Require 40,000 Tons

WITH contracts for structural steel amounting to 41,000 tons in the past week and with fresh inquiries put out for almost 60,000 tons, there is ample evidence that the somewhat unsettled business situation has not adversely affected building construction activities. In fact, awards and new work were the heaviest since the latter part of October. It is significant that approximately half of the lettings were for industrial expansion purposes.

The outstanding awards were 12,300 tons for a New York subway section and 6500 tons for a Ford assembly plant at Edgewater, N. J. The feature among inquiries was the taking of bids for the first part of the building of the Union Railroad Terminal at Cincinnati, which will take at least 40,000 tons of steel. Awards follow:

BOSTON & MAINE RAILROAD, 365 tons, signal bridges, to Boston Bridge Works, Inc.

MAYNARD, MASS., 294 tons, American Cyanamid Co. plant units, to a New Jersey fabricator.

FAIRFIELD, CONN., 200 tons, State bridge, to an unnamed fabricator.

ATHOL, MASS., 113 tons, theater, to Eastern Bridge & Structural Co.

DANVERS, MASS., 100 tons, school, to Boston Structural Co.

PROVIDENCE, R. I., 1000 tons, Crawford Street bridge, to Boston Bridge Works, Inc.

NEW YORK CENTRAL RAILROAD, 230 tons, bridge, to American Bridge Co.

NEW YORK, 1800 tons, apartment building at 104th Street and Central Park West, to Easton Structural Steel Co.

NEW YORK, 750 tons, apartment building at 131-135 East Eightieth Street, to Easton Structural Steel Co.

NEW YORK, 350 tons, apartment building at Manhattan Avenue and 106th Street, to J. Klein, Inc.

NEW YORK, 12,300 tons, section 10, route 110, of subway, through Rosoff Subway Construction Co., to American Bridge Co.

BROOKLYN, 5850 tons, Kings County Hospital, formerly reported awarded to Harris Structural Steel Co., to Taylor-Fichter Steel Construction Co.

BROOKLYN, 450 tons, public school No. 199, to Easton Structural Steel Co.

CAMDEN, N. J., 140 tons, Fifth Street vehicular underpass for Delaware River Bridge, to American Bridge Co.

VALLEY STREAM, L. I., 100 tons, airplane hangars, to Jones & Laughlin Steel Corporation.

EDGEWATER, N. J., 6500 tons, assembly plant for Ford Motor Co., to McClintic-Marshall Co.

YONKERS, N. Y., 485 tons, St. John's Riverside Hospital, to Hinkle Iron Works.

BRIGHTON, N. Y., 100 tons, highway bridge, to American Bridge Co.

ELIZABETH, N. J., 600 tons, telephone building, to Hinkle Iron Works.

NEWPORT NEWS, VA., 500 tons, boat plant for Horace E. Dodge Boat & Plane Corporation, to Virginia Bridge & Iron Co.

BALTIMORE & OHIO RAILROAD, 700 tons, bridges, to American Bridge Co.

BROOKNEAL, VA., 265 tons, bridge, to Virginia Bridge & Iron Co.

MEADOWBROOK, W. VA., 800 tons, Grasselli Chemical Co., to McClintic-Marshall Co.

CLEVELAND HEIGHTS, 370 tons, Monticello School, to Niles Forge & Mfg. Co.

DETROIT, 550 tons, Elks Temple, to R. C. Mahon Co.

FORT WAYNE, IND., 430 tons, theater, to Central States Bridge Co.

FORT WAYNE, 180 tons, building for Joslyn Mfg. & Supply Co., to Indiana Bridge Co.

STATE OF ILLINOIS, 1650 tons, Welfare Building, to Mississippi Valley Structural Co.

CHICAGO, 140 tons, alterations to *Tribune* Tower, to Duffin Iron Works.

PROVISO, ILL., 500 tons, high school, to Mississippi Valley Structural Steel Co.

KANSAS CITY, MO., 1200 tons, Phillips Hotel, to Kansas City Structural Steel Co.

DENVER, 550 tons, Publix Theater, to E. Burkhardt Sons Steel & Iron Works, local.

STATE OF OKLAHOMA, 1150 tons, Pack Saddle bridge across South Canadian River, to Lakeside Bridge & Steel Co.

EVERETT, WASH., 1400 tons plates, 36- to 48-in. welded steel pipe line, to Steel Tank & Pipe Co.

WOODLAND, WASH., 120 tons, bridge for Northwest Electric Co., to Wallace Bridge & Structural Steel Co.

PORT ANGELES, WASH., 300 tons, pulp mill for Olympic Forest Products Co., to Isaacson Iron Works.

BREMERTON, WASH., 625 tons, Bremerton bridge, to Wallace Bridge & Structural Steel Co.

TACOMA, WASH., 2400 tons, Eleventh Street viaduct, to Poole & McGonigle.

PHOENIX, ARIZ., 170 tons, bridge on Holbrook-Lupton highway; general contract to F. D. Shufflebarger, Albuquerque, N. M., steel to unnamed bidder.

PORTLAND, ORE., 100 tons, hangar on Swan Island, to Poole & McGonigle.

SAN FRANCISCO, 350 tons, warehouse for Western Sugar Refining Co., to California Steel Co.

SAN FRANCISCO, 300 tons, factory for Link-Belt, Meese & Gottfried Co., to Pacific Coast Engineering Co.

SAN FRANCISCO, 150 tons, apartment building, Sixteenth and Clement Streets, to McClintic-Marshall Co.

SAN FRANCISCO, 100 tons, apartment building, Fifteenth Avenue and West Portal Street, to McClintic-Marshall Co.

BAKERSFIELD, CAL., 120 tons, telephone building, to Judson-Pacific Co.

BAKERSFIELD, 185 tons, Haberfelde Building, to McClintic-Marshall Co.

LOS ANGELES, 175 tons, warehouse for Crane Co., to Consolidated Steel Corporation.

YORBA LINDA, CAL., 125 tons, packing plant, to Pacific Iron & Steel Co.

SACRAMENTO, CAL., 738 tons, Shasta River bridge, to Minneapolis-Moline Power Implement Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

SOMERVILLE, MASS., 100 tons, ice manufacturing plant.

NEW YORK, 5150 tons, section 3, route 110, of subway in Brooklyn; readvertised for bids which are due Dec. 3.

NEW YORK, 3200 tons, loft building at Seventy-sixth Street and Madison Avenue.

NEW YORK, 1450 tons, two apartment buildings at 431 East Fifty-first and on East Fifty-second Street.

NEW YORK, 330 tons, widening of Washington bridge.

NEW YORK, 1250 tons, building at Fifth Avenue and Fifty-seventh Street.

PENNSYLVANIA RAILROAD, 375 tons, bridge at Shinnecock, Long Island.

ERIE, PA., 300 tons, building for Mutual Telephone Co.

AUBURN, N. Y., 400 tons, building for Firth Carpet Co.

RICHMOND, VA., 2000 tons, warehouse for American Tobacco Co.

DETROIT, 5000 tons, building for Sharer estate.

DETROIT, 2000 tons, Union League Club.

FLINT, MICH., tonnage unstated, power house for Dow Chemical Co.

CLEVELAND, 1500 tons, National Town and Country Club building, Thompson, Starrett & Co. general contractors.

CINCINNATI, 40,000 tons, Cincinnati Union Terminals Co.; first inquiry out for unstated tonnage in connection with this project.

CHICAGO, 1000 tons, Twelfth Street bridge.

Reinforcing Steel

Awards, Totaling 2500 Tons, Are Exceptionally Light

REINFORCING steel lettings, amounting to 2500 tons, reflect a seasonal slackening in construction work. The largest awards were 575 tons for a school at Amherst, N. Y., and 550 tons for an industrial plant at Chicago. Fresh inquiries are very light, totaling only 1200 tons. Awards follow:

STATE OF CONNECTICUT, 200 tons, road work, to Concrete Steel Co.

AMHERST, N. Y., 575 tons, school, to R. S. McMannus Steel Construction Co.

CHICAGO, 550 tons, for Grigsby-Grunow Co., 200 tons to Kalman Steel Co. and 350 tons to Olney J. Dean & Co.

SPRINGFIELD, ILL., 450 tons, State buildings, to Inland Steel Co.

SAN FRANCISCO, 100 tons, apartment building, Union Street, to W. C. Hauck & Co.

TACOMA, 155 tons, penstocks for Lake Cushman project, to Northwest Steel Rolling Mills.

SEATTLE, 100 tons, store for Firestone Tire & Rubber Co., to Northwest Steel Rolling Mills.

PORTLAND, ORE., 100 tons, hangar, Swan Island, to Mercer Steel Co.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

ALBANY, N. Y., 200 tons, County jail.

CLEVELAND, 120 tons, repeater buildings for American Telephone & Telegraph Co.

SPRINGFIELD, ILL., 150 tons, addition to Centennial building.

GRANITE CITY, ILL., 130 tons, St. Elizabeth's Hospital.

LOS ANGELES, 125 tons for city; bids Nov. 19.

SACRAMENTO, CAL., 317 tons, paving work in Imperial County; bids Dec. 4.

Sales Cartel Planned for Continent

British Costs Bother Pig Iron Makers—Germany Using More Aluminum—Aircraft Engine Builders Busy

(*By Cable*)

LONDON, ENGLAND, Nov. 18.

DOMESTIC demand for Cleveland pig iron is well sustained and likely to increase, as the Furness Shipbuilding Co., Ltd., has secured orders for seven large, all-British tank ships. Export sales are restricted by the high price, but makers' stocks are all sold and current output is going into consumption.

Hematite prices are firm and makers are well sold into February, asking up to £4 1s. ($19.64) a ton, but accepting tonnage for delivery before the end of the year at £3 18s. ($18.90) a ton.

New business in finished iron and steel is quiet, but specifications are coming in freely against domestic orders which were placed prior to the meeting of the steel makers' committee and mills are generally well engaged.

Export business still lags, but inquiry is more promising. The British Steel Makers' Export Committee, which handles large export orders in certain markets, is likely to form a central sales office in London.

The Government is meeting the employers' and workers' executives in the shipyard dispute on Nov. 19, when it is hoped that a lockout will be averted.

British exports of pig iron in October were 36,000 tons, of which the United States received 1300 tons. Total exports of iron and steel were 390,500 tons.

Tin plate business is steady and prices are likely to advance if the tin market rises materially, as makers are well sold ahead and current unfilled orders are the largest in a number of years. Some mills are booked well into the first half of next year. New business is fair with heavy Far Eastern demand for light, 14 x 20-in. tin plate, because of restricted supplies.

Galvanized sheet orders are small, but scattered, with Indian demand poor. Japanese makers are reported outbidding British mills on Indian orders for No. 24-gage galvanized sheets and are offering increasing competition in China and Africa. Black sheets are inactive in the Japanese specifications and prices have been reduced.

Continental markets have been steadied as a result of the International Steel Cartel's output restriction plans, so that with makers receiving sizable orders some mills are naming 12 to 14 weeks as the earliest delivery. British consumers are buying lightly, especially as the British sheet trade is very quiet.

British Pig Iron Costs High —Export Trade Small

LONDON, ENGLAND, Nov. 8.—The iron and steel trade remains in small volume. The tone of the pig iron market, particularly on the North East Coast, is improved, with consumers showing slightly less caution in placing orders. Makers, however, are dissatisfied with current prices, as production costs continue to rise steadily. In the Cleveland district, blast furnaces are well engaged for the current month, but there has not been much forward buying and, as a result, Bolckow, Vaughan & Co., Ltd., is blowing out one furnace. Stocks of Cleveland iron are small, so that makers are able to maintain their prices, but merchants with low-priced contracts are selling at slightly less than the furnaces. Most of the demand has been from domestic sources, since foreign buyers are reluctant to pay present prices, especially in view of the weaker tone on the Continent.

Hematite furnaces have been able to sell some good tonnages abroad, especially in Southern Europe, and have advanced their prices to £3 18s. ($18.95) per gross ton for East Coast, mixed numbers, which is still considered about 2s. (49c.) less than cost. Coke is scarce, with prices rising steadily, 24s. ($5.83) a ton having

British and Continental European Export Prices per gross ton, f.o.b. United Kingdom Ports, Hamburg and Antwerp, with the £ at $4.85

British Prices, f.o.b. United Kingdom Ports

Cleveland No. 3 foundry	£3	12½s.	to	£3	13½s.	$17.58	to	$17.82
East Coast hematite	3	18	to	4	1	18.94	to	19.64
Ferromanganese, export	13	10	to	14	0	65.47	to	67.90
Billets, open-hearth	6	5	to	6	7½	30.31	to	30.92
Sheet bars, open-hearth	6	5	to	6	10	30.31	to	31.52
Black sheets, Japanese specifications	12	10				60.62		
Tin plate, per base box	0	18¾	to	0	19	4.54	to	4.60
Rails, 60 lb. and heavier	7	15	to	8	15	37.59	to	42.43
						Cents per Lb.		
Steel bars, open-hearth	7	15	to	8	10	1.67	to	1.84
Beams, open-hearth	7	2½	to	7	12½	1.55	to	1.65
Channels, open-hearth	7	7½	to	7	17½	1.60	to	1.71
Angles, open-hearth	8	2½	to	8	12½	1.76	to	1.86
Ship plates, open-hearth	7	12½	to	8	2½	1.66	to	1.76
Black sheets, No. 24 gage	10	0	to	10	5	2.17	to	2.21
Galvanized sheets, No. 24 gage	12	15	to	13	0	2.76	to	2.86

Continental Prices, f.o.b. Antwerp or Hamburg

Foundry iron, 2.50 to 3.00 per cent sil., 0.50 to 0.90 per cent phos.	£3	8s	to	£3	11½s.	$16.49	to	$17.33
Foundry iron, 2.50 to 3.00 per cent sil., 1.00 per cent and more phos.	3	7	to	3	8	16.24	to	16.49
Billets, Thomas	4	13	to	4	13½	22.56	to	22.80
Sheet bars, Thomas	4	12	to	4	12½	22.31	to	22.43
Wire rods, low C., No. 5 B.W.G.	6	3	to	6	5	29.82	to	30.30
Rails, 60 lb. and heavier	6	8½	to	6	10*	31.16	to	31.52
Rails, light	6	1½				29.46		
						Cents per Lb.		
Steel bars, merchant	5	5	to	5	7½	1.14	to	1.16
Steel bars, deformed	5	3	to	5	4	1.12	to	1.13
Beams, Thomas, British standard	4	19	to	5	5	1.07	to	1.14
Channels, Thomas, American sections	5	14	to	5	18	1.25	to	1.27
Angles, Thomas, 4-in. and larger, over ¾-in. thick	5	2	to	5	7½	1.09	to	1.16
Angles, Thomas, 3-in.	5	6				1.14		
Ship plates, open-hearth inspected	7	5				1.61		
Black sheets, No. 31 gage, Japanese	12	4	to	12	5	2.68	to	2.70
Hoop and strip steel over 6-in. base	5	14				1.25		
Wire, plain, No. 8 gage	7	2½	to	7	3½	1.54	to	1.55
Wire, galvanized, No. 8 gage	8	15	to	8	16	1.87	to	1.89
Wire, barbed, 4-pt. No. 12 B.W.G.	11	4	to	11	F	2.47	to	2.48
Wire nails, base	0	7¼				$1.75	per	keg
Wire nails, assortments, 1 to 6-in. keg	10	6½				2.23		

*Open-hearth steel, 8s. ($1.94) per ton extra.

been paid for Durham coke of good average quality.

In high-quality semi-finished steel, domestic makers, particularly in Sheffield, are supplying the bulk of British requirements, but most of the business in ordinary crude steel has gone to Continental makers, the recent recession of the market having made their prices attractive.

Producers of finished products have little new business except for certain domestic construction and engineering orders. Export is difficult with keen competition on the Continent, and most of the export business now being booked is with Colonial railroads, shipping companies and Government departments. Decision of the International Steel Cartel to restrict its production quota by 10 per cent is expected to aid in advancing Continental prices, which should result in some increase of business abroad for British sellers.

German Builder of Wasp and Hornet Motors Busy

HAMBURG, GERMANY, Nov. 4.—The Bayrische Motorenwerke A. G., Munich, which builds the Wasp and Hornet motors under license from the Pratt & Whitney Aircraft Corporation, has had substantial motor sales in Germany and for export. Orders from abroad have been from Asia and Mediterranean countries and, added to a good domestic business, have permitted full operation, which is expected to continue until July, 1930.

This company is also building the British Austin automobile motor and has introduced on the German market a new design of small car with 775 cu. cm. cylinder volume. This model is being sold at a low price with considerable success and is a direct competitor of the popular small car of the Opel works, controlled by the General Motors Corporation.

Gain in Exports of Wood-Working Machinery

Foreign markets for American sawmill and wood-working machinery have been gradually expanding during the past few years. With the exception of a slight drop in 1926, exports have tended steadily upward, according to the Industrial Machinery Division, Department of Commerce. They totaled more than $3,200,000 in 1928, compared with $2,560,000 in 1927, $2,434,000 in 1926 and $2,446,000 in 1925.

Canada is by far the best customer for American sawmill and wood-working machinery, in 1928 accounting for 22 per cent of the total. The United Kingdom ranks next, taking American sawmill machinery to the value of $457,000 last year. Sales to Russia, after averaging about $40,800 during the preceding three years, rose suddenly to more than $275,000 in 1928. Both the Philippine Islands and Australia bought well over $200,000 worth last year.

Europe Plans Sales Cartel

Continental Mills Agree to Cooperate in Effort to Form Large Export Sales Organization

DÜSSELDORF, GERMANY, Nov. 11.—That the long sought and much discussed selling organization for the International Steel Cartel may take form before the end of this year appears possible from the fact that the committee working on such an organization finally gained the consent of all cartel members last month and will introduce its formal proposal at the next meeting. It is generally realized in the cartel, especially in Germany, that the present plan of a maximum quota for each member country fails when business is good, as it is impossible to fix a fine that a member is not willing to pay when the possibility of additional business appears.

The plan in its preliminary form calls for four subsidiary cartels, grouping the membership of the International Steel Cartel, as follows: Group No. 1, Germany and the Saar; Group No. 2, Belgium; including Luxemburg; Group No. 3, France; and Group No. 4, Austria, Czechoslovakia and Hungary. A central sales office is proposed in Luxemburg, or some Swiss city, and export prices will be maintained as firmly as possible. A domestic cartel in a member country will not be permitted by the selling cartel to revise its prices without the consent of the other three groups.

The sales cartel will control export prices of semi-finished steel, bars, plates, beams, rods and Thomas quality structural shapes. Provision has not been made to include cold rolled hoops and sheets thinner than 3 mm., open-hearth structural steel, or products already internationally controlled, such as tubes and rails.

The allotment for each of the four groups in the cartel will be on the basis of the exports of each group in 1929. Should orders be accepted in excess of these allotments they will not be subject to a fine, but will be distributed pro-rata to all members. An interesting feature is the proviso that each group in the cartel must forward a copy of its contracts to the central selling office, which will keep the contracts in a confidential record, not available to the members of other groups. The sales organization has full authority over all contracts.

It will not be the purpose of the selling cartel to establish sales offices abroad and agents will be appointed only in certain European markets, such as London, Rotterdam and Antwerp. As in the past, it is intended to execute overseas business through the mills' own sales offices, or through exporters and importers. In the case of exporters it is planned to give uniform trade discounts based on quantities purchased. For example, these will range from 2.50 per cent to 5 per cent on bars.

While this proposal has not become effective, all members of the International Steel Cartel have agreed to cooperate on the basis of these conditions, which may be altered in certain details before becoming effective.

Large Mills Force Renewal of German Cartels

DÜSSELDORF, GERMANY, Nov. 4.—It appears probable that the German domestic syndicates in the steel industry will be generally renewed for another five years on or before Dec. 20.

At the meeting of the cartels Oct. 28, it was agreed that all domestic syndicates should terminate at one time on Jan. 31, and Dec. 20 was fixed as the latest date at which new agreements for their continuation could be negotiated. Consequently, should any cartel not be renewed, the members could immediately begin selling for delivery after Jan. 31 without being subject to any control. This decision was reached despite vigorous opposition from the smaller producing members of the cartels, who have ceased to maintain sales organizations, having become entirely dependent upon their cartel for distribution. These members would, therefore, be forced to assemble a sales personnel and begin selling direct in about six weeks. The larger producing members have their own sales departments, which could be rapidly increased to whatever size proved necessary.

Setting an early date for renewal of the various cartels is believed by many to have been purposely adopted by the larger producers to force the small plants to abandon their demands for increased allotments and special conditions, which were proving obstacles to renewal. It has evidently served the purpose intended and about the only remaining question to be settled before general renewal of the agreements is the allotment to be given to the Friedrich Krupp A.G., Essen.

Foreign Steel Sold in Japan on Price and Delivery

YOKOHAMA, JAPAN, Oct. 15.—Inquiry for finished steel has increased considerably as a result of building construction and repairs and bridge work. Much of this business is going to importers of foreign material, despite domestic producers' need of tonnage. The reason is said to be the uncertainty of deliveries from the Government works and other Japanese mills, especially when forward shipment is specified, and a slight advantage in price in favor of imported material. Shapes are available at £6 14s. per ton (1.47c. per lb.), c.i.f. Japanese port.

German Tariff Trend Upward

Advocates of Higher Duties Point to Example Set by United States—High Automotive Duties

BERLIN, GERMANY, Oct. 25.—The tariff bill under consideration in the American Congress has supplied propaganda to high-protection advocates in Germany, and various proposals for downward revision of the German tariff have been temporarily shelved. The so-called "minor" tariff of August, 1925, which provided for considerable increases in the duties on automotive products, typewriters, cash registers and other leading American export items, was scheduled to expire Dec. 31, this year. It is now believed that it will be extended.

Following the Geneva Economic Conference in 1927, the Cabinet introduced a bill reducing the duties on 141 items in the tariff, but this bill has not been passed and is considered dead. During the summer, duties on wheat, barley and other American export foods were advanced and when the commercial treaty with Sweden expires further advances in these rates will probably be made. A duty is likely to be imposed on raw aluminum, which is at present duty free but on the import prohibition list, to be brought in only under license.

As the Reichstag in committee has decided to ratify the Geneva convention resolution abolishing import and export prohibitions, a duty on aluminum is regarded as essential to prevent the United States and Canada from swamping the German market. Although German public opinion still appears to favor lower tariffs, agitation from industries that claim to be threatened by low-priced foreign products is strong.

Canada to Consider New Iron and Steel Tariffs

The Advisory Board on Tariff and Taxation of Canada has published its new suggested schedule of iron and steel products made in Canada or imported into the Dominion. The revised schedule comprises thousands of articles into which iron and steel products enter. No tariff rates are entered on the new schedule, these being for the minister of finance to decide and include in his budget.

The board on Nov. 26, will open its most important hearing since its inception. The entire schedule will be dealt with at the hearing, which will continue for several weeks.

The new schedule, which comprises a book of 84 pages, is to be circulated throughout Canada to any manufacturer, producer or consumer who desires it. The Canadian Manufacturers' Association will send out about 4500 copies to its members. Any business man or manufacturer who believes his business will be affected in any way will have the right to make his own representations to the board, either by mail or personally. No sworn evidence is taken, but the board asks for facts to substantiate claims.

The iron and steel schedule has not been revised since 1906 and upon evidence at the hearing tariff charges in the next budget will be based.

After the hearing the evidence will be laid before the minister of finance and with the tariff experts of the board and of the Department of Finance the new rates will be agreed upon.

German Aluminum Demand Increasing

HAMBURG, GERMANY, Nov. 4.—Despite recent increases in the capacity of aluminum producing plants in Germany, requirements are such that there are almost no existing stocks. It is estimated that the 1929 output of aluminum may exceed the 1928 figure of 35,000 tons by 7000 to 8000 tons. The question of a duty on aluminum has not yet been decided, but aluminum producers have agreed not to advance the domestic price of aluminum beyond the world market level.

Japan Expects to Buy Less Indian Iron

YOKOHAMA, JAPAN, Oct. 15.—Importation of Indian pig iron may be reduced to a minimum during the coming year, if the new 500-ton blast furnace at Yawata is ready for operation as soon as expected. Of the 1,000,000 tons of pig iron annually required by the Government works, about 100,000 tons has been bought from the South Manchuria Railroad Co. furnace at Anzin, Manchuria. With the new Government Works furnace in operation, the company will be self-supplying, which will leave the Anzin pig iron for sale in the open market to other Japanese consumers, who are now using imported iron, principally from India.

German Wire Rod Cartel May Lower Prices

HAMBURG, GERMANY, Nov. 4.—With its members unable to agree on allotments and methods to meet outside competition, the German Wire Rod Cartel is faced with serious difficulties. A number of members of the cartel are advocating further price reductions in view of the lower market for wire and wire products. It is pointed out that reduced wire prices for export have stimulated business in the United Kingdom and that British wire mills which largely use Continental wire rods have been unable to reduce their prices on wire. The margin for conversion of wire rods into wire has recently been narrowed by 15s. to 25s. ($3.63 to $6.05) a ton.

A reduction in wire rod prices would aid British and other foreign consumers to meet present market prices on wire, it is argued, and would result in an increase in wire rod exports. Although the official price of the cartel is still £6 5s. ($30.37) a ton, f.o.b. Antwerp, concessions of 1s. to 2s. (24c. to 48c.) a ton have been made on recent sales.

German Tube Prices Exceed British and American

HAMBURG, GERMANY, Nov. 4.—Members of the German Tube Syndicate are protesting against present export prices of that organization. The quotations are slightly higher than the prices of American and British mills, but the syndicate explains this unusual situation by the statement that Germany has exceeded its quota in the International Tube Cartel and must reduce export sales until British and American works have reached their allotment.

The producers and sellers of tubes point out that this policy has resulted in curtailment by certain mills and has forced German exporters to place desirable export business with mills in France, Belgium and the Saar. It it further claimed by the tube mills that, although all the important world producers are in the cartel, except certain makers in Spain, Italy and Poland, the market is not effectively controlled and cartel prices are continually shaded by outsiders as well as by other member countries.

Cartel Quota Reduction May Not Aid Business

PARIS, Nov. 6.—Action of the executive committee of the International Steel Cartel in hastily meeting on Oct. 30, and recommending a 10 per cent reduction in all quotas, effective Nov. 1, equivalent to 3,250,000 tons, is attributed to the cancellations of export orders following the first American stock market break. There has been a steady decline in domestic demand since August, but Belgian and certain German mills have been insisting on full output because of their export business. It is believed in some quarters that the recent 10 per cent reduction has come too late to cause improvement and without some unexpected favorable change, another reduction may be necessary in January.

The Federal Trade Commission has authorized the holding of a trade practice conference with the fire-resisting safe industry. A time or place has not yet been determined. Commissioner C. W. Hunt will preside at the meeting.

Machinery Markets and News of the Works

Sales Continue at Fair Rate

Usual Tapering Off at End of Year, However, Is Becoming Apparent

IN view of the unsettled situation which has resulted from the recent deflation of security values, machine tool sales have been fairly good, although the total volume is running somewhat behind that of October.

In this connection, however, it must be remembered that business booked by tool builders usually tapers off during the last two months of the year and that some letdown was apparent even before the stock market collapsed. It is significant that few, if any, cancellations of orders are reported by the industry.

Aside from rather sharp curtailment in radio manufacturing and a less drastic paring down of production in electric refrigerators and one or two other luxury or semi-luxury lines, metal-working plants have not been seriously affected by the stock debacle. Many companies are going ahead with their plans for the future, despite the possibility of some business reaction. It is not unlikely, however, that some machine tool buying that would have been done this year will be postponed until an adequate appraisal of the industrial trend can be made.

Most purchases in the past week have been confined to one or two machines each, but orders in the aggregate have kept the total volume at a moderate level. The Thew Shovel Co., Lorain, Ohio, has an inquiry out for a number of tools. Some business is coming from tire mold makers who are preparing for next year's production.

Deliveries on some lines of tools have shortened, but generally delivery dates still extend well into 1930.

Orders booked in October by members of the National Machine Tool Builders' Association showed a gain of 34 per cent over September, the association's index rising from 240.8 in September to 322.2 in October. The improvement was sufficiently pronounced to turn up again the three months' average index, which now stands at 287. Shipments were heavy during the month, cutting down unfilled orders to less than two and a half times the current rate of shipments.

New York

NEW YORK, Nov. 19.—Aside from rather sharp curtailment in radio manufacturing and a less drastic paring down of manufacturing programs in electric refrigerators and one or two other luxury or semi-luxury lines, the metal-working manufacturing industries of the New York district have not materially been affected by the recent stock market deflation. Machine tool salesmen who have canvassed the situation report that many companies are going ahead with their plans for the future, despite the possibility of some business reaction. Sales of machine tools have fallen off to a marked extent in the past week, and inquiries also are fewer, but in any event some letdown would have been apparent as the year comes to an end.

Records of machine tool sales show that business has nearly always tapered off in the last two months of each year, 1928 having been an exception. In many instances manufacturers have postponed prospective purchases until after Jan. 1, but some of these postponements had been decided upon before the deflation of security values had injected a new element in the situation. No cancellations of orders are reported in this district. Deliveries of some lines of machine tools have shortened moderately, but except for lathes, which are obtainable from some makers in two or three weeks, many delivery dates extend into January or later.

Department of Street Cleaning, Municipal Building, New York, and 68 Hunterspoint Avenue, Long Island City, has plans for one-story equipment storage, service and repair shop at Long Island City, to cost about $150,000 with equipment.

Atlantic Basin Iron Works, Inc., 168 Van Brunt Street, Brooklyn, has awarded general contract to Gibbons Co., 343 Columbia Street, for rebuilding part of plant recently damaged by fire, comprising two-story shop unit, to cost about $45,000 with equipment.

J. E. Kelly & William Cain, 45 South Broadway, Yonkers, N. Y., architects, have filed plans for an automobile service, repair and sales building on South Broadway, to cost $165,000 with equipment.

Richfield Oil Corporation of New York, Inc., Chanin Building, New York, a subsidiary of Richfield Oil Corporation, Los Angeles, Cal., has acquired former storage and distributing plant of Petroleum Terminal Corporation, Bayonne, N. J., for Eastern plant for tank vessels from California properties. Company has also purchased similar plant of Municipal Service Real Estate Co., Inc., Newtown Creek, Brooklyn, for service in that district. Plans are under consideration for extensions and improvements in properties. C. M. Fuller is president of parent organization.

New York City Airport, Inc., care of Lawrence Halleran, Halleran Agency, 63 Broadway, Flushing, L. I., will take bids in about 60 days for airport buildings on field now being established at College Point, L. I., including hangars, machine shop, oil storage and other units, to cost more than $500,000 with equipment.

Paramount Cab Corporation, 730 Fifth Avenue, New York, has leased former Chrysler service station at 637-47 West Fifty-seventh Street, totaling 37,500 sq. ft. floor space, for new service, repair and garage unit for taxicabs, with machine shop and parts department.

A. H. Grebe & Co., 70 Van Wyck Boulevard, Richmond Hill, L. I., manufacturers of radio sets and equipment, parts, etc., has leased additional space in Bush Terminal, First Avenue, Brooklyn, for storage and distribution, releasing space heretofore used at factory for this purpose, and which will be used for increased facilities for manufacture of radio receivers and parts.

Board of Education, Schenectady, N. Y., is considering installation of manual training equipment in three-story high school in Mount Pleasant section, to cost more than $250,000, for which bids are being asked on general contract until Dec. 14. R. L. Bowan, 207 State Street, is architect.

Wilchik & Kline, Inc., New York, manufacturer of paper boxes and containers, has leased floors in building at 190-2 Greene Street, and will occupy for new plant.

Board of Trustees, Industrial Institute of Brooklyn, 26 Court Street, will take bids in about 60 days for new industrial school on 35-acre tract recently acquired at Toms River, N. J., to cost over $100,000 with equipment. Walter S. Schneider, 1757 Broadway, New York, is architect.

Hubeny Brothers, 617 East First Avenue, Roselle, N. J., machinists, have asked bids on general contract for one-story addition to machine shop, to cost close to $25,000 with equipment. W. L. Finne,

1201 East Grand Street, Elizabeth, N. J., is architect.

Salmon Brothers, Netcong, N. J., road contractors, have purchased municipal stone-crushing plant at Newton, N. J., inactive for several years, and will remodel for branch plant, including installation of conveying, loading and other mechanical-handling equipment.

Driver-Harris Co., Middlesex Street, Harrison, N. J., manufacturer of wire products, has authorized construction of power plant for new two and three-story factory group, to cost about $40,000 with equipment. Entire project will cost over $350,000. J. A. Finegan, 776 Broad Street, Newark, is architect.

Spanjer Brothers, Inc., 198 Badger Avenue, Newark, manufacturer of signs and displays, has purchased two-story factory at 267-71 Mount Pleasant Avenue, for new plant to replace former works recently destroyed by fire and which will not be rebuilt at this time, as previously reported.

Thomas A. Edison, Inc., West Orange, N. J., will discontinue manufacture of standard size talking machines and parts, and will use space at plant heretofore given over to such production for manufacture of radio equipment, as well as combination electric talking machines and radio sets. R. R. Karsh is vice-president.

Shell Eastern Petroleum Products, Inc., 122 East Forty-second Street, New York, a subsidiary of Shell Union Oil Co., St. Louis, will soon begin work on oil storage and distributing plant at East Rutherford, N. J., with machine shop, to cost over $140,000 with equipment.

Truscon Steel Co., Youngstown, has opened a new warehouse at Harrison, N. J., 75 x 210 ft. It maintains an office at 605 Broad Street, Newark.

New York Central Railroad Co., 466 Lexington Avenue, New York, has awarded general contract to J. F. Fitzgerald Construction Co., 38 Chauncy Street, Boston, for addition to engine house, with repair facilities, at Utica, N. Y., including improvements in present structures, to cost over $50,000 with equipment. F. B. Freeman is chief engineer.

New England

BOSTON, Nov. 19.—Industrial New England apparently has not felt the recent stock market slump to any appreciable extent. Sales of machine tools have been in fairly good volume. A number of local sellers will make a good November showing, even though orders during the remainder of the month are not large. Orders have come from all parts of the territory. Demand for used tools and small tools has also held up well.

Springfield Bronze & Aluminum Co., Springfield, Mass., will soon start work on a one-story addition, 60 x 82 x 142 ft. A molding department will be installed.

City of South Norwalk, Conn., has plans for a junior high school, with manual training department, to cost $350,000.

Hartford Empire Co., Hartford, Conn., has taken bids for a one-story steel storage building, 40 x 100 ft. Overhead conveying equipment will be required.

Wood Hydraulic Hoist & Body Co., 316 North Beacon Street, Boston, has filed plans for an addition to cost about $25,000 with equipment. Headquarters are at 7924 Riopelle Avenue, Detroit.

Somerville Auto Body Co., 643 Broadway, Somerville, Mass., has plans for one-story factory, 75 x 100 ft., to cost about $45,000 with equipment.

Following acquisition of controlling interest in Indian Motorcycle Co., Springfield, Mass., a few months ago by Charles A. Levine, New York, and associates, ownership has reverted to local group headed by J. Russell Wait, who will again become president of company. Plans for developments in airplane manufacture, as first proposed, will not be carried out, but production will be concentrated on motorcycles and parts, as well as on outboard gasoline engines for boats.

E. W. Carpenter Mfg. Co., Railroad Avenue, Bridgeport, Conn., manufacturer of wire goods, sheet metal stampings, dies, etc., has awarded general contract to Hewlett Co., 886 Main Street, for a one-story addition, 60 x 200 ft., to cost over $50,000 with equipment. Fletcher-Thompson, Inc., 542 Fairfield Avenue, is architect and engineer.

General Box Co., Winchendon, Mass., manufacturer of wire-bound boxes, crates, etc., has plans for a two-story addition, 60 x 160 ft., to cost about $45,000 with equipment. Thompson & Lichtner Co., Inc., Statler Building, Boston, is architect. Headquarters are at 508 North Dearborn Street, Chicago.

Lamb & O'Connell Shipyard, Squantum, near Quincy, Mass., plans rebuilding part of plant recently destroyed by fire.

Officials of Whitin Machine Works, Inc., Whitinsville, Mass., manufacturer of textile machinery and parts, and Oscar Kohorn & Co., Chemnitz, Germany, manufacturers of machinery for rayon mills, have organized Whitin-Koborn, Inc., to produce rayon machinery in United States under Koborn patents. Part of Whitinsville plant will be given over to this line. New company will also arrange for service and repair units in different parts of country for rayon mills using its equipment. E. K. Swift, treasurer and general manager of Whitin company, will be president of new organization; P. K. Uhleman is secretary and treasurer.

The Crane Market

THERE is a fair volume of pending inquiry for locomotive cranes, most of which is from large industrial users. In the past week the Tidewater Oil Co., New York, has closed on a 25-ton locomotive crane with the Browning Crane Co. In the overhead crane field there is a tendency on the part of buyers to postpone action until they feel that the future trend of business is more definitely determined. These prospective buyers are, as a rule, maintaining a fair rate of operation, although somewhat less than in the first half of the year. The Phoenix Utility Co., 71 Broadway, New York, has a 25-ton, 1-motor, overhead crane to buy and the Standard Oil Co. of New Jersey is inquiring for a 3-ton hand power crane for export.

In the Pittsburgh district a number of crane orders have been placed, but new business has declined rather sharply since the first of the month. The Westinghouse Electric & Mfg. Co., East Pittsburgh, is inquiring for six 3-ton to 5-ton electric traveling cranes.

Among recent purchases are:

Roger Daoust, Defiance, Ohio, gasoline operated crawl-tread crane from Orton Crane & Shovel Co.

Keeport Stone & Lime, Inc., Logansport, Ind., 22-ton, steam operated locomotive crane from Orton Crane & Shovel Co.

H. D. Conkey & Co., Mendota, Ill., report the following recent orders for overhead equipment: National Carbide Corporation, Keokuk, Iowa, 5-ton, 38-ft. span, 3-motor crane; Dallas Brass & Copper Co., Chicago, 6-ton, 27-ft. 6-in. span transfer crane; Kansas City, Kan., 5-ton, 27-ft. 10-in. span hand power crane; Consolidated Paper Co., Monroe, Mich., 10-ton, double girder hand power crane; General Alloys Co., Champaign, Ill., 5-ton, 46-ft. 10-in. span, 3-motor, double girder crane; Buckeye Coal Co., Nemasolin, Pa., 5-ton, 23-ft. 6-in. span hand power crane; Truscon Steel Co., Youngstown, 2-ton, 35-ft. span single I-beam electric crane; Sauerman Brothers, Chicago, 10-ton, 27-ft. 4½-in. span, double girder electric crane and 1½-ton mast type jib crane; Penn Railroad Co., Crestline, Ohio, 10-ton, 37-ft. span single I-beam electric crane; Roanoke Webster Brick Co., Webster, Va., 3-ton, 18-ft. span hand power crane.

Philadelphia

PHILADELPHIA, Nov. 18.—Morris, Wheeler & Co., Inc., Roberts Avenue and Pennsylvania Railroad, Philadelphia, iron and steel products, has awarded general contract to McCormick-Lenham Co., Fortieth and Chestnut Streets, for one-story storage and distributing plant, to cost about $30,000 with equipment.

Bachmann Brothers, 609 Commerce Street, Philadelphia, manufacturers of celluloid products, have plans for a new factory, to cost over $70,000 with presses and other equipment. Eugene A. Stopper, Fuller Building, is architect.

General Steel Castings Co., Eddystone, Pa., has begun work on new building, 60 x 200 ft., for general operating service, for which contract recently was let to Wark Co., 1608 Walnut Street, to cost $125,000. Simon & Simon, Fidelity Building, are architects.

Edward G. Budd Co., Twenty-fifth Street and Hunting Park Avenue, Philadelphia, manufacturer of steel automobile bodies, has awarded general contract to Wark Co., 1608 Walnut Street, for one-story manufacturing unit, to cost about $20,000 with equipment.

Board of Education, Paulsboro, N. J., is considering installation of manual training equipment in new three-story high school to cost about $300,000, for which plans are being drawn by Edwards & Green, 548 Federal Street, Camden, N. J., architects.

City Commission, City Hall, Trenton, N. J., will receive bids until Nov. 29 for pumping machinery, piping, valves, etc., for pumping plant on Clearfield Avenue. Leon D. Hirsch is city clerk.

Charles J. Schiemer, 232 North Charlotte Street, Lancaster, Pa., and associates have organized Multivane Blower & Electric Co., and will operate local plant for manufacture of heat-regulating devices and equipment, mechanical blowers, parts, etc. Chester W. Bowman, Lancaster, is also interested in new company.

Lebanon Steel Foundry Co., Lebanon, Pa., has awarded general contract to Hughes-Foulkrod Co., 1515 Race Street, Philadelphia, for two-story foundry addition, 150 x 182 ft., to cost $100,000 with equipment. Wilbur Watson & Associates, 4614 Prospect Avenue, Cleveland, are architects and engineers. W. H. Worrilow is president.

Chamber of Commerce, Coatesville, Pa., has authorized purchase of 120-acre tract on Lincoln Highway for new municipal

airport, to include hangars, repair shop and other field units, to cost more than $75,000.

Board of Education, Keystone Building. Philadelphia, is asking bids until Dec. 3 for vises, etc., as per list on file at office of Edward Merchant, secretary and business manager.

Cochrane Brass Foundry, Boll and Spahn Avenues, York, Pa., is completing construction of new one-story foundry unit, 60 x 120 ft., to cost more than $30,000 with equipment.

Allis-Chalmers Mfg. Co., Milwaukee, has appointed T. B. Wood's Sons, Co., Chambersburg, Pa., special distributer of Texrope drives. A large stock of drives and belts will be carried at Chambersburg.

South Atlantic

BALTIMORE, Nov. 18.—Baltimore Copper Smelting & Rolling Co., Canton, Baltimore, has awarded general contract to Herbert J. West, Knickerbocker Building, for a one-story addition, to cost about $35,000 with equipment.

Baltimore Airways, Inc., Edward Handler, Calvert Securities Corporation, 32 South Calvert Street, Baltimore, president, is planning construction of four hangars, with reconditioning and repair facilities, at airport on Park Heights Boulevard, to cost more than $85,000 with equipment; other field units are also proposed. Company is arranging for sale of 50,000 shares of common stock, part of fund to be used for expansion.

Baugh Chemical Co., 25 South Calvert Street, Baltimore, has plans for a one and two-story commercial fertilizer manufacturing plant, to cost about $100,000 with conveying and other equipment. W. H. Ulrich is company engineer.

Wicomico County Board of Education, Salisbury, Md., has authorized installation of manual training equipment in new three-story high school to cost about $300,000, for which bids will be asked soon on general contract by Smith & May, Calvert Building, Baltimore, architects.

Richmond Engineering Co., Richmond, Va., plans rebuilding part of metal-working shop destroyed by fire Nov. 9.

Nantahala Co., recently organized, has purchased properties of North Carolina Talc & Mining Co., Hewitts, N. C., consisting of 8000-acre tract in Nantahala Gorge district, and plans installation of works for mining of soapstone, limestone, talc and kindred products.

Old Dominion Anthracite Coal Corporation, Pulaski, Va., is considering rebuilding electric power plant at properties about 8 miles from city, recently partially destroyed by fire.

American Tobacco Co., 111 Fifth Avenue, New York, plans installation of elevating, conveying and other material-handling equipment in five new storage and distributing plant at Durham, N. C., for which general contract has been let to Fiske-Carter Construction Co., Greenville, S. C., to cost about $500,000. Company is also building similar units at Reidsville, N. C., to cost more than $250,000.

Schofield Co., 2 East Saratoga Street, Baltimore, manufacturer of silverware, metal plated goods, etc., has leased four-story plant to be erected at 3-7 East Pleasant Street, for which general contract has been let to Consolidated Engineering Co., 20 East Franklin Street, to cost about $45,000.

Norfolk Radiator Works, Inc., 160 West Olney Road, Norfolk, Va., manufacturer of automobile radiators and equipment, has awarded general contract to Nichols & Lindemann, Norfolk, for one-story plant, to cost about $30,000 with equipment. Neff & Thompson, Seaboard Bank Building, are architects. A. C. Martens is head.

Chain Belt Co., Milwaukee, has appointed following new distributers in Southeast for Rex chains and transmission equipment: Bailey - Lebby Co., Charleston, S. C.; Georgia Supply Co., Savannah, Ga., and Jacksonville, Fla.; Harry P. Leu Co., Orlando, Fla.; J. M. Tull Rubber & Supply Co., Atlanta, Ga.

High Point Machine & Mfg. Co., High Point, N. C., has been organized with capital of $100,000 to do a general machine shop and foundry business on site formerly occupied by High Point Machine Works. Company will manufacture gray iron, aluminum, bronze and boiler room castings and a few special machines, including a line of clamps for furniture factories.

Pittsburgh

PITTSBURGH, Nov. 18.—Business is slowing down somewhat and the volume of new inquiries is generally reported to be somewhat lighter. Purchases of single tools are being made from day to day, but some buyers are more cautious and a few have definitely postponed action on present inquiries until after the first of the year. Awards have not yet been announced on the Pittsburgh Board of Education's recent list, although bids closed some time ago. The United States Aluminum Co., New Kensington, Pa., has taken no action on a supplementary list of tools for which inquiries were sent out some time ago, but the Westinghouse Electric & Mfg. Co., East Pittsburgh, is closing regularly against its fourth quarter list. The Bethlehem Steel Co. has yet to place some tools for its Johnstown plant.

The effect of the recent stock market collapse on the machinery business is not yet fully apparent, but most local dealers are of the opinion that the trade will feel adverse influences over the remainder of the year. However, the year thus far has been extremely active and machinery and equipment builders in this and nearby districts have large backlogs of orders.

Westinghouse Electric & Mfg. Co., East Pittsburgh, has plans for initial unit of Eastern factory branch and distributing plant in meadow district, Newark, N. J., to be two stories, totaling 150,000 sq. ft. floor space, to cost about $500,000 with equipment. Bernard H. Prack, Martin Building, Pittsburgh, is architect.

Keystone Metal Specialties Co., recently formed by James K. Ruby, 1306 Park Avenue, McKeesport, Pa., and associates, plans operation of plant at Pittsburgh for manufacture of sheet metal products. James G. Fulton, 2850 Espy Avenue, Dormont, Pa., is interested in new organization.

Ingram-Richardson Mfg. Co., Beaver Falls, Pa., manufacturer of sheet steel and cast iron enameled products, has awarded general contract to Leroy Freed Co., 1211 Seventh Avenue, for one-story addition, 35 x 100 ft., to cost over $35,000 with equipment.

Duquesne Light Co., 435 Sixth Avenue, Pittsburgh, is planning for pumping plant and water-treating station at generating plant at Brunot Island, to cost $290,000 with machinery.

Mutual Telephone Co., 24 East Tenth Street, Erie, Pa., has closed bids on general contract for one and two-story equipment storage and distributing plant, with electrical and mechanical repair departments, and automobile service and repair shop, to cost $175,000 with equipment. Myers & Johnson, Commerce Building, are architects.

Loudon School District, Charleston, W. Va., plans installation of manual training equipment in high school at South Charleston, to cost $250,000, and junior high school at Marmet, W. Va., to cost $100,000. Bond election has been called on Dec. 10, and architect will be selected immediately thereafter.

Aviation Committee, Chamber of Commerce, Clarksburg, W. Va., is considering purchase of 40-acre tract on Buckhannon Road for city airport, to include hangars, repair shop and other structures, to cost more than $75,000 with equipment. J. M. Carskadon is chairman of committee.

William B. Scaife & Sons Co., range boiler and steel tank manufacturers, Pittsburgh, has recently completed a large warehouse for storing galvanized products.

Detroit

DETROIT, Nov. 18.—American Forging & Socket Co., Branch Street, Pontiac, is considering new plant comprising several one-story units, to cost about $150,000 with equipment.

American Oil & Grease Corporation, Jackson, is planning to rebuild part of plant recently destroyed by fire, with loss more than $100,000 including equipment.

Checker Cab Mfg. Co., Gibbons Street, Kalamazoo, manufacturer of taxicabs, will soon begin superstructure for one and two-story addition, primarily for automobile body manufacture, to cost more than $350,000 with equipment.

Copeland Products, Inc., 630 Lycaste Street, Detroit, manufacturer of electric refrigerating equipment, is arranging for early removal of plant to new buildings at Mount Clemens, Mich., where production will be concentrated and capacity increased.

Consumers Power Co., Jackson, will erect two-story addition to steam-operated electric generating plant at Kalamazoo, to cost over $150,000 with equipment. Stevens & Wood, Inc., 20 Pine Street, New York, is consulting engineer.

Clarke Sanding Machine Co., 3815 Cortland Street, Chicago, manufacturer of vacuum portable sanding machines and parts, has awarded general contract to Strom Construction Co., Muskegon, Mich., for one-story plant at last-noted place, totaling about 38,000 sq. ft. floor space; to cost more than $75,000 with equipment. Company will remove present plant to Muskegon, where production will be increased and concentrated. L. G. Hallberg, 116 South Michigan Avenue, Chicago, is architect.

Wood Hydraulic Hoist & Body Co., 7924 Riopelle Avenue, Detroit, has awarded general contract to Otto Randolph, Inc., 59 West Jackson Boulevard, Chicago, for one-story addition, 80 x 190 ft., to cost about $70,000 with equipment.

Lakey Foundry & Machine Co., Muskegon, is said to be arranging for rebuilding part of plant recently destroyed by fire.

O. L. Anderson Co., Inc., 1347 East Fort Street, Detroit, manufacturer of metal stampings, automobile gasoline tanks, etc., is contemplating one-story plant unit on site recently acquired, to cost about $70,000 with equipment.

Board of Education, Ypsilanti, plans installation of manual training equipment in new junior high school to cost $750,000, for which general contract has been let to R. S. Knapp Co., 15518 Idaho Street, Detroit. R. S. Gerganoff, Ypsilanti, is architect.

Briggs Commercial & Development Co., Buhl Building, Detroit, has plans for a new multi-story automobile service, repair and garage building at Pontiac, to cost more than $100,000 with equipment. A similar structure is planned at Detroit to cost close to like sum. Charles Kotting, Dime Bank Building, Detroit, is architect for both structures. Company also has plans for another such automobile building at Detroit, to cost more than $125,000 with equipment. O'Dell & Diehl, Donovan Building, Detroit, are architects for last-noted unit.

Chicago

CHICAGO, Nov. 18.—Activity in the local machine tool market has subsided somewhat from the rate of a week ago, the change being more noticeable in inquiries than in orders. Railroads are still taking figures for budget use, and several lines have intimated that 1930 purchases of machine tools will be heavy. A local steel mill after paring down its list has placed a 24-in. shaper and an 18-in. x 12-ft. and a 30-in. x 14-ft. lathe, and will buy five or six additional items. A local embossing press manufacturer has ordered a 48-in. planer.

Several farm implement makers have placed orders for machine tools. A Chicago jobbing shop plans to replace nine machine tools and the Great Northern Railroad will take prices on 15 tools, the majority of which are woodworking. Additional inquiries are expected from farm machinery manufacturers in Illinois, Iowa and Michigan. Shops, with the exception of those operated by radio manufacturers, remain busy. Nash Motors Co., after curtailing output last week, is now increasing production.

Belden Mfg. Co., 4625 Van Buren Street, Chicago, manufacturer of insulated wire and cable, has filed plans for a two-story building, 68 x 132 ft., to cost $60,000. A. S. Coffin, 6 North Michigan Avenue, is architect.

Allis-Chalmers Mfg. Co., West Allis, Wis., tractor division, has plans for one-story addition to plant at Springfield, Ill., to cost about $135,000 with equipmen.

Grigsby-Grunow Co., 2038 North Kolmar Avenue, Chicago, manufacturer of radio equipment and parts, has awarded general contract to H. Ericcson Co., 674 North La Salle Street, for three-story addition, 260 x 300 ft., to cost about $750,000 with equipment. Graham, Anderson, Probst & White, 80 East Jackson Boulevard, are architects. Company has also let contract to same company for two-story addition, 80 x 680 ft., to plant on Dickens Avenue, recently acquired, to cost more than $500,000 with equipment, for which plans were drawn by Holabird & Root, 333 North Michigan Avenue, architects.

Metz Mfg. Co., Seventeenth and Elm Streets, Dubuque, Iowa, manufacturer of sash, doors, etc., has awarded general contract to R. F. Conlon, Federal Bank Building, for three-story and basement addition, 80 x 130 ft., to cost about $60,000. C. I. Krajewski, 730 Main Street, is architect.

Colorado Fuel & Iron Co., Pueblo, has authorized electrification of mining properties at Crested Butte, Colo., including installation of additional equipment, to cost $175,000.

City Council, Watertown, S. D., is considering installation of a municipal electric light and power plant, to cost close to $100,000 with equipment.

Hume Pipe Corporation, Room 910, 100 West Monroe Street, Chicago, manufacturer of steel reinforced concrete pipe, is considering new plant at Arlington Heights, Ill., with main unit one-story, 75 x 165 ft., to cost about $115,000 with equipment. J. A. Dunn, Evanston, Ill., is vice-president and general manager.

Great Northern Railway Co., Railroad Building, St. Paul, Minn., has awarded general contract to Pappin & Dudley, Great Falls, Mont., for additions to local shops, including one-story car repair shop and mill, 115 x 600 ft., to cost about $50,000, and one-story wheel shop, 50 x 70 ft., to cost about $25,000 with equipment. T. D. McMahon is company architect, address noted.

Atchison, Topeka & Santa Fe Railroad Co., Topeka, Kans., has awarded a general contract to W. A. Smith Co., Fort Madison, Iowa, for extensions in engine house and repair shops at Shopton, Iowa, to cost $60,000 with equipment.

Public Service Co. of Colorado, Denver, is arranging an expansion program for 1930 to cost over $2,500,000. Work will include extensions in steam-operated electric power plants at Sterling, Grand Junction, Alamosa and other localities, to cost $700,000 with equipment, and an addition to the Valmont generating station near Boulder, to cost about $500,000 with machinery.

Sundstrand Engineering Co. has acquired a one-story factory at Harrison Avenue and Ninth Street, Rockford, Ill., with 10,000 sq. ft. floor space and will center all activities there. Company is planning expansion of its oil burner production.

Buffalo

BUFFALO, Nov. 18.—Union Carbide & Chemical Corporation, Niagara Falls, N. Y., plans expansion at local works for increase in production of carbide. Manufacture of ferroalloys will be transferred to plant of subsidiary at Glen Ferris, W. Va., where increased facilities will be arranged. Company will also carry out hydroelectric power development in last-noted State. Work will form part of a general development program to cost over $25,000,000. Headquarters are at 30 East Forty-second Street, New York.

Vanott Machine Corporation, Buffalo, recently organized by Thomas J. Mingovan, 174 Whitfield Avenue, and associates, with capital of $75,000, plans operation of local factory to manufacture machinery and parts. Vincent Schiavi, 559 McKinley Parkway, is also interested in new company.

Penn Yan Boat Co., Liberty Street, Penn Yan, N. Y., has plans by L. A. Harding Construction Corporation, 1335 Main Street, Buffalo, for addition to boat-building and repair plant, to cost about $135,000 with equipment. It is understood that construction company noted will receive general contract.

Union Free High School District No. 1, East Aurora, N. Y., is considering installation of manual training equipment in addition to high school, to cost $325,000, for which plans will be drawn by A. H. Merritt, Erie County Bank Building, Buffalo, architect.

Cleveland

CLEVELAND, Nov. 18.—Considering the unsettled situation that has resulted from the collapse of stock market prices, machine tool business held up quite well the past week. A fair volume of sales in single machines was well distributed among metal-working industries. Deliveries of some tools have been deferred, but there have been practically no cancellations. The Thew Shovel Co., Lorain, Ohio, has an inquiry out for a number of machines, and the Industrial Brownhoist Corporation, Cleveland, is considering the purchase of a few tools.

Some business is coming from the Akron district where tire mold manufacturers are preparing for 1930 production. One purchase in this field was a boring mill by a Cuyahoga Falls plant. Buying by the automotive industry in the Michigan territory is almost at a standstill. Deliveries on some lines show a gain of two weeks, but others have not improved.

Brainard Steel Co., Warren, Ohio, contemplates enlargement of its plant, quadrupling present capacity. Plans call for construction of two factory buildings and an office building, to cost about $300,000.

Cleveland office of William K. Stamets has been moved to larger quarters at 462-464 Rockefeller Building. George D. Miller is Cleveland district manager. Mr. Stamets has been appointed sales representative in northern Ohio for Andrew C. Campbell, Inc., manufacturer of Campbell nibblers.

Truscon Steel Co., Youngstown, Ohio, manufacturer of standard steel buildings, steel sash, etc., is arranging for expansion at local mill, including new buildings and equipment, to cost about $500,000. Julius Kahn is president.

W. R. Hopkins, City Hall, Cleveland, city manager, has awarded general contract to Gilchrist Construction Co., Western Reserve Building, for one-story municipal automobile service, repair and garage building, 80 x 180 ft., to cost $100,000 with equipment.

B. F. Goodrich Rubber Co., Akron, Ohio, will carry out expansion at branch mill at Los Angeles, including new buildings and equipment, to cost about $250,000.

Electric Power & Maintenance Co., Monroe and Eleventh Streets, Toledo, Ohio, has plans for one and two-story automobile repair, service and electrical shop, to cost about $50,000 with equipment. Langdon, Hohly & Gramm, Security Bank Building, are architects.

Union Malleable Mfg. Co., Ashland, Ohio, manufacturer of pipe, pipe fittings, etc., has purchased for expansion local mill of Ashland Tire & Rubber Co., consisting of group of buildings on 4-acre tract.

Timms Spring Co., Buckeye Street, Elyria, Ohio, manufacturer of wire

springs and other wire specialties, is considering rebuilding part of plant destroyed by fire Nov. 9.

Duncan Oil Refining Co., Youngstown, plans rebuilding part of refinery destroyed by fire Nov. 9.

Columbia Metal Stamping & Die Co., Cleveland, manufacturer of parts for automobiles, radios and electrical appliances, has purchased a plant now being constructed at East 116th Street and Harvard Avenue from Harold K. Ferguson, president of H. K. Ferguson Co., Cleveland. About $50,000 will be expended in new equipment for plant, which will add 21,000 sq. ft. to floor space of company. Fred C. Koch is president.

St. Louis

ST. LOUIS, Nov. 18.—Railroads centering in St. Louis are expected to come into the market shortly after the first of the year for their 1930 machine-tool requirements. From contacts with purchasing agents, manufacturers' representatives get the impression that the lists will be larger than in 1929, but that there will be few, if any, heavy tools purchased. Missouri Pacific is in the market for a heavy-duty tire turning lathe.

Missouri Boiler & Sheet Iron Works, 908 South Twenty-third Street, St. Louis, has arranged for purchase of adjoining property for expansion, particularly in tanks and kindred plate products.

Wood Brothers, Inc., Kansas City, Mo., manufacturer of aircraft and parts, will soon take bids on general contract for one-story plant at Rosecrans Field, St. Joseph, Mo., for parts manufacture and assembling, to cost over $300,000 with equipment. C. A. Smith, Finance Building, Kansas City, is architect.

Clay & Bailey Mfg. Co., Kansas City, Mo., manufacturer of tank and drum fittings and other iron and steel products, operating Morgan Foundry Co., Kansas City, has engaged Stephen C. Kenney, Gumbel Building, architect, to prepare plans for plant on 3½-acre tract recently acquired. Initial units will be one-story, about 60 x 120 ft., and will be used for foundry, machine shop, storage and other units, entire project to cost more than $90,000 with equipment.

Grand Hydro-Electric Corporation, Tulsa, Okla., recently organized by Philip Ball, Security Building, St. Louis; W. E. Hudson, Tulsa, and associates, has plans for hydro-electric generating plant on Grand River, Mayes County, taking over power site and property heretofore held by W. E. Hudson, now affiliated with new company. Plant will have ultimate output of 400,000 hp., with initial station approximating one-fourth of this sum, to cost more than $500,000 with transmission system.

City Council, Lincoln, Neb., will soon take bids for equipment for municipal electric light and power plant, including boilers, stokers, economizers, superheaters, etc., to cost about $50,000. D. L. Erickson is engineer. Theodore H. Berg is city clerk.

Southern Air Service, Inc., Tulsa, Okla., has leased three-story building at 205 South Cheyenne Avenue, and will establish branch for Nicholas-Beasley Corporation, Marshall, Mo., manufacturer of airplanes and parts, including service, repair and parts building. A flying school is planned. Entire project will cost more than $70,000.

City Council, Concordia, Mo., has plans for municipal electric light and power plant, to cost about $50,000 with equipment. W. B. Rollins & Co., Railway Exchange Building, Kansas City, Mo., are engineers.

Carter Carburetor Co., 2838 North Spring Ave., St. Louis, is erecting a third-floor factory addition containing about 13,000 sq. ft. floor space, which will increase present production 50 per cent.

Star Mfg. Co., Inc., St. Louis, manufacturer of popcorn machines and electric grills, has moved from 4477 Finney Avenue to 4569 Swan Avenue, increasing its floor space from 4000 to 12,000 sq. ft.

Cincinnati

CINCINNATI, Nov. 18.—Inquiry for machine tools continues fairly brisk, but buyers seem to be displaying more caution in placing orders after receiving quotations. One leading interest indicates that fresh bookings last week were unusually light. Despite this slackening in demand prospects are good, with inquiry remaining level. There is a noticeable increase in requests from Canada and the Pacific Coast for quotations. Production is being maintained at a high level and manufacturers expect that present schedules will be maintained well into next year.

Procter & Gamble Co., Gwynne Building, Cincinnati, has approved plans for new plant at Memphis, Tenn., to be operated by Buckeye Cotton Oil Co., a subsidiary, to cost about $1,000,000 with machinery.

William Powell Co., 2521-25 Spring Grove Avenue, Cincinnati, manufacturer of valves, engineering specialties, etc., will soon take bids on general contract for two-story addition, to cost about $55,000 with equipment. Teitig & Lee, Merchants' Building, are architects. H. E. Coombe is vice-president and general manager.

Traveling ovens, power equipment, conveying and other machinery equipment will be installed in new plant, 150 x 200 ft., to be erected by Colonial Baking Co., Memphis, Tenn., to cost $320,000. Majority of equipment will be electrically operated.

Holophane Glass Co., Newark, Ohio, has plans for an addition, to include tank house, installation of two furnace units, and auxiliary equipment, to cost about $80,000 with machinery.

Auto Rotary Lift Co., 1055 Kentucky Street, Memphis, Tenn., has awarded general contract to John F. Schwitzer, 591 North Third Street, for one-story plant, 50 x 150 ft., to cost about $22,000 with equipment.

Memphis Natural Gas Co., Memphis, Tenn., is considering construction of pipe line from Memphis to Covington, Brownsville, Dyersburg and vicinity, to cost more than $100,000 with booster stations.

Edward R. Edwards and associates have formed Edwards Engineering Co., Niles, Ohio, to manufacture a special steel loading and unloading device, the invention of Mr. Edwards. One of these machines has been in successful operation for five months at plant of Mahoning Valley Steel Co. at Niles.

Gulf States

BIRMINGHAM, Nov. 18.—National Portland Cement Co., Santa Fe Building, Dallas, Tex., has purchased river front property at Vicksburg, Miss., including quarry lands, as site for new cement mill with daily capacity of 3500 bbl. Project will include steam power house, machine shop and other units, and will cost over $1,000,000 with machinery. Equipment will be purchased early next year.

White Packing Co., Parallel Street, Montgomery, Ala., meat packer, has plans for new two-story unit, with refrigerating department, lard refinery and other units, to cost about $200,000 with equipment. H. Peter Henschien, 1637 Prairie Avenue, Chicago, is architect and engineer.

Gulf Pipe Line Co., Fort Worth, Tex., a subsidiary of Gulf Oil Corporation, Fort Worth, with headquarters in Frick Annex, Pittsburgh, has taken title to property near Lucas, Tex., and plans construction of oil storage and distributing plant, to cost $125,000 with equipment, including pipe line facilities.

Taylor Link Oil Co., San Angelo Bank National Bank Building, San Angelo, Tex., is considering construction of carbon black manufacturing plant near Girvin, Tex., to cost over $75,000 with equipment.

Board of Education, Lubbock, Tex., is considering installation of manual training equipment in new two and three-story high school to cost $650,000, for which bids will be asked at once on general contract by Peters, Strange & Bradshaw, Myrick Building, architects.

Landreth Petroleum Co., McCamey, Tex., has begun construction of oil storage and distributing plant in Upton County, to cost more than $150,000 with tanks, pumping machinery, etc. A similar plant is planned in Pecos County.

Alford Pure Milk & Ice Co., 819 South Presa Street, San Antonio, Tex., has plans for immediate construction of one-story ice-manufacturing plant at Mercedes, Tex., to cost about $70,000 with machinery.

International Harvester Co., 606 South Michigan Avenue, Chicago, has plans for one and two-story factory branch and distributing plant at Sweetwater, Tex., 100 x 100 ft., and 100 x 500 ft., with part given over to assembling department, to cost over $100,000 with equipment. W. D. Price is company architect.

Merchants Ice & Cold Storage Co., 1306 East Houston Street, San Antonio, Tex., has plans for addition to cold storage and refrigerating plant, to cost about $125,000 with machinery. W. E. Simpson Co., Milam Building, is engineer.

Maverick County Water Improvement District No. 1, Eagle Pass, Tex., has plans for a hydroelectric power plant on Rio Grande River, in connection with irrigation system, for which permission has been asked from State Board of Water Engineers. Generating station will include transmission system, and will cost $1,000,000.

Ford Motor Co., Detroit, is planning an addition to branch assembling plant at Houston, Tex., to cost about $50,000 with equipment.

Oklahoma Natural Gas Co., 112 North Broadway, Oklahoma City, Okla., plans one-story mechanical repair and equipment shop at San Angelo, Tex., to cost about $40,000.

Milwaukee

MILWAUKEE, Nov. 18.—Inquiry continues in good volume, although there has been some recession in orders for machine tools, but not enough to lower business below last year's mark at this season. Deliveries have improved but slightly. Orders cover a wide range of industries but are mostly for small lots. Cancellations have not exceeded the normal number and none is attributed to the situation in the securities market. Several large lists are being awaited from manufacturers of excavating equipment, cranes, marine motors and gasoline engines. Automobile production is picking up slightly. Some manufacturers of agricultural implements, with more orders than at this time last year, announce plans for expansion of production facilities.

Curtiss Airport Corporation, 27 West Fifty-seventh Street, New York, has awarded contract to Hunzinger Construction Co., 144 East Wells Street, Milwaukee, for service building and hangar, 122 x 145 ft., at newly acquired airport at Granville, Wis.

Spring City Foundry Co., 901 West St. Paul Avenue, Waukesha, Wis., is building a shop addition, 55 x 65 ft.

Kimberly-Clark Co., Neenah, Wis., is taking bids for addition to finishing room, 122 x 127 ft., and paper storage and crate shop, 148 x 276 ft., to cost over $150,000. O'Keefe-Orbison Engineering & Construction Co., 201 East College Avenue, Appleton, Wis., is engineer.

Western Printing & Lithographing Co., Racine, Wis., has appointed Austin Co., Cleveland, to design an addition to plant at 1212 Mound Avenue, to cost $100,000. R. A. Spencer, vice-president, is in charge.

West Side Mfg. Co., 3100 Walnut Street, Milwaukee, millwork manufacturer, has appointed Klug & Smith, Mack Block, engineers, to design three-story addition, 114 x 138 ft., to cost about $100,000 including equipment. Edward Schildknecht, president-treasurer, is in charge.

Board of Industrial Education, West Allis, Wis., has let contract to Pfeifer Construction Co., West Allis, for third unit of Vocational Training School, to be three stories, 40 x 57 ft.

Indiana

INDIANAPOLIS, Nov. 18.—Bids will be received until Dec. 10 by Board of Trustees, Indiana Soldiers and Sailors Orphans' Home, Knightstown, Ind., for power plant to cost over $125,000 with equipment. McGuire & Shook, 941 North Meridian Street, Indianapolis, are architects.

Board of Trustees, Notre Dame University, South Bend, is considering a new multi-story mechanical engineering building on campus, to cost more than $400,000 with equipment.

Great Atlantic & Pacific Tea Co., 209 West South Street, Indianapolis, with headquarters at 420 Lexington Avenue, New York, has leased three-story building, 105 x 400 ft., now in course of construction on South State Avenue, for baking plant and factory branch for storage and distribution, installation to include ovens, power machinery, conveying, loading and other equipment. It will cost about $260,000, and is scheduled for occupancy in January.

Board of Trustees, Milwaukee School of Engineering, Milwaukee, is considering establishment of branch school at Indianapolis, with facilities for instruction in electrical and mechanical engineering.

Pacific Coast

SAN FRANCISCO, Nov. 14.—Plans are being considered by Minerals Increment Co., Los Angeles, care of J. Ralph McInerny, 1400 East Sixth Street, president, for new plant at Pittsburg, Cal., where 6-acre tract has been secured, for production of new light metal for aircraft construction, for which rights to German patents have been secured. Initial plant will cost about $200,000 with equipment.

Aeronautical Corporation, San Diego, Cal., T. Claude Ryan, president, has applied for permission to lease part of tidelands as site for plant to manufacture airplanes, including parts, and assembling departments. Initial units will cost about $120,000 with equipment.

Western Sugar Refining Co., 2 Pine Street, San Francisco, has awarded general contract to Barrett & Hilp, 918 Harrison Street, for one and two-story addition, 140 x 320 ft., for storage and distributing plant, to cost about $250,000 with mechanical-handling and other equipment. H. J. Brunnier, Sharon Building, is architect.

City Council, Seattle, is considering construction of municipal cold storage and refrigerating plant at Smiths Cove, consisting of four two-story units, 90 x 420 ft., to cost about $400,000 with equipment. City engineering department will be in charge.

Clift Motor Co., 1104 Central Avenue, Bellingham, Wash., is planning two-story machine, welding and pattern shop, 50 x 110 ft., to cost about $22,000 with equipment.

DeMartini Motor Truck Co., 435 Pacific Street, San Francisco, is considering early rebuilding of part of plant recently destroyed by fire.

Pacific Iron & Steel Co., 241 East Avenue 26, Los Angeles, operating a general fabricating works, has purchased 22-acre tract at Compton, as site for new plant, to cost about $250,000 with equipment. It is understood that present works will be removed to new location. Company engineering department is in charge.

Empire Refining Co., Signal Hill oil district, near Long Beach, Cal., is considering rebuilding part of refinery recently destroyed by fire.

Rickard Anti-Friction Brake, Inc., 1202 East Artesia Street, Bellflower, Cal., has been organized with capitalization of $100,000 to manufacture brakes for automobiles, trucks, elevators, oil wells, hoists and other appliances. Actual manufacture will be done by subsidiary companies which are in process of organization and which will need materials and equipment. Parent company will confine itself exclusively to designing models and perfecting patent. A. D. Boone is secretary.

Canada

TORONTO, Nov. 18.—Although no lists for machine tools have been issued recently, demand for single tools is fairly steady. Business as a whole is better than a year ago and prospects indicate that trade for the remainder of the year will be in fairly good volume. Industrial plant construction is holding at a good level with a number of large companies either erecting plants or additions or having plans prepared for early erection. Many machine tool builders have a good volume of unfilled business.

Houdaille Engineering Corporation, 537 Delaware Avenue, Buffalo, N. Y., is considering establishment of a plant at Bridgeburg, Ont., on which construction will start next spring. Harold Lighthart, Fort Erie, Ont., is interested.

Nichols Copper Co., 25 Broad Street, New York, is planning erection of a copper refinery near Montreal.

United Mfg. Co., has awarded general contract to Charles Page Construction Co., Three Rivers, Que., for erection of a plant at Cap de la Madeleine, Que., to cost $60,000.

St. Mary's Cement Co., St. Mary's, Ont., has started work on a plant addition.

Regina Sash & Door Co., 3300 Railway Street, Regina, Sask., has awarded contract to Shoquist Brothers, 211 Duchess Street, Saskatoon, for a one-story factory, 100 x 490 ft., at Saskatoon, to cost $150,000.

Foreign

NEGOTIATIONS have been concluded by Yale & Towne Mfg. Co., Stamford, Conn., manufacturer of locks, builders' hardware, chain hoists, etc., for purchase of H. & T. Vaughan, Ltd., Willenhall, England, manufacturer of similar products, with factory branch and distributing plant at London. Purchasing company will consolidate with organization, operating as subsidiary unit. Present plants will be continued and expansion in output is planned.

Compagnie Industrielle des Petroles, Paris, France, a subsidiary of Vacuum Oil Co., 61 Broadway, New York, is consiiding new oil refinery in France, to cost more than $600,000 with equipment.

Ford Motor Co., Detroit, is reported to have concluded arrangements for purchase of site at Gdyniawith, Poland, for new assembling plant to cost more than $650,000 with equipment.

Société Francaise Recherches au Venezuela, Paris, France, known as "Recherches," is completing plans for extensive oil operations in Venezuela. Three producing wells will be established in Mene Grande, Mara and Urdaneta districts, near Lake Maracaibo, and storage and distributing facilities constructed. Plans have been drawn for a pipe line from plants to Lake Maracaibo for loading on tankers. Company has recently increased capital to 60,000,000 francs (about $2,200,000), part of proceeds to be used for project. Société de Prospection de Petrole et de Mineraux par les Procedes Geophysiques, Paris, known as "P. P. G." is also interested in enterprise and will be affiliated in pipe line construction.

Firestone Tire & Rubber Co., Akron, Ohio, is planning expansion at mill at Brentford, near London, England. Harvey S. Firestone, Jr., vice-president, and E. A. Hoener, chief engineer, have left for that place and will arrange details.

A new company has been organized at Manila, P. I., by local interests to construct and operate a mill for the manufacture of mechanical rubber goods, using native-grown rubber as raw material. Equipment purchases will be made at once in United States. Information at office of Bureau of Foreign and Domestic Commerce, Washington, reference Philippines No. 96090.

New Trade Publications

Milling Machines in Aircraft Work.—Kearney & Trecker Corporation, Milwaukee. Booklet of 24 pages under title of "Milling Faster for an Industry That Flies," illustrates several applications of the company's machines on airplane engine parts.

Speed Reducers.—Ohio Gear Co., 1333 East 179th Street, Cleveland. Catalog No. 29-A, giving horsepower ratings and dimensions of small worm-gear speed reducers. Timken roller bearings are used, and the hardened worms are ground all over, including the thread. Cases are of semi-steel, with ample reservoir for oil.

Lathe and Drill Chucks.—Westcott Chuck Co., Oneida, N. Y. Leaflet of four pages.

Centrifugal Compressors and Blowers.—De Laval Steam Turbine Co., Trenton, N. J. Catalog F, 48 pages, includes turbine-driven blast furnace blowers rated at 60,000 cu. ft. per min., against 30 lb. maximum pressure at 2800 r.p.m. Both single stage and multistage blowers and boosters for use in water gas plants and in connection with coal gas retorts and coke ovens are shown, as well as large multistage compressors for the high pressure called for in the gas industry. Other applications include converters, cupolas, pneumatic handling of materials and supercharging Diesel engines. The catalog includes data relating to the mechanics and thermodynamics of the compression of gases and the physical properties of industrial gases.

Electric Heat in Industry.—General Electric Co., Schenectady, N. Y. Bulletin 261-A of 48 pages illustrates and describes the application of electric heat to groups of basic operations commonly found in industrial plants. About a dozen pages are devoted to the metal industry and many other industries are covered. The industrial advantages of electric heat are stressed in the introduction.

Chain Grate Stoker.—Combustion Engineering Corporation, New York. Catalog of 27 pages illustrating and describing the Green natural-draft chain grate stoker. It is installed under boilers totaling over 1,200,000 rated hp. and can burn screenings from noncoking or moderately coking bituminous coals, high-ash coals and many lignites.

Bearing Metals.—Phosphor-Bronze Smelting Co., Philadelphia. Card 9 x 11 in., with table of sizes and approximate weights of Elephant brand phosphor bronze "S" metal bushings carried in stock. Cored bushings are in 49 sizes, from 1 to 10 in. outside diameter, the 1 to 4-in. sizes being in steps of ⅛ in. and the 4 to 10-in. sizes in steps of ¼ in. Outside diameter and sizes of cores are in black and the approximate weights of 12-in. lengths are in red; wall thickness is indicated at the bottom of each column. Weights of solid metal, stocked in 25 sizes, from 1 to 4 in. diameter, are shown at the extreme right of the chart, the arrangement of which is such that the data for each size of bushing may be read at a glance.

Industrial Lubrication.—Alemite Corporation, 2650 North Crawford Avenue, Chicago. Bulletin of eight pages, illustrating and describing the Alemite lubricating system, designed for reducing production costs.

The Week's News Quickly Told

Current Events That Bear on the Course of Business

FREEDOM of the seas for food ships is proposed by President Hoover, but Europeans believe this would prevent an economic blockade of a belligerent nation, regarded the most effective weapon of the League of Nations. The President would prevent war by prompt adjustment of differences and increasing the sense of national security, rather than by enforcing peace . . . Guatemala and Honduras accept invitation to meet in Washington and discuss their boundary dispute.

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MACDONALD is assured of whole-hearted support by all parties in the House of Commons for his plans for the naval conference, Work on Singapore naval base, being developed for battleships, is suspended . . . Release of funds from stock exchange eases interest rates in foreign as well as American financial centers to the benefit of trade. Further stimulation of employment in Great Britain is to come from an extensive program of utility improvements, highway construction and railway electrification . . . Canada will buy 600,000 tons of British hard coal this winter.

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INDUSTRIES and regions connected with automobile and residential construction reflect the weakness in those lines. Thus, trade in the States bordering on the Great Lakes and the lumbering industry is depressed . . . Retail trade in other parts of the country is affected by continued mild weather . . . Other basic industries continue at a high level, with no marked reductions, other than seasonal.

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FACTORY employment, wages and farm income remain at high figures; car loadings and retail sales also reflect a large volume of distribution in general trade, in the opinion of the Federal Reserve Board.

* * * * *

STOCK, grain and cotton exchanges declined severely but later recoverd all or nearly all of their losses . . . Commodities generally continue a slow but steady decline in price—good for consumers, but not so good for the producers.

* * * * *

TAX reduction (1 per cent on normal incomes of individuals and corporations) is promised by President Hoover, Secretary Mellon, and party leaders in Congress.

* * * * *

TEXTILE and cotton yarn production will be curtailed sharply by agreement among Southern mills, in order to match production to orders. About two weeks' supply is now on inventory . . . New England cotton industry is operating at about 80 per cent of one shift.

* * * * *

EXPORTS and imports during October were at highest totals for several months. Manufactured goods comprised half the exports; chemicals and machinery were prominent factors. Auto-trucks, exported to South America, constituted a bright spot in the automotive industry . . . Europe has taken considerably less copper this year than expectations.

* * * * *

BANK for International Settlements will be located in Basle, Switzerland. Its limited powers will not compete with various central banks, and it assumes no responsibility for settling the reparations question . . . Belgian representatives protested its location . . . Ambassador Schurman is negotiating a plan for direct payments, Germany to the United States, independent of the Young plan.

* * * * *

SOVIET budget, equivalent to $5,700,000,000, is nearly half again as large as last year, large increases being assigned to education, agriculture and electrification. Financing state industries will require 13 per cent of the total, but about one fifth this sum is expected to return to the treasury as profits . . . . Efforts to establish collective and mechanized farms for intensive grain production have met much resistance from well-to-do farmers, and numbers of them have been executed or exiled . . . Eighty per cent of the grain crop has been taken by the State at a fixed price . . . House of Commons has approved resumption of diplomatic relations between England and Russia . . . MacDonald Engineering Co., Chicago, received a $110,000,000 contract to build cement plants, grain elevators and flour mills in Russia . . . United States Shipping Board has sold 25 cargo vessels, laid up seven years, to the Soviet Union.

* * * * *

RAILROAD construction valued at $200,000,000, comprising passenger stations, freight terminals and yards, is being undertaken in Philadelphia by the Pennsylvania and Baltimore & Ohio railroads . . . The New York Central Railroad proposes to increase its capital stock from $500,000,000 to $700,000,000 — its valuation is now over one billion. It has also asked the Interstate Commerce Commission to authorize a new main line skirting Syracuse, New York, where its present tracks occupy a down-town street . . . Transcontinental lines oppose Wyoming-Montana Railroad's plan to build and link up a system in the Rock Mountain States extending from Canada to Mexico . . . American Locomotive Co. has bought McIntosh & Seymour Corporation of Auburn, N. Y., manufacturer of the Diesel engines used for oil-electric locomotives.

* * * * *

TELEPHONE rates in New York will be increased $3 to $5 per year, according to award of Statutory Court in a 9-year old rate case. Company has a right to a 7-per cent return on reproduction value of plant, less depreciation.

THE IRON AGE

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Wear Tests on Bearing Bronzes

Pioneer Work on Difficult Subject Undertaken to Discover Best Alloy and Casting Method for Journal Boxes Carrying High Unit Loads

BY W. M. CORSE*

IN all bearings worthy of the name the loss in weight, after they are run-in, is practically zero as long as lubrication is maintained. Consequently test methods were devised which indicated comparative resistance of copper-lead-tin alloys to combined rolling and sliding friction when run dry, and resistance to repeated pounding. Whether a chill cast bearing is better than a sand cast one is still an open question; either method appears to give suitable results when the analysis contains 5 to 7 per cent tin and 15 to 22 per cent lead.

ABOUT ten years ago railway executives and metal manufacturers became acutely aware of the fact that the wide variations in the specifications for bearing metals were inimical to the interests of both groups. To be sure, some progress had been made by technical societies toward specifications for bearing metals, but due to lack of definite reproducible data (or for other reasons) individual consumers refused to accept the recommendations.

The Chicago Bearing Metal Co. had developed certain definite ideas concerning the manufacture and practical applications of bearing bronzes, but there was neither support nor disproval of these views in the literature of the subject. There was, in fact, little but theories and personal opinions. Also, material found to be satisfactory by one group of users seemed to fail in the hands of another.

In January, 1925, a trunk line railroad considered the advisability of replacing sand cast bearings with others cast in metal molds, in the belief that the latter were superior. But investigation showed little evidence on which to base predictions that the change would be beneficial. Lack of this information influenced the Chicago Bearing Metal Co. to undertake the investigation herein summarized, and late in 1925 the work was begun at the Bureau of Standards, under the research associate plan. E. R. Darby, chief metallurgist of the company, was very active not only in getting the work started but in supervision of the project as well.

The Chicago Bearing Metal Co. supported the work until 1927, when its interests were merged with those of the Magnus Co., and after that date R. J. Shoemaker, engineer of tests of the Magnus Co., lent his cooperation. The writer of this article acted as consulting metallurgist throughout the period. The final phases of the program were completed by the staff of the Bureau of Standards and the results published in Research Paper No. 13,, entitled "Wear and Mechanical Properties of Railroad Bearing Bronzes at Different Temperatures," by H. J. French, senior metallurgist, S. J. Rosenberg, assistant metallurgist, W. LeC. Harbaugh, research associate, and H. C. Cross, junior metallurgist. The material presented herewith is developed at much greater length in the research paper noted.

There are at present no generally accepted methods of test nor any well defined procedure which may be followed in attempting to compare different bearing metals. Reliable information is based on practical experience, and performance in service is the logical criterion. For various reasons it is difficult to approximate service conditions in laboratory tests, but the latter can be more closely controlled and can, therefore, give fundamental information of value. It was recognized, also, that supplementary service tests would be of great value, but for fair comparisons the conditions of service must be resolved into essential components which can be expressed in terms of fundamental properties.

The major object of the tests was to find out the important physical properties of a group of copper-tin-lead alloys within (and in some cases beyond) the limits of chemical composition and constitution ordinarily applied industrially in railroad journal boxes, and to supply information that might ultimately permit a logical revision of specifications.

Alloys Selected

Two groups of copper tin alloys were studied, i.e. alloys with copper-tin ratio of 92.5 to 7.5 and lead varying from 0.25 to 25 per cent, and a second group with copper-lead

*Metallurgical engineer, Washington.

ratio of 84 to 16 and tin varying from a trace to 10 per cent.

Each alloy was cast in sand molds and in metal molds and the mechanical and wearing properties studied at different temperatures.

Alloys were cast into "sticks" about 12 in. long by 2½ in. diameter, and both chill cast and sand cast sticks were cast on end and gated at the bottom. This method was unsatisfactory, as the sticks thus prepared were filled with tiny pockets.

Next was tried the method of melting, freezing and re-melting under glass. This gave satisfactory results for laboratory tests but was too slow for commercial purposes.

The equipment employed in the metallographic examinations, hardness, tensile and notched bar impact tests was typical of that used on this continent and abroad. Special equipment was constructed for repeated pounding tests and is shown in the figure. An Amsler wear-testing machine was also used in the wear tests. The important features of both of these special test units are summarized in the captions.

Wear Under Sliding and Rolling Friction

Two sets of tests were first carried on in the presence of oil on a group of copper-tin alloys containing different proportions of lead. In the first set the specimens were subjected to sliding friction under contact pressures within the range normally encountered in railroad bearing service. In the second set the alloys were subjected to combined rolling and sliding friction under relatively high contact pressures.

Disks made of railroad axle steel were rotated against the specimens for a selected number of revolutions, and the wear determined by loss of weight. Repeated and consecutive determinations were made with the same pair of specimens (bronze and steel) until a uniform rate was attained.

When a test of this sort is in its early stages the amount and rate of wear will vary widely, but after an initial period the curves plotting wear against revolution and against work turned toward the horizontal axis. After this preliminary wearing-in period, the loss of weight dropped to very low values in the presence of a lubricant, and it appeared impracticable to develop with any degree of certainty differences between the alloys. Therefore, it seemed necessary to make wear tests *without* lubrication.

These results appear to be consistent with the view that after an initial period in which the contact surfaces "wear-in," good bearings will undergo little or no further wear so long as complete lubrication is maintained.

Dry Sliding Friction at Ordinary Temperatures

Wear tests under sliding friction without oil were attended by difficulties even at fairly low contact pressures. The temperature of the bronze quickly raised and resulted in a marked flow of the surface metal. Under such conditions it was difficult to determine how much wear and how much plastic deformation took place. Likewise, variations in the frictional and thermal properties of the different metals probably produced variations in the temperatures reached, and direct comparisons of the results did not seem justified.

Such difficulties were minimized with the lower rate of slip and the small area of contact between the two disks in tests under combined rolling and sliding friction. There was less heat developed in a given time, despite the relatively high unit contact pressures, and there was probably also a better opportunity for dissipation of the heat resulting from the frictional forces. Therefore, wear tests without lubricants described herein were made under combined rolling and sliding friction.

The first tests were characterized by erratic losses in weight; individual specimens did not show consistent rates of wear in consecutive tests, even after a preliminary period. In addition to a change in the roughness of the contact surfaces from the original ground finish, a change in color occurred, and what appeared to be a coating or film was frequently observed. Formation of such coatings seemed to be related to changes in the wearing and frictional properties of the metal. The compositions of these films are not now known, but they are apparently of two types. The first, comprising films which looked like copper oxide, was observed in the copper-tin alloys which were low in lead. These same films also occurred in the high-lead bronzes, but they were not so easy to detect in the latter alloys, due to the more frequent formation of a second type of coating, viz., a black film which was either lead or a lead compound. Tests so far made, including X-ray analysis, have failed to reveal the exact nature of these surface effects.

However, it appeared certain from the preliminary wear tests of bronzes without lubricants, that film formation played a part in the erratic results, and that some method of eliminating or controlling these films should be provided if consistently uniform results were to be obtained. Copper scrapers were used and minimized but did not eliminate film formation.

Single Blow Impact Tests

Single blow impact tests were made on notched specimens with an Izod impact machine.

All except the low-lead alloys had very low impact resistance. Increase in lead up to 25 per cent caused progressive decrease in the impact values at all temperatures between room temperature and 600 deg. Fahr., the first few per cent of lead having greater influence than a corresponding variation in the high-lead range. Increasing the tin up to about 5 per cent increased the impact resistance, but with higher tin the impact values decreased somewhat. These effects of lead and tin were more marked in the sand cast than in the chill cast bronzes, except that in the low lead alloys the chill cast specimens showed higher impact values at some temperatures. In general the impact strength decreased slowly with rising temperature up to 350 deg. Fahr., and then dropped off rapidly.

The finely disseminated small particles of lead in the chill cast bronzes probably produce greater weakness under impact than the large lead particles in corresponding sand cast analysis, and may more than offset the benefits of the finer grain structure of the copper-tin constituents.

Pounding with Repeated Blows

Small cylindrical specimens were subjected to repeated blows in compression both at atmospheric and elevated temperatures. The rate of deformation of some of the bronzes decreased as the pounding proceeded, due to gradual work hardening. The initial high rate of deformation increased with the lead content and decreased with the tin content. Sand cast bronzes usually showed higher initial rates of deformation.

It was found that the deformation produced by a given number of blows increased rapidly with lead content up to 5 per cent, and but little beyond this. The rate of deformation decreased slowly with increase in tin content up to 5 per cent and then rapidly from 5 to 10 per cent tin. The effects described above were also observed at the temperatures up to 600 deg. Fahr., although the actual changes due to variations in composition and casting conditions were less than at atmospheric temperatures.

General Discussion

No one laboratory test by itself gives enough information to determine the suitability of different bronzes for industrial applications. Comparison must still be based on a broad knowledge of the characteristics of the different

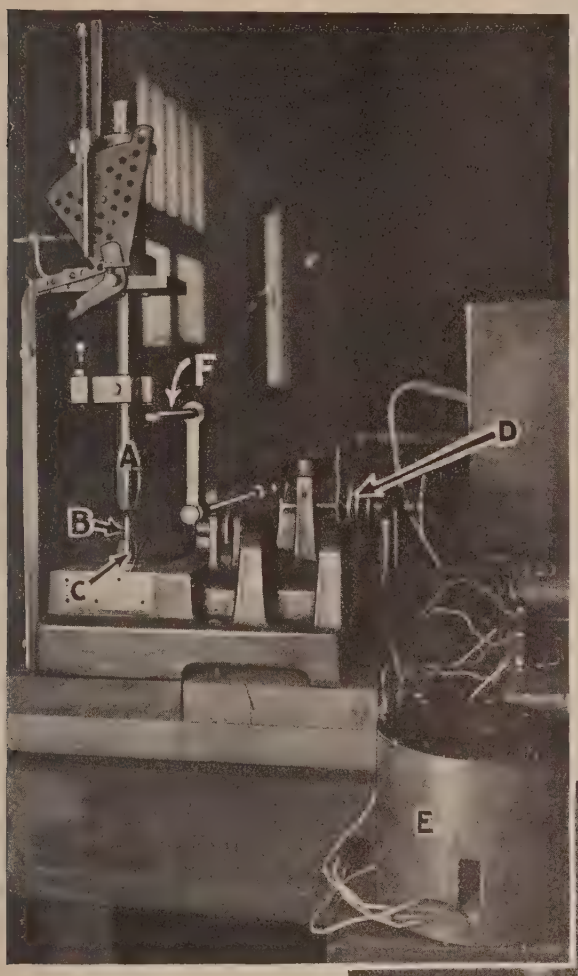
bearings determined from varied tests and from service records.

Variations in chemical composition change the mechanical properties, to be sure, but within certain ranges the chemical composition is less important than the casting conditions. With a few exceptions the chill cast bronzes wore faster in these tests and had less resistance to single blow impact on a notched specimen than the same analysis when sand cast, but were more resistant to repeated pounding and to static tension.

There is still room for considerable argument on the relative merits of chill cast and sand cast bearing liners, and the casting method used should depend on the service to which the part is to be subjected.

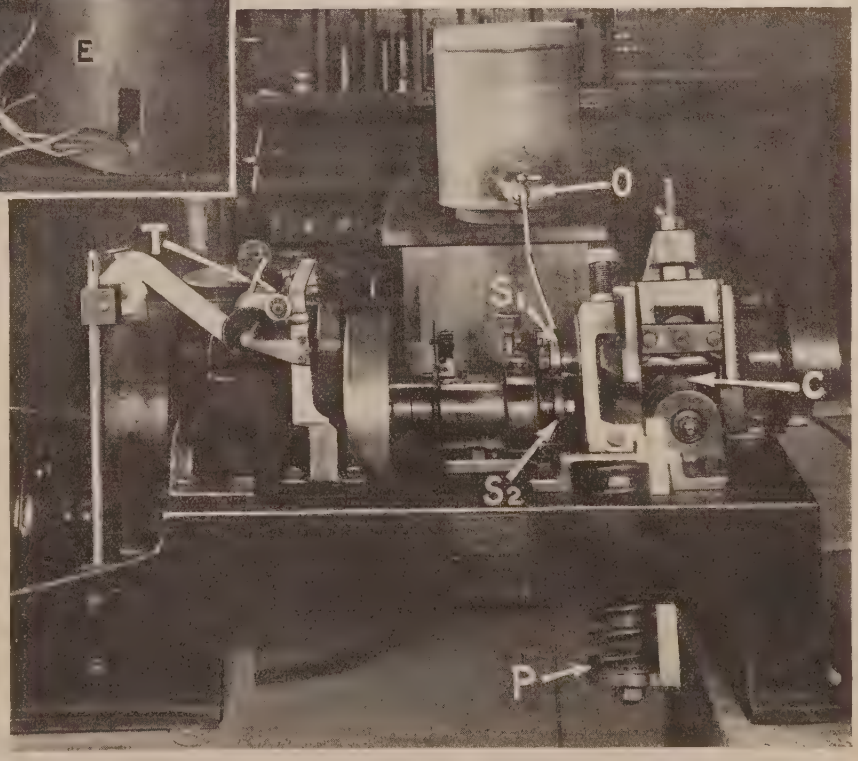
Specifications might well be limited to a series of relatively few compositions with liberal tolerances for the major components. The analysis chosen and the casting method will naturally depend on the service. The wide variations in present specifications for bearings destined for similar service, and the narrow composition tolerances specified by many companies, are not always justified. Naturally, the effects of impurities and other intentionally added components besides copper, tin and lead will have to be studied before any complete specification can be drawn up. A study of heat treatment of these alloys to produce desirable properties is also advisable.

As to the bronzes investigated, those containing less than 5 per cent tin had poor mechanical properties, wore badly and were apparently unsuited for general bearing service except possibly for applications involving low loads. Bronzes containing 5 to 15 per cent of tin and 12 to 25



EQUIPMENT Used in the Repeated Pounding Tests. Specimen *B*, on anvil *C*, is subjected to repeated blows in compression by the falling weight *A*. Furnace *E* is used for tests at elevated temperatures. *D* is the driving mechanism and *F* prevents auxiliary blows from rebound of *A*. Tests were made with a weight of 7.15 lb. falling through a distance of 2 in. (at Left)

AMSLER Wear Testing Machine. Surfaces of S_1, and S_2 move in the same direction but at different speeds with lateral oscillation produced by cam *C* and under contact pressures controlled by spring *P*. Friction is recorded on the torque indicator *T*. In tests with lubrication the oil is supplied from reservoir *O*. In all tests the total load between specimens was 37.5 lb.; the slip 12 ft. per min.; the amplitude of lateral oscillation 0.3 in. (Below)



per cent of lead can meet a wide range of service conditions. These bronzes do not wear as fast as low lead bronzes and the surface does not roughen as rapidly when lubrication fails.

Where mechanical strength is essential it is desirable to keep the lead content near the lower limit of the range. For many purposes the bronzes containing 15 to 25 per cent lead should be interchangeable, since the changes in mechanical and wearing properties with lead content are small.

The results of these tests lead to a grouping of bronzes consistent with the American Society for Testing Materials tentative specification B67-27T for journal bearings on railroad rolling stock, according to which the tin may vary from 5 to 7 per cent and the lead from 15 to 22 per cent.

Hardened Copper for Electrical and Chemical Equipment

USES and properties of the hardened coppers known as "everdur" and "tempaloy" and their welding characteristics were described by W. R. Hibbard, technical department American Brass Co., Waterbury, Conn., in a paper read before the International Acetylene Association, Nov. 14. Physical properties are summarized in the table. It will be noted that these cold rolled alloys have a strength equal to or better than medium carbon steels. Everdur possesses excellent welding characteristics when welded by the oxy-acetylene process. It is non-rusting and non-magnetic, and resists corrosion, particularly of hydrochloric acid and chlorides. It will not season or corrosion crack.

Tempaloy was patented early in 1928 by M. G. Corson and is controlled by the American Brass Co. Nickel and silicon are present in the proper proportions to form nickel silicide; when heated to 750 deg. C. or above, the nickel silicide is in solid solution in the copper. It may then be hot rolled or forged. When this alloy is quenched from above that temperature, it is ductile and may be cold worked. The silicide is precipitated from solid solution when heated for a few hours at 450 deg. C., causing the alloy to become hard and strong. Annealed tempaloy can be forged to shape, welded with tempaloy rod, and then age hardened to secure increased mechanical strength in the weld as well as in the base metal.

Generally speaking, it is best to use a welding rod of the same composition as the base metal, but everdur can be used in welding tempaloy. A fused boric acid flux may be used, but for best results add 10 per cent of sodium fluoride. A backing bar is usually necessary. The flame should be slightly oxidizing to concentrate the most heat upon the weld, and its length must be governed by the thickness of the metal.

The alloys containing silicon flow much freer than low carbon steel when using the oxy-acetylene torch, and a film of silica forms upon the surface of the molten metal. These alloys are hot short, therefore cool the completed weld as quickly as possible to the solid state. The concentration of heat over as small an area as possible is likewise desirable and it is, also, advisable to make the weld in one pass.

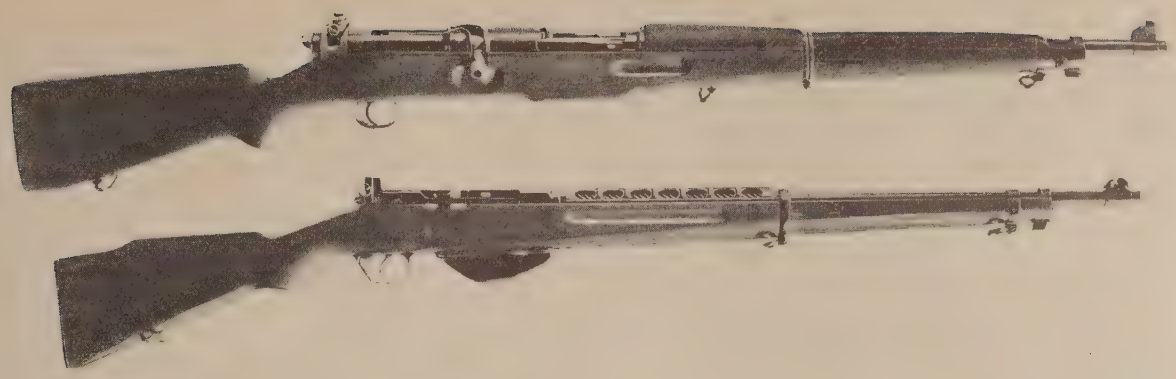
The electrical industry has found many applications for welded high copper alloys. Motor bars are welded to end rings. Copper-manganese-silicon alloy is non-magnetic and this property is utilized for certain electrical equipment. Housings, barriers, panels and domes for circuit breakers and switch-gear, where the current volume is too high to permit the use of ordinary steel, are now fabricated from everdur, and in others where the current volume is not so great, satisfactory results are obtained by welding everdur inserts in ordinary steel to break the magnetic circuit.

Deoxidized copper and high copper alloys such as everdur are used extensively in the fabrication of heaters, coolers, condensers, evaporators and many kinds of chemical and engineering apparatus. A recent use has been the manufacture of copper radiators for heating buildings, reducing space and weights. It is the general practice to make the header sheet of heavier gage steel than the copper tube and to press it into shape to resist pressure before the holes are punched and reamed to fit the tubes; the latter are then welded as quickly as possible with the minimum amount of heat to prevent warping.

Composition and Physical Properties of Soft and Hardened Copper

Composition, per cent	Tough Pitch Copper	Deoxidized Copper	Everdur: Copper-Silicon-Manganese Alloy		Tempaloy: Copper-Nickel-Silicon Alloy
			Cast	Wrought	
Oxygen	0.03 to 0.07	0.0	..	..	..
Silicon	.....	0.03 to 0.15 (a)	4.5	3	0.80
Manganese	.....	0.03 to 0.15 (a)	1.1	1	..
Nickel	.....	.....	..	..	3.20
Cadmium	.....	0.10 to 0.50 (a)	..	..	..
Phosphorus	.....	0.03 to 0.10 (a)	..	..	..
Copper	Remainder	Remainder	Remainder	Remainder	Remainder
Ultimate Strength, lb. per sq. in.					
Cast	28,000	30,000	45,000	..	40,000
Forged	33,000	35,000	..	55,000	50,000
Cold worked	60,000	65,000	..	130,000	120,000
Welded	15,000	30,000	45,000	45,000	40,000
Density	8.9	8.9	..	8.45	8.82
Melting point, deg. Fahr.	1,981	1,981	..	1,868	1,981
deg. C.	1,083	1,083	..	1,020	1,083
Coefficient of linear expansion per deg. C.	0.0000177	0.0000177	..	0.000018	..
Heat conductivity, calories per sq. cm. per cm. thickness per sec. per deg. C.	0.910	0.8 to 0.2 (b)	..	0.063	0.45 to 0.18

(a) Only one of these is present, depending on the deoxidizer used.
(b) Depending upon the amount of deoxidizer present.
A mild steel has a heat conductivity of 0.117 in the same units.



Heat Treatments for Rifle Parts

Definite Temperature for Rolling the Barrel—Carburizing and Parkerizing Practice Described—Methods of Putting on Color

BY J. B. NEALEY*

ONE highly vital factor to consider in the adoption of a new rifle for Army use is a simplicity of design and manufacture that will minimize confusion and misunderstandings when contracts for its production are let out to a large number of concerns.

This holds true also for the kinds of steel and the various processes by which they are heat treated. This policy of simplification of manufacture has been carried out at the Springfield Arsenal, Springfield, Mass., where fine military rifles have been manufactured for more than a century, and will no doubt be extended to include any new arms that may be accepted.

While there are more than 90 steel parts in this model, only five different steels are used. Specifications for these, for all essential purposes, are the same as the S.A.E. numbers 1020, 1120, 1095, 1350 and 2340, with slight variations. For instance, the rifle barrel steel is close to 1350 S.A.E. and this compares with the War Department specification as follows:

	S.A.E.	War Dept.
Carbon, per cent..	0.45 to 0.55	0.45 to 0.55
Manganese	0.90 to 1.20	1.00 to 1.30
Phosphorus, maximum.....	0.040	0.050
Sulphur, maximum.....	0.050	0.050

Rifle barrels can be made in three ways: Forging, as in the plant of the Winchester Repeating Arms Co.; machining from round stock, as done by the Colt's Patent Fire Arms Mfg. Co.; and rolling, which is the practice at the shops of the Springfield Arsenal. After shearing a piece 13 in. long and 1.4 in. in diameter from a steel billet, it is heated to 1500 deg. Fahr. and rolled by passing it through 12 grooves, all on the same set of rolls.

The piece is reduced and tapered slightly in each groove and when it passes through the last it is roughly of barrel shape, 26 to 27 in. long and ready for heat treating and machining. This rolling operation is accomplished on a single heat. Formerly the practice was to roll from a temperature of 1200 deg. and cool in lime without any further heat treatment, but the present practice, recently introduced, produces much higher physical characteristics.

*American Gas Association, New York. Both rifles shown at top of page are of the semi-automatic type.

With the old practice the following physical characteristics were obtained: Tensile strength, 110,000 lb.; yield point, 75,000 lb.; elongation, 20 per cent; reduction of area, 50 per cent. This mechanical working at temperatures below the critical partially hardened the steel, as does heat treating. However, the maintenance cost of the rolls was very high and later it was found that working at higher temperatures effected a reduction in roll maintenance which more than offset the added cost of heat treating, and materially bettered the physical characteristics.

A series of tests was conducted which included rolling barrels at temperatures from 1200 to 1500 deg. Fahr. and heat treating afterward, with the following results:

Rolling Temperature, Deg. Fahr.	Yield Point	Tensile Strength	Elongation	Reduction of Area
1200	79,533	112,466	21.8 per cent	53.2 per cent
1250	77,717	114,233	21.8 per cent	53.2 per cent
1300	74,966	108,333	24.2 per cent	55.5 per cent
1350	74,276	104,426	25.5 per cent	57.1 per cent
1400	74,950	115,483	23.6 per cent	53.6 per cent
1500	96,773	126,930	20.0 per cent	52.9 per cent

Rolling at the 1500-deg. temperature was adopted. As soon as the barrel is out of the rolls it is straightened in a drop hammer, the temperature then being about 1200 to 1250 deg. It is then normalized by heating to 1700 deg. and allowing it to soak in this heat for about 2 hr., after which it is air cooled. This temperature gives the steel better machinability than did the 1600 to 1650 deg, formerly used. It is then soaked in a heat of 1550 deg. for an hour and quenched in oil for hardness, after which it is drawn at 1100 to 1200 deg. for a period of 2 hr. and air cooled.

The bolt, receiver, etc., are made from 2340 S.A.E. steel. Formerly W.D. 1325 steel was used, but the 2340 S.A.E. was found to give higher physical and better shattering properties. With this steel the flange on the bolt, for instance, will not blow off, and the receiver, instead of shattering into many flying pieces, will simply open up under too great pressure, thereby minimizing the danger to the user.

Heat treating practice for this steel is to anneal at

1550 deg. by putting the parts into a furnace, bringing them up to temperature, turning off the gas and allowing them to cool in the furnace.

For hardening, a salt bath is used, the parts being heated to 1425 or 1450 deg. Fahr. for 5 min. and quenched in oil. They are then drawn in a salt tempering bath at 700 deg. for ½ hr. and air cooled, which gives them a Rockwell hardness of 40 to 50 on the C scale.

Treating the Smaller Parts

Sight parts, cocking pieces, trigger, sear, screws, etc., are made from carburizing steel S.A.E. 1020 and 1120. The sear is the small part which releases the firing mechanism when the trigger is pulled. A "hair trigger" is produced by filing off the top of this piece, and certain users do this. However, it is bad practice, for only a very small amount of filing is necessary to penetrate the case and leave the soft steel to wear away quickly; then there is nothing to hold back the cocking piece or firing pin. Many rifles are returned annually to the Arsenal to have the sear replaced, after such tampering.

In carburizing these parts, they are first packed in pots with charred bone or put into rotary carburizing machines and heated to about 1450 or 1500 deg. Fahr. for varying periods, according to the depth of case desired, which is 0.008 in. in most cases. The cocking piece is held at a higher heat for 4 hr., it having first required 2 hr. to bring it up to this temperature after it was put in the furnace. This produces a case 0.012 in. deep. It is then dumped into a sieve, where the bone is allowed to fall through, and the work gradually dribbles into an oil quench by gravity. Besides producing the case, this treatment tends to harden the core.

The cocking piece is then repacked in bone and reheated to 1300 deg. and held at this temperature for ½ hr., after which it is again quenched in oil. This second heating refines the grain structure of the case and core and reduces the hardness and toughens the core. This last part of the process is necessary, for the firing pin rod is assembled to the cocking piece, which would crack were it not toughened.

The sear is given the first half of this treatment, but the latter part is omitted.

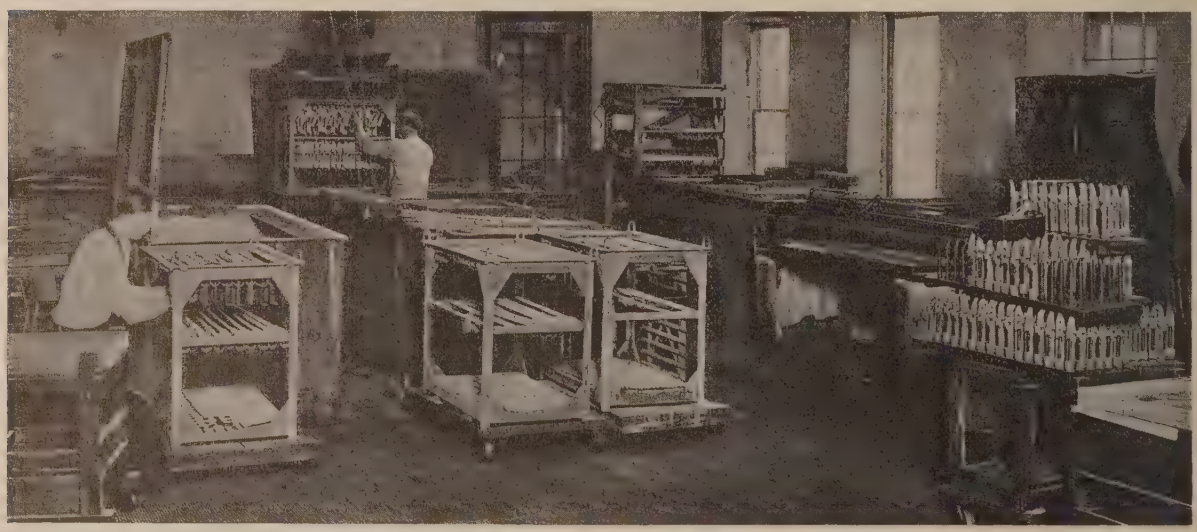
Springs, including the flat spring actuating the follower, are of S.A.E. 1095 steel. These are put into furnaces at 1450 deg. Fahr. and, as they are small, and only 25 on a tray are charged at a time, they are heated in 10 min. and withdrawn and quenched in oil. They are drawn at 770 deg.

Types of Furnaces Used

In the heat treating department gas is used, mixed with air for combustion in a mixing machine. Four brick furnaces are used interchangeably for several kinds of heat-treating work. Each is about 6 ft. wide and 4½ ft. square, and heated with two gas burners in front and two in the rear, firing under the hearth (semi-muffle type). The doors are counterweighted and lifted by pulleys. An indicating pyrometer with a four-point switch serves all four.

There are two pot furnaces, each furnace containing two 10-in. pots holding salt, lead and niter baths for tempering, hardening and blueing. Each furnace is built of brick encased in sheet steel and four gas burners fire each pot, two from the front and two from the rear. Temperatures are checked by an indicating pyrometer with a four-point switch. There is also a small 6-in. cyanide or salt pot which is set in brick and heated with two gas burners.

Facing the above is a row of five furnaces, and the oil, water and brine quench tanks form a row in between. Three of the five furnaces are about 3-ft. cubes and are of the semi-muffle type. They are used for hardening tools of high-speed steel. An indicating pyrometer with a five-point switch is part of this equipment, as well as a recording pyrometer for more particular work.

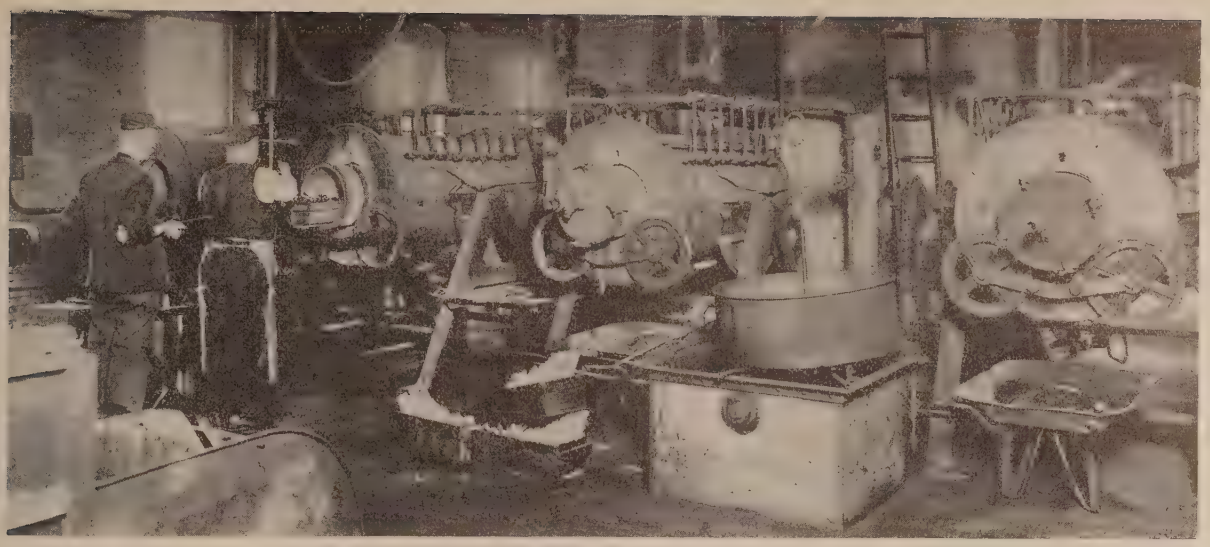


Parkerizing Installation for Rifle Barrels and Other Parts

Handling Reamers and High-Speed Steel

Heat treatment of long reamers is done in a small, circular furnace made at the Arsenal. This is about 4 ft. high and 18 in. in diameter, built of brick, steel encased, and with a 6-in. hole in the center. It is heated with three gas burners spaced at regular intervals vertically and firing tangentially against a steel muffle, which holds the work. This muffle consists of a length of steel pipe capped on the lower end.

A unique unit for hardening small parts of high-speed steel consists of a circular steel shell, brick lined, and divided into three chambers vertically. This unit, which sets on legs, is 2½ ft. high and 2 ft. in diameter and is heated with a single gas burner firing under the hearth. Between each chamber and the next is a refractory tile with the correct number and size holes to permit the passage upward of just the required amount of heat. Thus



Group of Gas-Fired Rotary Carburizing Machines

the temperature of the first chamber is 2200 to 2400 deg. Fahr., the second 1600 to 1700 deg., and the top one 900 to 1000 deg.

Method of Carburizing

Carburizing is accomplished in another room, at one end of which are four rotary carburizing machines. These consist of a steel retort within a steel shell 5 ft. long and 5 ft. in diameter, through which 16 gas burners fire. The retort, 18 in. in diameter, extends from both ends of the shell about a foot. It rests on four wheels, two in front and two in the rear, and is rotated by means of a chain and sprocket, which engages another sprocket wheel fitted over the rear end of the retort. One motor drives all four machines, and one indicating pyrometer with a four-point switch is used to regulate the temperatures.

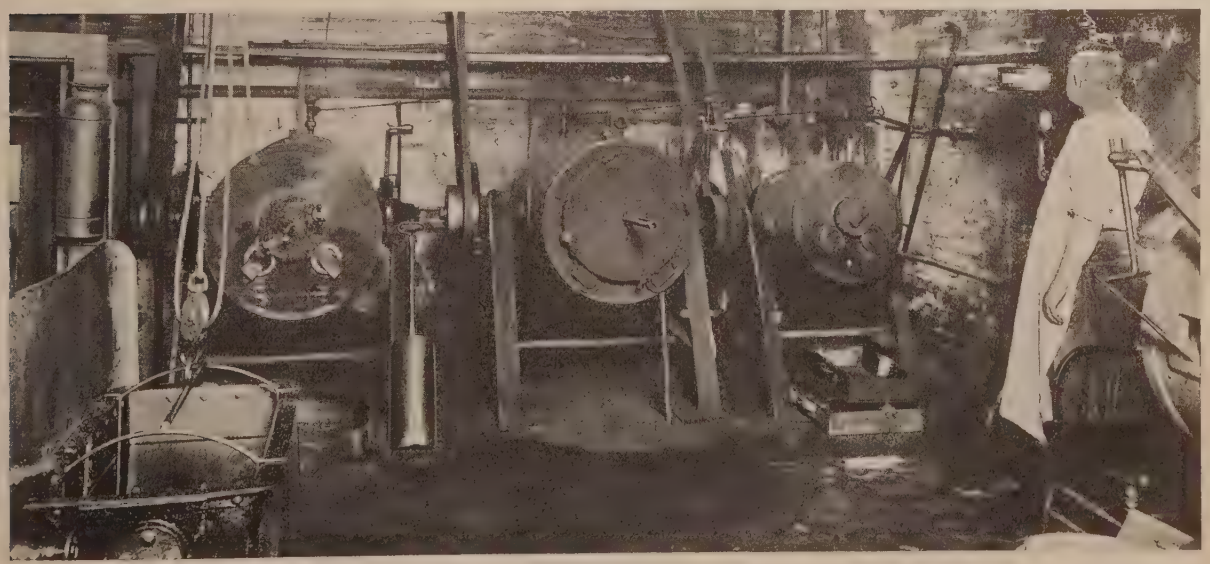
In front are two steel quench tanks with an overhead monorail and hoist with which to handle the sieves and baskets. The steel parts and bone are discharged into a long sieve, the bone dropping through while the work rolls by gravity into the quench where it drops into baskets for further handling.

At the other end of the room are eight more machines, similar in type, except that they are heated with a long gas-pipe burner, located in the bottom of the combustion chamber, the flames impinging on the retort. These are driven from a single motor and are used for tempering and blueing or blackening. They are served with two oil quenches and two indicating pyrometers with four-point switches.

Coloring the Parts as Desired

Oil blackening is carried out as follows: The work is charged into the retort with charred bone, heated to 900 deg. Fahr. and cooled slowly to 650 deg. The bone is then removed, saturated in mineral cylinder oil and returned to the retort, and the whole charge held at 650 deg. for 3 hr. The work is then removed and quenched in oil, which gives it a black finish, which has twice the life of a blue finish. Another method used here is to heat the bone to 1300 to 1500 deg. and quench in oil.

Niter blueing of small parts is accomplished in a two-pot furnace, the baths being carried at 700 to 900 deg. Fahr. The baths are a mixture of nine parts sodium nitrate to one part manganese dioxide. The work is im-



Rotary Gas-Fired Furnaces Used for Tempering and for Blueing and Blacking. At left is the quench tank

mersed for about 5 min., and quenched in cold water; any adhering niter is then removed in boiling water. There are many variations from the above practice. Indicating pyrometers serve every unit.

Parkerizing Applies to Several Parts

Rifle barrels and other parts are Parkerized in a separate room. The parts are first cleaned to remove dirt, oil and scale, a soda wash and sulphuric acid pickle followed by a rinse being used. The work is then placed on a circular cast iron grating, the barrel excepted, which revolves and carries the parts through a booth where sand under 50 lb. pressure is forced on to them through a series of nozzles. The barrels are sand rubbed.

All parts, including barrels, are then placed in steel racks, handled by an overhead monorail system, and the racks, two to a tank, are placed in the Parkerizing solution. The barrels are stoppered at both ends. When first put in, hydrogen gas is given off. The work is kept immersed until this action stops, which occurs within 1½ hr. This solution is kept just below the boiling point. The work is then washed in boiling water and dried in cabinets. The surface of the steel is charged into an insoluble phosphate, highly resistant to oxidation.

Test Bars Vary with Size of Castings in New Standards

BY W. ROLAND NEEDHAM*

DUE principally to researches made under the auspices of the British Cast Iron Research Association, new British engineering standards have been issued covering test pieces for gray iron castings. In the past it is to be feared that the use and interpretation of test coupons has been perfunctory and casual, because everyone connected with the design and production was aware that the mechanical properties varied appreciably with the thickness of the section; nevertheless one size of test bar did duty for everything from an engine bed plate to a small bell crank.

Research has made it quite clear that the average tensile strength of gray iron decreases the thicker the sections, since the rate of cooling in the mold profoundly affects the solidified metal. This is particularly noticeable in large masses, the outside surfaces setting considerably before the inner metal. Consequently, there is a comparatively weak and spongy core encased within a harder shell.

Both tensile and transverse test-pieces are now graded in cross section to suit the material they are intended to represent. For tensile tests there are three standard diameters to represent three distinct ranges of casting thickness. Disparities are thus reduced within narrow limits.

Three Thicknesses and Two Grades

For transverse tests, too, three sizes of circular bar are now made to serve for these three casting thickness ranges. Values for the breaking loads are also tabulated to accord, not only with the nominal diameters, but also with small casting variations therefrom. This is just as it ought to be, because bending stress varies inversely as the diameter cubed. Because metal in the casting crystallizes radially, this should favor the circular shape rather than rectangular bars for bending tests. Furthermore, square corners are a source of weakness, since they tend toward the formation of always undesirable cleavage planes. It is thus doubly appropriate that the test-piece should more nearly approximate the condition enforced by correct design: i. e., that liberal fillets and semi-circular or well-rounded terminal contours be provided.

Briefly, the new provisions for the tensile test are as follows: A ⅞-in. diameter cast bar is turned in the waist to 0.564 in. and this serves to represent castings up to and including ¾ in. thick; a 1.2-in. cast bar is turned to 0.798-in. waist diameter to answer for casting thicknesses above ¾ in. and up to 2 in., while for thicker pieces a 2.2-in. cast bar is turned to a waist diameter of 1.785 in. In each case the gage points are a minimum of 2 in. apart. The minimum ultimate tensile strengths for these three bars are 12, 11 and 10 gross tons per sq. in. respectively for grade *A* material, and 10, 9 and 9 gross tons per sq. in. for grade *C* cast iron.

*Engineer, design department, English Electric Co., Ltd.

It may appear somewhat contradictory to machine the cast specimens to a considerably smaller diameter. It does sacrifice some of the strongest material, but it removes surface inequalities characteristic of a cast bar. Practical considerations enforce a compromise, and the balance probably gives a close approximation to the correct result.

Values Specified for Round Transverse Test Bars

Transverse test-pieces nominally ⅞ in. diameter, 15 in. long, to span supports 12 in. apart, are made for castings up to and including ¾ in. thick; 1.2 in. and 2.2 in. diameter bars, 21-in. long for 18-in. spans, represent castings between ¾ in. and 2 in., and above 2 in. respectively. Great pains have been taken in tabulating central loads and deflections for the three thicknesses and for both grades of iron, for diametrical variations in steps of plus and minus 0.05 in. As illustrating the effect of plus or minus 0.10 in. in grade *A* material, a transverse bar 0.775 in. diameter must carry a minimum of 835 lb., whereas the load for a bar 0.975 in. diameter reaches 1620 lb.

Modulus of rupture does not appear in the specification, but is a useful relative value. It also decreases as the casting thickness increases. The approved figures are: 54,000, 50,900 and 43,000 lb. per sq. in. in grade *A* iron; 43,900, 42,400 and 38,500 lb. per sq. in. for grade *C* iron corresponding to the three sizes of bar.

The specification permits the use of bars either cast on or cast separately, as the engineer may prefer. If the latter, it is stipulated that the bars must be poured at the same time and from the same melt as the castings they represent.

Reclaiming Axles with Surface Cracks

Tests at University of Illinois directed by Prof. H. F. Moore indicate that car axles which have developed fatigue cracks in service may be safely used after they are turned to a smaller size, and at least 1/16 in. below the bottom of the crack. If the material is removed only to the apparent bottom of the fatigue cracks, the tests show that not all the damaged metal is removed.

A theoretical result of interest contained in the report (Bulletin 197, Engineering Experiment Station, Urbana, Ill.) is that heat treated axles of 0.45 carbon steel may have lower endurance limits, as determined on "Farmer" specimens, than others made of 0.55 carbon steel, not heat treated after forging, even though the ultimate and impact strength of the former are materially higher. Furthermore, tests using 0.3-in. diameter "Farmer" specimens give endurance limits about ⅓ higher than those for specimens 1 in. or 2 in. diameter.

Getting the Best Out of Equipment

Whether to Add New Manufacturing Units or Remodel Existing Ones—Weighing the Relative Investments

BY JOSEPH R. MILLER*

IN considering ways and means of obtaining an increased output of a given product from an existing works the question of installation of additional producing units similar to existing units is weighed against the possibility of altering existing equipment. The addition of new units involves an expenditure of known magnitude, additional operating force, additional power costs, etc.

Alteration of existing equipment usually involves features of uncertainty as to the outcome; such a procedure being as a rule considered in the light of an experiment, but carrying the possibility of less investment and less labor and other charges, which in many cases means the saving of large amounts in the capital investment and a marked increase in earnings from the capital already invested. Often the successful accomplishment of such alterations constitutes the point of difference between a very prosperous concern and one that loses money in its operations.

¶ Often successful alterations point the difference between a very prosperous concern and one which loses money.

* * *

¶ Question: What part of the equipment or what movement of the material is blocking the way toward more rapid production?

* * *

¶ Few operating men and few engineers are trained in research methods; still fewer research men are practical—an unusual type is required to discover opportunities for improved operations.

* * *

¶ Examples of betterment touched on by the author include: Shortening non-productive movements of a drawbench; reducing the blowing time of a Bessemer converter; increasing the speed of flow of stock through a blast furnace.

Competition Permits No Standstill

There can be no doubt that any concern which is to stay in business must make those changes in equipment and methods demanded by the progress of competition. However, it is not always the concern having the newest plant that shows the largest earnings. The older concern which is operating a plant that has already paid for itself has that as an advantage over the one with the newly built plant. It has, besides, the opportunity of making comparatively inexpensive alterations, in the light of operating experience, both in old equipment and design of additions.

Such a plant can outstrip the new plant in earning power, as may be seen by comparisons of the earnings of certain plants during the last two or three years.

In reviewing some major operations in the production of steel the fact stands out that the industry has in the past been very slow in making those changes in the design of producing equipment that favor increased production in proper quality. In fact, for a number of years (some time back) it might be spoken of as having, comparatively, drifted.

There is at present a tendency toward a resolute attempt to make progress in this direction, with consequent better earnings in those quarters in which the attempt has been successful. The drawback seems to be that few operating men and few engineers have been trained in the methods of the research worker, and still fewer men in the research field are inclined to be practical. An unusual type of man is required.

The principles involved in the study of an operation and its equipment from the standpoint of a contemplated improvement are not complex. The question to be asked is simply what part of the equipment or what movement of the material under process is blocking the way toward a more rapid rate of production. Nor is the problem any more complex in the case of a large operation than in the case of a very small operation. The risk involved, only, is greater.

Increasing Production of Cold-Drawn Bars

SOME years ago the writer was called upon to increase, if possible, the output of a shop producing a range of sizes of cold-drawn bars, mostly rounds from ¾ in. to 2 in. in diameter. The major operation, that of drawing the bars through the die, was done on two benches operated by high-pressure hydraulic power. The speed of pulling was a satisfactory compromise between the production and metallurgical requirements. Also, the operators were highly efficient.

There were, however, two features that restrained, unnecessarily, the production rate. One feature had to do with the ejection of the drawn bars from the cradle of the machine. Here two slow motions of an ejection mechanism were replaced by one rapid motion. The other feature was the slow return of the drawing head. A minor change, in the valve openings and connecting

*A graduate of Oberlin College, Mr. Miller has worked in the Lorain, Ohio, plant of National Tube Co., South Side works of Jones & Laughlin Steel Corporation, and with Erie Forge & Steel Co., Erie, Pa. His experience has been unusually broad, including inspection, testing and metallurgical engineering, steel making and rolling and cold rolling and cold-drawing of steel. For a time he was superintendent of open-hearth and Bessemer at the South Side works.

piping, accomplished a fast return of the drawing head up to the limits of control of its movements.

Thus by very slight changes involving minor expenditures, entirely within the range of repair charges, these benches were made to produce nearly 40 per cent more bars of the same good quality as formerly, and the shop immediately responded to a 40 per cent expansion of its capacity without an additional capital layout or extension of the floor space. Here we said: We cannot increase the drawing speed, due to metallurgical limitations, but we can increase the rapidity of other movements of production that have no bearing on the quality of the product.

Speeding Up Bessemer Blowing

ANOTHER instance in which advantage was taken of a limiting condition in operation is that of a Bessemer plant making 9-ton melts, the blowing time of which on the general run of iron was 14 min. The ladle-handling equipment was limited to 9-ton melts and could perform properly down to 8-min. intervals. Thus the limiting condition in the production rate of the plant was the time of blowing.

It was decided to increase the diameter of the vessel and the number of tuyeres, in this way reducing the depth (and pressure) of the charge and increasing the rate of supplying air while blowing. A favorable consideration at the time of making the alteration was the bad condition of the shells, which required their replacement. By moving the outboard stand as far as possible, it was calculated that the vessel could be enlarged to a diameter that would accommodate the necessary added air openings to bring the blowing time down to about 9 min.

The reduced depth of the charge, it was thought, would reduce the tendency to spitting, and there were indications that the new operation would improve rather than interfere with the chances for making Bessemer steel of good quality. The change was made as contemplated, resulting in a gain in production rate of good quality steel of around 30 per cent.

An example in major operations that stands out as illustrative of this method of study, although arrived at by slower degrees and by less direct planning, is the blast furnace with the large hearth. In the operation of reducing ore the feature limiting production in any furnace is the speed of movement of the stock down the shaft. In blast furnaces of ordinary design the stock moves more slowly than would be required merely for proper reduction and metallurgical reactions.

The enlarged hearth not only provides the receptacle for the increased output of iron; it also so modifies the bosh angle as to facilitate a more rapid movement of the stock downward, which results in increased activity of the furnace, providing at the same time more room for the introduction of blast.

Whether, if some one had planned such a change ten years ago, the owners would have had the courage to try it is questionable. The reasoning would at that time have been sound, with the possible uncertainty concerning the metallurgical features. This, of course, would be enough to deter any action other than a gradual transition toward the lines as now adopted. In this case the more radical change in high-cost equipment involves a considerable increase in investment, which could not be made in the face of any uncertainty, although a study of the extent of uncertainty might have been made.

In these three examples have been outlined: First, a simple mechanical problem involving small expenditure; second, a more complicated problem introducing metallurgical considerations already somewhat well understood, and greater expenditure; third, a problem involving not only an extensive change of major equipment but metallurgical features not previously studied to the extent required for making a reasonably sure prediction of success. All of these cases bring out the features essential to the study of production methods and equipment that have to do with quantity and costs.

The call for greater productivity is legitimately based, not only upon an increasing number of individuals, but upon the increasing needs and requirements, wants and desires of each individual and the broadening of his life. It is a natural call, therefore, and not an artificial or fabricated state of affairs. He who uses to best advantage the tools of production that are already in his hands profits thereby.

Solderless, Puttyless Skylight, Built of Angle Iron

THE two skylights now under construction at the plant of the Auto Specialties Mfg. Co., St. Joseph, Mich., are fabricated from 2 x 2 x 3/16-in. ingot iron angles, without the use of putty or solder. One skylight is 16 ft. wide and 220 ft. long and the other is 10 ft. wide and 220 ft. long, with five ventilating units. Each unit is operated with Dayton operators. The skylight, which was developed by the Michigan Fireproof Skylight Co., Benton Harbor, Mich., has been put on the market to take the place of monitor-type construction for factories, foundries, laundries and garages.

German vs. American Steel Practice

Differences Analyzed, with Reasons for Divergence—Germans Ahead in Combustion; Americans Lead in Mechanisms

BY F. L. ESTEP*

AS is well known, the United States leads the world in production of steel and Germany has again become second. Most of the steel made in the United States is used domestically, whereas a large percentage made in Germany is exported. This has had a certain influence upon the processes developed and methods pursued in the two countries, as has also very materially the supply and cost of raw materials. Another factor which has affected the methods and the equipment used is the quantity and quality of labor available and the wages which must be paid.

In Germany the greater percentage of ore used comes from foreign countries, while in the United States the great bulk is mined at home. Coal is plentiful and of good quality in Germany, but its price for metallurgical purposes is higher than that used here for the purpose.

[Coke plants, blast furnaces, steel making, soaking pits, blooming and heavy finishing mills, plate mills, merchant mills, rod mills, sheet mills, tin mills and tube mills were taken up successively by the author and the characteristics of each, in the two countries, briefly described. In particular, he pointed out the divergences and told the reasons for the differences noted. Following is a brief abstract of some of the outstanding points.—EDITOR.]

Blast Furnaces

IN the United States a blast furnace shell, supported by a mantel and columns, carries the weight of the top and superstructure, and incloses the brickwork. In Germany the furnace lining is usually built and held together by bands, and separate columns extend from the ground to top of the furnace to carry the weight above.

The United States leads in number and percentage of large furnaces. There are perhaps six furnaces here which have averaged over 1000 tons a day for at least one month and one furnace which averaged over 1000 tons a day for all of 1928.

Because of the comparatively high price of coal, it has always been essential that a steel plant in Germany operate at the highest possible thermal efficiency. If and when Germany uses individual blowing units on each furnace, and when they size the raw materials, then, in conjunction with the 20 to 30 per cent of sintered ore in the burden, it is believed that Germany may again take the lead in output per furnace.

Steel Making Operations

IN Germany about 45 per cent of the total steel is made by the Thomas process. The remainder is made in open-hearth furnaces, usually stationary, where practically all of the scrap made in the plant is melted. Thomas steel is used for ordinary products, such as rails, structurals, merchant material, rods and wire. Open-hearth steel is used for seamless tubing, sheets, tin plate and other products where this grade is better suited.

In the United States the percentage of the total production of steel ingots by the Bessemer process has steadily decreased over the last 30 years. In 1900 about 65.5 per cent of the total was made by this process, but in 1928 only 13.1 per cent, although the tonnage was almost the same.

Because of the predominance of Thomas steel in Germany, an arrangement of plant different from American plants has been possible. Thomas steel can be poured and stripped very quickly, and for many products can be brought to a rolling temperature without fuel by merely inclosing in a single ingot pit for about 2 hr.

Construction of stationary open-hearth furnaces in the two countries is generally the same, but there are some points where they differ more or less radically. United States furnaces are equipped with water-cooled doors, frames and ports to insure the longest life and the minimum delay in production. Water cooling is not done on German furnaces to any marked extent. Many American furnaces are also built with sloping backwalls, which greatly increase furnace life and minimize delays.

In Germany checkers have been developed to a much higher degree of efficiency in heat transfer than is common here. They are building checkers of large volume and extreme height, making it possible to preheat the air and gas to a very high temperature. This means also that the temperature of the stack gases is much less than here—so low that it is uncommon to find a waste-heat boiler on a recent open-hearth furnace in Germany.

Fuel consumption per ton of ingots in Germany is generally considerably better. This is partly due to use of a mixture of blast-furnace and coke-oven gas in open-hearth furnaces, this having been developed to a high degree of efficiency and reliability.

Blooming and Heavy Finishing Mills

FINISHING of rails, heavy and medium structural shapes, and some special shapes is done in Germany almost universally upon two-high reversing mills, consisting of two or three stands adjacent to and usually in line with the blooming mill. Finishing is done from the original ingot heat. The blooming and finishing mills for this class of product in Germany are somewhat larger than those in common use here.

In the United States a mill to roll rails or structurals up to 24-in. beams is arranged differently. Here it is customary to bloom an ingot, deliver it on the back side of the mill, crop it and send it in blooms of proper lengths to the finishing mill. In some few installations a two-high reversing rougher is interposed between blooming and finishing mills. In many American plants sections corresponding to those which would be rolled, in Germany, direct from the ingot heat are reheated before rolling.

It is practically a certainty that, for the majority of

*Chief engineer, Perin & Marshall, New York. This is an abstract of a paper presented before the Metropolitan section, A.S.M.E., Nov. 12, and sponsored by the Iron and Steel Division of the society.

products which can be rolled direct from the original ingot heat, if mills of the two types were installed side by side, given the same materials to roll into the same finished products, the American mill would produce a greater tonnage in given length of time with less labor. The first cost of the American installation would be little if any higher.

Tube Mills

Tube mills can be classified as three kinds: butt weld, lap weld and seamless. In manufacture of pipe by the butt-weld process, the United States is far ahead of Germany in tonnage and equipment. Germany has few butt-weld mills and all are of antiquated design and operated inefficiently. In the winter of 1928-29 the first installation of a butt-tube mill equivalent in design, capacity, etc., to those in common use in America was installed. Practically no lap-weld pipe is made in Germany.

In manufacture of tubes by the seamless process Germany has always led the world. The United States has been backward in adopting this process.

Further Divergences Noted

ENGINEERS of the more advanced nations, in tackling metallurgical and other steel-making problems, will achieve results which are practically identical in all fundamental respects, according to a letter from F. C. Biggert, Jr., vice-president and chief engineer United Engineering & Foundry Co., Pittsburgh, which was read by Stewart M. Marshall at the conclusion of Mr. Estep's paper.

There are essential differences between the plant layouts in Germany and the United States, according to a letter from H. J. Freyn, president Freyn Engineering Corporation, Chicago. In the United States the layout is along simple lines, providing opportunities for expansion of departments and providing also easy transportation from one place to another. European plants lack the benefit of an adequate conception of a general scheme and plans for future growth. This is, of course, attributable largely to the fact that many of the plants are so old.

In the United States there is more flexibility in regard to the tonnage produced. A drop of 50 per cent in the output is not nearly so detrimental to total costs as is the case in Germany. In the latter country, Mr. Freyn writes, a diversity of products must be made on a given set of mills. There has been much help recently through mergers, which have made it possible to specialize better.

Furnace Man Has No Control Over Coke

Coke oven plants and blast furnace plants are not under common ownership in Germany, except in a few instances. The coke is made largely at the mines, so that it is the coke which is hauled and not the coal. This condition gives the blast furnace man less control over the quality of his coke.

Germany Leads in Combustion

Mr. Estep's paper might be very briefly summarized by saying that he has accorded the United States the primacy in mechanical features and Germany the lead in combustion, according to a statement by Sidney G. Koon, associate editor THE IRON AGE, New York, in continuing the discussion. With their characteristic thoroughness the Germans have gone into the chemistry of the fuels, whereas the American inventive genius is shown along other lines.

He directed attention to the figures in the paper, telling the rapid growth of the tin plate industry in the United States to a point where it now dominates the world. In particular, the paltry thousand tons made in the United States in 1891 recalled the political history of that period, when Grover Cleveland solemnly assured the American public (and all others) that steel makers in the United States would never be able to compete in tin plate with those in Wales.

Two Ruhr furnaces were cited by Dr. George A. Orrok, consulting engineer, New York Edison Co., New York, both of which have produced over an entire month an average of more than 1000 tons a day. Their maximum days were respectively 1065 and 1100 plus tons. They follow the general design common in recent furnaces in the United States, including skip hoists for charging.

Large centrifugal blowers are getting common on the Continent for producing wind for blast furnaces, he said. These go as high in some cases as 15,000 hp. in a single unit and with good results. Some of the modern gas engine blowers on the Continent are fitted with waste-heat boilers in the exhaust lines. Steam raised in these boilers furnishes power for most of the electricity used in the plants.

Crude Handling Methods Still Used

Discussing another phase of steel mill operation, Willard C. Brinton, president Terminal Engineering Co., New York, spoke of the crude methods still in vogue in transporting certain materials about American steel mills. His remarks were directed particularly at the repair gangs—millwrights, electricians, bricklayers, carpenters, etc. many of whom he had seen hauling or pushing materials by main strength in wheel-barrows or other hand-operated devices, whereas so many of our other manufacturing establishments do all of this work mechanically. He spoke of the great waste in time occupied in this manual effort and the high cost of doing it with men earning high hourly wages.

He made reference again to the change from narrow-gage industrial tracks within the plants to standard-gage tracks. While this is along the line of general progress, it introduces elements which make operation more difficult. For example, the curves on the broad-gage tracks are necessarily much less sharp than with the narrow-gage tracks, which means that materials have to be moved a considerably greater distance. He spoke of one case where a movement of materials to a point about 100 ft. away from their previous location in a direction transverse to the track involved running them one-half mile or more down the track to a switch point, and then back a similar distance.

Differing levels in plants, as, for example, the height of the open-hearth charging floor and the elevation of the stock floor of the open-hearth department about 4 ft. above the general ground level to correspond with the tops of cars on the tracks on the ground, introduce complications in transverse movements. Mr. Brinton made a particular plea for a method of facilitating these transverse movements, with the definite recommendation that they be made on rubber tires. This might be a form of electric truck or other transportation unit, but customarily the ordinary type of motor truck would not fit well into the scheme.

Efficiency of Steel Production

Discussing the matter of efficiency of steel-making units, with particular reference to the element of time efficiency, Stewart M. Marshall, of Perin & Marshall, consulting engineers, New York, referred to a hot strip mill in an unidentified American plant in which a monthly record had been made as high as 84 per cent. This figure is known as the efficiency of the finishing groove. It is obtained by dividing the number of feet of strip made in the month by the number of feet of peripheral travel of that groove as measured by its number of revolutions in the month. Several months this unit has run from 82 to 83 per cent.

Charles P. Perin, senior member of Perin & Marshall, presided at the meeting.

Business Must Change Its Rule

Modern Trends in Production and Distribution Call for Improved Practices and Sacrifices for the Common Good

BY SAUNDERS NORVELL*

MY subject is new trends in distribution of goods. Fully 60 per cent of the influences that make the success or failure of any business are outside of that business. By this I mean that a merchant working in his own business, no matter how thoughtful he may be, no matter how hard he may work, no matter how good his judgment is, if he confines his thinking entirely to his own business, then the factors he covers are only 40 per cent of the total result.

This principle has been illustrated where a harness or a carriage maker did not watch the development of the automobile; gas taking the place of oil; electricity replacing gas; prohibition destroying brewing and distilling; rayon replacing cotton; concrete and steel in buildings superseding wood; steamships replacing sailing vessels, and so on down a whole list of changes that have taken place in trade, and all the other changes that were influenced by these changes.

Changes in Distribution Are Steadily Taking Place

There have not only been changes in industries, but changes are steadily taking place in methods of distribution. Fifty years ago, goods were sold almost exclusively through the channels of manufacturer to jobber and jobber to retailer. Within this period, we have seen the development of the mail order house and the chain store and house-to-house selling. All of these changes took place outside of the business of the oldtime merchants, entirely independent of their business, but at the same time having a profound effect upon them.

Within my own business experience, there were no established rates made by railroads. Different rates were made to different customers. Rebates were a common thing. Rate wars between railroads occurred at frequent intervals. Then came Government regulation, through the Interstate Commerce Commission, the fixing of rates, the laying down of rules by which the railroads are governed—result, the stabilization of the railroad business. Where railroads 40 years ago were almost all bankrupt, frequently passing into the hands of receivers, now they have good credit, are prosperous, are giving the best service in the world, and their stocks and bonds are as good as or better than other securities that can be bought.

Take banking: All the older men in this audience remember the banking panics of the past. A large part of the nation's troubles was the result of banking conditions. Then came the National Bank Law, the Government regulation of national banks. All this at first was opposed by the banks themselves. It was called Government interference with business. Then came the Federal Reserve Bank and the regulation and control of our entire banking system. No one in this audience will doubt that the Federal Reserve has stabilized the banking of the country. Failures among banks are largely the private, not national, institutions.

In the early days, we remember wars between the public utility companies. Now we find our great public utilities, such as the telephone and telegraph companies, regulated by the Government. Their rates are fixed. As a result, these great industries have prospered, have given the public wonderful service, and now their securities are sold broadcast in the land, so that the people have become, in an increasing measure, the owners of the companies that serve them.

All of these things are history, and well known to every business man of average intelligence. But now let us turn to industry, to manufacturing, to jobbing and to

*Mr. Norvell is president of the Remington Arms Co. and the Remington Cash Register Co., New York. His address was delivered before the first Ohio Management Congress at Columbus, Ohio, Nov. 20.

Saunders Norvell says that:

- **Modern business must pay attention to outside influences that affect its future.**
- **The game of selling must be played according to rules that are laid down, giving an equal chance to all the players.**
- **Modern business in every industry must make sacrifices for the common good.**
- **Business must be conducted as a science—reaching the truth by establishing and recognizing facts.**
- **The time is coming when a member of any industry who attempts to take unfair advantage, who will not play according to fair rules, will be ostracized.**

retailing. In these fields, on account of the development of modern selling, of national advertising, of modern handling of salesmen, of changing channels of distribution, the competitive pressure for business has become a tremendous force. Modern selling in its present development has become a Frankenstein, which, unless controlled, like the monster in the story, will destroy its maker. In other words, industry in this country, as I see it, is like the railroads, the banks and the others mentioned above, before they were taken in hand, regulated and the rules of the game laid down and enforced.

The Sherman Law and the Clayton Act laid down certain principles, but these laws are very hazy and foggy. The meaning of the laws on point after point has had to be established by the courts. This has taken a great deal of time and has caused a great waste of money in litigation. Glaring inconsistencies exist in the present interpretations of these laws. Some of these interpretations almost approach the verge of absurdity. I have no time in this address to go into this aspect of the laws controlling distribution.

Unfair Classification of Customers and Secret Rebates Are Current Evils

Some of the glaring evils resulting from mass production, overproduction, high-power selling and national advertising are, first of all, the unfair classification of customers. Manufacturers, for instance, selling a jobber at a certain price and then selling a retail dealer at exactly the same price. Manufacturers selling retailers at a price, and then going to other manufacturers using their goods in the same cities as these retailers and selling these manufacturers, who buy their goods in large quantities, at even lower prices than they have sold their jobbing or retail customers.

Another great evil that is rampant in modern distribution is the secret rebate. Large distributers receive favors not granted to smaller distributers in the same class, these favors placing the large distributers in a position to destroy their smaller competitors.

Along with the above conditions, which I have sketched hastily, we find that modern competition has built up a sales structure, composed of national advertising, district sales managers, branch houses, salesmen and missionaries, which costs immense sums of money, a tremendous burden upon almost every industry. With this modern system that is applied to many lines, the same goods are not only sold once but frequently twice, and in some cases three or four times, all this cost of selling, of course, being added to the cost of the goods, and in the end being paid for by the public.

In the old days, almost every large business was built up as a result of the shrewdness, energy, and occasionally by the crookedness, of one individual. This has led to the saying that every great institution is the shadow of one man. That was especially true in the old days. In those days, we had individuality in business. It was my fortune in my early years to be brought in contact with many of those old-time captains of industry. I think I can say, without fear of contradiction, that the majority of them were exceedingly narrow in their thinking. They cared nothing whatever for the general welfare of their industry.

I can just imagine how one would have been laughed at 40 years ago if he had suggested to one of these gentlemen the idea of thinking first about his industry as a whole and afterward of his own business. These men were woefully ignorant of what was happening in their own industry. They were ignorant of the trend of the times.

Game of Selling in Old Days Played without Rules

Nevertheless, many of them established great businesses and left large fortunes. The reason they did this was on account of the unprecedented growth of this country. The whole United States was opening up. Immigration was pouring into the country. Territories were being turned into States. Railroads were being built. In those days, the country was growing so fast that ignorant, narrow men could succeed. It was only necessary for them to buy goods, to buy more goods, to fill up their warehouses and to send out their salesmen to gather the harvest of ever-increasing orders.

The game of selling in those days was played without any rules. There were all kinds of practices—fair and unfair. Successful salesmanship was largely a matter of inspiring friendship and of physical strength to travel hard, to make long trips and work long hours in taking orders. In those days, when the goods were sold, they were sold. After selling the goods, the jobber or manufacturer felt no responsibility toward his customer. After selling, the next problem was simply to collect.

It was an era in which each man took care of himself and the devil took care of the hindmost. But let me repeat, the great growth of the country, the expansion of business, took care of all the inefficiency that existed in business. Unusual profits took care of heavy losses through bad debts. Chances were taken in the way of credits, because the profits were so large. Means of communication were poor. There were no great papers such as we have today, giving facts and information daily in regard to business. As a result, things were done just as they are now done in China and are never heard of on the outside. Information traveled in small circles, and, as a result, the various merchants were not so much troubled about the things that were done, simply because they never heard of them.

Despite New Environment Old Practices Still Exist

Now, what is the condition today? What are the new trends in distribution? Today, in an entirely different environment from that of 40 years ago, some of the same evil practices of those days are still in existence. The difference between now and then is that merchants know what is being done today. They know of discriminations, they know of secret rebates, they know of price cutting, they know of the wrong classification of trades. They know that manufacturers do not protect their customers, and that jobbers, in turn, do not protect their customers.

On account of our modern methods of distribution, information on all these things is known and is known quickly. As a result, the whole trade is honeycombed with the feeling of distrust, fear and suspicion. Short-sighted salesmen, by gossip, tale bearing and even by exaggeration, stir up and make the situation worse.

As a result of these conditions, many industries are suffering from what has been termed "profitless prosperity." We enjoy a large volume of sales that in many cases keeps our factories going. We pay large salaries to the heads of departments and to the workers in our factories, but when we come to the end of the year and figure up our profits, we find, in many cases, they are exceedingly small or entirely non-existent. Under these conditions, business, instead of being a pleasure and a rational occupation, has become a tremendous grind, full of irritations and disillusions and so wearing upon the executives that the tired business man has become one of our national institutions.

New Rules for Business Must Be Laid Down and Enforced

What is the answer to all of this? To my mind, the answer and the only solution is that the rules of the game must be laid down. We must have fair rules, giving an equal chance to all the players. These rules must be enforced. How could we play a game of bridge today unless there were rules governing the game and unless those rules were rigidly enforced? One reason why the

game of mahjong never got far in this country and soon came to an end was because no one ever knew the rules. Every player set up his own rules, and, as a result, the game usually broke up in a row.

The Federal Trade Commission and the Department of Justice, as they are functioning at present, seem to see this situation clearly. The Federal Trade Commission is working on the problems of each industry. They are helping to lay down the rules upon which the game can be played. They are trying to eliminate unfair practices. They are opposed to secret rebates and special advantages. A number of industries have already visited Washington and have worked with the Federal Trade Commission in laying down the rules for their industries. Great benefits have followed to merchants simply knowing the rules under which they are to play the game.

I happen to know of some of these industries that have taken this course, and there have been some very surprising results. One thing has been the opening up of more information about industries as a whole. In one case, for instance, it was supposed by the manufacturers of a certain line of goods that the annual sales in this country amounted to about $10,000,000. Believing this to be a fact, each manufacturer was dissatisfied with his share of the business. He was driving his salesmen for greater volume. He was suspicious of his competitors' prices. The result was an utterly demoralized business. When the facts were gathered in regard to this industry, it was discovered that, instead of $10,000,000, the total volume of the business was only $3,000,000, and when each manufacturer compared his volume with the total amount, he appreciated the fact that he was getting a fair share.

Now, in conclusion, just a word about the modern merchant as compared with the old-time individualistic merchant. The modern merchant, realizing, first of all, how outside influences are sure to affect his business, must be a very broad student of such influences. If, for instance, he had been in the harness business when the automobile came in, the chances are he would have tapered off in his manufacture of harness and developed something in the line of automobile supplies in his factory. He would not have stuck to the harness business until this business was down and out.

This modern merchant not only must study all the factors surrounding his own business, but he also must seek just as much information as possible as to the general conditions inside of his industry. Instead of being the individualistic merchant of the old days, he must believe in the new spirit of cooperation. Now I do not mean that he must believe in cooperation simply from an altruistic point of view, but he must fully realize that the welfare and success of his own business depend not only upon what his house does but upon the things the other houses are doing. If there are bad practices in any industry, these practices are sure to react upon all the industry. One bad apple will soon spoil the whole barrel.

Sacrifices Must Be Made for the Common Good

This modern merchant must be willing to make sacrifices for the common good, and this is especially true of those executives who are at the head of the largest and strongest institutions. In other words, business today cannot be conducted as it was 25 or 40 years ago. Business to be successful and profitable must be done as a science, and of course we all know the basis of all science is reaching the truth by establishing and recognizing facts. There is no place for ignorant, prejudiced men in modern merchandising. There is no place for men whose judgment is warped by their hatreds.

In my opinion, the weakness of much association work is in the fact that the scope of these associations is too large. There are so many varied interests that these interests cannot be harmonized. These large associations may be of value just in a general way, but it is my opinion that the best work can be done in the trade by smaller associations of merchants covering strictly their own line of business, or parts of their business, such small associations not attempting to do anything illegal in the way of price fixing, but to meet for the purpose of studying and trying to improve the practices in their trade. Not only that, but to try to lay down rules to govern the competition in the trade.

I believe the time is coming when a member of any industry who attempts to take an unfair advantage, to play the game without following fair rules, will have just as much social standing as the member of a high-grade club who might be caught cheating at a game of cards. The time is coming, and must come, when merchants who will not play the game straight will be ostracized and without standing among all fair-minded merchants in the fraternity of their trade.

Conditions Promoting Solution of Cast Iron in Acids

ATTACK of iron and steel by acids has generally been thought of as accelerated by local action. This is particularly true for gray cast irons for, as Bauer has shown, the iron has an electrode potential of — 0.76 volt and graphite a potential of + 0.37 volt, measured against a calomel electrode.

Interesting tests, in confirmation of the local action theory, have been reported by Bardenheuer and Zeyen in Publication No. 132 of the Kaiser Wilhelm Institut für Eisenforschung at Düsseldorf. The investigators made up a series of irons in which the nature of the graphitic constituent was made to vary. The variation was brought about by casting into molds of different shapes and temperatures and by superheating the iron in varying degree before casting.

The loss in weight per unit area in normal HCl, HNO_3, H_2SO_4, and acetic acid CH_3COOH, was then measured. It was found that in nearly every case a fine graphitic constituent was accompanied by rapid solution, while large plates of graphite produced slower attack by the acids. It further developed that no difference could be observed, depending on the manner in which a definite degree of fineness was obtained.

The authors conclude from these facts that local action —that is, a flow of electricity from graphite to iron—is largely responsible for acid attack and that the larger number of graphite centers exposed explains the more rapid solution of those irons in which the graphite is finely divided.

Detecting Copper in Copper-Bearing Steels

BY suitable annealing followed by a 20-min. etch with 1 to 2 HCl, the presence of over 0.20 per cent of copper in low-carbon steels is readily detected, say K. Daeves and G. Tichy in *Stahl und Eisen* for Sept. 19. The process depends on the fact that copper is not readily attacked by non-oxidizing acids and therefore appears as a finely divided residue on the surface of an etched specimen. This residue has the characteristic copper-red color. Annealing to 800 or 900 deg. C. in an oxidizing atmosphere brings out most reliably the copper color.

Fins Cause Unmachinable Castings

Chill to White Iron on Castings from Mixtures Already Adjusted for Highest Practicable Strength and Hardness —Designers and Foundries Both Responsible

BY G. M. EATON*

G. M. EATON

EPIDEMICS of white iron edges on machined surfaces of cylinder heads and blocks for internal combustion engines are often responsible for failure in meeting production schedules. Failure to meet production schedules is a very serious matter, resulting in direct money loss, damaging the customer's confidence in his supplier, and possibly even resulting in the loss of contract business. In addition to these vital commercial troubles, white iron edges produce serious internal shop complications in the shape of heavy tool costs, the failure of pieceworkers to make their rates, and other obvious and expensive irritations.

Chemical Analysis Not a Controlling Factor

An investigation has recently been made into the causes of white iron edges in several specific epidemics of this trouble. The irons investigated included: (1) unalloyed irons, (2) chrome-nickel irons, and (3) chrome-molybdenum-irons. No type of iron investigated was entirely immune from the trouble.

Investigation of each specific case invariably traced the trouble to a common cause, and leads to the belief that it is a constructive service to publish the facts.

In over 90 per cent of the individual castings edged with white iron, the hard edge was due to the presence of a fin on the rough casting, which landed on the edge in question and acted as a chill. Of course the presence of a fin on an edge that is to be machined does not necessarily mean that white iron will be encountered by the tool, but it does mean that when one or more of the variables which tend toward white iron edges, approaches the danger point, the fin accelerates the trouble. Among the variables referred to may be noted (a) high chromium in the analysis, (b) a low silicon iron, (c) low total carbon, (d) cold poured metal, or (e) wet sand.

Molybdenum and nickel when alloyed with gray iron both have a definite tendency to combat white iron edges, but they are not always adequate as a sole preventive measure and it is therefore only common sense to look for further assistance.

The first logical step is to prevent the formation of the fin on the critical edge of the rough casting. This is sometimes a difficult task, but it can often be accomplished if the problem is attacked with determination. The only logical aim for this attack is the production of satisfactory finished castings at the least over-all cost. If the elimination of the fin from the critical edge makes a more expensive pattern, core box, or core, this must be weighed against the ultimate dollars lost in the machining operations due to the practice which produces the trouble making fin.

There are two general methods for preventing the formation of fins on edges which are to be machined.

First, move the parting line so that the fin lands on the rough casting, as far remote from the machined surface as possible.

Second, grind the cores to a fit so close that the fin is of immaterial thickness.

Moving the parting line will often require the cooperation of the mechanical engineer responsible for the design of the part.

For example, one of the most troublesome hard edge epidemics occurred at the bottom end of the bore of internal combustion engine cylinders. If the detail drawing calls for a square corner at *A*, Fig. 1, it is a foregone conclusion that the pattern maker will arrange for a simple cylindrical core, and the rough casting will show a fin as at *B*, unless the cores are very carefully ground to a close fit. If, however, the detail drawing shows a round corner as at *C*, with the finish bore running out as shown, the fin will be located at *D*, and there will be no white iron encountered at the end of the bore—unless some of the variables noted above have slipped so far that the entire bottom end of the cylinder is white iron.

Another practical illustration is found in a lot of split casings, as shown in Fig. 2. White iron was encountered at *A*, on half the casings in this lot. The parting line was at *B*, and fins developed as indicated by the cross hatched areas *C*.

The white iron was just heavy enough to cause trouble on the edges; moving the parting line to *D* would be easy and would make a very real improvement.

A third and final illustration where white iron resulted from a sharp isolated corner, even where no fin existed, is an epidemic on several lots of automotive cylinder-head castings. This trouble took the form of white iron edges at *A*, Fig. 3, on the bolt bosses.

To correct the trouble the identical weight of metal could perhaps be employed to make the top of the boss of an elliptical cross section, as at *B*, with no opportunity for white iron to form, unless some detail of the foundry practice is very far from proper. It is a surer procedure, however, to add a little more metal as shown at *C*, and thus insure that the finishing operation will clean up the boss to full diameter.

Modify Molding Practices for Stronger Irons

This last is an illustration of a condition where the designer can be of material assistance to the foundry and the machine shop.

There are a number of very logical reasons for the increasingly serious situation created by white iron edges.

*Molybdenum Corporation of America. Sometime chief mechanical engineer, Westinghouse Electric & Mfg. Co.

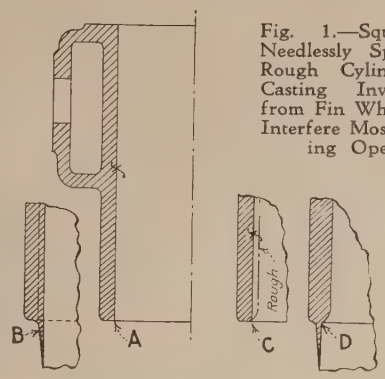


Fig. 1.—Square Edge Needlessly Specified on Rough Cylinder Block Casting Invites Chill from Fin Where It Will Interfere Most with Boring Operation

Some of these reasons work together to create conditions which are hard to correct, and yet which should and can be corrected.

The designer takes the position that he uses time-honored practices in proportioning his iron castings and that the foundry must be responsible when a type of casting that was satisfactory a few years ago begins to give trouble. A similar stand is made by the pattern maker, and by others along the whole line of production. The trouble is not due to change in their practices, they say.

Such a situation is particularly hard to handle when the castings are purchased outside of the manufacturing organization, where there is a division of responsibility, and where each party is guarding his own costs carefully.

The weakness of this widely held opinion lies in the fact that the *gray* iron, around which the present design and molding technique was evolved many years ago, was a very different material from the iron which the designer demands today. Where Brinell values of around, say, 160 were once satisfactory, the designer has been forced by competition to raise his Brinell requirements to 190, or even to 210 Brinell on castings for services absorbing tremendous tonnage and demanding increased strength and wear resistance.

This boosting up of the strength and hardness of gray iron simply means that the foundry has been pushed closer to the limits of practical production of machinable iron, and this evolution automatically lays on the designer the responsibility for modifying his castings in every reasonable way, to ease the problem confronting the foundry.

Most able designers need only to have this condition placed before them clearly, to grasp the necessity of modifying their designs so as to effect the greatest possible overall reduction in the cost of their ultimate product.

When unmachinable iron is reported by the shop, the designers who are in this broad-minded group will attack the trouble on this basis: "Due to the recent fundamental changes in gray iron there is in all probability something I can change in the design of this rough casting, that will eliminate or at least ease up the trouble."

The fundamental point at issue may be summed up very tersely as follows:

The present technique of design for gray iron castings is directed almost exclusively toward the *finished casting*, whereas the only safe basis is the sharpest possible attention to the *rough casting*, exactly as it comes from the sand, including all fins and other excrescences heretofore considered as only incidental to the finished product.

Responsibility of Executives and Designers

This calls for so much hard plugging on the part of the designer, before he can add to his store of knowledge a sufficient familiarity with detail pattern and foundry practice, that many will be prevented either by the press of production or by mental and physical inertia from doing the necessary work.

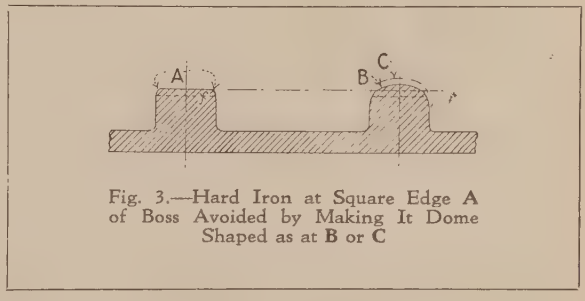


Fig. 3.—Hard Iron at Square Edge A of Boss Avoided by Making It Dome Shaped as at **B** or **C**

This brings us logically to a consideration of the responsibility of the executive. The executive who senses the importance of modifying designs and patterns in a way that will increase the margin of safety in the foundry, and then fails to create a setting whereby his designers are permitted or forced, as the case may be, to take the necessary corrective measures, has only himself to blame for the continued high machining costs and loss of production that are properly traceable to white iron. It is, of course, impossible to correct all going designs overnight, but it would be an economic crime to permit the designs of new engines to go out which are doomed by improper design to become addicts to the white iron habit.

A word of caution to the foundry would then be that when every possible precaution has been embodied in the design, bad foundry practices may still produce white iron. When a white iron epidemic occurs, the foundry therefore cannot safely conclude that it is all the designer's fault. On the other hand the entire responsibility does not necessarily rest on the foundry.

Furthermore it is a foregone conclusion that as soon as the designer finds that he is no longer troubled with white iron, he will inevitably stiffen up his specifications to secure a still stronger and more wear resistant iron. Therefore, the foundry must keep on its toes to be ready to fulfill this coming demand.

Most of these comments have been directed specifically to cylinder heads and blocks, because of the great tonnages and consequent seriousness of the situation when

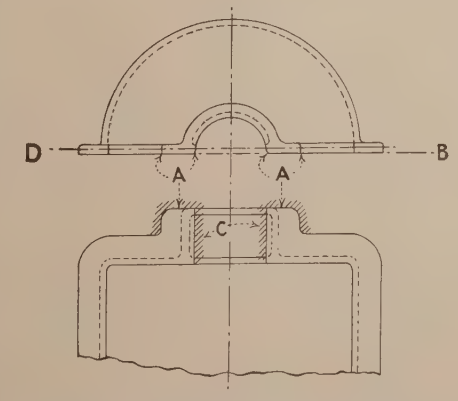


Fig. 2.—Moving Parting Line from **B** to **D** Will Avoid White Iron at Fins Shown by Hatchings at **C**

trouble does occur. Everything that has been said applies equally in principle to all similar castings made of gray iron.

Recapitulation

1. White iron edges on finished surfaces are responsible for loss of production and wasted money, much of which is preventable.

2. Either molybdenum or nickel alloyed into the iron tend to combat white iron edges.

3. High chromium, low silicon, low total carbon, cold poured metal and wet sand, also tend to produce white iron edges.

4. Fins, on the rough castings, which are found on the edges in question are a prolific cause for white iron edges when the items listed above drift toward the danger zone.

5. A fundamental reduction of white iron edges can be made by modifying the designs and patterns in a way that will remove fins from critical locations. Improvements made in this way will remain improvements once the essential changes have been made, until the requirements are made more drastic.

6. The designer has a heavy share of responsibility for white iron edges because he has pushed the foundry closer to the limit of possibility in the production of uniformly machinable iron.

7. The ultimate responsibility for continuing or correcting the present situation caused by white iron is squarely on the shoulders of the executive.

8. The foundry responsibility is not radically changed by the points that have been brought out.

9. The development of improved iron is sure to continue and the foundry cannot slacken their practices after present designs are made more adaptable to the production of rough castings free from white iron.

Zinc Oxide in Grease Solves Obscure Corrosion Problem

CONSIDERABLE attention was given by the English engineering press two years ago to a toothless gear known as the Keenok pinion. It consists of a steel tire and a central hub, both of which are serrated to receive between them a number of steel rollers. End plates are attached to the central member to retain the rollers and the tire in position. The tire has a freedom of 0.001 or 0.002 in. on the ring of rollers, and the central hub is keyed to a shaft.

A simple application of the pinion is for the transmission of power between two parallel shafts. The tire presses against a plain collar on the second shaft. The pressure between the two sets the tire slightly eccentric to its inner member, and the tangential force received by the rollers from the tire causes the rollers on the contact side of the pinion to move slightly up the slopes of the serrations. By so doing, they act to restore the tire to concentricity with the inner member and therefore to increase the contact pressure between the tire and the other shaft. The greater the tangential force applied to the tire, and therefore to the rollers, the farther will the rollers climb up the serrations, and consequently the greater will be the contact pressure between the tire and the driving shaft. At all loadings no slip occurs, even when the whole gear case is filled with lubricant.

In practice it was found that ruinous corrosion was set up in the device, amounting to 1/64 in. in 300 hr., even on parts which were not subjected to abrasion. According to *Engineer*, Sept. 27, more than 50 different types of lubricant were tried, both acid and alkaline in reaction; even when the gear was run dry in an enamelled case the rapid corrosion occurred. It was finally decided that the local stresses, rapidly varying in intensity, set up sizable potential differences and induced electrolytic corrosion. It ought then to be possible, by mixing some substance with the lubricant, to convert the harmful corrosion of the electrolytic action into a beneficial protective effect.

The substance eventually chosen was zinc oxide. When small quantities of this oxide were mixed with the lubricant little or no benefit was noticed. When, however, the amount added was some 50 per cent or more of the weight of the oil, it was found that all corrosion troubles disappeared and that the parts, instead of corroding, became coated with an extremely thin and apparently permanent film of metallic zinc. Examination at the National Physical Laboratory showed that the deposit is metallic zinc; the film has a thickness of 0.0004 mm. or less, that is to say, less than the average wave length of white light, and therefore invisible beneath the microscope when viewed in section. The film is speedily established, and once established does not grow beyond a limiting thickness. That its thickness does not increase indefinitely is proved by the fact that the device shows no signs of jambing or seizing after it has been run for many hours in the presence of the zinc-depositing lubricant.

Corrosion of this kind has been noted before and has been called "mechanical corrosion." It occurs in high-speed ball or roller bearings or chain drives, and the new lubricant has a field of application in those directions.

"Featherweight" Concrete Roof Tile Is Cellular

A lightweight concrete roof tile has been put on a quantity production basis by the Federal Cement Tile Co., 608 South Dearborn Street, Chicago. The tile, which is made of a material known as Haydite, is one-third lighter than ordinary concrete tile, made from sand and gravel, or stone. A sand concrete slab of channel form, say 2 ft. wide by 6 ft. long, weighs 15 lb. per sq. ft., compared with 10 lb. per sq. ft. for the Haydite tile.

The lightweight tile is recommended as a means of saving steel in roof construction. It requires, it is said, no heavier steel design than any other form of roof covering, at the same time offering the advantages of permanence, fire-safety and absence of maintenance.

Haydite is made from shale, ground and burned at a temperature of 2000 deg. Fahr. in rotary kilns similar to those used in making Portland cement. During the burning, oxidation of the carbon content forms gases, which cause the shale to expand into an inert, light-weight cellular structure. This material, a mass of trapped air cells, the walls of which are thoroughly vitrified fused shale, is crushed, screened and graded and used as an aggregate for concrete instead of sand and gravel. The cellular structure of the tile made from Haydite not only makes for lightness, but also gives the slabs a definite insulating value, it is stated.

Since its foundation in 1921 the British Cast-Iron Research Association has made considerable progress. Among other things a heat-resisting cast-iron has been discovered which has given remarkable results when repeatedly heated in the presence of moist carbon dioxide at temperatures ranging from 600 deg. C. to 1000 deg. C. The results are stated to have radically modified existing views with regard to the effect of composition on growth.

Good Business Volume in Prospect for 1930

Early Recovery from Stock Market Crash Seems Assured, But Forcing of Activity Might Bring New Setback

BY VIRGIL JORDAN

I DO not believe that any specific forecast of general business conditions in 1930 can be scientifically justifiable or indeed quite honest at this time. The evidence upon which to base any such forecast is confused, fragmentary and uncertain. Most of the things that are being said about current conditions and prospective programs, whether for better or for worse, cannot be taken at their face value. The true situation is still somewhat distorted by exaggerated anxiety, due to individual losses, and by excessive optimism colored by a political purpose.

Within a month or six weeks we shall be able to judge more clearly and fairly how much truth there is in the assertions and promises now being made. In the meantime I think it is wisest to disregard them and to guide business and financial policies conservatively and cautiously in the light of those fundamental factors in the situation, both known and unknown, which are likely in view of past experience to determine the general business outlook for next year.

Danger in Forcing a Boom

THE balance of probabilities is certainly in favor of a fairly quick recovery and a moderately good year in most lines of business in 1930. The underlying forces are all set in the direction of expansion, and it is quite possible that they may be so strong, so quickly brought into action and so effective that the basis for a good-sized boom may be laid early next year. This, I think, is a real danger and would be a most unfortunate consequence of the current tendency to force business expansion.

Too early and too great an expansion would rest upon a weak and insecure foundation and would invite an early relapse in the stock market and in general business which would destroy confidence far more seriously than the events of the past few months and would be far more difficult to correct. Such a boom would quickly become a boomerang and hopelessly discredit those who fostered it.

It must be remembered that the present recession is in large part a reaction to the boom conditions that developed in the latter part of 1928 and came to their climax in the first half of 1929. The 1929 bull market was built upon that boom, and its collapse was in larger part merely a reflection of the readjustment of business to a more normal rate of growth.

¶ Fluctuations in business volume have been progressively smaller since 1921.

* * *

¶ Current recession promises to be short-lived, and general business in 1930 should average somewhat above normal.

* * *

¶ Loss of general purchasing power cannot be estimated, and statistics on inventories are incomplete.

* * *

¶ Stocks of farm products are large, and consumer inventories are an unknown quantity.

* * *

¶ It is fairly certain that current readjustment will not be more severe than those of 1924 and 1927.

* * *

¶ But an artificial bull movement, induced by easy money and boom propaganda, might result in a new and more serious business setback.

I am inclined to think that the present level of general business activity, though somewhat below last year at this time, and far below the level in the first half of 1929, is still little, if any, below normal for the season, if by "normal" we mean the level that would be reached in the regular average year-to-year growth of general trade, and if by "season" we mean the time when usually in the past there has been a slackening of activity. In some industries and lines of trade there may be new normals and marked changes in season, but there is no evidence that such changes have affected the course of the total volume of trade from year to year.

Present Situation Resembles That of 1927

IN the fall of 1927, at the annual meeting of the Railway Business Association and elsewhere, I made a definite prediction of the 1928-29 boom period. It seems to me now that the present situation closely resembles that which developed in the last half of 1927 following the business expansion in 1926. That expansion was less marked than the 1923 boom and the recession which followed it was more mild than that which took place in 1924. Both these in turn were less severe than the boom of 1919-20 and the succeeding depression of 1920-21.

We can perhaps secure a better idea of the present situation and outlook if we compare the degree of fluctuation in general business in these three successive periods of readjustment from excessive business and financial expansion — readjustments which took place at approximately three-year intervals and of progressively diminishing severity. The following quotation from an article by the writer in *Business Week* for Nov. 27 summarizes these comparisons, based upon the comprehensive and careful measurements of industrial and trade activity by the Federal Reserve Bank of New York:

Business Fluctuations Narrowing

"In each of these recessions general productive activity, as measured by manufacturing, mineral and agricultural output, building construction and employment, has shown the greatest fluctuation, next to financial activity, falling earlier and further and rising sooner and higher than any other measure of business except financial activity. But since the war these movements have never been very wide. The highest was about 16 per cent above normal in January, 1920, the lowest 23 per cent below for one month, February, in 1921. In 1924 it fell, at the worst, no more than 7 per cent below the normal line in June; and in 1927 was below normal by only 1 per cent in one month, November. The average for 1921 was only 15 per cent below normal; for 1924, 3 per cent above; and for 1927, 5 per cent above.

"Primary distribution, as measured by carloadings, wholesale trade and foreign trade, has fluctuated even less widely in these recession years, in 1921 reaching only 10 per cent below normal in September; in 1924, 5 per cent below in June and July. In 1927 it was above normal throughout the year except in December, when it fell 6 per cent below. The average for

1921 was only 3 per cent below normal; for 1924, 1 per cent above; for 1927, 3 per cent above.

"Distribution to the consumer, as measured by retail trade, advertising, life insurance sales, is steadiest of all. It has fallen no more than 8 per cent below normal in any month in the past 10 years—once in December, 1920. The average for the depression year 1921 was only 3 per cent below; in 1924 it was 1 per cent above; in 1927, 4 per cent above.

"The New York Federal Reserve Bank combines these and other measures of general business, such as postal receipts, telephone and telegraph business, power production, incorporations, real estate transfers and check payments in and outside of New York, into an index of the total volume of trade for the country as a whole. At no time in the past 10 years has this index fallen more than 9 per cent below normal—except in two months, February and March, 1921. The average for 1921 was 8 per cent below; for 1924, 2 per cent above; for 1927, 7 per cent above. Even at the peaks of business activity it has not risen more than 12 per cent above normal.

"If the measures of primary distribution and distribution to the consumer are combined with the general business indicators, and financial activity excluded, the fluctuations in general trade in recession periods are even smaller still. They have never been more than 7 per cent below or 10 per cent above normal in the past decade. In 1921 this measure of general trade averaged only 4 per cent below normal; in 1924, 1 per cent above; in 1927, 4 per cent above."

Nothing Like 1920-1921 Recession in Sight

THESE comparisons seem to be extremely important in judging the probable extent and duration of the present movement. Measured in any terms the 1920-21 recession was the most severe of which we have any record, and I believe it is entirely improbable that anything resembling it can take place at this time or under present conditions. The difference between these conditions and those which existed at that time—notably the absence of anything approaching the world-wide credit and commercial paralysis that existed in 1921, and the absence of large inventories in the hands of producers and dealers, or of drastic commodity price inflation—have been sufficiently emphasized and need not be further stressed. But even under those conditions it should be noted that the fluctuations in the general volume of trade were relatively small, and only in a few months did it fall markedly below normal.

There may be certain new and unknown factors in the present situation which destroy or modify the force of these comparisons, but I think that on the whole they are more likely to be favorable than unfavorable. We do not know, and have no means of measuring, the actual amount of loss in the stock market crash, or the extent to which it has affected general purchasing power, and I believe that all estimates of this kind are mere blather. Nor, it should be remembered, do we know how much further it still has to go.

Status of Consumer Inventories Uncertain

WE cannot be sure, moreover, that there are really no large inventories of some kind somewhere to be liquidated. Our statistics of stocks are fragmentary. We do know that stocks of raw materials in some lines, including particularly agricultural commodities that are being held on credit with the aid of the Farm Board, are quite large; and we still have to learn whether the new kind of inventories, very large in amount, in the hands of consumers can be successfully carried in face of loss of purchasing power and liquidated out of new income without loss of markets for new products. Finally, we are not altogether certain about the position of many of the smaller units in our banking system, or the extent to which their assets and those of savings banks, building and loan associations and life insurance companies have been frozen, or their ability to expand loans reduced, by the emergency aid they rendered to their customers, depositors, members or policyholders who were caught in the crash.

It is clear, however, that it is individuals rather than business or business organizations as a whole that have been involved in the collapse; that our banking reserves are remarkably strong, thanks to the far-sighted policy of the Federal Reserve authorities and most of the member banks; and that the world-wide credit tension has been eased with unusual speed, so that there is every prospect of there being enough credit available to carry business over a slack period without great strain.

Overstimulation Would Impede Recovery

IN general, therefore, while the business boom conditions and the financial inflation that preceded this recession have doubtless been more excessive than any we have seen since the war, it is fairly certain that the readjustment will not be more severe than those we experienced in 1924 and 1927. I am inclined to think that, so far as can now be observed, it will be less severe than in 1924, and not much if any more than in 1927. At the very worst that can now be foreseen, general business in 1930 will still average somewhat above normal, though it may fall slightly below in the next two months.

The rapid easing in money rates, which will probably bring the rediscount rate down to 4 per cent by the end of the year, combined with the unnecessary boom propaganda now under way, moves me again to warn against the danger of inducing an artificial and unsoundly supported bull movement, either in the stock market or in general business next year. The stock averages have already risen nearly 50 points since the lows of Nov. 13. If they are pushed up further at this rate during the next few months, a general relapse is certain before the middle of 1930, and normal business recovery will suffer a serious setback. The normal course of security prices for the next six months should be irregularly and gradually downward until levels approximating those of late 1926 are reached. Upon such a basis a normal recovery and expansion of business in 1930 and 1931 could be looked for.

Machinery Manufacturers' Rules of Practice

WASHINGTON, Nov. 26. — Eleven rules of business practice adopted by the manufacturers of concrete mixers and pavers at their trade practice conference held with the Federal Trade Commission last September have been approved by the commission as applying to unfair methods of competition. Eight other rules adopted by the industry were accepted by the commission in the class known as "expressions of the trade."

The first group of rules covers such practices as representation by a manufacturer that the capacity of any concrete mixer or paver is greater or less than its published rated capacity; circulation by a manufacturer of false statements concerning production, ability or financial standing of his company, or of a competitor; false statements regarding size, weight, design or performance of his machines or of a competitor's machine; enticing employees of a competitor to violate their contracts of employment; inducing breach of contract; payment of secret rebates; discrimination in price by selling to favored customers a new-model concrete mixer or paver as an old model or repossessed or rebuilt machine; and selling of concrete mixers and pavers without profit or below cost for the purpose of injuring a competitor.

The second group of rules accepted concerns such subjects as published prices; allowance of special price; uniform cost accounting; quotations f.o.b.; and creation of a committee on trade practices to investigate and determine whether the resolutions adopted are being observed.

Purchase of the Chicago Railway Signal & Supply Co., a subsidiary of the Illinois Iron & Bolt Co., Carpentersville, Ill., by the Railroad Supply Co., Chicago, has been announced. The Chicago Railway Signal & Supply Co. was incorporated as a subsidiary of the Illinois Iron & Bolt Co. in 1914, and has been in continuous operation since that time, producing a line of railroad crossing signal devices, train signals and general railway supplies. E. H. Bell is president and Paul W. Kohnen is secretary of the Railroad Supply Co.

National Founders Have Varied Program

Improved Equipment and Production Methods, Selling Methods, Analysis of Human Material in the Plant and Other Subjects Discussed

WITH a varied program, which included such important topics as improved foundry equipment and methods, the human element in production as scientifically analyzed, the relation of business facts to the stability of business, the current financial situation and modern selling methods, the thirty-third annual convention of the National Founders' Association, at the Hotel Astor, New York, Nov. 20 and 21, contained a great deal of informative value for manufacturers in all metal-working lines.

This convention marked the end of the first year of the new policy inaugurated by the association at its 1928 convention, when it abandoned its custom of long standing of employing a paid president. Col. Thomas S. Hammond of Harvey, Ill., who is president of the Whiting Co., was unanimously reelected by the association as a recognition of his work in steering the association on its new course.

Colonel Hammond, in his presidential address, said that the first year under the new régime had been successful financially and otherwise. For the first time in many years, the income from memberships was more than sufficient to pay the running expenses, and a surplus for the reserve fund was left over.

Although there were 44 resignations from membership, the association ended the year with more member plants and a greater reportable income than it had at the beginning of the year. Some of the loss in membership was due to consolidations, financial difficulties and other unavoidable causes.

Labor Troubles at Minimum

During the year strike support was required by only five members. In each of the labor controversies the question at issue was the closed shop, neither wages nor hours being involved.

Colonel Hammond stressed the importance of the work being done by the administrative staff in such lines as accident prevention, study of manufacturing costs, apprentice education, legislation and in spreading the gospel of the open shop.

He urged the need of further work in building up the membership lists, and this thought was amplified in the report later submitted by the membership committee, which launched a membership campaign that will enlist the services of every present member in raising the total membership during the coming year.

The association, in addition to reelecting Colonel Hammond president, selected S. Wells Utley, Detroit Steel Castings Co., Detroit, and former president of the American Foundrymen's Association, as vice-president, and reelected J. M. Taylor secretary. A. E. McClintock, whose office is appointive, remains as commissioner. District committeemen elected are listed in an adjoining column.

Resolutions were adopted in memory of O. P. Briggs, for many years a member of the administrative council and up to his death an honorary member of the council, and for Mathew Griswold, who had served as vice-president and as a member of the council.

Opposes Anti-Injunction Bill

Walter Gordon Merritt, associate counsel, League for Industrial Rights, discussed the present status of labor legislation, dwelling principally on the anti-injunction bill of Senator Shipstead of Minnesota, which probably will come before Congress at its next regular session.

"The bill now being proposed," he said, "ignores the principle that combined economic power may be oppressively used as against the individual and as against society. It proposes to put beyond injunctive restraint the right of organized labor to engage in strikes, direct and sympathetic, and in boycotts, primary and secondary, in private industries or on railroads or public utilities. Neither could injunctions issue against mass picketing or intimidation. Only violence and fraud could be enjoined, and then only under impracticable restrictions.

"A new law of agency is also to be set up, applicable to labor unions alone, which would relieve members from responsibility for their agents' acts, except where they expressly authorized or ratified them. Every other member of society would be subject to the rule heretofore laid down that a principal is bound by the acts of his agent within the scope of his employment regardless of whether the specified acts were authorized or ratified.

"This proposed bill, in effect, would give legal sanction to combinations to engage in strikes, secondary boycotts, and mass picketing against a union employer who merely refused to consent to a union's cancellation of its own agreement. It would also place beyond injunction restraint railroad strikes to prevent the hauling of non-union products by non-union men, and would encourage sympathetic strikes on railroads to assist the United Mine Workers of America in depriving the public of coal in times of coal strikes. These are but illustrations of the character of combinations which would be placed beyond injunctive restraint were this bill to become law.

"The inherent vice of the bill is the fact that it legalizes the use of combined economic power for any and all purposes, however oppressive, anti-social or unholy, instead of attempting to distinguish between the legitimate and illegitimate uses of combined economic power. In this respect the bill attempts to make legal favorites of the activities of labor unions by the establishment of fundamental principles applicable to no other section of society."

Facts Help to Stabilize Business

IN an address on "Business Policies and Business Information," Roland P. Falkner, chief statistician, National Industrial Conference Board, referred to the recent collapse of stock values by saying that "many who were playing the game in Wall Street were living in a fool's paradise in which rumor, hope and an exaggerated optimism took the place of business judgment." He added that optimism based on dreams and untempered by business judgment "pushes its victims into the pit.

"In contrast with the wild excesses of the stock market," Mr. Falkner said, "industry and commerce in the United States have in the last few years moved along steadily at an even gait, expanding with the normal growth of population and demand. The general belief at the present time is that the spasm in the stock market will prove to be more or less of a local convulsion, with, at the worst, only a comparatively slight influence upon the development of trade and industry. If this be true, we shall see possibly no halt to industrial progress but only, and for a comparatively brief time, a slight slackening in the rate of its advance.

"It would be idle to attempt to analyze all the causes of the marked industrial and commercial stability which has characterized the entire era since 1921. Many and varied have been the explanations which have been offered for this continued prosperity, and assuming that each of them has

more or less merit, it would be an interminable, if not an impossible, task to weigh the exact importance of each.

"Among them, however, one thing stands out preeminent, namely, the vast increase in business information which is available for those who know how to use it and which, as we have every evidence, industry and commerce are in fact using more and more from day to day in the conduct of affairs.

"The facts upon which business policies rest today may be classed as fundamental and current. The fact-finding and fact-recording machinery in each of these fields grows almost daily in strength and efficiency.

"The business structure today is vastly different from what it was a generation ago. Its units have become much larger, their fields of operation more extensive. The privacy and secrecy which surrounded every business enterprise 50 years ago have almost entirely disappeared. Whether the business men of today are superior in their energy or intellect to those of 50 years ago is a wholly idle question. It is enough to say that they are different and live and work in an altogether different environment. Business experience in those days was a private possession and not publicly advertised.

"Today, through the multiplication of business journals, the alert business man can profit not only by his own experience but from that of hundreds of others. He is no longer an isolated factor in the business world, but realizes instead that he is part of an army marching toward the same end, animated by a common purpose, and, as one of the leaders, fully conversant with the purposes he has to pursue, the problems he has to meet and the experience which has been gained toward the solution."

Business Data Are Voluminous

Mr. Falkner spoke of the vast development of business literature in the past few decades, not only in the trade publications but in books of varied descriptions bearing on the facts of business. Trade associations and research bodies and the universities have added greatly to the available supply of facts which affect business operations. In addition, various bureaus of the Government have expanded their work in this direction in recent years. Current information on business is being supplied by business publications in volume and thoroughness never before reached, said Mr. Falkner.

"There is no longer any need," he added, "for business to rest upon rumor, surmise or conjecture. The facts are available for all who are willing to seek them and able to use them. Does not the experience of the past few years demonstrate beyond contradiction that business facts judiciously used will guide industry and commerce into continued prosperity, and may we not hope that with the spread of this information, and with its increased use, the shocks to business which are the bane of industrial activity may be mitigated and almost entirely done away with?"

Frank F. Winans of the stock brokerage firm of Baker, Winans & Harden, New York, discussed the financial situation leading up to the recent stock market collapse. He brought up the question whether present conditions would bring to an end the era of business consolidations. His view was that the short-range outlook was for a

Officers and District Committees Elected by National Founders Association

President

THOMAS S. HAMMOND
Whiting Corporation ...Harvey, Ill.

Vice-President

S. WELLS UTLEY
Detroit Steel Casting Co....Detroit

Commissioner

A. E. MCCLINTOCK

Secretary

J. M. TAYLOR Chicago

Treasurer

Chicago Trust Co.....Chicago

DISTRICT COMMITTEES

FIRST

New England States

CARL S. NEUMANN
Union Mfg. Co..New Britain, Conn.
HENRY S. CHAFEE
Builders Iron Foundry
Providence, R. I.
EDWIN W. SMITH
H. B. Smith Co..Westfield, Mass.
A. J. O'CONNOR
Hunt-Spiller Mfg. Corporation
Boston
GEORGE A. RAY
The Taylor & Fenn Co.
Hartford, Conn.

SECOND

New York and that part of New Jersey north of a line drawn from Lambertville to Point Pleasant, and the provinces of Ontario and Quebec in the Dominion of Canada

ANGUS S. MACDONALD
Sneed & Co.....Jersey City, N. J.
E. O. BUESING
McIntosh & Seymour Corporation
Auburn, N. Y.
WILLIAM B. VAN HORN
Otis Elevator Co.....Buffalo
M. F. SIMMONS
General Electric Co.
Schenectady, N. Y.
W. W. CHENEY, JR.
S. Cheney & Son....Manlius, N. Y.

THIRD

Pennsylvania, Delaware, Maryland, District of Columbia and that part of New Jersey south of a line drawn from Lambertville to Point Pleasant and including those two towns

T. B. WOOD
T. B. Wood's Sons Co.
Chambersburg, Pa.
G. L. COPPAGE
The Pusey & Jones Corporation
Wilmington, Del.
B. H. JOHNSON
R. D. Wood & Co..Florence, N. J.
L. W. MESTA
Mesta Machine Co.....Pittsburgh
A. HUNTER WILLIS
National Erie Co.....Erie, Pa.

FOURTH

Lower Peninsula of Michigan, Ohio, Kentucky, Indiana and West Virginia

W. L. SEELBACH
Forest City-Walworth Run Foundries Co. .....Cleveland
L. W. OLSON
Ohio Brass Co.....Mansfield, Ohio
E. A. LEARY
Cincinnati Steel Castings Co.
Cincinnati
O. A. SEYFORTH
West Michigan Steel Foundry Co.
Muskegon, Mich.
L. H. LINK
Bass Foundry & Machine Co.
Fort Wayne, Ind.

FIFTH

Illinois, Missouri, Oklahoma, Kansas, Nebraska and Iowa

A. J. HARTLEY
Hart Grain Weigher Co..Peoria, Ill.
C. N. STONE
Deere & Co.....Moline, Ill.
J. W. BETTENDORF
Bettendorf Company
Bettendorf, Iowa
J. P. O'NEIL
Western Foundry Co.....Chicago
KENNETH GREEN
Green Foundry Co.....St. Louis

SIXTH

Wisconsin, Minnesota, Upper Peninsula of Michigan, North Dakota, South Dakota and the Province of Manitoba in Canada

C. S. ANDERSON
Belle City Malleable Iron Co.
Racine, Wis.
FRED S. POWER
St. Paul Foundry Co.
St. Paul, Minn.
E. C. BAYERLEIN
Nordberg Mfg. Co.....Milwaukee
GEORGE H. ATWOOD
Twin City Forge & Foundry Co.
Stillwater Minn.
CLARENCE R. FALK
Falk Corporation .....Milwaukee

SEVENTH

Virginia, North and South Carolina, Georgia, Florida, Alabama, Mississippi, Arkansas, Louisiana, Texas and Tennessee

A. E. HARTWELL
Hartwell Iron Works
Houston, Tex.
R. C. STOBERT
Hardie-Tynes Mfg. Co.
Birmingham
W. D. MOORE
American Cast Iron Pipe Co.
Birmingham
C. S. BARRY
Murray Co.....Dallas, Tex.
HOUSTON DUDLEY
Gray & Dudley Co.
Nashville, Tenn.

COL. T. S. HAMMOND
President

S. WELLS UTLEY
Vice-President

J. M. TAYLOR
Secretary

A. E. MC CLINTOCK
Commissioner

checking of such activities, but that ultimately the tendency to work out economic improvements in various lines of business would reassert itself.

S. Wells Utley, Detroit Steel Castings Co. Detroit, who was one of a party of American foundrymen who visited the International Foundrymen's Congress in London, England, last summer, gave an entertaining description of the delegation's tour through England and Scotland, and drew some comparisons of underlying industrial conditions in Great Britain and the United States. S. T. Johnston of the S. Obermayer Co., Chicago, who headed the American delegation, and Fred Erb, president, American Foundrymen's Association, spoke briefly.

Modern Equipment Doubles Output

SEVEN years development in the foundry of the Wilson Foundry & Machine Co., Pontiac, Mich., was described by Henry M. Lane, foundry engineer, after a brief introduction by D. R. Wilson, head of the company and chairman of the association's committee on foundry methods.

Mr. Lane recalled that a pictorial description of this foundry had been presented to the National Founders' Association seven years ago, and he outlined the changes and improvements which had been made in equipment and methods in the interim.

The original foundry occupied 21,350 sq. ft. of floor space. Seven years ago it had 304,150 sq. ft., and since then only 5 per cent in floor space has been added, but the output has been doubled. Sixty per cent of the output is obtained from 30 per cent of the floor space.

In 1922 the foundry was producing 10 cylinders per man per day, and now the output is 35 cylinders per man per day. A good part of the present output is 6-cylinder work, whereas formerly it was 4-cylinder.

The cost of molding sand seven years ago was 72c.; now it is 52c. The saving has been effected by utilization of waste core sand. There is a total saving from this item of $22,000 a year, and storage space occupied by 700 carloads of sand is also utilized for other purposes.

Seven years ago the output of flywheels was 73 per man per day; now it is 120. The charging cost seven years ago was $1.61 a ton; now it is 90c. There has also been a gain of 3.61 per cent in the tonnage of good castings turned out, and a reduction in scrap from 3.58 per cent to 1.49 per cent.

These results have been accomplished by the installation of sand handling equipment, mold handling equipment, shake-out equipment and various other appliances. In the core room the increased output has been accomplished by a better arrangement of core assembly conveyors and a relatively small increase in the area of the core room; only one double battery of oil-fired ovens containing 20 ovens has been added.

Lantern slides showing the new equipment were presented.

Effects of the Human Factor on Output

Elton Mayo, professor of industrial research, Graduate School of Business Administration, Harvard University, gave an interesting account, illustrated by charts, of experiments conducted under his supervision to determine the effects of mental and physical fatigue and other factors on production.

He first told of experiments conducted with about a dozen men who ran at a rate of about six miles an hour for 20 minutes on a treadmill, and his chart showed the physical changes, determined by medical examination before and after, which had occurred in each as a result of this exertion.

This prefaced a more detailed explanation of the results of a two and a half year test made in a large industrial plant, where two groups of five girls each were subjected to constant study of all of the elements which affected their production either adversely or favorably.

Some of the observations which resulted from this intensive study were illuminating as to the decided effect of working conditions, daily habits of living, mental attitude and other influences on productiveness.

The girls selected were in good health and normal in every way, as determined by physical examinations. Each group was placed in a room. The purposes of the experiments were carefully explained to them, but they were urged to make no special effort to attain high production but to work in their normal manner.

Results of Changes in Working and Outside Conditions

Working conditions and outside conditions were changed at various periods to watch their effect. For example, it was found that production was higher when the girls were given a 15-min. rest period morning and afternoon. When a slight slump in production occurring just before the noon hour was noted, the girls were supplied with a light lunch during their morning rest period, and this had the effect of keeping the production curve straight up to the noon recess. The conclusion was that some of the girls ate light breakfasts and hunger, as noon hour approached, slowed up their work.

Experiments were conducted as to the results of a five-day week. It was found that the daily rate was higher, though the weekly rate at first fell off. Later both the daily rate and the weekly rate were increased, developing the conclusion that a five-day

week was not a destroyer of production totals.

During the period of the test the girls were examined by physicians at regular intervals, and it was found that the general health of the group improved, they accomplished their work with diminishing effort as time went on and there was a steady increase in production. The gain for the girl who was the most rapid at the beginning was 30 per cent and the slowest girl made a gain of 50 per cent in this time.

The experiments determined that certain types of supervision were inimical to efficient work. It was found that when a girl was "called down" for low production on a preceding day her output for the day of the "call down" also suffered. This discovery resulted in a new type of supervision, in which there is "no ragging," as Professor Mayo put it.

Effects of mental attitude were noticeable in the test. When one girl's work dropped off perceptibly, it was found that she was nervous and apprehensive regarding certain conditions at home. When a change came about in her mental attitude her work immediately improved.

It was found that the wage incentive was less of a factor in keeping up production than improvement in general working conditions. Outside influences, such as hours of sleep, were found to have a considerable effect. Experiments were conducted as to the results when the girls had sleep ranging from six to nine hours. Starting at six hours, the production curve went upward with each hour of sleep nightly that was added. With nine hours, for example, the results were better than when the girls got eight hours.

However, the most apparent lesson of all, Professor Mayo said, was that the method of supervision has a greater influence than was realized. As a result of the test, the company in whose plant it was made has changed its whole method of supervision. He emphasized the point that supervision must be based on knowledge of the human material a plant is handling.

Important Elements in Salesmanship

R. C. Borden and Alvin C. Busse, professors of public speaking, New York University, whose subject was "The Business of Selling," gave a convincing demonstration of good and bad salesmanship. Their talk, which was punctuated with selling impersonations presented with dramatic effectiveness, was based on a survey of seven and a half years which they conducted with the cooperation of some of the largest New York corporations.

Professor Borden said that he and Professor Busse were permitted to sit in the offices of buyers and study the various types of sales presentations. From this long and intensive study they prepared 15,000 case reports. An analysis and digest of this large volume of actual experiences brought out six important points in successful selling, which Professor Borden said are so obvious that it is surprising how often they are overlooked in actual practice.

Professor Borden said that the best "conversational strategy" would not overcome any lack of knowledge by the salesman of his goods and his market, but, assuming that the salesman is well versed in these essentials, his technique of selling could be greatly improved if he would heed these six major points:

1. Watch out you do not do too much of the talking yourself. If the prospect is earnest in raising an objection, he wants to talk, too. Be a good listener first and a good talker second.

2. Watch out that you never interrupt a prospect when he has only started to explain some objection. This causes irritation.

3. Watch out you do not slip into an argumentative manner that becomes almost belligerent.

4. Inquire first; attack afterward. Ask for more details of the buyer's objection, or for any other objections he may have. Let the buyer disarm himself by stating all of his objections without hindrance.

5. When you begin your sales attack, repeat your prospect's objections in your own words. If you do not, he is likely to feel that you have not understood his objections. Show a full and sympathetic comprehension of the buyer's point of view.

6. After the preliminary phase, base your concluding attack on one key issue, not two or three. The key issue will manifest itself in the discussion. Don't digress. Subordinate all other issues to the one you feel is uppermost in the buyer's mind.

Summing up, Professor Borden quoted Confucius that "men don't trip on mountains, they trip on molehills," and said that many possible sales were ruined because of lack of attention to the seemingly trivial things in the sales approach.

Metal Workers Form Association

Metal Stamping Shops, Tool and Die Makers in New York District Organize and Elect Board of Governors

METAL stamping manufacturers, tool and die makers of the metropolitan district, New York, met Nov. 20 at 71 West Twenty-third Street, New York, to organize a trade association. By-laws, based on the procedure recommended by the Department of Commerce, were passed and the name "Metal Trades Association of New York" was adopted by the meeting.

Membership in the association is limited to manufacturers in the New York metropolitan district and vicinity. To be eligible, a person, firm, or corporation must be engaged in the manufacture by contract or job order of pressed metal goods, dies, tools, machinery or kindred lines.

The meeting was the third organization meeting to be held, but the first at which definite action could be taken toward forming the association. A brief address was made by Fletcher D. Dodge, secretary, Toy Manufacturers of the United States, outlining the activities and value to the trade of an association.

As a questionnaire sent out by the committee of organization had resulted in a large proportion of requests for information on uniform cost systems and contracts, Prof. DeWitt C. Eggleston of the accounting department of the College of the City of New York, had been invited to address the meeting and read a paper on the necessity of establishing all the factors entering into the cost of operation of a plant as a means of profitably bidding for business.

While the by-laws adopted at the meeting call for a board of nine governors in three groups, elected for one, two and three years each, it was decided to elect only the three governors in the one-year group until the association had increased its membership. The organization committee of three was unanimously elected to the governing board. They are Adolph Hopp, Mutual Metal Craft Co., 390 Second Avenue, Felix Wyner, Wyner Machine Works, 251 Third Avenue, and Ernest Furst, Eureka Tinware Mfg. Co., 139 West Twentieth Street, all in New York.

Companies which have signified their intention of becoming members include the following in New York: H. K. Lorentzen, Tudor Metal Products Co., Gustav Danzis Co., Inc., Wyner Machine Works, Novelty Wire & Metal Works, Triangle Mechanical Laboratories, Ben-Moore Mfg. Co., Selco Tool & Die Co., and Mutual Metal Craft Co.; in Brooklyn, the Du Plus Co., Century Machine & Tool Works and the Woodhaven Metal Stamping Co.

Waterways Movement of Steel Declines

Movement of iron and steel products on the Ohio River during October amounted to 119,129 net tons, according to figures of the United States Engineers' Office, Pittsburgh. This compares with 150,163 tons in September, and with 130,808 tons in October, 1928.

Monongahela River commerce in iron and steel in October totaled 119,380 tons, compared with 135,773 tons in the preceding month and with 131,281 tons in October, 1928. No iron and steel was moved on the Allegheny River last month.

Business Leaders Promise Aid

President Hoover's Conferences Expected to Result in Release of Building Projects and Further Railroad Equipment Orders—Henry Ford Raises Wages

WASHINGTON, Nov. 26.—With the next to the last of the series of White House business conferences held yesterday with agricultural interests, President Hoover has practically completed the cycle for the maintenance of industry and employment through the support of the entire country. Railroad, financial, industrial, construction, labor and agricultural interests, State governors and the public generally have pledged their cooperation, and large programs of expansion and replacements have been announced which promise continued business activity and employment. The White House conference with representatives of public utilities has been indefinitely postponed.

With a view to crystallizing the plans, Chairman Julius Barnes of the Chamber of Commerce of the United States, at the suggestion of President Hoover, has called a meeting for Dec. 5 at the chamber of important industrial and trade groups for the organization of a business council to continue the study of business conditions. The conference, of 150 to 250, will be asked to make recommendations respecting the personnel of the executive committee which the chamber has been asked to create and which was proposed at the White House meeting of the industrial group held on Thursday of last week. Among those attending this conference were President E. G. Grace of the Bethlehem Steel Corporation; Myron C. Taylor, chairman, finance committee, United States Steel Corporation; E. J. Kulas, Otis Steel Co., and George Laughlin, Jones & Laughlin Steel Corporation.

President to Open Conference

The conference at the Chamber of Commerce of the United States will be opened by President Hoover, and in telegraphic invitations to trade associations representing basic industries and to individuals, President William Butterworth and Chairman Barnes announced it was proposed to consider voluntary and cooperative action between various lines of industry and between business and government agencies in aid of the preservation of the recent high level of business activity. It was stated that President Hoover would open the conference and that from it may grow some form of business council for continuing action. The trade associations were requested to send their strongest leaders.

It was at the industrial group conference that it was agreed a definite organization should be established through a committee representing different industries and sections of the business community for the purpose of carrying out the program of President Hoover. Members of the group promise to act as a temporary advisory committee with Secretary of Commerce R. P. Lamont, who was authorized to add to the committee, and Mr. Barnes was asked to create an executive committee from members of the group. The industrial group conference had in turn followed the suggestion at the initial White House business conference, held with railroad executives, that similar conferences should be called to the end that some method of coordination of their activities should be developed. The subsequent conferences pursued this course.

President's Prosperity Program

INDUSTRIAL and trade groups to organize council to cooperate with Government in study of business conditions at business meeting in Washington, Dec. 5.

President Hoover receives widespread response from business interests and officials throughout country to aid in continuing industrial activity and employment.

Federal, State and municipal road building and construction programs indicate outlay of more than $2,200,000,000 next year.

Chairman Julius Barnes, Chamber of Commerce of United States, speaking at suggestion of President Hoover, tells radio audience of United States details of White House conference with industrial leaders, reflecting enormous projects of expansion and improvements.

Among other things, Mr. Barnes said:

That steel industry, through its leaders, announced $300,000,000 in new construction and in industrial improvements by one great corporation.

That automobile manufacturers told the President that orders have picked up again.

That Clarence M. Woolley, American Radiator Co., said it has been estimated that 1,000,000 homes will be modernized in 1930 to the extent of $2,000 each.

That public utilities propose to spend $1,000,000,000 in their 1930 improvement program.

Expansion Programs Planned

In announcing the result of his conference with 22 industrial and business leaders on Thursday of last week, President Hoover said it was the unanimous opinion that there was no reason why business should not be carried on as usual and that construction work should be expanded in every prudent direction, both public and private, to cover any slack of unemployment. The President said that, in the steel industry, it was stated that large construction programs would be undertaken for replacement of obsolete plants. The steel men present would not comment on the conference, leaving the statement to the President, but it understood that the programs they have in mind involve heavy construction of new units as well as large replacements. Interestingly enough, it was pointed out that steel manufacturers had been held back from expanding building programs partially because of the lack of the supplies of their own material which they were producing in such large volume for other consumers.

The President's statement regarding the industrial conference said that it was found that a preliminary examination of a number of industries indicated that construction activities can in 1930 be expanded even over 1929. The telephone company was said to be preparing an expansion program over that of 1929 which involved an outlay of $600,000,000, and that power, gas and other public utilities could undertake a program in excess of that of 1929. This group arranged for a meeting in New York today with a view to announcing its program.

Leaders in the automobile industry told the President that while 1929 production was unusually large due to the carry-over of a great deal of unfinished business from the previous year, they confidently expected that except for this excessive margin the industry should quickly return to its normal production. It was also held that an indirect but substantial contribution could be made to the extension of credit for local building purposes and for conduct of small business, if the banks would freely avail themselves of the rediscount privilege offered by the Federal Reserve banks.

Ford Announces Wage Increase

The industrial group meeting is known to have emphasized the necessity of maintaining wages and em-

ployment throughout industry as a means of keeping up purchasing power and therefore the absorption of goods, points which are understood to reflect the views of President Hoover. The announcement made an hour after this conference by Henry Ford, who was one of the attendants, that he was going to grant a general percentage increase in wages, created a stir because it was unexpected. Mr. Ford declared in a statement, made previous to and apart from the Ford Motor Co. wage increase announcement, that wages should be increased in order to increase purchasing power, and took the view that the decline in business was not due to the collapse in the stock market but rather was the result of exhaustion of buying power of the people, the solution of which he held was in increased wages. He said that there had been a serious withdrawal of brains from business. Men who would otherwise have been working out better designs for commodities and better methods of manufacture and planning to put more value into their products, Mr. Ford said, were drawn off from the work they were best fitted to do by the promise of quick profits in speculation.

Another reason, he said, is that American production has come to equal and even surpass, "not our people's power to consume, but their power to purchase. This is not the same thing as over-production; it is under-supply of purchasing power."

Labor to Make No Wage Demands

The meeting of the labor group, made up largely of representatives of the American Federation of Labor, was held immediately after the one with the industrial leaders. The labor group assured the President that there would be no demand for increased wages or any other wage movements, outside of those already under way.

The conference with trade associations and other informational services in the construction lines was held on Friday, and it was stated that data gathered indicated that there was about $2,200,000,000 of highway and road building projected throughout the country. It was declared that about half of this comprises Federal and State work and the remainder consists of country and municipal undertakings. It could not be estimated how much of this outlay would be undertaken during the coming year. Officials who have been making a survey of the residential building situation said that construction of this character for the first 10 months of 1929 was about $710,000,000 below the total for 1928. The American Institute of Steel Construction was represented at the meeting by Past-President W. M. Wood, Decatur, Ill.

Railroads Promise Aid

President Hoover clearly was gratified upon receiving assurance last Friday from railroad executives representing 97 per cent of the total railroad operating revenue of the country that they would give their "sincere and earnest cooperation" to the stabilization and stimulation of business. This statement grew out of the meeting of railroad executives in Chicago and represented fulfillment of the pledge given the President by railroad executives at the first business conference that they would attempt to secure the cooperation of the entire railroad interests.

The receipt of the message, based on the action taken in Chicago, brought the oral statement from the White House that it meant the sustaining of larger employment in the railroad equipment industry and bringing substantial increase to demands for steel. The message was conveyed through Chairman R. H. Aishton of the American Railway Association. He said that steel rail deliveries for 1930 are estimated at approximately 2,500,000 tons; that the number of freight cars on order on Oct. 1 was 29,481, a greater number than on the corresponding date in any year since 1924 and that this number has been increased as of Nov. 1 to 33,642, which is an increase of 27,561 compared with the same date a year ago. On Oct. 1, it was stated, there were 354 locomotives on order as compared with 113 on the same date in 1928 and 134 in 1927. There are also now on order, it was declared, approximately 1,500,000 tons of steel rails for delivery beginning early in 1930, with the expectation of increasing this total by 1,000,000 tons.

The announcement said that "Not believing that there is anything in existing conditions to require it the (railroad) executives have no purpose whatever to reduce or abandon any part of this program." A movement, it was added, to increase future capital and maintenance expenditures has been started and "is being actively and intelligently pressed forward." The meeting selected Mr. Aishton to act for the railroads as member of the committee of contact of the various industries.

Automobiles and Machinery Top Exports

Two Metal Products Have Displaced Cotton and Oil, Which for Years Dominated American Sales

"KING COTTON" has been dethroned as the leader in the American export trade. Department of Commerce figures for the first nine months of 1929 show machinery in first place, with 462.5 millions of dollars, followed in second place by automobiles and parts, amounting to 455.4 millions, while cotton is third with 444.5 millions. This is in sharp contrast with preceding years, of which last year made the highest previous record in machinery and automobiles.

In the first nine months of 1928 exports of cotton were 522.5 millions, of machinery, 365.3 millions, and of automobiles and parts, 373 millions. Last year petroleum and its products, at 396.7 millions, stood in second position, whereas this year, while oil is still second to cotton, it is in fourth position, as both have been passed by machinery and automobiles. Petroleum exported this year was 415.9 millions.

This is in keeping with the steady change which has taken place over the past dozen years in the general complexion of our export trade. Manufactured goods have been advancing year after year to a higher proportion of the total than ever before, and correspondingly crude materials have gone backward in relative position, although holding their own in total volume. In the figures above cotton is, of course, a raw product. The petroleum exports include largely refined oil, which is a manufactured product, but not with the same degree of manufacture as such complicated units as automobiles and machinery.

In passing it may be of interest to note that as recently as 1922 exports of automobiles stood in tenth position, whereas now they are second. At that time they were exceeded not only by cotton, oil and machinery, but also by wheat products, packing-house products, iron and steel mill products, copper and its manufactures, tobacco and cotton manufactures.

United States Airports Now Number 1509

WASHINGTON, Nov. 26.—There are 1509 airports in the United States, of which 440 are municipal, 465 commercial, 278 intermediate fields, 86 Government and 240 auxiliary, according to Clarence M. Young, Assistant Secretary of Commerce for Aeronautics. California leads all other States with 161; Texas is second with 101; Pennsylvania, third with 83; Ohio, fourth with 72; Illinois, fifth with 67, and New York, sixth with 57. There are of record more than 4000 other fields on which aircraft landings can be made. In addition to the 1509 airports and landing fields already in operation, approximately 1278 more airports are either proposed or in process of construction.

Galvanized sheet protection has been applied to 26 per cent of all classes of farm buildings in the United States, according to field investigations by the Trade Research Division of the National Association of Flat Rolled Steel Manufacturers, Cleveland.

To Discourage Liquor at Exhibits

American Foundrymen's Association Initiates Action Which Is Supported by Equipment and Supply Men and Exhibition Managers Association

A MOVEMENT has been started by the Association of Exhibition Managers to discourage entertainment and wholesale dispensing of liquor at business conventions and expositions, after like action had been initiated by the American Foundrymen's Association.

The Association of Exhibition Managers voted unanimously to indorse the attitude of the American Foundrymen's Association. The subject was introduced at the meeting of exhibition managers by C. E. Hoyt, executive secretary and manager of exhibits of the American Foundrymen's Association, who said:

We have viewed with much concern the increasing amount of entertainment of this character. We do not believe that conditions at conventions and exhibits of our association are any worse than they are at most conventions. In fact, we have been repeatedly assured by hotel managers and others that there is much less room entertaining at our conventions than there is at the conventions of a number of national associations.

We know that if we were to combat successfully this objectionable practice we would have to have the cooperation of hotel managers, exhibitors and members. Our first step was to bring the matter to the attention of the board of directors last April, at which time it was voted to make this question an order of business at our annual board meeting.

Our 1930 convention will be held in Cleveland and our next step was to address a communication to the manager of the convention board of the Cleveland Chamber of Commerce and secure from him assurances of cooperation on the part of the hotel managers of that city.

Mr. Hoyt then read excerpts of a letter he had sent to the Foundry Equipment Manufacturers' Association, as follows:

The board of directors of the American Foundrymen's Association feels that a condition has arisen in the conduct of annual conventions and exhibits which demands serious consideration; namely, entertainment and wholesale dispensing of liquor. The evils of this practice could be summed up as follows:

1. Detracts from and tends to defeat the real purposes of the annual gatherings.

2. Reflects discredit on the men of the industry.

3. Tends to discourage the attendance of men who would profit by and who could contribute to the convention.

4. Is an unwarranted expense which cannot justifiably be charged against the expense of exhibiting, but usually is.

Nearly all associations have this problem to contend with to a lesser or greater degree than we do. We have discussed the matter with hotel men. They deplore the whole business of having their rooms converted into bars, and we have been assured of their cooperation in any effort to stamp out the practice. They tell us that the breakage and damage is far in excess of any profits from the sale of "set-ups" and the damage to the reputation of the hotel is even more serious.

Mr. Hoyt's letter to the foundry equipment manufacturers went on to suggest that a rule be adopted similar to that which went into effect some time ago to discourage the giving away of souvenirs at foundry exhibitions. This rule, Mr. Hoyt says, has not entirely done away with the use of souvenirs but it has reduced it to a minimum.

He says that room entertainment has grown up in much the same manner as the giving away of souvenirs. It is largely competitive, he says, engaged in by companies because their competitors do it, or whose representatives believe the practice is necessary to get business.

"It is our belief that practically all those who engage in this practice at our or any other conventions would welcome relief from it," the letter continued. "We do not believe that the chief executives of any concern would give their representatives carte blanche expense accounts for this sort of entertainment if they were told that our joint associations disapproved and were given to understand that their competitors, as well as they, would be governed in accordance with the expressed wish of our associations."

As a result of this appeal to the Foundry Equipment Manufacturers' Association, Mr. Hoyt said, a resolution was recently adopted by that organization reading as follows:

Whereas, conditions have arisen resulting in excessive, lavish and wholesale entertainment, including the dispensation of intoxicating liquor, at the conventions and exhibitions of the American Foundrymen's Association, at which the members of this association are among the principal exhibitors, which abuses have resulted in conditions inimical to the welfare of the foundry industry and the foundry equipment industry,

And whereas, the American Foundrymen's Association has addressed a communication to this association on this subject under date of Aug. 26, 1929,

Therefore, be it resolved, by the Foundry Equipment Manufacturers' Association, at a regular meeting held at Schenectady, N. Y., on Aug. 29, 1929, that the members of this association believe the practice of promiscuous and wholesale entertainment of customers and others, with especial reference to the dispensing of intoxicating liquors at the conventions and exhibits of the American Foundrymen's Association, should be discountenanced,

And therefore, be it further resolved, that the members of the Foundry Equipment Manufacturers' Association pledge themselves to cooperate with the American Foundrymen's Association in the control and discontinuance of miscellaneous and unwarranted entertainment, which constitutes an unnecessary expense and is contrary to good business ethics.

Directly after receiving this assurance of cooperation from the exhibiting manufacturers, the board of directors of the American Foundrymen's Association at a meeting in Cleveland, Sept. 12, adopted unanimously the following resolution:

Whereas, the practice of lavish, unwarranted and wholesale entertainment in hotel rooms and elsewhere is being indulged in by certain exhibitors and others attending conventions of the American Foundrymen's Association, resulting in conditions inimical to the best interests of said association,

And whereas, such practices detract from and tend to defeat the purposes of such conventions, reflect discredit on the men of the industry, and discourage companies from sending their representatives to such conventions,

And whereas, such practices result in excessive, unnecessary and unwarranted expense, contrary to good business ethics and practices,

Now therefore be it resolved, by the board of directors of the American Foundrymen's Association, at the annual meeting held in the city of Cleveland, Ohio, Sept. 12, 1929, that exhibitors and all other interests concerned be requested to cooperate in the abatement of such practices, and that the manager of exhibits and the committee on convention arrangements be and they hereby are authorized and directed to take such action as in their judgment may be expedient or necessary to abate such practices.

Later the report of the Foundry Supply Manufacturers' Association was given. At its convention it indorsed the resolution adopted by the Foundry Equipment Manufacturers' Association.

Welding Conference at Purdue

Purdue University will hold its annual conference on welding at Lafayette, Ind., Dec. 11 to 13, under the joint direction of the Engineering Extension Department, (W. A. Knapp, professor in charge), and the Department of Practical Mechanics.

The value and interest of these meetings may be inferred from the fact that the first, held five years ago, lasted a single day. Three days are now required for lectures, demonstrations and exhibits of welding methods and equipment. Last year's conference was attended by 250 representatives of manufacturers.

Steel Mill Wages Higher in 1929

Fewer Employees in Most Departments—Weekly Hours Slightly Greater—Earnings Up 6 Per Cent from 1926

WASHINGTON, Nov. 25.—Average hourly wages in the iron and steel industry increased from 63.7c. in 1926 to 67.4c. in 1929, while the full-time weekly earnings rose from $34.41 to $36.48, according to the November number of the *Monthly Labor Review*, published by the Department of Labor. Full-time hours per week increased from 54.4 to 54.6 hr., but the present working week, it is pointed out, is less than in any year prior to 1926 and almost 12 hr., or 17 per cent, less than in 1913. Hourly wages in 1913 averaged 30.1c.

This story is the last of a series of articles showing hours and earnings in the iron and steel industry in 1929, the departments here covered being rail mills, bar mills, sheet mills and tin plate mills, together with averages for the industry as a whole.

Drop in Number of Employees

A striking feature of the study of the four departments is the reduction of the number of employees in 1929 in identical plants when compared with 1926. In all except the sheet mills, a decrease in labor force is noted. Of the 39 bar mills reporting for the current year, 28 were identical with those of 1926. In 1929 they employed 5057 workers, against 6112 in 1926, a decrease of 17 per cent.

The seven standard rail mills reporting for both years employed 2816 in 1929, compared with 3280 in 1926, a decrease of 14 per cent. Of the 15 sheet mills reporting in 1929, as against 14 in 1926, there were 12 which were identical; in the current year they employed 9698, compared with 9393 in 1926, an increase of 3 per cent. Eight identical tin plate mills, reporting for both years, engaged 8386 workers in 1929, against 8892 in 1926, a decrease of 6 per cent.

Work Week Slightly Longer

Full-time hours per week for bar mills were 55.6 in 1929, compared with 54.7 in 1926. This slight increase, it is pointed out, was due not to the inclusion of continuous or semi-continuous mills, but rather to an increase in working time in hand mills, the average time for hand mills being 56. During the same period an increase of 3.4c. an hour took place, wages rising from 59.1c. to 62.5c. an hour. Part of this gain was attributed to the inclusion of continuous and semi-continuous mills, although some increase was shown in the hand group also.

Average hourly earnings in 1929 were two and one-sixth times what they were in 1913. Average full-time weekly earnings amounted to $34.75 in 1929, more than 7 per cent in excess of those for 1926, and almost double the $17.71 in 1913.

Although an increase in average full-time hours per week of from 55.5 to 56 is shown for the standard rail mills from 1926 to 1929, the 1929 average is still 21 per cent less than that of 1913. Average hourly earnings increased from 59.5c. in 1926 to 62.8c. in 1929, while the full-time weekly earnings increased from $33.02 to $35.17, the 1929 earnings being almost twice the $18.01 of 1913.

Sheet and Tin Mill Conditions

Average full-time week in the sheet-mill department shows no change between 1929 and 1926, the average for both years being 48.9 hr. Average hourly earnings, however, rose 3.4c. in 1929, to 79.3c. from 75.9c., while full-time weekly earnings increased from $37.12 to $38.78. Earnings in 1913 were 48.3c. an hour and $25.26 a week.

The tin plate departments show a slight decrease in average full-time hours a week in 1929, declining to 47.4, compared with 48.1 in 1926. Average hourly earnings were 73.2c. in 1929, compared with 70.4c. in 1926. Average hourly earnings of 1929 are one and three-fourths times as great as those of 1913, but 23 per cent less than the 94.9c. of 1920. Average weekly earnings were $34.70 in 1929, compared with $33.86 in 1926, and were 81 per cent greater than the $19.22 in 1913. In 1920 average weekly earnings were $48.02.

Sharp Drop in Fabricated Plate Orders

WASHINGTON, Nov. 25.—Declining to 30,669 net tons or 39 per cent of capacity, orders for fabricated steel plate in October, reported to the Department of Commerce by 48 firms, were the lowest since June, 1927, when bookings reported were 28,811 tons. The lighest monthly orders reported to the Bureau of the Census since it began collecting the figures were in February, 1924, with a total of 18,768 tons. Orders in September were 41,653 tons, or 52.9 per cent of capacity.

Bookings in October for oil storage tanks were 8607 tons, against 15,189 tons in September; for refinery materials and equipment, 3316 tons, compared with 4009 tons; for tank cars, 2393 tons, against 2779 tons; for gas holders, 985 tons, compared with 3353 tons; for blast furnaces, 853 tons, compared with 200 tons and for stacks and miscellaneous purposes, 14,515 tons, against 16,123 tons.

Oil storage tank bookings in October made the lowest total, with one exception (last June), since June, 1927. Those for gas holders were the smallest since the 978 tons of November, 1927. Stacks and miscellaneous made the poorest showing of the year, except for January.

Orders for fabricated steel plate for the first 10 months of 1929 aggregated 444,606 tons, against 437,951 tons for the corresponding period of last year. Operations were at the rate of 55.9 and 55.1 per cent of capacity respectively.

Ten-month orders for fabricated steel plate for the different lines of consumption follow, with 1929 first: Oil storage tanks, 126,063 and 195,230 tons; refinery materials and equipment, 44,381 and 30,529 tons; tank cars, 32,558 and 18,806 tons; gas holders, 40,264 and 27,426 tons; blast furnaces, 9579 and 7415 tons; stacks and miscellaneous, 191,761 and 158,545 tons. In every category except oil storage tanks, the 1929 ten-month total is higher than for all of 1928.

Bopp Steel Corporation Organized in Detroit

The Bopp Steel Corporation of Detroit held its organization meeting and elected officers at a stockholders meeting recently in Detroit. This company will manufacture cold-rolled strip steel. The following officers were elected: President, A. J. Bopp, formerly Weirton Steel Co.; vice-president, F. C. Smith, formerly Fisher Body Corporation; secretary and treasurer, J. H. O'Hara, president, J. H. O'Hara Co. and Manistique Lumber & Supply Co. These officers serve on the board of directors with J. W. Gier, Motor Wheel Corporation, Lansing, and H. L. Maher, formerly chief electrical engineer, Ford Motor Co.

Eugene H. Meyer has been appointed superintendent of the cold-rolled strip mill. He was formerly with Weirton Steel, Superior Steel Corporation, and the American Tube & Stamping Co.

Contracts have been placed for the mills, motors and annealing furnaces, and construction on the buildings will be started about Dec. 1. The plant will be located on a site owned by the company at Tireman Avenue and the Pennsylvania Railroad. From present indications, the plant will be ready for operation by April 1, 1930.

Birmingham Bolt Plant to Be Further Enlarged

Following the recent merger of the Lamson & Sessions Co. and the Lake Erie Bolt & Nut Co., of Cleveland, instructions have been issued for the addition of another unit to the new plant of the Lamson & Sessions Co. under construction at Birmingham. Upon the completion of this plant, it is proposed to consolidate certain departments of the American Bolt Co. plant with it. The American Bolt Co. was taken over by the Lake Erie Bolt & Nut Co. last August. It will continue to operate until the new plant at North Birmingham has been completed.

Recovery to Be Strong—Verity

Ebb and Flow of Activity Must Be Expected, But Business Always Goes Ahead Stronger After Breathing Spell

"THERE are no doubt many who now believe that our national income, large and diversified as it is, has been seriously reduced and that there has been a huge decline in values, through the recent drastic decline in the securities market. That is, of course, a great mistake, born of the individual tragedies of the situation and of a misunderstanding of the real relation between business and the securities market," said George M. Verity, president, American Rolling Mill Co., in addressing the Ohio Management Conference at Columbus, Ohio, Nov. 20.

"There has been no decline in real value. There has been a temporary decline in the market values of the securities representing business as estimated by the stock market, but while market values change constantly they do not affect or change real values.

"While the temporary earnings of business are always proportionately decreased during any period of lessened activity, the real average earning capacity of any sound and properly financed institution is not affected in the least by either a period of quiet business or by the fluctuations in the securities markets.

Earning Capacity Requires Three to Five-Year Test

"The temporary earning capacity of any company must, of course, respond to any decline in the normal volume of current business, no matter what the cause.

"The earning capacity of a company or the real value of its issued securities can be fairly appraised only by the results obtained over a period of three to five years. During any such period business is bound to be affected by the many influences that exist peculiar to the period and by the changing tides of supply and demand and of production.

"What a business can and does do in a five-year period in spite of all these changing influences reflects the average of its real earning capacity.

"As the world is now organized, the tides of life and of business cannot be stopped. They can only be checked, because both life and business are extremely resilient.

"The 17,000,000 stockholders of our corporate institutions can be assured that, somewhat in proportion to the length and depth of a decrease in volume of business in any given period, the country will enjoy a corresponding period of activity when the influences which brought about the temporary recession have passed.

"The country can congratulate itself that, in spite of the great commercial and industrial activity of the past four years, basic business conditions were never sounder than they are now.

"Economic laws have been served in that period as never before. Such prosperity as we have enjoyed has been due to a sound, consistent and insistent demand, to a steady decrease in the costs of production, a marked increase in the quality of product and in the giving of increasingly better values to the consumer.

"As a result there has been and is no inflation in either prices or inventories, while the average earning capacity of the worker has gradually increased and living conditions have been the best ever known.

"Due to the extended period of great activity in almost every line of human endeavor, business was beginning to show signs of fatigue before the collapse of the stock market.

"It would be absurd to believe or to argue that business, sensitive to all influences as it is known to be, will not show some decrease in volume for at least a time.

"In any particular period of quiet business some lines are affected more than others, and there are always a good many that are affected but very little. A cross-section of the commerce and industry of the country usually shows a very fair average of operation.

Greater Acceleration Follows Every Temporary Recession

"Just how long it will take to get things going fully normally again is all a matter of individual opinion, but of this we can be assured: Our business structure is supported by great human, material, scientific and financial resources and by the well-known fact that the wants and the consuming and buying power of our people have been developed as never before.

"Each time we emerge from a temporary recession of business we go ahead stronger, more surely and more efficiently than we did before. Whatever the cause and effect, the recession always represents a period of practical readjustment, of general housecleaning, of refinement in organization and of improvement in all of the material things that affect efficient operation."

Change in Economic Thought Traced to Taylor

"Take your eyes off the distribution of wealth and put them on the creation of surplus." This conception, first brought into the shop by Frederick W. Taylor, 30 years ago, is now replacing the assumption of a deficit civilization that previously underlay all economic thought, said Robert W. Bruere, research secretary, J. C. Penney Foundation, in addressing the New York Metropolitan Section of the Taylor Society at a dinner meeting at the Fraternity Clubs, New York, Nov. 21.

The philosophy of optimism that scientific management ushered in is permeating all walks of life. It took a long time before industrial relations could be based on anything but a spirit of conflict, but today labor problems, to an increasing extent, are being approached in a spirit of research instead of antagonism.

In commenting on Taylor's belief that the brotherliness of capital and labor would create so much surplus that the division of wealth would no longer be a problem, Frank Copley, author of "Frederick W. Taylor, Father of Scientific Management," stated that this view did not impress him at first because it did not take into account envy. But the years seem to have borne Taylor out, Mr. Copley added. With the generally improved standard of living among the masses, the man who is able to ride around in a Ford is not worrying much about the man who travels in a Lincoln.

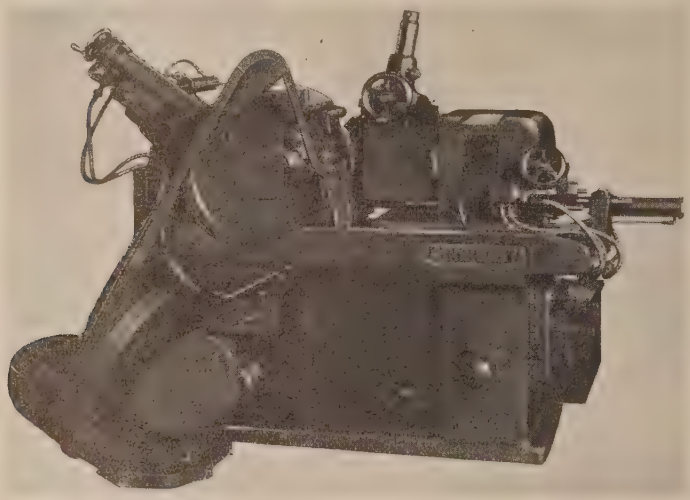
Scientific management is not a rigid, mechanistic thing, but something that one must create and adapt to fit a particular situation; the thing that is universal about it is the manner of approach to management problems, said Dr. Harlow S. Person, managing director, Taylor Society, in the course of remarks outlining the preparation and contents of the new Taylor Society Book. The volume was written following a request from Czechoslovakia for an up-to-date textbook on scientific management suitable for use in higher educational institutions. Containing nearly 500 pages, the book is of multiple authorship, with about 85 per cent of the text devoted to an exposition of the technique of scientific management and 15 per cent to its origin, its philosophy, its principles, its economic significance, etc.

In the general discussion which followed the addresses Dr. Person pointed out that the reaction to scientific management in this country has been to a large extent a seizure on mechanisms, while in Europe the philosophy and principles have been given more attention than the technique. Col. King Hathaway, consulting engineer, offered the comment that it is a mistake to regard principles as the only essential thing and to think technique unimportant. No matter how sound principles may be, mechanisms are necessary to apply them.

The question was raised as to why it is usually easier to convince the worker of the benefit of scientific management than the employer. One reason, according to F. A. Silcox, New York Employing Printers' Association, is that some years ago poor systems were put into shops, in many cases, by incompetent engineers. The overhang of that period is still felt.

Floor-Level Type Hopper for Centerless Grinder

FULL-AUTOMATIC grinding of piston pins, small rollers, bushings and other straight cylindrical work is obtained on Cincinnati centerless grinders by means of a floor-level type of hopper recently developed for these machines by Cincinnati Grinders, Inc., Cincinnati. With this device, which eliminates manual feeding, one man can operate a battery of machines, his only duty being to fill the work basin of the first machine and check the size and finish of the pieces ground.



With the Continuous Hopper Feed the Centerless Grinder Is Fully Automatic

The hopper is driven by motor through a worm and wormwheel reduction and slip change gears which permit variations in feed to suit the flow of work through the machine. Work dumped into the work basin is carried upward to a delivery chute by a series of studs spaced to suit the work. Studs are mounted in a ring which is interchangeable on the main carrier disk. Timing of the hopper is adjusted so that the delivery of the work is slightly in excess of the machine requirements, the surplus work being returned to the basin by means of return chute. The hopper can be disconnected conveniently and removed from the machine. It is adapted for handling work through a series of consecutive machines, since the basin is low and gravity is utilized to bring the work from one machine to the basin of the next. Thus the work passes from the first machine through a series of other machines until the finished piece is of exact size.

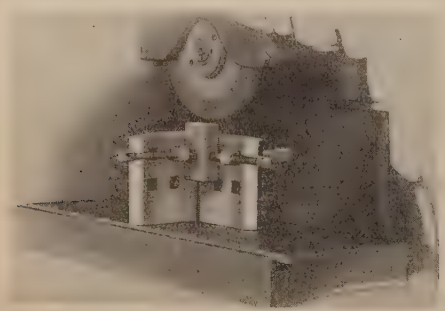
Clamping Block for Grinder and Lathe Work

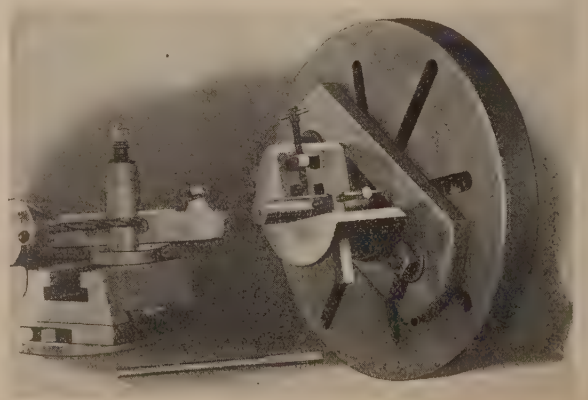
FOR the rapid squaring and clamping and the secure holding of odd or irregular shaped pieces that can be held in the common lathe chuck, angle plate or vise, Homer Strong & Co., Rochester, N. Y., are offering the Squar-It clamping here shown. The device is for use in toolrooms, machine shops and inspection departments in laying-out, grinding, lathe and other operations. It is 3½ in. wide and 5½ in. long, overall, and the clamping surfaces are 2⅞ in. wide and 3½ in. high. The maximum capacity is 2⅛ in.

The device consists of a clamping block, two sliding clamps and two clamp screws. The blocks are made from semi-steel castings. After being rough machined they are heat-treated to relieve casting strains and then machined again. Finally all square surfaces are ground to close limits. The sliding clamps and the clamp screws are pack hardened. The screws have dog points and knurled heads with pin holes. Hardened clamping blocks for use in inspection departments can be furnished, as well as an adapter plate for holding the block more securely to the faceplate of lathes on long runs of work. For holding very short work close to the top of the block, a "T" sliding-clamp having two clamping screws in the head, one above center and one below center, is available.

In laying out, the square face of the work is placed against the clamping surface of the block and the clamp screws are tightened. This, it is pointed out, eliminates the indicating and tapping usually necessary to bring the work square when using an angle plate with ordinary parallel clamps. Used in connection with surface grinding, the broad face of the block makes generous contact with the magnetic chuck, and the work can be clamped easily and securely in position. The block can be used on the table of other machines merely by clamping securely to the machine table the steps on the back of the block. On lathes this clamping fixture can be used in connection with drilling, centering shafts, turning and boring. It is strapped to the faceplate, and the first piece of work fastened by tightening the two clamp screws, thus forcing the work into the two squared surfaces of the block. The next step is to indicate this first piece and correctly locate the block on the faceplate. Duplicating the pieces merely involves loosening and tightening the clamp screws. For long runs, use of the adapter plate is recommended.

The net weight of the device, with clamps and screws, is 8 lb.

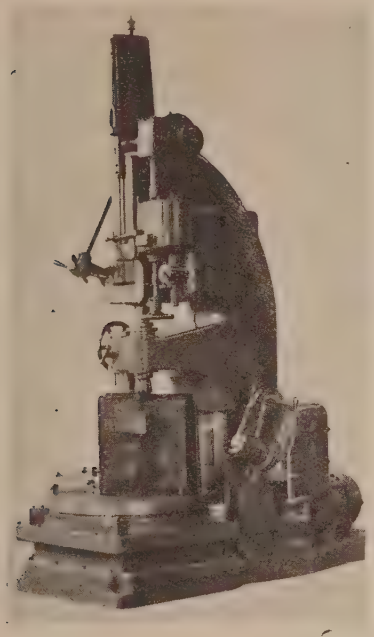




Holding of Work on a Surface Grinder Is Shown Above and Use of the Clamping Blocks for Lathe Work at the Right

Vertical Drilling, Boring and Milling Machine

FOR face milling the round large bore of crankcases, as well as for standard drilling, boring, reaming and tapping operations, the Defiance Machine Works, Defiance, Ohio, has brought out a special 36-in. swing heavy-service drilling, boring and vertical milling machine. It has an inclosed head, and the feed and speed boxes are oiled by means of a gravity or continuous flow system.



Face Milling, Drilling, Boring, Reaming and Tapping Operations Are Performed

The machine has a single pulley drive. Spindle speeds are obtained by two cones of hardened gears running idle except when one set is meshed by a roll-in hardened gear operated by a convenient lever at the side of the machine. Helical gears drive the spindle at the bottom of the head or close to the spindle nose. There are two keys through the driving sleeve into the spindle, and the thrust of the keys and the helical gears is taken by a large thrust anti-friction bearing.

The 36-in. revolving table is driven by a 2-hp., 1750-r.p.m. motor, through worm gearing, while the machine proper, including the spindle drive, feed and speed, is driven by a 7½-hp., 1200 r.p.m. motor. The principal specifications are: Diameter of spindle, diameter of spindle nose and diameter of spindle sleeve, 3½ in.; length of power feed, 16 in.; Morse taper in spindle No. 5; width of helical drive spindle gear, 2½ in.; center of spindle to face of column, 18 in., and maximum distance nose of spindle to top of table, 41 in. Plain table, compound table or tapping attachment can be furnished. The machine occupies a floor space 50 x 94 in. and weighs 8800 lb. net.

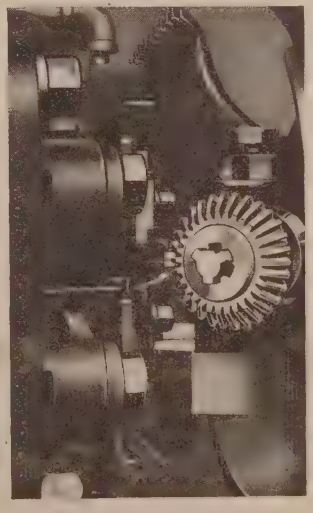
3-In. Straight Bevel Gear Generator

GEARS up to 4½-in. pitch diameter, 2¼-in. cone distance, and 10 diametral pitch can be cut on the 3-in. straight-bevel gear generator brought out recently by the Gleason Works, Rochester, N. Y. The machine, a companion to the 3-in. spiral-bevel gear generator described in THE IRON AGE of Sept. 19, is adapted for either large or small production and will both rough and finish in either one or two operations, depending upon the pitch quality and work desired.

The generating principle is the same as used in previous Gleason straight-bevel gear generators. The tooth shape is developed by rolling the teeth between reciprocating tools which represent adjacent sides of a tooth in an imaginary crown gear.

An outstanding improvement incorporated in this machine is the quick throw-out mechanism which enables the operator, by a single throw of a lever, to move the tool-head into or away from the cutting position. This provides ample room for chucking or removing the gears.

The work-head is mounted on a cradle on which it is adjustable angularly and in the direction of the work spindle to permit setting the work to the proper cutting angle and cone distance. The index, of the notched plate type, is actuated by the generating motion. The work segments are adjustable so that each segment covers a range in pitch angle from about 1 deg. on the small pinion segment to 7 deg. on the largest gear segment. Thirty-two segments cover the entire range of the machine.



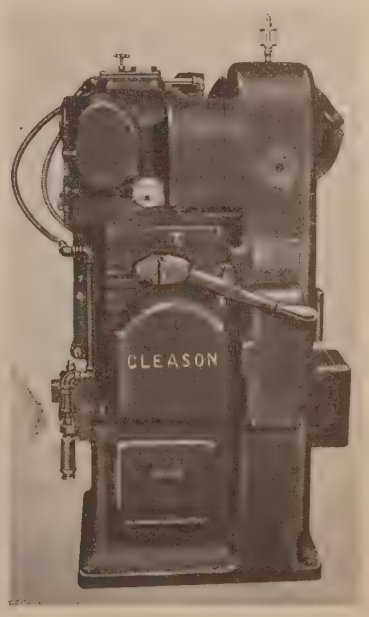
Straight-Bevel Gear Generator for Gears Up to 4½-In. Pitch Diameter. The tools and work are shown above

Feed motion is imparted to the tool-head directly through a cam. The clapper blocks are mounted in the clapper boxes and swivel on bronze taper pins located behind the cutting edges of the tools. Consequently, only a slight movement of the blocks is required for the tools to clear the work on the return stroke. This slight motion is emphasized as a factor in making the machine smooth, quiet and efficient in operating at high speed. The drive for the tools has the effect of a draw cut, inasmuch as the power is applied to the slide connections well ahead of the tool. Length of stroke can be changed according to the face length of the gear being cut, the maximum face being ⅞ in. Tools used in this machine are identical with those used on the larger straight-bevel gear generators, except for size.

Feeds and speeds are regulated through accessible change gears. Feeds are from 1½ to 30 sec. per tooth, and tool stroke-speeds range from 200 to 800 per min. A circulating oil system built into the tool head furnishes clean oil to the tool drive and to the arms and slides, while another circulating system, built into the speed bracket, circulates oil to all points of the feed mechanism.

The machine is furnished with built-in motor drives only, a ½ hp. motor driving the tools and a ¼ hp. motor the rest of the machine. Floor space occupied is 27 x 31 in., and the net weight of the machine is 1500 lb.

The General Refractories Co., Philadelphia, has appointed the Bison Builders' Supply Co., 1345 Genesee Street, Buffalo, as its dealer representative in Erie County, N. Y., for Grefco chrome high temperature cement and Standard silica bonding cement.



Pressure Gage to Use With Resistance Welders

A SELF - CONTAINED pressure gage is being marketed by Gibb Welding Machines Co., Bay City, Mich., for enabling the operators of resistance welders to set and hold their equipment to the correct operating

(At Left) The Gage Enables Setting and Holding the Welding Equipment to Correct Operating Pressures

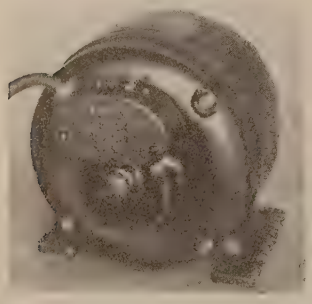
(At Right) The Wide Range of the Micrometer Is Obtained by the Four Interchangeable Anvils

performances. It consists of a small flat oil-reservoir connected with a dial indicator. It is chromium plated and weighs about 2 lb.

In use, the disk-like reservoir would be placed between the electrodes, movable vises or heads of the welding machine and the lever throw adjusted to produce the correct welding pressure. Once set, conditions may be maintained constant. Wear on welding dies is compensated for by repeating the test at appropriate intervals and adjusting the links or other pressure producing mechanism.

Small Motors with Built-In Switch

FRACTIONAL-HORSEPOWER split phase induction motors fitted with a built-in switch, which in addition to facilitating starting and stopping, eliminates the necessity of plug-

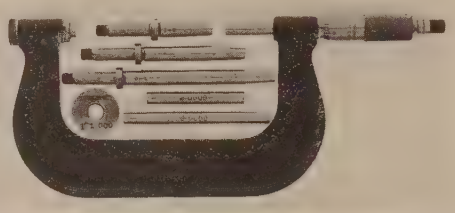


The Built-In Switch Which Facilitates Starting and Stopping Is a Feature of the Motor at the Left

ging in the current connection, are being marketed by the Reynolds Electric Co., 2650 West Congress Street, Chicago. Designated as the type C, they are made in four sizes, 1/20, ⅛, 1/6 and ¼-hp., respectively. The motor is practically inclosed, but means are provided for free circulating air about the core and through the windings of the motor, a temperature rise of 40 deg. C. being said to be the maximum under constant-duty full-load conditions.

Micrometer with 0 to 4-In. Range

FROM 0 to 4 in., by thousandths of an inch, is the range of a new micrometer caliper, designated as the No. 54, which has been added to the line of the Brown & Sharpe Mfg. Co., Providence. With this range, obtained by means of four interchangeable anvils of different lengths, the one tool performs the work for which a set of four micrometers has been required. It is adapted for measuring



practically all automobile parts, including pistons, camshaft bearings, wristpins, crankshaft bearings and pins. The tool is furnished with a ratchet stop and set of three standards, unless otherwise ordered.

Welded Grab Bucket

A SINGLE-HOOK grab bucket has been placed on the market by Edgar E. Brosius, Inc., Sharpsburg, Pa. As shown, this bucket is built up with structural shapes and plates and, with the exception of the lips, is electrically welded throughout. The lips are of manganese steel and are riveted to the scoop.

With capacity of ½ cu. yd., the bucket can be attached to any crane or hoist. It trips by hand line from the operator's cage or ground, and opens without shock to the crane or bucket. The latching mechanism is simple and the maintenance is said to be low.

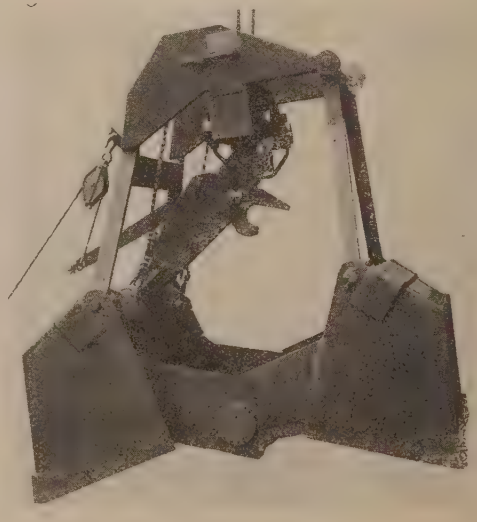
Cut and Ground Thread Tap Standard Proposed

A draft of the proposed American standard for dimensions of cut and ground thread taps is now available, through the American Standards Association, 29 West Thirty-ninth Street, New York, for review and criticism. The draft covers machine screw, end, tapper, nut and pulley taps. Standard tolerances on all dimensions are included.

A foreword to the proposed standard points out as its most important features: Adoption of larger major diameters to allow for greater wear; increase in minimum pitch diameters on cut thread taps over ¾ in. diameter to compensate for lead error; adoption of a comprehensive standard for ground thread taps; and standardization of a number of elements not heretofore covered.

Technical committee No. 12 of the A. S. A. general committee on standards for small tools and machine tool elements prepared the draft under the chairmanship of Charles M. Pond, manager of the small tool and gage division of the Pratt & Whitney Co., Hartford. The Society of Automotive Engineers, the National Machine Tool Builders' Association and the American Society of Mechanical Engineers are sponsors.

Location factors for industry in the Buffalo district forms the subject of a paper by Charles Langdon White, which is reprinted from the Denison University bulletin, Journal of the Scientific Laboratories. The reprint in 20 pages, with illustrations, points out many of the special facilities, including water transportation to overseas markets through the New York State barge canal or the Welland Canal in Canada.



Fabrication by Welding and Ease of Operation Are Features of the Grab Bucket at Right

United States Faces a New Economy

Rapid Initial Growth Is Past and Industry Is Concentrating on Intensive Cultivation of a More Restricted Market

"THE United States, while still relatively a new country, shows definite signs that a period of more settled existence has begun," said Magnus W. Alexander, president of the National Industrial Conference Board, New York, in addressing the World Engineering Congress at Tokio, Japan, on the "Economic Evolution of the United States, Its Background and Significance."

"The rate of increase in manufacturing, as well as in what may be referred to as the agricultural plant," he declared, "has of late been declining. Contrasting the annual rate of increase during the last 30-year period of the nineteenth century with the annual rate of increase during the present century, it is found that the rate in manufacturing was 6.9 per cent in the former as against 3.8 per cent in the latter. Similarly, the annual rate of growth in agriculture was 3.4 per cent as against 1.3 per cent; and in mining, 7.6 per cent as against 4.5 per cent."

Reduced Economic Growth Brings New Problems

This reduced rate of growth, according to Mr. Alexander, accounts for many recent economic changes. "The limits within which it is possible to increase the land area capable of cultivation are being approached, and indications are that manufacturing plants are nearing maximum size for efficiency.

"This tendency has stimulated efforts to increase efficiency through intensified rationalization, that is, improved organization, technique and planning, and by similar means. The conservation movement, scientific management, standardization and elimination of waste, consolidation and mergers in production and distribution, trade associations and industrial institutes, and similar organizations have thus received impetus from the forces which have made the decline in rate of growth in economic expansion."

Pointing out that the United States no longer is a seller's market, but has become a buyer's market, Mr. Alexander states that manufacturing is now more than a production problem.

"Producers today," he asserts, "are realizing that they must be alert in adjusting their output to the available markets, foreign as well as domestic. As against the flair for magnitude, speed, ruthless competition and an element of gamble, which characterized American business life in the nineteenth century, there is today a tendency toward consolidation and association for greater efficiency, careful planning on the basis of diligent research, and much concern over the ramifications and effects of economic life upon social progress."

"Benevolent" Circle Replaces "Vicious" Circle

Instead of trying to keep up with rapidly expanding demand, industry is concentrating on the intensive cultivation of a relatively stable market. The purchasing power of wages has become a matter of prime concern.

"High wage levels, while originally an incidence of labor scarcity and later of wartime demands and inflation, have become a distinct element of American economic life. In fact," says Mr. Alexander, "a definite philosophy has arisen from the relationships of high wages, intensive productivity and national purchasing power. It may be said that the trend of American business policy today is toward creation of widespread consumer purchasing power by providing high wages and wage values which, in turn, tend to raise the standards of living among the masses.

"Thus there is being established a 'benevolent circle' in place of the 'vicious circle,' extending from high wages to high consumer purchasing power, to increased demand for manufactured goods and services, and to still greater industrial production, all of which makes possible intensified mass production methods resulting in still lower unit costs. These, in turn, lead to lower prices and thereby again raise the purchasing power of wages. While it is true that the United States is constantly seeking to expand its export markets, it is also a part of the modern American business creed that American industry's greatest potential expansion for the present lies in an expanding domestic consumption."

Increase in Real Wages and Savings

The extent to which this policy has already affected American business is indicated by the fact that in 1928 "the average American factory worker was enabled to buy with his weekly pay envelope fully a third more of the goods and services of the same quality purchased by him in 1914. . . . At the same time hours of work averaged only 48 a week against 52 in 1914."

While high wages have resulted in liberal spending, they have also been translated into an "enormous rise in savings deposits in banks, in assets of building and loan associations and in those of life insurance companies, which are in large measure built up by the wage earners and other persons of moderate income. The aggregate of these accumulated savings at the end of 1928 was over $50,000,000,000, as contrasted with $14,700,000,000 in 1914, representing an increase of about 250 per cent, while money inflation, measured by wholesale commodity prices, amounted during the same period to only 43 per cent, and the population had increased by only 23 per cent."

Installment Selling Necessary

Installment selling greatly widened the demand for manufactured goods among people who otherwise could not have purchased the articles in question, according to Mr. Alexander. "An output of 4,500,000 automobiles in the United States in 1928, for instance, could hardly have been reached without the deferred payment plan. A very small percentage of losses, even during times of business recession and declining employment, has helped to establish confidence in the soundness of installment merchandising. Although they vary with the kind of goods sold and the class of people to whom sold, it may be said on good authority that the losses of concerns extending installment credit averaged less than 1 per cent in recent years.

"Underlying the entire idea of installment selling is, indeed, a sound economic principle, although those who first practised it perhaps were not conscious of it. This principle is that productivity *creates* purchasing power, which statement might be called the American version of the economic doctrine first enunciated by Adam Smith —'the wealth of nations does not consist of the unconsumable riches of money, but of the consumable goods annually produced by society.'

"From 70 per cent to more than 90 per cent of all gas stoves, phonographs and radios, automobiles, furniture, mechanical refrigerators, pianos, washing machines, sewing machines and vacuum cleaners are sold on the installment plan.

"Total installment purchases in the United States have been estimated to amount at present to from $5,000,000,000 to $6,000,000,000 a year, which represents, however, in terms of value only about one-seventh of the total retail sales of the year. But even of the retail sales, more than half in value are credit transactions, while practically all installment purchases require a fairly substantial initial payment, with balances constantly reduced.

"The total amount of currently outstanding installment paper is estimated at from $2,000,000,000 to $2,500,000,000—about half of the annual new savings of the population."

Austin Co. Creates Foreign Department

The Austin Co., Cleveland, industrial engineer and builder, has created a department of foreign operations, this having been necessitated by the magnitude of its recent contract with the Russian Government to build an automobile plant and complete industrial city at Nishni Novgorod. H. F. Miter, general manager of the company's Cleveland district, has been named as head of the department, with the title of vice-president in charge of foreign operations. L. E. Cooney, who has been assistant sales manager, has been promoted to assistant general manager of the Cleveland district, of which he will have charge during Mr. Miter's absence in Russia.

H. F. MITER

L. E. COONEY

The company has established separate offices in Cleveland, providing 15,000 sq. ft. of floor space to serve as headquarters for the foreign operations department. More than 100 engineers and draftsmen are now employed in these offices in preparing plans for the construction that will begin next spring in Russia. Mr. Miter will go to Russia in April to supervise the beginning of actual construction work. C. G. Palmer, Cleveland district engineer, and Fred A. Colman, the company's foundry expert, are now in Nishni Novgorod superintending preliminary work. Quarters are being constructed there for the Austin organization and for 3000 Russian workers who will be employed when construction work is in full swing. The Oka River, which joins the Volga at Nishni Novgorod, is being dredged to allow ships to reach the site, and railroad and trolley lines are also being constructed.

It is planned to equip the plant for the manufacture of virtually every part of the automobile. Plans originally called for an initial production of 100,000 Ford automobiles annually, but this has been increased to 120,000 cars. The ultimate capacity is to be 500,000 cars. The Nishni Novgorod plant will be the key plant for Autostroy, the Soviet bureau for building automobile plants. This bureau intends to establish assembly plants in the various parts of Russia in the same manner as the Ford Motor Co. in this country.

Rail-Water Rates to Coast From St. Louis Area Lower

WASHINGTON, Nov. 26. — Reduced through rail-and-water rates on iron and steel and other products from central and southern Illinois, St. Louis, Evansville, Ind., and Henderson and Hopkinsville, Ky., to California ports are proposed in tariffs filed with the Interstate Commerce Commission to become effective Dec. 16. Rates on general iron and steel products would be 63.5c. to 71c. per 100 lb.; on iron and steel pipe, 71c., and on wire and wire goods, 85c. The rates proposed would meet those now maintained by way of the Illinois Central and Redwood steamship line. The schedules were filed on behalf of the Chicago & Alton, Illinois Terminal and the Chicago & Illinois Midland railroads as originating lines and the Louisville & Nashville and the Mobile & Ohio railroads as delivering rail lines. The traffic would move by way of Mobile, Ala., and New Orleans with water connection by way of the Gulf Pacific, Luckenbach Gulf and the Transmarine Corporation steamship lines.

Pipe Machinery Makers Are Consolidated

Merger of the Oster Mfg. Co., Cleveland, and the Williams Tool Corporation, Erie, Pa., pipe machinery manufacturers, involving properties valued at approximately $2,000,000, has been effected by the purchase by the Oster company of a controlling interest in the common stock of the Williams corporation. The stockholders of the latter company will exchange their stock for Oster company stock. Both companies will retain their corporate identity, at least for the present, and the only changes in the personnel will be the retirement of Horace W. Davis as president of the Williams company. He will be succeeded by Roger Tewksbury, vice-president and treasurer of the Oster company, who will be operating head of the combined companies.

The Oster Mfg. Co. manufactures die stocks and rotary head pipe-threading and cutting machines. The Williams company makes a line of pipe and bolt-threading machinery and pipe cutting-off machinery. The Williams company controls a plant in Brantford, Ont., under the name of the Williams Tool Corporation of Canada, which is also absorbed by the Oster company in the merger. The officers of the Oster company, in addition to Roger Tewksbury, are R. B. Tewksbury, president, and Arthur S. Gould, secretary. The officers who remain with the Williams company are E. P. Poole, vice-president, and J. E. Humble, secretary-treasurer.

Steel Freight Rate Change Is Again Postponed

WASHINGTON, Nov. 26. — For the second time, the Interstate Commerce Commission has postponed the effective date of its decision in the general steel rate case, an order last week naming March 20 as the new effective date. The decision affects all manufactured iron and steel products throughout Official Classification territory and the effective date was postponed in each instance at the request of the carriers, which claimed it was physically impossible to prepare the great volume of new tariffs in the time allotted.

The commission has reopened the case with respect to the application of alternative rates on bars, plates and shapes subject to a carload minimum of 80,000 lb., and also as to the fourth section (long-and-short-haul) order pertaining to circuity limitations. The commission has begun reconsideration, based on the record, of the request of producers of agricultural implements, etc., in Davenport, Ia., and Rock Island and Moline, Ill., and of the Highland Iron & Steel Co., Terre Haute, Ind., and the Terre Haute Chamber of Commerce for rates on bars, plates and shapes when shipped in carloads of 80,000 lb., equivalent to 75 per cent of the rate on shipments in carloads of 36,000 lb., the minimum carload. The decision, however, fixed the minimum at 40,000 lb., on all iron and steel products. Reconsideration as to bars, plates and shapes will not involve hearings.

The reopened phase of the fourth section order will be the subject of hearings to begin on Dec. 3 at the Merchants' Association rooms, 233 Broadway, New York.

Continental Iron & Steel Co., 33 Rector Street, New York, has established a Worcester, Mass., office at 44 Pearl Street, in charge of Simon I. Edinburg, who has been in business for himself for a number of years in Worcester.

This Issue in Brief

Forcing a business boom would have a boomerang effect, says economist. Early recovery from stock market crash seems assured, but an artificial bull movement might result in a new and more serious setback. — Page 1449.

* * *

High machining costs, due to hard spots in castings, can be cut if fins are allowed for in design. The fin acts as a chill. Move the parting line so that the fin occurs away from machined surface. Grind cores to fit closely, to reduce size of fins.—Page 1446.

* * *

Production increased by 15-min. rest periods, tests reveal. Quarter-hour recesses in morning and afternoon enlarge daily output.—Page 1454.

* * *

Fortunate manufacturer of today profits by others' experience, thanks to business papers, says economist. In former days business experience was a private and unadvertised possession.—Page 1452.

* * *

"Room entertainment" at conventions frowned upon. Too many "set-ups" nullify value to those who attend. Convention executives want liquor tabooed.—Page 1457.

* * *

Foreign customers of American steel makers increase their orders. October exports were 11 per cent above September. Gain for first 10 months of 1929 was 12 per cent over same period of 1928.—Page 1494.

* * *

Hardened copper alloys as strong or stronger than medium-carbon steels. Cold-rolled alloys weld easily and will not season or corrosion crack.—Page 1434.

Quick return to normal in automotive industry is promised President. Leaders confidently expect an early resumption of normal output.—Page 1455.

* * *

Chill cast bronze bearings wear faster in tests, but are more resistant to repeated pounding and static tension. For mechanical strength lead content should be kept near the lower limit of 12 to 25 per cent range.—Page 1433.

* * *

Hardens small high-speed steel parts in three-chamber, vertical furnace, heated with single gas burner. Temperature in each chamber is determined by size and number of holes in refractory tile bottoms.—Page 1436.

* * *

Black finish on rifle parts has twice the life of blue finish. For oil blackening, charge work into a retort with charred bone, heated to 900 deg. Fahr. Then saturate in mineral cylinder oil. —Page 1437.

* * *

Production increased 40 per cent by making minor changes in equipment. Metallurgical considerations prevented speeding the pulling of cold-drawn bars through drawing dies, so slow return of drawing head was changed to fast return.—Page 1439.

* * *

Success of your business depends 60 per cent on factors outside the business. The manufacturer who confines his thinking entirely to his own problems neglects the majority of the factors governing success or failure. —Page 1443.

Wage incentives second to general working conditions as a means of increasing output, tests reveal. Certain types of supervision are inimical to efficient work. "Nagging" slows up the worker.—Page 1454.

* * *

Machinery now king of export trade, displacing cotton. Foreign customers took over 462 million dollars worth of American machinery in first nine months of 1929.—Page 1456.

* * *

Business tide cannot be stopped, as the world is now organized, says George M. Verity. It can only be checked; business is extremely resilient.—Page 1459.

* * *

Secret rebate is one great evil of modern distribution, says Saunders Norvell. It places large distributer in a position to destroy smaller competitor.—Page 1444.

* * *

Casting test bars should vary with size of castings. Average tensile strength of gray iron decreases with thickness of section. —Page 1438.

* * *

Casting designer thinks too often in terms of the finished casting. The only safe basis is the sharpest possible attention to the *rough* casting, exactly as it comes from the sand.—Page 1447.

* * *

Detects copper in steel readily by etching with 1 to 2 HCl. The specimen should be annealed, then given a 20-min. etch. Over 0.20 per cent copper in low-carbon steel will be revealed, as the copper is not attacked by the acid.—Page 1445.

A. I. FINDLEY
Editor

THE IRON AGE

W. W. MACON
Managing Editor

ESTABLISHED 1855

The President to the Rescue

THE President's conference with industrial leaders was obviously for psychologic effect. The public was getting scared and that always is dangerous. Consequently it was appropriate for the President, who alone commands national attention, to dispel fears. If we were under the domination of great economic motions no conference of industrial leaders, agreements, assurances or promises would stay them.

The halt in business that was previously in evidence was clearly ascribable to over production rather than to under consumption. The automobile manufacturers had been making too many automobiles. The zinc miners had been mining too much ore. The manufacturers of rayon, who had enjoyed the one good branch of the textile industry, ended by making too much of their own article. The bad situations in bituminous coal and in petroleum have been chronic. These industrial troubles are practically worldwide. Equally unsatisfactory situations could come about in steel and in copper if the producers of those commodities should cut loose. It is the good organization prevailing in those industries that preserves their well-being.

The petroleum producers after prodigious efforts seem to be bringing a semblance of order into petroleum production. On the other hand, the European cartel of zinc smelters has just been disrupted after a vain effort to regularize affairs in an industry wherein they did not control the initial production, the mines. The price for spelter has fallen to about the figures for 1913 and the American market sings to the tune of London, lest foreign zinc be landed here, duty paid. Obviously no conferences in the White House are of any effect upon such conditions.

Washington's Resultful Conferences

THERE is no point in questioning the ultimate influence of President Hoover's conferences on business—they have already had a far-reaching effect. This can be said despite the fact that the President, with his familiarity with economic reactions, could have had no illusions about the limitations of any program that might be undertaken at this time. But what merits admiration is that he saw that much nevertheless could be done and undertook to do it. By calling together leaders of various branches of industry for counsel he inspired them with the feeling of duty that always comes with the assumption of responsibility. They saw their own problems in the light of the greater problem confronting the country at large and with true public spirit gave assurances that they would proceed with a view to tiding business over its period of readjustment.

While it is doubtless true that railroads and manufacturers, in most cases, announced improvement programs that were already authorized, the important fact is that these plans were reaffirmed rather than reduced or abandoned, as might have been expected in view of our experiences following previous Wall Street crises. Likewise the assurances that wages will be maintained and unemployment kept at a minimum are gratifying, since it is realized that the larger corporations are well fortified with cash reserves to back up their promises.

To raise the objection that expansion of plant capacity is a poor remedy in the face of overproduction in a number of leading industries is to overlook the fact that considerable work can be undertaken to replace obsolete and obsolescent equipment in the interests of more efficient operations. As a matter of fact, the tempo of production was so high in a number of lines in the first nine months of the year that much current maintenance and repair work was slighted or postponed. This accumulation of reconditioning work is alone an important item.

Neither the President nor the public can be deceived by the promises of overzealous publicists that business will entirely escape the effects of the stock market crash. Popular buying power has been curtailed, and producers of consumer goods will feel that curtailment. Clearly the time calls for the marshaling of offsetting influences. Overextension of activity, such as apparently affected a number of manufactured products in the first three quarters of the year, certainly was not characteristic of public works. Many municipal and State projects, which were deferred on account of an unfavorable bond market, are now in a position where they can be expedited. The Federal Government has already taken positive action to accelerate work under its control.

Critics point out that expansion of public undertakings means a heavier tax burden, but that is preferable to the consequences of widespread unemployment. The pushing of governmental activity, therefore, is amply justified as an emergency measure to smooth out the business cycle.

Concern lest efforts to temper the effects of the stock market crash may overstimulate business, paving the way for a new boom, does not seem warranted by the widest stretch of imagination, following the shock that the country has just experienced. All remedies carry a risk, but a do-nothing policy at the present juncture would be much more dangerous.

How Many Lost in Stocks?

DURING the active and advancing stock market the common talk was that everybody was speculating. Since the big decline much has been said about the small percentage of the population that lost. There is a remarkable difference in the two appraisals, the first being several times the second.

In neither case has there been any direct and specific information. Such specific information as does come out is likely to be misinterpreted. There have been statements of various corporations as to number of shareholders. Adding the numbers together would make a formidable total, whereas the number of duplications is undoubtedly large. Even in the same corporation with preferred and common shares, there is some duplication.

With so much latitude for guessing there can be no doubt that human nature has entered in each case, making the early estimates of the number of speculators too large and the latest estimates too small. A large number of registered stockholders can be interpreted either way, that nearly everybody is interested in stocks and is therefore speculating, or that nearly everybody owns his stock outright.

Perhaps an illustration of how easy it is to guess wrong as to the conduct of the general public may be obtained from the automobile. If the rest of the world were furnished specific information as to the population of the United States, its per capita income by classes, the cost of automobiles and the cost of running them, the guess as to how many automobiles were in operation in the country would in all probability be far below the actuality.

The National Bureau of Economic Research has just issued a statement of income of the people of the United States, 1916 to 1926 inclusive, with division by classes. This furnishes a basis for guessing how many people are likely to be shareholders or speculators. For 1926 the total of 44,673,550 income receivers divides as follows:

Per cent	Annual income
99.00	Under $8,700
0.89	$8,700 to $43,750
0.10	$43,750 to $183,000
0.01	Over $183,000

If we allow ten automobiles to each income in the highest class, five to each in the next highest and two to each in the next highest we have a total of 1,049,929. The remainder would be automobiles owned by receivers of less than $8,700 income. Passenger car registration in 1926 was 19,237,171 and in 1928, 21,379,125. On account of replacements these figures contain duplications, and incomes have increased somewhat since 1926, but one is safe in assuming that this year fully 15,000,000 passenger cars are owned by people with less than $8,700 income, making approximately one owner out of three in this income class. Evidently as to the great mass of the people the tendency has been to own an automobile rather than purchase stocks outright or speculate in them.

The interesting point is buying power. Of the total income in 1926, 87 per cent was received by 99 per cent of the income receivers. There is a strong suggestion that general buying power has not been greatly affected by the stock market slump. The buying power of the future will be chiefly a matter of the course general trade takes.

To Throw New Light on Business

WHAT may we expect of the business council or super-committee that is to come into being out of the Hoover business conferences? Will it act as a governor to the business machine? If so, we shall have a new control of the business cycle.

As it is, the curves of ups and downs in business have been greatly flattened as compared with their swings prior to 1922. It took the depression of 1921 to force recognition of economic statistics as a tool of business. The mass of them that has since been coming to the business executive has apparently helped to dampen fluctuations. We have only to recall how known conditions of manufacturing and transportation have minimized the hazard of reduced inventories. Now, with the proposed business council, there is the suggestion of a further force to check declines or advances when either of these threatens to get out of hand.

It is presumed that this super-committee (to be organized under the direction of Julius Barnes, chairman of the Chamber of Commerce of the United States) will be essentially a fact-finding body. In that case, considerable time must elapse before it can be ready to make public statements, but thereafter, if it becomes a continuing institution, as seems to be the purpose, its findings should easily have a close time relation to current events. It is then reasonable to believe it may serve to curtail the swings of the business pendulum whenever facts seem to support such action. The thought naturally does not escape that the council will have serious responsibilities if its influence should prove so sweeping.

That the council may quicken and maintain respect for statistical information seems likely and it may develop the compilation of what is now missing but important. On the face of production figures, overconsumption may describe the condition of some markets. Steel output in ten months of this year, for example, has averaged 24 per cent above normal, normal being measured by what has been the rate of increase of previous years; including 1928, the average is 18 per cent for 22 months. The question needing answer is whether new uses have arisen at a much faster rate than in the past or whether in some lines absorption has been at a rate too high to last. The figures illustrate the absence of a good measure of the status of consumption. The council may prove to be the needed agency. It has possibilities so great that even limited performance will be immensely helpful.

Automobiles and General Trade

EFFORTS of the administration at Washington to preserve general trade activity are likely to be as successful as anyone could hope. They aim at continuance of such activity as can be continued and increase in such activity as affords opportunity for increase.

This virtually leaves out one great activity, the automobile trade, and it is worth while to get as

exact bearings as possible on this matter. One readily recalls comment at the close of 1927 along the line that perhaps dullness in the automobile trade was largely responsible for the lull in total trade activity; likewise predictions a year ago that the prospective great activity in the automobile industry would stimulate trade nearly all around. These views from the past give us some cue at the present time. As a matter of fact, automobile production in the second half of 1927 was the lowest for any second half in many years and was 37 per cent below the highest second half production then on record

As to the recent performance we may now take stock as it is ended. The gage we use is the convenient one of totals for 12 consecutive months. As production last September was under that in the preceding September, we have the 12 months, September, 1928, to August, 1929, inclusive, as the record high. The total of cars and trucks in the United States and Canada was a trifle over 5,800,000.

There was a remarkable bulge, as may readily be observed, for 1923 made a record with 4,180,450, 1924 was off, 1925 and 1926 made new records by small margins, 1927 was off and 1928 made another new record by a small margin. After 1923 there were three years with fresh records, yet 1928, at 4,601,141, was only 10 per cent over 1923, five years earlier. The 12 months through last August ran 26 per cent higher, this gain being in less than a year, whereas previously the average rate of increase was only 2 per cent per annum.

The apparently low production of automobiles at present is in part seasonal and in part a reaction from the bulge. Last month's production, 394,465, was less than two preceding Octobers only, in 1925 and 1928. If the average seasonal variation of the last five years be taken as criterion, last month's production was in keeping with a calendar year total of 4,700,000. Furthermore, if December were related to October by the average proportion of the last five years, its production would be only 247,000. If it were 147,000 or 47,000 or nothing, it would not make a great deal of difference in the long run.

The object of these comparisons is to bring out the fact that a mere return of automobile production to its general trend line makes what looks like a very dull industry, and accordingly the dullness does not furnish a basis for predicting a large increase or recovery. It is a matter of reaction or return to the trend line of the long range past, rather than to the line made by the recent bulge. The heavy buying recently was not ultimate consumption, it was a matter of early replacement, reducing the average age of the cars in service. The accepted computations show 1923, six years ago, to have been the biggest year for new buying. Replacements have since increased so much that they have made up for decreased new buying and supplied an increase for the total production. All of which is not to argue that it would not be better for many more cars to be replaced if the owners can afford to do so, for their own safety and for the safety and comfort of other drivers.

CORRESPONDENCE

Aluminum Can Be Slush Molded

To the Editor: On page 1096 of THE IRON AGE, Oct. 24, it is stated that slush molding (casting) cannot be applied to aluminum. It is not clear from the statement made as to whether zinc is poured in metal molds or in sand molds. There is considerable scope for the production of both zinc-base and other white-metal alloy castings, as well as aluminum, by slushing in metal (cast iron) molds. Several plants in this country and abroad have long used the slush-casting process for the production of certain hollow castings in aluminum alloys.

The statement that slush-casting cannot be applied to aluminum it not true. The process is applied in practice and is finding increasing use.

ROBERT J. ANDERSON,
Vice-President in Charge of Production,
Fairmont Mfg. Co.
Fairmont, W. Va.

Is Endurance Limit Raised by Overstress?

To the Editor: "Does overstress increase or decrease the endurance limit?" In your issue of Nov. 14 you raised this question, quoting me as an authority for an affirmative answer and Messrs. Smith, Connor and Armstrong as authorities for a negative answer.

The tests I have quoted may be found described in Bulletins 124, 136 and 165 of the Engineering Experiment Station of the University of Illinois. All the results were based on long-time endurance tests. It was found that, for a small number of repetitions of stress to reduce the endurance limit appreciably, the stress must be far above the endurance limit. It was found that, if a fatigue crack had spread to the point where it could be detected without the aid of a microscope, the endurance limit of car axle steel was very markedly reduced.

It has been our experience at Illinois that attempts to determine endurance limit by any kind of a yield point test are of doubtful value.

H. F. MOORE,
Materials Testing Laboratory,
University of Illinois, Urbana, Ill.

Warping Controlled When Welding Structural Steel

Welding structural steel with an oxy-acetylene flame is generally thought to produce considerable warpage. H. H. Moss, development engineer Linde Air Products Co., New York, told the International Acetylene Association recently that welding a major structural frame, during the past year, has provided observations on the warpage effect over a wide range of conditions and it has not been found to be a prevalent characteristic, but is confined to connection details between ends of members. Its control is a matter of designing so the forces set up by localized heating are balanced with respect to the center of gravity on the section being welded.

Experience in welding the heavy shapes has demonstrated that as the mass of the part increases the warpage effect decreases. A practical demonstration of warpage control in a structure of good size may be seen in a structural frame erected by oxy-acetylene welding at Niagara Falls, N. Y. The alinement of the welded steel in this job, which contained approximately 300 tons of miscellaneous shapes, was excellent and was accomplished (with but few exceptions) without corrections subsequent to welding.

A.S.M.E. Meeting Program Comprehensive

More than 25 technical sessions have been arranged for the annual meeting of the American Society of Mechanical Engineers, which will be held at the Engineering Societies Building, New York, Dec. 2 to 6.

The machine-shop practice division will hold a session on Dec. 2, with a paper on "Quality Control and Product Gages," by Earle Buckingham, associate professor of engineering standards and measurements, Massachusetts Institute of Technology, Cambridge, Mass. A joint session with the A.S.M.E. committee on the cutting of metals, on Dec. 3, will include the following papers:

"Turning with Shallow Cuts at High Speeds," by H. J. French, International Nickel Co., Bayonne, N. J., and T. G. Digges, assistant metallurgist, Bureau of Standards, Washington.

"Power Required to Drill Cast Iron and Steel," by O. W. Boston, director of engineering shops, University of Michigan, and C. J. Oxford, chief engineer, National Twist Drill & Tool Co., Detroit.

"A Test Code for High-Speed Steel for Turning Tools," by Lewis H. Kenney, United States Navy Yard, Philadelphia.

"Present Practice in the Use of Cutting Fluids," compiled by S. A. McKee, engineer, friction and lubrication section, Bureau of Standards.

At a joint meeting of the lubrication committee and the machine-shop practice division, Dec. 4, G. B. Karelitz, research engineer, Westinghouse Electric & Mfg. Co., will present a paper on "Performance of Oil Ring Bearings." A session on mechanical springs, Dec. 2, will include: "Present Status of the Mechanical Spring Art," by J. K. Wood, consulting engineer, New York, and "Elastic and Inelastic Behavior in Spring Materials," by M. F. Sayre, assistant professor applied mechanics, Union College, Schenectady.

"Use of Economic Manufacturing Quantities," a paper by R. W. Kent, Bigelow, Kent, Willard & Co., Boston, will be presented at a symposium on production management, Dec. 5. Other papers at this symposium are: "Twelve Years' Experience with Economic Production Quantities," by C. H. Best, and "Advantages Derived for the Simplification of Fundamental Formulas for Economic Production Quantities," by F. E. Raymond, assistant professor of industrial research, Massachusetts Institute of Technology.

"Metallurgy in the Railroad Field," a paper by Charles McKnight, metallurgist, International Nickel Co., New York, will be a feature at the railroad session, Dec. 5. Simultaneously, at a general session, Dr. D. S. Jacobus, Babcock & Wilcox Co., New York, will speak on "Working Stresses for Steel at High Temperatures," and G. B. Karelitz, Westinghouse Electric & Mfg. Co., and O. W. Ellis, Ontario Research Foundation, Toronto, Canada, on "A Study of Tin-Base Bearing Metals."

Three sessions on applied mechanics have been arranged. Papers at the first, Dec. 2, are "Factors of Safety and Working Stress," by C. R. Soderberg, Asea, Vesteris, Sweden, and "The Mechanics of the Plastic State of Metals," by A. Nadai, research department, Westinghouse Electric & Mfg. Co. The third session, Dec. 3, will include "Natural Frequency of Gears," by R. E. Peterson, research engineer, Westinghouse Electric & Mfg. Co.

The Week in Business

Drift of Current Financial and Economic Opinion

THE resiliency of business under the impact of the stock market crash and the disappearance of unreasoning pessimism are sources of widespread encouragement.

"The most satisfactory feature of the situation at the moment—and it is a very reassuring feature," says the *Commercial and Financial Chronicle*, "is that . . . things are rapidly returning to normal.

"Evidences of this are met on every side. In the first place, the stock market is at length regaining tone, after the violent convulsions which it suffered. It has shown strong rallying tendencies the present (last) week and this, too, on a light volume of business, indicating that as far as the market as a whole is concerned, selling pressure is no longer an influence playing havoc with prices."

This journal also calls attention to the large shrinkage in brokers' loans, the strong revival in the demand for bonds and the cheapening of money rates "in every direction."

Hoover Conferences Timely

President Hoover's conferences, in checking hysteria, were "timely and just what the situation required," in the opinion of the *Chronicle*, "though it would be too much to expect that the ill consequences of the stock market debauch can be completely overcome, no matter how resolute the purpose and however well designed the means employed to that end."

Approval of the Administration's action is not shared by Benjamin Baker, *Annalist*. While recognizing the desirability of reassuring public sentiment, he feels that the Washington meetings clouded rather than clarified the business outlook. "The inadequacy of such measures for overcoming business depression arises from the uncomfortable fact that the depression itself is, in large part, due to what is now proposed as its remedy, namely, expansion in industrial production."

Diverting Influence of Speculation Removed

The salutary results of stock market liquidation are receiving more emphasis as business men become readjusted to the new situation facing them. One of these, not measurable by statistics, is the removal of the lure of easy money and renewed concentration on one's own business, according to John T. Madden, president, Alexander Hamilton Institute, and dean, New York University School of Commerce, Accounts and Finance. Wall Street speculation absorbed "a great deal of time, interest and thought on the part of business men, bankers, professional men and wage earners whose daily pursuits are far removed from stock market affairs."

Another favorable factor, commonly mentioned as likely to offset curtailment of buying power traceable to Wall Street losses, is the easing of money rates, However, the *Guaranty Survey*, published by the Guaranty Trust Co., New York, believes that the importance of ample credit has been overemphasized.

Easier Money Not a Primary Stimulant

"Just as business during the last two or three years has not been seriously hampered by the advance in interest rates, so a period of easier money will not, by itself, create a business revival. The influence of interest rates on most branches of business is negative rather than positive. When recovery occurs, however, the abundance of funds available at low rates will be a stimulating factor."

Actual Wall Street losses, in the view of the *Survey*, were probably exaggerated, but there is no point in calling attention to the obvious fact that no physical wealth was destroyed in the market convulsion.

"Business reactions," the *Survey* adds, "are caused by the destruction not of physical wealth but of dollar values; and so long as wealth and incomes are measured in terms of dollars, to belittle the destruction of such values as a mere bookkeeping sleight-of-hand does not diminish its importance."

Iron and Steel Markets

Further Reduction in Output

Pig Iron and Steel Producers Curtail in Step with Receding Specifications—Approach of Inventory Period Is a Factor Restricting Releases

IRON and steel production has undergonea further decline in conformity with receding specifications. Retarded recovery of the automotive industry, approaching year-end inventories and the usual caution of buyers in a quiet market have all contributed to the slowing up of demand.

Doubtless many users are also delaying purchases until they can obtain a better appraisal of the effect of the stock market crash on ultimate consumption and thereby secure an estimate of their future requirements. Few cancellations are reported by steel producers, but specifications in some instances have been pared down or entirely suspended. An offsetting influence is the reinstatement of orders held up several weeks ago.

With current market factors discouraging the placing of new business and adding emphasis to the importance of cutting down inventories, it is difficult to get a satisfactory measure of steel consumption. Meanwhile steel producers are keeping finishing mill schedules in the closest possible adjustment with bookings, although here and there moderate stocks of standard sizes of bars are being accumulated.

Purchases of steel by the automotive industry for new models have not developed in any great volume and no marked improvement in shipments to motor car builders is looked for this year. Independent Cleveland mills, which depend on automobile manufacturers for a larger portion of their tonnage than producers in most other districts, have reduced operations to 35 per cent of ingot capacity. Youngstown output has been interrupted recently by complete shutdowns of a number of open-hearth plants, but is now estimated at 40 to 50 per cent. The average for the Pittsburgh district has declined to 65 per cent and the Chicago rate, notwithstanding expanding rail operations, has receded to 70 per cent. Steel Corporation subsidiaries are running at 68 per cent of capacity, compared with 72 to 74 per cent a week ago, while the average for Bethlehem plants is 70 per cent.

Railroad equipment business is featured by an order placed by the St. Louis-San Francisco for 3800 freight cars, requiring 40,000 tons of steel. Fresh inquiries call for 2700 cars. Both rolling stock builders and farm implement makers continue to operate at a high rate, but the former are holding down their current specifications for steel as a pre-inventory precaution.

Steel fabricating shops also remain active, with new demand for structural projects developing in a promising manner. Work that came out for bids during the week totaled 65,000 tons, although lettings, at 22,000 tons, were only half those of the previous week. Approximately half of the new tonnage that came into the market was for two Chicago projects—an addition to the Chicago *Tribune* Tower, 17,000 tons, and an addition to the Morrison Hotel, 15,000 tons. Construction prospects in the Lake Michigan city are considered excellent, in view of the reopening of plans that have lain dormant for a year or more, but most of this work will not reach the contracting stage until after the turn of the year.

Rail production at Chicago is now above 85 per cent of capacity. A Western road has bought 7500 tons, and the Missouri-Kansas-Texas is in the market for 8000 tons. The Southern Pacific has not yet taken action on its inquiry for 120,000 tons of rails, but has distributed orders for 14,000 tons of tie plates. The New York Central will shortly buy 35,000 tons of track supplies.

Tin plate output has improved slightly, with the leading interest operating at more than 75 per cent and independents running at somewhat above 60 per cent of capacity. Large tin plate contracts for the first half of 1930 have been placed, and indications are that the requirements of can companies will be fully as large as for the comparable period this year.

Buyers of other forms of finished products are manifesting virtually no interest in first quarter contracts. With spot business also light, prices are flexible but, on the whole, have undergone few severe tests.

Scrap markets have grown still weaker, with heavy melting steel down 50c. a ton at Pittsburgh, Chicago and Philadelphia and with reductions the rule in practically all other grades.

Curtailment of pig iron shipments has extended to melters outside of the automobile industry and a further decline is expected in December, with the approach of inventory taking. With demand diminishing, producers continue to reduce operations rather than to stock iron. One furnace has gone out at Cleveland, three at Buffalo, and two in the Pittsburgh district. Buffalo foundry iron for delivery along the Eastern seaboard has declined to $17, furnace, a drop of 50c. a ton.

Exports of iron and steel in October, 247,646 tons, showed a gain of 11½ per cent over the previous month, but a reduction of 4 per cent from the total for October, 1928.

THE IRON AGE composite price for pig iron has declined to $18.29 a gross ton from $18.38, its level in the preceding five weeks. A year ago it stood at $18.59. The finished steel composite is unchanged at 2.362c. a lb., the same figure as 12 months ago.

A Comparison of Prices

Market Prices at Date, and One Week, One Month and One Year Previous, Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron, Per Gross Ton:	Nov.26, 1929	Nov.19, 1929	Oct.29, 1929	Nov.27, 1928
No. 2 fdy., Philadelphia	$21.26	$21.26	$21.26	$21.26
No. 2, Valley furnace	18.50	18.50	18.50	18.00
No. 2 Southern, Cin'ti	17.69	17.69	17.69	20.19
No. 2, Birmingham	14.50	14.50	14.50	16.50
No. 2 foundry, Chicago*	20.00	20.00	20.00	20.00
Basic, del'd eastern Pa.	19.75	19.75	19.75	19.75
Basic, Valley furnace	18.50	18.50	18.50	17.50
Valley Bessemer, del'd P'gh	20.76	20.76	20.76	20.01
Malleable, Chicago*	20.00	20.00	20.00	20.00
Malleable, Valley	19.00	19.00	19.00	18.25
Gray forge, Pittsburgh	19.76	19.76	19.76	19.26
L. S. charcoal, Chicago	27.04	27.04	27.04	27.04
Ferromanganese, furnace	105.00	105.00	105.00	105.00
Rails, Billets, Etc., Per Gross Ton:				
Rails, heavy at mill	$43.00	$43.00	$43.00	$43.00
Light rails at mill	36.00	36.00	36.00	36.00
Rerolling billets, Pittsburgh	35.00	35.00	35.00	33.00
Sheet bars, Pittsburgh	35.00	35.00	35.00	33.00
Slabs, Pittsburgh	35.00	35.00	35.00	33.00
Forging billets, Pittsburgh	40.00	40.00	40.00	38.00
Wire rods, Pittsburgh	40.00	40.00	40.00	42.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.85	1.85	1.85	1.90
Finished Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Bars, Pittsburgh	1.90	1.90	1.90	1.90
Bars, Chicago	2.00	2.00	2.00	2.00
Bars, Cleveland	1.90	1.90	1.90	1.92½
Bars, New York	2.24	2.24	2.24	2.24
Tank plates, Pittsburgh	1.90	1.90	1.90	1.90
Tank plates, Chicago	2.00	2.00	2.05	2.00
Tank plates, New York	2.17½	2.17½	2.22½	2.22½
Structural shapes, Pittsburgh	1.90	1.90	1.90	1.90
Structural shapes, Chicago	2.00	2.00	2.00	2.00
Structural shapes, New York	2.09½	2.09½	2.14½	2.19½
Cold-finished bars, P'gh	2.30	2.30	2.30	2.20
Hot-rolled strips, Pittsburgh	1.90	1.90	1.90	1.80
Cold-rolled strips, Pittsburgh	2.75	2.75	2.75	2.85

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

Finished Steel,	Nov.26, 1929	Nov.19, 1929	Oct.29, 1929	Nov.27, 1928
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 24, P'gh	2.75	2.75	2.75	2.75
Sheets, black, No. 24, Chicago dist. mill	2.85	2.85	2.95	2.85
Sheets, galv., No. 24, P'gh	3.40	3.40	3.50	3.50
Sheets, galv., No. 24, Chicago dist. mill	3.50	3.50	3.60	3.60
Sheets, blue, No. 13, P'gh	2.25	2.25	2.35	2.10
Sheets, blue, No. 13, Chicago dist. mill	2.45	2.45	2.45	2.20
Wire nails, Pittsburgh	2.40	2.40	2.40	2.55
Wire nails, Chicago dist. mill	2.45	2.45	2.45	2.60
Plain wire, Pittsburgh	2.40	2.40	2.40	2.40
Plain wire, Chicago dist. mill	2.45	2.45	2.40	2.45
Barbed wire, galv., Pittsburgh	3.05	3.05	3.05	3.20
Barbed wire, galv., Chicago dist. mill	3.10	3.10	3.15	3.25
Tin plate, 100 lb. box, P'gh	$5.35	$5.35	$5.35	$5.25
Old Material, Per Gross Ton:				
Heavy melting steel, P'gh	*$15.50*	$16.00	$17.25	$17.00
Heavy melting steel, Phila.	*14.50*	15.00	15.50	15.50
Heavy melting steel, Ch'go	*12.50*	13.00	14.00	14.50
Carwheels, Chicago	*13.50*	14.00	14.00	14.25
Carwheels, Philadelphia	15.50	15.50	16.50	16.50
No. 1 cast, Pittsburgh	15.00	15.00	15.50	14.50
No. 1 cast, Philadelphia	*15.50*	16.00	16.00	16.25
No. 1 cast, Ch'go (net ton)	13.50	13.50	14.50	15.50
No. 1 RR. wrot., Phila.	*15.50*	16.00	16.00	15.50
No. 1 RR. wrot., Ch'go (net)	*12.00*	12.25	14.00	13.25
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$2.65	$2.65	$2.65	$2.75
Foundry coke, prompt	3.75	3.75	3.75	3.75
Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	18.12½	18.12½	18.12½	16.12½
Electrolytic copper, refinery	17.75	17.75	17.75	15.75
Tin (Straits), New York	**41.62½**	39.75	40.75	52.87½
Zinc, East St. Louis	6.25	6.25	6.60	6.35
Zinc, New York	6.60	6.60	6.95	6.70
Lead, St. Louis	6.10	6.10	6.55	6.22½
Lead, New York	6.25	6.25	6.75	6.35
Antimony (Asiatic), N. Y.	8.62½	8.62½	8.75	10.00

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Pittsburgh

Steel and Pig Iron Curtailed in Keeping with Demands—No Sustained Improvement Expected Before January

PITTSBURGH, Nov. 26.—Pittsburgh steel producers continue to fortify their position with curtailed production of basic materials and the closest possible adjustment of finishing mill schedules to current demand. Two integrated independent steel companies have blown out blast furnaces in the last week and production of open-hearth steel is still declining.

The principal Steel Corporation subsidiary and the leading independent company in this district are now the only interests which are operating more than half of their available open-hearth furnaces, while production in the Youngstown and Wheeling districts is even more drastically curbed. However, with the two leading interests in the immediate Pittsburgh area running at 70 per cent, or slightly better, the average ingot operating rate is not below 65 per cent of capacity and possibly not far below 70, the estimated rate in the previous week.

In some cases, finishing mills are running this week at a better rate than open-hearth furnaces. This is particularly true in the Youngstown district, but in that locality many sheet and strip units were down in the previous week and orders had accumulated. Finishing mill schedules are so closely adjusted to tonnage releases that operations are now figured in days rather than weeks by many companies. But the demand of consumers is urgent enough to justify this situation and shipping departments find their duties as exacting as in times of very heavy production.

Steel demand shows no definite trend. A company which was agreeably surprised by the volume of specifications in the week before last was astonished just as much by the sharp decline last week. In other cases the reverse is true, and it now seems certain that demand will see no sustained improvement before the first of the year. The extent of such an improvement is not so well defined, but when year-end inventories are completed steel releases are not expected to be so restrained. Consumers will also have had more opportunity to gage the full effect of the recent stock market collapse on the country's ultimate buying power and thus place some estimate upon their 1930 requirements.

Steel buyers are still very apathetic toward their usual first quarter contracts, and here again makers expect little interest before the end of the year. Many users will still have considerable tonnage coming to them on present contracts at the end of December and makers will be in no hurry to cancel such obligations and run the risk of making new contracts at possibly reduced prices.

Makers of wire products and strip steel have already opened their books for first quarter at unchanged prices and at least one sheet producer has followed suit. In this case, however, the prices asked are the maximum figures now quoted and are scarcely representative of the true market.

No announcement has been made regarding the heavy hot-rolled products, but the present 1.90c., Pittsburgh, quotation will probably be reaffirmed. In fact, the extension of present quotations on all products is

about the only policy which could be followed, as an advance would be out of the question and a reduction not to be desired.

Pig Iron.—Buying shows no improvement and shipments are declining somewhat more rapidly than they were earlier in the month. Many companies are beginning to reduce their requirements preparatory to year-end inventory taking, which in some cases will extend over a two-week period during the latter part of December. Generally speaking, consumers' stocks are normally low at this time of the year, and pig iron makers are not surprised at the added caution now being shown by most buyers. However, reduction in pig iron consumption has not taken place any more rapidly than production, and none of the important merchant interests is stocking iron. The Pittsburgh Crucible Steel Co., an occasional seller of basic iron, has blown out one of its furnaces at Midland, Pa., and the Pittsburgh Steel Co. has taken out a furnace at Monessen. The latter company seldom, if ever, is a factor in the merchant pig iron market. In the absence of buying, excepting in carload lots, pig iron prices are holding at $18.50, Valley, for foundry and basic, and $19 for malleable and Bessemer. The Pittsburgh furnace is quoting prices 50c. over these figures. All of these prices, however, are more or less nominal and will probably not stand the test of large tonnage buying. At least, this is the opinion of a number of producers as well as consumers.

Prices per gross ton, f.o.b. Valley furnace:

Basic	$18.50
Bessemer	19.00
Gray forge	18.00
No. 2 foundry	18.50
No. 3 foundry	18.00
Malleable	19.00
Low phos., copper free	27.00

Freight rate to Pittsburgh or Cleveland district, $1.76.

Prices per gross ton, f.o.b. Pittsburgh district furnace:

Basic	$19.00
No. 2 foundry	19.00
No. 3 foundry	18.50
Malleable	19.50

Freight rates to points in Pittsburgh district range from 63c. to $1.13.

Semi-Finished Steel.—Spot sales are uncommon, and, with many contract users gradually curtailing their requirements, the market is extremely dull. Most users who do not make their own steel have enough tonnage contracted for to last until January, and are in no hurry to extend their commitments. In view of this, sellers have not opened their books for first quarter, and are not sure just what the price will be at that time. The present quotation of $35, Pittsburgh or Youngstown, for billets, slabs and sheet bars is getting no test, but even sellers are willing to admit that the figure would show little strength on any substantial tonnage. Forging billets are nominally quoted at $40, Pittsburgh, but demand is light. Wire rods are unchanged at the same figure, and some producers have opened their books for first quarter. As yet consumers are not interested in material for that period.

Bars, Shapes and Plates.—Demand for bars is extremely dull, and with some companies is still tapering off rather than increasing. Such consumers as farm implement and machinery builders are taking a fair tonnage, but other large consuming lines have practically cut off shipments. In no cases are cancellations reported, but suspensions are in effect on considerable tonnage, the release of which would stimulate mill schedules considerably. Reinforcing bar awards have declined seasonably, although shipments are still being made on some projects let earlier in the year. Structural awards in the immediate Pittsburgh district are very light, but fabricators here are engaged on large projects let during the summer, and some have ahead of them from three to four months of comparatively heavy operations. This is keeping shape mills well occupied. Demand for plates is not as good as it should be, considering the large car awards placed recently with builders served by this district. However, this tonnage is bound to reach the mills sooner or later, and the continued demand for rolling stock by the carriers is very beneficial to general feeling in the industry. The Chesapeake & Ohio and the Pere Marquette are expected to enter the market this week for about 10,000 freight cars, and other large inquiries are said to be forthcoming in a short time. The barge business is not active, and some yards are badly in need of orders. Others have backlogs which will keep them busy well into January. Talk of heavy barge buying in this district persists, but is not yet backed up by formal inquiry from any of the proposed buyers. Prices on bars, shapes and plates are not strong, but few concessions from the quoted figure of 1.90c., Pittsburgh, are reported. Although mills have not yet opened their books for the first quarter, some of them believe that the 1.90c. price will be reaffirmed for that period.

Rails and Track Accessories.—The market is not particularly active, but most makers feel that the conference of railroad executives last week will undoubtedly serve to stimulate buying on the part of carriers. Rail mill operations are being improved gradually, and as deliveries are made to the railroads specifications for track accessories naturally improve.

Wire Products.—The opening of books for first quarter on wire and wire nails by leading makers has not served to stimulate business, as most users have their requirements for the remainder of the year contracted for, and with some material not to be shipped until late in December, they would not be faced with any shortage until well into January. Demand for manufacturers' wire is not very good, but the present price of 2.40c. a lb., Pittsburgh, is fairly well established. Jobbers are being quoted $2.40 to $2.50 a keg on nails, and 2.55c. to 2.65c. a lb. on annealed wire, but their stocks are ample and there is little buying.

Tubular Goods.—Pipe demand has recovered slightly in the last week or two, but is still considerably behind that of October. On butt-well material this might be expected on account of the usual seasonal trend, but some lap-weld projects have undoubtedly been held up because of the uncertainty of the general business situation. Among these is the proposed gas line from the Texas fields into Chicago, which now seems to have been postponed until spring. How-

The Iron Age Composite Prices

Finished Steel

Nov. 26, 1929, 2.362c. a Lb.

One week ago	2.362c.
One month ago	2.362c.
One year ago	2.362c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products make 87 per cent of the United States output of finished steel.

	High	Low
1929	2.412c., April 2;	2.362c., Oct. 29
1928	2.391c., Dec. 11;	2.314c., Jan. 3
1927	2.453c., Jan. 4;	2.293c., Oct. 25
1926	2.453c., Jan. 5;	2.403c., May 18
1925	2.560c., Jan. 6;	2.396c., Aug. 18

Pig Iron

Nov. 26, 1929, $18.29 a Gross Ton

One week ago	$18.38
One month ago	18.38
One year ago	18.59
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High	Low
1929	$18.71, May 14;	$18.25, Aug. 27
1928	18.59, Nov. 27;	17.04, July 24
1927	19.71, Jan. 4;	17.54, Nov. 1
1926	21.54, Jan. 5;	19.46, July 13
1925	22.50, Jan. 13;	18.96, July 7

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base per Lb.
F.o.b. Pittsburgh mill	1.90c.
F.o.b. Chicago	2.00c.
Del'd Philadelphia	2.22c.
Del'd New York	2.24c.
Del'd Cleveland	1.85c. to 1.90c.
F.o.b. Cleveland	1.85c. to 1.90c.
F.o.b. Lackawanna	2.00c.
F.o.b. Birmingham	2.10c.
C.i.f. Pacific ports	2.35c.
F.o.b. San Francisco mills	2.35c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills, 40, 50, 60-ft.	2.00c.
F.o.b. Pittsburgh mills, cut lengths	2.25c.
F.o.b. Birmingham, mill lengths	2.10c.

Rail Steel

F.o.b. mills, east of Chicago dist.	1.90c.
F.o.b. Chicago Heights mill	1.90c.
Del'd Philadelphia	2.27c.

Iron

Common iron, f.o.b. Chicago	2.00c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	2.12c.
Common iron, del'd New York	2.14c.

Tank Plates

	Base per Lb.
F.o.b. Pittsburgh mill	1.90c.
F.o.b. Chicago	2.00c.
F.o.b. Birmingham	2.10c.
Del'd Cleveland	2.09c. to 2.14c.
Del'd Philadelphia	2.10c. to 2.15c.
F.o.b. Coatesville	2.00c. to 2.05c.
F.o.b. Sparrows Point	2.00c. to 2.05c.
F.o.b. Lackawanna	2.00c. to 2.05c.
Del'd New York	2.17½c. to 2.22½c.
C.i.f. Pacific ports	2.25c. to 2.35c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh mill	1.90c.
F.o.b. Chicago	2.00c.
F.o.b. Birmingham	2.10c.
F.o.b. Lackawanna	2.00c. to 2.05c.
F.o.b. Bethlehem	1.95c. to 2.00c.
Del'd Cleveland	2.09c. to 2.14c.
Del'd Philadelphia	1.96c. to 2.06c.
Del'd New York	2.04½c. to 2.14½c.
C.i.f. Pacific ports	2.35c.

Hot-Rolled Hoops, Bands and Strips

	Base per Lb.
6 in. and narrower, P'gh	2.00c.
Wider than 6 in., P'gh	1.90c.
6 in. and narrower, Chicago	2.10c.
Wider than 6 in., Chicago	2.00c.
Cooperage stock, P'gh	2.20c.
Cooperage stock, Chicago	2.30c.

Cold-Finished Steel

	Base per Lb.
Bars, f.o.b. Pittsburgh mill	2.20c.
Bars, f.o.b. Chicago	2.20c.
Bars, Cleveland	2.20c.
Bars, Buffalo	2.20c.
Shafting, ground, f.o.b. mill	*2.55c. to 3.50c.
Strips, P'gh	2.75c.
Strips, Cleveland	2.75c.
Strips, del'd Chicago	3.05c.
Strips, Worcester	2.90c.
Fender stock, No. 20 gage, Pittsburgh or Cleveland	4.25c.

*According to size.

Wire Products

(Carload lots, f.o.b. Pittsburgh and Cleveland.)

To Merchant Trade

	Base per Keg
Standard wire nails	$2.40 to $2.50
Cement coated nails	2.40 to 2.50
Galvanized nails	4.40 to 4.50

	Base per Lb.
Polished staples	2.85c. to 2.95c.
Galvanized staples	3.10c. to 3.20c.
Barbed wire, galvanized	3.05c. to 3.15c.
Annealed fence wire	2.55c. to 2.65c.
Galvanized wire, No. 9	3.00c. to 3.10c.
Woven wire fence (per net ton to retailers)	$65.00

To Manufacturing Trade

Bright hard wire, Nos. 6 to 9 gage	2.40c.
Spring wire	3.50c.

(Carload lots, f.o.b. Chicago.)

Wire nails	$2.45 to $2.55 (keg)
Annealed fence wire	2.60c. to 2.70c. (lb.)
Bright hard wire to manufacturing trade	2.45c.

Anderson, Ind., mill prices are ordinarily $1 a ton over Pittsburgh base; Duluth, Minn., mill $2 a ton over Pittsburgh, and Birmingham mill $3 a ton over Pittsburgh.

Cut Nails

	Per 100 Lb.
Carloads, Wheeling, Reading or Northumberland, Pa.	$2.70
Less carloads, Wheeling or Reading	2.80

Light Plates

No. 10, blue annealed, f.o.b. P'gh	2.10c. to 2.20c.
No. 10, blue annealed, f.o.b. Chicago dist.	2.30c.
No. 10, blue annealed, del'd Phila.	2.42c. to 2.52c.
No. 10, blue annealed, B'ham	2.35c.

Sheets

Blue Annealed

	Base per Lb.
No. 13, f.o.b. P'gh	2.25c. to 2.35c.
No. 13, f.o.b. Chicago dist.	2.45c.
No. 13, del'd Philadelphia	2.57c. to 2.67c.
No. 13, blue annealed, B'ham	2.50c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh	2.75c.
No. 24, f.o.b. Chicago dist. mill	2.85c.
No. 24, del'd Philadelphia	3.07c.
No. 24, f.o.b. Birmingham	3.00c. to 3.10c.

Metal Furniture Sheets

No. 24, f.o.b. P'gh	4.00c. to 4.10c.

Galvanized

No. 24, f.o.b. Pittsburgh	3.40c. to 3.50c.
No. 24, f.o.b. Chicago dist. mill	3.50c. to 3.60c.
No. 24, del'd Cleveland	3.59c. to 3.69c.
No. 24, del'd Philadelphia	3.72c. to 3.82c.
No. 24, f.o.b. Birmingham	3.75c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.90c. to 3.00c.
No. 28, f.o.b. Chicago dist. mill	3.00c. to 3.10c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh	4.00c.

Long Ternes

No. 24, 8-lb. coating, f.o.b. mill	3.90c. to 4.00c.

Vitreous Enameling Stock

No. 24, f.o.b. Pittsburgh	3.90c.

Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills	$5.35
Standard cokes, f.o.b. Gary	5.45

Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)
(Per Package, 20 x 28 in.)

8-lb. coating I.C.	$10.70
15-lb. coating I.C.	13.40
20-lb. coating I.C.	14.60
25-lb. coating I.C.	$15.90
30-lb. coating I.C.	16.80
40-lb. coating I.C.	18.80

Alloy Steel Bars

(F.o.b. makers' mill)

Alloy Quality Bar Base, 2.65c. per Lb.

S.A.E. Series Numbers		Alloy Differential
2000	(½% Nickel)	$0.25
2100	(1¼% Nickel)	0.55
2300	(3½% Nickel)	1.50
2500	(5% Nickel)	2.25
3100	Nickel Chromium	0.55
3200	Nickel Chromium	1.35
3300	Nickel Chromium	3.80
3400	Nickel Chromium	3.20
4100	Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50
4100	Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600	Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel)	1.05
5100	Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100	Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100	Chromium Spring Steel	0.20
6100	Chromium Vanadium Bars	1.20
6100	Chromium Vanadium Spring Steel	0.95
9250	Silicon Manganese Spring Steel (flats)	0.25
	Rounds and squares	0.50
	Chromium Nickel Vanadium	1.50
	Carbon Vanadium	0.95

Above prices are for hot rolled steel bars, forging quality. The differential for cold-drawn bars is ¾c. a lb. higher, with standard classification for cold-finished alloy steel bars applying. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis.

Billets under 4 x 4 in. carry the steel bar base. Slabs with a sectional area of 16 in. or over carry the billet price. Slabs with sectional area of less than 16 in. or less than 2½ in. thick, regardless of sectional area, take the bar price.

Rails

	Per Gross Ton
Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	36.00
Light (from rail steel), f.o.b. mill	34.00
Light (from billets), f.o.b. Ch'go mill	36.00

Track Equipment

	Base per 100 Lb.
Spikes, ⅝ in. and larger	$2.80
Spikes, ½ in. and smaller	2.80
Spikes, boat and barge	3.00
Tie plate, steel	2.15
Angle bars	$2.75
Track bolts, to steam railroads	$3.80 to 4.00
Track bolts, to jobbers, all sizes, per count	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel Inches	Black	Galv.	Iron Inches	Black	Galv.
⅛	45	19½	¼ and ⅜	+11	+36
¼ to ⅜	51	25½	½	23	5
½	56	42½	¾	28	11
¾	60	48½	1 and 1¼	31	15
1 to 3	62	50½	1½ and 2	35	18

Lap Weld

2	55	43½	2	23	9
2½ to 6	59	47½	2½ to 3½	28	13
7 and 8	56	43½	4 to 6	30	17
9 and 10	54	42½	7 and 8	29	16
11 and 12	53	40½	9 to 12	26	11

Butt Weld, extra strong, plain ends

⅛	41	24½	¼ and ⅜	+13	+48
¼ to ⅜	47	30½	½	23	7
½	53	42½	¾	28	12
¾	58	47½	1 to 2	34	18
1 to 1½	60	49½			
2 to 3	61	50½			

Lap Weld, extra strong, plain ends

2	53	42½	½	29	18
2½ to 4	57	46½	2½ to 4	34	20
4½ to 6	56	45½	4½ to 6	33	19
7 to 8	52	39½	7 and 8	31	17
9 and 10	45	32½	9 to 12	21	8
11 and 12	44	31½			

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Steel		Charcoal Iron	
2 in. and 2¼ in.	38	1½ in.	1
2½ in.—2¾ in.	46	1⅞ in.	8
3 in.	52	2 in.—2¼ in.	13
3¼ in.—3¾ in.	54	2½ in.—2¾ in.	16
4 in.	57	3 in.	17
4½ in. to 6 in.	46	3¼ in. to 3½ in.	18
		4 in.	20
		4½ in.	21

On lots of a carload or more, the above base discounts are subject to a preferential of two fives on steel and of 10 per cent on charcoal iron tubes. Smaller quantities are subject to the following modifications from the base discounts:

Lap Welded Steel—Under 10,000 lb., 6 points under base and one five; 10,000 lb. to carload, 4 points under base and two fives. Charcoal Iron—Under 10,000 lb., 2 points under base; 10,000 lb. to carload, base and one five.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	61	3 in.	46
1¼ to 1½ in.	53	3¼ to 3½ in.	48
1¾ in.	37	4 in.	51
2 to 2¼ in.	32	4½, 5 and 6 in.	40
2½ to 2¾ in.	40		

Hot Rolled

2 and 2¼ in.	38	3¼ to 3½ in.	54
2½ and 2¾ in.	46	4 in.	57
3 in.	52	4½, 5 and 6 in.	46

Beyond the above base discounts a preferential discount of 5 per cent is allowed on carload lots. On less than carloads to 10,000 lb., base discounts are reduced 4 points with 5 per cent preferential; on less than 10,000 lb., base discounts are reduced 6 points, with no preferential. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage take the mechanical tube list and discounts. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30%, base (carloads)	55
Carbon, 0.30% to 0.40% base	50

Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

ever local mills are still getting some business for feeder lines and the demand for seamless tubing from the oil country has not been curtailed noticeably in recent weeks. Distributers' stocks in the oil region are ample in most cases and the present tendency is toward reduction. Mechanical tubing is rather quiet. The airplane industry, which is a large consumer of this material, is said to be buying more conservatively than in the past.

Cold-Finished Steel Bars.—No improvement in demand is reported and shipments are lower than they have been in several months. Agricultural implement makers served by mills in this district are busy and their expected requirements indicate that they expect next year's business to be fully equal to this year's. The automobile industry has shown little interest in its first quarter requirements, although some mills are willing to quote for that period at the present price of 2.20c., Pittsburgh.

Sheets.—Business has registered no additional falling off in the last week, and, although the operations of some mills are slightly lower, improved schedules of some of the larger interests have offset this reduction. The average operating rate for the sheet industry is still somewhat under 60 per cent of capacity. Such a figure must necessarily be rather indefinite, for most of the current estimates are made on the basis of expected operating rates for the week collected on Monday and actual performance sometimes varies as much as 10 points from preliminary estimates. In most cases such variations are on the minus side, but occasionally there is an improvement. A few mills are benefiting from heavier specifications from their Canadian customers, as a change in tariff regulations, effective early in January, will add from $2 to $4 a ton to the prices Canadian consumers must pay for their sheets and tin plate. Otherwise export business is about the same as usual, although tin plate demand from this source seems to be better than usual. The automobile industry is still rather indifferent regarding its future requirements and most of the larger companies are hesitant in announcing production schedules. This does not prevent them from pressing for lower prices and the 4c., Pittsburgh, price on automobile body sheets is still subject to considerable pressure. With mills making this product not operating at more than 40 per cent of capacity, the urge to take tonnage at a lower figure would seem to be rather strong, but thus far leading producers are not shading the price promiscuously. Sheet prices in general are no weaker than they have been and on blue annealed sheets and light plates prices seem slightly stronger than they were a few days ago. A price of 2.70c., Pittsburgh, on black sheets is still heard occasionally, but the general market is still 2.75c. On metal furniture material, prices range from 4c. to 4.10c.

Tin Plate.—Tin plate makers are closing contracts for next year with their regular customers and report little difficulty with regard to tonnage or price. Can manufacturers evidently expect a 1930 business fully equal to this year's. Many of the leading tin plate manufacturers are increasing operations slightly this week and the leading interest expects to run its mills at better than 75 per cent. Independent companies average slightly better than 60 per cent.

Strip Steel.—The strip business is still exceedingly dull. If companies increase operations this week, it is probably because they failed to operate at all last week. Such a condition is true with most companies, and the average operating rate for the industry is between 20 and 30 per cent of theoretical capacity. Cold mills are not so well occupied as hot mills. Specifications are naturally very light under such circumstances and mills are having little or no opportunity to quote on new business. Some of the automobile manufacturers are mildly interested in their future requirements, but they are exerting pressure on current prices and mills are not anxious to commit themselves at lower figures than the present when there is no certainty that the tonnage will be taken out in the near future. There is little or no interest in first quarter tonnage, although practically all makers have opened their books for that period at the present quotations of 2.75c., Pittsburgh or Cleveland, for cold-rolled strip and 1.90c. and 2c., Pittsburgh, on hot-rolled.

Coal and Coke.—Furnace coke is finding little or no demand, and as production has not declined as rapidly as consumption, prices are very weak. The market is no longer quotable at higher than $2.65, Connellsville, and business has been taken at lower figures. Colder weather during the last week has stimulated the demand for heating coke slightly, but the foundry grade is still very quiet and many consumers have suspended shipments for considerable periods. Domestic coal is seasonably active, but declining industrial consumption is having an adverse effect upon the market.

Old Material.—The scrap market is even duller than it was last week, if this condition could be possible, and in the absence of mill buying as well as sustained purchases by dealers, it is very difficult to arrive at quotations which might stand the test of buying or selling. Heavy melting steel is being offered to mills at $15.50, which probably represents the lowest figure freely quoted. Dealers are paying $15 for this grade of scrap, and distress tonnages have been moved at much lower figures. In view of these conditions, the No. 1 grade is apparently 50c. weaker than it was last week, and quotable at $15 to $16. A market for hydraulic compressed sheets is also lacking, but tonnage from the East is being offered at low figures in this district, and dealers are able to buy in that territory for low Pittsburgh delivered prices. Detroit scrap is also becoming a factor in this market, as boat movement is just about ended for this year, and bidding at the leading automobile plants is very weak. Specialties apparently are the only grade of scrap for which there is any demand. Steel foundries are still calling for this material, and the market is not quotably lower. Machine shop turnings have no strength, and the same might be said of the blast furnace grades, for which demand is decreasing as furnaces are taken off. The monthly list of the Baltimore & Ohio Railroad, which closes on Dec. 3, contains 16,500 tons, including 4500 tons of No. 1 heavy melting steel.

Warehouse prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.25c.
Hoops	4.25c.
Black sheets (No. 24), 25 or more bundles	3.70c. to 3.80c.
Galv. sheets (No. 24), 25 or more bundles	4.35c. to 4.45c.
Light plates, blue annealed (No. 10), 1 to 24 plates	3.25c. to 3.35c.
Blue annealed sheets (No. 13), 1 to 24 sheets	3.40c. to 3.50c.
Galv. corrug. sheets (No. 28), per square	$4.33
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count,	60 per cent off list
Machine bolts, 100 count,	60 per cent off list
Carriage bolts, 100 count,	60 per cent off list
Nuts, all styles, 100 count,	60 per cent off list
Large rivets, base per 100 lb.	$3.50
Wire, black soft ann'l'd, base per 100 lb.	$2.90 to 3.00
Wire, galv. soft, base per 100 lb.	2.90 to 3.00
Common wire nails, per keg	2.80 to 2.90
Cement coated nails, per keg	2.95 to 3.05

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$15.00 to $16.00
No. 2 heavy melting steel	13.00 to 13.50
Scrap rails	14.50 to 15.00
Compressed sheet steel	15.00 to 15.50
Bundled sheets, sides and ends	14.00 to 14.50
Cast iron carwheels	14.00 to 14.50
Sheet bar crops, ordinary	17.50 to 18.00
Heavy breakable cast	11.00 to 11.50
No. 2 railroad wrought	15.00 to 16.00
Hvy. steel axle turnings	15.00 to 15.50
Machine shop turnings	10.00 to 10.50
Acid Open-Hearth Grades:	
Railr. knuckles and couplers	19.50 to 20.50
Railr. coil and leaf springs	19.50 to 20.50
Rolled steel wheels	19.50 to 20.50
Low phos. billet and bloom ends	20.50 to 21.00
Low phos., mill plates	20.50 to 21.00
Low phos., light grades	19.50 to 20.50
Low phos., sheet bar crops	20.50 to 21.00
Heavy steel axle turnings	15.00 to 15.50
Electric Furnace Grades:	
Low phos., punchings	18.50 to 19.00
Hvy. steel axle turnings	15.00 to 15.50
Blast Furnace Grades:	
Short shoveling steel turnings	10.50 to 11.00
Short mixed borings and turnings	10.50 to 11.00
Cast iron borings	10.50 to 11.00
Rolling Mill Grades:	
Steel car axles	20.00 to 21.00
Cupola Grades:	
No. 1 cast	14.50 to 15.50
Rails 3 ft. and under	17.50 to 18.50

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and under 10-in., Pittsburgh	$35.00
Rerolling, 4-in. and under 10-in., Youngstown	35.00
Rerolling, 4-in. and under 10-in., Cleveland	35.00
Rerolling, 4-in. and under 10-in., Chicago	36.00
Forging quality, Pittsburgh	40.00

Sheet Bars

(Open Hearth or Bessemer)

	Per Gross Ton
Pittsburgh	$35.00
Youngstown	35.00
Cleveland	35.00

Slabs

(8 in. x 2 in. and under 10 in. x 10 in.)

	Per Gross Ton
Pittsburgh	$35.00
Youngstown	35.00
Cleveland	35.00

Skelp

(F.o.b. Pittsburgh or Youngstown)

	Per Lb.
Grooved	1.85c. to 1.90c.
Universal	1.85c. to 1.90c.
Sheared	1.85c. to 1.90c.

Wire Rods

(Common soft, base)

	Per Gross Ton
Pittsburgh	$40.00
Cleveland	40.00
Chicago	41.00

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.80
Old range non-Bessemer, 51.50% iron	4.65
Mesabi Bessemer, 51.50% iron	4.65
Mesabi non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.40

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algerian	12.00c.
Iron ore, low phos., Swedish, average 68% iron	12.00c.
Iron ore, basic Swedish, average 65% iron	10.00c.
Manganese ore, washed, 52% manganese, from the Caucasus	30.00c.
Manganese ore, Brazilian, African or Indian, basic 50%	30.00c.
Tungsten ore, high grade, per unit, in 60% concentrates	$15.50 to $16.50

	Per Gross Ton
Chrome ore, 45 to 50% Cr_2O_3, crude, c.i.f. Atlantic seaboard	$22.00 to $24.00

	Per Lb.
Molybdenum ore, 85% concentrates of MoS_2, delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$2.65
Foundry, f.o.b. Connellsville prompt	3.75 to 4.75
Foundry, by-product, Ch'go ovens	8.00
Foundry, by-product, New England, del'd	11.00
Foundry, by-product, Newark or Jersey City, delivered	9.00 to 9.40
Foundry, by-product, Phila.	9.00
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry by-prod., del'd St. Louis	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.25 to $1.75
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, ¾-in. f.o.b. Pa. mines	1.90 to 2.00
Mine run gas coal, f.o.b. Pa. mines	1.65 to 1.75
Steam slack, f.o.b. W. Pa. mines	80c. to 90c.
Gas slack, f.o.b. W. Pa. mines	1.00 to 1.10

Ferromanganese

	Per Gross Ton
Domestic, 80%, seaboard	$105.00
Foreign, 80%, Atlantic or Gulf port, duty paid	105.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$31.00 to $34.00
Domestic, 16 to 19%	29.00 to 32.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$83.50
75%	130.00

	Per Gross Ton Furnace		Per Gross Ton Furnace
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	45.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		Per Gross Ton
10%	$30.00	12%	$34.00
11%	32.00		

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		Per Gross Ton
6%	$22.00 to $23.00	10%	$26.00 to $28.00
7%	23.00 to 24.00	11%	28.00 to 30.00
8%	24.00 to 25.00	12%	30.00 to 32.00
9%	25.00 to 26.00		

Other Ferroalloys

Ferrotungsten, per lb. contained metal del'd	$1.40 to $1.50
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.15 to $3.65
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	$160.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton	$91.00
Ferrophosphorus, electric 24%, f.o.b. Anniston, Ala., per gross ton	$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silicon, gravel, f.o.b. Illinois and Kentucky mines	$18.00
No. 2 lump, Illinois and Kentucky mines	20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	$18.25 to 18.75
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines	32.50

Fire Clay Brick

	Per 1000 f.o.b. Works	
	High-Heat Duty Brick	Intermediate Heavy Duty Brick
Pennsylvania	$43.00 to $46.00	$35.00 to $38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	.....
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00
Standard size	45.00

Chrome Brick

	Per Net Ton
Standard size	$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts	70
‡Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts, blank or tapped, hexagons	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	7.00c. to 6.75c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled thread up to and including ⅛ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagon nuts	70
Semi-finished hexagon castellated nuts, S.A.E.	70
Stove bolts in packages, P'gh.	75, 20, 10 and 5
Stove bolts in packages, Chicago	75, 20, 10 and 5
Stove bolts in packages, Cleveland	75, 20, 10 and 5
Stove bolts in bulk, P'gh.	75, 20, 10, 5 and 2½
Stove bolts in bulk, Chicago	75, 20, 10, 5 and 2½
Stove bolts in bulk, Cleveland	75, 20, 10, 5 and 2½
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55, 60 per cent apply.

Large Rivets

(½-in. and larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$3.10
F.o.b. Chicago	3.20

Small Rivets

(⅞-in. and smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70 and 10
F.o.b. Cleveland	70 and 10
F.o.b. Chicago	70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10 and 5
Milled standard set screws, case hardened	80 and 5
Milled headless set screws, cut thread	75 and 10
Upset hex. head cap screws, U.S.S. thread	85
Upset hex. cap screws, S.A.E. thread	85
Upset set screws	80, 10 and 5
Milled studs	70

Chicago

Ingot Output Declines as Finished Steel Specifications Continue to Taper—Another Blast Furnace Blown Out

CHICAGO, Nov. 26.—Specifications for finished steel have not been in sufficient volume to support ingot output at the rate of a week ago, and, as a result, operations in this district are not above 70 per cent of capacity. Releases against rail contracts are larger, now being near the rate usually expected at the end of the year, but even this favorable turn is not enough of a factor to balance the lighter demand from the general trade.

No. 5 furnace at South Works has been blown out, leaving 23 steel mill stacks in blast of 36 in the district.

Releases from a wide range of consumers are spotty, and most finishing mills are operating on uncertain schedules that offer no forecast as to output that can be expected next week. This situation is favorable to prompt delivery and closer cutting of stocks by consumers.

One independent producer has accumulated a satisfactory stock of pig iron and, in the absence of a supporting steel market, is considering blowing out a blast furnace.

The impression is widespread here that improvement in building construction cannot be expected until the turn of the year. Numerous sizable projects have taken shape, and easier money rates are bringing to light again a round tonnage in plans which have been dormant for a year or more. Civic improvements and the World's Fair at Chicago are also counted on to add life to this market.

The railroad equipment market remains active, and prospects for the development of new business are good. However, car builders, like other consumers, are cautious in the matter of carrying excessive stocks at the end of the year and, as a result, specifications for car material are not supporting mill operations as had been the hope.

Pig Iron.—Although there has been some shifting in demand for Northern foundry iron, the total of all shipments in the week has held steady at the rate of the first half of the month. Shipping instructions are larger than on Nov. 1 and give promise that in nearby weeks deliveries will approximate local furnace output. Interest thus far shown in future needs is almost wholly confined to the larger consumers. The relatively high rate of demand this month raises the hopes of sellers that total shipments this year will come close to the record set in this district in 1926. Southern interests are asking $13.50 a ton, Birmingham. This price lacks a real test other than that a Michigan melter has taken an option, which expires Dec. 2, on 2500 tons. An Illinois inquiry calls for 500 tons.

Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	$20.00
N'th'n No. 1 fdy., sil. 2.25 to 2.75	20.50
Malleable, not over 2.25 sil.	20.00
High phosphorus	20.00
Lake Super. charcoal, sil. 1.50	27.04
So'th'n No. 2 fdy. (all rail)	$19.01 to 19.51
Low phos., sil. 1 to 2, copper free	29.50
Silvery, sil. 8 per cent	$28.79 to 29.79
Bess. ferrosilicon, 14-15 per cent	46.29

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Ferroalloys.—This market is quiet. Next year's prices have not been announced on 50 per cent ferrosilicon and spiegeleisen. Forward buying of ferromanganese has made no headway.

Prices delivered Chicago: 80 per cent ferromanganese, $112.56; 50 per cent ferrosilicon, $83.50 to $88.50; spiegeleisen, 19 to 21 per cent, $39.76 to $41.76.

Rails and Track Supplies.—Chicago district rail mills have again stepped up output, which now is close to the range which producers normally expect at the turn of the year. A Western railroad has ordered 7500 tons of standard-section rails. It is reported here that the Southern Pacific, which has had an inquiry in the market for 120,000 tons of rails, has not definitely placed this tonnage. Miscellaneous orders for track fastenings total 6000 tons and fresh inquiry for 35,000 tons by the New York Central is before the trade. In past years about 50 per cent of the New York Central tonnage has been taken by Western mills.

Prices f.o.b. mill, per gross ton: Standard section open-hearth and Bess. rails, $43; light rails, rolled from billets, $36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.07½c. to 2.15c.; angle bars, 2.75c.

Sheets.—Current quotations are holding well in a market which is characterized by small-lot buying in light aggregate tonnage. Consumers are closely watching the trend of business and also are holding stocks to a low point as the inventory period approaches. This situation is reflected favorably in warehouse business. Deliveries from mills range from seven to 10 days for blue annealed sheets and from two to three weeks for the galvanized and black commodities. Producers are not optimistic over the course which they believe the market will follow in the next few weeks, but they feel that once the inventory period is past the condition of stocks in consumers' hands will force larger orders. Several manufacturers of agricultural machinery have entered the market for tonnages which will be used on equipment now being produced, but which will not be delivered until spring. Hot mill operations in this district range from 50 to 55 per cent of capacity.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 2.90c.; No. 24 galv., 3.55c. to 3.65c.; No. 10 blue ann'l'd, 2.35c. Deliv'd prices at other Western points are equal to the freight from Gary, plus the mill prices, which are 5c. per 100 lb. lower than Chicago delivered prices.

Cast Iron Pipe.—Of special interest in this market is an inquiry by Detroit for about 6500 tons of large size cast iron pipe. Bids will be opened Dec. 2 on 1500 tons of 24-in., 2160 tons of 36-in. and 2900 tons of 42-in., all Class C pipe. Avon, Ohio, will soon be in the market for 11,000 ft. of 6-in. pipe. Among public lettings, which are unusually light, is 100 tons let by Dearborn, Mich., to the American Cast Iron Pipe Co. Notwithstanding the dullness of this market, several producers of cast iron pipe report satisfactory operations, with November shipments running close to the rate in the same month a year ago. Here and there is a bright spot, though most sellers agree that they can hope for little this year unless public utilities make purchases in December. Current quotations are holding on odd lots. No word has come whether winter buying prices will be named. A number of municipalities in northern Ohio have voted favorably this fall on projects which will call for sizable tonnages of cast iron pipe. This work will get under way in the spring. In the immediate Chicago district there is no encouragement beyond several requests for prices for estimating purposes.

Prices per net ton, deliv'd Chicago: Water pipe, 6-in. and over, $43.70 to $45.70; 4-in., $47.70 to $49.70; Class A and gas pipe, $3 extra.

Cold-Rolled Strip Steel.—Demand remains light and output is not above 20 per cent of capacity. Prices locally remain steady at 2.75c. a lb., Cleveland, or 3.05c., delivered Chicago. From the viewpoint of use of cold-rolled strip, there is little encouragement to be had from manufacturers of automobiles.

Semi-Finished Steel.—Rerolling billets, 4 in. and under 10 in., are being quoted at $36 a gross ton, Chicago. Demand for semi-finished steel is light.

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars	3.00c.
Reinforc'g bars, billet steel	1.90c. to 2.25c.
Reinforc'g bars, rail steel	1.85c. to 2.00c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Bands (⅛ in. in Nos. 10 and 12 gages)	3.20c.
Hoops (No. 14 gage and lighter)	3.75c.
Black sheets (No. 24)	4.05c.
Galv. sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.35c.
Spikes, ⅜ in. and larger	3.55c.
Track bolts	4.55c.
Rivets, structural	4.00c.
Rivets, boiler	4.00c.

	Per Cent Off List
Machine bolts	60
Carriage bolts	60
Coach or lag screws	60
Hot-pressed nuts, sq., tap. or blank	60
Hot-pressed nuts, hex., tap. or blank	60

No. 8 black ann'l'd wire, per 100 lb.	$3.45
Com. wire nails, base per keg	$2.75 to 2.95
Cement c't'd nails, base per keg	2.75 to 2.95

Structural Material.—Chicago fabricators are pinning their hopes on business which they expect will come soon after the first of the year. Two projects, which it now appears will come out for figures in January, are the *Tribune* Tower, which will require close to 17,000 tons of steel, and an addition to the Morrison Hotel, Chicago, which will call for about 15,000 tons. Contracts this week were few and for individually small tonnages, mostly from the railroads. Close to 15,000 tons of steel will be needed for new power plant construction in Oklahoma, Minnesota, Illinois and Texas. The promise of easier money is resulting in the resuscitation of old plans, some of which were prepared a year or more ago. Among local improvement jobs being counted on for Chicago are the outer bridge across the Chicago River and a subway.

Mill prices on plain material, per lb.: 2.00c. base, Chicago.

Bars.—Backlogs of mild steel bars are of moderate size and deliveries are prompt. Manufacturers in general continue to take small quantities. Agricultural machinery manufacturers are holding to a high rate of output and road machinery builders are finding larger use for steel. Demand for alloy steel bars is at a low but steady rate. The iron bar market is without feature. New orders for rail steel bars show improvement after a week in which demand was unusually dull. Numerous users in the bed and barn equipment trade have found stocks too low to meet late fall needs and they have entered liberal specifications. Prices at 1.90c. a lb., Chicago Heights, lack strength.

Reinforcing Bars.—New contracts show a substantial gain. This business comes at a time when shipments are tapering and shop operations are going to lower levels. Few new inquiries are before the trade. Competition for going tonnages remains keen, and prices below current quotations have been made. Dealers are basing their views of the immediate future on the number of old quotations, many of which are ready to be closed as soon as financial matters can be arranged. There is promise that money for building purposes will soon be available in more liberal quantities. Several large warehouses report shipments in the first 10 months of 1929 at practically the same tonnage as was moved in the corresponding part of 1928. However, figures now at hand show that building permits in Chicago in the past 10 months are 33 per cent below the total in the corresponding period a year ago, whereas the average drop for 20 cities throughout the country is only 7 per cent.

Plates.—Information more definite than that available a week ago shows that the tonnage of steel pipe reported as having been placed by a California company was in fact a release of an old contract which had been temporarily suspended during changes in plans. The alterations had to do principally with a change in diameter from 22 in. to 26 in. The order now calls for 63,000 tons of 26-in. pipe. Early shipments against this contract are expected by the purchaser, and plate orders placed at local mills have materially strengthened the position of producers. More than 40,000 tons of steel will be needed for the 3500 cars ordered this week by the St. Louis-San Francisco. It is reported that the Rock Island will place contracts for cars this week and that the Louisville & Nashville has authorized the expenditure of upward of $5,000,000 for new equipment to be delivered in 1930. St. Louis-San Francisco plans to build 300 cars in its own shops and the Missouri-Kansas-Texas will build 500 cars. Current specifications from car shops are steady, but there is not the disposition to take increased tonnages in accordance with large contracts recently placed. In some quarters it is believed the car shops desire to hold accounts payable as low as possible to the end of the year and therefore releases for much of the steel needed for new car contracts will not be forthcoming until after the start of the new year. Plate deliveries are prompt on most sizes.

Bolts, Nuts and Rivets.—Demand for these commodities is unchanged as to volume, but specifications are more spotty than a week ago. Farm implement manufacturers still give the greatest support to this market. Railroad and car builders' needs are also in good volume. Jobbers are distributing large quantities, as many consumers turn to this source for small supplies at frequent intervals.

Coke.—All ovens in this district are lighted, and shipments are at the rate of capacity output. Forward contracting continues to make headway. The price is firmly established at $8 a ton, f.o.b. local ovens. By-product foundry coke delivered in Chicago is being quoted at $8.75 a ton.

Old Material.—The insistence of buyers for lower prices is again reflected in current quotations for scrap iron and steel. About 15,000 tons of heavy melting steel has been taken by consumers at $13 a gross ton, delivered, a drop of 50c. in the week. Dealers find supplies free at $12.50 a gross ton. The thought is expressed that yard operators are resisting the low prices, and in some quarters it is expected that present quotations will result in less scrap being prepared by yards. Mills are turning down hydraulic bundles at $11.25 a gross ton, delivered, and brokers are buying this grade freely at $10.50 a ton. Users of cast iron borings are getting ample supplies against old purchases, one melter in the past week having had 65 cars on track in one day. New purchases are lacking, and quotations at $9 to $9.50 a gross ton are nominal. Local production of borings is well below the rate of midsummer, and the bulk of current shipments is coming from outlying points. Dealers look for this market to stiffen with the completion of old orders, when it is thought supplies will be drawn from the limited production of the immediate Chicago territory. Foundries generally are marking time in the matter of purchases, stocks and old orders being ample to meet needs for 30 days. Cold weather of recent days was not of long enough duration to act as a check on the preparation and movement of scrap. The result is incoming shipments are fully ample to meet buyers' needs.

Prices deliv'd Chicago district consumers:

Per Gross Ton

Basic Open-Hearth Grades:	
Heavy melting steel	$12.50 to $13.00
Shoveling steel	12.50 to 13.00
Frogs, switches and guards, cut apart, and misc. rails	13.00 to 13.50
Hydraul. compressed sheets	10.75 to 11.25
Drop forge flashings	9.75 to 10.25
No. 1 busheling	11.50 to 12.00
Forg'd cast and r'l'd steel carwheels	17.50 to 18.00
Railroad tires, charg. box size	17.50 to 18.00
Railroad leaf springs cut apart	17.50 to 18.00
Acid Open-Hearth Grades:	
Steel couplers and knuckles	16.00 to 16.50
Coil springs	18.00 to 18.50
Electric Furnace Grades:	
Axle turnings	12.75 to 13.25
Low phos. punchings	15.00 to 15.50
Low phos. plates, 12 in. and under	14.75 to 15.25
Blast Furnace Grades:	
Axle turnings	10.50 to 11.00
Cast iron borings	9.00 to 9.50
Short shoveling turnings	9.00 to 9.50
Machine shop turnings	6.50 to 7.00
Rolling Mill Grades:	
Iron rails	14.50 to 15.00
Rerolling rails	15.00 to 15.50
Cupola Grades:	
Steel rails less than 3 ft.	16.25 to 17.25
Steel rails less than 2 ft.	18.00 to 18.50
Angle bars, steel	15.25 to 15.75
Cast iron carwheels	13.50 to 14.00
Malleable Grades:	
Railroad	16.00 to 16.50
Agricultural	14.50 to 15.00
Miscellaneous:	
*Relaying rails, 56 to 60 lb.	23.00 to 25.00
*Relaying rails, 65 lb. and heav.	26.00 to 31.00

Per Net Ton

Rolling Mill Grades:	
Iron angle and splice bars	15.00 to 15.50
Iron arch bars and transoms	17.50 to 18.00
Iron car axles	25.50 to 26.00
Steel car axles	15.50 to 16.00
No. 1 railroad wrought	12.00 to 12.50
No. 2 railroad wrought	11.00 to 11.50
No. 1 busheling	9.00 to 9.50
No. 2 busheling	7.00 to 7.50
Locomotive tires, smooth	14.50 to 15.00
Pipes and flues	9.50 to 10.00
Cupola Grades:	
No. 1 machinery cast	13.50 to 14.00
No. 1 railroad cast	12.50 to 13.00
No. 1 agricultural cast	12.00 to 12.50
Stove plate	11.50 to 12.00
Grate bars	11.25 to 11.75
Brake shoes	9.75 to 10.25

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

The Oliver Machinery Co., Grand Rapids, Mich., manufacturer of woodworking machinery and machine tools, has opened a branch office, warehouse and salesroom at 514 Bryant Street, San Francisco, with H. C. Wood as manager. In addition to the line of Oliver machines, the branch will be the Pacific Coast agent for the woodworking machines and tools manufactured by the Buss Machine Works, G. M. Diehl Machine Works, Sheboygan Machine Co., Vonnegut Machinery Co. and the Wilkins-Challoner Co.

New York

Pig Sales About 5000 Tons, Inquiries Light—Steel Orders Show a Slight Improvement

NEW YORK, Nov. 26. — Pig iron sales totaled 5000 tons for the week, and inquiries are light, the largest calling for 1000 tons. Melters are in no haste to cover their forward requirements, but are taking shipments without interruption. Suspensions on account of business conditions have been few and hold-ups because of inventory taking are not looked for until the middle of next month. Melters' stocks are very low and it is almost literally true, in many cases, that pig iron is being unloaded directly from cars into cupolas. Prices have become somewhat easier, with foundry iron rather commonly available at $17 to $17.50, base Buffalo. Producers are taking steps, however, to keep operations in tune with demand. The leading merchant producer in Buffalo blew out a furnace last week and other interests are prepared to curtail output as conditions demand it. The navigation season on the State barge canal is approaching its close and concluding shipments from Buffalo are being made. Buffalo interests have built up the usual stocks at New Jersey ports to take care of the expected winter needs of their customers. Alabama foundry iron continues to reach this district by water, with sellers quoting $19 to $19.50 a ton, delivered on docks at Jersey City, N. J. The Worthington Pump & Machinery Corporation has closed for 1000 tons for its Harrison, N. J., plant, and the New York Air Brake Co. has bought 650 tons for delivery at Watertown, N. Y.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	$21.91 to $22.41
*Buff. No. 2, del'd east. N. J.	20.28 to 20.78
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	$19.89 to 21.02
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	20.39 to 21.52

Freight rates: $4.91 from Buffalo, $1.39 to $2.52 from eastern Pennsylvania.
*Prices delivered to New Jersey cities having rate of $3.28 a ton from Buffalo.

Ferroalloys.—With most large consumers covered by contracts calling for their requirements, new demand for ferromanganese is naturally confined to smaller users. There have been orders from this source for carload and small lots in the past week, with requests for early shipment. Sales have been at the regular price of $105, seaboard. There is also some demand for carload lots of spiegeleisen at regular quotations. It is expected that contracts for 1930 requirements for ferromanganese, ferrosilicon, ferrochromium and spiegeleisen will be negotiated early next month.

Reinforcing Bars.—Although there has been a slackening in demand for reinforcing bars, considerable tonnage is still pending. Nine hundred tons for a subway section should be awarded soon, and the new public library in Brooklyn will require 700 tons. The Turner Construction Co. has the general contract for the Edgewater, N. J., plant of the Ford Motor Co., which will take 1100 tons of bars. Prices are holding fairly well at 2.05c., New York, but concessions are reported to have been made in some cases.

Finished steel—Steel buying in some lines was slightly better in the past week than in the week preceding, a reflection, perhaps, of the fact that many consumers found the ordering of fresh supplies imperative after a period of hesitancy. It is too early, however, to say whether this indicates a definite trend toward improvement. The placing of large tin plate contracts for the first half of 1930 was a conspicuous event of the week, but the improvement of the past week was also in lines other than tin plate. Structural steel lettings continue in fairly large volume, the total for the week being about 11,000 tons in New York and vicinity, including 4000 tons for an apartment building at Madison Avenue and Seventy-sixth Street. Among new projects up for bids is a high school building in the Bronx, calling for 3500 tons. Eastern railroads are not prominent in the railroad equipment market, but inquiries are expected from one or two roads within the next week or two. Car builders estimate that nearly 20,000 cars will come up for bids within a fortnight, in addition to about 8000 on which figures have gone in. Toward the end of December there will be further large inquiries. There are no new developments in the price situation other than further weakness in cold-rolled strip, which is being sold to tube makers and other large consumers at 2.65c., Cleveland or Pittsburgh, although the ordinary buyer is still being asked to pay 2.75c. Structural shapes are quoted at a range of 2.04½c. to 2.14½c., delivered New York. A large maker of structural material states, however, that it has not found it necessary to go below 2.14½c.

Mill prices per lb., deliv'd New York: Soft steel bars, 2.24c.; plates, 2.17½c. to 2.22½c.; structural shapes, 2.04½c. to 2.14½c.; bar iron, 2.14c.

Warehouse Business. — The total tonnage of sales from stock in the current month has been considerably smaller than in October, although the number of orders has continued at about the same level. Since the recent reduction of black sheet prices to 3.90c. a lb., base, and galvanized to 4.50c. a lb., base, concessions have ceased, but blue annealed sheets, which are still quoted at 3.90c. a lb., base, are subject to shading, which brings the price down to 3.50c. a lb. and occasionally lower.

Cast Iron Pipe.—Pressure pipe producers in the Birmingham district are not maintaining better than 40 per cent operation and Northern makers are in need of tonnage in small sizes of pipe, although still moderately well engaged to the end of the year on large sizes. Prices continue irregular, with only small tonnages of water pipe being bought. The Department of Purchase, New York, which has or-

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.30c.
Soft steel bars, small shapes	3.25c.
Iron bars	3.24c.
Iron bars, Swed. charcoal	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons	3.50c.
Flats and squares	4.00c.
Cold-roll. strip, soft and quarter hard	5.15c. to 5.40c.
Hoops	4.25c.
Bands	3.75c.
Blue ann'l'd sheets (No. 10)	3.50c. to 3.90c.
Long terne sheets (No. 24)	5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galv. annealed	5.15c.
Tire steel, ½ x ½ in. and larger	3.40c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.75c.
Open-hearth spring steel, bases	4.50c. to 7.00c.

	Per Cent Off List
Machine bolts, cut threads:	
¾ x 6 in. and smaller	60
1 x 30 in. and smaller	50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	60
¾ x 20 in. and smaller	50 to 50 and 10
Coach Screws:	
½ x 6 in. and smaller	60
1 x 6 in. and smaller	50 to 50 and 10

	Per 100 Ft.
Boiler Tubes—	
Lap welded, 2-in.	$17.33
Seamless steel, 2-in.	20.24
Charcoal iron, 2-in.	25.00
Charcoal iron, 4-in.	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
½-in. butt	46	29
¾-in. butt	51	37
1-3-in. butt	53	39
2½-6-in. lap	48	35
7 and 8-in. lap	44	17
11 and 12-in. lap	37	12
Wrought Iron—		
½-in. butt	5	+19
¾-in. butt	11	+ 9
1-1½-in. butt	14	+ 6
2-in. lap	5	+14
3-6-in. lap	11	+ 6
7-12-in. lap	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box	$6.45	$6.20
Charcoal, per Box—	A	AAA
IC	$9.70	$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating	$10.00 to $11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets, Box Annealed—Black, C. R. One Pass

	Per Lb.
Nos. 18 to 20	3.70c.
No. 22	3.85c.
No. 24	3.90c.
No. 26	4.00c.
No. 28*	4.15c.
No. 30	4.40c.

Sheets, Galvanized

	Per Lb.
No. 14	4.15c.
No. 16	4.00c.
No. 18	4.15c
No. 20	4.25c.
No. 22	4.35c.
No. 24	4.50c.
No. 26	4.75c.
No. 28*	5.00c.
No. 30	5.40c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

dered pipe rather sparingly this year, compared with the usual requirements of the city, has asked for bids on a lot of less than 100 tons of 16-in. pipe, special fittings and valve box castings. The Federal Water Service Corporation, New York, is about to close on 1100 tons of pipe. The Sinclair Refining Co., New York, is in the market for slightly less than 100 tons of water pipe for Houston, Tex., and the Pan-American Petroleum & Transport Co., New York, is asking for about 120 tons of water pipe for Savannah, Ga.

Prices per net ton deliv'd New York: Water pipe, 6-in. and larger, $34.60 to $36.60; 4-in. and 5-in., $37.60 to $39.60; 3-in., $44.60 to $46.60. Class A and gas pipe $3 extra.

Coke.—Except for the renewal of by-product coke contracts for the first quarter and first half of next year, the market continues quiet. Furnace coke is unchanged at about $2.75 a net ton, Connellsville. Special brands of beehive coke are still quoted at $4.85 a net ton, ovens, or $8.56, delivered to northern New Jersey, Jersey City and Newark, and $9.44 to New York and Brooklyn. By-product foundry coke is quoted at $9 to $9.40 a net ton, Newark or Jersey City, and $10.06, New York or Brooklyn.

Old Material.—Consumer buying of iron and steel scrap has reached the lowest level of the year, and this condition is reflected in a continued downward trend of brokers' buying prices. Brokers have reduced prices on No. 2 heavy melting steel for a Phoenixville, Pa., consumer to $12 a ton, delivered, and a consumer of this grade at Harrisburg has temporarily suspended shipments on its contracts. In the past week a broker has sold a small tonnage of No. 1 machinery cast to a Phillipsburg, N. J., foundry at $14 a ton, delivered. With most consumers of scrap seeking low inventories for the end of the year, sellers of scrap expect a continuation of the present situation into January.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel	$11.00 to $11.35
Heavy melting steel (yard)	8.00 to 8.50
No. 1 hvy. breakable cast.	10.25 to 11.00
Stove plate (steel works)	8.00
Locomotive grate bars	8.25
Machine shop turnings	7.00 to 7.50
Short shoveling turnings	7.25 to 7.50
Cast borings (blast fur. or steel works)	7.00 to 7.50
Mixed borings and turnings	6.75 to 7.50
Steel car axles	15.25 to 16.25
Iron car axles	21.00 to 21.50
Iron and steel pipe (1 in. dia., not under 2 ft. long)	9.75
Forge fire	8.50 to 9.00
No. 1 railroad wrought	12.00 to 12.50
No. 1 yard wrought, long	11.00 to 11.50
Rails for rolling	11.50 to 12.00
Stove plate (foundry)	8.25 to 9.00
Malleable cast (railroad)	13.50 to 14.00
Cast borings (chemical)	9.00 to 9.50
Prices per gross ton, deliv'd local foundries:	
No. 1 machry. cast	$15.00 to $15.50
No. 1 hvy. cast (columns, bldg. materials, etc.), cupola size	13.00 to 13.50
No. 2 cast (radiators, cast boilers, etc.)	12.50 to 13.00

Cleveland

Steel Orders Show Little Change Except for Slight Improvement in Sheets—No Gain in Automotive Tonnage

CLEVELAND, Nov. 26.—Specifications for finished steel showed little change the past week, and mills are operating at about the same schedules as in the preceding week, although some of the sheet mills are doing a little better. As independent Cleveland mills depend on the automotive industry for a larger portion of their business than mills in most other districts, they are feeling probably to a greater extent the slump in that industry and have reduced operations to about 35 per cent of ingot capacity. With inventory time approaching, orders generally are for small lots.

The automotive industry appears to be going along at about the pace set earlier in the month, and specifications from this source continue light. Some bar specifications have been issued for early January shipments. New buying by the automotive industry has not developed in any volume for new models of low-priced cars, makers of some of which are not expected to get started on good production schedules before January.

Some of the local forge shops have orders for automobile forgings that will enable them to maintain fair production schedules in December in making parts that will go in January automobile production.

Local bar mills are in need of orders and have been kept operating to some extent by rolling standard sizes for stock.

A local motor truck manufacturer is maintaining good production schedules. Industries outside the motor car field are still doing fairly well. Many of these had enough business on their books before the stock market collapse to keep them busy for some time.

Present prices on alloy steel bars have been reestablished for the first quarter. A Cleveland mill has opened its books for plates at 1.90c. for that delivery and another is willing to quote the present prices on plates, shapes and bars for the first quarter.

Mills that have reestablished present prices for sheets and strip steel for the first quarter report that buyers are showing no interest in contracts.

Pig Iron.—There is very little buying in any territory served by Cleveland interests, and sales by these producers dwindled to 6250 tons during the past week. These were mostly in small lots for the remainder of the year, although a few orders were taken for the first quarter. Very little interest is being shown in first quarter contracts. With decreased demand, producers are curtailing operations rather than stocking iron. The Corrigan, McKinney Steel Co. blew out one of its Cleveland furnaces for relining during the week and the Hanna Furnace Co. put one Buffalo furnace out of blast and will blow out a second Dec. 1, leaving two in operation. Shipments this month are falling somewhat below those of October and a further decline is looked for in December, as there is usually a slowing down during that month because of approaching inventories. While two or three automotive foundries in Michigan issued releases during the week, these were not sufficient to indicate any definite trend upward in that industry. Considerable iron is being moved this month by boat from Buffalo to Saginaw, Mich., the buyer putting this iron in storage for the winter before the close of navigation. Prices on foundry and malleable iron are untested and unchanged at $18.50, Cleveland, for outside shipment and $19 for local delivery. For Michigan delivery, the range is $19.50 to $20, furnace.

Prices per gross ton at Cleveland:

N'th'n fdy., sil. 1.75 to 2.25	$19.50
S'th'n fdy., sil. 1.75 to 2.25	$19.51 to 20.51
Malleable	19.50
Ohio silvery, 8 per cent	28.00
Basic Valley furnace	18.50
Stand. low phos., Valley	26.50 to 27.00

Prices except on basic and low phosphorus are delivered Cleveland. Freight rates: 50c. from local furnaces; $3 from Jackson, Ohio; $6.01 from Birmingham.

Iron Ore.—Lake shipments are rapidly drawing to a close. Some of the upper Lake ports have sent their last cargoes and others have a few more, which will be dispatched before the end of the week. The water movement this year will exceed by about 350,000 tons the record established in 1916, when shipments by boat amounted to 64,734,198 tons. However, the total movement is expected to run about 500,000 tons less than in 1916, as the all-rail shipments will amount to only about half as much this year as in the record-breaking year, due to the fact that the Mayville, Wis., blast furnace that takes ore by rail is out of blast and the ore for the furnaces at Granite City, Ill., is now being sent by water to Chicago and by rail to destination. The water movement during the first 22 days of November was 3,700,000 tons and the final cargoes will add 100,000 tons or

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and struc. shapes	3.00c.
Soft steel bars	3.00c.
Reinforc. steel bars	2.25c. to 2.50c.
Cold-fin. rounds and hex	3.65c.
Cold-fin. flats and sq.	4.15c.
Hoops and bands, No. 12 to ¼ in., inclusive	3.25c.
Hoops and bands, No. 13 and lighter	3.65c.
Cold-finished strip	*5.95c.
Black sheets (No. 24)	3.70c. to 3.90c.
Galvanized sheets (No. 24)	4.60c. to 4.75c.
Blue ann'l'd sheets (No. 10)	3.25c.
No. 9 ann'l'd wire, per 100 lb.	$2.65
No. 9 galv. wire, per 100 lb.	3.00
Com. wire nails, base per keg	2.65

*Net base, including boxing and cutting to length.

more to this total. Consumption of Lake ore during October was 5,382,561 tons, an increase of 20,994 tons over September, and as compared with a consumption of 5,024,642 tons in October last year. Furnace stocks Nov. 1 amounted to 34,769,584 tons. The amount on hand at furnaces and Lake Erie docks Nov. 1 was 41,134,926 tons, as compared with 39,554,612 tons on the same date a year ago. Central district furnaces consumed 2,715,170 tons in October, a decrease of 30,454 tons for the month. Lake front furnaces used 2,418,121 tons, an increase of 40,068 tons. Eastern furnaces consumed 120,706 tons, a decrease of 3392 tons, and all-rail furnaces consumed 128,564 tons, an increase of 14,772 tons. There were 180 furnaces using Lake ore in blast Nov. 1, a decrease of six for the month.

Alloy Steel Bars.—The present base price of 2.65c., mill, to round lot users has been named for the first quarter. Differentials are unchanged. Orders are light, but a pick-up is looked for next month, when automobile manufacturers issue specifications for January production.

Bolts, Nuts and Rivets.—Bolt and nut orders showed a decline this month, as compared with October. Demand is slow from all consuming industries and little business is coming from jobbers, who do not usually place orders at this time of the year. It is expected that present prices will be reaffirmed for the first quarter. Rivets are still rather quiet.

Bars, Plates and Shapes.—Structural shapes are in good demand from local fabricating shops that are well filled with small work. A fair volume of new building work is in prospect, as well as a goodly amount of highway bridge construction. Plates are in fair demand from boiler and tank shops. Call for steel bars is very light because of the limited demand from the automotive industry. While 1.95c., Pittsburgh, has not disappeared for small lots, 1.90c. has become the general price for plates and shapes. On steel bars, 1.85c., Cleveland, has become more common. While this is a minimum quotation by outside mills, 1.80c. quotations have appeared.

Semi-Finished Steel.—Specifications are holding up to recent volume, which is around 50 per cent of normal. Shipments of sheet bars, billets and slabs are being made against $35 contracts. There is no new business to test prices.

Sheets.—Operations are a little better this week, some mills having accumulated enough business to increase their schedules. Independent mills are operating at from 40 to 70 per cent. Orders from the automotive industry show no gain. A local plant making bodies for one of the low-priced cars has resumed operations in a limited way, but has held up sheet shipments until Dec. 4. Metal furniture plants are fairly busy, but have good stocks. Conditions in the stove industry are spotty. Prices show little change, although 2.10c., Pittsburgh, for No. 10 light plates and 2.25c. for No. 13 blue annealed have become more common. There are reports of occasional concessions from the 2.75c. price on black sheets. Galvanized sheets are rather commonly quoted at 3.40c.

Strip Steel.—Demand for both hot and cold-rolled strip is still very light. While most mills are maintaining regular quotations on hot-rolled strip, there are reports of concessions. Cold-rolled strip appears firm at 2.75c., Cleveland.

Reinforcing Bars.—Two jobs requiring 2100 tons, an Akron store building and local railroad work, were placed during the week. Prices are soft. Some jobbers, anxious to reduce stocks, are quoting around 2c. or close to the mill price.

Coke.—Ohio by-product coke has been reestablished at $8.25, ovens, for December shipment. Prices on by-product coke for domestic use have declined another 25c. a ton, being back to where they were early in October of $4.75 for egg and $4.50 for nut. The cold spell has stimulated shipments, which for a time were being deferred by dealers. The slowing down of the steel industry is resulting in an increase in the quantity of coke available for the market.

Old Material.—Not much scrap is being shipped to the mills, as very little is being taken by consumers in the Cleveland and Valley districts. Mills outside these districts are taking moderate amounts. Scrap production has decreased almost to the same extent as the demand from mills. Consequently, not a great deal of scrap is backing up or is being forced on the market. When offered at unusually low prices, dealers are buying small lots for yard stocks. Prices are weak, but no lower than a week ago, except on railroad wrought scrap and No. 1 busheling.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$14.00 to $14.50
No. 2 heavy melting steel	13.50 to 13.75
Compressed sheet steel	14.00 to 14.50
Light bundled sheet stampings	12.00 to 12.50
Drop forge flashings	12.00 to 12.50
Machine shop turnings	9.00 to 9.75
Short shoveling turnings	11.50 to 12.00
No. 1 railroad wrought	13.00 to 13.50
No. 2 railroad wrought	14.00 to 14.50
No. 1 busheling	12.50 to 13.00
Pipes and flues	9.00 to 9.50
Steel axle turnings	12.50 to 13.00
Acid Open-Hearth Grades:	
Low phos., forging crops	17.75 to 18.00
Low phos., billet, bloom and slab crops	18.50 to 18.75
Low phos., sheet bar crops	18.00 to 18.50
Low phos., plate scrap	18.00 to 18.50
Blast Furnace Grades:	
Cast iron borings	10.00 to 10.50
Mixed borings and short turnings	10.00 to 10.50
No. 2 busheling	10.00 to 10.50
Cupola Grades:	
No. 1 cast	17.00 to 17.50
Railroad grate bars	11.00 to 12.00
Stove plate	12.00 to 12.50
Rails under 3 ft	18.50 to 19.50
Miscellaneous:	
Railroad malleable	18.00 to 18.50
Rails for rolling	16.25 to 16.50

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.70c.
Plates, $\frac{3}{16}$-in.	2.90c.
Structural shapes	2.70c.
Soft steel bars, small shapes, iron bars (except bands)	2.80c.
Round-edge iron	3.50c.
Round-edge steel, iron finished 1½ x 1½ in.	3.50c.
Round-edge steel planished	4.30c.
Reinforc. steel bars, sq., twisted and deform.	2.60c. to 2.80c.
Cold-fin. steel, rounds and hex.	3.50c.
Cold-fin. steel, sq. and flats	4.00c.
Steel hoops	3.55c.
Steel bands, No. 12 to $\frac{3}{16}$-in. inclus.	3.30c.
Spring steel	5.00c.
*Black sheets (No. 24)	3.90c.
†Galvanized sheets (No. 24)	4.65c.
Light plates, blue annealed (No. 10)	3.25c.
Blue ann'l'd sheets (No. 13)	3.40c.
Diam. pat. floor plates—	
¼-in.	5.30c.
$\frac{3}{16}$-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

*For 50 bundles or more; 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.
†For 50 bundles or more; 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

Philadelphia

Sheet Prices Lack Firmness—Pipe Line Requires 1700 Tons of Plates—Scrap Prices Decline

PHILADELPHIA, Nov. 26.—Steel buying is still limited to carload lots and less, with buyers showing no inclination to foresee future requirements. However, a general improvement in sentiment is evident. November steel business is expected to be the smallest of the year, because of the lack of buying early in the month, following the decline in the stock market. Prices are still slightly irregular, but except for some tendency to increase the concessions offered to preferred buyers of sheets and a general downward trend of iron and steel scrap prices, no definite recession has appeared.

Eastern mills are quoting on 1700 tons of flanged steel plates for a pipe line at Erie, Pa., in addition to a substantial tonnage of ship plates, which will be required by the shipyard receiving award of the two liners, on which the United States Lines opened bids Nov. 22. An order for 40 locomotives has been placed by the Rock Island with the American Locomotive Co.

Pig Iron.—Except for an occasional inquiry for 100 to 200 tons of foundry iron for early shipment, buying is limited to carload lots. Most consumers show no interest in next year's requirements and are concentrating their efforts on reducing existing stocks for year-end inventory. Demand for low phosphorus iron is fair and the price is firm. The Washington Navy Yard is inquiring for 500 tons of low phosphorus and the Brooklyn Navy Yard has not yet awarded 100 tons. About 1000 tons of

cylinder grade iron for the Baldwin Locomotive Works has been placed with a Southern producer. Birmingham foundry iron continues to compete for eastern Pennsylvania business, but on a smaller scale than some months ago. The Virginia furnace interest, which is quoting $17.75 a ton, base, on foundry iron, is seeking business in the Cumberland Valley, but most consumers are covered in their current requirements and are not yet interested in contracting for next year. Basic iron is still quiet.

Billets.—Consumers are reducing their stocks, and in some cases still receiving deliveries on old contracts. In most cases, mills will need billets for first quarter rolling, and some contracting is expected before the end of December. Quotations are unchanged at $35 a ton, Pittsburgh, for rerolling billets and $40, Pittsburgh, for forging quality.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil.	$21.26 to $21.76
East. Pa. No. 2X, 2.25 to 2.75 sil.	21.76 to 22.26
East. Pa. No. 1X	22.26 to 22.76
Basic (del'd east. Pa.)	19.75 to 20.25
Gray forge	20.00 to 20.50
Malleable	21.25 to 21.75
Stand. low phos. (f.o.b. N. Y. State furnace)	22.00 to 23.00
Cop. br'g low phos. (f.o.b. furnace)	23.50 to 24.00
Va. No. 2 plain, 1.75 to 2.25 sil.	22.29
Va. No. 2X, 2.25 to 2.75 sil.	22.79

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces; $4.54 from Virginia furnaces.

Bars.—Buying is limited to carload lots, but the price is maintained at 1.90c., Pittsburgh, or 2.22c., delivered Philadelphia.

Reinforcing Bars.—Competition is keen, with only a few projects in the market. Billet steel bars continue at 1.95c. to 2c., Pittsburgh, or 2.22c. to 2.27c., delivered Philadelphia, with the usual $5 extra for cutting to length omitted. Rail steel bars are about 1.85c. a lb., Franklin, Pa., and Tonawanda, N. Y., or 2.17c. a lb., delivered Philadelphia, with no extra for cutting to length. On desirable contracts billet steel bar sellers occasionally meet the rail steel bar price and rail steel bar mills have had to make further concessions to obtain business.

Shapes.—Fabricating shops are well engaged, but are not bidding on much new tonnage. A number of projects in this district have been pending award for some time and are expected to be placed soon. Mills have a fair tonnage of shapes on their books, but prices are still irregular at 1.90c. to 1.95c., f.o.b. nearest mill to consumer, or 1.96c. to 2.01c., delivered Philadelphia. Occasionally lower than 1.90c., f.o.b. mill, is quoted on desirable specifications.

Plates.—Mills are maintaining a fair rate of operation, but new business is rather limited. In addition to a substantial tonnage of ship plates being quoted on for liners pending award, mills are bidding for 1700 tons of flanged steel plates in a pipe line at Erie, Pa. On current small orders, 2.05c. a lb., Coatesville, Pa., or 2.15c. a lb., delivered Philadelphia, is quoted, but on the more substantial tonnages of plates 2c., Coatesville, or 2.10c., Philadelphia, applies.

Sheets.—Local sheet consumers are still operating on restricted schedules, the radio manufacturers having passed the peak of their season of production, and the automobile body builders still await specifications on the new models for which they have contracts. While blue annealed sheets are quoted at 2.35c. a lb., Pittsburgh, or 2.67c., delivered Philadelphia, for No. 13 gage, certain sellers have recently shown an inclination to increase the concession of $2 to $4 a ton, usually granted to the automobile manufacturers. Blue annealed plates, No. 10 gage, are quoted at 2.20c., Pittsburgh, or 2.52c., delivered Philadelphia, with concessions of $2 a ton and more to preferred buyers. Black sheets are quoted at 2.70c. to 2.75c., Pittsburgh, or 3.02c. to 3.07c., Philadelphia, but most of the current buying is at the lower price. Galvanized sheets are moderately firm at 3.40c., Pittsburgh, or 3.72c., delivered Philadelphia.

Imports.—In the week ended Nov. 23, arrivals of ore at this port consisted of 1990 tons of chrome ore from Greece and 765 tons of iron ore from Germany. A total of 1864 tons of pig iron was received, of which 1451 tons was from British India, 263 tons from the United Kingdom and 150 tons from the Netherlands. Steel arrivals consisted of 68 tons of steel billets, 15 tons of steel rods, 24 tons of drill steel and 1 ton of steel bars from Sweden, 21 tons of steel bands from Germany and 506 tons of strip steel from France. Scrap steel arrivals were 32 tons from the United Kingdom and 2 tons from Japan.

Old Material.—Prices on all grades of scrap show further recession, consumers in most cases being willing to buy only at reductions of 50c. a ton or more from the prices previously paid. No. 1 heavy melting steel has receded another 50c. a ton on the basis of a purchase of about 20,000 tons at $14.50 a ton, delivered Bethlehem, Pa. Immediately following a purchase of No. 2 automobile steel at $13.75 a ton, delivered, a Pencoyd, Pa., mill bought a small tonnage at $13.50 a ton. Machine shop turnings have been bought by a Phoenixville, Pa., consumer at $11 a ton, delivered.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	$14.50 to $15.00
Scrap T rails	14.00 to 14.50
No. 2 heavy melting steel	12.00 to 13.50
No. 1 railroad wrought	15.50 to 16.00
Bundled sheets (for steel works)	11.50
Hydraulic compressed, new	13.50 to 14.00
Hydraulic compressed, old	12.00 to 12.50
Machine shop turnings (for steel works)	11.00
Heavy axle turnings (or equiv.)	13.00 to 14.00
Cast borings (for steel works and roll. mill)	11.00 to 11.50
Heavy breakable cast (for steel works)	14.50
Railroad grate bars	12.00 to 12.50
Stove plate (for steel works)	11.50 to 12.00
No. 1 low phos., hvy., 0.04% and under	21.00 to 22.00
Couplers and knuckles	19.00 to 19.50
Rolled steel wheels	19.00 to 19.50
No. 1 blast f'nace scrap	10.50 to 11.00
Wrot. iron and soft steel pipes and tubes (new specific.)	14.00
Shafting	19.00
Steel axles	21.00 to 22.00
No. 1 forge fire	13.00 to 13.50
Cast iron carwheels	15.50 to 16.00
No. 1 cast	15.50 to 16.00
Cast borings (for chem. plant)	14.50
Steel rails for rolling	16.50 to 17.00

Detroit Scrap Market Weak and Dull

DETROIT, Nov. 26.—On account of the low rate at which automobile companies are operating, very little scrap is being produced in this district. Price declines of 25c. a ton have occurred during the week on several grades.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Hvy. melting and shov. steel	$12.00 to $13.00
Borings and short turnings	8.00 to 8.50
Long turnings	7.50 to 8.00
No. 1 machinery cast	12.50 to 13.00
Automotive cast	11.50 to 12.00
Hydraul. comp. sheets	11.75 to 12.25
Stove plate	9.00 to 9.50
New No. 1 busheling	11.00 to 11.50
Old No. 1 busheling	9.50 to 10.00
Sheet clippings	8.00 to 8.50
Flashings	10.25 to 10.75

To confer on the Hoover constructive program for industry a luncheon meeting will be held at the Manufacturers Club, Philadelphia, Nov. 29.

Building Construction, Cement and Trackwork Shipments

		October, 1929	September, 1929	October, 1928
Building contracts, 37 States(a)		$445,642	$445,402	$595,000(b)
do.,	ten months	5,046,910	.....	5,724,048
do.,	residential	137,690	118,391	.....
do.,	public works and utilities	85,116	117,229	.....
do.,	commercial	67,733	76,921	.....
do.,	industrial	60,864	52,640	.....
Trackwork shipments(c), net tons		12,902(d)	12,962	9,493
do.,	ten months	139,963	.....	120,205
Portland cement production(e)		16,731	17,223	17,533
do.,	ten months	144,896	.....	148,711
do.,	shipments(e)	18,695	19,950	19,836
do.,	ten months	152,239	.....	156,120

(a) F. W. Dodge Corporation, New York; figures in thousands of dollars.
(b) Approximate.
(c) American Iron and Steel Institute.
(d) Smallest since last February.
(e) United States Bureau of Mines; figures in thousands of barrels.

Pacific Coast

Business Only Moderately Affected by Stock Market Decline —Reinforcing Bar Orders Fairly Heavy

SAN FRANCISCO, Nov. 23 (*By Air Mail*).—Those in close touch with business conditions on the Pacific Coast are of the opinion that the recent stock market collapse has affected the purchasing power to some extent, but not to any alarming degree. So far as can be ascertained, unemployment is not increasing in any lines except those affected by seasonal fluctuations. Inventories are not excessive and commercial failures have not increased.

Demand this week was not particularly heavy, though a fairly good tonnage of reinforcing steel bars was booked. This commodity was the most active one. Structural steel and cast iron pipe awards were considerably below the weekly average for the year.

Pig Iron.—Movement of foundry pig iron continues to be confined to unimportant lots for prompt shipment. Prices are unchanged.

Prices per gross ton at San Francisco:

*Utah basic	$25.00 to $26.00
*Utah fdy., sil. 2.75 to 3.25	25.00 to 26.00
**Indian fdy., sil. 2.75 to 3.25	25.00 to 26.00

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Bars.—While demand for merchant bar steel remains light, with prices fairly firm at 2.35c., c.i.f. coast ports, a sizable amount of reinforcing steel bars was placed. The Pacific Coast Steel Co. took 750 tons for a chapel and 325 tons for a warehouse in San Francisco, 150 tons for a garage in Oakland and 110 tons for a dry kiln at Scotia, Cal. The Soule Steel Co. took 500 tons for a sewer project in San Francisco and the Concrete Engineering Co. secured 125 tons for the city of Los Angeles. While 2.30c., base, on carload lots and 2.60c. on smaller tonnages continue as the prevailing quotations in the bay district, Los Angeles prices are $2 a ton higher. Pending business calls for more than 3000 tons.

Plates.—Movement of plates fell off this week. The Steel Tank & Pipe Co. secured the only important letting, 100 tons for a 24-in. welded steel pipe line for the East Bay Municipal Utility District, Oakland. No action has yet been taken on 370 tons for the Cedar River pipe line No. 2 at Seattle. The trade is interested in the proposed consolidation of a number of plate fabricating plants up and down the coast. Definite information has not yet been released, but it is understood that the new company will be capitalized at $8,000,000 and will include a number of plants now competing with the Western Pipe & Steel Co.

Shapes.—Structural bookings did not exceed 500 tons and were the lightest in over 13 weeks. The McClintic-Marshall Co. secured 175 tons for a factory at Maywood, Cal., for the American Brake Shoe & Foundry Co., and the Modern Iron Works took 140 tons for a store building at Santa Ana, Cal. Bids were opened this week on 370 tons for the Dumas Bay bridge at Seattle. Plain material remains firm at 2.35c., c.i.f.

Cast Iron Pipe.—Activity in the cast iron pipe market remains quiet and few new inquiries have come up lately for figures. Lee R. Weber, South Gate, Cal., took 118 tons of 4 to 10-in. Class B pipe for Olive Street, Compton, Cal. The only new inquiry of importance during the week is for 138 tons of 6-in. Class C pipe for Fortieth Street, San Diego, Cal.

Steel Pipe.—So far as can be ascertained, the Standard Oil Co., San Francisco, has not yet taken action on its inquiry for 100,000 tons of gas line pipe. Oil country goods are not in heavy demand, and no large pipe line inquiries, aside from the above, have recently come into the market.

Railroad Material.—It is understood that 14,000 tons of tie plates ordered by the Southern Pacific Co. were divided between the Columbia Steel Corporation and the Colorado Fuel & Iron Co. This railroad has not yet taken any action on its inquiry for 120,000 tons of 90 to 130-lb. T rail, due, no doubt, to the fact that officials of the company are engrossed in Interstate Commerce Commission hearings, being held in San Francisco, on the Great Northern-Western Pacific railroad project.

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and struc. shapes	3.30c.
Soft steel bars	3.30c.
Small angles, ⅞-in. and over	3.15c.
Small angles, under ⅞-in.	3.55c.
Small channels and tees, ¾-in. to 2¾-in.	3.75c.
Spring steel, ¼-in. and thicker	5.00c.
Black sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.80c.
Galv. sheets (No. 24)	5.30c.
Struct. rivets, ½-in. and larger	5.65c.
Com. wire nails, base per keg	$3.40
Cement c't'd nails, 100 lb. keg	3.40

St. Louis

Basic Pig Iron Users Buy for Early Delivery—Foundry Demand Quiet—Steel Sales Decline Slightly

ST. LOUIS, Nov. 26.—A rather large tonnage of basic pig iron is reported to have been purchased during the last week for shipment during the remainder of 1929, consumers having been prompted to buy because of the receipt of railroad car orders. It also is reported that several of the mills in the district are planning to use a greater percentage of basic iron to scrap iron than formerly. Buying of foundry iron is light, being confined almost entirely to carloads for immediate shipment. The stove foundries in the district are said to have slowed down operations, following reports of poor sales due to unseasonable weather. Malleable plants catering to the automobile trade report light business, but agricultural implement manufacturers are operating at full capacity.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill.	$19.50 to $20.00
Malleable, f.o.b. Granite City	20.00
N'th'n No. 2 fdy., deliv'd St. Louis	22.16
Southern No. 2 fdy., deliv'd	18.42 to 18.92
Northern malleable, deliv'd	22.16
Northern basic, deliv'd	22.16

Freight rates: 75c. (average) Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

Coke.—Buying of domestic coke is on a larger scale, following a cold snap the latter part of last week. Foundry coke sales are smaller, but smelters are buying furnace coke of all sizes in liberal quantities.

Rails.—The Missouri-Kansas-Texas will buy 8000 tons of 90-lb. rails within the next few weeks.

Finished Iron and Steel.—The Granite City Steel Co. has reaffirmed its fourth quarter prices on tin plate for first quarter, but has not opened its books for first quarter business in sheets or plates. This company reports a slight falling off in business. Beginning this week, the sheet-mill operation will be cut from 100 per cent to 90 per cent, but the other units will continue at full capacity. Very little construction work is going on, and few projects of size are in hands of architects.

Old Material.—The market for old material continues quiet and weak, with prices unchanged. One of the larger consumers purchased a round tonnage of specialties, but others either are buying nothing or are

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-fin. rounds, shaftings, screw stock	3.75c.
Black sheets (No. 24)	4.25c.
Galv. sheets (No. 24)	5.10c.
Blue ann'l'd sheets (No. 10)	3.45c.
Black corrug. sheets (No. 24)	4.30c.
Galv. corrug. sheets	5.15c.
Structural rivets	4.15c.
Boiler rivets	4.15c.

	Per Cent Off List
Tank rivets, ⅞-in. and smaller, 100 lb. or more	65
Less than 100 lb.	60
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-pressed nuts, sq., blank or tapped, 200 lb. or more	60
Less than 200 lb.	50
Hot-pressed nuts, hex., blank or tapped, 200 lb. or more	60
Less than 200 lb.	50

withholding shipments of material already contracted for. Mills in the district are getting large orders for railroad equipment, but this is not being reflected in purchase of old material. Railroad lists: Atchison, Topeka & Santa Fe, 6660 tons; Union Pacific, 2000 tons; Wabash, 197 tons; Nickel Plate, 54 carloads; St. Louis-San Francisco, 39 carloads; Nashville, Chattanooga & St. Louis, 12 carloads.

Dealers' buying prices per gross ton, f.o.b. St. Louis district:

No. 1 heavy melting or shoveling steel	$13.00 to $13.50
No. 2 heavy melting or shoveling steel	12.00 to 12.50
No. 1 locomotive tires	14.50 to 15.00
Misc. stand.-sec. rails including frogs, switches and guards, cut apart	14.00 to 14.50
Railroad springs	15.50 to 16.00
Bundled sheets	9.50 to 10.00
No. 2 railroad wrought	13.00 to 13.50
No. 1 busheling	9.75 to 10.25
Cast iron borings and shoveling turnings	9.25 to 9.75
Iron rails	13.00 to 13.50
Rails for rolling	15.00 to 15.50
Machine shop turnings	7.25 to 7.75
Heavy turnings	9.50 to 10.00
Steel car axles	18.00 to 18.50
Iron car axles	27.00 to 27.50
Wrot. iron bars and trans.	21.50 to 22.00
No. 1 railroad wrought	13.00 to 13.50
Steel rails, less than 3 ft.	17.00 to 17.50
Steel angle bars	14.00 to 14.50
Cast iron carwheels	14.00 to 14.50
No. 1 machinery cast	15.25 to 15.75
Railroad malleable	13.50 to 14.00
No. 1 railroad cast	14.50 to 15.00
Stove plate	11.75 to 12.25
Agricult. malleable	14.00 to 14.50
Relay. rails 60 lb. and under	20.50 to 23.50
Relay. rails 70 lb. and over	26.50 to 29.00

Apollo Steel Co. Adding 33 Per Cent to Capacity

The Apollo Steel Co., Apollo, Pa., is carrying out an extensive improvement program, costing $750,000, which will increase its capacity by about 33 per cent. The program provides for the installation of mills for producing full finished sheets for the furniture and automobile trades, this being a new line for the Apollo company. With the additions, the company will have a capacity of 15,000 tons a month of steel sheets. The work is already under way, and, it is expected, will be completed within 60 days.

The equipment being installed includes 11 new box annealing furnaces, four pair heating furnaces, three sheet pack furnaces and one normalizing furnace, as well as new cold-rolling equipment, consisting of six stands of rolls. In discussing these improvements, A. M. Oppenheimer, president of the company, stated that he did not believe the letdown in buying by automobile companies would be of long duration.

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and struc. shapes	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.95c.
Cold-fin. flats, sq. and hex.	4.45c.
Rounds	3.95c.
Cold-rolled strip steel	5.85c.
Black sheets (No. 24)	4.20c.
Galv. sheets (No. 24)	4.85c.
Blue ann'l'd sheets (No. 10)	3.50c.
Com. wire nails, base per keg	$3.60
Black wire, base per 100 lb.	3.75

Buffalo

Pig Iron Shipments Heavy But New Buying Is Meager—Steel Mill Operations Decline Further

BUFFALO, Nov. 26.—A heavy volume of specifications against old orders is the feature of this week's pig iron market. Practically all of the melters are accepting iron on schedule or ahead of schedule. Stocks in foundries are apparently low and, with the present status of operations, furnace stocks are likewise low. The price for the district is firm at $19.50. All of the business being placed now is for carload lots for prompt shipment. The Lackawanna plant of the Bethlehem Steel Co. has reduced its operation to five out of seven blast furnaces.

Prices per gross ton, f.o.b. furnace:

No. 2 fdy., sil. 1.75 to 2.25	$19.50
No. 2X fdy., sil. 2.25 to 2.75	20.00
No. 1 fdy., sil. 2.75 to 3.25	21.00
Malleable, sil. up to 2.25	20.00
Basic	$17.50 to 18.00
Lake Superior charcoal	27.28

Finished Steel.—Mill operation has declined. The Lackawanna plant of the Bethlehem Steel Co. is operating at about 60 per cent. Sixteen of its 24 open-hearths are on and most of the mills are on single turn, with some of them down. The Donner Steel Co. is operating three open-hearths, and the Seneca Iron & Steel Co. is operating at about 60 per cent. The Gould Coupler Co. is operating all three of its open-hearths and its acid furnace, and the Wickwire-Spencer Co. is operating three of four open-hearths. The city of Buffalo will place 185 tons of reinforcing bars for school No. 44.

Old Material.—The outstanding transaction in the local market was the sale of approximately 10,000 tons of No. 1 and No. 2 heavy melting steel. The mill paid $14.50 for the No. 1 and $13 for the No. 2. Dealers anticipate little difficulty in filling this order at a reasonable profit. One of the local mills is still holding up shipments, although this week it may release six cars. Consumers are specifying freely against old orders for No. 1 machinery cast scrap, but the price is weaker. Some scrap rails have been purchased at around $14, the differential at this mill being 50c. under No. 1 heavy melting steel. Some sales of steel rails, 2 ft. and under, are reported at $18. The entire list is somewhat softer.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel.	$14.50
No. 2 heavy melting steel.	13.00
Scrap rails	15.00 to 15.50
Hydraul. comp. sheets	13.00
Hand bundled sheets	11.00 to 11.50
Drop forge flashings	13.00
No. 1 busheling	13.00
Hvy. steel axle turnings	13.00
Machine shop turnings	7.50 to 8.00
No. 1 railroad wrought	11.50 to 12.00
Acid Open-Hearth Grades:	
Knuckles and couplers	17.00 to 17.50
Coil and leaf springs	17.00 to 17.50
Rolled steel wheels	17.00 to 17.50
Low phos. billet and bloom ends	18.00 to 18.50
Electric Furnace Grades:	
Short shov. steel turnings	10.75 to 11.25
Blast Furnace Grades:	
Short mixed borings and turnings	10.75 to 11.25
Cast iron borings	10.75 to 11.25
No. 2 busheling	8.00
Rolling Mill Grades:	
Steel car axles	17.00 to 17.50
Iron axles	20.00 to 21.00
Cupola Grades:	
No. 1 machinery cast	14.50 to 15.00
Stove plate	12.00 to 12.25
Locomotive grate bars	11.00 to 11.50
Steel rails, 3 ft. and under	17.75 to 18.00
Cast iron carwheels	12.00 to 12.25
Malleable Grades:	
Industrial	16.50 to 17.00
Railroad	16.50 to 17.00
Agricultural	16.50 to 17.00
Special Grades:	
Chemical borings	12.50 to 13.50

Youngstown

Signs of Slight Gain in Steel Orders—No Substantial Automobile Tonnage is Expected This Year

YOUNGSTOWN, Nov. 26.—Despite the fact that the steel business in the Valleys is extremely dull, signs of slight improvement are reported from some quarters. The automobile industry is the only large steel consumer whose requirements have been sharply reduced, although business from other lines is not so heavy as it was a month ago. Large users of steel in the immediate Youngstown area are operating their plants at a good rate, and their orders are sufficient to continue this rate for some time without much reduction. These companies have not had any of their orders cancelled, and temporary holdups, which were prompted by the recent break in stock prices, have now generally been withdrawn.

Valley steel companies are naturally interested in the trend of automobile production, but nearly all have come to the conclusion that no substantial steel tonnage will move in that direction this year. They expect a gradual resumption of shipments to the Michigan companies in the first quarter. Lack of automotive demand has affected bars, sheets and strips, but demand for these products from other industries is still fairly good. The metal furniture industry is taking full finished sheets at a good rate, and strip steel is moving well to the hardware manufacturers. Demand for sheets and strip from companies manufacturing building materials has declined seasonally, but is considered normal. The pipe business is also as good as could be expected for this time of the year,

and mills in the district are able to maintain a 50 to 60 per cent operating rate in these departments.

Steel ingot production in the Valleys last week reached a very low point. The Republic Iron & Steel Co. operated no open-hearth furnaces at either Youngstown or Warren, Ohio, although the closing down at Warren was prompted partly by mechanical difficulties. The Sharon Steel Hoop Co. had no open-hearths in operation until the middle of the week, while the Youngstown Sheet & Tube ,Co. operated about half of its furnaces. The latter company's Brier Hill plant may be practically inactive this week, while Republic expects to operate several furnaces. Sheet production is at about 40 per cent of capacity, and strip output is somewhat lower. Tin mills have been averaging from 50 to 60 per cent, but improvement is definitely in sight.

Prices are weak and untested. Companies opened their books for the first quarter on strips, nails and wire at unchanged prices, but consumers are uninterested in their requirements for that period. Although sheet order books have not been officially opened, the larger producers would be willing to book tonnage for shipment during the first three months of the year at the present quoted prices of 2.75c., Pittsburgh, for black sheets; 3.50c. for galvanized, and 2.35c. and 2.20c. for blue annealed sheets and light plates. Black sheets are still holding fairly well at the above figure, but the current market on the other grades is about $2 a ton less than these figures. Automobile body sheets are still quotable at 4c. but this price is subject to considerable pressure as is the 4.10c., Pittsburgh, price on metal furniture sheets. In fact, concessions on the latter grade are becoming common.

Prices on primary materials are also subject to question. Although pig iron is still quoted at $18.50, Valley, for basic and foundry iron, and $19 for malleable and Bessemer, sales are negligible and consumers feel that these prices are out of line with current market conditions. The same is true with semi-finished steel on which the $35, Pittsburgh or Youngstown, quotation which has been maintained on spot business for several months has not recently been tested. Expected buying for first quarter will undoubtedly clarify the price situation on these products. The scrap market is also weak, with heavy melting steel quotable somewhere between $15 and $16.

General Refractories Co., Philadelphia, has appointed Paxson Taggart Co., Luzerne and D Streets, Philadelphia, as exclusive high-temperature cement dealer representative in the Philadelphia district. The territory includes the southern half of New Jersey, going as far north as Trenton and Princeton. The products to be handled are Grefco chrome high-temperature cement and Standard silica bonding cement.

Birmingham

Railroad Orders Boost Business in Steel—Pig Iron Shipments Decline—Scrap Dull

BIRMINGHAM, Nov. 26.—The recent announcement by Southern furnaces that they will take first quarter contracts at $14 in competitive territories has resulted in very little tonnage. District buying continues light, mostly in carload lots taken at $14.50. A few inquiries are coming in, but buyers are in no hurry to close for other than nearby requirements. The decline in shipments that began two weeks ago continued through last week. The movement is considerably less now than it was at the beginning of the month. Both district and outside shipments have been affected. The number of active furnaces remains at 16. Of these, nine are on foundry iron, six on basic and one on recarburizing iron.

Prices per gross ton, f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil.	$14.50
No. 1 fdy., 2.25 to 2.75 sil.	15.00
Basic	14.50

Finished Steel.—New rail and car orders boosted last week's bookings of finished steel well above the average for the month. The Illinois Central Railroad placed an order for 25,000 tons of rails with the Tennessee company. The Frisco System placed a contract with the Bessemer plant of the Pullman Car & Mfg. Corporation for 1000 box cars and 700 coal cars. New business in bars, plates and railroad accessories was about equal to the best weeks of the season. Orders for wire products and sheets have declined. Mills are taking first quarter business at unchanged prices. Fabricated structural steel orders included 300 coal car underframes for the Frisco System, booked by the Virginia Bridge & Iron Co. and 160 tons for the Gulf Refining Co., Norfolk, Va., booked by the Ingalls Iron Works Co. Reinforcing bar business is confined to a few small orders. The number of active open-hearths in the district remains at 20.

Cast Iron Pipe.—A general increase in inquiries leads pressure pipe makers to believe that within the next two or three weeks municipalities and utilities will begin to place some of their requirements for next year. The only new project to develop last week was a fair-sized tonnage for Los Angeles, Cal., on which bids are to be opened this week. Bids were rejected on the 4000-ton project at Dallas, Tex., and new bids are to be taken. There has been only a slight reduction in shipments this month, and the current movement is considered fair for the season. Prices continue at $37 to $38 a net ton, Birmingham, for 6-in. and larger sizes.

Coke.—A few foundry coke consumers have contracted for their first quarter requirements at the unchanged price of $5 a net ton, Birmingham. Shipping instructions are a little below the average of the past few weeks. There have been no changes in operations in several weeks. Out of the 1380 ovens, only eight are idle.

Old Material.—Consumers of steel scrap are specifying fully on contracts, and the movement as a whole is considered fairly good. Dealers are keeping stocks light. No improvement in the dull market for iron material is expected before the turn of the year as the period for reducing inventories is now at hand. Prices are unchanged.

Prices per gross ton, deliv'd Birmingham dist. consumers' yards:

Heavy melting steel	$13.00 to $13.50
Scrap steel rails	14.00
Short shoveling turnings	9.00
Cast iron borings	9.00
Stove plate	11.50 to 12.00
Steel axles	22.00
Iron axles	23.00
No. 1 railroad wrought	10.00 to 10.50
Rails for rolling	15.50
No. 1 cast	13.00
Tramcar wheels	12.50
Cast iron carwheels	13.00 to 13.50
Cast iron borings, chem.	13.50 to 14.00

Boston

Southern Pig Iron Prices Firmer While Northern Are Somewhat Easier—Scrap Market in Stalemate

BOSTON, Nov. 26.—Alabama iron prices are firmer, cuts from the $14.50 base not now exceeding 25c. a ton, as against 50c. and more heretofore. In contrast, Buffalo iron is openly quoted at $17 a ton, base furnace, and large users say they have been offered No. 2X at $17 for first quarter delivery. One Buffalo stack, however, is endeavoring to maintain an $18 base. Furnaces east of Buffalo are meeting Buffalo prices, and in some instances have sold at the equivalent of less than $17, base Buffalo. The Walworth Mfg. Co., Boston, bought several hundred tons of iron at the equivalent of less than $17 a ton, base Buffalo, the past week. Local sales of all irons the past week fell considerably short of 5000 tons. No inquiries of importance are in the market, but several large buyers are sounding out the market for first quarter delivery. The last barge load

of Buffalo iron for New England delivery by water and rail this season left Buffalo last week.

Foundry iron prices per gross ton deliv'd to most New England points:

*Buffalo, sil. 1.75 to 2.25	$21.91 to $22.91
*Buffalo, sil. 2.25 to 2.75	21.91 to 23.41
East. Penn., sil. 1.75 to 2.25	22.65 to 23.15
East. Penn., sil. 2.25 to 2.75	23.15 to 23.65
Va., sil. 1.75 to 2.25	25.21
Va., sil. 2.25 to 2.75	25.71
*Ala., sil. 1.75 to 2.25	24.11
*Ala., sil. 2.25 to 2.75	24.61
†Ala., sil. 1.75 to 2.25	20.25
†Ala., sil. 2.25 to 2.75	20.75

Freight rates: $4.91 all rail from Buffalo; $3.65 all rail from eastern Pennsylvania; $5.21 all rail from Virginia; $9.61 all rail from Alabama and $5.75 rail and water from Alabama to New England seaboard.

*All rail rate.

†Rail and water rate.

Fabricated Steel. — The fabricated steel outlook is more encouraging. Several large fabricating jobs give promise of being closed before the end of 1929. Details are withheld. In addition, there are a number of 100 to 400-ton jobs up for figuring. A local postoffice, calling for several thousand tons, will come up for figuring and a $2,000,000 State office building at Hartford, Conn., and a sizable number of bridges also will be let shortly after Jan. 1 if present plans mature. Mills openly quote 1.90c. a lb., base, Pittsburgh, for standard shapes, but 1.85c. has been done.

Reinforcing Steel.—Current buying of billet steel bars is in small lots and competition even for such orders is keen. As a result, prices on all tonnages coming into the market are more or less elastic. The trade openly quotes large tonnages at 2.61½c. a lb., base, from stock; and small lots at 3.16c. The steel bar market continues quiet. While 2.26½c. a lb., base, delivered common Boston freight rate points, is openly quoted, that price has been shaded.

Old Material. — The old material situation is unchanged. Owners of scrap are reluctant to sell at ruling prices, yard stocks are small, steel mills show little interest in supplies, the movement of scrap out of New England is in scattered car lots, while prices remain unsettled, with further concessions on girder rail, steel turnings, steel mill borings and long bundled skeleton. Last week steel turnings were sold for less than $6 a ton, on cars shipping point, for the first time in months. For certain kinds of material, notably rails for rerolling, axles, shafting and railroad and yard wrought, it is difficult to establish prices owing to a lack of buyers and sellers. Scrap exporters also experience difficulty in securing material, but expect to ship several thousand tons to Danzig in December.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$9.75 to $10.00
Scrap T rails	9.50 to 10.00
Scrap girder rails	8.50 to 9.00
No. 1 railroad wrought	10.00 to 10.50
No. 1 yard wrought	9.50 to 10.00
Machine shop turnings	5.75 to 6.00
Cast iron borings (steel works and rolling mill)	6.00 to 6.25
Bundled skeleton, long	8.50 to 9.00
Forge flashings	8.50 to 9.00
Blast furnace borings and turnings	5.50 to 6.00
Forge scrap	8.50 to 9.00
Shafting	14.00 to 14.25
Steel car axles	16.00 to 16.50
Wrought pipe 1 in. in diameter (over 2 ft. long)	9.00 to 9.50
Rails for rolling	11.00 to 11.50
Cast iron borings, chemical	9.00 to 9.50

Prices per gross ton deliv'd consumers' yards:

Textile cast	$14.00 to $14.50
No. 1 machinery cast	15.00 to 15.25
No. 2 machinery cast	13.00 to 13.25
Stove plate	11.00 to 11.50
Railroad malleable	18.50 to 19.00

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars, small shapes	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway rounds	6.60c.
Norway squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tie steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold-rolled steel—	
Rounds and hex	*3.55c. to 5.55c.
Squares and flats	*4.05c. to 7.05c.
Toe calk steel	6.00c.
Rivets, structural or boiler	4.50c.

	Per Cent Off List
Machine bolts	50 and 5
Carriage bolts	50 and 5
Lag screws	50 and 5
Hot-pressed nuts	50 and 5
Cold-punched nuts	50 and 5
Stove bolts	70 and 10

*Including quantity differentials.

Canada

Gain in Spot Demand for Pig Iron

TORONTO, ONT., Nov. 26.—Although no forward buying has developed recently in the Canadian pig iron markets, the demand for spot delivery is showing some improvement. The gain is due to the fact that several melters have practically run out of supplies. Pig iron prices are holding firm.

Prices per gross ton:

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75	$23.60
No. 2 fdy., sil. 1.75 to 2.25	23.10
Malleable	23.60
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75	$25.00
No. 2 fdy., sil. 1.75 to 2.25	24.50
Malleable	25.00
Basic	23.50
Imported Iron, Montreal Warehouse	
Summerlee	$33.50
Carron	33.00

Structural Steel.—Sales in the past week or 10 days have been at a low level. Deliveries against contract, however, are large, and most fabricating plants are still running at capacity. Some improvement in demand is expected to develop in the not distant future as a result of recently announced building programs. Much of the steel required, however, will be for delivery next spring. Among the large orders pending is one for several thousands of tons of structural for a highway and railroad bridge at Vancouver.

Old Material.—Foundries and other consumers of iron grades were more prominent in the market during the week. The demand is chiefly for machinery cast, with stove plate and malleable scrap showing some betterment. Prices are unchanged.

Dealers' buying prices:

	Toronto	Montreal
	Per Gross Ton	
Heavy melting steel	$10.00	$8.50
Rails, scrap	11.00	9.00
No. 1 wrought	10.00	12.00
Machine shop turnings	7.50	5.00
Boiler plate	7.50	6.00
Heavy axle turnings	8.00	7.50
Cast borings	7.50	5.00
Steel borings	7.50	6.50
Wrought pipe	6.00	6.00
Steel axles	15.00	20.00
Axles, wrought iron	17.00	22.00
No. 1 machinery cast	....	17.00
Stove plate	....	13.00
Standard carwheels	....	16.00
Malleable	....	13.00
	Per Net Ton	
No. 1 mach'ry cast	$16.00	....
Stove plate	12.00	....
Standard carwheels	15.00	....
Malleable scrap	14.00	....

October Sheet Production Gained, Sales Off

Production by independent sheet mills showed some gain in October as compared with September, according to the monthly report of the National Association of Flat Rolled Steel Manufacturers. October production of these mills was 319,660 tons, against 302,490 tons in September. While shipments and sales fell off last month, the decline was rather light. Shipments were 291,135 tons, against 301,330 tons during the previous month, and sales were 258,810 tons, against 274,568 tons in September. In both shipments and sales it was the quietest month since the summer of 1928. Unfilled orders also declined, these on Nov. 1 having been 478,038 tons, or less than at any previous time during the year. The October report and comparisons in net tons follow:

	Oct.	Sept.	Aug.
Total number of mills	712	715	722
Capacity per month	498,300	459,075	492,765
Percentage reporting	67.3	67.4	67.9
Sales	258,810	274,568	282,107
Production	319,660	302,490	366,734
Shipments	291,135	301,330	365,649
Unfilled orders	478,038	522,803	570,613
Unshipped orders	106,216	111,042	108,887
Unsold stocks	63,174	43,886	34,436
	Percentages of Capacity		
Sales	77.2	88.7	84.4
Production	95.3	97.7	109.7
Shipments	86.8	97.4	109.4
Unfilled orders	142.6	168.9	170.7
Unshipped orders	31.7	35.9	32.6
Unsold stocks	18.8	14.2	10.3

Use of By-Product Gases for Welding Encouraged

To stimulate experiments in the use of illuminating or city gas instead of compressed acetylene gas for the welding and cutting process, the Alexander Milburn Co., Baltimore, manufacturer of welding and cutting equipment, is offering a prize of $1,000 during each of the next three years for the best authenticated results accomplished with illuminating or by-product gases tending to lower the costs of present methods. The results are to be embodied in articles to be submitted to the company and passed on by a committee of judges.

Cincinnati

Pig Iron Sales Increase Slightly but Buyers Still Pursue Conservative Policy—Scrap Dull and Weak

CINCINNATI, Nov. 26. — Although total sales of pig iron in this district last week were a trifle larger than in the preceding week, there is no indication that district consumers have abandoned the conservative buying policy which has prevailed for the last few months. In fact, furnace representatives report that buyers are taking substantially less iron than they specify in their inquiries, and even shipping orders against contracts are being curtailed. A Hamilton, Ohio, buyer, who inquired a week ago for 1200 to 1500 tons of Northern foundry iron, closed for only 750 tons, which was the only sizable order of a total of 2700 tons of iron sold last week. Prices, however, are being maintained. A report from Birmingham, last week of the offering of Southern iron at $14, base, Birmingham, for first quarter sales in Middle West cities, while confirmed here, is said not to apply in this district. All Southern furnaces, except one, are maintaining quotations at about $14.50, base Birmingham, while the exception is not granting concessions under $14. The only inquiry before the trade is for 500 tons of Northern foundry from a Kokomo, Ind., consumer.

Prices per gross ton, deliv'd Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25	$19.89 to $20.39
Ala. fdy., sil. 1.75 to 2.25	17.69 to 18.19
Ala. fdy., sil. 2.25 to 2.75	18.19 to 18.69
Tenn. fdy., sil. 1.75 to 2.25	17.69 to 18.19
S'th'n Ohio silvery, 8 per cent	26.89

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

Finished Material.—Although fresh bookings of district sheet mills were approximately the same last week as in the preceding week, consumers are displaying a less hesitant attitude. New orders during the week were about 40 to 45 per cent of capacity, while operating schedules were curtailed to about 40 per cent of normal. Hot and cold-rolled strip are well below the normal demand. Despite this slowness of new business in the district, mills are beginning to receive a good many inquiries for first quarter.

Coke. — Shipments of by-product foundry coke are sharply below the level of October, and district oven representatives anticipate a further decline in December. Prices, however, will continue at about $10.05, delivered in Cincinnati, during December.

Old Material. — The old material market is dull and featureless. Dealers are bidding from 25c. to 75c. less on the leading items than they did a week ago and they indicate that further reductions may be necessary during the next week. Although the largest supply of scrap is in the cast grades, dealers say there is a comfortable quantity of steel scrap available. Mills are taking scrap on contract at a fair rate, but practically no new business is being done.

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and struc. shapes	3.40c.
Bars, soft steel or iron	3.30c.
New billet reinforc. bars	3.15c.
Rail steel reinforc. bars	3.00c.
Hoops	4.05c.
Bands	3.50c.
Cold-fin. rounds and hex.	3.85c.
Squares	4.35c.
Black sheets (No. 24)	4.05c.
Galvanized sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.45c.
Structural rivets	3.85c.
Small rivets	65 per cent off list
No. 9 ann'l'd wire, per 100 lb.	$3.00
Com. wire nails, base per keg	2.85
Cement c't'd nails, base 100 lb. keg	2.85
Chain, per 100 lb.	8.75
	Net per 100 Ft.
Lap-weld steel boiler tubes, 2-in.	$16.50
4-in.	34.50
Seamless steel boiler tubes, 2-in.	17.50
4-in.	36.00

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel	$12.25 to $12.75
Scrap rails for melting	13.00 to 13.50
Loose sheet clippings	8.00 to 8.50
Bundled sheets	10.75 to 11.25
Cast iron borings	8.25 to 8.75
Machine shop turnings	8.00 to 8.50
No. 1 busheling	10.00 to 10.50
No. 2 busheling	6.50 to 7.00
Rails for rolling	13.50 to 14.00
No. 1 locomotive tires	14.25 to 14.75
No. 2 railroad wrought	12.25 to 12.75
Short rails	17.50 to 18.00
Cast iron carwheels	12.50 to 13.00
No. 1 machinery cast	18.50 to 19.00
No. 1 railroad cast	15.00 to 15.50
Burnt cast	10.00 to 10.50
Stove plate	10.00 to 10.50
Brake shoes	10.00 to 10.50
Agricultural malleable	14.00 to 14.50
Railroad malleable	15.00 to 15.50

More Coking Coal at By-Product Plants

WASHINGTON, Nov. 22. — During the third quarter stocks of coking coal at by-product coke plants increased nearly 1,000,000 tons, while steel works stocks showed a slight decline, says the Bureau of Mines.

Complete returns from the by-product plants showed 5,417,554 tons of coking coal in storage on Oct. 1, of which 3,832,120 tons was high-volatile and 1,585,434 tons was low-volatile. The by-product plants had an average of 26 days' supply of coal on Oct. 1, against 23 days' on Aug. 1, the supply of low-volatile coal on Oct. 1, being 29 days' against 24 on Aug. 1, and the supply of high-volatile being 24 days' and 22 days', respectively.

Steel plants reported 782,491 tons of steam coal and 570,467 tons of gas coal in stock on Oct. 1, a total of 1,352,958 tons. The average supply of coal at steel plants on Oct. 1, was 27 days', against 26 on Aug. 1. The supply of gas coal on Oct. 1, was 28 days', against 27 on Aug. 1, while the supply of steam coal was 26 days' and 25 days', respectively.

Consumers' stocks of bituminous coal throughout the country on Oct. 1, totaled 37,500,000 tons, an increase of 4,400,000 tons over July 1, but 3,600,000 tons below one year ago.

American Steel & Wire Co. to Expand at Donora, Pa.

The American Steel & Wire Co. will make extensions to its Donora, Pa., works, involving an expenditure of approximately $5,000,000. Construction will include a continuous billet mill and two continuous rod mills. These will handle the product of the present 40-in. blooming mill. With the present layout, the steel is reduced into 4 x 4-in. billets before cooling, but with the new billet mill the stock will be reduced to smaller sizes before reheating. The new mills will have an annual capacity of 225,000 to 250,000 tons.

These extensions had been under consideration for some time and were authorized the past week in the carrying out of the Steel Corporation's program of plant extensions and improvements. While details have not all been worked out, the company plans to start at once on the construction work necessary to carry out its program.

Steel Castings and Barrels and Canadian-Made Automobiles

	October, 1929	September, 1929	October, 1928
Steel barrels produced (a)	629,904 (b)	668,224	656,021
do. do. ten months	7,145,901 (c)	.....	6,283,025
do. stocks, end of month	57,636	66,341	50,071
do. unfilled orders	901,621	1,098,650	823,872
Canadian automobiles made (d)	14,523	13,817	18,536
do. do. ten months	248,376	.....	221,188
do. passenger cars	7,262	9,001	.....
do. trucks, chassis, taxicabs	7,261	4,816	.....
Steel castings produced (a), net tons	121,450 (e)	106,909	87,952
do. do. ten months	1,136,351	.....	857,368
do. new orders (a)	135,400	86,413	78,860
do. do. ten months	1,147,481	.....	819,168
do. do. railroad use	72,400 (f)	33,463	26,736
do. do. miscellaneous	63,000	52,950	52,124

(a) United States Department of Commerce. (b) Smallest number since last February. (c) New high record. (d) Dominion Bureau of Statistics, Ottawa. (e) Greatest tonnage since last May. (f) Largest since last April.

Fabricated Structural Steel

Fresh Inquiries for 65,000 Tons Include 32,000 Tons for Two Chicago Projects

ALTHOUGH structural steel awards were only half of those of the previous week, amounting to 22,000 tons, fresh inquiries continue heavy and give promise of an active winter in the building construction industry. Work which came out for bids the past week totaled 65,000 tons. Approximately half of this tonnage is for two Chicago projects. An addition to the Chicago *Tribune* tower will take 17,000 tons and an addition to the Morrison Hotel 15,000 tons.

That building activities in New York are being maintained at a good rate is shown by the fact that over 50 per cent of the volume of work let in the past week is in that city. The largest awards were 4000 tons for a New York apartment house and 3300 tons for a Pittsburgh telephone building. Awards follow:

BOSTON & MAINE RAILROAD, 700 tons; three bridges, 330 tons, to Phoenix Bridge Co.; five bridges, 170 tons, to Boston Bridge Works, Inc.

WELLESLEY, MASS., 300 tons, administration building, to New England Structural Co.

ANDOVER, MASS., 200 tons, two school units, to New England Structural Co.

CAMBRIDGE, MASS., 187 tons, Boston & Maine power house, to Palmer Steel Co.

SOMERVILLE, MASS., 100 tons, ice making plant, to unnamed fabricator.

NEW YORK, 800 tons, high school in Queens, to Harris Structural Steel Co.

NEW YORK, 1450 tons, apartment building at 431 East Fifty-first Street, to Lehigh Structural Steel Co.

NEW YORK, 2000 tons, apartment building at Park Avenue and Eighty-ninth Street, to Taylor-Fichter Steel Construction Co., Inc.

NEW YORK, 4000 tons, apartment building at Madison Avenue and Seventy-sixth Street, to Paterson Bridge Co.

NEW YORK, 1200 tons, New York Trust Co. building at Fifth Avenue and Fifty-seventh Street, to McClintic-Marshall Co.

BROOKLYN, 1300 tons, *New York Times* building, to Lehigh Structural Steel Co.

LONG ISLAND RAILROAD, 350 tons, bridge, to American Bridge Co.

PHILADELPHIA, 500 tons, Jewelry Trade Building on Sansom Street, to American Bridge Co.

LEHIGH VALLEY RAILROAD, 500 tons, bridges, to Bethlehem Steel Co.

STATE OF MARYLAND, 275 tons, highway bridge, to American Bridge Co.

BALTIMORE, 500 tons, Young Men's Hebrew Association building, to Dietrich Brothers.

BIG SANDY & CUMBERLAND RAILROAD, 1200 tons, bridges, to Virginia Bridge & Iron Co.

NORFOLK, VA., 160 tons, Gulf Refining Co., to Ingalls Iron Works.

PITTSBURGH, 3300 tons, addition to Bell Telephone office building, to McClintic-Marshall Co.

MIDLAND, MICH., 1000 tons, power house addition for Dow Chemical Co., to Flint Structural Steel Co.

INDIANA HARBOR, IND., 200 tons, Youngstown Sheet & Tube Co., to Hansell-Elcock Co., Chicago.

CHICAGO, 325 tons, two buildings for Grigsby-Grunow Co., to McClintic-Marshall Co.

CHICAGO, ROCK ISLAND & PACIFIC, 340 tons, bridges, to American Bridge Co.

MILWAUKEE, 100 tons, for Curtiss Airport, to Lakeside Bridge & Steel Co.

OAKLAND, CAL., 100 tons plates, 24-in. welded steel pipe line for East Bay Municipal Utility District, to Steel Tank & Pipe Co.

SANTA ANA, CAL., 140 tons, store, Sixth and Main Streets, to Modern Iron Works.

MAYWOOD, CAL., 175 tons, factory for American Brake Shoe & Foundry Co., to McClintic-Marshall Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

BOSTON & MAINE RAILROAD, 1000 tons, bridge at Windsor, Vt.

SOUTH DARTMOUTH, MASS., 1300 tons, building for an unnamed owner.

NEW HAVEN, CONN., 600 tons, New Haven Hospital.

BROOKLYN, 1000 tons, public library.

NEW YORK, 1500 tons, apartment building at Eighty-eighth Street and Madison Avenue.

NEW YORK, 1200 tons, buildings for Hunter's College.

NEW YORK, 3500 tons, Walton High School in Bronx.

LANCASTER, PA., 500 tons, telephone building.

PHILADELPHIA, 6800 tons, convention hall; all bids rejected.

PHILADELPHIA, 600 tons, Presbyterian Hospital; bids in.

PHILADELPHIA, 400 tons, Olney Avenue bridge.

PHILADELPHIA, 2000 tons, Plaza subway under City Hall; general contract to Underpinning & Foundation Co.

CHICAGO, 300 tons, garage for Western Electric Co.

DETROIT, 600 tons, building for W. E. Wood Co.

CLEVELAND, 720 tons, Kinsman Road bridge for Nickel Plate Railroad.

CLEVELAND, 1000 tons, Severance Hall, Cleveland Orchestra Home.

AKRON, OHIO, tonnage unstated, Mayflower Hotel, plans to be out in January.

AKRON, OHIO, 700 tons, Young Men's Christian Association Building.

AKRON, OHIO, 700 tons, Young Women's Christian Association Building.

CINCINNATI, 1750 tons, building as part of Cincinnati Union Terminals Co. development.

CHESAPEAKE & OHIO RAILROAD, 1500 tons, new bridge at Cincinnati.

COLUMBUS, OHIO, 225 tons, building for Columbus Mutual Auto Insurance Co.

CHICAGO, BURLINGTON & QUINCY, 900 tons, girder spans.

CHICAGO, 17,000 tons, addition to *Tribune* Tower.

CHICAGO, 15,000 tons, addition to Morrison Hotel.

CHICAGO, 600 tons, substation for Commonwealth Edison Co.

GRANITE FALLS, MINN., 2000 tons, power house.

KANSAS CITY, KAN., 600 tons, hotel for Fisher Realty Co.

DENNISON, TEX., 950 tons, highway bridge.

TERRAL, OKLA., 1150 tons, highway bridge.

THACKERVILLE, OKLA., 1150 tons, highway bridge.

RANDOLPH, OKLA., 3000 tons, power house.

OKLAHOMA CITY, OKLA., 3000 tons, power house.

SEATTLE, 370 tons, Dumas Bay bridge; S. A. Moceri, low bidder on general contract.

Ship Program May Take 200,000 Tons of Steel

WASHINGTON, Nov. 26.—Until the Shipping Board makes its report, it is impossible to say accurately the number, size and speed of vessels that will be required for the 13 ocean mail routes which the interdepartmental committee on the merchant marine at a meeting yesterday unanimously voted to authorize the Postoffice Department to advertise. Under the law, the Shipping Board must certify, through the Postmaster-General, the type, size, speed and other characteristics of the vessels which should be employed on each route.

Postmaster General Brown said that the 13 routes will require 40 vessels, with 460,000 gross tonnage, costing $250,000,000, to be spread over 10 years. On this basis, the estimate of 150,000 to 200,000 tons of steel for these ships is considered conservative.

In addition to 13 routes which will be advertised soon, the interdepartmental committee will in the near future authorize advertisement for two additional routes requiring at least four new ships.

Steel Committee Selected for Chicago Fair

A committee of nine will study the most effective means of exhibiting advances in steel production during the past 100 years at the Chicago Century of Progress Celebration in 1933. Headed by W. H. Eisenman, secretary of the American Society for Steel Treating, the committee includes C. B. Murray, who will deal with ores; Arthur G. McKee, blast furnaces; H. M. Boylston, metallurgy as related to steel making; H. A. Schwartz, castings; Zay Jeffries, non-ferrous metals, all of whom are in Cleveland. Others are C. H. Herty, Jr., Pittsburgh, who will deal with the open-hearth; Mark Lathrop, Canton, Ohio, electric steel, and W. B. Coleman, Philadelphia, to whom has been assigned the mechanical aspects of the subject.

Leaders in the mineral industries from all parts of the country will assemble in Washington from Dec. 4 to 7 to take part in the thirty-second annual convention of the American Mining Congress, whose program will embrace a discussion of trends in industry, mineral taxation, the coal industry, mine mechanization, and the relation of government toward business.

Non-Ferrous Metal Markets

Copper More Active, Price Unchanged—Tin Dull, Prices Higher—Lead and Zinc Quiet

NEW YORK, Nov. 26.

Copper.—It is stated by copper producers generally that reports which prevailed yesterday and today in Wall Street that a reduction in the price of copper is pending is purely stock market propaganda. Primary producers and custom smelters assert that the price of electrolytic copper is still 18c., delivered in the Connecticut Valley. In a market such as the present there is always a small quantity of metal which can be obtained at a concession, and this has been the case for several weeks. That the quantity is not large is demonstrated by the fact that one large fabricator is reported to have been able to obtain no more than 200 tons at a lower price. Sales to foreign consumers have been considerably larger in the last few days. This morning about 1000 tons has been sold and on Monday the total was about 1600 tons. On Friday and Saturday the foreign sales were about 1600 and 2000 tons respectively. They all call for prompt shipment. Foreign consumers are bare of stocks and evidently must buy considerable during December, but probably not as much as in the earlier months of the year. The fact that money is easier in Europe is used as an argument that foreign consumers will buy fairly liberally in the near future. Domestic buying is a little better this week, but it is by no means large. Some metal is being sold each day at 18c., with a little here and there from dealers and other sources at around 17.75c. delivered in the Connecticut Valley, as against 17.50c. a week ago. One large producer reports that his advices are that shipments of copper wire and sheets are 70 to 75 per cent of capacity. There is undoubtedly some falling off in demand for brass products. The quotation of Copper Exporters, Inc., is still maintained at 18.30c. c.i.f. usual European ports. Lake copper is quiet but firm at 18 to 18.12½c. delivered.

Tin.—Despite marked activity in the London market, sales on this side have been lighter than in many weeks. The London market has advanced rapidly, with large sales on the London metal exchange practically every day. This is said to be due to a report that some time tomorrow, Nov. 27, there will be a meeting of the so-called "group" at which an important announcement will be made.

THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY

	Nov. 26	Nov. 25	Nov. 23	Nov. 22	Nov. 21	Nov. 20
Lake copper, New York	18.12½	18.12½	18.12½	18.12½	18.12½	18.12½
Electrolytic copper, N. Y.*	17.75	17.75	17.75	17.75	17.75	17.75
Straits tin, spot, N. Y.	41.62½	41.87½	41.50	41.50	41.12½	40.12½
Zinc, East St. Louis	6.25	6.25	6.25	6.25	6.25	6.25
Zinc, New York	6.60	6.60	6.60	6.60	6.60	6.60
Lead, St. Louis	6.10	6.10	6.10	6.10	6.10	6.10
Lead, New York	6.25	6.25	6.25	6.25	6.25	6.25

*Refinery quotation; price ¼c. higher delivered in the Connecticut Valley.

Rolled Products
List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over.

Sheets—
- High brass ..... 23.25c.
- Copper, hot rolled ..... 26.75c.
- Zinc ..... 10.50c.
- Lead (full sheets) ..... 10.25c.

Seamless Tubes—
- High brass ..... 28.25c.
- Copper ..... 29.25c.

Rods—
- High brass ..... 21.25c.
- Naval brass ..... 24.00c.

Wire—
- Copper ..... 19.87½c.
- High brass ..... 23.75c.

Copper in Rolls ..... 26.75c.
Brazed Brass Tubing ..... 30.87½c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also to St. Louis on shipments to points west of that river.

- Sheets, 0 to 10 gage, 3 to 30 in. wide ..... 33.00c.
- Tubes, base ..... 42.00c.
- Machine rods ..... 34.00c.

Chicago Warehouse

(Prices Cover Trucking to Customers' Doors in City Limits)

Sheets—	Base per Lb.
High brass	23.25c.
Copper, hot rolled	27.75c.
Copper, cold rolled, 14 oz. and heavier	30.00c.
Zinc	10.75c.
Lead, wide	10.30c.
Seamless Tubes—	
Brass	28.25c.
Copper	29.25c.
Brass Rods	21.25c.
Brazed Brass Tubes	31.00c.

New York or Cleveland Warehouse

Delivered Prices, Base per Lb.

High brass	21.12½c.	to 22.12½c.
Copper, hot rolled, base sizes	27.75c.	to 28.75c.
Copper, cold rolled, 14 oz. and heavier, base sizes	30.00c.	to 31.00c.
Seamless Tubes—		
Brass	26.00c.	to 27.00c.
Copper	29.12½c.	to 30.12½c.
Brass Rods	18.87½c.	to 19.87½c.
Brazed Brass Tubes	29.12½c.	to 30.12½c.

New York Warehouse

Delivered Prices, Base Per Lb.

- *Zinc sheets (No. 9), casks* ..... 10.75c. to 11.25c.
- *Zinc sheets, open* ..... 11.50c. to 12.00c.

Metals from New York Warehouse

Delivered Prices, Per Lb.

- Tin, Straits pig ..... 43.00c. to 44.00c.
- Tin, bar ..... 45.00c. to 46.00c.
- Copper, Lake ..... 19.50c.
- Copper, electrolytic ..... 19.25c.
- Copper, casting ..... 19.00c.
- Zinc, slab ..... 7.25c. to 7.75c.
- Lead, American pig ..... 7.00c. to 7.50c.
- Lead, bar ..... 9.00c. to 9.50c.
- Antimony, Asiatic ..... 10.50c. to 11.00c.
- Aluminum No. 1 ingots for remelting (guaranteed over 99% pure) ... 25.00c. to 26.00c.
- Alum. ingots, No. 12 alloy ..... 24.00c. to 25.00c.
- Babbitt metal, commercial grade ..... 25.00c. to 35.00c.
- Solder, ½ and ½ ..... 28.50c. to 29.00c.

Metals from Cleveland Warehouse

Delivered Prices, Per Lb.

- Tin, Straits pig ..... 47.00c.
- Tin, bar ..... 49.00c.
- Copper, Lake ..... 19.50c.
- Copper, electrolytic ..... 19.25c.
- Copper, casting ..... 18.75c.
- Zinc, slab ..... 8.00c. to 8.25c.
- Lead, American pig ..... 7.00c. to 7.20c.
- Lead, bar ..... 9.25c.
- Antimony, Asiatic ..... 16.00c.
- Babbitt metal, medium grade ..... 18.00c.
- Babbitt metal, high grade ..... 50.00c.
- Solder, ½ and ½ ..... 29.50c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged consumers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	14.75c.	16.00c.
Copper, hvy. and wire	14.50c.	15.50c.
Copper, light and bottoms	12.50c.	13.50c.
Brass, heavy	8.00c.	9.00c.
Brass, light	6.75c.	7.75c.
Hvy. machine composition	11.50c.	12.50c.
No. 1 yel. brass turnings	9.25c.	9.75c.
No. 1 red brass or compos. turnings	10.75c.	11.75c.
Lead, heavy	4.75c.	5.25c.
Lead, tea	3.75c.	4.25c.
Zinc	3.25c.	3.75c.
Sheet aluminum	13.00c.	14.00c.
Cast aluminum	11.25c.	13.25c.

This is understood to signify curtailment in tin production and this has caused the London buying. In New York, the situation has been the exact opposite to that in London. There is no interest by consumers, who are apparently pretty well covered and, because of the uncertainty in the business outlook, they are very cautious. Dealers are also inactive. Prices today in London were the highest in some weeks, with spot standard quoted at £188 10s., future standard at £191 5s. and spot Straits at £192 10s., all nearly £9 per ton higher than a week ago. The Singapore price today was £194 7s. 6d. Sympathetically, quotations in New York have advanced nearly every day. Today, in a very dull market, spot Straits tin was quoted at 41.62½c., New York.

Lead.—Sales, which are not in large volume, are principally for prompt and early December shipment. Quotations are unchanged at 6.10c., St. Louis, for delivery into January. The price of the leading interest continues at 6.25c., New York, as the contract quotation.

Zinc.—Unquestionably some consumers are very low in stocks of prime Western zinc, but they are buying only what they absolutely have to. There are rumors of low prices, but sales at these reported levels are hard to substantiate and are small at the best. Most producers are maintaining their asking price at 6.25c., East St. Louis, or 6.60c., New York, and are doing some business at these levels. The ore price was unchanged last week at $40, Joplin, and sales were small at 5680 tons. Production has been reduced, but not to the extent expected. It was 8500 tons last week, and the ore surplus is now estimated at 55,147 tons.

Antimony.—Chinese metal for spot and future delivery is quoted unchanged at 8.62½c. New York, duty paid. Demand is very light.

Nickel.—Wholesale lots of ingot nickel are quoted at 35c. a lb., with shot nickel at 36c. and electrolytic nickel in cathodes at 35c.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is obtainable at the published price of 23.90c. a lb., delivered.

Non-Ferrous Metals at Chicago

CHICAGO, Nov. 26.—On the whole this market is quiet. Quotations for tin have advanced and prices for zinc are a shade lower. The old metal market is moderately active and prices are holding.

Prices per lb., in carload lots: Lake copper, 18.50c.; tin, 42.75c.; lead, 6.20c.; zinc, 6.30c.; in less-than-carload lots, antimony, 9.50c. On old metals we quote copper wire, crucible shapes and copper clips, 14c.; copper bottoms, 11.50c.; red brass, 11.50c.; yellow brass, 8c.; lead pipe, 4.50c.; zinc, 3c.; pewter, No. 1, 24.50c.; tin foil, 24c.; block tin, 34c.; aluminum, 12.87½c.; all being dealers' prices for less-than-carload lots.

Railroad Equipment

St. Louis-San Francisco Places Order for 3800 Cars

THE placing of an order by the St. Louis-San Francisco for 3800 freight cars was the feature of the week in the railroad equipment market. Inquiries which have appeared in the past week for approximately 2700 cars and reports of further prospective buying which is regarded as imminent indicate that the carriers of the country are planning to expend large sums for replacement of old rolling stock. The Reading is taking bids on 1000 to 2000 steel box cars and the Missouri-Kansas-Texas will purchase 600 coal cars. The New York Central will buy 1060 freight cars, 65 locomotives and 10 steel dining cars. The Rock Island has ordered 40 freight locomotives. Details of the week's business follow:

Purchase of 1060 freight cars, 65 locomotives and 10 all-steel dining cars will be made by the New York Central railroad if the Interstate Commerce Commission will give the requested authority to issue $5,895,000 4½ per cent equipment trust certificates. Such requests are almost invariably granted. This is understood to be only a part of the New York Central's 1930 program.

St. Louis-San Francisco has purchased 700 coal cars and 1000 box cars from Pullman Car & Mfg. Corporation, 1500 box cars from American Car & Foundry Co., 300 automobile cars from General American Tank Car Corporation, underframes for 300 coal cars to be built in company's shops at Memphis, Tenn., from Virginia Bridge & Iron Co.

Missouri-Kansas-Texas will purchase 600 coal cars, three steel dining cars, 25 cabooses and 100 miles of automatic block signals. This railroad will also build 500 cars in its own shops.

Chicago, Rock Island & Pacific has ordered 40 freight locomotives of the 4-8-4 type from American Locomotive Co.

Reading Railroad is inquiring for 1000 to 2000 all-steel box cars.

North American Car Co. is inquiring for 50 to 100 express refrigerator cars.

Shell Co., San Francisco, is in the market for 10 flat cars.

Denver & Rio Grande Western is inquiring for 10 Mallet type locomotives.

East Jersey Railroad & Terminal Co. has ordered a switching engine from Baldwin Locomotive Works.

Peoples Gas By-products Corporation, Chicago, is inquiring for 10 to 25 tank cars.

Santa Fe has ordered 100 tank cars from General American Tank Car Corporation.

Lehigh & New England is in the market for three 8-wheel switching locomotives and two decapods.

Reinforcing Steel

Awards, at 6000 tons, Show Large Gain Over Previous Week

LETTINGS, totaling 6000 tons, showed a substantial gain over those of the previous week. The largest award was 1300 tons for culverts for an interurban railway at Cleveland. Eight hundred tons will be required for an Akron, Ohio, department store. New work which came out for bids was the largest since the latter part of October, amounting to 3600 tons, of which 900 tons is for a New York subway section and 700 tons for a Brooklyn public library. Awards follow:

NEW YORK, 100 tons, work for Baltimore & Ohio Railroad on Staten Island, to Faitoute Steel Co.

AKRON, OHIO, 800 tons, Polsky department store, to West Virginia Rail Co.

CLEVELAND, 1300 tons, culverts for Cleveland Interurban Railway Co., to Bourne-Fuller Co.

CLEVELAND, 120 tons, buildings for American Telephone & Telegraph Co., to Republic Structural Iron Works.

CHICAGO, 450 tons, apartment building at Sixty-ninth Street and Crandon Avenue, to Inland Steel Co.

PONTIAC, ILL., 200 tons, State Hospital, to Calumet Steel Co.

MAYWOOD, ILL., 125 tons, high school, to Concrete Engineering Co.

AURORA, ILL., 150 tons, telephone exchange, to Joseph T. Ryerson & Son.

STATE OF ILLINOIS, 200 tons, highway bridge and highway work, to Calumet Steel Co.

WHITTIER, CAL., 100 tons, mausoleum, to unnamed bidder.

LOS ANGELES, 125 tons for city, to Concrete Engineering Co.

PALO ALTO, CAL., 100 tons, apartment building, to Concrete Engineering Co.

SCOTIA, CAL., 110 tons, dry kiln for Pacific Lumber Co., to Pacific Coast Steel Co.

SAN FRANCISCO, 750 tons, Grace Cathedral chapel, to Pacific Coast Steel Co.

SAN FRANCISCO, 325 tons, warehouse for Western Sugar Refining Co., to Pacific Coast Steel Co.

SAN FRANCISCO, 500 tons, sewer, to Soule Steel Co.

OAKLAND, CAL., 210 tons, Pier 14 for Port Commission, to Gunn, Carle & Co.

OAKLAND, 150 tons, garage, Eleventh and Washington Streets, to Pacific Coast Steel Co.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

BOSTON, 200 tons, Edison Electric & Illuminating Co. plant.

NEW YORK, 900 tons, subway section 10, route 110.

BROOKLYN, 700 tons, public library.

BUFFALO, 185 tons, school No. 44.

CINCINNATI, 400 tons, new high school.

FORT WAYNE, IND., tonnage not stated, building for General Electric Co.

STATE OF INDIANA, 200 tons, State road work.

EAST MOLINE, ILL., 100 tons, high school.

SPRINGFIELD, ILL., 175 tons, Centennial building; Great Lakes Construction Co., low bidder on general contract.

TACOMA, WASH., 300 tons, grain elevator for city; bids opened.

SAN FRANCISCO, 310 tons, sewer on Alemany Boulevard; bids opened.

SAN FRANCISCO, 130 tons, dyeing and cleaning plant; bids opened.

The Concrete Reinforcing Steel Institute, Chicago, has opened a New York office at 11 West Forty-second Street. J. P. Thompson is in charge.

PERSONAL

W. A. FORBES, assistant to the president of the United States Steel Corporation, who has been abroad since early in September, is expected to arrive, on his return to the United States, on Dec. 15.

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E. C. WOOD and E. E. LITZ sailed Nov. 27 for Russia to join the group of Freyn engineers who have been in Leningrad since last May, in connection with a contract between the Freyn Engineering Co. and the Union of Socialist Soviet Republics for technical assistance in the Russian iron and steel indusry.

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GEORGE C. DAVIS has been appointed eastern distributer, with offices at 292 Madison Avenue, New York, for the Case Hardening Service Co., Cleveland.

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W. J. DIEDERICHS, formerly metallurgist in the bearing division of the Timken Roller Bearing Co., Canton, Ohio, has become metallurgist for the Autocar Co., motor truck manufacturer, Ardmore, Pa.

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MAX MELTZER, formerly of the Hausman & Wimmer Co., Pittsburgh, and for a number of years with the Continental Iron & Steel Co., New York, iron and steel scrap broker, has become identified with the Detroit office of the Joseph Schonthal Co., iron and steel scrap, Columbus, Ohio.

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LEROY O. PFAU has withdrawn as copartner in the business operated under the name of Acme Tool & Machine Co., tool and die maker, Milwaukee, which will be continued under the same name by the remaining two copartners, HAROLD LARSON and KURT KERSEG.

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C. N. MAURER, recently State traffic engineer with the Wisconsin Highway Commission, has been made sales promotion engineer for the Heil Co., Milwaukee, manufacturer of steel pressure and storage tanks, motor truck bodies, hydraulic hoists and snow plows.

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ROGER NEWBERRY, heretofore manager of the foreign department of the Bucyrus-Erie Co., South Milwaukee, Wis., has left for England, to become director of sales of the Ruston-Bucyrus, Ltd., an associated company. N. R. KNOX has been made assistant to the vice-president in charge of manufacturing and C. K. CHARLTON has been named superintendent of foundries, both at South Milwaukee. P. NORDSTROM has been appointed engineer in charge of plant improvements at South Milwaukee and Evansville.

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S. C. VESSY, president, W. W. Sly Mfg. Co., Cleveland, has been elected to the board of directors of the American Foundrymen's Association and D. M. AVEY, editor, *Foundry*, Cleveland, has been appointed chairman of the association's committee on international relations. Mr. Vessy and Mr. Avey succeed the late H. COLE ESTEP, vice-president, Penton Publishing Co., Cleveland, who held both positions.

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W. M. CORSE, metallurgical engineer, Washington, addressed the Detroit chapter of the American Society for Steel Treating, Nov. 18, on bearings and bearing metals. E. M. STAPLES, research associate at the Bureau of Standards for the Bunting Brass & Bronze Co., Toledo, assisted Mr. Corse.

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W. H. EISENMAN, secretary, American Society for Steel Treating, has been elected for the third successive year to head the Association of Exposition Managers. He has been director of the National Metal Exposition since 1919.

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EMMETT B. CARTER, industrial engineer, New York, is now located at Bradford, Pa., with the S. R. Dresser Mfg. Co., maker of pipe fittings. He is in charge of the extensions and improvements that this company will make to the Bradford plant.

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RALPH H. TYLER, who has been identified with the drop forging industry for the past 23 years, has become associated with the hammer department of the Industrial Brownhoist Corporation, Cleveland, to advise with manufacturers engaged in drop forging work.

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JEROME STRAUSS, chief research engineer of the Vanadium Corporation of America, Bridgeville, Pa., will address the members of the Boston chapter of the American Society for Steel Treating on Dec. 6. The history of vanadium and its relation to the chemical and metallurgical industries will be discussed.

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F. P. MULLINS has resigned as vice-president and secretary-treasurer of the Mullins Mfg. Co., Salem, Ohio. R. F. WHITE has been elected a director to succeed Mr. Mullins and W. P. CARPENTER and CLIFTON REEVES have been elected treasurer and secretary respectively.

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R. S. POISTER has been elected vice-president in charge of operations of the Alan Wood Steel Co., Conshohocken, Pa. He has also been elected vice-president in charge of operations of the Alan Wood Mining Co., a corporation just organized to operate the Oxford and Replogle iron mine properties in New Jersey recently leased from the Warren Foundry & Pipe Co. R. W. HEFFNER has been elected vice-president in charge of operations of the Rainey-Wood Coke Co., an affiliated organization.

Lamson & Sessions Co. Elects New Officers

New officers of the Lamson & Sessions Co., Cleveland, were elected Nov. 25, completing the merger of that company and the Lake Erie Bolt & Nut Co. Stockholders of the two companies at meetings late in the week approved the consolidation, which will become effective Dec. 1.

Four new directors who were on the board of the Lake Erie company were added to the Lamson & Sessions Co. directorate. These are N. J. Clarke,

GEORGE S. CASE

who has been president of the Lake Erie company; S. Livingston Mather and Richard Inglis, Cleveland, and Hugh McNicol, East Liverpool. C. L. Wasmer, who was on the Lamson & Sessions board of directors, tendered his resignation. J. G. Jennings, who has been president of the Lamson & Sessions Co., became chairman of the board, succeeding Frank C. Case, who retired.

George S. Case was elected president; N. J. Clarke, vice-president and chairman of the executive committee; I. L. Jennings, vice-president and director of sales; Roy H. Smith, vice-president and director of factories; C. H. Longfield, secretary and manager of sales; H. E. Volmar, treasurer; H. P. Ladds, assistant manager of sales, and H. H. Winterberg, assistant secretary and treasurer. Mr. Volmar was treasurer of the Lake Erie company and Mr. Ladds was sales manager of that company.

The Detroit Alloy Steel Co. has appointed William C. Eakin eastern district sales manager, with offices at 707 Berkshire Avenue, Pittsburgh, for the distribution of PRK-33 Cobaltcrom air-hardening tool steel castings made under rights secured from Darwin & Milner, Inc.

OBITUARY

SAMUEL B. SHELDON, president of the Minnesota Steel Co., a subsidiary of the United States Steel Corporation, died of heart failure at his home at Duluth, Nov. 22. Mr. Sheldon was born at Manchester, Mass., in

S. B. SHELDON

1868, and was graduated from Massachusetts Institute of Technology. His early experience with the steel industry was with the Otis Steel Co., Cleveland. In 1899 he was made assistant general superintendent of the Joliet Works, Illinois Steel Co. Eighteen months later he was promoted to general superintendent and held that position until 1903. Soon afterward he accepted a position with the Lackawanna Steel Co., as general superintendent, and later was employed by the Bethlehem Steel Co. He returned to the United States Steel Corporation in 1913, becoming identified with the Minnesota Steel Co. at Duluth. In 1920 he was made vice-president and succeeded the late Judge Gary as president.

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GEORGE SCOBY-SMITH, director and commercial manager, Bolckow, Vaughan & Co., Middlesbrough, England, died Nov. 18, aged 81 years. He was chairman of the North East Coast Pig Iron Central Committee.

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JOHN A. STEVENS, consulting engineer, died at his home in Lynn, Mass., on Nov. 18, aged 61 years. He served as chairman of the committee, appointed by the American Society of Mechanical Engineers, to prepare a standard boiler code, and during the war was standardization engineer for the United States Shipping Board Emergency Fleet Corporation. He was the donor to the American Society of Mechanical Engineers of the John A. Stevens trust fund for encouraging inventions in conservation of fuels and in generation of light, heat and power.

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LOUIS DUFFKE, secretary-treasurer of the Nortmann-Duffke Foundry Co., Milwaukee, died in that city, Nov. 18, aged 66 years, following several months of illness. With the late Val Nortmann he established the foundry company in 1890.

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JOHN S. BRENNAN, for 27 years with A. J. Lindemann & Hoverson Co., Milwaukee, and more recently an executive with the National Enameling & Stamping Co., in the same city, died at Miami, Fla., Nov. 16, aged 61 years, as the result of a fall which fractured his skull.

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JOSEPH KOENIG, a pioneer in the aluminum industry and founder of the Aluminum Goods Mfg. Co., Manitowoc, Wis., died in that city on Nov. 15.

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ARTHUR L. SHAW, president, Chicago Automatic Conveyor Co., died on Nov. 15.

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ROBERT T. HUSTON, vice-president and superintendent of the Connersville Blower Co., Connersville, Ind., died at his home in that city of a heart attack on Nov. 14. He had been connected with the company since its organization in 1893.

Canada's Pig Iron Output Declines; Ingots Gain

TORONTO, ONT., Nov. 26. — Production of pig iron in Canada in October, at 91,409 gross tons, was slightly under the 98,816 tons produced in September, but compared favorably with the total of 93,186 tons reported for October a year ago. For the 10 months ended with October, production of pig iron amounted to 921,096 tons, a gain of 10 per cent over the 838,659 tons made during the corresponding period of 1928.

Production of steel ingots and castings in October amounted to 115,674 tons, a gain of 17 per cent over the production of 99,000 tons in the previous month, and 6 per cent over the total of 108,987 tons reported for October, 1928. For the 10 months ended with October, the output of steel ingots and direct steel castings, at 1,203,635 tons, was the highest reported for any 10 months since the war year, 1918, and was 17 per cent higher than the 1,028,697 tons produced during the corresponding ten months last year.

Production of ferrosilicon and ferromanganese in Canada during October at 7674 tons was 8 per cent greater than the total of 7131 tons reported for the previous month. For the first 10 months of this year, production aggregated 65,606 tons.

October Gain Shown in Ohio Foundry Melt

Foundry operations in Ohio in October increased over September, according to the monthly report of the Ohio Foundries Association, Inc. Based on returns of 40 foundries, the industry was operating in October at 115.6 per cent of normal capacity, compared with 102.5 per cent in September and with 103.89 per cent in October, last year.

British Output in October High for Year

LONDON, ENGLAND, Nov. 25. (*By Cable*).—Pig iron output in October was 688,700 gross tons and that of steel ingots and castings was 889,800 tons. These are records for any month this year. The next best pig iron production was 682,000 tons in August, and in steel the nearest approach to October was the 859,900 tons in March.

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Comparison of recent output with other periods is as follows:

	Pig Iron, Gross Tons	Steel Ingots and Castings, Gross Tons
1913—Av. monthly..	855,000	638,600
1920—Av. monthly..	669,500	755,600
1922—Av. monthly..	408,500	490,100
1923—Av. monthly..	620,000	706,800
1924—Av. monthly..	609,900	685,100
1925—Av. monthly..	519,700	616,400
1926—Av. monthly..	203,500	296,700
1927—Av. monthly..	607,800	758,200
1928—Av. monthly..	550,900	710,400
1929—Av. first half..	599,600	813,800
1929—August	682,000	753,300
1929—September ...	664,600	847,900
1929—October	688,700	889,800

MOVEMENT OF LAKE SUPERIOR ORE, IN GROSS TONS

Port	October, 1929	October, 1928	Season to Nov. 1 — 1929	Season to Nov. 1 — 1928
Escanaba	819,890	858,655	5,774,053	4,935,719
Marquette	533,719	533,377	4,090,379	3,101,732
Ashland	839,166	997,488	7,197,979	5,955,715
Superior	2,668,287	2,514,506	18,476,484	14,293,683
Duluth	2,415,616	2,624,179	19,466,145	16,093,816
Two Harbors.....	712,449	925,747	6,248,914	5,339,266
Total	7,989,127	8,453,952	61,253,954	49,719,931
Decrease	464,825	.....	.....	.....
Increase	.....	.....	11,534,023	.....

Mixed Trends in European Markets

Cartels in Greater Favor—Not Much Buying Ahead in British Iron —Finished Steel Well Sought, Except Plates

(*By Cable*)

LONDON, ENGLAND, Nov. '25.

IRON and steel inquiry has increased with the decline in the bank rate, but business is still slow and consumers cautious in buying, because of the uncertain coal situation. Cleveland furnaces are disposing easily of their current output, but early 1930 order books are still largely unfilled.

Less foreign pig iron is arriving, so that makers are less apprehensive and prices are maintained better. Hematite producers have their books well filled, consumers covering requirements into March and prices advancing slowly. Fully £4 1s. ($19.64) per ton has been quoted for mixed numbers on delivery beyond November-December.

Finished steel is quiet, especially for export, but mills are receiving specifications against previous contracts, and order books, except with plate mills, are generally well filled.

Tin plate demand has revived with the stronger tin market and recent Welsh floods, which forced suspension of some mills, resulting in their orders being placed with others. The position of mills is strong, one group being sold out until February-March.

Negotiations are pending between British and Continental mills for an agreement delimiting export markets on a basis similar to the agreement now existing between Welsh and American tin plate producers. Substantially higher prices are expected if the negotiations are successful.

Galvanized sheets are rather more active, but large tonnage orders are still lacking and certain works are unable to secure full specifications. Japanese inquiry for black sheets has improved, but actual business is small.

The Standard Oil Co. has placed an order for a 16,000-ton motor tank ship with the Palmers Shipbuilding & Iron Co., Ltd.

The British Mannesmann Tube Works at Newport has suspended operations as a result of industrial trouble. The claim of the engineering unions for a National wage increase has been refused.

Shareholders of Dorman, Long & Co. have approved the merger with Bolckow, Vaughan & Co., Ltd.

Irregular prices in the Continental markets became firmer on the announcement that the International Rail Makers' Association has allocated 100,000 tons of rails, of which 60,000 tons went to Belgium, but weakened as a result of pressure by certain makers to obtain orders. Demand for Continental products is quiet here, with consumers generally uninterested.

Cartel Prestige Increased

Steel Prices Firmer Following 10 Per Cent Reduction of Output—Machinery Exports Larger

BERLIN, GERMANY, Nov. 10.—Improvement in the steel export market, which appeared early this month, is attributed to the 10 per cent reduction of output authorized by the International Steel Cartel. The reduction in output to a maximum of 29,066,280 tons a year is effective only until the end of the year. Another factor in the improvement of business is the better prospect for renewal of the domestic syndicates and the international cartel. Many buyers had been delaying purchases in the belief that dissolution of the cartels would result in lower prices.

The improvement of business directly following reduction of output by the International Steel Cartel has increased the prestige of that organization considerably, as it is the first time an action of the cartel has been directly traceable to an improved business situation. Export prices have advanced so that steel bars are quoted at from £5 5s. to

British and Continental European Export Prices per gross ton, f.o.b. United Kingdom Ports, Hamburg and Antwerp, with the £ at $4.85

British Prices, f.o.b. United Kingdom Ports

Cleveland No. 3 foundry	£3	12½s.	to	£3	13½s.	$17.58	to	$17.82
East Coast hematite...	3	18	to	4	1	18.94	to	19.64
Ferromanganese, export	12	5	to	13	0	59.42	to	63.05
Billets, open-hearth....	6	5	to	6	7½	30.31	to	30.92
Sheet bars, open-hearth	6	5	to	6	10	30.31	to	31.52
Black sheets, Japanese specifications	12	10				60.62		
Tin plate, per base box	0	18¾	to	0	19	4.54	to	4.60
Rails, 60 lb. and heavier	7	15	to	8	15	37.59	to	42.43
						Cents per Lb.		
Steel bars, open-hearth.	7	15	to	8	10	1.67	to	1.84
Beams, open-hearth....	7	2½	to	7	12½	1.55	to	1.65
Channels, open-hearth..	7	7½	to	7	17½	1.60	to	1.71
Angles, open-hearth....	8	2½	to	8	12½	1.76	to	1.86
Ship plates, open-hearth	7	12½	to	8	2½	1.66	to	1.76
Black sheets, No. 24 gage	10	0	to	10	5	2.17	to	2.21
Galvanized sheets, No. 24 gage	12	15	to	13	0	2.76	to	2.86

Continental Prices, f.o.b. Antwerp or Hamburg

Foundry iron, 2.50 to 3.00 per cent sil., 0.50 to 0.90 per cent phos.	£3	8s.	to	£3	11½s.	$16.49	to	$17.33
Foundry iron, 2.50 to 3.00 per cent sil., 1.00 per cent and more phos.	3	7	to	3	8	16.24	to	16.49
Billets, Thomas	4	11	to	4	12	22.07	to	22.31
Sheet bars, Thomas....	4	11	to	4	12	22.07	to	22.31
Wire rods, low C., No. 5 B.W.G.	6	3	to	6	5	29.82	to	30.30
Rails, 60 lb. and heavier	6	8½	to	6	10*	31.16	to	31.52
Rails, light	6	1½				29.46		
						Cents per Lb.		
Steel bars, merchant...	5	4	to	5	6	1.13	to	1.15
Steel bars, deformed...	5	3	to	5	4	1.12	to	1.13
Beams, Thomas, British standard	4	18	to	5	2½	1.06	to	1.10
Channels, Thomas, American sections...	5	13	to	5	17	1.24	to	1.26
Angles, Thomas, 4-in. and larger, over ⅝-in. thick	5	1	to	5	6	1.09	to	1.15
Angles, Thomas, 3-in...	5	6				1.14		
Ship plates, open-hearth inspected	7	5				1.61		
Black sheets, No. 31 gage, Japanese	12	4				2.68		
Hoop and strip steel over 6-in. base.....	5	11½	to	5	12½	1.21	to	1.22
Wire plain, No. 8 gage	7	2½				1.54		
Wire, galvanized, No. 8 gage	8	12½				1.86		
Wire, barbed, 4-pt. No. 12 B.W.G.	11	4	to	11	5	2.47	to	2.48
Wire nails, base.....	0	6¼				$1.54 per keg		
Wire nails, assortments 1 to 6-in. keg.....	10	6½				2.23		

*Open-hearth steel, 8s. ($1.94) per ton extra.

£5 7s. 6d. per ton (1.15c. to 1.18c. per lb.) compared with a low price for this year of £5 per ton (1.10c. per lb.). While some foreign consumers are unwilling to pay the advances in prices, Great Britain and the Scandinavian countries have been fairly active buyers.

Domestic business continues quiet with prices unchanged, and certain plants are reducing their personnel considerably. Unemployment is not increasing more rapidly than is normal in the late fall, but the total of unemployed is larger than a year ago. The decline in the American stock exchange is viewed with some apprehension here, as it is pointed out that prolonged depression in the American stock market is usually followed by a general stagnation of world trade. Recently the gross and net exports of steel have been declining. The highest monthly net export (the total shipments less imports) was in April with 464,000 tons; the September total net export was only 322,000 tons.

The machine manufacturing industry is quiet. Inquiry from Russia has begun to improve following a dull period, but the Soviet Union mission in Berlin complains of German credit conditions and prices. Exports of electrical equipment are heavy with a total of 415,000,000 m. in the first nine months of this year compared with 291,000,000 m. in all of 1913, 321,000,000 m. in 1925, 353,000,000 m. in 1926, 399,000,000 m. in 1927 and 488,000,000 m. in all of 1928.

The greatest increases of electrical equipment exports have been to eastern Europe and the near East. Exports to South America have shown but little change. Russian imports of electrical equipment in the past year were 65 per cent from Germany. Recently the Elektricitats-Lieferungs A. G. received an important order from Rumania for the plant and cables to supply the Banat district.

American Industry Catalog Sent to Russia

A catalog of American industry and trade, containing 1000 pages and listing 6500 companies manufacturing equipment of interest to Russia, has been published in the United States by the Amtorg Trading Corporation, New York, and 10,000 copies have been shipped for distribution throughout the Soviet Union. In a foreword, Saul G. Bron, chairman of the board, Amtorg Trading Corporation, says:

> At the present time, the penetration of American technique into Soviet industry, and partly into agriculture, is proceeding at a fast rate. This is evident from the fact that, of the 30 technical assistance contracts with American companies at present in operation, over half have been concluded within the last six months. Another illustration is the growth in the purchases of American industrial equipment for the U. S. S. R., which amounted to $30,000,000 during the fiscal year 1928-1929, two and one-half times the figure of the previous year.

It is further pointed out that in the six years of trade between the Soviet Union and the United States the turnover has been $580,000,000, of which purchases of American products totaled $450,000,000 and sales in the United States $130,000,000, an adverse trade balance for the U. S. S. R. of $320,000,000. The United States, says the foreword, is the only important country with which the Soviet Union has an adverse trade balance.

German Iron and Steel Exports Decline

WASHINGTON, Nov. 22. — German exports of iron and steel in September totaled 414,541 metric tons, compared with 464,819 tons in August, and imports were 114,099 tons in September compared with 117,331 tons in August, according to a cablegram to the Department of Commerce.

The principal items in the September trade were 99,453 tons of iron and steel bars, rods and angles exported and 51,901 tons imported, 67,753 tons of plates and sheets exported and 6532 tons imported, 32,474 tons of rails exported and 7314 tons imported, 31,635 tons of plain wire exported and 8355 tons imported, 16,241 tons of hoops and bands exported and 7590 tons imported. Exports of pig iron and ferroalloys in September totaled only 36,388 tons, and imports were 12,143 tons.

Japan Plans Rail Output and Seeks Exports

YOKOHAMA, JAPAN, Oct. 15.—As the result of improvements in the rail mill of the Seitetsu Jo (Government Works), production of rails has been steadily increasing and output in September, 15,378 tons, was a monthly record. During its present business year the Government works plans to roll 240,000 metric tons of heavy rails, the maximum capacity.

However, the Imperial Government Railways, its largest customer for rails, has announced a reduction of about 45,000 tons in its expected purchases from the Government works, and to offset this, an effort will be made to export rails to China, Siam and other Far Eastern countries. A firm offer is reported to have been received from a Chinese railroad for 35 miles of 60-lb. rails.

Reparations Deliveries Total Over $180,000,000

HAMBURG, GERMANY, Nov. 11.—Since the Dawes plan became effective, Sept. 1, 1924, Germany has shipped on reparations account iron, steel and non-ferrous metal products valued at 314,240,000 m. ($74,789,000) and machinery to the value of 451,650,000 m. ($107,493,000). Of the total shipments, France and French colonies received 58.7 per cent, Belgium 16.7 per cent, Jugoslavia 14.2 per cent, Italy 4.8 per cent, Japan and Portugal each 1.1 per cent and Rumania, Greece and other countries the remaining 3.4 per cent.

Builds Three New Blast Furnaces

HAMBURG, GERMANY, Nov. 11.—Three blast furnaces at the plant of the Buderussche Eisenwerke A. G., Wetzlar, are being dismantled and three new furnaces being constructed with a total annual capacity of 275,000 tons. The first new furnace will go in blast early next year. Work is also proceeding on the construction of new by-product coke ovens.

Russia Buys 40,000 Tons of Bars, Shapes and Plates

HAMBURG, GERMANY, Nov. 11.—The Friedenshutte A. G. in Silesia has booked an order from Russia for about 40,000 tons of bars, shapes and plates, of which 20,000 tons is to be shipped in January and 20,000 tons in March.

German Tin Smelter to Produce Copper

HAMBURG, GERMANY, Nov. 11.—The Zinnwerke Wilhelmsburg, near here, which is controlled by the National Lead Co. and British interests, has entered into a five-year contract, through the American company, for the delivery of tin ore from Bolivia. During the coming year the Zinnwerke will begin smelting copper, adding about 20,000 tons of copper to its tin output of 2000 to 3000 tons. The works is not a member of the copper syndicate.

Germany Made Horseshoes for Washington's Army

HAMBURG, GERMANY, Nov. 11.—An investigation of the German hardware industry which was recently completed shows that the oldest line of hardware manufacture in the country is horseshoe making. Certain of these works have been in existence for more than 200 years. Two such makers have old order books, in which are recorded shipments of horseshoes to the account of French merchants for the Continental Army in the American war of independence.

The oldest German metal works is the Manfeld Kupfer A. G., copper producer, which has been in existence under the same name for about 700 years. The second oldest manufacturer in Germany, one of the largest chain makers, has been in existence for more than 400 years under the same name.

The Bancroft & Martin Rolling Mill Co., Portland, Me., manufacturer of reinforcing bars, is making improvements at its South Portland plant. In addition to new office and yard arrangements, the company will install a warehouse, garage, and later a gasoline and oil distributing plant for the operation of its rolling mill.

Steel Exports Higher in October

Ten-Month Total of Rolled Shows 12 Per Cent Gain Over 1928—Imports Lower in Both Periods

WASHINGTON, Nov. 25.—Making an increase of 25,238 gross tons, exports of iron and steel products from the United States in October aggregated 247,646 tons, against 222,408 tons in September, and 258,774 tons in October of last year. For the first 10 months of the current year shipments of steel to foreign markets were 2,575,281 tons, a gain of 191,445 tons or 8 per cent over the total of 2,384,836 tons for the same period of 1928.

Imports in October, amounting to 63,226 tons, reflected an increase of 2252 tons over those in September, totaling 60,974 tons. For the first 10 months of the current year, however, imports, aggregating 637,392 tons, showed a decline of 19,161 tons from those in the like period of last year.

The average daily movement of exports in October was 7989 tons, compared with 7414 tons in September and 7834 tons in August. The daily average entering the United States in October was 2039 tons, compared with 2032 tons in September and 2709 tons in August.

Increases in exports in October, when compared with September, were general. Scrap again was the largest item, amounting to 47,936 tons, of which 26,636 tons went to Japan, 6615 tons to Canada, 3030 tons to Italy and 3014 tons to Sweden. The largest item of rolled steel exports was plain structural shapes, 30,513 tons, an increase of 9326 tons. Of the October exports, 24,350 tons went to Canada and 3223 tons to Chile.

Exports of tin plate in October were 23,389 tons, an increase of 3479 tons. The largest customer was Japan, which took 8565 tons. Canada took 2662 tons; China, 2226 tons; Argentina, 1995 tons. Of the 16,971 tons of skelp exported in October, a gain of 4835 tons, all but 83 tons went to Canada. Exports of steel bars in October, amounting to 13,077 tons, reflected a decrease of 3922 tons; 6438 tons went to Canada, 2436 tons to the United Kingdom and 1501 tons to Japan.

Of the 11,929 tons of plates exported in October, 9909 tons went to Canada, while that country took 1986 tons of the 9390 tons of galvanized sheets exported, Japan taking 1023 tons. Of the 12,331 tons of black steel sheets exported in October, 7414

Exports of Iron and Steel from the United States

(In Gross Tons)

	October		10 Months Ended October	
	1929	1928	1929	1928
Pig iron	1,432	11,532	44,056	64,091
Ferromanganese	33	143	1,388	7,435
Scrap	47,936	39,413	440,334	463,525
Pig iron, ferroalloys and scrap	*49,401*	*51,088*	*485,778*	*535,051*
Ingots, blooms, billets, sheet bar	1,733	5,649	33,877	24,759
Skelp	16,971	16,236	111,840	103,461
Wire rods	2,578	3,425	36,676	32,536
Semi-finished steel	*21,282*	*25,310*	*182,393*	*160,756*
Steel bars	13,077	16,264	171,815	125,129
Alloy steel bars	832	1,211	13,623	12,318
Iron bars	225	136	3,456	3,083
Plates, iron and steel	11,929	16,456	165,692	126,018
Sheets, galvanized	9,390	13,046	134,754	125,794
Sheets, black steel	12,331	14,258	151,065	154,776
Sheets, black iron	1,363	1,741	13,413	13,166
Hoops, bands, strip steel	4,026	5,433	60,912	47,487
Tin plate; terne plate	23,389	18,180	217,662	203,652
Structural shapes, plain material	30,513	25,847	232,790	157,963
Structural material, fabricated	7,534	7,412	95,414	72,817
Steel rails	8,297	11,253	126,858	171,921
Rail fastenings, switches, frogs, etc.	2,531	2,330	27,235	36,607
Boiler tubes	1,630	2,204	16,081	15,320
Casing and oil line pipe	9,932	12,987	105,777	99,504
Black and galvanized pipe	12,568	8,813	121,211	95,202
Malleable iron screwed pipe fittings	1,466	927	10,444	8,243
Plain wire	3,471	4,380	39,540	39,239
Barbed wire and woven wire fencing	5,673	7,397	56,605	61,488
Wire cloth and screening	115	107	1,456	1,508
Wire rope	597	445	6,268	4,296
Wire nails	721	968	11,477	12,696
Other nails and tacks	577	886	8,669	8,195
Horseshoes	88	35	375	375
Bolts, nuts, rivets and washers, except track	1,267	1,117	13,698	10,833
Rolled and finished steel	*163,542*	*173,833*	*1,806,290*	*1,607,630*
Cast iron pipe and fittings	7,755	2,824	37,427	27,843
Car wheels and axles	2,211	752	18,677	13,143
Iron castings	528	675	9,532	9,576
Steel castings	871	651	9,675	7,874
Forgings	977	1,678	10,676	9,906
Castings and forgings	*12,342*	*6,580*	*85,987*	*68,342*
All other	1,079	1,963	14,833	13,057
Total	247,646	258,774	2,575,281	2,384,836

Imports of Iron and Steel into the United States

(In Gross Tons)

	October		10 Months Ended October	
	1929	1928	1929	1928
Pig iron	14,295	14,108	117,889	118,885
Ferromanganese*	5,944	4,039	54,762	38,716
Ferrochrome†	55	65	577	634
Ferrosilicon‡	1,115	155	8,421	2,737
Scrap	11,056	9,938	81,862	47,591
Pig iron, ferroalloys and scrap	*32,465*	*28,305*	*263,511*	*208,563*
Steel ingots, blooms, billets and slabs	2,944	2,005	23,845	18,624
Wire rods	642	948	13,250	13,078
Semi-finished steel	*3,586*	*2,953*	*37,095*	*31,702*
Rails and splice bars	164	1,057	6,066	14,039
Structural shapes	9,378	10,530	127,952	141,855
Boiler and other plates	77	2,091	3,110	6,759
Sheets and saw plates	1,917	782	21,026	20,694
Steel bars	3,017	4,759	31,969	75,725
Bar iron	110	67	2,556	1,681
Hoops, bands and cotton ties	3,732	4,891	37,985	44,731
Tubular products (wrot.)	3,150	4,796	33,734	36,309
Nails, tacks, staples	609	1,089	7,799	8,211
Tin plate	20	48	257	865
Bolts, nuts, rivets and washers	34	46	308	222
Round iron and steel wire	400	606	5,029	3,836
Barbed wire	450	572	4,936	3,693
Flat wire; strip steel	187	222	1,850	2,002
Steel telegraph and telephone wire	5	5	19	173
Wire rope and strand	379	117	2,158	1,372
Other wire	3	50	405	501
Rolled and finished steel	*23,632*	*31,728*	*287,159*	*362,668*
Cast iron pipe	3,427	3,838	47,959	51,152
Castings and forgings	116	153	1,668	2,468
Total	63,226	66,977	637,392	656,553
Manganese ore*	24,867	26,142	285,035	172,799
Iron ore	270,279	169,902	2,584,403	2,057,103
Magnesite (dead burned)	2,047	.....	33,962	38,391

*Manganese content only.
†Chromium content only.
‡Silicon content only.

UNITED STATES IMPORTS OF IRON AND STEEL PRODUCTS

(In Gross Tons)

	Oct.	Sept.	Aug.
Austria	89	17	28
Belgium	11,374	13,238	18,131
Czechoslovakia	38	98	95
Finland	1	.....	.....
France	6,272	8,756	11,423
Germany	8,400	10,933	14,225
Italy	393	345	367
Netherlands	585	791	908
Norway	4,294	460	4,874
Sweden	2,810	3,063	3,140
Switzerland	30	19	.....
United Kingdom	1,950	3,791	6,725
Europe	*36,226*	*41,511*	*59,920*
Canada	18,082	12,917	16,648
Mexico	60	30	109
British India	8,846	6,485	7,227
Japan	2	7	30
Miscellaneous	.....	24	39
Total	63,226	60,974	83,969

tons went to Canada and 1412 tons to Japan. Exports of steel rails in October declined to 8297 tons in October from 10,070 tons in September. The largest foreign market was Brazil, which took 3035 tons, Canada taking 1226 tons and Japan, 929 tons. Of the 3073 tons of hoops and bands exported in October, 2318 tons went to Canada.

Taking a total of 97,091 tons, Canada was as usual the chief outside market for American iron and steel. For the first 10 months of the current year exports to Canada aggregated 1,063,927 tons, compared with 968,301 tons in the corresponding period of last year. Exports in October to Japan, the second largest market, were 43,100 tons, while in the first 10 months they were 330,867 tons, against 350,293 tons in the corresponding period of 1928.

Pig iron was in first position among the items imported in October, incoming shipments totaling 14,295 tons, against 11,013 tons in September. Scrap was next, with 10,748 tons of the total coming from Canada. Imports of structural shapes were 9378 tons, of which 5235 tons came from Belgium, 2190 tons from Germany and 1715 tons from France.

Of the 5944 tons of ferromanganese imported in October, 3042 tons came from Norway and 2068 tons from Canada. Of the imports of 3427 tons of cast iron pipe, 1977 tons came from France and 1442 tons from Belgium. Sweden supplied 1470 tons and Belgium 1016 tons of the 3017 tons of steel bars imported. Of the 24,867 tons of manganese concentrates imported, 12,889 tons came from Brazil, 7009 tons from Soviet Russia and 2080 tons from India.

Unusually large imports of scrap and pig iron from Canada gave that country the leading position as the source of incoming shipments in October, with a total of 18,076 tons. Belgium was second, with 11,374 tons.

Destination of Iron and Steel Exports from the United States

(In Gross Tons)

Country of Destination	October, 1929	September, 1929	October, 1928	January Through October 1929	January Through October 1928
North and Central America and West Indies	*121,517*	*111,433*	*136,091*	*1,300,274*	*1,163,697*
Canada and Newfoundland	97,309	88,107	113,103	1,066,130	971,064
Cuba	6,101	5,939	6,246	58,687	53,497
Guatemala	816	481	342	6,509	6,760
Honduras	683	364	397	8,703	5,314
Mexico	11,484	8,922	6,354	89,355	67,516
Panama	1,095	2,864	2,011	16,827	13,716
Salvador	708	127	254	6,162	2,924
British West Indies	1,114	1,288	615	16,122	6,534
Other West Indies	1,209	2,703	6,199	23,461	28,904
Other Central America	998	638	570	8,318	7,468
South America	*34,405*	*27,446*	*40,259*	*331,994*	*361,409*
Argentina	8,378	6,145	10,126	79,882	82,288
Brazil	7,979	6,240	9,239	60,634	69,792
Chile	5,515	2,898	5,809	49,724	58,570
Colombia	3,409	2,424	4,967	36,781	54,035
Peru	1,982	6,949	3,244	31,937	22,395
Uruguay	2,445	372	606	9,005	7,368
Venezuela	4,197	2,042	5,907	59,121	62,823
Other South America	500	376	361	4,910	4,138
Europe	*19,371*	*25,332*	*13,829*	*314,590*	*247,714*
Belgium	108	303	999	2,428	13,174
France	1,118	1,059	1,363	16,947	5,188
Germany	2,992	246	93	21,098	21,183
Italy	3,453	7,888	3,604	96,925	85,217
Netherlands	264	382	109	2,672	1,812
Poland and Danzig	10	3,002	1	75,091	53,719
Rumania	119	649	260	3,538	3,906
Soviet Russia	912	2,249	90	8,547	2,691
United Kingdom	5,704	7,825	5,371	57,502	44,445
Other Europe	4,691	1,729	1,439	29,842	16,379
Far East	*65,714*	*56,014*	*68,137*	*604,666*	*600,869*
British Malaya	955	490	29	8,505	5,483
China	3,588	6,356	4,965	60,658	81,851
Netherlands East Indies	3,359	3,544	3,657	54,719	34,107
India and Ceylon	1,568	1,004	1,322	16,581	19,979
Japan	43,100	29,117	47,894	330,867	350,293
Kwantung	294	566	809	9,576	13,165
Philippine Islands	8,937	11,581	6,498	85,845	71,123
Australia	1,557	1,348	1,020	18,970	13,263
New Zealand	907	736	177	4,598	1,978
Other Asia and Far East	1,449	1,272	1,766	14,347	9,627
Africa	*6,639*	*2,183*	*958*	*23,757*	*11,147*
Union of South Africa	655	813	653	7,415	5,054
Egypt	5,724	444	31	12,012	3,461
Mozambique	128	892	85	2,784	1,091
Other Africa	132	34	189	1,546	1,541
Total	247,646	222,408	258,774	2,575,281	2,384,836

Manganese Ore Producers Not Interested in Cartel

HAMBURG, GERMANY, Nov. 11.—Agents of Brazilian, African and Indian manganese ore producers state that although the Soviet Government is apparently desirous of forming a world cartel of producers, no attempt at such an organization is to be made at present. Competing producers of manganese ore are apparently of the opinion that the Russian mines are being operated at a loss on each ton of ore, based on present selling prices. It is stated that the Soviet Manganese Ore Trust is credited by the State steel producers with considerably more per unit than the mines are receiving from foreign consumers for their manganese ore.

Huge Coke Production Continues

WASHINGTON, Nov. 26.—By-product coke produced in October (31 days) was 4,610,138 net tons, an average daily rate of 148,714 tons, against 147,100 tons in September, according to the Bureau of Mines.

A new plant, that of the Davison Coke & Iron Co., at Neville Island, Pittsburgh, started production on Oct. 1 with a battery of 55 Koppers-Becker ovens. There are now 87 by-product coke plants in active operation, and during October they produced about 92.7 per cent of their capacity.

Production of beehive coke in October was 470,200 tons, compared with 504,300 tons in September.

Production of all coke for the first 10 months of 1929 was 50,230,186 tons, against 43,318,486 tons for the corresponding period of 1928. Of the 1929 coke production, 44,973,386 tons came from by-product plants. Both the by-product coke and total coke made new high records for 10 months.

Quoting THE IRON AGE, the bureau shows that production of pig iron during the first 10 months of the current year was 36,267,442 gross tons, against 31,165,435 tons for the corresponding period of last year; and that 1.385 net tons of coke was made for each gross ton of pig iron in 1929, against 1.39 tons in 1928.

A quarterly review of literature pertaining to vanadium and vanadium alloys and chemical compounds has been started by Vanadium Corporation of America, New York. The publication, called *Vancoram Review*, appears as a 6 x 9-in. pamphlet, and in addition to an inclusive series of abstracts, it is also planned for the publication of technical and scientific data secured by the corporation's own research staff.

Machinery Markets and News of the Works

Machine Tool Orders Decline

November Sales Probably Will Be 20 Per Cent Less Than Those in October

ALTHOUGH there has been a further recession in machine tool sales, many builders are gratified that the volume has held up so well in view of the general apprehension about business and of the usual tapering off as the end of the year approaches.

Reports from machine tool centers throughout the country indicate that bookings this month may run from 20 to 25 per cent less than those in October. If this proves to be the case when the monthly figures are compiled, the industry will feel fairly well satisfied with conditions.

While there has been curtailment of production and consequently of buying in the automobile, radio and airplane industries, new prospects for machine tool business are developing, notably in lines catering to the building construction field.

In fact, the amount of inquiry before the trade is fairly large. Some of the pending orders are expected to be closed soon, but a considerable portion probably will not be acted upon until after the first of the year.

The delivery situation has not improved materially and many builders have sufficient orders on their books to carry along operations in their shops at the current high rate until early spring.

Two shaper manufacturers have announced that prices are to be advanced 10 per cent.

An Iowa farm implement maker has bought a substantial amount of production machinery and will purchase a number of standard tools. The Chicago & North Western, Santa Fe and Kansas City Southern each have contracted for a few tools.

New York

NEW YORK, Nov. 26.—Although machine tool buying has declined this month, some new prospects are developing, notably in the lines of manufacture catering to the building industry. Companies in this field expect that their business will increase early in the new year and they have begun to prepare by inquiring for new equipment. Brakes for steel interior trim manufacture are among the machines sought. A large distributer of machine tools reports that its November sales, according to present estimates, will drop about 20 per cent below those of October. However, most machine tool sellers are quoting on a considerable number of inquiries, some of which may be acted upon quickly while others may go over until after the first of the year.

Aside from the automobile, radio and airplane industries, no market curtailment in metal-working manufacturing has occurred, and many manufacturers, it is reported, are surprised that their volume of business has held up so well in view of the general apprehension which has existed. Among the lines which are particularly active are electrical equipment, various lines of machinery and motor trucks. One purchase of the past week totaled about $25,000.

General Electric Co., Schenectady, N. Y., plans factory branch and distributing plant, four stories, and basement, 80 x 160 ft., with two-story service and equipment repair unit adjoining, at Minneapolis, Minn., to cost over $350,000 with equipment.

Scott Welded Products, Inc., Van Alst and Harris Avenues, Long Island City, has awarded general contract to Bonafide Building, Inc., 276 Jackson Avenue, for one-story addition, to cost about $30,000 with equipment. B. Slavin, last noted address, is architect.

Board of Education, Yonkers, N. Y., has purchased property on Van Cortlandt Park Avenue, about 300 x 824 ft., as site for new multi-story high school, to include manual training department, for which plans will be completed soon, to cost more than $350,000. Richard Edie, Jr., is president of board.

Holler Ice Mfg. Co., New York, care of Sibley & Fetherston, 205 East Forty-second Street, architects, is having plans drawn for one-story ice-manufacturing plant 80 x 150 ft., to cost about $50,000 with equipment.

Dornier Corporation of America, Inc., an interest of General Motors Corporation, Broadway and Fifty-seventh Street, New York, recently formed by officials of that organization, Fokker Aircraft Corporation, Glendale, W. Va., a subsidiary, and Dr. Claude Dornier, head of Dornier Metallbauten, Friedrichshafen, Germany, is arranging purchase of site for new plant to manufacture flying boats, including two and four-motor units. Dr. Dornier is now in United States to complete plans for project, which will cost over $400,000 with equipment. Plane models will be similar to those now being produced by Dornier company in Germany, for which new company has patent rights.

Samuel L. Malkind, 93 Court Street, Brooklyn, architect, has plans for two-story automobile service, repair and garage building, 110 x 250 ft., to cost $100,000 with equipment.

Shell Eastern Petroleum Products, Inc., 122 East Forty-second Street, New York, a subsidiary of Shell Union Oil Co., St. Louis, has filed plans for oil storage and distributing plant at Mount Vernon, N. Y., to cost about $40,000 with equipment.

Department of Water Supply, Gas and Electricity, Municipal Building, New York, is arranging for acquisition of plant of Long Island Water Corporation, Rockaway, and will carry out expansion and betterment program, including installation of pumping machinery and other power equipment, to total $500,000. W. W. Brush is chief engineer.

Richfield Oil Corporation of New York, Inc., Chanin Building, New York, a subsidiary of Richfield Oil Corporation, Los Angeles, will erect oil storage and distributing terminals along New York State Barge Canal. Work on first such unit is under way at Schenectady, N. Y., to have capacity of 110,000 bbl., to cost close to $75,000 with equipment. Other plants will be about similar size.

Jersey Central Power & Light Co., 20 South Street, Asbury Park, N. J., has superstructure under way for steam-operated electric generating plant, 160 x 160 ft., at South Amboy, N. J., to cost $5,000,000 including transmission system. Electric Management & Engineering Corporation, 57 William Street, New York, is engineer.

Van Blerck Motors, Inc., Red Bank, N. J., manufacturer of marine motors and parts, is disposing of a stock issue to total about $310,000, part of proceeds to be used for expansion.

Bell Telephone Laboratories, Inc., 463 West Street, New York, a subsidiary of American Telephone & Telegraph Co., has acquired property at Holmdel, near Red Bank, N. J., and plans experimental laboratory for radio and radio equipment work.

Gilman Corporation, Jersey City, N. J., care of Charles M. Egan, 15 Exchange Place, attorney, recently organized, has plans for a six-story automobile service, repair and garage building, to cost about $125,000 with equipment.

Mono Service Co., Verona Avenue and Oraton Street, Newark, manufacturer of paper cups and containers, has work under way on five-story and basement addi-

tion, 113 x 160 ft., to double present capacity, to cost over $400,000 with machinery. Part of unit will be used for storage and distribution. William Clifford, Jr., 1177 East Grand Street, Elizabeth, N. J., is architect.

Aero Radio Corporation, Maple Shade, N. J., has acquired local factory of Strittmater Corporation for new plant to manufacture radio equipment and parts.

Klingrose Engineering Co. has leased building at 461 Hamilton Avenue, Brooklyn, to manufacture special machinery.

Philadelphia

PHILADELPHIA, Nov. 25.—Quaker City Iron Works Co., Tioga and Richmond Streets, Philadelphia, has awarded contract to Blaw-Knox Co., Widener Building, for one-story unit for storage and distributing service.

United Gas Improvement Co., 1401 Arch Street, Philadelphia, operating electric light and power, and gas properties, has authorized an expansion program to cost about $41,000,000. Of fund noted, about $26,000,000 will be expended by Philadelphia Electric Co. and $2,000,000 by Philadelphia Gas Works, subsidiary organizations, while appropriation of $2,862,000 will be used by Delaware Power & Light Co., Wilmington, for additions and betterments in Brandywine plant and other work in that territory, including $730,000 for installation of submarine cable line from new generating plant at Deepwater Point, N. J., to Wilmington.

Keystone Index Card Co., 3225 Race Street, Philadelphia, manufacturer of commercial card stocks, etc., is planning two-story factory, to cost $40,000 with equipment.

M. B. Whitney, 1734 North Fifth Street, Philadelphia, and associates have organized Nicetown Mfg. Co., to establish plant in Nicetown district for manufacture of pressed, stamped and drawn metal products, also die-stamped specialties. Edward L. Davis, 4250 Wissahickon Avenue, is interested in new organization.

Grinnell Co., Inc., Commercial Trust Building, Philadelphia, manufacturer of sprinklers and sprinkling systems for fire protection, etc., with headquarters at Providence, R. I., has plans by United Engineers & Constructors, Inc., 112 North Broad Street, architect and engineer, for one and two-story plant on site recently acquired, to cost about $140,000 with equipment.

Board of Education, Phoenixville, Pa., is considering installation of manual training equipment in new two-story junior high school to cost over $400,000, for which bids will be asked soon on general contract. Ritter & Shay, Packard Building, Philadelphia, are architects.

Harrisburg Airplane Service, Inc., Harrisburg, Pa., recently organized by Raymond Hartman and George G. McFarland, Harrisburg, and associates, is arranging for establishment of flying school on tract near city limits, with hangar, repair shop and other field buildings. Company will also operate airport at Beaufort Field on Linglestown Road, where similar aircraft units will be established. New organization will represent Curtiss-Wright airplanes for sales and service, parts, etc., in this territory. Mr. Hartman will be president of company, and Roy W. Shreiner, secretary and treasurer.

Harrisburg Gas Co., Harrisburg, Pa., is arranging an expansion and improvement program to cost $368,000, including increased generating and distributing facilities and extensions in service to Rockville, Fort Hunter and vicinity.

Andes, Inc., care of William D. Andes, R. D. No. 3, Lancaster, Pa., recently organized by Mr. Andes and associates, plans operation of local foundry for production of iron and steel castings, machine parts, tools, etc. E. B. and M. E. Andes, Lancaster, will be connected with new company.

Brandt-Warner Co., Broad Street, York, Pa., manufacturer of automobile axles, etc., will soon take bids on general contract for two-story addition, to cost about $45,000 with equipment.

The Crane Market

ALTHOUGH there has not been a noticeable increase in the volume of inquiry for electric overhead cranes, sellers report less inclination by buyers to delay purchases because of the uncertainty of business. Buying has been good in the Middle West and there is some substantial business in prospect in the Pittsburgh district. The Art Stone Co., Millers Falls, Mass., is reported to have closed on a 5-ton, 59-ft. span overhead crane with the Bedford Foundry & Machine Co., and the Monterey Iron & Steel Co., Monterey, Mexico, has purchased some foundry equipment and two 10-ton electric cranes from the Whiting Corporation.

Locomotive crane inquiry is moderately active, especially from the larger industrial users. The New York Central Railroad is reported to have closed on a 50-ton locomotive crane, but action has not yet been taken by the Standard Oil Co. of New Jersey, Anglo-Chilean Consolidated Nitrate Corporation, New York, or the Bethlehem Shipbuilding Corporation, on locomotive cranes, for which they have been inquiring.

Among recent purchases are:

American Steel Foundries, Alliance, Ohio, 10-ton, 67-ft. overhead electric crane from Shaw Electric Crane Works.

American Steel Foundries, Granite City, Ill., 5-ton, overhead electric crane from Shaw Electric Crane Co.

National Automatic Tool Co., Richmond, Ind., two 10-ton, 48-ft. span electric cranes from unnamed bidder.

Locomotive Finished Material Co., Atchison, Kan., one 10-ton, 87-ft. span and two 10-ton, 75-ft. span overhead electric cranes from unnamed bidder.

Western Gas Construction Co., Fort Wayne, Ind., 10-ton, 38-ft. span foundry crane from unnamed bidder.

Illinois Steel Co., 300-ton electric crane from Alliance Machine Co.

Byllesby Engineering & Management Corporation, Chicago, 50-ton overhead powerhouse crane from Whiting Corporation.

Buffalo

BUFFALO, Nov. 25.—Stewart Motor Corporation, 93 Dewey Avenue, Buffalo, manufacturer of motor trucks and parts, has filed plans for one-story addition for service and parts department, to cost about $60,000 with equipment.

Tiffany Machine Works, Inc., Rochester, N. Y., has been formed by David H. Tiffany and associates to manufacture automobile parts and machine equipment. It is understood that new company will take over and expand D. H. Tiffany Corporation, 68 Scio Street, manufacturer of motor parts and mechanical equipment. Halstead R. Tiffany, 125 Falleson Road, will be an official of new company.

Great Atlantic & Pacific Tea Co., 420 Lexington Avenue, New York, is contemplating cold storage warehouse and refrigerating plant at Buffalo, to cost over $85,000 with equipment.

Chase Brass & Copper Co., Waterbury, Conn., has arranged for new factory branch and distributing plant at 25 Ellicott Street, Buffalo. Frederick C. Kaufmann will be local manager, in charge.

John C. Schneiter, Churchville, N. Y., and associates have organized Schneiter Electric Co., with capital of $50,000, and plan operation of factory at Batavia, N. Y., to manufacture electrical equipment and parts. William J. Darch, 203 East Main Street, Batavia, is representative for company.

New York State Electric & Gas Corporation, Ithaca, N. Y., an interest of Associated Gas & Electric Co., 61 Broadway, New York, has acquired Otsego Light & Power Co., Otsego, and will consolidate. Expansion is planned, including transmission line between present systems.

Plant and equipment of General Airplanes Corporation, 618 Northumberland Avenue, Buffalo, have been secured at public sale by H. Paltrowitz, 167 South Street, New York, contractors' supplies and equipment, for $65,000. No announcement has as yet been made regarding continuance of production at present location.

M. J. DeAngelis, 49 East Avenue, Rochester, N. Y., architect, has plans for an automobile service, repair and garage building, to cost about $100,000 with equipment.

New England

BOSTON, Nov. 25.—Machine tool business in this district has fallen off and manufacturers throughout New England state that bookings have dropped perceptibly this month. Prospects give no indication when they will buy, but the feeling is general that the remainder of this year will see little activity. Despite the slowing up in metal-working shops, demand for small tools is good. October sales, however, will not total as large as anticipated.

Warren Telechron Co., Ashland, Mass., will have plans ready about Dec. 3 for a plant addition.

Lindstrom Toy & Tool Co., Bridgeport, Conn., has filed plans for a one-story addition, 40 x 100 ft.

City of South Norwalk, Conn., will ask bids next month on a two-story, 63 x 184 ft. and 67 x 168 ft. junior high school, which will contain a manual training department.

Taunton & New Bedford Copper Co., New Bedford, Mass., has awarded a general contract for a one and two-story addition.

Early next year, city of Westerly, R. I., will ask bids on a two-story and basement junior high and industrial school, 160 x 338 ft., which will contain metal-working departments.

Wilcox Crittendon & Co., Middletown, Conn., has started work on a new foundry, plans for which were prepared by Lockwood Greene Engineers, Inc., New York.

International Silver Co., Meriden, Conn., has awarded general contract to Bartlett-

Brainard Co., 252 Asylum Street, Hartford, Conn., for two and three-story addition, 55 x 320 ft., to cost over $100,000 with equipment.

Walker Ice Co., Worcester, Mass., has filed plans for one-story ice-manufacturing plant, to cost $50,000 with equipment.

City Council, Barre, N. H., plans establishment of municipal airport, including hangars, repair shop and other field units, to cost about $50,000. T. W. Dix, City Hall, city engineer, is in charge.

Hiagh Lumber Co., Burlington, Vt., has plans for two-story wood-working and finishing mill, 65 x 100 ft., to cost about $55,000 with equipment. F. L. Austin, College Street, is architect.

New England Power Association, Worcester, Mass., is arranging expansion and improvement program in hydroelectric and steam-operated electric power plants, transmission system and distributing lines to cost about $20,000,000, of which about $11,000,000 will be expended for development in Vermont and New Hampshire, $6,000,000 in Massachusetts, and $3,000,000 in Rhode Island. Frank D. Comerford is president.

N. D. Cass Co., Canal Street, Athol, Mass., manufacturer of toys, games, etc., is contemplating an addition, to cost about $45,000 with equipment.

Boston & Maine Railroad Co., North Station, Boston, has filed plans for two-story refrigerating and cooling plant at Worcester, Mass., to cost about $65,000 with equipment.

Edgar T. Ward Sons & Co., 44 Farnsworth Street, Boston, iron and steel products, with headquarters at Pittsburgh, will build a one-story local factory branch and distributing plant, to cost about $45,000 with equipment.

South Atlantic

BALTIMORE, Nov. 25.—Glenn L. Martin Co., Baltimore, manufacturer of Government bombers and other type aircraft, is arranging for sale of note issue of $3,000,000, part of fund to be used for expansion, particularly in development of commercial airplanes.

St. Paul Garage Co., Redwood and Light Streets, Baltimore, W. B. Collins, president, will soon take bids on general contract for four-story service, repair and garage building, to cost about $1,000,000 with equipment. Wyatt & Nolting, Keyser Building, are architects; Henry Adams, Calvert Building, is mechanical engineer.

Motor Car Ventilator Co., Suffolk, Va., John K. Beeber, manager, is planning construction of one-story foundry, 60 x 75 ft., for production of brass and aluminum castings, to cost more than $20,000 with equipment.

Columbus Gas & Electric Co., Charleston, W. Va., is considering construction of natural gas pipe line from Kentucky to Martinsville, Dansville, Va., and vicinity, totaling about 600 miles. Entire project will cost about $200,000.

Benedict Coal Co., St. Charles, Va., with headquarters at Sixth and Laurel Streets, Knoxville, Tenn., is considering plans for extensions and betterments in mining properties at St. Charles, including tipple, conveyor and other equipment, to cost about $200,000. Part of work will replace recent fire loss.

A. B. Heaton, 1211 Connecticut Avenue, N. W., Washington, architect, has plans for two-story automobile service, repair and garage building for Washington Railway & Electric Co., Fourteenth and C Streets, N. W., for motor buses, trucks, etc., to cost about $200,000 with equipment.

Board of Education, Columbus, Ga., has engaged Smith & Biggers, Murrah Building, architects, to prepare plans for new industrial school for negroes, to cost about $100,000. T. Firth Lockwood, Murrah Building, architect, will draw plans for extensions and improvements in industrial school on Rose Hill.

Mexican Petroleum Co. of Georgia, Savannah, a subsidiary of Pan-American Petroleum & Transport Co., 120 Broadway, New York, has begun grading for new oil storage and distributing plant, to cost over $850,000 with equipment. S. B. Schapiro is company engineer. Project will include complete oil refinery later.

C. E. Freeman, 269 Boulevard, N. E., Atlanta, Ga., operating Ford automobile agency, has leased two-story and basement building, 105 x 150 ft., to be erected on neighboring site, and will establish service, repair and sales building, to cost about $100,000 with equipment. G. Lloyd Preacher & Co., Mortgage Guarantee Building, are architects.

Water Department, Municipal Office Building, Baltimore, will take bids at once for one-story pumping plant, to cost $40,000 with machinery.

Lynchburg Traction & Light Co., Lynchburg, Va., has plans for car barn and shops, including one-story repair shop, wood-working and paint shops, and one-story service, repair and garage building, 60 x 100 ft., for motor buses, to cost more than $90,000 with equipment. Aubrey Chesterman is company engineer, and Elmer E. Barnard, engineer.

John Evans Welding Co., Sumter, S. C., is considering immediate rebuilding of one-story plant, recently destroyed by fire.

Blue Ridge Aircrafts, Inc., Dr. L. Van Proyen, Public Service Building, Asheville, N. C., president, recently organized, plans hangar with repair shop, oil storage and other field buildings for airport at Brickton, near Asheville, to cost over $40,000.

Detroit

DETROIT, Nov. 25.—Lufkin Rule Co., Hess Street, Saginaw, manufacturer of steel rules, tapes, etc., has plans for a one-story addition, to cost about $25,000 with equipment. F. Beckbissinger, 114 South Jefferson Avenue, is architect.

Board of Water Commissioners, Water Board Building, Detroit, is asking bids until Dec. 4 for four 750-hp. and one 500-hp. electric motors for centrifugal pump service at low lift water plant, Water Works Park Station. George H. Fenkell is general manager and chief engineer.

Chevrolet Motors Corporation, Detroit, has acquired tract, 220 x 827 ft., adjoining plant at Bay City, Mich., and plans several new units to cost more than $200,000 with equipment. S. A. Woodmancy is superintendent at Bay City plant.

Paper Products Mfg. Co., Michigan Avenue, Kalamazoo, has plans for three-story addition, to cost $125,000 with machinery. Vosler & DeLoff, 230 East Kalamazoo Avenue, are architects. H. Schrier is president.

Muskegon Traction & Lighting Co., Muskegon, is arranging an expansion program to cost about $350,000. Work will include remodeling and additions to gas-manufacturing plant, with equipment for artificial gas instead of natural gas, as heretofore. D. A. Powell is vice-president and general manager.

Fisher Body Corporation, General Motors Building, Detroit, has plans for new two-story unit, 75 x 450 ft., at Lansing, to cost more than $200,000 with equipment.

Arctic Ice Cream Co., 3301 Grand River Avenue, Detroit, plans installation of ice-making and refrigerating machinery, conveying and other equipment in two-story and basement plant at Jackson, to cost $140,000 with equipment.

Mitchell & Smith, Inc., Copeland Avenue and Michigan Central Railroad, Detroit, manufacturer of cork and insulating products, has awarded general contract to Austin Co. for three one-story additions, including grinding mill, manufacturing unit, and building for storage and distribution, to cost over $90,000 with equipment.

Department of Public Works, South Haven, has plans for extensions and improvements in municipal electric light and power plant, including additional equipment, to cost about $40,000. Giffels, Hamilton & Weber, Grand Rapids National Bank Building, Grand Rapids, are consulting engineers.

Pittsburgh

PITTSBURGH, Nov. 25. — Generally speaking, the machinery business in this territory is holding up well and local dealers are now inclined to minimize the effects of the recent stock market decline. No commitments of any importance have been cancelled and the larger companies have nearly all expressed their intentions of going ahead with recently announced improvement programs. In fact, some important new projects have come out in the last week which will involve large expenditures of money for machinery, cranes and other heavy equipment. The Weirton Steel Co., Weirton, W. Va., will make important plant additions and betterments, as stated in THE IRON AGE last week. The American Steel & Wire Co. plans extensions to its Pittsburgh district plants, and Spang, Chalfant & Co., Inc., has announced an improvement program for its Etna, Pa., plant.

Orders and inquiries for machine tools the past week have been mostly for single items. However, purchases are being made regularly against the lists of the larger buyers. Railroad buying is not yet a factor in this market.

Titusville Iron Works, Inc., Titusville, Pa., has plans for a one and two-story addition to cost about $175,000 with equipment. Portion of unit will be used as a foundry. J. T. Dillon, Sr., is head.

E. I. duPont deNemours & Co., Wilmington, Del., will carry out expansion at plant at Belle, W. Va., to more than double present capacity of ammonia, methanol and miscellaneous commercial alcohols, entire project to cost over $500,000.

West Virginia Pulp & Paper Co., 230 Park Avenue, New York, has work under way on extensions and betterments in mill at Piedmont, W. Va., to cost about $400,000, including addition to mill waste reduction plant to cost close to one-half of amount noted.

A. E. Rainey, Grove City, Pa., and L. C. Pettler, Beaver Falls, Pa., have organized

Rainey-Pettler Mfg. Co., with capital of $100,000 to operate a plant at Titusville, Pa., for manufacture of tools, metal toys, and kindred products. T. U. Smith, Titusville, is treasurer of company and will represent organization.

Mesta Machine Co., Oliver Building, Pittsburgh, has called a special meeting of stockholders, Dec. 4, to approve an increase in capital from $4,000,000 to $7,000,000, portion of fund to be used for general expansion. G. E. Townsend is secretary.

Union Storage Co., Boulevard of Allies, Pittsburgh, has filed plans for extensions and improvements in power plant, including change from steam to electric operation, to cost more than $80,000 with equipment. Ophuls & Hill, 112 West Forty-second Street, New York, are engineers.

Chicago

CHICAGO, Nov. 25.—Sales of machine tools are tapering slowly. Dealers generally look on November bookings as satisfactory for this time of the year, although the rate so far is about 25 per cent below that in October. A farm implement manufacturer in Iowa has placed sizable orders for production machinery and will buy a number of standard tools. The Chicago & North Western will purchase a 14 x 96-in. grinder and a motor-driven turret lathe and the Santa Fe is taking prices on a 24-in. drill.

The delivery situation has cleared but little in recent weeks. Shipment given this week on a boring mill was 30 weeks. Prices are firm with announcements by two manufacturers of shapers that quotations are to be advanced 10 per cent. The used tool market is quiet; dealers are still unable to find equipment of satisfactory quality.

Naylor Pipe Co., 1230 East Ninety-second Street, Chicago, will build an addition, 70 x 198 ft. Abell-Howe Co., 53 West Jackson Boulevard, is architect.

Plant of Sinko Tool & Mfg. Co., 351 North Crawford Avenue, Chicago, was damaged by fire Nov. 22.

General contract for new office and warehouse for John Deere Plow Co., Moline, Ill., has been awarded to J. H. Hunzinger & Co., Davenport, Iowa. Building will be 138 x 218 ft., five stories and basement and will cost $300,000. Upon completion present warehouse will be discontinued.

George D. Whitcomb Co., Rochelle, Ill., manufacturer of industrial and railroad locomotives, has completed a factory addition, primarily for manufacture of large oil-electric and large gear-drive locomotives. Company contemplates building another addition in near future.

Sloan Valve Co., 4300 West Lake Street, Chicago, manufacturer of valves, steam specialties, etc., has awarded general contract to Thorgersen & Erickson, 228 North La Salle Street, for three-story addition, 125 x 135 ft., to cost about $100,000 with equipment. Alfred S. Alschuler, 28 East Jackson Boulevard, is architect.

Board of Education, Glen Ellyn, Ill., is considering installation of manual training equipment in three-story addition to high school to cost $200,000, for which plans are being prepared by Max Dunning, 304 South Wabash Avenue, Chicago, architect.

City Council, St. Paul, Minn., will soon take bids for municipal airport units, including hangar, 115 x 200 ft., repair and reconditioning shops, automobile service and garage building and other structures, to cost $100,000 with equipment. Harry S. Bronson, City Hall, is acting city architect.

Great Northern Railway Co., St. Paul, Minn., is planning an addition to grain elevator at Superior, Wis., including elevating, conveying, screening and other equipment for a capacity of 3,000,000 bu., to cost over $850,000.

Colorado Dry Ice Co., 1712 Welton Street, Denver, has plans for a one and two-story factory, 55 x 110 ft., to cost about $35,000 with equipment, on site at 955 South Logan Street.

City Council, Red Wing, Minn., is considering construction of a municipal electric light and power plant, to cost more than $75,000 with equipment. It is proposed to hold special election to vote bonds. S. T. Irvine is city clerk.

Norton Co., 11 North Jefferson Street, Chicago, manufacturer of abrasive products, with headquarters and main plant at Worcester, Mass., will soon begin superstructure for two-story plant, 160 x 280 ft. General contract has been let to Ford & Phillips, 559 West Van Buren Street. Mundie & Jensen, 39 South La Salle Street, are architects.

Board of Education, Burlington, Iowa, plans installation of manual training equipment in new two-story high school to cost about $250,000, for which bids will be asked on general contract early in December. C. L. Ritts, Eisfeld Building, is architect; W. B. Ittner, Board of Education Building, St. Louis, is consulting architect.

L. G. Hallberg, 116 South Michigan Avenue, Chicago, architect, has plans for a two-story automobile service, repair and garage building at Evanston, Ill., to cost about $150,000 with equipment.

Standard Oil Co., 910 South Michigan Avenue, Chicago, will soon begin construction of two-story oil storage and distributing plant at Robinson, Ill., to cost close to $50,000 with equipment.

Milwaukee

MILWAUKEE, Nov. 25.—Some further recession has taken place in the machine tool trade, but this is largely due to the season and the approach of inventory taking. No marked reduction is noted in the output of metal-working industries. While automobile production has improved only slightly, there is considerable activity among manufacturers of tractors, excavating machinery, electric and steam power generating machinery and parts for motor trucks and tractors, with no changes noted in expansion programs. The drop in radio manufacturing has had only slight effect on a few small metal-working plants, but has forced some curtailment in wood-working factories. Inquiries are in normal volume for the season and point to a revival of machine tool business after the first of the year. Deliveries are reported considerably improved.

Benz Industrial Products Co., 1048 Third Street, Milwaukee, manufacturer of factory supplies, is taking bids on plans by George Zagel & Brother, 144 East Wells Street, Milwaukee, for erection of a factory to cost about $50,000.

Merrill Wood Products Co., Merrill, Wis., manufacturer of toys, novelties, handles and other hardwood products sustained an estimated loss of $50,000 by fire in its main factory and warehouse. Plant probably will be rebuilt, and practically all equipment will require replacement.

Bass Brothers, 1231 Thirty-first Street, Milwaukee, refiners and dealers in scrap metal, have started construction of a two-story addition, 50 x 135 ft., costing about $30,000 with equipment.

Milwaukee Electric Crane & Hoist Corporation, 5921 Greenfield Avenue, West Allis, has plans for a shop addition, 50 x 60 ft.

Milwaukee Department of Public Works, City Hall, is taking bids until Dec. 2 for construction and installation of a 1,500,000-gal. elevated steel tank for city water department, costing about $120,000. David McKeith is commissioner of public works.

Chase Brass & Copper Co., Waterbury, Conn., has opened a branch office and warehouse at 340 East Water Street, Milwaukee, in charge of C. W. Baker, heretofore of Chicago.

Cincinnati

CINCINNATI, Nov. 25.—Demand for machine tools in this district declined the past week, the sharpest recession being in the smaller tools. District manufacturers, basing their opinions upon the present flow of inquiries, are optimistic regarding the future. With unfilled orders still heavy, manufacturers are maintaining operations at a high level.

Kansas City Southern Railroad placed an order with a local manufacturer for two engine lathes and a Michigan buyer purchased four medium-sized lathes.

Lunkenheimer Co., Carthage, Ohio, manufacturer of valves, steam specialties, etc., has awarded general contract to Ferro Concrete Construction Co., Third and Elm Streets, Cincinnati, for one-story addition, to cost about $30,000 with equipment.

Board of Trustees, University of Cincinnati, Burnet Woods Park, is contemplating new power plant on campus to cost about $85,000, in connection with group of college structures to cost more than $600,000, for which architect will soon be selected.

Geyer & Neuffer, Ludlow Arcade Building, Cincinnati, architects, have plans for one-story, L-shaped automobile service, repair and garage building, 84 x 148 x 428 ft., to cost about $100,000 with equipment.

Farmer & Co., Inc., Chattanooga, Tenn., organized recently by Lovell J. Morris, Volunteer Building, and associates, is considering establishment of plant to manufacture steel plates for railroad crossings and kindred products. Building will be purchased or leased.

East Tennessee Light & Power Co., Bristol, Tenn., formerly known as Tennessee Central Service Co., an interest of Henry L. Doherty & Co., 60 Wall Street, New York, will issue bonds for $5,500,000 and 51,000 shares of stock, proceeds to be used in part for acquisition of Bristol Gas & Electric Co., Bristol; Erwin Electric Light & Power Co., Erwin Tenn., and other properties, and for extensions and improvements in plants and system.

Nashville, Chattanooga & St. Louis Railway Co., Nashville, Tenn., has filed plans for addition to engine house, with repair facilities, to cost $20,000. Hunter McDonald is chief engineer.

C. O. Sherrill, City Hall, city manager,

Cincinnati, is considering one-story municipal automobile service, repair and garage building for city-owned cars and motor trucks, to cost over $200,000 with equipment.

Brown-Brockmeyer Co., 10 Norwood Avenue, Dayton, Ohio, manufacturer of fractional horsepower motors, parts, etc., is considering new plant on Overbrook Street, first unit to be one story, 80 x 500 ft., to cost about $100,000 with equipment.

Indiana

INDIANAPOLIS, Nov. 25.—South Bend Tool & Die Co., 1918 South Main Street, South Bend, has awarded general contract to Ralph Sollitt & Sons, 518 East Sample Street, for one-story addition, 35 x 85 ft., to cost $23,000 with equipment. Fett, Pearson & Goffeney, Associates Building, are architects.

R. S. Holland, Milwaukee, formerly connected with National City Products Co., same city, manufacturer of metal castings, etc., is organizing company to establish plant at Fort Wayne for production of brass, bronze, aluminum and similar castings. Local building has been secured. Fort Wayne Chamber of Commerce, J. B. Wiles, manager, is interested in project and has detailed information.

Auburn Automobile Co., Auburn, has awarded general contract to William A. Sheets Construction Co., Cal-Wayne Building, Fort Wayne, for two two-story additions, 200 x 240 ft., and 22 x 275 ft., to cost $220,000 and $70,000, respectively, with equipment. Last-noted will be used primarily for storage and distribution. A. M. Strauss, Cal-Wayne Building, Fort Wayne, is architect. E. L. Cord is president.

Fire King Stoker Co., 1159 Roosevelt Avenue, Indianapolis, has recently taken over heavy-duty branch of Dayton Stoker Co., Dayton, Ohio, and will consolidate with its organization to round out line of mechanical stokers and parts. Purchasing company is considering expansion, including addition to Indianapolis plant.

Noblitt-Sparks Industries, Inc., 603 East Washington Street, Indianapolis, manufacturer of children's vehicles, toy wagons, etc., and automobile accessories, is arranging for increase in capital, part of proceeds to be used for expansion. Company is now operating branch plants at Greenwood, Columbus and Seymour, Ind.

Showers Brothers Co., Bloomington, manufacturer of kitchen cabinets, etc., is planning addition to cost about $55,000 with equipment.

Board of Education, Gary, is considering installation of manual training equipment in three-story high school to cost about $1,000,000, for which bids will be asked soon on general contract. W. B. Ittner, 911 Locust Street, St. Louis, is architect.

Expansion, which will double production of Superior Body Corporation, Marion, has been announced by John E. Sisson, secretary, following reorganization of business. Arthur Hughes, Mansfield, Ohio, is president. Mr. Sisson will be general manager and Ray Hines, treasurer. Ed. Walsh, who has been connected with company since its organization in 1921, is vice-president.

Plant of Hurwich Iron Co., South Bend, recently destroyed by fire, will be rebuilt at a cost of about $40,000, exclusive of equipment.

J. D. Adams Mfg. Co. of Indianapolis, manufacturer of road construction and maintenance machinery, has purchased a road grading equipment plant at Paris, Ontario. The subsidiary firm will be known as the J. D. Adams Co., Ltd.

St. Louis

ST. LOUIS, Nov. 25.—Chicago, Rock Island & Pacific Railroad Co., La Salle Street Station, Chicago, will soon break ground for one-story addition to engine house and repair shops at Kansas City, Kan., 115 x 130 ft., to cost $50,000 with turntable and equipment. A. T. Hawk, address noted, is engineer.

Walter O'Bannon Co., 400 South Rockford Avenue, Tulsa, Okla., manufacturer of oil pumps, parts, oil-well tubing, etc., is planning one-story addition, to cost about $25,000 with equipment.

Missouri-Kansas-Texas Railroad Co., St. Louis, is arranging a fund of about $1,000,000 for car and locomotive shop expansion and improvements, including additional equipment and tools. An appropriation of $7,000,000 will be allotted for line extensions, way structures and equipment during year.

Pittsburgh Equitable Meter Co., Kennedy Building, Tulsa, Okla., manufacturer of gas and water meters, parts, etc., with main offices and plant at 400 Lexington Avenue, Pittsburgh, has asked bids on general contract for one-story factory branch and distributing plant, 50 x 150 ft., at Tulsa, to cost about $50,000 with equipment. Rush, Endacott & Goff, New Wright Building, Tulsa, are architects; Southwest Engineering Co., 910 North Elwood Street, is engineer.

Bird Wing Commercial Aircraft Co., Rosecrans Field, St. Joseph, Mo., is contemplating erection of one-story plant for parts manufacture and assembling, to cost about $60,000 with equipment. C. Wolfley is general manager.

Sides Airway Corporation, Stuart Building, Havelock, Neb., has plans for a hangar, with repair facilities and other field units, to cost about $100,000 with equipment. Davis & Wilson, 525 South Thirteenth Street, Lincoln, Neb., are architects.

Board of Public Utilities, Kansas City, Kan., has plans for extensions in municipal electric light and power plant and waterworks, including installation of additional equipment, to cost more than $100,000. Burns & McDonnell Engineering Co., Interstate Building, Kansas City, Mo., is consulting engineer.

Phoenix Sand & Gravel Co., Bagnell, Mo., has acquired island in Osage River for new sand and gravel plant, including installation of power equipment, elevating, conveying and other machinery, to cost more than $30,000.

Board of Education, Seminole, Okla., is considering installation of manual training equipment in new two-story high school to cost more than $200,000, for which bids will soon be asked on general contract. Hawk & Parr, First National Bank Building, Oklahoma City, Okla., are architects.

Cleveland

CLEVELAND, Nov. 25.—Machine tool sales were light the past week, business not holding up to the volume that came out the first half of the month. Orders were mostly for single machines from diversified industries. The Thew Shovel Co., Lorain, purchased several used machines, including a 72-in. planer and two or three large turret lathes. One northern Ohio inquiry is pending for about a half dozen large machines. Some complaint is being heard that competitive conditions are resulting in offers of excessive trade-in prices for used machinery. With the slowing down of various metal-working industries and in view of the fact that December is usually a slow month in machine tool sales, a quiet market is looked for during the remainder of the year.

Wheeler Metal Products Co., 1637 Collamere Road, Cleveland, has awarded general contract to A. A. Lane Construction Co, city, for one-story addition, 80 x 300 ft., to cost $140,000 with equipment.

Willard Storage Battery Co., East 131st Street and St. Clair Avenue, Cleveland, manufacturer of electric storage batteries, has awarded general contract to Albert M. Higley Co., Plymouth Building, for one-story addition, to cost about $45,000 with equipment.

International Steel Corporation, Canton, Ohio, has secured long-term lease on former local plant of Canton Steel Foundry Co. Extensions and improvements will be made, including installation of new equipment.

Ohio Nut & Bolt Co., Berea, Ohio, has plans for one-story addition, 45 x 160 ft., to cost about $45,000 with equipment. John W. Bagley, 1706 Euclid Avenue, Cleveland, is architect.

Alliance Drop Forge Co., Alliance, Ohio, recently organized by local interests, has begun construction of one-story plant unit, to cost about $50,000 with equipment. Company has arranged for paid-in capital of $75,000. Local Chamber of Commerce is interested in project.

Board of Education, Mentor School District, Mentor, Ohio, is considering installation of manual training equipment in addition to high school, to cost about $200,000. Miller & Son, 27 West Madison Street, Youngstown, are architects.

Lakewood Automobile Co., 16009 Detroit Avenue, Cleveland, has awarded general contract to Charles Peterson Construction Co., 4500 Euclid Avenue, for one-story service, repair and sales building, 140 x 145 ft., to cost about $140,000 with equipment.

Youngstown Steel Car Door Co., which recently transferred manufacturing operations from Cleveland to a new plant in Youngstown, has plans for an addition, on which work will start soon.

Gulf States

BIRMINGHAM, Nov. 25.—City Council, Baton Rouge, La., has plans for municipal airport, including hangars, repair shops, oil storage and other field units, to cost $160,000 with equipment. Jones, Roessle & Olschner, Reymond Building, are architects.

Southwestern Public Service Co., Amarillo, Tex., has plans for extensions and improvements in local steam-operated electric generating plant, including installation of equipment. Company also plans similar expansion in steam-operated electric station at Pampa, Tex., with additional equipment, entire project to cost more than $150,000. Company is a subsidiary of American Commonwealth Power Corporation, 120 Broadway, New York.

Curtiss Flying Service, Inc., 27-29 West Fifty-seventh Street, New York, has awarded general contract to J. F. Russell

Construction Corporation, Bloom and Brook Streets, Louisville, for airport buildings at Dalworth field, Dallas, Tex., to cost about $90,000 with equipment.

Central Power & Light Co., Frost National Bank Building, San Antonio, Tex., has plans for cold storage and refrigerating plant at San Benito, Tex., to cost about $35,000 with machinery. Plans are also being drawn for ice-manufacturing plant at Raymondville, Tex., to cost about $70,000 with machinery. John M. Marriott, Frost National Bank Building, is architect.

Dallas Power & Light Co., Dallas, Tex., is arranging for a preferred stock issue totaling about $1,500,000, part of fund to be used for expansion in steam-operated electric power plant, including transmission lines.

Luthy Aircraft Co., Jackson, Mich., is contemplating establishment of plant at Petersburg, Fla., including departments for parts manufacture and assembling, to cost more than $50,000 with equipment. Company is considering removal of plant from Jackson to new location, where production will be concentrated.

Galveston Wharf Co., Galveston, Tex., has awarded general contract to Jones & Hertelesater, Inc., Kansas City, Mo., for construction of new grain elevator on local site. It will include elevating, conveying, screening and other mechanical equipment, and will cost $2,850,000.

City Commission, Jacksonville, Fla., will receive bids until Dec. 9 for two 333-kva., transformers, spares, storage battery equipment, etc., for municipal substation. M. W. Bishop is secretary.

American Brown-Boveri Electric Corporation, 420 Lexington Avenue, New York, manufacturer of heavy electrical machinery, parts, etc., with main plant at Camden, N. J., is negotiating with Associated Factories Corporation, Dallas, Tex., Judge John M. Spellman, vice-president and counsel, for establishment of plant near Dallas to build dirigible airships, including operation of a dirigible passenger ship line. Initial work will comprise construction of two such units, each of 6,500,000 cu. ft. displacement, with capacity of 120 passengers. Project will cost about $15,000,000.

City Council, Austin, Tex., is planning bond issue of $70,000 for establishment of municipal airport, including hangars, repair shop, and other field structures. Adam R. Johnson is city manager, in charge.

Toronto

TORONTO, Nov. 25.—The machine tool trade has been affected by curtailment in the automotive industry, but demand from locomotive and car building companies is holding at a satisfactory level. Replacement buying is fairly active throughout the Dominion, and some small tool lists are appearing. Betterment in the call for wood-working tools has developed and small tools are moving freely.

Nelson River Construction Co., 124 Pears Avenue, Toronto, has purchased property at Leaside, Ont., and contemplates building a factory next spring.

Trane Co., 439 King Street, West, Toronto, manufacturer of pumps and pumping apparatus, has purchased a site at Leaside, Ont., and will start work early next year on a manufacturing plant to cost $100,000.

Several contracts have been awarded for an addition to factory of Steel Equipment Co., Ltd., 360 Steel Street, Pembroke, Ont., to cost $30,000. Walter Beatty Estate, 125 Pembroke Street, is general contractor.

Contract for a two-story addition to plant of International Nickel Co. of Canada, Ltd., at Port Colborne, Ont., has been awarded to Fraser Brace Engineering Co., Ltd., 107 Craig Street, Montreal.

Quebec Gas & Electric Co., Three Rivers, Que., has let contract to Page Equipment Co. for an artificial gas manufacturing plant.

Steel Trough & Equipment Co., James Street, Tweed, Ont., will start work next spring on erection of a plant at Hamilton, Ont.

Western Canada

J. J. Herb, president of New Westminster Paper Co., New Westminster, B. C., states that some contracts for rebuilding its plant on north arm of Fraser River have been placed. Others, including machinery and equipment, will be awarded soon. Plant will cost $800,000 and will include finishing building, machine room, shipping wharf, etc. R. F. Arnett is architect.

Erection of a sawmill on Lulu Island, New Westminster, B. C., to cost $200,000, is contemplated by J. L. Galbraith, 303 Queen's Avenue, New Westminster.

Pacific Coast

SAN FRANCISCO, Nov. 21.—San Francisco Galvanizing Works, Inc., 1176 Harrison Street, San Francisco, has awarded general contract to Sorensen & Haggmark, 2652 Harrison Street, for extensions and improvements to cost about $25,000. Dodge Reidy, 821 Market Street, is architect.

Gaffer & Sattler, East Forty-ninth Street, Los Angeles, manufacturers of iron castings, have awarded general contract to William P. Neil Co., 4818 Loma Vista Avenue, for one-story foundry addition, 60 x 60 ft., to cost about $24,000 with equipment. Lawrence Nowell, 4818 Loma Vista Avenue, is engineer.

Mutual Income Properties, Inc., Union League Building, Los Angeles, John Boos, president, has awarded general contract to Roy Brown, Union League Building, for a ten-story cold storage and refrigerating plant in San Pedro Harbor district, to cost over $1,000,000 with machinery. F. A. Brown, 1489 West Washington Street, is architect.

Pacific Lumber Co., Scotia, Cal., has awarded general contract to Mercer-Fraser Co., Eureka, Cal., for a new plant unit to cost about $300,000, with conveying, hoisting and other mechanical-handling equipment. Company engineering department is in charge.

Washington Electric Co., Seattle, has secured permit for hydroelectric generating plant on Columbia River, near Wenatchee, Wash., to develop capacity of 60,000 hp., to cost over $2,000,000 with transmission system. Willis T. Batchellor, Dexter-Horton Building, Seattle, is consulting engineer.

Western Products Co., Salem, Ore., will soon begin work on paperboard mill on local site, consisting of several units, to cost more than $450,000 with equipment. L. A. DeGuere, Wisconsin Rapids, Wis., is engineer.

Gray & Danielson Radio Co., San Francisco, plans rebuilding part of factory destroyed by fire Nov. 19.

Allen Lockheed, Los Angeles, formerly head of Lockheed Aircraft Co., recently sold to Detroit Aircraft, Inc., Detroit, is at head of project to construct a new plant on local site for production of airplanes and parts, including assembling department. Permission has been secured to sell about 200,000 shares of stock to provide funds for project. Malcolm Lockheed will also be interested in new organization.

Monterey Ice Delivery Co., Monterey, Cal., a subsidiary of Union Ice Co., 354 Pine Street, San Francisco, has plans for one-story ice-manufacturing plant, to cost about $50,000 with machinery. Engineering department of parent company is in charge.

Foreign

ESTABLISHMENT of plant near Moscow, Russia, for production of both razor handles and blades, is under consideration by Gillette Safety Razor Co., 15 West First Street, Boston. William J. McCarthy and Clarence S. Grey, officials of company, are now abroad to arrange details.

Norsk Hydro Co., Oslo, Norway, is arranging for increase in capital from 76,852,800 kroner (about $19,213,000) to 104,999,940 kroner (about $26,249,900), part of fund to be used for expansion and improvements at nitrogen fertilizer manufacturing plant.

Secretary of Public Works and Tenders Board, Wellington, New Zealand, will receive bids until Jan. 28 for three 50-kva. oil-immersed circuit breakers, with spare parts, etc.; until March 4 for structural steel, steel screens and kindred products.

Soviet Russian Government, Moscow, is arranging for reorganization of aluminum industry in country, with plant expansion and improvements to develop output of 20,000 tons per annum at end of five-year program. Entire project will cost about $15,000,000. Amtorg Trading Corporation, 261 Fifth Avenue, New York, is official buying agency in United States.

Oberkoks Chemical Co., Berlin, Germany, has concluded agreement with E. I. duPont deNemours & Co., Wilmington, Del., for participation of latter in lacquer manufacturing plant of Oscar Mosebach, Riesa, Saxony, a subsidiary. Last-noted company will increase capitalization and carry out expansion for production of lacquers under duPont patents, with installation of additional equipment.

A company at Nyslott, Finland, is planning construction of large plywood manufacturing plant, to replace factory recently destroyed by fire. Installation will include about 15 milling machines, glue presses, mechanical drying equipment, saws and other tools, and it is anticipated will be purchased in United States. Information at office of Bureau of Foreign and Domestic Commerce, Washington, reference Finland No. 319335.

International Railways of Central America, 11 Broadway, is contemplating purchase of rolling stock and equipment for new line between Guatemala and Salvador systems, now nearing completion, to cost about $400,000.

New Trade Publications

Metal-Working Machines.—Niagara Machine & Tool Works, Buffalo, N. Y. Eight-page bulletin illustrating and describing various types of machines for a number of production uses, including particularly aircraft manufacture.

Air Heaters.—Gehnrich Oven Co., Inc., Long Island City, N. Y. Folder of

four pages illustrating and describing indirect gas-fired industrial heaters in three sizes for temperatures up to 250 deg. Fahr., with gas consumption ranging from 200 to 600 cu. ft. an hour. These heaters are 44 in. deep and 58 in. high, with widths of 24, 44 and 64 in.

Washfountains.—Bradley Washfountain Co., 2203 Michigan Street, Milwaukee, Wis. Booklet of 16 pages, illustrating and describing various types and sizes of fountains for washroom use. List of users is given.

Ovens. — Despatch Oven Co., Minneapolis, Minn. Two four-page illustrated bulletins, Nos. 80 and '81, describe installations of various types of oil, gas and electric foundry ovens for the baking of cores and molds.

Steel Castings.—Nugent Steel Castings Co., Chicago. Illustrated two-page bulletin, No. 122, describes how a tractor manufacturer settled the spade lug question by the use of electric alloy steel castings. The bulletin discusses in particular "Nuloy," an alloy steel casting especially adapted where good strength, resistance to shock and resistance to abrasion are required.

Case Hardening. — Case Hardening Service Co., Cleveland. What is claimed as the first general catalog of heat-treating materials which has been produced is offered in an elaborate 20-page bulletin entitled "Supplies and Accessories for Heat-Treating Plants." The catalog describes Bohnite, Non-Case, Caseite, Drawite Salts, Bathite Salts, Pressed Steel Pots, Cleancoat, and Electric Hevi-Duty Furnaces.

Worm-Gear Speed Reducers.—Gears & Forgings, Inc., Cleveland. Bulletin C, 48 pages. Outlines the advantages of worm gear units, and describes and illustrates constructional details and typical installations. Ratings and dimensions of the various types and sizes manufactured are included, and data are given on G & F worm hobs.

Lathes.—South Bend Lathe Works, South Bend, Ind. Bulletin No. 9, 20 pages, devoted to the new 9-in. lathe, and bulletin No. 22, 20 pages, describing the new 9-in. Junior lathe. Both are back-geared screw-cutting machines and can be furnished with several types of drives, legs and lengths of bed. In addition to specifications and prices, data are given on the construction, manufacture and uses of these machines. Attachments for milling, keyway cutting and grinding are also shown.

Die Sets and Accessories.—Danly Machine Specialties, Inc., 2014 South Fifty-second Avenue, Chicago. Sixth edition of catalog and data book on die sets and die makers' supplies. A complete line of reverse die sets, and a new shoulder guide post or leader pin and bushing, are included. A chart shows the various sizes and makes of punch presses which may be employed for the different sizes of large die sets.

Governors. — Massey Machine Co., Watertown, N. Y. Catalog No. 27, devoted to the construction and action of the class W engine governor and the company's speed regulator.

Press Brakes.—Cincinnati Shaper Co., Cincinnati. Loose-leaf booklet devoted to construction and specifications of the company's No. 120 and No. 70 series all-steel press brakes. Several outstanding applications are illustrated, and sections are devoted to a list of representative users and products being made on these machines.

The Week's News Quickly Told

Current Events That Bear on the Course of Business

"COORDINATION of business and governmental agencies in concerted action for continued business progress," was the aim of several conferences called by President Hoover . . . He was assured by labor leaders and leading employers that wage rates will remain stabilized . . . He asks Governors to encourage public works in the States, counties and cities . . . Treasury department will recommend to Congress a $423,000,000 building program for the next decade.

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RAILROAD executives will increase rather than abandon any part of their betterment programs, said R. H. Aishton, president American Railroad Association . . . President Hoover urged Interstate Commerce Commission to expedite consolidations, to permit further railroad reconstruction . . . Automatic train control and visual cab signals will be installed on all Pennsylvania main lines west of Pittsburgh . . . In New York all Grand Central approaches will be made "two-way" tracks, to handle a three-fold increase of traffic since the terminal was constructed . . . Weekly freight car loadings showed half the usual seasonal decline of about 50,000.

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ROAD and street construction aggregating $2,200,000,000 is projected for 1930 . . . Los Angeles traffic commission reported that subways are necessary to relieve congestion in center of city . . . Much unemployment exists among building trades in the Central States . . . Chicago lathers' union demands privilege of naming foremen.

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WAGE increase on a percentage basis for about 100,000 employees is announced by Henry Ford . . . Ford assembly plants throughout the country will close, "pending adjustments for 1930 business," as soon as stocks of parts are consumed . . . Automobile finance companies report no increase in delinquent payments . . . Several thousand tire retailers organize a central purchasing organization to obtain larger discounts . . . Raw rubber is lower. Efforts of Dutch growers to control production of crude fail because 40 per cent of world's supply is gathered by unorganized Asiatics.

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RETAIL trade is cautious. Department store sales in the East are somewhat better than in the Central States and South. . . . Percy S. Straus, vice-president of Macy's (New York) and affiliated stores in Newark, N. J., Atlanta, Ga., and Toledo, Ohio, said that "Since the stock market panic has not thus far seriously interfered with business, there is no prospect that it will." . . . Some 9,000,000 Christmas Clubs will return $600,000,000 this year, about 10 per cent more than 1928.

STOCKS, grain and cotton are steady at higher quotations . . . Wheat prices are 14c. above the recent low point—Winnipeg prices are 10c. higher than Chicago . . . Index of wholesale commodity prices is up slightly, checking a steady decline since July . . . Michigan fruit packers and cold storage plants organize into a cooperative, controlling 90 per cent of the pack.

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TEXTILE manufacturing is slower not only in America but in nearly all foreign weaving centers . . . New England cotton mills are operating at about 60 per cent of single shift. Acushnet mill, the third oldest in New Bedford, operating 102,000 spindles, votes to liquidate, having passed dividends for two years . . . National Wool Marketing Association is formed under guidance of Federal Farm Board, to market wool and mohair direct from growers to spinners.

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ARGENTINE Republic and Great Britain have arranged preferential tariffs on rayon goods and wool mixtures southward, and on grain and meat northward . . . The former country continues its policy of non-cooperation in Pan-American movements sponsored by the United States by failing to reply to sanitary conference pourparlers . . . Pension law in Uruguay requires public works and utilities to employ persons over 45 to the extent of 10 per cent of the payroll.

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MONEY appears to be plentiful in most financial centers . . . Business and banking throughout each of the 12 Federal Reserve Bank districts are in a sound condition. Brokers' loans decreased sharply last week, bringing total reduction of $3,217,000,000 since peak on Oct. 7 . . . Federal Reserve Bank (New York) reduced its rate to 4½ per cent, and the Bank of England reduced its discount rate ½ per cent for the second time in three weeks, it now being 5½ per cent . . . Japan, having stabilized its currency, announced that it will lift the embargo on gold shipments Jan. 11 . . . Taxes in France are producing a surplus of about 350,000,000 francs a month. This is being used to deflate the currency and to improve industrial and agricultural equipment. Tax reduction and soldiers' pensions are topics of popular discussion.

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RUSSIAN armies have advanced into Manchuria from both eastern and western portals of the Chinese Eastern Railroad . . . Former Secretary of State Kellogg, speaking in London, said that three things are necessary to uphold the peace treaties, viz, educate the people to the advantages of peace, promote conciliation and arbitration agencies, and limit armaments.

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Meeting More Rigid Specifications

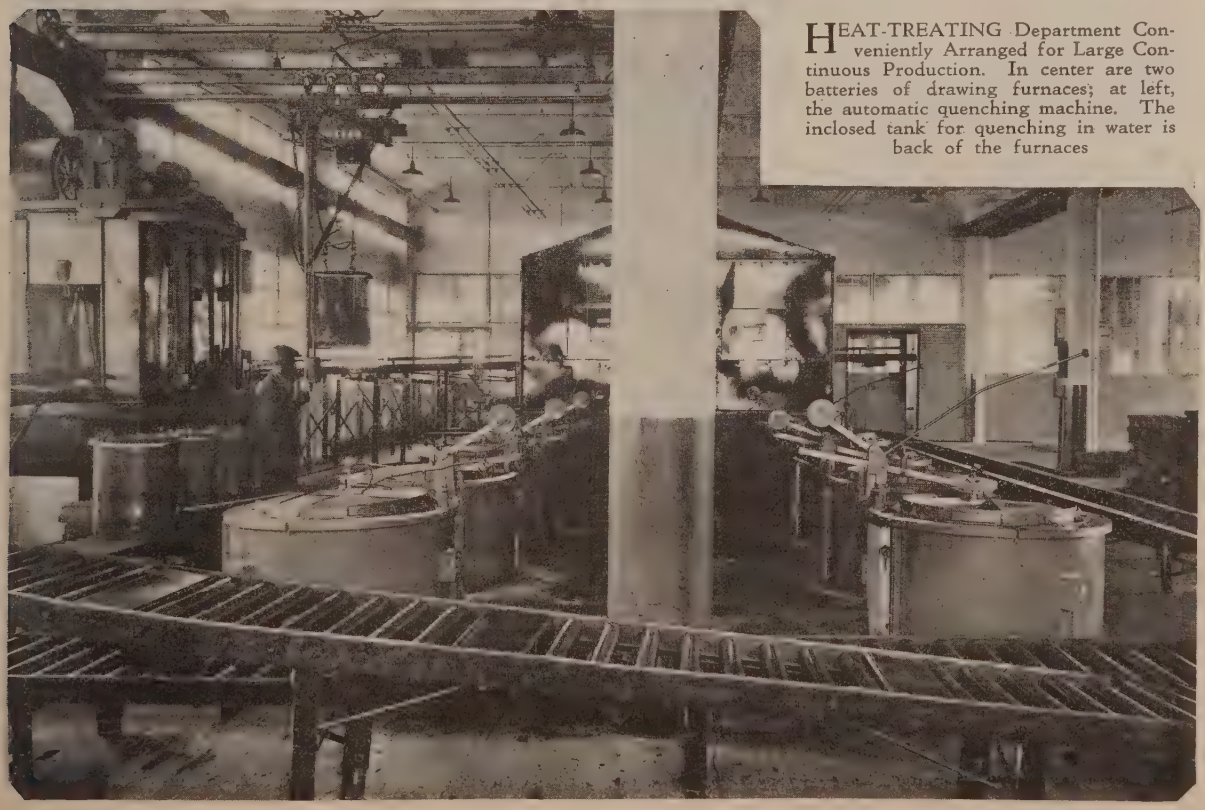
New Heat-Treating Equipment for Bolts Designed for Accurate Control and Large Output— Plating Room Flexible

BY FRED L. PRENTISS*

TO effect close control of its heat-treating operations in the manufacture of bolts, to produce a product uniform in quality and to meet the more rigid specifications of consumers as to physical properties, the Lamson & Sessions Co., Cleveland, recently placed in operation a new heat-treating department equipped with electrically operated drawing furnaces, in which all cold-headed work except stove bolts are heat treated. Interesting features of this department include a compact and efficient arrangement of the equipment, an automatic quenching machine designed to assure uniformity and quality of product and the provision of roller tables and overhead handling equipment to reduce labor to a minimum.

The company has added a plating department which shares, with the heat-treating department, the fourth floor of a new 80 x 140-ft. manufacturing building. While the two departments are separated by a partition, they are connected by roller conveyors for carrying to the

*Resident editor, THE IRON AGE, Cleveland.



HEAT-TREATING Department Conveniently Arranged for Large Continuous Production. In center are two batteries of drawing furnaces; at left, the automatic quenching machine. The inclosed tank for quenching in water is back of the furnaces

plating department, after drawing and quenching, work which is to be plated.

More exacting demands of consumers of steel in various forms have spurred manufacturers of bolts as well as of other steel products to improvements in processes and methods. At the same time competition has been an incentive for introduction of better manufacturing methods to reduce production costs. Bolts regarded as satisfactory not long ago do not meet present specifications of many buyers, particularly in the automotive field.

Formerly buyers were satisfied with bolts having a tensile strength of 45,000 to 50,000 lb. per sq. in. Now there is a tendency to demand a product with a tensile strength of 80,000 lb. and higher in plain carbon steel, and up to 125,000 lb. per sq. in. in alloy steels. Buyers have become more particular, also, in respect to tolerances of the other physical properties, particularly hardness, resulting in specifications that hold to a closer range in Brinell numbers.

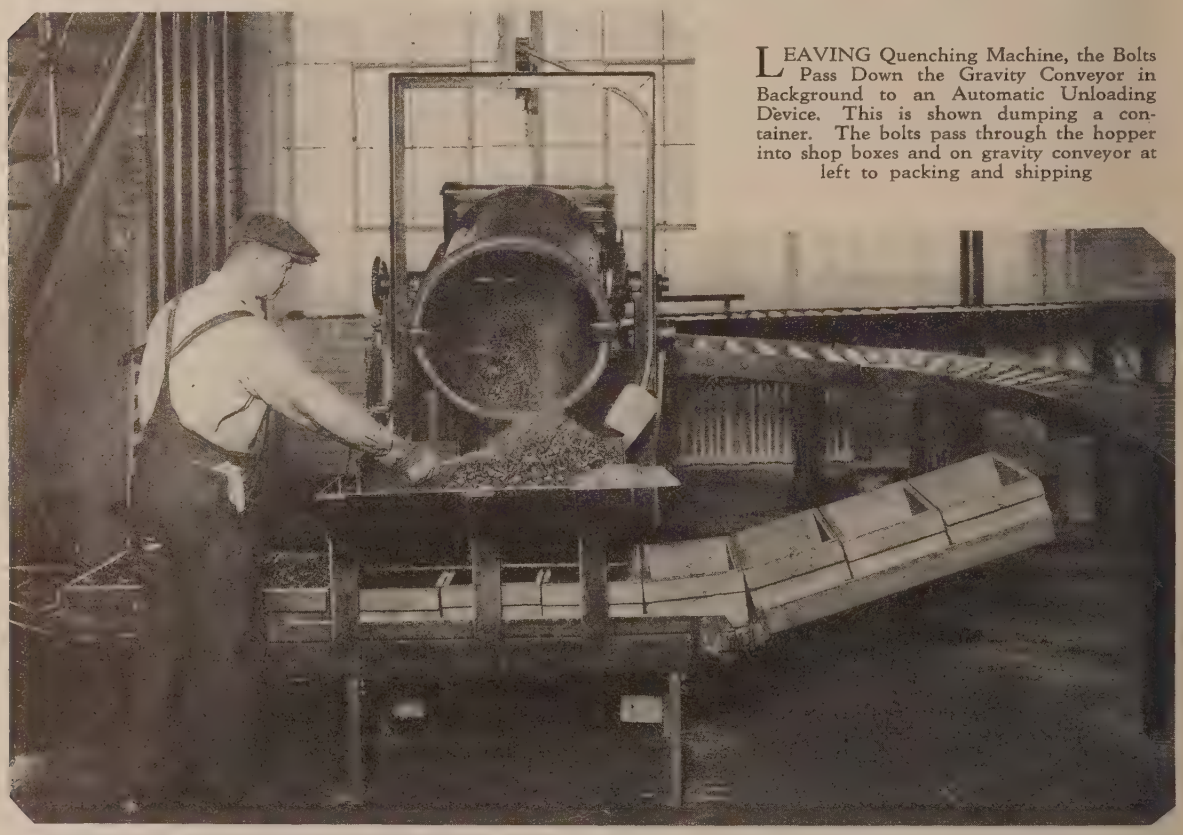
Some consumers are interested mostly in tensile strength, others in Brinell hardness, wanting it high or low, depending on their product, and still others in the elastic limit. Although tensile strength and hardness are the two physical properties given most importance by exacting buyers, some have strict requirements in respect to all three of these properties. Some also include specifications covering elongation and reduction in area. In addition, and perhaps no less important, is the demand for closer dimension limits. This necessitates avoidance of scale.

Gas Furnace for Hardening

Hardening, the first heat-treating operation, is done in the Lamson & Sessions plant in a gas-fired rotary furnace in the basement. The bolts are kept in the furnace from 60 to 90 min. at 1450 deg. to 1600 deg. Fahr., depending on the steel and the customer's requirements. This furnace is used also as a carburizing furnace for bolts which are to be case hardened and not subjected to any further heat-treating operation. An electric furnace of the continuous conveyor type, will be installed shortly in the heat-treating department, to supplement the gas-fired furnace for hardening high-carbon and alloy steels.

Bolts after heating for hardening are brought from the second floor to the heat-treating department in shop boxes on an automatic lift and dumped into containers on a roller conveyor that passes along the side of the furnaces. They are drawn in Homo furnaces, of which there are eight of 40 kw. capacity arranged in two parallel groups.

Space is provided for eight additional furnaces of this type. Another roller conveyor leading from the automatic lift will be placed parallel to and back of the one now passing in front of the first row of furnaces. From this the boxes of work will be lifted over to the second conveyor, and dumped into the containers in which they are charged into the furnaces.



LEAVING Quenching Machine, the Bolts Pass Down the Gravity Conveyor in Background to an Automatic Unloading Device. This is shown dumping a container. The bolts pass through the hopper into shop boxes and on gravity conveyor at left to packing and shipping

Each row of furnaces is served by a crane with 16-ft. span and carrying an electric hoist. The crane has electric drive for both movement of the hoist along the span and movement of the bridge along the crane runway. Current for the longitudinal movement is supplied by three rails suspended from the ceiling. The containers, circular buckets 24 in. in diameter and 30 in. deep, have a capacity of 800 lb., which is the usual furnace load.

The drawing furnace temperature ranges from 1100 to 1200 deg. Fahr. and the work is kept in the furnace from 45 to 75 min., depending on the grade of steel and the physical properties required. From the drawing furnace the hoist carries the container to the quenching machine. This consists of a tank 4 ft. x 8 ft x 4 ft. deep, with automatic mechanism with push button control for handling the container in and out of the tank. The

quenching solution is soda water and a small percentage of soluble oil.

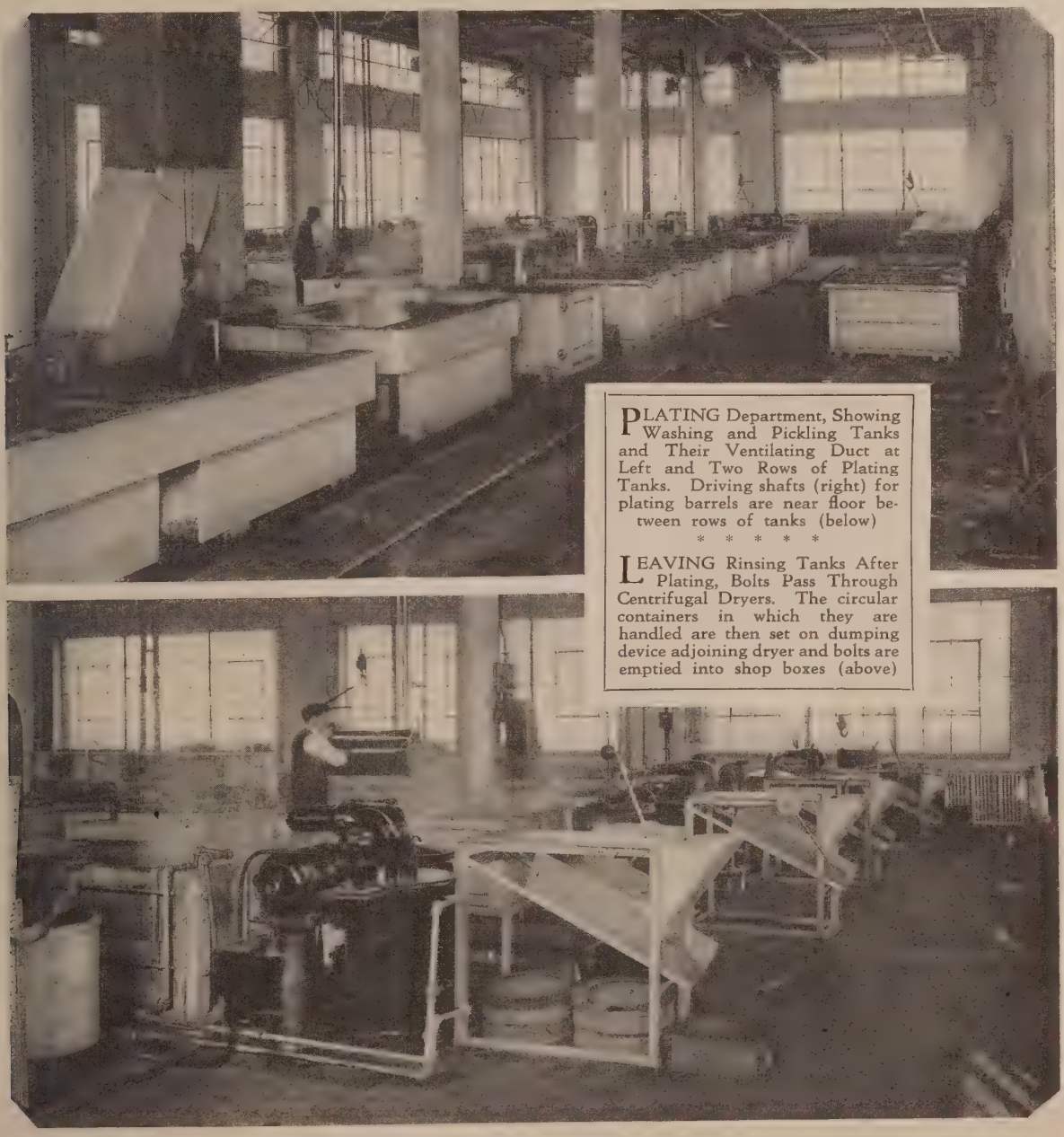
Quenching by Automatic Lowering Device

Lowering the container into the quenching tank is controlled by a variable-speed drive. When the bucket of work reaches the solution its speed is materially reduced; when it is lifted out the same speed is maintained until the container is out of the solution, the speed then being about doubled. Because of the slow dipping in the quenching solution instead of rapid immersion, the liquid slowly seeps through the work, not causing a large amount of steam and insuring a uniform quenching. The quenching solution is heated in the morning to a minimum of about 130 deg. Fahr., by means of steam coils, and is kept normally at approximately 180 deg., although the heat from the work sometimes brings it up to the boiling point.

The function of the soluble oil is to give color to the product. The temperature of the work is high enough to carbonize the oil and the work comes out with an attractive black coating, which will prevent oxidation for some time. The supply of oil is replenished occasionally by dumping a bucket of fresh oil into the quenching tank. The cycle for immersing the work in the solution, quenching and raising it from the tank takes 5 min.

As the bolts are handled in large quantities, there is little surface exposure to the air during the short time required for moving them from the drawing furnaces to the quenching machine. Thus formation of scale is avoided and there is assurance that the pitch diameter will not be changed. The heat-treating methods followed, it is stated, result in a product uniform in tensile strength and in hardness. A cup fracture is produced on tensile testing and the structure has a silky appearance. The bolts are held within the National Screw Thread Commission's tolerances for class 2 and 3 fits. The pitch diameter is held within 0.002 and 0.003 in.

On being lifted from the quench the container remains above the tank about 5 min., or until the next container



PLATING Department, Showing Washing and Pickling Tanks and Their Ventilating Duct at Left and Two Rows of Plating Tanks. Driving shafts (right) for plating barrels are near floor between rows of tanks (below)

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LEAVING Rinsing Tanks After Plating, Bolts Pass Through Centrifugal Dryers. The circular containers in which they are handled are then set on dumping device adjoining dryer and bolts are emptied into shop boxes (above)

is brought to the tank, that time being sufficient for the work to drain. The container then moves on to a roller conveyor which carries it a short distance to an automatic unloading device, which dumps into a hopper. The empty container is switched on to another roller track which moves it back to a position in front of the furnaces for reloading.

From the hopper the bolts pass to a gravity roller conveyor which carries them 350 ft. through an inclosed runway over the roof of an adjoining building. This conveyor connects to a spiral conveyor which carries the boxes of bolts down to the packing and shipping department.

A second quenching tank is provided for quenching in water those bolts which are to be plated. The overhead hoist delivers the containers of work to this tank. After quenching, the containers are placed on a roller conveyor that leads into the plating department.

Efficiency in handling the work is being increased by the use of work containers handled with tongs. These are suspended from the hoist. When the latter is raised the tongs grip over a lug that extends around the top of the container. When the tongs are lowered they release hold on the container. With the use of the tongs containers with eyes and a handling device with hooks, requiring hand labor in hooking and unhooking, will be eliminated. For drawing and quenching small lots the company has devised circular sheet metal boxes holding 150 lb., five of these nesting in one of the standard containers.

Control equipment for the drawing furnaces is located in a glass-inclosed mezzanine room overlooking the furnaces. Each furnace has independent heat and production control from instrument boards designed by the company. Red signal lights and a bell are used to signal the operator when the furnace is turned off.

Three Men—9600 Lb. an Hour

With the eight furnaces a bucket holding 800 lb. of bolts is heat-treated every 5 min. or at the rate of 9600 lb. an hour. However, with the efficient handling and other facilities only three persons are required to operate the department—a furnace operator, a helper and a man in the instrument room.

Freedom from smoke and fumes and the clean appearance of the room are conspicuous features of the heat-treating department. The cleanliness is due to the unusual attention that has been given to ventilation. The furnaces are set through the floor, the bottoms being a little below the ceiling of the floor below and the tops at a convenient working height for the furnace operator. The furnaces themselves are equipped with a ventilating system for carrying away the fumes.

An air outlet is provided by a 2 x 7-in. duct connected to the top of each furnace and extending down the outside to an 8-in. diameter duct that extends along the third floor ceiling beneath. One such duct serves each battery of four furnaces and the air through the two ducts is drawn out by one fan and exhausted at the side of the building. Air to replace that drawn out is admitted into the top of the furnace, where an aluminum slip ring fits loosely around the furnace cover and provides an air inlet.

One feature of the furnaces that does not have to do with ventilation is the elimination of the usual cylindrical screen in the center of the containers. The air placed in circulation by the fan in the bottom of the furnace is forced through the work, instead of through the cylindrical screen. This is proving a satisfactory method of air circulation and at the same time the capacity of the container is increased.

Both quenching tanks are entirely inclosed with sheet metal hoods and the smoke and steam arising during quenching are exhausted through ducts, being drawn out by suction fans on the roof. The room is ventilated by four exhaust ventilators extending from the ceiling and connected to a fan on the roof. The room is heated by unit heaters; when the windows are closed these supply air to replace that exhausted by the various ventilating units.

Face brick is used for the interior mason work because, with its tile finish, it is easy to clean. The walls are finished in a light tan color which, with the brick trimming, gives the room a bright and neat appearance.

Flexibility Features Plating Facilities

NOT only is the plating department equipped for plating with cadmium, brass, nickel, lead and copper, including plain copper coatings and bronzes, but also for Parkerizing and galvanizing. Chromium plating will be added. The electrolytic process is used for all kinds of plating. In lead plating the company has found that the coating applied electrically is not so porous as when hot dipped and consequently is more satisfactory. Four double-wheel buffing and polishing machines make it possible to meet any polishing specification.

The convenient arrangement of the equipment and the location of the plating barrel driving mechanism are among the interesting features of the plating department. Work starts at the end of the plant adjoining the heat-treating department and is finished at the other end. A floor-type gravity conveyor will be installed shortly for carrying work through the department. This will deliver boxes of finished bolts to an automatic lift, which will discharge them to a gravity conveyor, which will in turn carry them to the packing and shipping department.

The plating tanks are of the double-barreled type arranged lengthwise of the plant in five lines, two for cadmium plating, one for galvanizing, one for special finishes (copper, brass, nickel and lead) and one for Parkerizing. There are 16 tanks and 32 plating barrels. In addition, a sixth line contains large tanks for the still galvanizing, and nickel, copper and cadmium plating of work too long to be handled in the plating barrels.

Shaft Lines Along Floor

Driving shafts for the plating barrels, usually placed overhead, are here located a few inches above the floor. One shaft along the wall drives the barrels in the first line of tanks and the other four lines are driven by two shafts, each located between rows of tanks and driving the barrels in two adjoining lines. There are two washing and pickling tanks, one of each at the head of one line, and these serve the adjoining line in the same bay, a crane with a short runway being provided to deliver work for the second line.

From the end of the crane runway, monorail tracks equipped with electric hoists extend over the tanks the length of the building for handling work in and out of the barrels. Fumes from the pickling and washing tanks are drawn through ducts around the sides at the top of the tank and carried outside the building through a vertical duct leading to the roof, where they are exhausted by a suction fan.

Two rinsing tanks, one for cold water and one for hot water, are located at the end of the line of plating tanks. After rinsing, the bolts are placed in centrifugal driers, one of which is located at the end of each plating line. Here they are dried by a blast of hot air.

Adjoining each drier is an efficient dumping device designed by the company. The circular container that holds the work during drying is placed in a holding fixture on the dumping mechanism and is turned over by a hand-operated spider, bolts being dumped into a chute, from which they pass into shop boxes. Then they are ready to go to the packing and shipping department.

Molybdenum in Cast Iron

Strength and Hardness Increased Much More Rapidly Than Machinability Decreased—Best Results Achieved With 1.5 Per Cent Molybdenum

BY E. K. SMITH AND H. C. AUFDERHAAR*

As usual, steel has led the iron industry in the use of alloys, but recently they have been successfully introduced into gray iron foundries—particularly the use of nickel and nickel with chromium. Other alloys have been tried with varying results, but as yet have not been accorded wide use. One of the most promising of these, molybdenum, has received comparatively little attention in the past, despite its availability from many mines within the United States.

Gillett and Mack, in their recent book "Molybdenum, Cerium, and Related Alloy Steels," state that four alloys are most used in steel making, these being nickel, chromium, vanadium, and manganese; and that the most of these alloys are imported. "The development of a domestic alloying element which can, in whole or in part, replace or supplement these foreign elements, is of obvious importance to American steel makers and users. Molybdenum is such an element. The United States has the largest potential supply of molybdenum ores of any country in the world." Any large metallic deposit is a national asset and this is particularly true of molybdenum. There are a number of deposits, mostly in the Western States. The present price of about one dollar per pound of contained molybdenum restricts the use of this material but it seems very probable that the price can be reduced when molybdenum is used in larger tonnages. Molybdenum has earned a definite and increasingly important place in steel making, and may have an even more essential part in the development of high-test gray irons, especially in case a national emergency should make it difficult to obtain other alloys.

*Metallurgist and assistant metallurgist, respectively, Stockham Pipe & Fittings Co Birmingham.

(a) A.S.T.M. *Transactions*, Part 2, 1920, page 5.

(b) O. Smalley, *The Iron Foundry*, supplement to *Metal Industry*, Jan. 19, 1923.

(c) E. Piwowarsky, *Stahl und Eisen*, Feb. 26, 1925, page 294.

Little Information Now Available

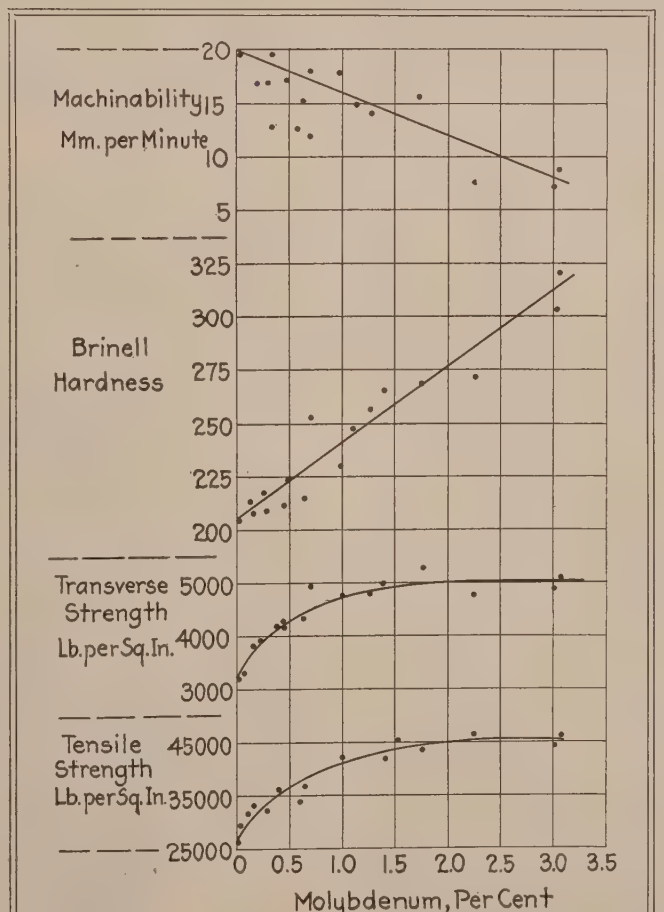
Surprisingly little has been published on the subject of molybdenum in cast iron, although there are numerous articles on molybdenum in steel. In 1920, G. W. Sargent reported improved tensile strength and toughness imparted to gray iron by molybdenum. (a) In 1923, O. Smalley presented data before the Institute of British Foundrymen on special cast iron. (b) He found that molybdenum is valuable as a strengthener, toughener and grain refiner and that up to 0.50 per cent, machinability is not affected. He noted one of the most striking characteristics of molybdenized gray iron, i.e. its strong tendency toward putting graphite into the nodular form.

Piwowarsky, in his notable article on alloys in gray iron, (c) finds increased strength due to molybdenum.

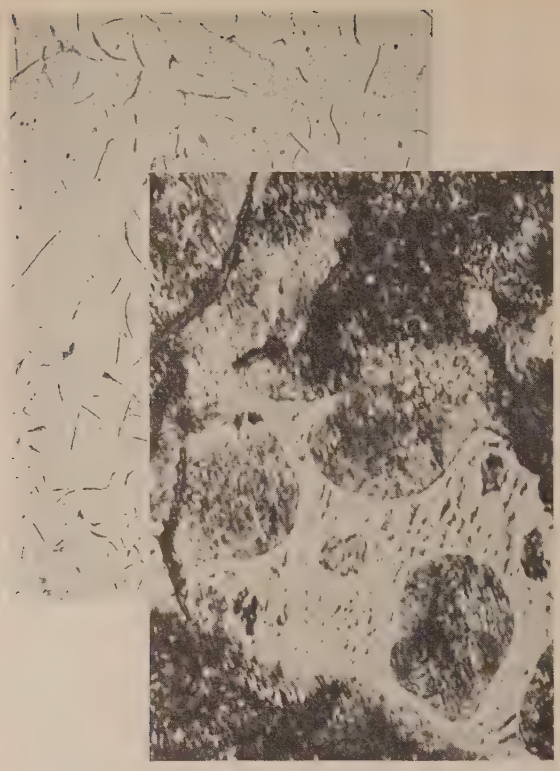
Recently there has been considerable work on molybdenum in cast iron but as yet little has been published.

Data on Crucible Melts

In planning this series of experiments it was desired to follow practical foundry conditions as closely as possible. Preliminary work demonstrated that it was difficult to effect complete solution of high percentages of molybdenum when such additions were made to the ladle. There was also to be considered the small but unavoidable fluctuations in



FORTY Crucible Melts of Cast Iron of Uniform Composition, Except for Molybdenum Content, Were Tested by Standard Methods, and the Most Important Data Is Plotted Above



STANDARD Cast Iron Containing No Molybdenum. Unetched Micro at 100 Diameters Shows Fine Graphite in Flakes. Etched micro at 500 diameters shows comparatively coarse grains, with graphite, pearlite and phosphide

composition of iron produced by the cupola on a commercial scale. Therefore all charges were melted in crucibles, by which means the usual fluctuations in chemical constituents could be rendered negligible. As a check on the results, molybdenum was added in the ladle, especially in the lower ranges, these results being comparable to those obtained by the crucible melting.

In order to have uniform composition, identical charges were made up for the whole series of crucible heats, forty in number, varying only in the size of molybdenum addition. Cast scrap (42 per cent of each charge) was obtained from one large casting of uniform dimensions, while pig iron (50 per cent) and steel (8 per cent) were from carloads of unusual constancy of composition. Molybdenum was used in two forms, ferromolybdenum and a lower melting point molybdenum alloy. (Calcium molybdate seemed unsuited for these experiments.)

Analysis of test bars was as follows, there being little variation:

	Per Cent
Silicon	2.18
Manganese	0.52
Sulphur	0.060
Phosphorus	0.37
Total Carbon	3.32
Graphitic Carbon	2.67
Combined Carbon	0.65
Molybdenum	According to addition

Gas was used as a fuel, crucibles being carefully covered.

Tension tests were made on bars cast in accordance with the recently recommended pattern for gray iron for pipe flanges and fittings. Transverse tests were run on American Society for Testing Materials arbitration bar. Brinell hardness was determined on the lower end of the arbitration bar.

Machinability Determined by Drilling

In arriving at comparative values for machinability, we used a modified Keep test, it having been found to give satisfactory results in the past. Equipment consisted of a direct-connected, motor-driven drill press travelling at 400 r.p.m. Suitable weights were placed on the press (which was free to move vertically) so that the total weight at the point of the drill was 130 lb. A ⅝-in. high-speed drill was used, care being taken that sharpening between experiments was uniform.

In order to test for machinability, the end of a transverse bar was ground to a depth of ⅛ in. and the drill point rested on the bar, the exact point being located by a center punch. The drill was then operated for one minute, and the depth of the hole measured. Machinability was reported in penetration — millimeters per minute. Duplicate determinations checked closely.

The authors realize that no one test can measure all kinds of machinability, but believe that the drill test gives good average results.

Physical Properties and Structure

Results are summarized on the graph showing the physical properties determined and by the micrographs showing the structure. Owing to the method of melting the variations, which are reasonably consistent, may be ascribed primarily to the influence of molybdenum.

Machinability.—Increasing percentages of molybdenum decrease machinability, as measured by the drill press. However, machining did not become notably difficult, until molybdenum had reached 1.5 per cent, which point also marked the attainment of maximum strength. At 3 per cent molybdenum, drilling was difficult. A bar, not shown in graph, with 4.40 per cent molybdenum, could not be drilled.

Brinell Hardness.—Molybdenum hardens cast iron, even in small amounts, but apparently hardness increases more rapidly than machinability decreases. At maximum strength, with 1.5 per cent alloying metal, the Brinell

STANDARD Cast Iron Containing 0.65 Per Cent Molybdenum. Unetched micro at 100 diameters shows large nodular graphite. Etched micro at 500 diameters shows a somewhat finer grain than the iron without molybdenum. Constituents are phosphide, graphite and pearlite

number was about 260, but the bar could be readily drilled. A bar with 4.40 per cent molybdenum showed 418 Brinell, and could not be drilled.

Transverse Strength.—Starting with unalloyed bars having transverse strength of 3200 lb. per sq. in., strength increased rapidly, reaching a maximum of 5000 lb. per sq. in. with 1.5 per cent alloy.

Tensile Strength.—Results on tensile bars plotted in a similar curve to that for transverse strength, a maximum of 45,000 lb. per sq. in. being found with 1.5 per cent molybdenum.

The micrographs, both etched and unetched, explain the effect of molybdenum on the physical properties of cast iron. In the first place, the usual long, heavy plates of graphite are absent, and most of the carbon is in the from of nodules. This naturally strengthens the iron. Very fine pearlite or sorbito-pearlite, induced by the alloy, also tends towards strength.

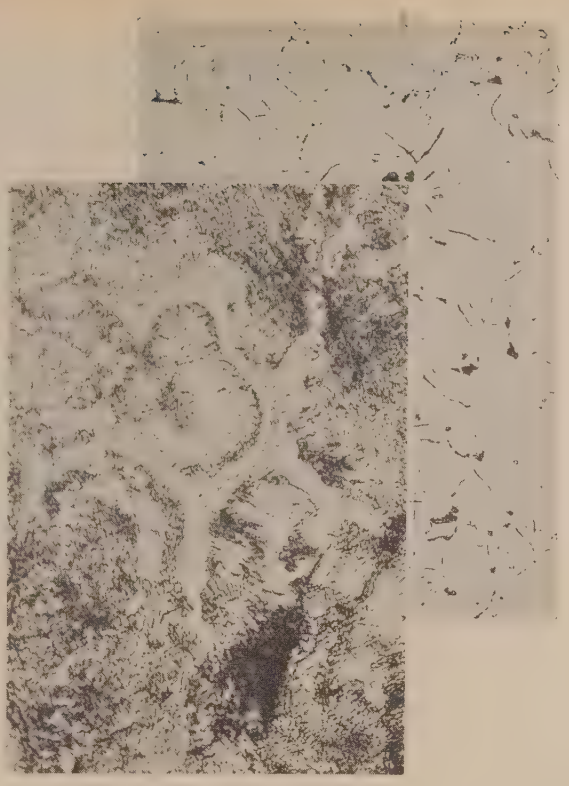
The fact that the molybdenum to a great extent is in solid solution in the ferrite toughens the matrix, promotes shock-resistance, and also inhibits grain growth.

Both the solid solution and the sorbitic structure harden the cast iron, as shown by Brinell tests, and in the higher ranges of molybdenum, make the castings less machinable.

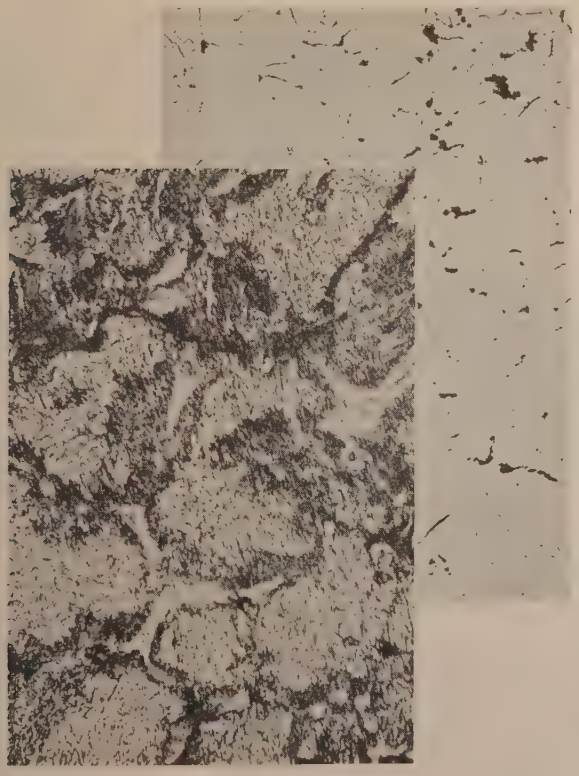
Increasing hardness of the iron is not due to increase in carbides, as there is little increase in combined carbon shown by analysis, and by microstructure. This absence of excess carbide, coupled with the strengthened matrix, also helps to account for the high resistance to shock.

Practical Conclusions

Molybdenum is far from being a remedy for all foundry troubles, but as a strengthener it has a definite use, especially where low costs are not of primary importance. With molybdenum at one dollar a contained pound, two per cent added to cast iron would add about $40 per ton to the cost, the tensile strength being increased from 26,000 to 45,000 lb. per sq. in. An addition of one per cent will raise the strength from 26,000 to 40,000 lb. per sq. in., at a cost of $20 per ton. Obviously, the increased strength would permit lighter sections.



STANDARD Cast Iron Containing 1.77 Per Cent Molybdenum. Unetched micro at 100 diameters shows flake and nodular graphite. Etched micro at 500 diameters shows that increasing amounts of molybdenum progressively refine the grain. Structure comprises a small amount of graphite, very fine pearlite tending toward sorbite, and phosphide



STANDARD Cast Iron Containing 3.10 Per Cent Molybdenum. Almost all the graphite is in nodules; the grain size is small, and the pearlite tends strongly toward sorbite

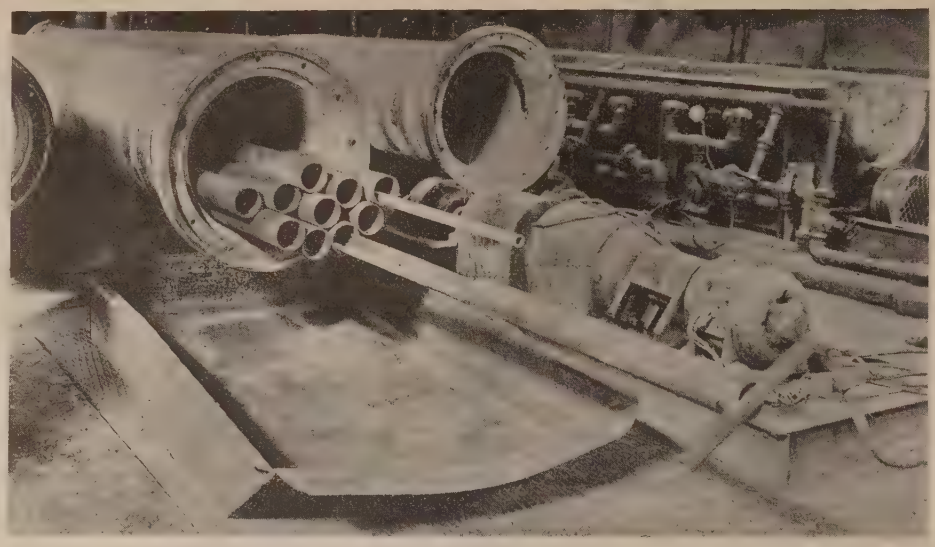
The statement has been made that molybdenum acts as a desulphurizer. The present experiments gave evidence of no such action, although at first the addition of alloy apparently reduced sulphur. This effect seemed to be due to an interference with the usual analytical methods.

A limited number of impact tests indicated that iron containing 1.77 per cent molybdenum had almost double the shock resistance of the unalloyed iron. It seems probable that this property of molybdenum bearing cast irons will prove of value.

Preliminary experiments also indicated that small percentages of molybdenum have little effect on the growth under repeated heatings, or on scaling.

Maximum values for transverse strength at 5000 lb. per sq. in., and for tensile strength at 45,000 lb. per sq. in. were found, but it is obvious that these values hold only for the type of cast iron used. By changing the other elements such as carbon and silicon, higher strengths could undoubtedly be obtained.

In summary, the results of our experiments show that moderate amounts of molybdenum have a beneficial effect on the physical properties of cast iron, but the increased cost is a detriment. However, where decreased weight, increased strength, or shock resistance are important, molybdenum can be used to decided advantage.



SEAMLESS Tubes are Loaded Into Retort. Calorizing compound is then placed uniformly inside each tube by means of the split pipe, and a small diameter pipe placed in each tube to prevent the charge from moving endwise and leaving some portions bare. Compound is also placed in channels between tubes

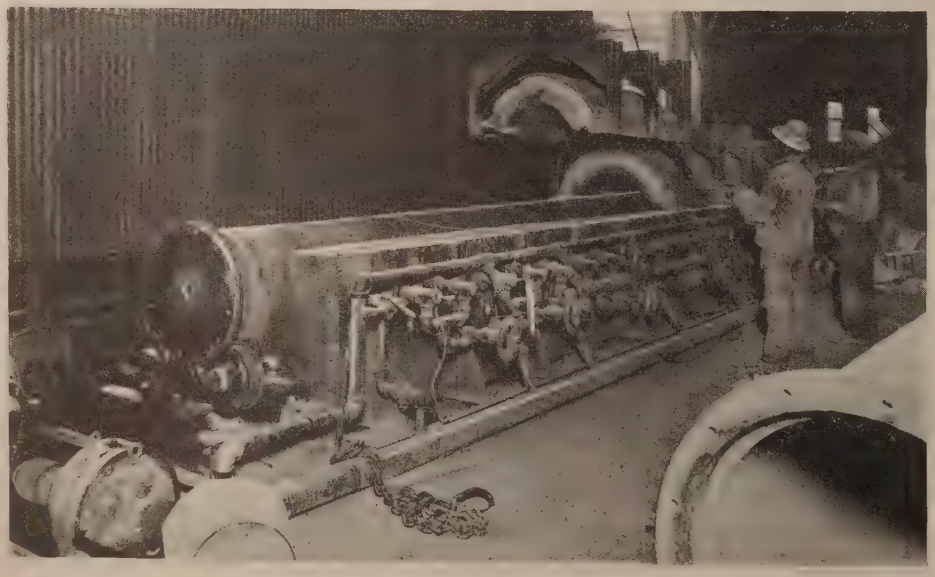
Calorizing Tubes to Resist Corrosion

Rotating Retort Contains Steel Tubes, Granular Aluminum and Hydrogen Atmosphere—Alloy Forms on Surface Which Resists Oxygen and Sulphur

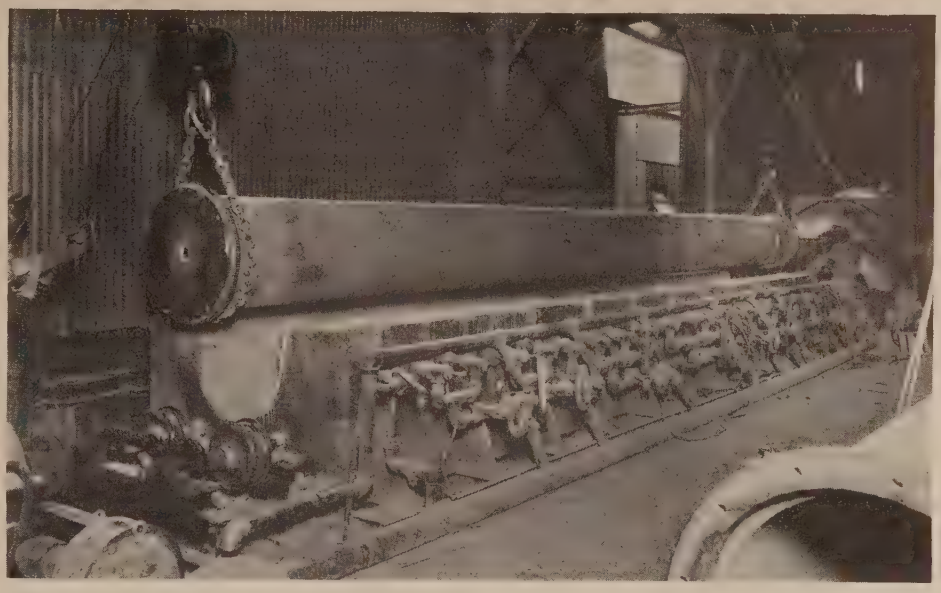
BY B. J. SAYLES*

CALORIZING, as is well known, is a process whereby aluminum is driven into the surface of another metal, usually mild steel, to form an aluminum alloy. This alloy, where mild steel is the base metal, is practically immune to oxidation up to maximum temperatures of 1650 deg. Fahr., and entirely resistant to the corrosive attack of gaseous sulphur products. The process has thus extended the use of an inexpensive construction material to operations in which it could not previously be successfully employed.

*President, Calorizing Co., Wilkinsburg, Pa.



FURNACE Top Consists of Series of Bungs. After assembling, joints are patched, and uniform temperature given to work by series of gas burners. Heat and reducing atmosphere closely controlled at all times



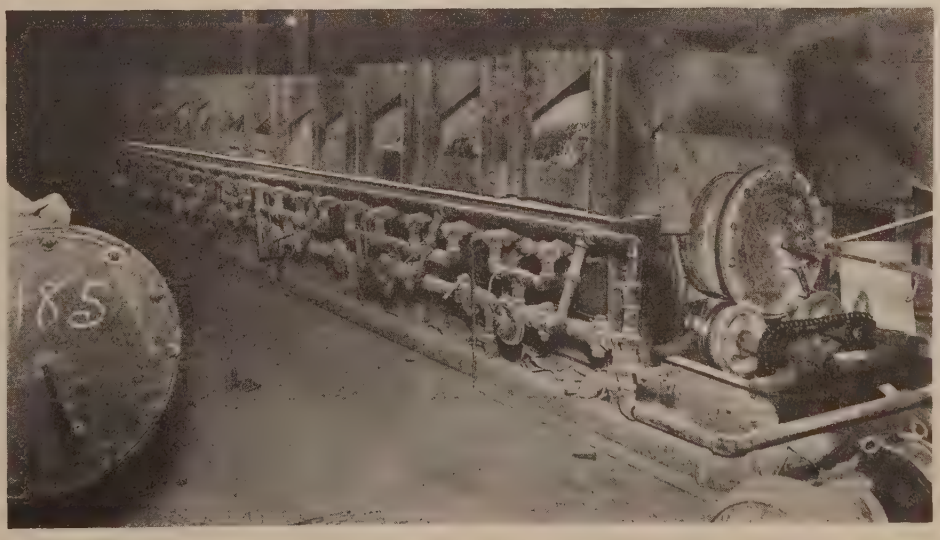
LOADED Retort Has Ends Tightly Bolted On, and Is Lowered Into Furnace Casing. End flanges engage rollers, one pair driven, another pair idling, and retort turns slowly while under heat

One of the major applications of calorizing is for processing seamless steel tubes for oil stills. Even when such equipment is designed to operate on petroleum products at comparatively mild temperatures—say 750 deg. Fahr.—the reactions going on in the fluid cause the deposition of more or less petroleum coke. This prevents the normal heat flow from the furnace gases to the petroleum, the same as boiler scale cuts down the efficiency of a steam boiler. A more serious consideration is that the temperature of the outside of the tubes rises, gradually approaching the temperature of the products of combustion, to a degree where bare iron or steel scales rapidly.

Another factor which weakens oil still equipment is internal corrosion by sulphur-bearing compounds. In combating this latter difficulty two methods have been in vogue. The equipment may be built extra heavy, providing sufficient metal thickness to withstand corrosion for an extended period, or the oil may be treated to neutralize its corrosive elements. Both of these expedients are costly and only partially effective. Sulphur corrosion is especially active at temperatures above 700 deg. Fahr., so that still tubes are invariably subjected to severe attack and rapid destruction.

When this combination of external oxidation and internal corrosion has substantially reduced the wall thickness of an ordinary steel or iron tube, it usually swells in diameter, there being insufficient steel to resist the internal pressure. Reduction of the wall to the danger point is therefore first evidenced by swelling, but there is no assurance that the swelling will be detected in time to permit replacement before rupture occurs.

From the foregoing it is apparent that calorizing serves a dual purpose on cracking-still tubes, rendering the interior immune to sulphur corrosion while the exterior is protected from oxidation. In calorizing the aluminum is driven into the surface layer of the steel forming an iron-



ATMOSPHERE of Hydrogen Maintained in Retort; Gas Enters Through Pipe at Center of End Plate. Calorizing requires 5 hr. at 1740 deg. Fahr. Entire cycle takes 11 hr.

aluminum alloy, an integral part of the steel, which resists both oxidation and corrosion. The alloy surface is much harder than mild steel and under the action of the tube cleaner assumes a high polish.

Cracking-still tubes to be calorized are preferably specified to be cold drawn under American Society of Mechanical Engineers Specifications, hot pickled after annealing at the mill to remove scale. The steel as delivered is also thoroughly sandblasted and wire brushed to provide a smooth, clean surface. The tubes are then placed in a cylindrical retort and packed in an aluminum compound which is uniformly distributed over both the interior and exterior surface of the steel. The illustration shows a pipe split down its center for introducing powdered compound into the tube, uniformly from end to end. The heads of the retorts are then bolted on and hermetically sealed, a hydrogen atmosphere being maintained during the entire subsequent process.

Calorizing retorts shown in the illustrations are 24½-in. outside diameter, 30 or 35 ft. long. Four furnaces are provided, approximately 35 ft. long by 5 ft. wide by 6 ft. high, designed and built by Surface Combustion Co. of Toledo, Ohio. The shell of the furnace is a cylindrical steel plate lined with 9 in. of fire brick.

Tops or bungs are removable in 3 ft. and 6 ft. sections. Tops are lined with 2½ in. of Sil-o-cel and 9 in. of fire brick, and are carried in a steel frame. The lower part of the furnace is also sectionalized and bound together by a structural steel frame.

A base carrying chilled iron rollers is located at either end of the casing; retorts rest on flanges bearing on these rollers. Rollers at one end are driven by a 5-hp. motor through speed reduction gears to permit rotation at speeds varying from 1 to 3 r.p.m. Rollers at the opposite end of the furnace are idlers.

Each furnace is fired with 23 Surface Combustion burners for natural gas located on one side. There are seven thermocouples protruding into each combustion chamber and these are connected with an indicating switchboard type pyrometer, so that the temperature at any point may be accurately checked at convenient intervals. Gas burners are manifolded to inspirators by which the proper gas-air mixture for complete combustion is maintained. Any furnace atmosphere may be had with this system, but in this application a neutral atmosphere is vital to minimize scaling of the retorts at the operating temperature of 1740 deg. Fahr.

It requires from 4 to 4½ hr. to bring the retort and furnace up to operating temperature; gas consumption for this and the 5-hr. soaking period is about 33,000 cu. ft. A charge in the 35-ft. retort will include 3750 lb. of steel, 3000 lb. of calorizing compound which, with the 11,000-lb. retort, makes a furnace charge of 17,750 lb. After shutting off the gas it takes 2 hr. for the retort to cool black.

German Version of Birth of Stainless Steel

BY DR. PHIL. H. SCHOTTKY*

IT was a peculiar coincidence that in 1912 the most useful of the non-rusting steels was just being baptized, while a noted authority on special steels was publishing in his handbook the following statement:

> The question of the rust-resistance of certain special steels has been insufficiently studied. Still, everything points to the fact that there is no alloy of iron which will withstand the attack of rust.

Many a scientific prediction is later contradicted, for to err is human, and science is of human origin. However, in this case, the contradiction followed close upon the heels of the prediction. Corrosion problems had been under investigation in the Krupp laboratories at Essen since 1909. Two men, of quite different nature, were joined in the common pursuit: Professor Strauss, physicist, hearty in spirit and tireless in his search for improvement, and his assistant, Dr. Maurer, metallurgist, slow, yet temperamental, profoundly absorbed in his scientific thoughts. He was fresh from Paris, where he recently completed an outstanding research under the great Osmond.

At the same time as, but independently of, the study of rust-resistance, Professor Strauss had begun investigations on heat-resisting alloys, which were to serve as protecting tubes for pyrometers. Two high-chromium and three high-nickel, high-chromium steels were prepared for this purpose. It was then noticed that a piece of the steel remained bright in the air of the laboratory for months, while nickel itself was quickly attacked. Such a fortunate discovery, bridging the gap between two independent investigations, was, of course, a tremendous spur, for here at hand was an alloy steel which behaved like a noble metal. Such was the ancient goal of the alchemists, who were wrecked by its impossibility. Rarely was it permitted them to find something useful along the way—although, according to tradition, Johann Friederich Vöttger discovered the process of making porcelain in the effort to produce gold.

People were more reasonable perhaps in the scientific nineteenth century. Still, from its beginnings, from the production of crucible steels by Alfred and Friedrich Krupp, the company had always been devoted to the building up from raw materials of finished and semi-finished products of every description. It lay, therefore, in the Krupp tradition to supply an alloy, containing 75 per cent of cheap, base metals, which had the enduring properties of a noble metal.

A similar steel had already been produced by the Frenchman, Guillet, who, however, was unable to forge it. This Krupp was able to do, and for this reason the Krupp building where the first crucible melts were made has come to be known as the source of the "noble" steels.

The goal of practical utility was still far from reached. The mechanical division, which was to prepare tensile specimens, returned the steels to Professor Strauss as unworkable. In fact, it resisted every effort to turn it down in a lathe and broke on bending, with a brittle crystalline fracture. Heat treatment seemed the only answer, but no information was available for selection of the proper procedure. This delayed the "birthday party" of V2A steel for several months.

The correct treatment was finally found through scientific knowledge of the special properties of this non-magnetic steel—by quenching from 1100 or 1200 deg. C., in oil or water, the metal was rendered tough and relatively easy to work. Physical tests showed favorable values for tensile strength, ductility and toughness, while corrosion tests showed it to be superior to any other ferrous alloy. A large, smooth-turned cylinder, which is today on exhibition at the Krupp laboratories, had hung in the open, half under water, for months, without showing a trace of rust or a dimming of the nickel-like surface.

The V2A steel, as a useful alloy, was thus born, as is evidenced by the German patent, and if the reader wonders at its strange and somewhat mysterious name, let him learn that V2 signifies "test steel (Versuchstahl) No. 2," and that A denotes its austenitic character.

*From an article in *Monatshefte*, published by the Krupp company, Essen, Germany.

Development of Upset Forgings

Saving of One-Fifth in Weight and Great Improvement in Output—Uniform Grain Conditions Give Higher Strength

BY WILLIAM E. CROCOMBE*

PRACTICALLY a new process of forging, known as upset forging, has been developed to such an extent during the past five years that present output approximates 350,000 tons yearly. This estimate covers only commercial and automotive forgings; other types of forgings such as rivets, bolts, nuts and miscellaneous railroad car forgings (hangers, knuckle pins, air brake pins and coupler yokes) make up a total far in excess of that mentioned. This method of forging has decreased the amount of steel actually consumed by producers about 70,000 tons—a really great saving. The estimate for all types of upset forgings shows a 20 per cent saving in weight compared with hammer, hydraulic, or other methods of forging.

The upset forging machine has been one of the most important factors in the tremendous increase of automobile production, and has been a vital factor in the decrease of cost. This has been brought about not only by the saving of material entering into the forging itself, but also by the great increase in production over other forging methods.

Much Greater Production Obtained

I remember producing steering worms for the old Mitchell car in 1912 on a 3500-lb. steam hammer at the rate of 250 in a 9-hr. day. This forging, produced in a rolling die, had approximately 10 to 12 deg. draft. Its weight of about 20 lb. did not include the tong end, which was later cut off the forging and thrown away.

*President, American Forge Co., Chicago.

Present methods produce the same type forging on a 4-in. upsetter at a rate of 1200 in a 9-hr. day, and the finished weight of the same forging is 14 lb.—a saving of 30 per cent in steel and an increase of 380 per cent in production. This same story applies in even greater measure to main drive gears and cluster gears. The increase in production on main drive gears averages over 700 per cent and on cluster gears from 500 to 600 per cent.

Upset Method Eliminates Tong Holds

Another great saving in the upset method of forging is the elimination of flash and tong holds. This is accounted for by the difference in die construction and design. Hammer dies are made in two parts—the top die and the bottom die—and it is necessary to have the proper amount of draft, or taper, to remove the forging from the dies. This draft varies from 3 to 12 deg., differing with the design of the forging.

By contrast, the new forging machine die opens in three parts: a moving die, a stationary die, and the heading tools. The operator places the stock in the stationary dies and steps on the treadle, bringing the moving die over in direct line and gripping the stock. The headers then come in and do the necessary upsetting or forging operation, then return to their original position, leaving the finished forging in the stationary die. Neither draft nor taper is required for the operator to release the forging. In recent years new developments in upset forgings include the production of irregular designs requiring a trimming operation to remove flash, and this operation is

Bars Are Cut to Exact Multiples of the Metal Needed for a Given Forging. A bar end is heated and forged. The forged end is removed by a hot saw and the cut end of the bar is then reheated preparatory to continued forging

generally finished in the same die and same heat, eliminating the need of a trimming press.

Piercing of holes, or displacing of metal, in upset forgings has been an important factor in the reduction of cost to the consumer. No doubt the piercing of holes by the upset forging method saves the consumer not only considerable money in raw material, but also the cost of removing additional metal by either lathe or drilling operations. On large holes, 1½ in. in diameter and larger, material should be displaced, or pierced, but with enough tolerance allowed the forging manufacturer so that his production will not be impaired.

It should be remembered that in the piercing of upset forging smaller size stock must be used, increasing the number of passes, or operations, necessary to complete the forging. On the larger size holes the body of the punch is heavy enough to withstand the heat in the constant production of forgings, and the holes are fairly uniform. We have never been able, however, to maintain a perfect hole. By this we mean that constant production day after day will show some variation, 1/32 in. off to one side, then to the other.

It was our thought that improper heating caused this variation, thinking the punch would follow along the lines of least resistance, and in case a bar was not heated perfectly the punch would run to the hottest side of the forging. In a test, however, of a brand new machine (with new dies) and the bars all heated in an electric furnace, we still found a variation, amounting to 1/32 in. maximum. But it should be remembered that everything was new and in perfect condition. With older dies and equipment we have found our average variation from concentricity to be 1/32 to 1/16 in. This variance, with proper allowance for finish on the outside diameter, does not interfere with high-speed finishing production, and the saving in material and drilling time is highly desirable.

Design Shows Whether to Pierce

On small holes, 1½ in. and under, the design of the forging has much to do with the advisability of piercing. On a straight forging, with a perfectly plain outside diameter, we have gone to a 1-in. hole with no difficulty. But on certain types of gears, cluster gears for example, with three gears on one forging, we find it impossible to produce these parts economically with holes. These forgings, which vary in length from 5 to 8 in., generally have a finished hole either 1 in. or 1⅛ in. in diameter.

We found on this class of work that our die expense was increased 300 per cent and our production decreased to one-fifth. The increased die cost was caused by more passes and high-cost material for punches. Decreased production was brought about by the absolute necessity for perfect holes, and in case one punch bent or broke, the holes were off center, requiring a new set-up.

We discovered, after working this problem out with our customer, that we were trying to eliminate a drilling operation on these gears where the saving in material amounted to slightly over a pound, and one man on a multiple-spindle drill could drill and broach in one day more than our entire daily production of solid forgings. We were trying to compete, on equipment valued at considerably more than $50,000, including a forging machine, furnaces, motors, with a crew of four men, against a multiple drill and one man. Covering a period of two months, our average running production time on these gears pierced was 18 per cent, 82 per cent of the time we were down for machinery adjustments. Rejected forgings totaled 31 per cent. On the same gear made solid our production time was 94 per cent and rejected forgings 1.2 per cent.

While practically all metallurgical engineers insist on upset forgings in gear work, not only for additional strength on account of uniform grain flow, but on account of increased density that eliminates warpage or distortion in heat treating, the layman sometimes is at a loss to understand the changes which have been brought about in this method of forging. The increased strength in upset forgings was brought home forcibly in our organization last year.

We had a job that called for delivery of 7000 pieces a day—a very intricate job, which had six prongs running into the header about 1½ in. in depth. We tried every known die steel, and our average life on these dies amounted to 1200 to 1500 forgings. Four headers on one machine were split in one day and immediate action on our part was required to keep up production schedules. These headers were 8½ in. in diameter and were made of hammer-forged alloy steel.

A set of dies was designed to produce the same header forging from a 4½-in. round. It required 28 in. of this size stock to produce the headers, and to our great surprise the first one of these upset headers produced 26,000 forgings, and the largest run on the upset headers amounted to 37,000 forgings, from exactly the same quality steel as furnished in the hammered forgings.

From our experience in making and quoting on thousands of different designs of upset forgings, we believe the consumer would save not only on upset work, but on hammer work as well, if he called on competent forging experts to go over new designs, with the idea in mind of simplifying die construction and increasing actual production. On cluster gear production, the addition of ¼ in. in spacing between gears results in increased production of 30 to 40 per cent, with a corresponding decrease in die expense on forgings of this type.

On certain types of gears with a 1-in. finished space between gears, the forging must be finished 13/16 in. at that point to have necessary stock for finishing. This means that an insert as large as 8 in. in diameter must take the entire thrust in finishing the forging. Rapid production on gears of this type heats these inserts in spite of all methods of cooling, causing them to bend, making it necessary to stop production and so tying up expensive machinery to change the die equipment.

The addition of only ¼ in. in the spacing between gears allows a much stronger die to be designed, resulting in increased die life and increased production, all of which reflects back to the customer in lower prices.

After parts have been released for production, small changes are often impossible to make on account of adjacent component castings and gears, all of which must be redesigned to agree with the change on one gear.

Another factor in designing that causes considerable grief to all forging concerns is the use of very thin sections. We have found in our practice that, on forgings requiring a thickness of less than ⅜ in., it is necessary to set our headers flush with the dies, letting the spring of the bed casting produce the desired thickness. This method, of course, is dangerous. Production of forgings having a flange in excess of 5 in. in diameter and under ⅜ in. in thickness we believe to be impractical on upsetting machines, due to the tremendous strain put on the bed casting and crankshafts.

How the Large Demand Grew

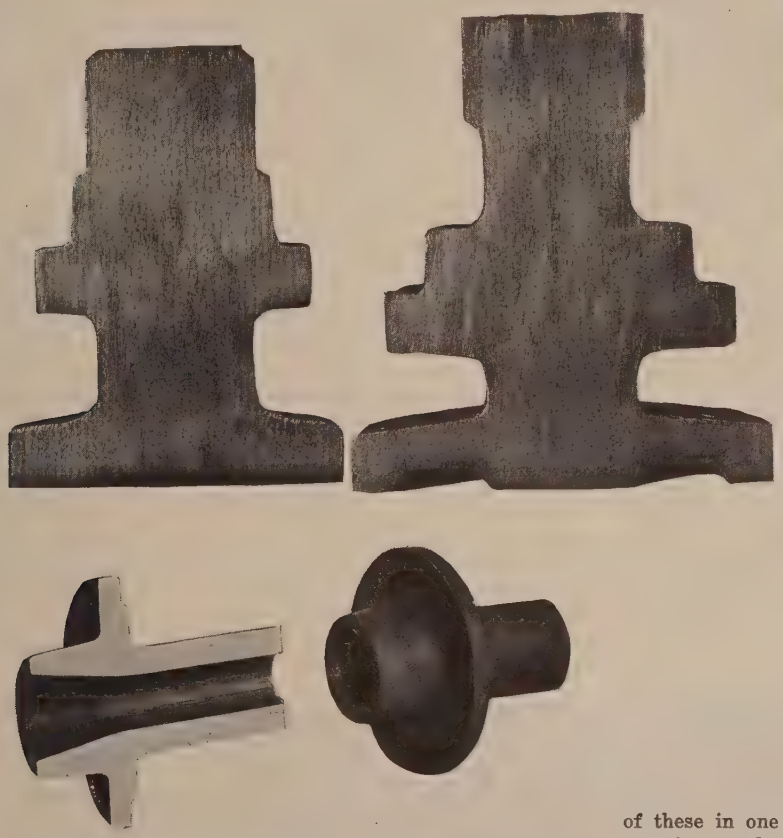
The first real demand for drop forgings came from the bicycle industry, and after the advent of the automotive industry the demand for forgings became so great that forge plants were unable to meet it. This led the larger automobile companies to install their own forging equipment as an insurance against delays in deliveries on their specifications. Thence came excess capacity, and after several periods of depression the World War created such a demand for forgings that perhaps no one industry in the entire country expanded so rapidly. The post-war period in the forging industry left a trail of bankruptcy, and

probably no line of business suffered so heavily from ruthless price cutting and keen competition.

As in all trade conditions of this kind, after a period of four years of practically no profits, the remaining forging concerns looked forward to better times, as hundreds of hammers and other forging equipment were forced out of the market. Bargain prices on this second-hand equipment led some buyers of our products to believe that forgings could be made cheaper in their own plants. Hence much of this old and obsolete equipment was sold and set up in competition with modern equipment, up-to-date plants and first-class forging organizations.

Plea for Adequate Cost Analysis

I have never been able to understand the installation of forging equipment in plants not consuming tonnage enough to warrant the organization necessary to produce forging on a competitive basis. Not enough time or study is put into the proposition until after the equipment is installed, and then eyes are closed to the constant loss of money. Charges that should be made direct against the forging department are made against general overhead, and no proper basis of outside competition can be arrived at.



This Upset Forging Was Made from a 3-in. Bar. The pierced hole is 1½ in. in diameter. The rim of the flange is ⅝ in. thick and the diameter of the flange is 7⅛ in.

Some producers would get quite a shock, I am sure, if the total of steel cost, actual labor, die expense, fuel cost, repair expense and power were prorated over the forgings actually produced, and then compared with competitive figures obtained from modern forging plants.

In our business the steel cost alone on certain types of forgings often runs from 65 to 70 per cent of the selling price, leaving so small a fabricating margin that only high and constant production with high-speed and efficient organizations, not only in the forge shop, but the die department as well, can show a profit.

One of our associated companies has had an experience of this kind in connection with the production of bolts and rivets. All told, we probably produce in our eight plants throughout the country 60,000 tons of miscellaneous hammer and upset forgings yearly, and we all thought we were pretty well up on all types of forgings. We discovered we had seven different bolt and rivet machines in various sections. The thought occurred to group all of these in one section and produce all forgings of this type in one plant.

ETCHED Cross-Section of an Upset Gear Forging (Above). Note that the grain is parallel to the axis of the bar and also parallel to the rim of the gear blank at the point where the teeth are to be cut

* * *

PERFECTLY Designed Cluster Gear Forging (Extreme Left) for High-Speed Forging Production, Long Die Life, High Production and Fast Machining. At its right is an incorrectly designed cluster gear forging Note the narrow spacing at neck of forging, resulting in shorter die life, lower production and slower machining

Upon impartial investigation we discovered that, even upon grouping these units, our cost on this particular product was much higher than the price for which the same commodity could be purchased in the outside market. This discovery resulted in shutting down all the rivet and bolt machines in our plants, saving the company thousands of dollars yearly.

Abandoning One Type of Product

Our investigation of this proposed change brought out the interesting fact that, in connection with the installation of all of these units under one roof, with the necessary buildings, new foundations, die equipment, heat-treating equipment, shear equipment, oil storage, steel storage, steel handling equipment and furnaces, the interest on our investment, not including machines, amounted to over $12,000 annually, and this figure alone can certainly purchase a great quantity of bolts and rivets. The same is true of other types of forgings and castings.

Conveyors and Ovens for Large Cores

Both Continuous and Batch Units in Same Plant Make Comparison Easy— Handling Costs Reduced

BY J. B. NEALEY*

PRINCIPAL operations in the manufacture of radiators and boilers are making and baking cores, and molding and casting. The foundry at the Bond plant of the American Radiator Co. at Buffalo uses mass production based on straight-line mechanical methods. Molding, pouring and shakeout all center around continuous closed-loop roller conveyors. All materials to and from these units are handled on roller conveyors, also.

The core-making section has been equipped with conveyors, ovens and machines, arranged so as to synchronize the two operations of making and baking. This establishes a definite time schedule in this department and permits very close control.

Four of the core ovens are continuous and automatic in operation and two of them are identical in construction and dimensions. Each oven is served by two jolt, rollover core-making machines, located side by side and in front of the oven. Cores made up on plates are transferred directly from one machine on to oven trays on the charging table. Cores and plates from the other machine are transferred directly on to a second charging table, from which they are lifted and set down on top of the cores and plates from the first machine, the top plate being supported above the lower by four cast iron pegs. These are then loaded on to the shelves of the oven conveyor.

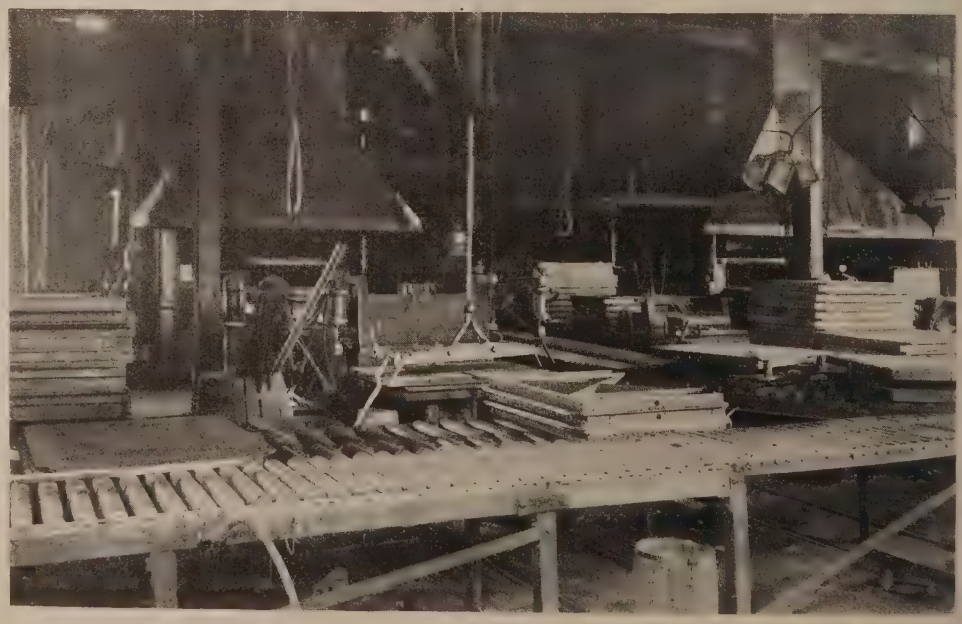
Built of steel, its walls filled with 4 in. of insulation, the oven is 74 ft. 6 in. long, 7 ft. 8 in. wide and 19 ft. high. The motor-driven conveyor consists of two endless chains supporting a series of shelves carried through the oven, returning at the top, with discharge at the charging end. There are 279 ft. of link chain weighing 13 lb. to the foot and supporting 62 carriers or shelves. Each shelf weighs about 96 lb., and hangs down 12 in.

*American Gas Association, 420 Lexington Avenue, New York.

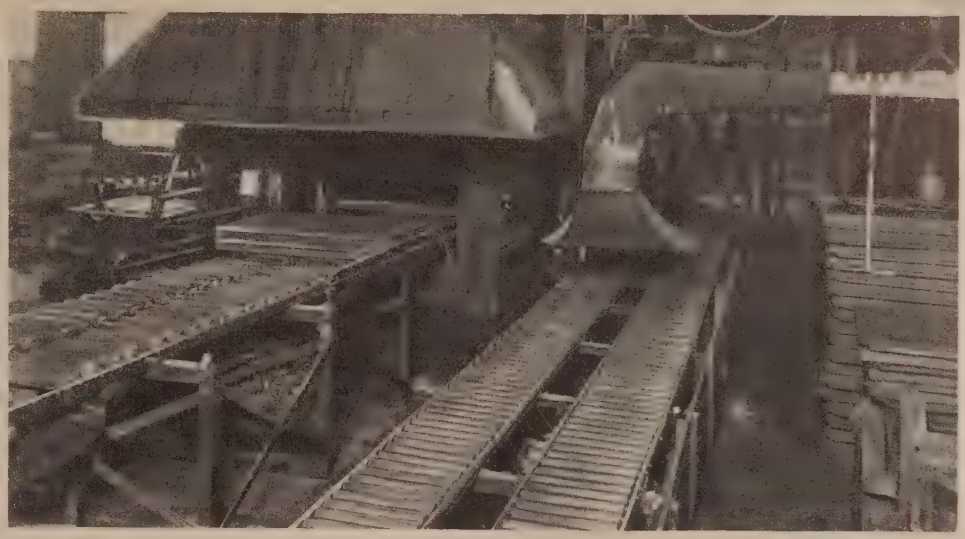
Two Unequal Burners Used

Heating is with gas and in the following manner: Two ducts for distributing combustion and recirculated products are installed in the bottom and run lengthwise of the oven. Ports in these ducts are so spaced as to distribute the heat evenly throughout the length of the oven. In one end of each distributing duct are one large velocity-type high-pressure burner and one small velocity burner, firing at an angle to the large one and into the same tunnel. The small burner is always operated and serves to hold the oven to temperature when no work is going through, and as a pilot light for the large burner. The large burner, connected to the automatic temperature control, is used while baking the cores.

A specially arranged firing tunnel and firing head are utilized, so that the combustion products from the tunnel are immediately mixed with recirculating gases, thus to decrease their temperature before being discharged into the oven from the distributing ducts.



CHARGING End of Ovens, Core-Making Machines and Conveyors Which Carry the Baked Cores and Return the Plates to the Oven Crew. Note pneumatic clamps on core-making machine at left, sand chutes over core-making machines and air lifts for handling plates



CHARGING End of One Oven, (at left side) with Conveyor. Return Loop from discharge is seen in extreme left background. At right center is return loop of discharge conveyor from other oven. Air is blown over the baked cores, to cool them so they can be handled by the time they have traveled to end of conveyor. Oven at left has a longer discharge conveyor, so that artificial cooling is not needed

Gases are taken off at a desirable point in the oven by a recirculating fan, which serves not only to return the gases, but also to pull in a certain amount of fresh air for proper oxidation of the cores. The remaining combustion gases are discharged from the oven through various openings.

Discharged Cores Move by Gravity

Baked cores as discharged from the unit are moved by gravity on roller conveyors to the front of the oven. Here the cores are shifted to a second conveyor, where they are inspected, pasted together, wired and then sent to storage. The plates are left on the conveyor and returned to the core-making machine, the transfer being made by an air lift.

Vecto heater cores are baked in a bank of four stationary gas-fired ovens, built of brick, 16½ ft. long, 10 ft. wide and 8 ft. high. Shallow pits underneath carry two manifolds, each supplying gas fuel to five burners, firing through the grating of the floor. These are used in conjunction with inspirators for exactly proportioning the gas-air mixture for perfect combustion and the correct oven atmosphere. Secondary air is admitted through vents in the rear setting, while six flues, three on each side, and located about 10 in. above the floor, are provided for exhausting the products of combustion.

The cores are rammed up in special core-making machines, and are loaded on to steel rack stands with the aid of pneumatic hoists. Owing to the dry sand binder, cores are charged into the ovens as quickly as possible, by electric trucks with high-lift platforms.

Each oven is charged with six racks and the burners are operated wide open (6-in. water) until a temperature of 380 deg. Fahr. is attained. One row of burners is then shut off and the temperature is maintained with the remaining manifold, until the work is discharged. This minimizes the time required to bring a cold charge up to temperature.

Comparative Tests of Differing Ovens

Two types of ovens in the same plant, operating on the same fuel and the same kind of work, afford a basis for comparative tests, from which valuable operating data have been obtained.

For every pound of cores put through continuous core oven there is at the same time included 1.84 lb. of steel. The gas consumption per 100 lb. of cores and steel is 16.2 cu. ft. The efficiency calculation based on 100 lb. of charge would be as follows:

B.t.u. of gas = 850
Charge = 35.2 lb. of cores plus 64.8 lb. of steel
Specific heat of steel = 0.127
Specific heat of sand = 0.195
Oven temperature = 450 deg.
Atmospheric temperature = 60 deg.
Temperature rise = 450—60 = 390 deg.
Heat in steel = 64.8 lb. × 390 × 0.127 = 3209 B.t.u.
Heat in sand = 35.2 lb. × 390 × 0.195 = 2676 B.t.u.

Total heat for 100-lb. charge = 5885 B.t.u.
Gas consumption = 16.2 cu. ft.

$$\text{Efficiency} = \frac{5885}{16.2 \times 850} = 42.7 \text{ per cent.}$$

Compared to this, on the batch oven for each 100 lb. of charge there are 57.8 lb. of cores plus 42.2 lb of steel.

Temperature of operation = 350 deg.
Atmospheric temperature = 60 deg.
Rise in temperature = 350—60 = 290 deg.
Heat in steel = 42.2 lb. × 0.127 × 290 = 1553 B.t.u.
Heat in sand = 57.8 lb. × 0.195 × 290 = 3268 B.t.u.

Total heat for 100-lb. charge = 4821 B.t.u.
Gas consumption = 22 cu. ft.

$$\text{Efficiency} = \frac{4821}{22 \times 850} = 25.8 \text{ per cent}$$

Continuous Ovens More Efficient Than Batch Ovens

From the test data one can see that the continuous oven is much more efficient than the batch type. Should the same proportion of steel and sand be used in the batch type oven, and operated at the same temperature as the continuous oven, instead of 22 cu. ft. for 100 lb. gross, there probably would be required around 35 cu. ft. This considerable difference in efficiency readily recommends the use of the continuous oven, from the standpoint of fuel consumption alone.

In addition to the lower fuel costs with the use of the continuous oven, operating expense and several other costs are reduced materially. A cut in labor cost through decreased handling results from the traveling conveyor systems. Indeed, for a sufficient number of periodic-type ovens to handle a production equal to that of one continuous oven, there would, perhaps, be required twice as many men for material handling. In addition, with

Core in Foreground Is Ready to Be Wired Together, Which Is the Last Operation

a large number of batch-type ovens, there is considerable truck expense necessarily involved in material handling.

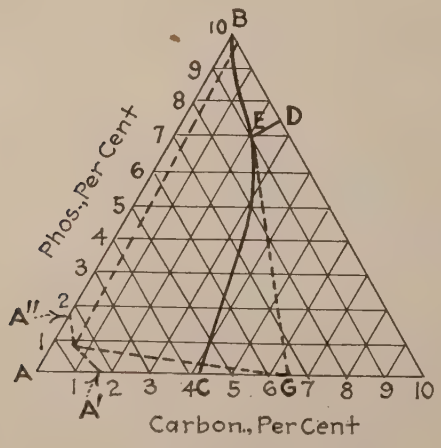
Better Costs Obtainable from Synchronized Work in the Oven

There is a further decrease in labor cost in coremaking when the various operations center along a continuous handling system. The speed of this part of the foundry is synchronized with that of the traveling conveyor in the oven. Of course the capacity of the oven and speed of the conveyor are designed to coordinate with the most efficient speed of the core makers. Considerable flexibility in the speed and capacity of the oven allows for variations in production rate, including making the cores, cleaning them, pasting halves together, blackening, etc., before the core is ready to deliver to the molder and to enter the production line.

Greater uniformity of temperature obtained with a continuous oven results in more uniform cores. With the continuous oven every core passes through each zone of heating, so, if there is a possibility of non-uniform distribution of heat in any part of the oven, each core is subjected to the same heat treatment as every one of its mates.

How Phosphorus Influences Graphite Formation in Iron Castings

CONCERNING the effect of phosphorus on the graphitization of cast iron there is expressed considerable difference of opinion by writers in the earlier literature. Generally it is supposed that phosphorus favors the precipitation of graphite. Observation of certain irons for thin-sectioned machine castings convinced von Keil and Mitsche that this was not the case and led them to attempt an explanation which would reconcile previous conflicting evidences. Their results are given in *Stahl und Eisen* for July 18, 1929. The explanation is based on the constitution diagram of the ternary system Fe-C-P, which is given herewith.



Constitution Diagram of the Iron-Carbon-Phosphorus System

It is known that, in the iron-carbon alloys, an increase in carbon above the eutectic composition is accompanied by a decrease in the tendency to form graphite. In the ternary system, it is evident that the iron-carbon eutectic, represented by CE becomes lower in carbon as the phosphorus content is raised. Hence a hypoeutectic iron may easily become hypereutectic when its content of phosphorus is sufficiently increased. This would presumably result in greater stability of the graphite, as is the case with pure hypereutectic iron-carbon alloys.

A series of melts made up with varying silicon contents and subjected to different rates of cooling indicates that the earlier observations attributed to phosphorus the ready separation of graphite which is really due to the presence of silicon and to a slow cooling.

Lacquered Pipe Proof Against Abrasion and Acids

Hammerproof and acidproof lacquer has been developed in Germany and applied to such products as steel pipe. Prof. W. Trinks, Carnegie Institute of Technology, Pittsburgh, told a sectional meeting of the American Society of Mechanical Engineers about it at Akron, Ohio, Oct. 23.

The lacquer, besides being virtually hammerproof, withstands, he says, even boiling hydrochloric acid. "The pipes to be coated are pickled, rinsed, dried and dipped in the lacquer, which is a phenol-formaldehyde condensation product; they are then baked and are ready for shipment. In places where pipes are cut, welded or threaded, lacquer is applied with a brush and baked with a blowtorch. There is only one thing wrong with this lacquer, namely, that the owners of the patent application ask for too much compensation for the rights in the United States.

"This lacquer is also being considered for structural material and promises to be a severe competitor to the new rustproof structural steels which contain copper and chromium. It is likewise a competitor to tin plate for cans, buckets, dishes, basins and so forth, and a competitor to zinc and lead not only for pipes but also for roofing sheets. Lacquered sheets can be doubled without cracking of the lacquer."

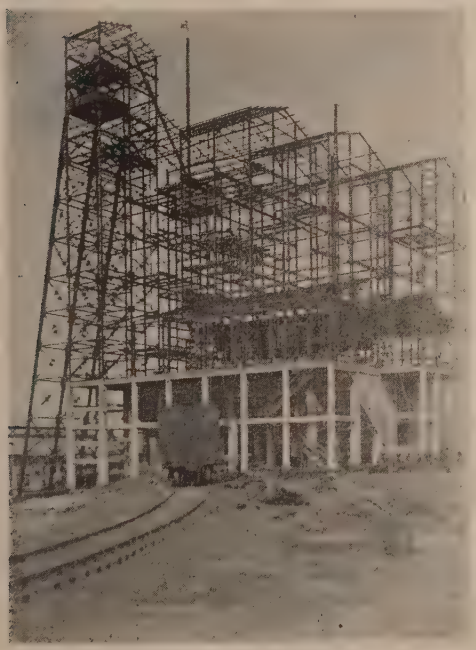
Steel Construction In Coal Mines

Rehabilitation of Locust Summit Breaker Emphasizes Progress Made in the Use of Steel in Pennsylvania Mines

BY FRANK W. JONES

PASSING of wood for important construction in and about the anthracite mines of Pennsylvania is emphasized by the large use of steel in the program of the Stone & Webster Engineering Corporation in its rehabilitation of the properties of the Philadelphia & Reading Coal & Iron Co.

About 25 years ago there were no steel coal breakers in the Pennsylvania coal region. Today, practically all new construction as well as important replacement and repairs are of steel. Illustrated are a typical wooden coal breaker of 25 years ago, compared with a steel coal breaker now in use, and the old method of heavy timbering



ABOVE, Modern Steel "Timbering" in a Coal Mine Contrasts Favorably with the Old Method of Heavy Wooden Timbering in Gangways. Below is the structural steel frame of a modern coal breaker compared with the Short Mountain breaker of 25 years ago, when wooden construction was general throughout the Pennsylvania coal region

of gangways compared with modern steel "timbering."

Impetus was given the use of steel when in 1912 the Mineral Spring breaker at Wilkes-Barre, operated by the Lehigh Valley Coal Co., was destroyed by fire and replaced by a steel structure. This construction was followed by other steel breakers, notably the Woodward, for the Delaware, Lackawanna & Western Coal Co. at Scranton, now the Glen Alden Coal Co., and the Nesquehoning breakers for the Lehigh Coal & Navigation Co., Lansford, Pa. The Woodward breaker required approximately 4500 tons of steel and the Lansford breaker about 8000 tons.

The initial unit of the Philadelphia & Reading Coal & Iron Co. at Locust Summit will require about 3000 tons of steel for the breaker, for the other buildings and for small bridges.

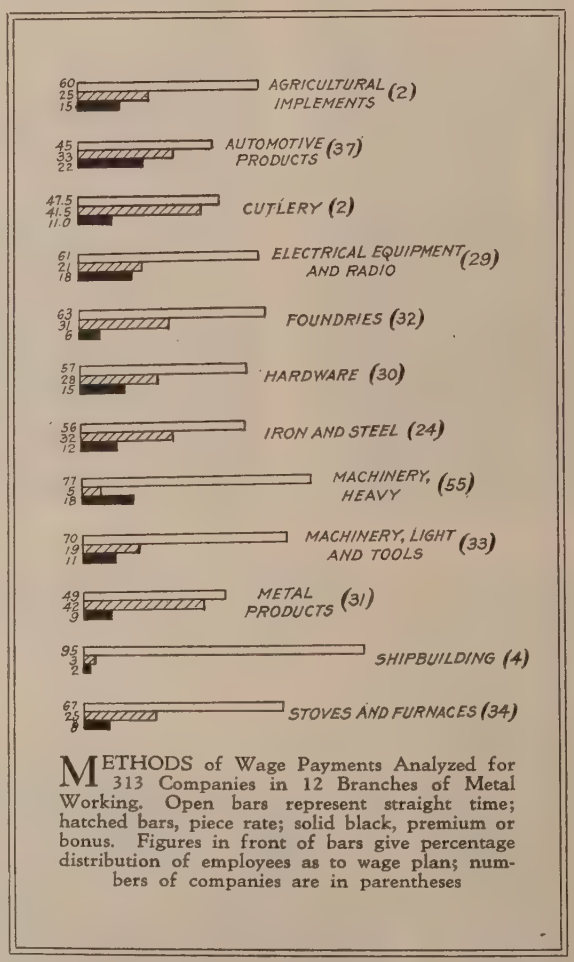
This provides for a structure with a capacity for the preparation of 12,000 tons of coal a day, which will supersede a number of smaller units now preparing from 1000 to 2000 tons of coal a day. The Chance flotation method of separating the slate from the coal will be used in this operation, so that hand slate picking will be entirely abandoned.

Varying Methods of Wage Payment

Two-thirds of Companies Use Straight Time; One-fourth, Piece Rate; Remainder, Bonus—Group Incentives in Metal Working

ANALYSIS of wage payment methods in 893 industrial companies having more than 500,000 employees shows that 66.4 per cent of the companies pay their men on a straight-time basis—either hourly, daily or weekly. These figures, compiled by the Sherman Corporation, Boston, show also that 24.1 per cent of the companies pay on a piece-rate basis, while the remaining 9.5 per cent pay on a premium or bonus basis. The latter are confined to those cases where definite standards are set and extra awards paid according to a planned schedule. No sporadic or opportunistic bonuses, vacations with pay, profit-sharing plans or life insurance are included.

Of all the companies reporting, 39 per cent had made changes in methods of paying wages during the past 20 years. These changes had been on a rapidly ascending scale, as 69.4 per cent of all had taken place between 1924 and 1929 and much smaller percentages in the three previous 5-year periods of the 20 years: 21.9 per cent in 1919-1924; 5.8 per cent in 1914-1919; 2.9 per cent in 1909-1914.



METHODS of Wage Payments Analyzed for 313 Companies in 12 Branches of Metal Working. Open bars represent straight time; hatched bars, piece rate; solid black, premium or bonus. Figures in front of bars give percentage distribution of employees as to wage plan; numbers of companies are in parentheses

Adoption of incentive plans had shown decreased manufacturing costs in 99.1 per cent of the cases. In the remaining 0.9 per cent of cases, manufacturing costs were increased. Similarly, employee earnings were increased in 99.7 per cent of the cases and decreased in only 0.3 per cent. As made, the analysis covered 43 different industries, with varying numbers of plants represented, from a minimum of two to a maximum of 74 in a single industry. The diagram herewith accounts for 12 of the industries lying within the specific field of metal-working.

The numbers in parenthesis after the name of the industry represent the number of concerns in the survey. The numbers standing in front of the several bars for each industry represent the percentage of employees being paid on the basis shown. The unshaded bar represents straight time; the cross-hatched bar, piece rate; and the solid bar a planned premium or bonus arrangement.

One of the outstanding developments in incentive method in paying wages during the past three years is said to have been the growing adoption of group methods rather than individual incentives. Group plans of one kind or another were found particularly noticeable in the automotive, heavy machinery and light machinery classifications.

W. Jett Lank, in his new book on "New Industrial Revolution and Wages," is inclined to the position that regardless of the method of payment, the total wages paid should be such as to insure a high rate of productive efficiency. Whereas much used to be heard of the "living wage" and the "cultural wage," he believes that industry has irrevocably committed itself in a practical and concrete way to the attitude and policy that wages may increase indefinitely so long as unit labor costs are not increased or profits reduced. For the immediate future, the pressing problem will undoubtedly be the working out of the proper share which the various occupational groups will receive in these enhanced wages.

Forge Shop for Aluminum Alloys

Furnaces, Hammers and Heat-Treating Equipment Installed for Daily Capacity of Ten Tons; Sizes Range from Tiny Parts to Airplane Propellers or Locomotive Side Rods

MANUFACTURE of aluminum forgings from strong alloys on a commercial basis was started about ten years ago by the Aluminum Co. of America at its Cleveland plant. Since then there has been important progress in the development of suitable alloy compositions to meet special requirements and perfection of heat treating processes, the application of which has resulted in improved physical properties of the metal. With the production of wrought alloys of greater tensile strength and increased hardness the field for forgings has been materially broadened, and this branch of the aluminum industry as well as the market for aluminum castings and rolled products has enjoyed a steady growth. The rapid advance of the aircraft industry, that demands engineering metal combining both strength and lightness, is probably responsible more than any other factor for the marked expansion of the market for aluminum forgings.

Hand in hand with the development of aluminum alloys, important improvements in dies and die making practice have occurred. The company's engineering and research departments have devoted much attention to designing parts to permit them to be made from forgings. Parts are now being forged of aluminum that it is claimed would not be attempted with steel.

Surface of Forging Billets Must Be Perfect

A NEW aluminum forge shop with a yearly capacity of 6,000,000 lb. (approximately 10 tons per day) of finished forgings is being built by the Aluminum Co. of America at its Cleveland works, and will soon be ready for operation. This company has pioneered in the production of aluminum forgings and the experiences it has had and the marked progress it has made in this field form a substantial basis for laying out and providing with mechanical equipment a plant arranged for the continuation of the methods and practices that it has successfully developed.

The secrets of the company's success in making aluminum forgings are mainly metallurgical. They include metallurgical control of the composition, proper forging temperature, close temperature control in heat treating and proper design of the forgings. Standard types of hammers such as are used in forging steel are employed. However, some of the operating methods differ from those followed in a steel forging shop; for example, highly polished dies are used and special methods of lubrication are required.

Production of aluminum forgings has presented two other major difficulties not encountered in the production of steel forgings.

At the beginning there was no stock available that was suitable for forgings. It was necessary, therefore, to develop methods and plant for making stock coincidently with the development of the forging business. This problem proved to be a very considerable one, with the result that up to date most of the stock used has been prepared in the forging department itself.

A good surface is more difficult to obtain on aluminum forgings than on steel. The scale which forms on the latter has been a blessing in disguise, for with its removal many skin-deep imperfections disappear. No such scale forms on aluminum forgings—hence, skin-deep imperfections must be avoided. In order to accomplish this result much greater care—with its incidental expense—is required in the preparation of the stock for forging.

Hammers Operated by 100-Lb. Air

AS the mechanical processes involved in forging aluminum do not differ materially from those for steel, the new aluminum forge shop is very similar in mechanical equipment and in general appearance to a well equipped forge shop. The buildings are arranged somewhat in the form of a U. The forge shop is 300 ft. long and 80 ft. wide. Parallel to it and separated by an open court 40 ft. wide is a building 50 x 240 ft. occupied by the die room and shipping department. At right angles to and connecting these two buildings at one end is the heat treating department, 60 x 170 ft. This arrangement permits convenient straight line routing of work through the forge shop, heat treating department, inspection department and finally to shipping room. The plant is designed so that extensions can be added to triple the present floor space.

Equipment includes two 18,000-lb. and one 14,000-lb. Erie drop hammers and also a 12,000-lb. Chambersburg hammer for forging large pieces such as aeroplane propellers and crank cases. An open frame 5000-lb. forging hammer will be used for making locomotive side and connecting rods, street car forgings and other large hand forgings. Eight smaller steam hammers and three board drop hammers ranging in capacity from 1000 to 3000 lb. will handle the smaller work.

All hammers will be air operated. In the existing forge shop it had been found that the use of air instead of steam for hammer operation is more economical, both in hammer upkeep and in power consumption. Advantages claimed for the air operated hammer are that the power can be shut off when the hammer is not being used (continued operation being necessary with steam hammers to keep the condensation low), there is no hot water running from the hammer as when steam is used, the pressure is always uniform and there is no danger of cracked cylinders from freezing during the winter.

Air will be supplied to the hammers at 100-lb. pressure by an 8000-cu. ft. Nordberg air compressor located in a separate 55 x 80-ft. building at the side of the forge shop. (This compressor has aluminum pistons, aluminum crossheads and forged aluminum connecting rods.) A receiver just outside the building delivers to a main supply line to which feeder lines connect each hammer. Three surge tanks will maintain a uniform air pressure when there is a heavy drain on the system. Intake and exhaust pipes are underground, the main exhaust line extending lengthwise under the center of the building.

Forge Shop of Glass and Steel

THE forge shop is 44 ft. high, providing sufficient room for handling all hammer parts with a crane except the sub-bases and anvil blocks. This arrangement

will be found particularly convenient in handling hammer rods. The shop is served by a 15-ton Cleveland traveling electric crane, with 5-ton auxiliary hoist.

The shop is of steel frame construction with glass sides with the exception of a band of corrugated iron at the crane rail and a section of the building just above the floor level in which are sliding 9 x 9-ft. wooden doors (the only wood in the building). It has a flat gypsum roof. Window sash are steel, with motor-operated ventilating sections.

Hammers are mounted on substantial concrete foundations, those for the larger units extending from 17 to 22 ft. below the floor level. Concrete runways are laid between the hammers. Most of the hammers will be served by two continuous electric heating furnaces, so that there will be no danger of the hammer-men getting cold metal. The speed of the furnace conveyors will be regulated to bring the material to the proper heat, as indicated by a thermocouple, of 750 deg. to 850 deg. Fahr.

Larger forgings will be hot-trimmed on presses adjoining the hammer and smaller work will be cold-trimmed and brought down to size on coining presses, for which Bliss and Consolidated equipment will be used.

Heat Treating Done in Pit Furnaces

FOUR pit-type electric furnaces are provided in the heat treating department. These are approximately 5 ft. diameter and 12 ft. deep, with tops about 2 ft. above the floor. This building has a basement to permit easy access to the furnaces for repair work, and to provide good ventilation.

Forgings on leaving the trimming presses will be placed in stainless steel baskets 55 in. diameter and 3 ft. deep and holding 2000 to 3000 lb. In these they will be handled in and out of the furnace by an overhead electric traveling crane. The forgings will remain in the furnaces from 6 to 18 hr., depending on the size of the section, but the practice will be to maintain a uniform heat treating temperature of 960 deg. Fahr., plus or minus 10 deg., on all classes of work. At this temperature the hardening constituents go into solution in the aluminum and are retained in a high degree of dispersion by the quenching operation.

After quenching, the tensile strength, yield point and hardness are further improved by aging either at ordinary temperatures (in the case of the alloy known as 17S), or at 310 deg. Fahr. in the case of alloys 25S and 51S. The artificial aging of the latter two will be done in the same furnaces as were used for heating, they being equipped with high and low temperature controls.

Furnaces are controlled by Wilson-Maeulen instruments; Tapalogs located in an instrument room record the temperature on charts. The switch panel, relay and instruments are suspended on springs to avoid the effects of vibration caused by the hammers.

Three alloys are used for forgings, these (after heat treating) being designated 17ST, 25ST and 51ST. Alloys 17ST and 25ST have a minimum tensile strength of 55,000 lb. per sq. in.; 51ST of 40,000 lb. per sq. in.; the yield point is 30,000 to 40,000 lb. per sq. in. for all three; elongation is 16 per cent for the former two and 12 per cent for the latter; Brinell hardness is 100 for all three alloys. These properties are obtained from standard size test specimens taken in the direction of maximum flow of the metal. Specific gravity ranges from 2.69 for 51ST to 2.79 for 25ST, or about one-third that of steel.

Rigorous Testing and Inspection

FOLLOWING the practice in the present forge shop, all forgings will be etched to provide a bright surface so that all defects in the forging, even minute line cracks, can be seen. The etching operation includes immersing the work in a caustic solution, washing it in warm water and then giving it an acid dip.

A testing laboratory is maintained for all forge shop products. Every heat is analyzed and the analysis of the bar stock accompanies the material from the rolling mills through the forging processes. Bars are tested for physical properties before they go to the hammers. Large pieces, such as airplane propellers and crankcases, carry a serial number and a test bar which accompanies them through the work until the forging and heat treating is completed, thus providing 100 per cent inspection of physical properties. The new forge shop will have a testing laboratory equipped with a set of indicating tensile testing machines supplied by Alfred J. Amsler & Co., as well as other testing equipment.

As a result of such care in the composition, forging, heat treating and inspection, it is stated that there have been no failures of forgings that could be attributed to the quality of the forgings. Forgings are now being made of a wide range in sizes and uses, extending from locomotive side rods weighing 700 lb. down to small parts for vacuum cleaners, typewriters and sewing machines. Among the more important forgings are airplane propellers and fittings, and various other forgings used both in aircraft and automobiles, including crankcases and connecting rods. Other common uses for aluminum forgings are for spray gun bodies, pneumatic tool parts, and connecting rods and other parts for outboard motors.

Plastic Seal for Stopping Gas Leaks from Furnace Settings

IN describing a large German open-hearth furnace some months ago a writer in *Stahl und Eisen* referred particularly to insulation on the four regenerator chambers. Steel plates were placed against the walls from the top to a depth of about 20 ft. The object was to prevent infiltration of air and at the same time gas leakage through the joints of the brickwork.

It is said, however, that this purpose is served only partly, as the gas presses through the joints and cracks in the walls, rises between the walls and the casings, and escapes where the plates terminate. This leakage is said to be especially noticeable when mixed gas is burned.

All attempts to stop this leakage by filling the cracks and holes with mortar have proved futile. Investigation with an experimental chamber at the Ruhrort-Meiderich Steel Works showed unexpectedly high figures for losses caused by air infiltration and gas leakage. In this chamber an effective seal was obtained by applying between the bricks a plastic sealing material which would permit the walls to expand and contract without breaking or cracking joints. This plastic mass, known as "Aerodensit," was applied also to the regenerator chambers.

It is said to be economical in application and low in cost. After the roofs had been sealed the success of the device was said to be evident, but figures for savings were not given. In building new furnaces it was planned to apply this material between the joints and over the brickwork and not to use steel sheets. Thus the exposed brickwork can be inspected whenever desired, which, of course, the steel casing does not permit.

Making Motor Integral with Machine

Builders, in a Revolutionary Economic Change, Are Coming to Merge the Power Units Into the General Composition of Industrial Machinery

BY WALTER STUART KELLEY

WHAT he terms a new epoch in machinery construction is now under way, according to Mr. Kelley, who is a consulting engineer of Boston and owns to an experience in mechanical design dating from 1890 and in electrical design dating from 1906.

An introductory article by Mr. Kelley appeared on page 1229 of THE IRON AGE of Nov. 7. This pointed out how the new development, revolving about the application of power, means a breaking away from tradition in not trying merely to replace hand power; also in making the power centers internal rather than external parts of a machine and finally in considering the manufacture of the power units a function of the machinery builder himself.

FUNDAMENTAL conditions that presaged a revolution in machine design were noted in a previous article. An epoch-making change was there forecast, by reason of freer use of electric means to impart motion (and power) directly at one or more points, rather than, as heretofore, to carry the initial motion throughout the machine.

The reason for redesigning machinery to make electric drive (or drives) an integral part of the machine is not merely to effect a theoretical gain, but to secure a very substantial improvement that will result. The warrant for such redesign is solely the resulting gain to the builder or to the user, or to both.

This new principle in machine design is already evidenced by various electrically-driven tools and appliances recently put on the market. It is to be noticed in certain instances of electric drive on a large scale in the steel mills. Practical application of the idea has enabled the writer to cut the floor space in one manufacturing process more than one-half.

Not every machine is adapted to such redesign. Many are, and in some cases there will result radical changes in organization and appearance.

Advantages of Integral Electric Drives

THE advantages to accrue are manifold. The most important are: less wear, less attention, less maintenance, less power, greater efficiency, less floor space, improved quantity and quality of product. The last will result chiefly through the elimination of variable speed caused by belt slippage. Few manufacturers realize to what extent production is lost and quality sacrificed through belt slippage. Graphs made by instruments that record instantaneous irregularities show amazing variations of speed in supposedly well equipped factories. It is not unusual with mechanical distribution of power to find five, six and occasionally eight belts between the prime mover and the driven machine. Each belt intervening is an element of variable slip, progressively because of gradual stretching, and from day to day because of changes in temperature or humidity. Momentary variation in speed may be 6 per cent above or below normal. In such a case, if the speed is made absolutely uniform, the running speed can be raised to the average maximum of the variations, with a gain of say 5 per cent in production.

The implications of the impending changes in machine design are many and varied. Broadly, of economic interest to the whole country, is the production of better goods at less cost, because of reduced floor space, greater efficiency and higher productive speed. This will be especially true of goods produced for the ultimate consumer. It is evident that when these results are realized, even with individual machines, the manufacturer must perforce scrap out-of-date equipment and install the new. He should sense this early enough to prepare for it through the depreciation account.

As a corollary to this situation it is evident that when manufacturers of machinery themselves build electric drive into their machines, there will be a materially lessened demand for standard type motors as now built by electrical manufacturers. This will be particularly true of the larger sized electric motors, with general acceptance of the individual-drive idea.

Power Application Viewed as External Thing

IN certain lines of production the essential features of the machinery used have not changed since power machines were first built. This is especially true with respect to machines originally designed and built for hand operation. With these and other early forms of machines, the first fifty years were required to eliminate the difficulties that developed because of the different conditions introduced by power drive. During the last fifty years crudities have been eliminated, refinements added and the use of the machines extended.

Textile machinery affords an excellent illustration of the developments following the application of power to hand machines. The hand mule—in use 60 years ago—was simply the hand spinning wheel with a hundred or more spindles instead of one. Power was used to turn the large number of spindles, hand operation was closely copied, even to the use of a gig wheel. With mule spinning today the same movements are automatically reproduced by power. The plain goods loom now used has the same parts as the old hand loom with some added refinements; it is a very interesting combination of reciprocating and rotary movements, both fast and slow. The original power card is essentially reproduced in the card now built. Textile machinery as a whole offers a very attractive field for redesign with built-in electric drive.

The greatest invention has been displayed in ma-

chinery originated more recently expressly for power operation, where there has been no incentive to copy former hand movements. In this class may be mentioned, by way of illustration, machine tools and shoe machinery, all of which has been designed expressly for power drive.

The fundamental idea of electrical power distribution is diametrically opposed to that of mechanical power distribution. That fact, plus force of habit, are the explanation why few men with strictly mechanical training are qualified to lay out properly and efficiently an electric drive, much less undertake electrical design. It accounts, too, for the rather slow application of the individual drive idea.

Mechanical distribution of power by shafts, pulleys and belts—practically the only method in use fifty years ago—drives each machine through these mechanical agencies from a single prime mover; whereas, with complete electrical distribution, belts and shafting are dispensed with and what is essentially a prime mover, applied directly to each machine, or, better still, incorporated in its construction. The comparison is between distribution and concentration.

Now it is obvious that with electrical concentration of power in each machine, the manufacturers of shafting, large belts, pulleys, bearings, etc., will face a gradually diminishing market for such products; likewise the builders of engines of all sorts not adapted for driving electric generators. Engine builders face the elimination of small prime movers, except where electrical transmission is not available, as with boats. More and more as time passes will electricity prevail in power applications; electricity furnished by large power stations, parts of an extensive super-power network. The so-called isolated, or local, power plant is doomed; those who manufacture apparatus for such plants must look elsewhere for their business.

Machinery Builder Will Make Electrical Parts

THE one most directly and intimately affected by these epoch-making changes in business alinement is the machinery builder. He must accept the situation and prepare for it, or change his line, or curtail. Assuming the machinery builder affected elects to swim with the tide and redesign his line, will he build the electrical parts for his machines? He cannot well do otherwise. The relation of parts is too intimate and specialized to have them made in different shops. This does not oblige him to face the exploration of an electrical or technical labyrinth. The obstacles are largely mental.

Alternating current will be used for most electric drives; the motors are mostly machine work with simple and easily made electrical features. The stationary electrical member, the stator, will have lateral slots into which formed coils of insulated wire are fitted. Making and fitting these coils is the only essentially electrical feature of the machine except in special cases where speed control is required. Electrical design is practically an open book today. There are no basic patents to make trouble. The first concern in the field, however, in the design of any particular line of machinery will be able to protect its own designs by construction patents that will trade-mark its output.

One Experience in Combining Motor with Machine

IN working out a particular case where the driving motor was incorporated as an integral part of the machine, the simplicity of the motor construction was surprising. The only parts added for the motor were two laminated rings of metal, one attached to the revolving part of the machine and the other to the end frame. There were neither casing, bedplate, shaft nor bearings, corresponding to such parts of a standard motor. What represented them were essential parts of the machine. The motor drive reduced floor space and added nothing to the machine that required attention. The only additional machinery needed for making the motor parts was a press to punch out the laminations for the rotor and stator rings. Given the data for the motor design, the only new help needed was for making the coils for the stator section. The cost will be less than for a standard type motor; the power used will be less too.

Such machinery is all to the good for the factory using it. When it is available in quantity none other will be used where electricity is available. The only adverse factor is that the builder will have to make and stock a different line of parts for each machine built. This is a matter deserving consideration, for it may mean a change in the line of machines that a manufacturer builds. The difficulty seems serious, but it is nine-tenths mental.

Suppose a shop is building, say, 20 different machines, used successively in producing one line of goods. By tradition and habit—mental habit—the management thinks it must continue to produce the entire line of machines. But there would be at least one electric motor drive for each machine, and for some machines perhaps two or three, say altogether thirty motor parts to be made and stocked. This would be too many to produce at low cost for the number marketed unless manufacturing was on an extensive scale.

The manufacturer is therefore confronted with the necessity of making, what is to him a momentous decision—of breaking with tradition. Will he continue to build the full line of 20 machines, with active competition on each one, or will he narrow his production to one-fourth as many (or even less), and produce in quantity the ones he continues to build? Good judgment dictates the latter course, for besides wisely meeting his particular case, it is in line with the twentieth century principle of economics—lower cost through mass production.

Deoxidized Copper for Welding

SINCE the small amount of oxygen purposely remaining in pure copper slabs, bars, plates and sheets makes it impossible to weld this material satisfactorily, copper and brass mills have placed on the market a deoxidized copper, according to W. R. Hibbard, technical department, American Brass Co., Waterbury, Conn., speaking before the recent meeting of International Acetylene Association. This is made by adding sufficient deoxidizer to the molten copper to remove all oxygen; usually a slight excess is added, as it is hard to know exactly how much oxygen is present in the metal.

Common deoxidizers for this purpose are phosphorus, silicon, manganese, zinc, cadmium and calcium boride. With the exception of the last one, the slight excess of deoxidizer remains in the copper; the boride takes up oxygen and floats off with the slag. From 0.03 to 0.15 per cent of the others may be residual (except cadmium, which is liable to run from 0.10 to 0.50 per cent).

A weld made with deoxidized copper will process easier and have nearly twice the strength of one made with electrolytic copper. There is one disadvantage to deoxidized copper and this is where high electrical conductivity is required. Very slight percentages of some deoxidizers decrease the electrical conductivity, in the case of phosphorus cutting it to one-fifth its normal value.

Corrosion by Superheated Steam

Investigation of Large Operating Boilers and High Pressure Experimental Boilers Indicates That Steel Is Corroded at Negligible Rate

BY J. K. RUMMEL*

WITHIN the last few years in central stations, steam pressures have been increased from 250 lb. to 1400 lb. per sq. in. and steam temperatures have increased from 600 deg. Fahr. to 750 deg. Fahr. at the superheater outlet. Even higher steam pressures and temperatures are being considered. Abroad, slightly higher steam temperatures have been in use on smaller installations at lower capacities than are common in America.

This trend toward increased temperatures and pressures, together with certain operating experiences, made it desirable to study the probable extent of the reaction beween iron and steam at the elevated temperatures existing in steam superheaters. This reaction, which proceeds at a low rate at temperatures around 900 deg. Fahr., and probably approaches maximum velocity at approximately 1470 deg. Fahr., may be expressed

$3\ Fe$	$+\ 4\ H_2O$	$=$	Fe_3O_4	$+\ 4\ H_2$
Iron	Steam		Magnetic iron oxide	Hydrogen

Since the early part of 1926, the service department of Babcock & Wilcox Co. has investigated five boiler units which represent a considerable range in operating conditions. These installations, designated as *A*, *B*, *C*, *D*, and *E*, are described in Table 1. Briefly the conditions were as follows:

A. Radiant heat superheater, 3-pass. Last pass equipped with Enduro KA2 tubes. Pressure: 200 lb. gage. 100 per cent makeup water treated, in the boiler, with soda ash, sodium phosphate and quebracho.

B. Stirling type boiler with convection single pass superheater. Pressure: 400 lb. gage. Feed water: all condensate with low oxygen content.

C. Babcock & Wilcox boiler with interdeck 3-pass superheater. Pressure: 600 lb. gage. Feed water: condensate from condensers using zeolite and acid treated makeup water. Practically no oxygen in the feed water.

D. Similar to C, except that the makeup water was distilled; the water to the evaporators being pre-treated in a lime and soda ash treating system. Practically no oxygen in the feed water.

E. Experimental boiler. Pressure 1500 lb. to 3200 lb. Feed water: condensate with sodium phosphate addition but with poor control of oxygen content.

The method used for measuring the rate of corrosion is based on the evolution of hydrogen by the reaction quoted above and the measurement and analysis of the gas in different parts of the system. Methods of sampling, gas separation and analysis were developed.

A selection of the results are reported in Table II for these five installations, representing operating pressures from 200 to 3200 lb. per sq. in. and final steam temperatures ranging from 600 to 790 deg. Fahr.

Method of Sampling and Gas Analysis

With minor modifications at different stations, the method of separating the gas from steam or water, at the desired sample points, is as illustrated on page 1527.

The sample, entering at the point marked "steam in-

*Chemical engineer, service department, Babcock & Wilcox Co.

Table I—Operating and Engineering Data

	Station A	Station B	Station C	Station D	Station E
Type of economizer	None	B. & W. Steel	B. & W. Steel	B. & W. Steel	
Type of boiler	B. & W.	Stirling	B. & W.	B. & W.	
Type of superheater	3 pass radiant —Enduro KA2 3rd pass	Convection— 1 pass. Steel	Interdeck— 3 pass. Steel	Interdeck— 3 pass. Steel	B. & W. Steel / Experimental
Temperatures deg. Fahr.					
Leaving economizer	.....	.....	385	310	375 to 450
Leaving boiler	395	450	480	480	700 to 728
Leaving superheater	730 to 790	700 to 725	720 to 750	710	712 to 778
Leaving superheater (2nd pass)	590 to 636	.....	.....	.....	.....
Superheater tubes, maximum	943 to 1200	900	900	900	.....
Furnace (flame)	2350	.....	.....	.....	2600
Boiler Data					
Boiler pressure — lb. per sq. in. approx.	200	400	600	600	1500 to 3200
Rate of evaporation—1000 lb. per hr.	17 to 19	150 to 350	125 to 170	115 to 135	1.6 to 3.4
Time of steam in superheater	0.216 sec.	1.4 sec	1.0 sec.	.....	5.6 sec.
Internal area of superheater tubes.	251.5 sq. ft.	4,785 sq. ft.	3,280 sq. ft.	2,068 sq. ft.	24.58 sq. ft.
Water conditions					
Make up—per cent	100	2	2	1.5	2
Treatment of make up water	Soda ash and quebracho	Distilled	Zeolite and acid	Distilled	Distilled
Internal boiler feed water treatment	Sodium phosphate	None	None	None	Sodium phosphate
Method of deaerating feed water	None	Vacuum condensers	Vacuum condensers	Vacuum condensers and deaerators	Partial vacuum condensers
Oxygen in feed water—cc. per liter.	3 to 6	0.08 to 0.18	0	0.025	0.16 to 1.8
Boiler water analyses, parts per million					
Sodium alkalinity as Na_2CO_3 equivalent	450	0.00	400	50	32 to 736
Sodium phosphate as Na_2HPO_4	50	.....	.....	.....	0 to 700
Total solids	1700	260	2,400	140	50 to 800

NOTE: The above figures are approximate values and do not cover all operating conditions.

let," first passes through a condenser where the steam is condensed and cooled to approximately room temperature. As shown by arrows, this condensate passes in turn through a gas separator, water tank and waste line. The rate of flow through the apparatus is estimated at intervals by directing the condensate into the measuring cylinder. When the water tank has been washed free of deaerated water with which it was previously filled, the gas collector at the outlet is filled with fresh condensate; the gas in the gas separator is transferred to a gas receiving bottle (marked "gas holder") and the sampling operation is stopped. The water in the tank is now boiled until free from dissolved gases, (by means of the steam coil therein), and the flow of steam and liberated gas from the top of the tank is passed into the gas collector. Steam condenses in the collector, while the gas rises to the top and is withdrawn into a separate gas receiving bottle. (The first gas separator is used to collect any free gas in the condensate, while the tank and second gas collector make it possible to recover the gas which remains dissolved in the condensate.)

The two gas samples, representing free gas from the gas separator and the dissolved gas from the tank, are then analyzed and measured in a Burrell (Bureau of Mines) Orsat apparatus; determining carbon dioxide, oxygen, hydrogen and carbon monoxide. Nitrogen is

Table II—Summary—Gas In Steam—Average Results

Station	Sample Point	Boiler Pressure, Lb. per Sq. In.	Steam Temp., Deg. Fahr.	Evaporation, Lb. per Hr.	Cc. of Gas per Liter Condensate	Pounds of Each Gas per Million Pounds Steam						Boiler Water Analysis Parts per Million		Remarks
						CO_2	O_2	H_2	CO	N_2	Totals	Na_2CO_3 Equiv.	Na_3HPO_4	
A	Superheater, inlet.	222	395	19,182	30.694	11.6221	8.1009	0.0196	0.0213	20.7456	40.5095	365	284	
	Superheater, 2nd pass outlet.....	...	590	....	32.145	12.4241	7.8173	0.0149	0.0000	22.2502	42.5065	...	...	Radiant superheater, 3rd pass Enduro KA2.
	Superheater, 3rd pass outlet.....	...	730	....	32.057	12.7005	7.7747	0.0288	0.0148	21.8039	42.3227	...	...	
A	Superheater, inlet.	224	396	17,513	30.987	11.1894	8.0555	0.0105	0.0931	21.4522	40.8007	...	...	Conditions same for all tests except rate of evaporation and final temperature.
	Superheater, 2nd pass outlet.....	...	640	....	29.391	10.8387	7.0854	0.0151	0.0442	20.6633	38.6467	...	...	The large amount
	Superheater, 3rd pass outlet.....	...	790	....	32.663	14.7850	7.2141	0.0290	0.0982	21.5893	43.7156	...	...	of gas at this station has diluted the hydrogen gas to a very small part of the whole.
B	Boiler outlet.....	400	444	151,000	0.9098	0.0000	0.0108	0.0117	....	0.8821	0.9046	No sodium	None	All conditions the same for these tests except rate of evaporation and corresponding temperatures and pressures. In later tests when the feed water was aerated the hydrogen increase through the superheater was about 0.005 lb./1,000,000 lb. A maximum of 0.016 lb. H_2/1,000,000 lb. was obtained at the superheater outlet.
	Superheater outlet.	...	710	....	1.0796	0.0009	0.0022	0.0129	....	0.9142	0.9302	Alkalinity		
B	Boiler outlet.....	415	448	342,700	1.0052	0.0075	0.0898	0.0055	....	1.0064	1.1092	"	"	
	Superheater outlet.	...	750	....	1.0248	0.0056	0.0559	0.0061	....	1.0499	1.1175			
C	Boiler outlet.....	600	480	125,000	1.4134	0.9667	0.0042	0.0256	0.0206	0.5798	1.5969	380-480	None	
	Superheater outlet.	...	720	....	1.3870	0.9639	0.0039	0.0275	0.0196	0.5877	1.6026			
C	Boiler outlet.....	600	480	170,000	1.0902	0.6358	0.0056	0.0333	0.0375	0.3491	1.0613	380-480	"	
	Superheater outlet.	...	746	....	1.1155	0.6279	0.0066	0.0370	0.0380	0.3317	1.0412			
C	Economizer outlet.	600	380	125,000 to 170,000	1.2570	0.5229	0.0064	0.0187	0.0000	0.8533	1.4013	380-480	"	Steam flow and gas evolution somewhat erratic for this station.
	Boiler outlet.....	...	480	....	1.5042	1.0767	0.0047	0.0228	0.0204	0.7121	1.8367			
C	Economizer inlet..	600	...	125,000 to 155,000	0.3421	0.0136	0.0358	0.0004	0.0000	0.3491	0.3989	380-480	"	
	Boiler outlet.....	...	480	....	0.7878	0.4477	0.0025	0.0199	0.0312	0.3155	0.8168			
D	Boiler outlet.....	600	480	125,000	0.157	0.0100	0.0025	0.0106	....	0.0238	0.0469	...	None	
	Superheater outlet.	...	710	....	0.184	0.0117	0.0029	0.0126	....	0.0274	0.0546			
D	Boiler outlet.....	600	480	130,000	0.120	0.0059	0.0012	0.0072	....	0.0339	0.0482	3	"	Small quantities of gas at this station made analysis difficult.
	Superheater outlet.	...	...	....	0.132	0.0071	0.0008	0.0079	....	0.0366	0.0524			
D	Economizer inlet..	600	200	125,000	0.126	0.0081	0.0269	0.0004	....	0.1116	0.1470	60	"	
	Economizer outlet.	...	310	128,500	0.144	0.0047	0.0138	0.0063	....	0.0632	0.0880			
E	Economizer inlet..	1552	273	3,201	8.4290	0.1278	2.4161	0.0037	0.4580	7.4507	10.4563	54	157	This group of samples taken at different times. Poor deaeration of feed water.
	Boiler outlet.....	1553	658	3,387	4.1699	0.1063	0.4152	0.0085	0.2274	3.6916	4.4490	170	284	
	Superheater outlet.	1551	609	3,385	5.3851	0.0429	0.8927	0.0125	0.2301	4.7010	5.8792	265	431	
E	Economizer inlet..	2445	323	3,038	7.9244	0.0182	1.8948	0.0062	0.0522	7.2489	9.2203	65	143	This group of samples taken at different times. Poor deaeration of feed water.
	Boiler outlet.....	2494	689	3,321	2.9006	0.0917	0.4083	0.0059	0.1693	2.6737	3.3489	208	96	
	Superheater outlet.	2519	684	3,362	7.0969	0.8092	0.7966	0.0228	0.2814	6.4341	8.3441	194	115	
E	Economizer inlet..	3430	196	1,682	1.753	0.0077	0.2351	0.0016	0.0234	1.7698	2.0376	32	18.7	Samples taken simultaneously in following tests. Deaeration of feed water improved.
	Boiler outlet.....	3354	714	....	1.869	0.0188	0.0449	0.0054	0.1263	1.9075	2.1029			
	Superheater outlet.	3233	746	....	2.489	0.0115	0.1160	0.0153	0.1989	2.3563	2.6980			
E	Economizer inlet..	3452	196	1,936	4.259	0.0317	0.4590	0.0040	0.0384	4.3839	4.9170	114.9	34	
	Boiler outlet.....	3335	716	....	4.591	0.0638	0.0635	0.0291	0.1681	4.6645	4.9890			
	Superheater outlet.	3227	740	....	4.808	0.0500	0.0632	0.0459	0.2867	4.5451	4.9909			
E	Economizer inlet..	3385	190	1,987	4.687	0.0622	0.6194	0.0033	0.0281	4.7626	5.4756	736.4	74.1	
	Boiler outlet.....	3385	718	....	5.164	0.0438	0.0443	0.0408	0.1184	5.2148	5.4621			
	Superheater outlet.	3221	758	....	6.195	0.0478	0.0963	0.0890	0.2346	5.5723	6.0400			

found by difference. Tests for hydrocarbons gave no more than traces.

From the data obtained, is calculated the volume of total gas per thousand pounds of condensate as sampled, and from this and the calculated average analysis of the gas in the sample, is found the pounds of each gas per million pounds of steam generated. The average analysis of the gas is calculated from the ratio of the water passed through the separator to the capacity of the tank and the volumes and analyses of the gas from the two sources.

Discussion of Data

The items of particular interest are the amounts of hydrogen made and the amounts of oxygen consumed under different operating conditions. From these may be inferred the amount of corrosion, by assuming that all of the hydrogen formed is the result of the reaction between iron and steam and all the oxygen consumed in the system is the result of its combining with hydrogen to form water. Under these conditions the formation of one pound of hydrogen would be equivalent to 20.744 lb. of iron and the consumption of one pound of oxygen would be equivalent to 2.617 lb. of iron. Thus, if a system generated 0.02 lb. of hydrogen and consumed 0.1 lb. of oxygen per million pounds of steam, the loss of iron in the system would be 0.677 lb. of iron. While this figure is considerably higher than found in any of the large boiler installations examined, (installations *B, C* or *D*), it is estimated that if this loss were distributed evenly over their entire surface, the tubes therein will give a satisfactory length of service before failures are likely to occur.

It is well known that hydrogen may be produced in the boiler system by reactions other than the one outlined above, and oxygen may be consumed in other ways than by combining with hydrogen gas. For example, the iron may corrode by combining with water to form ferrous hydrate and hydrogen gas, and the oxygen present then promote the oxidation of ferrous hydrate to ferric hydrate and iron oxides. It is therefore apparent that the iron equivalents for hydrogen and oxygen as given, are subject to interpretation depending on the existing conditions at the time the gas samples are taken. The probability that several simultaneous reactions take place in the system, makes it difficult to reduce pounds of gas to pounds of iron in the data presented.

Experience has fully justified the recommendation that oxygen in the feed water should be reduced to as near zero as is practically possible, in order to protect the surfaces in contact with both water and steam. This recommendation applies to the protection of superheaters as well, since there is ample evidence that superheater tube failures by corrosion have been greatly accelerated by the presence of oxygen in the steam.

Small scale experiments by C. H. Fellows (a) and J. Porter (b) have demonstrated that the reaction between iron and steam does not reach serious proportions in steel superheaters until the metal reaches or exceeds 950 deg. Fahr. Below 1000 deg. Fahr. the formation of hydrogen and iron oxide is found to increase slowly as the temperature increases. Above 1000 deg. Fahr. the formation of hydrogen and the corrosion of the metallic surface is considerably more rapid per unit increase in temperature. With tubes made of the alloy known as Enduro KA2 the rate of corrosion is considerably less and higher temperatures are permissible.

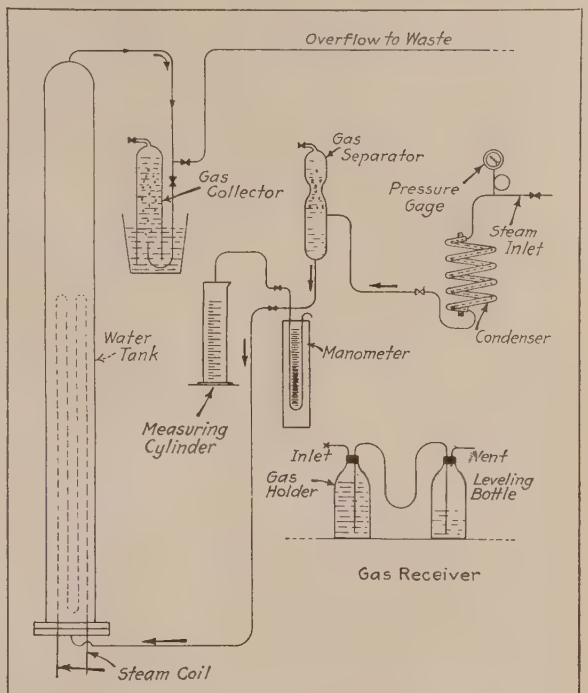
The general conclusions which may be drawn from the information available to date, are:

1. With oxygen-free steam, corrosion, due to the rate of reaction between steam and superheaters made with steel tubes, is negligible for steam temperatures up to 800 deg. Fahr. and tube temperatures up to 950 deg. Fahr.

2. The use of superheaters made with Enduro KA2 tubes with temperatures on the fire side up to 1200 deg. Fahr., is not limited by the reaction between iron and steam.

3. Hydrogen gas evolution (and corrosion in general) is accelerated by oxygen entering the system with the feed water, and the oxygen content of this water should be reduced to the lowest practical amount.

4. Within limits, the alkalinity of the boiler water will have no noticeable effect on the rate of reaction between iron and steam. A definitely alkaline boiler water and boiler feed water is preferred to prevent acid corrosion and limit corrosion due to other conditions. However, alkaline water does not stop corrosion due to oxygen.



Analytical Equipment for Measuring Gases in Steam Withdrawn from High-Temperature Superheaters

(a) Paper by C. H. Fellows of the Detroit Edison Co., before the American Water Works Association, at Toronto, 1929.
(b) Article by J. Porter, abstracted by S. T. Powell in his book, "Boiler Feed Water Purification," page 255.

Study Liquid Shrinkage of Metals

Progress in the investigation of the problem of liquid shrinkage, being carried on through the cooperation of the American Foundrymen's Association and the Bureau of Standards, is indicated in a report submitted by E. J. Ash, research associate for both organizations, to the committee on cast iron of the A. F. A.

A new procedure has been developed which is termed the crucible immersion method. This consists in immersing a crucible of known volume into a ladle of molten metal and filling the cavity of the crucible, allowing sufficient time for the crucible and the metal to reach a temperature equilibrium. When this state is attained a lid is pressed down firmly on the crucible and the whole removed from the melt. After cooling, the resultant ingot is weighed, and through the known volume of the crucible the specific volume value of the metal at the temperature of sampling may be determined.

Furnace Construction; Operation

Open-Hearth Men Consider Design of Furnace, Use of Auxiliary Equipment, Insulation, Character of Ports and Checker Brick

FUNDAMENTAL matters connected with the design of open-hearth furnaces were taken up, along with questions of quality control for steel and many other matters, at the autumn meeting in Chicago of the open-hearth committee of the American Institute of Mining and Metallurgical Engineers. The rapid-fire discussion of all these topics, participated in by operating men from many different steel plants, with no set papers and nothing printed, made this meeting one of unusual interest. The following pages conclude the story. The first section was on pages 1307 to 1310 of our issue of Nov. 14; the second, pages 1382 to 1384 of our issue of Nov. 21.

Auxiliary Equipment of an Open-Hearth Plant

BRIEF description was given by F. B. McKune, Steel Co. of Canada, Hamilton, Ont., of two new furnaces which he has installed within the past year The bath measures 15 ft. 6 in. x 42 ft. in surface area and has a depth of 3 ft. net. The foreplate is 4 ft. above the brick bottom of the furnace. This furnace over all is 77 ft. 6 in. long and the heat is 135 gross tons.

Regenerators are 23 ft. long and measure 20 ft. 6 in. high to the spring of the arch, the latter being 2 ft. 10 in. high. The brick checkers are 13 ft. 6 in. high. Air chambers at each end are 16 ft. 1 in. wide, while the gas chambers are 11 ft. 6 in. wide.

These furnaces are fitted to burn a combination of blast furnace and coke oven gas varying in proportion from 5 to 1 to about 2.3 to 1. The average fuel used in this mixture has a heat value of about 240 B.t.u. to the pound. One of the furnaces is fitted with control regulators.

During August, September and October more than 180 heats were taken out of the furnace with controls, with the following results:

	Heats	Tons of Ingots	B.t.u. per Ton
August	61	8,147	4,250,000
September ..	58	7,839	4,300,000
October	67	9,028	4,300,000
Total	186	25,014	

Average charges in October amounted to 143.6 tons, with heats averaging 134.8 tons. For the month, heats were made at the average rate of 12.1 gross tons an hour. These proceed at a very uniform rate, as many successive heats have been made with differences of not more than 10 min. between them.

It is the hope that tar may be burned in combination with blast furnace gas in these furnaces, using 16 or 17 gal. of tar to the ton of ingots and getting the remainder of the heat from blast furnace gas. The present stack temperature of about 1000 deg. Fahr. should be reduced to 800 deg., with proper control.

About 130,000 checker brick are used, measuring 4½ by 9 in. and with 54 sq. in. openings. The gas is not regenerated. Comparing the two furnaces, the automatic control arrangements drop the checker temperature about 200 deg. The two chambers, side by side, are running at about 2200 deg. for gas and 2100 deg. for air.

Blast furnace gas is heavy enough so that it lies close to the bath while burning. The port roofs are insulated and this is to be extended from each end of the main roof through about one-quarter the length of the roof. Thus, some 70 per cent of the total roof of the furnace will be insulated. The gas checker chamber is insulated, but the air is not. There is a brick stack 8 ft. in inside diameter and 225 ft. high.

Reversals are on a 20-min. schedule. This is found to accompany a drop of 110 deg., approximately, in regenerator temperatures. Complete combustion is obtained at about the center of the furnace. Some 260 B.t.u. for fuel is used for melting and then gradually the mixture is cut down until it reaches about 180 B.t.u., representing about six parts of blast furnace gas to one of coke oven gas. The port through which the gas comes is 9 ft. long, with a slope of 3 in. to the foot and sectional area of 1700 sq. in.

Thermal Units Consumed

Discussing heat economy in furnaces, one producer gas plant making steel castings reported about 4,500,000 B.t.u. consumed for each ton of metal charged. The producer is burning 550 lb. of coal at about 85 per cent efficiency. A natural gas furnace burning 5500 cu. ft. to the ton accounted for about 5,500,000 B.t.u. An oil furnace using 30 gal. to the ton, at 155,000 B.t.u., reported 4,655,000 B.t.u.

Other scattering reports showed 4,370,000 to 6,250,000 B.t.u. on producer gas, 6,700,000 B.t.u. on pulverized coal, 4,750,000 B.t.u. on natural gas, 5,000,000 to 5,900,000 B.t.u. on oil, 5,500,000 to 6,500,000 B.t.u. on tar and 4,300,000 B.t.u. on a mixture of blast furnace and coke oven gas.

A fuel engineer observed that it is possible to attain practically the same furnace efficiency, regardless of fuel, if the furnaces are designed properly for the fuel which is to be used.

Changing Producer Furnace to Natural Gas

IN making a change whereby a furnace built to burn producer gas is fired with natural gas, the opinion was expressed that the natural gas flame must be given a positive direction or it is likely to burn out the roof. There should be a pre-mixing burner. There will be little or no change needed in the uptakes. If a furnace is built with a single uptake, the initial cost is less than when three are fitted. Renewals, however, are more costly and the furnace may burn out the supporting wall.

Problems in Furnace Insulation

ONE plant has put Sil-o-Cel C-3 in the pan bottom of a furnace and has used less brick under the burned-in bottom surface. This furnace has made more than 700 heats; it is reported to be much cooler beneath this furnace than with the ordinary type and the bottom is holding up well.

In another plant a new 100-ton furnace, not yet in operation, has been insulated with 3 in. of C-3 cement, covering the rivet heads, and one course of C-22 Sil-o-Cel brick. Then there are four courses of fire-brick, 3½ in. of magnesite cement and then 17 in. of fused magnesite to make the bottom. The side walls have eight courses of C-22, making about 18 in.

Insulating checker chambers without changing the old walls was regarded as something of a makeshift. In one plant 1½ in. of Webber composition was daubed on, but it is now peeling off a bit. In another case, wire mesh has been fastened on the wall, and insulating cement thrown at it with a gun, by the Johns-Manville method. Still another plant has put 2½ in. of Sil-o-Cel on the roofs and covered them with Silcote. This has cracked open and the roof shows red hot through the cracks. This brings up the question of the structural steel

in there, which is not designed to stand a red heat.

One plant has used magnesia block over the regenerator chambers, covered with a steel mesh and Sil-o-Cel cement, and the whole thing inclosed in steel plates. Another man reported, however, that insulating engineers no longer advocate the use of steel plate. When holes form in the brickwork back of the plate they cannot be got at for patching. It was suggested that the plate might be put on in panels, easily removable, so that patches could be made.

Less Firebrick with Insulation

Another operator found it necessary to take down the side walls to put on insulation. Because of his clearances he took away enough of the fire-brick lining to make room for the Sil-o-Cel. Another man reported a furnace insulated and plated in, but stated that the insulation does not keep the heat in sufficiently well and the plate gets too hot. The opinion was expressed that cold air infiltration, however detrimental it may be to furnace balance, keeps the walls cooler than does the insulating material. Consequently, what is done by the methods in vogue consists more in air-proofing than in insulation.

One man, who has had all of his furnaces insulated, reported a producer gas consumption equivalent to 520 lb. of coal to the ton of ingots, everything included. He stated that this is a bit below the previous consumption, before the furnaces were insulated.

Purpose of a Venturi Port

ONE operating man reported great satisfaction from the use of a Venturi port on a producer-gas furnace. He stated that one such furnace which he had seen, and in which the regenerators were insulated and plated in, had its checkers so hot that they appeared around 2600 deg. Fahr. This led to the query from another man as to what refractories would stand that temperature.

A Canadian plant reported having to rebuild a flat roof over the gas port after 230 heats, out of 375 heats made in the entire run, with a Venturi port. The cross-sectional area at the knuckle was said to be 22 sq. ft. in a furnace having 40 sq. ft. for the air uptake and 5 sq. ft. for the gas.

William D. Pugh of the research department, English Steel Corporation, Sheffield, England, reported that the first Venturi port ever installed in an English furnace is now being put in.

One operating man described the Venturi port principle as an effort to approach the aspirating principle on the ingoing end and obtain a pre-mix of air and gas and, at the same time, on the outgoing end, not to oppose much resistance to the exit of the gases. High-velocity gas draws in air in the stream of gas and thus produces a good mix. With poor combustion, however, this flame would be likely to burn out the port at the outgoing end.

One Damper, or Several?

GOOD regulation is reported for furnaces which have separate dampers for each checker chamber and no main stock damper whatever. These furnaces, with their four dampers, appeared to give better regulation than obtained by the use of a stack damper; they have larger regenerators than in the latter case. In another plant where each chamber has its own damper there is also a main damper. Each chamber is regulated separately, resulting in keeping a more uniform temperature in the regenerators. Unless this is done the gas chambers get hotter than on the air side.

Blaw-Knox valves are used in another plant, giving different openings for the gas and the air; this is found to be very beneficial. The valves are governed through the use of recording pyrometers. There is a stack damper which is lowered in making bottom with the dolomite machine. Consequently little heat is lost through the regenerators at this time.

Flames Sweeping Wall or Roof

WHAT causes a flame to sweep along the back wall or to hang to the roof is a question which was discussed by several speakers. One man reported that, with a sloping back wall, the first part of the furnace to fail is along the skewback. It was found necessary, after about 125 heats, to put in a patch measuring about 3 x 8 ft.

This experience was verified by another man who stated that, particularly in the early part of the heat, that part is the hottest portion of the furnace. With light scrap piled up, the gases have to find their way to the outgoing port and take the line of least resistance. It was stated that we might increase the velocity of the gases and decrease the draft by reducing the amount of air which comes in through the front of the furnace and pushes the flame toward the back.

The opinion was expressed that reflection from the sloping backwall to the roof was responsible in part for the fact that it is necessary to put on a patch earlier with the sloping backwall than with the straight wall. Several speakers concurred in this view. In one case the rear skewback was raised and considerably more life was obtained from the backwall.

To obviate this trouble, particularly in furnaces which are filled up full with light scrap, one operator had the ports brought nearer the front of the furnace than their usual center-line position. This did not help; he then raised the skewback at the rear and obtained some benefit. One man reported, however, that he does not believe the trouble can be entirely obviated. A partial remedy was suggested, consisting in keeping the bridge wall low and consequently keeping the flame down nearer the bath.

Sloping or Inclined Port Roofs

WHY American furnaces must have sloping or inclined port roofs for directing the flame, whereas several efficient European furnaces have practically a straight roof, with only the gas roof pointing toward the bath, was a question which came up for extended discussion. One operator expressed the view that the roof has little or nothing to do with controlling the direction of the gas. He uses very little slope to his roofs. He stated, however, that the pitch of the port floor is the real answer, short ports needing a sharper pitch than long ones. With a Venturi port the pitch is only ¾ in. to the foot.

Producer gas furnace life was stated by this speaker to be measured by the life of the air chamber, which, in his practice, runs from 200 to 275 heats. The opening is 54 sq. in. and the checkers get very dirty. Using tar as fuel in the same furnace increases the life by about 75 heats.

One plant, using roofs which are straight from end to end, reported getting 400 heats in a campaign. The superintendent of this plant expressed the opinion that he would not get so many if his roof were sloped.

Recovery and Replacing of Checker Brick

PRACTICE in one plant was reported to be the recovery of about half the checker brick on a general repair. All of the brick are taken out and the new brick, half the total amount, are placed in the bottom. This results in scrapping at each repair the brick which have been used twice; that is, those which were put new into the bottom of a chamber and on the next repair into the top. This has to do with the air chamber only, as the gas chamber is built all of old brick.

Another plant, which reports 60 per cent recovery of the brick, with a single regenerator chamber at each end, takes all of the brick out each time. In this case, the new brick are placed on the top and the old brick on the bottom.

Still another plant takes out and discards the four top rows of brick after 150 to 200 heats, and scrapes and cleans all of the rest which need it. In rebuilding, the old brick are placed on top. Use of a brick-cleaning machine was reported to make it possible to straighten up brick which otherwise could not be put back into service. This gives a much better recovery of the brick.

Loftus brick, used in one plant, were reported to give about 300 heats; then the top three or four courses—the range being from one course to seven—are taken out and replaced with new. Loftus brick were stated in one case to be no improvement over the standard 4½ x 4½ x 10½-in.

Reporting for a casting plant, one man stated that he was making about

500 heats to the campaign and was putting most of the brick back in again. He expressed the opinion that some of these brick have gone through as many as 4500 heats.

Peterson brick, as indicated in the sketch, were reported to give a considerably greater bulk of brick in a given checker space than with the usual rectangular brick, and to give smaller horizontal openings. These brick, as the sketch shows, have the lower corners cut off so that they fit into each other more closely than do the rectangular units, making the openings smaller than with straight brick.

Inspection of Ladle Trunnions, Cable and Chains

SAFETY in handling heats of steel of 100 to 150 tons was discussed in some detail, with regard both to the size of trunnion on the ladle and inspection and renewal of the cables or chains on the crane. Such inspection is made in one plant regularly every four months, regardless of the rate of operation. Another plant makes this inspection every three months at a regular date. In still another case the cables are changed every six or seven months on the basis of the tonnage which has been handled. Another plant changes the cables when they begin to show signs of stretching. A stretch of ⅛ in. in a 7-in. length can be determined readily, and these changes occur about once a year.

Change of cables yearly was reported by another plant, each crane having handled about 200,000 tons of ingots during that interval. This plant reported having had trouble some years ago with a cast steel hook, which cracked. The plant has now standardized on laminated hooks made of steel plate for all ladle cranes. Another plant of the same company, which makes a practice of changing the cable yearly, had a narrow escape from an accident some time ago. One of the main cables broke, but the craneman saw it begin to unravel and was able to set the loaded ladle down by aid of the safety cable without spilling any steel.

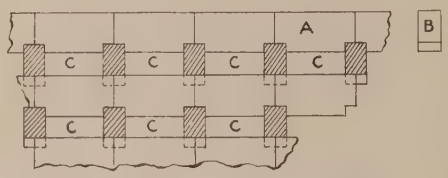
Several Breakages Reported

Another case was reported where weekly inspection of cables is in vogue. In this instance, a cast steel hook broke and the ladle came down. It did not tip over, however, and was picked up and the steel poured by means of another crane. This heat was dropped about 5 ft. straight down, as the second hook broke immediately after the first one let go. There was no running stopper.

One plant had a less fortunate experience, in having a cast steel hook break and tip the ladle over into the pit. In another case the drum shaft on the crane broke and dropped the ladle without tipping it over. This steel froze in the ladle, as it was out of reach of the other crane. In another case the U-bolt holding the cable broke and dropped the ladle, with the result that the heat was lost.

Trunnion Diameters

Trunnions 10 in. in diameter with 60-ton heats are used in one plant. In another case 10½-in. trunnions were put on 100-ton ladles and are now handling 145-ton heats. Still another plant uses 10-in. trunnions for 60-ton heats and 12-in. for 140 tons. Another one uses 10½-in. for 100 tons, but 12-in. diameter is used for the same size heat in a different plant. This plant has gone to nickel steel for the trunnions for 120-ton heats, in which 12-in. diameter is used, but 14-in. is being put on later ladles. This same 14-in. diameter is employed by another plant with heats of more than 100 tons in each ladle of steel.



Checker Brick Laid Up for Great Bulk in Limited Space. **A** and **B** are side and end views. The openings **C C** are smaller than with straight brick

Inspection of trunnions is customary at frequent intervals in one plant, beginning with a wash with coal oil. Hair-line cracks have been found in some cases on the top sides, due to hot slag running over the edge of the ladle. When these ladles were remade to avoid this trouble the cracks stopped appearing. Some trunnions which were broken have been removed and the cracks were found to be pretty deep. In another plant, where 14-in. trunnions are used, they are inspected daily by the steel mill force and monthly by the mechanical force.

Stopper Heads of Graphite and Clay

No report of the use of stopper heads of combined graphite and clay was made from any American plant. William D. Pugh, however, of the English Steel Corporation, Sheffield, reported using a nozzle of magnesite and clay, the latter being at the bottom. In this case pouring is done through a box; hence, the speed of pouring does not make much difference. His plant has found, however, that for high-manganese steel—13 per cent or so—a magnesite nozzle is the only one which will stand up. Clay used here cuts out too rapidly.

Lining and Drying Ladles

DRYING with oil, after lining and also at weekends, was reported in one castings plant to be all the heating the ladles are given. They are used in such rotation that they do not lose the heat imparted to them from the steel, before being again employed. About 19 heats to the lining are obtained in 25-ton ladles used every 5 hours. Even the nozzles are not heated after being set, as the heat of the ladle is sufficient to dry them.

Another operator reports using oil for 1 hour to dry the ladle after lining, but others are using 4 to 5 hours, especially when drying with a slag pot.

Heats obtained for each lining seem to vary considerably among the different plants. In one case, where coke-oven gas is used for drying, the October average was only 14 heats of 147 tons each. In two other cases, however, where a large amount of soft steel is made, as much as 25 heats is the average.

Circular clay brick are used in one of these cases on a ladle of 100 tons capacity, in which the steel is tapped at a temperature in excess of 3000 deg. This is for bottom pouring practice from a 3-in. nozzle and about 12 in. of slag is carried on top of the steel. Pouring of 24 ingots in a group takes about 30 min. In this same plant, with a different type of brick, only 12 heats were obtained, but sometimes with the present arrangement as many as 35 heats are made, with the aid of a patch after the first half of this run. This lining is allowed to wear away about 3 in. before a relining is made.

Desirable Type of Soaking Pits

NEW soaking pits, using producer gas and now about eight months old, were reported to be fitted with recuperators made of refractory material. Without definite data, the opinion was expressed that these pits take no more fuel than regenerator pits and possibly a bit less; they are causing no trouble. They give a more uniform heat from one side to the other than do the regenerator type, but the heat is less uniform top to bottom.

While the steel in these pits is washed a little, there is not enough of this action to cause difficulty in rolling. It is given a long soak because of the difference between top and bottom temperatures, and it heats a little faster than does the regenerator type. The ingots used are 20 x 22 in. and weigh 7000 lb. Eight are put in a pit and they are heated from cold steel in about 8 hours.

Recuperator-Type Pits

A fuel engineer reported that the tops of ingots in the recuperator-type pits heat much faster than the bottoms; consequently, it is practice to reduce the gas for a period to equalize the temperature. Reduction of the flame temperature results in more uniform heating.

Better control of heating conditions in recuperator types was reported by one operator because of the fact that each hole has a separate valve. The same condition was reported for furnaces with Isley control.

Confidence Restored Says President

Message to Congress Urges Public Building Works, Road Construction, Canalization of Waterways, Quick Action on Tariff and Income Tax Reduction

WASHINGTON, Dec. 4.—Devoted to a wide range of national and international subjects and making recommendations for legislation concerning many of them, including tax reduction of $160,000,000 for the calendar year 1930, President Hoover, in a message of approximately 11,000 words read at the opening of the second session of the Seventy-first Congress today, expressed the conviction that confidence has been reestablished. He declared that a very large degree of industrial unemployment and suffering has been prevented by the measures taken by voluntary cooperation between the Government and business institutions. Agricultural prices were declared to have reflected the returning confidence.

"The measures taken must be vigorously pursued until normal conditions are restored," he told Congress.

The recommended tax reduction program follows that given out recently by the Treasury Department. The President said, however, that in view of the uncertainty in respect of future revenues and the comparatively small size of the indicated surplus of 1931, estimated at about $123,000,000, relief should take the form of a provisional revision of tax rates.

"I recommend that the normal income tax rates applicable to the income of individuals for the calendar year 1929 be reduced from 5, 3 and 1½ per cent, to 4, 2 and ½ per cent, and that the tax on the income of corporations for the calendar year 1929 be reduced from 12 to 11 per cent," said the President. "It is estimated that this will result in a reduction of $160,000,000 in income taxes to be collected during the calendar year 1930. The loss in revenue will be divided approximately equally between the fiscal years 1930 and 1931. Such a program will give a measure of tax relief to the maximum number of taxpayers with relatively larger benefits to taxpayers with small or moderate incomes." Chairman Hawley, Ways and Means Committee, introduced a tax reduction bill in the House on Monday in line with the President's recommendation.

Asks for Early Action on Tariff

In pursuing his limited tariff revision program, President Hoover told Congress it would be most helpful if action should be taken at an early moment, more especially at a time when business and agriculture are both cooperating to minimize future uncertainties. It is just, he said, that they should know what the rates are to be.

No Conflict of Regional Interests

The President declared that there is no fundamental conflict between the interests of the farmer and the worker. Lowering of the standards of living of either was said to tend to destroy the other. The prosperity of one was held to rest upon the well-being of the other. Nor is there any real conflict between the East and the West or the North and the South in the United States, it was said. The complete interlocking of economic dependence, the common striving for social and spiritual progress, "our heritage as Americans and the infinite web of national sentiment, have created a solidarity in a great people unparalleled in all human history," the President declared. "These invisible bonds should not and can not be shattered by differences of opinion growing out of discussion of a tariff."

Public Building Work Urged

Taking up the subject of public buildings, the President recommended that consideration should be given to the extension of authorization both for the country at large and for the District of Columbia again distributed over a term of years. It was stated that a survey of the need in both categories has been made by the Secretary of the Treasury and the Postmaster General. It would be helpful, the President said, in the present economic situation if such steps were taken as would enable early construction work.

The President explained in opening discussion of the subject that under the provisions of various acts of Congress $300,000,000 has been authorized for public buildings and the land upon which to construct them, being $75,000,000 for the District of Columbia and $225,000,000 for the country at large. Excluding $25,000,000, which is for the acquisition of land in the so-called "triangle" in Washington, this public building legislation, the President pointed out, provides for a five-year program for the District of Columbia and an eight or nine-year program for the country at large. Of this sum, approximately $27,400,000 was expended to June 30 last, of which $11,400,000 has been expended in the District and $16,000,000 outside.

Treating the subject of the waterways and flood control, the President said that the development of inland waterways has received new impulse from the completion during the year of the canalization of the Ohio to a uniform depth of 9-ft. The development of other segments of the Mississippi system should be expedited, he said, and with this in view he recommended an increase in appropriations for rivers and harbors from $50,000,000 to $55,000,000 per annum, which, together with about $4,000,000 per annum released by completion of the Ohio, should make available, after providing for other river and harbor works, $25,000,000 to $30,000,000 per annum for the Mississippi system and thus bring it to early completion.

Road Program 50,000 Miles a Year

Dealing with highways, the President said that while proper planning should materially reduce the listed mileage of public roads, particularly in the agricultural districts, and turn these roads back to useful purposes, it is evident that road construction must be a long-continued program. Progress in improvement, the President said, is about 50,000 miles of all types per annum, of which some 12,000 miles are of the more durable type. The total expenditures of Federal, State and local governments last year for construction and maintenance, it was stated, assumed the huge total of $1,660,000,000.

"Federal aid in the construction of the highway system in conjunction with the States has proved to be beneficial and stimulating," President Hoover declared. "We must ultimately give consideration to the increase of our contribution to these systems, particularly with a view to stimulating the improvement of farm-to-market roads."

Progress in Civil Aeronautics

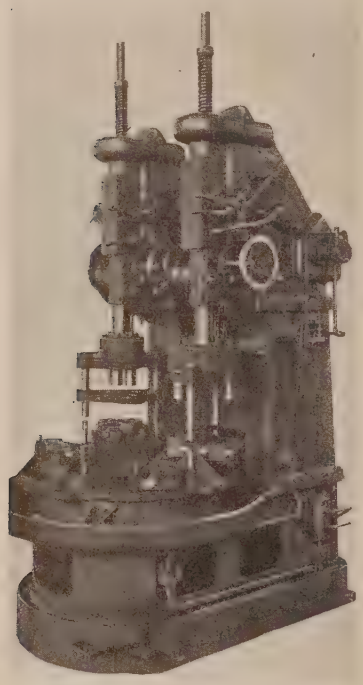
During the past year progress in civil aeronautics, the President said, has been remarkable. Government-improved airways now exceed 25,000 miles, more than 14,000 miles of which will be lighted and equipped for night-flying operations by the close of the current year, it was stated. There are now 1000 commercial and municipal airports in operation with an additional 1200 proposed for early development, the President pointed out.

"Through this assistance, the Nation is building a sound aviation system, operated by private enterprise," Presi-

(*Concluded on page* 1565)

Production Gang Drill with Hydraulic Indexing Table

A NEW two-spindle production gang drilling machine having a one-piece base and built-in rotating hydraulically controlled table has been placed on the market by the Barnes Drill Co., Rockford, Ill. The table may be of three or four-station type. The entire hydraulic mechanism is in-



The Hydraulic Indexing Three-Station Rotating Table with Foot Control Is a Feature. The table has a wide chip trough and a pusher which sweeps chips into a receptacle at the rear

closed within the frame of the machine.

Other new features include inclosing the spindle sleeve and spindle between the upper crown-gear housing and the spindle sleeve bearing in each gang head. This construction eliminates the possibility of chips getting on the spindle sleeve and scoring its bearing, and makes possible the self-oiling of the spindle in its sleeve. There is a split bearing for the spindle sleeve, the bearing cap being made of Gunite metal. The spindles and sleeves are made of Nitralloy, and are heat treated by the nitriding process after machining and grinding. The nitrided case penetrates some 1/32 in. deep, and provides an unusually hard surface. This heat treatment makes it possible to apply roller bearings in recesses in each end of the spindle sleeves, the rollers making contact directly on the spindle and the sleeve recesses, with no case or raceways for the rollers. In this way the overall diameter of the spindle sleeve is kept at a minimum.

Another new feature is the sweeper fastened to the under section of the rotating table. This device pushes the chips into a steel pan at the rear, the pan being perforated so that the coolant may pass into the reservoir base of the machine. The chips are left in this receptacle, which may be emptied conveniently by sliding it out from the rear of the gang column.

The speed-change transmission and the spiral crown gears have Timken taper roller bearings, while the drive shaft and handwheel shaft have radial ball bearings.

The first spindle of the machine illustrated is equipped with cam feed, giving rapid approach, then feed at a predetermined rate, dwell for facing, and a quick return. The second spindle has a similar cam feed, adaptable both for reaming and tapping, according to the set-up. Two of the pieces shown are bored simultaneously in the first station under multiple heads equipped with guide bars, while others are being reamed in the second station or in some operations tapped.

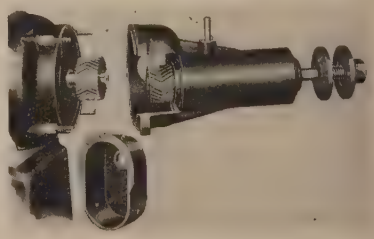
The machine shown is equipped with six-splined spindles and has drilling capacity of 2 in. in mild steel. Each gang head swings 24 in. and the spindles are spaced 28 in. center to center. The diameter of the master indexing table is 54 in. It requires only about 4 sec. to hydraulically index the table, and when the table has been indexed the hydraulic mechanism automatically actuates the throwing of the clutches and simultaneously starts the spindles upon another cycle of operations. The duty of the operator is merely to reload the spare station and actuate the foot pedal.

Polishing Lathe Has Herringbone Gear Drive

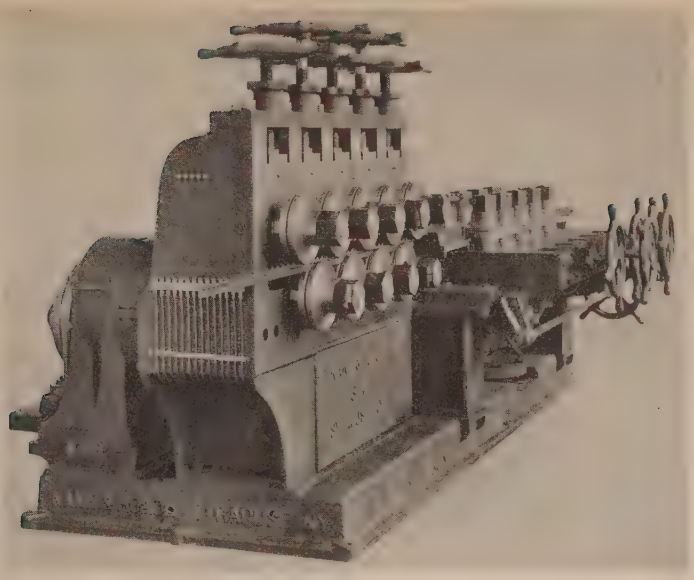
USE of continuous-tooth herringbone gears is a feature of a new motor-driven polishing lathe manufactured by the Mitchell Engineering Co., Springfield, Ohio, and marketed by Frederic B. Stevens, Inc., Larned and Third Streets, Detroit. The teeth of the gears are cut at a 40-deg. helical angle to assure quiet operation and maximum tooth contact. These gears have 2-in. width of face and are capable of transmitting 25 hp.

Each spindle bearing housing, with spindle and bearings, is an independent unit that can be removed without disturbing the motor or motor bearings. The motor shaft is carried on two ball bearings independent from the spindle bearings, an arrangement intended to eliminate undue strain and vibration from the motor bearings and to eliminate the possibility of damage to the motor by the rotor striking the fields or stator should the spindle bearings wear out. Each spindle is mounted on two ball bearings. Driving gears are of bronze, while the driven gears, on the spindles, are of steel. The former are keyed to the motor shaft by means of a feather key which permits the rotor to float to its magnetic center. Gears are completely incased and run in oil.

One spindle may be operated at one speed and the other spindle at a different speed. Eight spindle speeds ranging from 1800 to 3000 r.p.m. are obtainable. The spindles are well to the front of the machine, giving a straight-line front, and the length of the spindles overall is 56 in. They are 2 in. in diameter in the bearings and 1, 1¼ or 1½ in. in diameter between flanges. The distance between wheels is 45 in. The distance from the tight flange to the side of the machine is 16½ in. A 3, 5, 7½ or 10-hp. inclosed fan-cooled motor is employed. The size of the base at the floor is 20 x 22 in. The net weight of the machine is 700 lb.



EACH Spindle, with Spindle and Bearings, Is an Independent Unit, as Shown Above. This unit can be removed without disturbing the motor or motor bearings



New Line of Combination Roll Straighteners

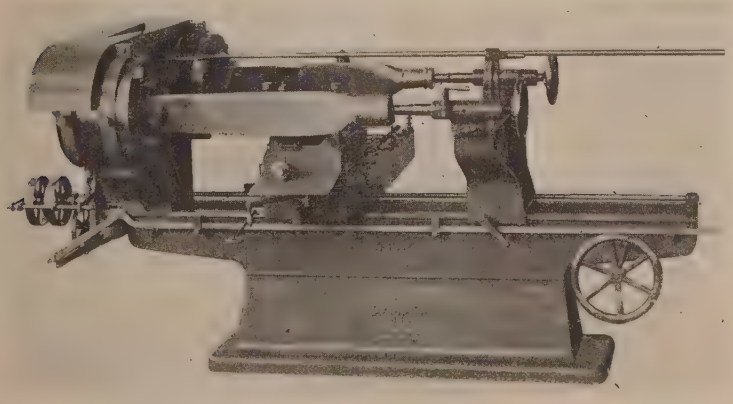
COMBINATION vertical and horizontal roll straighteners are now being built by Kane & Roach, Inc., Syracuse, N. Y., in seven sizes, comparable in capacity to the corresponding sizes of the company's eight-roll straighteners. Both the horizontal and the vertical roll shaft units are furnished with 8, 10, 12 or 16 rolls each, and can be supplied in any combination of straightening units.

These machines are designed for use where a high degree of accuracy and straightness is required, the combination of horizontal and vertical rolls enabling a larger percentage of material to be straightened within the limits required in one pass through the rolls. Roll shafts are of chrome-manganese steel and are accurately ground. Reduction and drive gears, also of alloy steel, have cut teeth, and where necessary they are heat treated. They run in oil-tight gear boxes. Drive pinions are cut from the solid and are heat treated and ground. Alemite system of lubrication is regularly furnished, but other systems can be furnished.

Delivery speeds of these machines range from 60 to 300 ft. per min. The rolls are designed for handling rounds, flats, squares, angles, U-bars, hexagons, octagons, channels, I-beams, rails, pipe, and for other special shapes.

Lathe for Wood and Aluminum Airplane Propellers

FOR turning the flat winding portion of aluminum airplane propellers, wood blade propellers and struts the Defiance Machine Works, Defiance. Ohio, is offering the propeller turning lathe here pictured. This machine, designated as the No. 613, can also be used for the production of other irregular-shaped pieces not exceeding 5 ft. in length and 12 m. in diameter. It is an adaptation of the company's copying lathe which produces facsimiles of the models used, producing both right and left-hand pieces from the same model. By simple adjustment either end of the work or the entire piece can be made larger or smaller than the model.



Although Designed for Propeller Blades, the Machine Can Be Used for Other Irregular-Shaped Parts

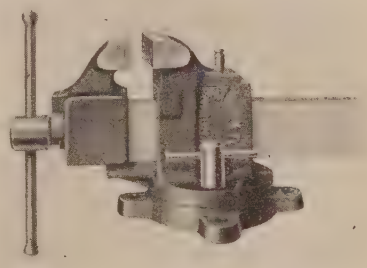
The screw feeding mechanism, which controls the cutter-head carriage, is arranged to feed from right to left and vice versa or in one direction only. It has five changes of feed, from ⅛ in. to ⅜ in. to each revolution of the work. It can be started or stopped instantly at any position of the cut. At the lowest rate of feed it will turn 2½ in. per min. and at the highest rate 13 in. per min.

When turning aluminum alloy, a 12-in. diameter 1⅜ in. circle nose-type special-tooth milling cutter is used. This is mounted on the sliding frame and supported by the carriage which travels across the path of the material, being turned by means of a heavy feed screw driven by double friction pulleys. The feed is engaged by means of a convenient hand lever, and is disengaged automatically at the end of the cut. A hollow chuck is supplied on both pattern and turning sides of the machine. At the tailstock end the propeller is held with a center provided with ball bearing thrusts.

Equipment includes a milling cutter with a tracing roll, and a countershaft. The machine occupies a floor space of 76 x 120 in. and weighs 4260 lb., net.

Vise With Back Jaw That Swivels

WITH the back jaw made in two parts, the top member of which swivels, the vise here illustrated is



The Top Part of the Back Jaw Is Free to Swivel, But It May Be Locked When the Swiveling Feature Is Not Needed

adapted for holding irregular-shaped pieces. When the swiveling feature is not desired, the top member may be locked to the back jaw by a pin.

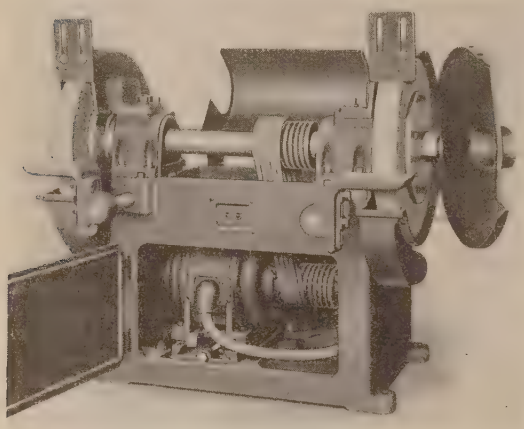
This vise, a product of the Simplex Tool Co., Woonsocket, R. I., is made with a steel slide, the sliding member of the front jaw being machined out of a solid steel bar. The nut that operates the vise screw is designed so that it cannot lift up at the back, this avoids binding of the screw which would limit the gripping power and make both the screw and the nut susceptible to breakage. The removable jaw inserts are doweled. as well as screwed on.

The combined deliveries of brass and bronze ingots and billets by the members of the Non-Ferrous Ingot Institute for October were 7726 tons.

Snagging Grinder Built in Single and Multi-Speed Types

SINGLE and multiple-speed, high-speed snagging grinders equipped with Texrope drives have been added to the line of the Hisey-Wolf Machine Co., Cincinnati.

The single-speed machine is built in three sizes, with 24, 20 and 18-in. diameter wheels and spindle speeds of 1550, 1800 and 2000 r.p.m., respectively. It is recommended for use in banks of three, or multiples thereof, so that as the grinding wheels become worn they can be transferred to machines operating at higher spindle speeds.



THE Drive Is by Texrope from the Motor in the Base. A safety device assures that the speed of the multi-speed grinder will not go below 7500 ft. per min. nor above 9500 ft. per min.

Equipped with a 10-hp. motor, the multi-speed machine is designed to use a 24-in. wheel operating at 9500 surface ft. per min. When the wheel is worn to 20 in. the spindle speed may be increased to 1800 r.p.m. by moving the wheel guards back to permit the safety device to be shifted and the Texrope belts to be transferred to the smaller driven pulley. With the belt on the smaller pulley the wheel speed is raised to 9500 surface ft. per min. The combination speed-change safety device automatically assures that the wheel speed will not drop below 7500 surface ft. per min., nor be increased above 9500 ft. per min., the maximum safe speed.

The motor is ball bearing equipped. It is mounted on a sliding base and is moved backward and forward by means of a screw to secure proper belt tension and accurate alinement of the motor. The motor starter is incased in a steel cabinet inside of the column, as a protection against dirt and grit, and is accessible through the large front door. Special attention has been paid to mounting the wheel guards, which are made of heavy boiler plate. The guard doors are hinged to facilitate changing wheels and the guards are adjustable to conform to wheel wear. Bearing boxes are keyed to the column and the spindle and bearing housings are assembled as a unit. The spindle is made of heat-treated chrome-nickel steel and runs in oversize ball bearings at each end, Timken bearings being optional. A heavy adjustable steel chip breaker is mounted on each wheel guard.

The machine is rugged and compact, with the spindle mounted forward of the center to give ample foot room for the operator. The single-speed machines are equipped with a 5, 7½ and 10-hp. motor, and weigh 2200, 2325 and 2430 lb. respectively. The weight of the multi-speed grinder is 2525 lb.

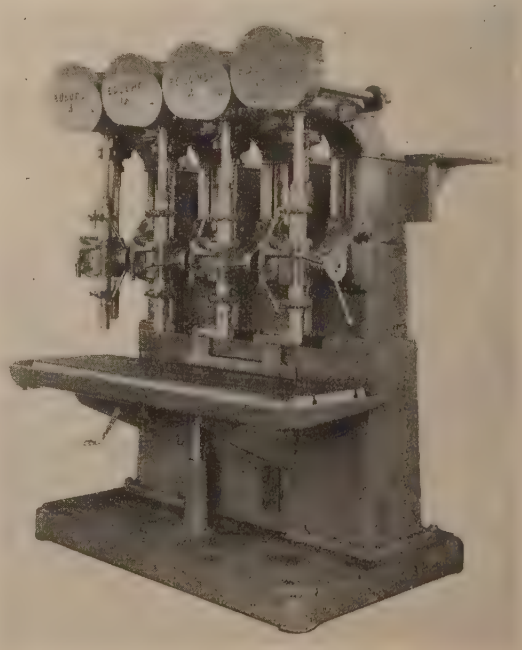
Production Drilling Machine

EDLUND MACHINERY CO., INC., Cortland, N. Y., has announced the manufacture of a 24-in production drilling machine capable of drilling 1½ in. diameter holes in steel. This machine, known as No. 1A in the company's line, may be built up to four spindles and may have riser blocks, if required. Hardened steel change gears, broached with two keys to avoid loose parts, are used. The jackshaft which carries the large change gear also carries a spiral bevel pinion which drives a gear mounted on a four-spline broached sleeve. This in turn drives the spindle. The spindle assembly is similar to that on the company's No. 4B machine.

The motor is mounted on a sliding bracket so that it can easily be removed and another put in its place. The necessary adjustments to line the motor shaft and the drive shaft can be made without the use of shims. The motor is connected to the drive shaft through a flexible coupling which takes care of any slight inaccuracy of alinement.

The power feed is driven through a train of gears with the change gears at the top, so that feeds ranging from 0.006 to 0.028 in. can be obtained. The sliding arm and power feed worm gear box assemblies are the same as on the company's No. 4B machine. The machine is open in the back to permit the use of extra counterweights for multiple head drilling. These weights can be taken off or put on as required. When a coolant system is desired, a bracket carrying an independent motor-driven pump is mounted on the side of the base. The machine is furnished with either hand or power feed, but not with tapping attachments. Spindles may have either No. 3 or No. 4 Morse tapers and may be flange quilled, if required.

Insulated Top Co., 1035 Fulton Building, Pittsburgh, has sold to the Jones & Laughlin Steel Corporation the right to use its patents for the manufacture of hot tops at its three plants. The Jones & Laughlin company has been manufacturing and using these tops on a royalty basis at its South Side Works and has recently completed a new plant at Aliquippa to supply its steel making department there.



EACH Spindle Has Its Own Motor Which Is Mounted on a Sliding Bracket. Motors may be removed and replaced conveniently and alinement of motor and drive shafts made without the use of shims. A flexible coupling takes care of any slight misalinement

Bethlehem Buys Pacific Coast Plants

Acquires Control of Pacific Coast Steel Co. and Southern California Iron & Steel Co.

THE Bethlehem Steel Corporation has announced the purchase of the Pacific Coast Steel Co. and the Southern California Iron & Steel Co., and thereby follows the lead of the United States Steel Corporation in extending its operations to the Pacific Coast. Purchase of the Columbia Steel Corporation of California by the United States Steel Corporation was announced a few weeks ago.

President Eugene G. Grace of the Bethlehem company made the following announcement at San Francisco, where he is completing arrangements for the transfer of properties to Bethlehem control:

"Through one of its subsidiaries, Bethlehem has entered into agreements covering the acquisition of all the properties and assets of Pacific Coast Steel Co. and Southern California Iron & Steel Co. The properties to be acquired include steel manufacturing plants located at South San Francisco and Los Angeles, Cal., and Seattle, Wash. The plants have a steel ingot capacity of 380,000 gross tons per year and produce billets, merchant and reinforcing bars, light structural shapes, transmission towers, universal plates, light rails, tie plates, splice bars, forgings, bolts, nuts and rivets, and other miscellaneous steel products.

"The Bethlehem officials for some years past have studied the steel situation on the Pacific Coast with a view to establishing manufacturing plants in that rapidly growing section of the country. The properties to be acquired will be operated through a separate subsidiary company having an active management with headquarters on the Pacific Coast. It will be Bethlehem's policy to develop the properties to the fullest extent for local and economic production, supplementing this production with products shipped by water from Bethlehem's eastern steel plants. With this combination of resources and opportunities, Bethlehem will be able more advantageously and effectively to serve the Pacific Coast territory with a full line of steel products."

The Pacific Coast Steel Co., which owned the entire capital stock of the Southern California Iron & Steel Co., was formed in 1909. It recently completed a new bolt, nut and rivet plant. Its capital stock consists of $3,000,000 in preferred stock and $3,000,000 in common stock.

The Southern California Iron & Steel Co. has its plant at Huntington Park, Cal. It produces alloy steel and bolts, nuts and rivets, capacity for the latter being 4000 tons.

Industrial Conference at Washington

Meeting Called by Chamber of Commerce to Consider Ways of Keeping Business on Even Keel

WASHINGTON, DEC. 3.—Prominent men in the iron and steel, machinery, mining and metallurgical and construction industries will attend the conference here on Thursday of the present week called by the Chamber of Commerce of the United States at the request of President Hoover, to cooperate in mobilizing the industrial and commercial agencies of the country in the interests of sustained business activity and employment. The meeting will be held at the Chamber headquarters, and, according to responses received, will be attended by approximately 250 business men of 32 groups, among them many trade association executives.

President Hoover will open the conference. From it may grow some plan for a continuing organization as the means of contact between Government and business and as the central agency to help each line of industry keep in step with others, according the notice sent out by Julius Barnes, chairman of the board of directors, and William Butterworth, president of the National Chamber. The conference will be asked to select an executive committee or council which may be made permanent.

Representatives of the different groups will be asked to review existing conditions and prospects and appraise the possibilities for wider cooperation on the side of business itself and between business and Government "in advancing the national economic welfare and keeping business on an even keel." The conference will receive the cooperation of official agencies, particularly the Department of Commerce, which will be represented by Secretary R. P. Lamont and Assistant Secretary Julius Klein.

Among those who have accepted invitations to attend the conference are:

James A. Campbell, president, Youngstown Sheet & Tube Co., Youngstown, Ohio; L. E. Block, chairman, Inland Steel Co., Chicago; W. W. Coleman, president and chairman, Bucyrus-Erie Co., South Milwaukee, Wis.; H. G. Dalton, Pickands, Mather & Co., Cleveland; H. B. Hirsch, Belmont Iron Works, Philadelphia; Carl A. Johnson, president, National Machine Tool Builders' Association; Lloyd Kimbrough, president, Indiana Bridge Co., Muncie, Ind.; A. E. McKinstry, president, National Association of Farm Equipment Manufacturers, Chicago; Charles Piez, chairman, Link-Belt Co., Chicago; George E. J. Pistor, Hay Foundry & Iron Works, New York; H. T. Richardson, president, National Boiler and Radiator Manufacturers' Association; Ralph M. Roosevelt, president, American Zinc Institute, New York; Harold G. Smith, president, National Metal Trades Association, Chicago; H. G. Smith, president, National Council of American Shipbuilders, New York; George M. Verity, president, American Rolling Mill Co., Middletown, Ohio.

E. A. S. Clarke, New York, secretary, American Iron and Steel Institute; Owen D. Young, New York, chairman, General Electric Co.; Charles M. Schwab, New York, president, American Iron and Steel Institute; Charles F. Abbott, New York, executive director, American Institute of Steel Construction, Inc.; A. J. Lockwood, Philadelphia, president, American Steel and Heavy Hardware Association; G. H. Weiler, New York, manager, Forging Manufacturers' Association; W. W. Nichols, New York, president, Machinery Builders' Society; J. A. Farrell, New York, president, United States Steel Corporation; E. G. Grace, New York, president, Bethlehem Steel Corporation; Leonard S. Horner, New Haven, Conn., president, Niles-Bement-Pond Co.; V. G. Iden, New York, statistician, American Institute of Steel Construction, Inc.; F. J. Kulas, Cleveland, president, Otis Steel Co.; George M. Laughlin, Pittsburgh, vice-president, J nes & Laughlin Steel Corporation; A. W. Robertson, East Pittsburgh, Pa., chairman, Westinghouse Electric & Mfg. Co.; W. D. Sayle, Cleveland, president, Cleveland Crane & Engineering Co.; Henry D. Sharpe, Providence, R. I., president, Brown & Sharpe Mfg. Co.; Gerard Swope, New York, president, General Electric Co.; Myron C. Taylor, New York, chairman, finance committee, United States Steel Corporation; John A. Topping, New York, chairman, Republic Iron & Steel Co.

Chicago Employment Down Only Slightly to Oct. 15

Manufacturing industries of the Seventh Federal Reserve District report to the Federal Reserve Bank of Chicago an aggregate loss of 1.1 per cent in the volume of employment for the period of Sept. 15 to Oct. 15. This is virtually the first decline in industrial employment of the district since January, when a drop of 0.7 per cent was shown.

With the exception of June and July, when the recessions were very slight, the trend in employment has been uniformly upward during the past year, and on Oct. 15 the volume was about 5 per cent higher than on the corresponding date in 1928.

Metals and metal products lead in the gain, with employment 10 per cent above a year ago and about the same increase in payrolls. Number of wage earners on Oct. 15, as compared with Sept. 15, was 0.5 per cent less for the metals and metal products industrial group, 0.5 per cent in vehicle manufacturing plants and 2.2 per cent less in the chemical products group.

Metal Inventories Well Below 1920 Level

Illinois Manufacturers' Association Finds that Stocks of All Goods on Nov. 1 Were Comparatively Low

DATA compiled from answers to a questionnaire sent out by the Illinois Manufacturers' Association to its members show that the percentage of raw materials on hand, based on annual sales, on Nov. 1, 1929, was approximately one-half of the average on Oct. 1, 1920.

Companies stocking iron, steel and foundry products report percentage of raw materials on hand to annual sales on Nov. 1, 1929, at 3.35 compared with 7.07 per cent on Oct. 1, 1920. Corresponding figures for metal products are 5.37 per cent and 11.09 per cent, and for machinery 9.51 per cent and 19.90 per cent.

Percentage of total inventory on hand to sales for iron, steel and foundry products on Nov. 1, 1929, was 11.56 per cent and on Oct. 1, 1920, 12.63 per cent. The corresponding figures for metal products are 15.01 per cent and 27.60 per cent, and for machinery 19.67 per cent and 26.54 per cent.

	Percentage of Raw Materials on Hand to Annual Sales		Percentage of Total Inventory on Hand to Sales	
	1920 (Oct. 1)	1929 (Nov. 1)	1920 (Oct. 1)	1929 (Nov. 1)
Iron, steel and foundry products	7.07	3.35	12.63	11.56
Food products	7.76	4.33	9.40	7.13
Metal products	11.09	5.37	27.60	15.01
Machinery	19.90	9.51	26.54	19.67
Lumber and wood products	24.87	14.37	27.87	17.81
Printing	7.49	4.37	13.76	13.49
Clothing and textiles	12.20	3.20	19.94	13.71
Electrical specialties	8.23	3.08	26.86	14.60
Chemicals	4.31	0.56	15.51	5.45
Miscellaneous	11.09	6.43	21.91	13.85
Averages	11.40	5.46	20.20	13.23

The principal reasons advanced for reduction in inventory by those answering the questionnaire were improved transportation conditions and better coordination among purchasing, production and distribution departments.

The complete table prepared by the association is given herewith.

Will Buy Equipment for South African Plant

Further particulars have been learned about the iron and steel plant to be built at Pretoria, South Africa, for the South African Iron & Steel Industrial Corporation, Ltd. The site is 4500 ft. above sea level. The plant will consist of by-product coke ovens, two blast furnaces, an open-hearth steel plant and rolling mills, all complete with power house and accessory departments. Ore and coal are available within easy reach of the site. The initial production is to be about 200,000 tons a year but the plant will be laid out for easy expansion.

The International Construction Co., Ltd., 56 Kingsway, W.C.2, London, England, is heading up the committee of consulting engineers for the work, and S. L. Bengtson, managing director of that company, is at present in the United States. He will sail for Europe on Dec. 14, but will be at the offices of Barclays Bank (Dominion Colonial and Overseas Bank), 44 Beaver Street, New York, on Dec. 12 and 13, where specifications for the blast furnaces, open-hearth plant and rolling mills may be obtained.

Three sets of the complete specification for each department will be issued against a deposit of £500, to be refunded to bonafide tenderers for at least one of the sections. Bids must be made by April 12, 1930.

The rolling mill equipment will include besides the blooming mill, a rail and structural mill, a medium structural mill, plate mill and merchant and rod mill, together with soaking pits and furnaces, gas producers, etc.

Blast Furnace Merger To Be Completed Dec. 9

Details of plans for the merger of the blast furnace and coke oven properties of the By-Products Coke Corporation, Chicago; Toledo Furnace Co., Toledo, Ohio; Perry Furnace Co., Erie, Pa., and Zenith Furnace Co., Duluth, Minn., will be worked out at a special meeting of the stockholders of the By-Products Coke Corporation that has been called for Dec. 9 to consider changing the company's name and to approve contracts for the acquisition of the properties of the other furnace companies.

No new financing will be required. Stock of the Perry Furnace Co. is to be acquired in exchange for 588,419 shares of By-Products common stock; assets of the Toledo Furnace Co. for 549,161 shares and assumption of that company's obligations, and property and assets of the Zenith Furnace Co. for 102,375 shares and assumption of that company's obligations.

With common stock now outstanding, there will be 2,000,000 shares issued of the 2,500,000 shares authorized. Stockholders will also consider fixing the amount which the capital stock shall represent on the balance sheet and giving directors authority to sell unissued stock and fix the price therefor.

Some Exhibits at New York Power Show

Included among the many exhibits shown at the eighth annual exposition of power and mechanical engineering at the Grand Central Palace, New York, Dec. 2 to 7, were a number of chain transmission devices. One of these, by the Morse Chain Co., Ithaca, N. Y., featured a silent chain drive with flexible coupling, single, double and triple-reduction speed reducers and both ring and disk oiling devices.

Through the medium of a Neon lamp synchronized with the pitch travel of a chain drive in operation, a novel stroboscope effect permitted observers to see the rocker action of the joint. Another unit in operation under glass is a drive featuring a ring oiler. This delivers clean oil to the moving chain without the splash system.

The Diamond Chain & Mfg. Co., Indianapolis, showed a high-speed drive in operation in a glass inclosure. Running at 3600 r.p.m., this quadruple-strand unit demonstrated its smoothness and quietness in operation. Another exhibit consists of 11 drives using chain from ¾ in. pitch up to 2½ in. pitch at a speed of 65 r.p.m.

Carnegie to Add 10-In. Bar Mill at McDonald

The Carnegie Steel Co. has completed engineering plans for a 10-in. bar mill at its McDonald works in Trumbull County, Ohio, which will give it a total of 11 bar and hoop mills at this property. Work is to start at an early date and the mill is scheduled to be completed in 1931. The company also plans changes to its 12-in. bar mill at the Upper Union mills to enlarge the capacity.

Finding FeO in Steel

Dr. C. H. Herty, Jr., has called attention to two errors in our issue of Nov. 21 in connection with the Open-Hearth Committee report. On page 1383 the method of obtaining FeO from Al_2O_3 should read, "If we multiply the amount of Al_2O_3 from analysis by 2.11 we obtain the FeO content of the steel."

On page 1384, regarding soda ash used in the Aston process, this should read, "This is put into the cupola metal ladle before carrying it to the converter."

Harnischfeger Corporation, Milwaukee, has declared an initial quarterly dividend of 45c. on its common stock, payable Jan. 1 to stock of record Dec. 15. The regular $1.75 quarterly dividend on the preferred stock was also declared. Earnings of the company are expected to equal $4 a share, as compared with $2.81 in 1928.

This Issue in Brief

Eliminates hand labor in quenching small parts by using containers having a lug which is gripped by tongs of overhead hoist. Containers need no longer be hooked and unhooked.—Page 1506.

* * *

Non-rusting steel discovered by German scientists, says German metallurgist. Strauss and Maurer found it in investigation of heat-resisting alloys, he says, and Krupp Works developed the proper heat treatment to make the metal workable.—Page 1512.

* * *

Saving of 20 per cent in weight of material is gained by use of upset forgings compared with hammer, hydraulic or other types, forging manufacturer estimates. And production is greatly increased, he adds.—Page 1513.

* * *

Saves fuel by heating core ovens with two unequal gas burners. Small burner holds oven to temperature when not in use. Large high-pressure burner, hooked to temperature control, is used when baking cores.—Page 1516.

* * *

Premium or bonus basis of compensation is used by less than 10 per cent of manufacturing firms investigated. Of that proportion, 99.1 per cent said the bonus cut their costs and increased employee earnings.—Page 1520.

* * *

Aluminum forgings require highly polished dies, and greater care is necessary in preparing stock for forging than in the case of steel. Forgings are heat treated at 960 deg. Fahr.—Page 1522.

* * *

Stops gas leaks from open-hearth furnace settings by use of a new plastic sealing material. Walls can expand and contract without breaking or cracking the joints.—Page 1522.

Sometimes you lose money by having holes pierced in forgings during the upsetting operation. It may pay to make the forging solid and drill the holes.—Page 1514.

* * *

Build the motor into the machine instead of applying it externally, engineer suggests. Predicts a revolution in machine design, and declares machinery builders will make electrical parts for their products, due to intimate relation of the motive power to other parts of the machine.—Page 1524.

* * *

Copper welding made easier and stronger by using deoxidized copper. But conductivity is reduced.—Page 1524.

* * *

Confidence has been reestablished, says President Hoover. But "measures taken must be vigorously pursued until normal conditions are restored," he tells Congress.—Page 1531.

* * *

Strength and toughness of gray iron are increased by molybdenum. Machinability is not notably decreased until molybdenum reaches 1.5 per cent.—Page 1508.

* * *

Increases capacity of containers used in heat treating small parts by eliminating cylindrical screen. Air circulated by fan in bottom of furnace is forced through the work, instead of through screen.—Page 1506.

* * *

Mild steel parts, with aluminum driven into surface (calorizing), will resist oxidation at temperatures up to 1650 deg.—Page 1511.

* * *

You can save money on your forgings by calling on a competent forging expert to go over new designs. A minor change may simplify die construction, increase production and reduce costs markedly.—Page 1514.

Production can be increased about 5 per cent by eliminating speed variations caused by belt slippage, says engineer. Variation may be 6 per cent above or below normal, due to stretching and temperature and humidity changes.—Page 1523.

* * *

Group incentive method of compensation has gained rapidly in past three years, investigation reveals. Automotive, heavy machinery and light machinery industries are principal users.—Page 1520.

* * *

Pressure for lower costs will not lessen, whether business gets better or worse. So now is the time to rearrange your plant for more efficient production.—Page 1538.

* * *

"Why did the steel wire break?" Failure of wires in main cables of suspension bridges is a mystery that may never be solved. Bureau of Standards' investigation may be made too late, as the evidence may even now be evaporating.—Page 1539.

* * *

Sees wide uses for new crack-proof, hammer-proof, acid-proof lacquer, which will withstand even boiling hydrochloric acid. Promises to compete with rust-proof metals.—Page 1518.

* * *

Corrosion of steel in high-pressure boilers proceeds at a negligible rate, tests reveal. Fears that high steam pressures and temperatures dangerously accelerate corrosion prove unwarranted.—Page 1525.

* * *

Sharp drop in number of blast furnaces in operation. On Dec. 1 there were 177 furnaces in blast, a net loss of 26 for the month. Average daily pig iron output for November was 106,047 tons, 8.3 per cent under October.—Page 1542.

A. I. FINDLEY
Editor

THE IRON AGE

W. W. MACON
Managing Editor

ESTABLISHED 1855

Now For Plant Revamping

THE extent that consumer buying power will be crippled by the stock market crash cannot be measured. But whether this setback proves greater or smaller than now estimated, business has an opportunity to put its house in order. Here and there manufacturers already have taken steps to rearrange plant layouts for more efficient production. Increasing numbers are on the way to replace obsolete or obsolescent equipment. A typical case, representing a community movement, is that reported from Youngstown in the news pages of this issue.

Fortunately American corporations, at least the larger ones, were never in a better cash position to undertake such a rehabilitation program. And the assurance that they intend to go ahead with improvements is not to be interpreted as mere propaganda; it reflects a long-range view, which does not allow temporary business fluctuations to interfere with plans to keep pace with the country's growth and to meet the ever-increasing pressure for lower costs.

The President's conferences did well to direct attention to the fact that much of the business of the country is of this character and is not immediately dependent on consumer demand. As the National City Bank of New York points out, "the sponsors of such undertakings are not disturbed by a few months' dip in business, for they know that the added facilities will soon be needed." Work of this kind, moreover, will encounter no financial obstacles, thanks to large corporate cash reserves and easier money rates.

Some of these programs, notably those of the railroads, are now under way. Others may require two or three months before they can be set in motion. Meanwhile business recession may increase or diminish according to the force of factors not yet susceptible to measurement. But the projects undertaken will prove an important offsetting influence and at the same time will be economically justified. It is axiomatic that if competition is to become keener more efficient plant and equipment are needed. Likewise, if mass demand is to grow—as it surely will sooner or later—ways of making mass goods more cheaply must be found.

Throughout the first nine months of this year plant managers in a number of leading industries were under pressure to get out a maximum production. Surely many defects in layout, methods and equipment were disclosed which, under the stress of the period, could not be remedied. Now management has the opportunity to put into practice what its experience recommends. While small companies, as a rule, cannot undertake long-range programs, such as large corporations plan, they can do much to put their plants in top notch shape for the next period of business activity.

The Status Quo of Trade

EFFORTS now being made to mitigate ill effects of the stock market collapse are not intended to restore or preserve the status quo of trade for several reasons. The simplest of these, and all-sufficient, is that there was none. General trade had been engaged in a short-term swing.

What really occurred is readily remembered and is measurable by trustworthy statistics. With minor interruptions there was active and healthy trade, slowly expanding with the increase in population and increase in efficiency from late in 1922, after the slump and readjustment, until about the middle of last year. Then activity, making allowance for seasonal variation, began to increase in various lines in an unusual manner. That special activity reached its height during the second quarter of this year, and for about four months preceding the crash in the stock market a recessive tendency was plainly observable, although it was slight. Obviously it was quite insufficient to measure against the almost vertical drop in the stock market.

Steel production pursued an unusual course. Precedents had been so clear that it was regarded as almost unavoidable that July should be the low month, with August no more than a trifle better, but last year June was the low month and August was 7½ per cent above June. October made the very unusual showing of being the top month of 1928.

In the first half of this year the special swing was still more pronounced. The second half of last year made a new record for second-half steel production by 12.5 per cent, but the first half of this year made a new first-half record (with proper allowance for an odd working day) by 17.6 per cent. Both percentages, particularly the latter, were so large for these latter-day times in steel as to be unusual or abnormal.

With a swing lighter than in steel, but still plainly marked, the Federal Reserve Board's index of industrial production, manufacturing and mining, made a similar showing. During the period of slowly rising activity it advanced about two points a year, whereupon beginning with July of last year it took a special trend upward. The index is adjusted for seasonal variation and it had its peak last June, declining five points from June to September.

The state of trade during, say, the second quarter of this year was one thing, the highest. The state of trade in early October, before the stock market slump, was another and lower thing. The state of trade one year ago was another thing. All were above the points that would be indicated by constructing a general trend line for the seven years of activity we have had since trade got on its regular post-war basis.

Thus there is no particular status quo to be selected as something to be aimed at. The objective should be,

and doubtless is, to give economic laws an opportunity to work unimpeded by adverse sentimental influence.

Economic Unbalances

THE well-informed London correspondent of the *Wall Street Journal* recently communicated some facts in respect to British agriculture. More than 1,500,000 acres have gone out of cultivation during the last six years. Some farms are being sold for $30 per acre. Many cannot find buyers. More than $40,000,000 was lost last year in general farming. British farmers are in debt to the banks to the amount of $250,000,000. There has been a steady drift from the farms to the towns. At present only 7 per cent of the British people live by agriculture. The only farmers in Great Britain who are prosperous and contented are those who have gone in for intensive raising of special crops and animals. All the rest are groaning and pleading for tariff protection or direct subsidy, which the 93 per cent of non-agricultural population is quite unwilling to grant.

Substituting other numerical expressions, which would alter the statement quantitatively but not qualitatively, this summary of the position of British agriculture and its political aspirations would be an accurate description of American conditions. Naturally there are differences. Great Britain is an importer of foodstuffs. The United States an exporter. The British wheat grower complains that with his small fields and non-mechanization he can not compete with the American. The American wheat grower in turn complains of the competition of the farmers of Canada and Argentina. Here we talk of much larger quantities than they do in Great Britain. Secretary Hyde has just let us know that out of 955,000,000 acres of American farm land only 505,000,000 can be cultivated, while only 350,000,000 produce crops enough to supply domestic needs plus all that we are able to market abroad.

It is evident that the farmer everywhere is under the yoke of economic conditions and that legislation cannot cure his ills. There is little use in bestowing upon him tariff protection if he produces a surplus that must be exported and sold in competition with similar products raised elsewhere. A bounty, naked or disguised, would inevitably lead him to augment his production. If too much of a commodity be produced, with the consequence of low prices, the only corrective is curtailment by extinction of the unprofitable. The labor that is thus released should be diverted to the growing of crops that are needed or else should be attracted to the towns to engage in manufacturing. Each of those movements has been proceeding in both the United States and Britain. Increase in manufacture should result in cheapening of the goods that the farmer as well as other persons have to buy.

Evidently, however, equalization does not work in accordance with theory. The cost of living does not come down. What, then, are the obstructions? Main Street answers, Wall Street. Since the catastrophe of October and November many will not think that so good an answer as previously. The farmers cannot fail to see that the operations of the great mail order houses have done much to reduce the cost of buying. On the other hand it may be perceived that the conduct of labor unions does not reduce the cost of railroad transportation, building, anthracite coal and other essential things.

Who Knows About Wire Making?

IT will be recalled that early this year a number of wires in the main cables of a 1200-ft. suspension span under construction at Mount Hope Bay (near Providence, R. I.) was found broken at the anchorage. The bridge had been finished except for the floor slab; nevertheless it was promptly decided to dismantle the structure and re-erect with new cables, since the number of broken wires was steadily increasing. A similar course was taken on a much longer bridge across the Detroit River, not so far toward completion, because the same variety of wire was also used in this structure.

Both these rebuilt bridges have now been opened to the public, at Mount Hope too late for the summer traffic, but the Detroit bridge full nine months ahead of schedule—truly remarkable feats, reflecting the highest credit to ingenious, energetic and resourceful organizations of erectors and field engineers. Worthy of commendation, too, is the way the firms involved in the matter (wire maker, cable erector and bridge contractor) adjusted the puzzling problem of financial responsibility.

This latter matter was undoubtedly decided on a give-and-take basis, because the cause of the trouble with the bridge wire was not known—is not known even yet. Lacking such exact information, the complex relationship among the various sub-contractors could not be adjusted in any other way than on the broad basis of mutual responsibility for a safe bridge and speedy erection. It is worthy of repetition, then, that great credit is due the courageous executives who could accept a share of the inevitably large financial loss without recrimination and recourse to long and equally expensive litigation.

Now that the bridges are opened and the bills paid, the various parties in the transaction may wish to close the books. But for some silent partners in the transaction—steel wire makers and users generally, bridge engineers and metallurgists—the matter is not settled, nor will it be until a convincing reply is given to the question "Why did the steel wire break?" It is of no use to say that it was quenched-and-tempered wire instead of the patented and cold-drawn material used so satisfactorily in former bridges; prior to the commencement of the failures in the bridge the engineers (among the most competent in America) were convinced that the new material was considerably better than the old. Had the wire been satisfactory after erection, the technical world would have applauded their courage and vision in taking yet one more step ahead.

With the rubbish cleared away, it is now time for the record to be made public, for detailed investigation to get under way, in order that this problem, affecting the fundamentals of wire making and using, be satisfactorily solved. Several hypotheses have been advanced, but none of them explains all the facts fairly easily ascertainable. The wire was not made of inferior steel, since it passed as rigorous tests in process and before acceptance as would be specified for cold-

drawn wire. The wire was not abused during erection, because the erector's gang was composed of experienced, steady workers, yet the failures were concentrated at the anchorage and in a few of the many strands. The wire was not overloaded, because each wire was stressed individually and equally on erection, and the whole cable carried only a fraction of the intended weight.

The supposition that the properties of heat treated steel are evanescent is contrary to experience and metallurgical theory. Heat treated carbon steel wire is not brittle under slow loading, rapid impact or alternating loads less than the fatigue limit—witness the successful performance of millions of valve springs in our gas engines. If the zinc coating on this wire roughened the surface of the steel so that it acquired notch-brittleness, why does not the same zinc coating do the same thing to patented and cold drawn bridge wire? The same query could be raised against the suggestion that it was the acid used prior to galvanizing that really did the damage.

A large quantity of the wire from Mount Hope is now at the Bureau of Standards, sufficient for any amount of laboratory testing. Eventually we will get from that institution an impartial report on the findings, but with the sadly depleted staff now at the bureau an early report cannot be expected. Meanwhile the evidence may be evaporating, if the trouble really is hydrogen or acid brittleness (the most plausible hypothesis yet advanced). Since the wire passed rigid tests before erection in the bridge, is it not reasonable to presume that it will pass rigid tests, after dismantling, at the Bureau of Standards?

We are still of the opinion, expressed in these columns in May, that the real solution is likely to come from a more distant view of the entire process of wire making, and may readily come from some maker or user not too close to bridge wire manufacture. With that in view, two supplemental courses of action are now in order. One, the most immediate and easiest, is to publish the fullest possible account of the manufacture, treatment, tests and erection of the wire cables; not only the unsuccessful ones, but the successful ones which replaced them. This will put the facts in such form that many can read and make suggestions.

A much more fundamental matter, however, is for wire makers to start a research into wire making. So many things about a wire mill are traditional, so little has been reduced to specific data in every step of the process from green rod to finished wire, that the field of research is embarrassing by its very size and vagueness. Such a cooperative research would naturally be directed at other things than a solution of the Mount Hope problem (although this might readily be an eventual by-product). Its main aim would be to help the wire industry to fortify itself with knowledge for the revolutionary changes in the industry which are just around the corner, and to help it avoid the numerous pitfalls which waylay rapid progress—such as, for instance, the failure of heat treated bridge wire.

CORRESPONDENCE

Coke Oven Plants of Soviet Russia

To the Editor: From Leningrad, by way of Moscow and Kharkov, it is 48 hr. to the Don Bas, one of the fertile farming sections of Soviet Russia, but also one rich in coal deposits and at present the source of production in this country of nearly all its metallurgical coke. A visit to its coking plants would probably not disclose anything in the way of technical developments to excite the curiosity of one familiar with American practice, but a short description of such a visit by the writer in June and July of this year may prove of interest.

Generally the ovens are located adjacent to the coal mines and the mine tipple becomes a part of the coal preparation department. It is seldom, however, that one mine is of sufficient capacity to supply a plant, so that a part of the coal must be transported, and this is done either by aerial tramway or in the standard Russian car of 20 tons capacity.

The coals available for coking in this district occur in thin and broken seams, which lie at an angle to the horizontal and at a considerable depth below the surface. Due to the angle at which these coals are found, one shaft may cut several seams of entirely different grades and it is possible to bring coal of 18 to 20 per cent volatile matter out of the same shaft with coals averaging as high as 35 to 40 per cent. Some mines are not even equipped to segregate these different grades, so that considerable care must be exercised to insure a uniform mixture at the ovens. The ash and sulphur contents are exceedingly variable, ranging from 9 to 14 per cent ash and from 1 to 3 per cent sulphur, making washing necessary with but few exceptions. After preparation, the coal mixtures charged to the ovens will average 22 to 24 per cent volatile matter, 10½ to 11 per cent ash and 1 to 2½ per cent sulphur.

The ovens are all of European design, consisting principally of those of the Coppe type, but including also Koppers, Collin, Piette and Piron installations. Some ovens built in 1900 are still operating, but a majority of the plants still making coke were built between 1910 and 1914. Several plants were built during the late war, one at Briansky by war prisoners, but these stood idle during the revolutionary period and the years immediately following, and have only recently been put in operation. All are of fireclay brick construction, of 3 to 9 tons capacity, and operate on a 24 to 48-hr. coking time.

One feature particularly noticeable on all of these plants is the absence of coke handling or screening facilities. Coke is pushed out on either a flat or an inclined bench in front of the ovens and quenched by hose. It is then forked into railroad cars for transportation or, as was the case in many plants, into hand buggies and wheeled to the furnaces nearby. Due to the strong coking characteristics of the coal and the long coking time at which the ovens are operated the coke is blocky and unusually large. It is strong and of a good cell structure.

In line with the country's policy of industrialization and expansion of the steel industry, coke making facilities are being enlarged and the more inefficient plants abandoned. This is evidenced by 100 new Koppers ovens at Gorlovka and 90 new Otto ovens at Rutchenkov that have been operating for the past year. These plants are thoroughly modern in every respect and are well operated, the efficiencies obtained being much better than on the older installations. Four new plants are also under construction, two of Becker ovens, one of Otto, and one of Evans-Coppe.

E. H. COLLESTER
Freyn Engineering Co.
Leningrad, U. S. S. R.

Buffalo Scrap Dealers Elect Officers

Scrap dealers from central and western New York and northern Pennsylvania attended a meeting of the Buffalo branch of the Institute of Scrap Iron and Steel held Tuesday at the Hotel Statler, that city. It was reported that the Buffalo chapter had contributed its quota to the $50,000 fund being raised to carry on the work of the institute during the next two years.

The following officers were elected: Charles Bock, M. Bock & Sons, Buffalo, president; first vice-president, Louis Hurwitz, Hurwitz Iron & Metal Co., Syracuse; second vice-president, Sol Frankle, Rochester Iron & Steel Co., Rochester; third vice-president, Sol Morrison, Morrison & Risman Co., Buffalo; secretary, John E. Farrell, Buffalo; treasurer, Harry Roblin, Buffalo Housewrecking & Salvage Co. Executive committee, Joseph M. Maher, Pennsylvania Wood & Iron Co., chairman; Nate Jacobs, Max Pressler, Samuel Greenfield, Terry Hanlon, Buffalo; Henry Zachs, Erie, Pa.; David Falk, Ben Rosenthal, Rochester; Abe Nathan, Utica; and Philip Roth, Syracuse.

Appointment of a board of arbitration to settle disputes between dealers and buyers of scrap iron material was discussed. David Schwartz, director of the institute, reported cooperation on the part of the mills with the new plans of the dealers.

Slight Reduction in Use of Electricity

Productive activity in the United States, measured by the monthly electrical energy consumption of 3600 scattered manufacturing plants, is reported by *Electrical World* at 134.6 for October, compared with 135.8 for September. The figures are on the basis of 100 as the average for 1923-1925 and may be compared with 129.5 in October, 1928. All the major products, with the exception of textiles, paper and pulp, rubber, chemicals and shipbuilding, show declines from September.

Metal industries dropped from 149.2 to 145.1, but still remain above the 144.6 of October, 1928. Rolling mills and steel plants, included under metal industries, declined from 152.3 to 144.8, being fractionally above the 144.7 of last year. Other metal-working plants, both ferrous and non-ferrous, dropped moderately from 147.4 to 145, compared with 130.6 in October, 1928.

Automobiles, including the manufacture of parts, fell considerably below the level of a year ago. The October figure is 122.4, compared with 138.1 in the previous month and with 141.2 in October, 1928. Shipbuilding, on the other hand, is the highest it has been for many months, at 134, compared with 114.9 in September, and with only 73.8 last year.

The Week in Business

Drift of Current Financial and Economic Opinion

FEAR, the first effect of the stock market crash, is rapidly giving way to sober judgement. Pernicious rumor, given impetus by distraught nerves and overstimulated imagination, has run its course without serious result, and calm appraisal of the business outlook is now the order of the day.

For this return to sanity the country is largely indebted to President Hoover's conferences. To what extent they will also succeed in forestalling or minimizing business reaction is still an open question. As is pointed out by the National Industrial Conference Board, it would require a revolutionary change in the habits of the population completely to eliminate the ebbs and flows of business activity.

"Between the years 1885 and 1927 there were approximately 13 distinct intervals in which business activity alternately expanded and contracted," the Conference Board adds. "However, the statistical, historical and economic events which brought about these changes have seldom if ever been very much alike."

A New Kind of Business Situation

It is clear that the present situation has little in common with that of the 1920-1921 depression, but it is likewise becoming apparent that it has other characteristics, both favorable and unfavorable, that will materially affect the course of business in coming months.

Actual losses in the stock market, as well as the frozen funds of speculators who saved their margins and still hold their stocks with no prospect of early liquidation, represent a definite, although still unmeasured, curtailment of consumer purchasing power. Another complicating factor is that banks are burdened with "frozen loans." Many of them, according to E. C. Harwood, writing in the *Annalist*, lent heavily to clients on stock and bond collateral which, at present prices, is quite inadequate.

Another imponderable is the extent that consumer inventories were inflated under the dual stimulus of installment selling and Wall Street profits. "The gigantic inflation of the stock market," in the opinion of the *Commercial and Financial Chronicle*, "acted as an inordinate stimulus to trade, raising it to unnatural and fictitious proportions."

Much Business Will Go Ahead Regardless

With consumer buying power evidently hardest hit—and it is still uncertain how badly—by the Wall Street panic, the President's conferences performed a second timely service by focusing attention on the magnitude of activities that will go ahead, regardless of the current status of ultimate consumption. As is well stated by the December survey of the National City Bank of New York, "a large part of the business of the country is not immediately dependent upon buying by the general public, but on the maintenance and improvement of the industries, railroads, telephone systems, light and power plants and municipal properties.

"Undertakings such as these," it adds, "are remote from the stock market and will go forward regardless of its fluctuations. Their sponsors are not disturbed by prospects of a few months' dip in business, for they know that the added facilities will soon be needed. Of far greater importance in shaping up a big construction program is the question of cost of capital, and this is fast solving itself in a manner favorable to enterprise."

Sees Recovery by Spring

The reassuring influence of the Washington conferences, in the view of the Harvard Economic Society, is probably less important than the action of the stock market itself, which has resulted in a stupendous reduction in brokers' loans and rapid easing of money rates, including the lowering of rediscount rates at New York, Boston and Chicago. "The soundness of business conditions and the rapid easing of money," the Society declares, "indicate that even a mild depression is improbable and that what we face is probably a business recession that will terminate by spring."

Large Loss in November Iron Output

Daily Rate Less Than October by 9698 Tons or 8.3 Per Cent—Net Loss of 26 Furnaces Largest Since May, 1924

VERY sharp was the contraction in pig iron output in November. The loss in daily rate from October was 9698 gross tons or 8.3 per cent. The most recent greater loss was 14,090 tons in May, 1925, from April. In net loss of furnaces the November record is the largest since May, 1924. The loss last month was 26 furnaces while in May, five years ago, it was 46 furnaces. Even in April of that year the net loss was 40 furnaces.

Production in November was 3,181,411 tons or 106,047 tons per day for the 30 days, as compared with 3,588,118 tons or 115,745 tons per day for the 31 days in October. The loss in October from September's total was less than 1 per cent. The November output is the smallest this year and compares with 3,302,523 tons in November last year. The daily rate last month is the smallest since September, 1928, when it was 102,077 tons.

Operating Rate on Dec. 1

More drastic than the drop in daily rate was the decline in operating rate on Dec. 1. The 177 furnaces blowing on that day had an estimated operating rate of 98,450 tons per day compared with 113,600 tons per day as the estimated operating rate for the

Daily Average Production of Coke Pig Iron in the United States by Months Since Jan. 1, 1925—Gross Tons

	1925	1926	1927	1928	1929
Jan.	108,720	106,974	100,123	92,573	111,044
Feb.	114,791	104,408	105,024	100,004	114,507
Mar.	114,975	111,032	112,366	103,215	119,822
Apr.	108,632	115,004	114,074	106,183	122,087
May	94,542	112,304	109,335	105,931	125,745
June	89,115	107,844	102,988	102,733	123,908
½ year	105,039	109,660	107,351	101,763	119,564
July	85,936	103,978	95,199	99,091	122,100
Aug.	87,241	103,241	95,073	101,180	121,151
Sept.	90,873	104,543	92,498	102,077	116,585
Oct.	97,528	107,553	89,810	108,832	115,745
Nov.	100,767	107,890	88,279	110,084	106,047
Dec.	104,853	99,712	86,960	108,705	.....
Year	99,735	107,043	99,266	103,382	.....

Pig Iron Production by Districts, Gross Tons

	Nov. (30 days)	Oct. (31 days)	Sept. (30 days)	Aug. (31 days)
New York and Mass.	229,850	243,702	235,317	253,889
Lehigh Valley	73,856	84,676	82,623	88,395
Schuylkill Valley	73,321	75,303	69,373	74,871
Lower Susq. and Lebanon Valleys	35,332	37,405	37,900	37,706
Pittsburgh district	646,461	772,236	770,222	827,285
Shenango Valley	63,297	93,928	131,052	139,835
Western Pennsylvania	121,833	154,451	144,394	150,272
Maryland, Va. and Ky.	120,346	120,428	114,181	115,804
Wheeling district	105,272	130,217	125,009	130,296
Mahoning Valley	293,706	371,718	354,446	368,609
Central and North'n Ohio	338,978	370,967	359,420	377,604
Southern Ohio	49,462	48,835	46,973	54,842
Illinois and Indiana	644,039	706,489	703,228	773,150
Mich., Minn., Mo., Wis., Colo. and Utah	148,281	148,837	131,329	147,992
Alabama	228,021	219,015	182,427	205,209
Tennessee	9,356	9,911	9,670	9,921
Total	3,181,411	3,588,118	3,497,564	3,755,680

Daily Rate of Pig Iron Production by Months—Gross Tons

	Steel Works Iron	Merchant Iron*	Total
November, 1928	88,474	21,610	110,084
December	85,415	23,290	108,705
January, 1929	85,530	25,514	111,044
February	89,246	25,261	114,507
March	95,461	24,361	119,822
April	95,680	26,407	122,087
May	100,174	25,571	125,745
June	99,993	23,915	123,908
July	98,044	24,056	122,100
August	98,900	22,251	121,151
September	95,426	21,159	116,585
October	93,644	22,101	115,745
November	83,276	22,771	106,047

*Includes pig iron made for the market by steel companies.

Coke Furnaces in Blast

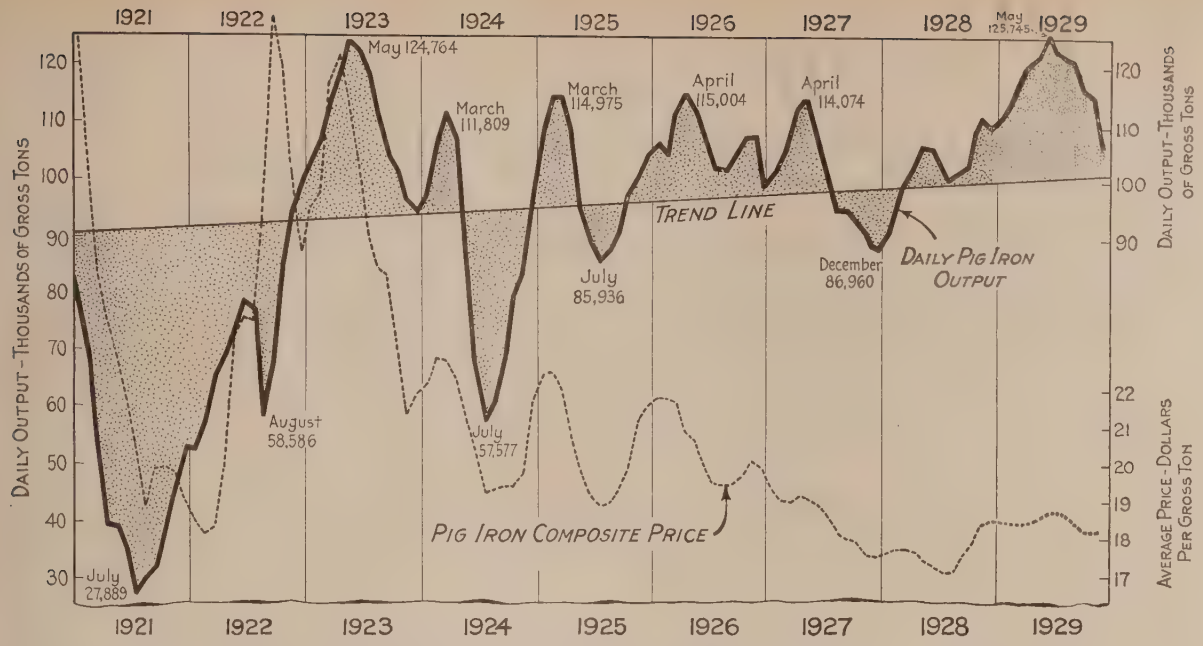
Furnaces	Dec. 1 Number in Blast	Dec. 1 Gross Tons per Day	Nov. 1 Number in Blast	Nov. 1 Gross Tons per Day
New York:				
Buffalo	11	5,540	14	7,085
Other N. Y. and Mass.	3	1,140	3	1,065
New Jersey	0	....	0	....
Pennsylvania:				
Lehigh Valley	5	2,270*	7	2,730*
Schuylkill Valley	5	2,440	5	2,430
Susquehanna Valley	2	1,175	2	1,205
Ferromanganese	0	....	0	....
Lebanon Valley	0	....	0	....
Ferromanganese	0	....	0*	....
Pittsburgh District	30	19,300	36	23,600
Ferro. and Spiegel	3	550	3	495
Shenango Valley	3	1,705	5	2,270
Western Pennsylvania	7	3,250	8	4,390
Ferromanganese	2	415	2	400
Maryland	5	3,045	5	2,940
Wheeling District	7	4,220	6	3,520
Ohio:				
Mahoning Valley	13	8,250	18	11,500
Central and Northern	17	10,700	19	12,080
Southern	4	1,650	4	1,570
Illinois and Indiana	29	19,500	33	23,000
Mich., Wis. and Minn.	6	2,865	6	2,915
Colo., Mo. and Utah	4	1,950	4	1,400
Ferromanganese	1	70	1	70
The South:				
Virginia	1	165	1	250
Ferromanganese	1	90	1	95
Kentucky	1	350	2	850
Alabama	16	7,600	16	7,420
Ferromanganese	0	....	0	....
Tennessee	1	210	2	320
Total	177	98,450	203	113,600

*Includes spiegeleisen.

Production of Coke Pig Iron in United States by Months Beginning Jan. 1, 1927—Gross Tons

	1927	1928	1929
Jan.	3,103,820	2,869,761	3,442,370
Feb.	2,940,679	2,900,126	3,206,185
Mar.	3,483,362	3,199,674	3,714,473
Apr.	3,422,226	3,185,504	3,662,625
May	3,390,940	3,283,856	3,893,082
June	3,089,651	3,082,000	3,717,225
½ year	19,430,678	18,520,921	21,640,960
July	2,951,160	3,071,824	3,785,120
Aug.	2,947,276	3,136,570	3,755,680
Sept.	2,774,949	3,062,314	3,497,564
Oct.	2,784,112	3,373,806	3,588,118
Nov.	2,648,376	3,302,523	3,181,411
11 mos.	33,536,551	34,467,958	39,448,853
Dec.	2,695,755	3,369,846	.....
Year*	36,232,306	37,837,804	.....

*These totals do not include charcoal pig iron. The 1928 production of this iron was 142,960 gross tons.



For Eleven Months Production of Pig Iron Has Exceeded the Peak of Five Preceding Years

Inclined line represents the gradually increasing theoretical needs of the country, ascertained by a balancing of the ups and downs in production. It shows an average yearly increase in consumption of about 423,000 tons

203 furnaces blowing on Nov. 1 last.

There were 29 furnaces shut down during November and only three blown in, a net loss of 26. In October the net loss was only two. The loss was confined mainly to steel-making stacks, 24 of the 29 being of that class. There were eight furnaces of the Steel Corporation shut down with 16 belonging to independent steel companies and five merchant stacks. The three furnaces blown in belonged to independent steel companies. The net loss was 21 steel company stacks and five merchant furnaces.

New Record for 11 Months

Even with the large loss in November, a new record for 11 months was made. The total output to Dec. 1 this year has been 39,448,853 tons which is 4,980,895 tons in excess of the same period last year.

Loss in Steel-Making Iron and Ferromanganese

There was a loss of 10,368 tons per day or 11 per cent in the steel-making iron last month. The daily rate was 83,276 tons compared with 93,644 tons in October. Merchant iron made a slight gain.

At 28,285 tons the ferromanganese output was the fifth largest this year and compares with 31,108 tons in October.

Furnaces Blown In and Out

Three furnaces were blown in during November: One furnace of the Wickwire-Spencer Steel Co. in the Buffalo district; one furnace at the Sparrows Point plant of the Bethlehem Steel Corporation in Maryland and No. 2 furnace of the Weirton Steel Co. in the Wheeling district.

Among the furnaces blown out or banked during November were the following: Two furnaces of the Hanna Furnace Co., one furnace of the Wickwire-Spencer Steel Co. and one Lackawanna furnace of the Bethlehem Steel Corporation in the Buffalo district; one furnace of the Bethlehem Steel Co. and one furnace of the New Jersey Zinc Co. in the Lehigh Valley; one Donora furnace of the American Steel & Wire Co., one Carrie furnace of the Carnegie Steel Co., two furnaces of the Jones & Laughlin Steel Corporation, one Midland furnace of the Pittsburgh Crucible Steel Co. and one Monessen furnace of the Pittsburgh Steel Co. in the Pittsburgh district; one furnace at the Cambria plant of the Bethlehem Steel Corporation in western Pennsylvania; one furnace at the Sparrows Point plant of the Bethlehem Steel Corporation in Maryland; the Norton furnace of the American Rolling Mill Co. in Kentucky; two Haselton furnaces of the Republic Iron & Steel Co. and two Campbell and one Hubbard furnaces of the Youngstown Sheet & Tube Co. in the Mahoning Valley; the Sharpsville and one Shenango furnace in the Shenango Valley; one Central furnace of the American Steel & Wire Co. and one River furnace of the Corrigan-McKinney Steel Co. in northern Ohio; one South Chicago furnace of the Illinois Steel Co. and three Gary furnaces in the Chicago district and the Johnson City furnace in Tennessee.

Production of Steel Companies for Own Use—Gross Tons

	Total Pig Iron Spiegel and Ferromanganese			Ferromanganese*		
	1927	1928	1929	1927	1928	1929
Jan.	2,343,881	2,155,133	2,651,416	31,844	22,298	28,208
Feb.	2,256,651	2,274,880	2,498,901	24,560	19,320	25,978
Mar.	2,675,417	2,588,158	2,959,295	27,834	27,912	24,978
Apr.	2,637,919	2,555,500	2,826,028	24,735	18,405	22,413
May	2,619,078	2,652,872	3,105,404	28,734	29,940	25,896
June	2,343,409	2,448,905	2,999,798	29,232	32,088	33,363
½ year	14,876,355	14,675,448	17,040,842	166,939	149,963	160,836
July	2,163,101	2,464,896	3,039,370	26,394	32,909	31,040
Aug.	2,213,815	2,561,904	3,065,874	21,279	24,583	28,461
Sept.	2,090,200	2,477,695	2,862,799	20,675	22,278	27,505
Oct.	2,076,722	2,729,589	2,902,960	17,710	23,939	31,108
Nov.	1,938,043	2,654,211	2,498,291	17,851	29,773	28,285
11 mos.	25,358,236	27,563,743	31,410,136	270,848	283,445	307,235
Dec.	1,987,652	2,647,863	.....	20,992	28,618	.....
Year	27,345,888	30,211,606	.....	291,840	312,063	.....

*Includes output of merchant furnaces.

Iron and Steel Markets

Sharp Drop in Pig Iron Production

Decline in Daily Rate Is Largest Since May, 1925—Recession in Steel Output Arrested—Large Rail and Equipment Orders Placed

PIG IRON production contracted sharply in November, reflecting a rapid adjustment of output to reduced demand. Total production was 3,181,411 tons and the daily average was 106,047 tons, the lowest since September, 1928. The decline from the October daily rate, 9698 tons, was the largest reduction recorded since May, 1925. The net loss in active blast furnaces in November was 26, three having been blown in and 29 put out. The greatest net losses in recent years were 40 furnaces in April, 1924, and 46 in May, 1924.

Both iron and steel makers are avoiding overproduction so far as is possible, although some piling of pig iron and semi-finished steel is reported at Chicago. At the same time, unemployment is being kept at a minimum. At Youngstown and at other centers work is being distributed among as large a number of men as possible. Where mills are now running on only one shift, the crews of all three of the customary shifts are being given an equal share of the operating time. Additional employment is being provided by an unusually large amount of repair work, resulting from the heavy strain on equipment in the first nine months of the year.

Steel production as a whole has shown little change, with slight increases tending to offset further reductions. Ingot output at Chicago has declined to 65 per cent, compared with 70 per cent last week, but the rate in the Pittsburgh district continues to range from 65 to 70 per cent. Youngstown production is now estimated at 55 to 60 per cent, compared with 40 to 50 per cent a week ago, while Buffalo operations have dropped from 60 to 50 per cent. The average for Steel Corporation subsidiaries remains at 68 per cent, which also represents the present rate of Bethlehem plants.

Railroad buying is conspicuously good, in contrast with the sharp reduction in the general level of demand. Rail mill backlogs have been augmented by orders for 165,000 tons, and purchases of 6700 freight cars will mean the rolling of 85,000 tons of plates, shapes and bars.

The Southern Pacific has bought 120,000 tons of rails, of which 60,000 tons was placed with the Colorado mill and 30,000 tons each went to the Steel Corporation and the Bethlehem company. The Southern Railway has ordered 44,200 tons of rails from the Alabama subsidiary of the Steel Corporation.

Freight car orders include 5000 bought by the Rock Island, 1000 purchased by the Missouri Pacific and 300 placed by the Milwaukee road. The last named line will buy 3050 additional cars and 30 locomotives, while the Canadian National Railways are inquiring for 3225 cars.

The consistent demand for railroad equipment throughout the fall and the concentration of rail orders, which are ordinarily spread more evenly over the autumn and winter months, have done much to offset the sharp decline in the requirements of the automobile industry and other lines. Shipments of rails from Chicago mills in November were the largest for any month in many years.

Steel specifications from the automotive industry have shown slight improvement and it is now predicted that December production of motor cars will show a gain over the November figure. The change for the better is ascribed to the fact that both the Ford and Chevrolet companies are getting under production in a limited way on their new models. However, recovery of the industry is expected to be slow.

The revival of deferred construction work is the most encouraging market development at Chicago and three projects which came out for figures in that city call for over 29,000 tons of structural steel. Pittsburgh counts on the Washington conferences to result in larger orders, chiefly for structural steel, by February or March. Actual fabricated steel awards for the week, at 12,000 tons, were the lowest of the year, but new work that came into the market totaled 47,000 tons.

The placing of 40,000 tons of plates and shapes for two Leviathan-type vessels for the United States Lines was brought one step nearer by the announcement that the New York Ship Building Corporation submitted the lowest bid.

Tin plate specifications are improving, and the leading producer is running at 80 per cent of capacity, with independents at a 60 per cent rate. Most of the large container manufacturers have placed their contracts for 1930.

Present prices on nearly all of the principal finished steel products have been reaffirmed for first quarter, but consumers are indifferent to their needs for that period and quotations still await a real test.

Scrap markets continue to soften, with heavy melting grade down another 25c. a ton at Pittsburgh.

Pig iron shipments continue to decline, with many foundries now operating on restricted schedules. December specifications from some of the automotive foundries show a gain, but deliveries to other melters tend downward, as the year-end shutdowns for inventories approach. Comparatively little interest has been shown in first quarter requirements.

Ferromanganese has been reduced $5 a ton to $100, seaboard, on contracts for 1930 requirements.

A Comparison of Prices

Market Prices at Date, and One Week, One Month and One Year Previous, Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron, Per Gross Ton:	Dec. 3, 1929	Nov. 26, 1929	Nov. 4, 1929	Dec. 4, 1928
No. 2 fdy., Philadelphia	$21.26	$21.26	$21.26	$21.26
No. 2, Valley furnace	18.50	18.50	18.50	18.00
No. 2 Southern, Cin'ti	17.69	17.69	17.69	20.19
No. 2, Birmingham	14.50	14.50	14.50	16.50
No. 2 foundry, Chicago*	20.00	20.00	20.00	20.00
Basic, del'd eastern Pa.	19.75	19.75	19.75	20.25
Basic, Valley furnace	18.50	18.50	18.50	17.50
Valley Bessemer, del'd P'gh.	20.76	20.76	20.76	20.01
Malleable, Chicago*	20.00	20.00	20.00	20.00
Malleable, Valley	19.00	19.00	19.00	18.25
Gray forge, Pittsburgh	19.76	19.76	19.76	19.26
L. S. charcoal, Chicago	27.04	27.04	27.04	27.04
Ferromanganese, seaboard	*100.00*	105.00	105.00	105.00
Rails, Billets, Etc., Per Gross Ton:				
Rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Light rails at mill	36.00	36.00	36.00	36.00
Rerolling billets, Pittsburgh	35.00	35.00	35.00	33.00
Sheet bars, Pittsburgh	35.00	35.00	35.00	33.00
Slabs, Pittsburgh	35.00	35.00	35.00	33.00
Forging billets, Pittsburgh	40.00	40.00	40.00	38.00
Wire rods, Pittsburgh	40.00	40.00	40.00	42.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.85	1.85	1.85	1.90
Finished Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Bars, Pittsburgh	1.90	1.90	1.90	1.90
Bars, Chicago	2.00	2.00	2.00	2.00
Bars, Cleveland	1.90	1.90	1.90	1.90
Bars, New York	2.24	2.24	2.24	2.24
Tank plates, Pittsburgh	1.90	1.90	1.90	1.90
Tank plates, Chicago	2.00	2.00	2.05	2.00
Tank plates, New York	2.17½	2.17½	2.17½	2.22½
Structural shapes, Pittsburgh	1.90	1.90	1.90	1.90
Structural shapes, Chicago	2.00	2.00	2.00	2.00
Structural shapes, New York	2.09½	2.09½	2.14½	2.19½
Cold-finished bars, Pittsburgh	2.30	2.30	2.30	2.20
Hot-rolled strips, Pittsburgh	1.90	1.90	1.90	1.80
Cold-rolled strips, Pittsburgh	2.75	2.75	2.75	2.85

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

Finished Steel,	Dec. 3, 1929	Nov. 26, 1929	Nov. 4, 1929	Dec. 4, 1928
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 24, P'gh	2.75	2.75	2.75	2.75
Sheets, black, No. 24, Chicago dist. mill	2.85	2.85	2.85	2.85
Sheets, galv., No. 24, P'gh	3.40	3.40	3.50	3.50
Sheets, galv., No. 24, Chicago dist. mill	3.50	3.50	3.60	3.60
Sheets, blue, No. 13, P'gh	**2.35**	2.25	2.35	2.10
Sheets, blue, No. 13, Chicago dist. mill	2.45	2.45	2.45	2.20
Wire nails, Pittsburgh	2.40	2.40	2.40	2.55
Wire nails, Chicago dist. mill	2.45	2.45	2.45	2.60
Plain wire, Pittsburgh	2.40	2.40	2.40	2.40
Plain wire, Chicago dist. mill	2.45	2.45	2.40	2.45
Barbed wire, galv., Pittsburgh	3.05	3.05	3.05	3.20
Barbed wire, galv., Chicago dist. mill	3.10	3.10	3.15	3.25
Tin plate, 100 lb. box, P'gh.	$5.35	$5.35	$5.35	$5.25
Old Material, Per Gross Ton:				
Heavy melting steel, P'gh	*$15.25*	$15.50	$17.25	$17.00
Heavy melting steel, Phila.	14.50	14.50	15.50	15.00
Heavy melting steel, Ch'go	12.50	12.50	13.75	14.50
Carwheels, Chicago	13.50	13.50	14.00	14.25
Carwheels, Philadelphia	15.50	15.50	16.50	16.50
No. 1 cast, Pittsburgh	*14.50*	15.00	15.50	14.50
No. 1 cast, Philadelphia	*15.00*	15.50	16.00	16.25
No. 1 cast, Ch'go (net ton)	13.50	13.50	14.00	15.50
No. 1 RR. wrot., Phila.	15.50	15.50	16.00	15.50
No. 1 RR. wrot., Ch'go (net)	12.00	12.00	13.00	13.25
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$2.65	$2.65	$2.65	$2.75
Foundry coke, prompt	3.75	3.75	3.75	3.75
Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	18.12½	18.12½	18.12½	16.12½
Electrolytic copper, refinery	17.75	17.75	17.75	15.75
Tin (Straits), New York	*39.37½*	41.62½	40.12½	52.50
Zinc, East St. Louis	*6.00*	6.25	6.50	6.35
Zinc, New York	*6.35*	6.60	6.85	6.70
Lead, St. Louis	6.10	6.10	6.35	6.32½
Lead, New York	6.25	6.25	6.50	6.50
Antimony (Asiatic), N. Y.	8.62½	8.62½	8.62½	10.00

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Pittsburgh

Steel Trade Sentiment Improved Though Business Is No Better—Depression Expected to Be Short

PITTSBURGH, Dec. 3.—Sentiment is slightly better in the Pittsburgh district this week, although no improvement in business is reported. The steel industry has been quick to react to the Government's program of business relief, and, although the conferences in Washington are not expected to be translated into orders for steel until February or March, there is a growing belief that the present business depression is going to be short-lived. At the same time, few men in the industry look for any sudden return to peak production, but rather a gradual improvement over the first half of the year, which takes into consideration conservative production schedules on the part of the leading automobile manufacturers.

The automotive industry promises to be a slightly larger user of steel this month than it was in November, as model changes are rapidly being completed in the plants of the two principal makers of cars in the low-priced field and both are expected to get into production before the middle of the month. However, a large part of the steel to be required before the end of the year has either been shipped or is now being rolled and the industry must look to other consumers for the maintenance of demand during December.

The railroads, which are expected to contribute a good share of this demand, are not yet specifying freely, nor are the car companies in the Pittsburgh district, which are now well supplied with orders. The local rail mill cannot ordinarily be expected to reach its full stride before January and February, but this company has thus far been able to maintain a 70 to 75 per cent operating rate producing semi-finished steel and structural shapes. Independent companies are not so well engaged, but, because of heavier releases of tin plate, sheets and strip steel, some have improved schedules this week, following sharp curtailment last week after the holiday.

Under the conditions, the average ingot operating rate in this and nearby districts is still at 65 to 70 per cent of capacity, although finishing mill schedules on sheets, strips and bars are not so high.

Present prices on nearly all the principal steel commodities are being reaffirmed for first quarter business. Consumers are still indifferent to their needs for that period and quotations are being tested only by infrequent spot sales. Sheet makers are taking a firmer stand on prices, and shading on blue annealed sheets, which had become common in the last two or three weeks, is less frequently encountered. The same is true on galvanized sheets, although manufacturers as well as jobbers are still getting concessions of $2 a ton from the formal quotation. The heavy hot-rolled products are holding at 1.90c., Pittsburgh, and strip steel is not quotably lower in spite of some pressure on present price.

The pig iron and coke markets are very dull, but weakness in scrap prices is less pronounced than it was two or three weeks ago.

Pig Iron.—The situation shows no change from the previous week, with buying practically negligible and shipments against old contracts at a reduced rate. Consumers are not yet

showing interest in their first quarter requirements, although buyers are occasionally sounding out the price structure. Producers in this and the Valley districts as yet show no inclination to offer lower quotations for first quarter, and in one or two cases the present schedule of $18.50, Valley, for foundry and basic iron, and $19 for malleable and Bessemer has been quoted on advance tonnage. With several furnaces blown out last month, production is fairly well adjusted to consumption and yard stocks are low. This situation is not conducive to price weakness, as pig iron makers are always more willing to shade prices on the product which is already made than they are on future tonnage.

Prices per gross ton, f.o.b. Valley furnace:

Basic	$18.50
Bessemer	19.00
Gray forge	18.00
No. 2 foundry	18.50
No. 3 foundry	18.00
Malleable	19.00
Low phos., copper free	27.00

Freight rate to Pittsburgh or Cleveland district, $1.76.

Prices per gross ton, f.o.b. Pittsburgh district furnace:

Basic	$19.00
No. 2 foundry	19.00
No. 3 foundry	18.50
Malleable	19.50

Freight rates to points in Pittsburgh district range from 63c. to $1.13.

Semi-Finished Steel.—Shipments to non-integrated companies are still declining as most of these users of semi-finished steel are anxious to reduce their stocks as low as possible for year-end inventories. However, a few companies have already made such reductions and are now forced to take regular shipments of small tonnages as their finishing mill needs require. The price of billets, slabs and sheet bars is unsettled and is still quoted nominally at $35, Pittsburgh or Youngstown. Some tonnage is undoubtedly moving at this figure, but it is not likely that any first quarter contracts have been taken at this price. By the latter half of the month the price will undoubtedly be established by open market transactions. Forging billets are unchanged at $40, Pittsburgh, and this quotation is still holding on small spot tonnages. Wire rods are also quoted at $40, Pittsburgh or Cleveland, and makers have opened their books for first quarter at this figure. Demand for skelp is declining, as pipe operations are lighter.

Bars, Shapes and Plates.—The heavy hot-rolled products are finding a fair demand in the aggregate, with bars exceedingly dull, plates only fair, and structural shapes comparatively good. The outlook for structural business is especially favorable, as steel fabricators expect to benefit as much or more than any other large steel consumers in the Government's program for stimulating business. In the immediate Pittsburgh district an addition to the Bell Telephone Building, recently placed, takes 3300 tons of steel, and there is still prospect for the letting before the end of the year of a bridge across the Ohio River at McKees Rocks, which will require about 13,000 tons of shapes. Several other sizable jobs are in the formative state, and, although some of this work may be delayed until early spring, it will undoubtedly go ahead at that time. This work will also stimulate the reinforcing bar industry, which is now seasonably quiet, and a contributing factor in the dullness of the steel bar business as a whole. Mills in this district are not yet receiving very heavy releases on plates from the nearby car shops, but the car builders have considerable business on their books, and expect to receive more before the end of the year. Some of the barge yards are rather badly in need of business and are now completing most of the barges placed in the summer and fall. Bids will soon be taken by the United States Engineer at Rock Island, Ill., for 20 steel barges requiring about 1300 tons of plates. Some makers of bars, shapes and plates expect to open their books for first quarter this week, reaffirming the present quotation of 1.90c., Pittsburgh, which has been subject to no real test in the last few weeks. As yet buyers are showing little interest in their requirements for the early months of 1930.

Rails and Track Accessories.—Pittsburgh mills have not benefited very largely from recent rail orders, but are now increasing their operations and will soon be making heavy shipments against tonnage placed earlier in the fall. Specifications for track accessories are only fair, but are showing some improvement. Demand for light rails is better than usual for this time of the year, but the aggregate tonnage of this product is not sizable. Prices on track equipment are nominal.

Wire Products.—The wire business is holding at about the same rate as the majority of other steel products. Demand for nails seems to be somewhat better than it was earlier in the year. Jobbers have very low stocks of nails and wire, and are taking carload shipments regularly for immediate delivery. Some makers have closed first quarter contracts with most of their important users at $2.40 to $2.50, Pittsburgh, on nails, 2.40c. on manufacturers' wire, and 2.55c. to 2.65c. on annealed wire. Manufacturers' wire has naturally felt the decline in automotive consumption, but is going into other lines at a fair rate.

Tubular Goods.—Pipe business is not particularly good, but has not felt the sharp decline which has characterized some other steel lines. In fact, demand for merchant pipe, which has been only fair this year, held up much later in the season than usual, and the aggregate tonnage shipped will not fall far under the preceding year. Lap-welded tubing is also feeling the usual seasonal decline, as the period for laying this pipe is limited in many parts of the country, and Pittsburgh mills have now completed shipments against many jobs which served as backlogs during the summer and fall. Seamless tubing is in fair demand, while the mechanical product is very dull. The automobile industry, normally a large user of this product, is taking little or none at this time and airplane makers reduced their requirements sharply several weeks ago. Boiler tubes are moving well.

Sheets.—Specifications for sheet steel still seem to be on the decline, although some companies are rolling some material for stock and are maintaining a fair operating rate. The leading interest last week operated its mills at about 60 per cent of theoretical capacity, but this rate was hardly equalled by the independents, particularly those whose product is

The Iron Age Composite Prices

Finished Steel

Dec. 3, 1929, 2.362c. a Lb.

One week ago	2.362c.
One month ago	2.362c.
One year ago	2.362c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products make 87 per cent of the United States output of finished steel.

	High	Low
1929	2.412c., April 2;	2.362c., Oct. 29
1928	2.391c., Dec. 11;	2.314c., Jan. 3
1927	2.453c., Jan. 4;	2.293c., Oct. 25
1926	2.453c., Jan. 5;	2.403c., May 18
1925	2.560c., Jan. 6;	2.396c., Aug. 18

Pig Iron

Dec. 3, 1929, $18.29 a Gross Ton

One week ago	$18.29
One month ago	18.38
One year ago	18.59
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High	Low
1929	$18.71, May 14;	$18.25, Aug. 27
1928	18.59, Nov. 27;	17.04, July 24
1927	19.71, Jan. 4;	17.54, Nov. 1
1926	21.54, Jan. 5;	19.46, July 13
1925	22.50, Jan. 13;	18.96, July 7

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base per Lb.
F.o.b. Pittsburgh mill	1.90c.
F.o.b. Chicago	2.00c.
Del'd Philadelphia	2.22c.
Del'd New York	2.24c.
Del'd Cleveland	1.85c. to 1.90c.
F.o.b. Cleveland	1.85c. to 1.90c.
F.o.b. Lackawanna	2.00c.
F.o.b. Birmingham	2.10c.
C.i.f. Pacific ports	2.35c.
F.o.b. San Francisco mills	2.35c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills, 40, 50, 60-ft.	2.00c.
F.o.b. Pittsburgh mills, cut lengths	2.25c.
F.o.b. Birmingham, mill lengths	2.10c.

Rail Steel

F.o.b. mills, east of Chicago dist.	1.90c.
F.o.b. Chicago Heights mill	1.90c.
Del'd Philadelphia	2.27c.

Iron

Common iron, f.o.b. Chicago	2.00c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	2.12c.
Common iron, del'd New York	2.14c.

Tank Plates

	Base per Lb.
F.o.b. Pittsburgh mill	1.90c.
F.o.b. Chicago	2.00c.
F.o.b. Birmingham	2.05c.
Del'd Cleveland	2.09c. to 2.14c.
Del'd Philadelphia	2.10c. to 2.15c.
F.o.b. Coatesville	2.00c. to 2.05c.
F.o.b. Sparrows Point	2.00c. to 2.05c.
F.o.b. Lackawanna	2.00c. to 2.05c.
Del'd New York	2.17½c. to 2.22½c.
C.i.f. Pacific ports	2.25c. to 2.35c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh mill	1.90c.
F.o.b. Chicago	2.00c.
F.o.b. Birmingham	2.05c.
F.o.b. Lackawanna	2.00c. to 2.05c.
F.o.b. Bethlehem	2.00c.
Del'd Cleveland	2.09c. to 2.14c.
Del'd Philadelphia	1.96c. to 2.06c.
Del'd New York	2.09½c. to 2.14½c.
C.i.f. Pacific ports	2.35c.

Hot-Rolled Hoops, Bands and Strips

	Base per Lb.
6 in. and narrower, P'gh	2.00c.
Wider than 6 in., P'gh	1.90c.
6 in. and narrower, Chicago	2.10c.
Wider than 6 in., Chicago	2.00c.
Cooperage stock, P'gh	2.20c.
Cooperage stock, Chicago	2.30c.

Cold-Finished Steel

	Base per Lb.
Bars, f.o.b. Pittsburgh mill	2.20c.
Bars, f.o.b. Chicago	2.20c.
Bars, Cleveland	2.20c.
Bars, Buffalo	2.20c.
Shafting, ground, f.o.b. mill	*2.55c. to 3.50c.
Strips, P'gh	2.75c.
Strips, Cleveland	2.75c.
Strips, del'd Chicago	3.05c.
Strips, Worcester	2.90c.
Fender stock, No. 20 gage, Pittsburgh or Cleveland	4.25c.

*According to size.

Wire Products

(Carload lots, f.o.b. Pittsburgh and Cleveland.)

To Merchant Trade

	Base per Keg
Standard wire nails	$2.40 to $2.50
Cement coated nails	2.40 to 2.50
Galvanized nails	4.40 to 4.50

	Base per Lb.
Polished staples	2.85c. to 2.95c.
Galvanized staples	3.10c. to 3.20c.
Barbed wire, galvanized	3.05c. to 3.15c.
Annealed fence wire	2.55c. to 2.65c.
Galvanized wire, No. 9	3.00c. to 3.10c.
Woven wire fence (per net ton to retailers)	$65.00

To Manufacturing Trade

Bright hard wire, Nos. 6 to 9 gage	2.40c.
Spring wire	3.50c.

(Carload lots, f.o.b. Chicago.)

Wire nails	$2.45 to $2.55 (keg)
Annealed fence wire	2.60c. to 2.70c. (lb.)
Bright hard wire to manufacturing trade	2.45c.

Anderson, Ind., mill prices are ordinarily $1 a ton over Pittsburgh base; Duluth, Minn., mill $2 a ton over Pittsburgh, and Birmingham mill $3 a ton over Pittsburgh.

Cut Nails

	Per 100 Lb.
Carloads, Wheeling, Reading or Northumberland, Pa.	$2.70
Less carloads, Wheeling or Reading	2.80

Light Plates

No. 10, blue annealed, f.o.b. P'gh	2.20c.
No. 10, blue annealed, f.o.b. Chicago dist.	2.30c.
No. 10, blue annealed, del'd Phila.	2.42c. to 2.52c.
No. 10, blue annealed, B'ham	2.35c.

Sheets

Blue Annealed

	Base per Lb.
No. 13, f.o.b. P'gh	2.35c.
No. 13, f.o.b. Chicago dist.	2.45c.
No. 13, del'd Philadelphia	2.57c. to 2.67c.
No. 13, blue annealed, B'ham	2.50c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh	2.75c.
No. 24, f.o.b. Chicago dist. mill	2.85c.
No. 24, del'd Philadelphia	3.07c.
No. 24, f.o.b. Birmingham	3.00c. to 3.10c.

Metal Furniture Sheets

No. 24, f.o.b. P'gh	4.00c. to 4.10c.

Galvanized

No. 24, f.o.b. Pittsburgh	3.40c. to 3.50c.
No. 24, f.o.b. Chicago dist. mill	3.50c. to 3.60c.
No. 24, del'd Cleveland	3.59c. to 3.69c.
No. 24, del'd Philadelphia	3.72c. to 3.82c.
No. 24, f.o.b. Birmingham	3.65c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.90c. to 3.00c.
No. 28, f.o.b. Chicago dist. mill	3.00c. to 3.10c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh	4.00c.

Long Ternes

No. 24, 8-lb. coating, f.o.b. mill	3.90c. to 4.00c.

Vitreous Enameling Stock

No. 24, f.o.b. Pittsburgh	3.90c.

Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills	$5.35
Standard cokes, f.o.b. Gary	5.45

Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)
(Per Package, 20 x 28 in.)

8-lb. coating I.C.	$10.70
15-lb. coating I.C.	13.40
20-lb. coating I.C.	14.60
25-lb. coating I.C.	$15.90
30-lb. coating I.C.	16.80
40-lb. coating I.C.	18.80

Alloy Steel Bars

(F.o.b. makers' mill)
Alloy Quality Bar Base, 2.65c. per Lb.

S.A.E. Series Numbers		Alloy Differential
2000	(½% Nickel)	$0.25
2100	(1½% Nickel)	0.55
2300	(3½% Nickel)	1.50
2500	(5% Nickel)	2.25
3100	Nickel Chromium	0.55
3200	Nickel Chromium	1.35
3300	Nickel Chromium	3.80
3400	Nickel Chromium	3.20
4100	Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50
4100	Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600	Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel)	1.05
5100	Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100	Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100	Chromium Spring Steel	0.20
6100	Chromium Vanadium Bars	1.20
6100	Chromium Vanadium Spring Steel	0.95
9250	Silicon Manganese Spring Steel (flats)	0.25
	Rounds and squares	0.50
	Chromium Nickel Vanadium	1.50
	Carbon Vanadium	0.95

Above prices are for hot rolled steel bars, forging quality. The differential for cold-drawn bars is ¾c. a lb. higher, with standard classification for cold-finished alloy steel bars applying. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis.

Billets under 4 x 4 in. carry the steel bar base. Slabs with a sectional area of 16 in. or over carry the billet price. Slabs with sectional area of less than 16 in. or less than 2½ in. thick, regardless of sectional area, take the bar price.

Rails

	Per Gross Ton
Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	36.00
Light (from rail steel), f.o.b. mill	34.00
Light (from billets), f.o.b. Ch'go mill	36.00

Track Equipment

	Base per 100 Lb.
Spikes, ⅜ in. and larger	$2.80
Spikes, ½ in. and smaller	2.80
Spikes, boat and barge	3.00
Tie plate, steel	2.15
Angle bars	$2.75
Track bolts, to steam railroads	$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel Inches	Black	Galv.	*Iron* Inches	Black	Galv.
⅛	45	19½	¼ and ⅜	+11	+36
¼ to ⅜	51	25½	½	23	5
½	56	42½	¾	28	11
¾	60	48½	1 and 1¼	31	15
1 to 3	62	50½	1½ and 2	35	18

Lap Weld

2	55	43½	2	23	9
2½ to 6	59	47½	2½ to 3½	28	13
7 and 8	56	43½	4 to 6	30	17
9 and 10	54	42½	7 and 8	29	16
11 and 12	53	40½	9 to 12	26	11

Butt Weld, extra strong, plain ends

⅛	41	24½	¼ and ⅜	+13	+48
¼ to ⅜	47	30½	½	23	7
½	53	42½	¾	28	12
¾	58	47½	1 to 2	34	18
1 to 1½	60	49½			
2 to 3	61	50½			

Lap Weld, extra strong, plain ends

2	53	42½	½	29	13
2½ to 4	57	46½	2½ to 4	34	20
4½ to 6	56	45½	4½ to 6	33	19
7 to 8	52	39½	7 and 8	31	17
9 and 10	45	32½	9 to 12	21	8
11 and 12	44	31½			

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Steel		*Charcoal Iron*	
2 in. and 2¼ in.	38	1½ in.	1
2½ in.—2¾ in.	46	1¾ in.	8
3 in.	52	2 in.—2¼ in.	13
3¼ in.—3¾ in.	54	2½ in.—2¾ in.	16
4 in.	57	3 in.	17
4½ in. to 6 in.	46	3¼ in. to 3½ in.	18
		4 in.	20
		4½ in.	21

On lots of a carload or more, the above base discounts are subject to a preferential of two fives on steel and of 10 per cent on charcoal iron tubes. Smaller quantities are subject to the following modifications from the base discounts:

Lap Welded Steel—Under 10,000 lb., 6 points under base and one five; 10,000 lb. to carload, 4 points under base and two fives. Charcoal Iron—Under 10,000 lb., 2 points under base; 10,000 lb. to carload, base and one five.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	61	3 in.	46
1¼ to 1½ in.	53	3¼ to 3½ in.	48
1¾ in.	37	4 in.	51
2 to 2¼ in.	32	4½, 5 and 6 in.	40
2½ to 2¾ in.	40		

Hot Rolled

2 and 2¼ in.	38	3¼ to 3½ in.	54
2½ and 2¾ in.	46	4 in.	57
3 in.	52	4½, 5 and 6 in.	46

Beyond the above base discounts a preferential discount of 5 per cent is allowed on carload lots. On less than carloads to 10,000 lb., base discounts are reduced 4 points with 5 per cent preferential; on less than 10,000 lb., base discounts are reduced 6 points, with no preferential. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage take the mechanical tube list and discounts. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30%, base (carloads)	55
Carbon, 0.30% to 0.40% base	50

Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

largely full-finished. The automobile industry fails to show any encouraging trends, although the largest maker of cars in the low-priced class expects to get into production by the middle of the month on its new model and will gradually step up production in January. Makers of high-priced cars which were running at a good rate a month ago have now curtailed sharply, and the average output of companies in both the high and medium-price range is well under 50 per cent. Sheet makers have opened their books for first quarter in a quiet way, and are beginning to solicit business for that period. On some finishes a firmer price stand is being taken. Because of the competition of mills rolling sheets by the continuous process, the matter of quoting market prices on blue annealed sheets recently has become complicated. The quotations appearing in THE IRON AGE relate to the jobbing mill product of quality grade. Leading producers of standard blue annealed sheets have reaffirmed their stand for a minimum of 2.35c. a lb., Pittsburgh, for No. 13 gage and 2.20c. a lb. for No. 10 gage, with usual extras. The continuous mill product, which is often sold on a hot-rolled strip steel base, has been quoted at prices from $2 to $4 a ton below these figures. The continuous mill product is made in a limited range of widths and is sold either annealed or unannealed. Quotations shown in THE IRON AGE for blue annealed sheets relate to the standard product. Black sheets are still holding at 2.75c., Pittsburgh, and galvanized at 3.40c. to 3.50c. With some companies the former price applies only to large jobbers, while others are offering it to the manufacturing trade. The 4c., Pittsburgh, price on automobile body sheets is still subject to pressure in the Detroit area, but has not yet been openly broken. Metal furniture sheets are at 4c. to 4.10c.

Tin Plate.—The industry as a whole has not yet increased its operations to any large extent, but specifications are beginning to improve and the leading interest has scheduled its mills this week at close to 80 per cent. Independents are running at about 60 per cent, but in some cases tonnage releases warrant a slightly better rate. Most of the large container manufacturers have placed their contracts for 1930, but a few are still hesitating with some hope of bringing out better prices.

Strip Steel.—Strip business shows little improvement, and the industry as a whole is not averaging better than 30 to 40 per cent of capacity. Some weeks these figures might be lower, but mills which curtail output to a minimum one week can usually expect a considerably better showing in the next comparable period. Last week many of them observed the Thanksgiving holiday and did not resume operations on Friday. The hot mills are better occupied than the cold mills, but this condition is to be expected. Prices are still untested by any significant tonnage buying, but some contracts for first quarter have been taken at 2.75c., Pittsburgh or Cleveland, for cold-rolled strip and 1.90c. and 2c., Pittsburgh, for hot-rolled.

Coal and Coke.—The coke market is in an unsatisfactory state, as production is declining less rapidly than consumption, and distress tonnage is a disturbing market factor. The furnace grade is quotable at $2.65 a net ton, Connellsville, while foundry coke is selling more freely at as low as $3.50. The premium brands are holding at $4.75 to $4.85, ovens. Colder weather during the last week has developed a considerably better demand for heating coke. Coal is also in stronger demand, but domestic consumption cannot offset the sharp decline in industrial demand.

Old Material.—The scrap market apparently has not reached bottom, but price weakness is not so pronounced this week as it has been in the last two. The Baltimore & Ohio Railroad list, which closed yesterday, is understood to have brought $15.50, or slightly better, for the No. 1 heavy melting steel, but this figure undoubtedly represents the top of the market. Dealers are beginning to accumulate yard stocks, for which some of them are paying as high as $15 for strictly No. 1 steel. Lower prices are heard in some instances, but the market is scarcely quotable at lower than $15 to $15.50, a decline of 25c. from last week in the average price. Sale of a tonnage of hydraulic compressed sheets last week by a local producer brought only $14.50, and this marks a sharp decline in the quotations on that commodity. Specialties are still strong, and some dealers are meeting with difficulty in picking up tonnage to cover old contracts. The other grades of scrap are weak and quotations are nominal. The Pennsylvania Railroad list, which closes on Dec. 4, contains 36,700 tons, including 3300 tons of No. 1 heavy melting.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$15.00 to $15.50
No. 2 heavy melting steel	13.00 to 13.50
Scrap rails	14.00 to 14.50
Compressed sheet steel	14.50 to 15.00
Bundled sheets, sides and ends	14.00 to 14.50
Cast iron carwheels	14.00 to 14.50
Sheet bar crops, ordinary	17.00 to 17.50
Heavy breakable cast	11.00 to 11.50
No. 2 railroad wrought	15.00 to 15.50
Hvy. steel axle turnings	15.00 to 15.50
Machine shop turnings	10.00 to 10.50
Acid Open-Hearth Grades:	
Railr. knuckles and couplers	19.50 to 20.50
Railr. coil and leaf springs	19.50 to 20.50
Rolled steel wheels	19.50 to 20.50
Low phos. billet and bloom ends	20.50 to 21.00
Low phos., mill plates	20.50 to 21.00
Low phos., light grades	19.50 to 20.50
Low phos., sheet bar crops	20.50 to 21.00
Heavy steel axle turnings	15.00 to 15.50
Electric Furnace Grades:	
Low phos., punchings	18.50 to 19.00
Hvy. steel axle turnings	15.00 to 15.50
Blast Furnace Grades:	
Short shoveling steel turnings	10.50 to 11.00
Short mixed borings and turnings	10.50 to 11.00
Cast iron borings	10.50 to 11.00
Rolling Mill Grades:	
Steel car axles	19.50 to 20.50
Cupola Grades:	
No. 1 cast	14.00 to 15.00
Rails 3 ft. and under	17.50 to 18.50

Warehouse prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.25c.
Hoops	4.25c.
Black sheets (No. 24), 25 or more bundles	3.70c. to 3.80c.
Galv. sheets (No. 24), 25 or more bundles	4.35c. to 4.45c.
Light plates, blue annealed (No. 10), 1 to 24 plates	3.25c. to 3.35c.
Blue annealed sheets (No. 13), 1 to 24 sheets	3.40c. to 3.50c.
Galv. corrug. sheets (No. 28), per square	$4.33
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count,	60 per cent off list
Machine bolts, 100 count,	60 per cent off list
Carriage bolts, 100 count,	60 per cent off list
Nuts, all styles, 100 count,	60 per cent off list
Large rivets, base per 100 lb.	$3.50
Wire, black soft ann'l'd, base per 100 lb.	$2.90 to 3.00
Wire, galv. soft, base per 100 lb.	2.90 to 3.00
Common wire nails, per keg	2.80 to 2.90
Cement coated nails, per keg	2.95 to 3.05

Belfont Steel & Wire Co. in Receivership

David T. Croxton, vice-president, Cleveland-Cliffs Iron Co., Cleveland, and I. P. Blanton, president, Belfont Steel & Wire Co., were appointed receivers for the Belfont company on Nov. 25 by Judge Robert Nevin, of the United States District Court, Cincinnati. The appointments were made following the filing of a petition for a receiver by Hickman, Williams & Co., dealers in pig iron, scrap, coke and alloys.

The complainant alleged that it is a creditor on a promissory note for $2,000 and on an open account for $1,000. The court was advised that the company also owes $87,197 on promissory notes given to creditors, $377,761 on open accounts and $79,509 as Federal taxes.

It also was said that the Norfolk & Western Railway Co. had brought suit in Federal Court on a note for $5,000 and that similar actions are threatened by other creditors. The complainant further alleged that the company's difficulties are the result of the absence of liquid assets and asserted the belief that the company will be able to meet all indebtedness if permitted to operate its business without interruption.

The Belfont Steel & Wire Co. is one of the oldest steel concerns in Ohio. It was established in 1864 under the name Belfont Steel Co. In 1923, the company was merged with the Kelly Nail & Iron Co., Ironton, and the name was changed to the Belfont Steel & Wire Co.

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and under 10-in., Pittsburgh	$35.00
Rerolling, 4-in. and under 10-in., Youngstown	35.00
Rerolling, 4-in. and under 10-in., Cleveland	35.00
Rerolling, 4-in. and under 10-in., Chicago	36.00
Forging quality, Pittsburgh	40.00

Sheet Bars

(Open Hearth or Bessemer)

	Per Gross Ton
Pittsburgh	$35.00
Youngstown	35.00
Cleveland	35.00

Slabs

(8 in. x 2 in. and under, 10 in. x 10 in.)

	Per Gross Ton
Pittsburgh	$35.00
Youngstown	35.00
Cleveland	35.00

Skelp

(F.o.b. Pittsburgh or Youngstown)

	Per Lb.
Grooved	1.85c. to 1.90c.
Universal	1.85c. to 1.90c.
Sheared	1.85c. to 1.90c.

Wire Rods

(Common soft, base)

	Per Gross Ton
Pittsburgh	$40.00
Cleveland	40.00
Chicago	41.00

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.80
Old range non-Bessemer, 51.50% iron	4.65
Mesabi Bessemer, 51.50% iron	4.65
Mesabi non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.40

Foreign Ore, c.i.f. Philadelphia or Baltimore	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algerian	12.00c.
Iron ore, low phos., Swedish, average 68% iron	12.00c.
Iron ore, basic Swedish, average 65% iron	10.00c.
Manganese ore, washed, 52% manganese, from the Caucasus	30.00c.
Manganese ore, Brazilian, African or Indian, basic 50%	30.00c.
Tungsten ore, high grade, per unit, in 60% concentrates	$15.50 to $16.50

	Per Gross Ton
Chrome ore, 45 to 50% Cr_2O_3, crude, c.i.f. Atlantic seaboard	$22.00 to $24.00

	Per Lb.
Molybdenum ore, 85% concentrates of MoS_2, delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$2.65
Foundry, f.o.b. Connellsville prompt	$3.75 to 4.75
Foundry, by-product, Ch'go ovens	8.00
Foundry, by-product, New England, del'd	11.00
Foundry, by-product, Newark or Jersey City, delivered	9.00 to 9.40
Foundry, by-product, Phila.	9.00
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry by-prod., del'd St. Louis	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.25 to $1.75
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, ¾-in. f.o.b. Pa. mines	1.90 to 2.00
Mine run gas coal, f.o.b. Pa. mines	1.65 to 1.75
Steam slack, f.o.b. W. Pa. mines	80c. to 90c.
Gas slack, f.o.b. W. Pa. mines	1.00 to 1.10

Ferromanganese

	Per Gross Ton
Domestic, 80%, seaboard	$105.00
Foreign, 80%, Atlantic or Gulf port, duty paid	105.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$31.00 to $34.00
Domestic, 16 to 19%	29.00 to 32.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$83.50
75%	130.00

	Per Gross Ton Furnace		Per Gross Ton Furnace
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	45.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		Per Gross Ton
10%	$30.00	12%	$34.00
11%	32.00		

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		Per Gross Ton
6%	$22.00 to $23.00	10%	$26.00 to $28.00
7%	23.00 to 24.00	11%	28.00 to 30.00
8%	24.00 to 25.00	12%	30.00 to 32.00
9%	25.00 to 26.00		

Other Ferroalloys

Ferrotungsten, per lb. contained metal del'd	$1.40 to $1.50
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.15 to $3.65
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	$160.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton	$91.00
Ferrophosphorus, electric 24%, f.o.b. Anniston, Ala., per gross ton	$122.50

Fluxes and Refractories

Fluorspar	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silicon, gravel, f.o.b. Illinois and Kentucky mines	$18.00
No. 2 lump, Illinois and Kentucky mines	20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	$13.25 to 13.75
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines	32.50

Fire Clay Brick

	Per 1000 f.o.b. Works: High-Heat Duty Brick	Intermediate Heavy Duty Brick
Pennsylvania	$43.00 to $46.00	$35.00 to $38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	.....
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00
Standard size	45.00

Chrome Brick

	Per Net Ton
Standard size	$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts, blank or tapped, hexagons	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	7.00c. to 6.75c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled thread up to and including ⅛ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagon nuts	70
Semi-finished hexagon castellated nuts, S.A.E.	70
Stove bolts in packages, P'gh	75, 20, 10 and 5
Stove bolts in packages, Chicago	75, 20, 10 and 5
Stove bolts in packages, Cleveland	75, 20, 10 and 5
Stove bolts in bulk, P'gh	75, 20, 10, 5 and 2¼
Stove bolts in bulk, Chicago	75, 20, 10, 5 and 2½
Stove bolts in bulk, Cleveland	75, 20, 10, 5 and 2½
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55, 60 per cent apply.

Large Rivets

(½-in. and larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$3.10
F.o.b. Chicago	3.20

Small Rivets

(⅞-in. and smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70 and 10
F.o.b. Cleveland	70 and 10
F.o.b. Chicago	70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10 and 5
Milled standard set screws, case hardened	80 and 5
Milled headless set screws, cut thread	75 and 10
Upset hex. head cap screws, U.S.S. thread	85
Upset hex. cap screws, S.A.E. thread	85
Upset set screws	80, 10 and 5
Milled studs	70

Chicago

Steel Output Recedes to 65 Per Cent Rate—Railroad Equipment Outstanding in Otherwise Slack Market

CHICAGO, Dec. 3.—The Chicago steel market is experiencing a gradual but definite slackening in demands. This change in the attitude of consumers is not restricted to any one line of steel mill products nor is there indication that any particular group of manufacturers is more affected than others. The recession in shipments is orderly and in a great measure reflects the approach of the inventory period and expected holiday shutdowns more than it does sharp curtailment of buying on the part of ultimate consumers of commodities into which iron and steel enter.

New orders for cars for the Rock Island and the Missouri Pacific will take over 80,000 tons of steel and new inquiries for cars for the Milwaukee road call for 45,000 tons of steel. Included in this week's railroad business is 44,200 tons of rails ordered by the Southern Railway from the Tennessee Coal, Iron & Railroad Co.

The outlook for new building work in Chicago still holds much promise. Although actual inquiries have not been made for some of the larger projects, the trade seems reasonably certain that figures will soon be taken for a large tonnage of structural shapes. Fresh projects made public this week will require an estimated 30,000 tons.

Prices for finished steel are holding, but it is expected that real tests of the situation will be afforded in the next three to four weeks. Books have been opened for first quarter by sheet and wire producers.

Output of steel ingots in this district has receded to 65 per cent of capacity. Some producers are attempting to match output with shipments, but at other steel mills both pig iron and semi-finished steel are accumulating. No. 1 furnace at Gary has been banked. The leading producer is now blowing 13 of 27 stacks, and, for the district as a whole, 22 of 36 furnaces are in blast.

Pig Iron.—Shipments of Northern pig iron are at a lower rate as the holiday and inventory periods draw nearer. While there is this noticeable decrease in total specifications, there is at the same time an increase in demand from malleable foundries, which are finding business more active in the railroad equipment and automobile fields. Sellers are willing to take first quarter business at present prices, but interest in future needs is spotty and variable. Small purchases for immediate needs are in good volume. All merchant stacks in this district are lighted and, in view of the tapering in shipments, stocks at furnaces are growing. The Southern iron market is quiet.

Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	$20.00
N'th'n No. 1 fdy., sil. 2.25 to 2.75	20.50
Malleable, not over 2.25 sil.	20.00
High phosphorus	20.00
Lake Super. charcoal, sil. 1.50	27.04
So'th'n No. 2 fdy. (all rail)	$19.01 to 19.51
Low phos., sil. 1 to 2, copper free	29.50
Silvery, sil. 8 per cent	$28.79 to 29.79
Bess. ferrosilicon, 14-15 per cent	46.29

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Rails and Track Supplies.—The inquiry by the Missouri-Kansas-Texas for 7500 tons of standard-section rails is still open, according to reports here. Chicago district rail mills are holding to the high rate of production reached in late November. Shipments of rails in the past 30 days were the heaviest for one month in many years. Miscellaneous orders for track supplies total 6000 tons, and inquiries, including 14,000 tons asked for a week ago by the New York Central, aggregate 25,000 tons.

Prices f.o.b. mill, per gross ton: Standard section open-hearth and Bess. rails, $43; light rails, rolled from billets, $36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.07½c. to 2.15c.; angle bars, 2.75c.

Sheets.—Local producers are opening first quarter books. Several sizable orders for delivery in the next year have already been entered, and sellers find many buyers in a mood to consider future needs. This situation is in contrast with the character of purchases for the quarter now ending. As the third period of this year neared an end, users held out of the market except for immediate needs and they continued to practise hand-to-mouth buying, with the result that mill books in the last two and one-half months have not showed backlogs of satisfactory size. The effect of placing orders in this way is that stocks in the hands of consumers are at an unusually low point, and on this score sheet producers expect to get a quick response in the way of releases with the first impulse of improvement in the general business situation. Prices asked are 2.90c. a lb., delivered Chicago, for black sheets, 3.55c. to 3.60c. for galvanized sheets, and 2.35c. for No. 10 gage blue annealed. Output of local mills is close to 50 per cent of hot mill capacity, which is about the rate at which releases are going to mills. Rolling schedules are at short range, though this situation is somewhat better, as shown by the fact that the Milwaukee hot mills, which have been down for about 10 days, resumed operations on Tuesday of this week. Distribution of sheets by jobbers is less active, as gaged by specifications to mills, though this is not a wholly satisfactory indicator, as at this time of the year jobbers are looking toward reduction of inventories.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 2.90c.; No. 24 galv., 3.55c. to 3.65c.; No. 10 blue ann'l'd, 2.35c. Deliv'd prices at other Western points are equal to the freight from Gary, plus the mill prices, which are 5c. per 100 lb. lower than Chicago delivered prices.

Cast Iron Pipe.—Early winter weather in the Middle West has served to cut off small orders, which in recent weeks have been moderately active. Fresh inquiry in and near Chicago is practically at a standstill and sellers can see little in the remainder of this month unless public utilities, which it is understood have new programs that are larger by about 6 per cent than those prepared for 1929, begin to inquire before the opening of the new year. Avon, Ohio, is said to have placed 11,000 ft. of 6-in. pipe with an unnamed bidder. A new project for a sailors' and soldiers' home at Xenia, Ohio, calls for 8000 ft. of 3 to 6-in. pipe. Bids will be opened Dec. 14. There is still doubt whether winter buying prices will be named and, in the meantime, current quotations are unchanged in a very dull market. The early cold snap is resulting in hurried calls for prompt shipment of old orders, and such new business as is before the trade is being placed largely where most favorable deliveries can be promised.

Prices per net ton, deliv'd Chicago: Water pipe, 6-in. and over, $43.70 to $45.70; 4-in., $47.70 to $49.70; Class A and gas pipe, $3 extra.

Structural Material.—Recent developments in the Chicago building market lend added support to the belief among fabricators that the present dullness in business is not to last long. It is reported here that the Northwestern Mutual Life Building, Milwaukee, requiring 3000 tons, will soon be out for bids. Prices are to be asked this week on 5000 tons for a traction company bridge at Indianapolis. New projects in Chicago are the Wabash Avenue bridge, which will take 2500 tons; the Chicago Yacht Club, which calls for 1800 tons, and, for the near future, according to re-

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars	3.00c.
Reinforc'g bars, billet steel	1.90c. to 2.25c.
Reinforc'g bars, rail steel	1.85c. to 2.00c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Bands (¼ in. in Nos. 10 and 12 gages)	3.20c.
Hoops (No. 14 gage and lighter)	3.75c.
Black sheets (No. 24)	4.05c.
Galv. sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.35c.
Spikes, ¼ in. and larger	3.55c.
Track bolts	4.55c.
Rivets, structural	4.00c.
Rivets, boiler	4.00c.
	Per Cent Off List
Machine bolts	60
Carriage bolts	60
Coach or lag screws	60
Hot-pressed nuts, sq., tap. or blank	60
Hot-pressed nuts, hex., tap. or blank	60
No. 8 black ann'l'd wire, per 100 lb.	$3.45
Com. wire nails, base per keg	$2.75 to 2.95
Cement c't'd nails, base per keg	2.75 to 2.95

ports, 25,000 tons for a new post office and a substantial tonnage for two of the World's Fair buildings, on which construction will be started in the spring. It is the impression of many here that such projects as the National Bank of the Republic Building and a structure for the Marshall Field Estate will also go ahead early in the spring. An encouraging situation recently brought to light by a survey made in Chicago is that rentable vacant property now stands at 4.70 per cent, whereas 10 per cent is usually considered a normal figure. While projects of the character listed here are taking shape, fabricators are faced with shortened hours of shop operation. Architects generally are busier, though their employment of added draftsmen will be set back for the reason that some of the work which they are putting into the market was prepared on drafting boards six months to a year ago. The expansion program of the Illinois Steel Co. is well under way, and steel has been ordered for the fabrication of the first units.

Mill prices on plain material, per lb.: 2.00c. base, Chicago.

Wire Products.—First quarter books are open, and prices named are 2.45c. a lb., Chicago, for bright annealed wire to the manufacturing trade and $2.45 to $2.55 a keg for wire nails in carload lots to the merchant trade. Insufficient time has elapsed since the opening of books to determine whether buyers are in the mood to make future commitments. In the meantime, specifications scarcely support mill operations at 50 per cent of capacity, a reduction of several points in the week. As to releases by the manufacturing trade, there are indications that the bottom in demand has been passed, though the change is not impressive. Jobbers, especially in the North and at some points in the West, find distribution cut by cold weather. The result is that for the country as a whole specifications from jobbers show a decline from the volume of a week ago.

Cold-Rolled Strip.—Current specifications are holding mill operations to about 20 per cent of capacity. Prices are steady at 2.75c. a lb., Cleveland, or 3.05c., delivered Chicago.

Bolts, Nuts and Rivets.—Among the interesting developments in this market is the fact that automobile parts makers are entering contracts for their needs over the next few months. Prices remain firm and contracts are being prepared on the basis of present quotations.

Plates.—More than 80,000 tons of steel will be required for 6000 cars ordered by the Rock Island and the Missouri Pacific. Five thousand cars were ordered by the Rock Island and 1000 by the Missouri Pacific. Fresh tank steel inquiries total 10,000 tons, of which 3000 tons is for a refinery in Louisiana. Orders for like projects are light in the aggregate for the week, being less than 1000 tons. Shipments of plates are larger to the Milwaukee pipe maker.

Reinforcing Bars.—An early spell of winter weather is serving to check plans for reinforced concrete work which otherwise might have been put under way in the near future. This situation, combined with the fact that this season is normally quiet, leaves bar benders with very small additions to books and a limited amount of new work on which they can prepare figures. Shop operations are at a lower rate than a week ago and further reduction in output is in sight. However, there are bright spots in this market. Easier money promises to support construction work at a higher rate than in the year now drawing to a close and road building programs in the Middle West promise the use of large tonnages of reinforcing bars. Prices for new billet and rail steel reinforcing bars are weak.

Bars.—There is little change in the mild steel bar market. Consumption is still widespread, but purchases are in small lots. Car builders are taking limited quantities in efforts to hold stocks at a low point at the turn of the year. Orders for alloy steel bars are more numerous, but the aggregate tonnage is small, and little support is being lent to mills, which are operating at low rates of output. There is a steady use of iron bars by railroads and car builders. Producers of rail steel bars have opened books for the first quarter at 1.90c. a lb., Chicago Heights. Spot buying is in larger volume, and specifications, though individually small, are greater in the aggregate than a week ago. Although books have been opened, insufficient time has elapsed to gage the interest shown by users in future needs.

Coke.—November shipments of by-product foundry coke surpassed by a small margin the total in October. The December rate is well up to the average in recent weeks. Prices remain steady at $8 a ton, f.o.b. Chicago ovens.

Old Material.—Opinion is divided as to the course being taken by the Chicago scrap market. Sales are unusually small and therefore throw no light on the situation. Most users have been alert to the price situation in recent weeks and, while they may not have accumulated oversized stocks, they are now amply protected for some time to come by orders which are in the hands of brokers. Use of scrap in this district is still at a fair rate, as gaged by shipments and the fact that distress tonnage is giving very little trouble. Two factors which should have a bearing on stabilizing this market are restriction of preparation and shipments of scrap due to cold weather and low production of industrial scrap. Those in the trade who hold that cold weather is an important factor in the winter scrap business feel that zero weather already experienced will curtail shipments enough to lend stability to prices and probably make present quotations a turning point for a stronger market. Shipments to foundries are in smaller volume. This is due in part to the approach of the inventory period and also the fact that many foundries will be closed over the Christmas holiday season. Among railroad lists are 30,000 tons offered by the Pennsylvania on Dec. 4, blank lists by the New York Central and the Michigan Central and 3000 tons offered by the Chicago & North Western.

Prices deliv'd Chicago district consumers:

Per Gross Ton

Basic Open-Hearth Grades:	
Heavy melting steel	$12.50 to $13.00
Shoveling steel	12.50 to 13.00
Frogs, switches and guards, cut apart, and misc. rails	13.00 to 13.50
Hydraul. compressed sheets	10.75 to 11.25
Drop forge flashings	9.75 to 10.25
No. 1 busheling	11.00 to 11.50
Forg'd cast and r'l'd steel carwheels	17.50 to 18.00
Railroad tires, charg. box size	17.50 to 18.00
Railroad leaf springs cut apart	17.50 to 18.00
Acid Open-Hearth Grades:	
Steel couplers and knuckles	16.00 to 16.50
Coil springs	18.00 to 18.50
Electric Furnace Grades:	
Axle turnings	12.75 to 13.25
Low phos. punchings	14.50 to 15.00
Low phos. plates, 12 in. and under	14.50 to 15.00
Blast Furnace Grades:	
Axle turnings	10.50 to 11.00
Cast iron borings	9.00 to 9.50
Short shoveling turnings	9.00 to 9.50
Machine shop turnings	6.50 to 7.00
Rolling Mill Grades:	
Iron rails	14.50 to 15.00
Rerolling rails	15.00 to 15.50
Cupola Grades:	
Steel rails less than 3 ft.	16.25 to 17.25
Steel rails less than 2 ft.	18.00 to 18.50
Angle bars, steel	15.25 to 15.75
Cast iron carwheels	13.50 to 14.00
Malleable Grades:	
Railroad	16.00 to 16.50
Agricultural	14.50 to 15.00
Miscellaneous:	
*Relaying rails, 56 to 60 lb.	23.00 to 25.00
*Relaying rails, 65 lb. and heav.	26.00 to 31.00

Per Net Ton

Rolling Mill Grades:	
Iron angle and splice bars	15.00 to 15.50
Iron arch bars and transoms	17.50 to 18.00
Iron car axles	25.50 to 26.00
Steel car axles	15.50 to 16.00
No. 1 railroad wrought	12.00 to 12.50
No. 2 railroad wrought	10.50 to 11.00
No. 1 busheling	9.00 to 9.50
No. 2 busheling	7.00 to 7.50
Locomotive tires, smooth	14.50 to 15.00
Pipes and flues	9.50 to 10.00
Cupola Grades:	
No. 1 machinery cast	13.50 to 14.00
No. 1 railroad cast	12.50 to 13.00
No. 1 agricultural cast	12.00 to 12.50
Stove plate	11.50 to 12.00
Grate bars	11.25 to 11.75
Brake shoes	9.75 to 10.25

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Reconditioning of Six Ships Authorized

Washington, Dec. 3.—In anticipation of substantial increases in the movements of grain, cotton and flour from Gulf ports to Europe during the next several months, the Shipping Board has authorized the reconditioning of six steel cargo steamers now laid up. The ships will be ready for service within 60 days. The outlay authorized amounts to $414,000. The vessels are the Marne, the West Compo, the West Hassayampa, the West Munham, the City of Alma and the Arden.

New York

Pig Iron Melt Declining and This Is Reflected in Orders—Structural Steel Outlook Bright

NEW YORK, Dec. 3.—Pig iron melt, in the aggregate, is declining. It is difficult to ascertain whether the reduction is due to seasonal or cyclical causes or reflects unsettlement following the stock market crash. The falling off has not been general, however, and may indicate nothing more than the usual curtailment that occurs as the year-end approaches. Suspensions are somewhat more numerous, but, in view of the rather common policy of carrying very light stocks, have not involved large tonnages. Shipments of a leading seller in October were the largest for any month of the year. The tonnage moved in November, augmented by concluding barge canal shipments, was not far behind. With the season of navigation over on the State canal and with the inventory period approaching, the opening of December sees a distinct falling off in the amount of iron moved. Sales of the week in this district were light, totaling 4500 tons, and inquiries are not numerous. The trade is encouraged, however, by the fact that several buyers have tentatively asked for prices on their first quarter requirements, aggregating 3000 to 4000 tons. With furnaces being put out in step with declining demand, sellers believe that the market will be kept free from the weakening effect of large accumulations of stock iron in producers' hands. In the absence of tests the price situation is substantially unchanged. The American Locomotive Co. has placed 500 tons for its Dunkirk, N. Y., works with a Buffalo stack.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	$21.91 to $22.41
*Buff. No. 2, del'd east. N. J.	20.28 to 20.78
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	$19.89 to 21.02
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	20.39 to 21.52

Freight rates: $4.91 from Buffalo, $1.39 to $2.52 from eastern Pennsylvania.

*Prices delivered to New Jersey cities having rate of $3.28 a ton from Buffalo.

Reinforcing Bars.—The Turner Construction Co., which has the general contract for the new Ford assembly plant at Edgewater, N. J., has not yet placed an order for the 1000 tons of bars which will be required. Likewise, no award has been made for 1000 tons of bars for an addition to the Pennsylvania terminal and warehouse at Hoboken, N. J. Another good-sized pending job is 600 tons for a warehouse under construction at Newark, N. J., by the Lehigh Valley Transportation Co. The volume of small jobs let in the past few weeks has declined, but prices are steady at 2.05c., New York.

Warehouse Business.—November sales from warehouse stocks were smaller than the October total. Structural steel demand has been steadily receding. Sheets are inactive, but prices are being fairly well maintained, except on blue annealed, which are subject to concessions from the scheduled quotation of 3.90c. a lb., base, to 3.25c. a lb., base, on desirable specifications.

Finished Steel.—A number of mills have begun the solicitation of first quarter contracts, but without much success. Consumers generally are not willing to commit themselves, but whether this policy is dictated by uncertainty as to requirements in the early part of the year or is due to the expectation of lower prices is not clear. Prices are holding fairly well, considering the fact that all mills are anxious for orders. There is naturally some irregularity, but no serious defection. Leading makers of blue annealed sheets have notified local sales offices that minimum prices henceforth are 2.35c. a lb., Pittsburgh, for No. 13 gage and 2.20c. for No. 10. These prices refer to the jobbing mill products, which recently have been brought into sharp competition with the product of the continuous mills. Black sheets are holding fairly well at 2.75c., though occasional sales are made at 2.70c. Galvanized sheets are well maintained at 3.40c. Plate prices are fairly steady at 2c. to 2.05c., Coatesville, the higher price applying on small lots. Some bar quotations below 1.90c., Pittsburgh, have appeared. No definite trend in the volume of business is discernible. Some local offices did better in November than in October, but on the whole the volume of the latter half of November showed no marked change from that of the first half. The structural steel outlook is described by leading fabricators as more favorable than at this time last year. A large volume of work is expected to come out for bids within 60 days, and considerable work on which bids have gone in may be closed before the end of the year. Outstanding among pending jobs is the Empire State Building, which will take 40,000 to 45,000 tons of steel, award of which may be made soon.

Mill prices per lb., deliv'd New York: Soft steel bars, 2.24c.; plates, 2.17½c. to 2.22½c.; structural shapes, 2.09½c. to 2.14½c.; bar iron, 2.14c.

Cast Iron Pipe.—Prices are still lacking in strength, with most foundries in the North and South in need of tonnage and buying limited to less than carload lots. The only sizable inquiry is for about 1300 tons of 4-in., 8-in. and 10-in. pipe for a city water system in Mexico. Hartford, Conn., has opened bids on about 200 tons of 12-in. water pipe, either sand cast or centrifugal.

Prices per net ton deliv'd New York: Water pipe, 6-in. and larger, $34.60 to $36.60; 4-in. and 5-in., $37.60 to $39.60; 3-in., $44.60 to $46.60. Class A and gas pipe $3 extra.

Coke.—Renewal of contracts for the first half of next year has been general, but demand for carload lots for prompt shipment is small. The price is unchanged at $4.85 a net ton, ovens, for special brands of beehive foundry coke, or $8.56, delivered to northern New Jersey, Jersey City and Newark, and $9.44, to New York and Brooklyn. Standard furnace coke is quiet at $2.65 a net ton. By-product coke is quoted at $9 to $9.40 a net ton, Newark or Jersey City, and $10.06, New York or Brooklyn.

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.30c.
Soft steel bars, small shapes	3.25c.
Iron bars	3.24c.
Iron bars, Swed. charcoal	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons	3.50c.
Flats and squares	4.00c.
Cold-roll. strip, soft and quarter hard	5.15c. to 5.40c.
Hoops	4.25c.
Bands	3.75c.
Blue ann'l'd sheets (No. 10)	3.25c. to 3.90c.
Long terne sheets (No. 24)	5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galv. annealed	5.15c.
Tire steel, ½ x ½ in. and larger	3.40c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.75c.
Open-hearth spring steel, bases	4.50c. to 7.00c.

	Per Cent Off List
Machine bolts, cut threads:	
¾ x 6 in. and smaller	60
1 x 30 in. and smaller	50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	60
¾ x 20 in. and smaller	50 to 50 and 10
Coach Screws:	
½ x 6 in. and smaller	60
1 x 6 in. and smaller	50 to 50 and 10

	Per 100 Ft.
Boiler Tubes—	
Lap welded, 2-in.	$17.33
Seamless steel, 2-in.	20.24
Charcoal iron, 2-in.	25.00
Charcoal iron, 4-in.	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
½-in. butt	46	29
¾-in. butt	51	37
1-3-in. butt	53	39
2½-6-in. lap	48	35
7 and 8-in. lap	44	17
11 and 12-in. lap	37	12
Wrought Iron—		
½-in. butt	5	+19
¾-in. butt	11	+ 9
1-1½-in. butt	14	+ 6
2-in. lap	5	+14
3-6-in. lap	11	+ 6
7-12-in. lap	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box	$6.45	$6.20
Charcoal, per Box—	A	AAA
IC	$9.70	$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating	$10.00 to $11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets, Box Annealed—Black, C. R. One Pass

	Per Lb.
Nos. 18 to 20	3.70c.
No. 22	3.85c.
No. 24	3.90c.
No. 26	4.00c.
No. 28*	4.15c.
No. 30	4.40c.

Sheets, Galvanized

	Per Lb.
No. 14	4.15c.
No. 16	4.00c.
No. 18	4.15c
No. 20	4.25c.
No. 22	4.35c.
No. 24	4.50c.
No. 26	4.75c.
No. 28*	5.00c.
No. 30	5.40c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

Old Material.—Buying prices show a further downward trend, with brokers in most cases offering only $14 a ton, delivered, for No. 1 heavy melting steel delivered to consumers at Bethlehem or Coatesville, Pa. Heavy breakable cast also shows a decline, brokers offering $13.75 a ton, delivered to a consumer at Florence, N. J., and $13.50 a ton, delivered eastern Pennsylvania. Buying of other grades is unimportant.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel	$11.00 to	$11.35
Heavy melting steel (yard)	8.00 to	8.50
No. 1 hvy. breakable cast	10.25 to	11.00
Stove plate (steel works)		8.00
Locomotive grate bars		8.25
Machine shop turnings	7.00 to	7.50
Short shoveling turnings	7.25 to	7.50
Cast borings (blast fur. or steel works)	7.00 to	7.50
Mixed borings and turnings	6.75 to	7.50
Steel car axles	15.25 to	16.25
Iron car axles	21.00 to	21.50
Iron and steel pipe (1 in. dia., not under 2 ft. long)		9.75
Forge fire	8.50 to	9.00
No. 1 railroad wrought	12.00 to	12.50
No. 1 yard wrought, long	11.00 to	11.50
Rails for rolling	11.50 to	12.00
Stove plate (foundry)	8.25 to	9.00
Malleable cast (railroad)	13.50 to	14.00
Cast borings (chemical)	9.00 to	9.50

Prices per gross ton, deliv'd local foundries:

No. 1 machry. cast	$15.00 to	$15.50
No. 1 hvy. cast (columns, bldg. materials, etc.), cupola size	13.00 to	13.50
No. 2 cast (radiators, cast boilers, etc.)	12.50 to	13.00

New German Bar Mill Undersells Syndicate

HAMBURG, GERMANY, Nov. 18.—A published report that the Rheinmetall A. G., which has just started operation of a new steel bar mill with a capacity of 35,000 tons annually, has become a member of the German Steel Syndicate is denied by the company. The entire output of the mill, it is announced, is being distributed through Kaufmann & Lipman, steel merchants of this city, at slightly less than the official syndicate prices.

Number of German Blast Furnaces Decreasing

HAMBURG, GERMANY, Nov. 18.—The total number of blast furnaces in Germany continues to decline as old small-capacity furnaces are dismantled and replaced with large modern furnaces. At the end of October there were 182 furnaces in existence, compared with 185 at the end of September. Since 1924, 51 old furnaces have been dismantled and 19 new stacks blown in.

Broken Hill Proprietary Buys German Engines

HAMBURG, GERMANY, Nov. 18.—A contract to furnish six Diesel engines for a new power plant of the Broken Hill Proprietary Co. in Australia has been awarded to Gebrüder Sulzer, leading German manufacturers of Diesel engines. Each motor will develop 2900 hp., and four Diesel compressor engines, also to be furnished in the contract, will develop 1230 hp. The maximum horsepower of the new power plant will be 27,800.

Cleveland

Slight Pickup in Orders for Steel from Automobile Industry —Resumption Expected to Be Slow

CLEVELAND, Dec. 3.—A slight improvement in releases from the automotive industry developed during the week, permitting a little gain in operations by a few of the mills. Others are going along at their recent rate. While the gain is not enough to indicate a permanent improvement, sentiment in the automotive industry in the Michigan territory is much better than a month ago.

December output of motor cars will show a gain over that of November in view of the fact that the Ford and Chevrolet companies are getting under production in a limited way on their new models. However, the pickup in this industry doubtless will be slow. Both the Ford and Chevrolet companies are ordering more steel than last month, but orders from these companies, as well as other automobile manufacturers, are for small lots covering only early requirements.

Stocks of all consumers are low and quick shipment is usually called for. A great deal of steel is still being held up by automobile manufacturers, from which mills are not securing releases.

An independent Cleveland mill that was practically shut down last week is operating at close to 50 per cent this week in both its steel making and finishing mill departments, but another has further reduced its open-hearth operations. Together, local independent mills are operating at about 30 per cent of ingot capacity.

While a few of the bar, plate and shape mills and most of the sheet and strip mills have named present prices for the first quarter, they are not trying to close contracts and consumers are showing no interest in future commitments. Announcements of first quarter prices made during the week included furniture sheets and vitreous enameling stock. Some bolt and nut and rivet makers have reaffirmed present prices for the first quarter.

Pig Iron.—Sales by Cleveland interests were 10,350 tons during the week, compared with 6250 tons the week before. The business was about evenly divided between early shipment orders and first quarter contracts. While some consumers are willing to contract for the coming quarter at current prices, others are holding off to see if present prices are maintained. The market so far appears to be holding firm at recent quotations. The only activity in the immediate territory was the purchase of 500 tons of foundry iron by a northern Ohio foundry at $18.50, furnace, the business being divided between two furnaces. November shipments fell off about 15 per cent, compared with October. Shipping orders from some of the automobile foundries for December show a gain, and this industry is expected to take more iron this month than during last month. However, shipments to other foundries will probably be light this month, as there will be the usual disposition to keep stocks low at inventory time. Many of the northern Ohio foundries are operating three to four days a week. While a few consumers will carry over enough iron to last them well into the first quarter, the aggregate will not be large, as buying for the present quarter was rather light. The American Steel & Wire Co. has blown out one of its Central furnaces in Cleveland. Foundry and malleable iron are quoted at $18.50, Cleveland, for outside shipment and $19, furnace, for local delivery. In Michigan there is a spread of from $19.50 to $20, furnace, for these grades.

Prices per gross ton at Cleveland:

N'th'n fdy., sil. 1.75 to 2.25		$19.50
S'th'n fdy., sil. 1.75 to 2.25	$19.51 to	20.51
Malleable		19.50
Ohio silvery, 8 per cent		28.00
Basic Valley furnace		18.50
Stand. low phos., Valley	26.50 to	27.00

Prices except on basic and low phosphorus are delivered Cleveland. Freight rates: 50c. from local furnaces; $3 from Jackson, Ohio; $6.01 from Birmingham.

Iron Ore.—The Lake shipping season has closed, with a total ore movement by water of 65,195,478 tons, breaking all previous records for shipment by water. More detailed report on ore shipments will be found in another column.

Sheets.—While a few of the mills are operating a little better this week than last, the improvement is slight. Some independent mills in this district are operating at only about 35 per cent capacity. There is a moderate improvement in orders from the automotive industry. Enameling sheets are moving fairly well. The present 3.90c., Pittsburgh, price has been reestablished on vitreous enameling stock for the first quarter. Some mills have named 4c. for metal furniture sheets for that delivery and others are asking 4.10c. Black and

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and struc. shapes	3.00c.
Soft steel bars	3.00c.
Reinforc. steel bars	2.25c. to 2.50c.
Cold-fin. rounds and hex.	3.65c.
Cold-fin. flats and sq.	4.15c.
Hoops and bands, No. 12 to ¼ in., inclusive	3.25c.
Hoops and bands, No. 13 and lighter	3.65c.
Cold-finished strip	*5.95c.
Black sheets (No. 24)	3.70c. to 3.90c.
Galvanized sheets (No. 24)	4.60c. to 4.75c.
Blue ann'l'd sheets (No. 10)	3.25c.
No. 9 ann'l'd wire, per 100 lb.	$2.65
No. 9 galv. wire, per 100 lb.	3.00
Com. wire nails, base per keg	2.65

*Net base, including boxing and cutting to length.

blue annealed sheets are firmer than recently. The former are holding to 2.75c., Pittsburgh, but the price spread on the latter still exists.

Strip Steel.—A few hot-rolled strip mills are running somewhat better this week than last, but do not have enough tonnage to maintain present operations long. Cold-rolled strip is moving very slowly. Occasional concessions from 1.90c. for wide and 2c. for narrow hot-rolled strip are being made. Cold-rolled strip appears firm at 2.75c., Cleveland. Naming of present prices on hot and cold-rolled strip for the first quarter has not brought out any business for that delivery.

Semi-Finished Steel.—Specifications for billets, sheet bars and slabs are still very light and there is no new business to test prices, nor is there interest in first quarter contracts. Wire rods have been reestablished at $40, Cleveland, for the first quarter.

Wire Products.—A limited amount of wire business has been taken for the first quarter at the reestablished 2.40c., Cleveland, price, which is firm for current orders. Demand is steady, but is for small lots. Nails are inactive.

Reinforcing Bars.—Demand is limited to small lots. The market is weak, a 100-ton lot that was placed during the week having brought out a lower price than had appeared recently.

Bars, Plates and Shapes.—Demand for steel bars continues very light. Some of the mills are doing better in light plates than recently as a result of orders from the automotive industry, but the demand for tank and boiler plate is dull. Shapes continue to move fairly well. New inquiry in the building field is light. Some mills have named present prices on steel bars, plates and shapes for the first quarter and others indicate their willingness to take business at these prices. Steel bars are quoted at 1.85c. to 1.90c., Cleveland, and plates and shapes at 1.90c., Pittsburgh.

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.70c.
Plates, ¼-in.	2.90c.
Structural shapes	2.70c.
Soft steel bars, small shapes, iron bars (except bands)	2.80c.
Round-edge iron	3.50c.
Round-edge steel, iron finished 1½ x 1½ in.	3.50c.
Round-edge steel planished	4.30c.
Reinforc. steel bars, sq., twisted and deform.	2.60c. to 2.80c.
Cold-fin. steel, rounds and hex.	3.50c.
Cold-fin. steel, sq. and flats	4.00c.
Steel hoops	3.55c.
Steel bands, No. 12 to ¼-in. inclus.	3.30c.
Spring steel	5.00c.
*Black sheets (No. 24)	3.90c.
†Galvanized sheets (No. 24)	4.65c.
Light plates, blue annealed (No. 10)	3.25c.
Blue ann'l'd sheets (No. 13)	3.40c.
Diam. pat. floor plates—	
¼-in.	5.30c.
¼-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

*For 50 bundles or more; 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.
†For 50 bundles or more; 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

Bolts, Nuts and Rivets.—No announcement as to next year's prices on bolts and nuts has appeared. However, no change is expected. Orders are still extremely light, and there is no evidence as yet of an increased demand from the automotive industry. Rivets are moving in fair volume.

Coke.—Foundry coke is inactive, but prices appear to be holding at recent quotations. By-product coke for domestic use is fairly active and is maintained at $4.75, Ohio ovens, for egg and $4.50 for nut. Ohio by-product foundry coke is quoted at $8.25, ovens.

Old Material.—About the only activity is in a limited amount of distress scrap, largely from the Detroit territory, which is being sold at somewhat under prices that have been prevailing. A small lot of compressed sheet steel scrap was sold in Cleveland during the week at $12.50. Dealers are still able to ship a small amount of scrap to two or three mills, although virtually none is being taken by mills in the Cleveland and Valley districts. The market has a weak tone, but in the absence of transactions most quotations are unchanged.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$14.00 to $14.50
No. 2 heavy melting steel	13.50 to 13.75
Compressed sheet steel	13.50 to 14.00
Light bundled sheet stampings	12.00 to 12.50
Drop forge flashings	11.50 to 12.00
Machine shop turnings	9.00 to 9.75
Short shoveling turnings	11.50 to 12.00
No. 1 railroad wrought	13.00 to 13.50
No. 2 railroad wrought	14.00 to 14.50
No. 1 busheling	12.50 to 13.00
Pipes and flues	9.00 to 9.50
Steel axle turnings	12.50 to 13.00
Acid Open-Hearth Grades:	
Low phos., forging crops	17.75 to 18.00
Low phos., billet, bloom and slab crops	18.50 to 18.75
Low phos., sheet bar crops	18.00 to 18.50
Low phos., plate scrap	18.00 to 18.50
Blast Furnace Grades:	
Cast iron borings	10.00 to 10.50
Mixed borings and short turnings	10.00 to 10.50
No. 2 busheling	10.00 to 10.50
Cupola Grades:	
No. 1 cast	17.00 to 17.50
Railroad grate bars	11.00 to 12.00
Stove plate	12.00 to 12.50
Rails under 3 ft.	18.50 to 19.50
Miscellaneous:	
Railroad malleable	18.00 to 18.50
Rails for rolling	16.25 to 16.50

Philadelphia

Consumers of Steel and Pig Iron Delay Contracting—Shipbuilding Active—Ferromanganese Reduced

PHILADELPHIA, Dec. 3.—Steel mill operations still show a tendency to recede, many consumers being inclined to await a definite trend toward business improvement before entering into any commitments for next year. Structural steel buying has slackened. Sheet prices, especially blue annealed, are slightly more stable than a week ago, and mills are not offering as drastic concessions to automobile manufacturers and other large buyers.

Prospective shipbuilding continues a feature of the market, with the New York Ship Building Corporation, Camden, N. J., low bidder on two large ships for the United States Lines, the Erie Railroad about to close on four tugs requiring 150 tons each of plates and the Mathis Yacht Building Co., Camden, N. J., building a private yacht requiring 160 tons of plates.

Ferromanganese.—Effective yesterday, domestic producers of ferromanganese began quoting $100 a ton, seaboard, on contracts for 1930, and British sellers have received instructions to meet the new level on future contracts. Buying for next year's requirements has begun to develop with domestic producers, but importers have not closed much tonnage.

Pig Iron.—Consumers of foundry iron show no interest in contracting for first quarter and in some instances have requested temporary postponement of scheduled deliveries on contracts because of year-end inventories. Delays in contracting for next year are attributed to the lower operating rates of foundries and a resulting surplus of iron due on contracts. The Textile Machinery Corporation, Reading, Pa., has closed on 1000 tons of foundry iron with eastern Pennsylvania furnaces. Prices of foundry iron are unchanged at $21 a ton, base, for small lots, with occasional concessions on desirable business or to meet Southern competition. Demand for low phosphorus iron is fair and furnaces which depend upon foreign sources for supplies of low phosphorus iron ore have been encountering difficulty in obtaining shipments, even on high-priced contracts. The American Steel & Wire Co., Worcester, Mass., recently closed on about 1000 tons of low phosphorus iron with a New York State furnace, and the Brooklyn Navy Yard has awarded 200 tons of low phosphorus to a Delaware River furnace.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil.	$21.26 to $21.76
East. Pa. No. 2X, 2.25 to 2.75 sil.	21.76 to 22.26
East. Pa. No. 1X	22.26 to 22.76
Basic (del'd east. Pa.)	19.75 to 20.25
Gray forge	20.00 to 20.50
Malleable	21.25 to 21.75
Stand. low phos. (f.o.b. N. Y. State furnace)	22.00 to 23.00
Cop. br'g low phos. (f.o.b. furnace)	23.50 to 24.00
Va. No. 2 plain, 1.75 to 2.25 sil.	22.29
Va. No. 2X, 2.25 to 2.75 sil.	22.79

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces; $4.54 from Virginia furnaces.

Bars.—Buying is limited to small lots, on which sellers are maintaining 1.90c., Pittsburgh, or 2.22c. a lb., delivered Philadelphia.

Reinforcing Bars.—The number of new projects requiring reinforced con-

crete is decreasing with the approach of winter. Several hundred tons of bars for a bulkhead on the Schuylkill River being built by Philadelphia are reported to have been placed with the Truscon Steel Co. Prices are unchanged at 1.95c. a lb., Pittsburgh, or 2.27c., delivered Philadelphia, for billet steel bars, with the extra for cutting to length usually omitted. Occasionally this price is subject to slight shading. Rail steel bars are quoted at 1.85c. to 1.95c., Franklin, Pa., and Tonawanda, N. Y., or 2.17c. to 2.27c., delivered Philadelphia, with no extra for cutting to length or bending.

Shapes. — Fabricating shops are still well engaged, but are bidding on a reduced tonnage of new projects. Shape mills are maintaining fair rates of operation on small sizes, but in most cases need tonnage in large shapes. Prices continue at 1.90c. to 1.95c., f.o.b. nearest mill to consumer, or 1.96c. to 2.01c. a lb., delivered Philadelphia.

Old Material.—Buying of all grades of scrap is small, consumers showing no desire to enter into contracts. A Pencoyd, Pa., mill has purchased a small tonnage of No. 2 automobile steel at $13.50 a ton, delivered, and a Phoenixville, Pa., consumer has bought stove plate at $11 a ton, delivered.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	$14.50 to $15.00
Scrap T rails	14.00 to 14.50
No. 2 heavy melting steel	12.00 to 13.00
No. 1 railroad wrought	15.50 to 16.00
Bundled sheets (for steel works)	11.50
Hydraulic compressed, new	13.50 to 14.00
Hydraulic compressed, old	12.00 to 12.50
Machine shop turnings (for steel works)	11.00
Heavy axle turnings (or equiv.)	12.50 to 13.50
Cast borings (for steel works and roll. mill)	11.00 to 11.50
Heavy breakable cast (for steel works)	14.00
Railroad grate bars	12.00 to 12.50
Stove plate (for steel works)	11.00 to 11.50
No. 1 low phos., hvy., 0.04% and under	21.00 to 22.00
Couplers and knuckles	19.00 to 19.50
Rolled steel wheels	19.00 to 19.50
No. 1 blast f'nace scrap	10.50 to 11.00
Wrot. iron and soft steel pipes and tubes (new specific.)	14.00
Shafting	19.00
Steel axles	20.00 to 21.00
No. 1 forge fire	13.00 to 13.50
Cast iron carwheels	15.50 to 16.00
No. 1 cast	15.00 to 15.50
Cast borings (for chem. plant)	14.00 to 14.50
Steel rails for rolling	16.50 to 17.00

Plates. — The price has generally settled to 2c. a lb., Coatesville, Pa., or 2.10c. a lb., delivered Philadelphia, which mills are endeavoring to maintain as the contract price for first quarter. Small lots of miscellaneous specifications still bring 2.05c., Coatesville, Pa., or 2.15c., delivered Philadelphia.

Sheets.—Automobile body builders in this district have been placing small orders for blue annealed and high finished sheets, but otherwise the sheet market is inactive. Prices are slightly more stable than a week ago and blue annealed sheets are quoted at 2.35c. a lb., Pittsburgh, or 2.67c., delivered Philadelphia, for No. 13 gage, and blue annealed plates at 2.20c., Pittsburgh, or 2.52c., delivered Philadelphia, for No. 10 gage. Concessions of $2 to $4 a ton are granted to preferred buyers. Black sheets range from 2.70c. Pittsburgh, or 3.02c., Philadelphia to 2.75c., Pittsburgh, or 3.07c., Philadelphia. Galvanized sheets are quiet and the price fairly steady at 3.40c., Pittsburgh, or 3.72c., Philadelphia.

Imports.—In the week ended Nov. 30, 5080 tons of manganese ore arrived at this port from British West Africa and 2024 tons of chrome ore was received, of which 1300 tons came from Greece and 724 tons from British South Africa. Pig iron imports consisted of 1545 tons from British India and 737 tons from the United Kingdom. The only steel arrival was three tons of scrap from the United Kingdom.

Castings, Babbitt and Equipment

	October, 1929	September, 1929	October, 1928
Malleable castings production (a), net tons	60,165	59,589	70,054
do., do., ten months	727,146	.....	656,489
do., shipments, net tons	52,092	63,049	63,510
do., orders booked	58,051	52,957	65,780
do., do., ten months	698,880	.....	638,044
Babbitt metal consumption (a), net tons	2,739	2,613	2,898
do., ten months	28,616	.....	24,530
Mechanical stoker sales (a), number	178	155	100
do., horsepower	56,108	45,685	27,219
do., ten months	515,140	.....	428,539
Electric trucks and tractors shipped (a)	169	160	134
do., ten months	1,754	.....	1,181

(a) United States Department of Commerce.

New Prices Announced for Ferroalloys

New prices for the major ferroalloys were made effective Dec. 2 and rule for contracts for 1930 requirements. A reduction of $5 a ton on ferromanganese brings the new quotation to $100, seaboard. Prices for ferrosilicon (50 per cent) are unchanged at $83.50 a ton, delivered. There is no change in the price of the higher carbon ferrochromium, which stands at 11c. a lb. of contained chromium on contract and 11½c. for spot delivery. Reductions, however, have been made in the lower carbon grades of about 3c. a lb.

The new quotation on ferrochromium containing 0.10 per cent carbon as the maximum is 26c. a lb. of contained chromium, as against 29c. formerly, and the new price on the product containing 0.06 per cent carbon is 28c., as against 31c. formerly asked. Contracts closed for next year's requirements include some for spiegeleisen at an unchanged price.

Ore Imports Far Above Last Year

WASHINGTON, Nov. 25.—Imports of iron ore in October totaled 270,279 tons, Chile providing 153,283 tons. Cuba ranked second with 46,000 tons and Sweden third with 35,914 tons. The month's total was an increase of nearly 10 per cent from the 246,917 tons of September, and of almost 60 per cent from a year ago.

For the 10 months of 1929 the total incoming movement of iron ore was 2,584,403 tons, against 2,057,103 tons for the corresponding period of last year. Chile supplied 1,351,836 tons in the 10-month period of 1929, against 1,170,100 tons in the corresponding period of 1928.

Ten months' imports this year have exceeded the total for all of last year —2,485,046 tons. Except for 1927, with 2,620,717 tons, and 1923, with 2,768,430 tons, no recent full year has reached the 10-month figure of 1929, and both those years showed smaller 10-month totals than the present.

SOURCES OF AMERICAN IMPORTS OF IRON ORE
(In Gross Tons)

	October		10 Months Ended October	
	1929	1928	1929	1928
Chile	153,283	91,000	1,351,836	1,170,100
Cuba	46,000	11,500	532,350	277,286
Spain	4,626	7,557	48,385	29,765
Sweden	35,914	.....	274,744	19,614
French Africa	.....	41,500	141,795	403,630
Canada	40	.....	3,443	45,359
Other countries	30,416	18,345	231,350	111,349
Total	270,279	169,902	2,584,403	2,057,103

Pacific Coast

San Diego Pipe Line Calls for 10,000 Tons of Steel—Prices on Most Products Holding Well

SAN FRANCISCO, Nov. 30.—(*By Air Mail.*)—Activity in the Pacific Coast iron and steel markets this week was interrupted by the Thanksgiving holiday and, as a result, both awards and inquiries fell off. Plate fabricators are interested in the call for bids for approximately 10,000 tons of plates for a pipe line at San Diego. Prices in most lines are holding well, structural shapes and mild steel bars being firm at 2.35c., c.i.f.

Pig Iron. — Foundry operations among the jobbing plants are slack and little new business is coming to hand. As a result, melters are not inclined to order material in advance, most of them having fair-sized stocks in foundry yards. Prices are unchanged.

Prices per gross ton at San Francisco:

*Utah basic	$25.00 to $26.00
*Utah fdy., sil. 2.75 to 3.25	25.00 to 26.00
**Indian fdy., sil. 2.75 to 3.25	25.00 to 26.00

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Bars.—Most of the reinforcing steel bar awards this week were in lots ranging from 20 to 60 tons. The Soule Steel Co. booked 350 tons for the Sears, Roebuck & Co. building in Oakland. Bids will be opened Dec. 18 for 306 tons for paving work in Los Angeles County. The Puget Sound Bridge & Dredging Co. secured the general contract for the Fourteenth Avenue South bridge, Seattle, calling for 200 tons.

Plates.—The Beall Tank & Pipe Co. secured 370 tons for the Cedar River pipe line No. 2 at Seattle. The only other award of importance called for 300 tons for one 85,000-bbl. tank at the Mount Poco field, Cal., for the Petroleum Securities Co., placed with an unnamed interest. Bids will be opened Dec. 23 for the Otay pipe line project at San Diego. This calls for 36 to 40-in. welded steel, reinforced concrete or cast iron pipe. Steel specifications call for material ranging in thickness from 3/16 to ⅝ in. It is estimated that approximately 10,000 tons will be required. Prices are weak, concessions of $2 to $4 a ton from the nominal quotation of 2.35c., c.i.f., being common on desirable lots.

Shapes. — Bookings of structural shapes this week were considerably below the weekly average for the year. The Pacific Iron & Steel Co. will furnish 500 tons for a new plant for itself at Los Angeles and 110 tons for condenser supports for the Texas Co. at Wilmington, Cal. The Union Pacific Railroad placed 450 tons for a freight depot in Los Angeles with the Minneapolis-Moline Power Implement Co. Dyer Brothers secured 273 tons for a crossing at California Park and 100 tons for a school in San Francisco. The Puget Sound Bridge & Dredging Co. took the general contract for the Fourteenth Avenue South bridge, Seattle, involving 1000 tons. Domestic shapes are firm at 2.35c., c.i.f.

Cast Iron Pipe.—Only two cast iron pipe awards of over 100 tons were reported this week. The National Cast Iron Pipe Co. took 141 tons of 8-in. Class 150 and 16-in. Class B pipe for the East Bay Municipal Utility District, Oakland, Cal. San Diego, Cal., placed 138 tons of 6-in. Class C pipe for Fortieth Street with the Butterfield Construction Co. The American Cast Iron Pipe Co. was low bidder on 1088 tons of 12-in. Class A pipe for Los Angeles. The Griffith Co. was low bidder on 230 tons of 4 and 6-in. Class C pipe for Coronado Avenue, San Diego. The National Cast Iron Pipe Co. was low bidder on 477 tons of 4 to 10-in. Class B pipe for Miramonte Park, Los Angeles. Bids will be opened on Dec. 23 for 3400 tons of 36-in. Class B pipe for the Otay pipe line project, San Diego. Alternate bids will be taken on reinforced concrete and welded steel pipe.

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and struc. shapes	3.30c.
Soft steel bars	3.30c.
Small angles, ⅞-in. and over	3.15c.
Small angles, under ⅞-in.	3.55c.
Small channels and tees, ¾-in. to 2¾-in.	3.75c.
Spring steel, ¼-in. and thicker	5.00c.
Black sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.80c.
Galv. sheets (No. 24)	5.30c.
Struct. rivets, ½-in. and larger	5.65c.
Com. wire nails, base per keg	$3.40
Cement c't'd nails, 100 lb. keg	3.40

St. Louis

Southern Pig Iron Sold for First Quarter—Spurt in Coke Buying—Scrap Market Stagnant

ST. LOUIS, Dec. 3.—Sales of pig iron during the last week were rather light and consisted largely of spot orders for fill-in purposes. A few sales of Southern iron, including one of 200 tons, were made for first quarter shipment, Southern makers having opened their books for next year's business at prices ranging from $14 to $14.50, f.o.b. Birmingham. Makers report that melters are showing some interest in their first quarter requirements, and are optimistic over the outlook for next year. Stove plants, which recently slowed down operations, are hopeful that the cold snap of last week will tend to stimulate buying by consumers and in turn help the manufacturers to resume full operations. Malleable casting plants in the district catering to the automobile industry have curtailed their melt considerably, but the implement business is well sustained.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill.	$19.50 to $20.00
Malleable, f.o.b. Granite City	20.00
N'th'n No. 2 fdy., deliv'd St. Louis	22.16
Southern No. 2 fdy., deliv'd	18.42 to 18.92
Northern malleable, deliv'd	22.16
Northern basic, deliv'd	22.16

Freight rates: 75c. (average) Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

Finished Iron and Steel.—The demand for sheets is not so large as it was a few weeks ago, but the Granite City Steel Co. feels that this is due to a considerable extent to a desire of manufacturers and jobbers to decrease their inventories before the end of the year. Because of weather conditions, the demand for galvanized sheets, a large percentage of which goes into roofing, also has declined. Orders for tin plate have been large, as is expected at this time of year. The demand for plates also has been good. Building construction continues quiet.

Coke.—Cold weather has stimulated buying of domestic grades of coke, and by-product ovens have been enjoying exceptionally good business. Smelters continue to buy heavily of furnace coke, but buying of foundry grades is light.

Old Material.—The market for old material is at a standstill. Not only is there virtually no buying by consumers, but three of the largest mills in the district are asking dealers to withhold shipments against contracts. This the dealers are doing, although some of the railroads are insisting on making shipments of materials bought by dealers against these contracts. Country dealers, too, are being asked by local dealers to withhold shipments. Prices are nominally unchanged be-

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-fin. rounds, shaftings, screw stock	3.75c.
Black sheets (No. 24)	4.25c.
Galv. sheets (No. 24)	5.10c.
Blue ann'l'd sheets (No. 10)	3.45c.
Black corrug. sheets (No. 24)	4.30c.
Galv. corrug. sheets	5.15c.
Structural rivets	4.15c.
Boiler rivets	4.15c.

	Per Cent Off List
Tank rivets, ⅞-in. and smaller, 100 lb. or more	65
Less than 100 lb.	60
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-pressed nuts, sq., blank or tapped, 200 lb. or more	60
Less than 200 lb.	50
Hot-pressed nuts, hex., blank or tapped, 200 lb. or more	60
Less than 200 lb.	50

cause of lack of sales, but probably would be on a lower basis if any were made. Railroad lists: Pennsylvania, 36,685 tons; Baltimore & Ohio, 16,520 tons; Southern Pacific, 2125 tons; New York, Chicago, Cleveland & St. Louis, 1400 tons; International-Great Northern, 200 tons; Missouri-Kansas-Texas, 100 tons; Missouri Pacific, 200 carloads; Chicago, Milwaukee, St. Paul & Pacific, 34 carloads; Mobile & Ohio, 20 carloads; Nashville, Chattanooga & St. Louis, 9 carloads.

Dealers' buying prices per gross ton, f.o.b. St. Louis district:

No. 1 heavy melting or shoveling steel	$13.00 to $13.50
No. 2 heavy melting or shoveling steel	12.00 to 12.50
No. 1 locomotive tires	14.50 to 15.00
Misc. stand. sec. rails including frogs, switches and guards, cut apart	14.00 to 14.50
Railroad springs	16.50 to 16.00
Bundled sheets	9.50 to 10.00
No. 2 railroad wrought	13.00 to 13.50
No. 1 busheling	9.75 to 10.25
Cast iron borings and shoveling turnings	9.25 to 9.75
Iron rails	13.00 to 13.50
Rails for rolling	15.00 to 15.50
Machine shop turnings	7.25 to 7.75
Heavy turnings	9.50 to 10.00
Steel car axles	18.00 to 18.50
Iron car axles	22.00 to 27.50
Wrot. iron bars and trans.	21.50 to 22.00
No. 1 railroad wrought	13.00 to 13.50
Steel rails, less than 3 ft.	17.00 to 17.50
Steel angle bars	14.00 to 14.50
Cast iron carwheels	14.00 to 14.50
No. 1 machinery cast	15.25 to 15.75
Railroad malleable	13.50 to 14.00
No. 1 railroad cast	14.50 to 15.00
Stove plate	11.75 to 12.25
Agricult. malleable	14.00 to 14.50
Relay. rails 60 lb. and under	20.50 to 23.50
Relay. rails 70 lb. and over	26.50 to 29.00

Canada

Railroads to Place Large Rolling Stock Orders

TORONTO, ONT., Dec. 3.—Melters showed only passive interest in the Canadian pig iron market during the week. Hand-to-mouth buyers are responsible for the bulk of new business. Orders from such melters are confined to lots of one or two cars. The daily iron melt is holding up much better than was expected a short time ago. Some of the larger consumers have sufficient business to maintain present production rates well into the new year, although there is curtailment of activity in the automotive and implement industries. Canadian pig iron prices are firm.

Prices per gross ton:

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75	$23.60
No. 2 fdy., sil. 1.75 to 2.25	23.10
Malleable	23.60
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75	$25.00
No. 2 fdy., sil. 1.75 to 2.25	24.50
Malleable	25.00
Basic	23.50
Imported Iron, Montreal Warehouse	
Summerlee	$33.50
Carron	33.00

Structural Steel.—While there is still a good volume of business pending for closing before the end of the year and still other tonnages in prospect for early 1930 closing, the current demand for structural steel is dull. Orders are mostly in lots under 500 tons, and even these are less numerous than formerly. Fabricating plants are running at full time and making large deliveries on old contracts.

Railroad Equipment.—The Canadian National Railways have announced their intention of placing orders for approximately $20,000,000 worth of freight and passenger cars and locomotives for Canadian lines during 1930. Tenders have already been called for on the first lot of the equipment required, and the initial orders will run into several millions of dollars. It is also stated that the Canadian Pacific Railway is preparing to enter the market for rolling stock for 1930 requirements.

Old Material.—Both Toronto and Montreal markets have developed dullness during the past week or 10 days, with new business confined to small tonnages for spot delivery. While no forward delivery booking is being done, melters are taking regular delivery on old orders and the consumption of scrap is holding at a good level. Mills are purchasing heavy melting steel and turnings for immediate needs only. Prices are unchanged.

Dealers' buying prices:

	Per Gross Ton	
	Toronto	Montreal
Heavy melting steel	$10.00	$8.50
Rails, scrap	11.00	9.00
No. 1 wrought	10.00	12.00
Machine shop turnings	7.50	5.00
Boiler plate	7.50	6.00
Heavy axle turnings	8.00	7.50
Cast borings	7.50	5.00
Steel borings	7.50	6.50
Wrought pipe	6.00	6.00
Steel axles	15.00	20.00
Axles, wrought iron	17.00	22.00
No. 1 machinery cast	....	17.00
Stove plate	....	13.00
Standard carwheels	....	16.00
Malleable	....	13.00
	Per Net Ton	
No. 1 mach'ry cast	$16.00	....
Stove plate	12.00	....
Standard carwheels	15.00	....
Malleable scrap	14.00	....

Birmingham

Tennessee Company Books 44,200 Tons of Southern Rail Order— Plates, Shapes, Galvanized Sheets Reduced $1

BIRMINGHAM, Dec. 3.—The movement of pig iron has declined to the smallest volume in weeks. This is partly due to reduced operations by pipe shops and other foundries in the district. The amount of carryover depends upon the length of the holiday shutdowns. Several inquiries for first quarter iron have been received from district consumers. A few small tonnages for first quarter delivery to outside points have been sold at $14. Prices for the district continue on the basis of $14.50. There have been no changes in furnace operations. Nine are on foundry, six on basic and one on rearburizing iron, a total of 16.

Prices per gross ton, f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil.	$14.50
No. 1 fdy., 2.25 to 2.75 sil.	15.00
Basic	14.50

Finished Steel.—The volume of incoming business is undiminished. In rails, railroad accessories, plates and bars, new business of the last two weeks of November was slightly ahead of that of the first two weeks. Declines were shown in wire and wire products, sheets and some of the lesser important lines. The Tennessee company shared in the new rail orders of the Southern Railway last week to the extent of 44,200 tons, including 11,000 tons of 130-lb. rails, 24,800 tons of 100-lb. and 8400 tons of 85 and 90-lb. Tank plates, structural shapes and galvanized sheets have been reduced $1 a ton. The former two items are now quoted at 2.05c. and the latter at 3.65c. All other prices are the same. Structural steel fabricators have several good projects in prospect for December. The Ingalls Iron Works Co. has booked 400 tons for the S. H. Kress Co. store at Durham, N. C. Reinforcing bar business is at the low point of the year. Active open-hearths total 19, one less than last week.

Cast Iron Pipe.—The American Cast Iron Pipe Co. has booked 800 tons for Los Angeles, Cal., and the McWane Cast Iron Pipe Co., 220 tons for the same city. Other sales last week were in lots less than 100 tons, and the aggregate was light. Plants here are bidding on a 6500-ton project at Detroit to be let this week and a 900-ton project at Memphis, Tenn., also to be closed this week. Richmond, Va., will open bids Dec. 5 for a fair-sized project, and St. Louis is expected to take bids within the next few weeks on several hundred tons. Demand is notably better than 10 days ago, and pressure pipe manufacturers expect continued improvement, with utilities and municipalities showing more interest in their 1930 requirements. It is estimated that operations are about 15 per cent less than they were 30 days ago. Base prices remain at $37 to $38 a net ton, Birmingham.

Old Material.—The movement of steel grades continues up to the average of the past several weeks, though it is light when compared with this time in previous seasons. Iron scrap is dull. Prices are unchanged.

Prices per gross ton, deliv'd Birmingham dist. consumers' yards:

Heavy melting steel	$13.00 to $13.50
Scrap steel rails	14.00
Short shoveling turnings	9.00
Cast iron borings	9.00
Stove plate	11.50 to 12.00
Steel axles	22.00
Iron axles	23.00
No. 1 railroad wrought	10.00 to 10.50
Rails for rolling	15.50
No. 1 cast	13.00
Tramcar wheels	12.50
Cast iron carwheels	13.00 to 13.50
Cast iron borings, chem.	13.50 to 14.00

Lewis-Shepard Co., Boston, has appointed the Lincoln Products Corporation, 31 Fulton Street, Newark, as distributers in northern New Jersey for jacklifts, arc-welded skid platforms and stackers for handling material into and out of storage.

Boston

Utility Companies to Buy 10,000 Tons of Pipe —Pig Iron Prices Unsettled

BOSTON, Dec. 3.—Pig iron buying continues small, but indications are business will be better this month. Two Buffalo district furnaces are offering No. 2X at $17 a ton, furnace, but so far have not offered No. 2 plain for less than that price. Furnaces east of Buffalo are meeting $17 a ton for No. 2X. Users of Southern iron are well covered. One Southern furnace is making low prices and foundries are using these as a lever on Northern iron prices. Recent sales included a fair tonnage of Indian iron at $21.50 to $22 a ton, duty paid, on dock here.

Foundry iron prices per gross ton deliv'd to most New England points:

*Buffalo, sil. 1.75 to 2.25	$21.91 to $22.91
*Buffalo, sil. 2.25 to 2.75	21.91 to 22.91
East. Penn., sil. 1.75 to 2.25	22.65 to 23.15
East. Penn., sil. 2.25 to 2.75	23.15 to 23.65
Va., sil. 1.75 to 2.25	25.21
Va., sil. 2.25 to 2.75	25.71
*Ala., sil. 1.75 to 2.25	24.11
*Ala., sil. 2.25 to 2.75	24.61
†Ala., sil. 1.75 to 2.25	20.25
†Ala., sil. 2.25 to 2.75	20.75

Freight rates: $4.91 all rail from Buffalo; $3.65 all rail from eastern Pennsylvania; $5.21 all rail from Virginia; $9.61 all rail from Alabama and $5.75 rail and water from Alabama to New England seaboard.
*All rail rate.
†Rail and water rate.

Cast Iron Pipe.—Activity centers in the sounding out of the market for an aggregate of 10,000 tons of pipe by five New England utility companies. Aside from the purchase of a car of 6-in. pipe and a car of 8-in. by Chelsea, Mass., from French pipe makers, no open municipal business was placed the past week. Westminster, Mass., will install a water system in 1930. Prices quoted openly on domestic pipe are: 4-in., $44.10 to $45.10 a ton, delivered common Boston freight rate points; 6 to 12-in., $40.10 to $41.10; 16 to 20-in., $39.60. A $4 differential is asked on Class A and gas pipe.

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars, small shapes	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway rounds	6.60c.
Norway squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tie steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold-rolled steel—	
Rounds and hex	*3.55c. to 5.55c.
Squares and flats	*4.05c. to 7.05c.
Toe calk steel	6.00c.
Rivets, structural or boiler	4.50c.

	Per Cent Off List
Machine bolts	50 and 5
Carriage bolts	50 and 5
Lag screws	50 and 5
Hot-pressed nuts	50 and 5
Cold-punched nuts	50 and 5
Stove bolts	70 and 10

*Including quantity differentials.

Reinforcing Steel.—Aside from a sale of 500 tons for a New Haven, Conn., job, the aggregate tonnage of billet steel bars sold the past week was again small. Prospects for business are a little brighter, however, as the Maine State Highway Commission will buy 300 tons; 200 tons is wanted for a Worcester, Mass., shoe shop addition, and 125 tons for a Cambridge, Mass., hospital addition, while 200 tons for a Boston electric lighting station and 150 tons for a Providence, R. I., bridge are still pending. The trade openly quotes 2.61½c. a lb., base, from stock on large tonnages of billet steel bars, and 3.16c. on small tonnages. The open market on rail steel bars is 2.26½c. a lb., base, delivered common Boston freight rate points.

Coke.—As anticipated, New England by-product foundry coke companies made no change in their price for December deliveries. It remains at $11 a ton, delivered within a $3.10 freight rate zone. November shipments were somewhat less than those for the corresponding month last year. Domestic coke is in good demand.

Old Material.—Business in scrap for domestic consumption the past week was practically at a standstill. Prices continue to ease off, some shading being noted on T rails, heavy melting steel, steel turnings, skeleton, shafting, axles and chemical borings. Easier prices on chemical borings are attributed to the holding up of shipments by consumers. A steamer with scrap rails and miscellaneous scrap cleared this port the past week for Genoa, Italy. A boat is now loading a similar cargo for Danzig.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$9.50 to $10.00
Scrap T rails	9.00 to 10.00
Scrap girder rails	8.50 to 9.00
No. 1 railroad wrought	10.50 to 10.75
No. 1 yard wrought	9.50 to 10.00
Machine shop turnings	5.50 to 6.00
Cast iron borings (steel works and rolling mill)	6.00 to 6.25
Bundled skeleton, long	8.25 to 8.50
Forge flashings	8.50 to 9.00
Blast furnace borings and turnings	5.50 to 6.00
Forge scrap	8.50 to 9.00
Shafting	13.50 to 14.00
Steel car axles	15.50 to 16.00
Wrought pipe 1 in. in diameter (over 2 ft. long)	9.00 to 9.50
Rails for rolling	11.00 to 11.25
Cast iron borings, chemical	8.75 to 9.00
Prices per gross ton deliv'd consumers' yards:	
Textile cast	$14.00 to $14.50
No. 1 machinery cast	15.00 to 15.25
No. 2 machinery cast	13.00 to 13.25
Stove plate	11.00 to 11.50
Railroad malleable	18.50 to 19.00

Cincinnati

Pig Iron Purchases Are Restricted to Immediate Needs—Sheet Demand About 50 Per Cent—Scrap Weak

CINCINNATI, Dec. 3. — Continued conservatism among district consumers of pig iron is restricting demand to a minimum. Purchases are small and for immediate needs. During the last week approximately 2500 tons of iron was sold, the bulk of which was in small quantities, generally carload lots, although a few orders of 100 tons or more were reported. A northern West Virginia consumer took 500 tons of Northern foundry iron and the Norfolk & Western Railroad bought 100 tons of the same grade. A Michigan consumer purchased 300 tons of charcoal iron. Price schedules on both Northern and Southern iron are being maintained, although one Southern furnace is reported to be granting concessions of 50c. The lack of inquiry either for immediate needs or for first quarter requirements reflects still further the quietness of this market and is causing some doubt as to any improvement in the near future.

Prices per gross ton, deliv'd Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25	$19.89 to $20.39
Ala. fdy., sil. 1.75 to 2.25	17.69 to 18.19
Ala. fdy., sil. 2.25 to 2.75	18.19 to 18.69
Tenn. fdy., sil. 1.75 to 2.25	17.69 to 18.19
S'th'n Ohio silvery, 8 per cent	26.89

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

Finished Steel.—New bookings of sheets in the past week were approximately 50 per cent of normal production, and operating schedules were at a rate about equal to the demand. Galvanized roofing material is still leading in current demand, although electrical manufacturers are taking a fair amount of sheets. With unfavorable weather holding up building projects, the demand for fabricated material is low and district fabricators are anxious for business.

Coke.—Movement of by-product foundry coke on contracts last month was approximately 20 per cent under

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and struc. shapes	3.40c.
Bars, soft steel or iron	3.30c.
New billet reinforc. bars	3.15c.
Rail steel reinforc. bars	3.00c.
Hoops	4.05c.
Bands	3.50c.
Cold-fin. rounds and hex	3.85c.
Squares	4.35c.
Black sheets (No. 24)	4.05c.
Galvanized sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.45c.
Structural rivets	3.85c.
Small rivets	65 per cent off list
No. 9 ann'l'd wire, per 100 lb.	$3.00
Com. wire nails, base per keg	2.85
Cement c't'd nails, base 100 lb. keg	2.85
Chain, per 100 lb.	8.75

	Net per 100 Ft.
Lap-weld steel boiler tubes, 2-in.	$16.50
4-in.	34.50
Seamless steel boiler tubes, 2-in.	17.50
4-in.	36.00

the level of October. Specifications so far this month are about on the same rate and, with the melt still light, oven representatives do not expect any marked improvement soon. Cold weather is stimulating the demand for domestic grades of coke.

Old Material.—Although no changes in dealers' schedules were made last week, dealers are leaning toward the bottom of price spreads in purchases. Further price recessions during the next week are anticipated. Mills are still curtailing shipments of scrap on contract, and business is small. The supply of most grades is ample.

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel	$12.25 to $12.75
Scrap rails for melting	13.00 to 13.50
Loose sheet clippings	8.00 to 8.50
Bundled sheets	10.75 to 11.25
Cast iron borings	8.25 to 8.75
Machine shop turnings	8.00 to 8.50
No. 1 busheling	10.00 to 10.50
No. 2 busheling	6.50 to 7.00
Rails for rolling	13.50 to 14.00
No. 1 locomotive tires	14.25 to 14.75
No. 2 railroad wrought	12.25 to 12.75
Short rails	17.50 to 18.00
Cast iron carwheels	12.50 to 13.00
No. 1 machinery cast	18.50 to 19.00
No. 1 railroad cast	15.00 to 15.50
Burnt cast	10.00 to 10.50
Stove plate	10.00 to 10.50
Brake shoes	10.00 to 10.50
Agricultural malleable	14.00 to 14.50
Railroad malleable	15.00 to 15.50

Youngstown

Valley Mills Operating at 55 to 60 Per Cent

YOUNGSTOWN, Dec. 3.—Iron and steel companies of the district, following an irregular month in November, entered December with production schedules between 55 and 60 per cent.

Both of the major independents, the Youngstown Sheet & Tube Co. and the Republic Iron & Steel Co., are maintaining this rate. The Sharon Steel Hoop Co. is operating all nine sheet mills at its Haselton plant in Youngstown, its open-hearth furnaces at Lowellville on a 50 per cent basis and its Sharon mills at 55 per cent.

Tin plate and strip capacity in this district is averaging 50 per cent, while independent bar mills and pipe mills are operating at 60 per cent. The outlook is that the industry will continue at this level for the remainder of the year. Sheet capacity in the Youngstown district is not engaged above 50 per cent. Of 51 independent open-hearth furnaces, 20 are active, while 50 of the 120 sheet mills are scheduled for partial engagement.

Japan May Buy Borneo Iron Ore

YOKOHAMA, JAPAN, Oct. 15.—An offer of iron ore from Borneo by a French company is being investigated by the Seitetsu Jo (Government Works), and the head of the Engineering Department of Kyushu Imperial University has been appointed to make a personal survey of the Borneo deposits and render a report as to the advisability of using supplies from that source.

Buffalo

Pig Iron Shipments Hold Up Well but New Buying Is Light —Steel Mill Operations Decline

BUFFALO, Dec. 3. — Although pig iron inquiry has dropped off considerably, shipments are keeping up remarkably well and producers are confident that late this month there will be a fair volume of inquiries for the first quarter. No extended buying movement is expected, however. Among current inquiries from consumers in the immediate Buffalo district is one for 400 tons of malleable; another is for 200 tons of foundry. An inquiry for 1500 to 2000 tons of foundry is expected shortly. The Y furnace of the Wickwire-Spencer Steel Co. has been blown in in place of the X furnace. The Lackawanna plant of the Bethlehem Steel Co. banked a furnace on Sunday, and now has four of its seven furnaces at that plant in operation.

Prices per gross ton, f.o.b. furnace:

No. 2 fdy., sil. 1.75 to 2.25	$19.50
No. 2X fdy., sil. 2.25 to 2.75	20.00
No. 1 fdy., sil. 2.75 to 3.25	21.00
Malleable, sil. up to 2.25	20.00
Basic	$17.50 to 18.00
Lake Superior charcoal	27.28

Finished Steel.—Operation of steel mills in this district has declined. The Lackawanna plant of the Bethlehem Steel Co. is operating at approximately 50 per cent of capacity, with 10 of its 22 open-hearths going, and mills either down entirely or on single turn. The Donner Steel Co. is operating three open-hearths about four days a week, and Seneca Iron & Steel Co. is at about 50 per cent capacity. A few small reinforcing bar jobs are being figured. The contract for school 67, which will require about 175 tons of rail steel, will be let this week. The remainder of the new City Hall reinforcing contract will be rail steel. There is almost an entire absence of structural lettings.

Old Material.—The market is very dull. No important transactions are noted. It is reported that one of the larger mills is out of the market for two months, having accumulated an exceptionally large stock pile. There appears to be a market for machine shop turnings, borings and turnings and cast iron borings, though one sizable order for cast iron borings was suspended recently. Premiums were paid in some instances for shipments of cast iron borings during November. One of the larger consumers of No. 1 machinery cast and stove plate continues to hold up shipments. The Michigan Central Railroad list closes Dec. 3, the Erie Dec. 4, and the Pennsylvania Dec. 4. The Pennsylvania list, which ordinarily includes about 10,000 tons of No. 1 heavy melting steel, will run about 2300 tons this month. Production of scrap in general has dropped off considerably.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$14.00 to $14.50
No. 2 heavy melting steel	12.50 to 13.00
Scrap rails	15.00 to 15.50
Hydraul. comp. sheets	12.50 to 13.00
Hand bundled sheets	11.00 to 11.50
Drop forge flashings	12.50 to 13.00
No. 1 busheling	12.50 to 13.00
Hvy. steel axle turnings	13.00
Machine shop turnings	8.00 to 8.50
No. 1 railroad wrought	11.50 to 12.00
Acid Open-Hearth Grades:	
Knuckles and couplers	17.00 to 17.50
Coil and leaf springs	17.00 to 17.50
Rolled steel wheels	17.00 to 17.50
Low phos. billet and bloom ends	18.00 to 18.50
Electric Furnace Grades:	
Short shov. steel turnings	10.75 to 11.25
Blast Furnace Grades:	
Short mixed borings and turnings	10.75 to 11.25
Cast iron borings	10.75 to 11.25
No. 2 busheling	8.00
Rolling Mill Grades:	
Steel car axles	17.00 to 17.50
Iron axles	20.00 to 21.00
Cupola Grades:	
No. 1 machinery cast	14.50 to 15.00
Stove plate	12.00 to 12.25
Locomotive grate bars	11.00 to 11.50
Steel rails, 3 ft. and under	17.75 to 18.00
Cast iron carwheels	12.00 to 12.25
Malleable Grades:	
Industrial	16.50 to 17.00
Railroad	16.50 to 17.00
Agricultural	16.50 to 17.00
Special Grades:	
Chemical borings	12.50 to 13.50

Detroit Scrap Weak

DETROIT, Dec. 3.—There have been no changes in the market on old material. The market is very weak. The few sales made are on the low side of the range.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Hvy. melting and shov. steel	$12.00 to $13.00
Borings and short turnings	8.00 to 8.50
Long turnings	7.50 to 8.00
No. 1 machinery cast	12.50 to 13.00
Automotive cast	11.50 to 12.00
Hydraul. comp. sheets	11.75 to 12.25
Stove plate	9.00 to 9.50
New No. 1 busheling	11.00 to 11.50
Old No. 1 busheling	9.50 to 10.00
Sheet clippings	8.00 to 8.50
Flashings	10.25 to 10.75

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and struc. shapes	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.95c.
Cold-fin. flats, sq. and hex.	4.45c.
Rounds	3.95c.
Cold-rolled strip steel	5.85c.
Black sheets (No. 24)	4.20c.
Galv. sheets (No. 24)	4.85c.
Blue ann'l'd sheets (No. 10)	3.50c.
Com. wire nails, base per keg	$3.60
Black wire, base per 100 lb.	3.75

American Electric Fusion Corporation, Chicago, has appointed the R. D. Thomas Co., Philadelphia, as agent for the company's spot, seam and tube welders.

Republic Iron & Steel Co. has leased offices in the new Lincoln Building, East Forty-second Street, for its New York headquarters. Company will move from 17 Battery Place next spring.

Railroad Equipment

Rock Island Buys 5000 Cars and Missouri Pacific 1000

WITH orders placed in the past week for almost 6700 cars and with fresh inquiries for a like amount, indications are that railroad equipment manufacturers will be busy during the winter months. The Rock Island has bought 5000 cars, the Missouri Pacific 1000 and the Chicago, Milwaukee, St. Paul & Pacific 300. The latter road also will buy 3050 cars and 30 locomotives. The Canadian National Railways are inquiring for 3225 cars. The Southern Pacific will spend $8,300,000 for new equipment, including 36 steam locomotives and 400 freight cars, while the New York, New Haven & Hartford will purchase 10 electric locomotives. Details of the week's business follow:

Chicago, Rock Island & Pacific has ordered 5000 freight cars, divided as follows: 1000 composite gondola cars to Pressed Steel Car Co.; 1000 automobile cars to Bettendorf Co.; 500 automobile cars to Standard Steel Car Co.; 1000 box cars to American Car & Foundry Co.; 500 box cars to General American Car Corporation; 500 box cars to Pullman Car & Mfg. Corporation; 250 stock cars and 250 flat cars to Ryan Car Co. This road is considering entering the market for passenger and baggage car equipment.

Missouri Pacific has ordered 1000 steel hopper cars from Standard Steel Car Co. and has 1250 box cars still to purchase.

Chicago, Milwaukee, St. Paul & Pacific has ordered 300 70-ton ore cars from Pressed Steel Car Co. This road will also buy 600 flat cars, 700 box cars, 1000 gondola cars, 750 stock cars, 15 freight locomotives and 15 passenger locomotives.

Great Northern has ordered 200 flat cars from Standard Steel Car Co.

Swift & Co., Chicago meat packers, are inquiring for 300 steel underframes for cars.

Atchison, Topeka & Santa Fe has ordered 100 tank cars from General American Tank Car Corporation.

New York, New Haven & Hartford has appropriated $3,500,000 to finance the purchase of 10 electric locomotives and 35 multiple-unit passenger cars and trailers.

Southern Pacific will expend $8,300,000 for new equipment to include 35 steam locomotives, two electric locomotives, 47 units of passenger train equipment, 400 freight cars, also cranes, ditchers and steam shovels. Company will build 60 caboose cars and 20 locomotive tenders in its own shops.

Canadian National Railways are inquiring for 3000 box, 200 refrigerator and 25 tank cars.

St. Louis-San Francisco has ordered 10 baggage-mail cars from American Car & Foundry Co.

St. Louis Southwestern will buy 10 4-8-4 type locomotives.

Chicago & North Western will buy one derrick car.

Otis Steel Contracts For Continuous Sheet Process

The Otis Steel Co., Cleveland, is planning for the erection of a continuous rolling mill for the manufacture of sheets and strip steel under the process controlled by the American Rolling Mill Co., Middletown, Ohio. The board of directors of the Otis company has authorized the closing of a contract with the Middletown company to use the latter company's rolling process.

Details of the plant extensions and equipment have not been worked out, but the Otis company plans to start on the construction work early in the year. The erection of plant additions and the new rolling equipment will involve an expenditure of $10,000,000, according to an announcement of E. J. Kulas, president of the Otis company.

Strong Aluminum Alloys for Warships

Since the weight of warships has been restricted to 10,000 tons displacement by the Limitation of Armament Conference, the weight-saving possibilities of aluminum have been of special interest to the United States Navy, says a recent bulletin issued by the Navy Department, Bureau of Engineering.

"Duralumin is a striking alloy," the bulletin continues. "In the wrought condition and when properly heat-treated it has the properties of structural steel with about one-third the weight." Acetylene welding of duralumin at the naval aircraft factory, at Philadelphia, has been developed to a satisfactory state. General methods of welding and of riveting duralumin sheet are also outlined in the bulletin.

Production, Shipments and Consumption

	October, 1929	September, 1929	October, 1928
Steel furniture shipments(a)	$2,971,004(b)	$2,333,984	$3,158,998
do., do., ten months	28,395,643	.....	29,071,961(c)
do., new orders(a)	2,855,588	2,290,133	3,192,927
do., unfilled orders(d)	2,067,212	2,055,457	2,095,139
Steel shelving shipments(a)	979,236	842,635	953,804
do., do., ten months	9,606,302(c)	.....	7,590,062
Electric power production(e)	8,685,131(c)	8,059,874	.....
Whereof, by water-power	2,724,872	2,471,369	.....
Coking coal consumed at by-product plants, net tons(f)	6,658,006	.....	6,098,028

(a) United States Department of Commerce. (b) Largest since last February. (c) Largest on record. (d) End of month. (e) United States Geological Survey; quantities are in thousands of kwhr. and represent output of public utility plants. (f) United States Bureau of Mines.

Reinforcing Steel

Awards Total 1400 Tons and Inquiries 3500 Tons

CONTRACTS for reinforcing steel in the past week totaled only 1400 tons. Inquiries appeared for 3500 tons, of which 1000 tons is for a freight terminal and warehouse at Hoboken, N. J. Awards follow:

NEW HAVEN, CONN., 500 tons, incinerator plant, to an unnamed fabricator.

CAMDEN, N. J., 125 tons, underpass at approach to Delaware River bridge, to Truscon Steel Co.

CLEVELAND, 110 tons, footings for National Town and Country Club, to Bourne-Fuller Co.

EAST MOLINE, ILL., 100 tons, school, to Laclede Steel Co.

ST. LOUIS, 100 tons, Coca-Cola bottling plant, to Laclede Steel Co.

ST. LOUIS, 100 tons, addition to Melbourne Hotel, to Missouri Rolling Mill Corporation.

OAKLAND, CAL., 350 tons, Sears, Roebuck & Co. building, to Soule Steel Co.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

AUGUSTA, ME., 300 tons for State Highway Commission.

WORCESTER, MASS., 200 tons, shoe plant addition.

CAMBRIDGE, MASS., 125 tons, hospital addition.

NEW YORK, 225 tons, power house at Hunter College.

CALDWELL, N. J., 240 tons, St. Dominick's Academy.

HOBOKEN, N. J., 1000 tons, additional unit for Pennsylvania Terminal & Warehouse Co.

NEWARK, N. J., 600 tons, warehouse for Lehigh Valley Transportation Co.

BUFFALO, 175 tons, rail steel for school No. 67.

LIMA, OHIO, 100 tons, depot.

CHICAGO, 200 tons, public school.

CHICAGO, tonnage being estimated, Chicago Yacht Club building in Grant Park.

CHICAGO, tonnage not stated, hotel at Wabash Avenue and Harrison Street.

SEATTLE, 200 tons, Fourteenth Avenue South bridge; general contract to Puget Sound Bridge & Dredging Co.

SACRAMENTO, CAL., 306 tons, highway work in Los Angeles County; bids Dec. 18.

Foundrymen's Non-Ferrous Shop Operation Course

A non-ferrous shop operation course for brass foundrymen, along the lines given in recent years for gray iron foundrymen, is part of the program for the next convention of the American Foundrymen's Association in Cleveland the week of May 12, 1930. The subjects to be dealt with will include crucible, open fire, and electric furnace melting practice, as well as the subject of gating and the effect of pouring temperatures and pouring practice. The course will be held at 4 p. m. during the days of the convention and each subject will be in charge of a leader who is an authority in each particular field. The chairman of the course is W. F. Graham, Ohio Brass Co., Mansfield, Ohio.

Distributing Employment at Youngstown

Part Time to Operating Men, While Extensive Repair Work Aids Others

STEEL companies at Youngstown are making every possible effort to distribute employment among as large a number of men as is feasible. In a period of restrained buying and operations, such as now exists, millwrights, electricians and repair crews are kept busy putting equipment in readiness for broader operations later on. This is requiring extra work at present because of the heavy strain upon rolling mills during the first eight months of the year.

Workers engaged in actual production are also provided for as much as possible. Where a mill operates only one shift, workers on all three shifts are given equal time. For example, on a rolling mill operating only the day shift, workers on the other two shifts divide the time with the day men. Thus, in a six-day week, each receives employment two days a week, whereas the day shift worker would receive six days' work and the men on the other shifts none, unless such a plan were used. Department heads and foremen in the plants are advised to distribute work so that the largest number of men benefit.

Frank Purnell President of Sheet and Tube Company

Directors of the Youngstown Sheet & Tube Co. on Tuesday elected Frank Purnell president, succeeding James A. Campbell, who becomes a chairman of the board, a newly created position. Since Jan. 1, 1927, Mr. Purnell has been assistant president and during the last few years has gradually assumed many of the responsibilities which formerly devolved upon Mr. Campbell. The changes become effective Jan. 1, 1930.

FRANK PURNELL

The directors also appropriated $2,000,000 for modernizations and replacements, chiefly in the Youngstown district, these sums to be expended in 1930. Regular dividends were declared.

Mr. Campbell, as chairman of the board, will continue to have general direction of the affairs of the company. Mr. Purnell is now 43 years of age and is one of the youngest steel company executives in the country. In 1902 he began his career in the industry, starting as a hall boy for the Sheet & Tube company. In August, 1917, he was "loaned" to the War Industries Board, and in 1919 became vice-president of the Consolidated Steel Corporation, New York, export representative of independent steel companies. In 1922 he was made vice-president of the Bethlehem Steel Corporation, in charge of its export department. He returned to the Sheet & Tube organization in September, 1923, as a vice-president, and on Jan. 1, 1927, was made assistant president.

Address Heat Treaters on Economics

"Economics of Heat Treating" will be the subject of Robert M. Keeney at the meeting of the New York Chapter of the American Society for Steel Treating, Monday evening, Dec. 9. Mr. Keeney is connected with the Connecticut Light & Power Co., Hartford and he has made a broad study of the application of various kinds of fuel besides electricity in the heat treatment of ferrous and non-ferrous products. The meeting will be held in the club rooms of the Building Trades Employers' Association, 2 Park Avenue, New York, and will be preceded by a dinner at the same place at 6.30.

The January meeting of the chapter will be held on Monday evening, Jan. 13, at which Dr. H. W. Gillett, director Battelle Memorial Institute, Columbus, Ohio, will be the speaker.

Steel Treaters Hear More About Nitriding

Nitriding, the new art of surface hardening of steel, featured the November meetings of three chapters of the American Society for Steel Treating. On Nov. 22 members of the Philadelphia, St. Louis and Washington-Baltimore Chapters met in separate meetings to learn more about nitriding from experts on the subject.

In Philadelphia, V. T. Malcolm of the Chapman Valve Mfg. Co., Indian Orchard, Mass., explained the commercial application of nitriding, in which he has gained considerable experience. Also on the Philadelphia program was John Hirsch, research metallurgist, Leeds & Northrup Co., Philadelphia. Mr. Hirsch's talk on "Controlling the Nitriding Operation," described the furnace mechanism which the speaker had adapted for the nitriding process.

Robert Sergeson, metallurgist with the Central Alloy Steel Corporation, Canton, Ohio, was the featured speaker at the St. Louis meeting. In a talk, illustrated with slides, Mr. Sergeson gave a survey of the accomplishments in the nitriding of steel and described the process.

Members of the Washington-Baltimore chapter met in Baltimore to hear Dr. Victor O. Homerberg, professor of metallurgy, Massachusetts Institute of Technology. Dr. Homerberg gave special emphasis to the practical aspects and use of nitriding.

Philadelphia Metal Jobbers to Merge Dec. 31

Carter, Donlevy & Co., Gummey, McFarland & Co., and Riter Brothers & Co., wholesale sheet metal distributers of Philadelphia, will be succeeded on Dec. 31 by a new organization to be known as the Eastern Metals Corporation.

The new company will be located in a commodious warehouse at 1736 to 1746 Frankford Avenue, with railroad siding, and all modern facilities. Large and diversified stocks of tin plate, metals, tools, machines and supplies will be carried.

Tin Plate Company Bought By Corrigan-McKinney

The N. & G. Taylor Co., Philadelphia, one of the oldest makers of tin plate in the United States, has been acquired by the Corrigan-McKinney Steel Co., Cleveland. For the past year and a half, William McLean, president, N. & G. Taylor Co., has been in charge, operating it for the creditors. Under the terms of the sale, the Corrigan-McKinney company will pay $300,000 for the plant and other assets and will incorporate a new company with the same name, which will issue 3000 shares of first preferred stock and 3250 shares of second preferred stock of $100 par value and 3500 shares of common stock of no par value. The stock and cash will be used to pay the obligations of the company.

The Taylor company has been in business since 1810, and until a year and a half ago, when financial difficulties were encountered, operated its main plant at Cumberland, Md., and a small plant in Philadelphia. At that time the Philadelphia plant was dismantled and removed to Cumberland, bringing the annual capacity of that mill to about 710,000 base boxes of tin plate. Present officers of the N. & G. Taylor Co. are William McLean, president, and J. H. Krupp, secretary and treasurer. Incorporation of the new company has not yet been completed.

Non-Ferrous Metal Markets

Copper Steady at 18c. But Buyers Wait for Concessions —Tin Dull—Zinc Price Down

NEW YORK, Dec. 3.

Copper.—Little has occurred in the past week to encourage producers. Buyers, especially in the foreign market, are continuing to press for a reduction in prices, but there is no indication that any substantial amount of electrolytic copper is available under 18c., delivered in the Connecticut Valley. In fact, the comparatively small tonnages which were offered at concessions in the past two weeks have been contracted for by those customers who were persistently hunting bargain lots and little, if any, material can now be obtained at less than 18c. However, the report has spread that after Jan. 1 the price will be cut by the large producers and consequently copper users are holding off making purchases until they see what happens. It is not surprising, under the circumstances, that sales have been meager and have consisted solely of small lots for delivery this month. Producers disclaim knowledge of a contemplated drop in quotations and declare that they can sell just as much copper at 18c. as at a lesser figure. The abstinence from buying on the part of foreign users is thought to have diminished their stocks almost to the vanishing point, so that they soon will be forced to place orders to cover immediate requirements. A comparable situation, however, does not exist in the domestic trade, because most customers have considerable material on hand and can well afford to await developments before making future commitments. November statistics are expected to show an increase in refined stocks, and this will tend to further weaken the position of producers. Curtailment of output, designed chiefly to correct the over-balance of supply as against demand, has been started, but probably will not be reflected in the monthly figures until January. Copper Exporters, Inc., is still quoting 18.30c., c.i.f. usual European ports. Orders for Lake copper have been light, with quotations steady at 18c. to 18.12½c., delivered.

Copper Averages.—The average price of Lake copper for November, based on daily quotations in THE IRON AGE, is 18.12½c., delivered New York. The average price of electrolytic copper is 17.75c., refinery, or 18c., delivered in the Connecticut Valley.

Tin.—With total sales scarcely ex-

THE WEEK'S PRICES, CENTS PER POUND FOR EARLY DELIVERY

	Dec. 3	Dec. 2	Nov. 30	Nov. 29	Nov. 27
Lake copper, New York	18.12½	18.12½	18.12½	18.12½	18.12½
Electrolytic copper, N. Y.*	17.75	17.75	17.75	17.75	17.75
Straits tin, spot, N. Y.	39.37½	38.75	39.75	39.75	40.37½
Zinc, East St. Louis	6.00	6.00	6.00	6.15	6.15
Zinc, New York	6.35	6.35	6.35	6.50	6.50
Lead, St. Louis	6.10	6.10	6.10	6.10	6.10
Lead, New York	6.25	6.25	6.25	6.25	6.25

*Refinery quotation; price ¼c. higher delivered in the Connecticut Valley.

Rolled Products
List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over.

Sheets—
- High brass ..... 23.25c.
- Copper, hot rolled ..... 26.75c.
- Zinc ..... 10.50c.
- Lead (full sheets) ..... 10.25c.

Seamless Tubes—
- High brass ..... 28.25c.
- Copper ..... 29.25c.

Rods—
- High brass ..... 21.25c.
- Naval brass ..... 24.00c.

Wire—
- Copper ..... 19.87½c.
- High brass ..... 23.75c.

Copper in Rolls ..... 26.75c.
Brazed Brass Tubing ..... 30.87½c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also to St. Louis on shipments to points west of that river.

- Sheets, 0 to 10 gage, 3 to 30 in. wide ..... 33.00c.
- Tubes, base ..... 42.00c.
- Machine rods ..... 34.00c.

Chicago Warehouse

(Prices Cover Trucking to Customers' Doors in City Limits)

	Base per Lb.
Sheets—	
High brass	23.25c.
Copper, hot rolled	27.75c.
Copper, cold rolled, 14 oz. and heavier	30.00c.
Zinc	10.75c.
Lead, wide	10.30c.
Seamless Tubes—	
Brass	28.25c.
Copper	29.25c.
Brass Rods	21.25c.
Brazed Brass Tubes	31.00c.

New York or Cleveland Warehouse

Delivered Prices, Base per Lb.

High brass	21.12½c.	to 22.12½c.
Copper, hot rolled, base sizes	27.75c.	to 28.75c.
Copper, cold rolled, 14 oz. and heavier, base sizes	30.00c.	to 31.00c.
Seamless Tubes—		
Brass	26.00c.	to 27.00c.
Copper	29.12½c.	to 30.12½c.
Brass Rods	18.87½c.	to 19.87½c.
Brazed Brass Tubes	29.12½c.	to 30.12½c.

New York Warehouse

Delivered Prices, Base Per Lb.

- *Zinc sheets (No. 9), casks* ..... 10.75c. to 11.25c.
- *Zinc sheets, open* ..... 11.50c. to 12.00c.

Metals from New York Warehouse

Delivered Prices, Per Lb.

- Tin, Straits pig ..... 41.50c. to 42.50c.
- Tin, bar ..... 43.50c. to 44.50c.
- Copper, Lake ..... 19.50c.
- Copper, electrolytic ..... 19.25c.
- Copper, casting ..... 19.00c.
- Zinc, slab ..... 7.00c. to 7.50c.
- Lead, American pig ..... 7.00c. to 7.50c.
- Lead, bar ..... 9.00c. to 9.50c.
- Antimony, Asiatic ..... 10.50c. to 11.00c.
- Aluminum No. 1 ingots for remelting (guaranteed over 99% pure) ... 25.00c. to 26.00c.
- Alum. ingots, No. 12 alloy ..... 24.00c. to 25.00c.
- Babbitt metal, commercial grade ..... 25.00c. to 35.00c.
- Solder, ½ and ½ ..... 27.50c. to 28.00c.

Metals from Cleveland Warehouse

Delivered Prices, Per Lb.

- Tin, Straits pig ..... 45.50c.
- Tin, bar 47.50c
- Copper, Lake ..... 19.50c.
- Copper, electrolytic ..... 19.25c.
- Copper, casting ..... 18.75c.
- Zinc, slab ..... 8.00c. to 8.25c.
- Lead, American pig ..... 7.00c. to 7.20c.
- Lead, bar ..... 9.25c.
- Antimony, Asiatic ..... 16.00c.
- Babbitt metal, medium grade ..... 18.00c.
- Babbitt metal, high grade ..... 48.00c.
- Solder, ½ and ½ ..... 29.50c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged consumers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	14.75c.	16.00c.
Copper, hvy. and wire	14.50c.	15.50c.
Copper, light and bottoms	12.50c.	13.50c.
Brass, heavy	8.00c.	9.00c.
Brass, light	6.75c.	7.75c.
Hvy. machine composition	11.25c.	12.25c.
No. 1 yel. brass turnings	9.00c.	9.50c.
No. 1 red brass or compos. turnings	10.50c.	11.75c.
Lead, heavy	4.75c.	5.25c.
Lead, tea	3.75c.	4.25c.
Zinc	3.25c.	3.75c.
Sheet aluminum	12.00c.	13.50c.
Cast aluminum	11.00c.	13.00c.

ceeding 700 tons, the Straits tin market has been exceptionally quiet in the past week. Buying has been mostly for delivery during the next three months, although a small amount of material is for March and April shipment. The London market has been very erratic, with wide swings in prices. For example, on Nov. 28 (Thanksgiving Day, when the New York market was closed) spot standard was £176 10s., future standard £179 10s. and spot Straits £180 10s. The following day the price advanced £3 5s. and on Dec. 2 dropped back £5 10s. Today there was another recovery, with spot standard at £177 15s., future standard at £180 15s. and spot Straits at £181 15s. The Singapore schedule today was £178 15s. Spot Straits tin at New York declined steadily during the past week until today it turned slightly upward to 39.37½c., New York. The reason that the London market broke yesterday was the announcement of the estimate of Straits tin shipments of 11,000 tons in December with 14,000 tons available. This is in addition to shipments of 10,174 tons in November, making altogether a large tonnage of tin to be absorbed by consumers. Usually at this time of the year, when tin plate prices are made public for the first half of the following year, there is good buying of tin, but the volume of purchases has been far below that of previous years. Dealers surmise that tin plate manufacturers have either liberal stocks on hand or are postponing placing orders to ascertain the trend of business.

Lead.—The market has been fairly active, with users ordering small quantities for delivery in December. In a few instances, business is being booked for January, but some sellers are refusing to make contracts for shipment after Dec. 31. Prices are firm at 6.10c., St. Louis. The leading interest is adhering to its contract quotation of 6.25c., New York.

Zinc.—Zinc prices broke the past week, dropping from 6.25c., East St. Louis, to 6.15c. and later to 6c. At times quotations dipped to 5.95c. and some orders were taken at that price. However, most of the tonnage available under 6c. has been sold and the market is becoming stabilized at 6c., East St. Louis, or 6.35c., New York. Buyers have manifested only slight interest, preferring to order small lots to meet immediate needs.

Antimony.—Quietness prevails in antimony. Chinese metal for spot and future delivery is 8.62½c., New York, duty paid, the same as a week ago.

Nickel.—Ingot nickel in wholesale lots is quoted at 35c. a lb., shot nickel at 36c. and electrolytic nickel in cathodes at 35c.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is selling at 23.90c. a lb., delivered.

Non-Ferrous Metals at Chicago

CHICAGO, Nov. 26.—Prices of copper, lead and antimony are holding steady in a quiet market. Quotations for tin are 3c. a lb. lower than a week ago and zinc prices also are off. The old metal market is dull.

Prices per lb., in carload lots: Lake copper, 18.50c.; tin, 39.75c.; lead, 6.10c.; zinc, 6.10c.; in less-than-carload lots, antimony, 9.50c. On old metals we quote copper wire, crucible shapes and copper clips, 14c.; copper bottoms, 11.50c.; red brass, 11.50c.; yellow brass, 8c.; lead pipe, 4.50c.; zinc, 3c.; pewter, No. 1, 24.50c.; tin foil, 22c.; block tin, 32c.; aluminum, 12.87½c.; all being dealers' prices for less-than-carload lots.

Fabricated Structural Steel

Awards, at 12,000 Tons, Are Lowest of Year—Chicago Post Office Will Require 25,000 Tons

THE total volume of fabricated structural steel awards in the past week was the lowest of the year, amounting to 12,000 tons. Most of the lettings consisted of small jobs ranging from 100 to 500 tons each. Of the 47,000 tons of new work which came out during the week, over 29,000 tons will be required for three projects in Chicago. The new Chicago post office will take 25,000 tons. Awards follow:

BOSTON & MAINE RAILROAD, 1000 tons, bridge at Windsor, Vt., to American Bridge Co.

PROVIDENCE, R. I., 250 tons, United States Rubber Co. vulcanizing plant, to J. H. Tower Iron Works, Providence.

NEW YORK, 950 tons, public school No. 102 in Bronx, to Easton Structural Steel Co.

NEW YORK, 1425 tons, apartment at Eighty-sixth Street and Madison Avenue, to Hay Foundry & Iron Works.

BROOKLYN, 300 tons, Kings County Bank, to George A. Just Co.

NEWARK, N. J., 1800 tons, garage, to American Bridge Co.

JERSEY CITY, 370 tons, Pennsylvania Terminal warehouse, to Bethlehem Steel Co.

SOUTHERN RAILWAY, 500 tons, Savannah River bridge, to Virginia Bridge & Iron Co.

DURHAM, N. C., 400 tons, S. H. Kress Co. store, to Ingalls Iron Works.

PITTSBURGH, 200 tons, addition to Boulevard of Allies, to Guibert Steel Co.

DETROIT, 200 tons, Richard School, to Guibert Steel Co.

CLEVELAND, 700 tons, Kinsman Road bridge for Nickel Plate Railroad, to McClintic-Marshall Co.

CLEVELAND, 100 tons, Dudley Blossom swimming pool, to Wheeling Structural Steel Co.

CHICAGO, BURLINGTON & QUINCY, 600 tons, divided between American Bridge Co. and Paxton & Vierling Steel Works, Omaha.

WHEATLAND, WYO., 300 tons, sugar refinery, to Midwest Steel & Iron Works Co., Denver.

GOSHEN, IND., 100 tons, factory for Chase Bag Co., New York, to Austin Co.

KEWAUNEE, WIS., 500 tons, highway bridge, to Milwaukee Bridge Co.

SEATTLE, WASH., 370 tons plates, Cedar River pipe line No. 2, to Beall Tank & Pipe Co.

BAKERSFIELD, CAL., 300 tons plates, one 85,000-bbl. tank for Petroleum Securities Co., to unnamed bidder.

OAKLAND, CAL., 100 tons, skating rink, to Judson-Pacific Co.

SACRAMENTO, CAL., 273 tons, crossing at California Park, to Dyer Brothers.

LOS ANGELES, 500 tons, plant for Pacific Iron & Steel Co., company to do its own fabricating.

LOS ANGELES, 430 tons, freight depot, Union Pacific Railroad Co., to Minneapolis Moline Power Implement Co.

PHOENIX, ARIZ., 172 tons, bridges on Holbrook-Lupton highway, to Kansas City Structural Steel Co.

WILMINGTON, CAL., 110 tons, condenser supports for Texaco, to Pacific Iron & Steel Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

NEW YORK, 1000 tons, Central Hanover Bank & Trust Co. building on Greenwich Street.

NEW YORK, 1500 tons, apartment building on West Sixty-sixth Street.

LANCASTER, PA., 500 tons, telephone exchange building; Central Construction Co., Harrisburg, Pa., general contractor.

RICHMOND, VA., 2500 tons, building for American Tobacco Co.; Wise-Granite Co., Richmond, general contractor.

PHILADELPHIA, 2600 tons, Eighth Street subway from Ridge Avenue to Walnut Street.

STATE OF NEW YORK, 500 tons, bridges for State highway department; bids taken Dec. 6.

EASTON, PA., 750 tons, building for Lehigh Telephone Co., John N. Gill, Philadelphia, general contractor.

PARKERSBURG, W. VA., 1000 tons, building for Viscose Co.

TOLEDO, OHIO, 1000 tons, building for Toledo University.

ROCK ISLAND, ILL., 1800 tons, 20 barges; bids being taken by United States Engineer, Rock Island.

SPRINGFIELD, ILL., 300 tons, addition to Monarch Tractor plant of Allis-Chalmers Mfg. Co.

CHICAGO, 25,000 tons, post office.

CHICAGO, 2500 tons, Wabash Avenue bridge.

CHICAGO, 1800 tons, Chicago Yacht Club building in Grant Park.

DENNISON, TEX., 950 tons, highway bridge; L. E. Meyer Construction Co., low bidder on general contract.

TERRAL, OKLA., 1150 tons, highway bridge; L. E. Meyer Construction Co., low bidder on general contract.

THACKERVILLE, OKLA., 1150 tons, highway bridge; L. E. Meyer Construction Co., low bidder on general contract.

SEATTLE, 1000 tons, Fourteenth Avenue South bridge; general contract to Puget Sound Bridge & Dredging Co.

LONG BEACH, CAL., 400 tons sheet piling; Steel, Inc., low bidder.

Rustless Iron Plant To Be Built at Pittsburgh

The Rustless Iron Corporation of America, Inc., Baltimore, has engaged Perin & Marshall, 11 West Forty-second Street, New York, consulting engineers, to prepare plans for a new mill in the vicinity of Pittsburgh.

PERSONAL

CHARLES M. SCHWAB, chairman of the board of directors of the Bethlehem Steel Corporation, will be the principal speaker at the annual banquet of the Indiana Manufacturers' Association, Dec. 16, at the Columbia Club, Indianapolis.

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HAROLD D. NORTH, vice-president and sales manager, Ferry Cap & Set Screw Co., Cleveland, has developed an international business in the manufacture of a projection screen for motion pictures which utilizes as the base an aluminum sheet.

—

R. W. HEFFNER has been elected vice-president in charge of operations of the Alan Wood Mining Co., not R. S. Poister, as stated in the Nov. 28 issue of THE IRON AGE.

—

E. W. PAGE, Victor X-Ray Corporation, Chicago, will address the Milwaukee chapter of the American Society for Steel Treating, Dec. 13, at Hotel Pfister, on "X-Ray Investigations."

—

B. D. QUARRIE, president, Oliver Iron & Steel Co., Pittsburgh, will act as toastmaster at a dinner and reception to be given at the Winton Hotel, Cleveland, Dec. 16, for Dr. WILLIAM E. WICKENDEN, new president Case School of Applied Science. Dr. Wickenden will speak on training engineers for positions of responsibility. The meeting will be held jointly by the Cleveland Engineering Society and the Cleveland section American Society of Mechanical Engineers.

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T. M. GIRDLER, formerly president Jones & Laughlin Steel Corporation, Pittsburgh, and now associated with the Mather-Eaton steel interests in Cleveland, has been elected a director of the Union Trust Co. of that city.

—

CHARLES STOLPER, president and treasurer, Stolper Steel Products Co., Milwaukee, manufacturer of sheet steel automotive parts, has relinquished all of his interest in the Charles Stolper Cooperage Co., to devote his time to the steel products lines, which comprise gasoline tanks, fenders, and similar parts.

—

R. SERGESON, metallurgist, Central Alloy Steel Corporation, Massillon, Ohio, addressed the Milwaukee section of the Society of Automotive Engineers, Dec. 4, on nitriding and other methods of hardening steel.

—

HUGH AIKMAN of J. H. Williams & Co., Buffalo, will address the Cincinnati chapter of the American Society for Steel Treating, Dec. 5, on "Drop Forging Methods and Equipment."

—

J. E. FLETCHER, who has had a long experience with the Northern Engineering Works, Detroit, has been appointed manager of the newly established Philadelphia office of the company.

—

C. E. PIOCH, formerly general master mechanic of the Chrysler Motor Corporation, has joined the staff of the Seneca Falls Machine Co., Seneca Falls, N. Y.

—

JAMES A. MEACHAM, for the past three years specification engineer for the H. K. Ferguson Co., Cleveland, has been made engineer in charge of inspection and research.

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J. T. MACKENZIE, metallurgist, American Cast Iron Pipe Co., Birmingham, was the principal speaker at the December meeting of the Quad-City Foundrymen's Association, held at the Chamber of Commerce, Davenport, Iowa, Dec. 2. Foundry practice was the subject of his address.

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HARRY R. NELSON, who has been associated with the Charles L. Anderson Machinery Co., Chicago, for the past 16 years, has joined the staff of the Tool Equipment Sales Co., Chicago, as mechanical engineer.

—

GEORGE W. DRIVER, heretofore assistant manager of the malleable plant at Buffalo of the American Radiator Co., has been promoted to the managership of the company's malleable and steel plants at Buffalo.

—

WILLIAM HAGUE of the Arter Grinding Co., Worcester, Mass., spoke on "European Steel Plants and Allied Industries," Dec. 4, at a meeting of the Worcester chapter of the American Society for Steel Treating.

Floyd K. Smith Elected Head of Donner Steel Co.

Floyd K. Smith, former vice-president and treasurer of the Donner Steel Co., has been elected president, succeeding William H. Donner, who recently resigned. Mr. Smith, who was born at Bayonne, N. J., studied at Cornell University and entered the steel business with the Buhl Steel Co. of Ohio. He became sales manager of the Buhl company and went from there to the Republic Iron & Steel Co. as a district sales manager. He later became a partner in Banning, Cooper & Co., Pittsburgh, brokers, and in 1910 acquired an interest in the Valley Mold & Iron Co., Sharpsville, Pa. He remained there until 1917, when he went with the Donner Steel Co. as vice-president and treasurer.

F. K. SMITH

W. W. HANCOCK

W. W. Hancock, secretary and director of the Donner Steel Co., has been elected vice-president. Mr. Hancock attended the University of Michigan and was later associated with William H. Donner at Donora, Pa. From 1912 to 1916 he was with the Cambria Steel Co. and in 1916 became a director and secretary of the Donner Steel Co. His duties included supervision of the iron ore department. During the war he was in the flying service as a flight lieutenant and instructor.

P. F. Boyer, comptroller of the Donner Steel Co., has been named treasurer, assuming the duties of this position along with the comptrollership. Mr. Boyer entered the steel business with the American Bridge Co. in 1907 and remained there until 1916, when he became associated with the Donner Steel Co.

The Danly Machine Specialties Co., 2104 South Fifty-second Avenue, Chicago, has been appointed by the Kinite Corporation, Milwaukee, as selling representative for the Chicago district, which includes Illinois, Missouri, upper Indiana and Iowa. The Danly Machine Specialties Co. will handle the sales of Kinite cast-to-shape dies as well as Kinite bar stock.

OBITUARY

CHARLES F. BLUE, JR., for a number of years vice-president of the Carbon Steel Co., Pittsburgh, and during the dissolution of that company in 1923 its head, died at his home in Oakmont, Pa., Nov. 26. Prior to joining the Carbon Steel Co. in 1916, Mr. Blue had been associated with the Crucible Steel Co. of America as manager of its Detroit office. With the completion of the dissolution of the Carbon Steel Co., he became associated with the Pittsburgh Iron & Steel Foundries Co. as vice-president and plant manager.

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ERIC WOLFF, designer of power and pumping plants and sales engineer with the Allis-Chalmers Mfg. Co., Milwaukee, for 17 years, and previously an engineer with the Minneapolis Steel & Machinery Co., Minneapolis, died in Milwaukee, Nov. 24, as a result of heart trouble, aged 63 years. He was born in Sweden and had engaged in engineering work since his arrival in the United States 30 years ago.

PETER C. QUACKENBUSH, president, Quackenbush & Son, Inc., dealer in iron and steel and heavy hardware, Paterson, N. J., died at his home in that city on Nov. 28, following a long illness, aged 61 years.

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FREDERICK G. LYNN, general superintendent of the Wood Newspaper Machinery Corporation, Plainfield, N. J., died on Oct. 29. He had also been general superintendent of the Plainfield plant of the Niles, Bement, Pond Co. for many years.

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JAMES W. MOFFAT, Canadian metallurgist, died at his home in Toronto, on Oct. 28, aged 69 years. At the time of his death he was engaged in research on a process which would be suitable for smelting Ontario ores.

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J. H. HOLLINGER, representative in Philadelphia of the Landis Tool Co., Waynesboro, Pa., died Nov. 18, aged 61 years. He had been connected with the Landis company for 32 years, most of the time at the plant in Waynesboro.

Confidence Restored Says President

(*Concluded from page* 1531)

dent Hoover explained. "Over 6400 planes are in commercial use, and 9400 pilots are licensed by the Government. Our manufacturing capacity has risen to 7500 planes per annum. The aviation companies have increased regular air transportation until it now totals 90,000 miles per day—one-fourth of which is flown by night. Mail and express services for passenger transportation to our principal cities, and extensive services for passenger transportation have been inaugurated, and others of importance are imminent. American air lines now reach into Canada and Mexico, to Cuba, Porto Rico, Central America, and most of the important countries of South America."

Stimulation of Shipbuilding

Construction loans for the building of ships have been made by the Shipping Board to the amount of approximately $75,000,000 out of the revolving fund authorized by Congress, the President said, and have furnished an additional aid to American shipping and further stimulated the building of vessels in American yards. It was stated that the Interdepartmental Committee on the Merchant Marine in its studies of ocean mail contracts found that they have aggregated 25 awards imposing a governmental obligation of a little over $12,000,000 per annum. Provision had been made in five of the contracts for construction of new vessels to replace and expand services. These requirements, the President said, come to a total of 12 vessels in the 10-year period, aggregating 122,000 tons. The committee at this time, it was pointed out, is recommending the advertising of 14 additional routes, making substantial requirements for the construction of new vessels during the life of each contract recommended. A total of 40 new vessels will be required, the President said, under the contracts proposed, about half of which will be required to be built during the next three years. The capital cost of this new construction, the President informed Congress, will be approximately $250,000,000, involving approximately 460,000 gross tons. Should bidders be found who will make these undertakings, the President said, it will be necessary to recommend to Congress an increase in the authorized expenditure by the Post Office of about $5,500,000 annually. It will be most advantageous, the President declared, to grant such authority.

An inspection trip to the Lorain plant of the National Tube Co. will be made Dec. 7 by members of the Cleveland Engineering Society and the Cleveland section, Association of Iron and Steel Electrical Engineers, this trip having been arranged jointly by the two organizations.

FitzGerald Laboratories Transferred to Canada

The FitzGerald Laboratories of Niagara Falls, N. Y., are to be transferred to Sault Ste. Marie, Ontario, Canada, as a result of an arrangement reached between Robert Turnbull, of Toronto, and J. A. McPhail, vice-president, Great Lakes Power Co. Work will be started at once on the erection of a building next to that of the Superior Alloys, Ltd., in which Mr. Turnbull is also interested. It will be ready for operation within a few months.

One of the most important problems to be tackled by the laboratory will be the making of the final tests in connection with the Turnbull process for the reduction of iron ore to sponge iron, which it is expected will make the low-grade iron ores of this province commercially available. For this purpose a furnace of semi-commercial size will be built in connection with the laboratories and the tests will be taken up at the point where they were interrupted by the recent death of F. A. J. FitzGerald, director of the laboratory and associate of Mr. Turnbull in several electrometallurgical enterprises. The new furnace will be utilized to work out refinements in the process, gather additional data as to costs, and so on. Algoma iron ore will be utilized.

A new company, to be known as the FitzGerald Laboratories of Canada, Ltd., will be formed, with Mr. Turnbull, James Kelleher, Niagara Falls, an associate of Mr. Fitzgerald, F. E. Kreusi, Chicago, and J. A. McPhail and A. E. Pickering, Sault Ste. Marie, as directors. Mr. Kelleher will be in charge, acting also as manager of the Superior Alloys, Ltd.

It is expected that the establishment of the laboratory here will lead to other electrochemical and metallurgical industries selecting this as a site for their operations The Sault was chosen partly because of the expected development of the iron and steel industry there and the existence of good shipping facilities and also the fact that the Great Lakes Power Co. agreed to take a substantial financial interest in the project.

To Improve Stove Operation

The Gary plant of the Illinois Steel Co. has made preparations to use fine, cleaned blast furnace gas in four high-efficiency hot blast stoves. Six disintegrators and eliminators, two washing towers, and the checker construction for four hot blast stoves have been purchased from H. A. Brassert & Co., Chicago.

The stoves embody the principles of continuous checker openings from top to bottom in vertical alinement, which permits inspection and gives effective heat transfer by gas and air traveling at equalized velocities through graduated checker openings.

Machinery Exports Far Above Last Year

Ten-Month Total Up 26 Per Cent to a New High Record—Imports Up Nearly One-Half Over 1928

WASHINGTON, Nov. 29.—Making an upturn of $6,203,857, exports of machinery of all kinds in October rose to a value of $53,188,403 from $46,984,546 in September. For the first 10 months they aggregated $515,597,664, an increase of $107,046,573, or 26 per cent, over the corresponding period of 1928, with a value of $408,551,091. A new high record for 10 months has been made, last year having had the previous record. Never before has a full calendar year reached so high a figure as $500,000,000. Exports for October of last year were valued at $43,208,872.

Exports of machinery and vehicles in October were valued at $90,053,421, a gain of $4,738,830 over those in September, valued at $85,314,591, but a decline of $4,753,616 from similar exports in October of last year, valued at $94,817,037. For the 10 months, however, exports of machinery and vehicles reached a total value of $1,045,129,849, reflecting an increase of $183,530,800, or 21½ per cent, over those in the corresponding period last year, valued at $861,599,049.

Exports of industrial machinery, as classified by the Division of Statistics, Department of Commerce, were valued at $24,090,870, an increase of $936,001 over those in September, valued at $23,248,731, and a gain of $4,029,088 over those in October of last year. For the first 10 months they were valued at $234,373,549, an increase of $51,286,565 over the like period of 1928, valued at $183,086,984.

Total exports of power-driven metal-working machinery in October were valued at $2,718,610, compared with $2,490,918 in October of last year. For the first 10 months they were valued at $27,869,772, compared with $21,508,167 in the corresponding period of last year. Exports of metal-working machinery, as listed in THE IRON AGE table, included 973 units, valued at $1,386,312, against 944, valued at $1,595,716, in September.

Imports of machinery and vehicles in October were valued at $3,636,532, compared with $3,115,744 in September and with $2,732,255 in October of last year. They made a sharp gain to $36,141,739 in the 10 months, against $23,927,027 in the corresponding period of last year. Imports of industrial, office and printing machinery in October were valued at $2,544,436, compared with $1,985,300 in September and $1,709,793 in October of last year. For the first 10 months of 1929 they were valued at $21,192,588, an increase of $6,261,183 over the same period of last year, at $14,931,405.

Imports of machinery, as listed in THE IRON AGE table, were valued at $2,648,455 in October, compared with $2,138,908 in September and with $2,161,169 in October of last year. For the 10 months they were valued at $27,421,980, an increase of $9,045,341, or 49 per cent, over those for the corresponding period of last year, valued at $18,376,639.

A striking feature of the October imports was the heavy increase in incoming shipments of metal-working machine tools, which rose to a value of $300,269, against $95,200 in September and only $34,552 in October of last year. For the first 10 months. imports of metal-working machine tools increased sharply to $1,204,679.

Imports of Machinery into the United States

(By Value)

	October		Ten Months Ended October	
	1929	1928	1929	1928
Metal-working machine tools..	$300,269	$34,552	$1,204,679	$467,799
Agricultural machinery and implements	467,338	322,955	7,927,726	4,074,807
Electrical machinery and apparatus	216,803	342,408	2,348,070	2,240,091
Other power-generating machinery	46,225	34,993	1,003,286	573,066
Other machinery	1,209,865	1,069,162	10,269,537	8,340,152
Vehicles, except agricultural ...	407,955	357,099	4,668,682	2,680,724
Total	$2,648,455	$2,161,169	$27,421,980	$18,376,639

Exports of Power-Driven Metal-Working Machinery

	October, 1929		September, 1929	
	No.	Value	No.	Value
Engine lathes.....	100	$227,454	86	$210,856
Turret lathes	28	101,257	47	140,537
Other lathes.....	82	181,306	110	183,492
Vertical boring mills and chucking machines	6	22,505	11	19,974
Thread-cutting and automatic screw machines	102	145,605	80	99,179
Knee and column-type milling machines...	53	122,461	53	141,800
Other milling machines	41	107,725	60	173,097
Gear-cutting machines	31	88,693	32	125,234
Vertical drilling machines	26	26,381	39	49,465
Radial drilling machines	8	26,567	7	21,798
Other drilling machines	228	51,584	155	44,620
Planers and shapers..	22	46,489	53	64,595
External cylindrical grinding machines..	124	116,673	89	185,962
Internal grinding machines	53	82,978	37	100,482
Metal-working tool-sharpening machines	64	38,634	85	34,625
Total	973	$1,386,312	944	$1,595,716

Machinery Exports from the United States

(By Value, in Thousands of Dollars)

	October		Ten Months Ended October	
	1929	1928	1929	1928
Locomotives	$132	$167	$3,165	$2,716
Other steam engines.....	64	65	656	772
Boilers	121	135	1,750	1,130
Accessories and parts....	116	64	827	527
Automobile engines.....	368	399	9,330	11,910
Other internal combustion engines	821	768	8,545	7,344
Accessories and parts....	313	259	3,691	2,999
Electric locomotives.....	99	28	608	1,157
Other electric machinery and apparatus.....	1,206	746	11,236	6,571
Excavating machinery...	491	519	6,825	6,865
Concrete mixers.....	96	108	1,250	903
Road-making machinery.	158	193	2,847	2,438
Elevators and elevator machinery	523	575	4,592	3,784
Mining and quarrying machinery	1,767	1,116	15,239	11,234
Oil-well machinery.....	2,493	2,005	21,482	12,896
Pumps	927	568	9,725	4,803
Bending and power presses	190	514	2,800	2,246
Power hammers.....	121	107	1,235	717
Machine tools*.....	2,408	1,869	23,825	18,544
Other metal-working machinery and parts.....	620	736	6,316	5,229
Textile machinery.....	1,108	953	11,024	10,686
Sewing machines.....	970	742	8,889	7,129
Shoe machinery.....	109	139	1,612	1,477
Flour-mill and gristmill machinery	46	43	547	378
Sugar-mill machinery....	689	574	3,883	3,869
Paper and pulp-mill machinery	323	326	3,264	2,570
Sawmill machinery.....	63	98	74	769
Other woodworking machinery	206	259	1,991	1,649
Refrigerating and ice-making machinery.....	1,261	638	13,523	7,720
Air compressors.....	705	690	6,571	5,698
Typewriters	1,838	1,638	19,723	17,298
Power laundry machinery	195	103	1,701	980
Typesetting machines....	344	518	4,892	3,889
Printing presses.....	454	607	5,617	5,060
Agricultural machinery and implements.....	10,451	9,046	120,176	99,228
All other machinery and parts	21,392	15,894	175,667	135,366
Total	$53,188	$43,209	$515,598	$408,551

*Details of principal items in another table.

Britain Absorbing Own Pig Iron Output

Continent Looking to Cartel Agreements—Japan to Buy Semi-Finished Steel—Export Rebates for Germany Are Higher

(*By Cable*)

LONDON, ENGLAND, Dec. 2.

THE bank rate reduction has induced pig iron consumers to operate rather more freely, although the market is generally inclined toward seasonal quietness and but little revival is expected before the new year. Cleveland makers are relying entirely on domestic business, as export orders are difficult to obtain. Current output, however, is being fully absorbed.

Hematite producers are well situated and obtaining more remunerative prices from domestic users, but export business is declining.

Finished steel is quiet and producers of heavy material, especially mills rolling for export and plate mills, are in need of orders. Domestic buying is fairly active, but insufficient to satisfy all makers.

Tin plate inquiry continues, but business is dull as a result of the slump in the tin market. Makers are well sold and not pressing for orders. Galvanized sheets are dull and prices easier with reduced production costs. Japan is buying moderately of light gage black sheets.

Clyde shipbuilding in November was nine vessels of 18,700 tons.

The Central Argentine Railway has placed orders for upward of 2000 passenger and freight vehicles with British builders.

Allen West & Co., electrical gear manufacturers, are negotiating for purchase from the Government of the Southampton Rolling Mills, erected for munitions production at a cost of more than £1,000,000, and idle since the end of the war.

Continental markets are awaiting the result of the International Steel Cartel meeting on Tuesday. Cartel members have already agreed to a minimum price on merchant steel bars for export of £5 5s. per ton (1.13c. per lb.), f.o.b. port, and agreements are expected on minimum prices for other finished materials. Meanwhile, the market is quiet, with semi-finished steel prices easy.

Luxemburg production in October was 259,000 tons of pig iron and 242,000 tons of raw steel. The Saar output in October was 179,000 tons of pig iron and 199,000 tons of raw steel.

German Export Rebates Increased

(*By Radiogram*)

BERLIN, GERMANY, Dec. 2.

DOMESTIC steel prices are unchanged, although the market shows a tendency to weakness and export prices have receded.

The Ingot Steel Syndicate has increased its price rebates to exporting manufacturers for the month of December, as the International Steel Cartel's recent reduction of 10 per cent in the production quota of members attained only temporary success in advancing prices.

At the coming meeting of the cartel the practicability of fixing minimum export prices for all member countries will be considered. It is confidently expected that both the International Steel Cartel and the German domestic syndicates will be renewed.

German output of pig iron and steel continues at one of the highest post-war levels, but domestic buying is slack and in export only the Scandinavian countries are buying heavily.

American Used Machinery Stocks in Germany

HAMBURG, GERMANY, Nov. 18.—Certain American exporters of used machinery have selected Frankfort-am-Main as a distributing point for equipment sold to Continental users. Sizable stocks of used metal-working machinery, motors, etc., have been collected at Frankfort for sale to users in Italy, Switzerland, France and Poland.

Japan to Buy Crude Steel

HAMBURG, GERMANY, Nov. 18.—Recently some substantial inquiries for semi-finished steel, especially billets and sheet bars, have been received here from Japan. Cabled inquiries in the past week have called for a total of more than 40,000 tons, but Japanese buyers are slow to place business. Wire rod inquiries from Japan are large.

British and Continental European Export Prices per gross ton, f.o.b. United Kingdom Ports, Hamburg and Antwerp, with the £ at $4.85

British Prices f.o.b. United Kingdom Ports

Cleveland No. 3 foundry	£3	12½s.	to	£3	13½s.	$17.58	to	$17.82
East Coast hematite...	3	18	to	4	1	18.94	to	19.64
Ferromanganese, export	12	5	to	13	0	59.42	to	63.05
Billets, open-hearth....	6	2½	to	6	5	29.71	to	30.31
Sheet bars, open-hearth	6	0	to	6	5	29.10	to	30.31
Black sheets, Japanese specifications	12	10				60.62		
Tin plate, per base box	0	18¾	to	0	19	4.54	to	4.60
Rails, 60 lb. and heavier	7	15	to	8	15	37.59	to	42.43
						Cents per Lb.		
Steel bars, open-hearth.	7	15	to	8	10	1.67	to	1.84
Beams, open-hearth....	7	2½	to	7	12½	1.55	to	1.65
Channels, open-hearth..	7	7½	to	7	17½	1.60	to	1.71
Angles, open-hearth....	8	2½	to	8	12½	1.76	to	1.86
Ship plates, open-hearth	7	12½	to	8	2½	1.66	to	1.76
Black sheets, No. 24 gage	10	0	to	10	5	2.17	to	2.21
Galvanized sheets, No. 24 gage	12	12½	to	12	15	2.73	to	2.76

Continental Prices, f.o.b. Antwerp or Hamburg

Foundry iron, 2.50 to 3.00 per cent sil.. 0.50 to 0.90 per cent phos.	£3	8s.	to	£3	11½s.	$16.49	to	$17.33
Foundry iron, 2.50 to 3.00 per cent sil.. 1.00 per cent and more phos.	3	7	to	3	8	16.24	to	16.49
Billets, Thomas.....	4	11	to	4	12	22.07	to	22.31
Sheet bars, Thomas....	4	10½	to	4	11	21.95	to	22.07
Wire rods, low C., No. 5 B.W.G.....	6	3	to	6	5	29.82	to	30.30
Rails, 60 lb. and heavier	6	8½	to	6	10*	31.16	to	31.52
Rails, light	6	1½				29.46		
						Cents per Lb.		
Steel bars, merchant...	5	5				1.13		
Steel bars, deformed...	5	4				1.12		
Beams, Thomas, British standard	5	1½	to	5	2½	1.10	to	1.11
Channels, Thomas, American sections...	5	13	to	5	17	1.24	to	1.26
Angles, Thomas, 4-in. and larger, over ⅜-in. thick.....	5	0	to	5	6	1.08	to	1.15
Angles, Thomas, 3-in...	5	6				1.14		
Ship plates, open-hearth inspected	7	2	to	7	5	1.54	to	1.57
Black sheets, No. 31 gage, Japanese	12	4				2.68		
Hoop and strip steel over 6-in. base.....	5	11½	to	5	12½	1.21	to	1.22
Wire plain, No. 8 gage	7	2½	to	7	3½	1.54	to	1.55
Wire, galvanized, No. 8 gage	8	12½	to	8	13½	1.87	to	1.88
Wire, barbed, 4-pt. No. 12 B.W.G.....	11	5	to	11	6	2.44	to	2.45
Wire nails, base.....	0	6¼				$1.54	per	keg
Wire nails, assortments 1 to 6-in. keg.....	10	6½				2.23		

*Open-hearth steel, 8s. ($1.94) per ton extra.

Machinery Markets and News of the Works

Month's Tool Sales Normal

Sentiment in the New York Machinery Trade Is Decidedly More Cheerful

ALTHOUGH machine tool buyers are showing an increasing conservatism in placing orders, November turned out to be about normal as business is measured at the end of the year.

Comparing it with the corresponding month of previous years, November established a favorable sales record; it suffers only when it is put alongside the high records of earlier months of the year.

Sentiment in the machinery trade in the New York district is decidedly more cheerful, a gain in both orders and inquiries being responsible for the feeling of optimism. In some centers throughout the country, however, a slow but steady recession in business has been interpreted as a forerunner of light business in December, a month which ordinarily is affected by a seasonal lull and by the end-of-the-year inventory period.

Deliveries on some lines of tools have shortened, but only in a few cases are builders able to promise shipment this month. Moreover, numerous plants still have enough unfilled orders to carry operations along at a satisfactory rate for at least the next 60 days.

Among the past week's tool buyers were the Standard Underground Cable Co., the Western Electric Co., the New York Central Railroad, a New Jersey printing press manufacturer, the Westinghouse company and the Thew Shovel Co., Lorain, Ohio. The United Engineering & Foundry Co., Pittsburgh, which is enlarging its Canton, Ohio, plant, has purchased four large turret lathes from a Cleveland company.

Users which recently have put out inquiries for tools include the United States Aluminum Co., Goodyear Tire & Rubber Co., the Illinois Steel Co., the Chicago & North Western, an independent steel maker and the Chicago, St. Paul, Minneapolis & Omaha.

New York

NEW YORK, Dec. 3.—Sentiment in the local machinery trade is decidedly more cheerful. Not only were orders slightly better in the past week than in the week before, but machine tool sellers received a considerable number of inquiries, and investigation of these established the fact that in practically all instances early purchases may be expected. It is pointed out that machine tool business is still very good; it suffers only by comparison with some of the high monthly records of earlier months of the year. November orders compared very favorably with the same month in other years. Deliveries have shortened on some lines of tools, but only in a few cases are shipments earlier than January being promised. Among the buyers of the week were the Standard Underground Cable Co., the Western Electric Co., the New York Central Railroad and a New Jersey printing press manufacturer.

Edwards & Co., 140th Street and Exterior Avenue, New York, manufacturer of time recording instruments, fire alarm apparatus, etc., has awarded general contract to Barney Ahlers Construction Corporation, 110 West Fortieth Street, for three-story addition, to cost about $80,000 with equipment.

Slee & Bryson, 160 Montague Street, Brooklyn, architects, will soon take bids on general contract for multi-story automobile service, repair and garage building, to cost more than $175,000 with equipment.

International Paper Co., 100 East Forty-second Street, New York, is acquiring property at Chatham, N. B., as site for new newsprint mill on which work will begin next year. Initial unit will have output of about 100 tons per day and will cost more than $2,500,000.

Board of Education, Tuckahoe, N. Y., plans installation of manual training equipment in new three-story high and grade school to cost about $600,000, for which bids are being asked on general contract until Dec. 10. Knappe & Morris, 171 Madison Avenue, New York, are architects.

National Biscuit Co., 85 Ninth Avenue, New York, has authorized an increase in capital from $85,000,000 to $145,000,000, part of fund to be used for expansion and improvement, including construction of additional baking plants and acquisition of existing plants.

Kohler Co., 711 Fifth Avenue, New York, manufacturer of sanitary ware, with main plant at Kohler, Wis., has awarded general contract to G. H. Fuller, Fuller Building, for six-story factory branch, storage and distributing plant at Long Island City, N. Y., to cost over $200,000 with equipment. Buchman & Kahn, 2 Park Avenue, New York, are architects.

Cities Service Co., 60 Wall Street, New York, operating electric light and power properties in different parts of country, as well as oil and gas properties, is arranging an expansion and improvement program to cost about $150,000,000, of which about $60,000,000 will be used for extensions in natural gas facilities, and close to like sum for extensions in oil properties, including pipe line construction, steamship transportation, etc.

Murray Klein, 65 Court Street, Brooklyn, architect, will soon take bids on general contract for one-story automobile service, repair and garage building, to cost about $100,000 with equipment.

Officials of United Aircraft & Transport Corporation, 51 Pine Street, New York, have organized United Airports of California, Inc., as a subsidiary. New company will take over airports of parent organization at Burbank Field, Los Angeles, and Pratt & Whitney Field, East Hartford, Conn.; it will also establish and operate airports in other parts of country, including servicing and repair facilities for aircraft.

United Electric Light & Power Co., 130 East Fifteenth Street, New York, has plans for a one-story addition to power plant at Locust Avenue and 134th Street, to cost over $100,000 with equipment.

Federal Shipbuilding & Dry Dock Co., Kearny, N. J., will carry out expansion and improvements at shipyard on Hackensack River, to provide in part for construction of larger vessels. Two large shipways will be built, with shops and equipment-handling facilities, elevating and conveying apparatus. Two existing shipways will be enlarged and improved, and additional mechanical shops provided. Entire program will cost over $200,000.

Ford Motor Co., Detroit, has awarded general contract to Turner Construction Co., 420 Lexington Avenue, New York, for new assembling plant at Edgewater, N. J., to replace present works at Kearny, N. J., lately sold to Western Electric Co. New plant at Edgewater will consist of main two-story unit, 360 x 1500 ft., and two one-story structures, each 50 x 113 ft., to cost over $1,000,000 with equipment. Albert Kahn, Inc., Marquette Building, Detroit, is architect and engineer.

Board of Education, 31 Green Street, Newark, will receive bids until Dec. 12 for machine shop and wood-working machinery, steel lockers and shelving, automobile shop equipment, exhaust fans, air compressors and pumps, electrical supplies, and other electrical and mechanical equipment. R. D. Argue is secretary.

M. Arthur Wolf, 845 Broad Street, Newark, architect, has plans for a three-story automobile service, repair and garage building, 160 x 200 ft., to cost about

$140,000, and will ask bids on general contract early next year.

Grasselli Chemical Co., Guardian Building, Cleveland, a subsidiary of E. I. duPont deNemours & Co., Wilmington, Del., manufacturer of industrial chemicals, etc., is considering expansion at plant at Grasselli, near Linden, N. J., to cost over $1,000,000 with machinery.

Philadelphia

PHILADELPHIA, Dec. 2.—R. D. Wood Co., 400 Chestnut Street, Philadelphia, manufacturer of hydraulic machinery and parts, automatic gas producers, etc., has taken bids on general contract for one-story machine shop, 100 x 240 ft., at plant at Florence, N. J., to cost more than $100,000 with equipment.

Shell Eastern Petroleum Products Co., Elverson Building, Philadelphia, a subsidiary of Shell Petroleum Corporation, Shell Building, St. Louis, has asked bids on general contract for new oil storage and distributing plant near Luzerne and D Streets, where tract was recently acquired, to cost about $125,000 with equipment. Plans have been filed for a pumping plant at that location, as well as for one-story automobile service and garage building. Headquarters are at 122 East Forty-second Street, New York.

Titgen-Eastwood Co., 3562 Salmon Street, Philadelphia, manufacturer of foundry equipment, has acquired one-story building, heretofore held by Quaker City Iron Works Co., and will develop as main plant. Structure has previously been occupied under lease. Quaker City company will retain building at Tioga and Edgemont Streets, adjoining, for foundry.

Crane Co., 212 South Thirteenth Street, Philadelphia, with headquarters at 836 South Michigan Avenue, Chicago, has taken bids on general contract for new factory branch and distributing plant, to cost more than $75,000 with equipment. Stearns & Woodnutt, Stephen Girard Building, are architects.

Alan Wood Mining Co., recently formed as subsidiary of Alan Wood Steel Co., Conshohocken, Pa., to operate iron ore properties at Wharton and Oxford, N. J., is arranging appropriation of more than $500,000 for extensions and improvements in properties, mill buildings and additional machinery.

Commissioner of Institutions and Agencies, State Office Building, Trenton, N. J., is asking bids until Dec. 16 for turbine-driven generators for New Jersey State Hospital at Hillsdale. William J. Ellis is commissioner.

United States Cast Iron Pipe & Foundry Co., Burlington, N. J., will soon take bids on general contract for two and three-story wing addition, 60 x 100 ft., to cost over $50,000. Ballinger Co., 105 East Twelfth Street, Philadelphia, is architect and engineer.

E. I. du Pont de Nemours & Co., Wilmington, Del., is arranging for expansion to cost about $25,000,000, including projects now under way, comprising a paper manufacturing plant for duPont Cellophane Co., at Old Hickory, Tenn.; extensions for duPont Ammonia Corporation, Belle, W. Va., and new unit for duPont Viscoloid Co., Leominster, Mass. Included in new program are additions to machine shops at Wilmington, used for manufacture of special machinery for subsidiary interests, to cost over $75,000. Work is under way on addition to experimental plant at Brandywine, Del., to cost $50,000 with equipment.

Board of Education, Chambersburg, Pa., is considering installation of manual training equipment in new two-story senior high school at Queen and Third Streets, to cost $275,000, for which bids will be asked on general contract early next year. Lawrie & Green, 821 North Third Street, Harrisburg, Pa., are architects.

Middleton-Hyde Mfg. Co., Philadelphia, recently organized by Harry C. Middleton, Jr., 324 Florist Street, and associates, is considering early operation of local plant for manufacture of hardware products. Mr. Middleton will be treasurer of company; John G. Hyde, 1432 North Seventeenth Street, will be one of company officials.

The Crane Market

MANY of the current inquiries for material handling equipment are for inventory purposes, or to obtain prices to be used in appropriations for next year. Certain companies in the market for overhead traveling cranes are delaying action until the beginning of the new year and some business in locomotive cranes is generally expected to carry over into January. The Standard Oil Co. of New Jersey, which has been inquiring for two 25-ton locomotive cranes for Bayway, N. J., has postponed purchase until the 1930 appropriation is available. The Anglo-Chilean Consolidated Nitrate Corporation, New York, in the market for a 25 and 35-ton locomotive cranes and two 5-ton cranes mounted on motor-trucks has not yet definitely decided upon the construction in Chile which would require these cranes.

Among recent purchases are:

Bethlehem Steel Co., Bethlehem, Pa., 25-ton, gasoline-driven locomotive crane for Buffalo from American Hoist & Derrick Co.

Davison Chemical Co., Baltimore, 25-ton, steam-driven locomotive crane reported purchased from Industrial-Brownhoist Corporation.

Beauharnois Light, Heat & Power Co., Montreal, two 30-ton locomotive cranes from Browning Crane Co.

Anaconda Copper Mining Co., 25 Broadway, New York, 10-ton, bucket handling gantry crane for Montana from Shaw Electric Crane Co.

Phoenix Utility Co., 71 Broadway, New York, 20-ton, 1-motor, overhead crane from Whiting Corporation.

Locomotive Finishing Material Co., Atchison, Kan., three electric overhead cranes from a Wisconsin builder.

Wyatt Co., Dallas, Tex., 15-ton overhead traveling crane from Whiting Corporation.

Mine La Motte Co., Bonne Terre, Mo., 10-ton, electric traveling crane from Manning, Maxwell & Moore, Inc.

Buffalo

BUFFALO, Dec. 2.—Officials of Sterling Range & Furnace Corporation, 524 Oak Street, and Co-Operative Foundry Co., 25 Lincoln Avenue, Rochester, N. Y., are organized new company under name of Sterling-Red Cross Corporation, to take over and consolidate both interests. New company will carry out expansion and improvement program.

Corning Glass Co., Corning, N. Y., manufacturer of special baking glassware, etc., has awarded general contract to H. K. Ferguson Co., Cleveland, for addition to plant to cost over $500,000 with equipment.

New York State Industrial School, Industry, near Buffalo, Dr. Andrew G. Johnson, superintendent, is planning construction of 14 trade school buildings at institution, each one story, for instruction in mechanical and building trades. A main unit is now in course of completion, to cost about $200,000 with equipment.

Joseph A. Firsching, Jr., 1631 Bennett Street, and Howard Brodt, 1201 Stark Street, Utica, have organized Joseph A. Firsching, Jr., Inc., and plan operation of local factory for manufacture of machinery and parts.

New York State Electric Corporation, Ithaca, N. Y., a subsidiary of Associated Gas & Electric Co., 61 Broadway, New York, is concluding arrangements for purchase of Delaware & Otsego Light & Power Co., Franklin, N. Y., and will consolidate. Plans are under way for expansion, including construction of transmission line to connect both systems.

Ogden R. Adams, Cutler Building, Buffalo, machine tool dealer, has been appointed district representative of Reisinger Machine Co., Rochester, N. Y., manufacturer of adjustable hollow mills.

New England

BOSTON, Dec. 3.—Some local machine tool dealers did an average business in November, but with the majority sales fell off. No new inquiries of importance have developed and those pending give no indication of closing until after Jan. 1. New England machine tool builders generally are active and well booked ahead.

American Brass Co., Waterbury, Conn., is taking bids on a one-story, shipping department addition, 43 x 64 ft. Conveying equipment is under consideraton.

Martin Trailer Co., Westfield, Mass., will erect a one-story plant, 80 x 100 ft., to cost $40,000 without equipment.

City of South Norwalk, Conn., closes bids Dec. 10 for a junior high school, which will include a manual training department, to cost $350,000.

Florence Stove Co., Gardner, Mass., has started work on a 30 x 90 ft. enameling furnace.

Wilcox, Crittendon & Co., Inc., Middletown, Conn., closes bids this week on a two-story foundry, 100 x 187 ft., with a one-story wing, 25 x 48 ft.

G. & O. Mfg. Co., New Haven, Conn., automobile radiators, etc., will shortly start work on a two-story and basement addition, 40 x 85 ft.

State Board of Education, Hartford, Conn., has plans for new trade school at Meriden, Conn., consisting of three-story L-shaped unit, 120 x 180 ft., with wing 60 x 60 ft. A machine shop, wood-working shop, plumbing shop and other mechanical departments will be installed. It will cost over $175,000 with equipment. Lorenzo Hamilton, Inc., Meriden, is architect.

Maine Seaboard Paper Co., recently organized by Walter S. Wyman, president, Central Maine Power Co., 317 Water Street, Augusta, Me., and associates, has authorized construction of new mill at Bucksport, Me., where property has been acquired. Plant will consist of several units and will cost more than $5,000,000. Company has also purchased about 400,000 acres of timberland in eastern part of State, and will develop for raw material supply.

Rice, Barton & Fales Co., Tainter Street, Worcester, Mass., manufacturer of paper-making machinery and parts, has awarded general contract to E. J. Cross Co., Worcester, for extensions and improvements, to cost about $25,000.

Taunton & New Bedford Copper Co., North Front Street, New Bedford, Mass., has asked bids on general contract for one and two-story addition, including improvements in present factory, to cost about $45,000 with equipment.

Superior Spring & Mfg. Co., 373 Washington Street, Hartford, Conn., will take bids at once for one and two-story addition, 60 x 128 ft., to cost about $36,000 with equipment. George L. Dunkelberger, Hartford, is architect.

Warren Foundry & Pipe Co., 201 Devonshire Street, Boston, will ask bids early next year for new pipe foundry, storage and distributing plant at Everett, Mass., to cost over $40,000 with equipment. French & Hubbard, 210 South Street, Boston, are architects.

Springfield Bronze & Aluminum Co., Page Boulevard, Springfield, Mass., has awarded general contract to Austin Co., Cleveland, for one-story addition, 82 x 142 ft., to cost about $45,000 with equipment.

Rising Paper Co., Housatonic, Mass., a subsidiary of Strathmore Paper Co., Mittineague, Mass., has plans for three-story finishing department addition, 75 x 180 ft., to cost more than $90,000 with machinery.

City Council, New Haven, Conn., has plans for municipal airport at Morris Cove, to include hangars, repair shops and other field units, to cost about $85,000 with equipment. Westcott & Mapes, 139 Orange Street, are architects and engineers.

Connecticut Broach & Machine Co., New London, Conn., has removed its manufacturing plant and offices from 376 Bank Street to 35 Pequot Avenue.

South Atlantic

BALTIMORE, Dec. 3. — Consolidated Gas, Electric Light & Power Co., Lexington Building, Baltimore, is arranging an expansion and improvement program to cost about $7,500,000, including extensions in generating facilities, transmission lines, underground conduits and other work. Company has plans for one-story addition to switching plant on Kloment Street, to cost about $50,000.

Eastern Rolling Mill Co., Sewer Road, Baltimore, has authorized an expansion and betterment program to cost about $325,000 with equipment, to be carried out over five months' period.

Washington Air Terminals Corporation, National Press Building, Washington, has plans for steel hangar, 100 x 135 ft., with repair and reconditioning facilities, at local airport, to cost more than $85,000 with equipment. Lockwood Greene Engineers, Inc., 100 East Forty-second Street, New York, is engineer.

Glamorgan Pipe & Foundry Co., Lynchburg, Va., has arranged for increase in capital stock for general expansion. S. M. Lloyd is president.

American Tobacco Co., Twenty-sixth and Cary Streets, Richmond, Va., has awarded general contract to Wise Granite & Construction Co., American National Bank Building, for new three and six-story factory at Richmond, 210 x 270 ft., to cost over $1,000,000, with power house, mechanical-handling, conveying and other equipment. J. E. Sirrine & Co., 215 South Main Street, Greenville, S. C., are architects and engineers.

Crown Oil & Wax Co., 200 South Eighth Street, Baltimore, will soon take bids for three-story automobile service, repair and garage building, to cost about $100,000 with equipment.

Victory Sparkler & Specialty Co., Elkton, Md., has leased factory of Bibbs Foundry Co., Port Deposit, Md., and will remodel for new branch plant for sparkler novelties of metal and other materials.

Washington Railway & Electric Co., Fourteenth and C Streets, N. W., Washington, will take bids on general contract for two-story motor bus service, repair and garage building, to cost about $200,000 with equipment.

Weston & Brooker Co., Grand Building, Columbia, S. C., has purchased quarry properties of A. T. Small, Macon, Ga., and is reported planning expansion, including installation of quarrying and other mechanical equipment.

Public Improvement Commission, City Hall, Baltimore, is considering construction of addition to Polytechnic Institute, with vocational training facilities, to cost $1,000,000, and will develop plans in connection with 1930 school expansion and improvement program. Herbert J. Leimbach is chief engineer, in charge.

Detroit

DETROIT, Dec. 2.—Detroit Stoker Co., 1510 East First Street, Monroe, has awarded general contract to Austin Co. for one-story unit, to cost about $35,000 with equipment. R. M. Dunbar, 4 South Front Street, Monroe, is architect.

Boyer-Campbell Co., Brush and Congress Streets, Detroit, tools, factory equipment and appliances, etc., is arranging for early removal to new four-story storage and distributing plant on Antoine Street, in course of construction, where operations will be expanded.

United States Rubber Co., 6600 East Jefferson Street, Detroit, will carry out expansion program at local mill and install additional equipment, to cost about $200,000. L. D. Tompkins is general manager of tire-manufacturing department. Headquarters are at Broadway and Fifty-eighth Street, New York.

City Commission, Kalamazoo, has leased part of Lindbergh Field, where city airport is now maintained, for construction of one-story airplane service and repair works, to cost more than $45,000 with equipment.

Board of Education, Harrison and Eighth Streets, Flint, is considering installation of manual training equipment in addition to Northern high school, to cost about $500,000, for which bids will be asked on general contract next spring. Malcolmson & Higginbotham, 1219 Griswold Street, Detroit, are architects.

Traveling ovens, power equipment, conveying machinery and other mechanical equipment will be installed in new plant, 80 x 200 ft., to be erected at Detroit by General Baking Co., 420 Lexington Avenue, New York, to cost over $800,000. C. B. Comstock, 122 East Forty-second Street, New York, is architect and engineer.

Plant and business of Century Boat Co., Manistee, have been acquired by new interests, headed by John A. Hacker, Detroit, which will take immediate possession. New company will be formed, retaining Century name, with capital of $300,000, to operate plant for production of outboard motor craft. Expansion and improvements are planned.

Dow Chemical Co., Midland, manufacturer of industrial chemicals, etc., will carry out expansion and install additional equipment. Company has arranged increase in capital, part of proceeds to be used for purpose noted, to cost more than $100,000.

Board of Education, Hamtramck, is considering installation of manual training equipment in two and three-story junior high school to cost about $750,000, for which bids will be asked on general contract in about 60 days. B. C. Wetzel & Co., Dime Bank Building, Detroit, is architect.

Public Lighting Commission, 174 East Atwater Street, Detroit, has awarded general contract to Martin & Kraussman Co., 955 East Jefferson Street, for extensions and improvements in former boiler station at East Atwater and Randolph Streets, four stories, 50 x 210 ft., to convert structure for equipment storage and distributing unit, with repair division, to cost $165,000. Smith, Hinchman & Grylls, Marquette Building, are architects.

Allied Die Casting Co. of America, Detroit, manufacturer of die cast automobile parts, has been incorporated by C. Sorenson, W. Friess and C. T. Fisher, and is in operation at 7420 Melville Street.

Pittsburgh

PITTSBURGH, Dec. 3.—November machine tool sales in this district declined somewhat, as compared with October, but were considered satisfactory in view of the uncertainty of general business conditions. Purchases were confined largely to single tools, and in many cases early delivery was urged, indicating that buyers are interested in taking care only of urgent needs. New inquiry is also lighter than early in the fall, and although the list of pending tools is still large, it is no longer increasing to any marked extent and some buyers have definitely postponed purchases until after the first of the year.

Westinghouse Electric & Mfg. Co., East Pittsburgh, has closed on the majority of tools on its fourth quarter list, but United States Aluminum Co. still has a number of items to buy on a supplementary list issued several weeks ago. Railroads are not buying as yet, but dealers hope to see a strong demand from the carriers in the near future.

Spang, Chalfant & Co., Inc., Clark Building, Pittsburgh, manufacturer of welded and seamless tubular products, has plans for extensions and improvements in plant at Etna, Pa., including electrification of works. Present isolated power plant will be discontinued. New one-story units will be built and additional machinery installed, to cost about $450,000.

Oliver Iron & Steel Corporation, 1001 Muriel Street, Pittsburgh, has plans for a one-story addition, to cost about $40,000 with equipment.

Sutton Engineering Co., Bellefonte, Pa., manufacturer of mechanical products, is considering construction of one-story machine shop, reported to cost about $45,000 with equipment. E. T. Risen is general manager.

Brockway Machine Bottle Co., Brockway, Pa., will carry out expansion at plant, including one-story additions, 90 x 160 ft., and 50 x 100 ft., to cost about $80,000 with equipment.

Blaw-Knox Co., Blawnox, Pittsburgh, has begun an expansion and betterment

program at local mill, to include installation of additional equipment, to cost about $250,000. An addition will be built to plant of Lewis Foundry & Machine Co., Groveton, recently acquired.

West Virginia Coal & Coke Co., First National Bank Building, Huntington, W. Va., is arranging for expansion at coal-mining properties at Logan, W. Va., including construction of new steel tipple at Mine 45, installation of conveying, dumping and other equipment at Omar mine, where a wire-rope haulage system, mine cars and other machinery will be installed. Entire program will cost more than $100,000. T. A. Stroup is chief engineer in charge.

M. Nirdlinger, Empire Building, Pittsburgh, architect, has plans for automobile service, repair and garage building, to cost about $140,000 with equipment.

Mill Creek Coal & Coke Co., Maybury, W. Va., is considering rebuilding tipple at local Elkhorn colliery destroyed by fire Nov. 25.

Chicago

CHICAGO, Dec. 3.—Both new buying and fresh inquiries continue to taper. However, dealers, in summing up business for November, find the total volume to be near their estimate of normal for this time of year. Of considerable importance in gaging the present market is the fact that cancellations of existing orders have been made only in a few unimportant cases. It is quite noticeable that buyers are much less insistent on deliveries than at the time orders were signed. Agricultural machinery manufacturers are still in the market, but are paying closer attention to orders placed.

Illinois Steel Co. is expected to issue a sizable list for a new machine shop. An independent steel producer is in the market for a radial drill and a planer. Chicago & North Western will buy two rotary shears, one for ½-in. and one for 1-in. plate. Chicago, St. Paul, Minneapolis & Omaha will purchase an 18-in. lathe, an 18-in. motor-driven grinder and a 36-in. drill.

Edgar T. Ward Sons & Co., 1455 West Thirty-seventh Street, Chicago, headquarters at Pittsburgh, has plans for a one and two-story factory branch, storage and distributing plant, to cost about $120,000 with equipment. A. Epstein, 2001 Pershing Road, is architect and engineer.

Utilities Power & Light Corporation, 327 South LaSalle Street, Chicago, operating electric light and power utilities in different parts of country, is arranging an expansion and improvement program to cost about $60,000,000, including completion of new steam-operated electric power plants of subsidiary companies, extensions in transmission lines, as well as expansion in gas properties and other work.

Grant Storage Battery Co., 226 North Second Street, Minneapolis, Minn., manufacturer of electric storage batteries, has awarded a general contract to August Cederstrand & Co., 966 Central Avenue, for a one-story addition, 200 x 300 ft., to cost about $100,000 with equipment. O. L. Schultz is president and treasurer.

Laurel Oil & Refining Co., Laurel, Mont., recently organized, has approved plans for a new refinery on local site for production of fuel oil, gasoline, road oil, asphalt and affiliated by-products. Initial plant will cost close to $850,000 and will be ready for service in spring. Smith Engineering Co., 107 West Linwood Boulevard, Kansas City, Mo., is engineer. Alfred J. Diescher, formerly vice-president and general manager of Empire properties of Cities Service Co., 60 Wall Street, New York, heads new organization.

Illinois Steel Co., 208 South La Salle Street, Chicago, has plans for a one-story machine shop, 50 x 300 ft., at South Chicago works, to cost $250,000 with equipment. L. C. B. Holmboe is company architect.

Northern Pacific Railway Co., 176 East Fifth Street, St. Paul, Minn., has awarded general contract to E. G. Evensta Co., 2135 California Street, N. E., Minneapolis, Minn., for additions to engine house with shop facilities at Mandan, N. D., to cost about $70,000. O. M. Regnan is company architect.

Charles A. Olson & Son, Inc., 2945 Pillsbury Avenue, Minneapolis, manufacturer of commercial automobile bodies, has asked bids on general contract for a one and two-story plant unit, to cost about $40,000 with equipment. C. J. Bard, Builders' Exchange, is architect.

International Harvester Co., 606 South Michigan Avenue, Chicago, will soon begin erection of two-story and basement factory branch and distributing plant at Sioux City, Iowa, 150 x 225 ft., to cost about $150,000 with equipment.

Gerrard Co., Inc., Cicero, Ill., manufacturer of wire-tying machinery, has started construction of a two-story factory and office building, 130 x 250 ft., at 2915 West Forty-seventh Street, Chicago. Mundie & Jensen are architects.

Milwaukee

MILWAUKEE, Dec. 3.—Machine tool buying is slowly increasing after a lull which was at no time pronounced. Inquiries are also more frequent and come from various industries. Jobbing machinists are in the market to a much greater extent than recently. Improvement in deliveries of machine tool is noted by some builders. Manufacturers of large tractors and excavating equipment are operating at close to capacity and output is being gradually increased by makers of automobiles, automotive equipment, farm implements and small tractors.

Davis & Thompson Co., Fifty-seventh Avenue and Mitchell Street, West Allis, Wis., manufacturer of drilling, milling, pipe-threading and special machines, reports orders sufficient to keep plant operating at capacity until June. Recent business includes special machines for Soviet Government's tractor plant.

Trane Co., LaCrosse, Wis., manufacturer of heating specialties, plans expansion through an increase of capital stock from $600,000 to $800,000.

Portage Mfg. Co., Portage, Wis., manufacturer of ice cream freezers, vacuum cleaners and other household specialties, recently incorporated for $125,000, has begun manufacturing operations in temporary quarters at 2718 Atwood Avenue, Madison, Wis., pending completion of plant at Portage, construction of which will begin in spring. J. E. Hoffman, of Hoffman Mfg. Co., Chicago, is designer of some products and is active in new company.

John Deere Plow Co., Moline, Ill., has let contract to John Hunzinger Construction Co., 144 East Wells Street, Milwaukee, for a five-story warehouse and office building, and one-story loading platform, 26 x 102 ft.

Briggs & Stratton Corporation, Milwaukee, manufacturer of automobile ignition switches, window lifters, air compressors and gasoline engines, announce expansion in its line of portable gasoline engines through production of a 2-hp. high-speed engine weighing 40 lb., built largely of aluminum, also a new 3-hp. light-weight motor.

Young Radiator Co., Racine, Wis., is planning to double its manufacturing capacity by installation of additional equipment and by augmenting its personnel. Company, of which F. M. Young is president, makes industrial type internal combustion engine cooling radiators for trucks, power units and industrial machinery, hot water automobile heaters and new type forced draft heating units for factories and buildings.

Cincinnati

CINCINNATI, Dec. 2.—Sales of machine tools the past week were well below the average weekly volume of the past three or four months. A number of contracts are pending on which buyers have received quotations, but have not yet signified any immediate intention of closing. Among these is one from the Russian Government for a quantity of lathes, on which quotations were submitted sometime ago. While inquiry is in fair volume, it is not as brisk as two weeks ago. District plants are operating on good schedules and no slackening of production is anticipated for some time.

Cincinnati Engineering Tool Co., 4659 Spring Grove Avenue, Cincinnati, has awarded general contract to Fisher-Devore Construction Co., Dixie Terminal Building, for one-story unit at Knowltons Corner, to cost about $45,000 with equipment.

Dayton Rubber Mfg. Co., Dayton, Ohio, manufacturer of automobile tires, mechanical rubber goods, etc., is considering purchase of site at Los Angeles for new branch plant, to cost more than $1,000,000 with machinery.

Smith Agricultural Chemical Co., Columbus, Ohio, fertilizer products, has awarded general contract to Middle States Construction Co., 1183 Essex Avenue, for a one-story storage and distributing plant, to cost about $40,000 with equipment. Improvements will also be made in present plant.

Nashville Gas & Heating Co., 226 Sixth Avenue, North, Nashville, Tenn., a subsidiary of United Gas Improvement Co., 1401 Arch Street, Philadelphia, is arranging for expansion to cost about $370,000, including increased gas-generating facilities, storage and distributing units.

Prichett-Thomas Co., Stahlman Building, Nashville, Tenn., has broken ground for new multi-story automobile service, repair and garage building, to cost about $400,000 with equipment. Marr & Holman, Stahlman Building, are architects.

Procter & Gamble Co., Gwynne Building, Cincinnati, has acquired property at Long Beach, Cal., for early construction of new plant for Pacific Coast trade, to cost about $5,000,000 with machinery. Work is in progress on similar plant at Baltimore.

North American Utilities Co., Madisonville, Ky., recently formed by W. B. Doty, Madisonville, and associates, is planning construction of artificial gas plant near Paris, Tenn., to cost about $100,000 with

equipment. Company plans pipe lines for service at Mayfield and Fulton, Ky., and vicinity.

Brown Wood Preserving Co., Louisville, recently formed as a subsidiary of W. P. Brown & Sons Lumber Co., Louisville, will install a boiler plant in connection with wood-treating and preserving plant at Highland Park, also storage tanks, pumps, air compressors, etc., as well as conveying and elevating equipment. Entire project will cost over $1,000,000 with equipment. J. Graham Brown is president. Grant B. Shipley, Koppers Building, Pittsburgh, is consulting engineer.

Board of Education, Norwood, Ohio, is considering installation of manual training equipment in addition to junior high school to cost $300,000. Charles F. Collarius, St. Paul Building, Cincinnati, is architect.

Cleveland

CLEVELAND, Dec. 3.—While the volume of machine tool business has shown a considerable decline recently, there is still quite a little activity. The United Engineering & Foundry Co., Pittsburgh, which is enlarging its Canton, Ohio, plant, purchased four large turret lathes the past week from a Cleveland dealer, involving an expenditure of about $50,000. The Thew Shovel Co., Lorain, added to its recent purchase a 42-in. boring machine and is inquiring for a 27-in. lathe. This company may buy one or two additional machines early in the year. The Goodyear Tire & Rubber Co., Akron, has an inquiry out for two small machines.

November sales showed quite a falling off as compared with October and little activity is looked for in December. However, quite a few plants in various metal-working industries are considering the purchase of new equipment, but are deferring placing orders until January.

E. I. Du Pont de Nemours Co., Wilmington, Del., has awarded a contract to Austin Co., Cleveland, for a one-story machine shop, 90 x 197 ft., to cost about $75,000.

Hammond Mfg. Co., 7808 Kinsman Road, Cleveland, manufacturer of drilling machinery, will erect a new one-story factory, 75 x 129 ft.

Strong, Carlisle & Hammond Co., Cleveland, has been given exclusive sales agency in Cleveland territory for line of milling machines made by Kempsmith Mfg. Co.

General Fireproofing Co., Youngstown, plans to start operating this month a new plant to manufacture aluminum office chairs.

Firestone Tire & Rubber Co., Akron, Ohio, has authorized expansion and improvements at branch mill at Los Angeles, to cost about $2,500,000 with machinery. Work is scheduled for completion within 60 to 90 days. Company has plans by Lockwood Greene Engineers, Inc., Hanna Building, Cleveland, for three-story factory branch, service and distributing plant at Toledo, Ohio, to cost about $200,000 with equipment.

Atlas Steel & Supply Co., 4401 Trumbull Avenue, Cleveland, has asked bids on general contract for three-story addition to storage and distributing plant, to cost more than $65,000 with equipment. Walter J. Wefel, 5716 Euclid Avenue, is architect.

Thew Shovel Co., Lorain, Ohio, manufacturer of steam and gasoline shovels, etc., is planning expansion to cost about $100,000 with equipment.

Youngstown Radio, Lamp & Novelty Co., Scienceville Road, Youngstown, Ohio, will ask bids on general contract early in January for one and two-story addition, to cost about $25,000 with equipment. Zenk & Campbell, 120 Wood Street, are architects.

St. Louis

ST. LOUIS, Dec. 2.—J. R. Brockman Mfg. Co., 617 North Second Street, St. Louis, manufacturer of pipe, pipe bends, etc., is considering one-story plant unit at 3806-16 Market Street, to cost over $80,000 with equipment.

Hoffman Aircraft Co., 1010 Pine Street, St. Louis, has plans for a one-story steam power plant, 30 x 40 ft., at Anglum, Mo., airport, to cost about $35,000 with equipment. B. Russell Shaw, Arcade Building, is architect.

Fremont Foundry & Bearing Works, Inc., 1338 West Fifth Place, Oklahoma City, Okla., will build a one-story factory branch, service and distributing shop at Tulsa, Okla., with facilities for repair of mechanical equipment used in oil field operations, to cost about $25,000 including equipment.

Edward J. Peters, Elks Building, Shawnee, Okla., architect, has awarded general contract to Tankersley Construction Co., Cotton Exchange Building, Oklahoma City, for three-story and basement automobile service, repair and garage building, 125 x 160 ft., at Oklahoma City, to cost about $120,000 with equipment.

Hussman-Ligonier Co., 911 North Broadway, St. Louis, manufacturer of electric refrigerating equipment, etc., has purchased Gustav J. Gruendler Mfg. Co., 814 North Broadway, manufacturer of commercial electric refrigerator units, and will consolidate. Different units include company last noted, Hussman Refrigerator Co., and Ligonier Refrigerator Co., as well as Steiner Mfg. Co., address stated. Expansion is planned in different types of electrically-operated refrigerator equipment. A subsidiary has been formed under name of Allied Store Utilities Co., for sales and distribution.

Springfield Tablet Mfg. Co., 300 North Jefferson Street, Springfield, Mo., manufacturer of commercial paper products, has asked bids on general contract for two-story L-shaped factory, 60 x 120 ft., with one-story unit adjoining, 50 x 60 ft., to cost more than $75,000 with equipment. Baldwin & Baldwin, Magnolia Building, Oklahoma City, Okla., are architects.

Shell Development Co., affiliated with Shell Petroleum Co., Shell Building, St. Louis, has acquired 135-acre tract near Long Beach, Cal., as site for new nitrogen fixation plant, for which plans will be prepared at once. Initial unit will be equipped with electrically-operated machinery, and will cost about $250,000. Entire project will cost over $1,000,000 with equipment.

All-Steel Products Mfg. Co., 300 South Wichita Street, Wichita, Kan., has awarded general contract to Aaron Wilson, 217 South Terrace Drive, for one-story plant to cost about $40,000 with equipment. Ted Mason, Miller Theater Building, is architect.

Moon Motor Car Co., 4400 North Main Street, St. Louis, has purchased plant rights and property of Ruxton front-drive automobiles, heretofore held by New Era Motors, Inc., St. Louis, and will arrange for early production at local plant, where manufacture will be concentrated in future.

Mine-LaMotte Co., Bonne Terre, Mo., has purchased a 42 in. x 21 ft. motor-driven Putnam lathe from Manning, Maxwell & Moore, Inc.

Missouri Pacific Railroad has purchased a locomotive crankpin grinder and a Monarch 24 in. x 14 ft. geared-head motor-driven heavy-duty geared-head lathe.

Gulf States

BIRMINGHAM, Dec. 3.—Contract has been let by Motor Tool Specialty Co., 2119 Commerce Street, Dallas, Tex., to Cowdin Brothers, Dallas, for one-story plant, 50 x 100 ft., to cost about $25,000 with equipment.

Texas Milk Products Co., Marshall, Tex., has asked bids on general contract for one-story milk processing plant at Mount Pleasant, Tex., to cost about $175,000 with equipment.

Crane Co., 836 South Michigan Avenue, Chicago, has taken bids on general contract for a factory branch, storage and distributing plant at Jacksonville, Fla., three stories, 100 x 105 ft., to cost about $100,000 with equipment.

Perry Burrus Elevators, Inc., Dallas, Tex., has authorized addition to local grain elevator, to include elevating, conveying, screening and other equipment, to cost over $1,000,000 with equipment.

West Texas Utilities Co., Abilene, Tex., is arranging an expansion and improvement program to cost about $5,000,000, including increase in generating facilities, power substations, transmission lines and other work.

State Highway Department, Austin, Tex., is considering erection of a one-story mechanical and repair shop for road machinery work, and one-story equipment storage and distributing plant at Dallas, Tex., to cost over $50,000 with equipment.

Roosevelt Flying Service, West Palm Beach, Fla., W. P. Lawless, in charge, has acquired local property for establishment of airport, to include hangars for housing about 20 airplanes, repair shops, oil storage and other field units, to cost more than $100,000 with equipment. Company is a subsidiary of Aviation Corporation, 122 East Forty-second Street, New York.

Board of Education, Birmingham, plans installation of manual training equipment in new West End high school, bids for first unit being asked by Dec. 13, to cost $750,000. Warren, Knight & Davis, Protective Life Building, are architects; William B. Ittner, Board of Education Building, St. Louis, is consulting architect. D. E. McKinley is business manager.

City Council, Gulfport, Miss., has plans for extensions at municipal airport, to include new hangar to accommodate six airplanes, with repair facilities and other field units, to cost over $50,000.

Minden Cotton Oil & Ice Co., Minden, La., has plans for a new factory for manufacture of commercial fertilizer, to cost over $65,000 with equipment.

Board of Education, Tyler, Tex., is planning installation of manual training equipment in two new junior high schools to cost $261,000, for which bids will soon be asked on general contract. Bryan & Sharp, Dallas, Tex., are architects.

E. F. Slayton Co., Orlando, Fla., plans construction of a cold storage and refrigerating plant in connection with new abattoir, including installation of conveying and other mechanical-handling equipment, to cost about $100,000. E. F. Slayton, 525 Howard Avenue, is head.

Bell Oil & Gas Co., Kennedy Building, Tulsa, Okla., has approved plans for new oil refinery near Pampa, Tex., with initial capacity of 4000 bbl. per day, including gasoline division, to cost over $200,000.

Indiana

INDIANAPOLIS, Dec. 2.—Haynes Stellite Co., Kokomo, has awarded general contract to L. P. Hutto, 1030 West Maple Street, for one-story addition, 75 x 125 ft., to be used primarily as a foundry, to cost about $50,000 with equipment.

O. P. Link Handle Co., Salem, has authorized rebuilding part of plant destroyed by fire Nov. 23. Reconstruction will be designed to double former capacity and will cost about $50,000 with equipment.

Capehart Automatic Phonograph Co., East Pontiac Street, Fort Wayne, will take bids early next year for one-story addition, to cost about $30,000 with equipment. Charles E. Weatherhogg, 250 West Wayne Street, is architect.

Inca Mfg. Co., Fort Wayne, manufacturer of wire and cables, has awarded a general contract to Buesching & Hagerman Construction Co., 402 East Superior Street, for one-story unit, 200 x 300 ft., to cost over $75,000 with equipment.

Engineering Metal Products Corporation, Indianapolis, has been organized to take over and consolidate T. Roch Iron Works, 600 Dorman Street, manufacturer of ornamental iron products; James H. Carnine & Co., 311 East South Street, building products, including fireproofing materials; Central Wire & Iron Works, 119 West Norwood Street, manufacturer of elevator doorway equipment, etc., and Diamond Wire & Iron Works, 310 East Empire Street, manufacturer of office and factory partitions, etc. Consolidated company plans general expansion. Lease has been secured on property at 401 South Harding Street, where headquarters will be maintained. James H. Carnine is president of new organization; F. G. Phillips, vice-president; George H. Roch, treasurer, and Ralph E. Finley, chief engineer.

Auburn Automobile Co., Auburn, has authorized an expansion program to increase present output by 50 per cent, including new units now in progress, to cost about $3,500,000 with machinery. Program includes extensions at plant of Central Body Co., Connersville, and expansion at Auburn-Connersville automobile works.

Pacific Coast

SAN FRANCISCO, Nov. 27.—Bids have been asked on general contract by Board of Works, Oakland, Cal., for municipal mechanical and equipment buildings, 200 x 200 ft., including machine shop, repair shop, paint shop and other units, to cost $75,000 with equipment. L. C. and D. D. Stone, Great Western Power Building, are architects.

Byron Jackson Pump Co., 55 New Montgomery Street, San Francisco, manufacturer of pumps, parts, etc., has filed plans for one-story unit at Berkeley, Cal., to cost about $30,000 with equipment.

Pacific Gas & Electric Co., 245 Market Street, San Francisco, has secured permission for a hydro-electric power project on Mokelumne River and will proceed with project at early date, to cost $19,000,000 with transmission system. Company is arranging an expansion program to cost about $35,000,000, including extensions in hydro-electric and steam power properties, transmission lines, switching stations, distributing lines and miscellaneous work. Natural gas properties also will be extended and developed.

Woodruff-Margetts Coal Co., Salt Lake City, Utah, has plans for a coal-carbonizing plant, to cost about $65,000 with equipment.

Sunset Pacific Oil Co., Sixteenth Street, S. W., and Hanford Street, South, is planning new oil storage and distributing plant to cost about $75,000 with equipment.

Board of Education, San Francisco, is considering installation of manual training equipment in third unit at South Side high school, to cost about $700,000, for which plans will be prepared by Bakewell & Weihe, 251 Kearny Street, architects.

In connection with an expansion program to cost $50,000,000, Southern Pacific Railroad Co., Los Angeles, is planning purchase of track-building and kindred equipment, including cranes, ditchers, steam shovels, etc. Extensions and improvements will also be made in a number of car and locomotive repair shops, with installation of additional equipment.

Boise Machine & Welding Works, Inc., Boise, Idaho, has leased a one-story building, 50 x 120 ft., to be erected at 1401 Idaho Street, and will occupy for a new plant, to cost about $30,000 with equipment. Tourtellotte & Hummel, Boise, are architects.

Southern California Gas Co., Los Angeles, has applied for permission to purchase properties at Madera and Turlock, comprising holdings of Madera Gas Co., and Turlock Gas Co., and will consolidate. Expansion is planned, including pipe line construction.

Canada

TORONTO, Dec. 3.—Current demand is chiefly for replacement needs, with occasional lists calling for a half dozen tools. Some good orders are pending for new works, but much of this business will be held over until after the first of the year. While there has been curtailment in demand, business, as a whole, is holding well above that of a year ago.

J. D. Adams Mfg. Co., manufacturer of railroad shop machinery, has purchased an existing plant and eight acres at Paris, Ont. Plant will be operated by a subsidiary to be known as J. D. Adams (Canada), Ltd., and will supply Canadian demand and some export trade.

S. C. Johnson & Co., Brantford, Ont., manufacturers of radiator cement, etc., will build an addition to cost $50,000.

Town Council, Hespeler, Ont., contemplates installing additional pumping apparatus in waterworks plant. M. E. Jardine is clerk.

Niagara Cut Stone Co., Ltd., Niagara Falls, Ont., has awarded contract to Smith Brothers, 1740 Ellen Avenue, for erection of a factory.

Cunningham & Son, 285 Queen Street, St. Catharines, Ont., have let contract to W. W. Park, 49 Queen Street, for erection of a foundry to replace one destroyed by fire.

Peerless Artificial Stone Co., Rhodes Avenue, Toronto, Ont., is receiving bids, no closing date set, for a factory to cost $20,000.

Bids are being received by D. R. Brown, architect, 980 St. Catharine Street West, for an addition and alterations to plant of Jenkins Brothers, 617 St. Remi Street, Montreal, manufacturers of valves, etc.

La Cie Electrique de Riviere a Pierre, Ltd., 72 Mountain Hill, Quebec, contemplates building an addition to power plant at Riviere a Pierre, Que., and will install waterwheel of 300-hp. capacity; one 225 kva. generator, and one 48-ft. diameter penstock, 450 ft. long. C. Lessard, 32 Boulevard des Allies, Quebec, is engineer.

Western Canada

Canadian National Railways is proceeding with erection of new car shops at Melville, Sask. A. A. Tisdale, Winnipeg, is general manager.

New Westminster Paper Co., Ltd., New Westminster, B. C., has awarded contract to Dominion Construction Co., for erection of a paper mill to cost $150,000.

Foreign

A CONTROLLING interest in Bavarian Motor Works, Ltd., Munich, Germany, has been secured by Pratt & Whitney Aircraft Co., Hartford, Conn., manufacturer of Wasp and other aircraft engines, a subsidiary of United Aircraft & Transport Co., 51 Pine Street, New York. Purchasing company will be active in management and will develop Munich plant for production of aircraft motors and parts for Continental trade.

Ford Motor Co., Detroit, is negotiating for land at Kastrup airdrome, Copenhagen, Denmark, and plans construction of plant for airplane division, including parts and assembling departments, to cost over $750,000 with machinery. Company is carrying out expansion at tractor manufacturing plant at Cork, Ireland, and will increase output from 125 to 300 complete tractor units per day. In connection with plans for importations to United States, it is proposed to build two or more assembling plants near ocean ports for domestic business.

Royal Dutch Petroleum Co., Amsterdam, Holland, operating Shell Oil Co., San Francisco, with other subsidiary units in United States, as well as oil refining properties in different parts of the world, has authorized an increase in capital from 600,000,000 to 1,000,000,000 florins (about $240,000,000 to $400,000,000, United States currency), part of proceeds to be used for expansion and improvements, and acquisition of other oil lands and plants.

Municipal Council, Juarez, Mexico, is considering early call for bids for equipment for municipal waterworks, including pumping machinery, power equipment, compressors and auxiliaries, to cost over $200,000.

Farnum Aircraft Co. of France, Paris, has purchased 75-acre tract in Belmont County, near Shadyside, Ohio, and plans early construction of American branch plant, including parts production and assembling, to cost more than $250,000 with equipment.

Rhine-Westphalia Electric Power Corporation (Rheinisch-Westfaelisches Elektrizitaetswerk), Berlin, Germany, has authorized increase in capital from 180,000,000 to 240,000 marks (about $45,000,000 to $60,000,000 United States currency), part of fund to be used for expansion in electric generating plants and systems, including development of new properties.

New Trade Publications

Electric Furnaces and Pyrometers.—Hoskins Mfg. Co., Detroit. A beautifully illustrated 40-page book, identified as catalog No. 52, has been issued by this company. It is divided into three parts, the first of which is de-

voted to a description of Hoskins electric furnaces in the larger sizes for industrial purposes, the second to smaller types commonly used in the laboratory and the third to Hoskins pyrometers. The question, "What is good furnace design?" is discussed in the fore part of the catalog. In the rear of the catalog is a compilation of data regarding methods of heat treating steel, and S.A.E. steel specifications.

Chromel.—Hoskins Mfg. Co., Detroit. Catalog G, consisting of 40 pages, describes the properties of resistance wire, thermocouples, electric furnace ribbon and heat-resisting alloys made of Chromel. In the rear part of the catalog are published tables of Fahrenheit and Centigrade equivalents, fraction and decimal equivalents, comparison of wire gages and conversion factors.

Automatic Control Recording Pyrometers.—Brown Instrument Co., Philadelphia. A four-page folder describes the satisfactory operation of the company's pyrometers in two industrial plants.

Truscon Ferrobord Ingot Iron Roofdecks.—Truscon Steel Co., Youngstown, Ohio. A 16-page booklet is devoted to erection data and specifications of roofdecks and is designed for the practical roofer and roofing contractor.

Steel Castings.—Lebanon Steel Foundry, Lebanon, Pa. A four-page illustrated leaflet describing a motor truck transmission case of intricate design, suitable for motor trucks where particularly heavy duty is involved.

Sash Weights.—Deved Brothers, Inc., 807 South Howard Street, Baltimore. An illustrated leaflet describes the patented combination core box for making sash weights on a large scale.

Foundry Cupolas.—Whiting Corporation, Harvey, Ill. An eight-page pamphlet, entitled "An Analysis of the Performance of 54-Inch Cupolas Based Upon Records of Practical Operation," is one of a series of papers on Cast Iron and Its Manufacture by Dr. Edward E. Marbaker, director of foundry research of the company. Among other subjects it discusses the temperature of the molten iron, the coke consumption, thermal efficiency and the theoretical calculation of coke and air.

Power Plant Equipment.—Chain Belt Co., Milwaukee. Folder of four pages illustrating and describing Rex handling and screening equipment for industrial power plants and central stations.

Water Wheels.—James Leffel & Co., Springfield, Ohio. Bulletin W208 illustrates and describes three units of type Z vertical-shaft turbines, 450 to 825 hp., each direct connected to 3-phase, 60-cycle, 2300-volt vertical generator.

Pumps.—Economy Pumping Machinery Co., Chicago. Bulletin 412 of seven pages and Bulletins 413 and 414 of 11 pages each, illustrate and describe various types of non-clogging sewage ejectors, open-shaft vertical and horizontal pumps and split case multi-stage centrifugal pumps.

Steel Shop Equipment.—Standard Pressed Steel Co., Jenkintown, Pa. Form 416 illustrating and describing various types of steel desks and benches for use in shops, factories, warehouses, etc.

Studies in Structural Welding.—Lincoln Electric Co., Cleveland. A series of eight 8½ x 11 in. leaflets illustrating important structural frames, welded in whole or in part, and detailed sketches of welded joints and girders.

The Week's News Quickly Told

Current Events That Bear on the Course of Business

PRESIDENT HOOVER met representatives of agriculture and public utilities in two conferences. The latter told him of plans to expend $1,800,000,000 for extensions and betterments during 1930. The former said that improvement of farm-to-market roads and maintenance of easy credit will be most effective means of governmental cooperation with agriculture.

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RETAIL clothing trade is brisk, due to cold weather. Textile manufacture, however, is generally slow. New England industry is feeling the effects of acute depression in Massachusetts cotton mills.

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CONSTRUCTION activities enter their usual winter slump. A survey by Engineering News-Record indicates that new building in 1930 will total the average of 1928 and 1929.

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GRAINS are noticeably higher in price, and Chicago trade reflects the improvement. Tobacco manufacturing is brisk; good prices for the leaf and for cotton lend good tone to conditions in South and South East. Wholesale and jobbing trade is slow and uncertain, especially in Middle Western States.

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PACIFIC North West is suffering from a prolonged drought. Hydro-electric power plants are all but shut down, and electricity is rationed for essential purposes . . . Fisheries, the main industry, have a pack ranking among the six best years in history. Lumbering, however, is much below normal, and unsold stock is increasing. Shingles are selling at lowest prices in years.

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SHIPBUILDING firms closed contracts for 213,000 gross tons of vessels during October, as much as an ordinary year's business . . . Thirteen new mail routes to foreign ports are established and offered to those American steamship lines which meet the Post-Office Department's requirements for vessels equal to or better than any competing foreign ships. About 40 new vessels will be required, costing about $250,000,000, 75 per cent of which will be financed by governmental loans . . . Port of New York Authority will build four 1200-ft. piers at Jersey City, together with belt line railroad and super-highway connecting with established trunk lines . . . Weser Shipbuilding Co., builder of the Bremen, reports large deficit and proposes wage reduction.

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PATENT office is so far behind that at present rate it will be six years before work is current, reports Commissioner Robertson, asking for at least 100 new examiners.

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CONSOLIDATION of two large Southern dairying enterprises marks another of a series of mergers in the food industry . . . General Baking Corporation, which has grouped about 50 bakeries, has completed a 5-year modernization program costing $18,000,000, and announced a reduction in the price of bread . . . Memphis and Cleveland wholesale drug houses merge and announce plan of cooperation with 20,000 independent druggists . . . Dissolution of Warner and Fox film enterprises is sought by Federal suit.

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DIVIDENDS were increased or extras declared by 211 corporations during November; 21 usual dividends were passed. New Haven railroad, which resumed dividend payments a year ago after a lapse of 15 years, increased its rate to $6 annually.

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AIRPLANE fares from Kansas City to Los Angeles are reduced for a 30-day trial period to about the same as rail plus Pullman plus meals, by Western Air Express, which has traffic arrangements with a score of Central trunk railroads . . . A 19-hour air-rail service is inaugurated from Cincinnati to New Orleans . . . Commercial aeronautics have a bright future in Central and South America, said C. A. Lindbergh, because other systems of transport are unusually slow and undeveloped . . . Capt. L. M. Woolson, designer of the Packard Diesel aviation engine, said it will cut the fuel load 20 per cent for a given radius of flight . . . A marked reduction in accidents is reported by the commander of the Army air corps, due to the perfection of the mechanism and rigid inspection requirements. Pilot errors constitute the major cause of fatal accidents . . . England adopts a "robot" pilot weighing 100 lb. as standard equipment on larger army and navy aircraft. It has flown bombing planes 400 miles without adjustments.

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ARMY strength of the United States is 137,529, reports Adjutant General . . . General Jan C. Smuts of South Africa said that aerial disarmament is more urgent than military limitation, as it constitutes the more serious danger . . . E. N. Hurley, in a proposal to Internation Chamber of Commerce, writes that a few powerful industrialists, controlling strategic minerals and munitions could effectively support Kellogg peace treaties by refusing all trade with belligerants.

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FRENCH troops are withdrawn from second zone of occupied area in Rhineland . . . Iceland, with 100,000 inhabitants is shocked by the news of its first murder in 16 years . . . A new traffic law in England abolishes the dead-letter speed limit for light cars, but imposes very severe penalties for dangerous or intoxicated driving, or exceeding 30 miles per hour with buses or trucks.

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Mergers Do Not Insure Low Costs

Mere Size of Consolidation Will Not Bring Reduction in Distribution Expense—Real Managerial Ability Is Most Important Factor

BY B. C. MILNER, JR.*

IT is impossible for me to conceive of any question which is more difficult to answer than that which I have been asked to discuss—"Do Consolidations Result in Reduction of Distribution Expenses?"

Unquestionably this is the most important problem facing American business men today. Consolidations during the first 20 years of this century were almost invariably based upon effecting economies in production. To a very large extent the possibility of effecting major savings in the cost of goods has been eliminated by the work which has already been done. It goes without saying that further ways of decreasing costs of production are being and will be developed, and I sincerely trust that this process will never cease. However, it must be recognized that, speaking in general terms, further savings in the costs of production will be in terms of fractions of per cent, or in pennies per unit.

Again, speaking in general, we may say that the substantial profits of the past have been earned by the companies that first learned how to produce more cheaply than their competitors. The profits of the future will go to the companies who learn how to distribute with greatest economy.

At this point it might be well for me to state frankly that I do not believe any one man can give a comprehensive and conclusive answer. There are numerous consolidations, with which you are all familiar, which have been eminently successful.

Fortunately, or unfortunately, developments of the past 45 days have brought very forcibly to our attention the fact that we have numerous mergers and consolidations which have received very little publicity, and which are not, and probably never will be, really successful.

Within the past few weeks we have read and heard many explanations for the crash in security prices on the Stock Exchange of the United States. Somewhere among these I read an article, in which paper and by whom I have forgotten, to the general effect that part of our ills was due to the fact that many consolidations had been effected solely because there was a "finder's commission" to the promoter, and a handsome profit to the banker who floated the securities.

It is a very simple matter to take the balance sheets and operating statements of two or more companies and to set down their figures in parallel columns. Working out estimates as to what might happen if these companies were consolidated has a distinct fascination. The process that is ordinarily followed includes an estimated increase in sales, an estimated saving in cost of sales, an estimated decrease in selling expenses and in administrative expenses, and consequently the estimated future operating profit is enormously increased.

Following the same process the balance sheet figures are totaled and then these totals changed to allow for amounts by which fixed investment can be decreased, inventories lowered, cash balances increased, fixed charges reduced, and so on.

In theory all of the estimates are correct, and the resultant figures are usually highly satisfactory from every angle. Theoretically, if two competing companies are consolidated, sales should increase. It would seem that eliminating the competition between two selling organizations and concentrating the efforts of those organizations under one executive should result in increasing sales both by obtaining a larger share of the existing business, and by increasing the market. Similarly, the consolidation of production facilities and the elimination of the least efficient plants should make it possible to decrease direct costs and to scale down overheads. In theory at least both sales and the administrative expenses should be decreased following a consolidation. Only one set of officers will be required, only one sales manager will be necessary, one production manager can be eliminated, and so on.

Again in theory, where two or more companies are merged it should be possible to carry on the combined businesses with less plant and machinery, with less inventory, with smaller fixed charges, and as a consequence of all of these things the net profits available for dividends should be tremendously increased.

No Way of Estimating Effect on Morale

It is very unfortunate that actual results obtained by consolidations do not always work out according to the estimates, and the fundamental reason for this is that no one has devised any method of estimating future results of the most important element in any consolidation—the human beings who are to be picked out of their separate organizations and thrown together, without their advice

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or consent, to work under circumstances which may or may not be pleasant, with new associates whom they may or may not like, and at tasks for which they may or may not be prepared.

Any of us can take two factories and place them under common ownership with full assurance that we will have so many square feet of floor space, so many machines and other facilities. Any one of us can take two bank balances and add them together with full assurance that the result will be a given number of dollars; but no formula has been devised whereby we can put together two presidents, or two sales managers, or two stenographers, or two workmen, with any assurance that the net result will be even one competent executive, or one aggressive merchandiser or one satisfactory secretary, or one efficient producer.

It is because of this essential human element that many consolidations fail to measure up to the estimates prepared by promoters. It is an unfortunate fact that most mergers which have been effected have entirely disregarded the persons who are to operate and manage the combination. The general feeling seems to be that if terms and conditions as to securities can be agreed upon, and the president of one company made chairman of the board, while the president of the other company becomes president of the consolidation, that no further thought need be given to the matter.

Few Mergers Really Successful

You are probably all familiar with the statistics regarding mergers prepared by Prof. Arthur Stone Dewing of Harvard University. Out of 35 major industrial consolidations effected between 1893 and 1902, in only three instances were the actual earnings for the first year equal to the estimated earnings; in only 13 cases were the earnings the first year for the consolidation equivalent to the earnings of the separate companies prior to the merger, and in only 14 cases were the earnings in the tenth year after consolidation equal to the earnings of the separate companies. It is my belief that if the same information were available on all mergers which have been effected in this country to date that very much the same situation would be revealed.

The engineering work of Ford, Bacon & Davis, Inc., has brought us into intimate relationship with numerous public utility and industrial consolidations during the past 35 years. Our work is of a type and character which makes it essential that we should procure an intimate knowledge of operations of these companies. This has enabled us to obtain a detailed cross-section of American business, which is not usually available. It might, therefore, be of interest to cite some of the specific situations which we have seen develop, or which we have been in position to watch in subsequent periods.

Merger of Motor Car Accessory Makers Fails

Company "A" was a medium-sized manufacturer of an integral part of automotive vehicles. The company had grown at an astonishing rate from a very small beginning and it reached a position of pre-eminence in its particular field. The president of the company was a man of unbounded energy, enthusiasm and a wonderful personality. He had started as an apprentice in a machine shop and his ability as an economical producer was unquestioned. He had, also, a special ability for picking, training and controlling production men. Merchandising, however, was a closed book as far as he was concerned and unfortunately he did not exercise the same keen discretion in choosing his sales organization as was so evident in the building of his production division.

The company continued to grow in spite of, rather than because of, its selling organization. A promoter suggested that the company absorb two other companies manufacturing non-competing products, also applicable to the motor car industry. Based on past records and estimated future earnings the consolidation was readily financed. The important element in the estimated increased earnings to be effected by the consolidation was the sales of the products of the three companies by one group of salesmen and the elimination of two sets of sales executives, branch offices, billing clerks, collection departments, etc. Further substantial savings were to be effected by consolidating shipments from three plants in carload lots.

Do Consolidations Result in R

¶ My first generalization would be that consolic ucts are less likely to effect savings in distributio competitive but allied products salable to the sam

¶ My second generalization would be that it standard products which are generally used than cialized products, such as machinery, equipment tively limited clientele.

¶ My third generalization will be a repetition of most important factor—mere size of a consolidatio pendence upon sheer mass is futile.

Dissension and Poor Sales Organization Bring Disaster

The three companies separately had earned in excess of two million dollars net in the year prior to the consolidation. Within three years after the consolidation, the company went into receivership. The cost of distributing the products of this consolidation actually showed an increase while the net sales showed a considerable decrease. As soon as the consolidation was effected, the general sales manager of the major company was given charge of all merchandising activities, with instructions that the best men in each organization were to be retained. Dissension developed immediately, accompanied by a feeling of uncertainty on the part of each member of the sales organization as to whether he was to be retained or discharged. Obviously very little effective sales work was done, for each man was primarily engaged in attempting to protect his own position and at the same time keep an eye out for other employment. By the time the final decision had been reached as to the eventual make-up of the consolidated selling force, it was ascertained that selling expenses had not been decreased to any material extent. Salary raises, based upon the assumed increase in responsibilities, had become rather general. In consolidating branch offices more expensive quarters were acquired, so that branch rents for the consolidation were almost equal to the rentals paid by the three separate companies; traveling and entertainment expenses showed an astonishing increase and calls per salesman decreased by over 50 per cent, the excuse being that each salesman now had to discuss three products and usually had to see three different men in each automobile plant with the consequent delays in going from one man to another or from one department to another. Numerous accounts were lost for each product, as the automobile manufacturers were absolutely unwilling to entrust to any one organization orders for three essential parts of their completed cars or trucks.

A Carefully Planned Merger Succeeds

Some years later, "B" company in an entirely differ-

uction of Distribution Expense?

ons of companies manufacturing competitive prod-an are consolidations of manufacturers of non-eneral market.

sier to effect savings in the cost of distributing fect savings in the cost of distributing more spe-pplies which must be merchandised to a compara-

revious statement. Real managerial ability is the ll not result in decreased cost of distribution. De-

ent field undertook a program of expansion. Careful consideration was given to all conditions prevailing in the particular industry in which this company was engaged and the decision was reached that expansion by consolidation should be effected, but that such consolidation should be with non-competing companies manufacturing products salable in the same general market. The first step was a major merger, carefully worked out, not only with the stockholders of the respective companies but with the operating personnel including the minor executives and department heads.

No attempt was made to eliminate any existing selling expense other than the duplication of branch offices. Branches were opened in numerous cities which neither of the separate companies had been able to afford. Therefore, where offices were consolidated one manager and some of the other employees were moved to new cities, retaining both titles and salaries. The sales staff was not only maintained but was increased by the addition of salesmen to cover the newly opened territories; each salesman continuing to concentrate on the product with which he was best acquainted, but, of course, boosting all the products of his company, and exchanging information with his fellow salesmen as to prospective customers for the allied line.

After an 18-month interval, spent in working out the consolidation of the two organizations, building a real esprit de corps, a third company, manufacturing a different line of products, was brought into the consolidation and similar methods were followed. A year later a fourth company was added. The net result has been an actual increase in sales of approximately 33 per cent over the sales of the separate companies, a decrease of administration expenses equal to 3 per cent of net sales, a decrease in selling expense of approximately 4 per cent and an increase in net profits of almost 250 per cent. Everyone concerned had benefited, the consumer by receiving improved products and better service at lower prices, the employees by increased earnings and steadier work, and the stockholders by increased dividends.

In this particular case the answer to our question would obviously be an enthusiastic affirmative.

Ignoring Personnel Proves Bad Policy

The results of the foregoing case were so entirely favorable that a promoter was able to interest a group of bankers in financing an even larger merger in the same industry, and the operation was carried out, not step by step, but simultaneously. Ten companies were merged at one time.

The first word that the employees of any of these companies had was the appearance in their local paper of an Associated Press dispatch from New York that the consolidation had been effected. The resulting confusion is almost indescribable. For, after all, 10 presidents, 32 vice-presidents, 10 secretaries, 10 treasurers, 10 sales managers and an unknown number of assistant sales managers, branch managers, factory superintendents and salesmen are a difficult group to handle, particularly when they are both astonished and displeased at what has been done by their superiors, and when they are pessimistic as to the workability of the consolidation.

In the first year after consolidation net sales were 40 per cent less than the separate companies had attained during the prior year, the substantial net profits of the individual companies had disappeared and were replaced by an operating loss. The total cost of distribution was decreased by the consolidation but the cost per unit was decidedly increased.

A Case of Sharply Reduced Merchandising Costs

Some years ago two manufacturers of a standard commodity decided to merge. Each company had a moderately successful record. Some refinancing was necessary and the bankers who were approached were frankly skeptical. However, they finally agreed to underwrite the securities after it was pointed out to them that the consolidated companies would probably have sufficient volume of business to eliminate the middleman completely, and to conduct its merchandising direct to the consumer by a selling organization completely controlled by the new corporation.

After the initial difficulties, always encountered in changing from one form of selling to another, the actual operating results attained considerably exceeded the prior estimates. The actual cost of distributing the merchandise through its own sales force proved to be almost 12 per cent less than the discounts and the commissions previously granted the middleman, and the sales of the consolidation were considerably expanded into new fields which the middleman had not discovered. In this case the decrease in the cost of distribution was very material.

A Merger Brings Startling Decrease in Sales

The fact that methods which are successful in one industry, or in one line of commodities, cannot be universally applied may best be illustrated by another merger which was effected simultaneously with the above. A group of companies manufacturing equipment for one of our major industries was consolidated. While each product of the consolidation had a distinct place in the industry, nevertheless each article had to be sold on its merits for the particular purpose then under consideration, and in competition with the products of several other manufacturers. The original purpose of the promoters was the elimination of duplication in salesmen and dealers, the theory being that one salesman could cover the territory previously requiring several men, and that all dealers could be eliminated and the territory which they had served could be covered by a few salesmen at less expense than the commission previously paid.

The immediate results were a startling decrease in sales, and it was not until the bankers stepped in and forced a complete change in management policies that the position was rectified. The improvement did not come through a decrease in distribution expense. Rather, expenses were brought back to the level existing prior to the consolidation. It was found, however, that the larger operation permitted the development of a group of salesmen whose sole purpose was the maintenance of intimate contact with all prospects in their territory. When these men, with their personal acquaintances, were reinforced by specialists whom they could call in to handle particular transactions, they were able to increase sales over any prior records. The enlarged operation warranted the in-

stallation of warehouses at all large centers. Therefore deliveries, an important consideration, could be made, which none of the competitors, compelled to ship from their factories, could possibly meet. Many other benefits of the consolidation developed as time elapsed. The merger today is considered one of our most stable and profitable industries.

Dictatorial Policies Invite Retaliation

Some years ago a merger was effected between several companies manufacturing products of general public use. The participants, the promoters and the bankers cited numerous benefits to be derived from the consolidation, prominent among them being the benefits to be derived both by the company and by the consumer from the decreased cost of distributing the several lines of products. It was pointed out that the consolidation would be the only company in a position to quote on a complete line, that both the wholesaler and the retailer could be almost compelled to carry the full line of products, and that the company would be in position to dictate as to this. It was further pointed out that the company would be in a position to undersell any of its existing competitors, should that become necessary. We were recently requested by a group of bankers to undertake a study of the situation of this company, the question asked of us being, "Shall we supply additional capital to this corporation or shall it be placed in liquidation?"

It developed that the promoters and executives of the original consolidation had not counted the human element in any of their plans. Wholesalers and retailers refused to be coerced. The dictatorial policies originally adopted were keenly resented and at the first possible opportunity retaliatory measures were instigated. Internal friction developed to such an extent that cost of production increased to a point where sales could not be effected at profitable levels. The competitors were quick to take advantage of the situation, first, by hiring away the best men of the organization who had become discouraged over the disagreeable conditions which had developed, second, by increasing their efforts to take care of the business of the wholesalers and retailers previously dependent upon the consolidation, third, by the formation of an association which would effectively eliminate competition between the small companies and direct it almost exclusively against the large company.

Brain Power Is Governing Factor

Instances of this character might be multiplied extensively. I believe, however, that you will have gathered the inference that insofar as our experience goes there is no possibility of answering our question in either the affirmative or the negative. Some consolidations do decrease the cost of distribution, other consolidations increase cost of distribution. Policies and personnel, in other words, brain power seems the governing factor.

There is such a thing, of course, as foolish economy, i.e., an effort to reduce distribution expenses on the basis that merely by such reduction some benefits are received. More often than not the effort should not be to reduce the number of dollars spent but to see that each dollar is spent more effectively and produces a greater volume of business. In this case the reduction of expense is relative rather than actual. In other words the cost of doing business becomes a lesser percentage of the sales dollar.

Good Management Is Imperative

Based upon our own observations we would say that in general the answer to the question depends, to the largest degree, upon the management. We have seen good management handle very difficult situations so skillfully that distribution and other costs were decreased. Likewise, we have seen poor management make a complete botch of operations which were inherently simple and held every promise of success. If a direct answer to the question is necessary, I must resort to generalizations, injecting a warning, however, that there are sufficient exceptions to these generalizations to furnish the basis of endless arguments. [For these concluding statements see p. 1576.]

If I must answer the question "Do consolidations result in reduction of distribution expense," then I must fall back on a precedent established by the Scotch and reply, "Not necessarily."

Arc-Welded Pipe Joints Are 75 Per Cent Efficient

INFORMATION concerning the 624-mile oil line from Cushing, Okla., to refineries near Chicago, has been issued by Lincoln Electric Co., manufacturers of the welding equipment used for making the field joints. Work started last winter, and was continued throughout cold and wet seasons; average production per welder was 10.3 welds per day, although in good weather the best men reached a figure of 25 joints per day.

Pipe was 12-in., electrically welded, with bell and spigot joints on each 40-ft. length. Ninety-one welding generators, driven by gas engines, mounted on wagon beds and drawn by team or tractor, were required. Each weld was completed in two beads. Hydrostatic tests at 800 lb. per sq. in. completed on 354 miles of this line revealed pin-hole leaks in only three of the 47,000 joints. Workmanship was under periodic test and close inspection; a number of joints were cut bodily from the line and pulled apart with the following results:

Test Number	Tensile Strength in Tons		Efficiency of Welded Joint, Per Cent
	Pipe	Welded Joint	
1	386.05	310	80.30
2	431.86	325	75.95
3	419.21	278	66.31
4	346.98	278	80.12
5	349.74	318	90.92
6	366.05	320	87.42
7	441.58	285	64.54
8	413.21	252	60.97
9	428.07	275	64.24
10	342.88	324	94.49
Average	392.57	296.50	75.52

Cleveland Opens Foundry School

Equipment for Training Apprentices Includes a $50,000 Foundry and $15,000 Worth of Machinery Donated by Manufacturers

A TRADE school for foundry training in Cleveland was formally dedicated at a dinner meeting held Dec. 6 in the molding room of the school by Cleveland foundrymen comprising the foundry group of the American Plan Association of that city. Those in attendance also included representatives of the Cleveland Board of Education, members of the manufacturers' committee on industrial training of the Cleveland Chamber of Commerce, foundry equipment manufacturers and the foundry school apprentice boys.

Walter L. Seelbach, president, Forest City-Walworth Run Foundry Co., Cleveland, and of the Gray Iron Institute and chairman of the Foundry Group of the American Plan Association of Cleveland, acted as toastmaster and formally presented the foundry equipment to the Cleveland Board of Education. The principal speaker was Harold S. Falk, vice-president and works manager, Falk Corporation, Milwaukee, who has long been active in promoting apprenticeship training in Milwaukee and as a member of committees of the National Metal Trades Association and of the American Society of Mechanical Engineers. Another speaker was William Frew Long, general manager of the American Plan Association of Cleveland, who reviewed the history of the school.

The school was founded and is being conducted by the cooperative efforts of the Cleveland foundrymen and the Cleveland Board of Education and combines school work with apprentice employment in foundries. It was started at the opening of the school year in September with an enrollment of 28 boys and marks a new step in vocational training in Cleveland.

The aim of the school is to give the boys a thorough training, both technical and practical, in the fundamentals of the foundry trade. The training will include melting and molding of gray iron and non-ferrous metals, brass and aluminum, core making and pattern making. The prime purpose is to train boys by cooperative methods to become skilled molders and core makers for the foundry industry of Cleveland through the combined efforts of the foundrymen and the public schools. With this training it is believed that many of the boys taking the foundry course will be capable of becoming foremen and plant executives.

Foundry Erected Last Summer

The foundries sponsoring the school compose the foundry group of the American Plan Association of Cleveland, which is cooperating with the Department of Vocational Training of the Cleveland Board of Education. A $50,000 foundry for the school was erected during the summer by the school board and the greater part of the equipment

Foundry for Training Apprentices Is Completely Equipped With Standard Type Machinery Used in Regular Production Work. Cupola is in background

was provided by funds contributed by Cleveland foundries and by donations of $15,000 worth of equipment by equipment manufacturers.

Several leading foundrymen of Cleveland cooperated in working out plans for the foundry, which is well arranged for practical operation and which occupies a comparatively limited amount of floor space without the appearance of crowding. While it might be called a miniature foundry, nevertheless it is completely equipped with standard type machinery used in regular production work.

The melting and molding department occupies a well-lighted room 30 x 60 ft., with a high ceiling. At one end is a 2-ton 41-in. Whiting cupola lined down to 27 in. The cupola is tapped into a 1-ton geared mixing ladle. The blower is located on the floor at the side of the cupola. The foundry is served by a traveling crane equipped with a 2-ton electric hoist.

Charging Floor Built in Form of Balcony

At the side of the cupola are two furnaces for melting brass and aluminum. The charging floor is built in the form of a balcony at the end of the foundry. This extends around one side of the room, where space is provided for the storage of patterns, flasks and other material. A raised driveway runs along the cupola end of the building, permitting pig iron, coke and limestone to be discharged from trucks onto the charging room floor. Beneath the driveway are sand storage bins, which open directly back of the cupola. Six molding machines of different types are placed along one side of the foundry.

Separate rooms are provided for the core making, cleaning and pattern making departments. The core room has two core making machines and a drawer type baking oven. The cleaning department equipment includes a sand blast cabinet, a sand blast mill, a 24 x 36-in. tumbling mill and a dust arrestor, all supplied by the W. W. Sly Mfg. Co., as well as a Bridgeport double wheel grinder. Seventeen benches are provided in the pattern making room, which is unusually well lighted through a glass skylight.

The school has a four-year apprenticeship course and admits boys who have completed the eighth grade in the public schools. Boys are spending full time in the school during the first year of their training. Half of this time is being spent in actual foundry work, in molding, core making, melting and mixing, pattern making and cleaning in the school shop. One-third of the time is occupied in such studies as mathematics, foundry technology and mechanical drawing as related to foundry operations. The remaining one-sixth of the time is devoted to such academic subjects as history, English, civics and hygiene.

Students Spend Half of Second Year in Foundries

During the second year the students will spend half time in the school and half time as apprentices in Cleveland foundries, receiving the wages of an apprentice for the time actually employed in the foundry. During the third and fourth years they will be employed in Cleveland foundries as apprentices at full time pay, but will return to the school for a half day each week for special instruction. They will receive their regular wages from their employers for the half day spent each week in school work. Apprentices already employed in Cleveland foundries will be admitted to the school for a half day each week with no tuition charge.

In addition to training apprentices, the school will give special instruction to molders and foundry foremen as soon as facilities can be provided. The school is in charge of James Goldie as chief instructor. Mr. Goldie equipped and operated the foundry division of the Meriden State Trade School at Meriden, Conn., and had previously received a practical training in the foundry industry.

Interest in the foundry school among prospective pupils was created by the distribution of an illustrated booklet in which the plan of the school was outlined and the opportunities for boys in the foundry industry were pointed out. It called attention to the changes that have occurred in the foundry industry on account of the invention of labor saving machinery and the increasing recognition of the need for scientific training and skill which have brought about new standards in this basic industry and which have marked the passing of the day when brawn and muscle were considered the prime essentials for foundry apprentices. This publicity was supplemented by advertisements inserted in the foreign language newspapers in Cleveland before the opening of the school with a view toward attracting students.

Advisory Committee Helped Prepare Course

An advisory committee of foundrymen was appointed to work with representatives of the Board of Education and the chief instructor in preparing the course of instruction and working out other details in connection with the school's operation. This committee serves as a liaison committee between the foundries and the school. It is composed of D. P. Lansdowne, West Steel Casting Co., chairman; Daniel Gluntz, Gluntz Brass Foundry; F. J. Grondie, Kilby Mfg. Co.; and A. B. Norton, United States Aluminum Co. Representing the Board of Education are H. L. Briggs, director of vocational education, and John Fintz, coordinator. In addition, there is a foundry apprenticeship training committee consisting of William H. Shilling, the Atlas Foundry Co., chairman; R. H. West, West Steel Casting Co.; Tracy Calhoun, Johnston & Jennings Co.; George Hamminк, Wellman Bronze Co.; W. J. Strangward, Forest City-Walworth Run Foundries Co.; and Messrs. Grondie, Gluntz and Norton.

Mr. Strangward was chairman of the committee on equipment. Among manufacturers who donated equipment were the Aluminum Foundry Equipment Co., Chisholm-Moore Hoist Corporation, Federal Foundry Supply Co., Foundry Equipment Co., Osborn Mfg. Co., Johnston & Jennings Co., Reliance Electric & Engineering Co., W. W. Sly Mfg. Co., Standard Sand & Machine Co., Standard Pattern Works Co., Sterling Wheelbarrow Co., E. J. Woodison Co., Smith Facing & Supply Co., and Werner G. Smith Co.

An Undersupply of Production Foremen

INVESTIGATIONS conducted by the Society for the Promotion of Engineering Education indicate that the manufacturing industries of the country could absorb yearly about 11,000 graduates of four-year college courses in engineering. To supply this need, and the additional needs of the mining and transportation industries as well, only about 9000 men are graduated each year.

However, a tremendously greater need is felt for men with 2 years of post high-school training—graduates of so-called technical institutes. Such men gravitate toward the production departments in supervisory capacities. Nearly 600,000 such positions exist and only about 10,000 of them are filled by graduates of technical institutes. To supply the replacements needed, 30,000 men should be graduated every year, yet at the present time probably not more than 2000 are being turned out annually by such schools as Pratt and Rochester Mechanics Institutes.

The conclusion, as stated by W. E. Wickenden, investigator for the society, before the meeting of the American Society of Mechanical Engineers last week, is that the numbers of schools offering this "truncated engineering course" should be greatly expanded. They would draw from a couple of million young men who are not fitted for full college work, or who cannot afford it, and would not compete with established institutions for students.

Burns Vitreous Enamel Electrically

Large Continuous Conveyor Furnace Used in Plant of Republic Stamping & Enameling Co.

A CONTINUOUS conveyor type electric furnace for burning in vitreous enamel on kitchen ware was recently placed in operation by the Republic Stamping & Enameling Co., Canton, Ohio. It is a 450-kw., 220-volt, 3-phase furnace of a new type developed by the General Electric Co. and briefly described in THE IRON AGE, Jan. 24, 1929. Several of the furnaces are being used by that company in enameling parts used in the manufacture of electric refrigerators and other products. Not only has the furnace a large capacity, but the quality of the work is said to be much improved because of the close temperature control and the absence of smoke and gases.

Continuous Type Electric Furnace Is Used for Burning Vitreous Enamel on Kitchenware

The furnace is of the closed end type, the work entering and leaving at the same end. The heating units are located in the closed end, which is U shaped, and in it the conveyor makes a loop. The furnace is 83½ ft. long and includes a preheating section approximately 68 ft. long. The first 40 ft. of this section is on a horizontal plane and can be used as a drying zone. The next 28 ft. is an inclined section, the incline being of such a degree that the bottom of the heating or firing chamber is slightly higher than the top of the drying section, so that the heated air is largely confined in the heating chamber. Each side of the firing chamber is 13 ft. long and the U bend is approximately 7½ ft. in length making a total travel in the firing chamber of 33½ ft.

The heating units, which are of nickel-chrome ribbons, are mounted on the side walls of the U and on each side of a center wall which extends partly through the heating chamber. There are three separate temperature control zones, one on the incoming side of the U and two on the outgoing sides, one of the latter being at the top and the other at the bottom in order to keep the temperature uniform at the top and bottom of these two zones. Temperature in the three zones is automatically controlled by Leeds & Northrup instruments including a chart recorder and the temperature is held within a range of 10 deg. Current for the furnace is supplied by a commercial company at 4000 volts, 3-phase, 60-cycle and this is stepped down by transformers to 220 volts.

Work is set on specially designed racks suspended from the conveyor chain on 36-in. centers. The racks, 28 in. long and 28 in. deep, have three adjustable shelves. Each rack will hold 12 moderately sized pieces. The work is set on pins or bucks which are parts of the rack members. The conveyor was built by the Palmer-Bee Co.

The conveyor has a speed range of from 3 to 18 ft. per min. However, the company is operating it at a uniform speed of 12 ft. per min. for burning the three coats, the temperature being reduced for the second and third coats. The ground coat is burned on at a temperature usually ranging from 1680 to 1700 deg. Fahr., the maximum being 1740 deg. and the second and third coats at 1500 to 1560 deg. If the quantity of ware on the conveyor is larger than in usual operations or heavy pieces of ware are being burned, the temperature may be raised or the conveyor run at a slower speed. In normal operations the work is kept in the heating zone 3 min.

While the first or entering zone is intended as a drying zone for drying the enamel after dipping and before burning, thus utilizing the heat that passes from the burning zone, lack of space did not permit the construction of a conveyor of sufficient length for the loading of the wet ware on the conveyor racks. Consequently, drying before burning is done in steam-heated ovens from which the work after cleaning and beading goes to the baking oven.

An output of 30,000 to 34,000 pieces of enamel kitchen ware, or 15 to 17 tons in a day's run of 23 hr., is being obtained with the present furnace operation, but it is stated that were the furnace operated at its maximum capacity this output could be about doubled.

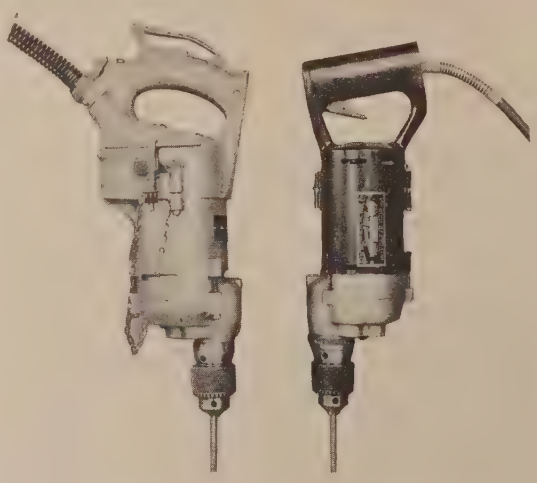
While electric furnaces have been used in this industry for some time, this is the first one of the continuous type used for burning vitreous enamel on kitchenware.

Economy from Use of Pressed Steel

Lower Costs and Handier Operation Follow Redesign of Motor Case and Other Parts of Portable Electric Drill

BY ROGERS A. FISKE*

REDESIGN to permit use of pressed steel motor cases and other parts of several models of portable electric drills produced by the Speed Way Mfg. Co., Cicero, Ill., has resulted in reductions of one-third to one-half in cost of labor and material. The steel case is smaller in outside diameter than the aluminum castings formerly used, and so is the gear case and other parts that fit to the ends of the motor case. On some models the end bell and handle are now made of pressed steel. The smaller outside dimensions of the steel case and the accompanying decrease in weight contribute to the handiness of these portable tools, without sacrifice of serviceability. On one model the diameter was reduced ¼ in. and the weight cut from 11½ lb. to 9 lb.



The Drill With Drawn Steel Motor Case (at right) Weighs 9 Lb. or 2½ Lb. Less Than the Former Type (shown at left).

These drills are broadly classified as standard and heavy-duty types. On the smaller sizes, that is, up to 5/16 in., the motor case and end bell are in one piece, which consists of a drawn steel shell, 3¼ in. outside diameter and 4⅝ in. deep, made from either No. 20 or No. 22-gage sheets. On larger tools the motor case and end bell are separate pieces cut from standard deep-drawn metal shells of the dimensions given. Tools of various sizes take the same diameter case but the length of the case varies. For some sizes of tools two of the standard shells are used, one from which the stator case is cut and one from which the head or end bell is cut.

The question immediately is raised whether this practice may not be wasteful, because two parts of two cases are discarded in order to assemble one motor shell with an end bell. However, close study of the problem has shown this manufacturer that the practice is sound from the viewpoint of cost. This is because the die cost would run up for the several sets of dies for cases of different dimensions, and there is a further advantage in price in ordering large quantities of one size case rather than small lots of different sizes. Also shop operations are simplified because there is only one set-up with the use of a standardized shell.

Weight of the working parts of the tools are the same regardless of the type of shell or case used. As previously pointed out, the saving in weight comes from the use of pressed metal and also from the reduction in diameter of parts, such as the gear case, which fit to the ends of the shell. On one model the aluminum case weighs 2 lb. 13 oz. and the steel case weighs 1 lb. 4 oz. About ⅜ lb. is saved by the reduction of ¼ in. in the diameter of the gear case casting.

Handles and Other Parts Also of Welded Steel

Drill handles also are made of pressed steel. Each handle is formed of two parts which are welded together and the seam ground to give a smooth surface. End bearing yokes, lugs for attaching the motor stator, lugs for attaching end bell to the motor case and this case to the gear case are all spot welded in place. The handle is spot welded to the end bell or the case, depending on the construction of the tool, and motor end bearings are welded to yokes, or, as in the case of the small tools, to the inside of the case head. Screws are used to assemble the end bell, motor case and the gear case. Drilled and tapped lugs on the gear case match with pressed metal lugs which are spot welded to the motor case. If the end bell is separate from the case tie screws with nuts hold the two parts in place by being passed through spot welded pressed steel lugs.

When both the shell and end bell were castings the following set-ups were required: four screw machine, five milling machine and three drill press; also two tapping

*Resident editor, THE IRON AGE, Chicago.

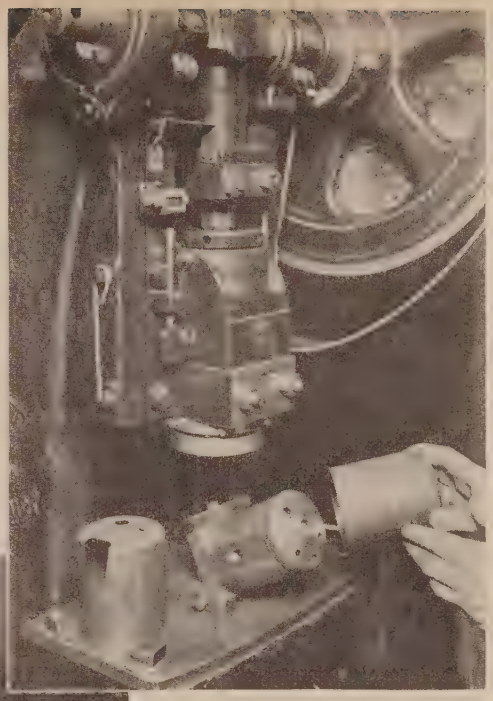
All Attachments, Such as Handles, Junction or Switch Boxes, Bearing Brackets and Screw Lugs, Are of Pressed Steel and Are Spot Welded to the Motor Case

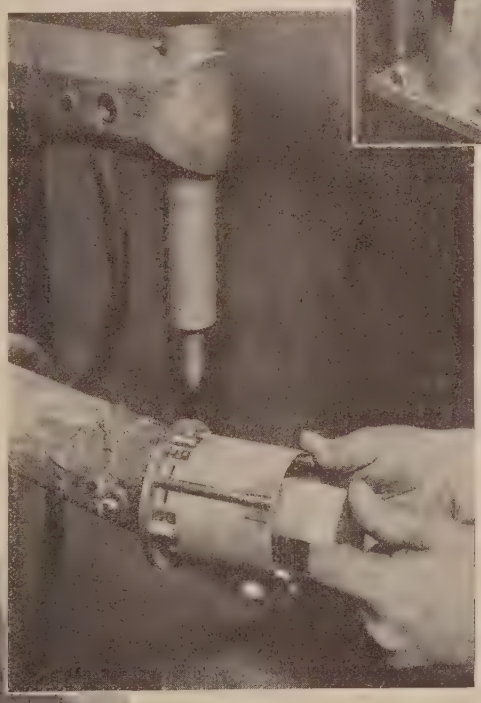
operations. The use of pressed metal calls for eight punch press, three spot welding and two screw machine operations. Equipment previously used was a screw machine, a miller, and an eight-spindle gang drill press. There are now in use a spot welder, a No. 2 punch press and a screw machine.

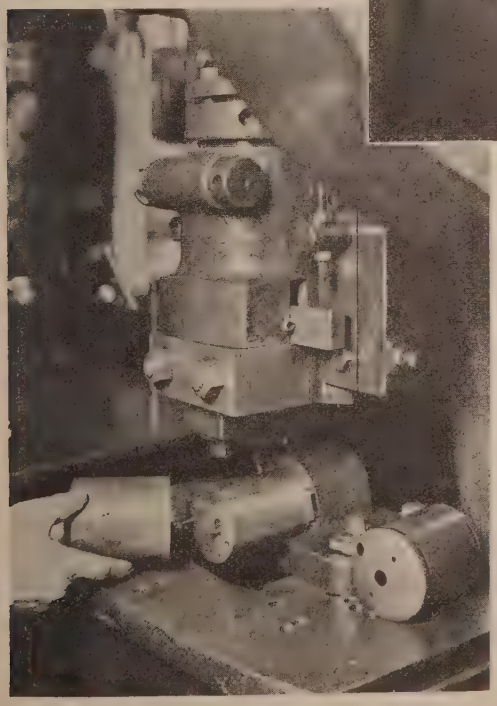
Press and Welding Operations Simple

An idea of the simplicity of punch press and welding operations may be had by reviewing the methods used in making the motor case for a small electric drill. The cases are purchased trimmed to size, and for this size of tool the head and the barrel are not cut apart. The first press operation is punching the holes in the end and, in some cases, a slot which in a subsequent operation is extended to the side of the shell. The lower die for this operation is hinged so that it may be tipped forward as illustrated to receive the steel shell. The die is then tipped back so that its axis is vertical and in line with the center of the punch head. A latch holds the die block to the punch press plate. To remove the finished part the operator releases the latch, tips the die forward and lifts off the shell.

Ventilator slots in the side of the shell are cut in another punch press operation on a cantilever type die block. Two pins inserted in the head of the die serve to properly locate the shell on the die. When the shell is properly seated these pins project through two of the holes which were cut in the end of the shell in the operation already described. The cantilever part of the die is free to rotate. A pin, which is pressed into place by a spring, drops into notches cut in the movable part of the die, thereby serving as a feeler so that after one pair of slots has been cut the operator rotates the die block until he feels the pin drop in the next notch; he then knows the shell is in the right position for cutting the next pair of ventilator slots.







HOLES and Slots Are Punched In the Motor Case Head On a Die Which Tips Forward to Receive the Blank, as Shown Above. The punched holes are used as guides in locating the piece for the second punch-press operation, shown at the lower left. A simple jig (at the left) serves for locating the pressed metal screw lugs which are spot welded to the motor case

All parts that are spot welded are securely held in jigs to assure interchangeability and accuracy. Screw lugs are made of pressed steel and like other assembled steel parts are electrically spot welded in place. The jig for spotting lugs on the shell consists of a flanged collar. The collar is turned so that it fits snugly into the end of the pressed steel motor shell with the flange resting against the end of the shell. Pins mounted in the flange extend along the outside of the shell, as illustrated. The diameter of each pin up to the point where a lug is to be fitted is larger than the opening in the lug. At the exact location of the lug the pin is turned down so the lug will snap over it. The shoulder formed by turning the pin forms a gage for the location of the lug. The pins are of various lengths so that all the lugs at the base and at the top of the shell are properly located before spot welding. After welding, the pressed metal parts are cleaned and lacquered.

"The greatest problem in production is that most uncertain factor, human nature," said Prof. Earle Buckingham, Massachusetts Institute of Technology, in a paper on Quality Control and Production Gages, presented at last week's meeting of mechanical engineers. "The present tendency is to provide equipment that can be operated by semi-skilled labor. Equipment cannot be made altogether fool-proof. The best that can be done is to arrange matters so that little or no excuse remains for making mistakes."

Economic Production Quantities

Utilizing Mathematical Formulas to Determine Lot Sizes in Manufacturing—Simplified Forms Believed Adequate

THREE papers were read before the American Society of Mechanical Engineers on Dec. 5, at the annual meeting in New York, dealing with determination of the economically best production quantity for manufacturing. One of these papers, by C. H. Best, supervisor of materials, Eli Lilly & Co., Indianapolis, dealt with 12 years' experience with the use of a formula for this work. A paper by Robert W. Kent, vice-president, Bigelow, Kent, Willard & Co., Boston, referred to obstacles encountered in introducing mathematical formulas for economic manufacturing quantities. A considerably longer paper by Fairfield E. Raymond, assistant professor of industrial research, Massachusetts Institute of Technology, Cambridge, was entitled "Advantages Derived from the Simplification of the Fundamental Formulas for Economic Production Quantities."

Experience Shows Value of Method

FOR twelve years economic production quantities have governed the sizes of production orders in the plant of Eli Lilly & Co. Mr. Best's paper outlines briefly some of the major results of this practice, both direct and indirect, and discusses some of the cost-accruing problems which were encountered in the derivation of the formulas. The discussion of cost-accounting problems is limited to such problems as might be generally encountered in other plants.

The company manufactures and ships from stock approximately 2400 products, which are marketed in over 8500 different packages. The problem is to maintain stocks of these 8500 items at the lowest possible combined cost of labor of preparation and charges for carrying the merchandise until sold. It was recognized long before 1917 that the quantity produced in a single batch was one of the important factors in determining the cost of producing and carrying the merchandise.

Data were assembled and eventually a mathematical formula was derived for "total cost," as follows:

$$N = 262.8\sqrt{\frac{Y}{M + 202}}$$

where N = economic production quantity in units
Y = number of units sold yearly, and
M = cost of material in cents per unit.

The solution is an easy slide-rule calculation.

During 1917 the production of the plant was handled in 25,633, batches with a labor force of 554. Since 1917 the annual output has very materially increased. In 1928 the increased output was handled in 13,453 batches with a labor force of 482.

Inventory Reduced Considerably

During the past five years the inventory of raw materials has been reduced 21½ per cent by taking advantage of conditions brought about by larger and less frequent batches or runs of staple products. Larger and less frequent batches of staple products suggested scheduling the production of these items in advance, so that raw-material purchases could be scheduled to arrive just in time to meet the production schedules. The average inventory of raw materials in 1928 was $185,000 less than it would have been at the same rate of turnover as was experienced in 1923.

To sum up, economic production quantities have afforded, or have assisted in affording, the following advantages:

1. Considerably more production with 13,453 batches in 1928 than with 25,633 batches in 1917.
2. Considerably more production with a labor force of 482 in 1928 than with one of 554 in 1917.
3. Planning-Department supervision of production at reasonable cost (23 persons, who do certain other work also).
4. Increase in application of mechanical handling of materials.
5. Reduction of 21½ per cent in raw-material inventory.
6. An increase in turnover of finished-stock account from three and two-thirds times a year to four and one-third times.

Executive Must Be Educated

FOR the sake of establishing better manufacturing procedure, Mr. Kent points out methods for determining how much to manufacture of a particular item or part at one time or in one lot. He discusses what is meant by economic manufacturing quantities, the aid toward increasing profits that comes from use of proper formulas, and states that minimum economic manufacturing cost can be obtained only through application of the principles made use of in developing a proper formula to fit each specific case.

Formulas are available which will prove valuable if used. It is true that attempts to understand them may prove discouraging unless one is either very patient or of rather above-average mathematical cleverness. Successful and practical manufacturing executives do not usually develop the nimbleness in transposing concrete facts and experience into abstract formulas necessary to digest rapidly and "become sold on" the practicability of using *x's*, *y's* and *k's* to tell them how much should be manufactured at one time.

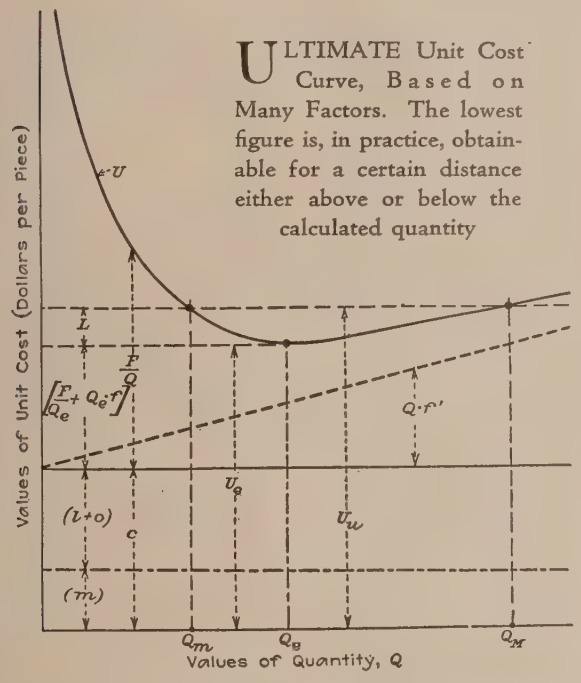
A successful manufacturer is usually apt to fear anything which savors of mystery or magic. Furthermore, anything not readily subject to proof, or anything involving complications of any kind, is apt to hide errors, and factory procedure, to be successful, needs to be as foolproof as possible. Obscurity of any kind reduces foolproofness.

Return Must Be Far Above 6 Per Cent

It is possible that there has not been sufficiently appreciated the extent to which return on capital invested in industry should exceed the return on investment in sound, negotiable securities. It is common for members of the producing phases of industry to think more or less of 6 per cent as a definite interest rate to be used in all calculations they make. But it is probable that return on investment in inventories, equipment, etc., used in industry

might much more properly be figured at 9 to 18 per cent, so that investors in industry may be assured of an added income to warrant their taking the added business risk.

It developed that a very real cause of the necessity for halving or quartering manufacturing quantities as calculated through the use of formulas, in the author's early experience with them, was that too low an interest rate on investment and inventory had been used. The modern economist, as well as the investment banker, in analyzing and diagnosing business situations, more or less accepts as standard the necessity for earning returns in excess of 9 per cent. The risks brought out through the possibility of changes and fluctuations in material prices, obsolescence due to new developments, credit stringencies, or business



ULTIMATE Unit Cost Curve, Based on Many Factors. The lowest figure is, in practice, obtainable for a certain distance either above or below the calculated quantity

depressions of any kind, require that planned returns should frequently be double normal attainable returns on negotiable securities.

Cost of Preparing to Process

Preparation cost, or the cost of making ready the various necessary equipment to run a production order of a given quantity, preparing the necessary forms, handling order through the plant, etc., is one of the most influencing factors in mathematical determination of an economic manufacturing quantity. In making use of mathematical formulas for this purpose it is essential in many cases that entire accounting methods be changed so that total preparatory expense may be correctly determined.

Lots of 1000 units frequently will be found to have been used for manufacturing quantities, for no specific reason. Quantities which will keep factory workers busily employed for one day, or one pay period, seem to be in vogue. Quantities which will constitute a truckload or a trayload also seem to prevail as standards employed in determining size of manufacturing lots. All of these, of course, seem ridiculous in that they present no consideration of the real cost involved nor the effect on cost of difference in the size of lots.

Experience has proved that, if sufficiently careful consideration is given to the particular application of the formula involved, surprising economy may be effected. Occasions have arisen where entire factory management policies were advantageously changed as a result of making use of economic manufacturing quantities.

Evaluating Many Factors

PROFESSOR RAYMOND'S paper seeks to demonstrate that a rapid and reliable method can be developed for application to the problems most frequently encountered in planning production schedules and controlling inventories. This method is stated to be more simple than the fundamental formula developed in the author's 1927 paper on "Economic Production Quantities." Other advantages are gained from the simplified method.

Advantages accruing from the use of Calculation Sheets proposed in the paper, methods of simplification, an approximate solution, elimination of extraordinary factors, consideration of the major elements, determining a coefficient of allowable variation in the data, all are outlined in the paper. A short-cut method for determining the economic production quantity and a study of the losses due to an uneconomic value are given.

Limits of the usefulness of the method are explored and a curve shown, herewith reproduced, for a graphical means of solution. No attempt will be made here to explain the various factors covered in the curve. Suffice it to say that the heavy line traces, for varying quantities, the respective unit costs under a certain set of conditions. The lowest is that at Q_e.

Direct Labor vs. Set-Up Cost

BALANCING up between direct labor cost in production and the preparation or setting-up cost before production begins was stated by Gordon Pennington, consulting industrial engineer, Cleveland, to be the criterion in determining economic production quantities. When there is a change in the ratio between these two items it is necessary to change the formula or to refigure, in determining upon a proper quantity to make of any one lot. When the preparation or set-up cost increases with relation to the direct labor cost, larger batches will be called for.

A simple formula for an economic lot was given by Mr. Pennington as follows:

$$L = \sqrt{\frac{2\ A\ D}{K\ B}}.$$

in which L is the economic lot, A is the preparation cost in dollars, D is the demand in number of pieces yearly, B is the unit cost per piece, not including any part of the preparation cost, and K is the sum of interest, obsolescence, deterioration and storage charges, expressed as a fraction and not as a percentage.

Usually K falls between 0.12 and 0.36. The results from using this equation were said to have as great accuracy as is inherent in any cost accounting system now in general use. As a matter of fact, a difference of as much as 15 per cent in the size of the lot quantity may affect the total unit cost by not over 0.1 per cent.

General formulas for this unit lot, taking account of many factors, have been put forward. One given by Mr. Pennington was as follows:

$$L = \sqrt{\frac{A^2}{B^2} + \frac{AD}{KB}\left(\frac{NP}{NP-D}\right)} - \frac{A}{B}$$

In this expression L, A, D, B and K are the same as before. N is the number of working days in the year, while P is the volume of production in pieces per day.

It is important to establish a reorder point somewhere between the inventory excess and emergency shop orders needed to make up deficiencies. Either of these extremes would result in added costs.

Theory Must Sometimes Be Ignored

Variation in demand for the product introduces serious discrepancies in any such formula, in the opinion of Robert

T. Kent, director of sales and engineering, Divine Brothers Co., Utica, N. Y. He cited a case where, in the same plant, one department was so short of orders that it was difficult to keep a nucleus of the working force busy, while another department at the same time was hard put to it to get out the product, in spite of operating night and day crews.

In such a case it frequently becomes necessary to disregard economic production quantities for both departments. For the one, as it is necessary to keep the organization together if one is to avoid undue expense later in assembling a new organization, production lots will have to be much smaller than the theory would point out as desirable. In the other case, demand for prompt shipment may require the same thing—that is, small production lots, to keep from turning customers away to competitors, even though the theory would call for much larger lots.

At the same time, when conditions permit, as when shipments are asked for by telegraph, the lots could be very much larger than called for by the equation, because then the element of inventory and storage charges would be entirely absent, and the machines could be run over a much larger lot than the equation specifies.

Uses Rotary Foundry Melting Furnace

German Plant Makes Gray Iron and Malleable Castings from Horizontal Cylindrical Shell Fired with Powdered Coal

A FURNACE of unique design, called the Brackelsburg furnace, has recently been put into operation in Germany in the production of high-quality gray and malleable castings. The originality in the design arises chiefly from the fact that the furnace is a horizontal, cylindrical shell, rotating during melting and superheating, and fired with powdered coal. The general features are given in publication No. 131 of the Kaiser Wilhelm Institüt für Eisenforschung, Dusseldorf.

The shell, which is of steel plate, is about 16 ft. in length and 5 ft. in outside diameter. It is lined with fireclay and silica brick and has a capacity of four to five tons. The flame enters one end and leaves at the opposite end, no provision being made at present for recovering waste heat in the stack gases. Charging is effected through the outgoing gas opening. The metal is tapped from an opening on the long side of the furnace.

Rate of Revolution Slow During Melting

Rotation of the furnace is accomplished by a ½-hp. motor. During melting the rate of revolution is comparatively slow, speeding up as the charge becomes liquid. In this way rapid exchange of heat between the "roof" and the metal charge is obtained.

Use of a very hot flame and the possibility of bringing the colder parts of the charge into repeated contact with it result in a short period of melting and only a slight oxidation loss. Owing to the blanket of slag which covers the metal as soon as it is melted, and which is not pulled away by rotation, the contamination of the iron by gas and oxides is very slight.

A comprehensive study, recently completed, deals with the heat and materials balances of two heats of malleable and one of gray. Among other factors studied was the fuel consumption. It was found that for the malleable heats about 13.5 lb. of coal were used per 100 lb. of iron charged, while for the gray iron heat 9.7 lb. were used. This, it is pointed out, compares favorably with any other type of furnace of the same size. The fuel would doubtless be considerably reduced in a large furnace, where equipment for utilizing the heat in waste gases would be available. The metalloid loss is given in an accompanying table:

Table of the Loss of Metalloids

Heat	C	Si	Mn	P	S
Malleable	%	%	%	%	%
Charged	3.31	1.25	0.19	0.068	0.059
Finished	2.82	0.99	0.16	0.072	0.077
Loss	0.49	0.26	0.03	0.004*	0.018*
Malleable					
Charged	3.33	1.25	0.19	0.069	0.063
Finished	2.88	0.87	0.15	0.078	0.057
Loss	0.45	0.38	0.04	0.009*	0.006
Gray					
Charged	2.80	3.62	1.24	0.076	0.023
Finished	2.79	3.28	0.98	0.090	0.028
Loss	0.01	0.34	0.26	0.014*	0.005*

*Gain.

A further conception of the operation of the furnace is given by the accompanying heat balances, which are expressed in per cent on the total heat input.

Table of Heat Balances in Per Cent of Total Heat Input

(A) Input	Malleable	Malleable	Gray
In charge	0.16	0.18	0.05
fuel	96.85	95.17	95.00
metalloid loss	2.99	4.65	4.95
Total	100.00	100.00	100.00
(B) Output			
In iron	31.52	27.31	39.09
slag	2.56	3.73	4.60
waste gas	51.10	55.36	45.05
Incomplete combustion	8.07	2.26	4.35
Dust, evaporation of water, etc.	2.35	3.12	2.79
Unaccounted for	4.40	8.22	4.12
Total	100.00	100.00	100.00

The tonnage melted per hour in the three heats was, respectively, 0.55, 0.46 and 0.60. This could, no doubt, be increased if some use were made of the fifty odd per cent of the heat now passing up the stack.

Savings from Use of Materials-Handling Equipment

Fully 80 per cent of the manufacturing plants not accustomed to the use of material-handling machinery, and particularly overhead machinery in large ways, do not realize the savings effected through the application of these two principles of handling materials. This is the conclusion reached by E. T. Bennington, manager, Cleveland Electric Tramrail Division, Wickliffe, Ohio, in a paper before the American Society of Mechanical Engineers' Akron meeting.

It is true that it is difficult for any engineer to determine definitely just how great these savings will be. It is one of those things for which no definite plans will probably ever be developed for calculating purposes, because of the various conditions encountered in the plants. But it is not difficult to go back, after these principles have been adopted by some manufacturer, and compare the cost under the new scheme of things with that existing before their application.

Aeronautical Aluminum Foundry

All Castings for Several Types of Wright Airplane Engines Made in New Plant—Unusual Daylight and Absence of Fumes

BY FAY LEONE FAUROTE*

IN several respects, the new Wright Aeronautical Corporation foundry in Paterson, N. J., is unique. It has a basement; it is so light and airy that artificial light ordinarily is not needed; there is an almost complete absence of fumes and odors arising from core-making and casting. It is devoted entirely to the manufacture of aluminum castings, except for an occasional bronze or experimental casting called for by the engineering department.

Seven major castings, comprising the important units of the Wright "Whirlwind" and "Cyclone" aeronautical engines, are made of aluminum alloy. Few foundries in the United States are equipped to make such aluminum castings commercially. After attempting to buy them outside, with more or less indifferent success, the Wright engineers concluded that, to obtain castings of their required excellence, it would be necessary for them to install their own foundry, specify their own aluminum alloys, make and bake their own cores, and have all parts and processes under their immediate control and supervision. From the beginning of their commercial manufacture, Wright aluminum engine parts have been made in their own plant. This applies also to the smaller minor parts, as well as those major components mentioned.

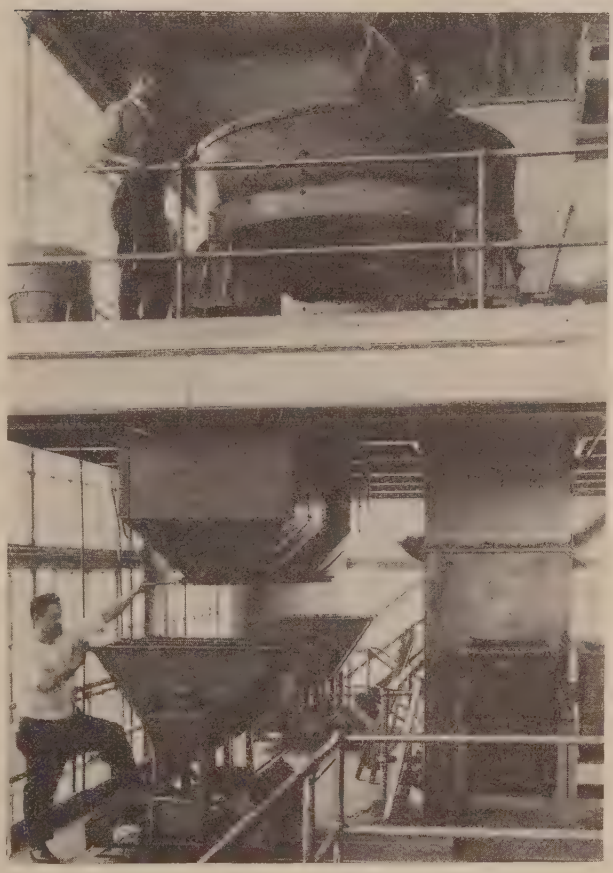
More than a year ago it was apparent even to the casual observer that the former foundry facilities were inadequate. Located on the first floor of the original wing, poorly lighted, cramped in space, it was difficult for even good foundrymen to return a high percentage of sound castings. And so the new foundry, 562 ft. long, 102 ft. wide, has been built of steel, glass, brick and concrete.

Mainly one story high, the building has a three-story section at one end, the second and third stories housing the wood and metal pattern shops. A full basement runs the entire length, and, the main floor being built about 4 ft. above grade, this permits windows in the basement walls. The first floor is of flat slab reinforced concrete construction, and the main story of structural steel, with center bay 40 ft. wide by 26 ft. 7 in. clear height, each side bay being 31 ft. wide with an average height of 17 ft.

Sidewalls are brick to the window sills, with steel sash from there to the roof. These sash have large ventilating elements, and the monitor sash also ventilate. The roof is of reinforced concrete.

Three main sections comprise the main floor. One for core making, one for molding and one for cleaning, heat treating, pickling, inspection, shipping and offices. In this latter section the cleaning department, heat-treating furnaces, pickling, welding and inspection departments are housed, each in a separate room.

Altogether, this new Wright unit adds some 128,000 sq. ft. to the already rapidly growing group recently erected on the original site a few hundred feet away.



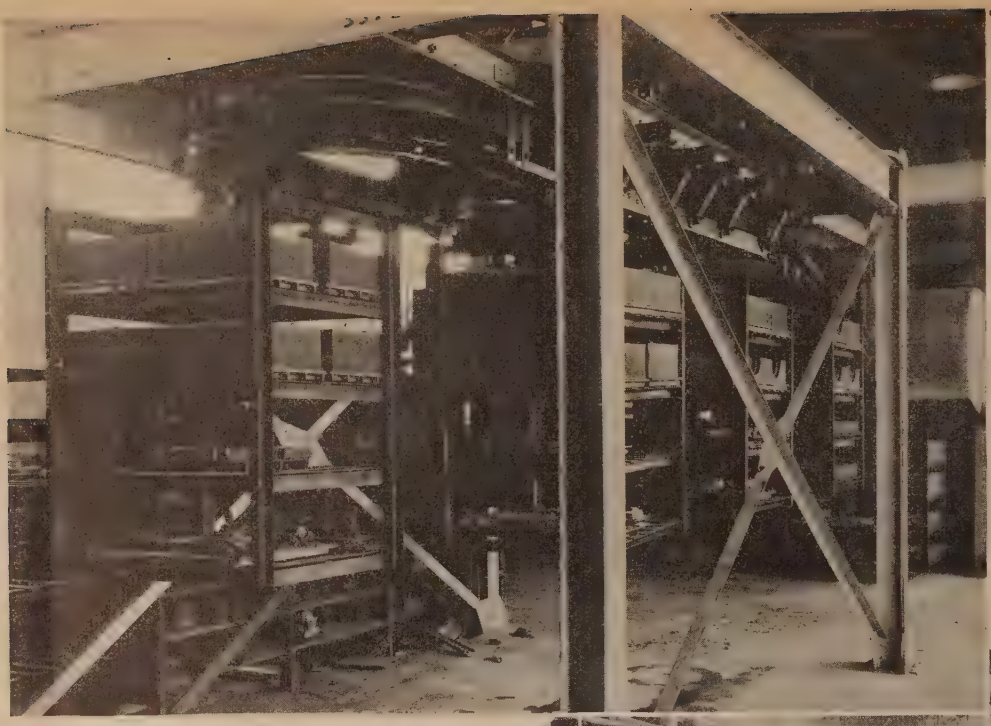
Simpson Sand Mixer at Top Mixing Sand With Oil for Making Cores and Molds. Sand is let out left side of mixer, dumped down into conveyors on the next floor and then hauled to the distributing point in the core and mold shop. On the right the square stack is the conveyor or elevator which hauls sand up from storage into mixer

Ample Room for Expansion

Designed by the Wright foundry engineers, the building was erected by the John W. Ferguson Co., Paterson. It is located on a piece of land recently acquired by the Wright company, comprising some 17.4 acres, so there is ample room for future expansion in the 15.6 acres left. At the present rate of growth of the aeronautical industry, it will not be surprising if this foundry capacity, large as it now is, will need to be doubled within the next year or two. At present writing, the foundry is able to take care of 500 engines a month.

It has been pointed out by officials of the Wright foundry that the crankcase castings are especially diffi-

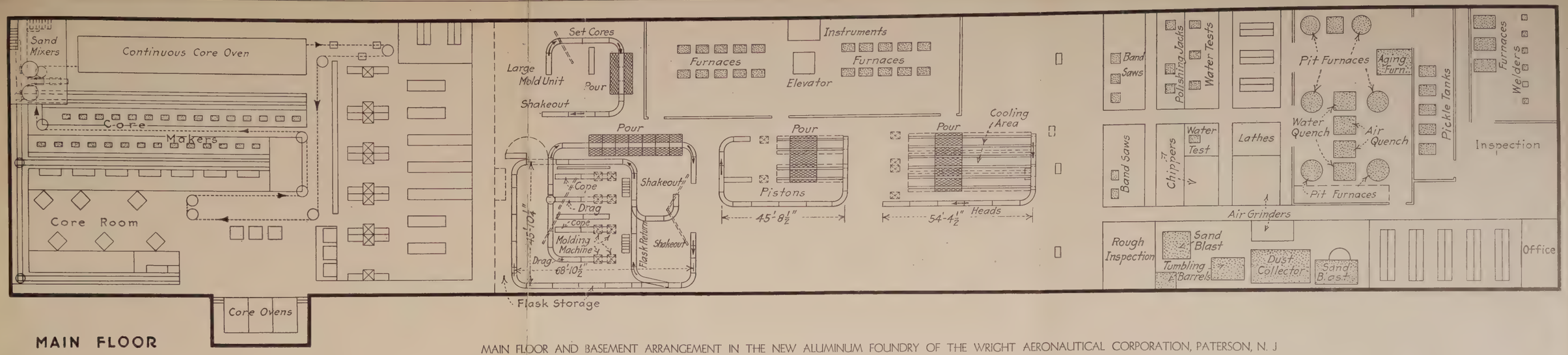
*Mechanical engineer, New York.



CORES, in Racks on Endless Chain, Emerging from Continuous Core Oven

ONE Boy in Core Room (in Circle) with the Trays Depending at Left from the Endless Chain. Coremakers at right load cores on the trays as they pass slowly by. Track above coremakers serves to distribute core sand, which is dumped through the screens into chutes as needed

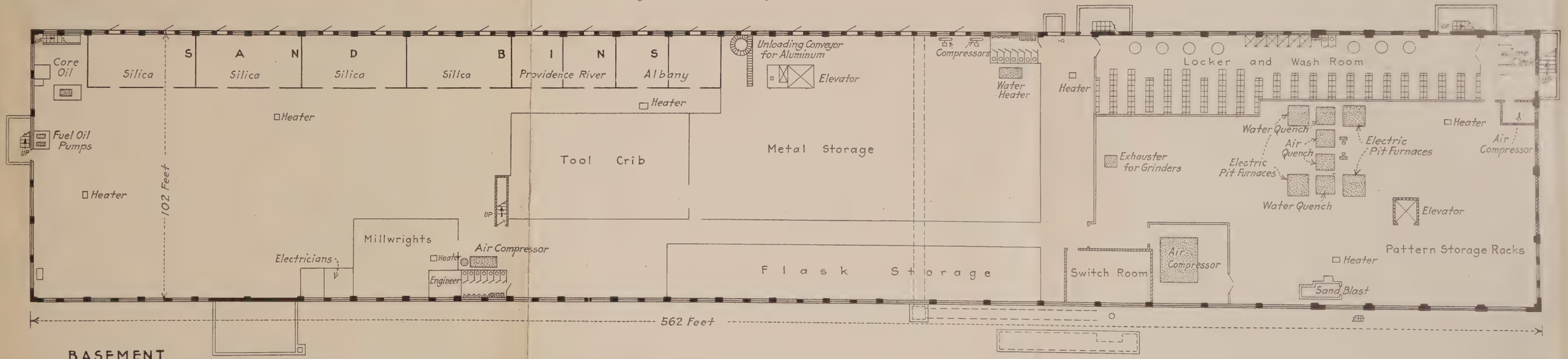
ROLLER Conveyors for Crankcases, with a Pouring Station in Foreground



MAIN FLOOR

MAIN FLOOR AND BASEMENT ARRANGEMENT IN THE NEW ALUMINUM FOUNDRY OF THE WRIGHT AERONAUTICAL CORPORATION, PATERSON, N. J

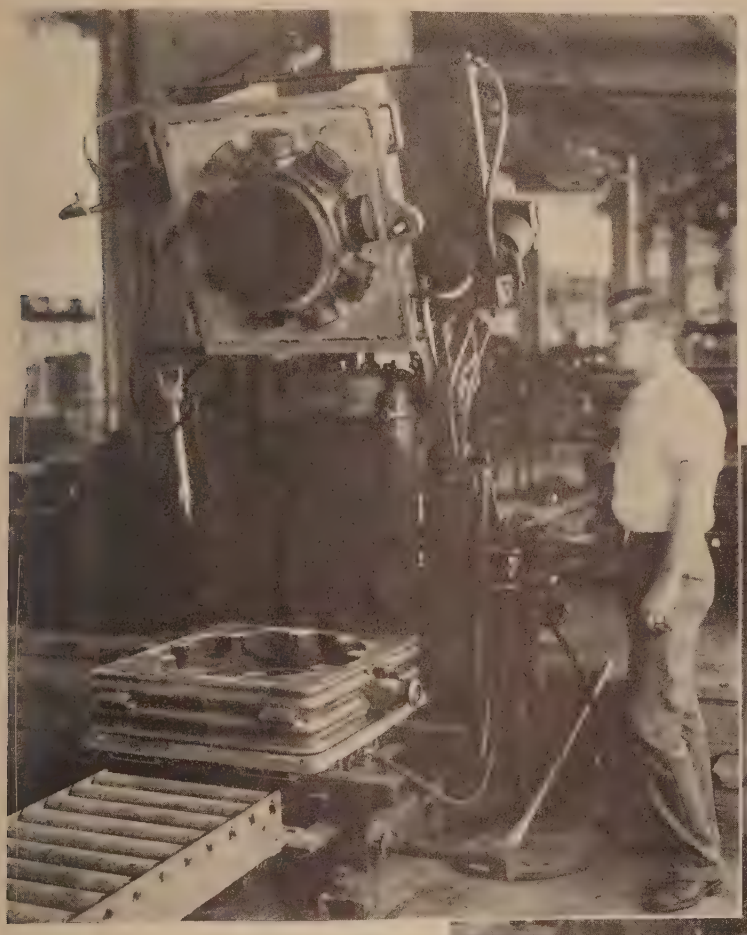
THE self-contained units for molding and pouring, all four in close proximity to the melting furnaces, are a feature. Core racks suspended from the traveling chain running through the continuous core oven pass slowly by the core makers, who load the racks as they pass. Cleaning, inspection and heat treating are handled at the other end of the 562-ft. building. This arrangement avoids cross-hauling of materials in process. As the basement is well out of the ground, it has unusual natural light.



BASEMENT

cult of production, as are also the cylinder head and piston. The cylinder head is a completely cored job. Other jobs are elaborate in the extreme, difficult to mold, requiring many cores and chills, multitudes of nails, trick venting and careful pouring. In the rear crankcase section alone, some 40 cores are used.

in the automatic conveyor ovens for about 3¼ hr. A Gehnrich continuous core oven is employed, oil-fired and with the temperature automatically controlled. Four sets of twin burners supply the heat, one of each pair operating continuously, the other automatically cutting in and out when the recording pyrometers indicate an over



TABOR MFG. CO. Compressed-Air Molding Machine (Left) Used in Making the Heavier Molds

* * * *

CLOSING Seven - Cylinder-Crank-Case Molds (Below) with Aid of Pneumatic Hoist

In the "Whirlwind" series of five-, seven-, and nine-cylinder engines, 94 per cent of the parts are interchangeable, under the new design. But the crankcase sections, of course, owing to the number of cylinders used, cannot be made so. Furthermoore, there are needed the castings for the "Cyclone," the large 525-hp. Wright radial, the new inverted-V Wright engine, the marine power plant and a considerable amount of experimental work which always must be done.

Larger cores, which take much time, are baked in the usual manner in large stationary ovens. But all but the very large ones are loaded on to pendant shelves and carried through the continuous ovens on automatic conveyors. There are three rack-type core ovens in use, also, supplied by the Foundry Equipment Co., Cleveland. Racks of cores are put in and removed by means of an Elwell-Parker electric lift truck.

Baking Cores in Continuous Oven

Most of the cores are made in special core-molding machines. The sand is mixed with oil core compound (containing roughly 80 per cent of linseed oil) and baked or under temperature. The core-baking oven is maintained at 470 deg. Fahr.

While the core conveyor chain is 660 ft. long, only about 250 ft. of it is in the oven. It moves about one foot a minute, and a carrier takes some 11 hr. to make the round trip from loading through oven to unloading, loading and back again.

Conveyor carriers pass down through a row of 25 core

machines, where the cores are made and loaded directly on the carriers by the men making them. This line of conveyor travels on an inclined track, so that empty shelfroom is always available to the various operators along the line, at about the same loading level.

From here the carriers are conveyed through the baking oven. In discharging them from the oven the conveyor takes them to a cooling zone. They are then carried alongside the unloading benches, where the cores are unloaded from the conveyor carriers and then continued through the subsequent process of blacking and pasting. The empty carriers of the continuous conveyor then repass through the loading section as before. The carriers are spaced 6 ft. apart and each carrier handles a load of about 1000 lb of cores and core plates. The system provides a loading surface of approximately 3600 sq. ft. of shelf area each 9½-hr. day.

Oil-burning equipment used for heating the continuous core oven is of the induced draft type. It is mounted directly underneath the oven and is equipped with automatic temperature control. From preliminary estimate, the operation in this oven is to bake 300 lb. of cores on each gallon of oil burned. The oven and dryer has an overall length of 125 ft., width of 14 ft. and height of 14 ft.

Baked cores as unloaded from the conveyor oven are pasted and painted with a blacking, to provide a smooth pouring surface. This paste and blacking finish is baked on to the cores in six direct gas-heated ovens set up in pairs, conveniently located in the core department.

These cores cover practically all of the various parts required in the manufacture of Wright motors, such as fin body, pistons, barrel cores, runner box, crankcase cores and a large variety of smaller parts.

International core machines are used. The core sand, which comes from southern New Jersey, is elevated from the basement to the mezzanine floor in the main building, where it is mixed in a Simpson sand mixer with Woodseed core oil. It is then dropped into four-wheeled hopper cars running on a track on an elevated platform, rolled along as required and dumped into chutes which, in turn, discharge at convenient stations near the core machines. Each hopper car can be dumped at either side; a sheet steel apron, covering the wheels, directs the sand into the head of the chute.

Some of the core sand is used over again, but most of the used sand is shoved through a grating on to a belt which carries it outside the building to a dump cart.

Molding sand comes from the Albany, N. Y., neighborhood. This is of course, after use, reconditioned, aerated and used over again. A Royer sand separator and blender and an Axman sand cutter are employed for reconditioning.

[*A second article will cover the careful heat treatment required in making aluminum aircraft castings and the wood and metal pattern shops.*]

Alloy Steels in the Railroad Field

A PAPER entitled "Alloy Steels in the Railroad Field" was read before the annual meeting of the American Society of Mechanical Engineers by Charles McKnight, International Nickel Co., New York, which hardly covered the ground indicated in the title. The author confined himself to locomotive parts, and while he mentioned many alloys, dwelt particularly upon nickel steels and irons. Considerable space was given to alloy steel castings for side frames, alloy cast iron for cylinders, and nickel steel plate for boilers, all of which have been described at length in THE IRON AGE within recent years.

Much emphasis was properly laid upon the fact that the purchaser of alloy steel should expect to pay at least a cent a pound for "quality"—representing high-grade raw materials and extra care in manufacture—and that old-fashioned carbon steels, when given equivalent attention, are capable of unusually good properties. Mr. McKnight assumed a critical attitude toward "semi-alloy" steels, recommending that analyses with an ample proportion of alloy be selected, but only for places where the best of plain carbon steels are deficient.

In discussion, A. W. Minuse, Central Alloy Steel Corporation, Canton, Ohio, said that a considerable amount of stainless iron (low carbon, 18 per cent chromium alloy) has been used during the last two years for firebox plates and syphons. It does not scale at operating temperature, and its brittle-temperature range is enough higher than that of best quality flange steel that higher pressures can be safely carried in the boiler.

J. R. Campbell, Baldwin Locomotive Works, Philadelphia, recalled that his company's experience on heat treated high carbon and alloy steels dated back at least 25 years, and he was personally acquainted with a fleet of over a dozen locomotives which were built and equipped 15 years ago with forged nickel-chromium steel side rods and pistons. Owing to a combination of good design, good steel, good forging, good heat treatment and careful machining, these parts had given excellent service; reported troubles having been limited to two piston rods. Ten-inch wrist pins on a group of electric locomotives built 14 years ago were made of plain high carbon steel (carbon 0.70 per cent, manganese 0.65 per cent). These were oil quenched and drawn under accurate pyrometric control; test bars gave ultimate strength 140,000 lb. per sq. in.; elastic built, 90,000 lb. per sq. in.; elongation 13 per cent and reduction in area 20 per cent; despite these excellent figures and good impact tests, these wrist pins were unsuccessful. Engines built today are reaching loads of 170,000 lb. on a piston, which in Mr. Campbell's opinion requires a quenched and drawn steel.

G. M. Eaton, Molybdenum Corporation of America, Pittsburgh, said that since wrist pins are subject to rapidly alternating stresses, their failure is frequently due to fatigue. Fatigue or endurance strength of steels appears to be more intimately related to the ultimate strength of the steel than to any of the other tensile properties, but the figures available for designers had all been determined from small samples with polished surfaces. It is known that scratches or lack of well rounded fillets reduce the endurance limit seriously; also that a hot-rolled bar with the mill scale on it may fail under alternating stress at half the loading to be expected. Consequently there was a great need for fatigue tests on full-size machine parts.

Mr. Eaton was confident that plain carbon steels should be used on locomotives wherever it is good enough for the working loads. Especially did he criticize use of case hardened or nitrided materials for essential parts like main pins or axles, calling attention to the well known facility, with which a crack in the hard brittle surface is propagated through the ductile core. If hard wearing surfaces are desired, these should be produced on thin bushings, which can be shrunk on; if they crack it only causes a train delay.

Modern Trends in Alloy Steels

Meeting Demands for Better Rails—Tests on a Chromium Rail—Modern Cutting Tools Compared—What Constitutes an Alloy Steel

LAST February, at the annual meeting of the American Institute of Mining and Metallurgical Engineers, the James Douglas Medal was awarded to Dr. Paul D. Merica, director of research, International Nickel Co., New York. Because of a protracted illness, Dr. Merica was unable to be present to receive the medal at the annual banquet of the institute at the Waldorf-Astoria Hotel, Feb. 20. (THE IRON AGE, Feb. 28, page 608.) It was announced, however, that the medal would be publicly presented at some future date.

Douglas Medal Presented to Dr. Merica

On Wednesday evening, Dec. 4, at a meeting of the New York Section of the institute, the medal was formally presented to Dr. Merica. The presentation and technical session which followed were preceded by a dinner at the club rooms of the Building Trades Employers' Association, 2 Park Avenue, New York. Immediately following the dinner, Stanislaus Skowronski, research chemist, Raritan Copper Works, Perth Amboy, N. J., chairman of the institute of metals division, formally notified Dr. Merica of the award of the medal.

In an appropriate speech Dr. Merica accepted the honor, dwelling briefly upon the fact that three of the six recipients of the medal since 1923 are members of the institute of metals division, and calling attention particularly to the fact that investigations in this field are divided primarily into two divisions—the extraction of the metal from the ores and the industrial applications of the metals in general. He emphasized the obstacles involved in finding applications, especially new ones, for certain metals and pointed out that this work is even more difficult than the extraction of the metals.

Recent Developments in Alloy Steels

FOLLOWING the presentation of the medal, C. E. MacQuigg, director Union Carbide & Carbon Research Laboratories, Inc., Long Island City, N. Y., delivered an address on "Recent Developments in Applications of Steels," followed by some discussion by a few of the hundred or so metallurgists present.

In general Mr. MacQuigg's discussion embraced only the alloy steels. Plain carbon steels have not made any new departure in composition in recent years, although there are many interesting expansions in their application, said Mr. MacQuigg. In 1928 of the 51,544,180 gross tons of all kinds of steel produced, 3,214,909 tons, or 6.2 per cent, was alloy steel, according to the data of the American Iron and Steel Institute. The whole story of steel has been one of constant progress, a consistent effort to meet the ever-increasing demands for enhanced properties. An example, taken from the experience of ordnance makers, is typical—shells to pierce the invulnerable armor and then armor to withstand the armor-piercing shell. At present, the shells seem to have it.

After discussing the progress which has been made in the application of steel in bridges and pointing out how the tensile strength in the latest bridge involves steels having strengths of 225,000 lb. per sq. in., the speaker dwelt briefly on rail steels in which field a jacking-up process has also been applied to the physical properties. This is because unit stresses are being raised, due to the ever-increasing wheel loads. This has led not only to an increase in the weight of the rail section, but to the marked raising of the carbon content to make a stronger and stiffer rail.

Inasmuch as rails may at times develop unit stresses of between 50,000 and 100,000 lb. per sq. in., the trial of alloy steel is not an illogical step. Heat treatment of the plain carbon steel rail is also being developed. In regard to the 13 per cent manganese rail, Mr. MacQuigg pointed out that this metal exhibits extreme resistance to wear when severely punished by pounding and shock, coupled with unusual toughness. The rail, however, is expensive and, since the disposal of scrap is a serious question, the use is restricted. Following the satisfactory results obtained by medium high-manganese steel for forgings, the medium-manganese rail has been developed. Its use has expanded notably in the past few years, the annual consumption by one system alone having risen from 50,000 to 80,000 tons in three years.

One factor in connection with the development of better steels for rails is that conditions are changing to such an extent that the exact requirements for the ideal material cannot be determined. One developed line of attack is to increase greatly the elastic limit of the steel, rather begging the question of ductility on the supposition that rail failures, other than wear, are resulting from excessive deformation, these, in turn, leading to the development of internal flaws.

Chromium Steel Rails Stand Tests

The speaker then referred to some work recently done on a 3 per cent chromium low-carbon steel rail. The idea is to make use of the high wear-resisting and air-hardening properties of such steel. Such a composition, it was argued, would give a dense, small grain in the center of the rail head, plus high tensile strength and wear resistance due to the chromium content. At the same time ease of machinability, as well as toughness and ductility, would be assured by the low carbon. Drop tests on these rails, using a 2000-lb. tup with 22-ft. drop, have shown that they possess greater stiffness and better distributed ductility than the plain carbon or medium-manganese steel rails of smaller section. Slides were shown of the Brinell hardness of the sections as cooled on the hot bed; these were in the neighborhood of 360 to 390. In spite of these high hardness values, said Mr. MacQuigg, the rail machines with ease and the drop tests were surprising in the number of blows required to break the sections. Final decision, however, must await rail tests in service.

The speaker alluded to a recent report on the behavior of a high-chromium rail steel in England, which is decidedly favorable. The rails contain about 1 per cent chromium with carbon about 0.50 per cent, manganese 0.80 per cent and silicon 0.20 per cent. Wear resistance of these rails has been exceedingly good.

Elimination of transverse fissures may not be expected to result from the use of alloys if, as seems to be the present consensus of opinion, they originate in the process of manufacture. Alloys will only add strength, toughness

or resistance to wear, and under some conditions may require better manufacturing technique.

Stronger Steels for Airplanes

DISCUSSING steels for dynamic use, as contrasted with those for static use, Mr. MacQuigg reviewed the substitution of metal for wood in airplanes, stating that the latest step is the use of sheet metal for fabric and that the day of the all-metal plane has already arrived —at least for the larger units. There is an increasing demand for high-tensile wire for airplanes. Where construction permits, very high unit stresses may be carried and high tensile strength can be developed by wire drawing. This will be used in the absence of stresses of compression or bending. Chromium-molybdenum steel is being largely used today in the joints of aircraft frames and in the fuselage itself, this steel having been selected because of its toughness and partly on account of its reliability under heat treatment.

Improvements Made in Cutting Tools

REFERRING to cutting tools, increased production per unit of labor time is brought about by cooperation of the metallurgist and the machine tool builder. The metallurgist's duty is to produce a tool that can do more work than its predecessor and the engineer must then build machine tools that can take advantage of this increase in ability. Cutting tools in general use are made of plain carbon steel, high-speed steel and Haynes stellite. When each of these tools was introduced it was a great improvement upon those in existence and each has contributed greatly to industrial developments.

By the use of Haynes stellite tools, it is now common practice to fully machine cylinder blocks at a cost of $1.13 for direct labor, this charge including all of the work necessary to make the rough casting ready to be placed in the motor assembly line.

High-Speed Steel 20,000,000 Lb. Annually

It is estimated that about 20,000,000 lb. of high-speed steel is produced annually, with the following distribution: Twist drills, reamers, counterbores and formed tools of that type, 30 per cent; cutters, hobs, mills and formed tools of similar type, 25 per cent; disks, punches, etc., 15 per cent; turning tools for lathes, for planers, shapers and boring tools, etc., 20 per cent; with other uses totaling 10 per cent. It is estimated that $200,000,000 a year is saved by the use of high-speed steels in the manufacture of automobiles alone. This represents only actual savings due to decreased machining expense and does not take into account savings resulting from decreased costs of additional machines and other facilities. It has been estimated that less than $1,000,000 in tungsten for high-speed steel saves from two to three billion dollars annually.

Haynes stellite, however, has not and never will displace high-speed steel which, in turn, did not displace carbon tool steel, each having a field in which it is superior to the others. The field for stellite is that of machining cast iron and for turning steel under fairly rigid conditions. The greatest field for high-speed steel tools today is the turning of steel parts on full automatic and semi-automatic machines. Plain carbon steel tools find their most valuable application for some kinds of finishing work and various turning jobs.

Effect of Tungsten Carbide Tools

Referring to the latest developments in this line, tungsten-carbide tools, the speaker said that during the past two years tools of this kind have been given more or less extensive trials by several manufacturers. Owing to their high mineral hardness, which lies between corundum and diamond on the scale, these tools will machine products which have heretofore been considered unmachinable, such as glass, porcelain, fiber, manganese steel and hardened steels. It seems that they will probably be very successful for the turning of cast or chilled iron, on which kind of work they will have a life long enough to justify their high cost. It is also probable that machine tools will be built that will enable the manufacturer to take advantage of the fact that they can be run at higher speeds, thus resulting in still lower labor costs per unit of product. Their general utility for turning and cutting steel is at this time not so well assured, said Mr. MacQuigg.

These tools, however, offer the possibility of a distinct and definite change in the types of steels used for certain particular purposes. If it should prove feasible to use them for turning, milling and drilling harder steels than can be handled by present practices, it will be possible for the manufacturer of automobiles and other machines to use harder, and consequently stronger, steels for parts subject to heavy stresses. Such parts as crankshafts would be hardened, but would still be machinable with these tools. This opens up the possibility of using lighter sections and securing all the indirect advantages which would usually result from a decrease in the weight of moving parts.

About 25,000 *Tons of High-Chromium Steel Made Each Year*

DISCUSSING the field of high-chromium corrosion-resistant steels, it is estimated that the total annual production is about 25,000 tons. The largest expansion is probably taking place in the fields of chemical technology and the food industry. These steels are, however, being used by the metallurgical and mining industries as well as by the petroleum engineer in his processes for oil cracking. One installation of a high-chromium nickel alloy alone will amount to several hundred thousand dollars in an ore-leaching process where the question of difficulty of replacements in an isolated situation very greatly outweighs considerations of first costs.

Locomotives Largest Field for Alloy Steels

In the discussion which ensued, Charles McKnight, metallurgist, International Nickel Co., New York, took some exceptions to the statement of the speaker regarding plain carbon steels. When alloy steel first appeared about 20 years ago, there was much difficulty in making a satisfactory product. As the technique and process improved, there was a corresponding enhancement of the quality of plain carbon steels and today these are of a much higher grade than they formerly were. The largest future use of alloy steels will be in the locomotive field, said Mr. McKnight. There is a constantly increasing use of these steels in forgings and castings incorporated in locomotives as well as in the boilers themselves.

In the 15 years before the war, when he was engaged in constructing copper smelters in the West, E. E. Thum, THE IRON AGE, New York, said that the various grades of steel which were available were decidedly limited. He vividly contrasted the situation today when numerous alloy steels of varied composition can be selected to accomplish difficult undertakings which greatly simplify the problems of the metallurgist and the engineer.

A Definition for Alloy Steels

Calling attention to the fact that we are dependent entirely upon the statistics gathered by the American Iron and Steel Institute as to the output of alloy steels, E. F. Cone, THE IRON AGE, New York, stated that there is no clear understanding of just what an alloy steel is and the statistics do not fully reflect the entire production. The statement of Mr. MacQuigg that copper-bearing steel is regarded in his discussion as an alloy steel is interesting. The statistics of the institute do not include the medium-manganese rail steel, of which a large quantity is made

each year. In some quarters it is contended that a true alloy steel is one which contains as a minimum 0.50 per cent of the alloying element. If this definition were accepted, it would rule out several of the important steels, such as carbon-vanadium and carbon-molybdenum steels and copper-bearing steels, all of which are now regular products. He also pointed out the confusion concerning the nomenclature of the high-chromium and the high-chromium nickel steels, a situation which certainly should be clarified.

Dr. F. M. Becket, vice-president, Union Carbide & Carbon Corporation, New York, could not agree to the statement that 0.50 per cent should limit the quantity of the alloying element for defining an alloy steel. He quoted a definition which he considered as excellent; namely, that an alloy steel is a plain carbon steel in which the addition of an alloying metal changes the properties of the steel. Asked as to whether he meant by this physical and chemical properties, such as non-corrosive qualities, he said that he would include both.

Effect of Composition on Hardness of Tungsten Steels

VARIOUS divergent results arising during the making and treating of tungsten steels led W. Zieler, *Stahl und Eisen*, 49 (1929), pages 1083 to 1084, to determine the effect of composition and drawing temperature on the hardness values.

Annealing and cooling are of primary importance in the formation of carbides in this system. Thus in the intermediate and higher tungsten steels, normal cooling favors the formation of a double carbide. With longer time near the critical temperature and slower cooling, this double carbide tends to split off more or less WC. However, small additions of chromium tend to prevent the decomposition and the splitting off of WC.

In tungsten steels the phases present may be classified as—Fe_3C, Fe_2W, WC, and two double carbides (known as Z_1— and Z_2—carbide). In the lower carbon ranges, the Fe_2W is stable, yielding, as the carbon increases, to the double carbides. WC appears as the stable component, unaffected by annealing, in the higher carbon steels.

Although the original results are given in the form of a space model, a few data tabulated below will serve to illustrate, in the general, the findings:

Series with 0.3 *Per Cent C—Oil-Hardened.*

W, per cent (approx.)	0	1	5	10	15	20
Best Brinell hardness.	311	311	425	343	401	321
Drawing temp., deg. C.	1200	1250	1050	1150	1250	1200

Same—Water-Hardened.

W, per cent.....	0	1	5	10	15	20
Brinell	447	495	506	290	262	212
Temp., deg. C.....	880	900	900	880	900	820–900

Series with 0.7 *Per Cent C; Oil-Hardened; Normal Si. Content.*

W, per cent.....	0	1	5	10	15	20
Hardness	305	712	627	653	627	627
Temp., deg. C.....	950	850	1000	1000	1000	1100–1300

Same but with 0.5—0.9 *Per Cent Si.*

W, per cent.....	0	1	5	10	15	20
Hardness	305	550	630	534	500	510

In no case could as high a degree of hardness be obtained with high-silicon contents as with low.

Series with 1.1 *Per Cent C; Oil-Hardened.*

W, per cent.....	0	1	5	10	15	20
Brinell	578	555	601	601	601	653
Temp., deg. C.....	1250	1250	950	1050	1050	1050

Series with 1.4 *Per Cent C; Oil-Hardened.*

W, per cent.....	0	1	5	10	15	20
Brinell	534	534	601	682	712	712
Temp., deg. C.....	900	800	850	800	750 to 950	750 to 1100

Worthy of mention, in the case of the higher tungsten steels, is the attainment of a good hardness at low temperatures (750-800 deg. C.) as well as a large hardening range. The figures given represent the best hardness values obtained for each steel with the corresponding temperature.

Limit of Carbon Content Determined by Forging Properties

Further study showed that the hardness was retained above 23 per cent tungsten and with carbon contents as high as 0.07 per cent for each per cent of tungsten (or 1.61 per cent C. with 23 per cent tungsten). In general, the upper limit of carbon content is determined by the forging properties.

In order to test out one of the steels, the last-named one above (20 per cent W, 1.4 per cent C) was used to cut a chill-cast roll, which exhibited about 50,000 lb. a sq. in. tensile strength. Against this material the tool stood up for 1½ hr., cutting at the rate of about 13 ft. a min. with an 0.008-in. feed and an 0.01-in. chip. Further improvement was noted on the addition to the alloy of 0.6—0.7 per cent Cr.

Large Trailers Minimize Quantity-Delivery Costs

WITH the aim of minimizing costs, the Atlas Steel Barrel Corporation, Bayonne, N. J., is using six-ton capacity trailers drawn by 2½-ton motor trucks for making large-quantity deliveries in territory near its plant. The particular outfit illustrated is loaded with 268 50-gal. steel drums. The overall length of the trailer and truck is 51 ft., while the maximum width is 8 ft. and the height 11½ ft. The trailer was supplied by the Lapeer Semi-Trailer Co., Long Island City, N. Y., and the truck by the Mack International Motor Truck Corporation, Jersey City, N. J.

Aircraft Problems Discussed

Engine Production Facilities Now in Excess of Demand—Situation Favors Improvements in Product

IN a paper on "Recent Developments in Aircraft Engines," contributed to the fiftieth annual meeting of the American Society of Mechanical Engineers in New York last week, John H. Geisse, vice-president of engineering, Comet Engine Corporation, Madison, Wis., outlined briefly the status of production facilities and some of the recent technical developments.

"The most noteworthy event of the last year or two has been the number of new concerns that have entered or have become closely affiliated with this field and the tremendous expansion of production facilities on the part of the older companies," he said. "Outstanding among the new ones may be mentioned such well-known companies as the Continental Motors Corporation, Lycoming, E. W. Bliss Co., Le Blond, and the author's associates, the Gisholt Machine Co.

"Before considering the products of these companies, it will be interesting to look into the possible market for their wares. A little over a year ago there was a definite shortage of engines. The stock of war-surplus engines was rapidly dwindling, and with the increased demand the production facilities of the country were not equal to meeting the situation. This curtailed the production of planes, and the market was quite definitely a sellers' market. Under this condition it was quite easy, and perhaps quite natural, for the plane manufacturers to make rather broad statements of the number of planes they could sell if only they could secure the engines.

Probable Sales Less Than 7000

"The existing engine manufacturers, and many others who were not then manufacturing, were influenced by these optimistic statements and immediately took steps to provide against another shortage this year. How admirably they succeeded is evidenced by the fact that present production facilities far exceed any possible demand. Whereas the year started with plane sales predicted to exceed 14,000, the latest estimates place the probable year's sales at less than one-half of this figure. The actual engine production for the first six months of this year as reported by the Aeronautical Chamber of Commerce was 3275, and it is doubted whether this figure will be greatly exceeded in the present period. If it is doubled in this period, it will mean a production rate of not over 40 engines per day. In contrast to this it is very easy to total up claimed production facilities of over 100 per day, and each day brings news of new enterprises, all planning on going into production, at the rate of ten per day.

"It is not desired to paint a gloomy picture for the industry, but the author does want to impress the fact that there is no shortage in production facilities for the time being, and that there is not likely to be another shortage in the immediate future. He confidently expects the industry to have a phenomenal growth and that the demand will catch up to production facilities, if the growth of the latter only will slow down to a saner rate.

"This rush to get into production has, to a considerable extent, held back engine development during the last year. Now that production facilities exceed the demand, developments will come along more rapidly. Not only will the engineers have more time to concentrate on improvements in their products, but competition will demand them."

The trend toward the "in-line" air-cooled types of engines was briefly discussed, as well as some of the advantages and disadvantages of the radial engine. Of the latter it was said that undoubtedly it will continue to be used by many manufacturers.

Cylinder construction comprising a steel sleeve having machined cooling fins and a cast-aluminum head screwed and shrunk on the sleeve was said to be almost general practice. In most cases the heads are cast of Y-alloy which retains a relatively high strength at elevated temperatures, giving about 26,000 lb. per sq. in. at 500 deg. Fahr.

Cylinders are generally machined from a 1050 S.A.E. heat-treated forging. "A new development of this year," said Mr. Geisse, "is the elimination of normalizing, and the re-heat treating of cylinder forgings. One prominent manufacturer is now securing his cylinder forgings with one heat treatment, which gives the desired Brinell hardness, but leaves a very coarse grain structure. The saving in heat-treatment cost is not very great, but the material in this condition is very much easier to machine than when normalized and re-heat treated to give the same Brinell hardness."

Heat-Treated Alloys for Crankcase

There was said to be a general trend toward the use of heat-treated alloys for the crankcase. The tensile strength of these alloys is from 30,000 to 40,000 lb. per sq. in., in the heat-treated condition as compared to about 20,000 lb. obtained from the more common No. 12 alloy. "Because of the limitations imposed by casting difficulties on minimum wall thickness and to the variations in wall thickness in the usual castings, which may adversely affect the heat treatment, all of this gain in strength cannot be utilized for weight reduction," said Mr. Geisse. "These considerations, along with the higher price of the castings, make the use of these alloys questionable in many cases. Use of forged crankcases is still limited, it is believed, to Pratt & Whitney. Curtiss is using some magnesium castings, which permit a considerable saving in weight where strength is not required, but which are expensive."

Written discussion submitted by Robert Insley, vice-president Continental Aircraft Engine Co., Detroit, included the elimination of normalizing and re-heat treatment of cylinder barrel forgings. The author of the paper, it was pointed out, makes no comment on the effect of this process on physical properties. "Unquestionably this shortened process saves a few cents per forging, but it also definitely reduces the strength and wear resistance of the material," said Mr. Insley. Regarding the advisability of heat-treated aluminum castings for crankcases, Mr. Insley said: "It is true that in the unstressed wall sections the minimum thickness required for good casting properties affords sufficient strength in un-heat treated castings. In highly stressed parts, such as mounting bolt lugs, cylinder flanges, etc., the saving in weight possible in the heat-treated casting will well repay the slight additional cost."

In reference to the use of magnesium alloy castings, he pointed out that "the strength of the cast magnesium alloy is distinctly better than common aluminum casting alloys, approximately the same as the Y-alloy, and that the elongation is nearly twice that of the best aluminum alloy used for aircraft engine parts. The cost, piece for piece, is approximately 25 per cent higher than aluminum, which, together with the susceptibility to corrosion, has restricted use of this material."

Large Airplanes for Transportation

At the same session, which was held Dec. 6 under the auspices of the A.S.M.E. aeronautical division and presided over by C. H. Colvin, Pioneer Instrument Co., Brooklyn, N. Y., C. T. Porter, vice-president Keystone Aircraft Corporation, Bristol, Pa., presented a paper on "Factors in the Design of Commercial Airplanes."

An increasing market for air transportation, using the equipment as now developed, was said to lie in the more remote and inaccessible places where quick and cheap boat and rail transportation has not yet been provided. "However, this type of market will not supply the demand that the industry needs, and the aeronautical engineer must produce a product that can equal the speed, cost and comfort of the extra fare train," said Mr. Talbot.

"To be successful in competition with the extra fare trains the airplane designer must supply a combination of speed and comfort that will be sufficiently more appealing to the general public to justify the higher cost of air transport. With increase in the number of landing fields and improvement in airplane efficiency, there is no doubt that air transportation will play a prominent part in the economic life of the country."

Can Business Balance Be Attained?

Economic Equilibrium, Mergers, Optimum Size of Organization and Satiability of Consumer Demand Are Discussed at Taylor Society Meeting

INDUSTRIAL equilibrium, a subject that is now challenging the best brains of Government and business, was a leading topic at the annual meeting of the Taylor Society, held at Hotel Pennsylvania, New York, Dec. 4, 5 and 6. Mergers, the optimum size of organization, the preservation of individual initiative in large companies, controllable factors in management and the satiability of consumer demand were other questions discussed —all of them inspired by the report of the Hoover Committee on Recent Economic Changes.

Briefly, the purpose of the meeting was to interpret findings of the report both from the standpoint of its broad application to the problem attacked by the Washington conferences and from the angle of their bearing on the managerial policies of individual industries.

Are there practicable steps toward an industrial equilibrium? This question, thanks to President Hoover's conferences, is uppermost in the minds of the American people at the present time. Many are disposed to doubt the feasibility of current efforts to promote economic balance, lacking faith in what they call "palliatives" or "artificial stimulants," but others take a more hopeful view, although frankly admitting that the undertaking is an experiment.

No question could have been more timely for consideration by the Taylor Society and no more appropriate speaker could have been selected than Prof. Wesley C. Mitchell, director of the National Bureau of Economic Research, which prepared the fact-finding portion of the report on Recent Economic Changes.

Cites Progress Made Toward Stable Economy

PRACTICABLE steps toward equilibrium can be taken, Professor Mitchell believes, stating that various measures have already been tried to make the business engine run more evenly, as brought out in the report that he helped prepare. "Also I recognize that a further step of great technical interest is being tried at this moment on a national scale," he added. "While a business cycle is passing over from the phase of expansion to the phase of contraction, the President of the United States is organizing the economic forces of the country to check the threatened decline at the start, if possible. A more significant experiment in the technique of balance could not be devised.

"But whatever measure of success may attend President Hoover's effort, further steps toward industrial equilibrium must be taken in the future."

Professor Mitchell explained that equilibrium is not a static condition, but that throughout the complicated business dealings going on at any time there runs a gravitational pull toward balance. Equilibrium constantly tends to establish itself afresh whenever departures from it occur. But departures are to be expected and the abolition of such disturbances might check progress in per capita production and consumption.

"We attribute a great part of the mechanical progress of the last hundred years to the pressure which those who early adopted superior methods applied to their slower moving competitors," he said. "The desideratum seems to be a technique of balance which will permit cumulative changes, each of which disturbs existing arrangements enough to secure the prompt adoption of improvements and keep everybody on his mettle, but a technique which will prevent these salutary irritants from developing into cancers.

"In other words, the aim is to reduce random, seasonal and cyclical fluctuations in economic activity, so far as that can be done without checking the rise of secular trends."

Gratifying progress in that direction has been made of late, according to Professor Mitchell. "The half-dozen years preceding 1929 combined moderation of cyclical fluctuations with acceleration in the rate at which per capita income grew. Doubtless circumstances which no man planned contributed to this outcome, but part of the result was due to human contrivance. Nor does any reason appear why, by the continued exercise of their inventive powers, men may not better the accomplishments of 1923-1928."

Rapid Liquidation Accelerated Recovery from 1921

THE bearing of industrial equilibrium on regularity of operations and of employment was the subject of a paper by Leo Wolman, member of the faculty of the New School for Social Research, New York, and also on the research staff of the National Bureau of Economic Research.

"If there is anything to the notion of balance and equilibrium," declared Mr. Wolman, "then the problem of securing industrial stability and regular employment consists in the early discovery of excesses in the industrial system and in the application of measures of control. In principle such a procedure may appear simple; in practice it is surrounded with unusual difficulties—difficulties of fact and of analysis.

"It is not so long ago since disturbances in the economic system were regarded as self-corrective. The interesting question now is whether we have passed much beyond that stage; and the answer to the question seems to lie in our capacity to analyze the experience of the recent past. . . .

"While many factors no doubt contributed to the swift and unexpected turn of American business after the deep depression of 1920 and 1921, the single and most effective force was, in my judgment, the speed and completeness of the business and industrial liquidation of those years. . . . In place of a hesitant and prolonged adjustment of costs to a new condition, such as has characterized the history of the past 10 years of English industry, the American adjustment was drastic and decisive. What happened here was probably not the result of deliberate policy, but was due to the prevailing temper of the country manifested in an unusual mobility of both capital and labor.

"This fact of mobility or of elasticity which seems to me to be central in accounting for both the recovery of business and for the maintenance of high levels, once they have been achieved, has persisted in the subsequent post-war years. If anything its force has been enhanced. The rising general level of education in the country, the progressive mechanization of industry, the experi-

mental attitude of the industrial engineers and of the managers of industry, the cumulative application of invention, and the preoccupation of industry with the improvement of plant and equipment, have been the factors that have combined to accelerate the pace of our industry and to perpetuate the habit of frequent and universal change.

Automotive and Building Industries Were Stimulants

"ASSOCIATED with this pervasive, psychological attribute of our contemporary business situation are features that may well turn out to be more fundamental. . . . Of these the most significant appear to be the state of the efficiency of industry, the direction of the price level, the credit condition of the country, and the probabilities of further growth in the size of the market."

Mr. Wolman points out that since 1919 American industry has been characterized by a reduction in costs as a result of improved methods of management and invention. But the most striking changes in productivity took place largely in the so-called new industries—the automobile and collateral industries, the electrical and chemical industries. A question of great moment at present is whether these industries have reached a stage of retardation in which, for the time being at least, no further progressive reduction in costs can be looked for.

The construction industry has also been an important contributor to prosperity in the last eight years. If both construction and the automobile industries have "reached the end of their rope," Mr. Wolman believes that "we must depend for an accelerated pace upon the performance of some unknown new industry or upon technical revolutions in the old, established ones."

Although it seems impossible to explain what happened in terms of reduced costs in the building industry (Mr. Wolman adds that improvement on that score may have been greater than is realized), a downward movement of the price level at this juncture, if unaccompanied by further cost reduction, may "produce those consequences in shrinking profits that are often associated with the existence of industrial depression."

New Stimulus Must Be Found

In appraising the activity of recent years Mr. Wolman suggests that the use of consumers' credit in developing the automobile, radio and similar industries may prove to have been a species of slow, but effective, inflation. Likewise the financing of building construction during the boom years 1925 to 1928 may have been marked by inflationary practices.

When for such or other reasons important industries slacken, "the existing economy," Mr. Wolman says, "must look elsewhere for a new stimulus. The creation of this type of incentive to business is the purpose of the conferences now being held in Washington and it may very well happen, within the next months, that the spur to business will come either out of the deliberations in Washington or from the discovery by a single industry of a new product or a variant of an old one."

See Greater Economic Coordination Ahead

"WE are challenged to control a billion horses more or less wild," declared Stuart Chase, Labor Bureau, New York, in picturing the problem of attaining industrial equilibrium. Pointing out that at least a billion horsepower has been loosed on the world since the day of James Watt, he declared that the greatest question facing us is, "Have we the intelligence collectively to control the machine age?"

It is conceivable that coordinated control is possible in a dictatorship like those in Italy or Russia, he said, but it is manifestly difficult of achievement in the United States with its system of free competition, "more or less diluted by mergers, to be sure."

Although admitting that the standard of living in Russia is still far below that in America, Mr. Chase suggested that there might still be some lessons for us in the Soviet experience. He related what he had learned in Russia about the Soviet program for the development of its economy. All industrial expansion is in the hands of a general economic staff. The Donetz coal basin and the Caucasus oil region are being exploited as single economic units. Overexpansion and wasteful methods of production can be and are avoided.

Available surplus capital in Russia is invested where careful study indicates that it is most needed. The first objective of the Soviet authorities was to bring industrial production back to the pre-war level by 1927. This goal was reached. The Government now has a five-year program to double production, at the same time reducing unit costs 35 per cent. For the first year (fiscal year ended October, 1929) the plan called for a 21 per cent increase in industrial production. The actual gain, said Mr. Chase, was 24.3 per cent.

In Russia's present program the accent is on producers' goods, particularly the building of steel plants and electric generating stations; just enough consumers' goods are being released to hold popular discontent in check. The Russian experiment in coordination, Mr. Chase added, is getting aid from this country in both equipment and technical personnel.

Believing that President Hoover has already inaugurated what is an approach to an economic general staff, Mr. Chase suggested that such a central body assisted by regional economic staffs—all of them purely advisory—might prove adapted to the needs of this country. Plans could be laid out for each region with an eye to the conservation of natural resources, and advice could be given on the use of capital, thereby discouraging the overbuilding of plants as well as the expansion of others to meet actual needs. The use of credit, industrial decentralization, the pooling of extraordinary advances in the science of management, and the handling of technological unemployment would also be matters that could properly come within the scope of the work of such bodies, Mr. Chase said.

Statistics as an Aid to Equilibrium

ANOTHER plea for greater coordination, though of a different kind, was made by Prof. J. T. Madden, New York University. He pointed out that there are many independent Government fact-finding agencies whose efforts might be made more effective if pooled. Many facts uncovered, moreover, lack utility because they are not made available or are too incomplete. The statistics that offer the greatest possibilities, in Professor Madden's opinion, are the income tax returns. If complete returns were made available for study a year after collection, they would greatly help business men in controlling business. They would indicate the profitableness of undertakings, and trends and tendencies in different lines of industry. If in addition information could be obtained on units sold, units produced, units in inventory, number of men employed, number of man-hours involved and wages paid, even more intelligent analysis would be possible. The additional burden of supplying such data might stir up some opposition, although Professor Madden was confident that it would not be insuperable, declaring that the significant thing about the American business man is that he is willing to try something new if he sees a possible benefit from it.

Professor Madden's suggestion, together with other proposals, were embodied in a resolution adopted by the Taylor Society for consideration by the President's conference. The resolution is published elsewhere.

A third discusser of the papers by Messrs. Mitchell and Wolman was Dr. Leonard Kuvin, chief statistician, Index Number Institute, New Haven, Conn. In his view the chief obstacle to industrial equilibrium is the present distribution of income. Funds that should reach the pockets of labor to nourish consumer demand are plowed back into unused plant and equipment.

Buying Power May Not Continue to Rise

THERE is nothing automatic about the gain in popular buying power, such as has characterized recent times, declared George Soule, associate editor, *New Republic*, speaking in another session. A further increase cannot be relied upon. In fact, the problem of mass purchasing power, in Mr. Soule's opinion, is one of the greatest uncertainties of our economic future in the next decade or two. It is a serious question,

he thinks, whether employers have consciously adopted the so-called doctrine of high wages and, if any of them individually have done so, whether such action has had much effect on business conditions generally. There was no appreciable growth of the purchasing power of wages between 1913 and 1919. The big boost came as a result of the 1920-1923 depression when prices fell more rapidly than wage rates. When employment increased after this depression the buying power of wages gained greatly. Since 1923, said Mr. Soule, there has been a further increase in purhasing power as a consequence of the rapid increase in production, although the gain has been small, the rise in wage earnings having been by no means so great as in the productivity of industry.

It is true, declared Mr. Soule, that the individual employer will gain from a general increase in purchasing power, but it is not true that he will gain much by raising the buying power of his own plant. Outside of men of exceptional resources, like Mr. Ford, individual employers will pay wages that the labor market dictates. Moreover wages can't go up proportionately in all industries. Productivity increases much more rapidly in some lines than in others. Some whole industries are suffering from over capacity and cut-throat competition and in every industry there are marginal plants that can't pay higher wages. The only recourse, in Mr. Soule's view, is to rely on a reduction in the prices of commodities that will stand it to raise general buying power. He does not recommend a 1921 to bring this about, feeling that it will be the natural result of competition. Even among non-competitive industries, such as utilities, the good sense of managements or of governmental regulating bodies should assure reductions of rates or prices.

Cites Change in Attitude Toward Unemployment

COMMENTING on Mr. Soule's belief that, generally, there has been no conscious adoption of the high wage doctrine, Edward Eyre Hunt, secretary of the President's Conference on Unemployment, who was presiding at the session in question, called attention to the marked difference in the attitude of industry toward labor today and immediately after the war. Nothing is more impressive at the present time than the widespread concern over the maintenance of employment.

Real Managerial Ability is Main Requisite for Successful Mergers

THE economic justification for mergers and the limits, if any, on the size of business organizations, were discussed from many angles in different sessions. A paper on the effect of consolidations on distribution expenses, by B. C. Milner, Jr., Ford, Bacon & Davis, New York, is published elsewhere. He emphasized the fact that dependence on mere size is futile—real managerial ability is the most important factor.

The importance of management was also emphasized by C. F. Hammond, Irving Trust Co., New York. Merging is not merely a matter of putting 2 and 2 together and getting 4. One can hitch two automobiles together, but the result will not be twice the speed. The large scale organization, declared Mr. Hammond, is relatively new and scientific management is even newer. To believe that there is a point beyond which a large-scale organization cannot expand without loss of efficiency is similar to accepting the Malthusian theory as final.

Size Depends on Standardization Possible

The size of a business is usually a function of standardization, according to Robert W. Burgess, chief statistician, Western Electric Co., New York, who presented a general analysis of the report on Recent Economic Changes, with emphasis on subjects of practical interest to management. He said in part:

"Standardization is associated with the large unit, individualization with the small. In fact, I should like to suggest that the possibility of an effective large unit depends on the possibility of sufficient standardization of work to be done to permit statistical control. To bring out my point here, consider the possibilities of constructing a country-wide organization for operating in real estate. I do not see how a standard report could be devised by which the central administration could tell whether an operator in a distant town had taken proper advantage of the existing opportunities for the purchase and sale of farms, stores, dwellings and vacant lots."

Despite the importance of statistics to the operation of a large-scale organization, statistics are a minor factor in determining the advisability of a consolidation. Mr. Burgess said, in part:

"The difficulty is that the most pertinent material does not get published in statistical form. I believe more light on this particular question would come from a frank discussion under the auspices of a group such as the Taylor Society, in which various insiders could make generalizations without stating specifically for record that bank A resulting from a merger is carrying quite a load of superfluous vice-presidents but does not have on its staff the first-class specialist in foreign exchange that it really needs, that industrial merger B is proving very successful because price-cutting millionaire X is now inside the fold and can be restrained from doing harm, that merger C of electric light and power plants will have to pass through a long seasoning period because several plants were acquired at a very optimistic valuation and because considerable employee and community ill will was created by the ruthless discharge of superfluous engineers and executives.

Conditions for a Successful Consolidation

"After a series of frank discussions it might be possible to formulate the conditions for a successful merger along some such lines as the following:

a. "The units merged must form a logical economic entity, which will really gain by having a common general staff, common operating methods, a common sales force and/or a common purchasing department.

b. "The financial basis of mergers must not involve fixed interest obligations in excess of developed earning power.

c. "The directors and principal officers of the merger must know their business, with enough grasp of changing economic factors to adjust their policies to current developments.

d. "The merger must secure a high-grade general staff to formulate plans and methods. If the officers and employees of the merged companies do not contain such men, they must be secured elsewhere; some of them, at least, should have familiarity with the business.

e. "The merger must show an obvious improvement in service before it raises its prices.

f. "All former employees of the merged units must be treated equitably.

g. "The merged concern must have good luck as respects such items as fluctuations in the prices of their raw materials and in consumer demand for their product, deaths of the principal officers, earthquake, fire, pestilence and stock market panics."

J. B. Swinney, Special Stores Association, New York, in addressing himself to the subject of mergers, said it was questionable whether they were warranted from the standpoint of any economies achieved in distribution. In retail trade, particularly, individual initiative is highly important. He quoted an old saying that "any business is the length and breadth of the shadow of some individual."

Ralph Borsodi, author of "This Distribution Age," declared that gains from size are confined very largely to production. He said there was something comic about the fact

that constantly decreasing costs of production are being lost in steadily rising costs of distribution.

Functionalization as Related to Size

In discussing whether there is an optimum size of organization, John H. Williams, consulting engineer, New York, said that the answer was mainly one of time. What was true 10 years ago is not true today, and what is true today will not be true 10 years hence. In his opinion, the size of an organization depends to a large degree on the extent that authority can be functionalized. Proper accounting can be made a great aid in visualizing management in terms of the responsibilities into which a business is broken up. Such accounting would make it possible to make incentives effective. Each executive having authority over a certain functionalized activity would have the work under his control measured.

Richard A. Feiss, business consultant, Boston, agreed with Mr. Williams on the importance of functionalization but made the reservation that a good boss with vision is still necessary. Decentralization for action on functionalized responsibilities must be coupled with centralized control. Walter Rautenstrauch, professor of industrial engineering, Columbia University, New York, also pointed out the need for these dual factors in the organization, calling them qualitative and quantitative control. Qualitative control fixes policies and the directions in which an organization is to grow and calls for a catalytic type of mind.

Compromise Between Functionalized and Unified Authority

That complete functionalization is not as practical as a compromise between a functionalized responsibility and unified authority was contended by Malcolm C. Rorty, vice-president, International Telephone & Telegraph Corporation, New York, in a paper entitled "To What Extent Can Large Groups Be Organized and Managed to Realize the Abilities, Capacities and Energetic Efforts of an Individual as Though He Were in a Small Business of His Own?" A liberal abstract will be published in a subsequent issue of THE IRON AGE.

H. A. Hopf, H. A. Hopf & Co., New York, emphasized the personal side of the problem of size, saying that when it is found that decisions are unduly delayed or initiative is stifled, then at that point the optimum size of an organization has been reached.

Consumers' Wants for Particular Goods Limited

A SUBJECT closely tied up with business equilibrium is the growth of consumers' wants. The possibility of producing en masse has been a major factor in paving the way for sharp reductions in unit costs of manufacture, as for example in the automobile industry. If consumers' wants are limited, that fact must be taken into account in estimating the scope of future decreases in operating costs in lines which have been depending for economies on a rising volume of business.

"For many years economists have taught that consumers' wants are without limits," said Paul H. Nystrom, professor of marketing, School of Business, Columbia University, New York, "but this statement has rarely, if ever, been interpreted as meaning that consumers' wants for particular goods are insatiable. Economists have had *general* rather than *particular* consumer demand in view. They have merely called attention to the fact of common knowledge that when certain consumer wants are satisfied others arise. As these are satisfied still others arise and so on indefinitely.

"The suggestion that consumer wants for particular goods are insatiable is contrary to ordinary common sense and every-day observation. Consider your own households. Are the wants of the members of your household insatiable? Are there no definite limits to the amount of food desired? Is there any particularly desirable item for which there exists no point of satiety? Are there no limits to the wants for clothing? For fuel and light? For furnishings and other commodities? If your wants and those of your immediate household are limited for any specific commodity, then is it not reasonable to assume that consumer demand generally, which is but a composite of individual wants, is definitely limited for every particular kind of goods?"

In discussing Mr. Nystrom's paper, Austin Donaldson, general manager, Gimbel Brothers, Inc., New York, emphasized the fact that society is in a dynamic and not a static state. We must expect motion, action, change, variation. From a practical point of view the individual business can rightfully hope to get part of the share of total trade now going to another business. It is true that the stomach can hold only a fixed amount of food, but management is not concerned about that, but rather about the variety of food that can be put into the stomach, replacing a 50c. meal with a $1 meal. What is the high limit of consumer demand today is a low one tomorrow.

Percy S. Straus, vice-president, R. H. Macy & Co., Inc., New York, who was presiding, made the point that it is difficult to ascertain at any one time whether satiety has been reached in a given product. The problem is limited by so many variables that results of investigation are very unsatisfactory. Prices, it has been found, are frequently an important factor. A product that has reached the point of satiety at one price may prove to have a much higher limit at a lower price.

The problem of business balance and regularity of employment raises the question whether the individual

Taylor Society Resolution Offers Suggestions

Whereas, the President of the United States has called a conference of business leaders for the purpose of making plans to promote business stability and prevent unemployment,

Be it resolved, by the members of the Taylor Society, in annual meeting assembled, that the following recommendations be forwarded to the President's conference:

First, since a fundamental factor essential to industrial equilibrium and prosperity is the prevention of wide fluctuations in the general level of commodity prices, we recommend that the conference express its appreciation of the actions already taken by the Federal Reserve System to this end, and that the conference recommend to the Federal Reserve Board that, as a means of reassuring business, they make open avowal of their intention to observe this policy in the future, so far as possible.

Second, since the Government is in possession of much valuable data, contained in the archives of the Treasury Department, the Department of Commerce, and elsewhere, which would be of inestimable value to business, if analyzed and summarized and the results made public, we recommend that the conference propose a plan whereby this information shall be made available to business in such form as not to violate the confidential character of the constituent data.

Third, since many industries are suffering from unbalanced production and other maladjustments, which are harmful to all concerned, including capital and labor, producers and consumers, and since the Department of Commerce, through the Bureau of Standards and the Division of Simplified Practice, has already pointed the way to a form of coordination within each industry which preserves to the public the benefits of competition, we recommend that the conference evolve plans whereby such coordination may be extended into other fields and phases of business and industry.

employer can contribute to its solution. To what extent can he control his business? This question was discussed in detail in a paper by Howard Coonley, president, Walworth Co., Boston. He stated that there are no wholly controllable factors in management, but listed a number that are largely controllable.

Every executive controls materials, although he does not always do it effectively or scientifically. Likewise, labor is assigned to individual departments and to individual jobs. A policy can be set up to govern the great majority of conditions that arise within the field of administration. After all such a policy is merely an economical device for specifying uniform procedures governing repetitive situations. Although volume of sales cannot be included among controllable factors, expenses can be controlled and indirectly influence sales volume and price.

A sales budget cannot be listed as controllable, since intelligent estimating dips into fields where conditions are most variable. But it is surprising, according to Mr. Coonley, with what accuracy intelligent conclusions can be reached in fields that first seem unexplorable. Once the step is taken it is found that possibilities prove probabilities, and probabilities turn into actualities. With a moderately accurate sales estimate, a production program can be established and controlled and the problems of uneven production counteracted with a consequent improvement in efficiency and labor turnover.

Among the uncontrollable items Mr. Coonley listed sales. In estimating sales there is always the difficulty of setting standards for purchases that are made to cover price advances or to insure against a probable shortage. Sporadic demand for slow-moving articles also complicates the machinery of control, since rapid turnover of inventory is not possible.

The labor market is highly seasonal and the productivity of labor is difficult to handle. The financing of business may be planned but cannot be absolutely controlled. Control of marketing is impossible, but offers a fertile field for research. Competitive cooperation may do away with unfair practices, but still holds great dangers that should be carefully guarded against.

Psychology is the most evident of uncontrollable factors. The executive who can gain the confidence and affection of his employees can capitalize this in definite economies.

In discussing Mr. Coonley's paper, F. A. Silcox, New York Employing Printers Association, Inc., said that there are controllable factors even in psychology. Professor Rautenstrauch agreed that there are certain fundamental psychological principles which can be used. One should get firmly in mind, he said, that man cannot make laws, but can conform to laws. There are laws of society and human nature. Our problem is to study the laws of human nature and the laws of conduct. He cited Tammany Hall as an example of control of a great mass of people through psychology.

Employer-Employee Cooperation

HOW employees and employer have cooperated in the interests of scientific management was described in papers presented by J. Foster Smith, agent, Naumkeag Steam Cotton Co., and John P. O'Connell, secretary and business agent, local union No. 33, United Textile Workers of America. Because of conditions in the industry the company was confronted with the necessity of further reducing costs. It presented a proposition to its employees that called for a reapportionment of jobs and the elimination of certain operations, but not the reduction of wages. The employees on their own initiative consulted a management engineer, in the hope that a more satisfactory readjustment could be worked out. As a consequence the company retained this engineer for a thorough study of the plant and the employees are cooperating in efforts to bring about improvements in methods.

In commenting on this experiment Miss Frances Perkins, industrial commissioner, State of New York, said that the important question is whether it is of special or general significance. If it points the way to methods of arousing the interest of the workers in their jobs, it is a great step forward. We live in a machine age and we are challenged to make it an industrial civilization. In the days of the medieval guilds when craftsmen had a wholehearted interest in their vocations and vied with one another in putting skill and art into their work, Europe had an industrial civilization. Greater understanding on the part of workers of their share in the control of our great industrial machine should fire their imagination and add the spice of interest and incentive to work that they too frequently look upon as drudgery.

New Officers

Henry P. Kendall, Kendall Co., Boston, was reelected president of the Taylor Society, and John G. Aldrich, New England Butt Co., Providence, R. I., was elected vice-president to succeed George D. Babcock, Asheville, N. C. Henry Bruere, Bowery Savings Bank, New York, holds over as vice-president. Edward W. Clark, 3d, E. W. Clark & Co., Philadelphia, was reelected treasurer, and Dr. Harlow S. Person was renamed managing director. New directors include Louise C. Odencrantz, executive secretary, Employment Center for the Handicapped, New York, and John M. Carmody, McGraw-Hill Publishing Co., Chicago.

Foreign Trends Discussed at Dinner

ADDRESSES describing the progress of the management movement in Western Europe, England and Japan, were given at the dinner, Dec. 5, by members of the Taylor Society, who had visited these countries in the past year. Henry P. Kendall presided and he and Morris L. Cooke, consulting engineer, Philadelphia, briefly described the recent international congress in Paris.

After seven months in England, during which she visited many of the larger and more progressive plants, Mary B. Gilson, Industrial Relations Counselors, New York, found that the English manufacturer is far from being as unprogressive as is often believed. Much of this impression, she pointed out, has doubtless developed from his unwillingness to talk about himself, or gather with other manufacturers to discuss subjects of common interest.

Victor Karabasz, University of Pennsylvania, gave a few impressions gained from traveling through 17 countries and visiting many manufacturing plants in each. While the scientifically managed European plant is quite as well operated as the better companies in the United States, perhaps largely due to the fact that many of the executives have been trained by working in the United States, he said that there is a much wider gap in Europe between the well-managed plant and the ordinary small company.

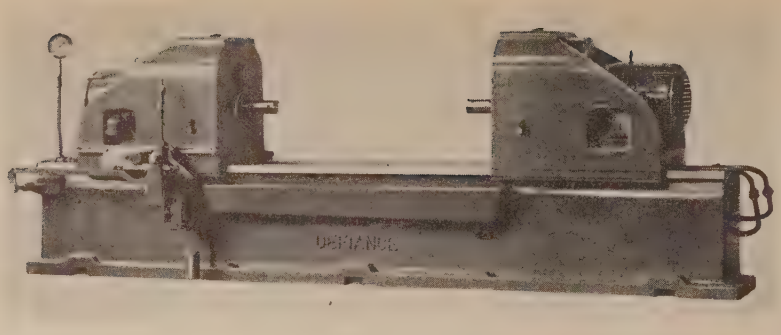
The meetings of the International Industrial Relations Association in Bavaria were briefly summarized by Mary Van Kleeck, Russell Sage Foundation, New York, who pointed out the difficulty of realizing the wide difference in economic conditions faced by various countries of Europe, except at a meeting such as the one held in Bavaria.

A visit to Japan by King Hathaway, consulting engineer, New York, resulted in an unexpected lecture tour by him. The Japanese expressed great interest in scientific management, but appeared to be unnecessarily intent upon expanding their foreign outlets for manufactured goods. He pointed out to many of them the great potential market they had among their own people, which could only be developed through reducing production costs by better methods, although not by the immediate introduction of quantity-production machinery, which would tend to produce too much unemployment.

Barton Rolling Mill Is Sold by Receiver

The Scott-Weiss Steel Co., 110 South Dearborn Street, Chicago, broker in iron and steel products, plants and equipment, has purchased at a receivership sale the plant and equipment of the former Barton Steel Co., 3426 South Kedzie Street, Chicago. Prior to its receivership, the Barton company was a producer of reinforcing bars.

The plant, which is a comparatively new development, consists of four acres of ground, a rolling mill, a one-story structure 98 x 600 ft., warehouse 100 x 400 ft., and a combination office and warehouse.



Two-Way Opposed Boring and Reaming Machine

FOR production work in the manufacture of automobile parts, gas engines, tractors, transmission cases and for other boring and reaming operations or for use as a power unit for driving multiple-spindle drilling heads, a two-way opposed horizontal boring and reaming machine has been brought out by the Defiance Machine Works, Defiance, Ohio. The base of the machine is heavy and rigid, has a cored center and heavy and wide broad ways on which the heads slide. The ways are planed over the entire length of the base providing a center between the heads true and suitable for mounting and clamping a work holding fixture. The base is built in length to suit requirements.

The machine illustrated has single spindle head but heads with any diameter spindle or with as many spindles as desired can be furnished. The spindles are of heat-treated alloy steel and run in anti-friction or bronze bearings. Heads are entirely enclosed and have stub tooth gears and splash or force feed lubrication. The minimum distance between nose of spindles is 29½ in. and the maximum distance with heads open is 57½ in. The height from top of ways to center of spindles is 12 in. The machine is equipped with Oilgear pump for feed or can be supplied with mechanical feed having rapid approach to the work, then desired rate of speed, dwell for facing, automatic kick-off and rapid return movement.

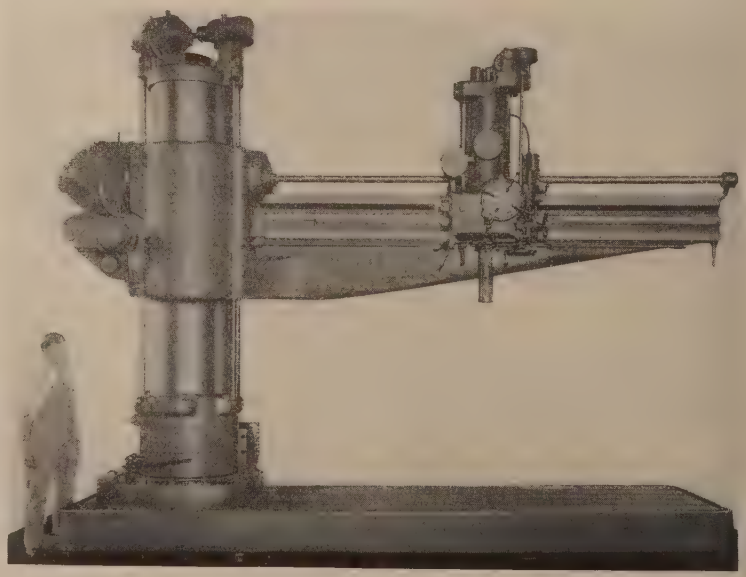
The length of the bed, diameter and height of spindle centers, number of spindles in each head and fixture are determined to suit the requirements of the customer. Motor specifications, giving horse power and speeds, must be determined, being dependent upon the work to be handled. For driving the heads the motors are attached to the drive spindles. The Oilgear pump is driven with a separate motor. The machine occupies a floor space of 13 ft. 10 in. x 55 in. and the net weight is 9710 lb.

Two Mammoth Metal-Working Machines

FOR the Fiat automobile company's Milan, Italy, works the Chambersburg Engineering Co., Chambersburg, Pa., has completed the large steam drop hammer shown at the left.

Although of standard Chambersburg design, the machine is unusual in some of its dimensions. It has a falling weight of 24,000 lb. with a cylinder bore of 32 in. and a stroke of 52 in. The diameter of the steam line is 7 in. and that of the exhaust line 9 in. The distance between the guides is 42 in., and the ram measures 66 in. from front to back. The guides are of the same type as those of the company's latest board drop hammer, the model H, and because of the length of work for which the machine is intended they were made extra wide. The overall height of the hammer, from the bottom of its three-piece anvil to the top of the head, is 34 ft. 10 in.; the height from the floor line is 24 ft. 4½ in. The weight of the anvil, which was made in three pieces to facilitate shipping, is 482,000 lb., while the weight of the upper section of the anvil alone is 222,000 lb. The weight of the complete machine is 662,000 lb.

OF unusual proportions also is the 12-ft. arm 26-in. column radial drill below, which was built recently by the Cincinnati Bickford Tool Co., Oakley, Cincinnati, for a manufacturer of heavy machinery. The machine was equipped with a variable-speed motor mounted on the arm as shown. Features include rapid traverse, power clamping, and electrical control of arm elevating and clamping from the head.



New Large Rotary Grinder

Machine Resembling Boring Mill Is Adapted for External and Internal, as Well as Surface, Grinding

A 108-IN. rotary grinder for grinding outside and inside cylinders and cones, as well as flat surfaces, has been built by the G. A. Gray Co., Cincinnati, for the Chicago Heights, Ill., plant of the American Manganese Steel Co. In general appearance, the machine resembles a large boring mill, the grinding wheels taking the place of the boring mill cutting tools.

The work table is driven by a 5-hp. variable-speed totally-inclosed motor. Two hand levers give four changes of speed, while immediately over these levers is a rheostat which controls the speed of the table drive motor. There is available a wide range of table speeds. The housings are massive and are designed to carry heavy saddles for additional grinding heads, if necessary. They are bolted to the bed of the machine and joined at the top by a rigid brace carrying the gearing and motor which operate the rail elevating and rapid traverse mechanism. The cross-rail, which is similar to a boring mill rail, carries the right and left-hand saddles. On each saddle is mounted a swivel which can, by means of a worm and wheel, be swiveled to any desired angle for the purpose of grinding outside or inside cones. In the swivel are fixed two adjustable bronze bushings in which the spindle rams slide.

Spindle rams are heavy steel forgings which are accurately ground to a uniform diameter. One side of the ram is keywayed to a slight depth to receive the traversing rack, which also acts as a key in the swivel to resist the turning moment produced by the grinding wheel pressure. At the upper end of each ram is secured a flange to which is bolted a 25-hp., 1000-2500-r.p.m. adjustable-speed motor adjusted for dynamic balance. The motor shaft is connected to the wheel spindle by a flexible coupling, and the upper end of the wheel spindle turns in a precision-type ball bearing, while the lower end turns in a pair of precision Timken bearings. The wheel spindle, which is about 6 ft. long, is a heat-treated alloy steel forging with a hardened nose. The spindle and motor armature are so well balanced and rigidly mounted that with the motor running at its highest speed, no vibration or noise can be detected except the rush of the air through the motor armature and around the wheel. To the lower end of the spindle ram is bolted a steel flange to which various types of wheel-guards may be attached. Each spindle is provided with a counterweight, which can be adjusted in amount to suit the weight of the wheel or other attachments, and the inclination of the ram.

Right-Angle Attachment Permits Grinding Flat Surfaces

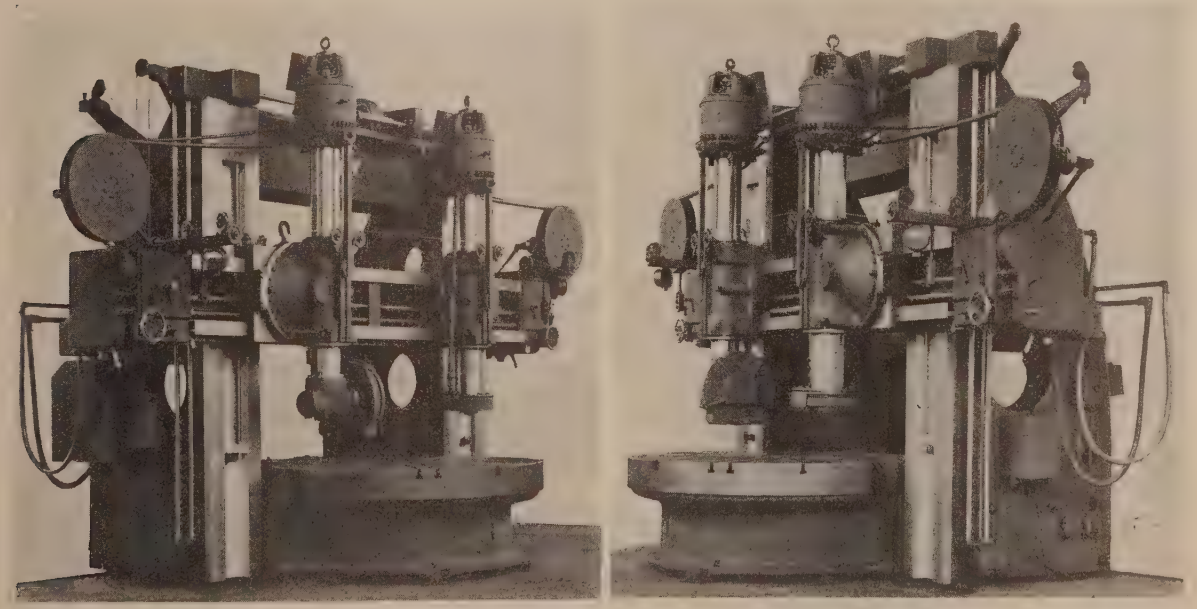
When the grinding wheels are mounted directly on the main spindle they may be used to grind inside and outside cylinders and cones. For grinding cones the heads are swiveled to the desired angle. When the right-angle attachment is used the machine can grind only flat horizontal surfaces. The wheel then revolves in a vertical plane and grinds on the edge.

The saddle is traversed along the rail by means of a heavy rail screw, which may be turned manually by means of a large crank. Immediately over this screw is a feed rod which rotates the rack pinion by means of a worm drive.

On the top brace is a motor which drives the rapid traverse mechanism. From the gear box at the end of the rail project three handles. One of these handles controls the rapid traverse for moving the saddle along the rail. When the handle is depressed the saddle rapidly traverses toward the operator. As soon as the handle is brought back to its mid position the saddle stops. When the handle is raised the saddle traverses away from the operator, and stops traversing as soon as the handle is returned to its mid position. The second handle controls the movement of the ram in a similar way, the ram traversing in the direction that the handle is pushed. The third handle controls the raising and lowering of the rail.

Sixteen Traverse Feeds and 12 Infeeds

Within the large gear case at the end of the rail, and covered by a swinging aluminum door, are change gears operating the traverse feed and infeed. Two levers provided on the front of the gear case are interlocked in such a way that when this traverse feed is connected to the feed rod, so that the ram traverses for the purpose of grinding a cone of cylinder, the infeed mechanism is coupled to the saddle screw. The change gears furnished provide 16 rates of traverse feed, ranging from ¼ in. to 2 in. per revolution of the table, and 12 different infeeds from 0.00025 in. to 0.004 in. per traverse. The feed mechanism is arranged so that whenever the ram reaches its lowest or highest position the infeed becomes operative, the rail screw rotates



Bed, Table, Housings and Rail of This 108-In. Rotary Grinder Are Similar to Those of a Boring Mill. Arrangement of the spindle ram and spindle drive and use of electrical interlocks and other safety devices are among the features

slightly and the wheel is moved into the work the desired amount.

To fix the limits of motion of the ram in the swivel (or of the saddle along the rail) and to reverse the direction of the traverse feed at the end of the traverse, a circular plate is provided which revolves in unison with the movement of the traversing member. On this plate are adjustably mounted two dogs which operate a trip mechanism. The trip mechanism in turn releases an escapement which permits a torque motor to operate the traverse feed reverse mechanism. Each time that a dog strikes the trip mechanism, the direction of travel automatically reverses. If the rapid traverse is used and the ram moved above the upper limit of its travel, it automatically returns as soon as the feed is thrown in.

The pieces to be ground in this machine are large, the material is hard and tough and the wheels wear much more rapidly than they would on a weaker or softer material. In consequence of this, the diameter of the wheel is reduced appreciably during the traverse, so that the depth of cut at the end of the traverse is only a small fraction of the infeed, which is the depth of cut at the beginning of the traverse. To compensate for this wheel wear, a differential mechanism is introduced into the infeed train. This is driven by a small electric motor through a speed changing mechanism. A knob projecting from the front at the bottom of the gear case on the end of the rail adjusts this mechanism so that any desired continuous feed (for the purpose of compensating for wheel wear) can be superimposed on the infeed which occurs at the beginning of each traverse movement.

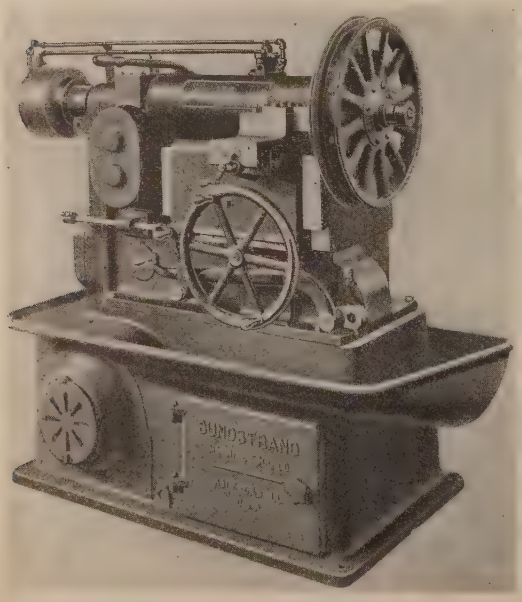
To enable the operator to adjust this compensating feed correctly, each wheel motor is provided with an ammeter which is supported by the counterweight bracket. The compensating feed is so regulated that the power taken by the motor will remain constant during the entire traverse, indicating a constant depth of cut.

Other interesting features of the machine are the electrical interlocks and safety devices which prevent the action of the feeds when the wheel is not rotating and which make it possible to instantly stop all motors by pushing any one of a number of emergency buttons conveniently located.

Lathe for Automobile Brake Drums

BRAKE drum stub lathes designed for turning automobile brake drums after they have been mounted on wheels, and for other work of this general character, are being built by the Sundstrand Machine Tool Co., Rockford, Ill. Twelve spindle speeds, ranging from 40 to 265 r.p.m., and ten feeds, ranging from 0.005 to 0.046 in., are obtainable. The longitudinal travel of the front and rear carriages is 6 in. and the longitudinal adjustment of the rear carriage is 1½ in. Transverse adjustment of front and rear tools ranges from 3⅝ to 6¼ in. Motor sizes recommended are 5 to 7½ hp., 1800 r.p.m. The floor space required is 45½ x 60 in. and the approximate shipping weight is 3500 lb.

R. T. Monahan, 1525 Arcade Building, St. Louis, is now in charge of the sales and servicing of Geometric self-opening die heads, collapsing taps and threading machines in eastern Missouri, southern Illinois, Arkansas and Oklahoma. These products are manufactured by the Geometric Tool Co., New Haven, Conn.



AUTOMOBILE Brake Drums Are Turned on the Lathe at Left, Which Is a Modification of the Sunstrand Stub Lathe

Meter Service Breaker Can Be Set Easily

A CIRCUIT breaker designed to prevent blown fuses and difficulty in locating them has been put on the market by the Square D Co., Detroit. It is arranged for a quicker make-and-break so as to banish contact burning and variable action. The front operating handle is insulated against shock to the operator.

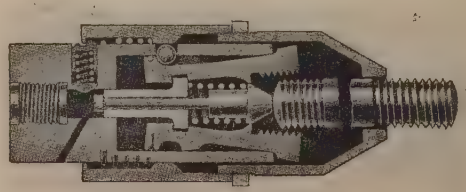
This handle indicates the on, off and tripped positions and can be locked or sealed. It is operated by a toggle and can be reset easily. The box is of the customary size. The circuit-breaking mechanism itself is sealed inside the insulating cover for protection against both tampering and dirt. This unit is made for 30-amp., 125-volt, 2-wire service.

Power-Driven Stud Setter With Quick Release

FOR use on all types of drill presses and on portable pneumatic and electric drills the Titan Tool Co., Erie, Pa., has brought out a self-opening type stud setter that will work efficiently at either high or low speeds and at any angle. Although positively driven, the studs are released automatically when driven to a predetermined height, and the seated studs are free from burred threads.

In operation the tool may be registered or loaded by clamping on to studs previously started in their seat by hand, or by inserting studs in the tool. The positive drive is released when the gage sleeve pushes back the slip ring, which in turn releases hardened steel driving balls. These balls move outwardly into a recess provided in the slip ring. At this stage, the driving jaws remain in complete register with the stud; and to further complete the cycle of operation it is necessary only to lift or pull away the tool from the stud. As the tool frees from the stud, the slip ring acts on the driving balls, forcing them into a driving position. The jaws come out into an open position and the unit is ready to register and drive another stud.

The jaws are arranged to fit closely over the stud, even where the studs may vary as much as 0.015 in. in pitch diameter. Studs as short as ½-in. may be seated with this tool, which is made in two sizes, having maximum capacities of ½ and ⅞-in. respectively.



IN the Stud Setter at Right, the Drive Is Released Automatically When the Stud Is Driven

National Steel Merger Is Completed

New Corporation Became Operative Dec. 4 with Election of Officers—Ingot Capacity 2,000,000 Tons

THE National Steel Corporation, recently formed by a merger of the Weirton Steel Co., Weirton, W. Va., the Great Lakes Steel Corporation, Detroit, and ore mining and blast furnace subsidiaries of the M. A. Hanna Co., Cleveland, became operative on Dec. 4 with a formal meeting of the directors at Pittsburgh. Officers elected at this meeting were: Ernest T. Weir, chairman Weirton Steel Co., chairman of the board; George R. Fink, president Great Lakes Steel Corporation, president; George M. Humphrey, president M. A. Hanna Co., chairman of the executive committee, and F. M. Hesse, treasurer of the Weirton company, secretary and treasurer.

Directors Also Elected

The executive committee consists of the first three officers, who serve also as directors. Other directors are Charles M. Thorp of the law firm of Thorp, Bostwick, Stewart & Reed, Pittsburgh; E. W. Mudge of E. W. Mudge & Co., Pittsburgh; J. C. Williams, president of the Weirton company; F. W. Blair, president of the Union Trust Co., Detroit; Carlton M. Higbie, chairman of Keene, Higbie & Co., Detroit; Howard M. Hanna, chairman of the M. A. Hanna Co.; C. A. Collins, president of the Hanna Furnace Co., Cleveland, and Isaac W. Frank, chairman of the executive committee United Engineering & Foundry Co., Pittsburgh.

Operations of the National company began Dec. 1 with the taking over of control of Weirton and Great Lakes properties and the Hanna subsidiaries. Depositing of Weirton and Hanna stock for exchange with National Steel has been going on for some time. Great Lakes holders will exchange their subscriptions for part paid National Steel receipts, paying out the balance Jan. 31 and Feb. 28, 1930. Temporary stock certificates of the new company are to be ready within a few days, and it is expected that the issue will be listed on the New York Curb market promptly.

Ingot Capacity 2,000,000 Tons

Consummation of this merger effects a completely integrated steel producing unit which, with the completion of previously announced expansion at Weirton and the inauguration of the new Great Lakes company plant at Detroit, will have an annual producing capacity of 3,500,000 tons of iron ore, 1,750,000 tons of pig iron and 2,000,000 tons of steel ingots, with a great diversity of finishing capacity. It will rank as the sixth largest producer of steel in the United States. No changes in executive personnel will be made, active direction of the three companies continuing under present guidance, subject to the executive committee of the National Steel Corporation.

A preliminary balance sheet for the consolidation reveals a financial setup with total assets of $119,982,007.-94 and current assets having a ratio of better than 2½ to 1 of current liabilities. Property account, less $37,288,850 for depreciation and depletion, is listed at $64,867,639. Liabilities include bonds on subsidiary companies listed at $10,370,891. The company has no funded indebtedness of its own, but assumes a mortgage indebtedness covering only the properties of its subsidiaries in Buffalo and certain coal interests. It has no preferred stock or other prior securities, the entire equity being represented by 2,072,000 shares of common stock of no par value, which are listed in the company's balance sheet at $51,-800,000. Surplus amounts to $40,903,-731. Properties appraised by H. A. Brassert & Co., Chicago, at $143,715,-000, in connection with the working out of the consolidation, are carried in the property and investment accounts of the balance sheet at less than $77,000,000. This conservative value results from a combination of the depreciated book values of the companies involved, which have been operated over a long period of years on a conservative basis.

M. A. Hanna Co. to Fund Back Dividends

A plan for the funding of accumulated first preferred stock dividends of the M. A. Hanna Co., Cleveland, is being contemplated. No dividends were paid on this stock from the last quarter of 1925 to the first quarter of 1929, making accumulated unpaid dividends of $24.50 per share. Current dividends were resumed in March, 1929, and have been paid regularly since.

Letters are being mailed to stockholders by the company, outlining the proposed plan, and calling a meeting for Dec. 30 at Cleveland for its consideration. It is understod the plan contemplates authorizing 200,000 shares of no-par $7 cumulative preferred stock, of which about 140,000 shares will be issued at once in exchange for the present first preferred stock on a share for share basis, and to provide funds for payment of the accumulated dividend.

Arrangements have been made by the company to have a sufficient amount of the new stock underwritten at the rate of $90 a share to pay the accumulated dividend. The company is offering to all preferred stockholders who exchange one share of their present stock for one share of the new stock the privilege of receiving in addition either 27/100 of one share of the new $7 cumulative preferred stock, which is at the rate of the underwriting price of $90 a share, or taking $24.50 in cash.

Through participation of some of its subsidiaries in the National Steel Corporation, the position of the Hanna company's preference stock owners is strengthened considerably. The National Steel Corporation will tend to stabilize Hanna earnings through greater diversification. Instead of relying almost entirely upon the conditions of the raw materials markets, Hanna stockholders will benefit from the earnings of the holding company as derived from finished steel income through its interest in the National Steel Corporation.

Funded debt of the Hanna company has been reduced almost 50 per cent by the National Steel Corporation assuming the bonds of the Producers Steamship Co. and the Buffalo Union Furnace Co., two of the Hanna subsidiaries entering the merger. Elimination of these bonds as direct obligations of the Hanna company has reduced almost by half the annual interest charges of $600,000. Wiping out the accumulated dividends on the first preferred eliminates cash obligation of the company to its stockholders of about $2,700,000.

James A. Campbell Not Opposed to Merger

When asked whether his relinquishment of the presidency of the Youngstown Sheet & Tube Co., to become the chairman of the board had any bearing on the possible inclusion of the Sheet and Tube company in a merger of independent steel companies, James A. Campbell said that the fundamental policy of the company he heads will not be changed.

At the same time Mr. Campbell stated that he was not opposed to an independent steel merger, but that, if the Sheet and Tube Company were to be taken in, it must be on a basis that would be fair to its stockholders and employees. He also said that he would continue to direct the shaping of the company's policies.

Mr. Campbell's statement received wide attention because it has been generally understood that he had been opposed to the absorption of the Youngstown Sheet & Tube Co., in a large grouping of independent steel companies.

Since the failure of the negotiations two years ago for a merger of the Inland Steel Co., and the Youngstown Sheet & Tube Co., the latter company has been frequently mentioned, but apparently without official authority, as likely to become a part of the steel merger plans of the Otis & Co.-Eaton-Mather group of Cleveland.

Increased production of the Gardner-Denver Co. will be in effect shortly, when machinery will be installed in a new plant addition at Quincy, Ill. Unfilled orders have been on an upward trend for the past several months.

Flexibility Needed in Materials Handling

Variety of Materials, Unit Sizes, Shapes of Packages, Distance and Route Covered Make Severe Problems

HANDLING any material from any part of a large plant to any other place within the fence is a problem which has not yet been solved satisfactorily, in the opinion of Willard C. Brinton, president, Terminal Engineering Co., New York. He was discussing the progress report on materials handling presented before the American Society of Mechanical Engineers on Dec. 3, at the annual convention in New York. This versatility must be compared with the special cases where uniform packages are taken over a constant route and in regular quantities. It is easy to design equipment if there is only one problem to solve. There is great difficulty, however, when one has a variety of materials, sizes of packages, distances, routes, etc., to deal with.

Emergency repairs constitute a large problem in handling materials. In a large steel mill one Saturday afternoon the speaker found about 300 men busily engaged in taking care of maintenance of machinery and equipment which had been run at top speed through the week. High-priced electricians, mechanics, carpenters and others were doing the manual job of hauling materials or carrying them on their shoulders, and more time was consumed by them in this human haulage than in the practice of their several trades.

In response to a criticism of electric trucks on rough roadways, because of serious battery deterioration, Mr. Brinton said that adequate spring suspension would obviate this difficulty. He has had such equipment working successfully on a rougher surface than one usually expects a motor truck to traverse.

When there are so many starts and stops within an hour as are necessary in handling materials within a plant, including unloading cars and placing goods in stock, etc., gasoline-driven equipment is not so good. Maneuverability, backing ability, etc., are cardinal points required of this equipment. With electric trucks the operator turns on the current and gets his acceleration. There is no need to shift gears or anything else as is required in gasoline-driven equipment.

The versatility of trucks used for this purpose is one of their most important features. This goes along with their shortturning radius and the ability to steer with all four wheels. The latter is particularly important when the load is to be pushed into a definite position.

Transmission Association Holds Third Meeting

The third annual meeting and luncheon of the Power Transmission Association was held at the Hotel Commodore, New York, Wednesday, Dec. 4. Recommendations for reorganization of some of the association's activities were contained in a joint report of the executive committee and the merchandising advisory committee, which is headed by W. W. French, Dodge Mfg. Corporation, Misawaka, Ind.

The report was presented by W. H. Fisher, T. B. Wood's Sons Co., Chambersburg, Pa., president of the association. A special committee with F. H. Willard, president, Graton & Knight Co., Worcester, Mass., chairman, has been appointed to set up a definite program along the lines recommended in the report. Closer coordination of group action and increase in publicity activities are among several recommendations to be considered by the special committee.

William Staniar, belting and transmission engineer, E. I. Du Pont de Nemours & Co., now consulting transmission engineer of the association, summarized the activities of the board of advisory engineers, pointing out that in the two years of its existence, the association had laid a good foundation and has become widely known.

W. S. Hays, Drexel Building, Philadelphia, secretary of the association, in outlining some of the activities of the year, gave in brief the results of a survey of the 1929 business of various divisions of the association. Increased sales in all lines, ranging from 13 per cent in the case of leather belting to 48 per cent in the case of short-center belt drive devices, were shown. The increase in belting sales was taken by some as an indication of a wider use of group driving and in this connection, the increased use of belt drive at the recent Machine Tool Show, as compared to the same Show two years ago, was commented upon. The individual motor was employed but there was a wider use of belts, the flexibility of the belt drive being said to be desired by many designers.

Dr. P. G. Agnew, secretary of the American Standards Association, outlined the organization and work of the A. S. A. and enumerated the standardization projects of direct interest to the Power Transmission Association. Membership in the A. S. A. is now before the board of directors of the P. T. A. In discussing Dr. Agnew's remarks, Secretary Hays said that the standardization of speeds of driven machinery would make possible the simplification of pulley sizes, and thus eventually reduce the inventories of pulley manufacturers.

Directors elected or reelected were as follows: J. E. Henry, secretary, Medart Co., St. Louis; G. H. Fisher, president, Fisher Leather Belting Co., Philadelphia; J. H. Duffy, treasurer, Scandinavia Belting Co., Newark, N. J.; S. P. Browning, president, Ohio Valley Pulley Works, Maysville, Ky.; M. F. Dunne, Pyott Foundry Co., Chicago; C. M. Murray, president, Transmission Ball Bearing Co., Buffalo; D. G. Ong, president, U. S. Leather Co., New York, and H. L. Coates, Flexible Lacing Co., Chicago.

It was voted to include in the minutes of the meeting the association's regret over the death of A. E. Pyott, Pyott Foundry Co., Chicago, Charles E. Carpenter, president, E. F. Houghton & Co., Philadelphia, and Donald A. Hampson, member of the association's board of advisory engineers.

Railroad Club Dinner to Be Attended by 3000

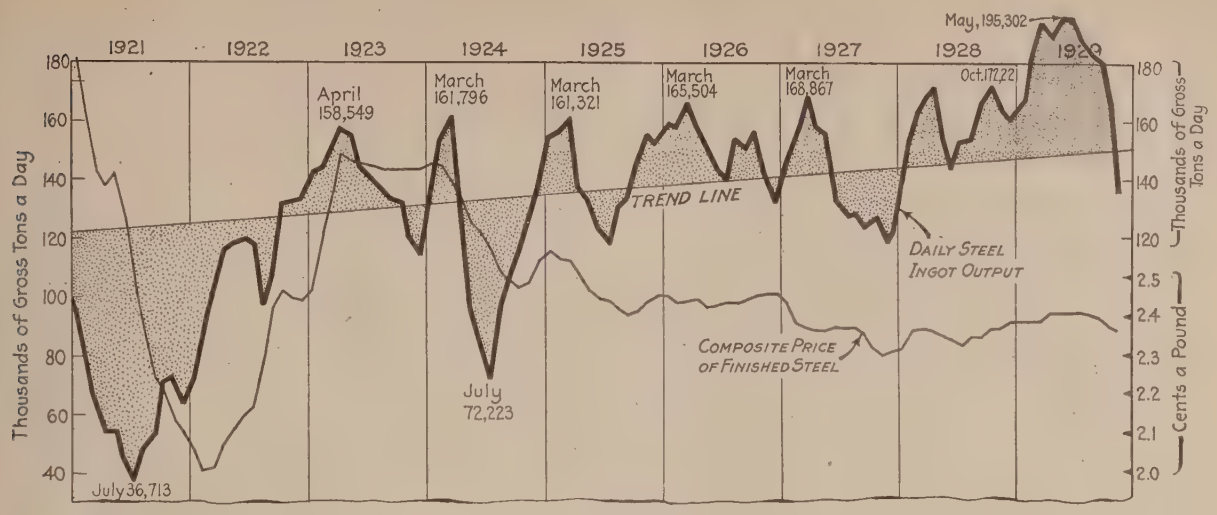
The New York Railroad Club will hold its annual dinner tonight (Thursday) at the Hotel Commodore, New York. More than 3000 reservations have been made. Eliot Sumner, president of the club, will preside. H. H. Vreeland, director of welfare, Interborough Rapid Transit Co., New York, will be toastmaster. After-dinner addresses will be delivered by J. J. Pelley, president, New York, New Haven & Hartford Railroad; George D. Ogden, assistant vice-president, Pennsylvania Railroad, and Congressman Charles Aubrey Eaton of New Jersey. The following railroad executives will be other guests of honor:

Frank Hedley, president, Interborough Rapid Transit Co.; W. S. Menden, president, Brooklyn-Manhattan Transit Corporation; M. H. Cahill, chairman of board, Missouri-Kansas-Texas; R. B. White, president, Central Railroad of New Jersey; C. E. Denney, president, Erie; Graham Sumner, Simpson, Thatcher & Bartlett; W. G. Besler, chairman of board, Central Railroad of New Jersey; J. M. Davis, president, Delaware, Lackawanna & Western; P. E. Crowley, president, New York Central Lines; L. R. Powell, Jr., president, Seaboard Air Line; C. W. Galloway, vice-president, Baltimore & Ohio; G. H. Foster, vice-president, Lehigh Valley; C. H. Ewing, vice-president, Reading Co.; L. S. Miller, president, New York, Westchester & Boston; J. W. Smith, general manager, Boston & Maine; H. J. Humphrey, president, Canadian Railway Club.

To Reroll 4000 Tons of Rails

The McKenna Process Co., Joliet, Ill., has received an order from the Chicago & Alton to reroll approximately 4000 tons of 90-lb. rails. These rails when rerolled will weigh approximately 80 lb. per yard.

Ingot Output in November Made the Sharpest Drop Ever Recorded in One Month. As a result the curve is below normal for the first time in many months. Finished steel prices are about on parity with those a year ago



Sharp Drop in Steel Ingot Output

Eleven Months' Production, However, Exceeds Any Complete Year Heretofore—November Showed Lowest Daily Average Since 1927

PRODUCTION of steel ingots in November was almost 1,000,000 tons below the September and October figures, and was 750,000 tons below the total for November, 1928, according to figures prepared by the American Iron and Steel Institute. No drop of this magnitude has ever before been reported for one month. The calculated November total was 3,513,025 tons, compared with 4,511,650 tons in October.

On the daily basis November, with 26 working days, dropped to 135,116 tons from October's 167,098 tons a day. Not only was the November daily average the lowest of the year; it was the lowest since December, 1927, when 122,134 tons was registered.

Both open-hearth and Bessemer steel were hit by the decline, and about equally. Reports from open-hearth plants showed a drop of 22.7 per cent, from the 3,619,432 tons of October, to 2,797,488 tons in November. Similar returns from Bessemer plants showed a drop of 19 per cent, from the 644,528 tons of October, to 522,672 tons in November.

Year's Record Already Broken

Despite the heavy shrinkage during the month, its output has boosted the total for the accrued portion of the year to a figure far higher than was ever before reached in any complete year. At 51,268,079 tons, a gain was registered of almost 3 per cent above the total for last year, which was by a large margin a high record. Comparing the 11 months of this year with 11 months of last year—itself a record at that time—the gain has been more than 5,400,000 tons, or about 12 per cent. The number of working days in the elapsed portions of the two years has been the same, at 286.

Electric and crucible ingots are not included in these totals. Production of these two types of steel last year averaged about 1480 tons a day. Some such amount would have to be added to the daily figures in the table to obtain the total ingot output of the United States.

In the diagram are traced the course of ingot production and finished steel prices for nine years.

PRODUCTION OF OPEN-HEARTH AND BESSEMER STEEL INGOTS
(GROSS TONS)

1928 Months	Reported by Companies Which Made 94.51 Per Cent of the Steel Ingots in 1928		Calculated Output of All Companies		No. of Working Days
	Open-Hearth	Bessemer	Monthly	Daily	
January	3,273,294	498,691	3,990,902	153,496	26
February	3,300,407	521,250	4,043,457	161,738	25
March	3,692,648	567,330	4,507,217	166,934	27
April	3,505,104	564,110	4,305,382	172,215	25
May	3,394,301	582,128	4,207,212	155,823	27
June	3,010,341	528,193	3,743,903	143,996	26
July	3,068,257	528,588	3,805,598	152,224	25
August	3,379,625	569,771	4,178,610	154,763	27
September	3,375,654	544,710	4,147,893	165,916	25
October	3,795,800	599,098	4,649,968	172,221	27
November	3,442,112	590,669	4,266,835	164,109	26
Eleven months.	37,237,543	6,094,539	45,846,977	160,304	286
December	3,301,114	496,679	4,018,208	160,728	25
Total	40,538,657	6,591,217	49,865,185	160,338	311
1929					
January	3,694,218	549,616	4,490,354	166,309	27
February	3,599,224	489,279	4,326,000	180,250	24
March	4,183,869	596,691	5,058,258	194,548	26
April	4,026,576	640,351	4,938,025	189,924	26
May	4,276,186	707,484	5,273,167	195,302	27
June	3,990,798	622,585	4,881,370	195,255	25
July	3,922,532	649,950	4,838,093	186,080	26
August	3,988,729	668,023	4,927,258	182,491	27
September	3,627,639	635,593	4,510,879	180,435	25
October	3,619,432	644,528	4,511,650	167,098	27
November	2,797,488	522,672	3,513,025	135,116	26
Eleven months.	41,726,691	6,726,722	51,268,079	179,259	286

A patented revolving distributor of the latest roller bearing type has been ordered from A. G. McKee & Co., Cleveland, by the Amtorg Trading Corporation, New York, for shipment to Russia, where it will be installed on a blast furnace. Two electrically-operated scale cars are covered also.

Act to Stabilize Nation's Industries

Industrial Leaders, by Presidential Invitation, Gather in Washington, Tell of Outlooks and Authorize Continuing Committees

WASHINGTON, Dec. 10.—Made up of approximately 400 business leaders, including about 250 trade association executives, the greatest cross section of American industry ever gathered together, the conference held here at the Chamber of Commerce of the United States on Thursday of last week at the request of President Herbert Hoover pledged itself to a program of expenditures for 1930 which it is confidently believed will maintain business activity, wages and employment. It was roughly estimated that the outlay will involve close to $18,000,000,000, thus giving assurance of the determination of business to put to practical application the remedy suggested by President Hoover in his address which opened the conference. His proposed solution, to use his own phrase, lay in "one good word—work."

In order that the program may be pushed forward and government and business may cooperate intelligently, an executive committee will be named to act as a point of contact, supplying information and advice as required.

The conference, which reflected every line of business, as well as finance and agriculture, actually, through the various papers of the groups which were represented, set before the country a complete symposium of conditions prevailing and in prospect. There was throughout an encouraging note sounded. The analyses were based on surveys for the most part, and spokesmen for the various lines of business were careful to avoid an attitude of undue optimism.

Steel Makers Authorize $500,000,000 Expenditures

SPEAKING for the iron and steel industry, as a delegate from the American Iron and Steel Institute, President James A. Farrell of the United States Steel Corporation, pointed out that the steel industry has had a profitable year. Earnings, he said, will enable manufacturers to make improvements long deferred.

"Expenditures already authorized and definitely planned in the industry approximate $500,000,000," said Mr. Farrell. "That is within the industry. Speaking of the industry as a whole, commitments to that extent have been entered into.

"The program of one company calls for $300,000,000 in its 1930-31 budget. The 1930 expenditure has been allotted; that is, the money has been voted and distributed to the different subsidiaries. Precisely this amounts to $160,000,000, and the work is proceeding and will be continued to completion.

"Earnings in the steel industry in recent years were largely expended in plant maintenance. It is well known to those in the industry that our most modern machinery becomes obsolete in 15 or 16 years, so that it requires earnings and surpluses in order to keep up with the times. It is not a question at this juncture of unduly enlarging capacity in our industry, other than keeping in step with the growth of the business.

"The steel plants of the country, having had a good year, will bring plant equipment up to date and contribute their share to general prosperity."

The present rate of operations in the industry, Mr. Farrell said, approximates 65 per cent of capacity. In some lines, such as structural steel, railroad materials, and the heavier lines, it was declared, operations are more extensive than they are in the lighter, or the so-called seasonal lines.

The steel industry was reported as "getting ready for the usual impetus which takes place after the turn of a new year. About this time, we naturally expect a little slowing down." To show the demand in some lines, Mr. Farrell said, one company in November booked as much business as it shipped, a condition described as being most remarkable "in any year, good bad, or indifferent."

Mr. Farrell said he liked the idea of cooperation between government and business and declared that "we have reached a period where, if we are going to be successful, we have got to cooperate, and I think this is going to be the beginning of a great opportunity to expand the business prosperity of our country."

The steel industry, it was stated, rarely has peak years, prefers good average years and expects a good average year in 1930.

"There has been no inflation of prices in the steel industry," continued Mr. Farrell. "There has been no change in our prices for several years. There is no accumulation of large inventories. We will enter the new year with stable prices and stable wages. We cannot have stable wages unless we have stable prices, and we foresee no change in the iron and steel industry in 1930 in either."

Speaking on exports and imports as president of the National Foreign Trade Council, Mr. Farrell said that during the first ten months of the current year exports showed a gain of 6.5 per cent and imports a gain of about 9 per cent over those for the corresponding period of last year. The prospect was declared to be for a substantial excess of exports over imports for the year. Mr. Farrell said that there is no basis for reports of friction between the United States and foreign countries over what might seem to be an intensive effort to increase foreign trade.

"We have got to have an exchange of trade," said Mr. Farrell. "We thrive on exchange of trade."

Julius Barnes, presiding as chairman of the conference, read a telegram from Chairman James A. Campbell of the Youngstown Sheet & Tube Co., who, after saying illness prevented his attendance at the conference, announced that the board of directors of the company on Tuesday had appropriated an additional $2,000,000 to its previous budget of $15,000,000 for its 1930 construction and maintenance program.

Machinery Builders Report on Orders

SPEAKING for the machinery industry, Otto H. Falk, president, Allis-Chalmers Mfg. Co., Milwaukee, said that there are about 10,000 large and small institutions comprising the machinery manufacturing group and that they are just concluding the biggest year in their history. He said that he had received the request to make a survey of conditions so late that the investigation was only cursory, but that there appears to have been no recession of business resultant from the adverse psychological condition created by "recent Wall Street events." He said he had found no one in the industry who anticipated much, if any, change during 1930.

Reports from the Wisconsin Manufacturers' Association coming from 64 machinery concerns were read to the conference. In answering the query as to the present situation regarding advance orders and business prospects as compared with that a year ago, 27 reported no change; 26 reported an

increase and 11 reported a decrease. In reply to the question as to prospects for business during the next six months when compared with the past six months, 26 reported no change; 26 reported improvement and 12 reported a decrease, four of the latter being seasonal. All 64 concerns reported that no wage reduction is contemplated.

Another statement read by General Falk concerned business conditions reported by mail from a group of machinery dealers in Connecticut, New York, Ohio, Pennsylvania, and Wisconsin. Their reports, it was stated, are almost the same as those received monthly throughout the year.

They reported as follows:

Inquiries—80 per cent report fair to good, with a recent tendency to slacken.

Domestic orders—75 per cent report fair to excellent.

Foreign orders — Unsatisfactory, only one or two reporting otherwise.

Labor situation — Generally satisfactory: Common, plentiful; but considerable scarcity of skilled.

Production—Plants running 75 per cent to 100 per cent.

Competition was declared to be keen but business was generally good.

"If you will allow me to make a suggestion which may be helpful, I would recommend," said General Falk, "that this conference go on record in asking that this Congress pass a tariff bill without further unnecessary delay, to relieve the uncertainty in business on this subject. It is my candid opinion that this would be more helpful than any other one thing in stabilizing business."

The machinery industry, said General Falk, sees blue skies ahead and will cooperate in every respect in any program that may be outlined by the conference.

Electrical Industry Looks for 3½ Per Cent Let Down in First Half

REPORTS from the electrical industry, according to the president of the National Electrical Manufacturers' Association, Clarence L. Collins, president, Reliance Electric & Engineering Co., had been received from 178 executives and in his judgment the first six months of 1930 will show a decrease in their productive activity of about 3.5 per cent as compared with the corresponding period of 1929.

It was stated that in spite of the slightly increased volume of business at this time, the aggregate figures on inventories show that the situation today is almost identical with that existing last year at the same time. Making approximate estimates for some of the companies that did not report, Mr. Collins said the questionnaire represented an aggregate in man-hours of about 500,000,000 or possibly an annual productive wage of $300,000,000.

A significant fact was that the branch of the industry that represents electrical appliances going into the home, said Mr. Collins, has the expectation of an increase in 1930 over the corresponding period of 1929. The judgment of the executives of companies manufacturing products going into the building industry showed a decrease. A slight recession, it was said, was expected in products going into industrial plants.

It was predicted that the 1930 program of that part of the industry representing the larger electrical appliances, generating appliances, and power distributing appliances, such as go within a large industrial program for public utilities, will be fully equal to 1929. In the electrical products that tie in with the electrification of railroads, a slight recession of business is expected, it was stated. Major contracts, however, it was added, will be reflected in the business of 1931. In capital expenditures, the belief was expressed that those of the electrical industry will be nearly normal.

Capital Expenditures of Railroads Put at $1,050,000,000

PROPOSED capital expenditures of the railroads amount to $1,050,000,000 for equipment and roadway and structures, and it is estimated that the first quarter of 1930 will absorb $212,000,000 and the second quarter, $278,000,000, or a total of $490,000,000 for the first six months as compared with $350,000,000 total expenditures for the first six months of 1929.

R. H. Aishton, chairman, executive committee of the Association of Railway Executives, said:

"The situation as of Oct. 1 showed a greater authorized program of railway improvements and capital expenditures under way at that time than in any similar period for the past five years. Briefly, it called for an expenditure within the next few months of $674,000,000 or $272,000,000 more than on the corresponding date in 1928.

The railroads do not believe there is anything in existing conditions that warrant them to reduce or abandon any part of their capital program. Instead, however, they are proceeding with confidence in the future business prosperity of the country and in reliance upon the full cooperation of industry in all its branches, equally interested.

"In addition to the capital expenditures outlined above, the railways are expending this year $1,300,000,000 or more in the purchase of supplies for operation and maintenance, ranging all the way from soap to steel castings, and $3,000,000,000 in wages to railway employees.

"Both these forms of distribution of money, aggregating nearly four and one-half billions of dollars, the railways expect to equal in 1930 and will represent a direct flow of cash into the channels of trade and industry. This distribution is additional to the $1,050,000,000 that the railways are now planning as their capital program next year."

Mr. Aishton also said that he was authorized to announce for the Pullman Co. that its capital expenditures for equipment in 1930 will be $11,900,000, of which $3,000,000 each will be spent during the first and second quarters.

Tribute Paid to Trade Press by Dr. Julius Klein, Assistant Secretary of Commerce, in address before Business Conference.

"A further factor contributing toward the success of any such undertaking as that which is now engaging the attention of business leaders everywhere is the vastly improved quality and increased influence of the trade press. It was but a short while ago that the resources of a very few large corporations permitted of any considerable collection of reliable trade and industrial data. Today the keen acumen of our trade editors and their expert staffs has made the sequestration of any important economic facts very difficult, if not impossible."

Automobiles and Ships

THE country at large need not worry about the motor vehicle industry, the conference was told by Alvan Macauley, president, National Automobile Chamber of Commerce, and president of the Packard Motor Car Co. He said the industry doubtless would share to some extent any difficulties that may beset the country, "but we will never be down seriously or for long."

Homer L. Ferguson, president, Newport News Shipbuilding & Dry Dock Co., reported improvement in the shipbuilding industry but said that the shipyards of the country can handle 50 per cent more work than they are handling in 1929. He spoke of prospects, through awards of ships in connection with mail contracts to be good, but added that what is needed is a continued steady flow of new orders. This, it was declared, can be obtained only by the development of paying and prosperous steamship lines.

"It appears," he said, "that freight ships cannot be built in the United States and for the foreign trade with-

out further aid from the Government. The demand for more ships for the foreign trade is up to the Government and it is hoped that the action taken by it will be reasonable in character, so as to enable shipowners to operate them continuously and successfully."

The Continuing Committees

The two committees of business men who are to follow up the work of the National Business Survey Conference have not been appointed at this writing. One of these probably will have a personnel of 15 or 20. It will be a working organization of outstanding leaders, whose purpose will be "to obtain and collate more detailed reports and to devise measures to eradicate whatever weaknesses in the national economic structure they might reveal," according to announcement of the Chamber of Commerce of the United States.

The other committee will be larger and advisory in character, based on trade association representation.

It is assumed that a general committee named at the conference last week, which was made up of 70 business leaders, will assist in selection of these two committees, though this point was not made clear. Among members of the committee selected at the conference were James A. Farrell, New York, representing the American Iron and Steel Institute, and General Otto H. Falk, Milwaukee, president Allis-Chalmers Mfg. Co., representing the machinery industry.

It was made clear at the White House that the Chamber committees will be temporary, rather than permanent. The President, in his address opening the conference, pointed out that the business interests had been invited "to create a temporary organization for the purpose of systematically spreading into industry as a whole the measures which have been taken by some of our leading industries to counteract the effect of the recent panic in the stock market."

In order to perform its part in the program the Department of Commerce has set up a new division to coordinate the construction programs of the Federal, State and local governments.

Chairman Julius Barnes, discussing features of the conference, said that the large capital expenditures for the purposes outlined must be provided from industrial treasuries or most largely by borrowings for capital investment. He pointed out how the Treasury refunded $325,000,000 at 3⅛ per cent against its last borrowings at 4⅞ per cent, not long ago, "probably the most extraordinary change ever recorded in Treasury operations between transactions.

C. M. Schwab Sees Healthy Outlook

Business Almost Entirely Unrelated to What Happened in Wall Street, He Says, and Never in More Stable Position

"AMERICAN business has assumed today a role of greater importance in the social and economic life of the country than it has ever filled before." This statement was made by Charles M. Schwab, chairman of the board of the Bethlehem Steel Corporation, at the thirty-second annual dinner of the Illinois Manufacturers' Association, Dec. 10, at the Stevens Hotel, Chicago.

"For the first time in history, all the forces of business, banking, industry and transportation," continued Mr. Schwab, "have been marshalled under the leadership of the President himself in the most constructive peace-time effort any nation has ever seen. This is business and governmental statesmanship of the highest order. One does not have to be a confirmed optimist to see in Mr. Hoover's conferences something more than a determined and powerful endeavor to substitute a new psychology for the one that has been almost inevitable under similar conditions in the past.

Country's Business Structure More Stable Than Ever Before

"My own view is that two of the outstanding factors in the present situation are these: This is the first time that business in its essential aspects can be regarded as almost entirely unrelated to what has happened in Wall Street, and the whole business structure of the country has in recent years become more stable than ever before.

"Several months ago, I suggested to the steel industry at the annual meeting of the American Iron and Steel Institute that the most fundamental progress made this year was in the degree of stability and balance which had become outstanding characteristics of our business. Other industries have made similar progress. The effect, therefore, of the conference between Mr. Hoover and the spokesmen for American business must inevitably be to preserve the stability and balance throughout the whole business structure. I think the results will be even greater and that we can also look forward to a wholesome expansion of business without the evils of artificial stimulation.

Industry Better Equipped and More Intelligently Managed

"Let me give you a few reasons for my own faith in our continued progress:

"Industry generally—the machinery of prduction—is better equipped and more intelligently managed than at any time in the past. Owing to long-continued good railroad service and the ability of manufacturers to get their needs promptly filled and their products promptly distributed, there are no disturbing stocks of goods or raw materials, and management in the meanwhile has become increasingly better able to adjust production to current demand.

"For the most part, too, this year has produced remarkable earnings, and the cash resources of most business enterprises are exceptionally strong. Credit has become plentiful, also.

"Agriculture, under the stimulus of the Federal Farm Board, has become enabled to organize itself on a more business-like basis and is making great progress already in this direction.

High Standards of Living Are Bulwark of Our Prosperity

"Moreover—and this is the most important aspect—there is today a greater and more widespread recognition on the part of all concerned—stockholders, manager, and Government—that our high standards of living constitute the bulwark of our prosperity and that the purchasing power of the people who buy our goods and services must be maintained.

"These are just a few of the indications of the real soundness of American industry. Taking the steel industry as an example, this year has been one of splendid progress. Production will probably exceed by about 10 per cent what it was in 1928. No big inventories have been built up, earnings have improved in all branches and prices for the most part have been stable for the reason that they have contained no element of inflation.

Healthy Outlook for Steel's Three Biggest Customers

"Steel's three biggest customers, the automobile, railroad and building industries, seem to me to justify a healthy outlook. We are a growing country and in addition to normal growth, which the Wall Street affair cannot seriously retard, the replacement factor alone in these industries furnishes a very substantial market for them and for ourselves. Just as the replacement factor in the automobile industry increases in importance as more automobiles go into service, so it is with buildings and so it has always been with railroads.

"It is upon the continued prosperous condition of our people generally that the future of our industry depends. But the determination of the Government and of the business leaders of the country to keep the wheels of industry turning, to provide continued employment, to protect purchasing power and to look forward may be regarded as a guarantee of sound and steady progress."

This Issue in Brief

How can you determine the most economical production quantity? Balance up between direct labor cost in production, and preparation or setting-up cost before production begins, is the criterion, says engineer.—Page 1585.

* * *

Not enough production foremen to supply needs of industry, says engineering society. Nearly 600,000 such positions exist. Yearly replacements number 30,000, but technical institutes are turning out only 10,000 graduates a year. —Page 1580.

* * *

Few mergers are really successful, says engineer. Theoretical savings are rarely realized, due largely to the fact that the effect on the most important factor, the human element, cannot be predetermined. — Page 1575.

* * *

Welding efficiency averages 75 per cent in all-weather work on oil line. Tests of arc-welded joints reveal that efficiency ranges from about 61 per cent to 94 per cent.—Page 1578.

* * *

Criticizes uses of case-hardened or nitrided materials for essential locomotive parts like main pins or axles. A crack in the hard, brittle surface is propagated through the ductile core. Hard wearing surface can be produced on a thin bushing, which can be replaced if cracks develop.—Page 1592.

* * *

Tungsten-carbide cutting tools may permit use of harder and stronger steels for parts subject to heavy stress in automobiles and other machines. Ability of the cutting alloy to machine hard surfaces opens possibility of using lighter sections. — Page 1594.

What is alloy steel? There is no clear understanding of just what an alloy steel is. Current statistics do not correctly measure entire production. — Page 1594.

* * *

Aircraft sales for 1929 will probably equal only one-half the estimate of 14,000. Production facilities for motors greatly exceed demand, but demand will catch up if production expansion slows down to a sane rate.—Page 1596.

* * *

Economic disturbances were formerly regarded as self-corrective. Will the Washington attempt to stimulate business produce a hesitant and prolonged adjustment?—Page 1597.

* * *

Are higher wages paid because of necessity or through belief in their economic advisability? With few exceptions, employers pay the wages the labor market dictates, says economist. Not so, says another, contrasting present situation with that of 1921.—Page 1599.

* * *

The business is too big if decisions are unduly delayed or if initiative is stifled. The ideal size of an organization depends in large degree on the extent to which authority can be functionalized.—Page 1600.

* * *

Cuts weight of part in half by substituting pressed steel for aluminum casting. Portable electric drill manufacturer also reduces labor and material cost one-third.—Page 1582.

* * *

Improves vitreous enamel surface by burning electrically. Close control of temperature betters quality of work. Smoke and gases are absent.—Page 1581.

Makes gray iron in rotary melting furnace. Flame enters at one end and leaves at the other. Contamination of iron by gas and oxide is slight. One pound of coal melts 7.4 lb. of iron.—Page 1586.

* * *

If you plan a merger, don't ignore the personnel. Experience shows that the confusion and suspicion resulting from throwing two or more organizations together often results in increased, rather than decreased, costs.—Page 1577.

* * *

Unwise extension of production facilities should receive attention of President Hoover's body of business leaders. Economist recommends that the body advise on use of capital.—Page 1598.

* * *

Steel output drops to lowest point since 1927. November daily production was 135,116 tons, almost 20 per cent below the October rate. But 11 months' total is a record, and surpasses any previous full year.—Page 1607.

* * *

Bakes aluminum casting cores in automatic conveyor oven. Conveyor chain is 660 ft. long, about 250 ft. of it being in the oven. —Page 1591.

* * *

Foundry equipment manufacturers contribute equipment for municipal foundry school. Grammar school graduates admitted to four-year training course in Cleveland school. After first year they work half time in foundries. —Page 1579.

* * *

Reduces raw material inventory 21 per cent by making longer and less frequent production runs on staple products. Raw material purchasers are scheduled to arrive just in time to meet production schedules.—Page 1584.

A. I. FINDLEY
Editor

THE IRON AGE

W. W. MACON
Managing Editor

ESTABLISHED 1855

The Concern of Business

"WE are concerned with employment. We are concerned with good wages. We are concerned with prices. And lastly, we are concerned with the continuance of good business, which will enable industry to earn sufficient to maintain all."

—James A. Farrell, president, United States Steel Corporation, at the business conference held at Washington, Dec. 5

Our National Income

ANY apprehension that still exists because of the catastrophe in the stock market doubtless reflects incomprehension rather than reason. Fear of the unexplained is a characteristic of human nature. What has happened is still not understood. If we had better economic data we should better understand the situation.

During the prolonged upward movement in the stock market it was repeatedly pointed out by conservative economists that what was occurring was a writing up of the paper representing a part of our national wealth rather than reckoning an increase in that wealth itself. Similarly and in consequence there might be a writing up of our national income without there being any real increase in it.

These conditions produced much perplexity. Some authorities who estimate the national income figured it as rising at a rate of phenomenal rapidity and attaining a figure of upward of 90 billion dollars per annum, and although such an estimate appeared incredible it was adopted by bankers, financiers and promoters because it suited them. Other authorities, however, could not arrive at figures showing anything but a slow, normal increase and totals never much exceeding 75 billion dollars.

The only explanation of this discrepancy was that one set of economists was reckoning what might be called earned income, reflecting the production of goods and services, while the other set was reckoning earned income plus capital gains, so to speak, following the thought in the requirements for our income tax returns. Plainly it would ensue from this that capital gains might in some year be replaced by capital losses, with strange exhibitions in the reckoning of our national income. If such a conception were valid—as it is not—there would be grave cause for apprehension now.

If there had been any real appreciation in wealth, realized in capital gains and so appearing in national income, that should have been followed by increase in earned income, inasmuch as it would have had to be expended for goods and services. Our national production statistics did not, however, in the aggregate reflect any such thing, and contemporaneously it was perplexing that they did not. The only logical explanation was that realized income from capital gains was being used not for more goods and services but rather for the purchase of other stock certificates, less the cut of the tax-gatherer and some relatively minor diversions, and that some day we might descend the hill just as we had ascended it.

We are mindful that we are attempting herein to draw a very broad picture and that there are many details that would look conflicting if they were examined. Thus we have certainly produced greatly increased quantities of some goods; automobiles, for example, and the steel and copper with which to make them and the petroleum with which to operate them. On the other hand we have produced less of other things. Such conditions show dislocations that may be in the way of progress, or at least in the way of change in our mode of living and consequently will be enduring; but which may have been carried too far and therefore require correction.

The adjustment of economic dislocations is apt to be vexatious, just as is the reknitting of a broken leg; but a broken leg has none of the seriousness of a broken spine. The fundamental things in our national economy are our earnings and our thrift. We are certain that nothing has happened to impair our earning capacity. We may reasonably expect that our earned income in 1930 will be as large as in 1929 unless there be some adversity of nature that no one can foretell. We shall not, however, have any more illusion that our income is more than it really is or ever was.

Direct and Removed Demand

IN present conditions it is especially necessary in making appraisals of the state of trade, as indicated by demand for various commodities, to make allowance for circumstances in the individual commodity, whether it is one in direct demand or in removed demand. A commodity in direct demand, according to the terms we are here using, is one that is being sold directly to the ultimate consumer. The demand is one degree removed if the commodity is sold to a dealer who sells to the ultimate consumer or if it is raw material for a manufacturer who sells to the ultimate consumer, and so on. A commodity may be many stages removed.

In the long run it is necessarily the ultimate consumer who determines the total volume of demand. Except in the possible psychological case of a "buyers' strike," of which we heard so much in 1920, some of it

perhaps not altogether to the point, the ultimate consumer buys according to his resources. This ultimate buying has a momentum, so to speak, producing relative steadiness.

Not so with the removed demand, which is subject to two influences. First, the appraisal of the future made by the buyer, whereby in anticipation the retailer may buy less goods or the manufacturer less material. Second, during the course of a slowing down, either of these buyers will purchase particularly less because with a smaller turnover he needs less goods in stock or material in process of manufacture.

This is a matter that may be overlooked on account of the point so much mentioned that in these recent years stocks have not been carried. The reference is really to reserve or extra stocks. There must be some goods in the retail store or in the warehouse and some material progressing through the manufacturing establishment, and the amount will vary according to the volume or rate of turnover.

A familiar and apt illustration is found in outside or purchased scrap for the open-hearth steel plant. In this case there is an exaggeration, for as the plant slows down it has a supply of works scrap disproportionate to its new rate of working, and the outside scrap must take the total fluctuation. By the same token the requirements in purchased scrap become particularly large when the plant is speeding up.

When a change occurs in the general trade outlook, the immediate effect is least upon direct demand and greatest upon demand that is removed the largest number of stages from the direct. Demand upon the clothing store will be one thing, demand for pig iron to make textile machinery another, decreasing more or increasing more according as the general outlook is down or up. In the last few months the steel demand of the automobile industry has furnished a concrete illustration, slowing down more rapidly than did the actual production of automobiles. The scrap demand of mills specializing in automobile steel slowed down still more.

To determine the state of trade and prospects from the indexes, all indexes should be consulted, but each should be considered according to the proximity or remoteness of the commodity relative to ultimate consumption. When this has been done there is a disclosure of the position of the buyer, which is made up of two elements, his actual condition, physical and financial, and his mental attitude as to the future. Statistics of retail sales represent two factors, the financial condition of the people and their views as to the future, whether they think they see better or poorer times ahead for them.

With a commodity of ultimate consumption subject to seasonal variation in demand, the more removed materials, the successive raw materials, will fluctuate much more in demand than the commodity itself, there being curtailments all along the line at one time and expansion all along the line at the other. By this principle a commodity in particularly poor demand at one time will be in particularly good demand at another.

A MEASURE of the reduction in employment prior to the Wall Street crash is afforded by figures of the United States Bureau of Labor Statistics. In 2265 identical plants in ten branches of the metal-working industries, employing 1,214,708 people in September, the drop to 1,160,559 on payroll in October was 4.46 per cent. The decline in payroll total was not quite so sharp, having been 3.67 per cent on a September weekly wage of $38,373,000. Pay envelopes averaged $31.59 a week in September, going up slightly to $31.86 in October. Of the loss of 54,149 from payroll lists, no less than 45,331 were in the automobile branch.

A Question of Ethics

THE Soviet Union is engaged upon a five-year plan for economic construction. An interesting and elaborate book describing this program has recently been issued by a well-known New York publishing house under the auspices of the Amtorg Trading Corporation, which is the commercial and industrial representative in America of the Soviet Union. The development plan is ambitious, calling for the expenditure of 33 billion dollars for the creation of plants during the next five years. The proper equipment of a great country like Russia would undoubtedly lead to such an investment, or more. Doubt may be entertained as to whether the Soviet Union can finance it; and whether it could be physically consummated in five years, even if it can be financed.

This program is necessarily framed with reliance upon American assistance, in rendering which American engineers, manufacturers and exporters are obliged to take their own chances, inasmuch as the Soviet Government of Russia has not been recognized by the American Government and there is no probability that it will be until the Soviet Government has acceded to our straightforward conditions of (1) the return of property confiscated from our citizens, (2) recognition of indebtedness owed to our Government and our citizens, and (3) abstention from communistic propaganda in our country.

With agreement to those simple terms of human morality we should have nothing but good wishes for the Russian Government and the people whom it represents. If the Russian people choose to continue to conduct themselves in accordance with a social theory that we condemn, that is their own affair. Such a difference of opinion would not prevent us from extending such assistance as might be requested.

Consequently, when it is now a matter of developing economic facilities, such as railroads, the generation and transmission of electricity, etc., or the development of natural resources that are unquestionably the property of the Russian nation, we may be generous in our attitude, always with reservations in respect to risks that must be assumed. We may even be careless as to questions of title among the Russians themselves. When, however, there are properties involved that were confiscated from foreigners, questions of ethics may well be considered.

Leslie Urquhart, chairman of the Russo-Asiatic Consolidated, Ltd., draws attention to this in a recent communication to the *Engineering and Mining Journal*. The Soviet Government took the mines belonging to that company, the metallurgical works that it had erected, and also its working capital, in respect to which the company has a claim against the Soviet

Government for £66,000,000 in case it decides not to return the property. In 1922 the Soviet Government signed an agreement to return the property, together with compensation of over £2,000,000, but has refused to carry it out. American engineers who are invited to assist in the development of such properties should pause to reflect as to professional ethics.

Russo-Asiatic was probably the severest sufferer in this way, but we may remind ourselves that many American companies were likewise treated. The Singer Mfg. Co. wrote off a loss on its investment in Russia in terms that approach that of Russo-Asiatic and would have ruined any enterprise that did not possess its colossal strength, while the International Harvester Co. and many others were similarly robbed.

We think that if the Russians want copper, lead and zinc, sewing machines, agricultural equipment, etc., they would do best to return these properties to their rightful owners and let them furnish the goods that are desired, being sure that they would then be furnished more economically than the Russian or any other Government could do. This, however, is a question of economics as to which there may be different opinions. The other thing is a question of morality, as to which there can be only one opinion.

Paradoxes in Acts and Thoughts

THE existing situation among us is producing some paradoxical occurrences but much more in paradoxical thought. Of the latter we have made notes of a few. We derive them mainly from remarks in the financial journals. But we interlard them with comments that are more serious.

One expressed opinion was that in the efforts to promote business the Sherman law will be permitted to become quiescent. It would follow from this that the Sherman law is a discourager of business. Well, perhaps that is so.

Anyhow, the Sherman law is supposed to be promotive of competition. In the retailing of cigarettes competition has all but ruined a great chain store system, and as for the little retailer his sales have become more or less accidental and he sees his means of livelihood vanishing, wherefore his organization is appealing to somebody to do something. This looks like the Sherman law working upside down.

The copper producers are adjusting themselves to a contracting demand by curtailing their production, wherefore alert bears sold copper stocks and a journalistic writer expressed the opinion that a diminished production was as bad as a reduction in price. However, the copper producers did not see it that way.

The Prince of Wales urged the women of his country to lengthen their skirts and otherwise increase their clothing in order to assist the British manufacturers of textiles. American manufacturers would like the women of this country so to conduct themselves. The style makers of Paris appear to be conniving in this. Our women, however, are vociferating that they will never forsake the freedom of short skirts, and Paris be hanged.

Mr. Ford made a dramatic gesture in raising the wages of his employees. The textile manufacturer has not the means to do such a thing. Mr. Ford resolves the labor question into a quasi-baronial system of profit-sharing. Of course that does not work when there are not any profits and raising wages is not therefore a general panacea for counteracting industrial depression.

Our last remark leads us to the thought of what would be the situation if the encouraging recovery in the stock market should continue; and if stocks should regain the high level of last summer. Should we then look back upon October and November as merely a nightmare?

IF individual demand is caused to shrink, under the influence of a drastic decline in stock market prices, or of a conception of thrift as saving money by withdrawing it from active business, or of a spread of indolent habits, then industrial activity must decline. Higher wages could help consumption were productive efficiency increased in proportion. Cutting the percentage of profit to raise wages could only have the effect of checking the improvement of plant, equipment, designs, tools and fixtures, which is indispensable to the increase of output per worker, and therefore to the increase of the general purchasing power. Western philosophies may follow those of the Orient in theorizing that less work and more leisure is the ideal; but the people of industrialized countries find their greatest comfort and happiness in discovering and supplying new wants.

CORRESPONDENCE

Early Coal Breaker of Steel Construction

To the Editor: For the sake of historical accuracy, I refer to the statement on page 1519 of your Dec. 5 issue, to the effect that there were no steel coal breakers in the Pennsylvania anthracite region 25 yr. ago, and refer you to the Transactions of the American Institute of Mining Engineers, Vol. XIX, which contains a paper by the late Eckley B. Coxe, describing the iron breaker at Drifton. This paper was read at the New York meeting of the institute in September, 1890. This breaker was completed about that time, and has been in operation ever since. No wood enters into its construction except the window sash. There are many cast iron columns in the structure, but considerably more roll shapes and fabricated girders.

This breaker stood alone as an example of iron and steel construction for many years before the coal companies gathered sufficient courage to adopt the steel construction method. In fact, Mr. Coxe's own company built a breaker entirely of wood, some ten or twelve years after the Drifton breaker was built. I believe, however, that it was more a question of the difference in the cost of material in that day.

J. H. PENNINGTON,
Manager, McFarland Foundry & Machine Co.
Trenton, N. J.

Bearing Investigations Put Under Way

At a meeting of the Heavy-Duty Anti-Friction Bearing Committee of the American Society of Mechanical Engineers, in the Engineering Societies Building, New York, Dec. 6, it developed that two of the leading bearing manufacturers have large-scale experiments already under way in efforts to determine bearing pressures on roll necks and elsewhere. These investigations are independent of that which is being sponsored directly by the committee.

Sufficient support to carry on the committee's work for about a year has already been pledged by steel companies, bearing manufacturers and others. A fellow is to be appointed whose work will be done under the general direction of Prof. W. Trinks, Carnegie Institute of Technology, Pittsburgh. He will collate all available data and discover places where experimental work would be most useful. He will carry on experimental work, insofar as may be possible, both in the Carnegie laboratories and in operating steel mills.

It is hoped, by the coordination of these several efforts, to make it possible to design roller bearings for this particular work which will take up less space than now seems to be required, and which at the same time can still be depended upon to function adequately under operating conditions. It is realized that the investigation is likely to cover a considerable expanse of time, but those backing it appear to be satisfied to carry it on to completion.

Scrap Institute Proposes Inspection Service

At a meeting of the Boston chapter of the Institute of Scrap Iron & Steel, Inc., Thursday evening, Dec. 5, at the Parker House, Boston, it was voted to recommend that a national inspection bureau be established by the institute to inspect material shipped to steel mills. It was recommended that inspection be by a neutral body; that local customs of each mill be taken into consideration during inspection, and that the cost of inspection be charged to the shipper requesting such inspection.

Will Not Expand Taylor Tin Plate Plant

The Corrigan, McKinney Steel Co., Cleveland, announces that it does not contemplate making extensions to the tin plate plant at Cumberland, Md., of the N. & G. Taylor Co., Philadelphia, which it recently purchased. The plant will continue to be operated under its present name and the new owners will follow the policy of the old organization in limiting its output to high-quality products in tin plate and terne plate.

The Week in Business

Drift of Current Financial and Economic Opinion

SOME tightening of credit, not necessarily portentous, is indicated by a large increase in loans on securities by member banks of the Federal Reserve System (8369 millions of dollars at the end of November against 6724 millions a year ago). A decided expansion in commercial loans is also shown. The total of bank loans on securities outside of New York, Benjamin Baker points out in the *Annalist,* continues practically undiminished, and he concludes that, with the increase in total loans, a large carry-over from the stock market crash is still to be disposed of; that an increase in loans can hardly be accounted for on the score of business activity. "This situation," he says, "is one of the indeterminate elements in the business outlook." He suggests that the when and extent of the recovery will depend on how courageous and thorough the liquidation is.

The Bureau of Business Conditions of the Alexander Hamilton Institute believes likewise that the increases in commercial loans represent to some extent borrowing on other assets to protect security holdings. The Federal Reserve Bank of New York finds that the liquidation has been almost wholly in loans by lenders other than banks.

Would Control the Business Cycle

Much that is being written regarding the Hoover conferences is highly repetitious. The plans of the more or less temporary committee or economic council to project the influence of these conferences and secure concrete results in maintaining employment has naturally brought out a few observations that the council may be intended to arrest or modify the business cycle. If it shall prove possible to "prevent the occasional depression which has hitherto been felt with regular irregularity," says Theodore H. Price, in *Commerce and Finance,* "then science will have achieved a great victory over human nature."

Words of caution still appear that the expansion programs encouraged by these Washington conventions must not be extended to increase activity among industries that actually require adjustment downward, lest the results aggravate the very conditions in need of correction. Leo Wolman, of the research staff of the National Bureau of Economic Research, makes the point that these meetings are of indispensable service, in the field of public work, by securing the whole-hearted cooperation of thousands of public officials and the breakdown of traditional executive procedure through the pressure of organized public opinion.

High Wages and Prosperity

Out of the welter of analyses and surveys of the causes of the Wall Street crash is coming a questioning of popularly accepted explanations of the prosperity which preceded it. The *Financial Chronicle* emphasizes that in holding that high wages are the key to prosperity, we are living in the midst of a huge delusion. Its argument in part is that the present static scale of high wages was begotten of the war, that agriculture and common labor have had to meet peace time conditions, that "the receipt of high wages by the few, increasing their consuming or buying power (though at the expense of increased price to the many) enabling them, let us say, to pay more for goods bought for sustenance and use cannot be the chief cause of 'prosperity'," because this fraction of labor cannot consume the total production of all other labor. Meanwhile that journal holds the Reserve Banks as responsible for the whole speculative debauch.

As to the end of the period of the recession, rather vague guesses are made as yet in circles outside of business and commerce. A passing reference is made by the National Industrial Conference Board that the American situation is not free from world-wide conditions, but if it is money that is needed, to increase international trade, late indications are that foreign loans are again becoming popular in the United States.

Iron and Steel Markets

Sentiment in Steel Trade Improves

Resumption of Automotive Demand, Large Tin Plate Releases and Sustained Railroad Needs Are Heartening Influences

SENTIMENT in the iron and steel industry has improved. December will be a poor month both in shipments and production, but this fact is not causing concern, since most consumers are reducing their stocks to a minimum preparatory to taking inventory and the price situation holds no incentive for forward buying.

What has impressed the trade is the reassuring manner in which business has reacted to the stock market crash. Apprehension regarding possibilities has given way to manifest satisfaction with what has actually occurred in recent weeks. Railroad orders, shipbuilding contracts, steel fabricating work and specifications from farm equipment makers have been in consistently good volume, apparently unaffected by Wall Street deflation.

Among some of the miscellaneous consumers also there have been evidences of a good rate of activity. Wire rope makers are feeling the stimulus of larger demands from public utilities. Hardware manufacturers and steel barrel makers have increased their specifications. Chicago reports crane and shovel builders busy, with books well filled for four months. Nowhere are there signs of a general paralysis of trade such as developed after other stock market panics.

Not the least among encouraging factors is a betterment in demand for automobile steel. Motor car builders have placed a fair amount of bar, sheet and strip business in new orders, specifications against contracts or releases of suspended shipments, and two of the larger manufacturers have put out inquiries for their first quarter requirements in steel bars. Although it will probably be some time after the first of the year before the motor car industry gets back to fair operations, production of new models in the low-priced class is slowly increasing. With returning confidence, the automobile trade is surveying prospects for 1930, and, while estimates of the year's output are still conservative, they range from 4,000,000 to 4,500,000 vehicles.

The scrap trade at Chicago and Pittsburgh shares the better feeling manifest among steel producers. A mill purchase of 10,000 tons of heavy melting scrap at the former center was followed by advances of 25c. to 50c. a ton in prices paid on dealers' trades. Prices at Pittsburgh also are pointing toward greater strength.

Steel ingot production has undergone little change since a week ago. The output of Steel Corporation and Bethlehem plants remains at 68 per cent of capacity. District operations have increased in Alabama to 85 per cent, but appear to have receded at Buffalo and Youngstown, where production is irregular, probably not averaging much more than 40 per cent. The Chicago and Pittsburgh district rates are unchanged at 65 per cent. With the approach of Christmas, output is expected to contract further, since year-end mill suspensions are likely to be longer than usual.

Railroad equipment business includes a purchase of 1285 freight cars by the Missouri Pacific, supplementing that road's order for 1000 cars a week ago. The Van Sweringen lines are expected to enter the market in a week or two for 13,000 cars.

Rail bookings have been augmented by 23,000 tons placed by the Atlantic Coast Line with the Bethlehem Steel Co. and 5100 tons by the Elgin, Joliet & Eastern with the Illinois Steel Co.

Structural steel lettings were in good volume for the season, totaling 35,000 tons. New inquiries, at 31,000 tons, include 19,000 tons for New York subway work. The contract for 55,000 tons for the Empire State Building, New York, is due to be awarded within a few days. Evidence of progress on public utility programs is seen in inquiries for a number of structural projects, among them a 3000-ton addition to a Chicago district power station. Fabricated steel awards in metropolitan New York in November totaled 44,000 tons, compared with 27,500 tons in the same month last year.

Demand for ship steel continues to expand. W. R. Grace & Co. will build one to four vessels, taking 6000 tons of steel each. About 5000 tons of plates will be required for nine oil barges awarded to the Bethlehem Shipbuilding Corporation. The Tidewater Oil Co. has placed two 13,000-ton tank ships with the Sun Shipbuilding Company and the Standard Shipping Co. will award contracts for four tankers.

Mills making a diversified line of products have been faring better than those more largely dependent on the automobile industry. Bookings of railroad steel, structural steel, tin plate and ship steel help to explain the Steel Corporation's gain in unfilled tonnage in November. Shipments averaged 40,000 tons a day and bookings 41,000 to 42,000 tons, and the net gain for the month was 38,783 tons.

The railroads, in addition to placing equipment and rails, are in the market for plates, shapes and bars. The Norfolk & Western and the Chesapeake & Ohio are each inquiring for 2500 tons.

Tin plate specifications are improving and the mills of the leading producer are now running at 80 per cent of capacity. This rate contrasts sharply with 50 per cent operations in the sheet industry and 20 to 40 per cent output by strip mills.

Pig iron demand continues to lag, but more interest is being shown in first quarter requirements both by the automotive industry and other consuming lines.

A Comparison of Prices

Market Prices at Date, and One Week, One Month and One Year Previous, Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron, Per Gross Ton:	Dec. 10, 1929	Dec. 3, 1929	Nov. 12, 1929	Dec. 11, 1928
No. 2 fdy., Philadelphia	$21.26	$21.26	$21.26	$21.26
No. 2, Valley furnace	18.50	18.50	18.50	18.00
No. 2 Southern, Cin'ti	17.69	17.69	17.69	20.19
No. 2, Birmingham	14.50	14.50	14.50	16.50
No. 2 foundry, Chicago*	20.00	20.00	20.00	20.00
Basic, del'd eastern Pa.	*19.50*	19.75	19.75	20.25
Basic, Valley furnace	18.50	18.50	18.50	17.50
Valley Bessemer, del'd P'gh	20.76	20.76	20.76	20.01
Malleable, Chicago*	20.00	20.00	20.00	20.00
Malleable, Valley	19.00	19.00	19.00	18.25
Gray forge, Pittsburgh	19.76	19.76	19.76	19.26
L. S. charcoal, Chicago	27.04	27.04	27.04	27.04
Ferromanganese, furnace	100.00	100.00	105.00	105.00
Rails, Billets, etc., Per Gross Ton:				
Rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Light rails at mill	36.00	36.00	36.00	36.00
Rerolling billets, Pittsburgh	35.00	35.00	35.00	33.00
Sheet bars, Pittsburgh	35.00	35.00	35.00	33.00
Slabs, Pittsburgh	35.00	35.00	35.00	33.00
Forging billets, Pittsburgh	40.00	40.00	40.00	38.30
Wire rods, Pittsburgh	40.00	40.00	40.00	42.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.85	1.85	1.85	1.90
Finished Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Bars, Pittsburgh	1.90	1.90	1.90	1.90
Bars, Chicago	2.00	2.00	2.00	2.00
Bars, Cleveland	1.90	1.90	1.90	1.90
Bars, New York	2.24	2.24	2.24	2.24
Tank plates, Pittsburgh	1.90	1.90	1.90	1.90
Tank plates, Chicago	2.00	2.00	2.00	2.00
Tank plates, New York	2.17½	2.17½	2.17½	2.22½
Structural shapes, Pittsburgh	1.90	1.90	1.90	1.90
Structural shapes, Chicago	2.00	2.00	2.00	2.00
Structural shapes, New York	2.09½	2.09½	2.14½	2.19½
Cold-finished bars, Pittsburgh	2.30	2.30	2.30	2.20
Hot-rolled strips, Pittsburgh	1.90	1.90	1.90	1.80
Cold-rolled strips, Pittsburgh	2.75	2.75	2.75	2.85

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

Finished Steel,	Dec. 10, 1929	Dec. 3, 1929	Nov. 12, 1929	Dec. 11, 1928
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 24, P'gh	2.75	2.75	2.75	2.85
Sheets, black, No. 24, Chicago dist. mill	2.85	2.85	2.85	2.95
Sheets, galv., No. 24, P'gh	3.40	3.40	3.40	3.60
Sheets, galv., No. 24, Chicago dist. mill	3.50	3.50	3.60	3.70
Sheets, blue, No. 13, P'gh	2.35	2.35	2.35	2.10
Sheets, blue, No. 13, Chicago dist. mill	2.45	2.45	2.45	2.20
Wire nails, Pittsburgh	2.40	2.40	2.40	2.65
Wire nails, Chicago dist. mill	2.45	2.45	2.45	2.70
Plain wire, Pittsburgh	2.40	2.40	2.40	2.50
Plain wire, Chicago dist. mill	2.45	2.45	2.45	2.55
Barbed wire, galv., P'gh	3.05	3.05	3.05	3.30
Barbed wire, galv., Chicago dist. mill	3.10	3.10	3.10	3.35
Tin plate, 100 lb. box, P'gh	$5.35	$5.35	$5.35	$5.25
Old Material, Per Gross Ton:				
Heavy melting steel, P'gh	$15.25	$15.25	$16.75	$17.75
Heavy melting steel, Phila	14.50	14.50	15.00	15.00
Heavy melting steel, Ch'go	12.50	12.50	13.25	14.50
Carwheels, Chicago	13.50	13.50	14.00	14.25
Carwheels, Philadelphia	15.50	15.50	15.50	16.50
No. 1 cast, Pittsburgh	14.50	14.50	15.00	14.50
No. 1 cast, Philadelphia	15.00	15.00	16.00	16.25
No. 1 cast, Ch'go (net ton)	13.50	13.50	13.50	15.50
No. 1 RR. wrot., Phila	15.50	15.50	16.00	15.50
No. 1 RR. wrot., Ch'go (net)	12.00	12.00	12.50	13.25
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$2.65	$2.65	$2.65	$2.75
Foundry coke, prompt	3.75	3.75	3.75	3.75
Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	18.12½	18.12½	18.12½	16.12½
Electrolytic copper, refinery	17.75	17.75	17.75	15.75
Tin (Straits), New York	39.62½	39.37½	39.37½	49.50
Zinc, East St. Louis	6.00	6.00	6.25	6.35
Zinc, New York	6.35	6.35	6.60	6.70
Lead, St. Louis	6.10	6.10	6.10	6.35
Lead, New York	6.25	6.25	6.25	6.50
Antimony (Asiatic), N. Y.	8.62½	8.62½	8.62½	9.62½

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Pittsburgh

Steel Industry Looks to Moderate Improvement Early in New Year—Pig Iron Output Further Curtailed

PITTSBURGH, Dec. 10.—Improved sentiment, which began to make itself felt about the first of the month, is still the dominant feature of this market, although it is now only too evident that December is going to be a very poor month from the standpoint of both shipments and production. Consequently, steel makers have turned their attention to the prospects for the beginning months of the new year and invariably find them encouraging. The explanation offered by some that conditions can hardly grow worse is far from satisfactory, as they have been far worse even in the memory of the less experienced, and the expectation of improved steel demand in January and February must be based on much more tangible evidence.

It is possible that too much importance is attached to the report that the leading maker of low-priced automobiles is planning a schedule of 180,000 cars in January. The common supposition is that other automobile makers, particularly those in the same price class, must also increase operations accordingly. This does not necessarily follow, but it does seem reasonable that the larger automobile companies may be expected to receive considerably heavier steel shipments in January than in November or December.

Other large consuming industries are seemingly more definitely committed as to their needs. Users of steel, both small and large, are reducing their inventories as much as possible this month, and will certainly stock up again after the first of the year. Present specifications are nearly all for urgent shipment and this offers proof of the closely regulated flow of raw materials into plants. Another point emphasized, especially by makers of heavy steel products, is the fact that steel for most of the heavy railroad buying in the present quarter will not be rolled until early next year, and will provide heavy backlogs for certain producers.

Steel ingot operations in the immediate Pittsburgh district do not average above 65 per cent of capacity this week and this is considerably higher than the average in the Valleys or the Wheeling district. The well-sustained schedules of the two largest steel producers in the Pittsburgh area are still responsible for the better showing here.

Among the finishing mills, the departments making rails, structural shapes and plates are running at a slightly better rate than the open-hearth average, but the sheet industry is not above 50 per cent and bar mills are no better off. Strip mills continue to curtail production, and complete suspension of activity Christmas week is already planned by some strip producers. Other companies will take advantage of holiday week to close some departments and will operate mills at as high a rate as is justified this week and next in order to raise Christmas pay envelopes.

Prices on finished steel products are still holding in a general way, at least among the smaller buyers, who usually pay the full market quotations. Few of the larger consumers have covered for their first quarter requirements.

Pig Iron.—This market is beginning to show signs of life. While there has been no appreciable increase

in sales over last week's, sellers in this district have taken the usual number of small lots for spot delivery, and one merchant furnace took an order for 500 tons of foundry iron. Inquiry for first quarter is also beginning to come out. The Westinghouse Electric & Mfg. Co. is asking for prices on the usual quarterly tonnages required at its Trafford City, Pa., and Cleveland plants, and a few other buyers who have not yet made formal inquiry are preparing to do so. Sellers who have been canvassing the trade rather thoroughly in the last week or two report considerable activity in prospect for malleable as well as jobbing foundries, and the steel foundries will undoubtedly require a considerable tonnage during the first quarter. Consumers' stocks are low, and efforts are being made to reduce them to the minimum for inventory taking. For that reason, shipments continue to decline slightly. The Davison Coke & Iron Co. has banked its Cherry Valley furnace, which leaves only three strictly merchant furnaces operating in Pittsburgh and the Valleys, and reduces merchant iron output to the lowest point of the year. All sellers have reaffirmed the present prices of $18.50 for foundry and basic iron, and $19 for malleable and Bessemer for first quarter, and a few sales have been made at those figures. The local furnace will continue to quote prices 50c. over these levels.

Prices per gross ton, f.o.b. Valley furnace:

Basic	$18.50
Bessemer	19.00
Gray forge	18.00
No. 2 foundry	18.50
No. 3 foundry	18.00
Malleable	19.00
Low phos., copper free	27.00

Freight rate to Pittsburgh or Cleveland district, $1.76.

Prices per gross ton, f.o.b. Pittsburgh district furnace:

Basic	$19.00
No. 2 foundry	19.00
No. 3 foundry	18.50
Malleable	19.50

Freight rates to points in Pittsburgh district range from 63c. to $1.13.

Semi-Finished Steel.—So far as can be ascertained, none of the users of semi-finished steel in this district has placed a first quarter contract. In many cases considerable tonnage on present contracts is yet to be shipped, and as companies are not anxious to receive this material before the end of the year, many of them will enter the new year with some tonnage owed them on old contracts. This is particularly true in the case of strip and sheet makers, who have been operating at a very low rate in the last two months. Under the circumstances, present quotations of $35, Pittsburgh or Youngstown, on billets, slabs and sheet bars are still untested. A Cleveland mill is said to be soliciting first quarter sheet bar business at $34, but this competition is not yet a factor in the Pittsburgh district. Nevertheless, sharp declines in sheet prices have made the sheet bar prices comparatively high, and some downward revision would not be considered unusual at this time. Forging billets are holding at $40, Pittsburgh, and wire rods at the same figure. A few users of rods have closed for the first quarter. Sellers of skelp are renewing contracts on the old basis of 1.85c., Pittsburgh.

Bars, Shapes and Plates.—The market continues rather dull, and interest is centered in first quarter prospects rather than in the immediate outlook. It seems certain that the remainder of the month will see no marked improvement in demand for bars, while contemplated projects requiring heavy tonnages of shapes and plates are likely to be postponed until after the first of the year. A local building for McCann & Co., requiring 900 tons of shapes, was placed last week, while 450 tons for transmission towers in Louisiana was taken by a local fabricator. Otherwise structural awards have been few. However, shape mills are well supplied with tonnage for some time to come and are running at a better rate than many other departments. Car builders tributary to Pittsburgh mills are still adding to their backlogs, and one is now booked at a fair rate over the first half of next year. Steel tonnage releases for this business are not reaching local mills at a very brisk rate. Barge yards are cleaning up old orders and a few units are being built for stock. About 1400 tons of plates will be required for water tanks in Wisconsin and Long Island, which have been placed with a local fabricator. The bar business is still exceedingly dull, but some of the dependable consuming industries have not reduced their requirements very much this quarter. However, cold-finishing mills are taking only small tonnages, and, with the reinforcing bar trade seasonably quiet, aggregate demand would not be impressive even if the automobile industry were operating at a normal rate. Occasional price shading is reported from time to time, but no transactions have come to light which might indicate a market quotable at less than 1.90c., Pittsburgh, on bars, plates and shapes.

Bolts, Nuts and Rivets.—This industry has not felt the lessened steel buying as much as some other departments, and most of the reduction in demand in the last few weeks can be traced to seasonal considerations such as year-end inventories. Shipments to the automobile industry have naturally declined, but the railroads are increasingly larger buyers, and the average operating rate for the industry is not less than 50 per cent of capacity. Present quotations of 70 per cent off list on bolts and nuts, 70 and 10 on small rivets and $3.10 a lb. for large rivets, have been reaffirmed for first quarter business and contracts are now being closed for that period.

Rails and Track Accessories.—Specifications for track supplies are light, but it is much too early to begin shipping tonnage for spring work. Rail mill operations are gradually improving, but will not reach their peak before January or February. Light rails are moderately active. Prices on track accessories are holding fairly well in a quiet market.

Wire Products.—Business is quiet, but spot orders for small quantities of wire and nails from jobbers are accounting for normally good tonnage for this time of the year. Comparatively, demand for manufacturers' wire is hardly so good, as this product is dependent enough upon the automobile industry to be seriously affected by low production in that field. The trade is now being canvassed rather actively for first quarter contracts, and a number of users have closed for that period at $2.40 to $2.50 on wire nails, and 2.55c. to 2.65c. on annealed wire. Wire mills are running at 40 to 50 per cent of capacity.

The Iron Age Composite Prices

Finished Steel

Dec. 10, 1929, 2.362c. a Lb.

One week ago	2.362c.
One month ago	2.362c.
One year ago	2.391c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products make 87 per cent of the United States output of finished steel.

	High	Low
1929	2.412c., April 2;	2.362c., Oct. 29
1928	2.391c., Dec. 11;	2.314c., Jan. 3
1927	2.453c., Jan. 4;	2.293c., Oct. 25
1926	2.453c., Jan. 5;	2.403c., May 18
1925	2.560c., Jan. 6;	2.396c., Aug. 18

Pig Iron

Dec. 10, 1929, $18.29 a Gross Ton

One week ago	$18.29
One month ago	18.38
One year ago	18.59
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High	Low
1929	$18.71, May 14;	$18.25, Aug. 27
1928	18.59, Nov. 27;	17.04, July 24
1927	19.71, Jan. 4;	17.54, Nov. 1
1926	21.54, Jan. 5;	19.46, July 13
1925	22.50, Jan. 13;	18.96, July 7

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base per Lb.
F.o.b. Pittsburgh mill	1.90c.
F.o.b. Chicago	2.00c.
Del'd Philadelphia	2.22c.
Del'd New York	2.24c.
Del'd Cleveland	1.85c. to 1.90c.
F.o.b. Cleveland	1.85c. to 1.90c.
F.o.b. Lackawanna	2.00c.
F.o.b. Birmingham	2.10c.
C.i.f. Pacific ports	2.35c.
F.o.b. San Francisco mills	2.35c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills, 40, 50, 60-ft.	2.00c.
F.o.b. Pittsburgh mills, cut lengths	2.25c.
F.o.b. Birmingham, mill lengths	2.10c.

Rail Steel

F.o.b. mills, east of Chicago dist.	1.90c.
F.o.b. Chicago Heights mill	1.90c.
Del'd Philadelphia	2.27c.

Iron

Common iron, f.o.b. Chicago	2.00c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	2.12c.
Common iron, del'd New York	2.14c.

Tank Plates

	Base per Lb.
F.o.b. Pittsburgh mill	1.90c.
F.o.b. Chicago	2.00c.
F.o.b. Birmingham	2.05c.
Del'd Cleveland	2.09c.
Del'd Philadelphia	2.10c. to 2.15c.
F.o.b. Coatesville	2.00c. to 2.05c.
F.o.b. Sparrows Point	2.00c. to 2.05c.
F.o.b. Lackawanna	2.00c. to 2.05c.
Del'd New York	2.17½c. to 2.22½c.
C.i.f. Pacific ports	2.25c. to 2.35c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh mill	1.90c.
F.o.b. Chicago	2.00c.
F.o.b. Birmingham	2.05c.
F.o.b. Lackawanna	2.00c. to 2.05c.
F.o.b. Bethlehem	2.00c.
Del'd Cleveland	2.09c.
Del'd Philadelphia	1.96c. to 2.06c.
Del'd New York	2.09½c. to 2.14½c.
C.i.f. Pacific ports	2.35c.

Hot-Rolled Hoops, Bands and Strips

	Base per Lb.
6 in. and narrower, P'gh	2.00c.
Wider than 6 in., P'gh	1.90c.
6 in. and narrower, Chicago	2.10c.
Wider than 6 in., Chicago	2.00c.
Cooperage stock, P'gh	2.20c.
Cooperage stock, Chicago	2.30c.

Cold-Finished Steel

	Base per Lb.
Bars, f.o.b. Pittsburgh mill	2.20c.
Bars, f.o.b. Chicago	2.20c.
Bars, Cleveland	2.20c.
Bars, Buffalo	2.20c.
Shafting, ground, f.o.b. mill	*2.55c. to 3.50c.
Strips, P'gh	2.75c.
Strips, Cleveland	2.75c.
Strips, del'd Chicago	3.05c.
Strips, Worcester	2.90c.
Fender stock, No. 20 gage, Pittsburgh or Cleveland	4.25c.

*According to size.

Wire Products

(Carload lots, f.o.b. Pittsburgh and Cleveland.)

To Merchant Trade

	Base per Keg
Standard wire nails	$2.40 to $2.50
Cement coated nails	2.40 to 2.50
Galvanized nails	4.40 to 4.50

	Base per Lb.
Polished staples	2.85c. to 2.95c.
Galvanized staples	3.10c. to 3.20c.
Barbed wire, galvanized	3.05c. to 3.15c.
Annealed fence wire	2.55c. to 2.65c.
Galvanized wire, No. 9	3.00c. to 3.10c.
Woven wire fence (per net ton to retailers)	$65.00

To Manufacturing Trade

Bright hard wire, Nos. 6 to 9 gage	2.40c.
Spring wire	3.50c.

(Carload lots, f.o.b. Chicago.)

Wire nails	$2.45 to $2.55 (keg)
Annealed fence wire	2.60c. to 2.70c. (lb.)
Bright hard wire to manufacturing trade	2.45c.

Anderson, Ind., mill prices are ordinarily $1 a ton over Pittsburgh base; Duluth, Minn., mill $2 a ton over Pittsburgh, and Birmingham mill $3 a ton over Pittsburgh.

Cut Nails

	Per 100 Lb.
Carloads, Wheeling, Reading or Northumberland, Pa.	$2.70
Less carloads, Wheeling or Reading	2.80

Light Plates

No. 10, blue annealed, f.o.b. P'gh	2.20c.
No. 10, blue annealed, f.o.b. Chicago dist.	2.30c.
No. 10, blue annealed, del'd Phila.	2.42c. to 2.52c.
No. 10, blue annealed, B'ham	2.35c.

Sheets

Blue Annealed

	Base per Lb.
No. 18, f.o.b. P'gh	2.35c.
No. 18, f.o.b. Chicago dist.	2.45c.
No. 18, del'd Philadelphia	2.57c. to 2.67c.
No. 18, blue annealed, B'ham	2.50c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh	2.75c.
No. 24, f.o.b. Chicago dist. mill	2.85c.
No. 24, del'd Philadelphia	3.07c.
No. 24, f.o.b. Birmingham	3.00c. to 3.10c.

Metal Furniture Sheets

No. 24, f.o.b. P'gh	4.00c.

Galvanized

No. 24, f.o.b. Pittsburgh	3.40c. to 3.50c.
No. 24, f.o.b. Chicago dist. mill	3.50c. to 3.60c.
No. 24, del'd Cleveland	3.59c. to 3.69c.
No. 24, del'd Philadelphia	3.72c. to 3.82c.
No. 24, f.o.b. Birmingham	3.65c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.90c. to 3.00c.
No. 28, f.o.b. Chicago dist. mill	3.00c. to 3.10c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh	4.00c.

Long Ternes

No. 24, 8-lb. coating, f.o.b. mill	3.90c. to 4.00c.

Vitreous Enameling Stock

No. 24, f.o.b. Pittsburgh	3.90c.

Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills	$5.35
Standard cokes, f.o.b. Gary	5.45

Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)
(Per Package, 20 x 28 in.)

8-lb. coating I.C. $10.70 | 25-lb. coating I.C. $15.90
15-lb. coating I.C. 13.40 | 30-lb. coating I.C. 16.80
20-lb. coating I.C. 14.60 | 40-lb. coating I.C. 18.80

Alloy Steel Bars

(F.o.b. makers' mill)
Alloy Quality Bar Base, 2.65c. per Lb.

S.A.E. Series Numbers		Alloy Differential
2000	(½% Nickel)	$0.25
2100	(1½% Nickel)	0.55
2300	(3½% Nickel)	1.50
2500	(5% Nickel)	2.25
3100	Nickel Chromium	0.55
3200	Nickel Chromium	1.35
3300	Nickel Chromium	3.80
3400	Nickel Chromium	3.20
4100	Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50
4100	Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600	Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel)	1.05
5100	Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100	Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100	Chromium Spring Steel	0.20
6100	Chromium Vanadium Bars	1.20
6100	Chromium Vanadium Spring Steel	0.95
9250	Silicon Manganese Spring Steel (flats)	0.25
	Rounds and squares	0.50
	Chromium Nickel Vanadium	1.50
	Carbon Vanadium	0.95

Above prices are for hot rolled steel bars, forging quality. The differential for cold-drawn bars is ¾c. a lb. higher, with standard classification for cold-finished alloy steel bars applying. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis.

Billets under 4 x 4 in. carry the steel bar base. Slabs with a sectional area of 16 in. or over carry the billet price. Slabs with sectional area of less than 16 in. or less than 2½ in. thick, regardless of sectional area, take the bar price.

Rails

	Per Gross Ton
Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	36.00
Light (from rail steel), f.o.b. mill	34.00
Light (from billets), f.o.b. Ch'go mill	36.00

Track Equipment

	Base per 100 Lb.
Spikes, ⅝ in. and larger	$2.80
Spikes, ½ in. and smaller	2.80
Spikes, boat and barge	3.00
Tie plate, steel	2.15
Angle bars	$2.75
Track bolts, to steam railroads	$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel Inches	Black	Galv.	*Iron* Inches	Black	Galv.
⅛	45	19½	¼ and ⅜	+11	+36
¼ to ⅜	51	25½	½	23	5
½	56	42½	¾	28	11
¾	60	48½	1 and 1¼	31	15
1 to 3	62	50½	1½ and 2	35	18

Lap Weld

2	55	43½	2	23	9
2½ to 6	59	47½	2½ to 3½	28	13
7 and 8	56	43½	4 to 6	30	17
9 and 10	54	42½	7 and 8	29	16
11 and 12	53	40½	9 to 12	26	11

Butt Weld, extra strong, plain ends

⅛	41	24½	¼ and ⅜	+13	+48
¼ to ⅜	47	30½	½	23	7
½	53	42½	¾	28	12
¾	58	47⅞	1 to 2	34	18
1 to 1½	60	49½			
2 to 3	61	50½			

Lap Weld, extra strong, plain ends

2	53	42½	½	29	13
2½ to 4	57	46½	2½ to 4	34	20
4½ to 6	56	45½	4½ to 6	33	19
7 to 8	52	39½	7 and 8	31	17
9 and 10	45	32½	9 to 12	21	8
11 and 12	44	31½			

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Steel		*Charcoal Iron*	
2 in. and 2¼ in.	38	1½ in.	1
2½ in.—2¾ in.	46	1¾ in.	8
3 in.	52	2 in.—2¼ in.	13
3¼ in.—3¾ in.	54	2½ in.—2¾ in.	16
4 in.	57	3 in.	17
4½ in. to 6 in.	46	3¼ in. to 3½ in.	18
		4 in.	20
		4½ in.	21

On lots of a carload or more, the above base discounts are subject to a preferential of two fives on steel and of 10 per cent on charcoal iron tubes. Smaller quantities are subject to the following modifications from the base discounts:

Lap Welded Steel—Under 10,000 lb., 6 points under base and one five; 10,000 lb. to carload, 4 points under base and two fives. Charcoal Iron—Under 10,000 lb., 2 points under base; 10,000 lb. to carload, base and one five.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	61	3 in.	46
1¼ to 1½ in.	53	3¼ to 3½ in.	48
1¾ in.	37	4 in.	51
2 to 2¼ in.	32	4½, 5 and 6 in.	46
2½ to 2¾ in.	40		

Hot Rolled

2 and 2¼ in.	38	3¼ to 3½ in.	54
2½ and 2¾ in.	46	4 in.	57
3 in.	52	4½, 5 and 6 in.	46

Beyond the above base discounts a preferential discount of 5 per cent is allowed on carload lots. On less than carloads to 10,000 lb., base discounts are reduced 4 points with 5 per cent preferential; on less than 10,000 lb., base discounts are reduced 6 points, with no preferential. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage take the mechanical tube list and discounts. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30%, base (carloads)	55
Carbon, 0.30% to 0.40% base	50

Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

Tubular Goods.—Although the season is practically at an end for both standard butt-weld pipe and heavy lap-weld material, mills are still shipping some tonnage in these lines, and December has started out to be about as good as it usually is. Large projects, which were talked about earlier in the year, will be delayed until early spring, and mills expect little further activity in line pipe for some time. Oil country demand is quiet, and as distributers' stocks in the oil fields are ample, shipments may be rather light in the next few weeks. Efforts to curtail oil production are still being watched with considerable interest by pipe makers, and some of them are hopeful that a definite program is not far in the offing. Mechanical tubing is quiet, although a few automobile makers are beginning to plan their requirements for January.

Sheets.—Specifications last week showed improvement, according to some makers, and the leading interest has scheduled its mills for a slightly better rate of operation. The last two weeks in the month may be somewhat lower, but makers are now somewhat more hopeful, and with shipments to the automobile industry at a low point, they are assured that even a slight improvement from that consuming industry would be immediately reflected in higher operating rates. Building materials made of sheet steel are normally quiet at this time of the year, but agricultural implement makers are still taking heavy tonnages, and the car builders are entering substantial orders for material for box car roofing and doors. The radio industry is taking very little sheet steel at this time, but the tonnage of electrical sheets is holding up well. Prices are still subject to some uncertainty, but the market has a firmer tone than it had two weeks ago. Black sheets seem to be fairly well established at 2.75c., Pittsburgh, and, although some buyers insist that they have had lower quotations mills are inclined to hesitate in recognizing such competition. Blue annealed sheets and light plates are now quotable at 2.35c. and 2.20c., Pittsburgh, respectively, and with mills selling the jobbing mill product generally refusing to meet the competition of wide strip these prices are well established. On galvanized material, the 3.40c. to 3.50c. Pittsburgh, range applies to practically all the tonnage now being placed. Metal furniture sheets are now quotable at 4c., Pittsburgh, as against the recent range of 4c. to 4.10c., which places them on the same basis as automobile body sheets.

Tin Plate.—Operations this week may show some improvement, although specifications are not much heavier than they have been in the last two or three weeks. At some mills the higher operating rates are made possible by tonnage which has been allowed to accumulate, while other companies plan to suspend operations during Christmas week, and are already arranging their tonnage schedules to accommodate this. The leading interest plans to operate at above 80 per cent again this week, although the rate of independent makers is not above 65 per cent of capacity.

Strip Steel.—Although conditions in the strip industry show no general improvement, a few companies have received some fair orders from the automotive industry for January delivery and see in these the promise of improved business next month. Mill operations are still very low and intermittent. With many units closed down entirely one week and running four or five days the next, it is difficult to gage the industry's operating rate, but a fair estimate would be about 40 per cent for hot mills and 20 to 25 per cent for cold. Prices lack strength, but considered in the light of business being placed, are holding remarkably well. Efforts to take business from the regular customers of one mill by another are uncommon, and a good percentage of first quarter contracts have been signed at the regularly quoted prices. Some buyers are inclined to seek concessions, but the market is still quotable at 2.75c., Pittsburgh or Cleveland, on cold-rolled material and 1.90c. and 2c. on hot-rolled.

Cold-Finished Steel Bars.—The market is very quiet, but prices apparently are firm and operations are well accommodated to light current demand. A few automobile companies are beginning to show interest in their first quarter requirements, particularly January tonnage, and reports thus far are encouraging. The agricultural implement industry is taking a substantial tonnage. Mills are quoting 2.20c., Pittsburgh, on cold-finished bars and 2.55c. to 3.50c., mill, on ground shafting, according to size.

Coal and Coke.—Coke business is dull. Lack of sustained cold weather is discouraging to the market for heating coke. The furnace grade is weak at $2.65, Connellsville, but lower quotations are not frequently met and no large inquiries have come out which might lead to sharp concessions. Foundry coke shipments are still declining, and spot purchases are infrequent. Although $3.75, Connellsville, is still the quotable minimum on 72-hr. coke, prices as low as $3.50 are not uncommon. The market for domestic coal is slightly more active, but industrial consumption is curtailed.

Old Material.—The scrap market has a considerably better tone this week, and dealers are generally of the opinion that prices will go no lower at present. This opinion also seems to be shared by a few mills in adjacent districts, which have made some effort in the last week to buy scrap at the present low levels. In the immediate Pittsburgh district the only sale reported was that of the Pennsylvania Railroad scrap, on which the No. 1 heavy melting steel brought up to $15.60 at a local mill. However, a considerable amount of this material was sold at prices ranging from $15 to $15.50, and the market on No. 1 heavy melting steel this week is much more clearly defined at $15 to $15.50 than it was last week. Other grades of scrap also are unchanged, but in nearly all cases the present quotations are somewhat stronger than they were a week ago. Demand for specialties continues to be heavy, and the steel wheels on the Pennsylvania list are reported to have brought $20.25. Dealers are watching the trend of the finished steel market closely in an effort to ascertain the probable course of operations during January, and they now believe that considerable improvement will manifest itself in the first two months of the new year.

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.25c.
Hoops	4.25c.
Black sheets (No. 24), 25 or more bundles	3.70c. to 3.80c.
Galv. sheets (No. 24), 25 or more bundles	4.35c. to 4.45c.
Light plates, blue annealed (No. 10), 1 to 24 plates	3.25c. to 3.35c.
Blue annealed sheets (No. 13), 1 to 24 sheets	3.40c. to 3.50c.
Galv. corrug. sheets (No. 28), per square	$4.33
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count,	60 per cent off list
Machine bolts, 100 count,	60 per cent off list
Carriage bolts, 100 count,	60 per cent off list
Nuts, all styles, 100 count,	60 per cent off list
Large rivets, base per 100 lb.	$3.50
Wire, black soft ann'l'd, base per 100 lb	$2.90 to 3.00
Wire, galv. soft, base per 100 lb	2.90 to 3.00
Common wire nails, per keg	2.80 to 2.90
Cement coated nails, per keg	2.95 to 3.05

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$15.00 to $15.50
No. 2 heavy melting steel	13.00 to 13.50
Scrap rails	14.00 to 14.50
Compressed sheet steel	14.50 to 15.00
Bundled sheets, sides and ends	14.00 to 14.50
Cast iron carwheels	14.00 to 14.50
Sheet bar crops, ordinary	17.00 to 17.50
Heavy breakable cast	11.00 to 11.50
No. 2 railroad wrought	15.00 to 15.50
Hvy. steel axle turnings	15.00 to 15.50
Machine shop turnings	10.00 to 10.50
Acid Open-Hearth Grades:	
Railr. knuckles and couplers	19.50 to 20.50
Railr. coil and leaf springs	19.50 to 20.50
Rolled steel wheels	19.50 to 20.50
Low phos. billet and bloom ends	20.50 to 21.00
Low phos., mill plates	20.50 to 21.00
Low phos., light grades	19.50 to 20.50
Low phos., sheet bar crops	20.50 to 21.00
Heavy steel axle turnings	15.00 to 15.50
Electric Furnace Grades:	
Low phos., punchings	18.50 to 19.00
Hvy. steel axle turnings	15.00 to 15.50
Blast Furnace Grades:	
Short shoveling steel turnings	10.50 to 11.00
Short mixed borings and turnings	10.50 to 11.00
Cast iron borings	10.50 to 11.00
Rolling Mill Grades:	
Steel car axles	19.50 to 20.50
Cupola Grades:	
No. 1 cast	14.00 to 15.00
Rails 3 ft. and under	17.50 to 18.50

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and under 10-in., Pittsburgh	$35.00
Rerolling, 4-in. and under 10-in., Youngstown	35.00
Rerolling, 4-in. and under 10-in., Cleveland	35.00
Rerolling, 4-in. and under 10-in., Chicago	36.00
Forging quality, Pittsburgh	40.00

Sheet Bars

(Open Hearth or Bessemer)

	Per Gross Ton
Pittsburgh	$35.00
Youngstown	35.00
Cleveland	35.00

Slabs

(8 in. x 2 in. and under 10 in. x 10 in.)

	Per Gross Ton
Pittsburgh	$35.00
Youngstown	35.00
Cleveland	35.00

Skelp

(F.o.b. Pittsburgh or Youngstown)

	Per Lb.
Grooved	1.85c. to 1.90c.
Universal	1.85c. to 1.90c.
Sheared	1.85c. to 1.90c.

Wire Rods

(Common soft, base)

	Per Gross Ton
Pittsburgh	$40.00
Cleveland	40.00
Chicago	41.00

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.80
Old range non-Bessemer, 51.50% iron	4.65
Mesabi Bessemer, 51.50% iron	4.65
Mesabi non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.40

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algerian	12.00c.
Iron ore, low phos., Swedish, average 68% iron	12.00c.
Iron ore, basic Swedish, average 65% iron	10.00c.
Manganese ore, washed, 52% manganese, from the Caucasus	30.00c.
Manganese ore, Brazilian, African or Indian, basic 50%	30.00c.
Tungsten ore, high grade, per unit, in 60% concentrates	$15.50 to $16.50

	Per Gross Ton
Chrome ore, 45 to 50% Cr_2O_3, crude, c.i.f. Atlantic seaboard	$22.00 to $24.00

	Per Lb.
Molybdenum ore, 85% concentrates of MoS_2, delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$2.65
Foundry, f.o.b. Connellsville prompt	$3.75 to 4.75
Foundry, by-product, Ch'go ovens	8.00
Foundry, by-product, New England, del'd	11.00
Foundry, by-product, Newark or Jersey City, delivered	9.00 to 9.40
Foundry, by-product, Phila.	9.00
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry by-prod., del'd St. Louis	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.25 to $1.75
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, ¾-in. f.o.b. Pa. mines	1.90 to 2.00
Mine run gas coal, f.o.b. Pa. mines	1.65 to 1.75
Steam slack, f.o.b. W. Pa. mines	80c. to 90c.
Gas slack, f.o.b. W. Pa. mines	1.00 to 1.10

Ferromanganese

	Per Gross Ton
Domestic, 80%, seaboard	$100.00
Foreign, 80%, Atlantic or Gulf port, duty paid	100.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$31.00 to $34.00
Domestic, 16 to 19%	29.00 to 32.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$83.50
75%	130.00

	Per Gross Ton Furnace		*Per Gross Ton Furnace*
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	45.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		*Per Gross Ton*
10%	$30.00	12%	$34.00
11%	32.00		

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		*Per Gross Ton*
6%	$22.00 to $23.00	10%	$26.00 to $28.00
7%	23.00 to 24.00	11%	28.00 to 30.00
8%	24.00 to 25.00	12%	30.00 to 32.00
9%	25.00 to 26.00		

Other Ferroalloys

Ferrotungsten, per lb. contained metal del'd	$1.40 to $1.50
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.15 to $3.65
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	$160.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton	$91.00
Ferrophosphorus, electric 24%, f.o.b. Anniston, Ala., per gross ton	$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silicon, gravel, f.o.b. Illinois and Kentucky mines	$18.00
No. 2 lump, Illinois and Kentucky mines	20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	$18.25 to 18.75
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines	32.50

Fire Clay Brick

	Per 1000 f.o.b. Works	
	High-Heat Duty Brick	Intermediate Heavy Duty Brick
Pennsylvania	$43.00 to $46.00	$35.00 to $38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	.....
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00
Standard size	45.00

Chrome Brick

	Per Net Ton
Standard size	$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts, blank or tapped, hexagons	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	7.00c. to 6.75c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled thread up to and including ⅛ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagon nuts	70
Semi-finished hexagon castellated nuts, S.A.E.	70
Stove bolts in packages, P'gh	75, 20, 10 and 5
Stove bolts in packages, Chicago	75, 20, 10 and 5
Stove bolts in packages, Cleveland	75, 20, 10 and 5
Stove bolts in bulk, P'gh	75, 20, 10, 5 and 2½
Stove bolts in bulk, Chicago	75, 20, 10, 5 and 2½
Stove bolts in bulk, Cleveland	75, 20, 10, 5 and 2½
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55, 60 per cent apply.

Large Rivets

(½-in. and larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$3.10
F.o.b. Chicago	3.20

Small Rivets

(7/16-in. and smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70 and 10
F.o.b. Cleveland	70 and 10
F.o.b. Chicago	70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10 and 5
Milled standard set screws, case hardened,	80 and 5
Milled headless set screws, cut thread	75 and 10
Upset hex. head cap screws, U.S.S. thread	85
Upset hex. cap screws, S.A.E. thread	85
Upset set screws	80, 10 and 5
Milled studs	70

Chicago

With No Further Recession in Ingot Output, Low Point Is Believed to Have Been Reached

CHICAGO, Dec. 10.—For the first time in several weeks, ingot output in this district has held at a uniform rate, and this situation is giving rise to the thought that the low point in steel production, as gaged by consumption, has been reached. However, it must be kept in mind that consumers are unusually cautious and will take tonnage only in limited amounts for immediate use. As long as this situation lasts, a change one way or the other by users will be quickly reflected at mills, especially with rolling schedules often as close as five or six days.

Ingot output is at 65 per cent of capacity, which closely matches with this week's specifications, part of which are coming to local mills from a wider territory. Sales of finished steel continue to drag, this being especially noticeable in commitments for future delivery. Railroad purchases this week are light, but the undertone of this market is strong. One estimate made here promises that close to 14,000 cars will be purchased in the Western market in nearby months, while miscellaneous rail tonnage still to be covered is said to be not far from 100,000 tons. The buying movement in track accessories to accompany 1930 rails is not yet under way, and production of these commodities is moderate in volume.

Several indications give rise to the thought that sentiment among manufacturers of automobiles is improving. Inquiries for pig iron from this source are more numerous and releases for immediate shipment show improvement. A parts maker is asking for prices on first half needs and several others are actively in the alloy steel bar market.

Crane and shovel builders are busy, some having books well filled for four months. Both specifications and forward contracting show farm implement manufacturers to be maintaining a high rate of output, with well arranged schedules for the next few months. The arrival last week of a cargo of steel and the expected docking of a boatload of pig iron before the close of the week mark the closing of the navigation season for Lake movement of blast furnace and steel mill commodities.

Ferroalloys. — Forward contracting for ferromanganese is well under way at $100 a ton, delivered Chicago. Commitments are being freely entered for 50 per cent ferrosilicon at $83.50 a ton, delivered Chicago.

Pig Iron.—The feature of the local pig iron market is an improvement in sentiment, which is evidenced by new buying and specifications for iron from manufacturers of automobiles and parts. The volume of this business is not large, but it implies that a turn for the better is at hand. Demands from other sources are measurably larger, with the result that December shipments are averaging better than the November rate. This week marks the closing of navigation, as the last boatload on order docks at Milwaukee. Four charcoal iron furnaces are in blast and stocks are in moderate volume. Prices of this grade are steady at $24, furnace, for tonnages from current make. The necessity to move some grades from stocks occasionally brings out lower quotations. A local steel mill has a tonnage of basic to sell, but recent demand has been limited to carload lots.

Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	$20.00
N'th'n No. 1 fdy., sil. 2.25 to 2.75	20.50
Malleable, not over 2.25 sil.	20.00
High phosphorus	20.00
Lake Super. charcoal, sil. 1.50	27.04
So'th'n No. 2 fdy. (all rail)	$19.01 to 19.51
Low phos., sil. 1 to 2, copper free	29.50
Silvery, sil. 8 per cent	$28.79 to 29.79
Bess. ferrosilicon, 14-15 per cent	46.29

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Rails and Track Supplies.—Estimates made here indicate that about 100,000 tons of standard-section rails will be purchased from local mills in the next 45 days. Much of this tonnage will be made up of miscellaneous orders from the smaller railroads. A Northwestern railroad, which normally buys 25,000 tons of rails, has still to come into the market for 1930 requirements. It is significant, according to the views of local sellers, that the total tonnage already purchased this year is measurably ahead of the requirements made known up to this time a year ago, and it is more or less taken for granted in the local market that the total tonnage, when completed, for 1930 deliveries will show a substantial increase over the 1929 shipments. Purchases this week totaled several thousand tons in small scattered lots. The track accessory market is quiet both in sales and inquiries. The 14,000 tons needed by the New York Central is still before the trade.

Prices f.o.b. mill, per gross ton: Standard section open-hearth and Bess. rails, $43; light rails, rolled from billets, $36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.30c.; steel tie plates, 2.07½c. to 2.15c.; angle bars, 2.75c.

Cast Iron Pipe.—The feature of this market is the fact that public utilities are taking preliminary steps in the matter of winter buying. Although no definite inquiries are before the trade, the announcements made recently that public utility expenditures for improvements will be heavier in 1930 than in the current year lead sellers to look forward to a more active market. Chicago has taken bids on 800 tons of 6 to 12-in. pipe, and Franklin County, Ohio, will receive tenders Dec. 15 at Columbus on 15,000 ft. of 6 and 8-in. pipe. A few scattered orders for carloads have been taken for small municipalities near Chicago. Deliveries on common sizes are prompt. Prices remain steady at $43.70 to $45.70 a ton, delivered Chicago.

Prices per net ton, deliv'd Chicago: Water pipe, 6-in. and over, $43.70 to $45.70; 4-in., $47.70 to $49.70; Class A and gas pipe, $3 extra.

Sheets.—Releases of sheets have not been in sufficient volume to support output at the rate of a week ago and, as a result, production at hot mills has been revised downward to 45 per cent of capacity. Some units are running three days a week, and schedules on the whole are seldom made for more than six days in advance. Forward buying is in smaller volume than a week ago. Usually expressions of future needs come from manufacturers who have taken business and therefore have prices for their goods established. This is the situation with several barrel manufacturers and makers of roofing materials. As in recent months, the blue annealed commodity is the most active of hot mill products. Chicago delivered prices are steady at 2.90c. for black sheets, 3.55c. to 3.65c. for galvanized sheets and 2.35c. for No. 10 blue annealed.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 2.90c.; No. 24 galv., 3.55c. to 3.65c.; No. 10 blue ann'l'd, 2.35c. Deliv'd prices at other Western points are equal to the freight from Gary, plus the mill prices, which are 5c. per 100 lb. lower than Chicago delivered prices.

Structural Material.—The most active field in structural steel at the moment is in power plant additions to public utility properties. Figures have been taken on a 3000-ton addition to the Public Service Co.'s plant at Waukegan, Ill., and 400 tons will be used for a similar project at Lin-

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars	3.00c.
Reinforc'g bars, billet steel	1.80c. to 1.90c.
Reinforc'g bars, rail steel	1.80c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Bands (¼ in. in Nos. 10 and 12 gages)	3.20c.
Hoops (No. 14 gage and lighter)	3.75c.
Black sheets (No. 24)	4.05c.
Galv. sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.35c.
Spikes, ⅜ in. and larger	3.55c.
Track bolts	4.55c.
Rivets, structural	4.00c.
Rivets, boiler	4.00c.

	Per Cent Off List
Machine bolts	60
Carriage bolts	60
Coach or lag screws	60
Hot-pressed nuts, sq., tap. or blank	60
Hot-pressed nuts, hex., tap. or blank	60
No. 8 black ann'l'd wire, per 100 lb.	$3.45
Com. wire nails, base per keg	$2.75 to 2.95
Cement c't'd nails, base per keg	2.75 to 2.95

coln, Neb. Public utility engineering offices and consulting engineers who do this kind of work are busy, and several of them report that work is now being planned for more than two years. Railroad bridge purchases in recent months have been heavier than is customary in the fall, and on this score the trade feels that little more will be purchased for delivery in the early spring. Reports indicate, however, that contemplated railroad bridge work for next year will make use of a round tonnage of steel. Several large bridges are being planned by Western railroads. The only local award of note is 1800 tons for the Fine Arts Building, Chicago, on which the steel will be fabricated at a moderate rate as required for the revamping of this old structure. All shops in this district, with the exception of one or two which are beginning to fabricate large tonnages for affiliated companies, are operating at greatly reduced schedules and are eagerly seeking new work. Competition has lowered prices named by fabricators.

Mill prices on plain material, per lb.: 2.00c. base, Chicago.

Bolts, Nuts and Rivets.—Contracting for the first quarter is progressing satisfactorily at unchanged prices. Specifications from the implement trade are large and steady.

Wire and Wire Products.—Little change has occurred in this market in the last week. Distribution by jobbers is in smaller volume as the winter season advances, but reports from most districts point to a substantial volume of business in the spring. Specifications from the manufacturing trade are small in the aggregate. Forward contracting is unusually slow and producers report the volume of business now on books the lowest in several years. Wire mills are engaged at 50 per cent of capacity.

Bars.—Use of mild steel bars by the general run of manufacturers is in moderate volume. Forward buying is not active and spot purchases are individually small and for prompt use. A fair part of current rollings is being taken by car builders and manufacturers of farm machinery, neither of which have cut output schedules in recent weeks. Prices for mild steel bars are steady at 2c., Chicago. Output of alloy steel bars is little above 50 per cent of capacity of local mills. Current specifications are a trifle heavier than the tonnage needed to support mill operations at the present rate. Automobile parts makers are signifying their intention of making larger use of this commodity. Demand for iron bars is steady, the bulk of the tonnage moving to car shops and railroads. Use of rail steel bars by barn equipment makers is expanding slowly. The bed industry continues to operate at a rate which is close to normal for this time of the year. Rail steel bar mills are operating at 60 per cent of capacity and deliveries are prompt. Shipments so far this year are practically equal to the tonnage moved in the corresponding period of 1928.

Old Material.—Some support has been given to the Chicago scrap market by purchases of 15,000 to 20,000 tons of heavy melting steel for delivery at Gary. The price reported to have been paid is $13 a gross ton, delivered. Dealers have rushed in to cover this and other orders, with the result that prices being paid on dealers' trades have risen 25c. to 50c. in the week. In some quarters the thought is expressed that the market has definitely turned upward and some brokers are inclined to go long of the market. However, consumers' interest in buying still drags, and it is definitely known that many buyers, including some large consumers, have sizable stocks on hand. The cast-iron borings market is at a standstill, with little tonnage coming on track and users' interest at low ebb. Recent sales by railroads have brought out prices of $13.50 a gross ton, delivered, for heavy melting steel.

Prices deliv'd Chicago district consumers:

Per Gross Ton

Basic Open-Hearth Grades:	
Heavy melting steel	$12.50 to $13.00
Shoveling steel	12.50 to 13.00
Frogs, switches and guards, cut apart, and misc. rails	13.00 to 13.50
Hydraul. compressed sheets	10.75 to 11.25
Drop forge flashings	9.75 to 10.25
No. 1 busheling	11.00 to 11.50
Forg'd cast and r'l'd steel carwheels	17.50 to 18.00
Railroad tires, charg. box size	17.50 to 18.00
Railroad leaf springs cut apart	17.50 to 18.00
Acid Open-Hearth Grades:	
Steel couplers and knuckles	16.00 to 16.50
Coil springs	17.75 to 18.25
Electric Furnace Grades:	
Axle turnings	12.75 to 13.25
Low phos. punchings	14.50 to 15.00
Low phos. plates, 12 in. and under	14.50 to 15.00
Blast Furnace Grades:	
Axle turnings	10.50 to 11.00
Cast iron borings	9.00 to 9.50
Short shoveling turnings	9.00 to 9.50
Machine shop turnings	6.50 to 7.00
Rolling Mill Grades:	
Iron rails	14.50 to 15.00
Rerolling rails	14.50 to 15.00
Cupola Grades:	
Steel rails less than 3 ft.	16.25 to 17.25
Steel rails less than 2 ft.	18.00 to 18.50
Angle bars, steel	15.25 to 15.75
Cast iron carwheels	13.50 to 14.00
Malleable Grades:	
Railroad	16.00 to 16.50
Agricultural	14.50 to 15.00
Miscellaneous:	
*Relaying rails, 56 to 60 lb.	23.00 to 25.00
*Relaying rails, 65 lb. and heav.	26.00 to 31.00

Per Net Ton

Rolling Mill Grades:	
Iron angle and splice bars	15.00 to 15.50
Iron arch bars and transoms	17.50 to 18.00
Iron car axles	25.50 to 26.00
Steel car axles	15.50 to 16.00
No. 1 railroad wrought	12.00 to 12.50
No. 2 railroad wrought	10.50 to 11.00
No. 1 busheling	9.00 to 9.50
No. 2 busheling	7.00 to 7.50
Locomotive tires, smooth	14.50 to 15.00
Pipes and flues	9.50 to 10.00
Cupola Grades:	
No. 1 machinery cast	13.50 to 14.00
No. 1 railroad cast	12.00 to 12.50
No. 1 agricultural cast	12.00 to 12.50
Stove plate	11.50 to 12.00
Grate bars	11.25 to 11.75
Brake shoes	9.75 to 10.25

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Coke.—Consumers are freely contracting for by-product foundry coke at $8 a ton, local ovens. December shipments continue to show an increase over the rate in November.

Plates.—Formal orders have not been placed with car builders by the Rock Island and, as a result, the 75,000 tons of steel needed for these 5000 cars has not been scheduled with mills. This situation would be of little moment except for the fact that some rolling mill units in this district are urgently in need of immediate releases. About 14,000 additional cars may soon be ordered from Western shops. Of this number, about half have been formally inquired for. Local sellers of steel estimate that for the country as a whole not less than 21,000 cars are definitely planned for, and this figure does not include several large programs which have been made public, but on which actual inquiry is still some distance in the future. Among probable purchases are 5000 or more by the Chesapeake & Ohio and allied lines. Reports indicate that a substantial volume of plate business will come from oil producing centers. In the meantime, inquiries and purchases of plates for tank building are individually small and widely scattered. Local tank shops are moderately busy, but are actively seeking additional work. Fabricators in the Southwest are well engaged on old orders and a fair volume of new miscellaneous work. Deliveries are at close range on most plate mill products. Prices are steady at 2c., Chicago.

Reinforcing Bars.—This market remains quiet in awards, and only slight encouragement is afforded by a nominal increase in new tonnages being estimated. New requests for prices in November were for about one-half the tonnage normally expected in that month. Activity by architects leads sellers to anticipate a normal market soon after the turn of the year. This would mean estimates on 8000 to 10,000 tons a month, with sales approximating 70 per cent of these figures. Price structures in this market are low, and, though repeated efforts have been made to put into effect higher quotations, results so far obtained have not been successful.

Factory Earnings Lower

Average weekly earnings in representative New York State factories in October are reported at $30.08, by the State Industrial Commissioner. This includes all employees in office and shop. It represents a recession from the $30.47 of September, which was the highest ever recorded, but is correspondingly higher than the $29.78 of October, 1928. No month previous to last December had ever reached $30.

New York

Pig Iron Sales Increase, Mostly for Early Shipment—Steel Volume Shows No Gain

NEW YORK, Dec. 10.—Pig iron sales have increased, totaling 8000 tons, compared with 5000 tons in the previous week. Part of the tonnage was for spot shipment. The General Electric Co., for example, closed against an inquiry for 500 tons for Bayway, N. J., and 200 tons for Schenectady, N. Y., for early delivery. The Pequonnock Foundry, Inc., Bridgeport, Conn., on the other hand, has bought 600 tons of foundry iron for first half shipment. Inquiries for about 3000 tons for first quarter are pending, but in general there are few definite requests for prices for that period, although a number of buyers have manifested some interest in tonnage for next year. Shipments to melters are declining as year-end shutdowns for inventory-taking approach. The recession is not due to suspensions, which have been exceptional, but rather to the fact that buyers are not placing additional orders to supplement those on which they have already received deliveries. Stocks on melters' yards are apparently very light. Buffalo iron is still available at $17 to $17.50, base furnace, for foundry grade, while Alabama foundry iron is being sold at $13.50, base Birmingham. The trade regards a concession from the latter price a possibility on a large tonnage. The Roane Iron Co., Rockwood, Tenn., contemplates blowing out a furnace shortly.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	$21.91 to $22.41
*Buff. No. 2, del'd east. N. J.	20.28 to 20.78
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	19.89 to 21.02
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	20.39 to 21.52

Freight rates: $4.91 from Buffalo, $1.39 to $2.52 from eastern Pennsylvania.
*Prices delivered to New Jersey cities having rate of $3.28 a ton from Buffalo.

Finished Steel.—Local district sales offices report that consumers are showing little interest in anticipating requirements. In view of the fact that the semi-annual inventory period is close at hand and that the price situation holds no incentive for forward buying, the dullness of the market is not surprising. Plates are fairly firm at 2c. to 2.05c., Coatesville, and bars are quoted at 1.90c., Pittsburgh. Demand for structural steel has slackened, although considerable work is pending. Much of this, however, probably will not be let until after the turn of the year. Structural awards in the metropolitan New York area, exclusive of civil engineering projects, totaled 43,905 tons in November, according to figures compiled by the Structural Steel Board of Trade. While this represents a sharp drop from the 85,699 tons in October, it is considerably larger than the 27,500 tons in November, 1928, and is a moderate gain over November, 1927, in which contracts were closed for 34,000 tons. A small amount of galvanized sheet business is being booked for delivery early in the first quarter at 3.40c., Pittsburgh, to large jobbers and 3.50c. to small users. Black stock is holding at 2.75c. and blue annealed at 2.35c., Pittsburgh, for No. 13 gage and 2.20c. for No. 10.

Mill prices per lb., deliv'd New York: Soft steel bars, 2.24c.; plates, 2.17½c. to 2.22½c.; structural shapes, 2.09½c. to 2.14½c.; bar iron, 2.14c.

Reinforcing Bars.—Sales have been affected by the seasonal dullness, although considerable work is pending. Two jobs requiring 500 tons of bars each, an incinerator plant at New Haven, Conn., and a warehouse at Newark, N. J., were awarded the past week. The city of Albany, N. Y., has taken bids on 1000 tons of bars for a new waterworks. Prices are unchanged at 2.05c., New York.

Cast Iron Pipe.—Current buying of pressure pipe is still limited to carload lots or less, and prices are irregular. Hartford, Conn., has closed on 200 tons of 12-in. water pipe with a Birmingham maker. Portland, Me., is inquiring for about 400 tons of water pipe for delivery during 1930. Northern foundries are still fairly well engaged on large sizes of pipe, with orders sufficient to maintain present operating rates beyond the first of the year. Capacity for the smaller specifications, however, is far from filled, and little new business is being booked in these sizes.

Prices per net ton deliv'd New York: Water pipe, 6-in. and larger, $34.60 to $36.60; 4-in. and 5-in., $37.60 to $39.60; 3-in., $44.60 to $46.60. Class A and gas pipe $3 extra.

Coke.—Contracts for delivery of by-product coke over the first half of next year are still being closed, but the market for prompt shipment continues quiet. The price of special brands of beehive foundry coke continues at $4.85 a net ton, ovens, or $8.56 delivered to northern New Jersey, Jersey City and Newark, and $9.44 to New York and Brooklyn. Standard furnace coke is quiet at $2.65 a net ton, Connellsville. By-product coke is quoted at $9 to $9.40 a net ton, Newark or Jersey City, and $10.06, New York or Brooklyn.

Warehouse Business.—The number of orders placed with jobbers continues fairly large, and in the past week individual tonnages have increased slightly. Demand for structural steel is small and the market for sheets is inactive. Quotations on black and galvanized sheets are only occasionally shaded, but blue annealed sheet prices still show a wide range.

Old Material.—Consumer buying of scrap is small and prices show a continued downward trend. Brokers have reduced their buying prices for No. 2 heavy melting steel for a consumer at Phoenixville, Pa., to $11.50 a ton, delivered, and are not offering more than $13.50 a ton, delivered, for heavy breakable cast for mills at Harrisburg, Bethlehem and Coatesville, Pa., or the foundry consumer at Florence, N. J. Specification pipe is still being bought at $13.50 a ton, delivered Lebanon, Pa., but in certain cases brokers have reduced their buying price for this de-

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.30c.
Soft steel bars, small shapes	3.25c.
Iron bars	3.24c.
Iron bars, Swed. charcoal	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons	3.50c.
Flats and squares	4.00c.
Cold-roll. strip, soft and quarter hard	5.15c. to 5.40c.
Hoops	4.25c.
Bands	3.75c.
Blue ann'l'd sheets (No. 10)	3.25c. to 3.90c.
Long terne sheets (No. 24)	5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galv. annealed	5.15c.
Tire steel, ½ x ½ in. and larger	3.40c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.75c.
Open-hearth spring steel, bases,	4.50c. to 7.00c.

	Per Cent Off List
Machine bolts, cut threads:	
¾ x 6 in. and smaller	60
1 x 30 in. and smaller	50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	60
¾ x 20 in. and smaller	50 to 50 and 10
Coach Screws:	
½ x 6 in. and smaller	60
1 x 6 in. and smaller	50 to 50 and 10

Boiler Tubes—	Per 100 Ft.
Lap welded, 2-in	$17.33
Seamless steel, 2-in	20.24
Charcoal iron, 2-in	25.00
Charcoal iron, 4-in	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
⅛-in. butt	46	29
¼-in. butt	51	37
1-3-in. butt	53	39
2½-6-in. lap	48	35
7 and 8-in. lap	44	17
11 and 12-in. lap	37	12
Wrought Iron—		
⅛-in. butt	5	+19
¼-in. butt	11	+ 9
1-1½-in. butt	14	+ 6
2-in. lap	5	+14
3-6-in. lap	11	+ 6
7-12-in. lap	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box	$6.45	$6.20
Charcoal, per Box—	A	AAA
IC	$9.70	$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating	$10.00 to $11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets, Box Annealed—Black, C. R. One Pass

	Per Lb.
Nos. 18 to 20	3.70c.
No. 22	3.85c.
No. 24	3.90c.
No. 26	4.00c.
No. 28*	4.15c.
No. 30	4.40c.

Sheets, Galvanized

	Per Lb.
No. 14	4.15c.
No. 16	4.00c.
No. 18	4.15c.
No. 20	4.25c.
No. 22	4.35c.
No. 24	4.50c.
No. 26	4.75c.
No. 28*	5.00c.
No. 30	5.40c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

livery to $13 a ton. Chemical borings are off about 50c. a ton, with $12.50 a ton, delivered to Bound Brook, N. J., usually offered.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel	$11.00 to	$11.35
Heavy melting steel (yard)	7.50 to	8.00
No. 1 hvy. breakable cast.	9.75 to	10.50
Stove plate (steel works)		8.00
Locomotive grate bars		8.25
Machine shop turnings	7.00 to	7.50
Short shoveling turnings	7.25 to	7.50
Cast borings (blast fur. or steel works)	7.00 to	7.50
Mixed borings and turnings	6.75 to	7.50
Steel car axles	15.25 to	16.25
Iron car axles	21.00 to	21.50
Iron and steel pipe (1 in. dia., not under 2 ft. long)	9.25 to	9.75
Forge fire	8.50 to	9.00
No. 1 railroad wrought	12.00 to	12.50
No. 1 yard wrought, long	11.00 to	11.50
Rails for rolling	11.25 to	11.75
Stove plate (foundry)	8.25 to	8.50
Malleable cast (railroad)	13.00 to	13.50
Cast borings (chemical)	8.50 to	9.50

Prices per gross ton, deliv'd local foundries:

No. 1 machry. cast	$15.00
No. 1 hvy. cast (columns, bldg. materials, etc.), cupola size	13.00
No. 2 cast (radiators, cast boilers, etc.)	12.50

Donner-Witherow Merger Is Consummated

Consummation of the merger of the Donner Steel Co., Buffalo, and the Witherow Steel Corporation, Pittsburgh, was authorized by Donner stockholders at a meeting in Buffalo Monday. They also authorized a change in the capital structure of the company to provide for the transaction. Stockholders of Witherow gave their approval of the consolidation late last week by the deposit of sufficient stock to carry out the terms. Combined assets of the two companies will be approximately $34,000,000.

Sheet and Tube Takes Out Continuous Mill License

The Youngstown Sheet & Tube Co. has taken out a general license for use of the continuous rolling mill patents of the American Rolling Mill Co., marking another step by the company in plans to completely modernize its Youngstown and Chicago district properties. James A. Campbell, chairman, signed the licensing agreement this week.

This is the seventh such agreement made by the American Rolling Mill Co. with steel companies.

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and struc. shapes	3.00c.
Soft steel bars	3.00c.
Reinforc. steel bars	2.25c. to 2.50c.
Cold-fin. rounds and hex	3.65c.
Cold-fin. flats and sq.	4.15c.
Hoops and bands, No. 12 to ¼ in., inclusive	3.25c.
Hoops and bands, No. 13 and lighter	3.65c.
Cold-finished strip	*5.95c.
Black sheets (No. 24)	3.70c. to 3.90c.
Galvanized sheets (No. 24)	4.60c. to 4.75c.
Blue ann'l'd sheets (No. 10)	3.25c.
No. 9 ann'l'd wire, per 100 lb.	$2.65
No. 9 galv. wire, per 100 lb.	3.00
Com. wire nails, base per keg	2.65

*Net base, including boxing and cutting to length.

Cleveland

Demand for Automobile Steel Improves, Though Volume is not Large—Mill Operations Unchanged

CLEVELAND, Dec. 10.—Quite an improvement in the demand for steel from the automotive industry in the Detroit territory developed during the week. Some good business came from that source in steel bars, sheets and hot-rolled strip. While it is still expected that it will be some time after the first of the year before the automotive industry gets back to fair operations, the production of some of the lower-priced cars is being increased slowly on the changed models.

Orders for steel from automobile makers were in such low volume for several weeks that a release of more tonnage was not surprising. While automobile manufacturers are ordering only for early requirements, some of them are beginning to show an interest in first quarter contracts.

Two of the larger car manufacturers have inquiries out for steel bar contracts covering their requirements for the quarter and two other inquiries aggregate 7500 tons. One consumer in this field has placed a contract for a fair tonnage.

Orders from consumers outside the automotive field continue very light. Consumers in all fields are reducing their stocks to a minimum for inventory time and, with exceptions noted, are showing no inclination to place first quarter contracts. Present prices have been reaffirmed on practically all steel products, but mills are doing little in the way of soliciting contracts.

Finishing mill operations in this territory show little change from a week ago. Local independent steel plants continue to operate at about 30 per cent of capacity.

Pig Iron.—Consumers are showing more interest in first quarter contracts than heretofore and inquiry has gained. Cleveland interests sold 15,500 tons of foundry and malleable iron during the week, some for early requirements, but largely for first quarter delivery. The business was well distributed among districts, but not much of it came from the automotive industry. Inquiries totaling 3000 to 4000 tons are pending in the northern Ohio territory. Some buyers are showing hesitation about placing contracts for the coming quarter, both because of uncertainty as to how much iron they will need and because they are satisfied prices will be no higher, and they see a possibility of a reduction. Shipments continue light and are not expected to show an improvement this month, as many consumers will shut down their plants for inventories in the latter part of the month and probably will discontinue taking iron. No price weakness is in evidence. Foundry and malleable iron are quoted at $18.50, Cleveland, for out-of-town shipment and $19, furnace, for local delivery. The Michigan market is represented by a spread of $19.50 to $20.

Prices per gross ton at Cleveland:

N'th'n fdy., sil. 1.75 to 2.25		$19.50
S'th'n fdy., sil. 1.75 to 2.25	$19.51 to	20.51
Malleable		19.50
Ohio silvery, 8 per cent		28.00
Basic Valley furnace		18.50
Stand. low phos., Valley	26.50 to	27.00

Prices except on basic and low phosphorus are delivered Cleveland. Freight rates: 50c. from local furnaces; $3 from Jackson, Ohio; $6.01 from Birmingham.

Iron Ore.—The dock balance of Lake Superior ore at Lake Erie ports Dec. 1 was 6,489,612 tons, as compared with 6,454,126 tons on the same date a year ago. Receipts at Lake Erie ports during the season were 45,747,079 tons, and shipments were 32,907,221 tons. Receipts at other than Lake Erie ports, mostly South Chicago, Gary and Indiana Harbor were 18,766,379 tons, as compared with 16,484,805 tons last year.

Sheets.—With quite a little business from the automotive industry in new orders, specifications against contracts and releases of held-up material, the market was more active the past week than for some time. The orders were not for large lots and were limited to early requirements. Some automobile body sheets were placed for January shipment because of the length of time it takes to furnish this grade. Specifications from barrel manufacturers also showed a gain. Independent mills in this territory are operating at 40 to 50 per cent of capacity, or at about the recent average. No interest is being taken in first quarter contracts. Some producers have taken a firmer stand on blue annealed sheets, and jobbing mills are holding to 2.20c. for No. 10 and 2.35c. for No. 13 in widths that do not have to meet continuous mill competition. On competitive material, a $2 a ton lower price is commonly prevailing. A quotation of 2.60c. on black sheets was made by one mill during the week for immediate specifications. Galvanized sheets are steady at 3.40c. Metal furniture sheets, about which there was some price uncertainty, are now commonly quoted at 4c. Some mills had attempted to hold to 4.10c. for the first quarter.

Bolts and Nuts.—Cleveland bolt and nut manufacturers have reestablished the present 70 per cent discount for the first quarter and reaffirmed stove bolt prices. Makers specializing on large bolts are doing much better than manufacturers of small bolts, the demand for the latter still being very dull.

Wire Products.—Concessions from the 2.40c., Cleveland, price on wire

have appeared in some sections. Leading makers are not meeting this price. Both nails and wire are very dull.

Bars, Plates and Shapes.—The volume of business in this territory continues light. Mills that have fourth quarter contracts expiring Dec. 15 will have considerable tonnage on their books to be cancelled or extended into the first quarter. Local plate mills are fairly well situated, having orders from locomotive builders. Detroit, which recently placed 1600 tons for a water pipe line, has an inquiry out for another extension requiring 2000 tons of plates. In the structural field, a local award of 1000 tons was made, but there is virtually no new inquiry. Local fabricating shops are still comfortably filled, but are reducing their backlogs. Although 1.85c., Cleveland, is being named for steel bars, outside mills are still quoting 1.90c., Cleveland. Plates and structural shapes are 1.90c., Pittsburgh. These prices are being named for the first quarter.

Coke.—Activity in foundry coke is light, being limited to specifications against contracts. Better grades of Connellsville foundry coke are unchanged at $4.85. Ohio by-product foundry coke is $8.25, ovens. Domestic heating coke is rather quiet following a spurt during the recent cold spell.

Rivets.—The leading local producer has reaffirmed for the first quarter present prices of $3.10 a 100 lb., Pittsburgh and Cleveland, for large rivets and 70 and 10 per cent off list for small rivets. Specifications are only moderate.

Strip Steel.—Specifications for hot-rolled strip increased during the week. Not only were there some fair releases from the automotive industry, but a better volume of orders from other consumers, including agricultural implement and hardware manufacturers. While there are occasional reports of concessions of $2 a ton, the market is holding rather firm at 1.90c., Pittsburgh, for wide strip and 2c. for narrow, and these prices are being paid by some of the larger consumers. Demand for cold-rolled strip continues very slow. This product is firm at 2.75c., Cleveland and Pittsburgh.

Semi-Finished Steel.—Specifications for sheet bars picked up the past week. Orders included one for 2000 tons for prompt shipment from a manufacturer of automobile body sheets. Demand for slabs and billets continues very light. No interest is being taken in first quarter contracts. Shipments of sheet bars, billets and slabs are being made against $35 contracts.

Old Material.—The market continues almost at a standstill. Mills in the Cleveland and Valley districts are taking very little scrap. One Cleveland consumer that for some time had been taking neither steelmaking nor blast furnace scrap is now accepting limited quantities of blast furnace grades. The market is weak and untested. While car lots are moving at concessions, yard dealers are inclined to hold their stocks until next month when they look for more activity and better prices.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$14.00 to $14.50
No. 2 heavy melting steel	13.50 to 13.75
Compressed sheet steel	13.50 to 14.00
Light bundled sheet stampings	12.00 to 12.50
Drop forge flashings	11.50 to 12.00
Machine shop turnings	9.00 to 9.75
Short shoveling turnings	11.50 to 12.00
No. 1 railroad wrought	13.00 to 13.50
No. 2 railroad wrought	14.00 to 14.50
No. 1 busheling	12.50 to 13.00
Pipes and flues	9.00 to 9.50
Steel axle turnings	12.50 to 13.00
Acid Open-Hearth Grades:	
Low phos., forging crops	17.75 to 18.00
Low phos., billet, bloom and slab crops	18.50 to 18.75
Low phos., sheet bar crops	18.00 to 18.50
Low phos., plate scrap	18.00 to 18.50
Blast Furnace Grades:	
Cast iron borings	10.00 to 10.50
Mixed borings and short turnings	10.00 to 10.50
No. 2 busheling	10.00 to 10.50
Cupola Grades:	
No. 1 cast	16.00 to 16.50
Railroad grate bars	11.00 to 12.00
Stove plate	12.00 to 12.50
Rails under 3 ft	18.50 to 19.50
Miscellaneous:	
Railroad malleable	18.00 to 18.50
Rails for rolling	16.25 to 16.50

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.70c.
Plates, ⅜-in.	2.90c.
Structural shapes	2.70c.
Soft steel bars, small shapes, iron bars (except bands)	2.80c.
Round-edge iron	3.50c.
Round-edge steel, iron finished 1½ x 1½ in.	3.50c.
Round-edge steel planished	4.30c.
Reinforc. steel bars, sq., twisted and deform.	2.60c. to 2.80c.
Cold-fin. steel, rounds and hex.	3.50c.
Cold-fin. steel, sq. and flats	4.00c.
Steel hoops	3.55c.
Steel bands, No. 12 to ⅛-in. inclus.	3.30c.
Spring steel	5.00c.
*Black sheets (No. 24)	3.90c.
†Galvanized sheets (No. 24)	4.65c.
Light plates, blue annealed (No. 10)	3.25c.
Blue ann'l'd sheets (No. 13)	3.40c.
Diam. pat floor plates—	
¼-in.	5.30c.
⅜-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

*For 50 bundles or more; 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.
†For 50 bundles or more; 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

Philadelphia

Railroads Inquire for Steel and Pig Iron—Heavy Plate Tonnages Required For Ships

PHILADELPHIA, Dec. 10.—Steel mill operations still show a tendency to decline, with a minimum of new business being placed and only small backlogs on mill books. Prices, however, have shown no further recession, and current quotations are in most cases being announced by mills for first quarter contracts. Meanwhile, the railroads and shipbuilding are providing most of the year-end activity. Recently, eastern Pennsylvania manufacturers of refrigerating machinery have been increasing their operating schedules, and wire rope makers are busier as a result of demand from public utilities.

The Baldwin Locomotive Works has booked orders for a total of 30 locomotives, of which 26 were from railroads and four from steel companies. The Norfolk & Western and the Chesapeake & Ohio are each taking bids on 2500 tons of plates, shapes and bars for first quarter delivery, and the Seaboard Air Line is also asking prices, but does not specify the tonnage. The Atlantic Coast Line Railroad has awarded 23,000 tons of rails to the Bethlehem Steel Co.

Shipbuilding activity continues an important factor. The Tidewater Oil Co. has awarded two 13,000-ton tank ships to the Sun Shipbuilding Co.; the Lake Tankers Corporation has placed nine barges with an Eastern shipyard; the Standard Oil Co. of New Jersey, which has recently placed contracts for eight tank ships, will award four more by the end of this month, and the Grace Line is contemplating construction of one to four vessels.

Ferromanganese.—Consumers are contracting for their 1930 requirements at $100 a ton, seaboard, and shipments on uncompleted contracts for this year are being made at the new price.

Pig Iron.—Small tonnage foundry iron inquiries for first quarter delivery are beginning to appear, but forward buying has not developed to any extent. Eastern Pennsylvania furnaces are generally maintaining $20.50 to $21 a ton, on foundry grade, with occasional concessions on desirable business. The Coatesville Boiler Works, Coatesville, Pa., is about to close on 250 tons of foundry iron for first quarter. The Norfolk & Western Railroad is inquiring for 1250 tons of No. 1, No. 2, No. 3 foundry and Bessemer malleable iron for delivery in the first quarter. The Newport News Shipbuilding & Dry Dock Co. has closed on a carload of foundry iron. Basic iron is apparently lacking in strength, a recent purchase by an Eastern consumer of about 1500 tons having been made at between $19.50 and $19.75 a ton, delivered.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil.	$21.26 to $21.76
East. Pa. No. 2X, 2.25 to 2.75 sil.	21.76 to 22.26
East. Pa. No. 1X	22.26 to 22.76
Basic (del'd east. Pa.)	19.50 to 19.75
Gray forge	20.00 to 20.50
Malleable	21.25 to 21.75
Stand. low phos. (f.o.b. N. Y. State furnace)	22.00 to 23.00
Cop. br'g low phos. (f.o.b. furnace)	23.00 to 24.00
Va. No. 2 plain, 1.75 to 2.25 sil.	22.29
Va. No. 2X, 2.25 to 2.75 sil.	22.79

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces; $4.54 from Virginia furnaces.

Bars.—Eastern Pennsylvania consumers of bars are moderately active in buying small lots, usually of less

than a carload. Quotations on this business and for first quarter contracts are firm at 1.90c. a lb., Pittsburgh, or 2.22c., delivered Philadelphia.

Reinforcing Bars.—Bids have been asked for by the Pennsylvania Railroad on two slaughter houses in West Philadelphia, requiring a total of 1500 tons of bars. Prices show no improvement. Distributers claim to have been quoted 2.10c. a lb., delivered, by importers of reinforcing bars. Billet steel bars from domestic mills are quoted at 1.95c. a lb., Pittsburgh, or 2.27c., delivered Philadelphia, with the usual extra for cutting to length omitted. Rail steel bars range from 1.80c. to 1.95c. a lb., Franklin, Pa., and Tonawanda, N. Y., or 2.12c. to 2.27c., delivered Philadelphia, with no extra for cutting to length or bending.

Shapes.—Mills are maintaining fair rates of operation, but are booking only a small tonnage of new business. Prices are unchanged at 1.90c. to 1.95c., f.o.b. nearest mill to consumer, or 1.96c. to 2.01c., delivered Philadelphia, with concessions of about $1 a ton sometimes granted on desirable tonnages. Fabricating shops are bidding on only a small tonnage of new projects. At the opening of bids today for the general contract on the convention hall in Philadelphia, McCloskey & Co. were low.

Plates.—Current buying is limited in most cases to small lots, usually of less than a carload, but mills are quoting on some substantial tonnages of plates to shipyards, and railroad business for next year is beginning to appear. One eastern Pennsylvania plate mill has just resumed operation following a week's suspension for repairs and installation of new electrical equipment. On orders for prompt shipment and for first quarter contracts, plate mills are quoting 2c. to 2.05c. a lb., Coatesville, Pa., or 2.10c. to 2.15c., delivered Philadelphia.

Sheets.—Most consumers of sheets are still operating on restricted schedules, except for manufacturers of refrigerating machinery, which have been increasing production recently. Prices are substantially unchanged, with black sheets quoted at 2.70c. to 2.75c. a lb., Pittsburgh, or 3.02c. to 3.07c., delivered Philadelphia, and galvanized at 3.40c., Pittsburgh, or 3.72c., Philadelphia. Blue annealed sheets are quoted at 2.35c., Pittsburgh, or 2.67c., Philadelphia, for No. 13 gage, and blue annealed plates at 2.20c., Pittsburgh, or 2.52c., Philadelphia, for No. 10 gage. Concessions of $2 to $4 a ton are granted on orders from automobile manufacturers and other preferred buyers. Mills are also quoting these prices for first quarter contracts.

Imports.—In the week ended Dec. 7, 3513 tons of chrome ore was received at this port, of which 2033 tons came from Portuguese Africa and 1480 tons from Greece. A total of 699 tons of pig iron was received, of which 499 tons came from British India and 200 tons from Sweden, and 150 tons of spiegeleisen was received from the United Kingdom. Steel arrivals consisted of 34 tons of steel rods and 13 tons of steel billets from Sweden, 24 tons of structural shapes, 24 tons of steel bands and 9 tons of steel bars from France, 82 tons of structural shapes, 50 tons of steel bands and 15 tons of steel bars from Belgium, and 509 tons of steel scrap from the United Kingdom.

Old Material.—Consumer buying of scrap is still limited to small lots, and the large users of No. 1 heavy melting steel are not in the market. Although scrap prices are generally unchanged in the absence of buying, they are lacking in strength.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel.	$14.50 to	$15.00
Scrap T rails	14.00 to	14.50
No. 2 heavy melting steel.	12.00 to	13.00
No. 1 railroad wrought...	15.50 to	16.00
Bundled sheets (for steel works)		11.50
Hydraulic compressed, new	13.50 to	14.00
Hydraulic compressed, old.	12.00 to	12.50
Machine shop turnings (for steel works)		11.00
Heavy axle turnings (or equiv.)	12.50 to	13.50
Cast borings (for steel works and roll. mill)...	11.00 to	11.50
Heavy breakable cast (for steel works)		14.00
Railroad grate bars.....	11.50 to	12.00
Stove plate (for steel works)	11.00 to	11.50
No. 1 low phos., hvy., 0.04% and under.....	21.00 to	22.00
Couplers and knuckles.....	19.00 to	19.50
Rolled steel wheels.....	19.00 to	19.50
No. 1 blast f'nace scrap..	10.50 to	11.00
Wrot. iron and soft steel pipes and tubes (new specific.)		14.00
Shafting		19.00
Steel axles	20.00 to	21.00
No. 1 forge fire	13.00 to	13.50
Cast iron carwheels.....	15.50 to	16.00
No. 1 cast	15.00 to	15.50
Cast borings (for chem. plant)	14.00 to	14.50
Steel rails for rolling.....	16.00 to	16.50

More Pig Iron Imported in October

WASHINGTON, Dec. 6.—Supplying 8846 gross tons, or 63 per cent of all, British India was the chief source of pig iron imports in October, totaling 14,295 tons. Canada ranked second, furnishing 3809 tons, an unusually large tonnage from that country. It represented more than the total from Canada during the preceding nine months, which was only 3472 tons.

For the 10 months of 1929, imports of pig iron were 117,889 tons, a decrease of 996 tons from the 118,885 tons imported in the first 10 months of 1928. India supplied 53,117 tons of the 1929 imports, leading all other countries, while the United Kingdom ranked second, with 31,903 tons. In the 10 months of 1928, the situation was the reverse, the United Kingdom being the leading source of importations, with a total of 47,254 tons, while India was second, with 42,637 tons. Netherlands was third, both years.

UNITED STATES IMPORTS OF PIG IRON BY COUNTRIES OF SHIPMENT
(In Gross Tons)

	October		10 Months Ended October	
	1929	1928	1929	1928
United Kingdom	65	7,702	31,903	47,254
British India	8,846	4,610	53,117	42,637
Germany	....	....	103	395
Netherlands	207	896	19,929	22,728
Canada	3,809	162	7,281	540
France	....	30	101	330
Belgium	....	20	184	222
Norway	1,027	280	2,888	955
Sweden	281	377	1,721	2,520
All others	60	31	662	1,304
Total	14,295	14,108	117,889	118,885

Moves from Building Occupied for 70 Years

The Mackintosh-Hemphill Co., Pittsburgh, has moved its general offices and engineering department from a building in that city it had occupied for 70 years. The old property, at the foot of Twelfth Street, has been sold to the Pennsylvania Railroad for terminal improvements. The company has occupied offices in the Point Building, Penn Avenue and Water Street.

This company, which has played an important role in the development of the iron and steel industry through its engineering and production work in steel plant and rolling mill equipment, traces its history back farther than 1859, when James Hemphill, Dr. W. S. Mackintosh and N. F. Hart acquired a small shop at the site just relinquished by the present company. In 1803, the Pittsburgh Foundry, the first foundry in Pittsburgh, was started by Joseph McClurg. A. Garrison & Co. succeeded to its ownership in 1865. Calvin Adams established another foundry in 1837, which successively was known as the Jarvis Adams Co. and the Pittsburgh Iron & Steel Foundries Co. Mr. McClurg and his son, Alexander, had established the Fort Pitt Works 12 years after their initial foundry venture, and in 1878 this company was acquired by James Hemphill and his partners to take care of their increasing business. The A. Garrison Foundry Co., Pittsburgh Iron & Steel Foundries Co., and Woodard Machine Co. were merged with the Mackintosh-Hemphill Co. in 1922, the Woodard company having been established by the Mackintosh-Hemphill organization six years previous at Wooster, Ohio.

All of these plants are rich in industrial history. The old Pittsburgh Foundry furnished cannon balls for Perry's fleet in 1812. The first locomotive built west of the Alleghenies was a product of the Fort Pitt Works. Civil War ordnance was made at all of the plants.

Birmingham

Pig Iron Buying Slow—Steel Backlogs Aided by Railroad Buying—Scrap Market Dull

BIRMINGHAM, Dec. 10. — Neither buyers nor sellers in this district seem to be much interested in first quarter iron. A few of the smaller consumers in the district have offered to buy first quarter iron, but furnace interests have not opened their books. In general, the unshipped balance, of fourth quarter contracts is more than ample for the remainder of the month, and buying is expected to be small when books are opened for the new period. Books were opened three weeks ago at $14 to $14.50 for first quarter iron in competitive territories, and small tonnages from these districts are coming in. District prices remain on the basis of $14.50, Birmingham, for No. 2 foundry iron. Sixteen furnaces are active, the same as in the past three weeks. Of this number, nine are on foundry iron, six on basic and one on recarburizing iron.

Prices per gross ton, f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil.	$14.50
No. 1 fdy., 2.25 to 2.75 sil.	15.00
Basic	14.50

Finished Steel.—It is estimated that backlogs of one of the larger companies are slightly better than they were 30 days ago, exclusive of new rail orders, and operations are equally as high. Decreases in some lines have been offset by increases in others. A feature of the market has been the well sustained demand for bars and plates. Railroad accessories have played an important part in maintaining backlogs. The lighter demand for sheets and wire products is attributed largely to the desire to reduce inventories. All prices are the same as last week. Of the 120,000 tons of rails ordered by the Southern Pacific, 30,000 tons will be rolled by the Tennessee company. The only order of importance for fabricated structural steel is 500 tons for a Southern Railway bridge at Augusta, Ga., booked by the Virginia Bridge & Iron Co. Several important projects are in prospect for early next year, including an office building and a hotel at Atlanta, each of 18 stories, and a 30-story hotel at Mobile, Ala. The Tennessee company is operating eight out of nine open hearths at Ensley, an increase of one, and six out of eight at Fairfield. The Gulf States Steel Co. continues to work all six at Alabama City.

Cast Iron Pipe.—The United States Pipe & Foundry Co. is reported to be low bidder on a large part of the 6500-ton project at Detroit, for which bids were opened last week. This company shared with the McWane Cast Iron Pipe Co. an order for several hundred tons of small sizes of pipe for Dallas, Tex. New bids are to be asked on upward of 2000 tons of large diameter pipe. Bids were opened last week and contracts are pending on projects at Memphis, Tenn., and Richmond, Va., totaling about 1400 tons. Inquiries from municipalities for their 1930 requirements are more numerous. Plant operations are at the low point of the year, averaging under 60 per cent in some cases. Makers continue to maintain base prices of $37 to $38 for 6-in. and larger sizes.

Old Material.—Sales declined considerably last week. Foundries have issued instructions to hold up shipments until after the inventory period. The larger mills continue to take some steel scrap, and this is about the only activity in the market. Prices on steel grades are softer, though quotations are unchanged. Iron scrap is too dull for prices to be well defined.

Prices per gross ton, deliv'd Birmingham dist. consumers' yards:

Heavy melting steel	$13.00 to $13.50
Scrap steel rails	14.00
Short shoveling turnings	9.00
Cast iron borings	9.00
Stove plate	11.50 to 12.00
Steel axles	22.00
Iron axles	23.00
No. 1 railroad wrought	10.00 to 10.50
Rails for rolling	15.50
No. 1 cast	13.00
Tramcar wheels	12.50
Cast iron carwheels	13.00 to 13.50
Cast iron borings, chem	13.50 to 14.00

Buffalo

Further Reduction of Active Blast Furnace Capacity in District—Steel Mill Operation Unimproved

BUFFALO, Dec. 10.—The pig iron market is quiet, although several medium-sized inquiries have come out, including one for 300 tons of foundry, one for 500 tons, and one for 600 tons, and there have been several orders of similar size. There have been some inquiries for the first quarter, but no real buying as yet. The Hanna Furnace Co. has taken another furnace out of blast, leaving two in operation, one of which is on silvery. It is reported that one of the Donner stacks may go out of blast soon. Shipments on old orders are very good and all of the business being taken is for spot delivery. Melters in various sections of the country appear to be anxious to obtain their iron on schedule and even ahead of schedule, with the result that furnace stocks are continuing to decrease.

Prices per gross ton, f.o.b. furnace:

No. 2 fdy., sil. 1.75 to 2.25	$19.50
No. 2X fdy., sil. 2.25 to 2.75	20.00
No. 1 fdy., sil. 2.75 to 3.25	21.00
Malleable, sil. up to 2.25	20.00
Basic	$17.00 to 18.00
Lake Superior charcoal	27.28

Finished Steel.—No increase is noted in the operation of Buffalo mills. The Lackawanna plant of the Bethlehem Steel Co. is operating 10 of its 24 open-hearths. Several of its mills are down and the rest are on single turn, with an average operation of 40 to 45 per cent. The Donner Steel Co. operation remains the same, with three open-hearths going four days a week. The Seneca Iron & Steel Co. is operating at approximately 40 per cent. The Wickwire-Spencer Steel Co. is operating three of four open-hearths, and the Gould Coupler Co. is operating three of four basic and one acid furnace. Fabricated structural steel lettings include 150 tons for an addition to the plant of the Carborundum Co., Niagara Falls, N. Y., and 300 tons for an Elmira school.

Old Material.—A purchase of No. 1 heavy melting steel at $14 by the largest interest in the district was made the past week. An inquiry is out for 500 tons of stove plate. Otherwise, the market is quiet, though some steel car axles have been sold at $16.50 to $17, and there have been a few scattered sales of knuckles and couplers, coil and leaf springs and rolled steel wheels at $18 to $18.50. One of the largest consumers in the district continues to suspend incoming shipments entirely.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$14.00 to $14.50
No. 2 heavy melting steel	12.50 to 13.00
Scrap rails	14.75 to 15.25
Hydraul. comp. sheets	12.50 to 13.00
Hand bundled sheets	10.50 to 11.00
Drop forge flashings	12.50 to 13.00
No. 1 busheling	12.50 to 13.00
Hvy. steel axle turnings	12.50 to 13.00
Machine shop turnings	8.00 to 8.50
No. 1 railroad wrought	10.50 to 11.00
Acid Open-Hearth Grades:	
Knuckles and couplers	17.00 to 17.50
Coil and leaf springs	17.00 to 17.50
Rolled steel wheels	17.00 to 17.50
Low phos. billet and bloom ends	18.00 to 18.50
Electric Furnace Grades:	
Short shov. steel turnings	10.75 to 11.25
Blast Furnace Grades:	
Short mixed borings and turnings	10.75 to 11.25
Cast iron borings	10.75 to 11.25
No. 2 busheling	8.00
Rolling Mill Grades:	
Steel car axles	16.50 to 17.00
Iron axles	20.00 to 21.00
Cupola Grades:	
No. 1 machinery cast	14.50 to 15.00
Stove plate	12.00 to 12.25
Locomotive grate bars	10.00 to 10.50
Steel rails, 3 ft. and under	17.75 to 18.00
Cast iron carwheels	11.50 to 12.00
Malleable Grades:	
Industrial	16.50 to 17.00
Railroad	16.50 to 17.00
Agricultural	16.50 to 17.00
Special Grades:	
Chemical borings	12.00 to 12.50

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and struc. shapes	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.95c.
Cold-fin. flats, sq. and hex.	4.45c.
Rounds	3.95c.
Cold-rolled strip steel	5.85c.
Black sheets (No. 24)	4.20c.
Galv. sheets (No. 24)	4.85c.
Blue ann'l'd sheets (No. 10)	3.50c.
Com. wire nails, base per keg	$3.60
Black wire, base per 100 lb	3.75

St. Louis

Pig Iron Melters Hold Purchases at a Minimum—Scrap Shipments Still Sharply Restricted

ST. LOUIS, Dec. 10. — The pig iron market continues quiet. Buying for immediate shipment is especially light, as melters are holding down their inventories of raw materials as much as possible. Only slight active interest is being taken in first quarter business. Heavy purchases made in the early fall and a falling off in the melt, especially among the stove foundries here and at Belleville and Quincy, indicate that some melters will carry over pig iron into the new year. Some melters, too, are said to be hesitant in placing orders for first quarter shipment because of uncertainty over the price situation. However, makers are optimistic and believe the turn of the year will bring a marked improvement in buying. Purchases of the week are reported to be less than 2000 tons.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill.	$19.50 to $20.00
Malleable, f.o.b. Granite City	20.00
N'th'n No. 2 fdy., deliv'd St. Louis	22.16
Southern No. 2 fdy., deliv'd	18.42 to 18.92
Northern malleable, deliv'd	22.16
Northern basic, deliv'd	22.16

Freight rates: 75c. (average) Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

Old Material.—The three largest district consumers of steel scrap still ask that shipments against contracts be withheld, while the railroads are urging the dealers to take material that has been purchased to fill contracts. Dealers are taking railroad shipments, and either are laying them down in their yards or finding other outlets at losses. Prices generally are unchanged because of an absence of sales. The only change is in machine shop turnings, which are off 50c. Railroad lists: Wabash, 3865 tons; Chicago, Rock Island & Pacific, 200 carloads; Great Northern, 49 carloads; St Louis-San Francisco, 26 carloads; Chicago & Western Indiana, 17 carloads.

Dealers' buying prices per gross ton, f.o.b. St. Louis district:

No. 1 heavy melting or shoveling steel	$13.00 to $13.50
No. 2 heavy melting or shoveling steel	12.00 to 12.50
No. 1 locomotive tires	14.50 to 15.00
Misc. stand.-sec. rails including frogs, switches and guards, cut apart	14.00 to 14.50
Railroad springs	15.50 to 16.00
Bundled sheets	9.50 to 10.00
No. 2 railroad wrought	13.00 to 13.50
No. 1 busheling	9.75 to 10.25
Cast iron borings and shoveling turnings	9.25 to 9.75
Iron rails	13.00 to 13.50
Rails for rolling	15.00 to 15.50
Machine shop turnings	6.75 to 7.25
Heavy turnings	9.50 to 10.00
Steel car axles	18.00 to 18.50
Iron car axles	27.00 to 27.50
Wrot. iron bars and trans.	21.50 to 22.00
No. 1 railroad wrought	13.00 to 13.50
Steel rails, less than 3 ft.	17.00 to 17.50
Steel angle bars	14.00 to 14.50
Cast iron carwheels	14.00 to 14.50
No. 1 machinery cast	15.25 to 15.75
Railroad malleable	13.50 to 14.00
No. 1 railroad cast	14.50 to 15.00
Stove plate	11.75 to 12.25
Agricult. malleable	14.00 to 14.50
Relay. rails 60 lb. and under	20.50 to 23.50
Relay. rails 70 lb. and over	26.50 to 29.00

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and struc. shapes	$3.25c.
Bars, soft steel or iron	3.15c.
Cold-fin. rounds, shaftings, screw stock	3.75c.
Black sheets (No. 24)	4.25c.
Galv. sheets (No. 24)	5.10c.
Blue ann'l'd sheets (No. 10)	3.45c.
Black corrug. sheets (No. 24)	4.30c.
Galv. corrug. sheets	5.15c.
Structural rivets	4.15c.
Boiler rivets	4.15c.

	Per Cent Off List
Tank rivets, 7/8-in. and smaller, 100 lb. or more	65
Less than 100 lb	60
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-pressed nuts, sq., blank or tapped, 200 lb. or more	60
Less than 200 lb	50
Hot-pressed nuts, hex., blank or tapped, 200 lb. or more	60
Less than 200 lb	50

Canada

Large Structural Steel Demands Expected

TORONTO, ONT., Dec. 10.—Blast furnace representatives have opened their books for first quarter business, but so far there have been only small bookings. Local representatives look for good business to start in about a week or ten days. Spot buying is holding at a satisfactory level. The melt is unchanged at an average of better than 80 per cent. Pig iron prices are unchanged.

Prices per gross ton:

Delivered Toronto

No. 1 fdy., sil. 2.25 to 2.75	$23.60
No. 2 fdy., sil. 1.75 to 2.25	23.10
Malleable	23.60

Delivered Montreal

No. 1 fdy., sil. 2.25 to 2.75	$25.00
No. 2 fdy., sil. 1.75 to 2.25	24.50
Malleable	25.00
Basic	23.50

Imported Iron, Montreal Warehouse

Summerlee	$33.50
Carron	33.00

Structural Steel.—Deliveries against contract are responsible for continued activity among fabricating plants in Canada. Although the demand at the moment is off, with only small tonnages being closed, large tonnage business is in prospect for closing early in the new year. Several large structures have been announced in Montreal, for which about 15,000 tons of steel will be required. In British Columbia, two or three large buildings will require 3000 to 8000 tons each, while bridge construction in that district will involve about 12,000 tons of steel. Other substantial tonnages are pending for Western cities. Taken as a whole, the prospective structural demand will call for upward of 50,000 tons, and much of this will be closed before spring.

Old Material.—A temporary flurry brought a better demand for iron and steel scrap during the week. The improvement was confined to iron grades and was due to the fact that a number of hand-to-mouth buyers were forced into the market for immediate requirements. Some of the large consumers appear to be getting ready to place first quarter contracts. Dealers have made no revision in prices.

Dealers' buying prices:

	Toronto	Montreal
Per Gross Ton		
Heavy melting steel	$10.00	$8.50
Rails, scrap	11.00	9.00
No. 1 wrought	10.00	12.00
Machine shop turnings	7.50	5.00
Boiler plate	7.50	6.00
Heavy axle turnings	8.00	7.50
Cast borings	7.50	5.00
Steel borings	7.50	6.50
Wrought pipe	6.00	6.00
Steel axles	15.00	20.00
Axles, wrought iron	17.00	22.00
No. 1 machinery cast	....	17.00
Stove plate	....	13.00
Standard carwheels	....	16.00
Malleable	....	13.00
Per Net Ton		
No. 1 mach'ry cast.	$16.00	....
Stove plate	12.00	....
Standard carwheels	15.00	....
Malleable scrap	14.00	....

New Sheet Mill to Be Built Near Pittsburgh

The Tarentum Steel Corporation, organized several months ago in Pittsburgh, will begin the construction of a new steel plant at Tarentum, Pa., soon after Jan. 1, according to an announcement of V. L. McClay, secretary. The mill is to be erected on the site of the old No. 2 plant of the Pittsburgh Plate Glass Co., and work of dismantling the old buildings is rapidly being completed. The new plant is to contain six complete sheet mills and will have an annual capacity of 55,000 to 65,000 tons of full finished sheets.

Ray P. Farrington, formerly vice-president and treasurer of the Heintz Mfg. Co., Philadelphia, is president of the Tarentum Steel Corporation; William Cole is vice-president in charge of operation, and Frank Irvine, treasurer.

The M. M. Rivard Co., Gumbel Building, Kansas City, Mo., has been appointed sales representative for western Missouri and Kansas by the Bradley Washfountain Co., Milwaukee. L. M. Bartlett Co., 286 Baker Building, Minneapolis, has been placed in charge of sales in Minnesota, North Dakota and that section of Wisconsin tributary to the Twin Cities.

Cincinnati

Pig Iron Sales Decline Further but First Quarter Inquiries Appear—Scrap Dull and Weak

CINCINNATI, Dec. 10.—Although the district demand for pig iron slackened still further last week, the receipt of two sizable inquiries for first quarter contributed some optimism to the market. The larger inquiry is from an unnamed railroad for 1250 tons and the other is from a central Ohio consumer for 500 to 1000 tons. Total sales last week were approximately 1850 tons, of which 300 tons was silvery, bought by a Michigan consumer. Since district users of pig iron have been purchasing in hand-to-mouth proportions during this quarter and have accumulated no inventories, it is expected that the demand will improve after the first of the year, when buyers will be forced into the market to supply their needs. Prices on both Northern and Southern iron are being well maintained.

Prices per gross ton, deliv'd Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25	$19.89 to $20.39
Ala. fdy., sil. 1.75 to 2.25	17.69 to 18.19
Ala. fdy., sil. 2.25 to 2.75	18.19 to 18.69
Tenn. fdy., sil. 1.75 to 2.25	17.69 to 18.19
S'th'n Ohio silvery, 8 per cent	26.89

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

Finished Material.—The sheet market recovered slightly last week from the recession of the preceding three weeks. While output has not been advanced beyond 50 to 55 per cent of normal operation, the demand last week exceeded the present production schedules.

Old Material.—With mills still curtailing shipments of scrap and new business quiet and small, dealers are bidding more closely on all grades than they did a week ago and are offering 25c. less on heavy melting steel and No. 2 wrought and 50c. less on cast iron carwheels. The Southern Railway and the Chesapeake & Ohio are offering their usual lists. The Louisville & Nashville has sent out a list of 6500 tons.

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and struc. shapes	3.40c.
Bars, soft steel or iron	3.30c.
New billet reinforc. bars	3.15c.
Rail steel reinforc. bars	3.00c.
Hoops	4.05c.
Bands	3.50c.
Cold-fin. round and hex	3.85c.
Squares	4.35c.
Black sheets (No. 24)	4.05c.
Galvanized sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.45c.
Structural rivets	3.85c.
Small rivets	65 per cent off list
No. 9 ann'l'd wire, per 100 lb	$3.00
Com. wire nails, base per keg	2.85
Cement c't'd nails, base 100 lb. keg	2.85
Chain, per 100 lb	8.75
	Net per 100 Ft.
Lap-weld steel boiler tubes, 2-in.	$16.50
4-in.	34.50
Seamless steel boiler tubes, 2-in.	17.50
4-in.	36.00

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel	$12.00 to $12.50
Scrap rails for melting	13.00 to 13.50
Loose sheet clippings	8.00 to 8.50
Bundled sheets	10.75 to 11.25
Cast iron borings	8.25 to 8.75
Machine shop turnings	8.00 to 8.50
No. 1 busheling	10.00 to 10.50
No. 2 busheling	6.50 to 7.00
Rails for rolling	13.50 to 14.00
No. 1 locomotive tires	14.25 to 14.75
No. 2 railroad wrought	12.00 to 12.50
Short rails	17.50 to 18.00
Cast iron carwheels	12.00 to 12.50
No. 1 machinery cast	18.50 to 19.00
No. 1 railroad cast	15.00 to 15.50
Burnt cast	10.00 to 10.50
Stove plate	10.00 to 10.50
Brake shoes	10.00 to 10.50
Agricultural malleable	14.00 to 14.50
Railroad malleable	15.00 to 15.50

Youngstown

Better Buying Expected from Automobile Makers

YOUNGSTOWN, Dec. 10.—Sentiment in the steel industry here is considerably better than it was last month. The automotive industry is beginning to show interest in its January requirements, and reports from the Michigan companies are encouraging. New orders and specifications have shown no increase, but there has been no further decline in tonnage releases and mill operations are on a more even keel. Ingot operations are at a very low point, as less than 20 of the 53 available open-hearth furnaces in the district were operated all of last week. However, the Ohio laws provide for a tax on year-end raw materials' inventories, and steel makers might be expected to reduce reserve tonnage to a minimum at this time. Operations of finishing mills are at a better rate, with sheet and strip mills operating at 40 to 50 per cent of capacity and bar pipe mills averaging slightly better. The average for bars is improved slightly by the somewhat higher rate of the Steel Corporation subsidiary. Tin mills average about 60 per cent, with increases in prospect before the end of the month. Local steel consumers are largely responsible for the maintenance of steel output at present levels, as little or no steel is now going to the automobile industry.

Sheet prices have a better tone in this district, although competition from other centers is still a threat to the existing schedules. Blue annealed sheets and light plates are again established at 2.35c. and 2.20c., Pittsburgh, respectively, but wide strip mills are quoting $4 a ton less, with jobbing mills making no efforts to meet this competition. Black sheets are still at 2.75c., Pittsburgh, although some buyers report lower quotations. In fact, if the reports of buyers are to be given full credence, lower quotations are being made on many products, but mills are usually unable to trace such statements and in the meantime are making no efforts to push first quarter buying. Automobile body and metal furniture sheets are holding at 4c., Pittsburgh, and the 4.10c. quotation on the latter has not disappeared. On galvanized sheets, 3.40c. seems to be the minimum, and 3.50c. is the general quotation on first quarter tonnage. Bars are unchanged at 1.90c., Pittsburgh, although a Cleveland mill is reported to be making lower quotations on some business in this territory. Prices on strip steel are subject to pressure, but the regular quotations are not seriously threatened.

On primary materials, the price situation is not essentially changed. Sheet bars apparently are settling to $34, Pittsburgh or Youngstown, but mills are currently quoting $35 in the face of lack of first quarter buying. Billet and slab prices are also nominal and have not been established at lower levels by actual sales. One seller of merchant pig iron has opened first quarter books at unchanged prices, or $18.50, Valley, on basic and foundry iron, and $19 on Bessemer and malleable. The market is very quiet. Scrap prices are still settling, with No. 1 heavy melting steel quotable around $15 and hydraulic compressed sheets at 50c. less.

Boston

Pig Iron Sales Small, Scrap Market Dull

BOSTON, Dec. 10.—Pig iron sales the past week were confined to scattered lots, a majority of them at, or the equivalent to, $17.50 to $18 a ton, Buffalo, for No. 2X. Foundries say customers are holding up orders, and many foundries are melting considerably less iron than they were a month ago. It is estimated at least 70 per cent of foundries have sufficient iron on hand or on order to carry them past Jan. 1. Textile machinery

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars, small shapes	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway rounds	6.60c.
Norway squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tie steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold-rolled steel—	
Rounds and hex	*3.55c. to 5.55c.
Squares and flats	*4.05c. to 7.05c.
Toe calk steel	6.00c.
Rivets, structural or boiler	4.50c.
	Per Cent Off List
Machine bolts	50 and 5
Carriage bolts	50 and 5
Lag screws	50 and 5
Hot-pressed nuts	50 and 5
Cold-punched nuts	50 and 5
Stove bolts	70 and 10

*Including quantity differentials.

manufacturers, now the largest consumers of pig iron in New England, have slowed up. All of them recently purchased large tonnages of Alabama iron and will require only small tonnages for mixture purposes during the next three months. A Massachusetts heater manufacturer has indicated iron will be bought before Jan. 1, but the tonnage is not specified.

Foundry iron prices per gross ton deliv'd to most New England points:

*Buffalo, sil. 1.75 to 2.25	$21.91 to $22.91
*Buffalo, sil. 2.25 to 2.75	21.91 to 22.91
East. Penn., sil. 1.75 to 2.25	22.65 to 23.15
East. Penn., sil. 2.25 to 2.75	23.15 to 23.65
Va., sil. 1.75 to 2.25	25.21
Va., sil. 2.25 to 2.75	25.71
*Ala., sil. 1.75 to 2.25	24.11
*Ala., sil. 2.25 to 2.75	24.61
†Ala., sil. 1.75 to 2.25	20.25
†Ala., sil. 2.25 to 2.75	20.75

Freight rates; $4.91 all rail from Buffalo; $3.65 all rail from eastern Pennsylvania; $5.21 all rail from Virginia; $9.61 all rail from Alabama and $5.75 rail and water from Alabama to New England seaboard.

*All rail rate.

†Rail and water rate.

Old Material.—Pennsylvania steel mills are holding up what few orders shippers have in hand, and the scrap market is exceptionally quiet. There is a market for steel turnings or steel mill borings at $6 to $6.10 a ton, on cars shipping point, but comparatively little of these materials is available. A Worcester, Mass., steel mill is taking small scattering tonnages of long bundled skeleton at $10.50 a ton, delivered, for which brokers are paying $8 to $8.50, on cars. A steamer is scheduled to leave here this week with 3000 tons of scrap for Danzig.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$9.50 to $10.00
Scrap T rails	9.00 to 9.75
Scrap girder rails	8.50 to 9.00
No. 1 railroad wrought	10.50 to 10.75
No. 1 yard wrought	9.50 to 10.00
Machine shop turnings	5.50 to 6.10
Cast iron borings (steel works and rolling mill)	6.00 to 6.10
Bundled skeleton, long	8.25 to 8.50
Forge flashings	8.00 to 9.00
Blast furnace borings and turnings	5.50 to 6.00
Forge scrap	8.50 to 9.00
Shafting	13.50 to 14.00
Steel car axles	15.00 to 15.50
Wrought pipe 1 in. in diameter (over 2 ft. long)	8.50 to 9.00
Rails for rolling	10.50 to 11.00
Cast iron borings, chemical	9.00 to 9.50

Prices per gross ton deliv'd consumers' yards:

Textile cast	$14.00 to $14.50
No. 1 machinery cast	15.00 to 15.25
No. 2 machinery cast	13.00 to 13.25
Stove plate	11.00 to 11.50
Railroad malleable	18.50 to 19.00

German Hardware Makers Assured Bounties

HAMBURG, GERMANY, Nov. 18.—Certain German hardware manufacturers have entered into private export bounty agreements with the steel producers, the agreements to become effective if the German steel cartels are not renewed. The manufacturers of hardware regard such arrangements essential to the maintenance of their export trade, while the steel mills are willing to pay the export bounties as a means of preventing manufacturers from buying Belgian or Luxemburg steel, on which they pay no duty if the finished product is exported.

Fabricated Structural Steel

Awards Total 35,000 Tons—Largest Inquiry Is For 18,700 Tons For New York Subway

CONTRACTS were placed in the past week for 35,000 tons of fabricated structural steel, of which 20,000 tons will go into buildings for non-industrial purposes and 11,000 tons into the construction of bridges. The largest awards were 6270 tons for a railway bridge at Cincinnati and 6000 tons for a hotel addition at Toronto. A New York subway section, needing 18,700 tons of steel, accounts for about three-fifths of the new work, totaling 31,000 tons, which came out for bids during the week. Awards follow:

WATERTOWN, MASS., 175 tons, Hood Rubber Co. vulcanizing plant, to A. L. Smith Iron Works.

BOSTON & ALBANY RAILROAD, 150 tons, power house in Allston District, Boston, to Eastern Bridge & Structural Co.

INWOOD, VT., 1000 tons, bridges for Connecticut River Power Co., to McClintic-Marshall Co.

NEW YORK, 700 tons, apartment building at 865 First Avenue, to Paterson Bridge Co.

NEW YORK, 4500 tons, addition to City Bank Farmers Trust Co., to McClintic-Marshall Co.

EDGEWATER, N. J., 445 tons, Ford assembly plant viaduct, to McClintic-Marshall Co.

EASTON, PA., 700 tons, building for Lehigh Telephone Co., to Bethlehem Construction Co.

LANCASTER, PA., 800 tons, telephone building, to Shoemaker Bridge Co.

STATE OF MARYLAND, 150 tons, highway bridge, to Dietrich Brothers.

ELMIRA, N. Y., 300 tons, school, to Kellogg Structural Steel Co.

JERICHO, N. Y., 700 tons plates, tanks for Jericho Water District, to Pittsburgh-Des Moines Steel Co.

NIAGARA FALLS, N. Y., 135 tons, addition to plant of Carborundum Co., to McClintic-Marshall Co.

TORONTO, 6000 tons, addition to Royal York Hotel, to Dominion Bridge Co.

LANSING, MICH., 345 tons, Grand River bridge for city, to Bethlehem Steel Co.

LANSING, 700 tons, R. E. Olds Bank, to R. C. Mahon Co.

CLEVELAND, 1000 tons, Severance Hall, to Massillon Bridge & Structural Co.

CINCINNATI, 6270 tons, White River bridge for Cincinnati Union Railway, to American Bridge Co.

PITTSBURGH, 900 tons, building for McCann & Co., to American Bridge Co.

BATON ROUGE, LA., 450 tons, river crossing towers for Baton Rouge Electric Co., to American Bridge Co.

FORT WAYNE, IND., 250 tons, building for General Electric Co., to American Bridge Co.

SPRINGFIELD, ILL., 350 tons, Monarch Tractor Co. building, to Illinois Steel Bridge Co.

CHICAGO, 300 tons, building for Mundelein College, to Hansell-Elcock Co.

CHICAGO, 1800 tons, Fine Arts building, to Hansell-Elcock Co.

CHICAGO, 536 tons, North Dearborn Street substation for Commonwealth-Edison Co., to McClintic-Marshall Co.

PEORIA, ILL., 400 tons, highway bridge, to Continental Bridge Co.

CHICAGO, BURLINGTON & QUINCY, 400 tons, bridge work, to Vierling Steel Works, Chicago.

ST. PAUL, 1815 tons, Third Street viaduct, to St. Paul Foundry Co.

MILWAUKEE, 700 tons, plates, tanks for Milwaukee County, to Pittsburgh-Des Moines Steel Co.

LINCOLN, NEB., 400 tons, power house, to Pittsburgh-Des Moines Steel Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

PHILADELPHIA, 6800 tons, convention hall, low bidder for general contract, McCloskey & Co., Philadelphia.

MIDDLETOWN, CONN., 250 tons, foundry and boiler house.

CAMBRIDGE, MASS., 100 tons, Jordan & Marsh storage warehouse addition.

NEW YORK, 2000 tons, apartment building at Central Park West and Sixty-sixth Street.

BROOKLYN, 18,700 tons, subway, Route 109, Section 3.

BALTIMORE, 4000 tons, postoffice.

CHICAGO, 100 tons, dock house at Sixteenth Street and Chicago River.

STATE OF MICHIGAN, 168 tons, two bridges for State Highway Department.

HASTINGS, MINN., 400 tons, highway bridge.

ST. PETER, MINN., 400 tons, highway bridge.

ST. LOUIS, 1400 tons, factory for Steel Frame House Co.

SAN ANTONIO, TEX., 4500 tons, Army Air Service, hangars for Randolph Field; bids to be asked.

Central Alloy Formally Takes over Interstate

Acquisition of the Interstate Iron & Steel Co., Chicago, by Central Alloy Steel Corporation, Massillon, Ohio, has become effective with the transfer of Interstate assets, it is announced by F. J. Griffiths, chairman of Central Alloy. Work of coordinating sales and production activities of the two companies will begin at once, Mr. Griffiths said.

With the acquisition of the Interstate properties, assets of Central Alloy Steel Corporation are increased approximately $17,000,000 to a total of more than $92,000,000. Total ingot capacity of the Massillon company will be 1,938,000 tons, including an addition of 396,000 tons representing Interstate's capacity. Interstate has three plants in East Chicago. Its properties include over 300 acres and one mile of frontage on the Calumet River.

Creative Spending Is Urged by Charles F. Abbott

It is no extravagance to spend money largely, but rather it is wasteful to be penurious, declared Charles F. Abbott, executive director of the American Institute of Steel Construction, in an address before the New England Foundrymen's Association at Boston Dec. 11. Industrial and commercial success, he said, has been predicated upon a courageous expenditure of funds and a willingness to be generous in all worthy efforts.

"We are discarding the old economic idea that business is limited," said Mr. Abbott. "We are rationalizing our industrial output in accordance with the ability of consumers to buy and are improving the consumer's purchasing powers. It is just as much industry's duty to make markets as it is to make goods.

"We must lift up an entire industry toward a higher average in tools, methods and business principles. We are willing to spend money to accomplish it—a great deal of money, individually and collectively. That is courageous and creative spending, the statesmanship of consumption and genuine progress.

"We are doing a greater and better job in advertising than we ever dreamed of doing in the old days," he said. "It is costing more money, but it is breaking down resistance, promoting bigger things because it is genuinely creative spending. The technical and industrial field is rapidly coming into the bigger sphere of usefulness, and he is a bold man who can predict where this era will end."

Factory Migration in Illinois

Forty-six cities in Illinois reported a gain of 261 plants and 13,411 employees between 1926 and 1927, according to a summary reported by the Illinois Manufacturers' Association, which compiled data from a nation-wide cooperative survey made by the civic development committee of the National Electric Light Association and the policyholders' service bureau of the Metropolitan Life Insurance Co.

This report shows that 193 were new plants, employing 5360 persons. Twenty-five were branch plants, employing 5391 persons and 43 were relocations, with 2660 employees. Of the 43 relocations in Illinois, 25 were from within the State, seven were from other States in the same section and eleven were from other sections of the United States.

The most frequently occurring reasons for the plant location in a definite place in the east-north central region, which includes Ohio, Michigan, Indiana and Wisconsin, as well as Illinois, were given as follows: market, transportation, labor materials, living conditions, available factory buildings, financial aid or investments, and near related industries.

Allis-Chalmers Mfg. Co. Has Large Unfilled Orders

Directors of the Allis-Chalmers Mfg. Co., West Allis, Wis., have placed the common stock on a $3 annual basis by declaration of a quarterly dividend of 75c. The previous annual payments were $2 per share. Unfilled orders of the company as of Nov. 30 totaled $13,600,000, as compared with $9,681,000 Jan. 1, 1929.

Steel Corporation's Orders Gain 38,783 Tons

For the third successive month a gain was reported for November in the unfilled orders of the United States Steel Corporation. It was small at 38,783 tons and compares with 183,981 tons in October and 244,370 tons in September. These three increases contrast with decreases in the previous four months. The total on Nov. 30 was 4,125,345 tons, as against 4,086,562 tons on Oct. 31. A year ago, or on Nov. 30, 1928, the unfilled orders were 3,673,000 tons.

Unfilled tonnage at the end of each month for the past three years follows:

	1929	1928	1927
November.	4,125,345	3,673,000	3,454,441
October ..	4,086,562	3,751,030	3,341,000
September.	3,902,581	3,698,368	3,148,113
August ...	3,658,211	3,624,043	3,196,037
July	4,088,177	3,570,927	3,142,014
June	4,256,910	3,637,000	3,053,246
May	4,304,167	3,416,822	3,050,941
April	4,427,763	3,872,133	3,456,132
March ...	4,410,718	4,335,206	3,553,140
February..	4,144,341	4,398,189	3,597,119
January ..	4,109,487	4,275,947	3,800,177
	1928	1927	1926
December.	3,976,712	3,972,874	3,960,696

Locomotive, Coal and Other Statistics

	November, 1929	October, 1929	November, 1928
Locomotives shipped (a)	95	96	35
Locomotives shipped, eleven months	783	.....	506
do. unfilled orders	398	423	.....
Bituminous coal mined, net tons (b)	45,500,000	51,235,000 (c)	46,788,000
Anthracite mined, net tons (b)	6,037,000	8,332,000 (c)	7,322,000
Beehive coke made, net tons (b)	427,900	470,200	427,000
	October, 1929	**September, 1929**	**October, 1928**
Enameled sheet-metal ware shipped (a):			
Dozens of pieces	371,292	338,169	417,387
Value	$1,538,021	$1,414,995	$1,650,657

(a) United States Department of Commerce. (b) United States Bureau of Mines. (c) Two extra working days, compared with either November.

Austin Co. Plans Large Expansion Program

A widely increased program of activity both here and abroad, including a 20 per cent increase in its advertising budget over last year, will be undertaken in 1930 by the Austin Co., industrial engineer and builder, W. J. Austin, president, announced, following a convention in Cleveland attended by 75 district managers and sales engineers of the company from 16 cities throughout the country. The consensus of opinion of the members of the Austin managers was that 1930 will be a year of unusual building activities.

Among the new departures contemplated by the company in 1930 are these:

An extension of Austin activities into other European countries than Russia, in which reviving industries are anxious to adopt American industrial methods. This will be in addition to $40,000,000 contract for a complete automobile plant and model industrial city at Nishni Novgorod, Russia.

The extension of technological specialization by experts of the company from some half a dozen industries to more than a score of industries in the United States.

An increase of 20 per cent in advertising in newspapers and other mediums to take advantage of the increased industrial building opportunities which delegates to the convention predict in their districts for 1930. Mr. Austin indicated that if the necessity arose a still further increase would be made.

George A. Bryant, Jr., executive vice-president of the company, who last summer carried on the negotiations with the Soviet Government, said there were opportunities for American construction and industrial methods in other European countries, particularly Germany. He also intimated that the company had additional work in prospect in Russia.

Acme Steel to Increase Strip Steel Capacity

Directors of the Acme Steel Co. have voted a stock dividend of 25 per cent. This action will be subject to approval by stockholders of a proposed increase in capital stock from 300,000 to 500,000 shares.

The Acme Steel Co. is closing the most prosperous year in its history, according to a statement issued by James E. MacMurray, chairman of the board. During 1930 the company will install machinery to increase further the manufacture of strip steel. During the present year the company has installed new hot mill and a heavy four-high train of cold mills which will increase the plant output by 25 per cent.

Non-Ferrous Metal Markets

Copper Firmer But Inactive —Tin Very Dull—Lead Steady—Zinc Easier

NEW YORK, Dec. 10.

Copper.—Statistics for November will be published Thursday, Dec. 12, and the trade expects a large increase in stocks of refined metal. Practically the only buying is by foreign consumers, and this has ranged from 500 to 1000 tons a day, a small amount. It is estimated that consumers abroad have bought since Dec. 1 only about 14,000 tons, which is no more than half of what may be considered their present requirements. In November the sales were 32,000 tons and in October about 40,000 tons. Purchases are all hand-to-mouth, with metal afloat taken as soon as it arrives. There is even some demand for copper from warehouses over there. In the domestic trade, there is a little buying each day, but it is unimportant. This also is of a hand-to-mouth character and for immediate shipment. Curtailment at the mines is proceeding, but definite information as to the extent is difficult to obtain. It is admitted, however, that reduction of output is anywhere from 25 to 40 per cent, depending on the company. The effect of this will not be apparent for two or three months. It is evident that there is less expectation of a reduction in the price and there is less talk about it than there was recently. Quotations are firm at 18c., delivered in the Connecticut Valley, for electrolytic copper and 18.30c. c.i.f. usual European ports. Lake copper is very dull but unchanged at 18 to 18.12½c., delivered.

Tin.—Demand for tin is at low ebb. Consumers are considered as being well covered and are not doing any nearby buying. Because of approaching inventories, there is a disinclination to increase stocks. The only news feature is the advance this week in the London market. Quotations yesterday were up £4 5s. a ton and today there was an additional advance of £3 10s., so that quotations today were £181 for spot standard, £184 5s. for future standard and £184 10s. for spot Straits, all considerably higher than a week ago. These advances are said to be due to propaganda emphasizing a probable world-wide curtailment of output and also a report that the Federated Malay States have ordered a six-day week. Demand in this market is very light today and spot Straits tin is quoted at 39.62½c., New York, the advance

THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY

	Dec. 10	Dec. 9	Dec. 7	Dec. 6	Dec. 5	Dec. 4
Lake copper, New York	18.12½	18.12½	18.12½	18.12½	18.12½	18.12½
Electrolytic copper, N. Y.*	17.75	17.75	17.75	17.75	17.75	17.75
Straits tin, spot, N. Y.	39.62½	39.25	....	38.25	38.37½	38.87½
Zinc, East St. Louis	6.00	6.00	6.00	6.00	6.00	6.00
Zinc, New York	6.35	6.35	6.35	6.35	6.35	6.35
Lead, St. Louis	6.10	6.10	6.10	6.10	6.10	6.10
Lead, New York	6.25	6.25	6.25	6.25	6.25	6.25

*Refinery quotation; price ¼c. higher delivered in the Connecticut Valley.

Rolled Products

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—
- High brass ..... 23.25c.
- Copper, hot rolled ..... 26.75c.
- Zinc ..... 10.50c.
- Lead (full sheets) ..... 10.00c.

Seamless Tubes—
- High brass ..... 28.25c.
- Copper ..... 29.25c.

Rods—
- High brass ..... 21.25c.
- Naval brass ..... 24.00c.

Wire—
- Copper ..... 19.87½c.
- High brass ..... 23.75c.

Copper in Rolls ..... 26.75c.
Brazed Brass Tubing ..... 30.87½c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also to St. Louis on shipments to points west of that river.

- Sheets, 0 to 10 gage, 3 to 30 in. wide ..... 33.00c.
- Tubes, base ..... 42.00c.
- Machine rods ..... 34.00c.

Chicago Warehouse

(Prices Cover Trucking to Customers' Doors in City Limits)

Sheets—	Base per Lb.
High brass	23.25c.
Copper, hot rolled	27.75c.
Copper, cold rolled, 14 oz. and heavier	30.00c.
Zinc	10.75c.
Lead, wide	10.30c.
Seamless Tubes—	
Brass	28.25c.
Copper	29.25c.
Brass Rods	21.25c.
Brazed Brass Tubes	31.00c.

New York or Cleveland Warehouse

Delivered Prices, Base per Lb.

High brass	21.12½c. to 22.12½c.
Copper, hot rolled, base sizes	27.75c. to 28.75c.
Copper, cold rolled, 14 oz. and heavier, base sizes	30.00c. to 31.00c.
Seamless Tubes—	
Brass	26.00c. to 27.00c.
Copper	29.12½c. to 30.12½c.
Brass Rods	18.87½c. to 19.87½c.
Brazed Brass Tubes	29.12½c. to 30.12½c.

New York Warehouse

Delivered Prices, Base per Lb.

Zinc sheets (No. 9), casks	10.75c. to 11.25c.
Zinc sheets, open	11.50c. to 12.00c.

Metals from New York Warehouse

Delivered Prices, Per Lb.

Tin, Straits pig	41.50c. to 42.50c.
Tin, bar	43.50c. to 44.50c.
Copper, Lake	19.50c.
Copper, electrolytic	19.25c.
Copper, casting	19.00c.
Zinc, slab	7.00c. to 7.50c.
Lead, American pig	7.00c. to 7.50c.
Lead, bar	9.00c. to 9.50c.
Antimony, Asiatic	10.50c. to 11.00c.
Aluminum No. 1 ingots for remelting (guaranteed over 99% pure)	25.00c. to 26.00c.
Alum. ingots, No. 12 alloy	24.00c. to 25.00c.
Babbitt metal, commercial grade	25.00c. to 35.00c.
Solder, ½ and ½	27.50c. to 28.00c.

Metals from Cleveland Warehouse

Delivered Prices, Per Lb.

Tin, Straits pig	46.00c.
Tin, bar	47.00c.
Copper, Lake	19.50c.
Copper, electrolytic	19.25c.
Copper, casting	18.75c.
Zinc, slab	8.00c. to 8.25c.
Lead, American pig	7.00c. to 7.20c.
Lead, bar	9.25c.
Antimony, Asiatic	16.00c.
Babbitt metal, medium grade	18.00c.
Babbitt metal, high grade	47.50c.
Solder, ½ and ½	29.50c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged consumers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	14.75c.	16.00c.
Copper, hvy. and wire	14.50c.	15.50c.
Copper, light and bottoms	12.50c.	13.50c.
Brass, heavy	8.00c.	9.00c.
Brass, light	6.75c.	7.75c.
Hvy. machine composition	11.25c.	12.25c.
No. 1 yel. brass turnings	9.00c.	9.50c.
No. 1 red brass or compos. turnings	10.50c.	11.75c.
Lead, heavy	4.75c.	5.25c.
Lead, tea	3.75c.	4.25c.
Zinc	3.25c.	3.75c.
Sheet aluminum	11.00c.	13.00c.
Cast aluminum	10.00c.	12.00c.

over recent prices being due to the effect of the London quotations.

Lead.—This is the most active market, but even so the quantity turned over is not large. There have been fair purchases for delivery this month and some inquiry for January, but commitments are limited to material that can be consumed this month so as to keep inventories low. The market at St. Louis is firm at 6.10c. and the contract quotation of the leading interest is unchanged at 6.25c., New York.

Zinc.—Conditions have changed little and buying is of a hand-to-mouth order. There is some slab zinc available under the quotation of most of the producers, but the quantity is limited. In fact, there is scarcely enough business to test prices, which are 6c., East St. Louis, or 6.35c., New York, the metal at concessions being available at 5.90c., East St. Louis. The ore price is unchanged at $38, Joplin. Although production is comparatively low, it is regarded as in excess of demand and the situation is unsatisfactory for both miners and smelters. The opinion is expressed that a further reduction in price is probable.

Antimony.—In a dull market Chinese metal for spot and future delivery is quoted at 8.62½c., New York, duty paid, unchanged from last week.

Nickel.—Wholesale lots of ingot nickel are quoted at 35c. a lb. with shot nickel at 36c. and electrolytic nickel in cathodes at 35c.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at the published price of 23.90c. a lb., delivered.

Non-Ferrous Metals at Chicago

CHICAGO, Dec. 10. — Demand for non-ferrous metals, though scattered and in small lots, is more active than a week ago. Prices for tin and lead are higher while quotations on zinc are lower. The old metal market is quiet.

Prices per lb., in carload lots: Lake copper, 18.50c.; tin, 40.75c.; lead, 6.20c.; zinc, 6c.; in less-than-carload lots, antimony, 9.50c. On old metals we quote copper wire, crucible shapes and copper clips, 14c.; copper bottoms, 11.50c.; red brass, 11.50c.; yellow brass, 8c.; lead pipe, 4.50c.; zinc, 3c.; pewter, No. 1, 24.50c.; tin foil, 22c.; block tin, 32c.; aluminum, 12.87½c.; all being dealers' prices for less-than-carload lots.

Railroad Equipment

Missouri Pacific Places Order For 1285 Freight Cars

THE Chesapeake & Ohio, Hocking Valley and Pere Marquette are reported to be on the verge of putting out an inquiry for about 13,000 freight cars to cover their 1930 requirements. It is believed that these carriers, all of which are controlled by the Van Sweringen interests, will be in the market within the next week or two. The Missouri Pacific has ordered 1285 freight cars and the Shell Petroleum Corporation 100 tank cars. The Reading is asking for bids on 100 multiple-unit electric coaches. The St. Louis Southwestern is inquiring for 25 locomotives, the Chicago Great Western for 10 and the Bessemer & Lake Erie for nine. The Burlington has purchased 20 locomotives. Details of the week's business follow:

Canadian National is inquiring for 20 60-ft. baggage cars.

Reading is taking bids on 100 multiple-unit electric coaches.

Beauharnois Light, Heat & Power Co., Montreal, has ordered 60 air dump cars from National Steel Car Corporation.

St. Louis Southwestern is now inquiring for 25 locomotives instead of 10, as reported last week.

Chicago Great Western is in the market for 10 locomotives.

Bessemer & Lake Erie will purchase nine locomotives.

Shell Petroleum Corporation has purchased 100 tank cars from General American Tank Car Corporation.

Rock Island is in the market for 10 coaches.

Chesapeake & Ohio, Pere Marquette and Hocking Valley railroads are lining up their freight carr requirements and are expected to issue an inquiry shortly for about 13,000 cars.

Missouri Pacific has ordered 625 box cars from Mount Vernon Car Co. and 625 box and 35 caboose cars from American Car & Foundry Co.

Bethlehem Steel Co. has purchased three locomotives from Baldwin Locomotive Works.

Chicago, Burlington & Quincy has awarded 12 Pacific type and eight mountain type locomotives to Baldwin Locomotive Works.

Belt Line Railway, Chicago, has purchased five locomotives from Baldwin Locomotive Works.

American Bridge Co. has bought one locomotive from Baldwin Locomotive Works.

Atchison, Topeka & Santa Fe has placed one locomotive with Baldwin Locomotive Works.

Foremen Organize Club at Racine, Wis.

Ninety foremen in plants at Racine, Wis., have organized a Foreman's Club to promote fellowship, cooperation and the exchange of ideas, largely through organization efforts of J. W. Morley, industrial secretary of the Racine Young Men's Christian Association, who was elected executive secretary of the organization. Other officers include Joseph D. Duffield, Belle City Malleable Iron Co., president; W. J. Walters, Massey-Harris Co., vice-president; and Harold Bullmore, Dumore Electric Co., secretary-treasurer. Among other industries represented are Harvey Spring & Forging Co., Lakeside Malleable Iron Co., J. I. Case Threshing Machine Co. and the Webster Electric Co.

Reinforcing Steel

Awards Total 1600 Tons—New Work Requires 2500 Tons

REINFORCING steel awards the past week totaled 1600 tons, of which 500 tons is for a warehouse at Newark, N. J. About 2500 tons was added to pending business, the largest inquiry being for 1000 tons for a municipal waterworks at Albany, N. Y. Awards follow:

BROOKLYN, 175 tons, *New York Times* plant, to Truscon Steel Co.

NEWARK, N. J., 500 tons, warehouse for Lehigh Warehouse & Transportation Co., to Faitoute Steel Co.

JERSEY CITY, N. J., 360 tons, bridge across Hackensack River, to Kalman Steel Co.

DEAL, N. J., 150 tons, sewage disposal plant, to Kalman Steel Co.

WAUKEGAN, ILL., 250 tons, addition to power plant of Public Service Co. of Northern Illinois, to American System of Reinforcing.

CLEVELAND, 250 tons, Severance Hall, to Bourne-Fuller Co.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

ALBANY, N. Y., 1000 tons, municipal waterworks.

BROOKLYN, 125 tons, subway route 109, section 3.

PHILADELPHIA, 1500 tons, two slaughter houses to be erected by Pennsylvania Railroad for Vogt Packing Co. and West Philadelphia Packing Co.

CINCINNATI, 265 tons, public school.

CHICAGO, 135 tons, bridge at Ninety-Fifth Street; Materials Service Corporation, general contractor.

CHICAGO, 380 tons, bridge; Underground Construction Co., general contractor.

OTTAWA, ILL., 250 tons, hotel.

Tone of Scrap Market in Detroit Stronger

DETROIT, Dec. 10.—The closing of Lake navigation has depressed prices on heavy melting and shoveling steel and hydraulic compressed scrap 50c. to $1 a ton. Borings and short turnings have advanced the same amount and long turnings are up 50c. a ton. Some releases on current orders during the past week have emphasized the small tonnage that is being produced, and the general tone of the market is stronger despite present quoted prices. Indications are that there will be some considerable buying done by mills and furnaces before the first of the year.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Hvy. melting and shov. steel	$11.50 to $12.00
Borings and short turnings	9.00 to 9.50
Long turnings	8.00 to 8.50
No. 1 machinery cast	12.50 to 13.00
Automotive cast	11.50 to 12.00
Hydraul. comp. sheets	11.00 to 11.50
Stove plate	9.00 to 9.50
New No. 1 busheling	10.50 to 11.00
Old No. 1 busheling	9.00 to 9.50
Sheet clippings	8.00 to 8.50
Flashings	9.50 to 10.00

Lake Ore Water Shipments Break Record

Season's Total 65,204,600 Tons Against 64,734,198 in 1916—Aggregate of Rail and Boat Movement Down

SHIPMENTS of Lake Superior ore by water during 1929 ended with the movement of one December cargo of 9112 tons from Marquette. Total shipments by water during 1929 amounted to 65,204,600 tons, breaking the former record of 64,734,198 tons in 1916 by nearly 500,000 tons. The increase was 11,223,726 tons, or 20.7 per cent, over last year.

All-rail shipments this year will be approximately 1,000,000 tons, or only about half as much as during 1916, so that the total water and all-rail movement this year will be about 700,000 tons less than in 1916, when the total movement was 66,902,778 tons.

After several record-breaking months, November shipments took a drop, amounting to 3,941,524 tons, a decrease of 319,419 tons from November last year.

Shipments by boat for November, for the entire year and for 1928 and total water shipments for 10 years are listed herewith.

LAKE ORE SHIPMENTS BY WATER, GROSS TONS

	November	Season 1929	Season 1928
Escanaba	574,520	6,348,573	5,487,556
Marquette	348,887	4,448,388	3,410,902
Ashland	422,081	7,620,060	6,481,158
Superior	1,146,655	19,623,139	15,413,694
Duluth	1,096,560	20,562,705	17,454,063
Two Harbors	352,821	6,601,735	5,733,501
Total	3,941,524	65,204,600	53,980,874
1929 increase	.....	.....	11,223,726

WATER SHIPMENTS OF LAST TEN YEARS, GROSS TONS

1920	58,527,226	1925	54,081,298
1921	22,300,726	1926	58,537,855
1922	42,613,229	1927	51,107,136
1923	59,036,705	1928	53,980,874
1924	42,623,572	1929	65,204,600

Interlake Iron Corporation Formed by Merger

Stockholders of the By-Products Coke Corporation, Chicago, at a special meeting in New York, Dec. 9, ratified the purchase of the properties and assets of the Zenith Furnace Co., Duluth, Minn., and the Toledo Furnace Co., Toledo, Ohio, and of the stock of the Perry Furnace Co., which owns a blast furnace and coke oven plant at Erie, Pa., together with valuable interests in ore mines in the Lake Superior district and coal properties in Green County, Pa.

The name of the company has been changed to the Interlake Iron Corporation, to which the new properties will be transferred Jan. 1. The company will have an annual capacity of over a million tons of pig iron and a half million tons of coke for the domestic market. The ore properties just acquired will satisfy the total requirements of the company's furnaces and will yield satisfactory grades of ore of all kinds produced on the six iron ore ranges of Lake Superior.

Pickands, Mather & Co., Cleveland, as well as the individual members of the firm who own stock in all of the companies in the merger, will take stock in the Interlake Iron Corporation in exchange for their several holdings and will remain prominent in the management of the new company. H. G. Dalton, Pickands, Mather & Co., will be chairman of the board of the Interlake company; C. D. Caldwell, president, By-Products Coke Corporation, will be president; and W. B. Castle, formerly president of the Zenith Furnace Co., and Elton Hoyt, II, Pickands, Mather & Co., vice-presidents. Samuel Mather, Mr. Dalton and Mr. Hoyt will be directors.

No new financing has been necessary in the new arrangement. The balance sheet of the corporation will show current assets in excess of five times the current liabilities. The property and investment account will be in excess of $50,000,000. First mortgage bonds of the By-Products Coke Corporation, approximating $6,600,000, and of the Zenith Furnace Co., approximating $3,000,000, will be assumed by the new corporation, and with bonds totaling $75,000 of the Perry Furnace Co. will be the only funded debt outstanding, all other securities being represented by 2,000,000 shares of no par common stock.

Sharon Steel Hoop to Make Nirosta Products

The Sharon Steel Hoop Co., Sharon, Pa., has concluded negotiations with the Krupp Nirosta Co., Inc., holder of the Krupp patents of Dr. Strauss, under which it will immediately proceed with the production and distribution of high-alloy rust-resisting iron of the KA2 type and other brands. The Sharon company has also made arrangements with the Ludlum Steel Co., Watervliet, N. Y., by which the latter will for the present furnish the alloy ingots or semi-finished steel to the Steel Hoop company, principally from its Dunkirk, N. Y., plant. This will enable the Sharon company to begin distribution of this steel at an early date, probably during January, 1930. All the facilities and metallurgical staffs of both the Ludlum and Sharon companies will be utilized in bringing out the products.

Newton Steel Co. Expects Better Automobile Buying

The Newton Steel Co. has declared the usual quarterly dividends of 75c. a share on common stock and $1.50 on preferred for the fourth quarter. Officials report that steel stocks in possession of automobile companies are at low ebb, and they anticipate substantial improvement in requirements of automobile steels in the first quarter of 1930.

Jobbers to Distribute Falk Flexible Couplings

A new method of distributing Falk flexible couplings has recently been adopted by its manufacturer, the Falk Corporation of Milwaukee. In the future, this product will be handled by leading distributers of mill machinery and electrical supplies located at strategic points throughout the country. In the past, distribution has been limited to company branch houses and special agents in some of the larger cities.

A complete service plan has been formulated which will enable distributers in all centers to carry complete stocks of couplings, quickly available to the trade. It is the plan of the Falk Corporation to select distributers to carry out this plan. After the distributers are appointed, the company will aid them through the cooperation of factory salesmen and by sales helps of various kinds.

Stanley Electric Tool Co. a Merger of Several Lines

The Stanley Works, New Britain, Conn., announces the formation of the Stanley Electric Tool Co. This new company will manufacture and distribute the electrically-operated hand tools developed by the Stanley Rule & Level Co., including electric drills, screw drivers, bench and aerial grinders, etc.

The recent purchase of The Unishear Co., New York, adds to this list of products a complete line of motor-powered shears for outside and inside cutting of sheet metal. Another company recently acquired is the Ajax Electric Hammer Corporation, New York, which has for some time manufactured and sold Ajax electric hammers and bits.

A contract has been placed by the Jones & Laughlin Steel Corporation with Arthur G. McKee & Co., Cleveland, for a patented revolving distributor of the latest roller bearing type for No. 3 blast furnace at the Aliquippa plant. The same supplier is to furnish also eight 6-ft. Kling goggle valves for the same plant.

PERSONAL

L. C. REIS, vice-president and general superintendent, Minnesota Steel Co., Duluth, Minn., has been made president to succeed the late S. B. SHELDON.

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C. H. HERTY, JR., supervising metallurgist, United States Bureau of Mines Experimental Station, Pittsburgh, addressed the Canton-Massillon chapter of the American Society for Steel Treating, Dec. 9. His topic was the deoxidation of steel.

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IRVING LANGMUIR, president of the American Chemical Society and associate director of the research laboratory of the General Electric Co., will receive the Chandler medal for "distinction in chemistry" on Dec. 13, when he delivers the Chandler lecture at Columbia University, New York, on "Electrochemical Interactions of Tungsten, Thorium, Caesium and Oxygen."

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CHARLES M. NUCKOLLS, formerly with the International Harvester Co., Chicago, has been placed in charge of design and development work in the crane department of H. D. Conkey & Co., Mendota, Ill.

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PHILIP BROWN, who has been with the Wilkoff Co., Youngstown, iron and steel dealer, for the past 15 years, has been elected vice-president of the company and general manager of the mill and warehouse division.

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ARTHUR W. F. GREEN has accepted a position as manager of the tool steel division of the Edgecomb Steel Co., Philadelphia. He will handle particularly the products of the Vanadium Alloy Steel Co., which is one of the companies for which the Edgecomb company is a distributing agent. Mr. Green resigned as sales metallurgist of the Poldi Steel Corporation of America on Nov. 30 to take up his new position. He is secretary-treasurer of the Philadelphia chapter of the American Society for Steel Treating, of which he has twice been chairman.

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ELTON HOYT, II, Pickands, Mather & Co., Cleveland, has been elected a director of the Newton Steel Co., Youngstown, succeeding G. T. Fillius.

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PHILIP D. BLOCK, president, Inland Steel Co., has been made a member of the transportation committee of the Chicago Association of Commerce.

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JORDAN KORP, metallurgical engineer with the Leeds & Northrup Co., Philadelphia, will address the St. Louis chapter of the American Society for Steel Treating at a meeting to be held in the American Annex Hotel, St. Louis, Dec. 20, on "Correct Procedure in Heat Treating."

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WILLIS S. GEORGE has been elected chairman of the board of the Pettibone-Mulliken Co., Chicago. R. E. WILSEY and BEN LYONS were added to the board, which has been increased from seven to nine members. Mr. George will take an active part in the management of the company.

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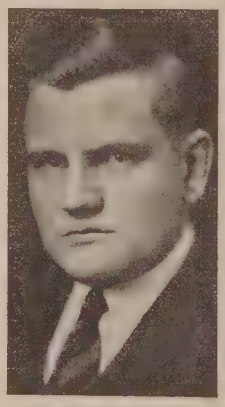
FRANK M. HESSE, who has been with the Weirton Steel Co., Weirton, W. Va., since 1912, has been appointed



F. M. HESSE

secretary and treasurer of the National Steel Corporation, which is the company formed by the merger of the Weirton Steel Co., Great Lakes Steel Corporation and the blast furnace subsidiaries of the M. A. Hanna Co. Mr. Hesse was born in New Cumberland, W. Va., and was educated in the public schools of Pittsburgh and at Bethany College.

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WILLIAM J. CRONIN, secretary of the Tri-City Manufacturers' Association, and A. R. PIERCE, director of industrial education of the National Metal Trades' Association, Chicago, were the speakers at the first meeting of the year of the Industrial Relations Group of the Tri-City Manufacturers' Association, held Dec. 2 at the LeClaire Hotel, Moline, Ill.

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R. C. TODD, assistant sales manager of the American Rolling Mill Co., Middleton, Ohio, delivered an illustrated lecture on new steel processes, Dec. 10, at a dinner meeting of the Milwaukee Association of Purchasing Agents.

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W. H. POTTER has been made general sales manager of the Manganese Steel Forge Co., Philadelphia. Formerly, he was manager of the company's Chicago office.

R. B. TUHEY has been appointed district representative at Indianapolis, Ind., by the Lincoln Electric Co., Cleveland, and S. H. TAYLOR has been promoted to a similar position at Los Angeles.

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WILLIAM K. FARRELL has become general purchasing agent of the American Locomotive Co., New York.

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GORDON GORDON, who has been secretary of the Taft-Peirce Mfg Co., Woonsocket, R. I., for the past 25 years, has been elected president and treasurer, succeeding the late Louis V. Hubbard. FREDERICK S. BLACKALL, JR., who continues as vice-president and general manager, has been made secretary also.

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FRANCIS R. WADLEIGH, consulting mining and fuels engineer, New York, and ERNEST L. BAILEY, mining engineer, have become associated as Wadleigh & Bailey, 1 Broadway, New York, to engage in consulting work.

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W. H. VAN VLECK has resigned as New York district sales manager of the Alan Wood Steel Co.

Duriron Co. Enlarges Plant Manufacturing Facilities

The Duriron Co., Inc., New York and Dayton, Ohio, has under way a plant expansion program calling for an enlargement of its facilities at Dayton and for a foundry at Newark, N. J. The company's foundries have put into operation new electric furnaces of both high-frequency and arc types capable of handling castings up to 10,000 lb. Castings will be manufactured not only in Duriron, Durimet, KA-2 and other alloy steels, but also in monel metal or nickel as corrosion-resistant needs dictate.

The Dayton machine shop has been enlarged to enable the finishing department to keep pace with the increased foundry capacity. The company's line of pumps, valves, pipe, fittings and other standard products will be available in the near future in Durimet or KA-2 alloy steel as well as in Duriron. A new fireproof laboratory is nearing completion at Dayton.

In both sales engineering and manufacturing the company has become affiliated with Industrial Welded Alloys, Inc., both organizations being divisions of Industrial Alloy Products Corporation. This makes it possible for the one unit to furnish practically all requirements for heat and corrosion-resistant materials, including fabricated sheet and plate construction, welded pipe, tanks, towers and special equipment.

What is said to be the largest single order for valves of such large size is one for nineteen 6-ft. Kling goggle valves for the Johnstown plant of the Bethlehem Steel Co. This order was placed with Arthur G. McKee & Co., Cleveland.

OBITUARY

CHARLES E. HILL, assistant general sales agent for the Crucible Steel Co. of America, with headquarters in Pittsburgh, died suddenly at his home in that city on Dec. 1. He was born in North Side, Pittsburgh, in 1883, and after attending school there, he entered the employ of the Crucible company in a secretarial capacity in 1901. He had been with the company continuously since that time, principally in the sales department; in the position he held at the time of his death he was active in the greater part of the middle section of the country.

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JOHN F. GOLDING, inventor of expanded metal and of machinery for producing it, died at his home in Philadelphia, Nov. 29. He was born in Pittsburgh on May 2, 1848, and was educated in Iowa State University. He had a varied career, having been a farmer, lawyer and editor of the *Industrial World and Iron Worker*, Chicago, before becoming known as an inventor. In 1898 he was awarded the John Scott medal for his invention of expanded metal and machinery for its production. He adapted expanded metal to the reinforcement of concrete. At the time of his death he was vice-president of the United States Nut & Washer Co.

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WALTER FRANK, service manager of the bar department of the Interstate Iron & Steel Co., died Dec. 5, aged 35 years. His first employment by a steel company was in the Chicago office of the Republic Iron & Steel Co., from which he was transferred to a position at the Moline, Ill., mills. Several years later he returned to Chicago to accept a position with the Interstate company, where he advanced by successive steps to the position which he held at the time of his death.

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HENRY ADAMS, for some years head of the mechanical engineering department of the office of the Supervising Architect of the Treasury Department, Washington, and for the past 30 years consulting engineer with offices in Baltimore, died suddenly Dec. 9 at his home in Baltimore. He was born in 1858 at Duisburg, Germany. He was one of the early presidents of the American Society of Heating and Ventilating Engineers.

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MAURICE A. OUDIN, vice-president of the International General Electric Co., died at his home in Schenectady Dec. 4, following an illness with pneumonia, aged 63 years. He was graduated from the College of the City of New York in 1885 and was graduated from Princeton University in 1891. He joined the Thomson-Houston Electric Co., Lynn, Mass., and continued in various capacities with its successor, the General Electric Co., at Schenectady. He was made manager of the foreign department in 1904, and traveled extensively in Russia, China, and Japan. When the International General Electric Co. was formed in 1919 Mr. Oudin was appointed its first vice-president. He served on the Advisory Committee of the Far East, a group of business men with which the Department of Commerce conferred on major problems relating to the Far East while President Hoover was Secretary of Commerce.

CHARLES E. HILL

J. F. GOLDING

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FREDERICK A. COE, formerly with Morris, Wheeler & Co., Philadelphia, died at his home in Philadelphia, Dec. 5, aged 92 years. He was born in England and entered the employ of Morris, Wheeler & Co. in 1888, with whom he remained until his retirement 20 years ago.

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SAMUEL T. WEYMAN, one of the founders of the Atlantic Steel Co., Atlanta, Ga., and for many years a vice-president of the Connors-Weyman Steel Co., Birmingham, was killed in a fall on his estate, in fighting a forest fire Nov. 28. He was 67 years old.

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FORRESTER B. LESLIE, sales manager of A. C. Leslie & Co., Ltd., iron and steel, Montreal, died on Nov. 21, aged 51 years. He was a son of Alexander C. Leslie, founder of the company, and entered the business when about 21 years of age.

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JOHN C. TAGGART, assistant general superintendent at the New Castle, Pa., works, Carnegie Steel Co., died on Dec. 4 at a hospital in that city. He was 66 years of age.

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DAVID C. KLAUSMEYER, assistant to the president, Cincinnati Bickford Tool Co., died suddenly in Cincinnati, Dec. 6. He was born in New York, Oct. 31, 1882. He was graduated from the Ohio Mechanics Institute and started work in the shops of the Bickford Drill & Tool Co., one of the constituent companies merged into the Cincinnati Bickford Tool Co. Eventually, Mr. Klausmeyer was put in charge of all designing and later of production.

Canadian Iron and Steel Made in 1928

Output valued at $609,632,999 is reported by the Dominion Bureau of Statistics, Ottawa, for iron and steel plants in Canada and plants working up iron and steel into finished form. There were 1159 establishments, with capital figured at $702,931,186, covered in the survey. These plants employed 119,200 people and paid salaries and wages aggregating $168,320,039. Deducting cost of materials from selling value of products, the estimated value added by manufacture was $300,014,925.

Imports into Canada of iron and steel and other products in 1928 were valued at $322,979,144, of which more than 91 per cent, or $295,114,281, were from the United States. The total shows a gain of about $75,000,000 over 1927. Exports in 1928 were $70,665,677, or a gain of about 4 per cent on 1927. The United States received more than any other country, with $9,216,896. United Kingdom, Australia, Argentina, India, New Zealand, Brazil and British South Africa followed, in that order, all with amounts of more than $2,950,000.

Among the principal producing industries automobiles stood first, with $162,067,495 of products. Castings and forgings showed $81,904,852. Railroad rolling stock was third, with $73,422,057; primary iron and steel, $62,071,694; machinery, $51,046,139; sheet metal products, $49,846,671; agricultural implements, $41,199,841; hardware and tools, $25,131,821, and other products in smaller amounts.

Steel Cartels Disorganize Market

Uncertainty Rules Both Buyers and Sellers—Dutch Make More Pig Iron—Zinc Sheet Cartel Proposed—Holidays Slow British Trade

(*By Cable*)

LONDON, ENGLAND, Dec. 9.

WITH the holidays approaching and annual inventories being made, the iron and steel markets are quiet. Cleveland pig iron makers are well sold to the end of the year, and stocks are low, so that price concessions have been refused. Export business is unobtainable at present high prices.

Hematite furnaces have sold iron at £4 ($19.52) a ton for prompt shipment and £4 1s. ($19.76) a ton for forward delivery of mixed numbers, but are still making deliveries on a number of uncompleted large contracts at low prices.

General export sales of heavy steel are slow, but mill order books are fairly well filled with domestic contracts.

Tin plate is firm with demand active and mills well sold ahead. World consumption is reported increasing and the outlook is considered favorable. Severe floods in Wales have affected some mills and materially reduced output.

The British Can Co., with a capital of £750,000 ($3,660,000) has been formed to enter into food packing and allied activities in the United Kingdom, in conjunction with the American Can Co., which will supply can making equipment, and the Thermokept Corporation, which holds licenses for food packing patents. The nucleus of the new corporation was provided by the purchase of the can business of Ernest Taylor, Ltd., Liverpool.

Galvanized sheets are quiet and prices are easy, with works unable to obtain specifications. Black sheets are quiet after the recent moderate activity in Japan on light gages. Germany is selling No. 30 gage sheets to Japan for £12 3s. ($59.29) a ton, or 2.69c. a lb., f.o.b.

British steel makers are arranging a London sales office under the management of Julian Piggott, which will be known as the British Steel Makers Export Association.

The Continental market is somewhat disorganized by the International Steel Cartel meetings. Reported decisions of the cartel are uncertain, but are believed to mean confirmation of the 10 per cent reduction of output originally suggested in November, but so far adopted only by Belgium.

It is understood that this reduction has been applied to all members from the beginning of December and that a minimum price on merchant bars of £5 5s. per ton (1.14c. per lb.) has been confirmed. At a future meeting in Charleroi, Belgium, two representatives each from Germany, France, Luxemburg and Belgium will arrange a list of international extras and fix minimum prices on other products. A preliminary price of £5 per ton (1.09c. per lb.), f.o.b., is reported to have been established on beams. The International Steel Cartel is meeting Dec. 14 at Dusseldorf, and renewal of the agreement is confidently expected.

The European Wire Rod Cartel has been renewed for another 12 months, provided the German syndicate is also prolonged. The International Rail Makers Association is meeting in Dusseldorf, Dec. 13, and the Continental Tube Cartel, Dec. 10.

Meanwhile, the general market is uncertain, with both buyers and sellers reluctant to transact business.

British Pig Iron Less Active

Consumers Reluctant to Pay Present Prices—Coke Supply Improves—Tin Plate Mills Well Booked

LONDON, ENGLAND, Nov. 25.—The tone of the iron and steel markets has improved slightly, but the volume of new business is small. The usual seasonal activity in pig iron has been less pronounced, consumers being reluctant to follow the upward trend of prices. For some time the fuel situation has been acute and prices have been advancing, but during the

British and Continental European Export Prices per gross ton, f.o.b. United Kingdom Ports, Hamburg and Antwerp, with the £ at $4.88

British Prices f.o.b. United Kingdom Ports

Cleveland No. 3 foundry	£3	12½s.	to £3	13½s.	$17.69	to	$17.93
East Coast hematite	4	0	to 4	1	19.52	to	19.76
Ferromanganese, export	12	5	to 13	0	59.42	to	63.05
Billets, open-hearth	6	2½	to 6	5	29.89	to	30.50
Sheet bars, open-hearth	6	0	to 6	5	29.28	to	30.50
Black sheets, Japanese specifications	12	10			61.00		
Tin plate, per base box	0	18¾	to 0	19	4.57	to	4.64
Rails, 60 lb. and heavier	7	15	to 8	15	37.59	to	42.43
					Cents per Lb.		
Steel bars, open-hearth	7	15	to 8	10	1.69	to	1.85
Beams, open-hearth	7	2½	to 7	12½	1.55	to	1.66
Channels, open-hearth	7	7½	to 7	17½	1.60	to	1.72
Angles, open-hearth	8	2½	to 8	12½	1.77	to	1.87
Ship plates, open-hearth	7	12½	to 8	2½	1.66	to	1.77
Black sheets, No. 24 gage	10	0	to 10	5	2.18	to	2.23
Galvanized sheets, No. 24 gage	12	10	to 12	15	2.72	to	2.78

Continental Prices, f.o.b. Antwerp or Hamburg

Foundry iron, 2.50 to 3.00 per cent sil., 0.50 to 0.90 per cent phos.	£3	7s.	to £3	11½s.	$16.35	to	$17.45
Foundry iron, 2.50 to 3.00 per cent sil., 1.00 per cent and more phos.	3	6	to 3	8	16.11	to	16.59
Billets, Thomas	4	12	to 4	14	22.45	to	22.94
Sheet bars, Thomas	4	10	to 4	11½	22.08	to	22.45
Wire rods, low C., No. 5 B.W.G.	6	3	to 6	5	30.01	to	30.50
Rails, 60 lb. and heavier	6	8½	to 6	10*	31.35	to	31.72
Rails, light	6	1½			29.65		
					Cents per Lb.		
Steel bars, merchant	5	5			1.14		
Steel bars, deformed	5	4			1.13		
Beams, Thomas, British standard	4	19	to 5	3	1.08	to	1.12
Channels, Thomas, American sections	5	10	to 5	17	1.19	to	1.27
Angles, Thomas, 4-in. and larger, over ⅜-in. thick	5	0	to 5	6	1.09	to	1.15
Angles, Thomas, 3-in.	5	6			1.15		
Ship plates open-hearth inspected	7	5			1.58		
Black sheets, No. 31 gage, Japanese	12	3	to 12	4	2.47	to	2.66
Hoop and strip steel over 6-in. base	5	11½	to 5	12½	1.21	to	1.22
Wire, plain, No. 8 gage	7	2½	to 7	3½	1.55	to	1.56
Wire, galvanized, No. 8 gage	8	12½	to 8	15	1.87	to	1.90
Wire, barbed, 4-pt. No. 12 B.W.G.	11	5	to 11	6	2.45	to	2.46
Wire nails, base	0	6¼			$1.55	per	keg
Wire nails, assortments 1 to 6-in. keg	10	6½			2.69		

*Open-hearth steel, 8s. ($1.94) per ton extra.

past fortnight Cleveland producers have blown out two furnaces for repairs and, as a result, pressure for fuel has relaxed and prices have eased slightly. Makers point out, however, that selling prices of pig iron have been less than cost of production for some time and have made no revision in their quotations.

Furnaces are, as a rule, fairly well engaged for the next few weeks and some sizable contracts have been made for deliveries of iron in the first quarter. Current output of Cleveland iron is being fully absorbed and stocks on yards are negligible. Hematite producers are fairly well occupied at present and some substantial sales to domestic and export buyers have enabled them to advance prices to a more profitable level. For first quarter delivery, hematite iron is being quoted at £4 1s. ($19.76) per ton for East Coast, mixed numbers, an advance of about 4s. (98c.) per ton within a few weeks.

Recently, Continental ship owners placed an order for seven large oil tank ships, which are to be entirely built of British steel. Conditions in the finished steel market have not been active, although domestic mills are supplying the bulk of the heavy steel requirements and there is considerable activity in general engineering and construction.

The announcement of the International Steel Cartel that output was to be reduced by 10 per cent was expected by British mills to diminish the recent severe competition in foreign markets. Although Continental prices did develop some firmness immediately after the announcement, this improvement has not been maintained and European mills are still offering severe competition for export orders.

World demand for tin plate is reported good and is expanding steadily. Unfilled orders on makers' books early this month were the largest in a number of years and included a contract for oil can tin plate. Many mills are booked with business well into next year. Restriction of output has worked satisfactorily and even at today's prices it pays some mills better to receive 2s. (49c.) per base box for underproduction. Makers claim that the present base price of 18s. 9d. ($4.58) per base box, f.o.b. port, is not especially profitable and that any substantial advance in the tin market will undoubtedly be promptly reflected in the tin plate quotation.

German Shipyards Building American Ships

HAMBURG, GERMANY, Nov. 27.—German shipyards have recently booked some sizable shipbuilding contracts from the United States. The Bremer Vulcan shipyard has been awarded a 16,000-ton merchant ship driven by MAN Diesel engines. The Germania Werft, Kiel, controlled by the Krupp interests, has booked a 17,000-ton tank ship, equipped with Krupp Diesel engines, and the Vereinigte Nordsee Werften, a 15,000-ton tank ship with Sulzer Diesel engines from the Standard Oil Shipping Co., New York.

Other shipbuilding contracts from the United States have included a 2500-ton private yacht to be built by the Germania Werft, Kiel, which brings the total of private yachts built by this yard for American owners, since 1925, to seven. The Germania Werft is also building two merchant ships of 8000 tons each for American companies.

German Aluminum-Coated Sheet Mill Completed

HAMBURG, GERMANY, Nov. 27.—The Stahlwerk Hoesch announces that its new mill at Stockheide for the production of aluminum-coated steel sheets has been completed and trial operation of the new equipment gave satisfactory results. Regular commercial production of aluminum-coated sheets will begin in December or early in January.

European Zinc Sheet Cartel Proposed

HAMBURG, GERMANY, Nov. 27.—The recent dissolution of the Continental Zinc Cartel has occasioned no surprise, as the cartel had for some time been unable to control its membership. Although it regularly fixed a production quota based on the output of zinc in November, 1928, members were not influenced by the cartel decisions, although they voted for them, and for some time production of zinc in Germany, Belgium and Poland had increased whenever the cartel announced restriction of output.

It is expected that the European zinc sheet producers will form a cartel. Meanwhile, the German Zinc Sheet Cartel has taken over export sales of about 75 per cent of the zinc sheet production of Germany and all the production of Austria, Poland, Hungary and Czechoslovakia. This gives it about 105,000 tons of zinc sheets annually to sell for export. Belgian producers, which exported about 56,000 tons last year, are reported negotiating with the German cartel.

Dutch Pig Iron Output Increased Last Year

HAMBURG, GERMANY, Nov. 27.—Pig iron production of the Royal Netherlands Blast Furnace & Steel Works, Ymuiden, Holland, in the fiscal year, July 1, 1928, to June 30, 1929, was 256,479 tons, compared with 209,875 tons in fiscal year 1927 to 1928. A total of 215,714 tons was shipped for export in 1928-1929, compared with 149,633 tons in the previous year, the greater part of the tonnage going to Great Britain and the United States. Completion of a third blast furnace early next year will bring the total capacity of the company to 400,000 tons a year.

Nirosta Licenses Granted 24 German Makers

HAMBURG, GERMANY, Nov. 27.—Although the Friedrich Krupp A. G. is the sole German holder of patents on high-chromium nickel steel, the company is not seeking to monopolize the production of this alloy, and to date has licensed 24 makers in Germany to operate under the patents for Nirosta. The charge for licenses is not high, but the number of licensed makers makes a substantial total income from this source. A policy of licensing other makers was adopted by the Friedrich Krupp A. G. as the best means of avoiding possible severe competition from companies that otherwise might have developed a competitive product to which the patents might not have applied.

European Wire and Nail Prices Shaded

HAMBURG, GERMANY, Nov. 27.—The German Wire Makers' Cartel has fixed its prices at £7 12s. 6d. per ton ($1.66 per 100 lb. keg) for wire nails, £7 7s. 6d. per ton (1.61c. per lb.) for bright wire, £12 7s. 6d. per ton (2.69c. per lb.) for barbed wire, and £9 per ton (1.96c. per lb.) for galvanized wire. Belgian wire mills are shading these prices by as much as 10s. ($2.44) per ton, which has resulted in similar large concessions being offered by the German makers.

Restriction of Cartel Output Disregarded

HAMBURG, GERMANY, Nov. 27.—Although the International Steel Cartel has officially reduced the steel production quota by 10 per cent, restriction of output began to be disregarded as soon as prices registered a slight upward turn. Consequently most mills are maintaining their former rate of operation and may pay a slight penalty for excess output. As the disregard of the restriction announced by the cartel is believed to be general with all members, and in the case of general overproduction the penalty payments are refunded in proportion to the excess of output, most makers will probably lose little.

German mills, which have been urging a selling syndicate for products of members of the International Steel Cartel, are pointing to the present inability of the cartel to control prices or production as further proof of the necessity for such a sales organization, which will be discussed at a meeting of a special committee of the cartel at Liége, Belgium, Dec. 3.

The Hevi-Duty Electric Co. has moved into larger quarters at 4100 Highland Boulevard, Milwaukee. The new building will provide double the present productive capacity and is especially equipped for building furnaces and furnace equipment.

Machinery Markets and News of the Works

Tool Sales Holding Up Well

Despite Proximity of Holidays and Inventory, Sales Have Gained

IN view of the slackening pace of business throughout the country, machine tool sales have been holding up unusually well. Despite the proximity of the holiday season and the annual inventory period, the volume of orders has actually shown a gain over the preceding two weeks.

While bookings are considerably less than they were a few months ago, in most centers they are paralleling those of November and are ahead of the record reported for the corresponding month of last year.

The amount of pending business, as well as numerous inquiries which are expected to be put out soon, gives promise of an active market for machine tools in the early weeks of 1930.

There has been no appreciable diminution in tool builders' shop schedules, which are being maintained practically at full capacity.

The Amtorg Trading Corporation, New York, has placed an order with a Cincinnati builder for 10 standard lathes. A New York district user has purchased three large lathes.

Foremost among lists which will appear shortly is one for $250,000 worth of machine tools for the Illinois Steel Co. The Allis-Chalmers Mfg. Co., Milwaukee, also may buy a large amount of equipment for its tractor plant additions at Milwaukee and Springfield, Ill.

Some automobile parts manufacturers are busier, having received large orders from the Ford company, and are buying a few tools. A machine tool user is asking for prices on seven turret lathes which he will buy in the immediate future. The Electric Auto-Lite Co., Toledo, is contracting for tools to equip its new plant extensions.

New York

NEW YORK, Dec. 10.—While demand for machine tools is smaller than two months ago, it is holding up much better than is usual at this time of the year. November sales, though below those of October, were higher than the total for the same month last year. A favorable indication is that the volume of inquiries has increased within the past week or two. Considerable of this prospective buying probably will go over into January. An unusual sale of the past week was a $20,000 grinding machine to a Boston company.

Brooklyn Borough Gas Co., 1721 Sheepshead Bay Road, Brooklyn, has plans for equipment storage and distributing plant, with mechanical shop, and automobile service, repair and garage building at 805-33 Neptune Avenue, to cost $275,000 with equipment. Bloch & Hesse, 18 East Forty-first Street, New York, are architects; C. E. Smith, 116 West Thirty-ninth Street, New York, is engineer.

Fein Tin Can Co., Inc., 65 Greene Street, New York, has leased space in building of New York Dock Co., Furman Street, Brooklyn, for manufacture of tin and other metal containers, steel pails, etc., to cost more than $70,000.

Westchester Lighting Co., 9 South First Avenue, Mount Vernon, N. Y., is arranging expansion and improvement program, including addition generating and transmission facilities, to cost $8,000,000.

M. J. Ort, 424 East 149th Street, New York, architect, has plans for a six-story automobile service, repair and garage building, to cost $185,000 with equipment.

Grover Loening, formerly consulting engineer and director of Keystone Aircraft Corporation, Bristol, Pa., has organized Grover Loening Co., with capital of $1,000,000, to operate plant for experimental airplane work and development, including production of single-motor aircraft. Space was recently secured at 305 East Forty-sixth Street, and operations will be placed under way at once.

Parkway Motor Co., Orawaupum Street, White Plains, N. Y., will soon begin superstructure for two-story service, repair and garage building, to cost about $100,000 with equipment. P. B. Nichols, Depot Plaza, is architect.

Rubel Coal & Ice Corporation, 937 Fulton Street, Brooklyn, has plans for three-story ice-manufacturing plant, refrigerating and ice cream factory to cost about $400,000 with machinery. Henry J. Nurick, 44 Court Street, is architect and engineer.

Spoor-Lasher Co., Inc., Poughkeepsie, N. Y., general contractor, has acquired local plant of Phoenix Horseshoe Works for about $250,000, and will remodel for equipment storage, distributing and repair plant for company service.

Sonora Products Corporation, 50 West Fifty-seventh Street, New York, manufacturer of talking machines and parts, has perfected new machine for reproducing talking motion pictures in home, and will develop plant capacity for new units.

Union Free School District No. 2, Tuckahoe, N. Y., is considering installation of manual training equipment in new two- and three-story high school to cost about $550,000, for which bids are being received on general contract. Knappe & Morris, 171 Madison Avenue, New York, are architects.

G. G. Miller, 1482 Broadway, New York, architect, has filed plans for multi-story automobile service, repair and garage building, to cost about $200,000 with equipment.

Idealite Lamp Shade Mfg Co., 836-38 Broadway, New York, manufacturer of metal frame lamp shades, metal novelties, etc., has leased four-story factory at 49-55 Fremont Street, Jersey City, N. J., for new plant. Three existing plants in New York and one factory at Higganum, Conn., will be removed to new location where production will be concentrated.

Department of Public Affairs, City Hall, Newark, Jerome T. Congleton, director, will receive bids until Dec. 19, for storage batteries, manhole frames and covers, couplings, drive chains and fan belts, etc.

Kent Garage Investing Corporation, 350 Madison Avenue, New York, will soon begin superstructure for multi-story service, repair and garage building, 180 x 190 ft., at Newark, to cost over $1,000,000 with equipment. Fougner & Gautier, 103 Park Avenue, New York, are architects.

William Prym of America, Inc., 16 West Nineteenth Street, New York, manufacturer of metal products, is considering new plant at High Bridge, N. J., to cost over $100,000 with equipment.

Montauk Equipment Co., Hoboken, N. J., has leased space in building at 1021 Grand Street, totaling 7500 sq. ft. floor space, to manufacture electrical specialties.

Public Service Railway Co., Public Service Terminal, Newark, is contemplating two-story automobile service, repair and garage building, 100 x 370 ft., for motor buses, to cost about $135,000 with equipment.

Beckwith-Chandler Co., Wright Street and Avenue B, Newark, manufacturer of colors, varnishes, lacquers, etc., has revised plans for three-story addition, to cost about $100,000 with equipment. Abbott, Merkt & Co., 175 Fifth Avenue, New York, are architects.

Lydon Brothers, Inc., recently organized, is manufacturing industrial ovens

for japanning, enameling, core baking, tempering, annealing and glass decorating, at its plant, 229 Colden Street, Jersey City. T. Lydon, formerly district sales manager of Young Brothers, Detroit, heads the company.

Philadelphia

PHILADELPHIA, Dec. 9.—Standard Oil Co. of Pennsylvania, Inc., Sixth and Chestnut Streets, Philadelphia, will take bids at once for new refinery, storage and distributing plant on Schuykill Avenue, to cost over $175,000 with equipment.

Reading Co., Reading Terminal, Philadelphia, has plan for expansion to cost $10,000,000, part of fund to be used for electrification program, now under way from Philadelphia to Lansdale, and for completion of car repair, storage and equipment shops at Wayne Junction, last-noted to cost about $1,000,000 with equipment. Engineering department of railroad is in charge.

Ovens, power equipment, conveying and other machinery will be installed in six-story and basement addition, 60 x 120 ft., to be erected by Tasty Baking Co., 2801 Huntington Park Avenue, Philadelphia, to cost more than $350,000 with equipment, for which contract has been let to Turner Construction Co., Seventeenth and Walnut Streets.

Bachmann Brothers, 609 Commerce Street, Philadelphia, manufacturers of celluloid and kindred products, have asked bids on general contract for two-story factory, to cost over $70,000 with presses and other equipment. Eugene A. Stopper, Fuller Building, is architect.

A. Moe & Co., Inc., Philadelphia, has been organized by Lewis H. Christensen, 5651 North Mascher Street, and associates, to take over and expand A. Moe & Co., operating a general machine works at 122 Lombard Street. New organization will engage as iron and brass founder, in addition to machinist, and will also operate a welding works.

Farman Aircraft Corporation of France, affiliated with Ludington Aircraft, Inc., Island Road and Tinicum Avenue, Philadelphia, N. Ludington, president, has plans by Airport Development & Construction Co., Mitten Building, for three-story aircraft manufacturing plant near Camden, N. J., to cost over $100,000 with equipment.

Armstrong Cork Co., Camden, N. J., with headquarters at Lancaster, Pa., has awarded general contract to Townsend, Schroeder & Wood, Inc., Philadelphia, for four-story and basement addition, to cost more than $100,000 with equipment. Part of unit will be used for oven department.

Sun Oil Co., 1608 Walnut Street, Philadelphia, is said to be arranging for expansion at refinery and storage and distributing plants at Linwood, Pa., in connection with a pipe line project from Linwood and Marcus Hook plants to different points in Pennsylvania and extending to New York State line. Entire project will cost over $2,500,000, with booster pumping plants and operating facilities. It is understood that a subsidiary company will be formed to carry out pipe line project.

Lansdowne Heating Co., Lansdowne, Pa., J. M. Delton, Drexel Hill Lumber & Supply Co., head, is considering early construction of steam power plant for central heating service, to cost more than $80,000 with equipment. A site has been secured.

Byron-Jackson Co., Berkeley, Cal., manufacturer of pumping machinery, oil well equipment, etc., has secured property near Saucon Park, Bethlehem, Pa., for establishment of branch plant, to cost over $85,000 with equipment.

Lycoming Mfg. Co., Williamsport, Pa., manufacturer of automobile engines, a subsidiary of Auburn Automobile Co., Auburn, Ind., is pushing work on an expansion program, including additions to foundry and assembling plants. A new machine shop is scheduled for completion early next year, to be given over to production of a new type of radial aircraft engine. Entire program will represent investment of more than $250,000. W. H. Beal is vice-president, in charge.

Barbour Brothers Steel Co., Trenton, N. J., has been organized with capital of $100,000 and 1500 shares of stock, no par value, to take over and expand iron and steel works of Barbour Brothers, Marion Street and Reading Railway. New company is headed by David and William B. Barbour, and William B. Barbour, II.

The Crane Market

NEW inquiry for locomotive cranes has declined as the year end approaches, and with contractors completing their contracts many rented cranes are being returned to the owners. The Bethlehem Steel Co., Bethlehem, Pa., has closed on a 50-ton locomotive crane, for which it has been in the market for a month. The overhead crane market is also inactive and not much improvement is expected by some sellers until after the first of the year, except for the probable award of certain business, which has been under consideration for some time. The Boston & Maine Railroad is reported considering an inquiry for an overhead crane and the Boston & Albany Railroad has closed on a gantry crane.

In the Pittsburgh district, inquiries for overhead cranes have declined in the past few weeks and most of the installations under consideration are expected to be delayed until after the first of the year. The Carnegie Steel Co. is negotiating for a number of cranes for various plants.

Among recent purchases are:

Boston & Albany Railroad, Boston, 20-ton, 58-ft. span gantry crane with 5-ton auxiliary from Milwaukee Electric Crane & Mfg. Corporation.

Standard Oil Co. of New York, 3-ton, 64-ft. 9-in. span hand power crane for export from unnamed builder.

Illinois Steel Co., Gary, Ind., two 30-ton, 8-wheel, steam-driven locomotive cranes from Orton Crane & Shovel Co.

Steel Products Co., McKees Rocks, Pa., 3-ton, 47-ft. span, electric overhead crane from Northern Engineering Works.

Center Foundry & Machine Co., Wheeling, W. Va., 20-ton and 10-ton, 50-ft. span electric overhead cranes from Northern Engineering Works.

Buffalo

BUFFALO, Dec. 9 — Plans have been filed by Buffalo Sintering Corporation, 10 Marilla Street, Buffalo, for one-story plant, to cost about $80,000 with equipment.

Coplan Steel Co., Hull, Que., is arranging for resumption of operations at plant at Ogdensburg, N. Y., which suspended production about three years ago. Initial work will be given over to finishing operations only, locomotive grates and other rough castings being shipped from Hull plant for that purpose. A. H. Coplan is head.

National Paper Products Co., Carthage, N. Y., a division of Crown Zellerbach Corporation, San Francisco, has work under way on extensions and improvements in former local mill of West End Paper Co., recently acquired, including installation of additional equipment, to cost over $100,000.

William and Samuel Bazarnic, 1076 College Avenue, Elmira, N. Y., have organized William Barzarnic, Inc., with capital of 1000 shares of stock, no par value, and plan operation of machine shop and mechanical works for production of iron and steel specialties.

New York & Ontario Power Co., care of George S. Van Kennen, Ogdensburg, N. Y., is considering construction of hydroelectric generating plant near Waddington, N. Y., to cost about $450,000, including transmission system.

Savage Arms Co., Utica, N. Y., has purchased shotgun and rifle manufacturing division of A. H. Fox Gun Co., Eighteenth Street and Wagner Avenue, Philadelphia, and will consolidate. Certain equipment will be removed from Fox plant at Utica, where expansion will be carried out to manufacture Fox type of guns as regular line of Savage company. Fox company will continue to operate Philadelphia plant under names of Fox Mfg. Co., and Fox Automotive Products Co., specializing in manufacture of toy pistols and automobile equipment. C. A. Godschalk will continue as president of Fox organization, and J. H. Connelly, secretary and treasurer.

New England

BOSTON, Dec. 9.—Heil Co., 140 Brookline Street, Boston, manufacturer of steel dump bodies for motor trucks, truck hoists, etc., with main plant at Milwaukee, has awarded general contract to John MacDonald Construction Co., 100 Arlington Street, for one-story factory branch and distributing plant at Brighton, Mass., 42 x 190 ft., to cost about $40,000 with equipment.

J. L. White Co., 16 Brown Street, Waterbury, Conn., has awarded general contract to James Corideo, Inc., 76 Eastern Avenue, for one-story welding plant, 60 x 130 ft., to cost about $25,000.

Hemphill Co., Central Falls, Pawtucket, R. I., manufacturer of knitting machinery and parts, has work under way on additional story on two-story factory, 80 x 300 ft., for which general contract recently was let to Rowley Construction Co., 206 Central Avenue, to cost more than $40,000.

American Bosch Magneto Corporation, Springfield, Mass., manufacturer of magnetos, radio equipment, etc., is considering one and two-story addition, for heat-treating and scrap reclamation departments, to cost about $50,000 with equipment.

Greenfield Electric Light & Power Co., Greenfield, Mass., is erecting a three-story and basement equipment storage and distributing plant, 25 x 85 ft., with mechanical and electrical repair departments, to cost over $50,000 with equipment.

Boston & Maine Railroad Co., Cambridge, Mass., is arranging a fund of more than $100,000 for tools and equip-

ment for new engine house and shops now under way at Somerville, Mass.

Chapman Valve Mfg. Co., Indian Orchard, Mass., manufacturer of heavy gate valves, etc., is planning one-story addition to steel foundry, 75 x 150 ft., to cost over $80,000 with equipment. An annealing oven department will be installed.

New Haven Road Construction Co., Inc., Hamden, Conn., has awarded contract for a one-story equipment and utility plant.

Andrew S. Aharonian, Providence, manufacturing jeweler, will soon start work on a two-story, plant, 65 x 82 ft. Grinding and polishing tools will be bought.

Great Northern Paper Co., East Millinocket, Me., has plans for a power house near Matawamkeag, Me.

Multibestos Co., Walpole, Mass., closed bids Dec. 9 on a drying oven unit to cost $10,000 without equipment. Electrical heating and other equipment will be purchased.

J. L. White Welding Co., Waterbury, Conn., has started work on a one-story, 60 x 129 ft., welding shop, to cost $20,000 without equipment.

Mays Mfg. Co., Inc., Providence, metal specialties, will start work at once on a one-story plant, 60 x 84 ft. Some machine tools will be purchased.

Maine Seaboard Paper Co., Augusta, Me., has started work on a $6,000,000 newsprint plant at Bucksport, Me. Special grinding equipment will be purchased.

Detroit

DETROIT, Dec. 9.—Plans are being considered by Kuhlman Electric Co., Twenty-sixth and Jefferson Streets, Bay City, manufacturer of electric transformers and kindred equipment, for one-story addition, to cost about $50,000 with machinery.

Hastings Mfg. Co., Hastings, Mich., manufacturer of piston rings and other automotive equipment, has approved immediate erection of one-story addition, 65 x 320 ft., to cost about $70,000 with equipment. Part of unit will be used for inspection and distributing service.

Motor Wheel Corporation, South Saginaw Street, Lansing, Mich., manufacturer of steel wheels, etc., has plans for two-story addition, 80 x 475 ft., to cost about $175,000 with equipment.

H. S. Lee Foundry Co., Plymouth, Mich., has acquired manufacturing rights for power spraying equipment of Pontiac Tractor Co., Pontiac, heretofore produced under trade name Universal, and will carry out production at Plymouth plant, continuing manufacture of gray iron and semi-steel castings.

City Council, Allegan, has plans for a municipal hydroelectric power plant, to cost more than $400,000 with transmission system, and will begin work soon. Ayres, Lewis, Morris & May, Cornwall Building, Ann Arbor, are architects and engineers.

American Twist Drill & Tool Co., 2804 West Jefferson Street, Detroit, has plans for one-story addition, to cost more than $75,000 with equipment. Clair W. Ditchy, 415 Brainard Street, is architect.

Detroit Aircraft Co., 115 Joseph Campau Avenue, Detroit, manufacturer of airplanes and parts, is considering one-story unit at Wayne, to cost about $70,000 with equipment.

Board of Trustees, University of Detroit, Livernois Avenue and Six-Mile Road, Detroit, will soon begin work on two-story engineering building, part of unit to be used as aerodynamical laboratory for aircraft experiments, to cost about $100,000 with equipment. Malcolmson & Higginbotham, 1219 Griswold Street, are architects.

American Malleable Co., Owosso, Mich., manufacturer of malleable iron castings, will erect one-story addition, 75 x 85 ft., for storage and distribution, to cost about $50,000 with equipment.

Fruehauf Trailer Co., 10940 Harper Avenue, Detroit, manufacturer of motor trailers, parts, etc., has acquired plant and business of Warner Mfg. Co., Beloit, Wis., manufacturer of kindred products, and will concentrate production at Detroit. Warner company, however, will continue to operate under present name, as a subsidiary of Fruehauf organization.

Pittsburgh

PITTSBURGH, Dec. 9.—Machine tool business has been quiet so far this month and local dealers do not look forward to much buying before January. A number of the larger lists which have been out are now largely cleaned up and new inquiry is confined mostly to single units. This condition, however, is considered seasonal and it is not thought that buying has been seriously disturbed by uncertain business conditions. Replacements are numerous and local offices are being called upon to furnish many parts for existing equipment.

Railroad buying is not a factor in the market, but a number of the larger carriers have made appropriations which include heavy tool buying and formal inquiry is expected at any time. The Baltimore & Ohio has an inquiry out for some tools on which several dealers are quoting.

Orders for steel mill and other heavy equipment are still reaching local companies and expansion programs announced in the last few weeks will bring additional business. Some companies have orders on their books which will require at least six months for execution and delivery dates are still an important factor in placing business.

Center Foundry & Machine Co., Wheeling, W. Va., will make $50,000 addition to its plant at Warwood, W. Va., which is expected to be completed by Feb. 1. New building to adjoin old plant will be 100 ft. long and will be devoted entirely to molding space. Foundation will be laid by Consolidated Engineering Co. and steel frame will be erected by Wheeling Structural Steel Co., both of Wheeling.

Aluminum Co. of America, Inc., Oliver Building, Pittsburgh, is arranging an expansion program to cost about $32,000,000, divided into fund of $15,000,000 for extensions to plant at New Kensington, Pa., and additions to other plants devoted to fabricating of string alloys from aluminum, including new works in Tennessee; $5,000,000 for expansion in plants given over to production of pig aluminum, and $12,000,000 for development of hydroelectric power for works operation, particularly in Tennessee district.

Firestone Tire & Rubber Co., Akron, Ohio, has asked bids on general contract for three-story factory branch, service and distributing plant at Pittsburgh, to cost about $225,000 with equipment. Lockwood Greene Engineers, Inc., Hanna Building, Cleveland, is architect and engineer.

State Board of Control, Capitol Building, Charleston, W. Va., James S. Lakin, president, is asking bids until Jan. 7 for new vocational training school at West Virginia State College Institute, to cost about $125,000 with equipment.

South Atlantic

BALTIMORE, Dec. 9.—Plans are being considered by Davison Chemical Co., Garrett Building, Baltimore, for two-story addition to commercial fertilizer plant in Curtis Bay district, to cost about $175,000 with equipment. Work will probably begin early next spring.

Leathersteel Products Corporation, John H. Mooney, Garrett Building, Baltimore, president, recently organized to take over and expand company of same name with plant at 173 Long Wharf, Boston, has leased space in local building at Lombard and Frederick Streets. Work has begun on removal of equipment from Boston to new location where production will be concentrated and additional machinery provided for increased output. John I. Peach, Baltimore, is secretary and treasurer of new organization.

Julian P. Friez Co. Division of Consolidated Instrument Corporation, Baltimore Street and Central Avenue, Baltimore, manufacturer of precision instruments, will take bids early next year for three-story addition, to cost about $80,000 with equipment. E. H. Glidden, Jr., American Building, is architect. Headquarters of parent company are at 395 East Forty-seventh Street, New York.

Board of Glynn County Commissioners and City Council, Brunswick, Ga., are arranging for joint airport to cost about $300,000, county and city each to defray one half of sum, to include hangars, repair and reconditioning shops, oil storage and distributing building and other units. F. J. Terras, Brunswick, engineer, has plans.

Board of Trustees, Fort Valley Industrial School for Colored, Fort Valley, Ga., has awarded contract to Aiken & Faulkner, 158 Auburn Avenue, for three-story addition to cost about $75,000. Ludlow & Peabody, 101 Park Avenue, New York, are architects.

Virginia Public Service Co., Charlottesville, Va., is arranging for hydroelectric power plant at Blands Ford, to cost $350,000 with transmission system. Contract for power dam has been let to L. E. Myers Co., 53 West Jackson Boulevard, Chicago.

City Council, Wilson, N. C., is planning extensions and improvements in municipal electric light and power plant, to cost about $300,000 including additional equipment. A bond issue is being arranged.

United States Cold Storage Co., Inc., recently organized, care of A. Epstein, 2001 West Pershing Road, Chicago, engineer, has plans for multi-story cold storage and refrigerating plant at Atlanta, Ga., for which permission recently was secured to take over site now occupied by Atlanta Union Station. It will cost $2,000,000 with machinery. Work will begin early in spring.

Hampton Roads Shipbuilding Corporation, Norfolk, Va., care of S. M. Brandt, Norfolk, attorney and representative, recently organized with capital of $250,000 and 2500 shares of stock, no par value, plans early operation of shipbuilding and repair works in Hampton Roads district. E. E. Gann, Washington, is president.

Page County School Board, Luray, Va., is considering installation of manual

training equipment in new two-story high school to cost about $175,000, for which superstructure will be placed under way at once. Mims, Speake & Co., Luray, are architects.

Cleveland

CLEVELAND, Dec. 9.—Single tool inquiries improved somewhat the past week and the market has a better tone. Some inquiries now coming out, however, are not expected to result in orders before January. Automobile parts manufacturers are busier, some having received large production orders from the Ford Motor Co., and are buying a little additional equipment. One inquiry is for seven turret lathes that will probably be purchased during the week. The Electric Auto-Lite Co., Toledo, is buying machine tools for its plant extensions. The press market, which has been slow the past few weeks shows improvement as manufacturers are now getting quite a few single tool inquiries.

Standard Oil Co. of Ohio, East Ohio Gas Building, Cleveland, is arranging an expansion program to cost $2,750,000, including additions in oil refineries and oil storage and distributing plants, and installation of new equipment.

Libbey-Owens Glass Co., Toledo, Ohio, has work under way on a continuous grinding unit to cost more than $2,500,000 with machinery. When completed, rotary grinding operations at plant will be discontinued.

Sherwin-Williams Co., Canal Road, Cleveland, manufacturer of paints, varnishes, oils, etc., is planning an expansion program representing a total investment of $1,500,000. Work will include addition to local plant to cost $450,000 with equipment; extensions in branch plant at Coffeyville, Kan., to cost about $300,000 with equipment; new storage and distributing plant at Chicago, and additions and improvements in plant at Newark, N. J., to cost $520,000; remainder of fund will be used for expansion in other parts of country.

Ice & Fuel Co., 1421 West Federal Street, Youngstown, will take bids in January for two-story ice-manufacturing plant to cost about $170,000 with machinery. George B. Bright, 2615 Twelfth Street, Detroit, is architect and engineer.

Pennsylvania-Ohio Power & Light Co., 25 East Boardman Street, Youngstown, is arranging for extensions and improvements in plants and system in eastern Ohio and western Pennsylvania, totaling $3,750,000 with equipment. C. S. McCalla is vice-president and general manager.

Indiana

INDIANAPOLIS, Dec. 9.—Fort Wayne Rolling Mills Corporation, 1701 McKinley Street, Fort Wayne, has plans for a one-story unit, 60 x 250 ft., to cost about $100,000 with equipment. Abel-Howe Co., 53 West Jackson Boulevard, Chicago, is engineer.

Josam Mfg. Co., Second and Canal Streets, Michigan City, manufacturer of iron pipe drains, unions, etc., will soon take bids on general contract for a one-story addition. Ahlgrim & Boonstra, Warren Building, are architects.

Packard Fort Wayne Co., 415 West Creighton Avenue, Fort Wayne, local representative for Packard automobile, has plans for one-story service, repair and sales building, to cost about $100,000 with equipment. Pohlmeyer & Pohlmeyer, Central Building, are architects.

In connection with expansion program to cost about $3,500,000, previously announced, Auburn Automobile Co., Auburn, will make extensions in plant of Limousine Body Co., Kalamazoo, Mich., a subsidiary, to cost over $100,000 with equipment.

United States Corrugated Fibre Box Co., 1315 Martindale Avenue, Indianapolis, has superstructure under way on one and two-story and basement plant, to cost about $200,000 with machinery. Work is also in progress on one-story storage and distributing plant, 160 x 160 ft., on adjoining site, to cost about $65,000. Charles E. Bacon, Odd Fellows Building, is architect.

Firestone Tire & Rubber Co., Akron, Ohio, has awarded general contract to Shelby Construction Co., Shelbyville, for one-story factory branch, service and distributing plant at Kokomo, to cost about $100,000 with equipment. Bishop, Knowlton & Carson, 3112 North Meridian Street, Indianapolis, are architects.

Service Products Corporation, 201 South Rural Street, Indianapolis, manufacturer of fans, sheet metal stampings, etc., has awarded general contract to Charles J. Wacker, 3228 Central Avenue, for one-story addition, 132 x 150 ft., to cost about $65,000 with equipment.

Anaconda Wire & Cable Co., Anderson, Ind., has started work on an addition, 90 x 200 ft.

St. Louis

ST. LOUIS, Dec. 9.—Johnston Tin Foil & Metal Co., 6106 South Broadway, St. Louis, will soon take bids on general contract for two-story addition, to cost about $45,000 with equipment. C. F. Deitering, Central National Bank Building, is architect. W. H. McIntyre is head of company, in charge.

Koken Companies, Inc., 3400 Morganford Road, St. Louis, manufacturer of enameled iron barber chairs and kindred products, has awarded general contract to William H. & Nelson Cunliff Co., 3327 Lindell Boulevard, for one-story addition, 80 x 100 ft., to cost $40,000 with equipment.

City Council, Ponca City, Okla., has plans for hangar, 125 x 210 ft., with repair and reconditioning facilities, at municipal airport, to cost over $65,000 with equipment. Part of unit will be used for administration service. E. O. Bennett, 1127 South Seventh Street, is engineer.

Missouri Natural Gas Co., 1107 Olive Street, St. Louis, is planning construction of pipe line from Poplar Bluff, Mo., to connection with trunk line of Mississippi River Fuel Corporation, to cost over $300,000 with booster stations and auxiliary equipment. J. A. Milner is construction engineer for company.

Protective Metals Co., Sand Springs, Okla., is considering plans for new one-story sheet metal plant, to cost over $80,000 with equipment.

Missouri-Pacific Railroad Co., Railway Exchange Building, St. Louis, is considering a new local engine terminal and repair shops near Nicholson and Topping Avenues, to cost about $600,000 with equipment. Appropriation will be arranged in 1930 budget. E. A. Hadley, address noted, is chief engineer.

Cities Service Oil Co., Tulsa, Okla., has awarded general contract to Hercules Construction Co., Wainwright Building, St. Louis, for one-story storage and distributing plant at 4226 Chippewa Street, St. Louis, to cost about $45,000 with equipment.

State Board of Administration, State House, Topeka, Kan., Harry Rhodes, business manager, plans call for bids on general contract early in January for two-story and basement industrial building at State School for Deaf, Olathe, 50 x 100 ft., to cost about $40,000 with equipment. Charles D. Cuthbert, State House, is architect.

Oklahoma Sash & Door Co., East Grand Street, Oklahoma City, Okla., is considering erection of new two-story millwork factory, to cost over $100,000 with equipment. Tools will be electrically operated.

In connection with an expansion program to cost $10,811,000, St. Louis-San Francisco Railway Co., plans new yards and shops at Springfield, Mo., to cost $1,856,000 with equipment.

Great Western Cold Storage Co., Oklahoma City, Okla., has leased building to be erected at Reno Street and Webb Avenue, four stories, 130 x 200 ft., for new cold storage and refrigerating plant, to cost $325,000 with machinery. John J. Harden, Petroleum Building, in charge.

Chicago

CHICAGO, Dec. 9.—Most promising among new developments in this market is a list for about $250,000 worth of machine tools soon to be issued by the Illinois Steel Co. Another industrial list expected at an early date is one from the Allis-Chalmers Mfg. Co. for its tractor plant additions at Milwaukee, and Springfield, Ill. Railroads are slow in making purchases against recent requests for prices on individual items. However, sellers judging by figures requested for budgeting purposes, anticipate a substantial volume of business from the railroads in 1930. It seems likely also that farm equipment manufacturers will buy needed machine tools in larger quantities. Sales the past week were widely scattered and in about the same volume as in late November.

Chicago, North Shore & Milwaukee has plans for car and electric locomotive shops at Waukegan, Ill., to cost $1,000,000. General coach and freight car yards will also be established.

Albertson & Co., Sioux City, Iowa, manufacturers of electric drills and bench grinders, are planning expansion which will increase production 50 to 100 per cent.

Dallas Brass & Copper Co., 6600 West Grand Avenue, Chicago, is planning two one-story additions, to cost about $900,000 with equipment. Company is completing several new units, including engineering building and machine shop, 112 x 161 ft.; addition to brass rolling mill, 125 x 239 ft.; and wood-working shop, 62 x 160 ft. C. D. Dallas is president.

Commonwealth Edison Co., 72 West Adams Street, Chicago, has plans for two and three-story automatic power substation, to cost about $100,000 with equipment, and another substation to cost about $50,000. Company engineering department is in charge.

Mid-West Canning Corporation, De Kalb, Ill., is considering new multi-story plant at Genoa, Ill., to cost about $300,000

with machinery. Company is now operating a branch factory at Rochelle, Ill.

Iowa Public Service Co., Fort Dodge, Iowa, is contemplating power plant at Audubon, Iowa, using Diesel oil-burning engine unit, to cost about $100,000 with equipment.

Board of Education, Le Sueur, Minn., is considering installation of manual training equipment in new two-story and basement high school to cost $150,000, for which plans will be drawn by George Pass & Son, Eckle Building, Mankato, Minn., architects.

Holly Sugar Corporation, Colorado Springs, Colo., is considering rebuilding storage and distributing plant at Torrington, Wyo., recently destroyed by fire with estimated loss over $450,000, exclusive of stock.

Minneapolis Threshing Machine Co., Hopkins, Minn., is contemplating a one-story factory branch and distributing plant at Grand Forks, N. D., to cost about $30,000 with equipment.

Viking Pump Co., Cedar Falls, Iowa, plans immediate erection of a two-story addition, 52 x 152 ft.

Electrical Coal Mining Machinery Co., 309 St. John's Court, Chicago, has secured a site at Danville, Ill., and contemplates erection of a new plant and removal to new location. Company is planning to add to its line of products.

Cincinnati

CINCINNATI, Dec. 9.—While demand for planers and other heavy types of machine tools is lagging somewhat, improvement in orders for lathes and lighter tools are noted. In fact, fresh bookings the past week were much greater than in the preceding two or three weeks. Production in all lines continues at a high rate and no change, at least for the remainder of this year, is anticipated.

The Russian Government has placed an order with a local manufacturer for ten standard lathes of various sizes and a New York company purchased three large lathes.

Bids will be received until Dec. 20 by Board of County Commissioners, Court House, Cincinnati, for automobile service, repair and garage building, and additions to power house and mechanical laundry at County institution, to cost more than $90,000 with equipment. Samuel Hannaford & Sons, Dixie Terminal Building, are architects.

Fyr-Fyter Co., 221 Crane Street, Dayton, Ohio, manufacturer of fire extinguishers, is considering erection of three-story addition, to cost over $85,000 with machinery.

Board of Education, Waverly, Ohio, is considering installation of manual training equipment in new high school to cost about $150,000, for which plans will be drawn by DeVoss & Donaldson, Hollywood Theater Building, Portsmouth, Ohio, architects.

Louisville Gas & Electric Co., Louisville, is arranging an expansion and improvement program to cost $4,950,000, including transmission lines, distributing systems and other work.

Manchester Lime Co., Manchester, Tenn., has plans for two-story storage and distributing plant to cost about $40,000 with mechanical-handling and other equipment. P. A. Stiver is one of heads of company in charge.

Kurz-Kasch Co., South Broadway, Dayton, Ohio, operating a plastic molding works, has awarded general contract to J. C. Gohn, Callahan Bank Building, for one-story addition, 90 x 120 ft., including improvements in present factory, to cost about $50,000 with equipment.

Kentucky Utilities Co., Louisville, operating electric light and power properties, will increase capital from $30,000,000 to $35,000,000, about $2,000,000 of fund to be used for extensions and improvements in generating and distributing plants and system.

Board of Education, Philo, Ohio, is considering installation of manual training equipment in new two-story and basement high school to cost about $300,000, for which plans will be prepared by Richards, McCarty & Bulford, 584 East Board Street, Columbus, Ohio, architects. Bids on general contract will be asked in about 60 days.

Standard Oil Co. of Kentucky, Inc., West Bloom Street, Louisville, is planning extensions and improvements in oil storage and distributing plant in Riverside section, Savannah, Ga., to cost $100,000 including equipment.

Cincinnati-Bickford Tool Co., 3148 Forrer Street, Cincinnati, has awarded general contract to Edwards Mfg. Co., Fifth and Culvert Streets, for one-story addition.

Milwaukee

MILWAUKEE, Dec. 9.—Inquiry and orders for machine tools in this territory show substantial increases and business is reported a little better than normal for the season. The automotive industry is gradually increasing production, and many manufacturers of parts and accessories, especially for trucks and tractors, are well booked for this time of year. Some expansion programs, involving construction of new plants, are scheduled to start in March, but machinery needs are not yet available.

Allis-Chalmers Mfg Co, Milwaukee, has received bids for a one-story addition, 200 x 350 ft., for its Monarch tractor division, at Springfield, Ill., with crane runway and railroad siding. Klug & Smith, engineers, Mack Block, Milwaukee, are in charge.

Wrought Washer Mfg Co, Milwaukee, has moved its subsidiary, Universal Tool & Die Co., into new two-story building at Barclay and Washington Streets, costing $85,000 with new equipment, and will invest $500,000 in rebuilding plant formerly occupied by Beaver Mfg Co., Chase and Oklahoma Avenues, for rerolling mill, raw material storage and shipping facilities.

School District No. 1, White Fish Bay, Milwaukee post office, has appointed M. Tullgren & Sons Co., architect, 20 Prospect Avenue, Milwaukee, to draw plans for new high school, 250 x 520 ft., costing $1,000,000, to include two manual training shops. H. S. Rogers, 230 Birch Avenue, White Fish Bay, is director.

Board of Vocational Education, Racine, Wis., has plans by Frank J. Hoffman, architect, Janes Block, for first unit of new vocational training school, three stories, 68 x 128 ft., to cost about $400,000 with equipment. T. S. Ress, Third Street and Lake Avenue, is director.

Board of Education, South Milwaukee, will rebuild vocational training school destroyed by fire Dec. 2. Site has not been selected. H. Daehling is secretary of board.

Board of County Supervisors, Waukesha, Wis., has appropriated $38,000 for erection and equipment of a new light and power plant at County asylum. William Koheler is County clerk.

Gillette Rubber Co., Eau Claire, Wis., has begun construction of a one-story addition, 56 x 146 ft., to its machine shop. Hoeppner-Bartlett Co., 414 East Grand Avenue, is general contractor.

Layne-Northwest Co., 1023 Wells Street, Milwaukee, has been organized to handle northwestern business of Layne & Bowler, Memphis, Tenn., manufacturer of turbine pumps and other deep-well equipment.

Gulf States

BIRMINGHAM, Dec. 9.—Black Diamond Coal Co., Birmingham, has authorized immediate installation of new mechanical washery at coal mines at Whitwell, Tenn., recently acquired, to cost about $45,000 with equipment.

American Service Co., 705 Walnut Street, Monroe, La., has plans for new ice-manufacturing plant at West Monroe, 100 x 125 ft., to cost about $100,000 with machinery.

Cage Hardware & Implement Co., Chaparral Street, Corpus Christi, Tex., has awarded general contract to T. A. Applewhite, Corpus Christi, for one-story storage and distributing plant, 100 x 140 ft., to cost about $30,000 with equipment. T. W. Crow, Corpus Christi, is architect.

Southwestern Gas & Electric Co., Shreveport, La., is arranging an expansion program to cost about $4,000,000, including additions in generating and transmission facilities in Texas, Louisiana, Mississippi and Arkansas.

Swift & Co., Union Stock Yards, Chicago, have begun superstructure for a one-story plant at Birmingham, on site, 125 x 200 ft., to cost more than $75,000 with equipment.

Rio Grande Oil Co., 225 East Seventh Street, El Paso, Tex., is considering a new refinery, with capacity of about 3000 bbl. per day, to cost over $750,000 with machinery. A large part of plant will be devoted to production of lubricating oils.

City Council, Tampa, Fla., is contemplating construction of hangars, repair shops, oil storage and other field units for new municipal airport, for which a bond issue of $750,000 has been approved. City engineering department is in charge.

Southern Natural Gas Co., First National Bank Building, Birmingham, is arranging for expansion to cost about $7,700,000, large part of fund to be used for pipe line construction in Alabama, Georgia and other States, with new compressor stations and auxiliary structures.

East Coast Refrigeration Co., Lake Worth, Fla., has plans for new two-story refrigerating and precooling plant, 65 x 120 ft., primarily for railroad car service, to cost about $85,000 with equipment. Daniel C. Smith is secretary.

Marion County Power Co. of Florida, recently organized, care of Scott B. Appleby, Jr., 2501 Thirtieth Street, N. W., Washington, has engaged Emmett S. Killebrew, Cordele, Ga., consulting engineer, to prepare plans for hydroelectric power project on Ocklawaha River, Florida, to cost more than $850,000 with transmission system.

Board of Education, El Paso, Tex., is considering installation of manual train-

ing equipment in new two-story and basement high school to cost about $285,000, for which bids are being asked on general contract until Dec. 17. Guy L. Fraser, Martin Building, and Braunton & McGhee, First National Bank Building, are associated architects.

Martin J. Insull, president of Middle West Utilities Co., 72 West Adams Street, Chicago, and associates have acquired controlling interest in Pecos Valley Power & Light Co., operating at Girvin, Tex., and in oilfield districts in western part of State. Company will be consolidated as unit of Middle West Utilities Co. and expansion carried out, including transmission lines.

Wichita Falls Motor Co., 802 Louisiana Street, Houston, Tex., manufacturer of motor trucks, with plant at Wichita Falls, Tex., has acquired building at Lamar and Chenevert Streets, Houston, for factory branch, service and sales building. Repair and parts division will be installed.

Pacific Coast

SAN FRANCISCO, Dec. 5.—Pacific Electric Mfg. Co., 5815 Third Street, San Francisco, manufacturer of electrical specialties, has asked bids on general contract for one-story addition, to cost $50,000 with equipment. R. E. McLane, address noted, is company engineer.

Board of Education, Seattle, plans installation of manual training equipment in one and three-story James Monroe junior high school to cost $600,000, for which bids are being asked on general contract until Dec. 18. F. A. Naramore, Central Building, is architect.

Pacific Gas & Electric Co., 245 Market Street, San Francisco, has plans for new steam-operated electric generating plant near Modesto, to cost about $200,000 with equipment. This will be first of three such stations to be constructed in this vicinity. Company engineering department is in charge.

Hood River Canning Co., Hood River, Ore., has asked bids on general contract for new two-story and basement plant, 100 x 100 ft., in St. Johns industrial district, Portland, where operations will be transferred following recent fire loss at Hood River. New plant will include a cold storage and refrigerating unit, and will cost about $75,000 with equipment. Richard Sundeleaf, Guaranty Building, Portland, is architect.

Crown Zellerbach Corporation, San Francisco, has begun expansion at pulp and paper mill of Crown Willamette Paper Co., Camas, Wash., a subsidiary, to cost over $500,000.

Readymix Concrete Co., 575 Berry Street, San Francisco, has revised plans for new plant, to cost $100,000 with equipment. L. H. Nishkian, 525 Market Street, is engineer.

Puritan Ice Co., Lompoc, Cal., plans one-story ice-manufacturing plant, to cost $90,000 with machinery.

Victor Talking Machine Co., North Sycamore Avenue, Los Angeles, subsidiary of Radio Corporation of America, Inc., New York, has filed plans for one-story addition, 90 x 160 ft., to cost about $80,000 with equipment.

Board of Education, Santa Barbara, Cal., has plans for a one-story manual training shop, to cost about $25,000 with equipment. Soule, Murphy & Hastings, 116 East Sola Street, are architects.

Foreign

PLANS have been approved by Phillips Glow Lamp Co., Amsterdam, Holland, for increase in capital from 100,000,000 to 250,000,000 guilders (about $40,000,000 to $100,000,000) part of proceeds to be used for plant expansion and for purchase of other companies in same line.

Secretary, Port and Telegraph Department, Wellington, New Zealand, is asking bids until Jan. 21 for 40 precision tension gages for measuring contact pressure of relay springs, etc., complete with sector-shaped scale.

General Electric Co., Schenectady, N. Y., is considering immediate erection of new plant at Monterey, Mexico, for manufacture of incandescent lamps, to cost about $400,000 with equipment.

A company at Verona, Italy, has plans for a new cold storage and refrigerating plant, including precooling facilities for freight car service, to cost about $260,000 with machinery. Information at office of Bureau of Foreign and Domestic Commerce, Washington, reference Italy No. 97352.

Barry, Ostlere & Shepherd, Kirkcaldy, Scotland, manufacturers of linoleum, have acquired 20-acre tract at Farnham, Que., as site for Canadian branch plant, with steam power plant, machine shop and auxiliary mechanical structures, to cost over $1,500,000 with machinery.

Officials of Julius Kayser & Co., 353 Fourth Avenue, New York, have organized Julius Kayser & Co., Ltd., of Australia, a subsidiary, to construct and operate a textile mill at Melbourne, Australia, to cost over $350,000 with machinery. Australian Knitting Mills, Melbourne, are interested in enterprise.

New Trade Publications

Arc Welding of Pipe Lines.—Lincoln Electric Co., Cleveland. 12-page folder describing methods of welding, inspection, and test found satisfactory on 17 lines totaling 2491 miles.

Roebling Welding Wire.—John A. Roebling's Sons Co., Trenton, N. J. Broadside illustrating notable construction work fabricated by use of this product.

Wire Cloth and Wire Screens.—Ludlow-Saylor Wire Co., St. Louis. A 36-page booklet gives complete reference data on double-crimped wire cloth and woven wire screens. Illustrations show filter presses, revolving screens, sifters, vibrating screens, driers, strainers, pulverizers and grinding mills, the operation and output of which are controlled with wire cloth and woven wire screens. There are 50 or more extra-heavy screens which have the wire diameter actually larger than the nominal opening between wires.

Fire Brick.—Laclede-Christy Clay Products Co., St. Louis. A four-page folder, issued in the form of a Thanksgiving proclamation, sets forth testimonials by various users of this company's fire brick.

Motor Controller.—Monitor Controller Co., Baltimore, Md. Bulletin 115 of eight pages illustrates and describes an automatic magnetic-reversing, dynamic braking controller for d. c. motors. Approximate weight is from 240 to 275 lb. and average rating 5 hp. or under to 15 hp.

Arc-Welding Sets.—General Electric Co., Schenectady, N. Y. Four-page folder illustrating and describing constant-potential arc-welding sets, suitable for furnishing power to a number of welding stations and for operating automatic-welding equipment. Standard sizes are 400, 500, 750, 1000 and 1500 amperes at 60 volts.

Chamfering Machine.—City Machine & Tool Works, Dayton, Ohio. Four-page folder illustrating and describing new air-equipped Peerless tooth chamfering machine. Base area is 26 in. x 36 in.; spindle speed, 1600 r.p.m.; net weight, 1800 lb.

Metal Paint Primer.—Liquid Metal Products, Inc., 231 South La Salle Street, Chicago. Sixteen-page illustrated pamphlet, outlining uses of Stibloy, a metal compound in liquid form, developed to extend the life of galvanized surfaces. The compound is described as a primer which holds paint, enamel and lacquer tenaciously, permitting the immediate painting of new galvanized steel.

Steel Products.—United States Steel Corporation, 71 Broadway, New York. Fifty-two page book, listing the corporation's subsidiaries, their offices, products and publications.

Spot-Welding Electrodes.—Fansteel Products Co., North Chicago, Ill. Folder describing "Truxeit," a material for electrodes made of copper hardened with tungsten, said to be tough, heat resistant and strong at high temperatures.

Recording Pyrometer.—Wilson-Maeulen Co., Inc., 383 Concord Avenue, New York. Catalog of 8 pages, illustrating and describing potentiometer recording pyrometer for temperature measurement with great width of chart, which permits very close reading. Scale ranges available reach maxima of 200 to 3000 deg. Fahr.

Continuous Centrifugal.—Elmore Centrifugal Products Corporation, 6527 Manchester Avenue, St. Louis. Four-page folder illustrating and describing continuous centrifugals with capacity up to 100 tons an hour. They are capable of deliquefying solid materials from over 20 per cent to 2½ per cent.

Heating and Ventilating.—General Iron Works Co., Cincinnati. Bulletin of 30 pages showing various installations of Hot-Kold system for heating and ventilating and humidifying control. Built in several sizes suitable for home or industrial plants, it is operated by gas.

Apparatus Insulators.—Westinghouse Electric & Mfg. Co., East Pittsburgh. Circular 1858, describing outdoor apparatus insulators which have application for assembling switchgear apparatus, such as bus supports, disconnecting switches, etc. Complete information and test data on company's complete line are included.

Automatic Welding Head.—General Electric Co., Schenectady, N. Y. Four-page folder illustrating and describing an automatic welding head and control with magnetic clutch. Distinctive features are simplicity, sensitivity, thorough lubrication, uniform operation, strong construction and interchangeability.

Precision Measuring Instruments.—S. F. Bowser & Co., Inc., Fort Wayne, Ind. A folder issued by this company describes the Xacto Meter, a precision meter for measuring the amount of

liquid passing through a pipe line by positive volumetric displacement.

Sand Blast and Dust Collecting Equipment. — Pangborn Corporation, Hagerstown, Md. A folder entitled "The Quarter Century Mark" tells of the twenty-fifth anniversary of the company and shows some of the industrial companies which have installed its equipment.

Centerless Grinders.—Cincinnati Grinders, Inc., Cincinnati. A new booklet giving a full description of the No. 3 and No. 4 Cincinnati centerless grinders has been published. Many views of the machines in operation are shown. The company also has issued a bulletin featuring automatic hoppers for Cincinnati centerless grinders.

Arc Welders.—Lincoln Electric Co., Cleveland. A series of specification sheets in bulletin form, describing the 300-ampere "stable-arc" welder in its various forms, driven by direct or alternating current motor or by gas engine, mounted on skids or on wheels.

Conveyor Furnace.—General Electric Co., Schenectady, N. Y. Four-page folder illustrating and describing a mesh-belt conveyor furnace, rated 45 kw., 220 volts, single-phase; conveyor 16 in. wide and 6 ft. long. Capacity is 300 lb. an hour at 1600 deg. Fahr.

Counterbores, Multiple-Operation and Other Tools.—Gairing Tool Co., 1629 Lafayette Boulevard, Detroit. Catalog No. 20, 124 pages, 8½ x 11 in. Describes and illustrates standard interchangeable counterbores, holders and pilots; adjustable extension holders; counterbore sets; back spot facers; offset spotfacing heads; core drills; and reamers, including nose drive type. Swing tool boring heads, multiple-operation tools of both inserted blade and solid type; form cutters, hollow mills and grinding fixtures are among other tooling shown. List prices are given in a separate section, and pages are devoted to interesting applications of standard and special tools. A section is devoted to useful information.

Bus-Bar Supports. — Westinghouse Electric & Mfg. Co., East Pittsburgh. Circular 1825, dealing with Type H bus-bar supports for indoor use. Both standard-duty and heavy-duty supports are treated, with special details of construction, distinctive features and fittings.

Shape Cutting Machine. — General Welding & Equipment Co., Boston. Folder describing oxy-gas automatic shape cutting machine for fabrication of parts from welded structural steel and plate, and illustrating some of the applications.

Oxwelded Piping.—Linde Air Products Co., New York. 24-page booklet illustrating various applications of the welded pipe joint in industrial services and for domestic, office and factory heating systems.

Airplane Fuselage Welding.—Linde Air Products Co., New York. 8-page folder outlining an instruction course for apprentice welders on thin-walled alloy steel tubing and duralumin.

Railroad Electrification. — Westinghouse Electric & Mfg. Co., East Pittsburgh. Publication 1857, describing electrification of Great Northern Railway. Among topics discussed are distribution system, locomotives, operation of system and maintenance of locomotives and equipment.

The Week's News Quickly Told

Current Events That Bear on the Course of Business

CONFIDENCE has been reestablished in all major industries, President Hoover said in his annual message, and he believes that wage rates and agricultural prices will be maintained . . . Industrial leaders met with him in Washington to form a temporary organization to encourage continuity of construction and maintenance work and to remove fear of unemployment.

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EXPENDITURES of the national Government next year will pass four billion dollars for the first time since 1921, the expected needs of the Federal Farm Board being responsible for much of the increase over this year, although gradually rising costs in all lines are expected by the President . . . The Treasury refunds its short time obligations at 3⅛ per cent; the last offering was taken at 4⅞ per cent a few months ago.

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SURPLUS of receipts over expenditures next year, Secretary Mellon estimates, will be $226,000,000, and he said that it "justifies a revision of our tax laws downward" . . . A resolution reducing income taxes is passed by the House of Representatives . . . Philadelphians will pay a 2.71½ tax rate next year instead of 2.79.

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RETAIL trade, woolen goods, and both hard and soft coal trades have benefited greatly by the continuing and widespread cold weather . . . The two leading Chicago mail-order houses report November sales 17 and 21 per cent better than a year ago . . . "A & P" stores, 15,000 in number, sold over one billion dollars worth of groceries and meats during the last 12 months; net profit on turnover was 2½ per cent.

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COMMODITY prices continue their slow rise, but wholesale and jobbing trades are very slow . . . Leather prices are decreasing; tanneries in the Central States are engaging in a price war . . . Shoe buying for spring is active.

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INSOLVENCIES during November were the third lowest in number of all years since 1921; gross liabilities, however, were higher than last year . . . Fox film interests passed from personal control to that of board of trustees representing firms holding $27,000,000 of promissory notes issued for new theaters and for "talkie" installations.

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PETROLEUM output again increases. American Petroleum Institute blames refineries for continuing to produce at a rate faster than gasoline can be sold . . . Sir Henry Deterding of the Royal Dutch Shell interests proposes an international understanding to prevent overproduction, but American producers do not approve his project . . . Cheap tanker rates on crude and decline in Pennsylvania production are responsible for conversion of a trunk line carrying oil eastward into a gasoline pipe bearing refined product westward from the Atlantic seaboard . . . Standard Oil Co. is building three semi-commercial production units to perfect manufacture of gasoline from hitherto unusable asphaltic residues by a hydrogenation process.

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NATURAL gas lines leading from Monroe, La., northward to St. Louis and eastward to Birmingham, commence delivery of about 150,000,000 cu. ft. daily . . . Drilling in five localities near Washington, Pa., increases the daily gas production of that region by 15,000,000 cu. ft.

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FORD Motor Co. increases minimum wage to $7 a day, and all salaried and hourly rates about 5 per cent . . . Employment gains somewhat in Detroit, as next year's models get into production . . . Total production of American cars during 1929 will reach 5,600,000 units; about 1,000,000 more than last year and considerably more than automobile executives are predicting for 1930 . . . Chrysler show rooms in New York are exhibiting extensive line of radios, thus endeavoring to maintain sales organizations during slack months . . . General Motors asks the French Government to revise its appraisal policy so that imported cars will be valued for duty purposes at retail price less selling cost. Duty is 45 per cent; nevertheless about 4000 American cars are imported annually, and about 10,000 Fords are assembled in that republic.

* * * * *

UNIFICATION of all rail, subway and motor bus transportation in the London area under Government ownership and private operation is the aim of Premier MacDonald—a plan branded as "socialistic" . . . An order imposing a 5-cent fare on the Los Angeles trolley system is nullified by the Supreme Court . . . After a 6-year trial of a basic 5-cent fare, during which time the earnings fell $3,300,000 below a 7 per cent return, the New Jersey Public Service lines are authorized to charge a 10-cent basic fare for casual riders for an experimental period.

* * * * *

MARINES were dispatched to Haiti to reinforce the 700 on duty there and to help to subdue rioting. President Hoover asked for a Congressional commission to study conditions on the island and formulate recommendations for future action . . . Secretary Stimson was joined by European powers in sending notes to Russia and China calling for cessation of hostilities in Manchuria, an action resented by the Soviet Government. A mutually satisfactory armistice is reported, however . . . Construction of the remaining three of the first five cruisers of the naval program will be delayed until after the limitations conference at London, but funds are provided in the budget for completing all of them by June, 1933.

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Thorough Studies Lower Shop Costs

Review of All Problems Incidental to Production Costs Necessary—Bonus, Premium or Other Wage Incentive Not Always the Only Cure

BY CRIS BERG*

DEFINITE benefits accruing from rational application of a bonus or premium system of paying for work done are outlined in this article. Specific analyses for three separate departments show similar, but unequal, gains in daily output. But these are not haphazard results; they accrue as the reward of a thoroughgoing study of the problem for each individual operation and for the shop as a whole.

IN many instances efforts made to reduce costs are not in themselves sufficiently broad and complete to attain results which are possible. Further, it often happens that an accomplishment of a reduction in cost is taken as a finality, without regard to a thorough coordination of men, methods and machines through which further lowering of cost may be possible. It is manifestly unfair to the equipment manufacturer if the whole burden of cost reduction is placed on his machine, when at the same time the flow of material, instructions to employees and other unfavorable conditions virtually strangle the machine, and keep it from doing work in the manner and in the quantity for which it was designed.

Wage incentive schemes or plans, whether piece work or bonus, cannot be considered as cure-alls for all of the evils of high cost of production. First of all it is necessary that the wage incentive be applied on the basis of studies which should follow the correction of miscellaneous factors, all of which will have an important bearing on whether or not the net outcome of the wage incentive plan will be successful.

How One Concern Attacked the Problem

Three tables herewith show data prepared from three departments in one manufacturing concern. It will be noted that, in the cases of the foundry and the machine shop, comparisons are drawn between wage incentive plans and day work. In the case of the structural shop the comparison is between a new premium system and an old premium plan. In each case the new plan, figures for which are given in the right-hand columns of the tables, on the following pages, was put into use only after studies of the entire shop problem.

The old-style premium system in the structural shop had been put into use without study of surrounding conditions. Consequently the average saving resulting from the new plan was higher in the case of the structural shop than in either the machine shop or the foundry, where day work had continued in practice. This demonstrates the need for a complete study of shop conditions, and also shows the fruitlessness of applying wage incentives without first rectifying as many as possible of the bad practices which tend to offset the advantages of a wage incentive scheme.

Thorough Study Is Essential

Thus the problem resolves into one of adequate and thorough study of all conditions which have a bearing on manufacturing cost. It often extends beyond the shop doors to the stockroom, and even to the clerical force in the office. Any accomplishment in the way of cost reduction should be taken as an incentive to search further under the assumption that work of this character is never finished.

There remains only to find the way which leads to still lower manufacturing cost. Sometimes this is accomplished by the purchase of new equipment; often by speeding old machines; by the rearrangement of manufacturing units; wage incentives; handling of orders and materials, and by a proper method of routing. Always, however, the best results are obtained when all the above factors are developed as far as possible, and so synchronized that one is an aid to the other.

Finding the "Neck of the Bottle"

FROM a plant where new equipment recently was installed, with the expectation that no further effort would be necessary to increase production and to cut cost,

*Consulting engineer, Chicago.

Table I.—Gray Iron Foundry Work

Kind of Piece	Weight of Casting per Piece	Day Work: No. of Pieces	Day Work: Time in Hours per Piece	Piece Work: No. of Pieces	Piece Work: Time in Hours per Piece	Increase in Production, Per Cent
Stands	20 lb.	15	0.70	15	0.50	40
53-in. gear	500 lb.	1	6.00	1	4.00	50
56-in. gear	900 lb.	1	9.00	1	4.50	100
End castings	30 lb.	15	0.40	15	0.24	66
Worms	40 lb.	6	0.33	10	0.20	65
Plunger	330 lb.	2	3.50	2	2.20	59
Drum	350 lb.	12	4.00	12	2.00	100
Frame	100 lb.	6	1.70	10	1.00	70
Core work—rollers	18 lb.	200	0.18	200	0.11	64
Core work—clutch	238 lb.	2	1.00	2	0.50	100
*Total and average			136.68		78.20	75

*Based on number of pieces in day-work column.

the following illustration is taken. The burden was placed wholly on the new equipment. Neither effect was realized except in a small way, because the flow of material formed the neck through which, without readjustment, greater production was impossible.

A new drying oven was installed, with many distinctive improvements over the old ovens. Ahead of the oven were two chain conveyors, the first one feeding to the second, which carried the product through the oven. After trial operation of many weeks, the only benefit derived was that of lower fuel cost. The oven could not be worked at capacity, simply because the conveyor was not loaded heavily enough. The conveyor could not be fully loaded because raw material did not move from the storeroom to the manufacturing department in properly proportioned lots. The stores department was to blame only in part, because the order department took no recognition of the problems involved in the actual manufacture of the product.

It was the practice of the order department to tabulate incoming orders until an (arbitrarily assumed) sufficient number of pieces of each kind had accumulated so that an order should be given to the shop. When this stage had been reached an order was issued on the factory, by way of the material storeroom. There the storekeeper, without a knowledge of shop conditions, used hit-and-miss judgment in sending material to the shop. He often separated items on an order, sending first to the shop that material which was easiest for him to handle or to take from stock.

The results were two-fold. Work went through the shop in slugs, and parts of an order often remained in the storeroom for a month, delaying shipment of the complete order far beyond even the unnecessarily long time required to get the first part of the order through the shop. This unsystematic method of handling orders and materials, which resulted in the unbalanced loading of the conveyors, so hampered this plant that it was able to ship finished products on only about one-half of the working days in each week.

Correcting Bad Conditions

The remedy was simple. The expenditure for the new oven having already been made, the only further outlay necessary was a few hundred dollars whereby the two conveyors were mechanically adjusted to cover all necessary conditions of loading. There was established also a scheduling department which was responsible for loading of the conveyor so that a properly correlated assortment of parts passed through the oven each day. This solved the problem in the shipping room, from which finished materials started to move every day.

Purchase orders are now forwarded without delay to this scheduling department. There an analysis is made and material is ordered out of stores in such quantity and in such sequence that the conveyor will neither be clogged nor only partly loaded. The schedule is such that finished parts will reach the shipping department in such quantity and assortment that orders may be promptly filled and promises of delivery kept.

As a result of the new management methods, the oven exceeds the rating given it by its manufacturer. Above all, the output of the shop was more than doubled, with only a small increase in labor needed to load and unload the conveyors.

Three Departments Show Large Gains

CONDITIONS similar to the above are not confined to any one phase of manufacturing. Recently a 76 per cent increase in production was made possible in the jobbing foundry referred to in an early paragraph simply by rearrangement of working space and equipment and installation of a wage incentive. Before changes were made the men were paid by the day. Molding machines were available, but they were poorly located with respect to the shop as a whole. Molders, after having finished a job, left the floor in search of a new one and the pattern necessary for it.

One of the first steps taken to revamp methods in this foundry was to study the flask situation. The assortment was, generally speaking, satisfactory for the run of work at hand. However, the storage space was unhandy with respect to the molding floor and flasks were piled with no regard to type or size. Hence much expense was incurred in sending them to storage, digging out the flask needed and again returning it to the shop. A handy storage space and orderly stacking overcame this difficulty.

Table II.—Machine Shop Work

Kind of Piece	Day Work: No. of Pieces	Day Work: Machine Used	Day Work: Time in Hours per Piece	Piece Work or Premium Work: No. of Pieces	Piece Work or Premium Work: Machine Used	Piece Work or Premium Work: Time in Hours per Piece	Piece Work or Premium Work: Piece Work or Premium Work	Per Cent Increase in Production
43-in. cast steel gear with clutch ring	4	Vert. boring mill	12.00	1	Vert. boring mill	5.20	Piece work	130
30-in. cast iron brake wheel	2	Vert. boring mill	6.30	1	Vert. boring mill	3.50	Piece work	80
37-in. cast steel cut gear	2	Vert. boring mill	7.20	1	Vert. boring mill	2.50	Piece work	188
Cast steel frame	2	Planer	15.00	1	Planer	8.70	Piece work	73
Cast steel frame	2	Horiz. boring mill	28.80	1	Drill press; Vert. boring mill	5.00; 4.50	Piece work	203
Cast steel rollers	102	Vert. boring mill	0.78	102	Vert. boring mill	0.43	Premium	81
40-in. packing metal rings	25	Planer	1.92	34	Planer	0.48	Premium	300
40-in. packing metal rings	6	Lathe	3.40	6	Lathe	1.14	Premium	200
Cast iron frame	2	Babbitt floor	11.10	2	Babbitt floor	6.50	Premium	72
Cast iron frame	2	Assembly	24.30	2	Assembly	16.20	Premium	50
*Total and average			381.36			177.30		115

*Based on number of pieces in day-work column.

Foremen were instructed to watch the progress of jobs and anticipate their completion, and to have delivered promptly to the molder the pattern which the schedule called for next. The layout of the floor was planned so that products now move progressively down aisles of ample width. This relieves congestion at the molding machines, making it possible for them to produce at rated capacity.

Piece work was based on a thorough motion study. The results were that output was increased over 75 per cent; not an extra man was employed; no expenditure was necessary for new equipment; the cost of production was lowered and the men were allowed to earn about 33 per cent more a day than with the old day rate.

Table I shows the increase in production brought about by the new methods. Figures are given for a number of miscellaneous items, some of which were made in single pieces, while others went through the shop in lots up to 15 pieces in each. The time required to make a single 56-in. gear was cut in half. The saving in time of making cores showed 64 per cent and 100 per cent increase in hourly output for the two jobs was accomplished.

How the Machine Shop Was Benefited

In Table II are shown results obtained after putting into practice improved methods in the machine shop. No new equipment was purchased, as most of the machine tools on hand were of recent design. Machine speeds were adjusted; cutting tools were properly ground; machine tools were rearranged with reference to the sequence of operations to be performed.

Special attention was given to the methods and time for setting up jobs in the machines. A material routing system was put in operation and both the men at the machines and the foremen were given advance information, so that they could plan a set-up ahead of time and have tools and material ready to start the new job. Time studies were made and piece work and a premium system of payment supplanted the old day rate.

Production in the shop was increased on the average, 104 per cent. The use of piece work resulted in a gain of 135 per cent, and on those jobs where the premium system was used the gain was 70 per cent.

Gains in Structural Fabricating Shop

Basis for establishment of a premium system may be at fault, and that, combined with other unfavorable factors, may choke shop production. The structural fabricating shop had for some time made use of a premium system which had been roughly based on records of day-work cost. It had been expected that the magic word premium would bring low cost. Little effort was directed in that early attempt at conditions under which the work was performed.

Some time was spent in the recent change in rearranging machinery. Aisles were cleared and material to be worked was carefully classified and piled in an orderly manner, convenient to the various machines. Then time studies were made and a new premium system was built from them. The workmen were instructed now to make the best possible use of the equipment.

Results attained are shown in Table III. The average increase in production was 106 per cent. It is noted that the production increase in several cutting operations ranged from 1 per cent to 300 per cent. This divergence in itself was clear proof that hit-and-miss production methods had been in use and that improvement was overdue.

When studies were completed, instructions were written covering each operation. This was done so that workmen and foremen could duplicate conditions for a specific job even though it might not get into production again except at long intervals.

Standard Speeds and Feeds Important

Often there is lack of interest in applying standard speeds and feeds in machine shops which are run on day work. It has been shown time and time again that the use of these standards is habit-forming among workmen and these habits become especially valuable in shops where day work and piece work are mixed. Once the men become accustomed to operating a given size drill at its proper speed they will of habit maintain these standards on any work which passes through their hands. It is therefore to be urged that standard speeds and feeds be specified for all classes of work throughout the shop.

A point often overlooked is the checking of patterns, to ascertain whether or not the castings will carry extra metal which later must be removed at unnecessary expense.

With reference to the attitude of the workmen, it should be impressed upon them that the possibility of earning higher wages depends on maintaining new conditions and on following instructions. No method is long satisfactory which is not closely adhered to. Finally, regardless of whether new or old equipment is used, one must coordinate all factors which contribute to the problem of production. Then the workman can be at his best.

Table III.—Structural Shop Work

Kind of Piece	Old Style Premium Work; No Improvement in Condition			New Premium Work after Condition Had Been Improved		Per Cent Increase in Production
	Operation	No. of Pieces	Time in Hours per Piece	No. of Pieces	Time in Hours per Piece	
Special Container Size A—						
3/16-in. Steel	Cut	106	0.194	50	0.160	21
"	Punch	106	0.349	50	0.128	173
"	Drill	106	0.140	50	0.070	100
"	Form	106	0.185	50	0.112	65
"	Assemble and rivet	106	0.565	50	0.284	98
Special Container Size B—						
No. 8 Steel	Cut	108	0.157	58	0.155	1
"	Punch	108	0.155	58	0.098	58
"	Drill	108	0.034	58	0.034	0
"	Assemble and rivet	108	0.290	58	0.128	127
Special Container Size C—						
No. 10 Steel	Cut	139	0.223	118	0.107	108
"	Punch	139	0.060	118	0.060	0
"	Drill	139	0.062	118	0.054	15
"	Form	139	0.110	118	0.042	163
Special Container Size D—						
No. 10 Steel	Cut	64	0.320	137	0.080	300
Special Container Size E—						
No. 10 Steel	Cut	46	0.410	88	0.123	233
"	Punch	46	0.250	88	0.064	290
"	Form	46	0.292	88	0.039	645
"	Assemble and rivet	46	0.220	88	0.102	116
Special Container Size F—						
3/16-in. Steel	Cut	96	0.250	96	0.210	19
"	Punch	96	0.345	96	0.164	110
"	Notch	96	0.193	96	0.053	264
"	Form	96	0.920	96	0.535	72
"	Assemble and rivet	96	2.040	96	0.950	115
8-in. long pieces of flat bars	Punch	50,000	0.00372	50,000	0.00340	9
*Total and average			905		535	69

*Based on number of pieces in day-work column.

Making Aluminum Aircraft Castings

Careful Heat Treatment Needed—Temperature Control of Melting a Feature—Wood and Metal Pattern Shops

BY FAY LEONE FAUROTE*

TWENTY Bellevue oil-fired furnaces are employed in melting metal for castings in the foundry of the Wright Aeronautical Corporation, Paterson, N. J. All the melting furnaces are located in one room in the center section of the main floor. The casting floors, equipped with roller conveyor tables made by Eastern Steel Castings, Newark, N. J., have been installed at convenient points in front of the entrance of the furnace room. Aluminum "Y" metal is used for cylinder heads and pistons, the pouring temperature of the "Y" metal being about 1300 deg. Fahr. For the crankcase castings the Aluminum Co. No. 195 metal is specified.

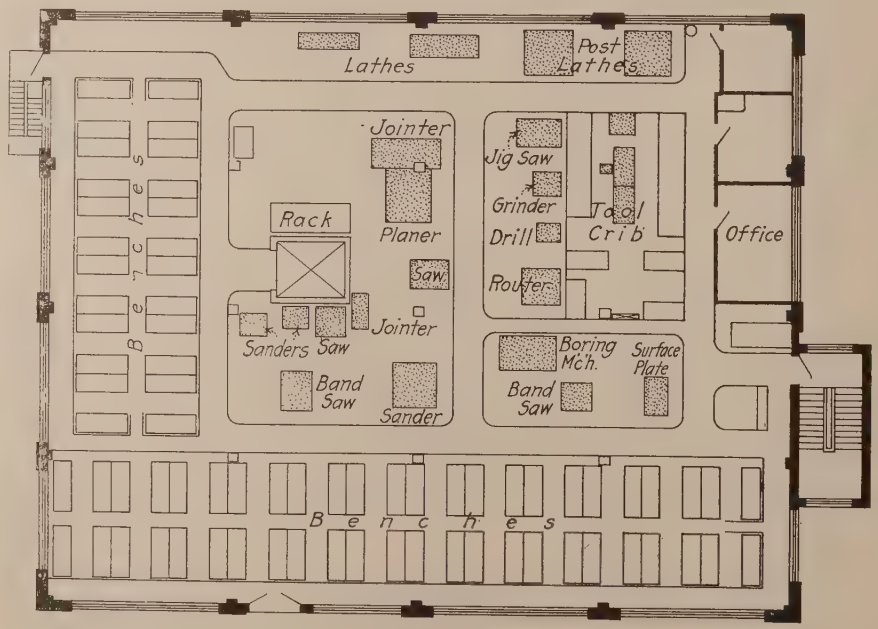
A pyrometer room equipped with Wilson-Maeulen Co. apparatus makes it possible for the temperature of each furnace to be read at any time. Here the observer may signal, by means of three electric lights mounted at a convenient point on the ceiling, when the metal is ready for pouring. A green light indicates that the furnace is coming up to heat; a red, that the temperature is excessive; and a white, when the critical pouring temperature is reached. In addition, the temperature of the metal in the ladle of each heat is ascertained by a pyrometer inserted just as the metal leaves the furnace room. Later each casting is stamped with the number of the heat, and thus a complete check on each heat is obtained.

After the castings have been shaken out they are taken to the cleaning room, where the gates and risers are sawed off by power-operated band-saws. Later they are chipped by pneumatic hammers, snagged, pickled, sand-blasted, stamped and given a careful inspection. The piston castings are rough turned outside before being heat treated, so that there may be uniform heat penetration.

Annealing and Aging the Castings

After the castings are made, it is necessary to reheat them to remove the casting strains and also to age the castings, to improve their tensile strength. This process is accomplished in an electrical truck loading oven, with outside dimensions 9 ft. wide, 9 ft. deep and 7 ft. high. It handles two cars 3 ft. wide by 6 ft. 9 in. long, each heat. The oven is electrically heated with a connected load of 60 kw., provided with automatic temperature control, and the range in operating temperature is from 200 deg. to 700 deg. Fahr., depending on the particular process under way. The circulating system with which

*Mechanical engineer, New York. The design and equipment of the Wright aeronautical foundry, together with an account of the making of engine castings, cores and the like, were covered in an article in THE IRON AGE, Dec. 12, page 1587.



WOOD Pattern Shop Layout in Wright Aeronautical Foundry. This is on the third floor of the building and, as the diagram shows, has excellent day lighting all around. Automatic sprinklers protect pattern shops and storage from fire danger

this oven is equipped provides most uniform heat distribution.

All of the crankcase parts, the pistons and cylinder heads are heat treated or annealed in electric furnaces at 960 deg. Fahr. The cylinder heads and pistons are aged at 400 deg. Fahr., and the crankcase sections at 212 deg. Fahr., in Gehnrich indirect-heat ovens.

All three parts are then pickled by immersing in hot caustic soda, followed by a nitric acid solution. The floor of the pickle room is protected by a pavement of acid-proof brick and the walls are coated with paraffin. After a final washing, the parts are taken to the inspection room and carefully explored for checks, cracks and other defects.

Some castings which are imperfect show up blow-holes. After the preliminary grinding these are pre-heated in (three) welding furnaces or ovens to a temperature of 900 deg. Fahr. and the blowholes then filled up by welding in on the hot castings. The ovens are of the car type, each oven having outside dimensions 6 ft. 8 in. wide, 7 ft. 4 in. long, 7 ft. high, and handling a car 36 in. wide by 72 in. long. Ovens are oil heated and operate at 800 to 900 deg. Fahr. The oil system operates from 16 oz. air pressure and 25 lb. oil pressure. There are a number of stands for oxygen-acetylene blowtorch welding.

To shrink the finished cylinder-head fin body on to the steel cylinder, the heads have to be expanded by heating to a temperature of 750 deg. Fahr. This is accomplished on a continuous conveyor running through an electrically heated Gehnrich oven. The equipment is entirely automatic in its operation, in that the operator at the unloading end, by a series of push buttons, may open or close the door at either end of the oven or progress the conveyor. Heating is entirely automatic, with automatic temperature control, and provides a continuous record of the heat cycle through which the castings pass.

After the cylinder heads are shrunk on the cylinders, they are black japanned and this japan finish baked in an electrically heated, truck-loading type oven having two compartments. The crankcases and other parts are finished with a gray enamel and these parts are baked in an electrically heated, truck-loading type oven with three compartments.

Pattern Shops on Two Floors

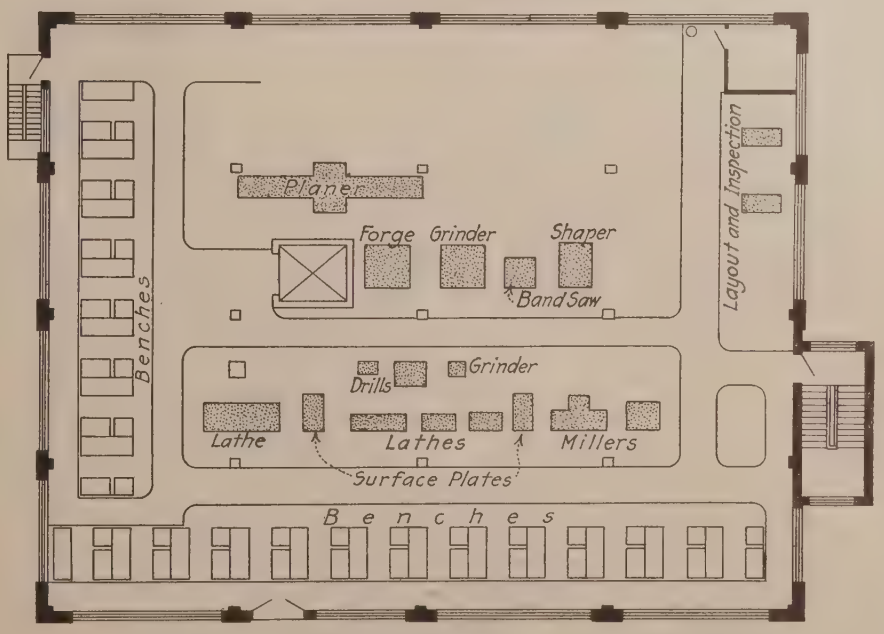
ON the second and third floors are to be found the metal pattern shop and wood pattern shop respectively. These and the pattern storage department in the basement are the only parts of the building equipped with automatic sprinklers. Equipment in the wood and metal pattern shops is extensive and adequate. An electric elevator runs from the pattern storage department in the basement to the pattern shops on the second and third floors.

In one corner of the metal pattern shop are three automatic metal band-saw filing machines and an automatic band setter. The entire time of one man is here required to keep the supply of sharpened band-saws ready for the department below, one saw lasting only about 3 to 4 hr., after which it must be re-filed and occasionally reset. Each bench in the metal pattern shop has both air and gas available.

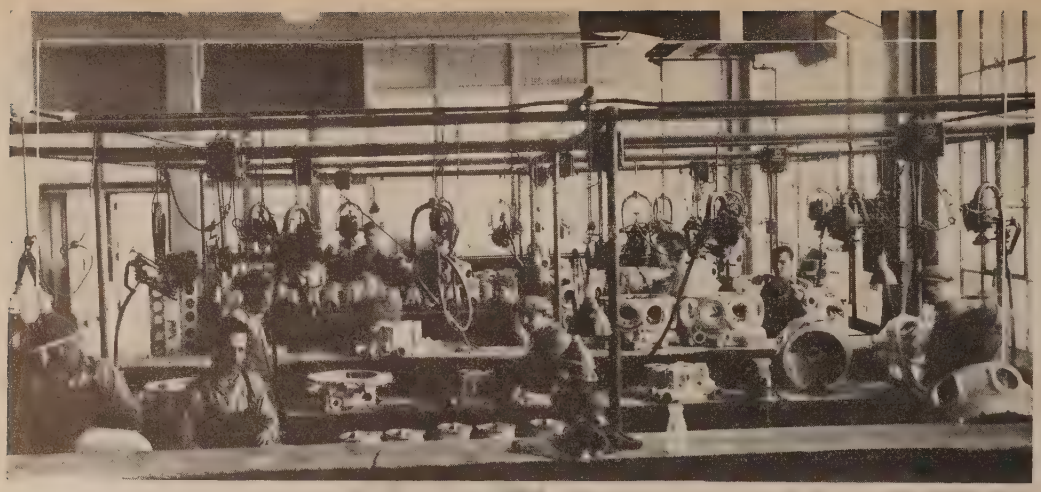
At present about 250 men are employed in the Wright foundry, 50 in the pattern departments, the remainder engaged in sand-mixing, core-making, molding, shaking out, cleaning, sawing, chipping, filing, pickling, heat treating, inspection, supervision and maintenance. The foundry offices, on the first floor, adjoin the inspection room.

Services Provide Comfort for Men

In both the foundry proper and the pattern shops, very efficient ventilation systems have been installed, so that linseed oil fumes, smoke, obnoxious gases, wood and metal dust are almost wholly withdrawn from the air. The ventilating systems for the pickle house consist of wooden ducts with a wooden fan outside of the building, discharging into a wooden stack. In the heat-treating room is equipment for air-cooling the castings, consisting of pits in the basement, through which air is blown by fans. The exhaust is used for heating the basement in winter, with a by-pass to the atmosphere in summer. These



METAL Pattern Shop Layout in Wright Foundry. Daylight on all four sides is assured, the shop being on the second floor of the building. The arrangement of benches and tools on the two pattern shop floors is much alike, with benches on two sides and heavy tools in the center



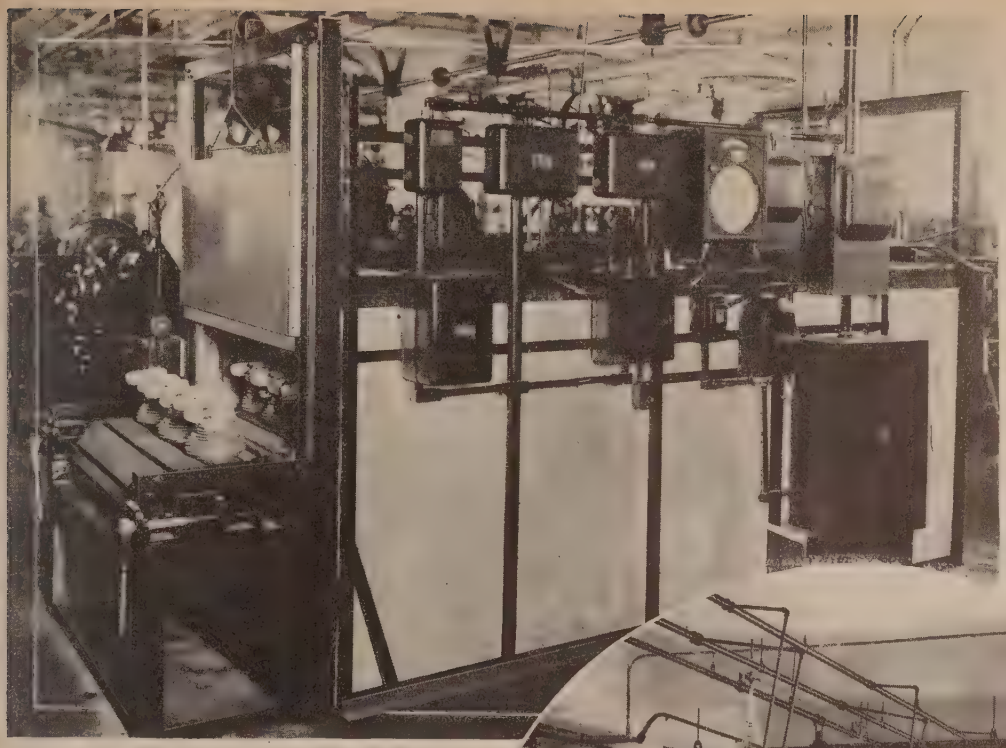
FLEXIBLE-Shaft Department for Cleaning Castings. This is largely bench work, because of the lightness of the castings

CYLINDER Head Shake-out (Left). After castings have cooled sufficiently they are conveyed on rollers over to this point, where the mold is separated from the casting

* * * *

AUTOMATIC Sand-Blast Table (Below) Where Aluminum Castings Are Cleaned

PICKLING Room, Where Aluminum Castings Are Passed Through a Series of Baths to Cleanse the Casting and Show Any Imperfection. (Left) Overhead conveyor is used for heavier castings



EXPANDING Furnace for Cylinder Heads to Fit Them for Shrinking on the Steel Cylinder. Below is a corner of the metal pattern shop, showing how air and gas are supplied to each man's bench

ON these two pages are characteristic parts of the foundry of the Wright Aeronautical Corporation, Paterson, N. J. Many of the subsidiary operations or pieces of equipment are here depicted.

ELECTRICALLY Heated Enameling Ovens, the Enamel Being Applied While Crankcases Are Held on Fixtures, as Shown. Japanning ovens are similar to these

ventilation systems are believed to be largely responsible for the complete absence of the smoky haze usually observed in foundries. No iron casting is done—only aluminum, kelmet metal and some bronze.

Interior walls in all departments are painted white down to shoulder height, below which they are dark. This, together with the large window area, entirely obviates the necessity for artificial interior illumination except during the late hours of the afternoon in winter.

Even the basement is well lighted and clean. It contains, in addition to sand storage bins, metal, pattern and general storage, the air compressor room, the oil supply pumps, the lower section of the electric heat-treating furnaces, a large, well-ventilated metal locker room, a spacious wash room equipped with Bradley Washfountains, a row of shower baths and toilets. In addition to this there is ample space for a rest room and cafeteria, which may be installed later. Aluminum alloy "ingots" are stored in the basement on sheet steel floor skids, which are handled by electric lift truck to the elevator and thence to the melting furnaces.

Along the ceiling of the basement runs the piping for the equipment above, such as high-pressure air, low-pressure air, fuel oil, gas, water and steam. The main distributing switch room is located in the basement also. To this is supplied 4150 volts of Public Service current, transformed here to 440 volts for power and 110 volts for lighting. Feeders run to the different power and lighting panels for all of the lights, motors, and furnaces.

In the basement the partitions of the sand bins are of wood, but all of the others, such as those of the metal storage and pattern storage, are of wire grating. This allows free circulation of air and an unobstructed penetration of light.

A spur track runs along the outside wall, the full length of the building on one side. This makes it possible for the incoming sand to be chuted directly to the bins by portable conveyor. Incoming metal is unloaded from cars on to a spiral gravity conveyor which dumps it out on to a metal truck frame, which needs to be wheeled only a few feet inside of the metal storage room. From there it is transferred to the furnace room on the main floor by a sidewalk-type elevator of 3-ton capacity.

Heat is supplied to the building by unit heaters. Those on the main floor are fed by steam at high pressure, and the trap discharge at low pressure is used for supplying unit heaters in the basement, which operate on a vacuum system, the condensate being returned to the boiler room. A 20,000-gal. fuel oil tank is buried outside at one end of the building, and the oil is pumped to the core ovens, melting furnaces and elsewhere as needed. A 10,000-gal. core oil tank is in the yard, near the fuel oil tank.

Tying Up Production Control with Materials Handling

AN electric washing-machine manufacturer, before installing an overhead tramrail system, had the usual type of stockroom, consisting of long rows of bins in which the smaller parts were kept, and four-wheeled trucks cluttered all over the place, in which the larger parts were kept. Operation of this plant was described before an engineering meeting in Akron, Ohio, by E. T. Bennington, Cleveland Electric Tramrail Division, Wickliffe, Ohio.

In assembling several models, several thousand different parts were used, consisting of screw-machine products, castings, pressed-metal parts, bars, angles, motors, switches, etc. The material was withdrawn from stock in the usual type of tote box of a size which would hold about 50 lb. of small screws. As an operator ran out of material his supply was replenished in containers of this size or in bundles of angles, rod, etc., depending upon the nature of the material being used.

If the stock of only one small part should unexpectedly become depleted, no more machines of this model could be assembled until the supply was replenished.

Definite Stock Runs Established

This manufacturer took the first step toward successful handling of his material when he established a definite stock run for each model of machine. He then purchased 300 steel containers, all of the same base dimensions and varying only in height. The cubical capacity of these containers was fixed so that there was a size to hold the exact quantity of any part required to complete the previously established stock order.

Assume that the established stock order of model X machines was 500. The purchasing department would purchase the various parts required, in the quantity which provided the lowest overall price.

When these parts were received, 500 of them would be put into one container, if only one piece was used on each machine. If ten pieces were used on each machine, 5000 would be placed in the proper-size container as they were received, and checked in the receiving department.

Where parts were too large to get into one container in quantities of 500, these were placed in two containers or five containers, and those containers plainly marked ½ stock order or 1/5 stock order, to conform to the quantity they held. There were also a few cases where several kinds of very small parts were grouped into one container. These were parts which did not require any manufacturing operations before assembly. They were placed in this container in such a way that they did not become mixed up, being separated from each other by partitions.

Those parts which did not require manufacturing or finishing were moved to the machines as the schedule of each department permitted. After the completion of the machine operation they would be moved back into stock to await assembly. This relieved floor congestion in the manufacturing department.

Better Control Over Operations and Stock

Aside from the saving effected in handling large units at one trip, and eliminating rehandling, the inventory system, cost system, and record of material lost in manufacturing operations could be more accurately accounted for.

Since a tramrail system was employed to handle these containers, with a special automatic grab that enabled the operator to attach or detach the load from the cab without the aid of anyone on the ground, these containers were piled four or five high, and aisle space was entirely eliminated. The capacity of the stockroom was increased about 400 per cent, and the cost of a new building which otherwise would have been necessary under the old scheme of things was saved entirely.

Hardness of Brinell balls for hardness testing machines has been investigated by the British National Physical Laboratory. For these very hard steels a Vickers hardness tester using a diamond cone is suitable. Brinell balls for testing steels whose hardness number does not exceed 500, should have a diamond hardness number (corrected for the curvature of the ball) not less than 900. For Brinell tests on material between 500 and 630 hard, "work-hardened" balls should be used. A file test can also be used as a rough indication of the surface hardness of balls. If a ball can be scratched by a new smooth file its corrected diamond-hardness number is probably below 850.

Strength of Zinc Base Die Castings

Improvement Has Been Large Recently—Gravity and Pressure Methods—Types and Relative Merits of Alloys Available

BY ROBERT M. CURTS*

ONE of the outstanding features in the recent development of zinc base die casting alloys is the remarkable improvement which has been made relative to physical properties. These improvements have been brought about through a systematic study of the effect of the deliberate addition of other metals to zinc, and by a careful study of the effects of certain metallic impurities which are likely to occur in the raw materials or which sometimes occur because of thoughtless contamination. Zinc base die casting alloys are now available which will make strong, sound and permanent castings. Tensile strength of from 45,000 to 50,000 lb. per sq. in. and initial impact strength of well over 100 ft.-lb. per sq. in. can now be obtained through the specification of the proper zinc base alloys.

Inasmuch as zinc base alloys are cast by several methods, and because the casting method not only determines the type of alloy which can be used but also influences the physical properties of the castings, it seems advisable to briefly consider these several methods and to limit the major part of the following dissertation to the one type which recently has become so popular.

*Technical Service, New Jersey Zinc Co., New York.

Gravity and Pressure Methods Compared

In a broad sense, the term die casting includes both gravity and pressure castings. As implied, the former method relies on the force of gravity to distribute the

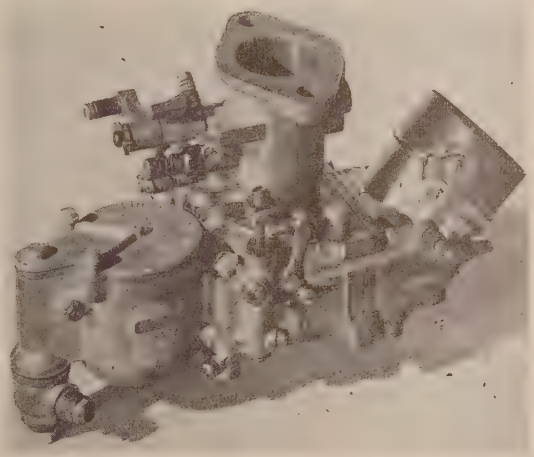


Fig. 2—Automobile Carburetor Made Up of Several Assembled Zinc-Base Die Castings (Above)

Fig. 1 — Ornamental Zinc Lamp Base Made by the Hand - Poured Gravity or Slush Casting Method (at Left)

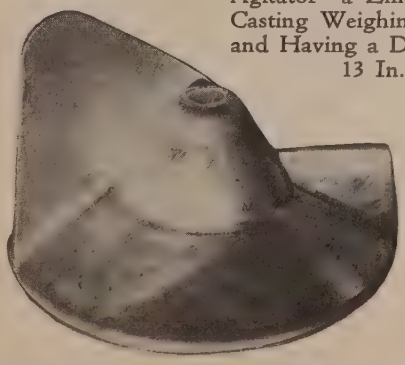


Fig. 3—Washing Machine Agitator—a Zinc-Base Die Casting Weighing 7¾ Lb. and Having a Diameter of 13 In.

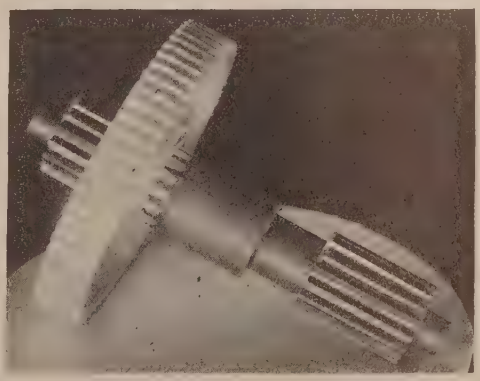


Fig. 4—Idler Gear for Speed Reducer Used on an Electric Hoist. Note the 4- in. (diameter) gear which has been cast around the 1⅛-in. axle

molten metal throughout the various cavities of the die, while the latter method employs the application of artificial forces, either pneumatic, mechanical, or a combination of both. In this process pressures ranging from less than 100 lb. per sq. in. and up to 2000 lb. per sq. in. are used. The higher pressures are usually employed where high rates of production are necessary and where the appearance of the surface is a primary factor.

Gravity castings are sometimes classified as slush castings (Fig. 1) and permanent mold castings. They are usually hand poured and necessitate the use of alloys having rather high fluidity. It is quite common practice to use high-grade, unalloyed zinc for this purpose. Castings of this type have a relatively low tensile strength (8000 to 10,000 lb. per sq. in.) and are used primarily in the production of ornamental objects and toys. Stronger castings may be made by the gravity method by using zinc alloys containing aluminum, copper and,

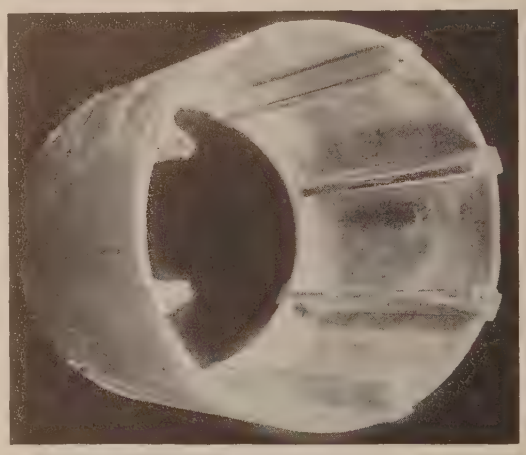


Fig. 5—Electric Hoist Motor Housing—(Weight 5 lb., Length 6 in., Diameter 6 in.). Note the design of the casting which distributes the shrinkage about the core and which allows minimum weight and maximum strength. The ⅛-in. walls are reinforced with eight ⅜-in. ribs which are an integral part of the casting

sometimes, magnesium—although the addition of these metals to the zinc influences the casting properties and often necessitates greater care when used in connection with complicated dies.

Possibly many readers have not realized the possibilities of zinc base alloy castings because they have considered castings of this gravity type only. Pressure die castings are invariably much stronger because of the difference in the structure of the cast metal, and because the types of alloys which can be cast by this method are very much stronger. Increased impact and tensile strengths, together with greater ease and rapidity of casting, have popularized the pressure casting method to the extent that it consumes about 90 per cent of the zinc and zinc base alloys now used in castings.

In order to prevent any confusion, and because pressure die castings are by far the most widely used, the author limits further discussion to this field.

The automobile industry consumes well over 50 per cent of the zinc base die castings which are now being produced, although the past year has witnessed the introduction of similar castings into many new and interesting fields. Practically all automobiles are equipped with castings made of the newer and stronger zinc base alloys. The recently perfected and widely adopted fuel pump, illustrated by Fig. 6, is made of Zamak, the 4-3-0.1

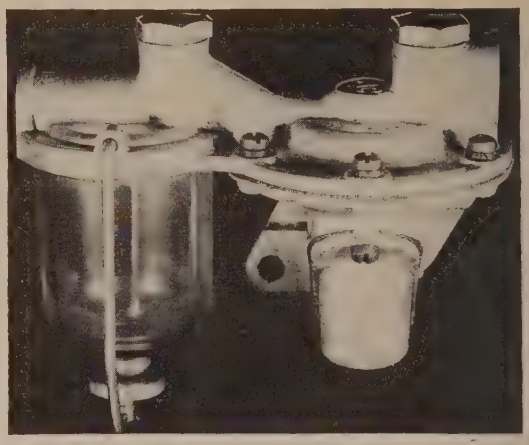


Fig. 6—Automobile Fuel Pump Composed of Two Die Castings Made of the 4-3-0.1 Alloy

alloy, which will be discussed in detail later on. Carbureters, lamp housings, cowl lamp brackets, windshield wiper housings, steering wheel parts, radiator caps, magneto and generator housings, spark and throttle levers, emblem bars, robe rail and foot rail brackets, instrument panels, speedometer parts, inside and outside hardware, clock frames and numerous other parts are now made of zinc base die castings.

Many Kinds of Zinc Base Castings

Varieties of zinc base die castings are also employed in the manufacture of numerous other articles, such as sewing machines, printing press accessories, moving picture machines, check writers, lighting fixtures, fractional horsepower motors, washing machines, gears, vending machines, sun lamps, toys, cash registers, locks, pencil

Fig. 7—Bronze-Plated Door Knocker Made of a Zinc-Base Die Casting

sharpeners, door closers, weighing machines, spray guns, radio chassis, radio loud speakers, plumbing fixtures, general house and furniture hardware, etc.

In scanning the foregoing list, it is at once evident that many of the applications noted impose rather exacting demands relative to tensile strength, resistance to breakage by impact, freedom from growth, and retention of physical properties. The improved zinc base alloys which are now being used are meeting these requirements. Not only do they meet specifications relative to strength, but they also lend themselves to the application of a great many attractive finishes including enamels, lacquers and almost any kind of plating. Nickel, chromium, cadmium and other metals commonly used for plating may be applied without difficulty.

The evolution of the strong alloys which may be had today is not the result of chance findings or over-night discoveries. It has been a slow evolution in which many factors had to be considered. Many alloys were made and tested. Primarily, research investigators sought alloys having high impact strength. But having accomplished this, their job was not finished. Ageing, due to intercrystalline oxidation and internal phase changes,

Fig. 8—Steel Inserts Used in Connection with Automobile Hardware

was determined for the alloys considered, and many of them had to be discarded because they failed to stand the tests to which they were subjected. Many other alloys "fell by the wayside" because they did not have suitable casting properties—for a good all-around alloy must not only have great strength, but must be free from hot shortness (cracking in the dies), and must have good fluidity and a liberal casting range. From the standpoint of finishing it must be easily machined, buffed, and plated.

Three Types of Die-Casting Alloys

At the present time there are three types of die-casting alloys in general use. The properties and merits of these alloys are reviewed in the following paragraphs:

1.—The commonly termed "Tin Alloy" contains approximately 6 per cent tin, 3 per cent copper, 0.5 per cent aluminum, and the balance zinc. This is one of the more antiquated zinc base alloys and has practically been displaced by the newer and stronger alloys. It has a relatively low tensile strength (approximately 24,000 lb. per sq. in.) and a low impact strength (17 to 28 ft-lb. per sq. in.). It has an elongation of from 1 to 1.50 per cent in 2 in. and a Brinell hardness of from 57 to 61. Such physical properties did not invite the use of this type of alloy for the hundreds of applications which die castings are now serving. About the only justification for the use of this alloy, scant though it is, is that it is quite readily soldered. Soldering and the tin alloy go hand in hand, for a "chain is no stronger than its weakest link" and if a weak soldered joint is necessary, a weak casting will serve. From the economic standpoint, this type of alloy is probably more expensive than the newer alloys because, although a low grade of zinc may be utilized, the cost of the copper-aluminum-tin combination with low-grade zinc will exceed the cost of the copper-aluminum and the copper-aluminum-magnesium combination used with high-grade zinc in the most recent alloys.

*United States Patent No. 1,596,761, Aug. 17, 1926.

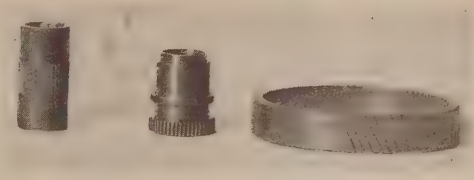


Fig. 9—A Group of Brass Inserts

2.—The 4-3 or 5-3 alloy contains from 4 to 5 per cent of aluminum, 3 per cent of copper, and the balance high-grade zinc. This type of alloy has a tensile strength ranging from 37,000 to 43,000 lb. per sq. in. and an impact strength of about 100 ft-lb. per sq. in. as cast. It has an average elongation of 2 to 3 per cent in 2 in. and a Brinell hardness of about 80. It has very good casting properties, being quite fluid and free from hot shortness. It can be cast with a smooth, even, fine-grained surface which facilitates subsequent buffing and plating operations, to which it is frequently subjected. It is easily machined and can be used in connection with steel, brass, bronze and other types of inserts.

3.—The "4-3-0.1" alloy (Zamak)* is composed of 4 per cent aluminum, 3 per cent copper, 0.1 per cent magnesium, and the balance high-grade zinc. This is the most recently developed alloy and, in many cases, it has replaced alloys of the 4-3 and 5-3 types. With a tensile strength of 47,000 to 50,000 lb. per sq. in. and an impact strength of well over 100 ft-lb. per sq. in., this alloy is undoubtedly the best available at the present time. It should be employed when long life and service are required of the finished casting. It is easily cast in complicated dies, although some care must be exercised in the gating of the die in order to prevent overheating which may result in cracking. It affords a smooth, hard, fine grained surface which is particularly suitable for plating and other finishing operations. It can be soldered, if necessary, although soldering is to be discouraged because a soldered section usually weakens the casting as a unit. The 4-3-0.1 alloy is somewhat harder than the tin alloy or the 5-3 or 4-3 type of alloy, having a Brinell hardness of from 80 to 90. It is easily machined and

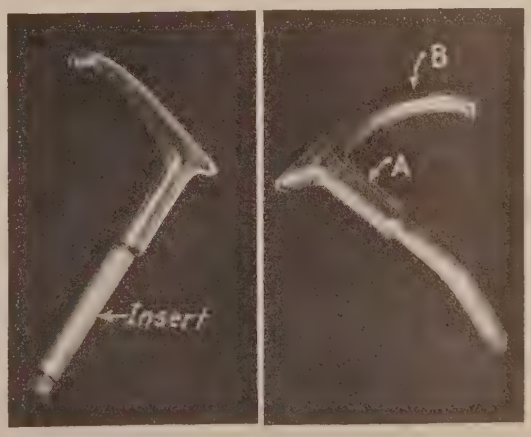


Fig. 10—Chrome-plated Die-Cast Door Handle with Steel Insert

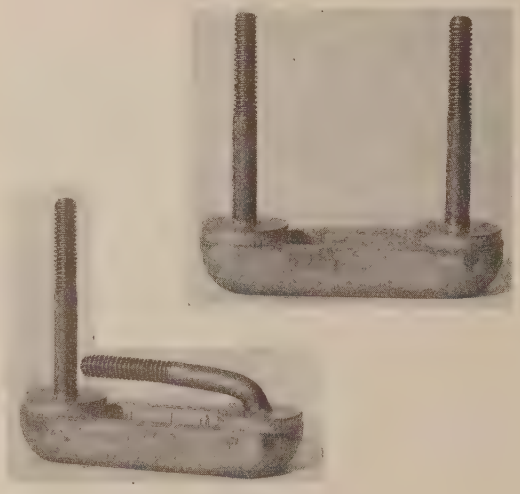
Fig. 10a—Same as No. 13 After Severe Hammering at Points A and B

is a splendid alloy for use in connection with various types of inserts. (See Fig. Nos. 4, 8, 9, 10 and 11.)

The use of inserts is quite general in the die casting industry. These may be of steel, brass, bronze, porcelain, etc. Occasionally another die casting is used as an insert —usually to prevent a soldering operation. Figs. 8 and 9 portray several types of inserts and illustrate the manner in which they are "keyed" into the casting. The shrinkage of the alloy around the insert is just pronounced enough to anchor it so firmly that the casting must actually be broken if the insert is to be removed.

And if the casting is made of a high-grade alloy such as the 4-3-0.1 type, it will not break, as shown by Figs. 11-a and 12-a.

Fig. 10 shows a commercial automobile door handle which has been cast around a steel insert of the type shown in Fig. 11. This door handle was placed in a vise and severely hammered, resulting in appreciable deformation without breaking. (See Fig. 10-a).



Figs. 11 and 11a—Steel Screw Inserts Cast in the 4-3-0.1 Alloy. Figure 14-a represents one of these inserts severely deformed but still firmly anchored in the casting

Another example of the toughness of good zinc base die castings is illustrated by Figs. 11 and 11-a. In this case one of the steel machine screw inserts was hammered flat on the casting without coming loose from its anchorage or without cracking the casting.

Although the employment of inserts will obviously increase the cost of the casting, it is frequently possible to prove an economy in the finished product due to the elimination of machining and assembling costs.

Inserts are used to impart greater strength or elongation at localized points—affording the properties of a wrought structure where a cast structure would not serve satisfactorily. Door handle inserts exemplify this use. They are sometimes used to give hardness or special wearing qualities (Fig. 4), and are also employed to afford the special bearing properties of the bronze alloys. Specific electrical properties pertaining to either resistivity or conductivity may also be had through the use of inserts. Laminated pole pieces may be made an integral part of the casting to be used in the manufacture of electric appliances.

In this connection, the use of zinc-base alloys offers an excellent material which may be given special properties at local points without influencing the general economy afforded by the use of die castings. As a matter of fact, the die casting process is much more versatile in this respect than many other production methods which involve welding, soldering, brazing, or mechanical couplings.

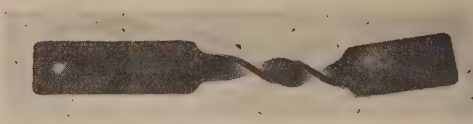


Fig. 12—Tensile Bar Die Cast of the 4-3-0.1 Alloy Twisted Through 360 Deg. Without Fracture

The author is frequently asked to compare the physical properties of zinc-base die castings with castings made of other materials such as brass, bronze, iron and aluminum alloys. Due to the wide variation in the figures given for these materials it is rather difficult to make an accurate comparison.

A study of the various possible sources of available data reveals that the tensile strength of the 4-3-0.1 alloy is at least 24 per cent greater than sand cast brass or bronze, while the impact strength is lower than that of cast brass and about the same as that of cast bronze. Compared with cast iron, the 4-3-0.1 alloy is at least twice as strong with respect to tensile strength, and is greatly superior in impact strength. Sand cast iron has an impact strength of from 2 to 5 ft.-lb. per sq. in., as compared with well over 100 ft.-lb. per sq. in. for the 4-3-0.1 alloy. The toughness and ductility of zinc base alloys are quite well illustrated in Fig. 13 which represents a die cast tensile bar twisted through 360 deg. without fracture.

It is estimated that the production of zinc-base pressure die-castings consumed well over 60,000,000 lb. of high grade zinc in 1928. The consumption for 1929 will exceed that of 1928. New fields are presenting themselves every day. Many complicated parts which were not economically possible with other methods of production are now being made of strong, high-quality zinc-base alloys by the die-casting method.

Fig. 13—This Well-Known Pencil Sharpener Is Made of the 4-3-0.1 Alloy. It was dropped 55 ft. to a concrete floor without any evidence of fracture. It could not be fractured by the application of 21.57 ft.-lb. force, which was the capacity of the testing machine.

High Speed in Cupola Melting

Metallurgical Advantages Are Many—Average Speed in Over 200 Foundries Is Slow—Conception of a Composite Cupola

THAT the economic advantages of melting iron in a cupola at the best speed obtainable are evident to all foundrymen was the contention of W. N. Truxell, research engineer, Potter Coal & Coke Co., Greensburg, Pa., in an address entitled "The Metallurgical Advantage of Higher Melting Speed," delivered at the December meeting of the Philadelphia Foundrymen's Association, Manufacturers Building, Wednesday evening, Dec. 11. The attendance of local foundrymen was large.

In his extemporaneous speech, Mr. Truxell said that the aim of most foundrymen is to melt iron at the cupola's rated speed or better, and he pronounced it his purpose to point out some not so obvious, but none the less real, advantages which follow such practice, properly carried out. His arguments and deductions on melting practice were collected from personal observation of over 200 foundries in Canada and in the United States, east of the Mississippi River.

Average Cupola Operation Only 75 Per Cent

TO begin with, said the speaker, it has been found that the average cupola is operated at approximately 75 per cent of its rated speed, although there are a few which are up to and even higher than the rated speed, while others are considerably below the average. To obtain extremely hot iron it has long been contended that speed necessarily must be reduced. It has certainly been learned that hot iron and rated speed can be obtained readily with the speed even increased.

When iron is melted slowly and at a high temperature, the charging of excessive coke is found to be the usual practice; but this term, excessive coke, requires some explanation. Most foundrymen think of coke weight as in ratio to iron rather than in comparison to air, so that, in the case of excessive coke and slow melting, one finds the hot area in the cupola limited in height and with poor conditions for combustion. Hot iron may be obtained this way, and it is being done quite frequently, although many other factors enter in. It is evident in these circumstances that the iron has quite a period of time and favorable opportunity to undergo changes such as losing silicon and phosphorus and picking up carbon and sulphur. Careful comparisons, however, show that iron melted in this way will vary so greatly from the iron which is charged as to be almost unrecognizable.

Loss and Pick-Up of Elements

WHEN a cupola is melting at capacity speed or better, that is, 10 tons an hour for a 10-ton cupola, and delivering equally hot metal, the difference between the analyses of metal charged and metal poured shows a likeness that encourages the melter in his conviction that he can deliver iron at the spout which will meet specifications. Many foundries are losing 0.20 to 0.25 per cent silicon and phosphorus while picking up 0.10 per cent sulphur as compared to others with a silicon and phosphorus loss of 0.10 per cent and a sulphur absorption of 0.05 per cent. It is rather significant that these figures vary directly with the melting speed.

As to the picking up of carbon, several large foundries are melting a high percentage of steel in an endeavor to obtain high tensile strength, aiming at low total carbon, and are obtaining 3 per cent carbon and under regularly by operating at high speed. It should be sufficient to encourage small foundrymen to at least investigate the possibilities of their own melting equipment when one realizes the high melting speeds maintained by our automobile foundries and the uniformity of their output.

Foundry cupolas and also the method of their operation vary to an almost unbelievable degree. The time is rapidly passing when every foundryman regards his cupola and foundry conditions unique. Today, one realizes that the cupola is no longer "she," but a piece of mechanical equipment, and therefore subject to the same laws of mechanics and physics.

A Composite Cupola Described

DESCRIBING what he termed a composite cupola, Mr. Truxell declared that the composite average of American cupolas today, which are operating economically and efficiently, will be found to conform to the following general description:

> The height of the charging doors from the tuyeres is 13 to 15 ft. This height varies only as the size of the material to be charged and not with the diameter. The cupola which will carry eight charges to the charging door has been found to lie well within these dimensions and to operate ideally as regards blast air pressure, sufficient stock being present to take advantage of the heat generated, and yet not excessive to the point of requiring additional blast pressure to penetrate the mass or to necessitate additional coke to replace fuel loss by premature burning high in the stack.
>
> As regards the tuyeres, our composite cupola has its single continuous tuyeres with a height equal to one-twelfth of the diameter as lined. This height gives a tuyere ratio to the cupola of three to one, which, of course, in turn, gives a low blast pressure. A large majority of foundries are approximating this tuyere condition.
>
> Coming to the crucible or reservoir at the cupola, there is a large variable due primarily to local conditions in jobbing foundries. Our average, however, for an economical cupola melting hot iron is a crucible 12 in. high from sand bottom to tuyere.

In a cupola which conforms to these general specifications, operated with the correct amount of air, the melting zone will be found to extend to approximately 24 in. above the tuyeres with its center lying about 16 in. above them. The height of the melting zone will vary with the kind of coke used. A dense, heavy, slow-burning fuel tends to lower the zone. The ideal coke for fast melting should contain a high total carbon and a high percentage of volatile matter with an open structure. High-volatile properties mean easy ignition, particularly when in conjunction with an open structure permitting easy penetration of air.

(*Concluded on page* 1705)

River Shipments Gaining Rapidly

Ohio Carries Large Tonnages of Iron and Steel— Gain of 339 Per Cent, 1917 to 1927— One-Sixth Enters Mississippi

IRON and steel shipped on the Ohio River in 1927 accounted for 981,999 net tons out of a total river traffic of 20,128,518 tons, and were the chief commodities having a through movement on that stream. The rapid growth of inland waterways traffic, prominently reflected in the increasing iron and steel movement, is strikingly shown in a report entitled "Transportation in the Mississippi and Ohio Valleys," issued by the Board of Engineers for River and Harbors of the War Department in cooperation with the Bureau of Operations, United States Shipping Board.

The vast bulk of iron and steel tonnage moving by water originates in the Pittsburgh district on the Monongahela and Ohio Rivers, shipments by the Allegheny River being small and declining, dropping to only 9676 tons in 1927 from 55,087 tons in 1924. In contrast with this were the heavy increases in iron and steel tonnage moving by the Monongahela and Ohio Rivers, though that moving by the Monongahela showed a slight dip in 1926 to 571,284 tons from 580,126 tons in 1925.

But the heavy gain in the steel traffic on this river is shown by comparing the figure of 957,278 tons in 1927 with 371,675 tons in 1924. The iron and steel movement by the Ohio, a great proportion of which comes from the Monongahela, was 575,462 tons in 1926, 535,543 tons in 1925 and 550,363 tons in 1924. The total Ohio River traffic in 1925 was 15,737,000 tons and in 1926 it was 19,754,000 tons, duplications being eliminated. The Ohio River traffic made a gain of 339 per cent in 1927 over the 4,600,000 tons of 1917. The traffic on the Ohio River system for 1928, after eliminating all known duplications, was more than 46,000,000 tons, or about 69 per cent of the total of 62,500,000 tons for the entire Mississippi River system.

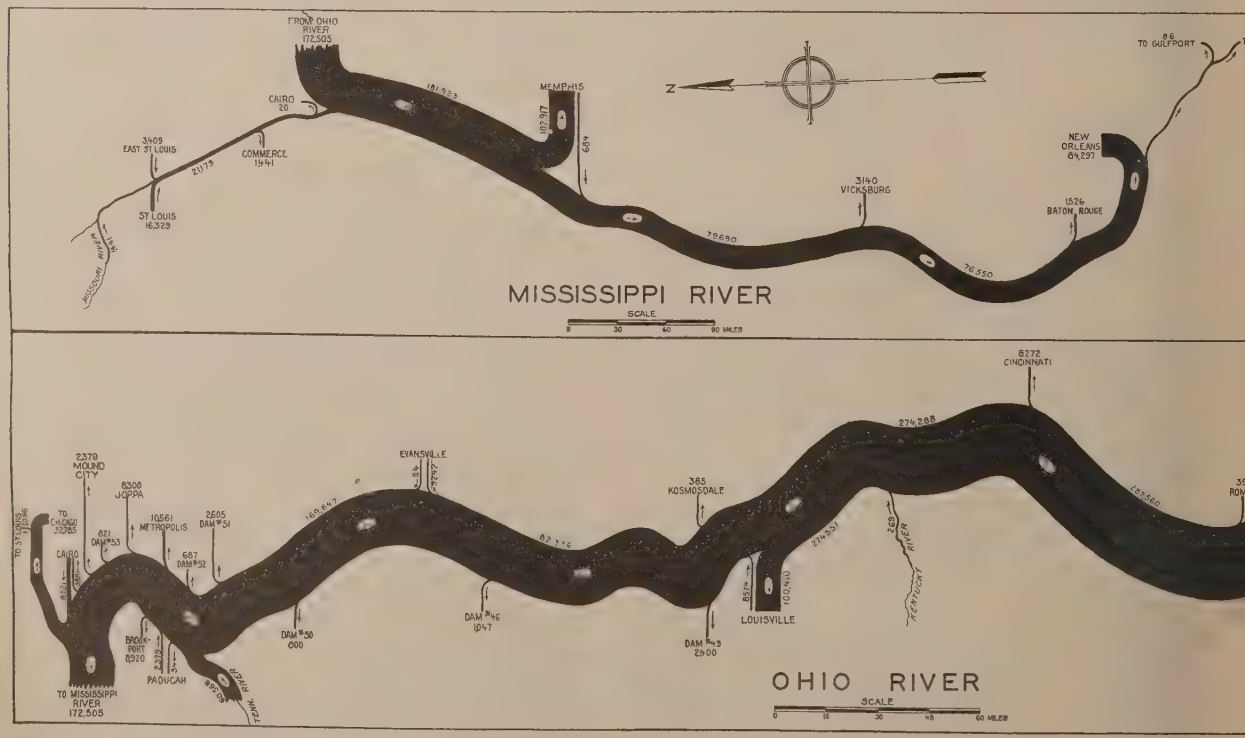
Large Savings in Transportation Costs

With the completion of the canalization project for the Ohio River, the report said, the traffic will undoubtedly make further important gains. The large steel companies, the public service corporations and common carriers are all planning to use the river more intensively. Deducting the fixed charges, including interest on the cost of improvements, operation, care and maintenance charges, the net saving in transportation costs in the ton miles of traffic as carried on the Ohio River in 1925 was found to be $11,387,000.

It was further declared that, during the last 27 years, the Monongahela improvement has paid for itself and has earned a surplus of about $100,000,000, returned to the general wealth of the nation through reduced transportation costs.

Movement Originates Above Pittsburgh

Dealing with the transportation of iron and steel by waterways, the report stated that the large steel corporations in the Pittsburgh district, along the banks of the lower Allegheny, Monongahela and upper Ohio Rivers, have in recent years been shipping large quantities of iron



and steel products to lower Ohio and Mississippi River points as far as New Orleans, a distance of 1959 miles. These products have moved on barges taken from the equipment of their long-established coal transport service on the Monongahela River and converted temporarily to the new use, as well as by covered barges constructed especially for the purpose.

"The use of water routes for shipment of iron and steel products is a natural development resulting from increased foreign and domestic competition," said the report. "The all-rail rates from the Pittsburgh district to the developing markets of the Southwest and the Pacific Coast are unfavorable as compared with rates from nearer plants and from Europe. Low-cost barge transportation, however, enables the plants in the Pittsburgh district to reach the markets of the Southwest, and it supplies an all-water route to the Pacific Coast, supplementing the rail-water route via North Atlantic ports, both of which afford savings, compared with transcontinental rates."

Many Plants Feed into the System

Analyzing the iron and steel movement, the report stated that of the 575,462 tons shipped in 1926 by the Ohio, 216,835 tons moved downstream from plants located on the Monongahela, while lesser amounts were shipped from Woodlawn, Pa., Ironton, Ohio, and points on the Tennessee. The principal receiving points on the Ohio were Ambridge, Pa., 71,197 tons; Bellaire, Ohio, 11,567 tons, and Louisville, 100,410 tons. Of the downstream movement, 193,628 tons passed from the Ohio to the Mississippi. The principal receiving ports on the Mississippi were Memphis, with 102,917 tons, and New Orleans, with 84,297 tons, while smaller quantities were barged to Gulfport, Miss., and Mobile, Ala. A total of 39,854 tons passed from the Ohio to the Mississippi for delivery at St. Louis and Chicago. Of this quantity, 32,785 tons of pig iron went to the latter and 7069 tons to the former.

The upstream movement of iron and steel during 1926 totaled 44,987 tons, according to the report. Shipments were made from New Orleans and Memphis on the Mississippi, while Bellaire, Ohio, with 19,366 tons, and Benwood, W. Va., with 18,864 tons, were the outstanding ports shipping tonnage upstream on the Ohio.

Iron and Steel Products Shipped on Ohio and Mississippi Rivers

(In Net Tons)

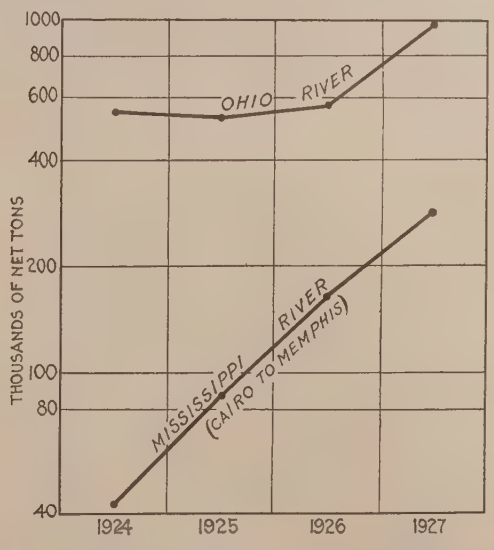
River	1927	1926	1925	1924
Monongahela	957,278	571,284	580,126	371,675
Allegheny	9,676	10,927	16,999	55,087
Ohio	981,999	575,462	535,543	550,363
Mississippi:				
Mouth of Missouri to mouth of Ohio	23,479	21,644	20,840	10,045
Cairo to Memphis	292,028	169,603	86,841	42,762
Memphis to Vicksburg	128,214	79,065	46,228	33,917
Vicksburg to New Orleans	133,208	76,023	43,993	32,567

The upper Mississippi was recently utilized by a prominent steel company to forward a barge of steel from its plant on the Ohio to Minneapolis. Another consignment of 2500 tons of pipe was taken from Birmingham by railroad to Memphis and barged to St. Paul and Minneapolis. The use of the rail-and-barge route for the latter shipment, instead of the all-rail route, it was pointed out, resulted in a substantial saving in freight rates to the consignee.

Some of the steel companies utilize the Ohio for interplant movements of semi-fabricated materials. One company, with plant at Charleston, W. Va., on the Kanawha River, moves high-grade tool steel from steel plants in the Pittsburgh district. The greater part of the steel moving from the Ohio to the Mississippi, it was added, consists of steel pipe destined to the Mid-Continent fields.

Character of Floating Equipment

Barges are now generally constructed of steel and the tendency in coal, gravel and steel traffic is to build hulls having a capacity of 800 to 1000 tons. Records of June 30, 1927, show that 60 per cent of the barge capacity in use in the Ohio Valley is in steel barges having a capacity of over 500 tons, 5 per cent in steel barges having a capacity of less than 500 tons each and 35 per cent in wooden barges. Barges for coal, sand, gravel, stone, unmanufactured steel, etc., were said to be of the open type.



Showing Rapid Growth of Mississippi River Iron and Steel Traffic

Iron and Steel Moving Downbound on Ohio and Mississippi Rivers, 1926

Shipped From	Net Tons	Received At	Net Tons
Allegheny River	2,347	Neville Island, Pa.	94
Monongahela River	216,835	Ambridge, Pa.	71,197
Neville Island, Pa.	1,966	Steubenville, Ohio.	6,475
Ambridge, Pa.	1,514	Mingo, Pa.	7,559
Woodlawn, Pa.	61,737	Benwood, W. Va.	1,882
Midland, Pa.	250	Pultney, Ohio.	3,415
Steubenville, Ohio.	24,062	Bellaire, Ohio.	11,567
Martins Ferry.	20,709	Parkersburg, W. Va.	245
Wheeling, W. Va.	41	Point Pleasant, W. Va.	1,043
Sistersville, W. Va.	204	Charleston, W. Va.	5,794
Parkersburg, W. Va.	912	Huntington, W. Va.	278
Pomeroy, Ohio.	748	Ironton, Ohio.	1,016
Kanawha River	782	Hanging Rock, Ohio.	3,721
Point Pleasant, W. Va.	1,016	New Boston, Ohio.	2,061
Ironton, Ohio.	65,684	Portsmouth, Ohio.	1,966
Portsmouth, Ohio.	2,027	Cincinnati	8,272
Rome, Ohio.	39	Louisville	100,410
Pryse, Ky (Kentucky River)	269	Kosmosdale, Ky.	385
Louisville	8,574	Dam 43	2,400
Evansville, Ind.	54	Dam 46	1,047
Tennessee River	60,566	Evansville, Ind.	9,242
Paducah, Ky.	2,379	Dams 50, 51, and 52	4,092
Cairo, Ill.	18,731	Paducah, Ky.	54
Mouth of Missouri River	1,441	Brookport, Ky.	8,920
St. Louis	16,329	Metropolis, Ill.	10,561
East St. Louis, Mo.	3,409	Joppa, Ill.	8,300
Memphis	684	Dam 53	821
		Mound City, Ill.	2,379
		Cairo, Ill.	3,891
		St. Louis.	7,069
		Chicago	32,785
		Commerce, Mo.	1,441
		Cairo, Ill.	20
		Memphis	102,917
		Vicksburg, Miss.	3,140
		Baton Rouge, La.	1,526
		New Orleans	84,297
		Gulfport, Miss.	86
		Mobile, Ala.	941
Total	513,309	Total	513,309

Iron and Steel Moving Upbound on the Ohio and Mississippi Rivers, 1926

Shipped From	Net Tons	Received At	Net Tons
New Orleans	1,049	Vicksburg, Miss.	568
Memphis	243	Memphis, Tenn.	11
Cairo, Ill.	602	Cairo, Ill.	274
Evansville, Ind.	1,542	East St. Louis, Ill.	54
Leavenworth, Ind.	200	St. Louis.	385
Newport, Ky.	200	Paducah, Ky.	52
Cincinnati	1,282	Louisville, Ky.	307
Point Pleasant, W. Va.	180	Mound City, Ill.	550
Parkersburg, W. Va.	77	Ironton, Ohio.	200
Charleston, W. Va.	306	Charleston, W. Va.	1,088
Wheeling, W. Va.	375	Green River points	1,435
Bellaire, Ohio.	19,366	Marietta, Ohio.	180
New Boston, Ohio.	701	Wheeling, W. Va.	77
Benwood, W. Va.	18,864	Steubenville, Ohio.	19,565
		Mingo, Pa.	8,169
		Munhall, Pa.	11,197
		Braddock, Pa.	169
		Pittsburgh	706
Total	44,987	Total	44,987

Covered barges, it was pointed out, have recently come into use for transporting manufactured steel, cement and miscellaneous freight, while specially constructed tank barges are used for transporting oil and gasoline.

Recent completion by the United States Engineer corps of the canalization project for the Ohio River, comprising 50 locks and dams, provides a year-around 9-ft. channel from Pittsburgh to Cairo, Ill., 968 miles. New projects are mentioned for the inland waterways system. In the summary the report expressed the hope that communities along the Ohio will recognize the importance of constructing suitable terminals to facilitate the development of common carrier service on this river.

"The outlook is for further increase in the use of the Mississippi River system for movement of the products of agriculture, mining and industry, as well as for essential products consumed in the Mississippi basin."

Encouraging Education and Training for Industry

ENGINEERS as a rule give little thought to the young men who are growing up in industry and learning industrial work. Of course, it is fashionable to patronize a young engineer and help him over his early strenuous years. But such patronage is different from an understanding of the need of American industry as a whole for trained young men, and young engineers are quite different from the type of young men who do not graduate from a technical college, but who hope to become mechanics, technicians, draftsmen, or highly trained, highly skilled experts of any kind.

Discussing this question before a recent meeting of the American Society of Mechanical Engineers, Harold S. Falk, vice-president and works manager Falk Corporation, Milwaukee, pointed out that it is no longer possible to hire skilled mechanics at will. In February, 1927, when business was rather dull and 40,000 men were reported to be idle in Milwaukee, a prominent oil-engine manufacturer received a considerable order, and wanted to engage 65 high-grade mechanics. Among all those unemployed men, it was impossible to find the 65 mechanics or anywhere near that many. The employment manager visited other cities in a search for skilled men, but failed to assemble the required number.

A certain foundry managed to get a little business in 1924, which was also a year of business depression, and was unable to engage 18 first-rate foundrymen, although the number of unemployed in the city at the time was as great as ever. Our industries are clearly confronted with the responsibility for training their own mechanics and experts.

At first sight, this may not appear to be a problem of the engineering profession. However, the welfare of the profession depends upon the progress of industry. To this extent, at least, engineers are concerned with these problems of industrial training. Although much has been done in apprenticeship in various centers and individual industries, a mere beginning has been made, and very few manufacturers, comparatively speaking, have given the question much attention.

Designing for Safe Operation

Some fundamentals of design should be embodied in every electrically-propelled overhead carrier put in service. Such a carrier should have the operator's cab supported separately from that part of the carrier which carries the load. The practice sometimes followed, of carrying the operator's cab from the main body of the hoist is to be severely condemned, in the opinion of E. T. Bennington, Cleveland Electric Tramrail, Wickliffe, Ohio, speaking at an engineering meeting in Akron.

It is not uncommon for an operator to try to pick up a load which either is attached to the floor or is held in place by sticking or shifting of piles, with the result that the lifting effort is many times that for which the carrier is designed, and something gives way. If it is a king pin, a wheel pin, load bar or hoist, the operator suspended from the load-carrying member will surely drop with that member. But if he is separately supported on the rail, the rail itself must break before he can be injured. There is then little likelihood of his ever reaching the ground, as the rail is always the strongest member on any monorail system.

Turning With Shallow Cuts at High Speeds

Experiments Include Effect of Composition and Heat Treatment Upon Tool Performance—Drilling Also Discussed at A. S. M. E. Meeting

RESULTS of fundamental studies in the fields of turning and drilling were outstanding features of the cutting of metals session held in connection with the fiftieth annual meeting of the American Society of Mechanical Engineers in New York last week.

The data relating to turning were given in a paper on "Turning with Shallow Cuts at High Speed" by H. J. French, formerly senior metallurgist, Bureau of Standards, now with the research department of the International Nickel Co., Bayonne, N. J., and T. G. Digges, associate metallurgist, Bureau of Standards. The paper on drilling, by O. W. Boston, college of engineering, University of Michigan, and C. J. Oxford, chief engineer, National Twist Drill & Tool Co., Detroit, was on the "Power Required to Drill Cast Iron and Steel." The session at which these papers were presented was held Dec. 3 under the joint auspices of the A.S.M.E. special research committee on cutting metals and the machine shop practice division. A. H. d'Arcambal, Pratt & Whitney Co., Hartford, Conn., was chairman.

The authors of the paper on "Turning with Shallow Cuts at High Speeds" pointed out that most studies of turning have been in connection with relatively coarse feeds and deep cuts. Such studies have made it possible to predict with accuracy sufficient for many practical purposes the cutting speeds that can be used economically in rough turning. But comparable information has not been made available for the shallow cuts used in finishing.

Lathe Tests Made with Two Tools in One Holder

Experiments dealt with in the report relate to a new method of test for lathe tools taking shallow cuts. To give a broad background for useful interpretation of results, the new method was used first in a study of the effects of feed, depth, cutting liquids and tool form upon cutting speed. It was then used in a study of the effect of composition and heat treatment upon the performance of carbon and high-speed steel tools, and the results compared with those obtained in the customary rough-turning tests.

The method of test makes use of two tools set at equal depths in one tool-holder (see Fig. 1) and is based upon the fact that the "trailer" or following tool will not cut so long as the "leader" or cutting tool shows no wear. One of the advantages of this method of test is its simplicity, as the only special equipment required is the tool-holder; another advantage is that there is nothing to interfere with the rigidity of the test tool. For the most part the test tool used had a broad nose and was of the form and dimensions shown in Fig. 2. A round-nose tool

(*Continued on page* 1704)

THE Special Tool Holder (Fig. 1) Used in the Shallow Turning Tests Is of Simple Design. The form and dimensions of the test tool are shown in Fig. 2 and those in the round-nose tool used for the trailer in Fig. 3

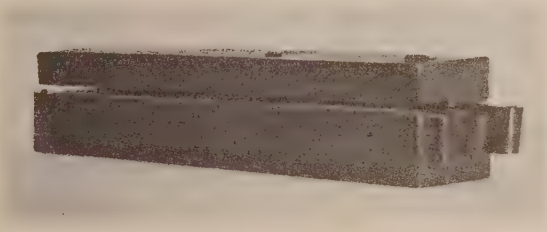


FIG. 1

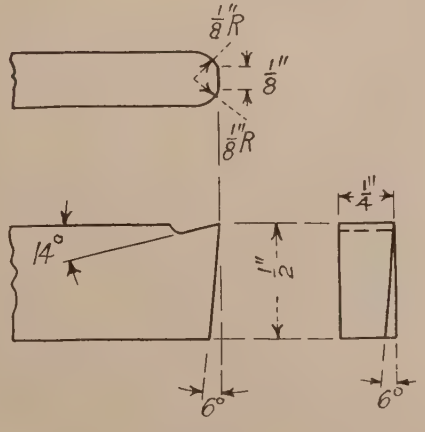


FIG. 2

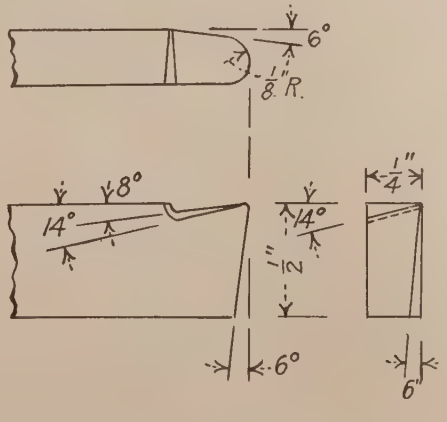


FIG. 3

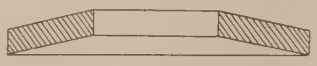
Mechanical-Spring Characteristics

Radially Tapered Disk Springs, Elastic and Inelastic Behavior in Spring Materials and Present Status of the Mechanical-Spring Art

SPRINGS for use in industry were considered somewhat exhaustively at a session of the American Society of Mechanical Engineers, Dec. 3, during the annual convention. Three papers were read and discussed. Much of the material was of a highly technical nature. Such of it as is of general interest is abstracted in the paragraphs below.

Radially tapered disk springs were taken up in a paper by W. A. Brecht and A. M. Wahl of the Westinghouse Electric & Mfg. Co., East Pittsburgh. They showed the advantages of disk springs, both flat and dished, having radially tapered cross-sections. Equations were given for calculating both the strength and the flexibility of these springs. Results of tests, including both strain measurements and deflection, showed the closeness with which practice follows the theory.

Present status of the mechanical-spring art forms the subject of a comprehensive paper by Joseph Kaye Wood, consulting engineer, New York. He traced the principal developments in this country and abroad during the past



Section of Belleville Dished Disk Spring

five years and made suggestions for additional research on points not yet fully established. The paper includes results of the author's continued work on a simplified code of design for mechanical springs.

Elastic and inelastic behavior in spring materials forms the subject of a progress report of the special research committee on mechanical springs. This was presented by M. F. Sayre, supervisory member in charge of research and associate professor of mechanical engineering at Union College, Schenectady, N. Y. He discussed tension tests made on spring metals and called attention to the fact that the elastic line of a metal is apparently curved. This effect is not noticeable at low stresses such as are carried in structural steel, but is observed at the high stresses carried in spring metals. Hysteresis was discussed in connection with changes in the value of the modulus of elasticity in the material.

Radially Tapered Disk Springs

IN ENGINEERING problems the need is frequently felt for a "frictionless" spring where space or other limitations do not permit the use of springs of conventional design, such as the helical spring. For one such application, flat or dished circular disks of spring steel, of uniform thickness, having concentric circular holes, and loaded uniformly at the inner and outer edges, were considered. Such disks could be used singly, or in stacks with suitable spacers to secure the desired flexibility.

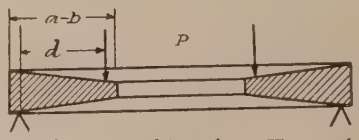
In computing deflections and stresses in these disks, an approximate method suggested by Dr. S. Timoshenko was first used. In this method the deformation is considered to consist purely of a rotation of the section, cross-bending being neglected. This was found to give results practically identical with those given by the elastic-flat-plate theory.

Advantages of Tapered Section

The advantage of the radially tapered section over a disk of uniform thickness lies in the materially increased flexibility that can be secured where space is limited in the direction of load application. A series or stack of radially tapered disks, such as shown, can often be advantageously substituted for helical springs, especially where loads are high and relatively small deflections are required. In such cases the advantages of the radially tapered disk spring may be summarized as follows:

1. The disk spring is adjustable in height and flexibility by adding or taking off disks.
2. It will withstand lateral loading as well as axial loading.
3. It can be so designed that no disk will be overloaded. Failure of one disk will not cause the complete loss of flexibility, nor will it increase the load on the remaining disks. A failure of one disk would not require replacement of the whole spring.
4. Helical springs of large size are difficult to heat treat uniformly—a disadvantage which can be overcome with the disk spring.
5. Disk springs can be designed to occupy very little space in the direction of load application.

Helical springs are the cheaper to manufacture unless production of the disks is high enough to warrant making



Application of Load on Tapered Disk Spring

forging dies. It may be noted that radially tapered disks have been successfully die forged from 0.90 to 1 per cent carbon spring steel so that no machining was required on the disk faces.

Formulas by Approximate Theory

Formulas have been developed for deflection and stress of radially tapered disks using both the approximate theory and the more exact flat-plate theory. The approximate theory is developed both for flat and dished disks. Since the flexibility decreases rapidly with dishing, the formulas in the paper apply to flat disks of radially tapered section only.

Proportions of Springs for Maximum Flexibility

It has been found that in designing a disk for a given load and a given stress the deflection varies with α, or the ratio of the outer radius a to the inner radius b. The

variation of α also produces a change in the thickness constant k.

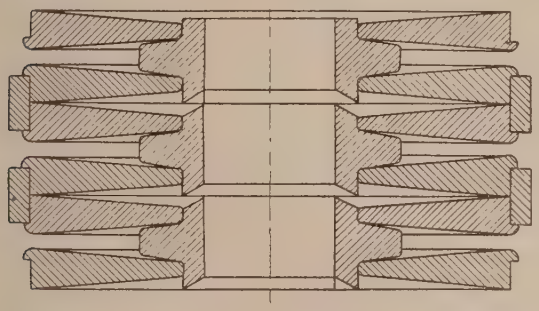
Deflections are a maximum when $\alpha = 2$. It has been found that this maximum always falls somewhere between $\alpha = 1.95$ and $\alpha = 2.05$. This value of α not only gives a maximum deflection, but results in disks of greater lateral stability and of better proportions for forging and heat treating than disks having larger ratios of outer to inner diameter.

Tests on Flat Disk Springs

A series of flat disk springs having various ratios of outer to inner diameter and various values of the thickness constant k were tested. [Test curves were given in the paper, one pair being reproduced here. This pair dealt with springs having outer radius 3.81 in., inner radius 1.5 in., outer thickness 0.267 in. and inner thickness 0.105 in. The springs tested were machined, heat treated and ground.]

Conclusions

Since the stress distribution along a radial section of these disk springs is approximately constant for values of



Stack of Radially Tapered Disks, with Distance Pieces and Keepers

the ratio α of outer to inner diameter less than about 2, it may be said that these springs utilize the material about as efficiently as do transverse elliptic springs (which may be considered as bars under a constant moment). They therefore do not utilize the material quite so efficiently as helical springs; but, on the other hand, have certain advantages over helical springs which may make them preferable for certain applications.

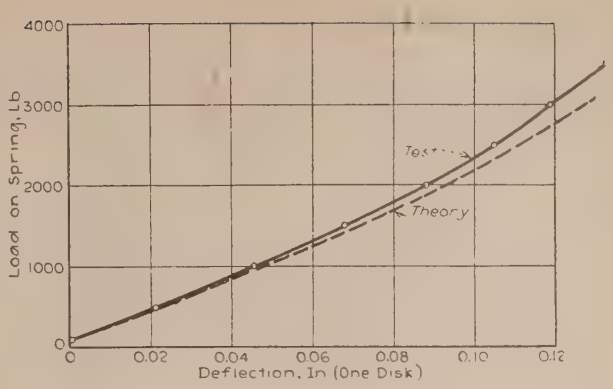
Elastic and Inelastic Behavior in Spring Metals

RESULTS of tests definitely confirm that the modulus of elasticity of a metal is not an absolutely fixed quantity. Overloading in tension beyond the yield point lowers the modulus of elasticity with respect to future lighter loads. Within limits, the greater the permanent elongation, the greater the reduction in modulus. Two weeks' rest at room temperature causes only a slight recovery.

For years Hooke's law, that stress is proportional to strain, has been almost a fixture in engineering practice. Numerical results obtained seem to indicate a second-order correction to this law, not great enough to be perceptible for materials commonly used at low stresses, such as structural steels, but great enough to be noticeable at customary spring stresses in phosphor bronze and spring steel.

Elastic Line Is Curved

With sufficiently accurate measuring instruments, the stress-strain line appears to be continuously curved from zero load upward, not because of minute departures from elastic behavior, but because the elastic line itself is curved. The modulus of elasticity in tension decreases as



Deflection Test on Disk Spring

the load increases, the decrease in slope of the stress-strain line being of the general order of magnitude of 2 to 4 per cent.

From theoretical reasons it is expected that in compression the modulus will increase as the load increases. Work is planned on the much more difficult problem of checking this phase.

The practical effect of this curvature of the stress-strain line upon the stresses in a power or cantilever spring will be to shift the neutral axis toward the compression side, to decrease slightly the maximum stresses on the tension side, and to increase them on the compression side. The magnitude of the effect will be small.

Hysteresis May Prove Troublesome

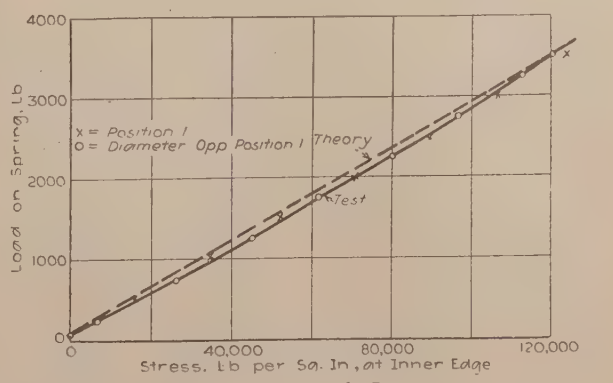
Mention was made last year of a discrepancy in the law of variation of internal friction, or elastic hysteresis, between tension and bending specimens. Later tests have shown that this discrepancy resulted from a sharp break in the law of hysteresis in tension which occurs at about the yield point.

Any overloading, to stresses which exceed 160,000 lb. per sq. in., acts to increase the future energy loss in hysteresis, even for small load ranges. Within limits, the greater the amount of overloading, the greater will be the effect on the hysteresis. Recovery from the effect of the overloading, after two weeks at room temperature, was relatively slight.

The fact that permanent or quasi-permanent changes in both modulus of elasticity and hysteresis begin at about the same unit stress indicates that the two are tied together.

Elongation Effect Negligible

Any permanent elongation of the specimen results in an equivalent decrease of area of cross-section, so that larger elongations would naturally be expected as a result of a given actual load. Any elastic elongation results in



Stress Test on Disk Spring

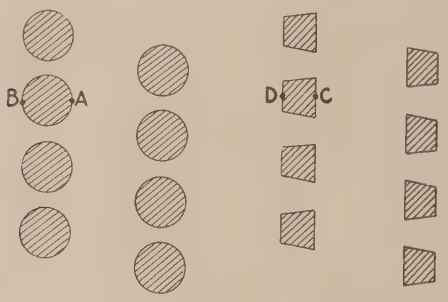
an equivalent elastic decrease in cross-section, but not in the same ratio. The actual amount depends upon the value of Poisson's ratio. It is not felt that this correction properly should be made; it would in any event not be likely to exceed ¼ per cent.

Present Status of the Mechanical-Spring Art

CONSENSUS of opinion in this country appears to be that the mechanical-spring art is not known well enough at this stage to warrant general standardization. Experimental investigation has recently yielded conclusive evidence that the standard stress formula for helical springs can, under certain conditions, be greatly in error. This renders partially obsolete and useless whatever standardization of the helical spring has been accomplished.

Helical Springs

Spring specialists have known for years that helical springs with low index (ratio of coil diameter to wire diameter) are actually stressed considerably beyond the



Stresses at Inner Points A and C Are Double Those on Respective Outer Sides, as B and D

point indicated by the standard formula. To some extent this is due to the fact that the vertical shear, which is neglected in deriving the general formula, becomes appreciable when low indexes are used. Thus, the vertical shear in a helical spring with index 3 is 16 per cent of the torsional shear; with index 8, however, it is only 6 per cent of the torsional shear.

This increase in stress was insufficient to account for breakages occurring in service. Hence, it has been considered good design practice to avoid indexes less than 5 and preferably to keep them above 7. Where space limitations or other factors have required low indexes, the best practice has been to calculate with unusually low stress—a considerably larger factor of safety.

Conical springs were discussed by the writer in connection with a new formula which he had derived. With the ratio of minimum to maximum coil radius increasing to unity, the conical spring approaches and becomes a helical spring.

Oscillatory Characteristics of Springs

Automotive engineers have been bothered with so-called surging or vibrational phenomena on valve springs in poppet valve engines. This comes when the springs get into resonance and vibrate freely in their natural periods at certain speeds within their operating range. This condition is a function of the amplitude of the harmonics of the complete valve-lift curve. Stresses in the spring are considerably greater when surge occurs than those calculated by formulas based upon static conditions.

Investigation of this trouble was reported upon last spring before the Society of Automotive Engineers. Conclusions include:

Low-frequency springs are to be avoided, because, at engine speeds within the driving range, they tend to come into resonance when excited by the lower order of harmonics of the complete valve-lift curve. The lower harmonics usually have appreciable amplitudes.

High-frequency springs are to be desired because, within the same driving range, the resonance points are due to the influence of the higher harmonics, which usually have much less amplitude than the lower harmonics.

Springs with a continuously variable pitch are valuable in minimizing the effects of surge. It is important that a few of the active coils should close up solid when the valve is opened.

Suggestions for Further Work

Several suggestions were made by Mr. Wood as a program for future investigation:

Valve springs—agreement to be reached among outstanding authorities on vibration as to the underlying principles governing the operation of these springs on poppet valve engines.

Helical and conical springs—testing specialists should determine the accuracy of the new deflection formulas for these springs as covered in this paper. This applies also to the special deflection formula derived for springs of variable pitch.

Modulus of elasticity (tensile and torsional)—determination should be made for all spring materials over the full range of sizes and shapes and under all conditions of temperature, heat treatment, cold work and combined stresses.

Continuation of the study of fundamental elastic behavior, particularly as regards the probable slight disruption of Hooke's straight-line law, was recommended. If atomic physicists in cooperation with the spring committee could reproduce in a specially built model the force existing between atoms, then the law of the modulus variation could be determined by test and compared with other observations.

Continuation was recommended of the development of a general code of design on mechanical springs, incorporating all new constants resulting from recent research.

Stresses in Disk and Coil Springs

ONE speaker, in discussing the papers, brought up the question of having disk springs made of rolled material instead of drop forged material, on the theory that this would be more uniform in structure and consequently more reliable in operation. If, then, these springs so made were to be quenched from the inside, it would be possible to transform the residual stress in the material from a hostile stress to one which is friendly. That is, it would provide a stress which in action would partly absorb the operation of the spring.

With regard to coil springs, investigations made by A. M. Wahl of the research laboratory of the Westinghouse Electric & Mfg. Co., East Pittsburgh, have shown that the material is stressed much more heavily on the inside of the coil (*A* on diagram) than on the outside (*B*). For any given load the stress on the inside may be as much as 60 per cent above the average for the whole section, while that on the outside is likely to be 40 per cent below the average. Thus, the ratio of inside to outside on springs of circular cross-section, is about 2½ to 1.

When square sections were bent into coil springs, resulting in final form in a section of trapezoidal character, due to the stretching of the fibers on the outside, approximately the same ratio was found between the inside stress at *C* and the outside stress at *D*, this ratio running from 2 to 2½. It had been supposed that the considerably greater width on the inside would have resulted in a smaller unit stress at that point compared with the unit stress on the narrower outside surface. This, however, was found not to be the case.

Revival of Iron Mining in Normandy

Ancient French Mining Region Develops into One of the World's Largest Iron-Ore Reserves, Capable of Cheap Production and Shipment

BY EDWIN C. ECKEL

FROM the iron trade viewpoint, the most striking result of the World War was the return of German Lorraine to France, thereby bringing under one national control the entire Lorraine ore field. But this change in control did not represent any actual gain to world industry—rather an actual economic loss. It has crippled Germany, which needed the ores and has the coke necessary for their economic utilization; it enriched France to an unnecessary extent, since France must still buy foreign coal to utilize the ores.

Another effect of the war, far less well advertised and probably far more important to the iron trade of the world, is the forced development of the iron field in the Armorican region of northwestern France (the provinces of Normandy, Anjou and Brittany). This is one of the oldest ore fields of the world. The outcrops were worked certainly by the Romans—and probably by the Gauls before them. But their present development, based on a clear knowledge of their geological condition, does not date back much earlier than 1910. Most of the development was forced by the war itself.

Reopening of Ancient Workings

All the older workings were simply shallow open cuts or trenches along the weathered outcrop, 10 to 30 ft. deep and often hundreds of yards long; or else they were equally shallow but broader workings in weathered ore which had become transported some distance from the outcrop and redeposited in small irregular areas. There are literally thousands of these old workings all over northwest France, and in the many centuries they have fed hundreds of small forges, hearths and furnaces.

Today almost all of the active mines are slopes driven in the ore beds to depths which are as yet mostly under 1000 ft., with few exceptions merely fractions of the depths to which workable orebeds are now known to extend. The old open cuts, working on weathered and hydrated brown ore, still furnish a fraction of the total output, serving somewhat as balance wheels; when demand falls off, the open cuts shut down.

In their original unweathered state the Armorican iron ores are hematites and carbonates, altered in some large areas into magnetites. They occur as original sedimentary beds, like the iron ores of Birmingham and Wabana, and, like the latter, they occur in rocks of Ordovician age.

The workable beds average from five to eight feet in thickness; reported thicknesses of 20 ft. are found to include a good deal of slate. Being sedimentary, these ores can be followed down the slope as far as mining is

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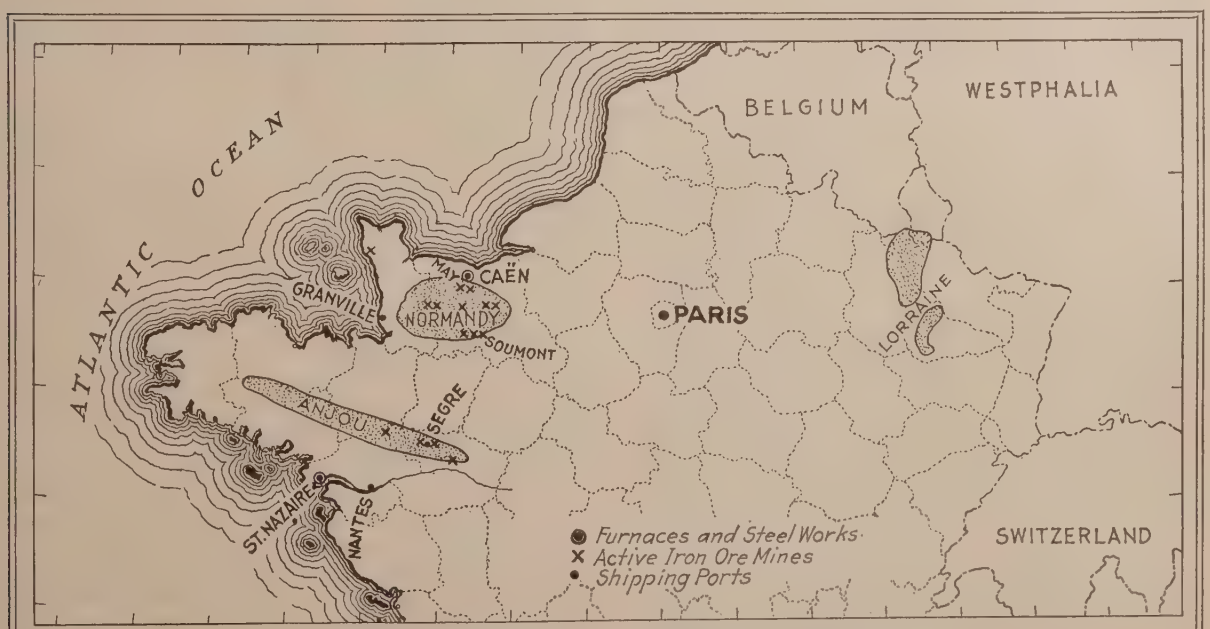

Sketch Map Showing Location of Ore Field In Northwest France

BOOK REVIEWS

Why Protection for Steel?

The Tariff on Iron and Steel. By Abraham Berglund and Philip G. Wright. 240 pages, 5 x 7¼ in. Published by the Institute of Economics of the Brookings Institution, Washington, D. C. Price $3.

There have been other attempts to tell the truth about iron and steel tariff schedules, but it is to be doubted if any has been so successful as this one. So used are we to politically partisan, sectional or other varieties of prejudice in tariff discussions that the fairness of what these authors have set down seems well-nigh millenial. By none should such a book have a better reading than by members of Congress; but nowhere would this reasoned, informed and unprejudiced putting of the tariff situation in respect to the chief of our manufacturing industries have less weight, judging from the way in which the pending bill has been bedeviled, than with the Congress now sitting at Washington.

Doctor Berglund made a special study of iron and steel when he was with the United States Tariff Commission some years ago, and did a good piece of work in war time and later, on the place of the ferroalloys and their ores in the economy of the steel industry, particularly in their relation to national defense. In the book before us he deals, in the first four chapters, with the various forms of iron and steel, the processes of manufacture, the building up of the industry in the United States, and the position of this country in competition with the steel-producing countries of Europe. With respect to natural resources for the production of iron and steel he shows that the United States leads the world. On the other hand, in respect to natural resources for the production of the ferroalloys (which were the main matter of contention in the making of the metal schedule of the tariff act of 1922, just as they are at Washington today) he finds that the United States is in no such position of unqualified leadership.

The authors have shown due discernment in sifting the propaganda material on manganese and other ores of ferroalloys that for so long has been doing duty in all the committee-room discussions of House and Senate. As might have been expected, they were much less impressed by much of it than were members of the sectional coalition who finally wrote the manganese section of the Senate bill. In dealing with the interests that were successful in getting the ferroalloy paragraphs of the tariff act of 1922 to their liking, they show that the pressure brought to bear on Congress for increased duties on ferroalloys and their ores was much stronger than that for increased duties on iron and steel tonnage products. They also bring out clearly the coalition between the Western producers of manganese, molybdenum and tungsten-bearing ores and the "agricultural bloc," which succeeded in writing into the bill high rates on these minerals which were mainly consumed by manufacturing concerns in the East.

In their final chapter the authors present their conclusions in the form of answers to several questions, including these: To what extent has the iron and steel industry prospered by reason of the tariff? Are iron and steel duties a burden on industrial or final consumers? What is to be said of these duties from the standpoint of public policy? In brief, the answers come to about this:

> 1. While the tariff was formerly helpful in placing the iron and steel industry on a solid foundation, now, so far as tonnage products are concerned, it has served its purpose. The industry is able to meet foreign competition on even terms without artificial aid. Except, perhaps, in the case of certain seaboard furnaces, the duties are nominal. They do not appreciably benefit the industry nor burden consumers. Their removal would cause little or no disturbance.
>
> 2. The duties on alloy ores are a burden to the industry as a whole and to final consumers. There is no prospect that these duties will develop strong industries. Public policy would seem to indicate their repeal.
>
> 3. On the other hand, duties on high grade carbon steel and on the ferroalloys have developed strong domestic industries. So long as protection remains the dominant note in our tariff policy, moderate duties, sufficient to maintain the more efficient domestic producers, have much to commend them.

There will be dissent from the view expressed in the first of the above three paragraphs, that the very moderate duties now imposed on tonnage iron and steel products may be dispensed with. The authors admit that the placing of all tonnage products on the free list "might compel certain branches of it located near the seaboard either to go out of business" [as though that were inconsequential] "or adopt more effective methods." The fact is that the methods of our seaboard works on both coasts are highly effective, yet there is a steady, even though not large, seepage of foreign finished material through seaboard ports. As has been suggested in these columns in previous discussions of this subject, the moderate steel prices prevailing in this market give our manufacturers a considerably smaller rate of profit than is enjoyed by most of our manufacturers who are buyers of steel. With one-sixteenth of the world's population, the United States produces one-half of the world's steel. The producers of the other half may well be satisfied to sell their steel to the fifteen-sixteenths of the world's people, without asking free entry to this market for the products of their low-wage labor.

Concerning the duties on tungsten and manganese ores it is stated that in order to be of any service to domestic producers they had to be high enough to double or treble the price of the imported product. Meanwhile imports, in the case of manganese ore, are six times the domestic production. Conservation of the small supplies we have is urged, against a need that may develop in the future. "The duties on these ores can be defended only on the theory that it is the Government's duty to cherish all its 'war babies' at any national cost. If it is felt that the men who risked their capital in these enterprises in time of national stress have a claim for consideration, it would be far better economy to reimburse them for their investment—buy them out once for all and have done with it."

Several appendices to the book deal with assembling and production costs of various iron and steel products in the United States and the countries of Europe. Some of the data are taken from two articles prepared for THE IRON AGE in 1927 by Paul M. Tyler, formerly on the staff of the Tariff Commission and later with the Bureau of Mines, on dealing with "Transportation Handicaps in Steel" and the other with "Ore and Fuel Costs, Here and Abroad."

A. I. F.

Reducing Management to Formula

Production Planning—Its Engineering Elements. By John W. Hallock. 172 pages, 6 x 8½ in., 64 figures, 3 tables. Ronald Press Co., New York. Price $4.

This volume, by the head of the industrial engineering department of the University of Pittsburgh, is intended to serve both as a textbook in engineering colleges and as an organized reference for manufacturing executives. The organization and direction of production is regarded as a technical engineering subject, and in this book is given the scientific and mathematical treatment universally adopted in dealing with problems of engineering design. The author aims to show how to use mathematical relationship and computations in answering practical questions and solving every-day production problems. Application of the principles and methods of planning are illustrated in connection with the manufacture of globe and gate valves.

From an outline of the function of planning, in which it is recognized that not all plants require the same refinements of planning and production control, the author passes to methods of estimating the time required to perform any given operation in the foundry and machine shop. Relation between power and the amount of metal removed (or machine analysis) includes lathes, milling machines and drill presses; computation of process time is conveniently done by the straight line or alignment chart. Economies in the use of jigs and fixtures is discussed and includes the formulas of Prof. Joseph W. Roe. A chapter on materials handling in controlled production includes the general formulas presented in 1925 by the materials handling division to the American Society of Mechanical Engineers. R. E. M.

Cost Accounting, American and German

Manufacturing Costs and Accounts. By A. Hamilton Church. 516 pages, 6¼ x 9¼ in., illustrated. McGraw-Hill Book Co., Inc., New York. Price $6.

This treatise on cost accounting is intended primarily for the student of accounting, but it seems evident that to receive the full measure of benefit the reader should have a good knowledge of accounting fundamentals, general methods and economics.

While the specific illustrations are based on the fabrication and assembly of finished products in a metal-working shop, the principles laid down and the methods described are applicable to general manufacturing and assembly. The approach and discussion throughout are analytical. The principle that all expenditure that does not contribute in some definite way to the alteration of the status or condition of material is wasted expenditure, is consistently carried in the mind of the author.

The author defines three principal types or methods:

Method A. Direct labor and expense are merged and averaged and charged to each unit of production on a time basis.

Method B. Direct labor is charged to unit quantity on a time basis, while expense is averaged and charged as a percentage on direct wages.

Method C. Direct labor is charged to unit quantity, and expense is similarly charged by means of a machine rate, both on a time basis.

In analyzing the three methods, diagrams, forms and specific examples are given with clearness and painstaking care. Diagrams are somewhat unusual. Emphasis is laid on "work in progress" and its effect on exact costs. The author here indicates that the value of intricate detail is very high to those responsible for manufacturing operations.

In summarizing the results, the author points out that the series of forms set up serve as abstracts of the various transactions treated. The principle is enunciated that all accounting is based on the difference between ownership and property.

To apply these methods to any industry a good grasp of the way in which values are analyzed and combined is necessary. Besides the actual materials bought, stored, accounted for and charged, depreciation, service (such as rent, taxes and insurance), labor and other expense, must be given due weight by a proper mechanism of assembly.

Part III relates to factory returns. Briefly, these are for three sets of officials in a factory, viz:—the foremen, the superintendents and the executives. For the foremen the reports should be prepared by the accountant in detail and each day, for the superintendents, there should be less detail and more comparison; for the executives, even more general and less frequent, consisting, in a word, of the financial results in brief. T. W. Buxton.

Russia Makes a New Start

The Soviet Union Looks Ahead. The Five-Year Plan for Economic Construction. 275 pages, 5⅛ x 7¾ in., with 2 colored maps and 13 charts included in text. Horace Liveright, New York. Price $2.50.

Industrial and agricultural expansion to the extent of $32,300,000,000 in the brief period of five years is so ambitious as to stir our admiration, even though possibility of complete realization appears decidedly remote. Yet such a plan was adopted last May by the 3000 members of the Congress of Soviets, representing more than 180 nationalities.

To quote the English version of the five-year plan, "the object must be, with the aid of the colossal natural resources of the Soviet Union, the advantages afforded by its system of an organized and planned national economy and the latest technical achievements, to secure a rate of economic development higher than that yet attained by modern capitalist countries."

Some hint of the problems faced by the Soviet Union with an obstinate peasantry not yet convinced of the advantage of communistic enterprise appears in the distribution of the planned expenditure; half of the 64,600,000,000 rubles will be devoted to agriculture by aiding cooperatives, furnishing tractors and other mechanical equipment and establishing state owned farms, so that by the end of the period the Government will occupy a more important agricultural position than at present. It is planned to have 75 per cent of the agricultural output in 1933 from private farms and 25 per cent from Government and cooperatives of the smaller peasants.

The remainder of the total expenditure is to be distributed to industry and housing, 20,300,000,000 rubles (a ruble is about 50c.); electrification (not including industrial power plants), 31,100,000,000; and transportation, 10,000,000,000.

The problem of obtaining an adequate force of engineers, technically trained workers and generally skilled workmen is acknowledged as the most difficult of solution. It is frankly admitted that the "principal defect in the long-term planning thus far done in the Soviet Union was the failure to give due attention to this problem of personnel, and to assign to it a proper place among the primary requisites." To execute this ambitious program 24,200 additional engineers will be needed by the end of the period in all departments, while the existing higher technical institutions as they now function can supply only about 20,000 for all fields, including transportation, commerce and teaching. It is consequently proposed to provide intensive instruction in certain special fields in-

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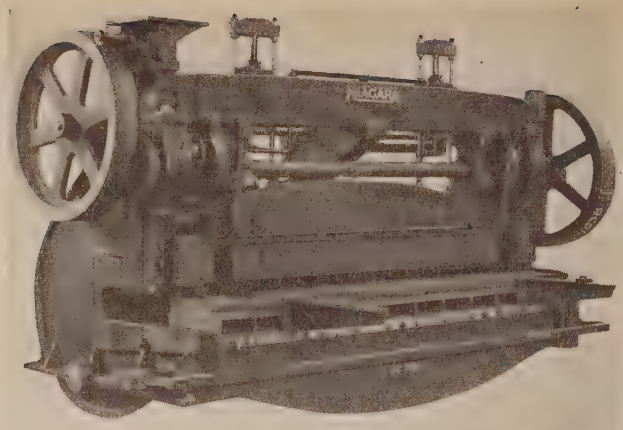


The Main Eccentric Shaft of This Squaring Shear Is an Accurately Ground Forging. The eccentrics are forged solid with the shaft

Improved Heavy-Duty Power Squaring Shear

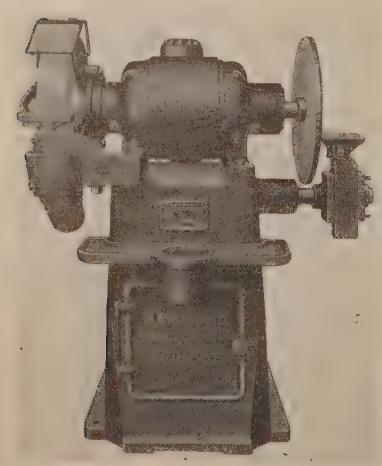
IMPROVED series M heavy-duty mill squaring shears, which range in capacity from ½ in. to ¾ in., mild steel plate, and in length from 60 in. to 192 in., have been announced by the Niagara Machine & Tool Works, Buffalo.

The main eccentric shaft is a large diameter steel forging accurately ground, with the eccentrics forged solid with the shaft. The main bearings in the housings and the rigid center bearings lie immediately adjacent on either side of the eccentrics and holddown cams, an arrangement intended to eliminate vibration, resists deflection and minimize bending stress. The two end bearings are solid sleeves fitted into the housings and may be removed conveniently when worn. The company's patented individual spring foot holddown employed is operated by two cams located on the main shaft. Cam rollers are of hardened steel and run in oil. Toggle links transmit the holddown pressure directly to the housings, relieving the cams, mainshaft and main shaft bearings. Each foot has an individual spring cushion, making it self adjusting for short and long plates of different thicknesses.

The massive crosshead carrying the upper knife is of deep box section, It is counterbalanced by means of two pneumatic cylinders mounted on the crown, but provision is made for counterbalancing by springs or weights if air is not available. The lower knife chuck, of box construction, is adjustable from front to back for the setting of the knives. A large positive jaw clutch with three engaging surfaces controls the motion of the crosshead. All machines of the M series are double geared, the gears having cut teeth. Either belt or geared motor drive may be applied.

Combination Disk and Production Grinder

WHEN disk grinding operations are limited, the solid wheel of the combination grinder illustrated can be used for grinding tools and castings. The machine is a recent addition to the line of the Hammond Machinery Builders, Inc., Kalamazoo, Mich., and is built in four sizes, 2, 3, 5 and 7½-hp. capacity, for 220 and 440-volt, 25 to 60-cycles alternating current, and 110 and 220-volt direct current. Standard equipment includes a steel adjustable wheel guard, steel disk, and plain table, although a universal lever-feed table can be furnished if desired. The machines can also be fitted with disk on both ends, with either the plain or universal lever-feed tables.



The motor is entirely inclosed and is fitted with an air cleaner (patent applied for) which supplies clean air to the windings. The machines are equipped with push button control and automatic motor starter, having thermal overload protection, low voltage, and phase failure protection. The automatic starter, mounted on the inside of the pedestal door is accessible for inspection and resetting. Ball bearings designed to take both radial and lateral thrust are used; they are completely inclosed and protected from dust and grit by double labyrinth seals. Oil reservoirs are provided with convenient oil cups, oil level gage and drain plug for ease of flushing the bearing chamber. The oil chamber is designed so that surplus oil will run out through overflow located at the wheel end of the bearing compartment, away from the motor windings.

The disks are machined on both sides so that two disk wheels can be mounted at one time. After one is worn, the disk can be reversed. Wheel presses for mounting disks can be supplied to order.

Bench Vise Designed to Hold Irregular Shapes

BENCH-TYPE Berjo vises in both plain and swivel-base models are being manufactured by the Avey Drilling Machine Co., Cincinnati. As indicated in the description of the machine vise in THE IRON AGE of Jan. 10, Berjo vises have multiple

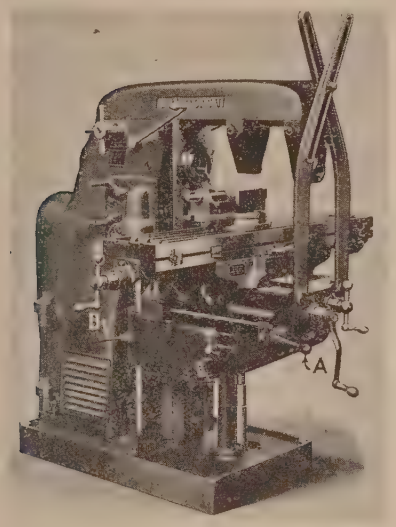
compensting jaws which hold both regular and irregular shaped pieces securely. The jaws are backed by an arrangement of steel balls which flow much the same as a fluid and allow the jaws to follow the contour of the work. The lever at the side is for bringing the compensating jaws into parallel alinement in which position they can be locked. The weight of the plain bench vise is 84 lb. and of the swivel vise 96 lb. The opening is 4 x 7 x 3 in.

Automobile Executives Are Le Blond's Guests

More than 30 executives of automobile factories were guests of the R. K. Le Blond Machine Tool Co., Cincinnati, Dec. 10 and 11, at a special showing of the latest models of Le Blond crankshaft lathes in operation. On Tuesday evening, Dec. 10, the visiting executives were dinner guests of the Le Blond company at the Alms Hotel. W. F. Groene, vice-president, spoke on "The Story of the Crankshaft," tracing the history and development of the crankshaft and the evolution of equipment for manufacturing it.

Millers Equipped with Power Quick Traverse

POWER quick traverse up and down, in and out, left and right, are now provided on the M-type milling machines, Nos. 1 and 2 plain, universal and vertical styles, manu-



factured by the Cincinnati Milling Machine Co., Cincinnati. The rates are 100 in. longitudinal, 66 in. cross and 33 in. vertical.

The power quick traverse lever *A*, which is conveniently located at the left front side of the knee, has three positions: Upward, for power quick traverse; horizontal, for neutral; and downward, for feed. To obtain power quick traverse in a given direction it is only necessary to engage the respective feed lever, move the reversing lever into position and then pull upward on the power quick traverse lever.

Feed in the same direction as the power quick traverse is obtained by moving the lever *A* into the downward or feed position. A detent is provided for holding it into position. Twelve feeds are available; that is, ¾ to 30 in. longitudinal, ½ to 20 in. cross and ¼ to 10 in. vertical, in both directions. Rear control of any one of the three feeds can also be obtained by the use of the rear reversing lever *B*, a duplication of the lever at the front of the feed box.

Pneumatic Wrench to Take Off Staybolt Caps

THE Independent Pneumatic Tool Co., 600 West Jackson Boulevard, Chicago, has brought out a new pneumatic wrench, designated as the Thor No. 278, which operates at 170 r.p.m. The speed is governor controlled. Heavy-duty ball bearings are used at vital points, and a renewable rotor liner is provided to save cylinder wear and reduce upkeep costs.

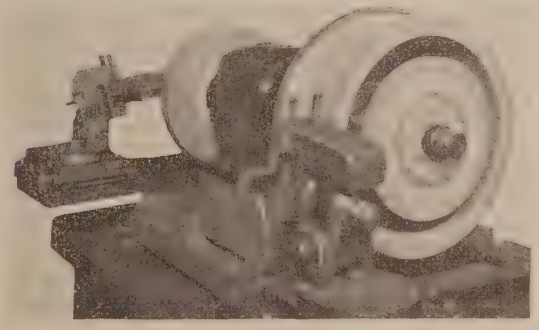
It is claimed that in one shop using this machine the 600 to 750 flexible staybolt caps usually used on locomotives are removed in 6 hr. with only one boiler maker and a helper. Previously, removing these caps by hand required two boilermakers and two helpers working 8 hr. The wrench can be used for removing rusted staybolt caps, and because of its fast starting torque it will break nuts loose from cylinder studs without backing the stud out. Dome nuts, superheater units and frame bolts are also handled rapidly. The tool weighs 40 lb.

Grinds and Laps Tungsten-Carbide Tools

TUNGSTEN-CARBIDE tools may be rough and finish ground and lapped in one set-up in the vise of the combination grinding and lapping machine illustrated, which has been brought out by the Advance Diamond Tool Co., 427 West Congress Street, Detroit.

At one end of the machine there are two rim wheels, one of which is a 12-in. 60-I grit roughing wheel and the other an 8-in. 120-I grit finishing wheel, while at the opposite end there is a diamond lapping disk. Both ends of the machine are provided with a slide that extends across the face of the wheels, and there is another slide which moves toward the face of the wheel. The latter carries a special universal vise.

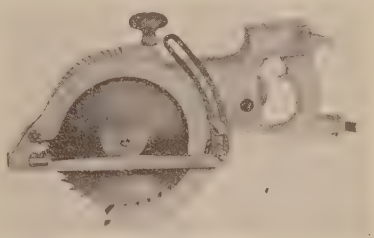
The tool to be ground is put in the universal vise, and the angles are adjusted to requirements. Grinding is accomplished by operating the slide across the face of the rim-type roughing wheel, and then across the finishing wheel. If diamond lapping is to be performed on the same tool the cross slide and universal vise with tool mounted thereon are removed and placed on the slide at the lapping end of the machine. The tool is then moved up against the lapping disk and finish lapped. The tool remains set up to the proper angle throughout the entire grinding and lapping operation. An electric rheostat permits varying the grinding speed to compensate for variations in the hardness of the emery wheels employed. This feature is important in grinding tungsten-carbide tools for the reason that unless the speed is correct, either the wheel does not cut at all or the tool wears the emery wheel away. The machine is said to prove economical in manufacturing plants using as few as a dozen tungsten-carbide tools.



THE Wheels in the Foreground Are for Rough and Finish Grinding of the Tungsten-Carbide Tools. The tool remains set up at the proper angle throughout the grinding and lapping operations

Light Weight Electric Saw

A PORTABLE electric hand-saw weighing 15 lb., for use in shipping departments, plant maintenance and other work, has been added to the



line of the Wodack Tool Corporation, 4627 West Huron Street, Chicago.

This machine, named the Junior model K, is designed for cutting boards up to 2⅝-in. thick. It is compact and has a saw-dust blower that facilitates sawing to a line, a convenient trigger switch, momentary contact, rip gage to save marking the board to be sawed, and a depth gage that is adjusted by one wing nut. Accessories include extension cord, lubricant, grease gun, and a steel carrying case.

An exhibit of silent chain drive in many phases of industrial application will be shown by the Morse Chain Co., Ithaca, N. Y., at the Road Show in Atlantic City, N. J., Jan. 11 to 17. This is substantially the same exhibit as was shown during the Power Show in New York early in December. Flexible couplings, single, double and triple-reduction speed reducers and ring and disk oilers will be featured, as well as the silent chain.

Committee Named to Stabilize Business

Business Leaders Appointed by Julius Barnes, Who Says Reports Indicate No Cause for Timidity

WASHINGTON, Dec. 17.—Courses of action looking to continued stabilization of business probably will be recommended at the first meeting of the 21 members of the executive committee whose appointment was authorized at the National Business Survey Conference held here at the Chamber of Commerce of the United States on Dec. 5. Julius Barnes, who announced the committee, will, as requested by the conference, act as its chairman. The committee is made up of prominent business leaders throughout the country. The steel industry is represented by Myron Taylor, chairman of the finance committee, United States Steel Corporation.

The conference also authorized the appointment of a larger general committee, to be named later. This committee will be broadly representative of the many lines of business enterprise and may consist of as many as 50 men, according to an announcement of the chamber. The individual members of the larger committee will serve as points of contact between the executive committee and trade associations and commercial groups.

Mr. Barnes said that the executive committee will be called into consultation at an early date but that nothing of an emergency character exists in the present business situation to require undue haste in its work. This committee will go over the reports submitted at the conference as well as other material which is being gathered on the business situation, and from these analyses it is expected to recommend a program to be followed for maintenance of business activity and employment.

No Cause for Timidity

Mr. Barnes said that a preliminary study of the many reports submitted to the conference indicates that there is nothing to cause further timidity or hesitation. On the contrary, these reports, he said, warrant confidence in the early stabilization of business activity.

He said that provisions for study and comparison of conditions in the various industries through representative trade organizations is being made by the formation of a large committee comprising competent and recognized leadership in the more important business fields.

The executive committee was made small in number, it was stated, so that it can meet more frequently and act with greater dispatch in shaping and directing major policies. In selecting the executive committee, Mr. Barnes said, it was necessary to choose from a wealth of proved leadership, ability and character. It was recognized that it was impossible to include many outstanding men of tried experience and judgment or to include representatives of every line of business, many of which are of great importance. Geographical distribution was taken into account in choosing the smaller committee, Mr. Barnes explained, but greater weight was given to breadth of experience.

The membership of the executive committee follows: Julius Barnes, chairman, board of directors, Chamber of Commerce of the United States, chairman; Owen D. Young, chairman of the board, General Electric Co. and Radio Corporation of America, New York; Myron C. Taylor, chairman of the finance committee, United States Steel Corporation, New York; Thomas W. Lamont, partner, J. P. Morgan & Co., New York; Paul Shoup, president, Southern Pacific Co., San Francisco; Clarence M. Woolley, chairman of the board, American Radiator & Standard Sanitary Corporation, New York; Henry M. Robinson, president, Los Angeles-First National Trust and Savings Bank, Los Angeles; Walter C. Teagle, president, Standard Oil Co. of New Jersey, New York; James Simpson, president, Marshall Field & Co., Chicago; Cornelius F. Kelley, president, Anaconda Copper Mining Co., New York; Elbert L. Carpenter, president, National Lumber Manufacturers' Association, Minneapolis; Pierre S. duPont, chairman of the board, E. I. duPont de Nemours & Co., Wilmington, Del.; Lewis E. Pierson, chairman of the board, Irving Trust Co., New York; George Horace Lorimer, editor, *Saturday Evening Post*, Philadelphia; Walter S. Gifford, president, American Telephone & Telegraph Co. New York; Alvan Macauley, president, National Automobile Chamber of Commerce, Detroit; John G. Lonsdale, president, American Bankers Association, St. Louis; Stuart W. Cramer, director, Cotton Textile Institute, Cramerton, N. C.; Charles Cheney, president, National Industrial Conference Board, Manchester, Conn.; Silas H. Strawn, chairman of the board Montgomery Ward & Co., Chicago; Harry Chandler, publisher, *Los Angeles Times*, Los Angeles.

Machine Tool Trade Hopeful

The chamber has prepared summaries of reports submitted to the conference and distributed them in booklet form.

The report for the machine tool industry was filed with the chamber by E. F. DuBrul, Cincinnati, general manager, National Machine Tool Builders' Association, who pointed out that the first 10 months of 1929 produced about one-third more business than was booked in the first 10 months of 1928. During all of 1928 the orders were on the upgrade, the report said, but in 1929 orders have been on the downgrade since May, which was the peak month for the present movement.

"It seems reasonable to expect that 1930 should turn in between 20 and 25 per cent less orders for machine tools than were booked in 1929," it was declared. "This would be only a little below 1928, which was a good, comfortable year for the industry. Since we had to run overtime and even double-shift to make deliveries in 1929, we feel that we shall be quite comfortably off on a year's business that would be only 75 per cent of the volume of such a boom as we have been in."

Crane Builders Expect Good Business

Reporting for the electric crane industry, President W. D. Sayle of the Electric Overhead Crane Institute said:

"We are just completing a most satisfactory business year, as is indicated by the fact that the shipments of electric overhead cranes for the first 10 months of 1929 exceeded the shipments for the same period of 1928 by over 68 per cent. The orders received for cranes during the first 10 months of 1929 exceeded those received during the same period of 1928 by over 97 per cent and exceeded the orders for the entire year of 1928 by 65 per cent.

"It is quite evident from the foregoing that the balance of orders at this time, and of which there is not the slightest evidence of cancellation, will provide a volume of business for the year 1930 fully equal to that of 1929, even should there be a slight falling off in the volume of new orders during the early part of the year 1930.

"It was the consensus of the industry that, while there might be a moderate cessation in the placing of new orders for cranes, there would be a quick recovery from such depression, if it occurred, and that the total volume of new crane business placed in 1930 would undoubtedly be fully equal to that of 1929."

Look for Upturn by March

The condition and prospects of the woodworking machinery industry were stated in a report filed by L. P. Monks, president, Association of Manufacturers of Wood Working Machinery. It was pointed out that during the closing period of 1928 the industry was on an upward curve and that the closing of 1929 shows it to be on a downward curve. The report said that the industry scarcely expects to note a decided improvement before March, 1930, although it is "quite confident that we shall swing into an upturn by that time."

The present situation in the forging industry was declared to be slightly off from this time last year, said a report filed on behalf of that industry by G. H. Weiler, New York. Prospects for the next six months, as compared with a corresponding period this year, it was added, are nearly equal. The report represented about 85 per cent of the industry.

Is Business Taking Course of 11 Years Ago?

Then, as Now, Output of Basic Materials Fell Off More Than Retail Trade—Post-Armistice Curtailment of Consumer Buying Failed to Materialize

BY DR. CHARLES O. HARDY

THE outlook for business in 1930 is but little clearer than it was a month ago. The recession of business activity which was in evidence before the stock market collapse is proving to be very irregular in its incidence, some lines of activity falling off with amazing rapidity while others show little sign of slackening. It is quite remarkable, for instance, that steel production has shown the most rapid decline on record, while coal production has not fallen below normal; cotton consumption has been extremely slow, while chain store and mail order sales continue their rapid rate of growth. The situation is confusing.

The favorable factors may be summarized as an unexpected strength in retail trade, a farm situation distinctly better than in most recent years, an ample supply of credit, moderate inventories and, finally, a well-organized movement headed aggressively by the President of the United States to stabilize the business situation by stimulating those lines of activity where output need not be adjusted to temporary fluctuations in demand.

The outstanding unfavorable factors are a widespread undercurrent of pessimism, engendered by the stock market collapse, and the accumulation of evidence that the actual rate of operation in several basic lines has been falling off with a rapidity which reminds one of the behavior of the stock market itself.

Of the two unfavorable factors mentioned the psychological situation is the more difficult of description. Naturally the optimists are more outspoken and receive greater publicity than do the pessimists; nevertheless there is an undercurrent of gloom which is not dissipated by the expressions of confidence that have emanated so generally from public officials, business and financial leaders and business forecasters.

Basic Production Shows Sharp Drop

THESE apprehensions were confirmed by the reports of basic production for November. The worst report was from steel—a drop in the daily rate of production, from October to November, of 19 per cent, the largest on record. Moreover, this was the sixth successive month which showed a decline. Pig iron output also, of course, fell off sharply, though the reduction was not so great and the November rate was higher than that in any month in the last half of 1927.

The report of unfilled orders of the United States Steel Corporation, on the other hand, showed an increase for the third successive month. This showing was due to the fact that production was cut in November to 75 per cent of capacity as compared with 85 per cent in the preceding month, while bookings fell only to 78 per cent of capacity as compared with 98 per cent in October. In spite of the substantial backlog of unfilled orders the Steel Corporation's rate of activity has continued to decline, and was reported at 65 per cent on Dec. 14.

¶ Public works and utility programs have previously expanded in slack times.

* * *

¶ Now central organization and planning will reinforce stimulus of savings in cost.

* * *

¶ Present juncture recalls business situation after Armistice. The stock market declined sharply in November, 1918, commodity prices turned downward, industrial activity slackened.

* * *

¶ Then, as now, the center of depression was in parts of the industrial organism furthest from the ultimate consumer. But the buying power of consumers was underestimated.

Cotton consumption in November was off 18 per cent from October and 14 per cent from November of last year. Stocks of copper and of raw silk are reported as heavy and increasing, and prices of raw materials generally have been falling except in cases where producers are so well organized that they can hold up prices in the face of slack demand.

Retail Trade Is Sustained

Wholesale trade is generally reported as bad. On the other hand, the slump in retail buying which was feared as the immediate result of the stock market collapse has failed to materialize. Sales of 26 leading chain store companies for November (including those of the two leading mail order houses) showed a gain of 15 per cent over last year. Nor does this mean merely that buyers have turned from the higher priced stores as a forced measure of economy. Reports of department stores and other retailers to the various Federal Reserve banks are generally good; it appears now that Christmas trade will be very satisfactory. Sales of radios, automobiles and a few other "luxury" lines show up badly; it is uncertain how far that reflects over-selling during the past year and how far it is a result of speculative losses.

The most interesting development of the month is the series of conferences called by the President to encourage the carrying forward of construction activities. It has often been suggested that the most hopeful way to deal with business depressions is through organized effort to concentrate in such periods the building of roads and school houses, the improvement of rivers and harbors and other public works, together with railroad and public utility construction and such industrial expansion as does not depend for its justification upon the immediate state of the market. On the other hand, so the theory runs, in periods of high industrial and commercial activity a sound policy calls for the curtailment of construction of the types just indicated. Such a plan has the double advantage that it would result in an economy of construction and financial cost and would tend to equalize the volume of employment and the disbursement of purchasing power.

Stabilizing Influence of Public Works in Previous Years

TO a certain extent the plan has been carried out heretofore, public works and public utility operations tending to expand in slack times and giving way to industry when the pressure is great. Thus railroad, public utility and State and local borrowings were nearly twice as great in 1921 as in 1919; their combined total was larger in the dull year 1924 than in either 1923 or 1925. To carry out the idea effectively, however, requires central organization and planning, in addition to the stimulus of an uncertain saving in cost.

The notion that the Federal Gov-

ernment can play an important role in bringing about such a balancing of economic activity is relatively new in practical politics, and is one of President Hoover's titles to recognition as a political-economic statesman. In the spring of 1923, as Secretary of Commerce, he warned the public that there were indications of an over-expansion of business activity and suggested a deferment of public construction expenditures. The writer has always believed that this action counted for more in checking business expansion at that time than did the small increases in discount rates which are generally believed to have done it. Under Mr. Hoover's administration the Department of Commerce devoted its energies to encouraging the accumulation and publication of statistical data which may make possible a better adjustment of individual programs to the general situation. Now, for the first time, he has an opportunity to test the possibilities of cooperative effort with Governmental leadership to shorten the downswing of business through a concerted concentration of effort.

Present Recalls Situation After Armistice

THE business situation at the close of 1929 suggests comparison with that of 1918. Then, as now, the economic organization of the country had received a terrific shock. Then the business world anticipated that the release of millions of men from military duty would at the same time create a vast burden of unemployment relief and make possible an output of commodities which would play havoc with the price level. War demand was about to cease, and vast industrial organizations would lose their only market. The stock market declined sharply in November; commodity prices turned downward, industrial activity slackened—all the familiar phenomena of the early stages of depression appeared. Agencies of the Federal Government called conferences of business men to plan how to avoid depression—in that case through agreements to stabilize prices rather than through efforts to increase production.

Then, as now, however, the center of depression was in the parts of the industrial organism that are farthest from the ultimate consumer. Production of basic raw materials fell off more than that of goods for consumption, and wholesale trade more than retail. Raw material prices fell most, the cost of living least. Curtailment of consumption was apprehended, and to get ready for it producers curtailed operations. The result, since consumers' buying slackened but little, was to use up stocks all along the line.

Consumers' Buying Power Was Underestimated

IN the course of a few months it became evident that business leaders had failed to take account of the enormous buying power which the farm population had accumulated through several years of prosperity, of the European demand that credit operations could change into actual buying, and of the demand that the return of the military forces would bring into the markets for civilian clothes, for housing facilities, and so on. Consequently the depression was very short-lived. Inventories were sold out; then industry set itself with renewed energy to building them up again—and this time caution was forgotten.

The details differ, but basically the present situation is very similar. Again a few industries really do face the probable necessity for adjustment to a market inadequate to utilize their capacity, but both rural and urban population have a purchasing power substantially unimpaired. Curtailment of businessmen's buying from one another has started in response to a consumers' market situation which is apprehended but not seen.

If we are right in believing that the high level of productive activity of the last two years has been only proportionate to the expansion of consumption and has not resulted in the general piling up of inventories of manufactured goods, and if the curtailment of business activity does not quickly run so far as to undermine its own market through curtailment of its wage payments, the most probable outcome is, as in 1919, an early realization that "the business situation is fundamentally sound." To the achievement of this end no better program than that now being fostered by the Federal Government and the United States Chamber of Commerce and other agencies could be suggested.

Two Risks in President's Program

TWO risks suggest themselves, however. First, it is not a sound long-run policy to meet threatened unemployment of labor by creating unemployment of productive capacity. If the construction program of 1930 is wisely planned it will at the same time relieve immediate fears of unemployment and bad trade and provide the ultimate basis for further expansion of both the production and consumption of the country. If, on the other hand, resources are turned into the production of types of building with which we are already supplied, of ships which can get business only by crowding other ships off the seas, into the digging of waterways to take care of non-existent traffic, immediate relief will only defer business difficulties. Second, and more serious, there is danger that if the present downswing of business shall be as temporary and as mild as those of 1919 and 1927 we may, as in 1919, sow the seeds of a worse harvest to follow. One of our most valuable business assets is the spirit of caution which the business world acquired in 1921. Commodity markets can run wild as easily as can stock markets. Too hasty an acceptance of the idea that we have mastered the technique of controlling business cycles may destroy the possibility of such control.

Favorable Factors

1. Unexpected strength of retail trade.
2. Improved farm situation.
3. Ample supply of credit.
4. Moderate inventories.
5. President's stabilization program.

Unfavorable Factors

1. Undercurrent of pessimism.
2. Sharp drop in activity of basic lines, such as steel and cotton.

Recommend Some Welding in New York Buildings

Technical committees which are assisting in the work of revising the building code of New York City have made recommendations to the Merchants' Association of New York, which, at the request of Mayor Walker, has undertaken the work of obtaining such professional advice.

One of the recommendations of the subcommittee on materials, loads and stresses is that welding, and in some instances bolting, be permitted as a cheaper means of construction and with a view to reducing noise.

This subcommittee also recommends an increase in permissible stresses of structural steel from 16,000 lb. to 18,000 lb. per sq. in., and a revision of the requirements in connection with wind pressure, with provision to be made in buildings for a wind load of 20 lb. per sq. ft. instead of 30 lb., as at present. It is recommended that the entire wind pressure be taken up in the frame of the building.

Proposed changes in the building code, it was stated, would effect savings of about 12 per cent in the cost of steel structures, this cost now representing 10 to 20 per cent of the entire cost of steel frame buildings.

Dinner Held for Apprentices at Milwaukee

The operating apprentice committee of the Milwaukee branch of the National Metal Trades Association held its annual booster dinner Nov. 11 in the Milwaukee vocational school, with Dr. Robert L. Cooley, director of the school, as speaker. About 200 men attended the dinner and later made a tour of the school. The Milwaukee branch of the National Metal Trades Association reports a steady increase in the number of indentured apprentices due to the combined efforts of school, state and industry coupled with a comprehensive program of education and work for apprentices.

Four-Company Steel Merger Announced

Republic, Central Alloy, Donner and Bourne-Fuller Companies to Be Consolidated—T. M. Girdler May Head Board—E. T. McCleary Probable President

CLEVELAND, Dec. 17. — Announcement was made here late today of the merger of important iron and steel companies which resulted in the formation of the third largest company in the United States.

At a meeting of the board of directors of the Republic Iron & Steel Co., E. T. McCleary, president, announced tonight, a plan was approved for the merger of his company, Central Alloy Steel Corporation, Donner Steel Co. and the Bourne-Fuller Steel Co. This plan will be submitted to the stockholders of the Republic company at an early date for their approval.

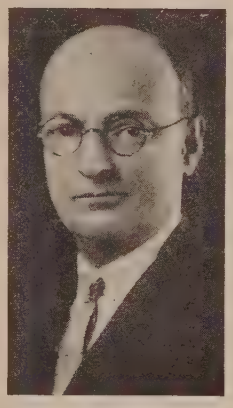
Similar action was taken by the board of directors of the Central Alloy Steel, Donner Steel and Bourne-Fuller companies, at which meetings the plan of merger was approved, and will likewise be submitted by each one of these companies to the stockholders for ratification.

Mr. McCleary said that the details of the merger are being worked out and will be made public later. He gave a general statement of the properties which will be included. These properties, which embrace a self-contained unit from raw materials to finished products, have combined total assets of approximately $350,000,000 and combined total annual sales of about $250,000,000. The total ingot capacity is approximately 4,900,000 tons a year. Pig iron capacity is estimated at about 2,400,000 tons.

The name of the new company probably will be the Republic Steel Co. As a working part of the merger there will be the Republic Research Co., to be devoted to exclusive research in all the processes and patents involved.

It is expected that T. M. Girdler, former president of the Jones & Laughlin Steel Corporation, will be chairman of the board of the new company. E. T. McCleary, of Republic, will be president. F. J. Griffiths, chairman of the board of Central Alloy, will be president of the research company, in charge of all the research and metallurgical work. The principal executives of the merged companies, in addition to the above, are B. F. Fairless, J. M. Schlendorf, of Central Alloy; H. T. Gilbert and W. M. Neckerman, of Republic; W. T. Witherow, of Donner, and R. S. Hall, of the Bourne-Fuller company. These, together with R. J. Wysor, formerly general manager of Jones & Laughlin, will constitute the active executive staff of the new company.

There was no announcement regarding the Youngstown Sheet & Tube Co. and the Inland Steel Co., which many had thought would be included in the merger when it was finally completed.



T. M. GIRDLER

T. M. GIRDLER, Former President of Jones & Laughlin Steel Corporation, is Slated for Chairman of the New Republic Steel Co. and E. T. McCleary, Now President of Republic, Will Continue in That Capacity in New Company

E. T. MC CLEARY

Lamson & Sessions Co. May Buy Foster Bolt

The Lamson & Sessions Co., Cleveland, has submitted an offer to purchase the Foster Bolt & Nut Mfg. Co., Cleveland, on an exchange of stock basis, and the directors of the latter company will hold a meeting this week to consider the merger. It is believed that the offer will be accepted. The Lamson & Sessions Co. recently acquired the Lake Erie Bolt & Nut Co., with plants in Cleveland and Birmingham. If it takes over the Foster company, it will also have a plant in Chicago in addition to acquiring the Foster plant in Cleveland. The Foster company has been in operation about 20 years and is understood to do an annual business of about $2,500,000.

American Steel & Wire Co. to Rebuild Newburgh Works

The American Steel & Wire Co., Cleveland, plans to start an extensive rebuilding program at its Newburgh steel works in Cleveland early next year. While details have not yet been worked out, the plans call for dismantling of the old plant and replacing it with an up-to-date steel plant with an increase in open-hearth and rolling mill capacity. Extensions will include the building of a new open-hearth department with a battery of 150-ton furnaces and blooming and finishing mill equipment. The plant now has seven open-hearth furnaces of 60-ton capacity. The construction program will probably extend over a period of a year or more. The Newburgh steel works were originally built in 1867-68.

Mining Institute to Be Held at Seattle

The annual Mining Institute at the College of Mines of the University of Washington, which is open to all persons interested in any branch of the mineral industry, will be held this winter at Seattle throughout the week beginning Monday, Jan. 20, 1930. The extensive new equipment for mining, metallurgy, and ceramics recently installed in mines laboratory will be used for instruction and demonstrations. In addition to the lectures by the regular staff of the college there will be talks by representative engineers and operators of the Northwest. In the evenings moving pictures of mining operations will be shown. At the last session of the Mining Institute 120 persons were in attendance. No fees are charged.

Algoma Steel Corporation, Sault Ste. Marie, Ont., will place its new 18-in. bar mill in operation this week. Its new 12-in. mill will begin operating about Jan. 1. The mills will have double the capacity of the ones they replace.

Reduced Iron Rates from South Denied

Commerce Commission Refuses Plea for Lower Tariffs from Alabama to North Central Points

WASHINGTON, Dec. 17.—In a decision made public last Thursday, the Interstate Commerce Commission held to be not justified proposed reduced rates on pig iron from points in Alabama, Tennessee and Kentucky to St. Louis and related or intermediate points in Illinois and Indiana. The schedules, which were under suspension, were ordered cancelled. They were filed by Southern carriers and supported by merchant blast furnace interests in the South. Opposing the schedules were pig iron producers in the St. Louis, Chicago, Cleveland, Youngstown, and Duluth, Minn., districts, consumers at Metropolis, Ill., Louisville and Newport, Ky., and Northern carriers.

From Birmingham to St. Louis, it was proposed to establish a rate of $3.69 a ton, a reduction of 73c. from the present rate of $4.42. Other proposed reductions ranged from 41c. to 72c.

The commission did not support the contention that the decline in tonnage of pig iron from Southern furnaces marketed outside of Southeastern territory was due to unfavorable rates. The accumulation of stock and depression were attributed in part to a general decline in the demand for pig iron, which has been felt by Northern as well as Southern producers by reason of the increased use of scrap. In the South, it was said, it is particularly due to the depressed condition of the cast iron pipe industry.

On the other hand, the commission concurred in the protest of Northern lines that, if the proposed reduced rates were allowed to become effective, the Northern producers would demand corresponding reductions from their furnaces, which, "because of competitive conditions, they will find it difficult to deny." Central carriers expressed the view that, if the proposed rates became effective, the Southern carriers would later find it necessary to make reductions in the rates to the Ohio River crossings sufficient to restore the present relation to the rates to St. Louis.

"These protestants state that if this should be done, producers located on their lines would demand corresponding reductions in their rates to the same destinations in order to meet the competition from the Southern furnaces," the opinion said. "Due to the geographical location of the furnaces in Central territory such requests could not be granted without a general revision of all the pig iron rates in Central territory, resulting in a very substantial depletion of the revenue of the Central lines."

Little Steel Improvement Expected Before March

The trend in the use of scrap in steel manufacture has been upward since 1923, with the trend of pig iron downward, declared Prof. Spurgeon Bell, head of the Bureau of Business Research, Ohio State University, at a meeting of the Cincinnati chaper of the Institute of Scrap Iron and Steel, held at the Deschler Hotel, Columbus, Ohio, on Dec. 11. By means of charts, Professor Bell demonstrated that the scrap market is a barometer of conditions in the steel industry.

In analyzing the prospects for the steel industry in 1930, he stated that the recession in steel operations would continue further beyond the beginning of 1930 than in previous years, with the result that there will possibly be no marked improvement until March or in the second quarter of the year. The conditions in the automobile, railroad and construction industries, however, warrant the prediction that the year 1930 will show good prospects for the steel industry.

"The prospects for the steel industry in 1930 are tied up with the prospects of the three principal consumers of steel—the automobile industry, the railroad industry and the construction industry.

"The automobile industry will continue on a lower scale in 1930. The delay brought about by the change in the Ford model developed a big deferred demand for cheaper cars in 1929, amounting to nearly three quarters of a million cars. When this demand was satisfied during this year, we were confronted with a normal demand for automobiles. In 1930, the demand should be approximately 500,000 cars less than in 1929.

"In the construction industry, the years 1921 to 1925 saw the largest boom in construction, with the result that the post-war demand for construction was satisfied during this period. The bull market discouraged speculative construction, and money was diverted to the stock market, bringing a decline in construction during 1929. The factors that should bring about an improved demand in the construction industry are the following: Rents have declined from 1925 to 1929, and the rent curve has now flattened out and is more stabilized. The cost of construction, which declined over a period of years, became stabilized in the middle of 1929. Interest rates will be easier as the result of the deflation in the stock market.

"The general expectation that a tremendous flood of money will now be available for the mortgage market is somewhat overdone. Capital is scarce all over the world, and there probably is not the large demand for bonds that some people expect. My own opinion is that it will not be long before another bull market will result.

"The railroad situation is particularly favorable for 1930. A good demand began in 1929 and will go forward in the next year. The excess demand in the railroad situation will offset any loss in the automobile industry.

"All indications are that the present decline in steel production will go further this time than in years past. There will possibly be no improvement until March, 1930, with the first quarter poor, the second quarter better and the second half improved."

Market Research in the Malleable Industry

The scope of activities of the Malleable Iron Research Institute will be materially enlarged in order to broaden the field for malleable castings. Action on the extension of work of the organization was taken at the annual meeting of the institute held in Cleveland, Dec. 11.

Laboratory and metallurgical work up to the present has dealt mainly with improving the quality of the product and the efficiency of plant operation. This phase of production research will be continued on an enlarged scale, supplemented by comprehensive plans for shop practice and product inspection services. In addition a broad program of market research will be undertaken which will include a comprehensive survey of the industry.

This will embrace thorough studies of new uses and applications, of specifications of materials for specific purposes and of the study of marketing conditions as affecting the use of malleables, all of which will be supported by a broad program of cooperative advertising. One subject that will be considered will be the provision of different specifications for malleable castings providing specifications for castings for different services to supplement the present single standard specifications of the institute. For the effective conduct of the enlarged activities the personnel of the institute will be increased by an additional administrative executive and field engineers.

R. R. Fauntleroy, Moline Malleable Iron Co., St. Charles, Ill., who became president of the institute early in the year to fill the vacancy caused by the death of Frederick L. Sivyer, was elected president for the ensuing year. Other officers elected were: vice-presidents, John G. Malnoski, Muncie Malleable Foundry Co., Muncie, Ind., and Joseph P. Kennedy, Baltimore Malleable Iron & Steel Castings Co., Baltimore; secretary-treasurer, Robert E. Belt, Union Trust Building, Cleveland.

This Issue in Brief

Wanted: skilled mechanics. Even in relatively dull times skilled mechanics can no longer be hired at will. Apprentice-training is the only answer to the serious problem facing industry. —Page 1662.

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Tool life not increased much by coolants, but they do improve the finish, tests reveal.—Page 1704.

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You waste fuel if you operate your cupola slowly, and the iron undergoes undesirable changes. Uniform output can be obtained at high melting speed.—Page 1659.

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Millions of dollars in transportation costs being saved by river shipments of iron and steel products. Increased competition forces great growth in barge transportation.—Page 1661.

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Greater strength of pressure die castings than in the gravity type is due to difference in structure of metal. Improved zinc-base alloys have greater tensile strength than sand cast brass or bronze.—Page 1658.

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Longest life in broadnose lathe tools is obtained with a back slope of 30 deg. Side slope of 0 deg. is better than one of 8 deg. —Page 1704.

* * *

Doubles machine shop output without buying new equipment. Shop rearrangement, material routing system and incentive system are responsible.—Page 1649.

* * *

Anneals aluminum aircraft engine castings at 960 deg. Fahr. For economy in handling, an electric truck-loading oven is used. It handles two cars.—Page 1650.

Your machine shop costs will fall if you establish standard speeds and feeds. The use of these standards is habit-forming among workmen.—Page 1649.

* * *

Don't expect wage incentive plan to produce wonders, unaided. Bad practices must be corrected. The new plan must be carefully fitted into the shop program.—Page 1647.

* * *

High-speed steel's most important constituent is cobalt, tests reveal. Five per cent is the maximum for economy. Best results are obtained only with high hardening temperature.—Page 1704.

* * *

Dished disk springs have many advantages for application where space is limited. They are cheap, durable, adjustable in height and flexibility.—Page 1664.

* * *

To safeguard crane operator, support the cab separately from load, says tramrail maker. Then if the operator tries to pick up something attached to the floor and the load-carrier breaks, the operator will not be hurt.—Page 1662.

* * *

Increases stockroom capacity 400 per cent and saves cost of new building by standardizing on parts containers, piling them four or five high, and handling them with overhead conveyor.—Page 1654.

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Decreased machining and assembly costs are frequently obtained by using die castings with steel inserts. Alloy shrinks just enough to anchor the insert so firmly that the casting must be broken before insert can be removed.—Page 1658.

Simplifies stock-keeping system by establishing a definite stock run for each model of machine. Then washing-machine manufacturer orders just enough parts for the stock run.—Page 1654.

* * *

Output of foundry increased 75 per cent without additional help or equipment. Arrangement of flasks in orderly manner, delivering to molders the patterns next required, and wage incentive system are responsible for marked savings.—Page 1649.

* * *

Cupola is no longer "she." It is a piece of mechanical equipment, and therefore subject to laws of mechanics and physics.—Page 1659.

* * *

Don't hamstring the new machine by putting on the whole burden of cost reduction. Flow of material, men and methods must be coordinated if best results are to be obtained.—Page 1647.

* * *

Salvages imperfect aluminum castings by preheating to 900 deg. Fahr. in welding furnaces and filling up the blowholes by welding the hot castings.—Page 1651.

* * *

Modulus of elasticity of a metal is not an absolutely fixed quantity. Overloading in tension beyond the yield point lowers the modulus of elasticity with respect to future lighter loads.—Page 1665.

* * *

New field yields low-cost, high grade iron ore. Normandy, France, region develops into one of the world's large iron ore reserves.—Page 1667.

* * *

Economical cutting speeds for finishing cuts can now be determined accurately. As a result of exhaustive tests, engineers evolve formulas for both high-speed steel and carbon-steel tools. —Page 1663.

A. I. FINDLEY
Editor

THE IRON AGE

W. W. MACON
Managing Editor

ESTABLISHED 1855

Next Year's Steel Prospects

BOTH precedent and an analysis of policies of steel buyers at the moment indicate that this year's lame ending in steel demand is not a criterion of what the early months of the new year will show. It was pointed out in this department in the issue of Oct. 24, exactly before the series of stock market crashes had begun, that each year in steel seems to take a fresh start, that if the old year ends well the new year carries the momentum, while "apparently if a year ends poorly demand accumulates."

With the limited number of years we have had since the post-war inflation and deflation there has been supplied a remarkably wide variety of precedent that good or bad endings of a year mean nothing to the new year. There was 1923, with monthly declines in steel production after April and clear through December, yet with 1924 opening very well indeed. It ran into bad things after March, but that had absolutely no connection with the 1923 ending. Then there was 1927, with its whole second half bad, and 1928 started out well, incidentally ending still better.

So much for the reassurance of precedents, that there is no precedent of a poor year ending being carried over. In the various cases the seasonal influence was too strong. As to the attitude of steel buyers, the unsettlement produced by the stock market, waning of late, induced a policy all along the line of particularly drastic curtailment of stocks. The application runs from the primary raw materials along down to final consumption, in many cases through numerous stages.

Steel mills themselves have been curtailing in this respect, whereby on a given date their ingot production is below the usual ratio to the shipments of finished products. The manufacturing consumer, the further manufacturer, if any, and the dealer all curtail. There may have been no stocks that could be called reserve stocks, but stocks that are ordinary stocks in ordinary times look too large in times like these, and with declining operations the volume of material in progress is reduced. Thus almost everywhere less has been going into a manufacturing establishment or a warehouse than has been coming out.

After the turn of the year, which involves the formal Jan. 1 inventory with its influence upon the balance sheet and the year's financial showing in general, and also involves a sudden commencement of looking forward to seasonal spring activity and preparation for it, the reverse action or rebound is in order. After rigid curtailment the disposition will be to return toward, if not to, normal or average. There will be a favorable sentimental influence.

In the last few years we have been much disposed to write "sentiment" and "tone" out of consideration of market or trade conditions, but no one can fancy that, if complete departure did occur, the very special developments of the last few weeks would not bring a reversal. Whereupon we may reasonably expect that unfavorable sentimental influences of the last few weeks will be replaced by more favorable sentiment as actual seasonal revival in trade begins to appear.

Ties Among Industrial Nations

PAYMENT of international war debts is going to involve sales development of enormous proportions. In times past, international obligations could be discharged by the payment of tribute to a royal treasury in gold, ivory, jewels or other exotic material. Such possibilities hardly exist today.

Direct payment in competing goods could not well be accepted unless demand could be expanded sufficiently to absorb the foreign products without at the same time checking the sale of the home products. Prohibitive tariffs give effect to refusals of nations to accept payments in goods; and the objection to payment in services, competing with the labor of the creditor nation, is also strong.

The result is that debtor nations must exchange their domestic products with countries which are the sources of exotic raw materials or of products which the creditor nations are willing to accept. Meanwhile demands of the debtors for increased capital to finance their growing business attract private loans from the creditors. Interest charges upon the debtor nations accordingly grow larger, intensifying the need of more export trade to be gained at the expense of the creditor nations.

It ought to be generally recognized that, while a high protective tariff is calculated to foster the development of the home industries, it is also forcing the development of the industries of debtor nations, for the investment of capital in foreign industries will strengthen the foreign industrial position. Thus the industrial nations will tend to be tied together more and more by international investments and industrial organizations—a condition which may be a powerful factor in the promotion of world peace.

Trends Regarding Old Age Pensions

THE movement in favor of the state paying old age pensions is growing. The sentimental appeal is so strong that we may rest assured from a purely psychological viewpoint that sentiment is the chief motivating force. Mortality statistics and facts in commerce and industry as to changing character of gainful occupation are naturally cited to help support the case. Putting sentiment entirely out of the reckoning, the purely factual trends affecting this problem may be reviewed. They include items of longevity, life insurance and annuities, thrift, housing conditions and character of occupation.

Mortality statistics are often cited loosely, particularly so when only life expectancy is mentioned. That has sharply increased, but chiefly by reason of a large decrease in infant mortality. The life expectancy of those aged 50, say, has not greatly increased. What one would like to do is construct series of curves, of this and other things, and combine them into one general curve showing how, from a purely statistical and factual basis, the need of pensions has varied over a period of time, say in a generation. The curve showing variation in life expectancy of those aged 50 would not be a final showing because physical condition of the more aged may vary from time to time. Improved habits of life are directed not so much at prolonging mere existence as at preserving physical and mental ability. A curve should be plotted for that item also.

The great increase in life insurance and annuities is an outstanding fact, and it plainly is in the direction of lessening the need of state old age pensions.

The change in habits of "thrift," whatever that may mean precisely, would if measurable make a particularly interesting curve, bearing on this general subject. On the one hand we have the increase in savings banks deposits and on the other hand the greatly increased tendency to buy not only what one has cash to pay for but to buy on installments, and however simply the proponents of one pension idea or another may put it, the data by which the thrift curve should be compiled are really very complicated.

The curve as to housing conditions is relatively much simpler but even it has some complications. For recent years there are statistics of housing construction, showing a continuous decrease in the proportion of facilities provided in one-family dwellings. In this and other ways the trend has been marked, for people to live in smaller quarters, whereby relatives have less facilities to take care of those who cannot take care of themselves.

In character of occupation we have the greatest changes, requiring in fact a series of curves. Obviously the farmhouse can better take care of its aged than the city dwelling, and the proportion of farming population shows a steady trend downward. Next there is the trend from individual business to working for hire, very marked as a purely statistical matter but very untrustworthy for purposes of conclusion, for the man in business may be less disposed to lay up for old age than the salaried man or wage earner. He may trust too much to his business while an increasing proportion of wage earners are protected by their employers. Then in factory work we have sharply increasing mechanization, whereby some work is made easier for older men and some work is made impossible.

Everyone readily feels the fascination of sentimental arguments for and against state pensions. The purely statistical and material items also have their fascination for they present interesting complications, while at the same time they represent trends which have been in force and are altogether likely to continue in force.

The Place of the Visiting Nurse

A SURVEY has been made lately of the results of the work carried on among employees and their families by the visiting nurses who have been for the past ten years on the staff of a large manufacturing company in New England. All through the decade detailed records were kept of the two nurses' visits to employees' homes. These included the name of the person who needed care, whether worker or member of his family, the nature of the ailment, number of visits required in each case, and any other fact that seemed worth recording. The data accumulated were found ample for purposes of analysis. According to officials the opinion was confirmed that the visiting nurse system gives a large return on the outlay. The nurse has proved to be the most intimate and perhaps the most valuable means of contact between the company and its employees, and as such to have contributed much to the maintenance of works morale at the high standard that has been in evidence in various ways.

The industrial nurse is no longer a rarity. At many industrial plants large enough to justify the money cost she has become an adjunct of hospital or dispensary. Groups of smaller plants have worked the plan on a cooperative basis, and others have availed themselves of the community's district nurses. But not a great deal has been made public as to the results of the nurses' work. In the case in question, conclusions were based on between 35,000 and 40,000 professional visits. In 1928 alone the nurses made 3800 calls, an average not much under one to the employee, and considerably more than one for each head of a family.

Far the greater number of patients attended were not employees but members of their households. They have been encouraged to regard the nurse as some one to call upon in time of need, not as a special privilege but as a right. They do not wait for the news of their troubles to reach the authorities in some roundabout manner. They notify the hospital and ask for a nurse. In fact, sometimes they demand her immediate presence; and this the management, instead of resenting, rather welcomes as a symptom that the nurse is accepted as an integral factor in the institution. It was not so in the beginning of the work. She was met with suspicion and aloofness. Espionage was suspected. She often received scant welcome, and sometimes was refused admittance, usually by the housewife. But patience and tact finally won the day.

The position of the plant nurse today is that of family confidante to people of a wide range of nationalities and creeds. They have learned that she holds a secret inviolate, and never tells of things she sometimes sees, the betrayal of which might make trouble. Particularly in matters of hygiene is her influence marked. Cleanliness has become more nearly uni-

versal. The family diet, including the dinner pail of the wage-earner, has become a very different affair.

In the opinion of the works physician the health of workers and their dependents is much better than would have been the case with no nurse working among them. In the plant she has been a direct influence in reducing absenteeism, as there is no need that men stay at home to care for the sick. Worry, which destroys efficiency, has been to no small extent alleviated. Altogether there is good ground for the statement of an officer of the company referred to that, if the time should ever come when personnel activities are curtailed, one of the last features to go would be the work of the visiting nurse.

Optimism Features Steel Foundry Meeting

Operations Excellent and Outlook Good, According to Those Attending Pittsburgh Meeting

THE outlook in the steel castings industry is excellent, according to statements by 65 executives at the regular monthly meeting of the Steel Founders' Society of America, Inc., held at the William Penn Hotel, Pittsburgh, Dec. 12.

The present rate of operations was reported as 86 per cent of capacity in the Eastern district, 92 per cent in the Middle West and 100 per cent in the Central Atlantic district. The average for the past decade has been between 55 and 60 per cent of capacity. Shipments are now running at 95 per cent of capacity, and inquiries show only a slight decrease as compared with the same period a year ago. Raw material prices were reported as having shown a slight decrease except in Detroit and in Ohio, where large purchases had recently caused a sudden upward trend in scrap quotations.

With but few exceptions manufacturers of railroad castings, automotive and mill equipment, as well as producers of miscellaneous steel castings, pronounced the present volume of business and the future outlook favorable. Sales prices have been advanced on practically all classes of work, and present bookings run two months into 1930.

The fact that 75 leading executives of the industry attended the meeting indicates the interest that is being taken in the society under its new plan of organization. The proper application of cost-finding methods, the correction of loose trade practices and customs, and the checking of overexpansion and internal dissension are among the problems stressed in the society's program. Results have already been achieved in connection with balancing capacity with demand, as evidenced by the reported abandonment of a number of poorly conceived projects.

Has Employment Bureau Already Operating

The society has had an employment bureau in operation for several weeks, and as a first step in handling trade disputes has formally indorsed and adopted the principles of the American Arbitration Association.

Plans were laid for establishing a special group within the society for producers of alloy steels and special acid, heat and corrosion-resisting products, so that their particular problems can be handled more effectively.

At a meeting of the Small Castings Division, led by H. J. Koch, Fort Pitt Steel Casting Co., McKeesport, Pa., a permanent organization was effected and a program of subjects to be presented at future meetings was developed. The group will confine its work largely to questions of merchandising and distribution, although operating phases of the business will also be covered.

Society's Data Effect Savings in Operating Costs

The chairman of the Large Castings Division, George H. Friesel, United Engineering & Foundry Co., Pittsburgh, led a discussion of operating data compiled by the society, as a result of which one member stated that his company had saved $18,000 in operating costs, while another reported a definite saving of $6,000.

The general meeting was presided over by the society's vice-president, John E. Galvin, president, Ohio Steel Foundry Co. Granville P. Rogers, managing director, read a report in which he called attention to the work now being done by the cost accounting committee, which will make recommendations for improvements in present practice, after which the methods developed will be ratified and a continuous effort will be made to obtain general adherence to a uniform plan. He reported the progress made to date in developing a standard set of trade customs and a standard sales contract.

An address on "Undeveloped Wealth in the Steel Foundry" was made by George Batty, technical director, Steel Casting Development Bureau, Philadelphia. He called attention to the fact that foundry superintendents acquire a large amount of data on foundry operation that they do not fully understand and, if they do, do not have the time, opportunity or training to deduce from their observations improved practices or remedies for adverse conditions noted. These empirical facts existing in the minds of foundry operators constitute unexploited wealth, he declared, for if they were collated scientifically new methods could be devised that would materially reduce wastes in both material and human energy.

New England Construction Interests Meet

At a joint meeting of sales staffs of various companies handling structural steel, gypsum, brick, terra cotta, lath, bar joists, etc., under the auspices of the Structural Steel Board of Trade of New England at the Copley-Plaza Hotel, Boston, on Tuesday, Dec. 10, Lee H. Miller, chief engineer, and Charles F. Abbott, executive director, American Institute of Steel Construction, Inc., were the speakers. The meeting was presided over by Harry W. Fitts, New England Structural Steel Co. Charles N. Fitts, president of the national organization, attended.

Mr. Miller's address largely concerned recent developments in fabricating methods. Special emphasis was placed on battledeck flooring and its advantages in construction of tall buildings. In connection with steel floor plates attention was called to an automatic welding machine developed by the General Electric Co., which was demonstrated at the recent annual meeting of the American Institute of Steel Construction. The new welder is operated by one man.

Mr. Abbott's address was largely on salesmanship. He said, in part, that while financing and manufacturing are highly important branches of industry, our great problem today is distribution. He pointed out that a great many salesmen lack terminal facilities—they do not know when to stop. A salesmanship survey recently made, he said, showed that 1714 untrained salesmen sold $19,000,000 worth of goods in a given time, while 500 trained men, in the same period, sold $50,000,000 of the same kind of goods. Just how seriously American industry is taking the distribution problem, Mr. Abbott stated, can be realized when it is known that it is spending $6,000,000 annually in sales promotion, as compared with $200,000 so expended 10 years ago.

Mr. Abbott assured those present that the use of fabricated steel in 1930 will exceed all previous yearly records in this country, and that 1931 will be an even greater year than 1930. He predicted the erection of 100-story buildings on large city plots.

Steel Corporation May Acquire Atlas Cement

An offer to acquire the Atlas Portland Cement Co., through an exchange of stock has been made by the United States Steel Corporation, according to a letter sent by the Atlas company to its stockholders. The letter, signed by John R. Morron, president of the company, asserts that officers of the company consider the offer very favorable, and urges stockholders to approve. A special meeting of stockholders of the Atlas company will be held Dec. 28 to act upon the proposal.

The transaction will involve 180,000 shares of United States Steel common stock in return for the outstanding stock and the entire assets of the cement company.

The capitalization of the Atlas Portland Cement Co. consists of 899,211 common shares, so that, at $167 a share for Steel common, the deal would involve slightly in excess of $30,000,000. In addition, the Steel Corporation offers to assume all existing liabilities of the company.

This contemplated expansion of the Steel Corporation would bring its rated Portland cement capacity to approximately 36,500,000 bbl. annually, constituting by a considerable degree the largest unit in the industry. The Atlas company and the Universal Portland Cement Co., the latter the cement subsidiary of the Steel Corporation, are among the four largest producers in the country, and their consolidation will place the leading steel producer in a dominant position in the cement industry.

Holders of a substantial majority of the stock of the cement company have given their approval of the transaction, and the directors have voted to accept the terms of the Steel Corporation.

Manufacturers of Resistance Welders Consolidate

Consolidation of the Thomson Electric Welding Co., of Lynn, Mass., and the Gibb Welding Machines Co., of Bay City, Mich., has been effected. The new company is known as the Thomson-Gibb Electric Welding Co. Both plants will continue in operation.

The former company is a pioneer, having been formed in 1886 to exploit the basic patents of Prof. Elihu Thomson. Professor Thomson has always been an officer and director, and will continue with the new company in both capacities. The Gibb company has been one of the most active in the West and has specialized in seam welding.

The Thomson-Gibb Electric Welding Co. will market a full line of butt, flash, seam, spot, projection, and wire fabric welders. It is fully aware that the user of welding machines is not so much interested in the machine as in the product of that machine, both from the standpoint of uniformity, and of uninterrupted production. The welding machine is but one of many special machines in a manufacturing plant. It is impossible to have in an organization an individual who would be as well acquainted with the welding machine itself and its ultimate capability as is the manufacturer of that machine. Therefore, the Thomson-Gibb company proposes to maintain service engineers to make frequent inspection calls upon its customers and to act in an advisory capacity. For this purpose competent factory trained engineers will be stationed at Boston, New York, Philadelphia, Cleveland, Cincinnati, Detroit, Chicago and St. Louis.

The Week in Business

Drift of Current Financial and Economic Opinion

WIDELY differing views on the business situation indicate a persistence of the confusion and perplexity into which the country was thrown by the stock market panic.

Col. Leonard P. Ayres believes it unlikely that the current trade recession will develop into a depression. "Speculation has come out of the stock market in a hurry," he writes, "but by and large we have no great amount of speculation to come out of business."

Sees No Early Recovery

A sharply divergent opinion is held by the *Annalist*, which says that "it has become clear that the business reaction is much more severe than had been generally believed," adding that no important recovery is in prospect for several months. A preliminary calculation of the *Annalist* index of business activity for November showed a drop of 10 points, the greatest decline in 11 years and comparing with a recession of 7.6 points in January, 1921, the sharpest previous monthly decrease recorded.

A survey of the whole field of business, according to Benjamin Baker, editor of that journal, forces the "realistic" observer to be skeptical of the ultimate value of the Washington program of "cheerio." "It is a good thing for the leaders of business to consult, and to try to work out a practicable stabilizing program; but to ignore facts is to court defeat."

But Forecasters Often Err

Less faith in the forecast value of statistics is shown by Alexander D. Noyes, New York *Times*, who points out how frequently business analysts have erred in recent years, even in near-range prophecy. He says, in part:

> A year ago this month not a single voice predicted the main event of 1929, the October panic. On the other hand, forecasts for such a twelve-month as 1926 were extremely guarded in relation to the last half of the year—a caution which turned out to have been unnecessary. On New Year's Day in the year of spectacular deflation of staple prices, 1920, the majority of experts prophesied over their own names that prices could not decline.
>
> Of recent years it has grown to be a habit of December prophets to describe with confidence the course of events in the next six months; but to beg off from telling the secrets of the autumn. Yet at the start of 1919, a year of inflated wages and profuse expenditure by the working classes, high authorities predicted "bread lines in every industrial center before May 1."

Recognizing that sentiment is, after all, a leading force in shaping business, Mr. Noyes concludes that the President's vigorous program has added great force to other psychological considerations and "may turn out to have influenced tangibly the general course of trade."

Federal Reserve Policy Criticized

Also stressing the importance of building up business confidence, the *Financial Chronicle* finds that efforts to that end by the President's conferences are being vitiated by Federal Reserve policy. By adding heavily to their holdings of Government securities and acceptances the Reserve banks are creating unneeded credit and are driving gold out of the country. This outflow of yellow metal, the *Chronicle* declares, is the disturbing influence that caused the last severe setback in the stock market.

Condemning what it calls a repetition of the easy money policy of 1927, which forced large exports of gold to Europe and encouraged stock market inflation, the financial journal characterizes present open market operations as "a meddlesome interference with the natural functioning of the Reserve system," which "should be discontinued for the benefit of all concerned."

Iron and Steel Markets

Further Shrinkage in Production

Steel Output Receding as Buyers Defer Purchases—Motor Car Output Rising—Scrap Steady—Semi-Finished Steel Weakens

THE anomalous situation of production shrinking and confidence rising characterizes the steel market as the year-end approaches. Producers are now satisfied that the sharp decline in steel output that began in late October was a psychological effect of the stock market crash and greatly exceeded the actual contraction in steel consumption.

The damper that the Wall Street panic put on steel buying, it is believed, greatly accentuated a trend that was already under way, giving the appearance of a sharper reduction in demand than actually occurred except in the automobile industry. The effect on buyers has been to make them still more cautious, with most of them drastically cutting down their inventories and withholding action on their first quarter needs.

Prices of finished steel are feeling the strain of curtailed buying, and pressure for concessions, particularly on the part of the automobile makers, is insistent. But steel producers are not attempting to force sales and have become reconciled to a further reduction of mill operations before Jan. 1. Prices of some products are wavering, particularly certain finishes of sheets, but there have been no additional open breaks in the market.

Mills believe that customers will be forced to enter the market in January, possibly in sufficient numbers to create a rebound in demand comparable with the recent slump in buying.

In this connection the immediate translation of expanding motor car production into steel orders is regarded as significant. While the rise in automobile output is slow and steel producers are not yet disposed to look for a real recovery before the end of the first quarter, the outstanding fact is that the trend is upward. Makers of low-priced cars are getting under production more rapidly than those manufacturing more expensive models. The Ford Motor Co. is understood to have a daily schedule of 4500 cars this week, a gain of 700.

While none of the motor car builders is making extended commitments in steel, improvement in orders and releases is making itself felt, particularly in carbon and alloy steel bars. Two of the larger independent mills in northern Ohio have increased ingot output to 60 per cent of capacity.

Ingot production generally is still declining. The average for both the Steel Corporation and Bethlehem plants is down to 65 per cent, compared with 68 per cent a week ago. Chicago district output is holding at 65 per cent, but the rate for Pittsburgh and tributary areas has gone down five points to 60 per cent and may drop as low as 50 per cent in another fortnight. Plans call for a sharp reduction of finishing mill operations, with the likelihood that many sheet, strip, bar and tin mills will suspend completely during Christmas week.

Support of the market by the railroads, the structural steel industry, farm equipment makers and shipyards has not relaxed and demand from some of the miscellaneous users shows signs of reviving. Releases from barrel manufacturers have improved and the requirements of wire rope makers are large. Heavy machinery and equipment makers will enter 1930 with unusually well filled order books.

Scrap, which is regarded as a sensitive barometer, remains firm for second week at Pittsburgh and Chicago, with several advances of minor grades reported at the latter point.

Semi-finished steel, on the other hand, shows weakness. A few Ohio mills have reduced billets, sheet bars and slabs $1 to $34 a ton.

Washington construction programs will not stimulate business for some time, but activity in structural steel remains at a high level. Fabricating awards total 51,000 tons, compared with 35,000 tons last week. Fresh inquiries call for 42,000 tons.

The Canadian National Railways have ordered 4650 cars and the Milwaukee road is in the market for 2300. The Louisville & Nashville is expected to inquire for 1823 cars.

The deadlock that exists between buyers and sellers of steel is duplicated in large measure in pig iron. Curtailment of blast furnace operations has tended to keep production in step with reduced demand, although some piling up of iron is reported at Chicago. In certain centers accumulating requirements have forced melters to increase their purchases, but in other districts foundry operations have fallen off and considerable unshipped tonnage will be carried over into the first quarter. Prices are softer in New England and have declined 50c. a ton in eastern Pennsylvania. Alabama producers have advanced quotations 50c. to $15 a ton, Birmingham.

The merger of the Republic, Central Alloy, Donner and Bourne-Fuller companies will have a combined ingot capacity of nearly 5,000,000 tons a year, making it the third largest steel company in the country.

THE IRON AGE composite price for pig iron has declined from $18.29 to $18.21 a gross ton, a new low for the year. Finished steel is unchanged at 2.362c. a lb.

A Comparison of Prices

Market Prices at Date, and One Week, One Month and One Year Previous, Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron, Per Gross Ton:	Dec. 17, 1929	Dec. 10, 1929	Nov. 19, 1929	Dec. 18, 1928
No. 2 fdy., Philadelphia	$20.76	$21.26	$21.26	$21.26
No. 2, Valley furnace	18.50	18.50	18.50	17.50
No. 2 Southern, Cin'ti	17.69	17.69	17.69	20.19
No. 2, Birmingham	14.50	14.50	14.50	16.50
No. 2 foundry, Chicago*	20.00	20.00	20.00	20.00
Basic, del'd eastern Pa.	19.50	19.50	19.75	20.25
Basic, Valley furnace	18.50	18.50	18.50	17.50
Valley Bessemer, del'd P'gh.	20.76	20.76	20.76	20.01
Malleable, Chicago*	20.00	20.00	20.00	20.00
Malleable, Valley	19.00	19.00	19.00	18.25
Gray forge, Pittsburgh	19.76	19.76	19.76	18.76
L. S. charcoal, Chicago	27.04	27.04	27.04	27.04
Ferromanganese, furnace	100.00	100.00	105.00	105.00
Rails, Billets, etc., Per Gross Ton:				
Rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Light rails at mill	36.00	36.00	36.00	36.00
Rerolling billets, Pittsburgh	35.00	35.00	35.00	33.00
Sheet bars, Pittsburgh	35.00	35.00	35.00	33.00
Slabs, Pittsburgh	35.00	35.00	35.00	33.00
Forging billets, Pittsburgh	40.00	40.00	40.00	38.00
Wire rods, Pittsburgh	40.00	40.00	40.00	42.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.85	1.85	1.85	1.90
Finished Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Bars, Pittsburgh	1.90	1.90	1.90	1.90
Bars, Chicago	2.00	2.00	2.00	2.00
Bars, Cleveland	1.90	1.90	1.90	1.90
Bars, New York	2.24	2.24	2.24	2.24
Tank plates, Pittsburgh	1.90	1.90	1.90	1.90
Tank plates, Chicago	2.00	2.00	2.00	2.00
Tank plates, New York	2.17½	2.17½	2.17½	2.17½
Structural shapes, Pittsburgh	1.90	1.90	1.90	1.90
Structural shapes, Chicago	2.00	2.00	2.00	2.00
Structural shapes, New York	2.09½	2.09½	2.09½	2.14½
Cold-finished bars, Pittsburgh	2.30	2.30	2.30	2.20
Hot-rolled strips, Pittsburgh	1.90	1.90	1.90	1.80
Cold-rolled strips, Pittsburgh	2.75	2.75	2.75	2.85

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

Finished Steel,	Dec. 17, 1929	Dec. 10, 1929	Nov. 19, 1929	Dec. 18, 1928
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 24, P'gh.	2.75	2.75	2.75	2.85
Sheets, black, No. 24, Chicago dist. mill	2.75	2.85	2.85	2.95
Sheets, galv., No. 24, P'gh.	3.40	3.40	3.40	3.60
Sheets, galv., No. 24 Chicago dist. mill	3.50	3.50	3.50	3.70
Sheets, blue, No. 13, P'gh.	2.35	2.35	2.25	2.20
Sheets, blue, No. 13, Chicago dist. mill	2.45	2.45	2.45	2.30
Wire nails, Pittsburgh	2.40	2.40	2.40	2.65
Wire nails, Chicago dist. mill	2.45	2.45	2.45	2.70
Plain wire, Pittsburgh	2.40	2.40	2.40	2.50
Plain wire, Chicago dist. mill	2.45	2.45	2.45	2.55
Barbed wire, galv., Pittsburgh	3.05	3.05	3.05	3.30
Barbed wire, galv., Chicago dist. mill	3.10	3.10	3.10	3.35
Tin plate, 100 lb. box, P'gh.	$5.35	$5.35	$5.35	$5.25
Old Material, Per Gross Ton:				
Heavy melting steel, P'gh.	$15.25	$15.25	$16.00	$18.00
Heavy melting steel, Phila.	14.50	14.50	15.00	15.00
Heavy melting steel, Ch'go.	12.50	12.50	13.00	14.50
Carwheels, Chicago	13.50	13.50	14.00	14.00
Carwheels, Philadelphia	15.50	15.50	15.50	16.50
No. 1 cast, Pittsburgh	14.50	14.50	15.00	14.50
No. 1 cast, Philadelphia	15.00	15.00	16.00	16.25
No. 1 cast, Ch'go (net ton)	13.50	13.50	13.50	15.50
No. 1 RR. wrot., Phila.	15.50	15.50	16.00	15.50
No. 1 RR. wrot., Ch'go (net)	12.00	12.00	12.25	13.25
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$2.65	$2.65	$2.65	$2.75
Foundry coke, prompt	3.75	3.75	3.75	3.75
Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	18.12½	18.12½	18.12½	16.12½
Electrolytic copper, refinery	17.75	17.75	17.75	15.75
Tin (Straits), New York	41.37½	39.62½	39.75	49.62½
Zinc, East St. Louis	5.50	6.00	6.25	6.35
Zinc, New York	5.85	6.35	6.60	6.70
Lead, St. Louis	6.10	6.10	6.10	6.35
Lead, New York	6.25	6.25	6.25	6.50
Antimony (Asiatic), N. Y.	8.50	8.62½	8.62½	9.87½

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Pittsburgh

Steel Buying Restricted to Small Lots—Moderate Improvement in Orders from the Automobile Industry

PITTSBURGH, Dec. 17.—While business with some of the mills in this territory is somewhat better than it was a month ago, buying is still restricted to small lots, and the great majority of the larger consumers who might be expected to cover their first quarter needs at this time are holding back. Nevertheless, sentiment in the industry is good, and the expectation of renewed demand in January continues.

Notably encouraging in the last week has been the placing of small orders by automobile manufacturers, but the volume of business from this source by no means promises a heavy demand during the first quarter. In fact, estimates of automobile production in the first quarter by many of the leading manufacturers range from 20 to 40 per cent of the rated capacity of plants, and the high January quota of the leading maker of cars in the low-priced field is certainly not to be taken as a criterion of the industry as a whole.

However, the immediate Pittsburgh district is not so dependent upon the automobile industry as are mills in the Valleys and the Wheeling area, and the prospects of demand for the steel products which do not go to the automobile makers are not so obscure. Heavy demand for plates, shapes and heavy sheets from the railroad car builders is assured by the large orders on their books, and the outlook for barge and shipbuilding work is much better than it was this time last year. Continued industrial expansion in this vicinity insures a good demand for structural material from this source alone, and plans for important public improvement work promise a substantial business. Lower money rates are already stimulating general building activity, which was impaired considerably in the year coming to a close.

Plans of the agricultural implement industry for 1930 call for no curtailment of earlier schedules. Heavy machinery and equipment makers normally absorb a good percentage of Pittsburgh's finished steel products, and companies engaged in this work will enter 1930 with unusually well filled order books.

The outlook for pipe is more or less uncertain, but there is no reason to believe that the usual seasonal demand will not set in as the year progresses.

Under these circumstances, mills are certainly justified in facing the new year with a fair degree of confidence.

Steel users are allowing their stocks to decline to the absolute minimum at this time and mills are meeting this situation with plans for sharply curtailed production in the next fortnight. This week finishing mills are at a slightly better rate, but Christmas week will see complete suspension of operations in many sheet, strip, bar and tin mills.

Ingot operations for the Pittsburgh and tributary districts may be expected to decline to about 50 per cent of capacity, and present schedules of open-hearth departments are certainly not higher than 60 per cent.

Prices on finished steel products are feeling the strain of curtailed buying, but in no cases have open breaks occurred. Mills are carefully avoiding any semblance of pressure upon buyers, but the latter, particularly in the automotive industry, are inclined to

press for concessions all through the list. Many small buyers have been willing to extend their present contracts at unchanged prices, but large users are waiting market developments and many already indicate that lower quotations have been offered them. Under such circumstances, it is safe to assume that first quarter prices will receive no real test until January.

Pig Iron.—A few small inquiries have come out in the last week but none of these calls for other than current needs. In fact, orders are occasionally placed for split carloads of two grades of iron, and it seems that consumers are determined to have no stocks at the end of the year. Further curtailment of shipments is also reported by many sellers, and in some cases complete suspensions for the next two weeks have been placed in effect. Few foundries have enough iron coming to them on old contracts to enable them to operate well into January, but others, which are disposed to wait for a while before contracting for their first quarter needs, will have to place small supplementary tonnages in the next few weeks. In the meantime, furnaces are determined not to let their yard stocks increase, and additional stacks may be banked before the end of the week. This attitude gives the price situation more strength than it would have ordinarily in a period of such light demand, and the small tonnages of iron which are being sold from time to time are bringing the full quoted prices of $18.50, Valley, for basic and foundry iron, and $19 for Bessemer and malleable. These quotations will probably not be tested by any substantial tonnage until after the end of the year.

Prices per gross ton, f.o.b. Valley furnace:

Basic	$18.50
Bessemer	19.00
Gray forge	18.00
No. 2 foundry	18.50
No. 3 foundry	18.00
Malleable	19.00
Low phos., copper free	27.00

Freight rate to Pittsburgh or Cleveland district, $1.76.

Prices per gross ton, f.o.b. Pittsburgh district furnace:

Basic	$19.00
No. 2 foundry	19.00
No. 3 foundry	18.50
Malleable	19.50

Freight rates to points in Pittsburgh district range from 63c. to $1.13.

Semi-Finished Steel. — Shipments are very light this month. Some makers are producing more than they are shipping. One or two of the larger mills in the district are said to be accumulating reserve stocks of semi-finished steel in anticipation of heavy rollings of other products, notably rails, in the next two months. However, this practice is economical only with Pennsylvania mills, and not with producers in Ohio and West Virginia, which must pay large year-end inventory taxes. From a sales standpoint, the semi-finished market is extremely dull, and price uncertainty continues. The market is nominally quotable at $35, Pittsburgh or Youngstown, and some mills are still shipping against contracts made at this figure. However, this price is by no means established on first quarter business. On forging billets, the $40, Pittsburgh, quotation is still made, and is applied to a small tonnage of first quarter business. However, this price ordinarily depends on the rerolling billet quotation, and contracts would probably be marked down in case billets declined. Wire rods are holding at $40, Pittsburgh or Cleveland, and first quarter contracting is proceeding at a fair pace.

Bars, Shapes and Plates.—Business is still quiet, and specifications reaching mills largely call for immediate shipment. A fair tonnage, specified for early January delivery, is beginning to accumulate with some companies, but this business is not yet affecting operating rates in this district. Structural mills are running fairly well, and demand from fabricators, working on large jobs, is steady. The railroad car builders have called for little tonnage as yet on recent orders, but this business is certain to develop in January and continue for several months, if car builders' order books may be taken as an indication. Pittsburgh mills will soon figure on a postoffice at Baltimore, which will take about 4500 tons of shapes and at least 500 tons of reinforcing bars. A sewer job at Columbus, Ohio, will also require 300 tons of reinforcing steel. Otherwise the reinforcing bar business is seasonably dull. Barge awards are lacking, but prospective work continues to attract interest. The Standard Unit Navigation Co., which earlier in the fall announced its intention of buying 50 small barges, now expects to buy 60, but there is little likelihood that this business will be placed before spring. The automobile industry is not yet placing orders for bars in this district in any considerable amount, although some small tonnages, apparently required for new models, are coming to local mills. Shipments to cold finishing mills are extremely light, but this may be due partly to continued effort to reduce inventories rather than to the exceptionally light demand for this product. However, the stocks of cold finishers are so low that replenishments in January are almost certain to bring out a considerable tonnage. Prices could hardly be expected to show much strength in such a quiet market, but bars, shapes and plates are still quotable at 1.90c., Pittsburgh, and there is no reason to believe that this figure is being shaded on occasional small lots which are being placed. It is possible that large buyers who might ordinarily enjoy an exceptionally low price are able to do even better in this market, but mills do not consider this business as indicative of generally reduced price levels.

Rails and Track Accessories.—Specifications for track accessories show little change in volume, but some makers are accumulating stocks this month in anticipation of heavy rush orders in January. The carriers may be expected to call for considerable tonnages in very short order, and, by stocking against this probability, it has been possible to keep mills operating at a better rate this month than is justified by the volume of current demand. The Baltimore & Ohio has come into the market for 15,000 kegs of spikes, but has not yet formally inquired for its annual rail requirements. Otherwise, new inquiry is very light, although some roads which buy quarterly are coming into the market for their usual tonnage.

Tubular Goods.—The pipe business is not exempt from the general stagnation in the steel business which has existed for several weeks, and lack of buying has resulted in further curtailment of mill operations. The pipe industry as a whole is not running at more than 50 per cent of theoretical capacity, and with some mills the figure is lower. Shipments to ware-

The Iron Age Composite Prices

Finished Steel

Dec. 17, 1929, 2.362c. a Lb.

One week ago	2.362c.
One month ago	2.362c.
One year ago	2.391c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products make 87 per cent of the United States output of finished steel.

	High	Low
1929	2.412c., April 2;	2.362c., Oct. 29
1928	2.391c., Dec. 11;	2.314c., Jan. 3
1927	2.453c., Jan. 4;	2.293c., Oct. 25
1926	2.453c., Jan. 5;	2.403c., May 18
1925	2.560c., Jan. 6;	2.396c., Aug. 18

Pig Iron

Dec. 17, 1929, $18.21 a Gross Ton

One week ago	$18.29
One month ago	18.38
One year ago	18.46
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High	Low
1929	$18.71, May 14;	$18.21, Dec. 17
1928	18.59, Nov. 27;	17.04, July 24
1927	19.71, Jan. 4;	17.54, Nov. 1
1926	21.54, Jan. 5;	19.46, July 13
1925	22.50, Jan. 13;	18.96, July 7

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base per Lb.
F.o.b. Pittsburgh mill	1.90c.
F.o.b. Chicago	2.00c.
Del'd Philadelphia	2.22c.
Del'd New York	2.24c.
Del'd Cleveland	1.85c. to 1.90c.
F.o.b. Cleveland	1.85c. to 1.90c.
F.o.b. Lackawanna	2.00c.
F.o.b. Birmingham	2.10c.
C.i.f. Pacific ports	2.35c.
F.o.b. San Francisco mills	2.35c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills, 40, 50, 60-ft.	2.00c.
F.o.b. Pittsburgh mills, cut lengths	2.25c.
F.o.b. Birmingham, mill lengths	2.10c.

Rail Steel

F.o.b. mills, east of Chicago dist.	1.90c.
F.o.b. Chicago Heights mill	1.90c.
Del'd Philadelphia	2.27c.

Iron

Common iron, f.o.b. Chicago	2.00c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	2.12c.
Common iron, del'd New York	2.14c.

Tank Plates

	Base per Lb.
F.o.b. Pittsburgh mill	1.90c.
F.o.b. Chicago	2.00c.
F.o.b. Birmingham	2.05c.
Del'd Cleveland	2.09c.
Del'd Philadelphia	2.10c. to 2.15c.
F.o.b. Coatesville	2.00c. to 2.05c.
F.o.b. Sparrows Point	2.00c. to 2.05c.
F.o.b. Lackawanna	2.00c. to 2.05c.
Del'd New York	2.17½c. to 2.22½c.
C.i.f. Pacific ports	2.25c. to 2.35c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh mill	1.90c.
F.o.b. Chicago	2.00c.
F.o.b. Birmingham	2.05c.
F.o.b. Lackawanna	2.00c. to 2.05c.
F.o.b. Bethlehem	2.00c.
Del'd Cleveland	2.09c.
Del'd Philadelphia	1.96c. to 2.06c.
Del'd New York	2.09½c. to 2.14½c.
C.i.f. Pacific ports	2.35c.

Hot-Rolled Hoops, Bands and Strips

	Base per Lb.
6 in. and narrower, P'gh	2.00c.
Wider than 6 in., P'gh	1.90c.
6 in. and narrower, Chicago	2.10c.
Wider than 6 in., Chicago	2.00c.
Cooperage stock, P'gh	2.20c.
Cooperage stock, Chicago	2.30c.

Cold-Finished Steel

	Base per Lb.
Bars, f.o.b. Pittsburgh mill	2.20c.
Bars, f.o.b. Chicago	2.20c.
Bars, Cleveland	2.20c.
Bars, Buffalo	2.20c.
Shafting, ground, f.o.b. mill	*2.55c. to 3.50c.
Strips, P'gh	2.75c.
Strips, Cleveland	2.75c.
Strips, del'd Chicago	3.05c.
Strips, Worcester	2.90c.
Fender stock, No. 20 gage, Pittsburgh or Cleveland	4.25c.

*According to size.

Wire Products

(Carload lots, f.o.b. Pittsburgh and Cleveland.)

To Merchant Trade

	Base per Keg
Standard wire nails	$2.40 to $2.50
Cement coated nails	2.40 to 2.50
Galvanized nails	4.40 to 4.50

	Base per Lb.
Polished staples	2.85c. to 2.95c.
Galvanized staples	3.10c. to 3.20c.
Barbed wire, galvanized	3.05c. to 3.15c.
Annealed fence wire	2.55c. to 2.65c.
Galvanized wire, No. 9	3.00c. to 3.10c.
Woven wire fence (per net ton to retailers)	$65.00

To Manufacturing Trade

Bright hard wire, Nos. 6 to 9 gage	2.40c.
Spring wire	3.50c.

(Carload lots, f.o.b. Chicago.)

Wire nails	$2.45 to $2.55 (keg)
Annealed fence wire	2.60c. to 2.70c. (lb.)
Bright hard wire to manufacturing trade	2.45c.

Anderson, Ind., mill prices are ordinarily $1 a ton over Pittsburgh base; Duluth, Minn., mill $2 a ton over Pittsburgh, and Birmingham mill $3 a ton over Pittsburgh.

Cut Nails

	Per 100 Lb.
Carloads, Wheeling, Reading or Northumberland, Pa.	$2.70
Less carloads, Wheeling or Reading	2.80

Light Plates

No. 10, blue annealed, f.o.b. P'gh	2.20c.
No. 10, blue annealed, f.o.b. Chicago dist.	2.30c.
No. 10, blue annealed, del'd Phila.	2.42c. to 2.52c.
No. 10, blue annealed, B'ham	2.35c.

Sheets

Blue Annealed

	Base per Lb.
No. 18, f.o.b. P'gh	2.35c.
No. 18, f.o.b. Chicago dist.	2.45c.
No. 18, del'd Philadelphia	2.57c. to 2.67c.
No. 18, blue annealed, B'ham	2.50c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh	2.75c.
No. 24, f.o.b. Chicago dist. mill	2.75c. to 2.85c.
No. 24, del'd Philadelphia	3.07c.
No. 24, f.o.b. Birmingham	3.00c. to 3.10c.

Metal Furniture Sheets

No. 24, f.o.b. P'gh	4.00c.

Galvanized

No. 24, f.o.b. Pittsburgh	3.40c. to 3.50c.
No. 24, f.o.b. Chicago dist. mill	3.50c. to 3.60c.
No. 24, del'd Cleveland	3.59c. to 3.69c.
No. 24, del'd Philadelphia	3.72c. to 3.82c.
No. 24, f.o.b. Birmingham	3.65c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.90c. to 3.00c.
No. 28, f.o.b. Chicago dist. mill	3.00c. to 3.10c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh	4.00c.

Long Ternes

No. 24, 8-lb. coating, f.o.b. mill	3.90c. to 4.00c.

Vitreous Enameling Stock

No. 24, f.o.b. Pittsburgh	3.90c.

Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills	$5.35
Standard cokes, f.o.b. Gary	5.45

Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)
(Per Package, 20 x 28 in.)

8-lb. coating I.C.	$10.70
15-lb. coating I.C.	13.40
20-lb. coating I.C.	14.60
25-lb. coating I.C.	$15.90
30-lb. coating I.C.	16.80
40-lb. coating I.C.	18.80

Alloy Steel Bars

(F.o.b. makers' mill)

Alloy Quality Bar Base, 2.65c. per Lb.

S.A.E. Series Numbers		Alloy Differential
2000	(½% Nickel)	$0.25
2100	(1½% Nickel)	0.55
2300	(3½% Nickel)	1.50
2500	(5% Nickel)	2.25
3100	Nickel Chromium	0.55
3200	Nickel Chromium	1.35
3300	Nickel Chromium	3.80
3400	Nickel Chromium	3.20
4100	Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50
4100	Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600	Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel)	1.05
5100	Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100	Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100	Chromium Spring Steel	0.20
6100	Chromium Vanadium Bars	1.20
6100	Chromium Vanadium Spring Steel	0.95
9250	Silicon Manganese Spring Steel (flats)	0.25
	Rounds and squares	0.50
	Chromium Nickel Vanadium	1.50
	Carbon Vanadium	0.95

Above prices are for hot rolled steel bars, forging quality. The differential for cold-drawn bars is ¾c. a lb. higher, with standard classification for cold-finished alloy steel bars applying. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis.

Billets under 4 x 4 in. carry the steel bar base. Slabs with a sectional area of 16 in. or over carry the billet price. Slabs with sectional area of less than 16 in. or less than 2½ in. thick, regardless of sectional area, take the bar price.

Rails

	Per Gross Ton
Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	36.00
Light (from rail steel), f.o.b. mill	34.00
Light (from billets), f.o.b. Ch'go mill	36.00

Track Equipment

	Base per 100 Lb.
Spikes, ⅜ in. and larger	$2.80
Spikes, ½ in. and smaller	2.80
Spikes, boat and barge	3.00
Tie plate, steel	2.15
Angle bars	$2.75
Track bolts, to steam railroads	$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel Inches	Black	Galv.	*Iron* Inches	Black	Galv.
⅛	45	19½	¼ and ⅜	+11	+36
¼ to ⅜	51	25½	½	23	5
½	56	42½	¾	28	11
¾	60	48½	1 and 1¼	31	15
1 to 3	62	50½	1½ and 2	35	18

Lap Weld

2	55	43½	2	23	9
2½ to 6	59	47½	2½ to 3½	28	13
7 and 8	56	43½	4 to 6	30	17
9 and 10	54	42½	7 and 8	29	16
11 and 12	53	40½	9 to 12	26	11

Butt Weld, extra strong, plain ends

⅛	41	24½	¼ and ⅜	+13	+48
¼ to ⅜	47	30½	½	23	7
½	53	42½	¾	28	13
¾	58	47½	1 to 2	34	18
1 to 1½	60	49½			
2 to 3	61	50½			

Lap Weld, extra strong, plain ends

2	53	42½	½	29	13
2½ to 4	57	46½	2½ to 4	34	20
4½ to 6	56	45½	4½ to 6	33	19
7 to 8	52	39½	7 and 8	31	17
9 and 10	45	32½	9 to 12	21	8
11 and 12	44	31½			

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Steel		*Charcoal Iron*	
2 in. and 2¼ in.	38	1½ in.	1
2½ in.—2¾ in.	46	1¾ in.	8
3 in.	52	2 in.—2¼ in.	13
3¼ in.—3¾ in.	54	2½ in.—2¾ in.	16
4 in.	57	3 in.	17
4½ in. to 6 in.	46	3¼ in. to 3½ in.	18
		4 in.	20
		4½ in.	21

On lots of a carload or more, the above base discounts are subject to a preferential of two fives on steel and of 10 per cent on charcoal iron tubes. Smaller quantities are subject to the following modifications from the base discounts:

Lap Welded Steel—Under 10,000 lb., 6 points under base and one five; 10,000 lb. to carload, 4 points under base and two fives. Charcoal Iron—Under 10,000 lb., 2 points under base; 10,000 lb. to carload, base and one five.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	61	3 in.	46
1¼ to 1½ in.	53	3½ to 3½ in.	48
1¾ in.	37	4 in.	51
2 to 2¼ in.	32	4½, 5 and 6 in.	40
2½ to 2¾ in.	40		

Hot Rolled

2 and 2¼ in.	38	3¼ to 3½ in.	54
2½ and 2¾ in.	46	4 in.	57
3 in.	52	4½, 5 and 6 in.	46

Beyond the above base discounts a preferential discount of 5 per cent is allowed on carload lots. On less than carloads to 10,000 lb., base discounts are reduced 4 points with 5 per cent preferential; on less than 10,000 lb., base discounts are reduced 6 points, with no preferential. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage take the mechanical tube list and discounts. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30%, base (carloads)	55
Carbon, 0.30% to 0.40% base	50

Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

houses in the oil country are very light, although some tonnage is moving down the river to distributing points in the Mississippi Valley. The mechanical tubing business looks more promising, as a few automobile companies have entered specifications for January shipments and others are expected to follow in the next two weeks. Pipe prices are holding satisfactorily and the difficulties in maintaining resale quotations, encountered during the summer and early fall, have been largely ironed out.

Wire Products. — Makers of wire products have noticed little change in their business, which continues very slow. Jobbers are placing occasional rush orders for carload lots of nails and wire, indicating closely clipped inventories, but demand for manufacturers' wire is dull and the slight increase in the demands of automobile and auto parts makers is not yet contributing much to the total tonnage. Prices are holding, with nails at $2.40 to $2.50 a keg, Pittsburgh, and bright hard wire at 2.40c. a lb.

Sheets.—Some makers of sheets report a slight increase in business, and operations this week seem to be generally higher than they were in the first two weeks of the month. This is due partly to the fact that a number of mills are cleaning up all possible tonnage with the prospect of practically no operation Christmas week, and partly to the placing of rolling orders by automobile makers. Nearly all of this material is for rush shipment, although a fair amount of tonnage for shipment during January is now reaching company books. The leading interest operated its mills last week at about 60 per cent of theoretical capacity, with the independents at a somewhat lower rate and the industry as a whole at not above 50 per cent. Full finishing mills have been running at about 35 per cent, but this will be improved this week. Prices are subject to strong pressure in the Detroit area, but in this immediate district they seem to be well established at 2.75c., Pittsburgh, for black sheets, 3.40c. to 3.50c. for galvanized, and 2.35c. and 2.20c., respectively, for blue annealed and light plates. The latter quotations apply only to the jobbing mill product, as wide strips are $2 to $4 a ton lower.

Tin Plate. — Tin plate mills are running at about the same rate as they did last week, when the leading interest operated at slightly above 80 per cent and the independents at 60 to 70 per cent. The smaller mills have not been so fortunate in securing anticipated tonnage to keep their mills busy at this time. Current specifications are light. A slight increase occurred at the end of the previous week when February tonnage is supposed to be specified.

Strip Steel. — Mill operations are slightly higher this week, but most of the mills in the district will not operate Christmas week, and the average for the month will be between 25 and 35 per cent of capacity. On the cold-rolled material, these figures will likely prove too high. Specifications from the automobile industry have increased slightly, although in most cases the tonnages are small, and it is evident that the motor car builders are not yet placing orders for heavy production. A good part of this business has come from the Ford Motor Co., which has planned a rather large January schedule, and which, so far as can be ascertained from the maze of conflicting reports in the Detroit territory, is not to be matched by other car builders. The hardware makers are taking a fair tonnage of strip steel, but demand from warehouses is small, and other consuming lines are equally cautious in their buying. Prices are none too strong, but not quotably lower. There is a belief on the part of some that a lower price on hot-rolled material may have been secured by one of the large automobile companies, but the majority of sellers are holding to 1.90c. and 2c., Pittsburgh, on this material. Cold-rolled strip is quoted at 2.75c., Pittsburgh or Cleveland, and subject to occasional shading. Small buyers of both hot and cold-rolled material have entered first quarter contracts at these figures.

Coal and Coke. — A few buyers of furnace coke are showing some interest in their requirements for the first two months of the new year. This may be prompted by their belief that prices may be no lower in January and possibly stronger, if curtailment of production continues. The $2.65, Connellsville, price is still representative of the market, although lower prices are mentioned occasionally. Demand for heating coke is better than it has been, although not particularly good for this season of the year. The foundry grade is dull, with shipments low and new buying light.

Old Material.—The scrap market retains its recent strength, but the heavy melting grade is not quotably higher on the basis of actual sales. Late last week a substantial tonnage was sold to a local consumer at $15.50, and dealers are meeting with difficulty in covering this order at a profit. It is fairly certain that no mill could duplicate this price on a large tonnage of scrap, but some of them are still making offers and would undoubtedly be willing to buy at the present figure for investment purposes. Hydraulic compressed sheets have also been sold during the week at $15.50, and are now quotable on the same basis as steel. Other grades of scrap are quiet, and the market is very limited. Specialties continue strong.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$15.00 to $15.50
No. 2 heavy melting steel	13.00 to 13.50
Scrap rails	14.00 to 14.50
Compressed sheet steel	15.00 to 15.50
Bundled sheets, sides and ends	14.00 to 14.50
Cast iron carwheels	14.00 to 14.50
Sheet bar crops, ordinary	17.00 to 17.50
Heavy breakable cast	11.00 to 11.50
No. 2 railroad wrought	15.00 to 15.50
Hvy. steel axle turnings	14.50 to 15.00
Machine shop turnings	10.00 to 10.50
Acid Open-Hearth Grades:	
Railr. knuckles and couplers	19.50 to 20.50
Railr. coil and leaf springs	19.50 to 20.50
Rolled steel wheels	19.50 to 20.50
Low phos. billet and bloom ends	20.50 to 21.00
Low phos., mill plates	20.50 to 21.00
Low phos., light grades	19.50 to 20.50
Low phos., sheet bar crops	20.50 to 21.00
Heavy steel axle turnings	14.50 to 15.00
Electric Furnace Grades:	
Low phos., punchings	18.50 to 19.00
Hvy. steel axle turnings	14.50 to 15.00
Blast Furnace Grades:	
Short shoveling steel turnings	10.50 to 11.00
Short mixed borings and turnings	10.50 to 11.00
Cast iron borings	10.50 to 11.00
Rolling Mill Grades:	
Steel car axles	19.50 to 20.50
Cupola Grades:	
No. 1 cast	14.00 to 15.00
Rails 3 ft. and under	17.50 to 18.50

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.25c.
Hoops	4.25c.
Black sheets (No. 24), 25 or more bundles	3.70c. to 3.80c.
Galv. sheets (No. 24), 25 or more bundles	4.35c. to 4.45c.
Light plates, blue annealed (No. 10), 1 to 24 plates	3.25c. to 3.35c.
Blue annealed sheets (No. 13), 1 to 24 sheets	3.40c. to 3.50c.
Galv. corrug. sheets (No. 28), per square	$4.33
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count,	60 per cent off list
Machine bolts, 100 count,	60 per cent off list
Carriage bolts, 100 count,	60 per cent off list
Nuts, all styles, 100 count,	60 per cent off list
Large rivets, base per 100 lb.	$3.50
Wire, black soft ann'l'd, base per 100 lb	$2.90 to 3.00
Wire, galv. soft, base per 100 lb	2.90 to 3.00
Common wire nails, per keg	2.80 to 2.90
Cement coated nails, per keg	2.95 to 3.05

Steel Corporation Files $13,401,467 Tax Claim

The United States Steel Corporation filed a claim this week of $13,401,467 in the United States Court of Claims, Washington. The Steel Corporation contends that this amount was erroneously collected by the Treasury as the company's liability for income and profit taxes for 1919, owing to faulty computation of capital by the commissioner of internal revenue.

That the use of steel or steel underframe cars in passenger-train service be required, subject to appropriate exceptions, is a renewed recommendation in the annual report of the Interstate Commerce Commission. Also it holds that the use in passenger trains of wooden cars between or in front of steel or steel underframe cars be prohibited.

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and under 10-in., Pittsburgh	$35.00
Rerolling, 4-in. and under 10-in., Youngstown	35.00
Rerolling, 4-in. and under 10-in., Cleveland	34.00
Rerolling, 4-in. and under 10-in., Chicago	36.00
Forging quality, Pittsburgh	40.00

Sheet Bars

(Open Hearth or Bessemer)

	Per Gross Ton
Pittsburgh	$35.00
Youngstown	35.00
Cleveland	34.00

Slabs

(8 in. x 2 in. and under 10 in. x 10 in.)

	Per Gross Ton
Pittsburgh	$35.00
Youngstown	35.00
Cleveland	34.00

Skelp

(F.o.b. Pittsburgh or Youngstown)

	Per Lb
Grooved	1.85c. to 1.90c.
Universal	1.85c. to 1.90c.
Sheared	1.85c. to 1.90c.

Wire Rods

(Common soft, base)

	Per Gross Ton
Pittsburgh	$40.00
Cleveland	40.00
Chicago	41.00

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.80
Old range non-Bessemer, 51.50% iron	4.65
Mesabi Bessemer, 51.50% iron	4.65
Mesabi non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.40

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algerian	12.00c.
Iron ore, low phos., Swedish, average 68% iron	12.00c.
Iron ore, basic Swedish, average 65% iron	10.00c.
Manganese ore, washed, 52% manganese, from the Caucasus	30.00c.
Manganese ore, Brazilian, African or Indian, basic 50%	30.00c.
Tungsten ore, high grade, per unit, in 60% concentrates	$15.50 to $16.50

	Per Gross Ton
Chrome ore, 45 to 50% Cr_2O_3, crude, c.i.f. Atlantic seaboard	$22.00 to $24.00

	Per Lb.
Molybdenum ore, 85% concentrates of MoS_2, delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$2.65
Foundry, f.o.b. Connellsville prompt	$3.75 to 4.75
Foundry, by-product, Ch'go ovens	8.00
Foundry, by-product, New England, del'd	11.00
Foundry, by-product, Newark or Jersey City, delivered	9.00 to 9.40
Foundry, by-product, Phila.	9.00
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry by-prod., del'd St. Louis	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.25 to $1.75
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, ¾-in. f.o.b. Pa. mines	1.90 to 2.00
Mine run gas coal, f.o.b. Pa. mines	1.65 to 1.75
Steam slack, f.o.b. W. Pa. mines	80c. to 90c.
Gas slack, f.o.b. W. Pa. mines	1.00 to 1.10

Ferromanganese

	Per Gross Ton
Domestic, 80%, seaboard	$100.00
Foreign, 80%, Atlantic or Gulf port, duty paid	100.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$31.00 to $34.00
Domestic, 16 to 19%	29.00 to 32.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$83.50
75%	130.00

	Per Gross Ton Furnace		Per Gross Ton Furnace
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	45.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		Per Gross Ton
10%	$30.00	12%	$34.00
11%	32.00		

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		Per Gross Ton
6%	$22.00 to $23.00	10%	$26.00 to $28.00
7%	23.00 to 24.00	11%	28.00 to 30.00
8%	24.00 to 25.00	12%	30.00 to 32.00
9%	25.00 to 26.00		

Other Ferroalloys

Ferrotungsten, per lb. contained metal del'd	$1.40 to $1.50
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.15 to $3.65
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	$160.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton	$91.00
Ferrophosphorus, electric 24%, f.o.b. Anniston, Ala., per gross ton	$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silicon, gravel, f.o.b. Illinois and Kentucky mines	$18.00
No. 2 lump, Illinois and Kentucky mines	20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	$18.25 to 18.75
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines	32.50

Fire Clay Brick

	Per 1000 f.o.b. Works: High-Heat Duty Brick	Intermediate Heavy Duty Brick
Pennsylvania	$43.00 to $46.00	$35.00 to $38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	.....
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00
Standard size	45.00

Chrome Brick

	Per Net Ton
Standard size	$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts, blank or tapped, hexagons	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	7.00c. to 6.75c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled thread up to and including ⅛ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagon nuts	70
Semi-finished hexagon castellated nuts, S.A.E.	70
Stove bolts in packages, P'gh	75, 20, 10 and 5
Stove bolts in packages, Chicago	75, 20, 10 and 5
Stove bolts in packages, Cleveland	75, 20, 10 and 5
Stove bolts in bulk, P'gh	75, 20, 10, 5 and 2½
Stove bolts in bulk, Chicago	75, 20, 10, 5 and 2½
Stove bolts in bulk, Cleveland	75, 20, 10, 5 and 2½
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55, 60 per cent apply.

Large Rivets

(½-in. and larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$3.10
F.o.b. Chicago	3.20

Small Rivets

(7/8-in. and smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70 and 10
F.o.b. Cleveland	70 and 10
F.o.b. Chicago	70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10 and 5
Milled standard set screws, case hardened,	80 and 5
Milled headless set screws, cut thread	75 and 10
Upset hex. head cap screws, U.S.S. thread	85
Upset hex. cap screws, S.A.E. thread	85
Upset set screws	80, 10 and 5
Milled studs	70

Chicago

Consumers Interest in Future Needs Growing But Current Steel Demand Is Light—Some Encouraging Factors

CHICAGO, Dec. 17.—Although sentiment in the Chicago iron and steel market is improved, demand for tonnage remains light. Interest in future needs is growing, as indicated by consumers' requests for prices. The total volume of contracts placed is smaller than that of last week, and spot buying, which is strongly under the influence of seasonal conditions, is receding.

However, several encouraging conditions exist. Structural awards and inquiries from a wide territory surrounding Chicago are noticeably larger. Farm implement manufacturers are maintaining a high rate of output of tillage machinery and are now releasing steel against production of harvesting equipment. Efforts by mills to drive in rail releases have been successful, and this tonnage, with specifications for other finished steel products permits ingot output to be held firmly at 65 per cent of capacity. Specifications for plates for pipe manufacture are larger and schedules point to heavier releases.

Closing of formal orders for the 5000 Rock Island cars has released about 75,000 tons of steel, some of which is already on rolling schedules. The Milwaukee road has entered formal requests for prices on 2300 cars and is preparing specifications on 750 stock cars.

Although pressure for lower prices is severe, most steel mill commodities are holding well at current quotations. Plates, shapes and bars are steady at 2c. a lb., Chicago. Some weakness is indicated in prices for nails at several points to the south of Chicago. Black sheets have been sold at $2 a ton below the quotation of a week ago.

Pig Iron.—Until very recently, the daily volume of specifications for Northern pig iron has held above the average of the preceding month. However, in recent days releases have grown lighter under seasonal influences. It long has been the practice for most foundries to close down about one week in the holiday season and, from all appearances, this year will not be an exception. With all merchant stacks in this district lighted, producers are making a surplus of iron and are adding to stocks. Practices in buying have reversed in the week. A short time ago the bulk of sales were for nearby shipment. Lessened needs over the holiday season have brought a sharp recession in spot purchasing, but contracts for the first quarter are showing a marked increase. It is reported that a Southern furnace has named $15 a ton, Birmingham, as the price for iron to be delivered in the South. No announcement has been made as to the course to be taken for Northern delivery.

Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	$20.00
N'th'n No. 1 fdy., sil. 2.25 to 2.75	20.50
Malleable, not over 2.25 sil.	20.00
High phosphorus	20.00
Lake Super. charcoal, sil. 1.50	27.04
So'th'n No. 2 fdy. (all rail)	$19.01 to 19.51
Low phos., sil. 1 to 2, copper free	29.50
Silvery, sil. 8 per cent	$28.79 to 29.79
Bess. ferrosilicon, 14-15 per cent	46.29

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Ferroalloys.—This market is quiet. Most contracts for ferromanganese and 50 per cent ferrosilicon have been signed. The spiegeleisen market is dull, with car-lot orders far apart.

Rails and Track Supplies.—Local mills are meeting with success in pressing for releases of standard-section rails as a measure to support the current rate of ingot output. New orders this week total 5000 tons made up of two lots, one for a frog and switch manufacturer and the other for a small Western railroad. Both orders are for early rolling. Little actual inquiry is now before the trade. However, there is still a sizable tonnage to come into this market, the bulk of which is normally bought soon after the turn of the year. It is reported here that the New York Central may close this week for the 14,000 tons of track accessories it has on inquiry. Miscellaneous orders this week total 3000 tons, the bulk of which is for current needs.

Prices f.o.b. mill, per gross ton: Standard section open-hearth and Bess. rails, $43; light rails, rolled from billets, $36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.07½c. to 2.15c.; angle bars, 2.75c.

Cast Iron Pipe.—Outstanding among fresh inquiries in this market is 8000 tons of cast iron pipe, on which Milwaukee will close bids Dec. 24. Included in this request for prices is 500 tons of 6-in.; 3500 tons of 8-in.; 2500 tons of 12-in. and 1500 tons of 16-in.; also 500 tons of special castings, 100 tons Class D offset castings and 500 hydrants. Detroit, which has an inquiry before the trade for large diameter pipe, is contemplating the purchase of several thousand tons of 6-in. and 8-in. pipe early in January. Several public utilities have taken preliminary figures on 1930 needs.

Prices per net ton, deliv'd Chicago: Water pipe, 6-in. and over, $43.70 to $45.70; 4-in., $47.70 to $49.70; Class A and gas pipe, $3 extra.

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars	3.00c.
Reinforc'g bars, billet steel	1.95c. to 2.10c.
Reinforc'g bars, rail steel	1.80c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Bands (¾ in. in Nos. 10 and 12 gages)	3.20c.
Hoops (No. 14 gage and lighter)	3.75c.
Black sheets (No. 24)	4.05c.
Galv. sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.35c.
Spikes, ⅜ in. and larger	3.55c.
Track bolts	4.55c.
Rivets, structural	4.00c.
Rivets, boiler	4.00c.

	Per Cent Off List
Machine bolts	60
Carriage bolts	60
Coach or lag screws	60
Hot-pressed nuts, sq., tap. or blank	60
Hot-pressed nuts, hex., tap. or blank	60
No. 8 black ann'l'd wire, per 100 lb.	$3.45
Com. wire nails, base per keg	$2.75 to 2.95
Cement c't'd nails, base per keg	2.75 to 2.95

Structural Material.—In Chicago, this market remains inactive in actual awards but new contracts and fresh inquiry from surrounding territory show substantial increases. Among awards this week is 5500 tons for bridge work at Indianapolis. Steel has been placed for a power house in Nebraska, and several like inquiries, including a large tonnage at Waukegan, Ill., are active. A telephone exchange at San Antonio, Tex., calls for 3000 tons of steel.

Mill prices on plain material, per lb.: 2.00c. base, Chicago.

Sheets.—Hot mill output in this district is holding at 50 per cent of capacity. The bulk of current business is in carload lots for immediate delivery. Producers are of the opinion that stocks in the hands of users are near the vanishing point. Jobbers are thinking more of the inventory period and have made sharp cuts in the tonnages which they are taking from mills. There is some interest in future needs, which is shown more in requests for prices than in signed contracts. Prices, delivered Chicago, for galvanized sheets are well-established at 3.55c. to 3.65c. a lb., and for blue annealed sheets, 2.35c. Quotations on black sheets are giving ground, and the range is now 2.80c. to 2.90c. For the first time in many months, shipments of galvanized sheets are in larger volume than those of blue annealed. This is explained by the fact that light manufacturers who use blue annealed sheets are cutting orders to match dullness in their activities, whereas distribution of galvanized sheets is in steady volume from lumber yards, hardware retailers and numerous like agencies. Galvanized roofing may be had from stock. Other sheet mill products can be shipped in one to two weeks.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 2.80c. to 2.90c.; No. 24 galv., 3.55c. to 3.65c.; No. 10 blue ann'l'd, 2.35c. Deliv'd prices at other Western points are equal to the freight from Gary, plus the mill prices, which are 5c. per 100 lb. lower than Chicago delivered prices.

Wire Products.—Producers of wire and wire products report a substantial increase in forward contracts, though the bulk of this tonnage is for wire ropes. Use of wire by the manufacturing trade has increased only in small degree in the last week. In the same period distribution by jobbers has lightened in the part of the country where cold weather has put an end to outdoor work. Additional tonnage taken for the manufacture of new automobile models is practically negligible. Shipments of electrical cables are large, and order books are well filled. New business is brisk, and producers of this commodity fore-

see an active year ahead, as gaged by expansion programs being announced by public utility operating companies.

Cold-Rolled Strip.—Consumers are showing more interest in forward needs. Prices are well established at 2.75c., Cleveland, or 3.05c. delivered Chicago. Shipments show moderate improvement because of slightly larger use by manufacturers of automobiles.

Reinforcing Bars.—Demand for reinforcing bars is practically nil. Prices continue low and, in the absence of attractive projects, dealers are inclined to give more attention to quoting slightly higher base prices for billet steel reinforcing bars out of warehouses. However, no improvement is shown in their willingness to cut extras for design, bending and the like. Prospects for the near future are uncertain. New projects before the trade are few in number and of small aggregate tonnage. Architects are dusting off some old plans for which they now hope money will be available. A moderate amount of road work is coming to dealers from Iowa and Minnesota. Bar bending shops are cutting deeply into backlogs at operating schedules which are lower than a week ago.

Bars.—The soft steel bar market is making a better showing. Specifications in the week are practically double the volume of the previous seven days, and therefore are measurably ahead of shipments. Sales, however, are in moderate volume. The fact that stocks are being held to a low point leads to the conclusion that expansion in releases is a measuring stick of an increase in the rate of consumption. Orders from manufacturers of farm machinery show that a high rate of output is being maintained in tillage machinery departments, and programs now being prepared indicate that the manufacture of harvesting machines will soon be under way. Mild steel bars may be had in seven to 14 days, depending on rolling schedules. Prices are well established at 2c., Chicago. Operations at rail steel bar mills are steady, and current specifications are ample to support this rate. Manufacturers of beds and barn equipment, though ordering frequently and in small lots, are taking quantities that in the aggregate are larger than is customary at this time of the year. Forward buying of fence posts for delivery in the spring is in moderate volume.

Plates. — Encouraging features of the local plate market are larger releases for pipe manufacture, which promise to expand still further in the near future, and the fact that the orders for the Rock Island cars have been formally placed and specifications for the steel are reaching mills. The Burlington Railroad is still undecided whether it will buy 1200 cars or build them in its own shops. It is reported that action on this question may be taken this week. A Texas refiner has placed 1200 tons of tank plates, which will be fabricated in the Southwest. Fresh inquiry for similar work remains light. Deliveries of plates range from one to three weeks, with several universal mills making the most deferred promises.

Bolts, Nuts and Rivets.—Sharp reductions in specifications for these commodities are attributed by the trade to seasonal influences. Farm implement manufacturers are arranging schedules for the production of harvesting equipment. Forward contracting is near an end.

Coke. — Shipments of by-product foundry coke remain at a level slightly higher than the average in November. All ovens in this district are lighted. Forward contracting continues at $8 a ton, local ovens.

Old Material.—The Chicago scrap iron and steel market continues to show added strength, as reflected by the feeling among dealers. There is still a strong urge to complete old orders as fast as possible, and this leads to spirited bidding for available tonnages, with higher prices being paid by brokers. On this score, numerous transactions are turning to losses on dealers' books. Large consumers are standing by, evidently being well satisfied with their stocks and tonnages that are being received from day to day. Some small melters are in need of scrap for business in hand. Inquiry from this source is active, and a few tonnages have been ordered at prices that are higher than those of a week ago. With the first of the year only two weeks away, some users are now making purchases on which they are specifying delivery in the first week in January. The market for brake shoes is more active, with supplies well matched with current demand. This situation is leading to some confusion, as users, after placing orders with dealers, enter the open market and bid against these dealers for available supplies. Consumers' transactions in heavy melting steel are lacking, but this grade is being turned over in large tonnages on dealer trades. The firmer tone in the market is explained by such factors as curtailment of gathering and preparation due to winter weather, dealers' unwillingness to prepare scrap at current low prices, the slowness of scrap production because of the reduced volume of manufacturing, and closer selection, which results from careful inspection by several major consumers.

Prices deliv'd Chicago district consumers:
Per Gross Ton

Basic Open-Hearth Grades:	
Heavy melting steel	$12.50 to $13.00
Shoveling steel	12.50 to 13.00
Frogs, switches and guards, cut apart, and misc. rails	13.50 to 14.00
Hydraul. compressed sheets	11.00 to 11.50
Drop forge flashings	9.75 to 10.25
No. 1 busheling	11.00 to 11.50
Forg'd cast and r'l'd steel carwheels	17.50 to 18.00
Railroad tires, charg. box size	17.50 to 18.00
Railroad leaf springs cut apart	17.50 to 18.00
Acid Open-Hearth Grades:	
Steel couplers and knuckles	16.00 to 16.50
Coil springs	17.75 to 18.25
Electric Furnace Grades:	
Axle turnings	12.75 to 13.25
Low phos. punchings	15.00 to 15.50
Low phos. plates, 12 in. and under	15.00 to 15.50
Blast Furnace Grades:	
Axle turnings	10.50 to 11.00
Cast iron borings	9.25 to 9.75
Short shoveling turnings	9.25 to 9.75
Machine shop turnings	7.00 to 7.50
Rolling Mill Grades:	
Iron rails	14.50 to 15.00
Rerolling rails	14.50 to 15.00
Cupola Grades:	
Steel rails less than 3 ft.	16.25 to 17.25
Steel rails less than 2 ft.	18.50 to 19.00
Angle bars, steel	15.25 to 15.75
Cast iron carwheels	13.50 to 14.00
Malleable Grades:	
Railroad	16.00 to 16.50
Agricultural	14.50 to 15.00
Miscellaneous:	
*Relaying rails, 56 to 60 lb.	23.00 to 25.00
*Relaying rails, 65 lb. and heav.	26.00 to 31.00
Per Net Ton	
Rolling Mill Grades:	
Iron angle and splice bars	15.00 to 15.50
Iron arch bars and transoms	17.50 to 18.00
Iron car axles	25.50 to 26.00
Steel car axles	15.50 to 16.00
No. 1 railroad wrought	12.00 to 12.50
No. 2 railroad wrought	11.00 to 11.50
No. 1 busheling	9.00 to 9.50
No. 2 busheling	7.00 to 7.50
Locomotive tires, smooth	14.50 to 15.00
Pipes and flues	9.50 to 10.00
Cupola Grades:	
No. 1 machinery cast	13.50 to 14.00
No. 1 railroad cast	12.50 to 13.00
No. 1 agricultural cast	12.00 to 12.50
Stove plate	10.50 to 11.00
Grate bars	10.75 to 11.25
Brake shoes	10.25 to 10.75

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Employment and Payroll Totals in Identical Plants in October and September (a)

	Establishments	Number on Payroll		Weekly Payroll (b)	
		October	September	October	September
Iron and steel	208	278,896	286,039	$9,049	$9,277
Foundry and machine shop	1,080	287,618	290,351	8,955	8,843
Machine tools	154	42,774	42,464	1,408	1,383
Hardware makers	72	32,503	32,566	844	837
Steam and hot-water appliances	112	33,379	32,587	1,018	961
Stoves	119	22,240	21,549	671	613
Structural ironwork	172	30,055	30,296	941	932
Cast iron pipe	39	11,635	11,999	273	283
Automobiles	222	393,297	438,928	12,980	14,449
Agricultural implements	87	28,162	27,929	830	795

(a) United States Bureau of Labor Statistics.
(b) Thousands of dollars.

New York

Pig Iron Sales, at 10,000 Tons, Indicate Urgent Needs as Buyers Are Still Cautious

NEW YORK, Dec. 17.—The pig iron market has an improved tone. Caution still dominates the policy of melters and, with a price incentive lacking, there is nothing resembling a general first quarter buying movement. Despite these facts, the amount of business being booked by sellers is increasing, indicating that foundry stocks are scraping bottom and that new metal is required to fill castings contracts. Most orders are for relatively small lots and until recently many were for prompt shipment, although, with the approach of the year-end shutdown for inventory-taking, purchases for next year now predominate. Considering the character of the buying, sales in this district for the week, at more than 10,000 tons, were impressive. With the completion of inventories, foundry purchases are expected to show further improvement, even if orders are still mainly confined to nearby requirements. In fact, a less conservative attitude on the part of both buyers of castings and melters will be in order. The price situation shows little change and, while it is possible that attractive inquiries might bring out further concessions, the trade is aware that blast furnace stocks have not been permitted to pile up and that curtailment of pig iron production has been drastic. Buffalo foundry iron is available at $17 to $17.50, base furnace, and Southern is still quoted at $13.50 to $14, base Birmingham. Alabama producers have raised quotations in the Birmingham district to $15, furnace, an advance of 50c. a ton, but so far as can be learned no change in prices for Northern deliveries is contemplated. The Worthington Pump & Machinery Corporation is in the market for 750 tons for first quarter delivery at its Holyoke, Mass., and Elmwood Place, Ohio, plants.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	$21.91 to $22.41
*Buff. No. 2, del'd east. N. J.	20.28 to 20.78
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	19.89 to 21.02
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	20.39 to 21.52

Freight rates: $4.91 from Buffalo, $1.39 to $2.52 from eastern Pennsylvania.

*Prices delivered to New Jersey cities having rate of $3.28 a ton from Buffalo.

Finished Steel.—Steel orders have dropped to the lowest point since the decline in buying set in. Moreover, most of the orders of the past week were not only small in tonnage, but in most instances shipment after Jan. 1 was specified. Locally, the structural steel market is the most active of all steel departments. About 20,000 tons of new work was added to the pending list during the week. Revised figures on the Empire State Building call for 52,000 tons of steel, and award of this project is expected shortly. New York district structural fabricators, having taken a large volume of work in October and November, have backlogs that will keep them busy for periods ranging from three to five months. Prices on finished steel products are fairly steady.

Mill prices per lb., deliv'd New York: Soft steel bars, 2.24c.; plates, 2.17½c. to 2.22½c.; structural shapes, 2.09½c. to 2.14½c.; bar iron, 2.14c.

Warehouse Business.—The larger jobbers have had a slight increase in business in the past week, but among the smaller warehouses buying is still rather limited. Despite the advanced season, there is still some demand for structural steel, especially bar-sized shapes. Although black and galvanized sheets are moderately active, occasional concessions have appeared recently on desirable tonnages.

Cast Iron Pipe.—The United Gas Improvement Co., Philadelphia, is in the market for about 7000 tons of gas pipe, which it intends to purchase this year. The New York Power & Light Corporation, Albany, N. Y., is inquiring for 1500 tons of 4-in. to 24-in. gas pipe. The Federal Water Supply Co., New York, has closed on 1700 tons of 30-in. Class B pipe for Youngstown and Girard, Ohio, with the leading producer and on 750 tons of 18-in. and 24-in. pipe for Salem, Ore., with a Birmingham maker. The Portland Water District, Portland, Me., is about to close on 900 tons of pipe. Manchester, N. H., will open bids Dec. 23 on 750 tons of water pipe and fittings for delivery in the first quarter.

Prices per net ton deliv'd New York: Water pipe, 6-in. and larger, $34.60 to $36.60; 4-in. and 5-in., $37.60 to $39.60; 3-in., $44.60 to $46.60. Class A and gas pipe $3 extra.

Coke.—Shipments on contracts are continuing in most cases without requests for delay, but buying for prompt delivery is light. The coke operation at Swedeland, Pa., which recently began to make foundry grade, is quoting $7.50 a net ton, ovens, the price maintained by the Philadelphia producer. Special brands of beehive coke are unchanged at $4.85 a net ton, ovens, or $8.56, delivered to northern New Jersey, Jersey City and Newark, and $9.44. to New York and Brooklyn. Standard furnace coke is quiet at $2.65 to $2.75 a net ton. By-product coke is quoted at $9 to $9.40 a net ton, Newark or Jersey City, and $10.06, New York or Brooklyn.

Ferroalloys.—Sellers of ferromanganese, particularly domestic producers, have closed requirement contracts for 1930 with most of their customers. The new price of $100, seaboard, a reduction of $5 a ton from the 1929 quotation, has been well received. Practically all buyers of 50 per cent ferrosilicon have also contracted for their 1930 needs.

Reinforcing Bars.—Business has slowed down somewhat on account of the usual year-end lull, although the number of small lettings has been fair. Several important projects are pending, but action probably will be

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.30c.
Soft steel bars, small shapes	3.25c.
Iron bars	3.24c.
Iron bars, Swed. charcoal	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons	3.50c.
Flats and squares	4.00c.
Cold-roll. strip, soft and quarter hard	5.15c. to 5.40c.
Hoops	4.25c.
Bands	3.75c.
Blue ann'l'd sheets (No. 10)	3.25c. to 3.90c.
Long terne sheets (No. 24)	5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galv. annealed	5.15c.
Tire steel, ⅜ x ½ in. and larger	3.40c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.75c.
Open-hearth spring steel, bases,	4.50c. to 7.00c.

	Per Cent Off List
Machine bolts, cut threads:	
¾ x 6 in. and smaller	60
1 x 30 in. and smaller	50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	60
¾ x 20 in. and smaller	50 to 50 and 10
Coach Screws:	
½ x 6 in. and smaller	60
1 x 6 in. and smaller	50 to 50 and 10

Boiler Tubes—	Per 100 Ft.
Lap welded, 2-in.	$17.33
Seamless steel, 2-in.	20.24
Charcoal iron, 2-in.	25.00
Charcoal iron, 4-in.	67.00

Discounts on Welded Pipe

	Black	Galv.
Standard Steel—		
½-in. butt	46	29
¾-in. butt	51	37
1-3-in. butt	53	39
2½-6-in. lap	48	35
7 and 8-in. lap	44	17
11 and 12-in. lap	37	12
Wrought Iron—		
½-in. butt	5	+19
¾-in. butt	11	+ 9
1-1½-in. butt	14	+ 6
2-in. lap	5	+14
3-6-in. lap	11	+ 6
7-12-in. lap	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box	$6.45	$6.20
Charcoal, per Box—	A	AAA
IC	$9.70	$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating	$10.00 to $11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets, Box Annealed—Black, C. R. One Pass

	Per Lb.
Nos. 18 to 20	3.70c.
No. 22	3.85c.
No. 24	3.90c.
No. 26	4.00c.
No. 28*	4.15c.
No. 30	4.40c.

Sheets, Galvanized

	Per Lb.
No. 14	4.15c.
No. 16	4.00c.
No. 18	4.15c.
No. 20	4.25c.
No. 22	4.35c.
No. 24	4.50c.
No. 26	4.75c.
No. 28*	5.00c.
No. 30	5.40c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb

postponed until January in most cases. Prices are firm at 2.05c., New York.

Old Material.—Buying prices still show a tendency to decline. No. 1 heavy melting steel is being bought at $14 a ton, delivered eastern Pennsylvania. The consumer at Claymount, Del., which has not been accepting deliveries of heavy melting steel for some weeks, is now receiving shipments on old orders. No. 2 heavy melting steel is inactive, and brokers are paying $11 to $11.25 a ton, delivered Pottsville, Pa., and $11.50 a ton, delivered Phoenixville, Pa. Most grades of railroad scrap are off about 50c. a ton, on the basis of recent small tonnage sales by brokers and by the railroads.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel	$10.50 to $11.35
Heavy melting steel (yard)	7.50 to 8.00
No. 1 hvy. breakable cast.	9.50 to 10.50
Stove plate (steel works)	8.00
Locomotive grate bars	8.25
Machine shop turnings	7.00 to 7.50
Short shoveling turnings	7.25 to 7.50
Cast borings (blast fur. or steel works)	7.00 to 7.50
Mixed borings and turnings	6.75 to 7.50
Steel car axles	15.25 to 16.25
Iron car axles	20.50 to 21.00
Iron and steel pipe (1 in. dia., not under 2 ft. long)	9.25 to 9.75
Forge fire	8.50 to 9.00
No. 1 railroad wrought	11.50 to 12.50
No. 1 yard wrought, long	10.50 to 11.50
Rails for rolling	10.50 to 11.00
Stove plate (foundry)	8.25 to 8.50
Malleable cast (railroad)	12.50 to 13.00
Cast borings (chemical)	8.50 to 9.50

Prices per gross ton, deliv'd local foundries:

No. 1 machry. cast	$15.00
No. 1 hvy. cast (columns, bldg. materials, etc.), cupola size	13.00
No. 2 cast (radiators, cast boilers, etc.)	12.50

Non-Ferrous Ingot Metal Prices and Orders

CHICAGO, Dec. 14.—The Non-Ferrous Ingot Metal Institute reports average prices per pound received by its membership on commercial grades of the six principal mixtures of ingot brass during the 28-day period ended Dec. 6 as follows:

Commercial 80-10-10 (1 per cent impurities)	16.652c.
Commercial 78 per cent metal	14.783c.
Commercial 81 per cent metal	15.239c.
Commercial 83 per cent metal	15.368c.
Commercial 85-5-5-5	15.629c.
Commercial No. 1 yellow brass ingot	12.433c.

As there are, as yet, no generally accepted specifications for ingot brass, it must be understood that each item listed is a compilation representing numerous sales of metal known to the trade by the designation shown; but each item, in reality, includes many variations in formulas. Until the program of standardizing the principal specifications, now progressing in cooperation with the American Society for Testing Materials, is completed, the specifications will be understood to refer to "commercial grades."

Unfilled orders Dec. 1 for brass and bronze ingots and billets, on the books of members of the Non-Ferrous Ingot Metal Institute, amounted to 10,696 net tons.

Cleveland

Moderate Gain in Orders from Automobile Industry—Northern Ohio Mills Increase Ingot Output

CLEVELAND, Dec. 17.—While there has been little change in the volume of steel business during the past week, the improved sentiment is being maintained, and whatever tendency has developed has been toward an improvement. This has been more noticeable in steel bars, both in carbon and alloy steel, than in other products. Some good specifications came from the bolt, nut and rivet manufacturers and from makers of automotive parts. An Ohio manufacturer of automotive equipment purchased approximately 5000 tons of steel bars.

There is a moderate gain in orders from the automotive industry in the Detroit territory, but none of the motor car manufacturers is making extended commitments.

Manufacturers of lower-priced cars evidently are getting in production more rapidly than those making the higher-priced models. The Ford Motor Co. is understood to have a daily schedule of 4500 cars this week, a gain of 700. While unsold stocks of cars have been materially reduced, they are still large enough to cause some manufacturers to keep production down to a low point.

Ingot output by two of the larger independent mills in northern Ohio has increased considerably, these operating now at approximately 60 per cent of capacity.

The only development in the price situation is a reduction of $1 a ton on sheet bars, billets and slabs.

Pig Iron.—Sales declined the past week, during which Cleveland interests sold 9500 tons of foundry and malleable iron. While most of the business was for the first quarter, there were a large number of small prompt shipment orders from foundries that are buying from hand-to-mouth. Foundries in the automotive field are staying out of the market, practically all the contracts placed coming from other industries. The General Electric Co. is inquiring for 300 tons of iron for its Erie works. The Westinghouse Electric & Mfg. Co. has not yet closed against its inquiry for iron for its Cleveland plant for the first quarter. Prices are unchanged and appear firm at $18.50, Cleveland, for out-of-town shipment, $19, furnace, for Cleveland delivery and $19.50 to $20, furnace, for shipment in Michigan. Shipping orders continue light and are not expected to show a gain during the remainder of the month. Two or three foundries in the automotive field that have not been taking iron issued releases during the week. However, there is no general improvement in shipping orders from this source. Most merchant furnaces are adding to their stock piles. The Central Alloy Steel Corporation has blown out its Massillon furnace for relining.

Prices per gross ton at Cleveland:

N'th'n fdy., sil. 1.75 to 2.25	$19.50
S'th'n fdy., sil. 1.75 to 2.25	$19.51 to 20.51
Malleable	19.50
Ohio silvery, 8 per cent	28.00
Basic Valley furnace	18.50
Stand. low phos., Valley	26.50 to 27.00

Prices except on basic and low phosphorus are delivered Cleveland. Freight rates: 50c. from local furnaces; $3 from Jackson, Ohio; $6.01 from Birmingham.

Fluorspar.—The present $18 price on gravel fluorspar has been reestablished for next year, but, with restricted operations, mills are showing no interest in contracts.

Semi-Finished Steel.—The leading local maker of semi-finished steel has opened its books for the first quarter at $34, Cleveland, Youngstown and Pittsburgh, for sheet bars, billets and slabs and has taken some contracts at this price, which is a $1 a ton reduction from its fourth quarter price. However, the market had shown weakness recently. Youngstown mills are also naming $34 for the first quarter. Wire rods are holding to $40, Cleveland, but not many buyers have closed contracts. A Cleveland mill that slowed down operations to two open-hearth furnaces now has seven furnaces in operation.

Sheets.—Stamping plants are now receiving considerable inquiry from automobile manufacturers for car stampings and have asked mills for prices on sheets for estimating purposes. Releases against tonnages held up several weeks ago have increased, and some of the mills are operating better than they were last month. Independent mills in this territory are running at about 40 per cent of capacity. Current orders continue rather light. Automobile manufacturers are buying only in small lots and are not interested in covering for extended requirements. There is quite an improvement in releases from barrel manufacturers. There is little change in the price situation. Black sheets are fairly firm at 2.75c., Pittsburgh, but shading from regular quotations

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and struc. shapes	3.00c.
Soft steel bars	3.00c.
Reinforc. steel bars	2.25c. to 2.50c.
Cold-fin. rounds and hex	3.65c.
Cold-fin. flats and sq	4.15c.
Hoops and bands, No. 12 to 1/4 in., inclusive	3.25c.
Hoops and bands, No. 13 and lighter	3.65c.
Cold-finished strip	*5.95c.
Black sheets (No. 24)	3.70c. to 3.90c.
Galvanized sheets (No. 24)	4.60c. to 4.75c.
Blue ann'l'd sheets (No. 10)	3.25c.
No. 9 ann'l'd wire, per 100 lb	$2.65
No. 9 galv. wire, per 100 lb	3.00
Com. wire nails, base per keg	2.65

*Net base, including boxing and cutting to length.

is reported on blue annealed sheets. While some of the continuous mills are naming 2.10c. for No. 10 and 2.25c. for No. 13, these prices are subject to concessions. On galvanized sheets, 3.40c. is a rather common quotation, and some first quarter business has been taken at that price.

Cold-Finished Steel Bars.—While a few consumers making automobile parts are operating a little better than recently, specifications have not increased. The market is firm at 2.20c., Cleveland. Very few contracts have been taken for the first quarter.

Bars, Plates and Shapes.—Specifications for steel bars gained during the week. Plates and structural shapes continue dull. Quite a few first quarter contracts were closed, these being at 1.90c., Cleveland, for steel bars and at 1.90c., Pittsburgh, for plates and shapes. While a 1.85c., Cleveland, price is still in evidence on steel bars, several of the outside mills will not meet this price. Specifications for alloy steel bars have increased, although some forge shops doing automobile work still have good stocks. Some first quarter contracts for alloy steel bars have been taken. Inquiry in the building field is light, and not much activity is expected during the remainder of the year.

Bolts, Nuts and Rivets. — Quite a few buyers have placed contracts for the first quarter since the reestablishment of the present 70 per cent discount. Specifications continue very light. As a result of the recent decline in the demand makers have considerable business on their books that will be cancelled at the end of the year.

Strip Steel. — While specifications for hot and cold-rolled strip are still rather light, orders are coming out in somewhat better volume than during the latter part of November. Most of the business is in specifications against outstanding contracts and consumers are ordering only for immediate needs. Prices on hot-rolled strip appear to be holding fairly well, but new orders are not for sufficient tonnage to test prices. Cold-rolled strip appears firm at 2.75c., Cleveland, efforts to secure a lower price on car lots having proved unsuccessful.

Coke.—The output of domestic coke has been increased following the blowing out of blast furnaces. The demand for heating coke has declined, however, because of the mild weather. While egg coke is quoted at $4.75, Ohio ovens, some price irregularity has developed. Foundry coke is very quiet and prices are unchanged. Ohio by-product foundry coke is quoted at $8.25, ovens.

Old Material.—The market has improved to the extent that mills in the Youngstown district, which for a time took practically no scrap, have released some shipping orders for heavy melting steel and compressed sheet steel. One Cleveland mill is still taking blast furnace scrap. As dealers are well covered, the additional releases have not stimulated buying by them to any extent. The market is weak, and prices on most of the steel-making grades have declined 50c. a ton. Little, if any, buying by mills is expected before January.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$14.00 to $14.50
No. 2 heavy melting steel	13.00 to 13.50
Compressed sheet steel	12.50 to 13.00
Light bundled sheet stampings	11.50 to 12.00
Drop forge flashings	11.50 to 12.00
Machine shop turnings	9.00 to 9.50
Short shoveling turnings	11.00 to 11.50
No. 1 railroad wrought	13.00 to 13.50
No. 2 railroad wrought	14.00 to 14.50
No. 1 busheling	12.00 to 12.50
Pipes and flues	9.00 to 9.50
Steel axle turnings	12.50 to 13.00
Acid Open-Hearth Grades:	
Low phos., forging crops	17.75 to 18.00
Low phos., billet, bloom and slab crops	18.50 to 18.75
Low phos., sheet bar crops	18.00 to 18.50
Low phos., plate scrap	18.00 to 18.50
Blast Furnace Grades:	
Cast iron borings	10.00 to 10.50
Mixed borings and short turnings	10.00 to 10.50
No. 2 busheling	10.00 to 10.50
Cupola Grades:	
No. 1 cast	16.00 to 16.50
Railroad grate bars	11.00 to 12.00
Stove plate	12.00 to 12.50
Rails under 3 ft	18.50 to 19.50
Miscellaneous:	
Railroad malleable	18.00 to 18.50
Rails for rolling	16.25 to 16.50

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.70c.
Plates, $\frac{3}{16}$-in.	2.90c.
Structural shapes	2.70c.
Soft steel bars, small shapes, iron bars (except bands)	2.80c.
Round-edge iron	3.50c.
Round-edge steel, iron finished 1½ x 1½ in.	3.50c.
Round-edge steel planished	4.30c.
Reinforc. steel bars, sq., twisted and deform.	2.60c. to 2.80c.
Cold-fin. steel, rounds and hex.	3.50c.
Cold-fin. steel, sq. and flats	4.00c.
Steel hoops	3.55c.
Steel bands, No. 12 to $\frac{3}{16}$-in. inclus.	3.30c.
Spring steel	5.00c.
*Black sheets (No. 24)	3.90c.
†Galvanized sheets (No. 24)	4.65c.
Light plates, blue annealed (No. 10)	3.25c.
Blue ann'l'd sheets (No. 13)	3.40c.
Diam. pat. floor plates—	
¼-in.	5.30c.
$\frac{3}{16}$-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

*For 50 bundles or more; 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.
†For 50 bundles or more; 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

Philadelphia

Shape and Black Sheet Prices Weaker — Concessions of 50c. to $1 a Ton on Pig Iron

PHILADELPHIA, Dec. 17.—Steel mill operations have receded to the lowest level of the year, and with the fourth quarter drawing to a close, new business is decidedly small. The shape market is inactive and prices have developed a further downward tendency, with recent sales of desirable tonnages at 1.85c. a lb., f.o.b. mill. Black sheet prices are also lacking in firmness when business is for prompt shipment. Automobile manufacturers have been increasing operations and railroad car buying has brought a substantial volume of activity to forging shops on axles and carwheels.

Shipbuilders are bidding on 10 steel barges for the New York, New Haven & Hartford Railroad, and are expecting award early next year of five steel tugboats for the Erie Railroad and two large passenger liners for the Export Steamship Corporation. Award of two large vessels for the United States Lines is delayed pending decision on the recommendation of the shipbuilder that the liners should be built with greater beam than is specified. Shipyards in this district are all well occupied, and one large builder has sufficient business for operation into the fall of 1930.

Pig Iron.—Foundry iron is still nominally quoted at $21 a ton, furnace, but concessions of 50c. a ton are being increasingly offered, and recently reductions of $1 a ton have been granted. Consumers show little interest in contracting for first quarter, evidently preferring to cover their requirements a carload at a time. The York Ice Machinery Co., York, Pa., has closed on a small tonnage of foundry iron; the American Engineering Co., Philadelphia, has purchased a carload of foundry and the Newport News Shipbuilding & Dry Dock Co., a carload of Virginia iron. The American Locomotive Co. has purchased 1000 tons of low phosphorus from an eastern Pennsylvania furnace. Southern iron is still a competitor for tonnage in this district, with sellers quoting $13.50 and $14 a ton, Birmingham district furnace, or $18.50 to $19 a ton, f.o.b. Philadelphia, rail-and-water delivery. Birmingham furnaces are reported to have about 300,000 tons of iron piled, and, with the recent make in excess of sales, are adding to this total.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil.	$20.76 to $21.76
East. Pa. No. 2X, 2.25 to 2.75 sil.	21.26 to 22.26
East. Pa. No. 1X	21.72 to 22.76
Basic (del'd east. Pa.)	19.50 to 19.75
Gray forge	20.00 to 20.50
Malleable	21.25 to 21.75
Stand. low phos. (f.o.b. N. Y. State furnace)	22.00 to 23.00
Cop. br'g low phos. (f.o.b. furnace)	23.00 to 24.00
Va. No. 2 plain, 1.75 to 2.25 sil.	22.29
Va. No. 2X, 2.25 to 2.75 sil.	22.79

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces; $4.54 from Virginia furnaces.

Bars.—In certain instances, consumers have entered into first quarter contracts at 1.90c., Pittsburgh, or 2.22c., delivered Philadelphia, but

most users are not inclined to make future commitments, preferring to buy small lots of bars as they are needed.

Reinforcing Bars.—The only sizable project in the district at present, 900 tons of bars in the Convention Hall, Philadelphia, has been provisionally awarded to the Concrete Steel Co., pending award of the general contract. Prices show no improvement, with billet steel bars quoted at 1.90c. to 1.95c., Pittsburgh, or 2.22c. to 2.27c., delivered Philadelphia, and the extra for cutting to length usually omitted. Rail steel bars are 1.80c. to 1.95c., Franklin, Pa., and Tonawanda, N. Y., or 2.12c. to 2.27c., delivered Philadelphia.

Shapes.—New business is limited, and prices have shown a tendency to decline further. On substantial tonnages, mills have quoted 1.85c. a lb., f.o.b. nearest mill to consumer, or 1.91c., delivered Philadelphia, but small lots are still bringing 1.90c. to 1.95c., f.o.b. mill, or 1.96c. to 2.01c., delivered Philadelphia. The larger fabricating shops continue well engaged, but small fabricators are in need of tonnage. The Convention Hall, Philadelphia, requiring 7000 tons, has been provisionally awarded to the Bethlehem Steel Co., pending award of the general contract.

Plates.—Mills are maintaining a fair rate of operation and quoting 2c. a lb., Coatesville, Pa., both for prompt shipment and on first quarter contracts. Local shipbuilders are asking for some substantial plate tonnages, including material for 10 steel barges to be built for the New York, New Haven & Hartford Railroad.

Sheets.—Automobile manufacturers in this district are beginning to increase operating rates, but have not been heavy buyers of sheets. One automobile body builder is executing a contract with the Ford Motor Co., but has been receiving material from the Ford company instead of buying it direct. Blue annealed sheets are still quoted at 2.35c. a lb., Pittsburgh, or 2.67c., delivered Philadelphia, and blue annealed plates at 2.20c., Pittsburgh, or 2.52c., Philadelphia, with $2 to $4 concessions to automobile body builders and other preferred buyers. Black sheets are being maintained at 2.75c. a lb., Pittsburgh, or 3.07c., Philadelphia, for first quarter contracts, but on small tonnages for early shipment buyers claim to have obtained 2.65c. a lb., Pittsburgh, or 2.97c., Philadelphia. Galvanized sheets are quiet, and the price continues at 3.40c., Pittsburgh, or 3.72c., Philadelphia.

Imports.—In the week ended Dec. 14, 479 tons of chrome ore arrived at this port from Greece and five tons of manganese ore from Germany. Pig iron arrivals consisted of 4002 tons from the United Kingdom and 74 tons from the Netherlands. Only 37 tons of structural shapes was received from Belgium and three tons of steel scrap from the United Kingdom.

Old Material.—A Claymont, Del., user of No. 1 heavy melting steel has closed on about 5000 tons at $14.50 a ton, delivered, and a Pencoyd, Pa., mill has purchased a small lot of No. 2 heavy melting steel at $12.50 a ton, delivered, 50c. lower than a previous purchase of the same grade. Consumer buying is limited, and the trend of prices is still downward.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel.	$14.50
Scrap T rails	14.00
No. 2 heavy melting steel.	$12.00 to 12.50
No. 1 railroad wrought	15.50 to 16.00
Bundled sheets (for steel works)	11.50
Hydraulic compressed, new	13.50
Hydraulic compressed, old.	12.00 to 12.50
Machine shop turnings (for steel works)	11.00
Heavy axle turnings (or equiv.)	12.50 to 13.50
Cast borings (for steel works and roll. mill)	11.00 to 11.50
Heavy breakable cast (for steel works)	13.50 to 14.00
Railroad grate bars	11.00 to 11.50
Stove plate (for steel works)	11.00 to 11.50
No. 1 low phos., hvy., 0.04% and under	21.00 to 22.00
Couplers and knuckles	19.00 to 19.50
Rolled steel wheels	19.00 to 19.50
No. 1 blast f'nace scrap	10.50 to 11.00
Wrot. iron and soft steel pipes and tubes (new specific.)	14.00
Shafting	19.00
Steel axles	20.00 to 21.00
No. 1 forge fire	13.00 to 13.50
Cast iron carwheels	15.50 to 15.75
No. 1 cast	15.00 to 15.50
Cast borings (for chem. plant)	14.00 to 14.50
Steel rails for rolling	15.50 to 16.00

Research Fellowships at Michigan Mining College

Twelve fellowships, each carrying a stipend of $1,200 with the usual exemption from fees, are to be offered by the Michigan College of Mining and Technology, Houghton, Mich., for the academic year 1930-31. Holders of these fellowships will enroll in the graduate school and be engaged in various problems connected with a general research program on iron and copper resources of northern Michigan. Among the approved subjects are an investigation of drill steel for use in mines, research in physical metallurgy, X-ray analysis, sintering and briquetting of fine ore, and various studies on ore dressing. Further information and special forms may be secured from L. F. Duggan, registrar of the college.

Sharp Drop in Automobile Production

WASHINGTON, Dec. 17.—Making a decline of 162,570, the production of motor vehicles in the United States in November was 217,441 units, against 380,011 in October and was the lowest since December, 1927, with a total of 133,309, according to the Department of Commerce. For the first 11 months of the current year, however, the production of motor vehicles was 5,235,316 units, an increase of 1,110,673 over that for the corresponding period of last year.

Passenger car output in November was 169,309, a decline of 151,018 from that for October, and was the lowest since December, 1927, with a total of 106,083. For the first 11 months of 1929 passenger car production was 4,494,813, against 3,616,179 for the corresponding period of last year, an increase of 878,634.

Production of trucks in November was 46,513, a decline of 12,303 from October and the lowest since December of last year, with a total of 28,123. For the first 11 months of the present year truck output was 724,424, an increase of 221,613 over that for the corresponding period of last year.

Building Porcelain Enameling Plant

Believing that porcelain enameling will be used more and more in connection with pressed steel for parts requiring a permanent, easily cleanable surface, the Youngstown Pressed Steel Co., Youngstown, Ohio, has awarded a general contract to the Austin Co., Cleveland, for the erection of a one-story plant, 60 x 382 ft., for vitreous enameling of pressed steel products. One of the chief products to be vitreous enameled is washing machine tubs. The enameling equipment for the new plant will be furnished by the Porcelain Enamel & Mfg. Co., Baltimore, and the electric furnaces and other electrical equipment by the Westinghouse Electric & Mfg. Co.

Advertisers Elect Officers

At a meeting of the Eastern Industrial Advertisers, Philadelphia, Dec. 13, the following were elected officers for next year: President, Anson B. Harvey, J. E. Rhoads & Son; vice-president, A. M. Robinson, J. G. Brill Co.; secretary, W. R. KortKamp, Dill & Collins Co.; treasurer, L. A. Cleaver, F. W. Dodge Corporation. Directors: N. S. Greensfelder, Hercules Powder Co.; L. D. Waldron, McGraw-Hill Publishing Co.; D. K. Benoliel, International Chemical Co.; W. S. Hays, National Slate Association; T. B. Whitson, James G. Biddle; R. B. Sabin, S. S. White Dental Co.; R. E. Lovekin, R. E. Lovekin Corporation; D. C. Miner, Asbestos Slate & Shingle Co.; F. C. Weber, Keasbey & Mattison Co.

Electric Hoists

Electric hoists ordered in November were 10.6 per cent off in number and 7.2 per cent in value from the amounts for October. Shipments were smaller by 3.7 per cent. The Electric Hoist Manufacturers Association, E. Donald Tolles, 165 Broadway, secretary, will meet at the Hotel McAlpin, New York, Jan. 16.

Wean Engineering Co., Inc., Warren, Ohio, has been appointed agent for the R. D. Wood gas producers in the territory west of Altoona, Pa.

Birmingham

Pig Iron Melters Show No Interest in First Quarter Buying —Producers Advance Price to $15 Base

BIRMINGHAM, Dec. 17.—Alabama producers of pig iron have opened their books for the first quarter at $15, base, for district consumers. The Southern makers have held off longer than usual in announcing the first quarter prices, but consumers have shown very little interest in forward buying. This situation is attributed largely to heavy purchases in the fall and a falling off in the melt of most of the large foundries. Several of the larger melters have announced longer shut-downs for the holiday period than usual and others are reducing operations to a part-time basis. The decline in shipments during the past 10 days is considered the greatest for any similar period in several seasons. Sixteen furnaces have been active throughout this month. Nine of these have been operating on foundry iron, six on basic and one on recarburizing iron. The Roane Iron Co., Rockwood, Tenn., operating one furnace, plans to shut down Jan. 1 for an indefinite period.

Prices per gross ton, f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil.	$14.50
No. 1 fdy., 2.25 to 2.75 sil.	15.00
Basic	14.50

Finished Steel.—Mills continue to experience a good demand in several important lines, including bars, plates, shapes, railroad accessories and steel castings. Those making these products will enter the new year with comfortable backlogs. The Ensley rail mill has tonnage on its books sufficient for several months' operation. Sheet demand has declined further, the past 10 days, with galvanized sheets bearing the bulk of the loss of trade. Mills continue to take first quarter business in all lines at unchanged prices. Structural steel fabricators report a good demand, and important tonnages are in prospect for early next year. New business in reinforcing bars is unusually light. The Tennessee company is working seven open-hearths at Ensley, one less than last week, and six at Fairfield. The Gulf States Steel Co. has been operating all six at Alabama City for some time in order to build up a reserve for operations while the new blooming mill is being installed next month.

Cast Iron Pipe.—Pressure pipe makers report a better feeling in the market. Active buying from municipalities and utilities is expected within the next few weeks. One company increased operations last week from a three to a four-day week. Plants will be closed down this week, but with one or two exceptions operations will be resumed on Dec. 30. Orders last week were for small tonnages. The McWane Cast Iron Pipe Co. booked an order for 10,000 ft. of 4-in. pipe for Bay St. Louis, Miss. Prices are unchanged at $37 to $38.

Old Material.—With the exception of two or three items of steel scrap being taken by the large mills, the market is without activity. General shutdowns for the holiday period, together with efforts to reduce inventories, are expected to keep the market dull until after the turn of the year. Prices are unchanged, and quotations represent nominal values.

Prices per gross ton, deliv'd Birmingham dist. consumers' yards:

Heavy melting steel	$13.00 to $13.50
Scrap steel rails	14.00
Short shoveling turnings	9.00
Cast iron borings	9.00
Stove plate	11.50 to 12.00
Steel axles	32.00
Iron axles	33.00
No. 1 railroad wrought	10.00 to 10.50
Rails for rolling	15.50
No. 1 cast	13.00
Tramcar wheels	12.50
Cast iron carwheels	13.00 to 13.50
Cast iron borings, chem.	13.50 to 14.00

St. Louis

Better Buying of Sheets Expected After Inventory Period —Pig Iron and Scrap Markets Dull

ST. LOUIS, Dec. 17.—The pig iron market is unusually quiet, for there is little buying either for prompt shipment or for first quarter. While a few inquiries for first quarter are pending, and it is said that other melters are beginning to think about their next year's requirements, it is not expected there will be any great amount of buying for first quarter. One reason for this is that melters in this district bought heavily during the early fall, when prices were low, and another is that in some instances the melt has not been as heavy as had been expected, with the result that there will be considerable tonnage carried over into the new year. Prices continue firm. Plants catering to the automobile car building and implement industries expect a marked improvement in business after the first of the year. Shipments of pig iron so far this month are said to be below November's volume, although about on a par with last December's shipments.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill.	$19.50 to $20.00
Malleable, f.o.b. Granite City	20.00
N'th'n No. 2 fdy., deliv'd St. Louis	22.16
Southern No. 2 fdy., deliv'd	18.42 to 18.92
Northern malleable, deliv'd	22.16
Northern basic, deliv'd	22.16

Freight rates: 75c. (average) Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

Finished Steel.—The Granite City Steel Co. reports that, while the volume of incoming sheet business is not entirely satisfactory, an improvement is foreseen, as both jobbers and fabricators are going into the year with exceptionally small stocks, virtually assuring a buying movement after the turn of the year. Demand for galvanized roofing is normally light for this time of year, and no particular improvement is expected until jobbers are ready to place orders for stocks in anticipation of the usual spring demand. Specifications for tin plate are seasonably light, but a healthy demand is expected after Jan. 1. Tank plates are being received in satisfactory volume, as a result of demand from the oil fields and from freight equipment builders. Construction field continues inactive. The only reinforcing bar inquiry of size pending is a section of the River Des Peres project, which will require 2000 tons.

Old Material.—The market for old material continues dull. The three largest consumers in the district of melting grades continue to ask dealers to withhold shipments against contracts in order to hold down their inventories. In some cases, where railroads insist on shipments, the material is laid down in the yards of consumers with the understanding that it is to be paid for when convenient, which makes the dealers' financial problems more difficult. Because of the desire to hold down inventories, it is not likely there will be important buying until after the first of the year. Railroad lists include: Chesapeake & Ohio, 8173 tons; Chicago, Burlington & Quincy, 5620 tons; Missouri - Kansas - Texas, 1830 tons; International-Great Northern, 1000 tons; Louisville & Nashville, 14,440 tons; Wabash, 194 tons; New

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-fin. rounds, shaftings, screw stock	3.75c.
Black sheets (No. 24)	4.25c.
Galv. sheets (No. 24)	5.10c.
Blue ann'l'd sheets (No. 10)	3.45c.
Black corrug. sheets (No. 24)	4.30c.
Galv. corrug. sheets	5.15c.
Structural rivets	4.15c.
Boiler rivets	4.15c.

	Per Cent Off List
Tank rivets, ⅞-in. and smaller, 100 lb. or more	65
Less than 100 lb	60
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-pressed nuts, sq., blank or tapped, 200 lb. or more	60
Less than 200 lb	50
Hot-pressed nuts, hex., blank or tapped, 200 lb. or more	60
Less than 200 lb	50

Orleans Great Northern, 105 tons; Pullman Co. (St. Louis), 8 carloads, and Nashville, Chattanooga & St. Louis, 7 carloads.

Dealers' buying prices per gross ton, f.o.b. St. Louis district:

No. 1 heavy melting or shoveling steel	$13.00 to	$13.50
No. 2 heavy melting or shoveling steel	12.00 to	12.50
No. 1 locomotive tires	14.50 to	15.00
Misc. stand.-sec. rails including frogs, switches and guards, cut apart	14.00 to	14.50
Railroad springs	15.50 to	16.00
Bundled sheets	9.50 to	10.00
No. 2 railroad wrought	13.00 to	13.50
No. 1 busheling	9.75 to	10.25
Cast iron borings and shoveling turnings	9.25 to	9.75
Iron rails	13.00 to	13.50
Rails for rolling	15.00 to	15.50
Machine shop turnings	6.75 to	7.25
Heavy turnings	9.50 to	10.00
Steel car axles	18.00 to	18.50
Iron car axles	25.50 to	26.00
Wrot. iron bars and trans.	21.50 to	22.00
No. 1 railroad wrought	13.00 to	13.50
Steel rails, less than 3 ft.	17.00 to	17.50
Steel angle bars	14.00 to	14.50
Cast iron carwheels	14.00 to	14.50
No. 1 machinery cast	15.25 to	15.75
Railroad malleable	13.50 to	14.00
No. 1 railroad cast	14.50 to	15.00
Stove plate	11.75 to	12.25
Agricult. malleable	14.00 to	14.50
Relay. rails 60 lb. and under	20.50 to	23.50
Relay. rails 70 lb. and over	26.50 to	29.00

Youngstown

Improved Rolling Mill Schedules This Week

YOUNGSTOWN, Dec. 17.—Steel companies in this district have increased production schedules for this week an average of 10 per cent, bringing the district average to around 55 per cent, against 48 per cent the week before. Departments which are accelerated are open-hearth furnaces, steel pipe, sheets and strips. At Warren, the Republic Iron & Steel Co. is operating this week all three of its strip mills, and such production is the best at any time in the past two months. The Youngstown Sheet & Tube Co. has likewise advanced its schedules to 45 per cent.

At Hubbard, the Sheet & Tube company is operating one of two blast furnaces, and some of the output of this stack is going to the merchant trade. The Struthers Furnace Co. is booked until Feb. 1, and has no present plans of suspending. However, it is likely the stack, a strictly merchant maker, will go down in the early part of next year for repairs.

Steel makers will suspend rolling mills for the most part during Christmas week, though some units will resume Thursday morning after Christmas Day.

Six hot-blast stove linings and two 40,000-cu. ft. disintegrators and eliminators have been ordered from H. A. Brassert & Co., Chicago, by the Jones & Laughlin Steel Corporation. These will be used in connection with the fine gas cleaning program at the Aliquippa plant.

Canada

Canadian National Orders 120,000 Tons of Rails and Nearly 5000 Cars—General Outlook Improved

TORONTO, ONT., Dec. 17.—Although the recent stock market crash brought an aftermath of uncertainty in the iron and steel industry of Canada, recent events have helped to dispel this pessimism, and the outlook is distinctly improved.

Canadian railroads are doing much to help the situation. Announced programs of the Canadian Pacific and Canadian National run into many millions of dollars. The Canadian National has ordered within the week 120,000 tons of rails and nearly 5000 box cars. The rail tonnage was divided between the Dominion Iron & Steel Co., Sydney, N. S., which was awarded 80,000 tons, and the Algoma Steel Corporation, Sault Ste. Marie, Ont., which will furnish the remaining 40,000 tons.

Equipment orders placed by the Canadian National were divided as follows: 2250 50-ton box cars and 25 tank cars to the Canadian Car & Foundry Co.; 1175 50-ton box cars to the National Steel Car Co., Hamilton, Ont., and about 1000 box cars and 200 refrigerator cars to the Eastern Car Co., New Glasgow, N. S. This road is inquiring for 18 Santa Fe type and 15 mountain type locomotives.

The new year will begin auspiciously for Canadian steel mills, locomotive works, car shops and allied industries. The agricultural implement and automobile industries are at the moment weak links in the chain of industrial activity. In these lines, however, there are prospects of improvement early in the new year.

Pig Iron.—Business closed during the week showed a gain, but the improvement was chiefly in orders for future delivery. Some tonnage from the present quarter will be carried over into the new year.

Prices per gross ton:

Delivered Toronto

No. 1 fdy., sil. 2.25 to 2.75	$23.60
No. 2 fdy., sil. 1.75 to 2.25	23.10
Malleable	23.60

Delivered Montreal

No. 1 fdy., sil. 2.25 to 2.75	$25.00
No. 2 fdy., sil. 1.75 to 2.25	24.50
Malleable	25.00
Basic	23.50

Imported Iron, Montreal Warehouse

Summerlee	$33.50
Carron	33.00

Old Material.—Renewed activity is beginning to develop in iron and steel scrap. Dealers are of the opinion that there will be a stronger demand for heavy melting steel and turnings in the near future. Dealers are picking up supplies at unchanged buying prices.

Dealers' buying prices:

Per Gross Ton

	Toronto	Montreal
Heavy melting steel	$10.00	$8.50
Rails, scrap	11.00	9.00
No. 1 wrought	10.00	12.00
Machine shop turnings	7.50	5.00
Boiler plate	7.50	6.00
Heavy axle turnings	8.00	7.50
Cast borings	7.50	5.00
Steel borings	7.50	6.50
Wrought pipe	6.00	6.00
Steel axles	15.00	20.00
Axles, wrought iron	17.00	22.00
No. 1 machinery cast	....	17.00
Stove plate	....	13.00
Standard carwheels	....	16.00
Malleable	....	13.00

Per Net Ton

No. 1 mach'ry cast	$16.00	....
Stove plate	12.00	....
Standard carwheels	15.00	....
Malleable scrap	14.00	....

Cincinnati

Pig Iron Sales Increase Moderately—First Quarter Inquiries Appear—Scrap Market Steadier

CINCINNATI, Dec. 17.—Although the general demand for pig iron in this district continues to be sluggish, a slight increase in the total sales was noticed last week. District furnace representatives reported the sale of approximately 3000 tons. Of this, two orders, one for 400 and the other for 500 tons of Northern foundry iron, from unnamed consumers were the first sizable tonnages to be placed for first quarter. Melters, generally, are inclined to mark time, and no definite buying movement is expected before the first of the year. The remainder of the week's tonnage was in one to two carlots and was chiefly for immediate use. An inquiry has been received from a central Ohio consumer for 1200 tons of Northern foundry iron for first quarter, and the Favorite Stove & Range Co., Piqua, Ohio, is in the market for 300 tons of the same grade of iron, also first quarter. The Roane Iron Co., Rockwood, Tenn., will blow out its stack about Jan. 1. Price schedules are being well maintained, although one Southern furnace is reported to be granting concessions of 50c.

Prices per gross ton, deliv'd Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25	$19.89 to $20.39
Ala. fdy., sil. 1.75 to 2.25	17.69 to 18.19
Ala. fdy., sil. 2.25 to 2.75	18.19 to 18.69
Tenn. fdy., sil. 1.75 to 2.25	17.69 to 18.19
S'th'n Ohio silvery, 8 per cent	26.89

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

Old Material.—Although new business in scrap is still slow, price sched-

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and struc. shapes	3.40c.
Bars, soft steel or iron	3.30c.
New billet reinforc. bars	3.15c.
Rail steel reinforc. bars	3.00c.
Hoops	4.05c.
Bands	3.50c.
Cold-fin. rounds and hex	3.85c.
Squares	4.35c.
Black sheets (No. 24)	4.05c.
Galvanized sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.45c.
Structural rivets	3.85c.
Small rivets	65 per cent off list
No. 9 ann'l'd wire, per 100 lb	$3.00
Com. wire nails, base per keg	2.85
Cement c't'd nails, base 100 lb. keg	2.85
Chain, per 100 lb	8.75
	Net per 100 Ft.
Lap-weld steel boiler tubes, 2-in	$16.50
4-in.	34.50
Seamless steel boiler tubes, 2-in	17.50
4-in.	36.00

ules steadied last week, and no changes were made. Dealers are now adhering to the present prices in current purchases, usually taking scrap at the average of the spread. While there is no superabundance of good scrap, dealers report that there is sufficient available to supply specifications on current commitments.

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel	$12.00 to $12.50
Scrap rails for melting	13.00 to 13.50
Loose sheet clippings	8.00 to 8.50
Bundled sheets	10.75 to 11.25
Cast iron borings	8.25 to 8.75
Machine shop turnings	8.00 to 8.50
No. 1 busheling	10.00 to 10.50
No. 2 busheling	6.50 to 7.00
Rails for rolling	13.50 to 14.00
No. 1 locomotive tires	14.25 to 14.75
No. 2 railroad wrought	12.00 to 12.50
Short rails	17.50 to 18.00
Cast iron carwheels	12.00 to 12.50
No. 1 machinery cast	18.50 to 19.00
No. 1 railroad cast	15.00 to 15.50
Burnt cast	10.00 to 10.50
Stove plate	10.00 to 10.50
Brake shoes	10.00 to 10.50
Agricultural malleable	14.00 to 14.50
Railroad malleable	15.00 to 15.50

Detroit Scrap Unchanged

DETROIT, Dec. 17.—There have been no changes in prices on old material during the past week. With many plants taking inventories, the feeling is that there will be no further decline over the remainder of the month, as scrap production is very low.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Hvy. melting and shov. steel	$11.50 to $12.00
Borings and short turnings	9.00 to 9.50
Long turnings	8.00 to 8.50
No. 1 machinery cast	12.50 to 13.00
Automotive cast	11.50 to 12.00
Hydraul. comp. sheets	11.00 to 11.50
Stove plate	9.00 to 9.50
New No. 1 busheling	10.50 to 11.00
Old No. 1 busheling	9.00 to 9.50
Sheet clippings	8.00 to 8.50
Flashings	9.50 to 10.00

To Build Ships for Black Sea Trade

WASHINGTON, Dec. 16.—Six ships of 9400 deadweight tons each, of which four are already under contract, will be built for the American Export Steamship Corporation as the result of a supplemental contract announced last week by Postmaster-General Brown, providing for the extension of the mail service to Black Sea and Mediterranean ports.

Boston

Pig Iron Prices Weaker—Scrap Steadier

BOSTON, Dec. 17.—Prices for Buffalo and east-of-Buffalo iron are weaker. A Massachusetts manufacturer of machinery has purchased 2000 tons of No. 1X and higher silicon iron at a price equivalent to less than $17 a ton, Buffalo, and a Vermont foundry, feeling out the market for 1000 tons of No. 2X, has been offered iron at the equivalent of $17, Buffalo. Smaller tonnages of No. 2X iron were sold the past week on the same basis, and a little business was taken at $17.50. Furnaces pay scant attention to silicon differentials no matter how small the tonnage. Recent transactions include a small tonnage of Indian iron at $21.50 and $21 a ton, on dock here, duty paid, for No. 2X. A Worcester, Mass., foundry is inquiring for 800 to 1200 tons of malleable iron, and a Holyoke, Mass., foundry seeks 300 tons of foundry iron.

Foundry iron prices per gross ton deliv'd to most New England points:

*Buffalo, sil. 1.75 to 2.25	$21.91 to	$22.41
*Buffalo, sil. 2.25 to 2.75	21.91 to	22.41
East. Penn., sil. 1.75 to 2.25	22.65 to	23.15
East. Penn., sil. 2.25 to 2.75	23.15 to	23.65
Va., sil. 1.75 to 2.25		25.21
Va., sil. 2.25 to 2.75		25.71
*Ala., sil. 1.75 to 2.25		24.11
*Ala., sil. 2.25 to 2.75		24.61
†Ala., sil. 1.75 to 2.25		20.25
†Ala., sil. 2.25 to 2.75		20.75

Freight rates; $4.91 all rail from Buffalo; $3.65 all rail from eastern Pennsylvania; $5.21 all rail from Virginia; $9.61 all rail from Alabama and $5.75 rail and water from Alabama to New England seaboard.

*All rail rate.
†Rail and water rate.

Reinforcing Steel. — Current business in billet steel bars is confined to small lots. Open quotations are 2.61½c. a lb., base, from stock on large tonnages and 3.16c. for small tonnages. The new power house for the Edison Electric Illuminating Co. of Boston will require 100 tons, instead of 200 tons as first reported.

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars, small shapes	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway rounds	6.60c.
Norway squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tie steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold-rolled steel—	
Rounds and hex	*3.55c. to 5.55c.
Squares and flats	*4.05c. to 7.05c.
Toe calk steel	6.00c.
Rivets, structural or boiler	4.50c.
	Per Cent Off List
Machine bolts	50 and 5
Carriage bolts	50 and 5
Lag screws	50 and 5
Hot-pressed nuts	50 and 5
Cold-punched nuts	50 and 5
Stove bolts	70 and 10

*Including quantity differentials.

The market for rail steel bars is quiet at 2.26½c. a lb., base, delivered common Boston freight rate points.

Old Material. — Eastern Pennsylvania steel mills are still holding up shipments of scrap on old contracts, but there apparently is a little more life to the Pittsburgh market, and prices on old material for shipment there appear a little steadier. A Worcester, Mass., mill has dropped its buying price on long bundled skeleton 25c. a ton, but continues to take limited tonnages on No. 1 heavy melting steel at $12.25 a ton, delivered. New England foundries are taking less textile and No. 1 machinery cast than heretofore, but that fact has failed to influence prices.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$9.50 to $10.00
Scrap T rails	9.00 to 9.75
Scrap girder rails	8.50 to 9.00
No. 1 railroad wrought	10.50 to 10.75
No. 1 yard wrought	9.50 to 10.00
Machine shop turnings	5.50 to 6.10
Cast iron borings (steel works and rolling mill)	6.00 to 6.10
Bundled skeleton, long	8.25 to 8.50
Forge flashings	8.00 to 9.00
Blast furnace borings and turnings	5.50 to 6.00
Forge scrap	8.50 to 9.00
Shafting	13.50 to 14.00
Steel car axles	15.00 to 15.50
Wrought pipe 1 in. in diameter (over 2 ft. long)	8.50 to 9.00
Rails for rolling	10.50 to 11.00
Cast iron borings, chemical	9.00 to 9.50

Prices per gross ton deliv'd consumers' yards:

Textile cast	$14.00 to $14.50
No. 1 machinery cast	15.00 to 15.25
No. 2 machinery cast	13.00 to 13.25
Stove plate	11.00 to 11.50
Railroad malleable	18.50 to 19.00

Buffalo

Bethlehem Operations Gain This Week

BUFFALO, Dec. 17.—There has been a good inflow of small pig iron orders, with some fairly sizable buying in the East. One furnace interest has taken 1000 tons of foundry, 1300 tons of foundry and malleable and 500 tons of malleable from New England. No important buying has occurred in the district, although there has been some small covering for January. The 800 tons of foundry and malleable recently purchased by the New York Air Brake Co., was for the first quarter. The price in the East has been shaded. Shipments have declined slightly but are still good. One of the Donner stacks is down for repairs and will be returned to blast on or about Jan. 1.

Prices per gross ton, f.o.b. furnace:

No. 2 fdy., sil. 1.75 to 2.25	$19.50
No. 2X fdy., sil. 2.25 to 2.75	20.00
No. 1 fdy., sil. 2.75 to 3.25	21.00
Malleable, sil. up to 2.25	20.00
Basic	$17.00 to 18.00
Lake Superior charcoal	27.28

Finished Steel. — An increase is noted in the operations of the Lackawanna plant of the Bethlehem Steel Co., which now has 15 open-hearths in operation, all of the mills running on single turn and two of them on double turn. Operation at the Donner plant remains about the same. The Seneca Iron & Steel Co. is operating

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and struc. shapes	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.95c.
Cold-fin. flats, sq. and hex.	4.45c.
Rounds	3.95c.
Cold-rolled strip steel	5.85c.
Black sheets (No. 24)	4.20c.
Galv. sheets (No. 24)	4.85c.
Blue ann'l'd sheets (No. 10)	3.50c.
Com. wire nails, base per keg	$3.60
Black wire, base per 100 lb	3.75

at about 50 per cent. A tunnel for the New York State hospital at Newark, N. Y., will require about 100 tons of reinforcing bars.

Old Material.—About the only transaction of interest since the recent purchase by one of the larger mills of a tonnage of No. 1 heavy melting steel at $14 was the purchase of 1000 tons of stove plate at $12.15. Of this, 500 tons was for immediate delivery and 500 tons for delivery after the first of the year. The Michigan Central list, which closed early in the week and came to Buffalo, brought $12.52, Black Rock, net, or $14.02 gross. There is a fairly good demand for specialties, but the foundry grades are extremely quiet.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel.	$14.00
No. 2 heavy melting steel.	12.50
Scrap rails	$14.75 to 15.25
Hydraul. comp. sheets	12.50
Hand bundled sheets	10.50 to 11.00
Drop forge flashings	12.50 to 13.00
No. 1 busheling	12.50
Hvy. steel axle turnings	12.50 to 13.00
Machine shop turnings	8.00 to 8.50
No. 1 railroad wrought	10.50 to 11.00
Acid Open-Hearth Grades:	
Knuckles and couplers	17.00 to 17.50
Coil and leaf springs	17.00 to 17.50
Rolled steel wheels	17.00 to 17.50
Low phos. billet and bloom ends	18.00 to 18.50
Electric Furnace Grades:	
Short shov. steel turnings	10.75 to 11.25
Blast Furnace Grades:	
Short mixed borings and turnings	10.75 to 11.25
Cast iron borings	10.75 to 11.25
No. 2 busheling	8.00
Rolling Mill Grades:	
Steel car axles	16.50 to 17.00
Iron axles	20.00 to 21.00
Cupola Grades:	
No. 1 machinery cast	14.50 to 15.00
Stove plate	12.15
Locomotive grate bars	10.00 to 10.50
Steel rails, 3 ft. and under	17.75 to 18.00
Cast iron carwheels	11.50 to 12.00
Malleable Grades:	
Industrial	16.50 to 17.00
Railroad	16.50 to 17.00
Agricultural	16.50 to 17.00
Special Grades:	
Chemical borings	12.00 to 12.50

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and struc. shapes	3.30c.
Soft steel bars	3.30c.
Small angles, ⅞-in. and over	3.15c.
Small angles, under ⅞-in.	3.55c.
Small channels and tees, ¾-in. to 2¾-in.	3.75c.
Spring steel, ¼-in. and thicker	5.00c.
Black sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.90c.
Galv. sheets (No. 24)	5.30c.
Struct. rivets, ½-in. and larger	5.65c.
Com. wire nails, base per keg	$3.40
Cement c't'd nails, 100 lb. keg	3.40

Pacific Coast

Steel Demand in West Shows Easing Off

SAN FRANCISCO, Dec. 14, 1929, (*By Air Mail*).—Demand has eased off considerably owing to the approach of the holiday season and the inventory-taking period. Outstanding awards include 1600 tons of plates for a penstock in Vancouver for the British Columbia Electric Railway Co., booked by the Vancouver Engineering Works; 900 tons of structural shapes for an office building on Montgomery Street, San Francisco, placed with McClintic-Marshall Co., and 365 tons of reinforcing bars for the Veterans' Home, Yountville, Cal., secured by the Concrete Engineering Co.

The Miracle Construction Co. took 293 tons of 6 to 10-in. Class B pipe for the improvement of Las Mesa Colony, San Diego, Cal. The United States Pipe & Foundry Co. was low bidder on 139 tons of 4 to 10-in. Class 150 pipe for Modesto, Cal. Bids open on Dec. 19 for 140 tons of 4 to 8-in. Class B pipe for West Salem, Ore.

The U. S. Engineer Office, Sacramento, Cal., has opened bids on 196 tons of ⅜-in. plate for shore pipe.

Pig Iron.—The pig iron market is without change. Current prices appear below.

Prices per gross ton at San Francisco:

*Utah basic	$25.00 to $26.00
*Utah fdy., sil. 2.75 to 3.25	25.00 to 26.00
**Indian fdy., sil. 2.75 to 3.25	25.00 to 26.00

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Gray Iron Institute Names Committee Members

The Gray Iron Institute, Cleveland, has appointed the following committees for 1930:

COST COMMITTEE—John L. Carter, Sacks-Barlow Foundries, Inc., Newark, N. J., chairman; G. E. Finck, Bethlehem Foundry & Machine Co., Bethlehem, Pa.; William J. Grede, Liberty Foundry, Inc., Wauwatosa, Wis.; A. E. Hageboeck, Frank Foundries Corporation, Moline, Ill.; P. E. Rentschler, Hamilton Foundry & Machine Co., Hamilton, Ohio; F. C. Schimpf, Olney Foundry Co., Philadelphia; L. C. Vallier, Buffalo Foundry & Machine Co., Buffalo.

FINANCE AND BUDGET COMMITTEE—H. J. O'Neil, Western Foundry Co., Chicago, chairman; H. S. Chafee, Builders' Iron Foundry, Providence, R. I.; H. R. Lafferty, Red Jacket Mfg. Co., Davenport, Iowa; F. L. Squires, Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.; H. C. Wilson, Cleveland Cooperative Stove Co., Cleveland.

MERCHANDISING COMMITTEE—J. H. Bruce, Bowler Foundry Co., Cleveland, chairman; H. R. Cooke, Olney Foundry Co., Philadelphia; Gerald Hannay, Barnett Foundry & Machine Co., Irvington, N. J.; Don McDaniel, Decatur Casting Co., Hamilton, Ohio; R. R. Monroe, Des Moines Foundry & Machine Co., Des Moines, Iowa; J. H. Pohlmann, J. W. Pohlmann Foundry Co., Buffalo; H. S. Washburn, Plainville Casting Co., Plainville, Conn.

RESEARCH COMMITTEE—B. H. Johnson, Florence Pipe Foundry & Machine Co., Florence, N. J., chairman; H. Bornstein, Deere & Co., Moline, Ill.; J. D. Coltman, Bullard Machine Tool Co., Bridgeport, Conn.; E. J. Lowry, consulting metallurgist, Detroit; R. D. Phelps, Francis & Nygren Foundry Co., Chicago.

TRADE INFORMATION COMMITTEE—Leo J. Ulstead, John C. Kupferle Foundry Co., St. Louis, chairman; Harry Graham, Bond Engineering Works, Toronto, Ont.; W. J. Grede, Liberty Foundry, Inc., Wauwatosa, Wis.; C. B. Magrath, North Western Foundry Co., Chicago, Ill.; Charles S. Parker, Charles Parker Co., Meriden, Conn.; W. E. Stephen, Roberts & Mander Stove Co., Philadelphia.

TRADE PRACTICE COMMITTEE—R. M. Hill, East St. Louis Castings Co., East St. Louis, Ill., chairman; W. J. Maton, Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.; Thomas W. Pangborn, Pangborn Corporation, Hagerstown, Md.; Chester A. Peebles, Stedman's Foundry & Machine Works, Aurora, Ind.; E. L. Wieland, Milwaukee Grey Iron Foundry, Milwaukee.

The personnel of the membership committee will be announced in the near future. Arthur J. Tuscany, manager, states that the standard cost finding system which the cost committee of the institute has been preparing will soon be ready for distribution to members.

Pittsburgh Scrap Dealers Reelect Officers

The Pittsburgh chapter of the Institute of Scrap Iron and Steel, Inc., at its annual meeting held on Dec. 12, reelected present officers. The officers are as follows: Charles Dreifus, Charles Dreifus Co., Pittsburgh, president; Ike Wilkoff, Wilkoff Co., Youngstown, vice-president; I. W. Solomon, Pittsburgh, secretary; Fred W. Wimmer, Hausman & Wimmer Co., Pittsburgh, treasurer.

H. N. Trimble, H. N. Trimble Co., Pittsburgh, was reelected chairman of the executive committee, and other members, with the exception of H. Tuch, United Iron & Metal Co., Pittsburgh, will also serve another year. Mr. Tuch, who retires on account of ill health, is succeeded by J. P. McCann of the same company. Other members of the executive committee are: Jay G. Stephens, Jay G. Stephens Corporation, Pittsburgh; Joseph Jacobson, Luria Brothers & Co., Pittsburgh; Hugh Ruffner, Wellsville Iron & Metal Co., Pittsburgh; and Harry Cohn, A. H. Cohn & Sons, Butler, Pa.

Directors of the Crucible Steel Co. of America have declared a stock dividend of 3 per cent on common stock and have ordered the regular quarterly distribution of $1.25 a share in cash on the common stock, both dividends payable Jan. 31 to holders of record Jan. 15.

Fabricated Structural Steel

With Awards of 51,000 Tons and Inquiries for 42,000 Tons, Market Is Unusually Active

WITH awards of 51,000 tons and inquiries amounting to 42,000 tons in the past week, there are no signs of the usual seasonal letdown in fabricated structural steel. About 70 per cent of the tonnage let in the last seven days will be required for buildings for non-industrial purposes. It is interesting to note that 13,000 tons is for work in Vancouver, B. C. Outstanding among awards were 7000 tons for a hotel at Vancouver, 6800 tons for a Philadelphia convention hall and 5500 tons for a railroad bridge at Indianapolis.

Approximately half of the tonnage on which bids were asked the past week is for construction projects in New York City. Revised plans for the Empire State Building, New York, call for about 52,000 tons of steel, as against the 40,000 tons previously reported. The steel for this building should be awarded the coming week. Awards follow:

MIDDLETOWN, CONN., 250 tons, foundry and boiler house, to an unnamed fabricator.

NEW HAVEN, CONN., 1070 tons, clinic for New Haven hospital, to Levering & Garrigues.

NEW YORK, 1120 tons, addition for Bloomingdale Brothers, to National Bridge Works.

NEW YORK, 565 tons, building at Walnut Avenue and 137th Street, to Reliance Steel Co.

NEW YORK, 1625 tons, Union League Club building, to Levering & Garrigues.

NEW YORK, 1900 tons, apartment building at Central Park West and Sixty-sixth Street, to Hinkle Iron Works.

NEW YORK, 2205 tons, two buildings for Central Hanover Bank & Trust Co., to Hedden Iron Construction Co.

NEW YORK, 965 tons, hotel on Washington Square, to McClintic-Marshall Co.

HOBOKEN, N. J., 365 tons, inspection shed for Delaware, Lackawanna & Western Railroad, to American Bridge Co.

PENNSYLVANIA RAILROAD, 400 tons, bridge at Coatesville, Pa., to American Bridge Co.

PENNSYLVANIA RAILROAD, 135 tons, two bridges, to Shoemaker Bridge Co. and Belmont Iron Works.

BALTIMORE & OHIO RAILROAD, 765 tons, bridge at Ohio Junction, Ohio, to Mount Vernon Bridge Co.

PHILADELPHIA, 6800 tons, convention hall, to Bethlehem Steel Co.

PHILADELPHIA, 2600 tons, bank and office building, Market and Juniper Streets, to American Bridge Co.

RICHMOND, VA., 2000 tons, building for American Tobacco Co., to Richmond Structural Steel Co.

PARKERSBURG, W. VA., 2080 tons, building for Viscose Co., to McClintic-Marshall Co.

YOUNGSTOWN, 335 tons, Erie Railroad grade crossing elimination work, to McClintic-Marshall Co.

INDIANAPOLIS, 5500 tons, bridge for Traction company, to American Bridge Co.

KENOSHA, WIS., 200 tons, building for Snap-On Wrench Co., to Milwaukee Structural Steel Co.

CHICAGO, 1000 tons, Twelfth Street viaduct, to an unnamed bidder.

PONTIAC, ILL., 200 tons, State buildings, to Mississippi Valley Structural Steel Co.

BLOOMINGTON, ILL., 150 tons, institutional building, to Mississippi Valley Structural Steel Co.

TROY, MO., 400 tons, highway bridge, to Vincennes Bridge Co.

DOUGLAS, ARIZ., 500 tons, building for Phelps Dodge Corporation, to St. Louis Structural Steel Co.

PHOENIX, ARIZ., 830 tons, office building on First Street, to McClintic-Marshall Co.

SAN FRANCISCO, 900 tons, office building, Montgomery Street, to McClintic-Marshall Co.

SAN FRANCISCO, 160 tons, shop for Pacific Electric Mfg. Co., to Herrick Iron Works.

SACRAMENTO, CAL., 168 tons, bridge over Corte Madera Creek, to unnamed fabricator.

SAN BERNARDINO, CAL., 104 tons, school auditorium, to Minneapolis Steel & Machinery Co.

LONG BEACH, CAL., 400 tons, sheet steel piling for city, to Steel, Inc.

ANAHEIM, CAL., 210 tons, telephone building, to McClintic-Marshall Co.

SEATTLE, 500 tons, plates, four oil tanks for Sunset Pacific Oil Co., to Steel Tank & Pipe Co.

SEATTLE, 230 tons, plates, pipe line No. 2, Cedar River project, to Beall Tank & Pipe Co.

GRANABY, B. C., 150 tons, plates, mill for Granaby Consolidated Mining Co., to Vancouver Engineering Co.

VANCOUVER, B. C., 400 tons, plates, tanks for British Columbia Wood Preserving Co., to Vancouver Engineering Co.

VANCOUVER, 7000 tons, hotel for Canadian National Railways, to Dominion Bridge Co.

VANCOUVER, 2200 tons, Marine Building, to Dominion Bridge Co.

VANCOUVER, 1800 tons, Royal Bank building, to Dominion Bridge Co.

VANCOUVER, 1600 tons, plates, penstock, British Columbia Electric Railway Co., to Vancouver Engineering Co.

SPENCE, B. C., 460 tons, Thompson River bridge, to Western Bridge Co.

NEW WESTMINSTER, B. C., 100 tons, brewery, to Western Bridge Co.

FAIRBANKS, ALASKA, 150 tons, plates, 36-in. riveted pipe for Fairbanks Exploration Co., to an unnamed bidder.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

NEW YORK, 52,000 tons, Empire State Building; previously estimated at 40,000 tons.

NEW YORK, 4150 tons, 35-story building at Greenwich and Rector Streets.

NEW YORK, 1350 tons, apartment building at No. 2 Horatio Street.

NEW YORK, 1000 tons, apartment building at Seventy-ninth Street and Amsterdam Avenue.

NEW YORK, 2165 tons, Home for Incurables, at Third Avenue and 181st Street.

NEW YORK, 235 tons, repairs on bridges at Croton water shed.

FOREST HILLS, N. Y., 650 tons, addition to West Side stadium.

PHILADELPHIA, 1000 tons, Midway Theater.

PENNSYLVANIA RAILROAD, 900 tons, two bridges at New Brunswick, N. J.

CINCINNATI, 450 tons, two public schools.

CLEVELAND, 100 tons, Sidway Avenue suspension foot bridge for Nickel Plate Railroad.

DETROIT, 3500 tons, *Detroit News* building.

RACINE, WIS., 300 tons, school.

CHICAGO, 180 tons, warehouse for Edgar T. Ward Sons.

CHISHOLM, MINN., 400 tons, sintering plant.

SAN ANTONIO, TEX., 3000 tons, building for Southwestern Bell Telephone Co.

DENVER, 600 tons, United States Custom House.

VANCOUVER, B. C., 2500 tons, plates, pipe line; bids being taken.

VANCOUVER, 400 tons, pier extension for Canadian National Railways; bids being taken.

SEATTLE, 370 tons, Dumas Bay bridge; general contract to S. A. Moceri.

JORDAN RIVER, B. C., 3000 tons, power house and penstock for British Columbia Electric Co.; bids being taken.

TACOMA, WASH., 300 tons, grain elevator; general contract to Albertson & Cornell.

LOS ANGELES, 1800 tons, office building, Sixth and Flower Streets; bids being taken.

LOS ANGELES, 1400 tons, bakery for Van De Kamps; bids being taken.

SAN JOSE, CAL., 450 tons, hotel; bids being taken.

SAN FRANCISCO, 150 tons, magazine building for Government at Benicia; bids being taken.

SACRAMENTO, CAL., 196 tons, plates, 20-in. shore pipe for United States Engineer Office; bids opened.

Expect Large Car Needs in the First Quarter

Car requirements for shipment of iron and steel products during the first quarter of 1930 will just about equal the requirements in the corresponding quarter of 1929, according to the quarterly estimates of the Allegheny Regional Advisory Board, which covers business in central and western Pennsylvania, eastern Ohio, northern West Virginia and western Maryland.

This forecast, which is based upon shippers' replies to a questionnaire furnished by the board, predicts a decrease of 8 per cent in car requirements for tin plate, and a decrease of 2 per cent for iron and steel scrap. For machinery a 7.2 per cent increase is reported, while castings makers expect a 5.3 per cent increase.

The figures on iron and steel are interesting in view of the fact that the first quarter of 1929 was a period of considerable activity in the steel industry, and, if the prediction is correct, a rapid resumption of business would have to ensue in a short time.

The Ashland, Wis., iron ore docks have terminated the season's activities with a record shipment of 7,620,000 tons, an increase of 1,000,000 tons over loadings in 1928.

Non-Ferrous Metal Markets

Copper Market Has Better Tone—Sharp Decline in Zinc—Tin Advances

NEW YORK, Dec. 17.

Copper.—Despite a large increase in refined copper stocks during November and the lack of interest on the part of consumers, the tone of the market has improved somewhat in the past week and the likelihood of a break in the present price of electrolytic copper, which is 18c., delivered in the Connecticut Valley, has become more remote. Most buyers are still refraining from making purchases, except to take care of current needs. This feeling of hesitancy has been accentuated by the proximity of the year-end inventory period. Moreover, the gain of 38,518 tons in refined stocks, a considerably larger increase than was anticipated, has not enhanced the position of producers. Even though these factors are far from encouraging, they are partially offset by the betterment in operations of brass and copper wire makers, which should soon be reflected in an augmented demand for copper, and by the desire of certain large users to let the present price of copper stand undisturbed. Producers declare also that curtailment of output has got under way and their order books are in such a satisfactory condition that they can go along for an indefinite time without yielding to the insistent urgence of some consumers for lower prices. Business in the foreign market has been generally dull, although there were two days in the last week when sales rose above 2000 tons. Forward buying is virtually at a standstill. Users know that they will not have to pay more for copper after the first of the year, and consequently are waiting until inventories have been taken before filling January and February requirements. Electrolytic copper for export is unchanged at 18.30c., c.i.f. usual European ports. Lake copper is rather sluggish at 18c. to 18.12½c., delivered.

Tin.—Little business was transacted the past week. Yesterday's sales, estimated at 200 to 300 tons, were the largest for the seven-day period, and the market again is quiet today. Practically all of the current orders have been from dealers, consumers having manifested no interest in making further commitments. The market has been flooded with reports of amalgamations and curtailment of output. There is talk in the trade of a consolidation of the Eastern Smelt-

THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY

	Dec. 17	Dec. 16	Dec. 14	Dec. 13	Dec. 12	Dec. 11
Lake copper, New York	18.12½	18.12½	18.12½	18.12½	18.12½	18.12½
Electrolytic copper, N. Y.*	17.75	17.75	17.75	17.75	17.75	17.75
Straits tin, spot, N. Y.	41.37½	41.62½	41.62½	41.75	39.62½	39.37½
Zinc, East St. Louis	5.50	5.50	5.65	5.65	5.70	5.75
Zinc, New York	5.85	5.85	6.00	6.00	6.05	6.10
Lead, St. Louis	6.10	6.10	6.10	6.10	6.10	6.10
Lead, New York	6.25	6.25	6.25	6.25	6.25	6.25

*Refinery quotation; price ¼c. higher delivered in the Connecticut Valley.

Rolled Products

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—	
High brass	23.25c.
Copper, hot rolled	26.75c.
Zinc	10.50c.
Lead (full sheets)	10.00c.
Seamless Tubes—	
High brass	28.25c.
Copper	29.25c.
Rods—	
High brass	21.25c.
Naval brass	24.00c.
Wire—	
Copper	19.87½c.
High brass	23.75c.
Copper in Rolls	26.75c.
Brazed Brass Tubing	30.87½c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also to St. Louis on shipments to points west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide	33.00c.
Tubes, base	42.00c.
Machine rods	34.00c.

Chicago Warehouse

(Prices Cover Trucking to Customers' Doors in City Limits)

	Base per Lb.
Sheets—	
High brass	23.25c.
Copper, hot rolled	27.75c.
Copper, cold rolled, 14 oz. and heavier	30.00c.
Zinc	10.75c.
Lead, wide	10.30c.
Seamless Tubes—	
Brass	28.25c.
Copper	29.25c.
Brass Rods	21.25c.
Brazed Brass Tubes	31.00c.

New York or Cleveland Warehouse

Delivered Prices, Base per Lb.

High brass	21.12½c. to 22.12½c.
Copper, hot rolled, base sizes	27.75c. to 28.75c.
Copper, cold rolled, 14 oz. and heavier, base sizes	30.00c. to 31.00c.
Seamless Tubes—	
Brass	26.00c. to 27.00c.
Copper	29.12½c. to 30.12½c.
Brass Rods	18.87½c. to 19.87½c.
Brazed Brass Tubes	29.12½c. to 30.12½c.

New York Warehouse

Delivered Prices, Base per Lb.

Zinc sheets (No. 9), casks	10.75c. to 11.25c.
Zinc sheets, open	11.50c. to 12.00c.

Metals from New York Warehouse

Delivered Prices, Per Lb.

Tin, Straits pig	43.50c. to 44.50c.
Tin, bar	45.50c. to 46.50c.
Copper, Lake	19.50c.
Copper, electrolytic	19.25c.
Copper, casting	19.00c.
Zinc, slab	7.00c. to 7.50c.
Lead, American pig	7.00c. to 7.50c.
Lead, bar	9.00c. to 9.50c.
Antimony, Asiatic	10.50c. to 11.00c.
Aluminum No. 1 ingots for remelting (guaranteed over 99% pure)	25.00c. to 26.00c.
Alum. ingots, No. 12 alloy	24.00c. to 25.00c.
Babbitt metal, commercial grade	25.00c. to 35.00c.
Solder, ½ and ½	28.50c. to 29.50c.

Metals from Cleveland Warehouse

Delivered Prices, Per Lb.

Tin, Straits pig	46.25c.
Tin, bar	48.25c.
Copper, Lake	19.50c.
Copper, electrolytic	19.25c.
Copper, casting	18.75c.
Zinc, slab	8.00c. to 8.25c.
Lead, American pig	7.00c. to 7.20c.
Lead, bar	9.25c.
Antimony, Asiatic	16.00c.
Babbitt metal, medium grade	18.00c.
Babbitt metal, high grade	49.00c.
Solder, ½ and ½	30.50c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged consumers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	14.75c.	16.00c.
Copper, hvy. and wire	14.50c.	15.50c.
Copper, light and bottoms	12.50c.	13.50c.
Brass, heavy	8.00c.	9.00c.
Brass, light	6.75c.	7.75c.
Hvy. machine composition	11.00c.	12.00c.
No. 1 yel. brass turnings	9.00c.	9.50c.
No. 1 red brass or compos. turnings	10.50c.	11.75c.
Lead, heavy	4.75c.	5.25c.
Lead, tea	3.75c.	4.25c.
Zinc	3.25c.	3.75c.
Sheet aluminum	11.00c.	13.00c.
Cast aluminum	10.00c.	12.00c.

ing Co., Ltd., Williams-Harvey & Co., Ltd., and Penpoll Tin Smelting Co., Ltd. In London there has been heavy buying on the part of one concern which is thought to represent the new London group. The result has been a sharp advance in the London market which was quoted today at £186 for spot standard, £189 5s. for future standard, and £189 5s. for spot Straits. Despite the fact that American tin consumers have shown little or no interest, the local market has been influenced by the situation in London so that prices moved steadily upward the past week, and spot Straits tin was quoted today at 41.37½c., New York.

Lead.—There has been some fairly good buying for December and January delivery. In a few cases users have inquired for material for shipment in February, but producers are reluctant to quote that far ahead, feeling that possibly by that time there may be an advance in prices. Quotations are steady and unchanged at 6.10c., St. Louis, and 6.25c., New York.

Zinc.—Prime western zinc., which was 6c., East St. Louis, on Dec. 10, dropped during the past week until today it was selling at 5.50c. The decline brought out considerable business after the low mark of 5.50c. had been reached and the opinion in the trade is that the market will become stabilized at that figure.

Antimony.—The nearness of inventory taking has resulted in a featureless market. Chinese metal is quoted today, for both spot and future delivery, at 8.50c., New York, duty paid.

Nickel.—Ingot nickel, in wholesale lots, is quoted at 35c. a lb., shot nickel at 36c. and electrolytic nickel in cathodes at 35c.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is priced at 23.90c. a lb., delivered.

Non-Ferrous Metals at Chicago

CHICAGO, Dec. 17.—Sales of tin in this market have been in sizable volume. Quotations on zinc and antimony are lower. Transactions in the old metal market are few in number and individually small.

Prices per lb., in carload lots: Lake copper, 18.50c.; tin, 42.75c.; lead, 6.20c.; zinc., 5.75c; in less-than-carload lots, antimony, 9.40c. On old metals we quote copper wire, crucible shapes and copper clips, 14c.; copper bottoms, 11.50c.; red brass, 11.50c.; yellow brass, 8c.; lead pipe, 4.50c.; zinc, 3c.; pewter, No 1, 24.50c.; tin foil, 22c.; block tin, 32c.; aluminum, 12.87½c.; all being dealers' prices for less-than-carload lots.

Reinforcing Steel

Inquiries Include 2000 Tons for St. Louis Sewer

EIGHTEEN HUNDRED tons of reinforcing steel bars was awarded during the past week. All of the lettings were small, ranging from 100 to 350 tons each. New inquiries which came out totaled 6000 tons, of which 2000 tons is for a sewer at St. Louis. Awards follow:

WASHINGTON, 125 tons; addition to Bellevue Hotel, to John J. Widmeyer, Inc.

CHICAGO, 380 tons, Twelfth Street viaduct, to Kalman Steel Co.

OTTAWA, ILL., 160 tons, hotel, to Concrete Engineering Co.

SACRAMENTO, 365 tons, Veterans' Home at Yountville to Concrete Engineering Co.

SACRAMENTO, 317 tons, highway work in Imperial County; A. M. Peck, Los Angeles, general contractor, steel placed with unnamed bidder.

SAN FRANCISCO, 100 tons, office building on Montgomery Street, to Gunn, Carle & Co.

SAN FRANCISCO, 100 tons, factory for Link-Belt, Meese & Gottfried Co., to Gunn, Carle & Co.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

NEWARK, N. Y., 100 tons, tunnel for New York State Hospital; bids in Dec. 19.

PHILADELPHIA, 900 tons, Convention Hall, provisionally awarded to Concrete Steel Co., pending award of general contract.

BALTIMORE, 500 tons, Post Office.

COLUMBUS, OHIO, 300 tons, extension to Scioto-Olentancey interconnecting sewer.

CHICAGO, 440 tons, building for the Pheoll Co.; A. S. Alschuler, architect.

CHICAGO, tonnage not stated, public school at Seventy-second Street and Clyde Avenue.

CHICAGO, tonnage being estimated, building for University of Chicago.

ST. LOUIS, 2000 tons, section F, River Des Peres sewer, for St. Louis Board of Public Service.

PHOENIX, ARIZ., 119 tons, cell house at Florence for State; bids Dec. 16.

SANTA ANA, CAL., 267 tons, bridge on Flower Street and on Santa Ana Boulevard; bids Dec. 16.

TACOMA, WASH., 400 tons, grain elevator; general contract to Albertson & Cornell.

TACOMA, 325 tons, power house No. 2, Lake Cushman project; general contract to Ward Construction Co.

LOS ANGELES, 104 tons for city; bids Dec. 18.

SAN JOSE, CAL., 300 tons, hotel; bids being taken.

RICHMOND, CAL., 550 tons, cannery; bids opened.

OAKLAND, CAL., 100 tons, hotel, Fourteenth and Jackson Streets; bids opened.

PORTLAND, ORE., 206 tons, Rogue River bridge; bids opened.

American Tankers Being Built Abroad

WASHINGTON, Dec. 17.—The Standard Oil Co. of New Jersey has placed orders with foreign yards for the construction of seven tankers, according to a report in the German press transmitted to the Department of Commerce from Hamburg. Three of the tankers are to be built in Germany, two in England, one in Italy and one in Denmark.

Railroad Equipment

Canadian National Railways Buy 4650 Cars

RAILROADS continue active in buying equipment. The purchase of 4650 cars by the Canadian National Railways was the feature of the market the past week. The Louisville & Nashville is expected to inquire soon for 1823 cars, while the Chicago, Milwaukee, St. Paul & Pacific is taking bids on 2300 cars. The Missouri Pacific and the Wabash have each ordered 25 locomotives. The Canadian National Railways are in the market for 33 locomotives and the Van Sweringen roads are reported to be ready to inquire for about 100 locomotives. Details of the week's business follow:

Chicago, Milwaukee, St. Paul & Pacific has inquired for 2300 of the 3350 cars it will buy in the near future. Bids are being taken on 1000 70-ton mill-type gondola cars, 600 50-ton flat cars and 700 box cars. It will soon enter the market for 750 stock cars.

Louisville & Nashville has authorized purchase of the following cars, inquiries for which will be issued shortly: 750 gondola cars, 300 hopper cars, 500 box cars, 250 flat cars, six passenger locomotives, three dining cars, four combination coach and baggage cars, four coaches, two baggage-mail cars, 10 baggage cars.

Chicago, Rock Island & Pacific is inquiring for 10 passenger coaches.

St. Louis-San Francisco has ordered three dining cars from Pullman Car & Mfg. Corporation.

Northern Pacific has ordered nine dining cars from Pullman Car & Mfg. Corporation.

Chicago, Burlington & Quincy is inquiring for 10 gas-electric rail motor cars.

Wabash has ordered three baggage-mail cars from American Car & Foundry Co. and 25 large freight locomotives from the Baldwin Locomotive Works.

Southern Railway is inquiring for 22 steel baggage-mail cars and one postal car.

Canadian National Railways have placed 2250 50-ton box cars and 25 10,000-gal. tank cars with Canadian Car & Foundry Co.; 1175 50-ton box cars with National Steel Car Co.; 200 refrigerator and 1000 box cars with Eastern Car Co. Inquiries are being made for 18 Santa Fe type locomotives and 15 Mountain type locomotives.

Missouri Pacific has purchased 25 locomotives from Lima Locomotive Works, Inc., and is taking prices on 10 coaches, five club cars and four parlor cars.

Van Sweringen interests are figuring on about 100 locomotives, inquiry for which will be out shortly. They will probably cover requirements of the roads controlled by these interests, which include the Nickel Plate, Chesapeake & Ohio, Erie, Pere Marquette and Hocking Valley.

Union Pacific is preparing specifications for 25 passenger locomotives.

Chicago & North Western plans purchase of 200 suburban coaches next year.

Empire Steel Corporation has moved its Chicago office to 520 North Michigan Avenue, room 1626.

PERSONAL

LOUIS C. REIS, who has been made president of the Minnesota Steel Co., Duluth, Minn., as announced in THE IRON AGE, Dec. 12, was born on Jan. 20, 1881, at New Castle, Pa., where he attended both grade and high schools. He served his apprenticeship in the shops of the Pennsylvania Engineering Works in the same city. He then entered the employ of the New Castle Works of Carnegie Steel Co. as a machinist, later being advanced to turn foreman in the machine shop. On May 20, 1913, he became identified with the Minnesota Steel Co. as assistant master mechanic, a position that he held during the period in which the plant was constructed. Shortly after the plant was put into operation, under date of Feb. 1, 1916, he was appointed general master mechanic. On May 1, 1920, he was made general superintendent of the company, and on Sept. 26, 1927, he was elected vice-president, still retaining the position of general superintendent. On Dec. 9, 1929, he was made president and general manager of both the Minnesota Steel Co. and the Morgan Park Co., succeeding the late Samuel B. Sheldon. Mr. Reis has a record of 30 consecutive years of service with United States Steel Corporation plants. Although his father, Charles H. Reis, has not been connected with the steel industry, two of his father's cousins distinguished themselves in important rôles in the Steel Corporation organization. One of them, John Reis, was formerly vice-president of the corporation and president of the Minnesota Steel Co. The other, George L. Reis, was formerly vice-president and general manager of the Minnesota company. Both are now retired, John Reis residing in Montclair, N. J., and George L. Reis in Knoxville, Tenn.

LOUIS C. REIS

—

BERTRAM G. PARKER has been elected president of the Youngstown Foundry & Machine Co., succeeding W. J. WALLIS, who becomes chairman of the board of directors. Mr. Wallis has been head of the company 40 years. Mr. Parker has been with the company 31 years and for the past eight years has been vice-president and general manager.

—

E. B. NICHOLS, heretofore with the Bell Telephone Laboratories, and before that chief engineer of the Victor Talking Machine Co., Camden, N. J., has been appointed chief engineer of the Brown Instrument Co., Philadelphia.

—

H. G. MOUAT has been made Southern district representative, with offices in the Martin Building, Birmingham, for the Clark Controller Co., Cleveland.

—

W. P. WITHEROW, president, Witherow Steel Corporation, Pittsburgh, recently merged with the Donner Steel Co., Buffalo, was elected chairman of the board of the Donner company on Dec. 13. He has been identified with the steel trade for over 20 years.

—

HARRY G. UPHOUSE, who has been manager of the Philadelphia district office of the Donner Steel Co. since 1918, has been transferred to the Buffalo territory. He will have charge of steel and pig iron sales in that district. The Donner company's office in Philadelphia will be closed, and sales will be handled under the direction of the New York office, 120 Broadway, of which P. M. GUBA is district manager of sales.

—

H. G. KESHIAN, metallurgist, Chase Companies, Inc., Waterbury, Conn., will speak on "Deep Etch Test" at the December meeting of the New Haven chapter of the American Society for Steel Treating to be held Dec. 19 at Hammond Laboratory, Yale University.

—

H. D. MATTHEWS, formerly section engineer, Westinghouse Electric & Manufacturing Co., has been appointed consulting engineer for the W. M. Chace Valve Co., Detroit.

—

JOHN M. DAVIE has been made representative in western Pennsylvania and northern Ohio, excepting Toledo and suburbs, by the General Mfg. Co., maker of flexible power presses, Detroit. He has his headquarters at 2453 Overlook Road, Cleveland Heights, Ohio.

—

E. B. JONES, assistant traffic manager of the Norton Co., Worcester, Mass., has been made a director of the Traffic Club of New England.

—

F. A. WHITEHEAD, formerly superintendent of rolling mills for the Copperweld Steel Co., Glassport, Pa., has been appointed general superintendent of that company, a newly created position. S. L. GIBASON, formerly assistant superintendent of rolling mills, has been named superintendent, and has been succeeded by J. C. GLOVER.

—

THORSTEN Y. OLSEN, son of Tinius Olsen, has been elected president of the Tinius Olsen Testing Machinery Co., 500 North Twelfth Street, Philadelphia, succeeding his father, who recently celebrated his eighty-fourth birthday and has retired from active participation in the affairs of the company. Thorsten Olsen has been vice-president of the company for a number of years, having been identified with it since he was graduated from the Sibley College of Engineering at Cornell University in 1903. He is a member of the Society of Automotive Engineers, American Society for Steel Treating, American Society for Testing Materials, Institute of Metals (British), Society of Military Engineers and the Engineers Club of Philadelphia. The retiring head of the company, TINIUS OLSEN, was the organizer of the company and has been the active head for about 50 years. He has long been interested in philanthropic work, especially in the place of his birth, Konigsberg, Norway. In September, 1928, his fellow-townsmen in Konigsberg unveiled a statue of him, in recognition of his work. He has also been knighted by the King of Norway and is a member of the Order of St. Olaf.

THORSTEN Y. OLSEN

—

H. E. YEAGER, formerly in charge of Philadelphia district sales of pig iron for the Donner Steel Co., Buffalo, but for the past year on the steel sales staff of the company in the Buffalo territory, has joined the Philadelphia sales organization of Joseph T. Ryerson & Son, Inc., Chicago.

OBITUARY

JOHN MORRISON HANSEN, chairman of the board of the Standard Steel Car Co., Pittsburgh, died on Dec. 13 at La Rochelle, France, where he was visiting in the interests of the company's plant at that place. Mr. Hansen was born in Butler County, Pa., and had spent his entire life in the Pittsburgh district. He was one of the pioneers of the steel car industry, having become associated with the Pressed Steel Car Co. shortly after his graduation from the Western University of Pennsylvania, now the University of Pittsburgh. He served as chief engineer of the Pressed Steel company, and, when the Standard company was organized in 1902, he became its president. He later became chairman of the board and in recent years had been required to spend considerable time abroad in the interests of the company's foreign plants.

—

DAVID C. KLAUSMEYER, general manager, Cincinnati Bickford Tool Co., died suddenly in Cincinnati, Dec. 6, as was noted in this column in the issue of Dec. 12. The brief sketch there given of his career, starting as apprentice in the Bickford Drill & Tool Co., indicated how much of an authority he was on drilling machinery.

—

WILLIAM H. REA, formerly treasurer of the Mesta Machine Co., Pittsburgh, and for many years active in the roll and rolling mill business, died at his home in Pittsburgh on Dec. 15. He was born in that city 73 years ago, and, after attending Phillips Andover Academy and the Massachusetts Institute of Technology, he joined the Robinson & Rea Mfg. Co., Pittsburgh, of which his father was one of the founders. When that company was merged with the Leechburg Foundry & Machine Co. into what is now the Mesta Machine Co., Mr. Rea became treasurer of the latter. For almost 50 years he served as secretary of the Iron Roll Association, retiring from that position early this year.

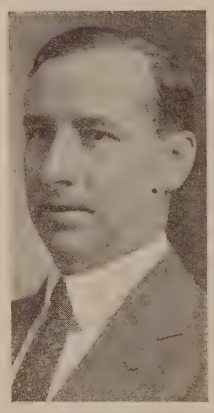
—

FRED D. HOLDSWORTH, formerly engineer in charge of air compressor design at the Claremont, N. H., plant of the Sullivan Machinery Co., Chicago, died Nov. 20, aged 62 years. He had been with the company from 1900 until his retirement in 1928, and had been granted many patents in connection with the development of Sullivan machines.

—

H. G. SEMPLE, for nearly 51 years associated with the Jones & Laughlin Steel Corporation, Pittsburgh, died at his home in Etna, Pa., on Dec. 14. He went to work for the company as a boy of 15, and had been employed in a number of departments prior to his association with sales, which began in 1903. Since 1911 he had been identified with the Pittsburgh city sales department, and was well and favorably known in the steel trade in that district.

J. M. HANSEN



D. C. KLAUSMEYER

—

JOHN D. BIRD, pioneer in the development of Corliss engines and internal combustion engines, died at his home in Milwaukee on Dec. 8, aged 61 years. After leaving high school, he became an apprentice in the plant of Hewes & Phillips Iron Works, Newark, N. J. In 1900 he helped organize Conover & Co., consulting engineers, New York, and 11 years later became general superintendent at the Beloit, Wis., plant of Fairbanks, Morse & Co., where he was engaged in developing light and heavy-duty gasoline and oil engines. In 1907 he became assistant to the works manager of the Worthington works of the International Steam Pump Co., Cudahy, Wis., and two years later was promoted to works manager, continuing in that capacity until the plant was abandoned in 1922. During the war he was president of the Wisconsin Gun Co., Milwaukee.

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DAVID MILLER, founder and president of the D. Miller Scrap Iron Co. and the De Pere Paper Co., died at his home in Green Bay, Wis., Dec. 9, aged 70 years.

Automobile Production 10 Per Cent Off in 1930

A reduction of less than 10 per cent in 1930 automobile production, as compared with the present year's production, is predicted by *Automotive Industries*, in its annual estimate of future production and sales conditions in the automotive manufacturing industry. The actual figure set by the publication is 4,945,000 units for next year, which will be about 500,000 fewer units than the record-breaking final showing for 1929.

International Licensing Large This Year

HAMBURG, GERMANY, Dec. 2.—Licensing of foreign companies to use German patents affecting the production of steel, non-ferrous metals and machinery has been unusually active this year. In the first nine months, companies in the United States acquired 193 licenses or patents from Germany and German companies bought 107 from American patent holders. Great Britain acquired 192 from Germany and Germany obtained 91 from the British; Belgium secured 103 from Germany and Germany 56 from Belgium; Japan acquired 87 patents or licenses from Germany and disposed of six licenses to German companies.

The Manganese Steel Forge Co., Philadelphia, manufacturer of Rolman screens and other rolled and forged manganese steel products, has discontinued its Cleveland office and the Cleveland district hereafter will be handled by J. H. McKinley, manager of the Pittsburgh office. P. M. Hobbs, formerly in Cleveland, now has charge of the company's Chicago office.

Cleaning steel for porcelain enameling was one of the topics discussed by 110 district managers and representatives of Oakite Products, Inc., New York, who attended the company's twenty-first annual sales conference on Nov. 20, 21, 22 and 23. The reading and discussion of papers were supplemented by practical laboratory experiments to acquaint the men with the new improvements in cleaning methods.

Revival of Iron Mining in Normandy

(Concluded from page 1667)

profitable, perhaps 3000 ft. or so, and along the very extensive outcrops they can be followed, due to repeated folds, for something like 400 miles.

A Rich Iron Ore, High in Phosphorus

On the accompanying sketch map are located all the Armorican mines which have been in activity during 1928 or 1929. There are also noted the two local steel works (at Colombelles near Caën and at Trignac near St. Nazaire), and the export shipping points (Caën, Granville, Nantes and St. Nazaire). The three main mining operations are separately named on this map (Soumont, May and Segre), and the other mines are located by crosses.

Actual shipping grades of the active mines, in carload or cargo lots, are as shown in the accompanying table.

With labor in this district ranging still below $1 per day, costs are naturally also low. My estimate is that a ton of ore on board cars at mine at present costs from 60c. to $1 and will average around 75c. This is a cost of almost exactly 1.5c. per unit of iron.

Selling prices at present are 11 shillings per ton f.o.b. Caën for Norman ores, as against 14 shillings per ton f.o.b. Nantes for Anjou ores. These compare with 20 to 25 shillings c.i.f. British ports for Spanish and Algerian ores of 50 per cent grade, and show that the Armorican field can meet any normal competition.

Output Increasing Rapidly

We can now come to some conclusion as to the probable future and competitive possibilities of this new ore field.

First we may briefly note the total outputs of ore in the Armorican field for certain past years. Modern development of the field dates back only to 1910, while of course the war disorganized its growth, giving unnatural increases in a few years and a serious collapse afterward. The field produced about half a million tons in the depression of 1921; by 1923 the output was somewhat over a million tons; in 1928 it passed 2½ millions. These are, admittedly, not large totals; but the rate of growth which they show is far higher than most other fields during this same period.

Of the total, just about half is used by furnaces in the Armorican region itself; the rest goes to Lorraine and Westphalia. Based on official data for 1928 and my own estimates for 1929 I should say that in these two years the average ore output of the Armorican region was distributed about as follows: 1,250,000 tons by rail to furnaces at Caën and St. Nazaire, 300,000 tons by rail to French furnaces in Lorraine, and 1,000,000 tons by rail and ship to German furnaces in Westphalia, making a total of 2,550,000 tons for 1928, and a similar amount for 1929.

Estimates as to future progress must take into account not only the probable total needs of the world's furnaces in future years, but the relation of the Armorican field to its other great competitors and to its possible markets.

With what we know now about world iron ore reserves, we can safely say that there are existent at least eight great ore fields, in each of which the probable reserve tonnage, figured in any possible way, would range from 1,000,000,000 to 4,000,000,000 tons.

These are tabulated, in order of their annual output, with a few additional data on grades:

Present Output Rank	Developed About	Per Cent Iron	Phosphorus
1. Lake Superior, U. S. A.	1860	50	Low
2. Lorraine, France	1870	35	High
3. Alabama, U. S. A.	1875	35	High
4. Cleveland, England	1860	28	High
5. Armorica, France	1910	50	High
6. Wabana, Newfoundland	1900	50	High
7. Mayari, Cuba	1905	50	Low
8. Brazil	....	60	Low

	Magnetites			Hematites			Roasted Carbonate	Workable Limits
Metallic iron	53.78	53.69	52.5	48.32	48.91	47.94	48.70	46 to 54
Manganese	0.19	0.30	n.d.	0.32	0.30	0.38	0.56	
Phosphorus	0.89	0.96	0.65	0.72	0.72	0.56	0.67	0.5 min.
Sulphur	0.027	0.03	n.d.	0.05	n.d.	0.01	n.d.	
Silica	10.84	11.96	11.0	13.80	15.79	15.71	13.75	8 to 16
Lime	n.d.	2.57	(a)	2.54	3.01	0.08	n.d.	
Magnesia	0.67	0.48	(a)	1.03	1.44	n.d.	n.d.	

(a) Lime plus magnesia is 2.5 per cent.

It will be seen immediately that these eight great ore fields fall into two sharply contrasted classes. On the one hand we have three fields of relatively low-grade ore, but located near to coal fields and to good steel markets; all their ore is consumed locally; they can never export ore of such grades; they tend rather to import higher grade ores for mixtures. These three are Lorraine, Cleveland and Alabama. As contrasted with this we have Lake Superior, Wabana, Armorica, Cuba and Brazil, all having deposits of relatively high-grade ore, all shipping most of their output to distant furnaces located near coal fields or markets. And of these five "exportable" fields, Lake Superior finds its markets in its own country; Cuban ore has certain special difficulties in chemical composition; and Brazil is probably several decades at least from becoming a serious factor in the ore market.

So in the long run the fields whose output will meet in the Atlantic markets of America and Europe are (1) Armorica, (2) Wabana, (3) Scandinavia, (4) North Africa and (5) Spain. With production costs as they are now, Armorica has more than an even chance in any such competition, particularly for the furnaces in Great Britain, Germany and Lorraine. And since its entire output at present is being mined from less than 5 per cent of its workable outcrop, we may fairly expect a continuation of its relatively rapid rate of growth. An annual output of ten to fifteen million tons of Armorican ore could readily be mined and marketed within the next decade; and this will require something more than the present scale of organization.

Engineers Hold Prominent Place in American Life

Of the 28,805 "notable living men and women of the United States" named in "Who's Who in America" (1928-1929), men of science comprise 30.4 per cent, lawyers 15.2 per cent and physicians and surgeons 7.3 per cent, according to L. W. Wallace, executive secretary of the American Engineering Council, Washington, and J. E. Hannum, editor of the Engineering Index Service, New York, in a paper on "Engineers in American Life," presented at the recent annual meeting of the American Society of Mechanical Engineers in New York.

"The 2858 engineers and architects named received 1417 academic degrees in branches of learning other than science, as well as 2497 scientific degrees. They are members of 1138 associations, conference boards, and commissions, half of which are non-technical. They hold 4785 official positions in 3928 organizations, of which number 2993 are industrial and commercial companies. They occupy the position of president in 1128 industrial and commercial organizations, 72 engineering firms, 68 banks and trust companies, and 23 colleges and universities. Among these 2858 engineers and architects there are, or have been, ten governors, 13 members of Congress, two members of the Cabinet, and the President of the United States."

Turning With Shallow Cuts at High Speed

(*Continued from page* 1663)

of the form shown in Fig. 3 was ordinarily used for the trailer.

From three to six tools were tested after each of two grindings for each condition investigated, and the tests were all made in sequence. For example, in the study of the effect of cutting speed on tool performance, one tool was tested at each of the selected speeds in the series, then a second tool was tested at each of the different speeds, and this procedure repeated until the desired number of tools had been tested for each condition. Only average values are used in the comparisons made throughout the report.

The results and conclusions of the tests were summarized by the authors as follows:

With the carbon and high-speed steel tools used, the second tool began to cut when the leader had worn 0.001 to 0.002 in. All subsequent comments on turning with shallow cuts and fine feeds are based on this end point, but greater wear can be made to represent tool failure by using a shallower setting for the second tool than is used for the cutting tool.

Tests were made dry at different cutting speeds, feeds, and depths of cut on nickel-steel forgings with tensile strengths of 80,000 to 100,000 lb. per sq. in. to give a broad background for the interpretation of the results of tests of different tool steels, first heat treated in various ways. The results could be represented approximately by the following equations in which V is the cutting speed, T the tool life, F the feed, D the depth of cut, A the area of cut ($=DF$), and c, K, K_1, K_2, and n are constants.

For high-speed-steel tools,

$$VT^{1/10} = c \quad \ldots\ldots\ldots\ldots\ldots\ldots \quad [1]$$

$$V = K_1 - K_2(DF) = K_1 - K_2A \ldots\ldots \quad [2]$$

For carbon-steel tools,

$$V = \frac{K}{DF} = \frac{K}{A} \quad \ldots\ldots\ldots\ldots \quad [3]$$

These equations are not to be construed to represent the true laws of cutting, since the cutting speed is probably not affected equally by variations in the feed and the depth of cut. However, they represent approximately the results of the experiments made with depths of cut of 0.005 to 0.020 in. and feeds of 0.0115 to 0.0204 in. per revolution.

Coolants Result in Better Finish

In tests of short duration, where tool failure occurred in about 2 to 10 min. the tool life was increased somewhat more by the use of water than by lard oil, but in tests of about 50 min. duration under the same feed and depth of cut but lower cutting speeds, these two liquids produced effects of the same magnitude. The increases in tool life from the use of these liquids were not large in any case, but the finish on the work piece at the end of the cut was better with the liquids than without.

Tests with tools of different forms and angles showed that the successful application of the described method of test was not dependent upon having the broad-nose tool used in a majority of the experiments. Tools with a plan angle of 65 deg. had a longer life than the broad-nose tools, but the finish produced on the nickel steels in dry turning did not appear to be as good. The best tool life in the broad-nose tools was obtained with a back slope of 30 deg.; a side slope of 0 deg. was better than one of 8 deg.

Effect of Composition and Heat Treatment of Tools

The cutting speed of quenched carbon-steel tools was not affected appreciably by variations in carbon content from 0.75 per cent to 1.3 per cent nor by subsequent tempering at temperatures up to 375 deg. Fahr., which did not lower the hardness; the cutting speed of the carbon-steel tools was equal approximately to that of a quenched "oil-hardening" tool steel, and only slightly lower than the cutting speed of a steel containing 1.3 per cent carbon and 2¾ per cent tungsten.

The cutting speed of carbon-steel tools was lower in all cases than that of high-speed-steel tools, but the differences between the two decreased with decrease in the areas of cut in dry turning.

The heat treatments which resulted in the best roughing-tool performance for high-speed steels of customary compositions also resulted in superior performance under shallow cuts and fine feeds. These treatments comprised oil quenching from the highest practical temperatures, followed by tempering to convert the larger part of the retained austenite to martensite.

Of 12 elements added in different proportions to chromium-tungsten or chromium-tungsten-vanadium high-speed steels only one, cobalt, produced decidedly beneficial results. Molybdenum and nickel offered promise under certain conditions, while the remainder either had a negligible effect or were definitely deleterious from one viewpoint or another.

Cobalt Improves Tool Performance

Cobalt improved the performance of the high-speed-steel tools both under shallow cuts and under heavy duty, but the maximum benefits were obtained only with high hardening temperatures. The percentage gain from the addition of cobalt was somewhat greater in rough turning than with shallow cuts and fine feeds, but increase in cobalt above about 5 per cent did not produce improvements commensurate with those resulting from 3.5 to 5 per cent and high hardening temperatures.

Replacement of part or all of the tungsten in high-speed steels by molybdenum, in the ratio of 1 part molybdenum to 2½ parts of tungsten, produced steels having performance comparable to that of the tungsten steels. Such substitution should be useful in case of a depleted tungsten supply, but is not advocated at the present time since there was some evidence of irregular performance in the high-molybdenum steels and their hot-working properties did not seem to be as good as those of the tungsten steels. However, a steel with 7 per cent molybdenum and no tungsten had one advantage over the tungsten steels for roughing tools in that its hardness and performance were not so largely affected by variations in the hardening temperatures.

The addition of 3¾ per cent of nickel to the customary chromium-tungsten-vanadium steels was beneficial for the rough-turning tools, particularly when combined with a 50 deg. Fahr. increase in the hardening temperatures, but was detrimental to the tools used under shallow cuts and fine feeds and adversely affected the machining properties of the high-speed steel itself. Lowering the carbon from 0.6 or 0.7 per cent to 0.5 per cent improved the machining properties without affecting the performance of the roughing tools, but was detrimental to the tools used under shallow cuts.

Effect of Arsenic and Other Elements

Each of the four elements, arsenic, antimony, copper, and tin, adversely affected the tool performance of high-speed steels under shallow cuts, and the magnitude of the decrease became greater as the proportions of these elements increased. Copper was the least harmful; next in order came tin, while arsenic and antimony were the most objectionable.

The effects of these four elements upon the perform-

ance of roughing tools did not necessarily correspond to those observed with shallow cuts. The 0.8 per cent arsenic additions lowered the cutting speed, but the addition of 0.4 per cent antimony or 0.5 per cent or less of tin had no measurable effect. Higher proportions of tin lowered the cutting speeds. The high-speed steels containing 0.36 to 1.77 per cent copper showed slightly better performance than the corresponding steels without copper.

The steels containing 0.4 per cent antimony, 0.8 per cent or more of copper, or 0.8 per cent arsenic did not have good hot-working properties, illustrated by numerous corner cracks on the bars, while those containing 1.7 per cent antimony or 1.8 per cent tin showed a high degree of hot shortness and could not be forged or rolled. Also the steel with 1.77 per cent copper could itself be machined only with difficulty in the annealed condition.

Phosphorus up to about 0.06 per cent and sulphur up to 0.215 per cent did not appear to be injurious, from the viewpoint of lathe-tool performance of the customary chromium-tungsten-vanadium steels, with or without cobalt. However, high sulphur tended to lower the cutting speeds in the presence of 3¾ per cent nickel. Because of the possibility of segregation of the phosphorus and the introduction of numerous sulphide inclusions in high sulphur steels, these two elements can advisedly be kept within low limits for all high-speed-steel lathe tools.

Aluminum Lowers Cutting Speeds

Aluminum adversely affected the performance of the high-speed-steel tools both with shallow cuts and under heavy duty. It was one of the few metals considered which, in proportions around 0.3 per cent, produced a measurable decrease in the cutting speeds in rough turning. This decrease became greater as the proportion of the aluminum was increased, and with 0.8 per cent the drop in cutting speed was greater than that produced by equal proportions of any of the other elements considered. These changes were accompanied by decrease in the hardness of the quenched steels, probably through decrease in the dissolving capacity of the aluminum-iron solid solution for carbon, chromium, tungsten, and vanadium. With 0.8 per cent aluminum there was also evidence of a low-melting eutectic in samples quenched from 2350 deg. Fahr.

Titanium was another of the elements which appeared to lower the dissolving capacity of the austenite, and as a result the hardness and the cutting speeds of the high-speed-steel tools decreased with increase in the titanium. Its interference was lessened, probably through the formation of less harmful carbides, instead of solution as titanium in the austenite, by increasing the carbon content of the steel.

Tantalum did not appear to be promising as a substitute for vanadium or as an alloying element in the customary chromium-tungsten high-speed steels for lathe tools. It acted in a manner similar to aluminum and titanium in that it appeared to decrease the dissolving power of the austenite for the chromium and tungsten compounds and so decreased the hardness and cutting speeds of the quenched lathe tools.

Power Required to Drill Cast Iron and Steel

THE drilling tests presented in the paper by Professor O. W. Boston and C. J. Oxford were on two cast irons, one made up of 20 per cent charcoal pig iron, and 17 different steels selected to cover material commonly used in modern manufacture. Standard twist drills ranging from ½ to 1½ in. were used. The drills were considered sharp in all tests and a coolant consisting of one part soluble oil and 16 parts of water was used in all cases. The scope and some of the conclusions of the test are:

Data as to drilling torque, thrust, computed horsepower at the drill point, and net horsepower supplied to the machine as measured on a recording wattmeter are given under two headings: commercial tests and special tests. All commercial tests were run at a peripheral speed of the drill of approximately 60 ft. per min. The feed for each drill size was as near to those given in the usual commercial-drilling table as the change gears available would permit. They were as follows: 0.009 in. per revolution feed for the ½-in. diameter drill, 0.011 in. for the ⅝-in. drill, 0.012 in. for the ¾-in. drill, 0.013 in. for the 1-in. drill and 0.015 for the 1¼- and 1½-in. drills.

Special tests were run on various cast irons and steels so that the influence of the speed, feed, and drill diameter could be determined, in order that the results of the commercial-drilling tests could be extended to cover any other conditions of drilling for each material. It was found from these special tests that the thrust for both cast iron and steel increased in direct proportion to the drill diameter d; that the torque increased in proportion to d^2 for cast iron and $d^{1.8}$ for steel. The thrust increased with an increase in feed f, but at a rate as slow as $f^{0.6}$ for both cast iron and steel. The torque increased as $f^{0.6}$ for cast iron, but $f^{0.78}$ for steel. It was found that the torque and thrust remained practically constant over the whole range of speeds covered from 74 to 441 r.p.m. for each drill size and feed.

High Speed in Cupola Melting

(*Concluded from page* 1659)

In order to obtain the metallurgical advantage in melting, and more particularly in high-speed melting, it is necessary to maintain a clean cupola. Limestone, mentioned because of its almost universal use, charged on the coke in the ratio of one to four, and with a charge on the bed coke to start off, will flux the cupola cleanly and will not affect the lining unduly. Slag should be removed from the cupola, commencing at the time the third charge reaches the tap hole.

Responses to Many Questions

Following the general presentation of his subject, Mr. Truxell informally answered many questions, some of which are reviewed here. In making high-test iron, where charges in some cases consist of 100 per cent steel scrap, some foundries have made iron with a carbon content as high as 3 per cent. Formerly a very hard, dense coke was regarded as the best, but in the speaker's opinion, a free-burning high-volatile coke is much better. So-called "silvery coke" is not now so highly thought of. A uniform charge in weight is recommended throughout.

That iron should be melted as hot as possible, no matter what kind of casting is to be poured, is the opinion of the speaker. Ingot molds, thus made, will stand up 40 per cent longer. The largest sanitary manufacturer in the country uses 72-in. cupolas and an air pressure of 7 in. Hot iron is poured continuously at the rate of 18 tons per hr. Asked as to whether melting conditions could be determined by the color of smoke issuing from the stack, Mr. Truxell replied, not usually. In response to a query as to whether foundries in general are using too much blast, he answered that as a rule more is used than is necessary.

Closer Affiliation With National Society

A movement which has been considered for some time by the local Philadelphia foundrymen and has been advocated by the officers of the American Foundrymen's Association has finally come to a head. It was announced that Julian Greenstreet, superintendent, Olney Foundry Co., Philadelphia, has been appointed as liaison representative of the local foundrymen to keep in close touch with the activities of the national organization.

Book Reviews

(*Continued from page* 1669)

stead of the broader present curriculum. Forty thousand trained technical men must be recruited before the end of the period, and it is planned to expand the technical evening schools for workingmen. Here, the adoption of the 7-hr. day is viewed as offering tremendous possibilities.

Control of imports constitute an important feature of the five-year plan. Complete elimination of luxuries will be continued, drastic economy in purchases of consumption goods and a corresponding increase in imports of goods for productive purposes. In the five-year period it is planned to spend 6,180,000,000 rubles for imports, of which "equipment for industry and transportation" will cost 1,784,000,000 rubles.

In the appendix a list is given of twenty-five American companies and individuals with which contracts for technical assistance have been closed. Five more have been negotiated since publication of the book. G. S. H.

Buying In a Large and Small Way

Principles of Scientific Purchasing. By Norman F. Harriman. 265 pages, 6 x 9 in., illustrated. McGraw-Hill Book Co., Inc., New York. Price $3.

At the outset the author points out that merchandising, advertising and distribution have attained a degree of importance greater than that of production. The importance of the purchasing function is indicated by the necessity for knowledge of the many processes of which purchasing is the final act. Besides these, there are other factors—technical, market conditions, economic factors, stores control, obsolescence, future requirements, price and business trends. It seems apparent that technical training is regarded with favor by the author.

Economic aspects are based upon or correlated with the elimination of waste and economical operation. Financial features of the purchasing agent's job presuppose such knowledge and alternative sources of supply, discounts, moral standing, payments, and storage costs. Psychology has its place, for in this field are the attitudes and reactions between buyer and seller, strategy, and relations with salesmen.

As to the purchasing agent himself, he is an aggressive, important, practical man and the friend of real value. He is either an engineer or possesses the engineering point of view, a factor which is one of the most significant of our modern business achievements. He possesses courtesy, is eager for ideas which are vital to his business, knows materials, recognizes psychology, and possesses the ability to protect himself. He is fair and earns and maintains the respect and confidence of all with whom he comes in contact. T. W. Buxton.

Commodity Exchanges. By Julius S. Baer and George P. Woodruff. 319 pages, 5 x 8¾ in., illustrated. Harper & Brothers, New York. Price $5.

This is both textbook and reference work, written in clear language by men who understand their subject. One of the authors directed the legal work in connection with four of New York's recently organized exchanges, and the other is a recognized investment analyst. The book supplies a complete description of every phase of the operation of commodity exchanges, and their place in the commercial world. The characteristics common to the various exchanges, the ways in which they differ, and the advantages they offer to all individuals dealing in commodities, are explained in considerable detail.

Describing the evolution of the modern exchange, the authors explain the workings of the "futures contract" and the difference between the cash and futures markets. The work includes a comprehensive discussion of the need for the futures contract in modern distribution, how it should be used by dealers, manufacturers, and others, and how possible evils have been minimized.

Two chapters are devoted to the hedge, which is of paramount importance to dealer, manufacturer, warehouse, and large producer, as a means of price insurance. These chapters present the generally accepted methods of using the hedge to remove business as far as possible from the realm of speculation to a sound merchandising basis.

Auxiliary functions of commodity exchanges may be used to greatest advantage. These functions include the maintenance of grading, weighing and inspection systems, the collection of statistics and the compilation of reports. H. J. Wolf.

Source Book on Industrial History

History of Manufactures in the United States. Vol. II, 566 pages; Vol. III, 467 pages, 6¾ x 10 in. Published for the Carnegie Institution of Washington by McGraw-Hill Book Co., Inc., New York. Price $7.50 for each volume.

Volume I of this important, accurate and readable book was reviewed in The Iron Age September 12. That book carried the subject up to the outbreak of the Civil War; the second and third volumes, now published, contain respectively an account of the years from 1860 to 1893, and from 1893 to 1928.

The year 1861 is very properly chosen as the beginning of a new industrial era, with great political consequences, as the tendency was manifest that "the earth and the fullness thereof" would accrue to the manufacturing nations, whether great, like America and England, or small like Belgium and Switzerland. Attempts were made to create industrial States by allying industry with government. Specialization along national lines became the rule. America stood alone in consuming the greater part of her products; with Europe it was the converse. America carried labor to materials; Europe, materials to labor. With our Civil War and the lessened and partly improvident home market came the northern manufacturers' need to seek foreign markets; in lumber we slashed our home supply in order to glut the marts abroad.

This period made our factory owners dependent on home resources. At first we were long on domestic copper, but so short on domestic coal that return to wood burning for locomotives was suggested. Our entry into Bessemer steel production was late; ship building became active. Our cotton goods supply, plus Great Britain's, was in excess of world demands; but this stimulated wool manufactures.

In the last volume, the author draws a parallel between the economic and business conditions in the years immediately before the Civil War and the World War. According to him, both conflicts began after long periods of subnormal prosperity, and cites statistics from New England to substantiate the thesis. It would appear that conditions were too spotty to warrant the conclusion; some industries were expanding rapidly and some countries were generally prosperous; in America we had passed through Roosevelt's "trust-busting" and another administration hostile to consolidation and integration of manufacture. Robert Grimshaw.

Of Interest to Ocean Shippers

Three recent books on shipping are before us. The first on "Port and Terminal Charges" will be of especial interest to traffic managers, being a comprehensive collection of data prepared by the Corps of Army Engineers and the United States Shipping Board. It may be

had from the Superintendent of Documents, Washington, for $1. It describes the facilities available for ships at the docks of 65 ports in the States and island possessions, and the costs of handling, storage, cartage and switching. From it one can get a close estimate of the total costs of getting a cargo cleared or landed at a certain port.

Similar data but on a much more detailed plan are contained in a 126-page volume on the Port of Galveston and tributary ports, compiled by the same authorities. It contains a number of inserted maps, tables of statistical matter and photographs showing the wharfage and other elements of value to the shipping trade. The waterborne commerce of Galveston has more than doubled since 1917, about two-fifths of which is coastwise.

A comprehensive analysis of the "American Merchant Marine Problem" is contained in a 167-page volume of that title published by the National Industrial Conference Board, New York. (Price $2.50.) Recognizing that the policy of the Government must be a determining factor in the success of a merchant marine, this book picks up the other factors entering into the situation and discusses suggested methods for improving the shipping fleet and its service to the carrying trade of the world. So long as a heavy wage differential makes both the construction and the operation of our vessels unduly expensive, American ships are handicapped in competition with more cheaply built and cheaply run ships.

Governmental assistance in overcoming this persistent differential brings up the question of subsidies and subventions, preferential treatment in railroad rates or discriminating duties. The authors conclude that the Shipping Board should withdraw from the field of ship operation. It is suggested that all of the idle tonnage owned by the Government which is unfit for service might be sold or withdrawn from registry, and held for use only in the event of national emergency. Any additional assistance which may be required to maintain essential shipping facilities under the American flag ought to be provided in accord with sound business principles.

Notes on New Books

Standardization activities of almost every major American industry are described in the 1929 American Standards Year Book published by the American Standards Association, New York. In a foreword, Secretary of Commerce Robert P. Lamont points out that the exchange of goods between countries will be facilitated by standardization of international character. As this exchange is perfected there will be an advance in world living standards through the increased division of wealth. Through the application of industrial standardization the economies of mass production are rapidly extending to consumer goods. This results in wider distribution and consumption of many of those things classed as luxuries.

A proper method of controlling material in process depends upon the scope of manufacturing activities to such an extent that the "storekeeper" may be the purchasing agent (where the raw material is the highest portion of the value, as in a brass foundry), the sales manager (as in a jobbing concern where the critical point is sales), or the production manager (where the mass production of a standard object is the aim). In any event, the economical flow of material in process and the maintenance of the necessary reserve is intimately connected with the most economical method of manufacture and allocation of labor and machines. Consequently a series of nine studies on "Material Control and Storeskeeping in Machine Shops and Foundries" (Willis Wissler, 284 pages, 8½ x 11 in., Ohio State University Press, Columbus, Ohio. Price $2.50) is in reality an intimate study of operations in representative Ohio factories, ranging from those making electrical equipment to others making steam shovels, and as such will serve as a mine of information for manufacturing executives generally.

More than 150 pages are comprised within the 1927 report of the Dominion Bureau of Statistics dealing with the production of iron and steel in Canada during that year, and the output of a considerable variety of finished products using iron and steel as the raw material. The tables go into considerable detail, as the study is essentially that of a census of manufactures. The number of establishments, employees, payrolls, capital investment, cost of materials, value of products and value added in manufacturing find a comprehensive treatment in this publication. Imports and exports, power employed, fuel and electricity used and many other items are covered in the survey.

American Institute of Steel Construction, New York, has prepared a handsome brochure entitled "The Superiority of the Steel Bridge." A brief introduction points out the main reasons for using steel, viz: Strength, permanence, adaptability and economy. But most of the pages are filled with half-tones of notable steel bridges, notable not for their size but for their beauty of line and an architectural treatment harmonious with the surrounding landscape. It is worthy of remark that the majority of these subjects are from European localities—a fact which is not particularly flattering to American constructors.

"Design Standards for Oxwelded Steel and Wrought Iron Piping" forms the subject of a 68-page pamphlet issued by Linde Air Products Co., New York. It should be of especial value to users of large diameter piping, for it gives detailed drawings of acceptable joints, plugs, branches, turns, headers and anchors, together with notes on the advantages and disadvantages of each design, the ordinary uses, commercial tolerances, and appropriate phraseology for specifications. An appendix includes dimension charts for standard flanges for welding, welding necks, a model general specification for a piping installation and a glossary. A supplementary 86-page pamphlet on "Fabrication of Welded Piping Designs" is intended for the shop men and contains sections on procedure control, template work, and cost data.

New Books Received

Psychology and Industrial Efficiency. By Harold E. Burtt. 395 pages, 5½ x 8¼ in., illustrated. D. Appleton & Co., 35 West Thirty-second Street, New York. Price $3.

Machine Design. By P. H. Hyland and J. B. Kommers. 448 pages, 6 x 9¼ in., illustrated. McGraw-Hill Book Co., Inc., 370 Seventh Avenue, New York.

Modern Aviation Engines. Two volumes. By Victor W. Pagé. 1908 pages, 6½ x 9½ in., illustrated. Norman W. Henley Publishing Co., 2 West Forty-fifth Street, New York. Price, for two volumes, $9, for one $5.

Edelguss. Edited by G. Meyersberg. 170 pages, 6¼ x 9¼ in., illustrated. Julius Springer, Linkstrasse 23, Berlin, W 9, Germany. Price 11 m.

American Society for Testing Materials. Tentative Standards: 1929. 901 pages, 6 x 9 in., illustrated. American Society for Testing Materials, 1315 Spruce Street, Philadelphia. Price $8.

General Sales or Turnover Taxation. 204 pages, 6¼ x 9¼ in., illustrated. National Industrial Conference Board, Inc., 247 Park Avenue, New York. Price $2.50.

Gauges and Fine Measurements. By F. H. Rolt. Vol I, 366 pages; vol. II, 357 pages, 6 x 9 in., illustrated. MacMillan Co., 60 Fifth Avenue, New York. Price $14.50.

Dullness Prevails in European Centers

Holidays Affect British Activity—Depression in Germany Partly Offset by Export Trade—Russia a Heavy Buyer in Germany

(*By Cable*)

LONDON, ENGLAND, Dec. 16.

CLEVELAND pig iron producers are benefiting by the reduction of 6d. (12c.) a ton on Durham furnace coke, but are maintaining pig iron prices. The market generally is dull, as domestic consumers are approaching the holidays and the usual stock taking period, and export demand for Cleveland iron is slack.

Hematite furnaces are booked with fair tonnages for first quarter delivery, including a moderate tonnage on Continental account.

Finished steel is quiet, especially for export. Plate and other heavy rolling mills are in need of work.

United Kingdom exports in November were 31,600 tons of pig iron, of which the United States received 2000 tons. Total iron and steel exports were 383,000 tons.

Tin plate is active, with consumers buying for prompt and forward delivery. Works are well sold and prices are likely to advance on an increase in the cost of tin. Galvanized sheets are quiet and prices weak. Black sheets are dull.

Reorganization of Richard Thomas & Co. is expected, following recommendations of the committee appointed to advise on readjustment of the company's capital.

Continental markets are confused, and business difficult to transact. The International Steel Cartel has arranged the first quarter production quota on a basis of the 10 per cent reduction previously agreed upon. The cartel is also establishing an export sales organization for principal products, which includes pooling of orders among mills to give each an adequate share of business. The Charleroi conference of cartel delegates has agreed on minimum f.o.b. prices, but it is now claimed here that sellers are willing to accept lower than these quotations.

The minimum fixed prices are, blooms £4 3s. ($20.25), billets £4 11s. ($22.20) and £4 12s. ($22.45), sheet-bars £4 11s. ($22.20) and £4 13s. ($22.69), merchant bars £5 6s. (1.15c. per lb.) to consumers and £5 5s. (1.14c. per lb.) to merchants, normal shapes £5 (1.09c. per lb.) to consumers and £4 19s. (1.08c. per lb.) to merchants, special shapes £5 1s. (1.10c. per lb.) and £5 2s. (1.11c. per lb.), plates, ¼-in., £6 4s. (1.35c. per lb.), 3/16-in. plates, £6 6s. 6d. (1.37c. per lb.).

German Home Trade Depressed

Steel and Machinery Exports Large and Production For Year May Establish New Post-War Record

BERLIN, GERMANY, Dec. 2.—General business conditions are unsatisfactory, and the usual winter increase in unemployment has been more rapid than a year ago, with the total unemployed estimated at more than one million. Business failures have increased, and in one month 30 small private banks suspended payment. Coal production is larger and the textile and leather industries, which have been depressed, show evidence of improving.

These conditions in the domestic market are, in part, offset by greater export trade, and the past three months have shown an export surplus over imports. This tends to prove that, when Germany ceases borrowing abroad, as has been the case recently, the country can meet its foreign obligations, including reparations payments and loans from the United States, through an active trade balance. The improvement in export trade has not extended to the steel market, where prices have been declining. As a result, the Ingot Steel Syndicate has again increased its rebates to exporting manufacturers and for December is allowing, per metric ton, 16 m. ($3.82) on ingots, 21 m. ($5) on billets and slabs, 36 m. ($8.60) on structural shapes, 34 m.

British and Continental European Export Prices per gross ton, f.o.b. United Kingdom Ports, Hamburg and Antwerp, with the £ at $4.88

British Prices f.o.b. United Kingdom Ports

Cleveland No. 3 foundry	£3	12½s.	to	£3	13½s.	$17.69	to	$17.93
East Coast hematite...	4	0	to	4	1	19.52	to	19.76
Ferromanganese, export	12	5	to	13	0	59.42	to	63.05
Billets, open-hearth....	6	2½	to	6	5	29.89	to	30.50
Sheet bars, open-hearth	6	0	to	6	5	29.28	to	30.50
Black sheets, Japanese specifications	12	10				61.00		
Tin plate, per base box	0	18¾	to	0	19	4.57	to	4.64
Rails, 60 lb. and heavier	7	15	to	8	15	37.59	to	42.43
						Cents per Lb.		
Steel bars, open-hearth.	7	15	to	8	10	1.69	to	1.85
Beams, open-hearth....	7	2½	to	7	12½	1.55	to	1.66
Channels, open-hearth..	7	7½	to	7	17½	1.60	to	1.72
Angles, open-hearth....	8	2½	to	8	12½	1.77	to	1.87
Ship plates, open-hearth	7	12½	to	8	2½	1.66	to	1.77
Black sheets, No. 24 gage	10	0	to	10	5	2.18	to	2,23
Galvanized sheets, No. 24 gage	12	10	to	12	12½	2.72	to	2.75

Continental Prices, f.o.b. Antwerp or Hamburg

Foundry iron, 2.50 to 3.00 per cent sil., 0.50 to 0.90 per cent phos.	£3	7s.	to	£3	11½s.	$16.35	to	$17.45
Foundry iron, 2.50 to 3.00 per cent sil., 1.00 per cent and more phos.	3	6	to	3	8	16.11	to	16.59
Billets, Thomas	4	11	to	4	12	22.20	to	22.45
Sheet bars, Thomas....	4	11	to	4	13	22.20	to	22.69
Wire rods, low C., No. 5 B.W.G.	6	3	to	6	5	30.01	to	30.50
Rails, 60 lb. and heavier	6	8½	to	6	10*	31.35	to	31.72
Rails, light	6	1½				29.65		
						Cents per Lb.		
Steel bars, merchant...	5	4	to	5	6	1.13	to	1.15
Steel bars, deformed...	5	3	to	5	5	1.12	to	1.14
Beams, Thomas, British standard	5	1	to	5	2	1.10	to	1.11
Channels, Thomas, American sections...	5	10	to	5	17	1.19	to	1.27
Angles, Thomas, 4-in. and larger, over ⅜-in. thick	5	0	to	5	6	1.09	to	1.15
Angles, Thomas, 3-in..	5	6				1.15		
Ship plates open-hearth inspected	7	5				1.58		
Black sheets, No. 31 gage, Japanese	12	3	to	12	4	2.47	to	2.66
Hoop and strip steel over 6-in. base.....	5	11½	to	5	12½	1.21	to	1.22
Wire, plain, No. 8 gage	7	2½	to	7	3½	1.55	to	1.56
Wire, galvanized, No. 8 gage	8	12½	to	8	15	1.87	to	1.90
Wire, barbed, 4-pt. No. 12 B.W.G.....	11	4	to	11	6	2.44	to	2.46
Wire nails, base.....	0	6¼				$1.55 per keg		
Wire nails, assortments 1 to 6-in. keg.....	10	6½				2.69		

*Open-hearth steel, 8s. ($1.94) per ton extra.

($8.13) on bars, 42 m. ($10.04) on bands, 21.50 m. ($5.14) on wire rods and 28 m. ($6.69) on heavy-gage sheets.

The refunds to exporting manufacturers are materially aiding such industries to compete for foreign trade with the United States. The cabinet, despite a socialist and free-trade chancellor, is decidedly protectionist in its attitude and among other tariff increases has decided to impose a duty of 250 m. a ton (2.70c. per lb.), on aluminum ingots, at present duty free.

Steel production this year will materially exceed output in 1928 and, with the present rate maintained to the end of December, it should be greater than in 1927, the largest post-war year. From January to October inclusive, steel ingot production was 13,801,328 metric tons, compared with 13,068,045 metric tons in the 10 months of 1928. Production of rolled products was 9,615,349 tons, compared with 9,418,051 tons in 10 months of 1928.

Exports of iron and steel are large, and imports and exports of pig iron have been about equal since spring. The scrap market here is dull, but there is considerable interest in the large increase in scrap exports from the United States, a part of which has been reaching Germany since 1925. In that year only 2 tons of scrap was received from the United States, but in 1928 imports from the United States reached a total of 18,984 tons and in the first seven months of this year were 16,681 tons.

Export sales of machinery and metal goods of nearly all kinds are gaining. Record shipments of certain products were made in October. Germany is increasingly competing in the fields which have been completely dominated by American equipment, such as tabulating machines, typewriters, talking machines and other fine manufactures. A comparison of machinery exports in the first nine months of 1929 with preceding years shows 54,333 machines, valued at 7,430,000 m. ($1,775,770), shipped in nine months of 1926; 40,105 machines, value at 7,399,000 m. ($1,768,361), shipped in 1927; 54,396, valued at 10,134,000 m. ($2,422,026), shipped in 1928; and 73,077, valued at 14,769,000 m. ($3,527,791), shipped in the nine months of this year.

Wire Rod Cartel Raises Tonnage Quota

WASHINGTON, Dec. 14.—At the meeting of International Wire Rod Cartel, Nov. 14, in Düsseldorf prices were left unchanged for the first quarter of 1930, but, in view of an improved market, the tonnage quota was increased from 440,000 metric tons to 475,000 tons. Extension of the cartel beyond April, 1930, was discussed without apparent decision, says a report from Paris to the Department of Commerce.

British Output Less in November

LONDON, ENGLAND, Dec. 13. (*By Cable*).—Pig iron output of Great Britain in November was 631,400 gross tons and that of steel ingots and castings was 815,000 tons. These are the lowest figures for several months, whereas October showed the highest production of the year, in both items.

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Comparison of recent output with other periods shows that 1929 has provided a higher tonnage, both in pig iron and in steel, than Great Britain has experienced in some years.

	Pig Iron, Gross Tons	Steel Ingots and Castings, Gross Tons
1913—Av. monthly..	855,000	638,600
1920—Av. monthly..	669,500	755,600
1922—Av. monthly..	408,500	490,100
1923—Av. monthly..	620,000	706,800
1924—Av. monthly..	609,900	685,100
1925—Av. monthly..	519,700	616,400
1926—Av. monthly..	203,500	296,700
1927—Av. monthly..	607,800	758,200
1928—Av. monthly..	550,900	710,400
1929—Av. first half..	599,600	813,800
1929—August	682,000	753,300
1929—September ...	664,600	847,900
1929—October	688,700	889,800
1929—November	631,400	815,000
1929—Av. 11 months	630,100	817,500

German Works Dismantles Puddled Iron Plant

HAMBURG, GERMANY, Dec. 2.—The Vereinigte Stahlwerke A. G., Düsseldorf, is beginning to dismantle its only remaining plant producing puddled iron, the Siegerlandische Abteilung Ax. The last puddled iron will be produced during the first week of December. Two blast furnaces at the plant will also be dismantled.

To Get French Export and Import Tonnages

Announcement has been made by the Iron and Steel Division, Department of Commerce, that, as a result of efforts of Trade Commissioner Thomas Butts of the Paris office, it will receive from the Comité des Forges de France monthly figures on exports and imports, divided into principal classes of products.

Large German Mills Had Profitable Year

HAMBURG, GERMANY, Dec. 2.—Improved methods in management and administration of German plants have apparently contributed to greater profits this year. Most of the larger steel companies are declaring higher dividends, despite the lockout in the fall of 1928 and the slow improvement in business this year. The Rheinmetall A. G., Klockner works, Hoesch Steel Co. and Gutehoffnungshütte are all paying higher dividends, but the smaller companies as a rule are reducing their dividends 25 to 75 per cent, or are passing them. It is suggested in some quarters that 1930 may see the absorption of many small companies by the leading steel producers. In fact, there are a number of unconfirmed reports of negotiations with that end in view.

Continental Rivets for Export

HAMBURG, GERMANY, Dec. 2.—Competition for rivet business is keen, especially in the export field, where foreign competition is strong. Quotations on ⅞-in. to 1-in. pan, cup, or round head rivets is now about £8 15s. per ton ($1.91 per 100 lb.) and for ½-in. rivets £10 10s. to £10 15s. per ton ($2.28 to $2.34 per 100 lb.), f.o.b. Hamburg or Antwerp, packed in double gunny sacks.

Russia Buying Heavily from Germany

HAMBURG, GERMANY, Dec. 2.—Purchases of iron and steel products by the U. S. S. R. continue large. A recent contract placed with the Kattowitzer A. G. für Bergbau und Hüttenwesen in Upper Silesia calls for steel plates, shapes and wire, to a total value of about 26,000,000 m. ($6,188,000). Under the contract the tonnage may be increased by 50 per cent.

Niles Works in Germany Acquires Two Companies

HAMBURG, GERMANY, Dec. 2.—The Deutsche Nileswerke A. G. of Berlin, controlled by the Niles Tool Works in the United States, has absorbed the Reis & Martin A. G. and Max Hasse & Co., manufacturers of machine tools. The company has declared a dividend of 6 per cent and reports that business, especially for export, has been much larger than in 1928. It has orders on its books for the next four to five months.

Rail Agreement Protested

HAMBURG, GERMANY, Dec. 2.—Rail mills in Belgium and Luxemburg have entered a formal protest with the International Rail Makers' Association against the agreement between Great Britain and Argentina under which the latter will buy British rails exclusively.

Smokeless Diesel Locomotive

HAMBURG, GERMANY, Dec. 2.—A new type of Diesel-engine locomotive, said to be entirely smokeless, has been developed by the Maschinenfabrik Augsburg, Nuremberg, and is being tested by the German railroads. The locomotive develops 1200 hp. and is equipped to absorb all smoke from oil burning.

Machinery Markets and News of the Works

Machine Tool Sales Lag

Substantial Volume of Inquiries Taken as Forerunner of Good January Business

ALTHOUGH the machine tool industry is feeling the effects of the usual year-end lull in buying and of the hesitancy on the part of users to make further major purchases until the future trend of business can be better appraised, sales have been fair in volume and in some centers have exceeded those in December, 1928.

Both manufacturers and dealers find encouragement in the substantial amount of inquiries now before the trade, predicting that a large percentage will be converted into orders early in 1930. If indications in January point to an expansion in business activities, there is little doubt that machine tool bookings will turn upward.

The Maytag Co., Newton, Iowa, has completed the purchase of $175,000 worth of tools, while the Caterpillar Tractor Co., Peoria, Ill., is contracting for machine tools and foundry equipment. The Electric Auto-Lite Co., Toledo, which is building a large extension for the manufacture of automobile lighting and starting equipment, has placed six machines with a Cleveland dealer and will buy considerable more equipment.

The machine tool orders index of the National Machine Tool Builders' Association stood at 178.7 in November, compared with 322.2 for October and 290.4 for November, 1928. The severe drop carried the three months' average trend of the association's index curve down to the lowest point for the year at 247.2 and, in fact, the lowest point since August, 1928.

Shipments in November, however, were somewhat less than in October so that the industry still has more than two months' unfilled orders.

New York

NEW YORK, Dec. 17.—Although buying of machine tools this month has dropped below the November rate, the volume is larger than in December, 1928. Machine tool business in this district has declined to a smaller extent than had been expected. Prospects for the first quarter of 1930 continue to be encouraging. A considerable number of inquiries are pending, and it is expected that a good deal of this business will be closed in January if indications then point to an upward trend in business activity.

Crest Mfg. Co., Inc., 108 West Twenty-fifth Street, New York, manufacturer of plumbing and heating equipment, has leased three-story factory at Long Island City for new plant, and will remove to new location.

Department of Parks, Arsenal Building, Central Park, New York, has plans for two one-story equipment service, repair and storage buildings, 30 x 115 ft., at Long Island City, to cost about $70,000 with equipment.

Erie Railroad Co., 50 Church Street, New York, plans rebuilding of wheel shops and other service buildings at repair plant at Port Jervis, N. Y., destroyed by fire Dec. 9.

Battery Operating Co., 49 West Sixty-sixth Street, New York, has plans by Julius Eckmann, 155 East Forty-second Street, architect, for a six-story automobile service, repair and garage building, to cost about $100,000 with equipment.

R. Hoe & Co., Inc., East River and 138th Street, New York, manufacturer of printing presses and parts, saws, etc., has filed plans for three-story addition, 79 x 137 ft., to cost about $125,000 with equipment. Frank S. Parker, 119 West Fifty-seventh Street, is architect and engineer.

National Lead Co., 111 Broadway, New York, has formed National Lead Co. of Canada, Ltd., a subsidiary, to take over and consolidate several properties in Dominion. New company will be affiliated with Hoyt Metal Co. of Canada, Ltd., Montreal, also a subsidiary of parent organization. Company is capitalized at $5,000,000. W. C. Beschorman, vice-president of parent organization, will be president of Canadian company.

I. Kallich, 26 Court Street, Brooklyn, architect, will soon take bids for a multi-story automobile service, repair and garage building at Coney Island Avenue and Quentin Road, to cost about $130,000 with equipment.

Toledo Scale Co., Toledo, Ohio, has leased floor in building now in course of erection at 801 Second Avenue, totaling 7500 sq. ft. floor space, for new factory branch and service department.

Pilot Radio & Tube Corporation, 323 Berry Street, Brooklyn, manufacturer of radio tubes and equipment, is arranging for consolidation of all plants at Lawrence, Mass., where local mill, totaling 1,500,000 sq. ft. floor space, was recently taken over.

John A. Marshall, Yonkers, N. Y., and Herbert Peterson, Woodhaven, L. I., have organized General Tin Industries, Inc., with capital of 2,500,000 shares of stock, no par value, and plan early establishment of plant in this vicinity; a metal and ore-treating unit will form part of new works.

Consolidated Instrument Co. of America, Inc., 305 East Forty-seventh Street, New York, has taken over property of Connecticut Telephone & Electric Co., Meriden, Conn., manufacturer of telephone apparatus, electrical instruments, etc., with two plants, both of which will be continued by new owner, which will operate Connecticut company as separate division. Company is also negotiating for a plant on Pacific Coast, and will carry out an expansion in that district. Herbert E. Linden is vice-president.

E. T. Cunningham, Inc., 370 Orange Street, Newark, manufacturer of radio tubes and equipment, has leased part of six-story factory at Johnson and Hillside Avenues and Peddie Street for a branch plant. Present works will be continued and, with new plant, about 60,000 sq. ft. of space will be used for production and distribution.

Positive Lock Washer Co., Avenue A, Newark, has taken bids for a two-story addition, to cost more than $40,000 with equipment. Raymond B. Flatt, 600 Bloomfield Avenue, Bloomfield, N. J., is architect.

Engraving & Engine Turning Co., Newark, recently organized by Oscar A. Von Buckow, has leased space at 149 Mulberry Street for a metal turning and etching works.

Board of Township Commissioners, Municipal Building, North Bergen, N. J., will take bids at once for three-story automobile service, repair and garage building, 90 x 112 ft., to cost about $140,000 with equipment. R. B. Glenn, address noted, is architect and engineer for board.

Alfred Hofmann, Inc., 629-35 Fifteenth Street, West New York, N. J., manufacturer of knitting machinery and parts, has superstructure under way for two-story addition, 103 x 125 ft., to cost over $60,000 with equipment. Lockwood Greene Engineers, Inc., 1 Pershing Square, New York, is architect and engineer.

Felco Mfg. Co., Inc., 17 William Street, Newark, manufacturer of steel cabinets, etc., has leased a two-story factory at Bloomfield, N. J., for new plant, and will remove to new location and increase capacity.

Buffalo

BUFFALO, Dec. 16.—United States Gypsum Co., 300 West Adams Street, Chicago, manufacturer of wallboard, cement plasters, gypsum lath, etc., has purchased Niagara Gypsum Co., Oakfield, N. Y., with plant adjoining a branch mill of purchasing company. New owner will consolidate acquired interest with organization, and will organize Niagara & Peerless Division for expansion in Oakfield district.

Camillus Cutlery Co., Camillus, N. Y., is considering erection of an addition, to cost about $40,000 with equipment.

Niagara Lead Co., Mill Street, East Lockport, N. Y., is planning replacement of part of mill destroyed by fire Dec. 12, with loss of about $60,000 including equipment. It is proposed to lease an existing factory for manufacture. Charles A. Johnson is president.

Marco Pagano, 32 Decker Street, Buffalo, and associates have organized M-P Metal Casting Co., with capital of $25,000, and plan operation of foundry for production of metal toys, novelties, etc. Eugene E. Burger, 200 LaSalle Street, is interested in new company.

A. & J. Mfg. Co., Binghamton, N. Y., manufacturer of kitchen tools and equipment, is considering one-story addition to plant on Noyes Island, to cost more than $50,000 with equipment. Company is affiliated with Edward Katzinger Co., 1949 North Cicero Avenue, Chicago, manufacturer of bakers' and confectioners' machinery, tinware, etc. E. H. Johnson is local manager.

Roy W. Whipple, 99 Oak Street, and Thornton D. Whipple, 46 Laurel Avenue, Binghamton, have organized Whipple's, Inc., with capital of $400,000, to operate a local plant for manufacture of automobile equipment and accessories.

Universal Bearing Metals Corporation, Rochester, N. Y., manufacturer of bearium bronze and bearium alloys, has bought assets, processes and patents of Bearium Bearings, Inc. Operating and sales force of latter will not be changed. E. P. Langworthy is president of Universal company.

Wright-Hibbard Industrial Electric Truck Co., Inc., Phelps, N. Y., is about to increase production by installation of new equipment involving an expenditure of about $50,000. Company desires representatives in different states who are familiar with material handling equipment, especially industrial electric trucks.

Philadelphia

PHILADELPHIA, Dec. 16.—Bids have been asked on general contract by Swift & Co., Ninth Street and Girard Avenue, Philadelphia, meat packers, for a three-story and basement addition, to cost over $85,000 with equipment. Company engineering department is in charge. Headquarters are at Chicago.

Philadelphia Rapid Transit Co., Mitten Building, Philadelphia, plans new shops on property recently acquired by Transit Land Co., a subsidiary, to cost more than $85,000.

Shell Eastern Petroleum Products Co., Elverson Building, Philadelphia, has taken over former plant of Philadelphia Rubber Works, 600 x 800 ft., as site for storage and distributing plant, to cost about $125,000 with equipment. Headquarters are at 122 East Forty-second Street, New York.

The Crane Market

ESTIMATING inquiries for use in making appropriations for next year continue to accumulate from the railroads and large industrial users of cranes. Although formal inquiries for overhead equipment have decreased this month, some projects, which have been pending for a number of weeks, have been revived. New business includes a number of small capacity overhead cranes. Contractors bidding for a project of the Westchester County Sanitary Sewer Commission, Yonkers, N. Y., have been obtaining prices on a 5-ton, 60-ft. span, 3-motor overhead crane and a 3-ton, 49-ft. span, grab bucket crane. Railroads have been especially active in seeking estimates on the cost of locomotive cranes for use in making 1930 budgets. The Boston & Albany Railroad, Boston, is about to close on a 20-ton locomotive crane.

Among recent purchases are:

Lebanon Steel Foundries, Lebanon, Pa., two 7½-ton, 50-ft. span overhead cranes, and a 3-ton, double-hook, high-speed electric hoist from Shepard Niles Crane & Hoist Corporation.

Levering & Garrigues Co., 552 West Twenty-third Street, New York, 10-ton, 75-ft. span crane for yard service at Dunellen, N. J., from Milwaukee Electric Crane & Mfg. Corporation.

United States Rubber Co., Providence, R. I., 15-ton and 5-ton electric traveling cranes from unnamed builder.

Congdon & Carpenter, Providence, R. I., 3-ton, 52-ft. span and 5-ton, 67-ft. span electric cranes from Shepard Niles Crane & Hoist Corporation.

General Electric Co., Lynn, Mass., 3-ton overhead electric crane, reported purchased from Shepard Electric Crane & Hoist Corporation.

Gimbel Brothers, Ninth and Market Streets, Philadelphia, will soon take new bids on revised plans for a two-story automobile service, repair and garage building for company motor trucks and cars, to cost $170,000 with equipment. Abbott, Merkt & Co., 178 Fifth Avenue, New York, are architects.

Philadelphia Electric Co., Ninth and Sansom Streets, Philadelphia, has plans for one-story equipment storage, repair and distributing plant at West Conshohocken, Pa., to cost about $60,000 with equipment. United Engineers & Constructors, Inc., 112 North Broad Street, Philadelphia, is architect and engineer.

Board of Education, Administration Building, Allentown, Pa., is considering installation of manual training equipment in three-story addition to Raub junior high school, to cost about $225,000, for which bids will be asked on general contract early next year. Jacoby & Everett, Commonwealth Building, are architects.

Coatesville Boiler Works, Inc., Coatesville, Pa., is planning one-story addition to foundry in Drumpelier district, to cost more than $75,000 with equipment.

Harrisburg Railways Co., Harrisburg, Pa., is planning expansion program to cost about $350,000, including track work, shop facilities, etc.

Susquehanna Pipe Line Co., care of J. Howard Pew, Ardmore, Pa., recently formed by Mr. Pew and associates, has applied for permission to construct and operate a pipe line from Elizabethtown to York, Pa., including establishment of oil storage and distributing plant to connect with system. Frank Cross, Merchantville, N. J., is also interested in new company.

New England

BOSTON, Dec. 16.—Dealers' sales of machine tools the past week were again quite limited. No new inquiries of importance have developed, and buying on old prospects apparently has been put off until after Jan. 1. The majority of New England machine tool builders have sufficient backlogs to keep plants on current operating schedules through the first quarter.

New England Smelting Works, Inc., West Springfield, Mass., is arranging for new plant to replace one recently destroyed by fire.

National Service Co., Fall River, Mass., early next year will build an artificial ice making plant for which miscellaneous equipment will be purchased.

Manning-Bowman & Co., Meriden, Conn., have plans for a new factory to be erected early next year.

Malden Machine Tool Co., Malden, Mass., closed bids last week for a machine shop, to cost $30,000 without equipment.

M. H. Barland Steam Engine Co., Providence, R. I., will start work at once on a one-story plant, 50 x 60 ft.

Central Maine Power Co., Augusta, Me., has engaged J. C. & J. M. Stevens, architects, to draw plans for a power station at Bingham.

Boston & Albany Railroad Co., South Station, Boston, has awarded general contract to J. F. Fitzgerald Construction Co., 38 Chauncy Street, for power plant at Beacon Park, Allston, to cost about $85,000. Densmore, LeClear & Robbins, 31 St. James Avenue, Boston, are architects.

Newark Rivet Works, 262 Lafayette Street, Newark, N. J., has purchased wire goods department of Bassett Metal Goods Co., Shelton, Conn., which sold its metal bag frame division to same company about six months ago. Purchasing organization will operate both departments at present location and will carry out expansion later.

G. & O. Mfg. Co., 138 Winchester Avenue, New Haven, Conn., manufacturer of automobile radiators, has asked bids on general contract for a two-story addition, 40 x 100 ft., for manufacture of aircraft radiators, to cost about $45,000 with machinery. Westcott & Mapes, 139 Orange Street, are architects and engineers.

Great Atlantic & Pacific Tea Co., 420 Lexington Avenue, New York, has plans for addition to storage and distributing plant at Portland, Me., with cold storage and refrigerating facilities, mechanical-handling and elevating equipment, to cost $170,000 with equipment.

Storts Welding Co., South Colony and Hanover Streets, Meriden, Conn., is considering one-story addition, to cost more than $30,000 with equipment, work to begin in spring. R. J. Tierney is general manager.

George Lawley & Sons Corporation, operating a shipyard and repair plant at Dorchester, Boston, plans rebuilding part of shops destroyed by fire Dec. 10, with loss estimated close to $100,000 including equipment.

Cadillac Providence Co., 9 Federal Street, Providence, R. I., has asked bids

on general contract for two-story service, repair and sales building, to cost $140,000 with equipment. Albert Kahn, Inc., Marquette Building, Detroit, is architect and engineer.

Pittsburgh

PITTSBURGH, Dec. 16.—The machinery business has not changed materially the past week and is very quiet with most dealers. December ordinarily is not a good month with many of them and this year is no exception. A few single tools are being placed, but new inquiries are not coming out in any volume and not much of the business now being figured will be placed before the first of the year. The Norfolk & Western closed for one or two tools the past week and is expected to be a heavier buyer within the next few weeks. The Baltimore & Ohio has not yet closed on the tools it has under inquiry, but the business is said to be settled. The fourth quarter list of the Westinghouse Electric & Mfg. Co. is now practically concluded, but a new list will appear in a short time.

Westinghouse Electric & Mfg. Co., East Pittsburgh, has awarded general contract to Public Service Production Co., Public Service Terminal, Newark, N. J., for initial unit of new factory branch, storage and distributing plant near Port Newark, to cost over $600,000 with equipment. Other structures will be built later to bring investment to more than $5,000,000. Company recently acquired 20 acre tract at location noted.

United Engineering & Foundry Co., Farmers' Bank Building, Pittsburgh, manufacturer of iron and metal-working machinery, is carrying out an improvement and modernization program at branch plant at Canton, Ohio, to include installation of additional equipment.

Oliver Iron & Steel Corporation, 1001 Muriel Street, Pittsburgh, has awarded general contract to Pihl & Miller, Wabash Building, for one-story addition, to cost about $40,000 with equipment.

Pittsburgh & Lake Erie Railroad Co., P. & L. E. Terminal Building, Pittsburgh, is asking bids until Dec. 27 for 6600 pieces of seamless steel tubing. J. H. James is purchasing agent.

Harpers Ferry Electric & Power Co., Harpers Ferry, W. Va., is arranging for expansion to cost about $250,000, including increase in power facilities, transmission lines and power substations.

J. H. France Refractories Co., Snow Shoe, Pa., will soon begin work on new plant at Falls Creek, Pa., consisting of main one-story kiln building, 100 x 450 ft.; mixing unit, 30 x 40 ft.; press building, 20 x 60 ft.; storage and other buildings, to cost about $325,000 with equipment.

Detroit

DETROIT, Dec. 16.—Standard Tube & Mfg. Co., 2435 Scotten Street, Detroit, manufacturer of metal tubing and kindred products, is considering new one-story plant at Ferndale, Mich., to cost more than $50,000 with equipment.

Hayes Body Corporation, Grand Rapids, Mich., has plans for a one-story addition, 175 x 565 ft., for stamping metal bodies, to cost $250,000 with equipment. Fett, Pearson & Goffeney, Associates Building, South Bend, Ind., are architects.

Oliver Machinery Co., Grand Rapids, manufacturer of wood-working machinery, has purchased Eaglefield Link Co., 1454 East Nineteenth Street, Indianapolis. It is understood that operations will be continued at Indianapolis plant for time being.

Ann Arbor Railroad Co., Ann Arbor, is planning to rebuild part of car repair works at Owosso, including coach repair shop, recently destroyed by fire, with loss of more than $100,000 including equipment.

Bellevue Industrial Furnace Co., 2971 Bellevue Avenue, Detroit, has plans for one-story addition, 80 x 165 ft., to cost about $50,000 including equipment. C. L. Phelps, Detroit Savings Bank Building, is architect.

Gifford Engine Co., Lansing, manufacturer of bushings and kindred equipment, contemplates expansion and installation of additional equipment. Company is arranging for change of name to Gifford Engineering Co.

Mueller Brass Co., 1925 Lapeer Street, Port Huron, manufacturer of brass, copper and other metal products, is considering one-story addition, to cost over $50,000 with equipment.

St. Joseph Electric Steel Castings Co., St. Joseph, is planning expansion program, including installation of facilities for production of stainless steel specialties, to cost more than $65,000 with equipment.

Detroit Edison Co., 2000 Second Avenue, Detroit, has disposed of a bond issue of $13,516,000, part of proceeds to be used for extensions and improvements in generating plants and transmission lines.

Homer Furnace Co., Coldwater, manufacturer of furnaces, iron castings, etc., is considering one-story addition to cost about $100,000 with equipment. Part of expansion will replace recent fire loss.

Board of Wayne County Commissioners, Detroit, will begin construction of new hangar at municipal airport, including installation of repair and reconditioning facilities, to cost about $325,000 with equipment.

Swope-McCracker Co., 7720 Gratiot Avenue, Detroit, and Walter Machine Co. have consolidated and are now operating as Walter Machine & Screw Co. at 500 Bellevue Street.

Hydraulic Hoist & Body Co., Detroit, has awarded general contract for an addition which will provide 44,000 sq. ft. additional floor space.

South Atlantic

BALTIMORE, Dec. 16.—F. G. Schenuit Rubber Co., 1200 Mount Royal Avenue, Baltimore, manufacturer of tires, etc., has awarded general contract to A. Kratz & Son, 118 South Carrollton Avenue, for rebuilding of two-story plant, recently destroyed by fire, to cost about $100,000 with equipment. Frank G. Schenuit is president.

In connection with an expansion program to cost $7,500,000, Consolidated Gas, Electric Light & Power Co., Lexington Building, Baltimore, plans extensions in gas generating and distributing lines to cost about $1,000,000. Fund of $500,000 will be used for additions and betterments in central steam-heating system in downtown district. Majority of remainder of appropriation will be used for extensions in electric light and power plants and system.

Board of Trustees, Loyola College, Evergreen Street and Charles Avenue, Baltimore, has plans for new three-story engineering building, to cost about $160,000 with equipment. L. R. White, Hearst Tower Building, is architect.

Standard Oil Co. of New Jersey, Montgomery Building, Spartanburg, S. C., is considering extensions and improvements in local oil storage and distributing plant, to cost about $75,000; a new one-story unit will be built, 60 x 100 ft., and pumping plant installed. Headquarters are at 26 Broadway, New York.

Universal Roofing Co., Rome, Ga., is planning extensions and improvements, including installation of equipment, to double present output, to cost more than $35,000.

Tyler Resilient Tire & Tube Corporation, 216 Schley Street, Cumberland, Md., is contemplating new plant at North Baltimore, where 60-acre tract has been secured, for production of recently-patented type of automobile tire, to cost over $100,000 including machinery.

City Council, Anderson, S. C., has authorized purchase of airport of Welch Aircraft Co., for municipal airport in future. Expansion is planned, including additional hangars, repair and reconditioning facilities, etc. A fund of $75,000 has been approved for project.

Potomac Electric Power Co., Fourteenth and G Streets, Washington, is arranging for expansion to total about $8,400,000, of which about $2,500,000 will be used for an addition to Bennings steam-operated electric generating plant. Work will include new power substation on Columbia Road and extensions in other such stations, to cost about $600,000 with equipment; construction of new multi-story service, operating and office building, to cost about $2,600,000, unit to include complete mechanical and electrical repair departments, meter shop, etc.; and extensions in transmission lines and distributing system to cost about $2,100,000.

Chicago

CHICAGO, Dec. 16.—New orders for machine tools are tapering sharply as the holiday season and end of the year approach. Dealers, accustomed to finding this a dull season, are hopeful that much pending business will be placed early in the new year. This is based on the fact that many quotations on machine tools are in the hands of buyers and the shaping of several large projects seems definitely assured. Deliveries are taking a sharp turn for the better. Fewer orders, combined in some cases with expansions in machine tool manufacturing facilities, are bringing this about.

Maytag Co., Newton, Iowa, has made the last purchases against a list which called for $175,000 worth of equipment. The Caterpillar Tractor Co., Peoria, Ill., is buying machine tools and foundry equipment and the Allis-Chalmers Mfg. Co., Milwaukee, is asking for prices on a few tools for expansion at its Springfield, Ill., tractor plant.

Pheoll Mfg. Co., Chicago, maker of machine screw products, will erect an addition 80 x 300 ft., three stories and basement. A. S. Alschuler, architect.

United Autographic Register Co., Chicago, will erect a new plant containing about 100,000 sq. ft. floor space, to cost $1,000,000. Frank D. Chase, Inc., is architect.

Wagner-Langemo Co., Minneapolis, manufacturer of threshers, has been purchased by Deere & Co., Moline, Ill.

T. Godwin, owner of G. & F. Mfg. Co., Exira, Iowa, maker of farm yard equipment, will erect a new one-story factory, 150 x 200 ft., at Council Bluffs, Iowa, and transfer activities there as soon as building is completed.

Liquid Carbonic Corporation, 3112 South Kedzie Avenue, Chicago, manufacturer of carbonating and bottling machinery, etc., plans expansion to cost more than $1,000,000. It is proposed to establish new plant units at Los Angeles and Seattle, and to make extensions in plants at Chicago, Long Island City, Boston, Philadelphia and Cincinnati, with installation of additional equipment. W. A. Brown is president.

Packard Motor Car Co., 1580 West Grand Boulevard, Detroit, has plans for three-story service, repair and sales building at Chicago, to cost over $125,000 with equipment. Albert Kahn, Inc., Marquette Building, Detroit, is architect and engineer.

Board of Park Commissioners, Cutting Building, Joliet, Ill., has plans for new hangar at municipal airport, with repair and reconditioning facilities, to cost about $55,000 with equipment. Glenn G. Paul is secretary.

Northwest Paper Co., Cloquet, Minn., has plans for two-story addition, installation to include paper-making machine, heaters and auxiliary equipment, to cost over $175,000. Jacobson Engineering Co., Plymouth Building, Minneapolis, Minn., is engineer. H. S. Hornby is president.

Iowa Railway & Light Co., Cedar Rapids, Iowa, is considering hydroelectric generating plant on local site, to cost about $1,750,000 with transmission system. Company engineering department is in charge.

Chicago, Burlington & Quincy Railroad Co., 547 West Jackson Boulevard, Chicago, is planning an addition to triple capacity of stock car building plant at Omaha, Neb., to cost more than $350,000 with equipment. It is also proposed to carry out extensions in box-car manufacturing plant at Lincoln, Neb., and develop facilities for manufacture of a new type of box car, to cost more than $200,000.

United Air Cleaner Co., 9705 Cottage Grove Avenue, Chicago, manufacturer of automobile equipment, air-cooling systems, etc., is planning to rebuild part of plant recently destroyed by fire.

Naylor Pipe Co., 1230 East Ninety-second Street, Chicago, manufacturer of iron pipe, etc., has awarded general contract to A. T. Herlin & Sons, 6816 Clyde Avenue, for one-story addition, 70 x 198 ft., to cost about $35,000 with equipment. Abell-Howe Co., 53 West Jackson Boulevard, is architect.

Milwaukee

MILWAUKEE, Dec. 16.—A large amount of pending business is scheduled to be closed during January. Plant construction, in accordance with previously announced programs, will go ahead as soon as weather permits and orders for machine tools and other equipment will probably be placed early next year. The present volume of inquiries and orders is considered normal for this time of year, with current bookings mostly for single machines. Agricultural implement manufacturers report increases in dealers' contracts and have advanced production schedules ahead of dates in recent years.

Allis-Chalmers Mfg. Co. announce that no extensive purchases of machine tools for Monarch tractor division at Springfield, Ill., are planned for the present, but that it may be in the market late in spring.

Northwestern Fuel Co., Milwaukee, subsidiary of Consolidation Coal Co., New York, has purchased 10 acre tract on Twelfth Street, and will build new docks.

Globe-Union Mfg. Co., 14-18 Keefe Avenue, Milwaukee, manufacturer of storage batteries, electrical and radio supplies, has let contracts to Worden-Allen Co. for an addition, one-story, 150 x 320 ft., to cost $100,000.

Board of Vocational Education, Racine, Wis., is taking bids until Dec. 26 for three-story vocational school, 68 x 128 ft., to be first of several units, to cost $1,000,000. Frank J. Hoffman, Janes Block, is architect and T. S. Rees, director.

Nelson Machinery Co., 131 North Pearl Street, Green Bay, Wis., is building a one and two-story addition, 35 x 81 ft.

John Hoell & Co., 7225 Roosevelt Street, Green Bay, Wis., is erecting one-story machine shop, 40 x 60 ft.

City of Oconto, Wis., has acquired property for waterworks improvements to include deep-well pumps with electric drive and standpipe, to cost about $40,000. Gordon & Balot, 53 W. Jackson Boulevard, Chicago, consulting engineers, are completing plans. P. T. Meeuwsen is city clerk.

Little Wolf Power Co., New London, Wis., has plans by L. A. DeGuere, consulting engineer, Wisconsin Rapids, Wis., for a new 1350-hp. hydroelectric generating plant on Little Wolf River.

County Highway Commission, Iron Mountain, Mich., has let contracts for service shop and warehouse and is taking bids on one electric crane, but will defer purchase of tools until after Jan. 1. C. I. Israelson is County engineer.

Julius Andrae & Sons Co., electrical equipment supplies, with headquarters in Milwaukee and closely affiliated with Westinghouse Electric & Mfg. Co., Pittsburgh, has changed its name, effective Jan. 1, to Westinghouse Electric Supply Co. Herman P. Andrae will remain president-treasurer and John C. Schmidtbauer will continue as secretary and vice-president.

Cleveland

CLEVELAND, Dec. 16.—Machine tool sales were fair the past week. In fact the volume of business was surprisingly good for this season of the year. The outlook also is promising as considerable business is pending for single machines. The Electric Auto-Lite Co., Toledo, which is building an addition for the manufacture of automobile lighting and starting equipment, placed six machines with a Cleveland dealer during the week and will buy considerable more equipment. Some business is also coming from other manufacturers of automobile equipment and parts. The United Engineering & Foundry Co., Pittsburgh, which recently purchased a number of tools, will buy some additional equipment for its Youngstown plant. Sales to Cleveland companies during the week included two openside planers.

New interests have acquired control of Paper & Textile Machinery Co., Sandusky, Ohio, manufacturer of paper-making machinery, etc., and will operate in future. Expansion is planned. It is understood that W. H. Millspaugh, president, will continue to be identified with company.

Hammond Mfg. Co., 7808 Kinsman Road, Cleveland, manufacturer of polishing machinery, drilling equipment and other mechanical specialties, has plans for one-story plant, 75 x 125 ft., to cost about $60,000 with equipment. H. M. Morse Co., Finance Building, architect, will soon take bids on general contract.

Ric-Wil Co., Union Trust Building, Cleveland, manufacturer of underground conduits, etc., is contemplating one-story addition to plant at Barberton, Ohio, to cost more than $45,000 with equipment.

Republic Stamping & Enameling Co., Canton, Ohio, has plans for one-story addition, to cost more than $85,000 with equipment. This will be part of a general expansion program to be carried out in 1930.

Cincinnati

CINCINNATI, Dec. 16.—Demand for machine tools in this district slackened the past week. Orders consisted of single tools and total sales were much less than those of the preceding week. While inquiries are in fair volume, buyers are holding up decision on quotations longer than usual.

A Cincinnati manufacturer has closed for one large lathe. An unnamed railroad is reported to be in the market for several large tools.

International Clay Machinery Co., 1140 Bolander Avenue, Dayton, Ohio, manufacturer of brick-making and other clay products equipment, has awarded general contract to A. P. Ziegler, Inc., Lowe Building, for one-story addition, 42 x 78 ft., to cost about $25,000 with equipment.

Brownell Co., North Findlay Street, Dayton, Ohio, manufacturer of boilers, tanks, underfeed stokers, etc., has plans for a two-story addition, to cost more than $150,000 with equipment. Geyer & Neuffer, Ludlow Arcade, are architects.

Cincinnati Tool Co., 1951 Waverly Avenue, Norwood, manufacturer of machine tools, is considering an addition to plant, to cost about $100,000 with equipment.

Tennessee Eastern Electric Co., Johnson City, Tenn., is planning expansion to cost about $100,000, including increase in generating facilities and transmission lines.

Virginia-Tennessee Marble Co., Friendsville, Tenn., operating local quarry properties and mill of Diamond Marble Co., recently secured under lease, is planning expansion, including enlargements in mill and installation of machinery for cutting, griding, polishing, etc. Additional quarrying equipment will also be installed. Company is a subsidiary of Virginia Alberene Stone Co., which is operated by Alberene Stone Co., 153 West Twenty-third Street, New York.

American Cigar Co., 3001-15 Madison Street, Louisville, has taken out permit for an addition to cost about $250,000, including material-handling equipment and air-conditioning apparatus; also permit for improvements in present plant to cost about $50,000. Headquarters are at 111 Fifth Avenue, New York.

Louisville Water Co., Louisville, plans extensions and improvements in plants and system to cost about $175,000, including installation of pumping machinery, power and auxiliary equipment.

United States Army, Air Corps, Fairfield Air Depot, Fairfield, Ohio, will soon

CARNEGIE LIBRARY OF ATLANTA

call for bids for a one-story aircraft assembling plant on Springfield Pike, to cost about $100,000 with equipment; also for a one-story machine and repair shop, to cost about $150,000 including equipment.

Exact Weight Scale Co., Columbus, Ohio, is completing new one-story plant, 60 x 278 ft., for occupancy early next year. It will cost more than $75,000 with equipment. Carmichael & Millspaugh, Columbus, are architects.

Nashville Interurban Co., Nashville, Tenn., is considering new steam-operated electric generating plant at Franklin, Tenn., for traction line operation, to cost about $100,000 with equipment. F. H. Tathwell is chief engineer.

Gulf States

BIRMINGHAM, Dec. 16.—Southern Wheel Co., 700 Sixth Avenue, South, Birmingham, manufacturer of car wheels, has awarded general contract to M. C. Banks & Co., 2501 Avenue A, for one-story machine shop, 60 x 80 ft., to cost about $25,000 with machinery.

Southern Phosphate Co., Bartow, Fla., an interest of Davison Chemical Co., Garrett Building, Baltimore, has plans for new unit for mechanical drying, to cost over $40,000 with equipment.

City Council, Port Arthur, Tex., has plans for municipal airport on waterfront to accommodate both land and seaplanes, including hangars, repair shops and other mechanical units. A fund of $500,000 is being arranged for project.

Ford Motor Co., 3906 Harrisburg Boulevard, Houston, Tex., has awarded general contract to Tellepsen Construction Co., 3700 Clay Street, for two-story addition to local factory branch and assembling plant, 35 x 75 ft., to cost more than $45,000 with equipment. Company engineers, Detroit, are in charge.

Common Council, Tyler, Tex., has begun grading of site on Dixie Highway for new municipal airport, to include hangar, 100 x 110 ft., with lean-to extension, 15 x 100 ft., for repair and reconditioning shop, to cost more than $45,000. O. C. Palmer is manager for airport.

West Texas Utilities Co., Abilene, Tex., operating electric light and power properties, is disposing of a bond issue of $8,250,000, part of proceeds to be used for expansion in power plants and system.

Board of Trustees, Prairie View College, Prairie View, Tex., has plans for one and two-story building, to include machine shop, metal and iron-working, wood-working and other departments, to cost about $100,000 with equipment. F. E. Giesecke, College Station, is architect.

Natural Gas & Power Co., Brady, Tex., is considering construction of pipe line to Lampasas, Tex., and vicinity, with booster stations, etc., to cost more than $80,000 with equipment.

Beaird Corporation, Shreveport, La., operating a welding works, is considering expansion program, to cost more than $150,000 with equipment.

Good & Foster Aero Service Co., Dallas, Tex., is planning to rebuild hangar with shop facilities at Love Field, destroyed by fire Dec. 7.

United Gas Co., Fort Worth, Tex., operating natural gas properties, has purchased natural gas system and holdings of Magnolia Petroleum Co., Dallas, Tex., a subsidiary of Standard Oil Co. of New York, for about $50,000,000. New owner will consolidate with its properties and plans construction of pipe lines, booster stations and auxiliary structures for interchange in service.

City Council, Goose Creek, Tex., is considering construction of a municipal electric light and power plant, to cost over $50,000 with equipment.

Emery, Peck & Rockwood Development Co., Seguin, Tex., has applied for permission to take over certain properties of Syndicate Power Co., including permit for a power dam at Marble Falls on Colorado River. Company plans hydroelectric power development at that location, to cost over $250,000 with transmission system.

Gulf Paper Products, Beaumont, Tex., recently organized by O. B. Sawyer, 875 Fifth Avenue, and associates, plans erection of new factory, 60 x 125 ft., for manufacture of paper goods, tablets, etc., to cost about $50,000 with machinery. W. B. Livesay, San Jacinto Life Building, is architect.

St. Louis

ST. LOUIS, Dec. 16.—Board of Education, 911 Locust Street, St. Louis, will ask bids early in January for five-story vocational high school, to cost $950,000 with equipment. Architectural department of board is in charge.

Coca-Cola Bottling Co., 1115 Clark Avenue, St. Louis, has awarded general contract to Boaz-Kiel Construction Co., Ambassador Building, for one and two-story bottling plant, 130 x 250 ft., to include installation of conveying, elevating and other mechanical-handling equipment, to cost $125,000 with machinery. W. S. Frank, Century Building, is architect.

Chamber of Commerce, Joplin, Mo., George Schier, member of airport committee, is at head of project to establish municipal airport, to include hangars, repair shops, oil storage and distributing building, to cost about $100,000.

Wells Valve & Equipment Co., Bartlesville, Okla., care of M. G. Blair, Bartlesville, recently formed by Mr. Blair and associates with capital of $25,000, plans operation of local factory to manufacture oil-well drilling and other equipment.

Board of Trustees, University of Oklahoma, Tulsa, Okla., has awarded general contract to W. S. Bellows Construction Co., Fifth Place and College Street, for three-story and basement petroleum engineering building on campus, 88 x 126 ft., to cost about $150,000 with equipment. Henry C. Hibbs, American Trust Building, Nashville, Tenn., is architect.

United States Cold Storage Co., 500 East Third Street, Kansas City, Mo., is considering new seven-story cold storage and refrigerating plant, making second unit, to cost about $1,000,000 with machinery. Site has been selected.

City Council, Tulsa, Okla., is arranging special election Dec. 31 to vote bonds for municipal improvements, including fund of $600,000 for municipal airport, comprising hangars, repair shops and other field units.

Patterson Steel Co., North Xanthus Street, Tulsa, Okla., has filed plans for a one-story addition, 60 x 80 ft., for storage and distribution, to cost about $25,000 with equipment.

International Harvester Co., 606 South Michigan Avenue, Chicago, has awarded a general contract to W. F. Kucharo, Des Moines, Iowa, for one-story factory branch, storage and distributing plant at Salina, Kan., to cost about $50,000 with equipment.

Arkansas Natural Gas Corporation, Ardis Building, Shreveport, La., is planning an expansion in Arkansas properties to cost about $6,000,000, including pipe line construction, booster stations, etc.

Yaffee Iron & Metal Co., 501 South Eleventh Street, Fort Smith, Ark., has awarded general contract to A. S. Johnson, South B Street, for two one-story additions, for storage and distribution, to cost about $30,000 with equipment. Haralson & Nelson, Merchants' National Bank Building, are architects.

J. R. Brockman Co., 617 North Second Street, St. Louis, plans investment of $175,000 for erection of one-story building, containing about 35,000 sq. ft. of floor space, for fabricating and warehousing of pipe.

Lincoln Foundry Co., St. Louis, has awarded general contracts for a new plant at Mount Carmel, Ill., consisting of foundry, 60 x 420 ft., enameling building, 60 x 100 ft., and cupola, 30 x 30 ft.

Indiana

INDIANAPOLIS, Dec. 16.—Central Mfg. Co., Connersville, manufacturer of automobile axles, etc., has awarded general contract to Austin Co., Cleveland, for one-story addition, 100 x 200 ft., to cost about $50,000 with equipment.

General Electric Co., 1635 Broadway, Fort Wayne, has taken bids on general contract for a six-story and basement addition to Fort Wayne Electric Works, 80 x 140 ft., to cost more than $250,000 with equipment. Harris & Richards, Drexel Building, Philadelphia, are architects.

Indiana Service Corporation, Fort Wayne, operating electric light and power properties, is arranging for expansion to cost $1,310,000, including extensions in power generating facilities, transmission lines and power substations.

Leader Specialty Co., 515 East Walnut Street, Indianapolis, manufacturer of plumbing equipment and supplies, has awarded general contract to Vern Headlee, 4246 Cornelius Avenue, for a one-story and basement addition, 45 x 112 ft., to cost about $40,000 with equipment. Bacon & Tislow, Architect & Builders' Building, are architects. Claude J. Mick is general manager.

Bendix Brake Corporation, Bendix Drive, South Bend, manufacturer of automobile and aircraft equipment, has awarded general contract to H. G. Christman & Co., 306 Notre Dame Avenue, for one-story addition, to cost about $45,000 with equipment. Company plans erection of additional units at early date.

Pacific Coast

SAN FRANCISCO, Dec. 12 — Southern Pacific Railway, 65 Market Street, San Francisco, is considering extensions and improvements in shops at Sparks, Nev., to cost more than $70,000 with equipment.

Procter & Gamble Co., Gwynne Building, Cincinnati, has taken title to property, 521 x 1255 ft., at Long Beach, Cal., and has plans for initial units of new plant, consisting of two main buildings, 100 x 700 ft., and 100 x 500 ft., for which bids will be asked soon. A battery of 12 steel storage tanks will be installed; a 500-ft. wharf also will be built. Project will cost about $5,000,000 with machinery.

Byron-Jackson Pump Co., Berkeley, Cal., manufacturer of pumping machinery,

oil-well supplies, etc., will soon begin work on one-story addition, to cost about $30,000 with equipment. General contract has been let to Austin Co. of California, Inc., Oakland.

Department of Public Utilities, Tacoma, Wash., Ira Davisson, commissioner, is considering construction of steam-operated electric generating plant for emergency service in connection with municipal hydroelectric generating stations, to cost over $150,000 with machinery.

Puget Sound Navy Yard, United States Navy, Bremerton, Wash., has secured an appropriation of $31,000 for addition to machine shop. Capt. E. R. Gayler is in charge.

Compton Union High School District, Compton, Cal., will build one-story vocational training shop at new junior high school group in Enterprise district to cost over $200,000, for which bids will be received on general contract on Jan. 3. John C. Austin and Frederic M. Ashley, Chamber of Commerce Building, Los Angeles, are architects.

Vallejo Electric Light & Power Co., Vallejo, Cal., is planning extensions and improvements to cost about $50,000.

Canada

TORONTO, Dec. 16.—While demand for machine tools has tapered from that of a couple of months ago, sales are up to average for this season of the year. Inquiries coming out give good indications of more extensive buying in the early part of the new year. Replacement buying is a feature of present business with some small lists for plant additions. The recent heavy placing of rolling stock orders by Canadian railroads is beginning to have a stimulating effect. The automotive industry is buying in a small way.

A Toronto syndicate has purchased Georgetown Foundry & Machine Co., which will hereafter be known as Credit Valley Foundry Co., Georgetown, Ont. Production is expected to start in near future. A new electric smelting furnace will be installed.

Aluminum Co. of Canada, Ltd., 158 Sterling Road, Toronto, has awarded several contracts for erection of an addition, to cost $50,000.

Canadian Paperboard Co., 32 Front Street, Toronto, has awarded contracts for erection of an addition, to cost $60,000.

A. Wander, Ltd., 455 King Street West, Toronto, has let general contract to T. A. Brown Co., Ltd., Wolfe Street, Peterborough, Ont., for a plant at Peterborough, to cost $50,000. Chapman & Oxley, 372 Bay Street, Toronto, are architects.

Weaver Canadian Co., Ltd., manufacturer of automobile jacks, pumps, etc., Chatham, Ont., will start work in spring on a plant addition.

Bids are being received, no closing date, by C. H. R. Fuller, business administrator, Centre Street School, Oshawa, Ont., for machine shop equipment, for Board of Education.

United Mfg. Co., Cap de la Madeleine, Que., has awarded contracts for erection of a plant, to cost $85,000. Charles Page Construction Co., Three Rivers, Que., has general contract. Philip Fainer, 1470 Peel Street, Montreal, is president of company.

Stewart-Warner Speedometer Corporation, Chicago, is considering consolidation of its Canadian units at Belleville, Ont. Plans are under way for erection of two two-story buildings, 50 x 180 ft., and 40 x 50 ft.

Western Canada

Pilkington Brothers (Canada), Ltd., 163 Market Street East, Winnipeg, contemplate erection of a glass manufacturing plant at Regina, Sask., to cost $80,000.

Soo Line Mills, Ltd., Weyburn, Sask., will start work soon on erection of flour mill, to cost $100,000.

Canadian National Railways, A. A. Tisdale, Winnipeg, general manager of Western region, contemplates building a rail salvaging plant at St. Boniface, Man.

Kapoor Lumber Co., Cowichan Lake, B. C., has plans for a two-story sawmill to cost $50,000.

In connection with hydroelectric power development plant at Lois River, B. C., for Powell River Power Co., Powell River, B. C., contract for first unit has been awarded to Stuart Cameron Co., Ltd., 543 Granville Street, Vancouver, B. C., at a cost of about $2,000,000. R. Bell-Irving is engineer.

Foreign

PLANS are under way by Ygnacio Soto, Nogales, Ariz., and associates, for construction of new cement mill at Hermosillo, Sonora, Mexico. Project will include power house and will cost close to $500,000 with machinery. It is expected to organize a company to carry out development, which has backing of Francisco Elias, governor of Sonora, Hermosillo.

Gillette Safety Razor Co., 15 West First Street, Boston, has secured concession from Soviet Russian Government for construction of plant in that country to manufacture razor handles and blades, to cost more than $1,000,000.

Officials of British Shareholders Trust, Ltd., London, England, headed by Sir John Ferguson, have formed British Can Co., Ltd., with initial capital of £536,000 (about $2,680,000), to manufacture tin cans and containers. Company has purchased plant and business of Ernest Taylor, Ltd., Liverpool, manufacturer of cans and metal containers, and will operate as first plant. Plans are under way for erection of other works. In addition to capital issue noted, company will dispose of 186,000 shares of preferred stock, to total about $930,000. New organization will be associated with American Can Co., 230 Park Avenue, and Thermokept Corporation, 522 Fifth Avenue, New York, both holding a financial interest in company. Edgar W. Carmmond, president of British Shareholders Trust, Ltd., will be identified in an official capacity with new organization.

A company at Liverpool, England, has acquired a 40 acre tract on Manchester ship canal, as site for a newsprint paper mill. It will have a capacity of 60,000 tons per annum and is scheduled for completion in about 12 months. Information at office of Bureau of Foreign and Domestic Commerce, Washington, reference United Kingdom No. 320708.

Stiassny Glass Works, Vienna, Austria, will build a new plate glass manufacturing plant at Burmoos, near Salzburg, to cost more than $800,000 with machinery. Site has been acquired and work will proceed at once.

Latvian Marine Department, Riga, is planning construction of a three-story warehouse in harbor district for which three lifting cranes and other mechanical-handling equipment will be purchased. Information at office of Bureau of Foreign and Domestic Commerce, Washington, reference Riga No. 97435.

Production, Shipment and Sales of Materials and Building Contracts

	November, 1929	October, 1929	November, 1928
Trackwork for T-rail track, shipments(a), net tons	11,326(b)	12,902	8,379
do. eleven months	151,289	.....	128,584
Portland cement production(c), thousand bbl.	14,036	16,731	15,068
do. do. eleven months	158,932	.....	163,779
do. shipments	11,205	18,695	11,951
do. do. eleven months	163,445	.....	168,071
Building construction contracts(d)	$391,013	$445,642	$471,482
do. eleven months	5,437,922	.....	6,195,530
do. new work contemplated	720,301	800,000(e)	935,000(e)
Mechanical stokers sold(f), number	107	178	116
do. horsepower	39,469	56,108	30,939
do. eleven months	554,609	.....	459,476

(a)American Iron and Steel Institute. (b)Lowest total since last January. (c)United States Bureau of Mines. (d)F. W. Dodge Corporation; amounts in thousands. (e)Approximate. (f)Department of Commerce.

New Trade Publications

Cross-Drum Boiler.—Erie City Iron Works, Erie, Pa. Four-page folder illustrating and describing a cross-drum boiler which is made in three diameters, 42, 48 and 54 in. It may be fired by mechanical stokers, or with pulverized coal or fuel oil.

Deaerator and Hot-Water Generator.—Cochrane Corporation, Philadelphia. Bulletin 686 of 20 pages, illustrating and describing self-contained deaerator and hot-water generator; also describing the heating, deaerating, softening, filtering and metering of water, measuring of steam and profitable utilization of low-pressure steam, etc.

Electric Hoists.—Robbins & Myers, Inc., Springfield, Ohio. Bulletin 5031, of 16 pages, illustrating and describing various types and sizes of electric trolley-type hoists. Clearance diagrams and other dimensions are given. Ratings are 250 to 15,000 lb.

Electric Gasoline Gage.—General Electric Co., Schenectady, N. Y. Bulletin GEA-1182 of 4 pages illustrating and describing electric gasoline gage for aircraft, designed to meet requirements for reliability, accuracy under all conditions of flight, light weight and simplicity of installation.

Switchboards.—Westinghouse Electric & Mfg. Co., East Pittsburgh. Folder with illustrations describing truck-type switchboards in various applications.

Continental Shares, Inc., Reveals Steel Stocks

Holdings of stock in steel companies by Continental Shares, Inc., Cleveland, an investment trust controlled by the Otis-Eaton-Mather group, are revealed in the listing of that company's stock on the New York Stock Exchange. The largest single holding is 245,142 shares in the Cleveland Cliffs Corporation, formed last June as a holding company that effected a merger of the Cleveland Cliffs Iron Co. and Cyrus S. Eaton interests.

Other steel plant stock held by Continental Shares Oct. 31, as listed, were: Central Alloy Steel Corporation, 46,700 shares, Inland Steel Co., 1000 shares, Youngstown Sheet & Tube Co., 8000 shares, Donner Steel Co., Inc,. 250,000 shares, Donner Steel Co. preferred 15,000 shares, and Wheeling Steel Corporation, 3243 shares. Ownership in various other industrial stocks was listed as well as public utility and bank stocks.

The Cliffs Corporation, it was disclosed, holds 99,860 shares in the Republic Iron & Steel Co., 99,860 shares in the Inland Steel Co., 125,821 shares in the Youngstown Sheet & Tube Co., 109,837 shares in the Central Alloy Steel Corporation, 29,957 shares in the Wheeling Steel Corporation and 397,736 shares in the Cleveland-Cliffs Iron Co.

The holding company stated that the total value, as of Nov. 30, of all of its securities was $130,000,303 against an original cost of $122,355,813, or an appreciation of $7,644,490 despite the recent decline in stock values.

C. S. Eaton is chairman of Continental Shares, Inc., and W. R. Burwell is president.

Many Accidents Caused by Moving Material by Hand

Of the accidents occurring in industrial plants from non-mechanical causes 33⅓ per cent were the result of manual handling of material, according to a survey recently made by Edward O. Allard, manager of the safety engineering and inspection department of the American Surety Co. and its affiliated company, the New York Casualty Co. In machine shops the survey revealed that 46 per cent of the accidents were due to moving materials by hand.

Road Machinery Sales Large

Orders for road building machinery have been booked in such volume by Foote Brothers Gear & Machine Co. as to keep the plant operating at full capacity for more than four months, according to a statement by W. C. Davis, president of the company. The regular quarterly dividends of $1.75 a share on the preferred and 30c. a share on the common stock have been declared, payable Jan. 2.

The Week's News Quickly Told

Current Events That Bear on the Course of Business

BUSINESS men are generally optimistic, although manufacturing, general industry and jobbing trades are markedly lower than a year ago. Retail trade is slightly lower, although sales of low-priced novelties are very good . . . Fur merchants report 1929 sales 13 per cent under the 5-yr. average.

* * * * *

COMMODITY index is down 0.1 per cent; the sharpest decline noted is in wheat (7c. per bu.) due to slow export demand . . . Secretary of Agriculture Hyde estimates the 1929 farm income ($12,500,000,000) to be higher than any year since 1920, except one . . . Arthur Reynolds, leading Chicago banker, advises rural correspondents that present situation warrants no other than usual precautions in supplying funds to local manufacturers and merchants.

* * * * *

UNION miners in western Kentucky coal fields strike for revised wage scale . . . Garment workers' unions have authorized several strikes, to commence early in 1930, where contracts expire or where working conditions are held to be subnormal . . . Establishment of impartial umpire and special mediation court has adjusted amicably 95 out of every 100 disputes occurring in New York garment trades during the past five years.

* * * * *

COTTON textile manufacturing is distributed unevenly; sales for the whole industry amount to about two-thirds of current production; unfilled orders equal four-fifths of finished stocks . . . Goodyear Tire & Rubber Co. starts a 50,000-spindle plant in Georgia for tire fabric . . . Woolen trade in New England is very quiet.

* * * * *

COPPER production in the Northwest has been curtailed . . . Good prices for the metal and improved technology have expanded the copper output of northern Michigan about 10 per cent over 1928 . . . A $4,000,000 copper refinery has been completed at El Paso, Texas . . . Joplin, Mo., zinc district, with capacity of 14,000 tons per week, is operating on a 6000-ton basis . . . Low prices for tin have slowed up all trade in Bolivia and have caused the Federated Malay States to prohibit expansion of placer mining areas.

* * * * *

DIVIDENDS on common and preferred stock were increased from $4 to $5 by Westinghouse Electric & Mfg. Co. . . . A civic organization in New York charges that each customer pays $8.28 annually on "water" in local electric utility stock . . . Federal Power Commission notes that steam-generated power is increasing at a far more rapid rate than hydro-electric, "due to unnecessary handicaps of legislation and regulation" . . . Governor Roosevelt of New York said that the Government should own and operate power plants at Muscle Shoals, Boulder Dam and on the St. Lawrence, "to remain forever as a yardstick to measure the cost of electricity."

EMPLOYMENT in the United States is seasonably low, but not much lower than in 1927 or 1928 except in one or two centers—notably St. Louis . . . Unemployment in Germany and Austria is especially acute; 1,400,000 are receiving doles and the German treasury is nearly empty . . . Belgian and Dutch diamond cutters (about 40,000 in number) are working half time, and the Diamond Syndicate has withdrawn all offerings of uncut stones to the trade . . . France, however, has only 577 registered unemployed. Its population of 40,750,000 is 2,220,000 less than 1911, despite the importation of about 3,000,000 alien laborers.

* * * * *

CIGARETTES have been cut in retail price by chain stores to a figure less than wholesale cost to the small dealer . . . Schulte-United 5c. to $1 Stores, passes $1.75 quarterly dividend.

* * * * *

RAILWAY net earnings in October were 5.6 per cent less than in 1928, largely due to decreased movement of grain in West . . . Interstate Commerce Commission authorizes 160 miles of railroad construction near the Texas-New Mexico border, and orders the Union Pacific to construct a 185-mile connection to the Southern Pacific through the Cascade Mountains in Oregon . . . A 5-year, $140,000,000 job of removing 4½ miles of track from streets in Manhattan to a private right-of-way (elevated and subway) is commenced by the New York Central Railroad.

* * * * *

STORM and floods strand 70 large vessels on northern European shores and destroy much property . . . Royal Mail Steam Packet Co., which controls one-sixth of the British merchant marine, passes a dividend . . . Four new 7000-ton 14-knot ships, in addition to two now building, will be required for new mail routes to the Black Sea, assigned to American Export Line.

* * * * *

RADIO service is commenced, Sayville, N. Y., to Lima, Peru . . . O. D. Young and J. G. Harbord of General Electric Co. and Radio Corporation of America, tell Senate committee that unification of cable, wire and wireless foreign communication, under either Government regulation or ownership, is necessary to meet competition with systems subsidized or owned by foreign governments . . . Only 168 of the 317 broadcasting stations returned profits in 1929.

* * * * *

AMERICAN signature was affixed to the constitution of the Permanent Court of International Justice, as directed by President Hoover, including the Root formula to cover Senate reservations . . . Great Britain officially interprets Kellogg peace treaty to mean that there can be no neutrals in the next war.

THE IRON AGE

New York, December 26, 1929

ESTABLISHED 1855

VOL. 124, No. 27

Radio Sets Put on Production Basis

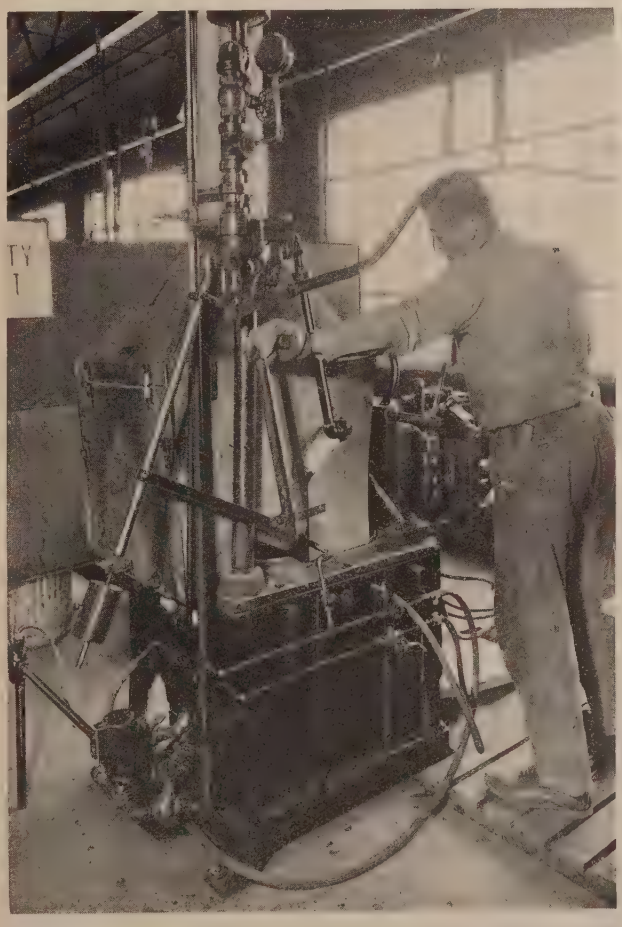
Method of Assembling and Testing Radio Units at the Crosley Plant Has Resulted in Manufacturing Economies

BY J. B. NEALEY*

THE design and manufacture of radio receiving sets have been forced to go through the various stages of development that are encountered in perfecting any mechanism. With the modern production methods of the automotive and other industries as a guide, however, the manufacture of this comparatively new product has been brought to a high degree of efficiency in an unusually short space of time, despite the intricacy and "trickiness" of a complex mechanism reproducing ephemeral tone qualities.

The Crosley Radio Corporation, Cincinnati, is putting out a line of radio receiving sets for which there has been such a great demand that the company operates in mass production. One of the biggest factors contributing to its success is its method of assembling and testing radio units, the entire process of manufacture being as near straight-line mechanical progression as possible.

The concern has three plants in Cincinnati. Assembly, testing and some manufacture are carried on in plant No. 1, which is six stories high. Production schedules, ranging from 1000 to 5000 sets, are made out a week in advance. Requisitions for parts and for sub-assemblies, in sufficient volume to fit the schedule, are then made to the foremen of the various departments and distribution is timed to meet their various requirements.



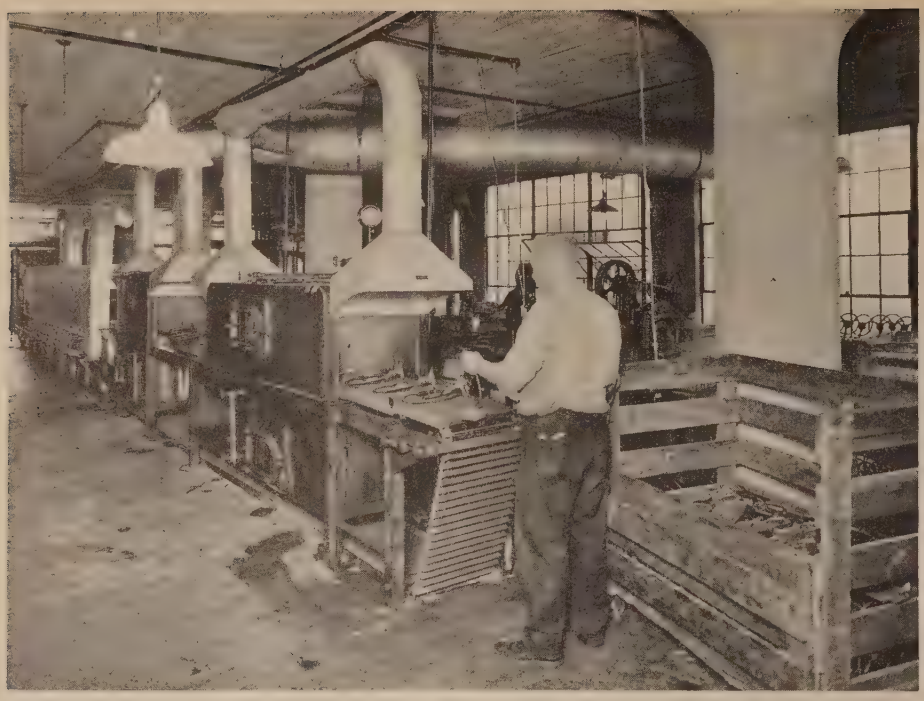
POT of Die Casting Machine Is Heated by Single Gas Burner Which Will Melt Cold Charge in 30 Min. Automatic temperature control is provided

Condensers are manufactured and assembled on the top floor, starting with the die casting of the stator and rotor blades into groups, after which the fins are trimmed from the die cast pillars and holes are tapped. A long line of presses and tapping machines are provided for this purpose.

Blade assembly sets are washed in a continuous, automatic gas-fired washing machine built of sheet metal. Work is sent through in pans with screen bottoms on a slat-type conveyor. Steam and water coils and jets for spraying are located in the first part of the machine, while the second part is for drying and is equipped with nine gas burners, equally spaced. There is a loading and unloading platform at opposite ends of the machine, the capacity of which is close to 10,000 sets of blade assemblies daily. It is 12 ft. long, 3 ft. wide and 4½ ft. high. The final operation is pressing in the rotor shafts.

The die casting department contains 10 die

*American Gas Association.



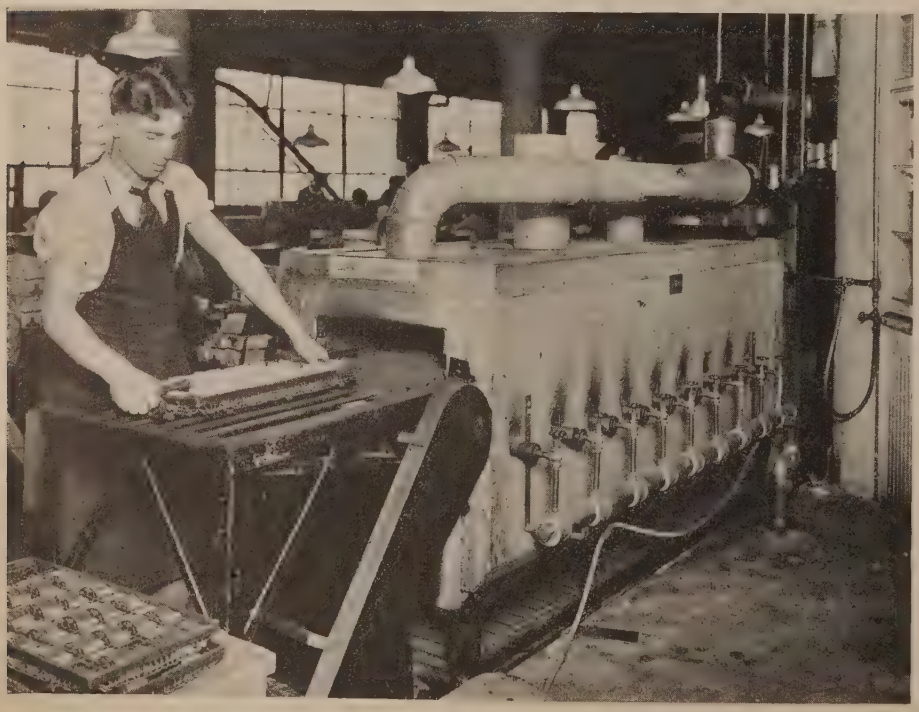
PARTS Are Cleaned and Dried in Automatic Cleaning Machine Equipped with Continuous Conveyor. Hot solution tank, hot water rinse tank and drying portion of machine are heated by gas. Machine can handle 30,000 parts daily

casting machines, and the metal, which is a zinc-copper-aluminum alloy, is melted with gas. The pots are 18 x 24 in. and are 15 in. deep, being heated by a single gas burner which will melt a cold charge in 30 min. An obsolete burner, formerly employed, required 2¾ hr. to do the same work. Pots are equipped with automatic temperature controls so that attention on the part of the operator is not required for this purpose.

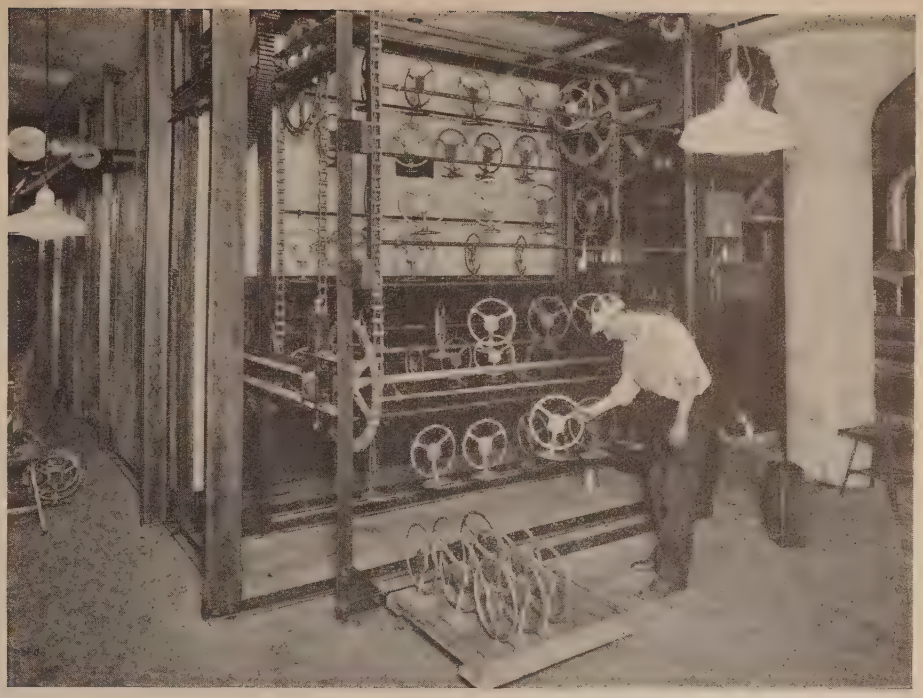
A goose neck sets down in the molten metal and the dies are held together in a machine just above and in front of the pot. The blades are set in a jig and placed in dies, which are closed under pressure. The goose neck is filled with metal, one end is elevated until the nozzle fits into an opening at the base of the dies and compressed air is used to force the metal into the dies, the molten metal chilling and setting the instant it comes into contact with the cold metal of the die.

Condensers are assembled on two tables about 200 ft. long and 3 ft. wide. Down the center of the tables runs a traveling belt conveyor. Parts are distributed to various stations along the tables, having been sent up from storage below by elevator. The condenser frame, a steel stamping with two partitions, is started down the line, the stators and rotors being put in and other parts affixed as it travels along.

As the three tuning or radio frequency coils and the



BLADE Assembly Sets Are Washed in Continuous Automatic Washing Machine. Work is sent through in pans with screen bottoms on a slat-type conveyor



AFTER Being Japanned, Parts Pass Through Gas-Fired Automatic Oven with Continuous Conveyor Consisting of Two Long Endless Chains Connected by Rods. Conveyor makes five vertical passes during journey through oven

three variable condensers must have identical electro characteristics (resistance, capacity and uniformity throughout a broadcast range), the condenser is tested and proper adjustments are made on the assembly line. These characteristics are then checked by another tester equipped with the proper appliances. The cover is put on and the finished condenser is hooked on to an overhead chain conveyor, which takes it to the receiving unit assembly department on the floor below.

Here units are assembled on 14 long tables, each about 75 ft. in length, running transversely across the room. The operations are as follows:

1. Tube sockets riveted into bottom panel.
2. Fixed condenser put on.
3. Transformer and wires put on.
4. Antennæ choke and connector strip.
5. Balance condensers.
6. Wires fastened to terminals.
7. Radio frequency coils and metal shields.
8. Tested for loose connections and matching of radio frequency coils.
9. Parts wired together.
10. Variable condenser attached. Here, the overhead conveyor from the floor above, carrying the condensers, crosses the table and the operator at this station on the line reaches up and takes them off as they come.
11. Other small parts put on.

A complicated testing mechanism, developed by the company, is located at the end of the line, where the set is

ASSEMBLY Work Is Done by Operators at Long Bench. Overhead chain conveyor is used to carry parts from one operation to next

tested for loose connections. The set is placed in a frame with 32 electrical points which match and contact perfectly the 32 points of the set. These are wired to a 32-point switch. There are seven jacks with four points each and seven more that fit in the tube holders. A panel contains numerous small lights, a millimeter, voltmeter and galvanometer. An accurate check is made of all connections in the set by rotating the switch and operating the jacks.

The finished receiving unit is then put on a conveyor, which takes it to the floor below, where the converters for the a.c. current are assembled. Here are located the same number of cross tables or assembly lines as on the floor above. The assembly starts with the frame, which is a steel stamping, and to it are added the transformer, chokes, condensers, resistance and other small parts as it moves down the line.

ONE of Assembly Lines with 40 Operators. Inspectors and testers are in foreground

Converters Added to Receiving Unit

The overhead conveyor, with completed receiving units from the floor above, crosses the assembly lines at the proper point and the operators remove them and attach the converter. This forms the radio set of commerce. Here the entire set is tested for continuity, that is, to show that all circuits are complete and that the proper voltages are supplied to the various tube filaments and plates. The set is lifted up to the chain conveyor from the ends of the assembly tables and carried to the floor below, where the principal testing is done.

As quiet and complete freedom from electrical disturbances are necessary, testers are placed in sheet steel booths, of which there are a large number, arranged in rows. A traveling belt conveyor runs the length of each row, small windows being provided in each booth for it to pass through. There are four testers in each booth, who remove sets as they pass through and replace them on the belt when they have been tested.

Much money and time have been spent in the Crosley laboratories in designing a testing unit by the aid of which radio design could be put on an exact basis. With the apparatus already developed, it is possible to measure with extreme closeness the sensitivity, selectivity, tone quality and amplification of any radio set in a few minutes. These tests are always made under the same conditions and may be repeated any number of times with the same results.

A signal is made especially for the test and its frequency may be adjusted to any value within the broadcasting range. The strength of the signal can be easily controlled within wide limits. Outside conditions, such as weather, static, etc., are excluded and are factors that do not affect this test. The overall performance of the set can be checked, or, if desired, any part such as the radio-frequency or audio-frequency may be tested separately. In this way it is possible to study a new set throughout all of its stages of development, detect any inferior part and redesign it. Furthermore, competing sets on the market can be measured with a common yardstick and their performances compared.

Cabinets, made of steel stampings, are received, washed, dried, japanned and baked on the second floor. The cleaning machine is automatic and has a continuous conveyor. It is of steel construction and is 52 ft. long, 4 ft. wide and 5 ft. high. The conveyor consists of two long chains of 6-in. links, with small wheels at short intervals riding on tracks at each side of the machine. A wide wire screen is suspended between the chains and cabinets are carried through on the conveyor, which is driven by a motor through variable-speed gears.

The first half of the machine is equipped with tanks and pumps below the conveyor and with coils and sprays above. In the first tank is a hot cleaning solution, which is pumped up into the coils and forced down on to the cabinets in jets. From this point it falls back into the tank for reuse. The next operation is similar, only a hot water rinse is used, followed by a cold water rinse, after which steam is forced on to the cabinets. Cold compressed air is then used to blow off some of the moisture as the work proceeds into the second half of the machine, which consists of the dryer.

The drying portion is equipped with four gas burners, two located in the front end and two in the discharge end. An automatic control, attached to each group, maintains constantly the correct heat in the dryer. The hot solution tank and the hot water rinse tank are heated with gas burners which are also automatically controlled to maintain the liquids at the correct temperature. This machine will wash and dry 30,000 or more parts daily, seven minutes being required for each part to travel through the machine.

Cabinet sections are then sprayed with japan in a long line of spray booths and sent through a gas-fired, automatic bake oven. This oven is 30 ft. long, 10 ft. wide and 9 ft. high and is provided with a continuous conveyor. The oven proper is constructed of sheet steel. The conveyor, consisting of two long endless chains connected by transverse rods, makes five vertical passes in the oven during the course of its travel.

Heat is supplied through eight long gas-pipe burners equipped with two automatic temperature controls with recording pyrometers. These maintain a temperature of 160 deg. Fahr. in the first part of the oven and 350 deg. in the second. The baking period, which is controlled by the speed of the motor-driven conveyor, is 45 min. A cabinet consists of three pieces and 9000 pieces can be japanned and baked in this oven daily. Other finishes require different temperatures and baking periods.

Following the spraying and drying operations, sets are placed in cabinets and the complete units are sent to the shipping department.

Promise of Steel Plate Floor for All Sorts of Buildings

THE new floor construction, known as the battledeck type, was announced and given its first public demonstration at the seventh annual convention of the American Institute of Steel Construction, Inc., at Biloxi, Miss., Nov. 14, as mentioned in THE IRON AGE of Nov. 21, page 1379. A special General Electric automatic arc welding machine there illustrated stitched the plates and beams together to form the flooring.

The new floor is described by the institute of steel construction as being a solid steel deck which acts as a girder to prevent any torsional distortion of the building when subjected to wind or earthquake action. It enables the engineer to select that part of the structure which is to carry the wind stresses to the foundations, and to be assured that the deck flooring will deliver the stresses to the most rigid part of the vertical frame. The floor construction can be carried out into the walls to provide standard construction to support the outside walls. It will provide a working floor for other trades and in many places eliminate the necessity of temporary planked floors.

The total cost of a floor constructed of 3-in. I-beams and 3/16-in. plates, covered on the top with cork tile and fireproofed on the under side, is estimated by the institute as being a little over $1 per sq. ft. It is pointed out, however, in this connection, that the cork tile floor eliminates the necessity of any other floor covering, which is always a part of a tenant's expense when using an ordinary masonry floor. The cost of a good chenille carpet alone is from $1.25 to $1.50 per sq. ft., and the welded battledeck floor complete will cost less than the carpet and eliminates its necessity.

The welding machine consists of a three-wheeled self-propelled vehicle driven by an adjustable-speed motor. On the framework are mounted a wire feeding device, a reel of welding wire, the travel motor and the control devices, all occupying a space of less than 5 sq. ft. and having a height of 2 ft. A motor generator at a remote point supplies, through a trailing cable, the current for welding and for operating the travel motor. The speed of travel and the speed of the welding wire feed can be varied by adjusting small rheostats. In the demonstration at Biloxi a satisfactory weld was accomplished at a speed of 9½ in. per min.

In operation the machine is placed on the beginning of a seam where it is lined up and started running. If by any chance it should tend to deviate from the seam during the course of travel, it can be easily steered by means of a small steering wheel on the mechanism. At the end of the seam it is merely necessary to turn the machine around and place it on the beginning of the next seam, proceeding from this point as before until all seams are welded.

The new steel floor, says the institute, is equally applicable to residences, multiple-story buildings and bridges, and for building construction it will save from 20 to 60 lb. per sq. ft. of floor in dead weight. In connection with a 75-story building with floor panels 21½ x 22½ ft., the saving in dead load on the foundations for each column is nearly two million pounds, and indicates that its use will permit an increase of 25 per cent or more in the height of the building or in the number of floors without increasing the loads on the foundations.

Handling Equipment Increases Unit Loads and Lowers Rehandling

Every successful installation of material-handling machinery is successful because it does one of two things. It either eliminates rehandling operations or it permits the handling of more material each trip. Discussing these factors before an engineering meeting in Akron, E. T. Bennington, Cleveland Electric Tramrail, Wickliffe, Ohio, said that many have a great deal of faith in what can be accomplished through the use of these two fundamental principles as applied to overhead conveying. But the large majority of engineers have not yet come to realize the real advantages through proper use of these principles of overhead conveying machinery.

The savings and advantages do not lie alone in reducing the cost of the payroll for the men actually engaged in moving materials. The application of these principles has usually a far-reaching effect. It has been known to affect the operating costs in every department in some of the largest plants in the country.

Capacity Quadrupled

As an example of elementary rehandling operations may be considered the handling of coils of wire in a large steel mill. A hairpin hook on a tramrail system lifts 3300 lb. of rod, made up of 11 bundles weighing 300 lb. each. Before the installation of the tramrail system 20 men were employed in handling this wire rod as it came off the mill. It was rehandled many times before it entered the manufacturing department or was placed on cars.

A conception of the relative capacity of hand labor aided by trucks, and the hairpin hook unit on the tramrail system, can be obtained by considering that the capacity of 20 men and a few trucks was 200 tons loaded into cars per day. Now, one unit is capable of loading 900 tons per day, if the wire mill could produce this amount of material.

Cast Aluminum Alloy That Compares With Die Castings

Made in Sand and Requires Minimum Machining—Unusual Practice at United States Naval Gun Factory

BY LEWIS H. FAWCETT*

EVERYONE conversant with the foundry industry is familiar with the accurate molding required in the manufacture of special iron castings, such as those that have been used in typewriter and cash register assemblies, where a minimum machine finish was required. Stove plate molding, also, has always demanded a high grade of work to produce the neat fits without machining so characteristic of those well-built articles. Likewise, a vast quantity of exact castings have been made of tin bronze in various compositions.

But, today, when light metal castings of precise dimensions are contemplated, one naturally thinks of die castings, their composition and the accurate equipment necessary to their production. In like manner, when manufacturing aluminum alloy sand castings with tolerances approaching die castings, the essential demands are composition and adequate equipment. The composition involved in this particular case can be disposed of in a few words as it consists of an alloy containing 95 per cent aluminum and 5 per cent silicon, designated as Navy Department Specifications 46 A 1 a, Class 2. This combination casts readily and produces sound castings free from checks and other molding troubles.

Metal and Wooden Patterns Used

Patterns must be so constructed that their original dimensions may be preserved. This is accomplished by the use of metal patterns where large quantities of castings are required; but the majority of patterns are made of hard wood, and in this case saw cuts are at times made in thin sections to allow expansion and contraction of members of pattern assembly without affecting the controlling dimensions. Different shrinkage (contraction) rules are used on the same pattern to cover varying conditions; and yet the pattern as a whole is designed to prevent restriction of contraction as far as possible. In this connection it is also essential to have accurate checking and severe inspection of the initial casting before proceeding with production.

Foundry equipment has been designed with a view toward obtaining maximum accuracy. Core benches are rigidly constructed of wood and rest on a level floor paved with wooden blocks. The bench top consists of a cast iron plate which has been machined to obtain a plane surface. All core plates are of iron, machined on face and supporting ribs. Rectangular blocks of cast iron machined all over are used as guides in removing core boxes from the cores, and where possible the boxes are constructed to part, so as to obviate the "rolling over" of the core.

Machine finish on equipment of this kind may seem extravagant but these shop tools have been in use for more than ten years and have fully justified their original cost. Pressed steel flasks for small jobs and substantial wooden flasks for large work are used in molding to prevent springing, and great care is taken to secure accuracy in flask pin alinement. Straight line railroad tracks leading into the core ovens pass between the core benches and the molding floor. Low flat cars, the width of the core ovens, run on these tracks. The floor or top of the car consists of a machine finished cast iron plate.

The more machining performed on the equipment the less machining required on the product. These true flat top cars permit full loading and movement into the ovens without vibration to cores. At night the cars are shoved into oil-fired insulated ovens and heated gradually to from 450 to 500 deg. Fahr. in about two hours time, this temperature being maintained for an additional two hours. The heat is then cut off. As the ovens are well insulated to prevent loss of heat, their temperature will have fallen only to from 350 to 400 deg. Fahr. on the following morning when

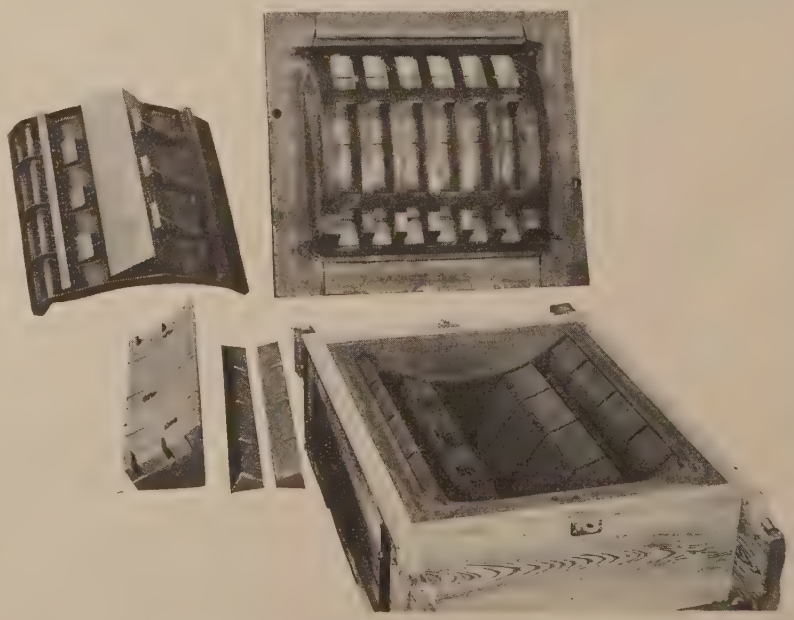


FIG. 1—Pattern and Drag of Chute Casting. To the right is the drag before the cores are set. Cores are shown to the left. In the background is the pattern on the left with the follow board at the right

*Metallurgical and Testing Division, United States Naval Gun Factory, Washington.

FIG. 2—The Core Bench and the Two Auxiliary Tables Have Machine Cast Iron Tops. On one is the core plate with two cores thereon and in the center a core box is being used to make a core. The foundry floor is composed of wooden blocks

the cars are removed. Having mentioned some of the precautions taken in the interest of accuracy, regarding the equipment, some idea of the molding practice will now be attempted by an outline of this procedure as applied to one comparatively simple job.

Molding of a Chute Casting, Typical Case

The casting to be described is the top member of a rectangular fabricated chute. This assembly is composed mainly of rolled sheet duralumin, 3/16 in. thick, its ends and top are designed as silicon-aluminum alloy castings which are bolted to these sheets.

Pattern, and the drag section of flask, are placed upon the follow board, the follow board being so designed as to fully support pattern during ramming. Facing sand is riddled on the pattern and carefully tucked around it; the drag is then shoveled full of heap sand and rammed up. The surplus sand is leveled off with a strike and the bottom board rubbed to a firm fit. Drag is then rolled over and the follow board removed. Parting compound is sprinkled over impressions made by follow board. The cope, which is barred to the approximate shape of the follow board, is set in place on the drag, filled with sand and rammed up.

Two wedge-shaped gates, three round risers, and an appropriate number of gaggers to support the sand when cope is lifted are utilized in molding the cope. Large vents, to permit easy escape of air, are made on each corner of the mold, at the highest points, and the usual amount of vents is also made over the entire surface of cope. Cope is then taken off; the pattern is removed from the drag and cope and drag-finished in a workmanlike manner.

The molding is done in green sand using No. 0 Albany sand which is mixed, ⅛ new sand and ⅞ used sand, for the facing material. Facing sand is riddled through a No. 6 sieve and the heap sand through a No. 4 sieve. Proper tempering of sand is important, best results being obtained when the sand is worked as dry as practicable, moisture content not exceeding 6 per cent. A high-grade dry Ceylon graphite is applied to the cope, no blacking is used on the sand in the drag. Chills are used and their use is recommended where practical in lieu of risers, in order not to cause excessive restriction of contraction. The flask used on this job is made of wood 2¾ in. thick 38 x 42½ in. inside, cope 9 in. deep and drag 14 in.

Foreground of Fig. 1 shows the drag, to the right, before the cores are set in place. The cores are shown on the left. In the background the pattern is on the left and the follow board on the right of picture. Ten copper chills are used in the drag, one under each of the six lugs, and four on the edge to the right of central portion of drag. These chills are painted with wet blacking. Note the nails used to chill the metal along the grooves in the sand which form ribs in the casting.

Two steel strips placed diagonally in the sand on the bottom of right bank of the central impression for the large core are not chills but bearings for the large central core. One of these bearings is barely visible, the other is on the same side or bank but does not show in the picture. A hole about 1½ in. in diameter is made through the sand in the bottom central portion of the drag to vent the large core. This venting is accomplished by a similar hole in the bottom of the core, leading to the interior of core which is filled with broken coke; and a 1-in. diameter hole in the bottom board. Attention is also directed to the three lifting hooks in the large central core. The other two cores have similar hooks.

The three cores used in molding this casting are

FIG. 3—In the Foreground Is a Mold Ready to Close. The pattern is in place on the follow board in the background. The cope at the right shows the position of the three risers.

made in wooden core boxes which are designed to part in order to obviate the necessity of rolling over, as the cores are purposely of very fragile construction and while green are only strong enough to withstand careful handling. Interior of cores is filled with crushed coke and rodded as lightly as practicable; in this case no rod over ¼ in. in diameter is used. These fragile cores facilitate contraction by crumbling under the pressure of the contracting metal, thus avoiding cracks and checks in the casting. Their porosity also serves as a means of venting by allowing gas and air to escape through their interior and pass off through the vent in bottom of core.

Core sand, which forms the exterior of the core, consists of 35 parts of straight silica sand, 10 parts No. 0 Albany sand, and one part oil, by volume; a good linseed oil substitute being utilized for this purpose. This combination, prior to the addition of the oil, is passed through a No. 10 sieve. After adding the oil, the core sand is carefully tempered with water and mixed thoroughly in a mechanical paddle mixer. While resting on a cast iron core plate the core box is removed from the core, thus allowing the core to be transferred to the core ovens on this plate. When removed from the oven, the

FIG. 4—The Finished Casting at the Left Shows the Heads and Gates. At the right is the other side of the casting after machining and ready for assembling

cores are painted while warm with wet blacking. The heat of the core quickly dries the blacking and the core is then ready to set or be placed in the mold.

In some mold assemblies chills are inserted in the cores to obviate the use of shrink heads; and, at times, where feasible, core assemblies are made in order to eliminate fins on the castings. These methods, however, do not apply to the particular casting being described now.

Closing the Mold and Pouring

After the cores are set in place in the drag, the impressions around the lifting hooks are swabbed with oil. These impressions are then filled with facing sand and smoothed over with a slick. All loose sand or foreign matter is then removed by means of an air hose directed over the surfaces of cope and drag. Mold is then closed and poured immediately.

Metal is placed in clay-graphite or carborundum crucibles and melted in anthracite coal-fired, pit type furnaces. When the temperature of the metal reaches 1300 deg. Fahr., it is poured immediately into the mold; the work being scheduled so that the mold and metal are ready at the same time.

Accurate temperature control is employed not only to improve the physical properties but also to obtain a uniform minimum shrinkage. The job is double poured, pouring 50 lb. of metal through each of the two wedge shaped gates.

After pouring, the heads and gates are relieved by removing the sand from around them so that they may be free to move as the casting contracts, and thus facilitate rather than retard the contraction of the casting to avoid internal stresses that might result in distortion. Likewise to prevent distortion, proper time is allowed for cooling before shaking out the casting. Heads and gates are removed by sawing, also a distortion preventative, and then ground to the level of the surface surrounding them. Fins, if present, are removed by grinding.

Fig. 3 is a mold ready to close, in the foreground, and the pattern in place on the follow board, in the background. Note that the hooks have been covered with sand, seen as spots on the cores. The cope shows three round heads or risers, one over each of three lugs; and the two wedge gates which are located near the other three lugs. These lugs may be seen on the pattern. They are to support a motor to be placed on top of the finished casting.

Six of the ten chills used in the mold are located under these lugs. The chilling and feeding of the metal in the vicinity of the lugs is a precaution taken due to the cross sectional area of the lugs being much greater than the casting in general. Nails with large heads are inserted in the cope, hardly visible in the photograph, to chill the metal at the junction of main body of the casting and the three large ribs. Attention is also called to the sturdy construction of cope, drag and pins.

Fig. 4 gives the cope side of the casting showing heads and gates. The other side of the casting after machining and ready to be assembled is also shown. The casting is approximately 32 in. sq., with ribs about 3/16 in. thick.

Machining and Assembling

Machining of these castings consists simply of placing the casting on the table of a milling machines and milling the end ribs or flanges which are to be secured to the duralumin sheets. In the case of castings with lugs or bosses, such as the one described, it is also necessary to mill the faces of the lugs or bosses. Only an average of 0.02 in. is removed from a flange by the milling cutter and no further machining is done except the drilling of the holes. Furthermore this machining is done without laying off the castings.

Holes 17/32 in. in diameter, to accommodate ½-in. bolts, are drilled in the flanges with the aid of jigs or templates. The assembly of the chute is accomplished by securing 3/16-in. duralumin sheets to the flanges of these castings by means of steel bolts previously dipped is asphaltum paint to avoid galvanic action accompanying the association of two dissimilar metals in the presence of sea air. After the bolts are secured, their heads and the nuts are given another coat of asphaltum paint. The chutes when completely erected are painted with aluminum paint and are then ready for use, presenting a very neat fitting assembly of creditable appearance.

By these means, due primarily to accuracy in foundry practice, a great deal of time and labor are saved, thus materially reducing the cost of the finished product.

Many large as well as small castings of intricate shape are manufactured in this manner. For example, a ring shaped assembly approximately 19 ft. in diameter consisting of 18 segments, each an intricate casting, was molded in this manner having only the bolting flanges trued up by milling a maximum of 0.02 in. off each edge of each segment. When erected, this assembly was found to be within a tolerance of plus or minus ⅛ in. in the entire circumference of about 60 ft.; or in other words, it fitted practically perfect. These castings also were not laid out, only the usual milling, and drilling of holes by the aid of jigs or templates.

All castings made in this manner have passed rigid inspection with few rejections, and so this procedure, when closely controlled in all details, may be regarded as eminently satisfactory, practical and economical.

Economic Use of Electric Furnaces

Analysis of Production Costs, Electricity vs. Natural Gas in Heat Treatment of High Grade Shovels

BY WIRT S. SCOTT*

SEVERAL brands of shovels made by the Baldwin Tool Works, Parkersburg, W. Va., may be outlined as follows: Alloy Steel brand, made from molybdenum steel, each shovel heat treated; Optimus brand, made from manganese steel, light weight, each shovel heat treated; Monongah Featherweight brand, made from high-carbon steel, light weight, each shovel heat treated; Pinnacle brand, made from high-carbon steel, standard weight, each shovel heat treated; Knoxall brand, a competitive product, not heat treated.

Steel from which the blades are made is purchased in large sheets cut to specified widths and lengths. In the forge department the sheets are cut first into multiple lengths, as required by the length of shovel blade, and then into rectangular pieces, as required by the width.

To this flat, rectangular piece of steel is welded a strap of soft steel. A flat drop machine is used for smoothing the blade, and it then passes to a trimming machine, where it is cut to exact size. The blade is then heated in a furnace, placed in a die, and by means of a drop, receives its final shape. By a somewhat similar process the strap is shaped to receive the handle.

From the forge room the alloy steel and high-carbon steel shovels go to the heat-treating room, for hardening and tempering. Since the company has had experience with both fuel furnaces and electric furnaces, of the same general type and dimensions, and used in exactly the same manner, a comparison of results is possible.

*Special representative, Westinghouse Electric & Mfg. Co., Mansfield, Ohio.

Heat Treating with Gas

Parkersburg is in one of the most favorable territories for natural gas supply. Natural gas of 1000 B.t.u. value is sold for 32½c. each thousand cubic feet.

Three gas furnaces, rectangular bath type, lead hardening and lead tempering, were installed, one being a spare. Nickel-chromium vessels were used, each about 18 in. wide, 46 in. long and 17 in. deep. Pyrometers indicate the temperature of the bath. Crushed coke was used on top of the baths, to reduce the lead loss.

The record of the heat-treated production, gas, lead and coke consumption for nine months, ended Jan. 31, 1929 is given in Table I.

Electric Furnaces Put In

Two duplicate electric furnaces are installed, each of 65-kw. capacity. This high capacity was not required by the tempering furnace, but the customer wanted both units to be available for either hardening or tempering.

As in the case of the natural gas furnaces, the vessels

QUENCHING Shovel Blades in Oil, Special Jigs Holding the Blades. For large shovels, such as scoops, the heated blade is placed in a form mounted on an elevated hand-operated conveyor, which permits exact quenching without distortion

are made of nickel chromium, 18½ in. wide by 46½ in. long at the top, 14½ in wide by 42½ in. long at the bottom, and 17¼ in. deep. The furnace shell is a heavy plate box with riveted and welded corners, surrounding the insulating and refractory brickwork. The furnace chamber, lined with refractory brick, supports the heating elements on the side walls and on the bottom.

Having wide flanges, the vessels rest on suitable supporting brickwork. After the vessel is in position nickel chromium alloy aprons are placed around, overlapping the flanged sides. Over this is put a heavy iron protective plate, covering the entire brick-work. This plate is cut out so as to expose the vessel and protective apron, but overlapping the apron. This construction effectively prevents molten lead, scale or other materials from getting down into the brickwork or furnace chamber.

Two thermocouples are used with each furnace, one in the bath, the other within the furnace chamber. The protected-type thermocouple in the bath operates a temperature recording and controlling pyrometer. By means of magnetic contactor switches, this functions to control the temperature of the lead bath. The thermocouple placed in the heating chamber is of the bare type, and is connected directly to a temperature control pyrometer.

This arrangement of thermocouples and control not only prevents excessive temperatures building up within the furnace chamber, but operates to reduce the temperature variation or surges within the bath. Fluctuations of temperature within a large bath of molten lead has been a great disadvantage of that form of heating. Unless the temperatures of both bath and heating chamber are under coordinated control, there is no hope of obtaining a sufficient uniformity of temperature for quality production.

Hardening the Product

Shovels are immersed in the lead to a depth of about four-fifths the blade length. An average shovel having a blade 10 in. wide by 12½ in. long by 0.086 in. thick has an immersed depth of 10 in. The weight of this immersed stock is 27 lb. per dozen shovels. The largest shovel heat treated has a width of 15½ in. and is immersed to a depth of 15 in.

A very heavy bed of powdered coke—about 2 in. in depth—is placed on top of the lead. This unusual depth retains the shovel blades down in the molten lead without any other means of holding them. Otherwise special hooks would be required for this purpose, or the shovel held in the bath by hand until heated.

The hardening bath control is set to maintain a temperature of 1475 deg. Fahr., and the tempering bath 700 deg. Fahr. From four to six shovels are placed in the hardening bath at one time, and from 12 to 34 in the tempering bath.

In hardening, one shovel is removed from the bath, and quenched in oil; a blade previously quenched is removed from the quench and placed on a drain board accessible for the operator doing the tempering, an unheat-treated shovel is placed in the hardening bath, completing the cycle. Twenty shovels can be hardened in 4 min., or at the rate of five shovels a minute, but this pace is not maintained throughout the day, since the operator gives a certain amount of attention to obtaining his supply of shovels.

Method of Tempering

Tempering immediately follows the hardening process, but the operation of the furnace is somewhat different. The hardened shovels may be removed from the drain board in batches, and placed in the tempering bath, completely filling the vessel, the shovels nested together as closely as possible for convenient handling. In one case the shovels were nested in two rows, of 18 and 16 shovels. A dozen or more shovels may be removed at one time, and placed in a large box mounted on a truck. A half dozen hardened shovels then take their places in the bath, and the operation continues until the entire batch has been removed from the furnace.

Reloading the furnace or bath then continues until the vessel is again full. The production capacity of the tempering bath is greater than that of the hardening bath, hence the shovels may be tempered at the same rate as hardened.

The electric furnaces were placed in operation Feb. 1, 1929, and meters were installed a little later for measuring the power consumption. The production records for

General View of Gas-Fired Lead-Bath Furnaces

Heat-Treating Department for Hardening and Tempering Shovels. The shovels are heated to 1475 deg. Fahr. in the bath-type furnace in foreground, quenched in oil, and placed on the drain board (rear center) to drip. They are then tempered at 700 deg. in the bath-type furnace shown at right

April (26 days), May (25 days) and June (10 days), are shown in Table II.

Comparing the Results

ANALYZING the production figures for gas and electric furnaces, from Tables I and II, a true comparison can be obtained of many things of importance in determining the relative values of the equipment.

Electric Furnace Analysis

Kilowatt hours consumed per dozen shovels heat treated	4.63
Lead consumed per dozen shovels heat treated, lb.	0.29
Man-hours of labor per dozen shovels heat treated	0.1155
Shovels produced per working hour, dozen	17.50

Gas Furnace Analysis

Gas consumed per dozen shovels heat treated, cu. ft.	70
Lead consumed per dozen shovels heat treated, lb.	0.71
Man-hours of labor per dozen shovels heat treated	0.16
Shovels produced per working hour, dozen	12.90

Heat Energy Costs

In determining the relative costs of electricity vs. gas, April, 1929, was taken as the basis. Electricity is purchased from the public service company, primary power, at $1.10 for every kilowatt of measured demand, plus an energy charge, block rates, varying with the amount consumed. As the purchase of power for other purposes must be done regardless of whether or not the electric furnaces are used, they are here charged with current at the rate of 1c. to the kilowatt-hour, as in Table III.

Using the current rate of $0.0125 per kw-hr. and $0.325 per M for gas, the monthly cost for a production of 4339 dozen shovels will be:

Electricity, 19,840 kw-hr. at $0.0125	$249.23
Gas, 308,069 cu. ft. at $0.325	$100.12

Lead Cost

Since the lead consumption as shown by any one month may not represent accurately the actual consumption, an

Table I—Heat Treating with Gas

Month	Man-Hours	Lead, Lb.	Coke, Lb.	Oil, Gal.	Gas, Cu. Ft.	Shovels, Dozen	Actual Working Hours
May, 1928	306	1,840	3,825	...	119,240	2,034	153
June	413	1,700	...	...	179,960	2,312	207
July	421½	1,900	...	...	219,230	2,799	207
Aug.	295	1,010	...	520	126,950	1,902	144
Sept.	351½	1,815	...	...	155,870	2,121	171
Oct.	475½	2,004	...	...	191,460	2,621	215
Nov.	458½	1,414	...	...	201,820	2,848	223
Dec.	425	2,318	...	260	185,309	2,654	207
Jan., 1929	497	2,222	...	...	226,360	3,511	243
Total	3,643	16,223	3,825	780	1,606,199	22,802	1,770

Table II—Heat Treating with Electric Furnaces

Month	Man-Hours	Actual Working Hours	Lead, Lb.	Kilowatt Hours	Maximum 15-Min. Demand	Shovels, Dozen
April	481	236	1,200	19,840	63.0	4,339
May	436	214	950	15,880	64.0	3,413
June	172	89	685	7,920	61.9	1,685
Totals	1,089	539	2,835	43,640		9,437

Table III—Power Rate Structure for Electric Furnaces

Energy charge—19,840 kw-hr. at $0.01 per kw-hr.	$198.40
Demand charge—63 kw. demand at $1.10 per kw.	69.30
Total April bill	$267.70
Discounts, 5 per cent for primary service and 2 per cent for prompt payment	$18.47
Net April bill	$249.23

$$\text{Net rate per kw-hr.} = \frac{\$249.23}{19,840} = \$0.0125$$

average figure should be used, based upon as long a period as possible.

	Gas Furnace	Electric Furnace
Lead consumption, lb. per dozen shovels	0.71	0.29
Total for 4339 dozen shovels	3,080	1,260
Monthly cost, at 6¼c. a lb.	$192.50	$78.65

Labor Costs

The men operating the gas furnaces were paid from 45 to 55c. an hour. With electric furnaces, less experienced help could be used. It was stated that young men from various parts of the plant were often drafted to operate the furnaces, and became thoroughly proficient within a day's time.

In the absence of a definite labor rate paid during the operation of the electric furnaces, it is safe to assume that the rate is the same as with gas, an average of 50c. an hour.

	Gas Furnace	Electric Furnace
Man-hours of labor per dozen shovels produced	0.16	0.1155
Man-hours to produce 4339 dozen shovels	694	501
Labor cost, heat treatment of 4339 dozen shovels	$347.00	$250.50

Comparative Production

Production figures are based upon actual working hours required to turn out a given quantity. With gas and electric furnaces of equal size, the production figures given below show the comparative value:

	Gas Furnace	Electric Furnace
Dozens of shovels	22,802	9,437
Actual working hours	1,770	539
Dozens of shovels produced per working hour	12.90	17.50
Working hours required to produce 4339 dozen shovels	336	248

Increased production capacity of electric furnaces over gas furnaces for the given size was found to be 35½ per cent. It is to be noted that the figure of 248 hr. is an average, whereas the actual time was only 236 hr. But, since an attempt is made to set up basic figures for comparison, the average value must be used.

Vessel Maintenance

Maintenance for the furnaces is that due to depreciation of the vessels, and that required for general upkeep. Vessel maintenance is based upon results obtained at customer's plant with gas furnaces, plus results obtained through definite information received from a large number of electric furnaces.

Cost of vessel, installed in pot, was $800. Life of vessel, electric (hardening), is placed at 6500 hr. and life of vessel, gas (hardening), at 2500 hr. Basis for maintenance is April, 26 days, and a production of 4339 dozen shovels.

Electric, working hours	248
heating up, 1 hr. each day	26
Total, hours use	274
Gas, working hours	336
heating up, 3 hr. each day	78
Total	414

Useful life of vessels used up during April was:

$$\text{Electric, } \frac{274}{6{,}500} \times 100 = 4.22 \text{ per cent}$$

$$\text{Gas, } \frac{414}{2{,}500} \times 100 = 16.56 \text{ per cent}$$

Vessel depreciation during April was thus:

Electric, $800 × 0.0422 = $33.76
Gas, $800 × 0.1656 = $132.48

No repairs of any nature were made to the electric furnaces during the past year of operation and they show no signs of deterioration. A general charge of $10 under this item, each month, will amply cover all contingencies.

Based on previous production, and corrected for present production, each gas furnace was shut down four times a year for two days each time for minor repairs. Labor of two men for two days, plus materials, call for annual expenditure of

16 man-days at $4.50	$72	
Materials	32	
		$104

Each furnace was shut down every three months for complete rebuilding. Labor, six days each time, for two men, made

48 man-days at $4.50	$216	
Materials	400	
		$616
Total yearly cost		$720
Average monthly gas furnace repairs		$60

Air for Gas Furnaces

For the gas furnace a 5-hp. motor was required to operate the blower and the pump for circulating the oil quench bath. With the electric furnaces a 2-hp. motor is required for circulating the oil. The saving, therefore, is the power consumed equivalent to 3 hp.

At 314 hr. a month, for a 3-hp. motor at 80 per cent efficiency, the power consumption will be

$$314 \times 3 \times 746 \div 0.80 = 878 \text{ kw-hr.}$$

Monthly power cost for supplying air to gas furnaces:

$$\$0.0125 \times 878 = \$10.98$$

Investment Charge

The three gas furnaces cost approximately $4,500 installed; the electric furnaces, $7,900. With interest and depreciation at 15 per cent, the investment charges are as follows:

Gas Furnaces	
Annual charge on $4,500	$675.00
Monthly charge	56.25
Electric Furnaces	
Annual charge on $7,900	$1,185.00
Monthly charge	98.75

Summary

COMPLETE summary of electric and gas furnace production costs, based upon one month's production of 4339 dozen shovels, appears in Table IV.

Table IV—Total Production Costs

	Electric Furnaces	Natural Gas Furnaces
Electric or gas bill	$249.23	$100.12
Lead consumption	78.65	192.50
Labor for heat treatment	250.50	347.00
Vessel depreciation	33.76	132.48
General repairs	10.00	60.00
Air for gas furnace	....	14.23
Interest and depreciation	98.75	56.25
Total	$720.89	$902.58
Monthly saving, using electric heat, including all factors accounted for by book records.	$182.31	
Annual savings	$2,188.00	
Return on investment	27.6%	

William H. Baldwin, president of the Baldwin Tool Works, states that the improved quality of product, the uniformity of results and the ease with which the furnaces may be operated by relatively inexperienced men, make the cost of power a negligible item. Replacement of shovels due to defects not showing up until placed in service, come from many sources besides heat treatment. However, these rejects, from all causes, have been reduced one-fifth since electric heat treatment was adopted.

No. 4 steam generating unit in the East River Station of the New York Edison Co., comprising a 1500-hp. boiler, equipped with water-cooled furnace and air preheater, and fired by the Lopulco storage system for burning pulverized fuel, recently gave a 532 per cent rating for 72 hr. operation.

Nordmarks Iron Mine near Philipstad, Sweden

AN old steel engraving depicting the methods of iron ore mining in another century is here reproduced in THE IRON AGE *by courtesy of the Swedish Iron & Steel Corporation, 17 Battery Place, New York. Mines in the Province of Varmland, where the Nordmarks is located, have been operated for more than 400 years. The pig iron made from its low-phosphorus, low-sulphur ore is used in the production of strip steel for razor blades, clock and watch springs. Most of the razor blades made by a leading American manufacturer have been of steel made from this ore.*

Layout of a Manufacturing Plant

Sequence of Departments in Which Aircraft Engines Are Made by the Wright Aeronautical Corporation

BY FAY LEONE FAUROTE

ONE of the largest organized manufacturing units in the aeronautical industry is the Wright Aeronautical Corporation plant. While less than a year ago it was able to perform its activities in one large building and a part of another, the production demands of this year have made necessary an expansion into a group of twelve buildings, all but one of which lie in a closely connected group between Gray Street and Madison Avenue, immediately adjoining the main line of the Erie Railroad at Paterson, N. J.

Plant No. 1 has 10.5 acres and a manufacturing floor area of 502,345 sq. ft. Plant No. 2, some distanee southeast and on the other side of the Erie Railroad, contains 17.4 acres and a floor area of 128,000 sq. ft., the main building being a new foundry recently put into operation. There is available here for future development a space of 15.6 acres.

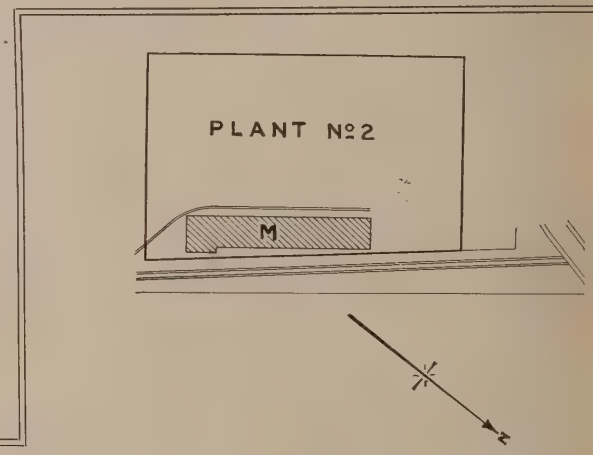
Composed of concrete, steel, brick and glass, the buildings are modern in every respect, and exceptionally well lighted. The machinery is grouped so that there are large aisles along each wall and through the center. Physically this gives the whole plant an airiness and spaciousness which is delightful. One has the feeling of being in a tool room rather than in a manufacturing establishment. Much of the machinery is new and of special design. The men are high-grade and skilled.

Plant Laid Out for Flexibility

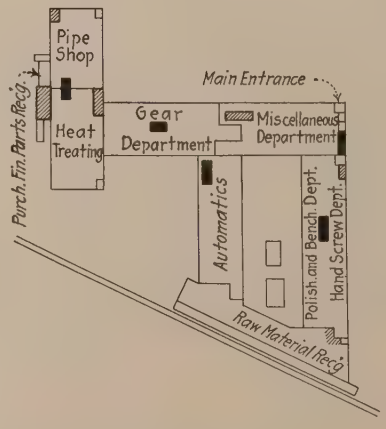
Guy Vaughn, the general manager, evidently has had the vision of a rapidly growing industry and has laid his foundations for a system of mass production and unit assembly which will make the shop not only presently efficient but capable of being adapted readily to new models.

Many of the special drilling tools, multiple drills, Bullards, automatics, lathes and grinders have been set up for a specific job, but, because they have standard heads and have been designed and assembled from standard parts, there will be little difficulty in keeping this factory in that state of flux which any rapidily growing industry such as the aeronautical seems to demand just at present.

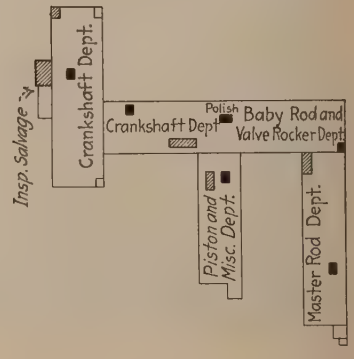
A glance at the accompanying diagrams will show the efficient manner in which these various departments have been laid out. Generally speaking, the work progresses



ARRANGEMENT of Principal Manufacturing Departments Is Shown on the Four Floor Plans at Right. These include buildings A, B, C, D and G, as indicated on the general plant layout above them. The new foundry, M, was described in THE IRON AGE of Dec. 12 and 19. Locations of inspection stations and work assignment stations are brought out clearly in our drawings



FIRST FLOOR



SECOND FLOOR

in an orderly procession from rough stock to finished component, the emerging streams meeting at proper points to facilitate later operations and minor assemblies. While the amount of production has not yet reached a point where conveyor systems and the other paraphernalia of intensive mass production are necessary or can be used with profit, there is the beginning of a hand-operated assembly line.

Engines are mounted on special assembling frames equipped with wheels so that the whole unit may be moved along the track as the work grows. Of course in some departments it has not been desirable to locate machine tools in productive order; the amount of work of one form or of one model is not large enough to make this desirable. But in such bays as those devoted to the manufacture of the crankshaft, cylinder and cylinder head, master rods and "baby" rods, crankcase, piston and valve rocker arms, one may see the production sheet visualized in the line of machine tools which makes the steps of production easier to follow.

Arrangement of Departments

Beginning with the first floor, one enters a miscellaneous department, traversing a gear department and two other wings filled with automatics, polishing and bench work, a hand-screw department, a raw material receiving room, a pipe shop and a heat-treating department. The latter has been recently installed, the inadequate old department having been torn out some months ago. There is on this floor also, but in another building, a production test, a main assembly and the final test.

Climbing a stairway to the second floor, the visitor sees the crankshaft department, passes through a polishing section, and the "baby" rod and valve rocker departments. In the wings extending to the south are the "master rod" department and a floor devoted to piston and other miscellaneous parts. The third floor is almost entirely devoted to crankcase and cylinder production. The general offices, engineering department, factory offices and experimental department occupy the greater proportion of the fourth floor, although there is a northwest wing containing a tool room, machine repair, tool inspection and main crib.

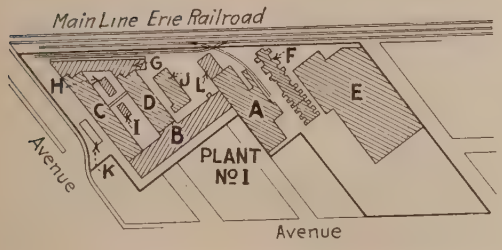
Engaged as they are in the manufacture of a precision power plant upon which the lives of pilot and passenger alike are dependent, Wright workmen seem to sense their moral obligations to the public. All their methods and forms of inspection are characteristically fine. Unusual means are taken to maintain the integrity of castings and forgings, and the special alloys of aluminum and steel are made up according to formulas which rigid tests and experience have set up as adequate.

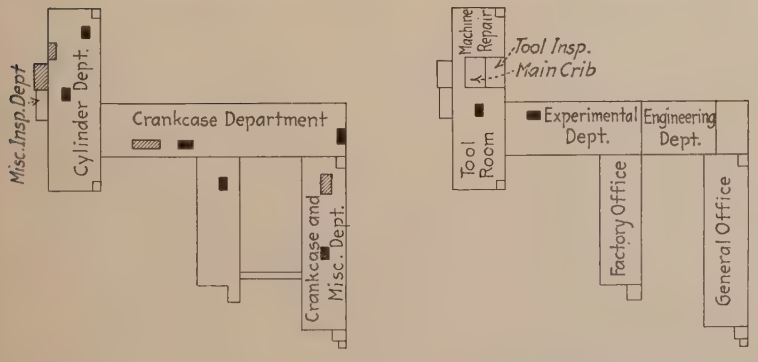
In an article devoted to the Wright foundry and Wright foundry practice the manner in which the intricate crankcase and cylinder head castings are made is described and discussed. The Wright Corporation makes all of its own castings, so it may control to a nicety the initial production of these important components.

Forgings for important steel parts, such as the crankshaft and the connecting rods, are purchased outside, but manufactured under the scrutiny of Wright inspectors. So much metal is taken off in the process of machining that there is little opportunity for a defect to get by. Furthermore, there are adequate tests and inspection between successive machining operations and a gruelling production test. And the engine is completely disassembled again, carefully inspected and reassembled preceding a final test, before it is turned over to the shipping department for its final touching-up, crating and delivery.

While many of the operations on smaller parts show little divergence from characteristic automotive work of a fine quality, yet there are some six or seven major parts whose method of fabrication is worthy of detailed description. Hence they were given in detail in a series of articles in THE IRON AGE of July 18, Aug. 8, Aug. 15, Aug. 22, Aug. 29 and Sept. 5, 1929.

Plants of Wright Aeronautical Corporation Paterson, N. J.





THIRD FLOOR

FOURTH FLOOR

Buildings Shown in General Plant Layout

A—Four-Story Main Building
B—Four-Story Head Building
C—Four-Story East Wing
D—Four-Story Center Wing
E—Assembly Building
F—Production Test Building
G—Rough Stock
H—Pickle House
I—Oil House
J—Experimental Test
K—Master Transformer Station
L—Boiler House

Making Motor-Bus Bodies of Steel

Die Costs Limit This to Multiple Production— Sheets, Formed to Shape, and Tubing Are Large Factors

BY FRED L. PRENTISS*

MOTOR-BUS transportation has gained so rapidly the past two or three years that there has been a steady increase in the production of buses. The manufacture of bus bodies has thus become well established as an important branch of the automotive industry. And the larger output of buses and the greater demand for bodies has enabled bus-body manufacturers to develop their methods with a view to increasing efficiency in production, and to make considerable progress in standardization.

There were 9000 motor buses built in this country in 1928 and the number now in operation is placed at 92,000. These figures indicate the importance which the industry has attained.

Developments of passenger bus transportation include the formation of large bus companies through the merger of small companies serving comparatively small areas, and the entrance of the railroads into the bus transportation field. It is stated that 72 railroads are now furnishing motor-bus transportation. The tendency toward the operation of buses in larger fleets than formerly has resulted in some standardization of motor-bus equipment by the transportation lines, working in cooperation with bus and body manufacturers.

Steel Dies Require Multiple Units

The steel industry has profited by the movement toward standardization in the bus-body manufacturing industry. When bus-body orders were for single or, at most, for very few units it was difficult for the steel bus-body frame to compete with the composite body made of wood reinforced with steel. If only a small number of bodies of a certain design was wanted, it was much cheaper to make them of composite material, as the expense of making dies for a few units made the cost of steel frames almost prohibitive.

INTERIOR of Assembled Body Frame. Longitudinal square tubing (top, center) carries baggage racks at sides. Roof rafters are at alternate pillars

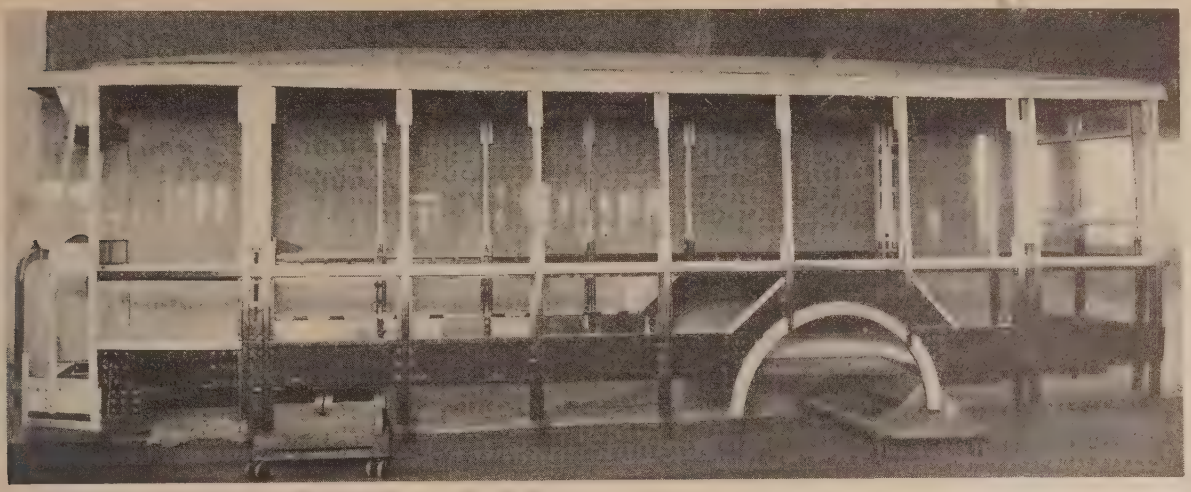
In addition, bus-body makers had to meet and overcome resistance to a change, the same resistance that the all-steel body met in the automotive industry a few years ago.

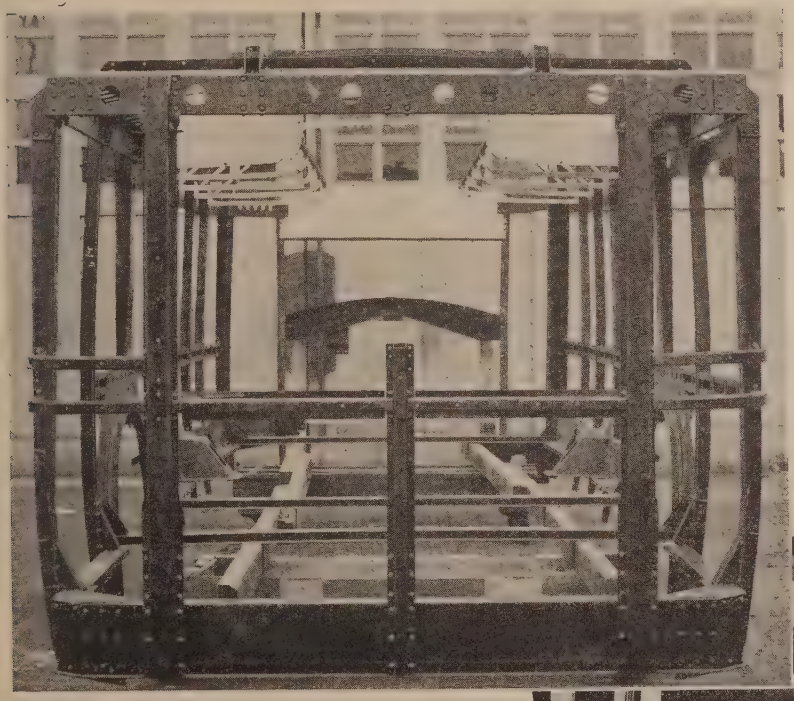
Standardized Steel Sections Used

Bus bodies having all-steel frames made of standardized sections are being manufactured by the Lang Body Co., Cleveland. These lack little of being all-metal bodies, as their outer covering is of aluminum and practically the only wood is the flooring and wood fillers on the inside, the latter serving as a deadener for noise and for attaching the interior finish of wood, leather or velour. While the metal frame, weighing 1800 to 2000 lb. for a large bus, is heavier than the composite frame, it is stated that the finished bus body having a steel frame is as light as one with a composite frame built according to specifications identical except as to frame material.

Advantages claimed for the steel-frame bus are its greater strength and safety to passengers in case of accidents. While manufacturers expect a longer life of a bus body with a steel frame than from the composite

*Resident editor, THE IRON AGE, Cleveland.

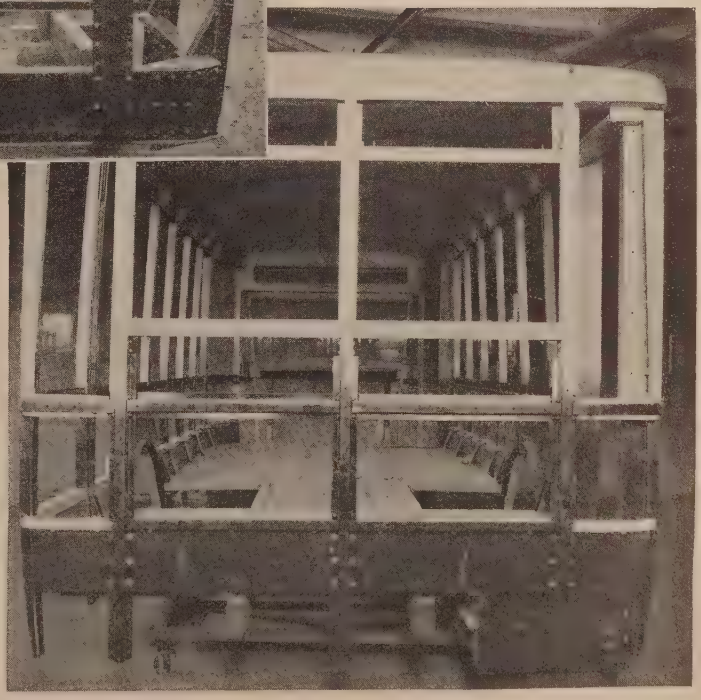




LEFT Side of Assembled Body Frame (Above), with Haskelite Roof in Place. Lower members provide for fastening the body to the chassis

* * * *

STEEL Body Frame, Assembled (Left), Viewed from Rear. Frame members are joined by hot riveting. Toncan steel or aluminum parts are used where exposed to weather



REAR of Assembled Body Frame (Right), with Wooden Fillers in Place. Many of the steel members are pressed from steel sheets of varying gages. Riveting work will be noted, on the underframe and elsewhere, on all the news on this page

frames, the steel-frame buses have not been in service long enough to substantiate this claim.

The frame of the Lang body bus is made of steel sections standardized in form, but varying in size and length, depending on the type and size of the bus. The main sills, which extend the length of the frame at the bottom of the two sides, are deep Z-sections, to which curved sections serving as the wheel housings are riveted and spliced near the rear end. To the sills are fastened uprights or pillars of channel form. Attached near the top of the pillars and extending the length of the body is a roof rail. This is a pressed channel section in which are lightening holes with a minimum diameter of 2¾ in. The holes also provide an opening through which a hand and tool can be inserted to hammer out dents that may be made in the outer metal covering during service.

Channel sections extend the length of the sides between the pillars at a point a little below the windows. The main sills are inside the pillars above the chassis line. On the outer side of the pillars, or along the outside of the body, are pressed steel buffer rails which serve as a brace to the chassis and relieve the sills of shocks that might be caused by collisions.

Rafters extending across the top of the frame for supporting the roof are attached to alternate pillars. Longitudinal members of square seamless steel tubing extend two-thirds the length of the bus beneath the rafters, for carrying the baggage rack. This is formed by similar sections connected to these longitudinal members and to the pillars. The various fabricated parts used in the construction of the rafters, baggage rack and supporting members for the roof are joined together by aluminum castings to which the steel members are riveted. The roof, which is of Haskelite, extends from roof rail to roof rail.

Under the frame at each chassis outrigger a cross sill made of a pressed channel section is riveted to the sills and bolted to the chassis outrigger. These serve as ties for the body and as bolting members for fastening the body to the chassis. The frame members are all joined by hot riveting, except a few minor joints which are welded because of their inaccessibility for riveting.

Formed Sheet Steel Used Largely

The pillars of Toncan steel and other metal parts exposed to weather are of that steel or aluminum. The side and cross sills and roof rails are of blue annealed sheets. The rafters are of metal furniture sheets. Sheet steel of various thicknesses is used for the different members, ranging from No. 12 gage to ¼ in. for cross sills, No. 13 to No. 10 gage for side sills, No. 16 to No. 12 gage for the pillars and for the roof rails. The outside paneling is No. 14 gage, one-half or three-quarters hard, gray sheet aluminum, which is bolted to the steel frame. There are no exposed bolt heads, as these are covered with hollow molding of aluminum or steel.

In manufacturing the steel frame sections steel templets are used in the blanking, punching and forming operations. This practice has been adopted to assure a duplication of holes and parts so that all service parts ordered for replacement will be exact duplicates of the originals.

All parts requiring holes are punched flat. All forming is done with the work located by holes, instead of having the edge of the sheets come in contact with a stop on the press. Certain holes are located for jig holes and, when possible, these are used also for structural holes. The jig is a permanent, adjustable fixture attached to the front and back of the press.

All templet holes are ⅝ in. in diameter, regardless of the size of the hole to be punched in the sheet. The templet is clamped to the blank and the holes are punched on a press equipped with a 4-gag punch holder, designed for use in punching holes in four sizes, one at a time. A ⅝-in. spring plug is used to locate the holes. By the methods followed both speed and accuracy in punching holes have been increased.

The set-up for the forming operation with the use of templets requires more time but, it is stated, results in more accurate work. The various operations involved in the making of parts are done without the use of blueprints. However, blueprints are used in the assembling operations.

Sub-Assembly Method Employed

A complete bill of material is kept for each part, as well as a drawing record, which shows the location of the parts. Every part is detailed on a bill of material and bears a number which is used in ordering service parts.

Sub-assemblies are made of the larger units that form the frame. These are the sills, the roof rails, pillars and wheel housings. These four units are brought together in box-type, adjustable assembly jigs where they and other minor parts are put together to form the final assembly of the frame. The parts and frames when completed are handled by hand hoists operated on two runways above the assembly line. When the assembly is completed the frame is lifted from the jig and placed on a dolly, on which it is moved to the painting room.

All parts of the frame are given two coats of asphalt paint. Each part is dip painted before assembly and the second coat is applied after assembling.

Offsetting Peening Action on Overhead Tramway Rails

FOR many years it was thought that the reason for the flange of an overhead carrying rail turning down was because the rail had been overloaded. This theory has long been exploded, according to E. T. Bennington, Cleveland Electric Tramrail Division, Wickliffe, Ohio, speaking at an engineers' meeting in Akron. If an overload were to cause the flange of the beam to turn down, it would turn down the first few days that such a system was in service. But it has been learned in practice that the turning down of the flange does not occur for a considerable period after the system is installed, and until it has been subjected to a great many passages of load-bearing wheels.

Only four ways are known to the author to provide a rail for an overhead system that will not be rendered useless in a short while by this peening action. Three of these are varying methods of providing separate wearing surfaces and attaching them to the lower flange of the I-beam (or equivalent) carrying the load. The fourth is a type of rail used by one manufacturer specializing in the construction of tramrail systems. This is rolled in one piece, and made of high-carbon steel. It provides a flange which will not be distorted by peening, although peening still takes place the same as it will in all of the shapes and suggestions offered.

In all four types the metal which is peened or expanded works off the rolling surface in the form of the flange without distorting the shape and without rendering it unfit for continued use.

Types of American Alloy Steels

Survey Gives Tonnage of Ingots and Castings Made in 1928—Some of the Uses

BY EDWIN F. CONE

INTEREST in knowing how much alloy steel of different types was made in the United States encouraged the making of a canvass of the 1928 production. Only open-hearth and electric steels were covered. The survey has given data for about 81 per cent of the ingot output and over 98 per cent of the alloy steel casting output.

The production, as compiled from the replies received from producing companies, and here tabulated, classifies 2,410,356 tons of alloy ingots (80.8 per cent of the 2,983,365 tons of open-hearth and electric steel recorded by the American Iron and Steel Institute) and 160,911 tons of alloy steel castings (98.7 per cent of the 163,236 tons of open-hearth and electric alloy steel castings made in 1928).

American Output of Open-Hearth and Electric Alloy Steel in 1928—Gross Tons

Type of Steel	Ingots	Castings
Nickel	125,444	2,179
Chromium	302,204	9,453
Chromium-nickel	235,887	25,720
Molybdenum	1,075	175
Chrome-molybdenum	60,993	7,104
Nickel-molybdenum	108,934	542
Nickel-chrome-molybdenum	16,653	1,726
Vanadium	15,958	417
Chrome-vanadium	160,415	167
Medium manganese (1 to 2 per cent min.)	231,185	30,414
Hadfield's manganese	7,098	51,504
Copper	868,501	10,712
Copper-molybdenum	67,214	.....
Molybdenum-manganese	2,153	1,450
Others	206,642	19,348
Unclassified	570,009	2,325
Open-hearth	2,629,703	83,802
Electric	353,662	79,434
Total	2,983,365	163,236

Copper and Chromium Steels Lead in Ingots

THE large quantity of copper-bearing steel ingots made in 1928—868,501 tons—heads the ingot alloy output. This is a measure of the extent of the copper-bearing sheet industry.

Second to this comes the chromium steel ingot output—302,204 tons—reflecting in part the production of stainless iron. If the production of chromium-nickel steel ingots is also considered in this classification, then over 536,000 tons of such steel is largely the rust-resisting steels—the stainless steels and the high-chromium-nickel steels. Of course, in these totals there is included the lower alloy steels, of which no small quantity is made.

Of considerable importance is the so-called medium-manganese steel, containing 1 to 2 per cent manganese —231,185 tons of ingots. There is an increasing demand for this grade.

The Molybdenum Alloy Steels

Another steel which is comparatively new is the nickel-molybdenum steel, of which 108,934 tons of ingots were reported for conversion into rolled products and forgings. Still more recent is the molybdenum-manganese steel, of which 2153 tons was reported, a steel of which probably more will be heard in ensuing years.

Probably the 67,214 tons of copper-molybdenum steel represents some alloy steel rails which are being experimented with by some of the American railroads.

That vanadium is a large factor in the alloy steel industry is partly brought out by this survey in that over 176,000 tons of ingots were made last year in which this element was incorporated.

Many Special Steels Are Made

Under "other" alloy steels in the table, the 206,642 tons of ingots and 19,348 tons of castings include high-speed steel, nitralloy and special compositions not embraced in the other classifications. There are a great many such steels, one company enumerating such compositions as manganese-copper; high aluminum; copper-chromium and nickel; silicon and manganese; nickel, vanadium and chromium; silicon; molybdenum, chromium and vanadium, and so on.

Features of Alloy Cast Steels

IN alloy steel castings the feature is the large production of Hadfield's manganese steel (12 to 14 per cent Mn.) at 51,504. If the output of converter foundries were added to this total, it is probable that this would approximate 55,000 to 60,000 tons.

Outside of the high-manganese castings, which have been made for many years, the most important seems to be the chrome-nickel composition of which 25,720 tons was made last year. Some of this is the corrosion and heat-resisting material. Probably the 9453 tons of chromium castings includes the major part of the alloy steel, frogs and switches produced.

Attention may be called to the 7104 tons of chrome-molybdenum and the 1450 tons of molybdenum-manganese castings as well as the 10,712 tons of copper-bearing castings.

Chromium Leads Among Alloying Metals

The extent to which the four chief alloying metals were used in 1928 as alloys in steel may be summarized as follows in gross tons:

	Ingots	Castings	Total
Chromium	615,737	160,415	776,152
Nickel	486,918	30,167	517,085
Molybdenum	257,022	10,997	268,019
Vanadium	176,373	584	176,957

These data do not include all such steels, for the classification "other steels" embraces some containing each of these alloying metals.

Some of the Industrial Uses

IN response to the question as to the industries to which alloy steels are sent, the replies were exceedingly varied. Only a few of these are worthy of attention, as many of the uses to which alloy steels are put are generally known.

A large company making several varieties of alloy steel ingots indicated that its products went to more than 15 types of consumers, including automotive products and parts, car builders, agricultural implement manufacturers, ship builders, structural steel fabricators, culvert, roofing and tank manufacturers, fence and other wire products, razor blade makers, industrial machinery manufacturers, makers of shafting, drop forgings, springs and axles, not to mention tool steel and castings for steel plants and rolling mills.

Another large alloy steel producer, making principally ingots and a few alloy castings, sends its products to the oil, chemical, machine tool, mining and milling industries, as well as to public utility companies. A concern having a small alloy casting output states that some of its products go to the ceramic, electrical and general stamping industries. A great deal of alloy steel ingots ultimately find their way to incorporation in shear knives for the sheet metal and tin plate industry, according to a large electric alloy steel ingot maker.

Several companies on the Pacific Coast report that their alloy steel ingots and castings are finally used in the sawmill and logging industries. Still another producer, which makes open-hearth and electric alloy steel ingots only, indicates that its products

are for chain makers and ball bearing manufacturers, and automotive, machine tool and tool steel consumers. That a considerable quantity of alloy steel ingots is finally incorporated in thermostatic equipment and magnets and in saws, knives and other edge-cutting tools is the testimony of a representative alloy steel ingot producer.

A Western producer of many grades of steel ingots and castings, both alloy and plain carbon, reports that its large output of copper-bearing steel is furnished to the Navy for use for special purposes and that some of its copper-bearing ingots are converted in its own mills from sheet bars into sheets. Some of its chromium-nickel castings are furnished to makers of oil-well machinery as pressure castings.

A representative producer of the high-chromium-nickel steels supplies the electrical, oil, chemical, paper, kitchen equipment and architectural industries.

Among the makers of alloy steel castings, one in the Far West serves paper making, cement mills and vegetable oil mills, as well as the mining and logging industries. A Texas steel foundry reports that all its chromium-nickel alloy castings go to the petroleum industry. For heat, corrosion and abrasion-resisting conditions, another company furnishes chromium and chromium-nickel castings, while an electric alloy-steel maker sends chromium-nickel castings to a steam hammer manufacturer.

A recently organized electric steel foundry makes six grades of alloy steel castings for crushing and grinding equipment, dredge-pump parts and equipment for cement plants. A large Eastern company which makes valves uses certain alloy castings, principally chromium-nickel, in its own product, and a Middle West foundry sends alloy steel castings to furnace manufacturers and heat-treating plants.

Alloy steel castings, made by a Pennsylvania foundry, are furnished to gear makers and steam and electric shovel manufacturers, a large proportion of these being medium-manganese steel. Builders of rolling-mill machinery, hydraulic and special machinery are obtaining a large quantity of chromium-molybdenum and manganese-molybdenum castings from a Middle West foundry. A small foundry reports that its chromium-nickel, nickel and plain vanadium castings are being sent to seamless tube mills.

Prospects for the Industry

QUITE general is the testimony of several of the reporting companies that the prospects are excellent for a largely increased production of both alloy steel ingots and castings. This is particularly true in the stainless field, orders for such steel now being very heavy.

It is undoubtedly true that the statistics of the American Iron and Steel Institute do not fully reflect the entire alloy steel production of the country. This is due to some misunderstanding as to just what an alloy steel is. Some contend that where the alloying element is used in only very small proportions, around 0.25 per cent, such as in the case of the carbon - vanadium, carbon - molybdenum and the "copper-bearing" steels, that these are "semi-alloy" steels and should not be included. Some producers of the medium-manganese rail steels, a large amount of which is made each year and the consumption of which is growing, are not included in the statistics of the institute.

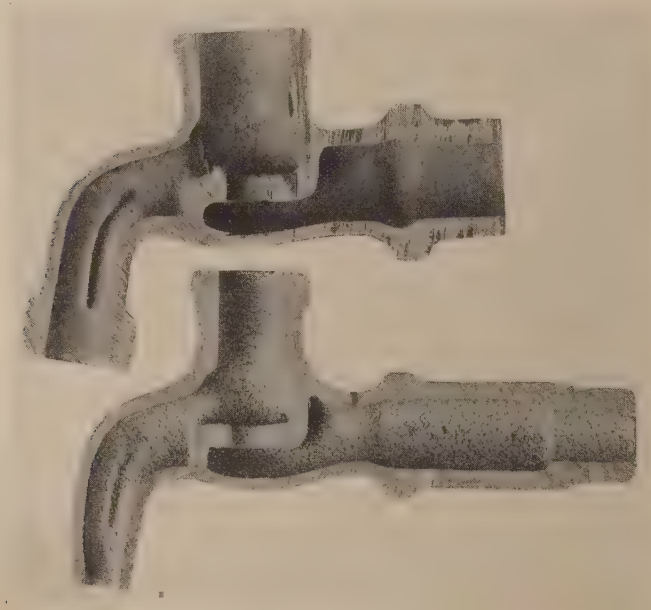
A plea for the clarification of this matter is urgently made. While the statistics gathered in the foregoing survey may not coincide in every particular with the data published by the American Iron and Steel Institute, it is felt that they are representative of the industry in general and therefore have some value as indicating trend. Only two or three important producers failed to reply to the questionnaire.

Core Preparation to Improve Castings

A NEW method of treating cores and molds in the production of castings has been devised by the Sherman Corporation, industrial engineer, 292 Madison Avenue, New York.

The method uses a highly volatile liquid vehicle diluted with various soluble binders to stiffen the surface filler material, preferably red talc, and the coating may be applied in varying thicknesses, due to infiltration; it dries quickly and is non-inflammable. Thus far the method has been used largely on dry sand cores and molds, and with cores having either a gluten or an oil binder or a combination of oil and other binders. While the method is particularly useful in brass foundries, due to the cutting-in of the metal into cores and molds, it offers interesting possibilities for ferrous work.

Demonstration has indicated that the work of cleaning castings, through this Sherman core treatment method, is reduced materially, running from 15 to 25 per cent less. Treated cores and molds do not absorb moisture and may be stored indefinitely. Sand blasting of all cored work has been reduced to much less than is required without the treatment.



Casting (Above) Made with Core Treated by the Sherman Method. By contrast the other was made with an untreated core

Avoiding Lost-Time Accidents

The Carrie blast furnaces at the Homestead Steel Works of the Carnegie Steel Co., Homestead, Pa., were operated from March 2 to Oct. 27, 1929, a period of 238 days, without a single lost-time accident. The average working force during this time was approximately 850 men, and the actual hours worked, 1,772,680.

During this period 1,066,110 tons of pig iron was produced and 94,548 cars were handled, including 36,008 ladles of molten iron and 26,190 ladles of molten slag. W. S. Unger, superintendent of the Carrie furnaces, was recently given the Johnson Award for outstanding blast furnace practice by the American Institute of Mining and Metallurgical Engineers.

Insulated Open-Hearth Furnace Built

Excellent Operating Results Reported for Unit Encased in ¼-In. Plate to Avoid Infiltration—Electrically Controlled Reversing Valve

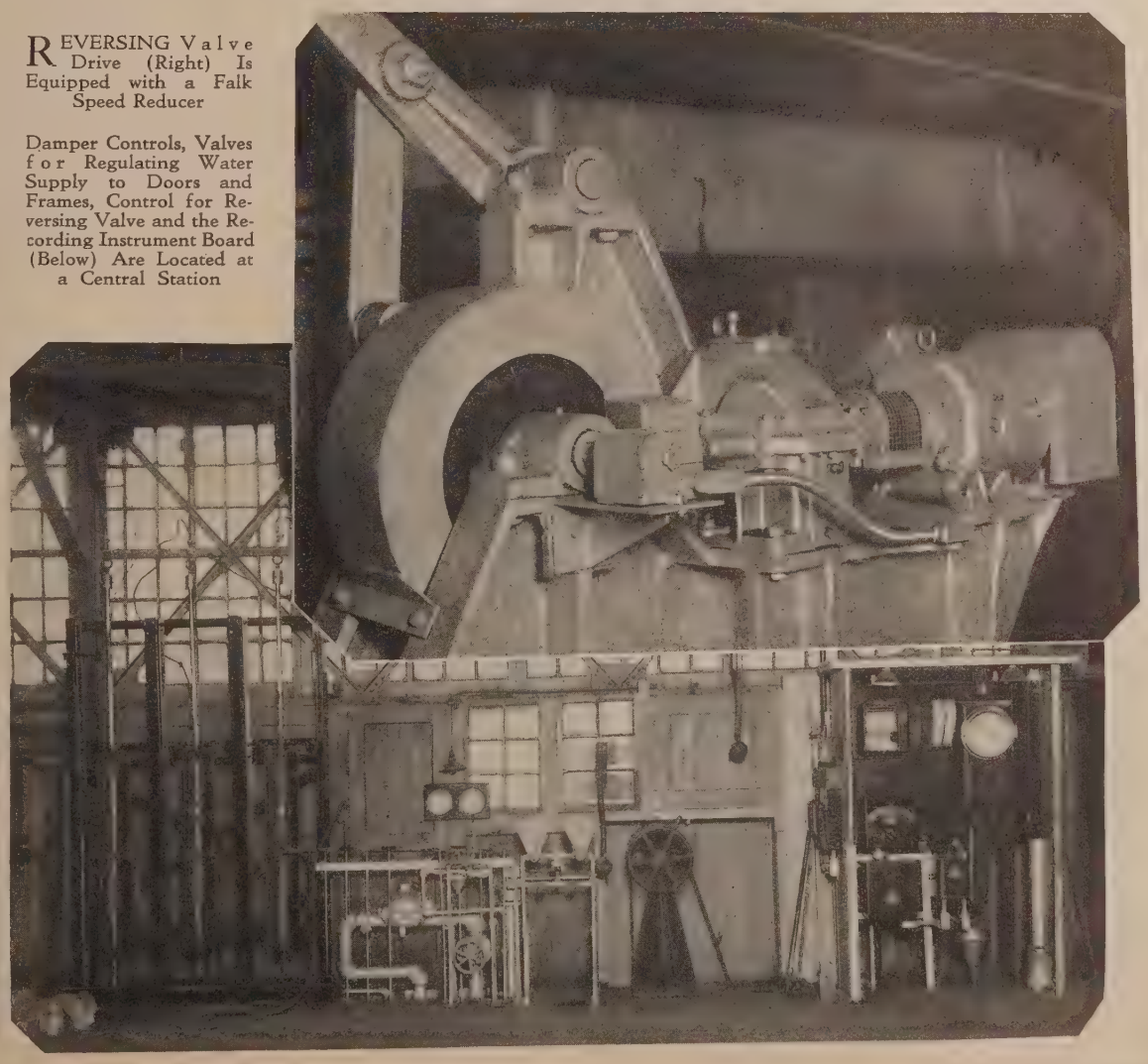
AFTER 550 heats no repairs have been made on roof ends, front and back walls or checker chambers of a 25-ton open-hearth acid furnace which was designed by the Freyn Engineering Co., Chicago, for operation by the Falk Corporation, Milwaukee. This is an oil-fired unit, which measures 12 x 44 ft. The average fuel consumption, when operating at capacity, is 35 gal. of oil per ton of metal.

Foundations under the checkers, flues and the valve are insulated with approximately 3 in. of Sil-O-Cel C3 furnished by the Celite Products Co., Los Angeles, Cal. In addition to the Sil-O-Cel, two courses of 9-in. standard firebrick complete the foundation. The checker chambers are encased entirely with ¼-in. steel plates. These chambers are surrounded with an 18-in. wall consisting of 4½ in. of insulating brick C-22, 4½ in. of firebrick and 9 in. of standard silica brick. The insulating brick were brought up to the skewback of the checker chambers. Inside, the checker chambers are 14 ft. 6 in. long and 11 ft. 5 in. wide.

Each chamber roof consists of 3 in. x 6 in. x 12 in. silica brick with 17-in. crown, covered with one course of insulating brick C-22. Each chamber has 17 courses of 9-in. brick, consisting of 13 courses of firebrick and four courses of silica brick. Two 5-in. peephole doors with colored glass give the furnacemen a good view into the chamber.

The bath is made up of six courses of brick as follows: one course of insulating C-25 brick running up both ends of the bath pan, two courses of firebrick laid in fire clay, three courses of 9-in. standard silica brick, allowing the usual expansion of ¼ in. This gives the bottom a thickness of 15 in. of brick plus 11 in. of silica sand to complete the bath for operation.

Slag pockets and uptakes are encased with ¼-in. steel plate. The



REVERSING Valve Drive (Right) Is Equipped with a Falk Speed Reducer

Damper Controls, Valves for Regulating Water Supply to Doors and Frames, Control for Reversing Valve and the Recording Instrument Board (Below) Are Located at a Central Station

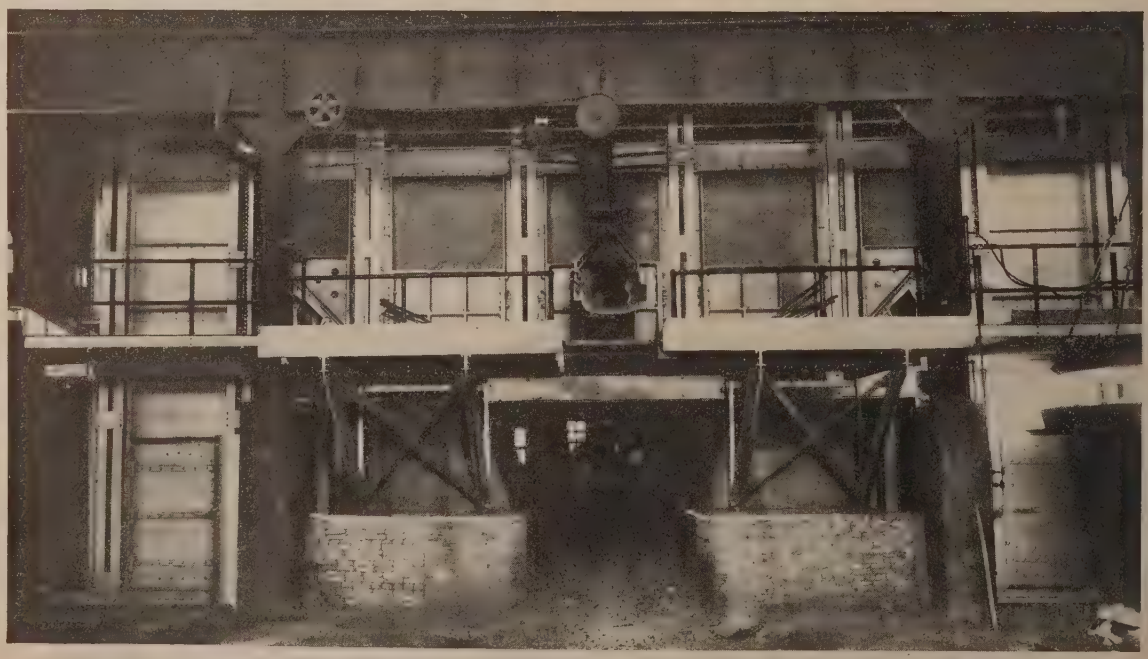
This Furnace Is Encased in a Steel Jacket. The doors and frames are water cooled

only parts not encased are the ends and part of the backwall. Openings in the uptakes are 41 x 42½ in. The slag pockets are 5 ft. wide. The bulkheads are protected with heavy steel doors lined with Sil-O-Cel 3 cement. The walls, which are 18 in. thick, are lined with silica brick laid in a thin silica cement dip. This method of laying the silica brick provides about 1/32 in. between bricks, plus the usual expansion allowed. Avoidance of infiltration of cold air, in addition to proper insulation, has decreased losses over Sunday shutdowns and has increased the speed of heats.

Among the features of the furnace, the doors have been in service for six months without relining. Water temperature at doors and frames averages 150 deg. Fahr. Three 7-in. diameter x 45-in. stroke air hoists are used to operate the doors, one hoist for each.

A water-cooled Nye reversing valve (rocker type) is entirely electrically controlled from the furnace platform and has a type 5DA Falk speed reducer. Air is furnished by a No. 4 Buffalo duplex conoidal fan with two Timken bearings, mounted on a standard subbase for a direct-connected motor. The fan is driven by a 5-hp., 230-volt d.c. adjustable-speed shunt-wound motor, having a Falk-Bibby coupling. The motor is controlled from the furnace platform by a d.c. starter.

The damper, inclosed in a steel frame, is controlled from the furnace platform. A gage regulates the height of damper and thus controls the stack draft. A superheater placed in front of the stack damper serves to superheat steam or air for atomizing the oil. This furnace has a recording pyrometer which gives the temperature at the stack damper, an automatic CO_2 recorder, and a draft gage.



The Walls, Which Are 18-In. Thick, are Lined With Silica Brick Laid in a Thin Silica Cement Dip

Opposition to New Duties on Graphite

American Importers, Grinders and Crucible Manufacturers Say Additional Duties Are Needlessly Burdensome Because Local Graphite Is Unsuitable

THE Senate in revising the tariff bill has made a grave mistake in allowing Senator Black of Alabama to enter a clause classifying "crystalline" and "flake graphite" under one head as "crystalline graphite," and placing a 2c. a lb. duty on it, according to a statement by H. M. Riddle, Jr., vice-president, Asbury Graphite Mills, Asbury, N. J.

Since 1922 crystalline graphite has carried a duty of 20 per cent ad valorem and flake graphite a specific duty of 1.5c. a lb. Before that time, graphite carried no duty. The present bill would mean an increase in duty on the highest types of crystalline plumbago from approximately $29 a ton to around $44.80 per ton, and on the lowest grade from an average of $7 per ton to $44.80, an increase of over 600 per cent.

These figures are opposed by a group of American companies engaged in the importation of graphite, and its grinding (whose spokesman Mr. Riddle is), particularly in view of the fact that American flake is today being offered at lower prices than the foreign product, and also since the increase is more than asked by the company producing 87 per cent of the flake graphite mined in this country in the last three years. In the hearing before the Ways and Means Committee it asked for a continuation of the present duty.

Efforts to Use American Graphite

As American flake graphite does not compete in quality or price with Ceylon or Madagascar graphite, Mr. Riddle's confreres can see no reason for a duty of any kind on this product. Ceylon graphite is of crystalline nature; it comes in several distinct formations which, with different characteristics, are suited for different products. Madagascar graphite, while of flake structure and resembling the American flake, is different in physical characteristics, flake size and structure. For these characteristics, nature itself is responsible. The types have not been found to be interchangeable.

American produced graphite is not an unknown material to any of the industries, neither does it represent a very young industry. It has been on the market for over thirty years and some of the crucible manufacturers and graphite grinders worked with it continually during that time.

It has been claimed by the Southern interests that American graphite has not been used by crucible manufacturers because of antagonism, lack of interest or price. Mr. Riddle states that all crucible manufacturers have tried to use it and they are today paying approximately 40 per cent more for the highest grade of imported graphite than is asked for the highest grade of American. These manufacturers are producers of crucibles of the highest quality. It is not reasonable to assume that an industry where cost must be kept down would pay this premium unless necessary. Yet a survey of the crucible industry showed that the total amount of domestic graphite used by all crucible manufacturers does not exceed 2 per cent of the total requirements, and this quantity is used in special products only.

The largest stove polish manufacturer in the United States (producing approximately 80 per cent of this country's requirements) and one of the largest users of graphite states "that regardless of the duty placed on imported graphite we will have to continue to use it, because we find it makes a much better stove polish than any domestic graphite."

Properties Required by Manufacturers

In making a graphite foundry facing the material must be pliable, unctuous and yet not claggy (sticky). These qualities are found to the highest degree in the foreign product but which, according to Mr. Riddle, do not appear in domestic graphite, which contains objectionable impurities, is harsh, has no body and is, therefore, unsuitable for foundry facing. In this connection the United States Government in issuing specifications for green sand foundry facing stipulates "Ceylon plumbago."

Several reports issued by the Department of Commerce, Bureau of Mines, shows this unsuitability of domestic graphite. The following is quoted from page 28 of Circular 6118, issued April, 1929:

> Some of the amorphous graphite mined in the United States has been nothing more than shale or slate, containing only enough carbonaceous matter to make it black. Other qualities grade into anthracite. Usually it is the physical character of the product that is of utmost importance, and the value of crystalline graphite depends upon its structure and upon the size of the particle quite as much as upon the carbon content. Flake finer than 90 or 100 mesh, for example, is not acceptable to crucible makers, and much larger flake (up to about 12 mesh) is desired.

The following is taken from Circular 6122 of May, 1929:

> American graphite deposits, though numerous and often large, are characteristically low grade. They constitute an abundant source of potential supply, but in normal times they have proved relatively costly to work, and even at the same price, the various products (domestic) never have been able wholly to displace certain imported qualities, notably crucible grades from Ceylon and pencil graphite from Mexico.

That circular has the following to say regarding Alabama graphite:

> The rock is largely quartz with some mica and apatite, and with rarely more than three or four per cent graphite. More efficient milling has made possible a 75 per cent recovery from rock containing only 2 per cent of graphite, the yield per ton being about 25 lb. of graphite.

California graphite is treated as follows in the circular:

> The smallness of the flake makes it of little value for crucibles and refractories.

Further information is given in Circular 6124 published in May, 1929:

> According to one authority, fully 600 graphite mines have failed in the United States, and the records show that of all these properties, scarcely a score have succeeded in operating for as much as a year or two. Throughout the country, in fact, there are scarcely a dozen States in which efforts have not been made at some time to exploit graphite deposits. Failures inevitably occur in all kinds of mining, but the disheartening feature of the record is that so few ventures have paid back the money put into them and none has been a conspicuous success.
>
> The graphite industry, it should be remembered, is in many respects a complicated one. Attempts to state its problems as broad generalities tend to obscure the facts that there are three or four wholly different types of graphite with several grades of each type. Moreover, graphites of nominally the same grade may not be interchangeable because of differences in purity and physical conditions.
>
> Both Alabama and Pennsylvania graphite dust (and flake) were said to be of inferior refractory quality because of their large silica and mica content which fuses under heat.

Further Consideration Urged

The consumers of graphite feel that Congress cannot fully understand this question or they never would burden the country with a duty on a commodity that cannot be produced here. No industry would go half way around the world to Ceylon and Madagascar, carry large stocks of crude material which ties up capital for from six to 12 months, and pay higher prices, if it were possible to use the material found at home. The American importers and grinders are therefore urging a further consideration of this question.

Easy Crane Control by Push Buttons

Accurate Spotting for Riveting Work, Saving in Labor and Increase in Production Reported

ELIMINATION of one man from the working crew and an increase of 25 per cent in output has been accomplished by the installation of a push-button control on a 40-ton riveting crane in the plant of the Lasker Iron Works, Chicago. The crew in this hydraulic riveting tower now numbers three men, including the rivet heater. The essential requirement on this installation was a flexible and delicate control which would quickly spot boiler shells, stack sections and other cylindrical work at 3-in. intervals for riveting in a bull riveter.

Equipment in this tower consists of a 40-ton overhead electric crane, the runway rails of which are 75 ft. above the floor, and three hydraulic riveting machines.

Three separate and independent push-button control stations, one at the control point of each bull riveter, are interlocked in such a way that only one set of push buttons can be used at one time, the others being thrown out of commission by an electric switch. Each push-button station has six push buttons; one for hoisting, indicating the hoisting direction; one for lowering; one for stopping, and three for first, second and third speeds.

An interesting part of the application is that for inching, or spotting at 3-in. intervals. The first-speed button is touched, after which, by pushing the stop button, the operator is able to stop exactly at the right point. For passing a seam of rivets to the next row, a distance of 2, 3 or possibly 4 ft., the operator uses the second or intermediate speed. For high-speed hoisting, as in normal work, the third or high-speed button is used. Incidentally, the problem of feeding current into the motor when the high-speed button is pushed is taken care of by means of a special control arrangement, whereby the motor is fed from the first or second bank of resistance before going across the line into high speed. This is done automatically by the switch arrangement.

The operation consists of very short movements repeated rapidly. The material to be riveted is spotted for the first rivet. The motor is then stopped, the rivet is driven in and then the motor is started again to move the material to the desired location for the next rivet and the operation is repeated many times.

This Push-Button Crane Control Provides Flexibility in Quickly Spotting Work at a Bull Riveter. Its use has cut labor cost and has increased production

How the Results Are Obtained

The motor used is a 60-hp., 220-volt, 3-phase, 60-cycle, slip-ring type, and speed control is obtained by the use of resistance inserted in the secondary winding. The resistance is under the control of magnetic contactors so that the amount in circuit at any one time may be varied and the speed changed accordingly. Three speeds are obtainable.

The control panel consists of a pair of three-pole magnetically-operated direction contactors which are mechanically interlocked one against the other, so that it is impossible to close more than one at a time. In addition to these, there are two three-pole magnetically-operated contactors for governing the amount of secondary resistance which is in circuit at any one time. Protection against overloads is secured by the use of a thermal type overload relay. There are also four small control relays used to obtain the proper functioning from the push-button station.

Push-button equipment consists of one push-button station having a forward button, a reverse button and a stop button. There are also five operating stations each consisting of three buttons, one for slow speed, one for intermediate speed and one for high speed. When starting up, the operator selects the direction of travel by pressing either the forward or reverse button. Operation of this button closes one of the directional relays but does not start the motor.

When ready to start, the operator presses one of the speed buttons, depending upon which speed he wishes to select, and the motor then starts and accelerates properly to that speed and no further. If he selects the slow speed, only the directional contactor closes, connecting the motor to the line with all of the secondary resistance in circuit. If he chooses the intermediate speed the directional contactor and one of the secondary contactors close and the motor is connected through a smaller amount of secondary resistance. The high-speed button closes the directional contactor and both of the secondary contactors, connecting the motor to the line with a minimum amount of secondary resistance in circuit. The amount of permanent resistance left in circuit at high speed is quite small and is used only to provide a slight cushioning effect when the motor is started or when load is suddenly thrown on it.

Obtaining Speed Acceleration

Automatic acceleration of the motor is accomplished by the use of timing relays mechanically fastened to the magnetic contactors. One of these relays is used in connection with the forward switch and one with the re-

versing switch; the closure of either one will make a circuit for the first resistance contactor. A third timing relay, used in connection with this first resistance contactor, controls the circuit for the second resistance contactor.

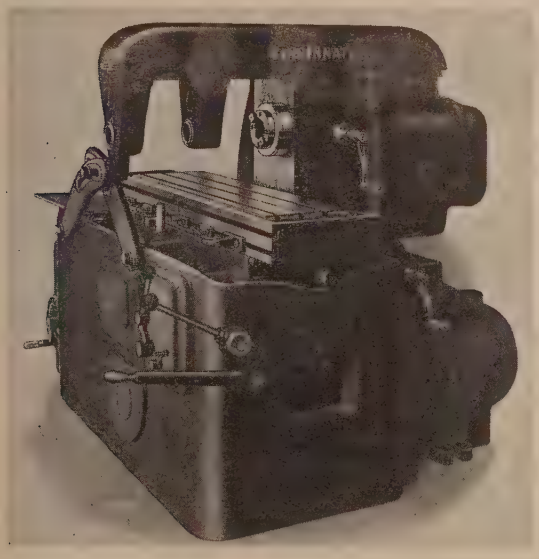
It will be noted that it is unnecessary to reach a high speed by first pressing the low speed and intermediate speed buttons. It is only necessary to press the push button for the speed selected and the motor automatically will accelerate to that point. The five speed selecting push buttons are located at different points around the machine and operation may be secured from any one of them.

Pressure of the stop button will shut down the entire equipment at any time, as will also operation of the overload relay. If a failure in voltage should occur, the equipment will shut down and will not automatically restart. It is necessary for the operator to restart by pressing the push button after a power failure. This control equipment, which was made by Cutler-Hammer, Inc., Milwaukee, was installed by Abell-Howe Co., Chicago, on a specially designed Northern Engineering Works crane.

Builds Smaller Hydraulic-Feed Miller

Machine with 24-in. Table Travel Available in Plain and Duplex Types for High-Production Work

TO the line of Hydromatic milling machines with locked hydraulic feed built by the Cincinnati Milling Machine Co., Cincinnati, has been added a smaller machine designated as the 3-24, with 24-in. table travel. The machine is made in plain and duplex types. Unit plan of construction is followed, the principal units of the plain machine being the standard No. 3 bed, No. 3 headstock, No. 3 spindle carrier with overarm and two arbor supports, spindle reverse and clutch units, and the hydraulic feed unit. The machines can be supplied with widened and raised headstocks, close-coupled spindle carriers, variable height overhung rail, and bridge-type fixed rail, to meet requirements.



THE Hydraulic Feed Unit Is the Same as That Used on the Larger Hydromatics. Any feed from 0 to 40 in. per min. is obtainable; quick traverse is at the rate of 300 in. per min. Plain machines are supplied with either one-way or two-way feed cycles

The bed is of semi-steel, is heavily ribbed and has pockets that permit coolant and chips to flow directly inside of the bed. Splash guards serve to confine the coolant within the table area. The spindle carrier unit and the spindle reverse and clutch unit comprise the entire spindle drive. A multiple disk friction clutch and bevel gear reverse mechanism are contained in the spindle reverse unit. The spindle carrier is self-contained, the entire gear transmission, including the spindle speed change gears, being mounted within it. Standard spindle speeds, eight in number, range from 27 to 200 r.p.m., but high and low series change gears can be supplied. The spindle is carried in a heat-treated 7-in. diameter steel quill that has a cross adjustment of 4¼ in., made through a self-locking worm and rack operated by a crank. Other adjustments for setting up the machine are made from the one position at the right of the machine.

The rectangular overarm, mounted on top of the spindle carrier, is of the company's standard design, but new overarm braces are employed. The spindle is mounted on double anti-friction bearings both front and rear, and all gears are of alloy steel and heat-treated. The face gear is 11 in. in diameter by 1¾ in. face. The entire spindle drive mechanism is equipped with anti friction bearings and is lubricated automatically. There are only four gear contacts from cutter to pulley.

The locked hydraulic feed unit, consisting of a variable displacement metering pump, a small booster pump, a gear pump and control valves, forms the closing member of the rear end of the machine bed. This unit is the same as that of the larger Hydromatics described in THE IRON AGE of Dec. 1, 1927. Hand feed changes are made by means of the lever on the feed unit, any feed from 0 to 40 in. per min. being obtainable. Automatic variable feed to suit a varying width or depth of cut is obtainable through a variable-feed attachment, which can be furnished. A positive stop and delayed trip attachment for feeding to a definite depth and dwelling to clean up the cut can also be supplied.

Operating levers are located conveniently at the operating position. The lower lever is used for starting and stopping the spindle. The lever just above it is the table feed directional control lever and has four positions. On the one-way cycle machine, which has feed to the left and quick traverse left and right, there is one position for feed, two for power rapid traverse of 300 in. per min. and a "stop" position. Two-way cycle machines have two positions for feed and two for power rapid traverse. Plain machines are supplied with either one-way or two-way feed cycles, while the duplex machines are offered only with the one-way cycle. A third lever, located at the side of the bed, starts and stops the table without affecting the table cycle.

Automatic control of all table movements, including automatic intermittent feeds, is obtained by dogs. The arrangement includes new type reversing dogs, set on the side of the table, which operate a trip plunger with oscillatory and reciprocating movement that controls the hydraulic feed mechanism. Reversal time of the milling cycle has been considerably reduced, permitting the use of shorter feeding strokes and giving faster production. A large variety of milling cycles can be obtained.

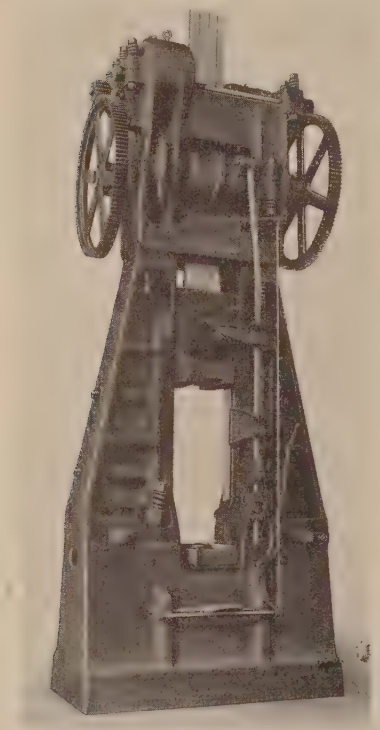
The table of the 3-24 machine has a working surface of 12 x 49 in. The net weight of the plain machine is 5500 lb., and of the duplex, 6500 lb. Machines of the same design but with 30-in. table travel can also be furnished; they are designated as the 3-30 plain or duplex Hydromatic.

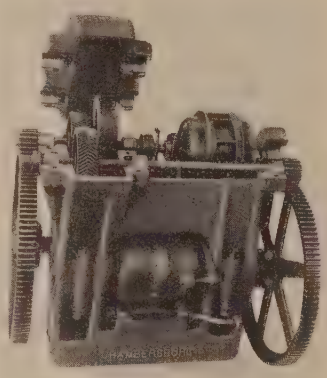
An attractive wall chart giving decimal equivalents of wire, letter and fractional size drills; tap drill sizes, and information relating to grinding, feeds and speeds and lubricants has been issued by the National Twist Drill Co., Detroit. The chart is on stiff board, is made in three folds for convenience and has a varnish finish. It is 11 in. wide and 27 in. long.

Board Drop Hammer with Motor-Driven Head

THE new model H board drop hammer built by the Chambersburg Engineering Co., Chambersburg, Pa., is now available equipped with individual motor drive. The motor-driven head is identical with the belt-driven head of model H machine, which was described at length in THE IRON AGE of Jan. 17, but the motor and driving assembly are mounted on a bracket that replaces the caps over the eccentric bearings. There is but one motor, which is spring mounted and shielded from the heat of forging. The drive to the roll shafts is claimed to provide uniform front and rear roll speed, and eliminate grinding of the boards.

The motor drives the rear roll-shaft through a metal flexible coupling. This shaft drives the front roll drive-shaft by means of a pair of balanced, forged herringbone gears that run in oil. A balanced flywheel on the rear shaft serves to protect the motor from variations of load and is capable of operating the hammer for several blows without power. At the opposing ends of the front and rear drive-shafts are non-metallic pinions that mesh with the cut steel gears on the roll-shafts. Movement of the roll-shafts is allowed for by sufficiently large centers between the drive and roll-shafts. All shafts are mounted in Hyatt heavy-duty roller bearings.





THE Driving Motor Is Spring Mounted and Is Shielded from the Heat of Forging. From the motor the drive is through flexible coupling to the rear roll-shaft, then to the front roll-shaft through herringbone gears. A flywheel is provided between the gears and the coupling of the rear roll-shaft

Among other advantages, the individual motor drive permits location to secure continuous flow of material to and from the hammer as well as greater convenience for reheats. Power is used only when forging and hazards are reduced because the hammer is stopped while it is being serviced. There is no hazard from belts, no need for staybraces and less wear on joints.

New Flexible Belt Lacing

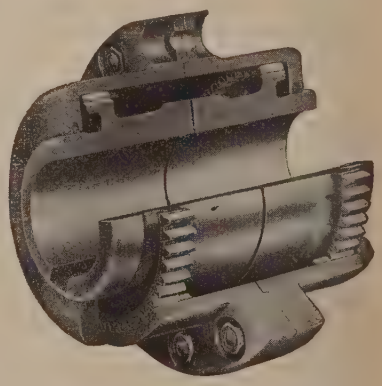
FLEXIBLE belt lacing called Steelgrip, for belts from 3/16 to ½ in. in thickness and for any belt width, has been placed on the market by Armstrong-Bray & Co., 28 North Clinton Street, Chicago.

This lacing is made of a heat-treated steel which has unusual toughness and high tensile strength but which is hard enough so that the points of the lacing will go through the toughest belting and stand up under long continuous use. The joint of the lacing is made with a steel rocker pin composed of two segments, one of which rocks against the other and thereby absorbing the wear at the joint when going over the pulley. The lacing can be applied with a hammer to fabric, leather or composition belting. Being smooth on both sides and flexible, the lacing is adapted for use on idler drives; because of its strength and flexibility it is recommended for use on conveyor belts.

Improved Poole All Metal Flexible Coupling

RECENT improvements in the flexible couplings made by the Poole Engineering & Machine Co., Baltimore, include a combination dust-proof and centrifugal oiling feature obtained by a new type double-flanged end-plate which contains within its inner lip a deep felt packing for the exclusion of dust and dirt. The outer section is grooved and contains back-drain holes which permit lubrication of the coupling while in motion. All parts are heat-treated to rigid specifications to assure longer life and protection against wear.

Few parts and ease of assembly are features of this coupling, which was described at length in THE IRON AGE of Jan. 14, 1926. The load is carried on crowned gear teeth, formed on the periphery of each shaft hub, which mesh with corresponding teeth on the interior of a floating and connecting sleeve member. The crowned teeth allow the sleeve to rock and assume the neutral position without binding action as the shafts rotate. The gear teeth are the only parts in contact and are continually submerged in oil under centrifugal pressure while running.



Improvements Include Centrifugal Oiling and Exclusion of Dust and Dirt

Scovill Mfg. Co. to Issue Bonds for Expansion

The Scovill Mfg. Co., Waterbury, Conn., manufacturer of screw machine products, has called a meeting of stockholders for Dec. 30 to vote on a proposal of the directors to issue $25,000,000 in 15-year 5½ per cent bonds and $12,875,000 of common stock to be used for the acquiring of other companies. E. O. Gross, president, has declined to make public the complete plans of the company, but it is said that one or more plants in the Central West are to be bought.

European Markets Affected by Holidays

General Apathy, But British Tin Plate Is Strong and Pig Iron Well Sold—Japan, Turkey, Egypt, Luxemburg and Germany Figure in News

(*By Cablegram*)

LONDON, ENGLAND, Dec. 23.

IRON and steel markets are quiet, on account of the approaching holidays, and no revival is expected before the new year. Cleveland furnaces are well placed and few accumulated stocks are anticipated over the holidays, as current unexecuted contracts are still heavy. Hematite furnaces are well sold in both domestic and foreign markets and makers now are reluctant to book first-quarter business except at increased prices.

British steel makers have advanced minimum export prices as follows: Plates, 2s. 6d. (61c.); angles and joists, 5s. ($1.22); asserting that they are unable to carry the burden of increased costs.

Tin plate markets are strong, with considerable inquiry, but business is slowing down, and all Welsh works will be closed this week.

Galvanized sheets are dull and prices have been reduced in an effort to attract buyers. Black sheets generally are idle.

On the Continent of Europe

Continental markets here are quiet and generally confused, after the European Raw Steel Cartel meetings. Most works are quoting the agreed minimum prices, but buyers assert that they still can obtain concessions from works wanting business.

The International Rail Makers' Association made no change in prices at its meeting on Dec. 13.

French October production was 894,000 (metric) tons of pig iron and 846,000 tons of raw steel. There were 157 blast furnaces active at the end of the month.

German pig iron production in November was 1,091,000 tons.

British Steel Market Is Quiet

Possible Government Transportation Control in London May Delay Railroad Buying—Steel Making Costs High

LONDON, ENGLAND, Dec. 6.—Business is beginning to show evidence of the usual decline in activity at the end of the year, although the iron and steel industry has not been genuinely active since early fall. Uncertainty as to the Government's intentions with the coal industry, and the unsettled financial conditions throughout the world have contributed toward making both buyers and sellers extremely cautious. In addition, British sellers are still faced with the serious difficulty of meeting severe competition in overseas markets, which has made them rely more upon their home market.

Production costs have shown a steady advance in the past few months, but in most cases producers have refrained from passing these increases on to the buyer. Cleveland pig iron producers are well engaged for the rest of this year and report practically all shipments going directly into consumption. So far, however, forward contracting has been small and irregular. Large railroad and construction contracts, however, promise some substantial buying of steel-making iron early in the new year.

Purchases for replacement, repairs and expansion of the transportation systems in the London area, such as buses, trams and railroads, may be delayed considerably by the Government's suggestion of a unified control under its supervision.

An example of the increases in costs faced by British producers was recently given by F. J. Rees of the Llanelly Steel Co., president of the Swansea Metal Exchange. At the annual meeting of the exchange, he stated that the Welsh steel makers are paying 50 per cent more for coal than in 1913, about 20 per cent more for pig iron, about 40 per cent more for scrap and 67 to 200 per cent

British and Continental European Export Prices per gross ton, f.o.b. United Kingdom Ports, Hamburg and Antwerp, with the £ at $4.88

British Prices f.o.b. United Kingdom Ports

Cleveland No. 3 foundry	£3	12½s.	to	£3	13½s.	$17.69	to	$17.93
East Coast hematite	4	0	to	4	1	19.52	to	19.76
Ferromanganese, export	12	5	to	13	0	59.42	to	63.05
Billets, open-hearth	6	2½	to	6	5	29.89	to	30.50
Sheet bars, open-hearth	6	0	to	6	5	29.28	to	30.50
Black sheets, Japanese specifications	12	10				61.00		
Tin plate, per base box	0	18¾	to	0	19	4.57	to	4.64
Rails, 60 lb. and heavier	7	15	to	8	15	37.59	to	42.43
						Cents per Lb.		
Steel bars, open-hearth	8	0	to	8	10	1.74	to	1.85
Beams, open-hearth	7	7½	to	7	12½	1.60	to	1.66
Channels, open-hearth	7	12½	to	7	17½	1.66	to	1.72
Angles, open-hearth	7	7½	to	7	12½	1.60	to	1.66
Ship plates, open-hearth	7	15	to	8	2½	1.69	to	1.77
Black sheets, No. 24 gage	10	0	to	10	5	2.18	to	2.23
Galvanized sheets, No. 24 gage	12	7½	to	12	10	2.69	to	2.72

Continental Prices, f.o.b. Antwerp or Hamburg

Foundry iron, 2.50 to 3.00 per cent sil., 0.50 to 0.90 per cent phos.	£3	7s.	to	£3	11½s.	$16.35	to	$17.45
Foundry iron, 2.50 to 3.00 per cent sil., 1.00 per cent and more phos.	3	6	to	3	8	16.11	to	16.59
Billets, Thomas	4	11	to	4	12	22.20	to	22.45
Sheet bars, Thomas	4	11	to	4	13	22.20	to	22.69
Wire rods, low C., No. 5 B.W.G.	6	3	to	6	5	30.01	to	30.50
Rails, 60 lb. and heavier	6	8½	to	6	10*	31.35	to	31.72
Rails, light	6	1½				29.65		
						Cents per Lb.		
Steel bars, merchant	5	5	to	5	6	1.14	to	1.15
Steel bars, deformed	5	3	to	5	5	1.12	to	1.14
Beams, Thomas, British standard	4	19	to	5	2	1.08	to	1.11
Channels, Thomas, American sections	5	10	to	5	17	1.19	to	1.27
Angles, Thomas, 4-in. and larger, over ⅝-in. thick	5	0	to	5	6	1.09	to	1.15
Angles, Thomas, 3-in.	5	6				1.15		
Ship plates open-hearth inspected	7	5				1.58		
Black sheets, No. 31 gage, Japanese	12	3	to	12	4	2.47	to	2.66
Hoop and strip steel over 6-in. base	5	11½	to	5	12½	1.21	to	1.22
Wire, plain, No. 8 gage	7	0				1.52		
Wire, galvanized, No. 8 gage	8	10				1.84		
Wire, barbed, 4-pt. No. 12 B.W.G.	11	4	to	11	6	2.44	to	2.46
Wire nails, base	0	6¼				$1.55 per keg		
Wire nails, assortments 1 to 6-in. keg	10	6½				2.69		

*Open-hearth steel, 8s. ($1.94) per ton extra.

more for other commodities. Handling charges at the docks on imported ore, he said, had increased by 130 to 143 per cent, on pig iron by 110 to 128 per cent and on scrap by 111 to 166 per cent. The average increases in freight rates since 1913 have been about 73 per cent on coal, 69 per cent on pig iron, 40 per cent on scrap and 73 per cent on steel bars. Wage costs on bars have increased 25 to 61 per cent between 1913 and 1929 and the cost of social insurance is at least 300 per cent above the 1913 level.

Cooperative Buying by Wire Rope Makers

HAMBURG, GERMANY, Dec. 9.—A cooperative buying organization of small manufacturers of strand wire and wire rope, the Einkaufs und Interessen G.m.b.H., Essen, has been sufficiently successful to justify its renewal for two years more. The Einkaufs und Interessen acts as buyer of raw materials for about 50 small plants in Germany and, with substantial tonnages to place, is able to obtain lower prices than an individual consumer. Tool makers and manufacturers of bolts and rivets are planning similar cooperative buying organizations.

Japan Expects Decline in Black Sheet Prices

YOKOHAMA, JAPAN, Nov. 27.—Following completion of its No. 2 sheet mill, the Seitetsu-jo at Yawata expects to produce about 5000 tons of electrical sheets next year. Black sheet production in Japan has been delayed somewhat, so that deliveries by the Kawasaki Dockyard Co. are expected to come into the market in volume about next April. Meanwhile, about 10,000 tons of light-gage black sheets are reported to have been bought abroad by trading companies for delivery at about the same time. Recently the Tokio Galvanized Sheet Co. has been quoting lower prices on its brand, and a still lower market is expected in some quarters as spring approaches.

Lower Prices on Wire Rods in Far East

HAMBURG, GERMANY, Dec. 9.—Following a considerable period of stable prices on wire rods for the Far East, keen competition among European makers has brought about a reduction, despite the fact that makers are united in a cartel. Recent quotations, c.i.f. Kobe or Yokohama, have been £7 9s. to £7 11s. per ton, (1.62c. to 1.64c. per lb.), although the official cartel price is £7 13s. 6d. to £7 15s. 6d. per ton (1.67c. to 1.69c. per lb.). Since reports from the Far East indicate that competition from the United States is less marked than earlier in the year, the lower price level is attributable only to European competition.

Second New Furnace Blown in at Arbed Works

HAMBURG, GERMANY, Dec. 9.—The second new blast furnace at the plant of the Acieres Reunies de Burbach-Eich-Dudelange in Luxemburg has been blown in, and a third furnace will be completed and ready for blast in January. The three new furnaces will replace six old ones, which are to be dismantled. The annual capacity of the three new furnaces will exceed that of the six old stacks by about 100,000 metric tons a year.

New Copper Plant Being Built in Germany

HAMBURG, GERMANY, Dec. 9.—The Siemens-Halske A. G. has begun construction of an electrolytic copper plant near here for the Zinnhütte Wilhelmsburg A. G. The new plant will have an annual capacity of 18,000 to 19,000 tons, which should further reduce importation of copper. In the first 10 months of this year 170,650 tons of copper was imported, compared with 197,801 tons in 1928. At the same time exports of copper increased from 16,477 tons in 1928 to 24,920 tons in first ten months of this year.

Chrome Ore Concessions Sought in Turkey

HAMBURG, GERMANY, Dec. 9.—Concessions to operate in the Turkish chrome ore fields are being sought by European companies, including the British Chrome Ore Co., Ltd., and the Société des Forges Françaises. Thus far a Swedish group, the Baschtasch Turk Maaden Shirketi of Angora, Turkey, is the only interest to be given a concession. This company will be permitted to export 16,000 tons of chrome ore annually.

Steel Cartel Retains Curb on Output

WASHINGTON, Dec. 24.—At the meeting of the administrative committee of the International Steel Cartel, held in Düsseldorf, Dec. 14, it was decided to continue to regulate production to market requirements as a part of the agreement to be concluded in the establishment of sales cartels, according to a cablegram from Berlin to the Department of Commerce.

It was also decided to establish an office for distribution of export orders for the principal products of the cartel membership as a preliminary to the formation of the much discussed sales cartels. It is planned to have the office function for six months, beginning Jan. 1, 1930, during which period an extended study will be made of existing international sales cartels, so that necessary changes may be made before establishing sales groups.

The present production quota, will remain in effect for the first quarter, the actual output being on the basis of 29,058,000 metric tons, or 10 per cent less than the 32,287,000-ton quota in effect prior to the reduction ordered in November. The next meeting of the cartel will be in Paris, March 13.

Wide Range of Bids for Egyptian Rails

HAMBURG, GERMANY, Dec. 9.—Despite the control over rail prices for export that the International Rail Makers' Association is supposed to exercise, a recent opening of bids on 20,000 tons of rails for the Egyptian State Railways brought out a wide variation in prices. Bids were submitted by 10 sellers, including the American Steel Export Co. The contract was placed with David Colville & Sons, Glasgow, Scotland, who received 15,000 tons, and with the Vereinigte Stahlwerke A. G., Düsseldorf, Germany, which was given 5000 tons. The German mill quoted a 2½ per cent lower price than the British maker.

Germany Seeks More Steel Furniture Business

HAMBURG, GERMANY, Dec. 9.—Manufacturers of steel furniture have established a cartel with offices in Berlin and are planning an advertising campaign in Germany to increase the use of their products. A number of manufacturers recently returned from the United States where they studied methods of making steel furniture.

International Wood Screw Cartel Planned

HAMBURG, GERMANY, Dec. 9.—At a recent meeting of British and Continental wood screw manufacturers in Paris, at which American makers were represented, establishment of an international wood screw cartel was discussed. This was the fourth meeting in two years called for such a purpose, but agreement could not be reached. However, a special committee was appointed, which will endeavor to work out a plan upon which all makers can agree.

Reed & Prince Mfg. Co., Worcester, Mass., manufacturer of screw products, has bought the property at 3635 Iron Street, Chicago, with the purpose of increasing its warehouse facilities in that city. The purchase includes a building with about 25,000 sq. ft. of floor space and a tract of land to provide for any further expansion that may be demanded. The Chicago project entails no plans for establishing manufacturing facilities in the Middle West.

This Issue in Brief

Seam welder "stitches" steel plates together to make new battledeck floor. Will strengthen building, lessen dead load, and cut cost.—Page 1721.

* * *

Operating costs in every department are usually reduced when mechanical-handling equipment is installed. Lower handling costs is not the only saving. Benefits are far-reaching.—Page 1721.

* * *

Aluminum alloy sand castings with close tolerances produced with 95 per cent aluminum and 5 per cent silicon. Casts readily and produces sound castings, free from checks and other molding troubles.—Page 1722.

* * *

Uniform hardening is achieved by using two thermocouples, one in the bath and the other within the furnace chamber, each operating a control pyrometer. Excessive temperature changes are prevented.—Page 1726.

* * *

Mass production methods not yet economical in aircraft engine building, but economical arrangement of departments in Wright plant permits adoption of quantity output measures when expansion warrants.—Page 1730.

* * *

Greater speed and accuracy in punching holes in motor bus frames is obtained by use of templets. Templet is clamped to the blank and the holes are punched on a press equipped with a 4-gag punchholder.—Page 1734.

* * *

Turning down of flange on overhead carrying rail is due to peening action. It can be corrected by providing separate wearing surfaces or by using a type of rail which is not distorted by peening. —Page 1734.

Heat-treating costs cut 19 per cent by using electric heat in place of natural gas. Savings in labor, depreciation and repairs offset the considerably lower cost of the gas fuel.—Page 1728.

* * *

Increases output 25 per cent and cuts labor cost by installing push-button control on riveting crane. In steel plate fabricating shop there are three separate control stations, one at control point of each bull riveter.—Page 1740.

* * *

Alloy steel output in 1928 was close to 3,000,000 tons, survey of American industry reveals. Prospects for increased production are excellent.—Page 1736.

* * *

Insulation makes sharp cut in repair bills. Open-hearth acid furnace has run 550 heats with no repairs on roof ends, front and back walls or checker chamber.—Page 1737.

* * *

During hardening operation, shovels are kept down in lead bath by covering it with two-inch layer of powdered coke.—Page 1732.

* * *

Higher graphite tariff unfair and uncalled for, say graphite products manufacturers. Domestic product is already cheaper than imported, and is not used because of inferior quality.—Page 1739.

* * *

Radio testers take their place in assembly line. Traveling belt carries completed sets to testers in sheet steel booths. A signal is made especially for the test.—Page 1720.

Spend money on machining your foundry equipment and you will save money when machining the castings in the machine shop. Government foundry finds it pays to use foundry equipment designed for maximum accuracy.—Page 1722.

* * *

Pattern accuracy is obtained by making saw cuts in thin sections to allow expansion and contraction of members of pattern assembly without affecting the controlling dimensions.—Page 1722.

* * *

Die expense prevented steel auto-bus bodies from competing with wood when only a small number of bodies of a certain design were wanted. But now that the industry is standardizing, multiple production is possible, and all-metal bodies are being made. —Page 1732.

* * *

Radio manufacturer uses a zinc-copper-aluminum alloy for his die castings. Single gas burner melts cold charge in 30 min.—Page 1718.

* * *

Distortion in castings reduced by allowing sufficient time for cooling before shaking out. Heads and gates of aluminum castings are removed by sawing, which is also a distortion preventative.—Page 1724.

* * *

Proper tempering of sand is important in making high-quality aluminum alloy castings. Best results are obtained when sand is worked as dry as practicable, with moisture content never above 6 per cent.—Page 1723.

A. I. FINDLEY
Editor

THE IRON AGE

W. W. MACON
Managing Editor

ESTABLISHED 1855

Calls on the Trade Association

THAT trade associations have won a large place in the scheme of things recent events have proved. When the move was made to mobilize industry and commerce after the first business-alleviating conferences were called by the President, heads of trade associations were selected to form the nucleus of the stabilizing machine.

The big figures of business, in their statements of conditions and prospects, served to remove suspicion that things were really worse than surmised. Now it is desirable to get accurately the succeeding pictures of changes when, and if, they occur. A wide subdivision of industry was wisely regarded as necessary, and the committee of 140 now appointed as the business survey committee is made up almost wholly of the leaders of what may be classed as trade associations.

Each representative is admittedly close to the outlook of his specialty. Through his association he can work to promote a repair, re-equipment and general betterment campaign while financial readjustments are under way and the broad construction programs promised are getting into full swing. For his own group he will probably be expected to report (to the executive committee of 20 in the Washington stabilizing setup) perhaps monthly for a time, respecting new facts bearing on significant changes and trends.

Thus we see a recognition of the trade group as a fact-finding agency and as a working unit for supplying information for industry as a whole. The responsibility is large, for it will not do to color unduly a given situation and again give rise to unwarranted doubts. For the present it does not seem to be the plan that this stabilizing machinery shall operate indefinitely. It may prove too cumbersome, for one thing. Yet how useful it would be if it could attempt to control the business cycle on the uptrend as well as now on the downtrend. To try to check an upswing would clearly be very difficult as well as unpopular, but it is the unbridled expansion that is followed by the depression.

If the lessons of the succeeding weeks prove that cooperative action among trade associations brings concrete results, there may be a demand for a coordinating bureau, say in the Department of Commerce, so that industry may supplement the statistics, which an association makes it a major activity to collect, with dependable information of the human factors that so often overturn the statistical.

The rule of reason respecting applications of the Sherman Law, the depression of 1921 that brought a demand for more economic facts than were hitherto available, and the group attempts of business to raise its ethical status through the trade practice conferences of the Federal Trade Commission have helped the growth of the trade association immeasurably. The new business stability obligation of the association should also help kindle the association idea where it now lies dead or dormant.

Structural Steel Index Favorable

STATISTICS of the structural steel fabricating shops make an interesting and favorable showing. In steel trade thought these statistics are hardly accorded as large a place as their importance deserves. They represent no inconsiderable part of the total steel made, they are associated with financial conditions, and they are particularly prophetic in several respects.

In the first place, the bookings of the fabricating shops represent steel that is still to be made. In the second place there is work to be done and labor employment to be furnished, after the steel has been fabricated and delivered, while in the case of apartment dwellings, hotels and office buildings the work extends for many months after erection of the steel. Finally, the structures commonly represent long-term investments, entered into with particular care. When there is much construction it is evident that investors take a favorable view of the long-range future.

It is a curious thing that, just as the tightening of money rates a year and half ago began to attract general attention, lettings of fabricated structural steel jobs underwent a sharp increase, and the higher rate was maintained thereafter with scarcely any interruption. The change occurred with May, 1928. Lettings in the four months preceding averaged 241,000 tons a month, while for five months thereafter they ranged well above 300,000 tons. Then, after a partial reversion to the old rate for five months, they made an all-time high record of 358,050 tons last March, and they have been heavy ever since with the exception of last month.

The statistics may be checked in an interesting way against the appearance steel in general presented, of beginning to lose its special activity at just about July 1 of this year. Lettings in the four months after that date were just a trifle above those in the four months preceding—1,386,000 tons against 1,382,150 tons.

This year as a whole is making a record showing by a substantial margin. Only the November lettings were light, and reports thus far this month suggest

that December will do better, but assuming December as merely equal to November, the year's bookings and shipments, of all fabricating shops as indicated by Department of Commerce reports, make the following comparison:

Fabricated Structural Steel—Net Tons

	Bookings	Shipments
1924	2,640,600	2,669,940
1925	2,980,730	2,998,080
1926	2,894,400	3,214,800
1927	3,052,500	2,853,750
1928	3,287,900	3,126,200
1929*	3,761,450	3,603,600

*December estimated equal to November.

Here is a gain in bookings of more than 14 per cent over 1928, previously the record year, and a gain of 26 per cent over 1925, record in its time.

A comparison of bookings and shipments indicates the relative state of order books. In 1924 and 1925 there was an even break between bookings and shipments, while in 1926 the order book lost. Both last year and this the order book has gained. There is more business on books than one year ago and still more than two years ago, making a very favorable showing for one class of building activity for the opening of the year 1930. Allowing for steel involved in this construction work, but not represented as fabricated structural, in the neighborhood of 10 per cent of the total steel produced in the last few years is accounted for by this activity.

Less Coal and More Power

IN a year of unusual industrial activity, requiring much power, the production of coal is less than in five preceding years, one of them 12 years earlier. This year's coal production may be forecast at an even 600,000,000 tons, made up of about 524,000,000 tons of bituminous and 76,000,000 tons of anthracite. In two war years production was 650,000,000 to 675,000,000 tons, though it must be admitted there were large stocks left. Then in 1920, 1923 and 1926 there was over 650,000,000 tons.

Measured by volume of output our industrial growth has been fairly large since 1913, though not so large in ratio as previously, but as to power requirements that is not all. In nearly every line we use more and more power per unit of output.

If we obtained all our power from coal, and with the same amount of efficiency—or rather inefficiency—as in the old days there would have been a very large increase in coal requirements since 1913. Two things occurred: a much stronger trend toward the economical use of coal and large increases in production of petroleum and natural gas.

The turn that occurred in the production of coal is depicted simply and forcibly by noting periods of time it required for production to double. Starting with 1880, when production of bituminous and anthracite was 71,481,570 net tons, there were doublings approximately as follows: in eight years to 1888, in 13 years to 1901 and in 12 years to 1913, when production was almost precisely eight times that of 1880, or an average of a doubling in 11 years. From 1913 to 1929, 16 years, there is only about 5 per cent increase.

We can conjecture roughly how much coal has been displaced, so to speak, by increased production of petroleum and natural gas. From 1913 to 1929 the increase in petroleum is roundly about 750,000,000 barrels, with an increase of somewhat over 1200 billion cu. ft. of gas. On a strictly heat-unit basis these increases represent about 170,000,000 tons of bituminous coal in the case of petroleum and about 50,000,000 tons in the case of gas. Not all of the oil and gas is used as substitute for coal, by any means, as witness the automobile in particular, but when so used there is generally more efficiency. We shall be conservatively high if we add the quantities of coal mentioned to this year's actual production, whereupon we find only 44 per cent as the supposititious increase in coal requirements from 1913 to 1929, and a 44 per cent increase in 16 years is quite different from a doubling in 11 years.

We have some indexes as to the pace at which economy in coal production has been proceeding. In nine years covered by actual statistics, 1919 to 1928, the public utilities decreased their coal consumption per unit of current generated by 45 per cent. Also there are data showing that per unit of freight train weight moved the railroads decreased coal consumption about 27 per cent in eight years from 1920 to 1928.

Some coal consumers have progressed more than others, and the others will make progress in future. We are by no means done in introducing economical methods of using coal.

Incidentally one readily sees one great reason why the coal industry has been in such poor shape in recent years, with a large excess of capacity. The previous history of rapid growth fixed the idea that more and more coal mines would be needed. Opening of coal mines had momentum which it took time to dissipate.

Research in a Large and Small Way

OF all the things which visiting industrialists from Europe dwell upon, the ones most often commended are our great organizations for mass production and the integrated business corporations controlling all steps in the manufacture, distribution and sale of their commodities. Our foreign friends, while admiring these activities in the States, almost invariably hasten to assure their countrymen that these conditions are indigenous to the Western continent, and cannot be transplanted to the older civilizations of Europe, where the business structure, the living conditions and the mental habits are so different, saying, "In America, Americans can do things on a grand scale. In England, the English are more individualistic."

This habit we have, over here, of doing things so grandly is not without its disadvantages in certain endeavors—such as fundamental or scientific research, for example. Two cases in point may be cited. A research into the alloys of iron, planned and sponsored by the Engineering Foundation, is waiting until $150,000 is subscribed before it can move in a large way, for its work so far has been ordered to conserve the

principal sum. American Institute of Mining and Metallurgical Engineers also has in its Seeley W. Mudd Memorial Fund a total of $200,000, but is endeavoring to multiply it by five in order "to take up a portion at least of the problems now untouched."

Both of these incompleted funds are worthy of the most generous support from the iron and steel industry, and THE IRON AGE is confident that the leading executives in the country have a proper appreciation of the importance of research. However, it is questionable whether such large sums are necessary before a useful start can be made.

Examples of important work steadily carried on with modest finances may be found on both sides of the Atlantic. In England, the Iron and Steel Institute has been able to finance the work of a long line of Carnegie research scholars on the income from a £25,000 endowment, and the younger and smaller Institute of Metals has for several years been financing, by subscription, fundamental work on the corrosion of brass and bronze.

A noteworthy amount of engineering research is also being conducted by various American societies, financed by subscription and volunteer effort. The investigations by the American Welding Society into structural welding, by the American Society for Testing Materials into corrosion, and into the properties of die castings, by the American Society of Mechanical Engineers into heavy-duty bearings and springs—to mention only a few—indicate that we also know how to get things done by a temporary organization.

All these things are part and parcel of that essential advance in knowledge that President Hoover, some years ago, estimated would cost industry several millions of dollars. American industry cannot afford not to support research generously, for it will lose far more from ignorance than the knowledge gained would cost. To anticipate that manufacturing industry in the United States will not provide funds for future research is to ignore the existence of Dr. Whitney, Dr. Jewett and Dr. Becket. Industrial research laboratories such as theirs number several hundred and the annual maintenance totals many millions.

Furthermore, we are getting ready to do more on these same lines. The United States Steel Corporation has established its central research laboratory; the Batelle Memorial Institute has opened its doors; and the newest steel merger has taken pains to announce that one of its important subsidiaries will be the Republic Research Co.

It sums up to this—a generous amount of provision has already been made for industrial research. A notable amount of cooperative research work is now under way. We have rather more laboratory facilities both in universities and in quasi-public institutions than we have adequate investigators.

Research will go on; it *must* go on; but it will be unfortunate if the development of organization must be hampered long because money facilities are so slow in accumulating.

CORRESPONDENCE

First Steel Coal Breaker

To the Editor: The comment of J. H. Pennington in your issue of Dec. 12, is of unusual interest. When the writer made the statement relative to steel breaker construction in the anthracite field, he was fully informed about the Drifton breaker, but concluded it should not be classed as a steel structure.

The paper presented by Eckley B. Coxe, and referred to by Mr. Pennington, sets forth clearly why this breaker built late in 1889 and early in 1890 cannot be considered as other than an iron structure. Mr. Coxe's paper describes it as follows: "The iron breaker is a pin-connected structure, the posts being of cast iron, the struts generally of cast iron, and the tie rods of wrought iron. Most of the larger beams are riveted plate girders. The smaller are rolled iron."

Structural steel was comparatively a new and untried commodity in 1889, and it is only reasonable to assume that if any steel had been used, Mr. Coxe would have so stated. The paper read before the institute of mining engineers includes a "Bill of material of the more important iron members of the breaker structure." The rolled sections are listed under this caption of "iron members" and no mention of steel is made.

The paper states: "The trussed and riveted girders, the rolled beams and tie rods were made by the Pencoyd Iron Works." Pencoyd continued to roll iron up until 1895, and no doubt the greater portion of its production in 1889 and 1890 was iron. The Phoenix Iron Co. rolled iron almost exclusively until 1893.

The Betz Building in Philadelphia now being dismantled was built in 1893. The "iron work" was furnished by the Phoenix Iron Co., and the dismantling reveals the fact that more than one-half the members were of rolled iron. The columns were steel, but the floor beams, etc., were iron.

The Buck Mountain breaker of the Lehigh Valley Coal Co., built about 1908, is the first steel-frame breaker to prove satisfactory. The structure was designed, fabricated and erected by engineers who gave proper attention to wind bracing to take care of vibration caused by the breaker machinery. This overcame the principal objection to steel-frame breakers; and together with the advent of the H-column, had much to do with the adoption of steel construction for permanent work about the anthracite mines.

FRANK W. JONES,
Philadelphia. Eastern Steel Co.

High-Chromium Steels Best for Roasting Furnace Rabbles

Chromium-iron alloys, low in carbon, are reported to be most suitable for roasting furnace rabbles used for zinc sulphides. In these furnaces, a thin bed of hot ore is rabbled from hearth to hearth by mechanical means. Temperatures reach 1100 deg. C. and atmospheres contain up to 6 per cent SO_2; however, corrosion of these alloys is confined almost exclusively to the "wash line," i.e., at the surface of the bed of fine ore.

Experiments at Port Pirie, South Australia, quoted in *Engineering and Mining Journal*, Nov. 30, indicate that the best alloys contain about 27 per cent chromium, silicon 0.75 per cent, carbon 1.5 per cent or less, and balance iron. Various high chromium-nickel alloys were tried, but the presence of nickel greatly reduced the corrosion resistance under the conditions existing in the furnace.

Western Pipe & Steel Co. Acquires Chicago Company

The Western Pipe & Steel Co. of Illinois has been acquired by the Western Pipe & Steel Co. of California, according to an announcement by officials of the latter corporation. The Illinois company started operations about six years ago and has developed a special line of pressed steel specialties for railroads. One of these specialties is a steel bulkhead for use in refrigerator cars. The company recently acquired 25 acres at Blue Island, Ill., and has completed a modern manufacturing plant. The Western Pipe & Steel Co. of California now operates plants at San Francisco, Los Angeles and Fresno, Cal., and at Phoenix, Ariz.

Wheeling Steel Buys Tyler Tube & Pipe

The Wheeling Steel Corporation, Wheeling, W. Va., has acquired the Tyler Tube & Pipe Co., Washington, Pa., manufacturer of lap-welded boiler tubing and light weight pipe. The company was organized in 1890 and for a long time was prominently identified with the making of charcoal iron tubing. In recent years its principal product has been steel tubing. The executive personnel of the Tyler company will probably be represented on the Wheeling board.

River Movement of Steel Declined in November

Movement of iron and steel products on the Ohio River in the Pittsburgh district during November totaled 88,011 net tons, as compared with 119,129 tons in October, and 137,019 tons in November, 1928, according to the United States Engineer Office, Pittsburgh. Traffic on the Monongahela River totaled 83,189 tons in November, as compared with 119,380 tons the preceding month, and 143,238 in November of last year. On the Allegheny River, 500 tons of steel products was moved in November, compared with 800 tons in the same month last year.

New Machinery Company Formed at Hartford

A group of prominent manufacturers of Hartford, Conn., and Springfield, Mass., have joined in the formation of the Hartford Engineering & Mfg. Co., which will design and build special machinery, in addition to taking over the manufacture of the Whitney hand milling machine, which for many years was built by the Whitney Mfg. Co. of Hartford, and during the past two years by the Young Mfg. Co., same city.

The Hartford Engineering & Mfg. Co. is capitalized at $100,000. Offices and shops will be located in the building of the Automatic Refrigeration Co. at Laurel Street and Capitol Avenue, Hartford.

John Oakley, vice-president, Perkins Machine & Gear Co., West Springfield, Mass., becomes president of the new company; Frank L. Young, head of the Young Mfg. Co., is vice-president and general manager; Earl C. Abbe, vice-president of the Moore Drop Forging Co., is also a vice-president, and the secretary and treasurer is Earl W. Knight, an engineer of Springfield. Others who are interested in the company are: Clayton R. Burt, vice-president and general manager, Pratt & Whitney Co., Hartford; Clarence E. Whitney, president, Whitney Mfg. Co., Hartford; Arthur B. Reynders, works manager, and William H. Scherer, superintendent, Westinghouse Electric & Mfg. Co., Springfield; Dr. Edward C. Gilbert, general manager, John J. Duggan, treasurer, and Thomas F. Mahar, sales manager, of the Chapman Valve Co., Indian Orchard, Mass; Julian N. Perkins, president, Perkins Machine & Gear Co.; William H. Hill, production manager, Curtiss-Wright Airplane Corporation, Paterson, N. J.

The Week in Business

Drift of Current Financial and Economic Opinion

FORECASTS for 1930 are beginning to accumulate. One of the earliest, that of Col. Leonard P. Ayres, of the Cleveland Trust Co., holds that general business next year "will be slower, but not slow, poorer but not poor." Output of iron and steel, he says, will be "distinctly less," the value of building construction "will probably not differ from that of 1929 by more than 5 per cent," and production of motor cars and trucks will fall off between 500,000 and 1,000,000 units — the last incidentally a latitudinous estimate, as it ranges between 9 and 18 per cent.

He expects price of non-agricultural commodities to average below 1929 by less than 5 per cent, industrial wage rates by 3 per cent or less, building costs only slightly under and net profits of industrial companies distinctly so. The year will "start poorly and finish well."

Year-End Consumer Buying

Current holiday retail sales are being watched for the information they may offer in respect to consumer buying power. Preliminary reports are conflicting, so that it is yet impossible to test the contention that a good volume of Christmas trade was certain in spite of the stock market crash, because employment and payrolls have run at a high level since the beginning of the year. Apparently the effect now expected is less expansion in year-end consumer purchasing than would otherwise have been looked for and some contraction possibly later on in 1930.

Another step in the Hoover-planned business-stability program has been taken in the appointment of the Business Survey Conference Committee of 140 by Julius Barnes, chairman of the Washington conference of Dec. 5. The members are to file statements by Dec. 28 covering significant changes and trends not apparent on Dec. 5. Then there will be the decision as to whether or not corrective measures are practicable and necessary. Theodore H. Price, in *Commerce and Finance*, is sure that "a spending campaign has been inaugurated that will provide work for everyone and keep most of our productive facilities fully employed."

Machinery Exports to Japan

Increased exports of machinery are regarded by the Alexander Hamilton Institute as one of the likely happenings following the return of Japan on Jan. 11 to the gold standard for the yen. It is the recent reduction in the Japanese import balance that has worked, among other things, for the removal of the gold embargo.

Use Advertising as in the War

Advertising is offered by several writers as the helpful instrument for bettering the present business situation. And E. E. Calkins, before the Adcraft Club of Detroit, urges a campaign of the scope of those used during the war. He would bring understanding that "it is up to each one of us whether business continues its present satisfying gait or whether it trips up because Wall Street says 'boo'." The Alexander Hamilton Institute expects advertising expenditures in 1930 to exceed 1500 millions of dollars and that magazines will fare rather better in their relative share, as compared with 1929, than the newspapers. The amount of advertising spent in business papers one infers is about $85,000,000 per annum.

Iron and Steel Markets

Improvement Indicated for January

Some Steel Producers Look for a 75 Per Cent First Quarter—Structural Awards 90,000 Tons—Scrap Up 50c. at Pittsburgh

FURTHER increases in specifications from the automobile industry, large awards of fabricated steel, additional strength in scrap and drastic reduction of consumers' stocks are encouraging features of the steel market.

Mill operations have been sharply curtailed, with many units idle for the entire week. Raw steel output will not be cut down proportionately, but the average, counting suspensions, may not be more than 40 per cent of capacity. The rate for December promises to be lower than that for any month, save in the summer of 1924, since the depression of 1921.

The very severity of the fourth quarter decline in production is regarded as the best promise of an early recovery. December's recession in ingot output from November may approximate November's 19 per cent drop from the October rate. The greatest decline in any single previous month was 34 per cent in December, 1907.

The thoroughness with which both manufacturing consumers and warehouses have deflated their steel inventories definitely calls for an improvement in tonnage releases next month. This expectation is borne out by developments at Chicago, where the blocking of shipments by one of the worst blizzards in years was immediately reflected in increased specifications from steel users.

A rush of new business in January is not looked for, since it is realized that many buyers are awaiting further price tests, but betterment is expected in proportion to the damming up of requirements in recent weeks. It is noted that the automobile industry, which has largely passed its inventory period, is continuing to increase its drafts on the mills. First quarter contracts for alloy steel bars have been placed by the largest buyers in the automotive field and fair January bookings from both motor car builders and parts makers have been entered for sheets, strip steel and carbon steel bars. The Ford Motor Co. has made large purchases of automotive accessories and now is understood to be aiming at an output of 125,000 cars next month.

Steel producers are disposed to suspend judgment on the rate of recovery in motor car production until after the January automobile shows, when the reaction of the public can be better appraised. However, steel interests with a diversified trade, and not primarily dependent on business from motor car makers, look for a substantial gain in mill operations, a number of them estimating that their ingot output for the first quarter will average close to 75 per cent.

The confidence of the industry rests partly on a downward revision of production estimates for 1929. It is now clear that total steel ingot output for the year will exceed the previous record, made in 1928, by not much more than 8 per cent. Pig iron production, which felt the stimulus of steel needs more than last year, will exceed the previous high mark, reached in 1923, by 6 per cent.

The strength manifested by the Pittsburgh scrap market in the past three weeks has crystallized in a 50c. advance in heavy melting steel, the first increase in that grade since Aug. 13. Chicago old material prices are also stronger, partly because of severe weather, with advances registered in several grades. At Philadelphia a mill purchase of 10,000 tons of heavy melting was closed at $14.50, the previous ruling price. Heavy melting grade at Cleveland, however, has declined 50c. a ton, although market sentiment has improved with the release of shipments by Youngstown, Warren and Canton mills that were taking virtually no scrap two or three weeks ago.

Billets, slabs and sheet bars have undergone a general decline of $1 a ton to $34, Pittsburgh or Youngstown. The reduction is mainly a "paper" one, since $35 was nominal for some time and ruled on very little contract business. Pressure against finished steel prices is still severe, but concessions are not widespread. In some cases mills have shown a willingness to shade on spot business, for example on black sheets, but have remained firm on contract tonnage. Hot-rolled strips and plain wire have also shown weakness.

Beehive furnace coke has declined 5c. a ton to $2.60, Connellsville, following a shrinkage in demand that has outstripped the curtailment of output.

Structural steel awards, at 90,000 tons, were the second largest for any week this year. This total, coupled with that of 51,000 tons for the previous week, reflects a degree of activity that is unusual for this season. Computed awards for November, at 227,150 tons, showed a sharp drop from the October figure of 350,350 tons, but the total for the 11 months, as reported by the Department of Commerce, was 3,534,300 tons, or nearly 7½ per cent larger than lettings for all of 1928, the previous record year.

Fresh rail orders at Chicago total 20,000 tons, and 100,000 tons additional are expected to be placed by small Western roads soon after the first of the year. Railroad freight cars ordered in 1929 will exceed 100,000, the largest number purchased since 1924.

Lower prices and quantity differentials on low-carbon stainless steel products have been announced by the American Stainless Steel Co.

THE IRON AGE composite prices are unchanged at the year's lowest levels, pig iron at $18.21 a gross ton and finished steel at 2.362c. a lb.

A Comparison of Prices

Market Prices at Date, and One Week, One Month and One Year Previous, Advances Over Past Week in Heavy Type, Declines in Italics

	Dec. 23, 1929	Dec. 17, 1929	Nov. 26, 1929	Dec. 24, 1928
Pig Iron, Per Gross Ton:				
No. 2 fdy., Philadelphia	$20.76	$20.76	$21.26	$21.26
No. 2, Valley furnace	18.50	18.50	18.50	17.50
No. 2 Southern, Cin'ti	17.69	17.69	17.69	20.19
No. 2, Birmingham	14.50	14.50	14.50	16.50
No. 2 foundry, Chicago*	20.00	20.00	20.00	20.00
Basic, del'd eastern Pa.	19.50	19.50	19.75	19.75
Basic, Valley furnace	18.50	18.50	18.50	17.50
Valley Bessemer, del'd P'gh.	20.76	20.76	20.76	20.01
Malleable, Chicago*	20.00	20.00	20.00	20.00
Malleable, Valley	19.00	19.00	19.00	18.00
Gray forge, Pittsburgh	19.76	19.76	19.76	18.76
L. S. charcoal, Chicago	27.04	27.04	27.04	27.04
Ferromanganese, furnace	100.00	100.00	105.00	105.00
Rails, Billets, etc., Per Gross Ton:				
Rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Light rails at mill	36.00	36.00	36.00	36.00
Rerolling billets, Pittsburgh	*34.00*	35.00	35.00	33.00
Sheet bars, Pittsburgh	*34.00*	35.00	35.00	33.00
Slabs, Pittsburgh	*34.00*	35.00	35.00	33.00
Forging billets, Pittsburgh	*39.00*	40.00	40.00	38.00
Wire rods, Pittsburgh	40.00	40.00	40.00	42.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.85	1.85	1.85	1.90
Finished Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Bars, Pittsburgh	1.90	1.90	1.90	1.90
Bars, Chicago	2.00	2.00	2.00	2.00
Bars, Cleveland	1.90	1.90	1.90	1.90
Bars, New York	2.24	2.24	2.24	2.24
Tank plates, Pittsburgh	1.90	1.90	1.90	1.90
Tank plates, Chicago	2.00	2.00	2.00	2.00
Tank plates, New York	2.17½	2.17½	2.17½	2.17½
Structural shapes, Pittsburgh	1.90	1.90	1.90	1.90
Structural shapes, Chicago	2.00	2.00	2.00	2.00
Structural shapes, New York	2.09½	2.09½	2.09½	2.14½
Cold-finished bars, Pittsburgh	2.30	2.30	2.30	2.20
Hot-rolled strips, Pittsburgh	1.90	1.90	1.90	1.80
Cold-rolled strips, Pittsburgh	2.75	2.75	2.75	2.85

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

	Dec. 23, 1929	Dec. 17, 1929	Nov. 26, 1929	Dec. 24, 1928
Finished Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 24, P'gh	2.75	2.75	2.75	2.85
Sheets, black, No. 24, Chicago dist. mill	2.75	2.75	2.85	2.95
Sheets, galv., No. 24, P'gh	3.40	3.40	3.40	3.60
Sheets, galv., No. 24, Chicago dist. mill	3.50	3.50	3.50	3.70
Sheets, blue, No. 13, P'gh	2.35	2.35	2.25	2.20
Sheets, blue, No. 13, Chicago dist. mill	2.45	2.45	2.45	2.30
Wire nails, Pittsburgh	2.40	2.40	2.40	2.65
Wire nails, Chicago dist. mill	2.45	2.45	2.45	2.70
Plain wire, Pittsburgh	2.40	2.40	2.40	2.50
Plain wire, Chicago dist. mill	2.45	2.45	2.45	2.55
Barbed wire, galv., P'gh	3.05	3.05	3.05	3.30
Barbed wire, galv., Chicago dist. mill	3.10	3.10	3.10	3.35
Tin plate, 100 lb. box, P'gh	$5.35	$5.35	$5.35	$5.25
Old Material, Per Gross Ton:				
Heavy melting steel, P'gh	**$15.75**	$15.25	$15.50	$18.25
Heavy melting steel, Phila	14.50	14.50	14.50	16.00
Heavy melting steel, Ch'go	12.50	12.50	12.50	14.50
Carwheels, Chicago	**13.75**	13.50	13.50	14.00
Carwheels, Philadelphia	15.50	15.50	15.50	16.50
No. 1 cast, Pittsburgh	14.50	14.50	15.00	14.50
No. 1 cast, Philadelphia	15.00	15.00	15.50	16.25
No. 1 cast, Ch'go (net ton)	13.50	13.50	13.50	15.75
No. 1 RR. wrot., Phila	15.50	15.50	15.50	15.50
No. 1 RR. wrot., Ch'go (net)	12.00	12.00	12.00	13.25
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	*$2.60*	$2.65	$2.65	$2.75
Foundry coke prompt	3.75	3.75	3.75	3.75
Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	18.12½	18.12½	18.12½	16.12½
Electrolytic copper, refinery	17.75	17.75	17.75	15.75
Tin (Straits), New York	39.50	41.37½	41.62½	49.62½
Zinc, East St. Louis	*5.45*	5.50	6.25	6.35
Zinc, New York	*5.80*	5.85	6.60	6.70
Lead, St. Louis	6.10	6.10	6.10	6.35
Lead, New York	6.25	6.25	6.25	6.50
Antimony (Asiatic), N. Y.	*8.37½*	8.50	8.62½	6.75

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Pittsburgh

Steel Industry's Forecasts Are for Moderate Recovery in January—Many Idle Mills This Week

PITTSBURGH, Dec. 23.—The holiday week is a period of pronounced inactivity in the Pittsburgh steel trade. Specifications are meager, shipments are light and operations are at a minimum with most mills. Buying is negligible, and companies which had not already closed their first quarter contracts are now inclined to wait until January.

In spite of this, sentiment in the industry continues good, and there are few companies in this district which do not feel that the turn of the year will see a decided change in business conditions. It cannot be denied that consumer inventories are so low that the early weeks of January are certain to see an improvement in tonnage releases. Manufacturers must specify as well as warehouses, because stocks of raw materials at this time are abnormally low. Specifications over the last two months have been only for immediate requirements, and mills have furthered this tendency on the part of buyers by declining to force business.

With the eyes of the industry turned toward future developments, forecasts for the first quarter are receiving considerable attention. There is little doubt that business will show a considerable improvement in January, but whether the trend will continue upward in February and March is a matter to be determined by developments in principal steel consuming lines.

January buying may seem large as compared to that of the last two months, but it may be confined only to limited requirements, and the remaining months of the first quarter may be characterized by the caution which has persisted in November and December. On the other hand, it would not be surprising to the trade if business increased gradually in February and March, with steel requirements reaching normal proportions early in the second quarter.

During the last two weeks, specifications from the automobile industry have shown some improvement, but have lacked substantial volume. This activity is undoubtedly prompted by the automobile shows in January, and a continuance of recent orders in increasing volume will depend entirely upon the public's attitude toward buying, as indicated by the shows. Steel operations in Pittsburgh and nearby districts this week are sharply curtailed, and complete suspensions in many departments are reported. Strip mills, which pushed production last week, are largely inactive, and sheet and tin plate departments will not run more than half the week. Open-hearth operations continue very low, with most of the smaller independents operating less than half their furnaces.

Prices show little change, but recent buying has added no strength to the market. Makers of semi-finished steel are now quoting $34, as compared with the recent $35 figure, and this decrease has not stimulated first quarter contracting. On the heavy hot-rolled products, the 1.90c., Pittsburgh, price is nominal, as few of the larger buyers have closed first quarter contracts at this figure. Sheet prices are weak, although concessions have not been common enough to warrant lower quotations. It now seems evident that first quarter prices will not be established until the first of the year, and

if buyers continue to press for concessions in nearly all lines of products, mills will have considerable difficulty in holding prices at present levels.

Semi-Finished Steel.—Makers of semi-finished steel in Pittsburgh and Youngstown have finally recognized the $34 quotation on billets, slabs and sheet bars, which have been made by a Cleveland mill, and are prepared to take contracts for first quarter at this price. This does not represent any particular weakness in the market, as the $35 price had been nominal for some time, and very little contract business was ever taken at that figure. A few small spot orders have been placed at this price, but by no means a representative part of the tonnage sold. On forging billets, some first quarter business has been taken at $40, but in some cases such contracts may have to be revised downward, as forging billets ordinarily take a $5 premium over the rerolling product. Recognition of the lower price has not stimulated business to any great extent, and users of semi-finished steel in this territory are in no hurry to place their first quarter contracts. Wire rods are unchanged at $40, Pittsburgh or Cleveland, and buyers are slowly placing their usual contract tonnage.

Pig Iron.—Market prospects are brighter, and buyers have clearly indicated in the last week that they are going to need iron in a very short time. The A. M. Byers Co. is said to be sounding out the market for a round tonnage, but is not anxious to place orders at the present quotations. This company will soon begin to buy Bessemer iron for its new Ambridge, Pa., plant, and in the meantime continues to use the foundry grade at Girard, Ohio. The Columbia Radiator Co., McKeesport, Pa., is also thought to be in need of pig iron, although no formal inquiry has been issued. The Westinghouse Electric & Mfg. Co. has not yet closed against its requirements for Trafford City, Pa., and Cleveland. Last week, the Pressed Steel Car Co. bought about 500 tons of foundry iron, which was divided between the Pittsburgh producer and a Valley interest. Shipments are very light. Stocks of iron in consumers' hands are lower than they have been for several years. In view of this, the leading sellers in the district expect considerable buying in the next few days, although some of them feel that users will continue to place small orders for immediate requirements rather than commit themselves over the entire first quarter at present prices. In the meantime, producers are curbing production. The Shenango Furnace Co. will blow out its remaining active stack tomorrow. This will leave only one merchant furnace in operation in the Valleys and but one in the Pittsburgh district, and bring production to a very low point, Small orders in the last week have been taken at $18.50, Valley, for foundry and basic iron, and at $19 for malleable and Bessemer. The local producer continues to quote prices 50c. higher, but Valley makers meet this quotation when coming into the Pittsburgh district.

Prices per gross ton, f.o.b. Valley furnace:

Basic	$18.50
Bessemer	19.00
Gray forge	18.00
No. 2 foundry	18.50
No. 3 foundry	18.00
Malleable	19.00
Low phos., copper free	27.00

Freight rate to Pittsburgh or Cleveland district, $1.76.

Prices per gross ton, f.o.b. Pittsburgh district furnace:

Basic	$19.00
No. 2 foundry	19.00
No. 3 foundry	18.50
Malleable	19.50

Freight rates to points in Pittsburgh district range from 63c. to $1.13.

Bars, Shapes and Plates.—Small users of the heavy hot-rolled products are placing their contract tonnage for the first quarter of 1930, but the larger consumers are somewhat more hesitant. However, the 1.90c., Pittsburgh, price on bars, shapes and plates is holding on the general run of business, and there is every reason to believe that this price will be carried into the first quarter. Operations are holding up fairly well on shapes, but bar mills are running slowly and there is not sufficient tonnage to justify very high schedules in the plate mills. Railroad car builders in this territory will not begin specifying the material required for recent car awards until January, but mills are counting on this tonnage to improve rolling schedules considerably in the early months of the new year. Structural mills are depending largely upon backlog tonnage at this time, but some new work is coming out. An addition to the Duquesne Club in Pittsburgh will require 1300 tons of shapes. A fair-sized barge order may be placed before the end of the year. A few releases on bars are coming from automobile and parts makers, but the volume of business from this source is still comparatively small. Cold-finishing mills are taking very little steel, and other consuming lines are quiet.

Tubular Goods.—The pipe business is in a quiet season, and shipments have gradually declined during the month. Mill operations are under 50 per cent of capacity, and immediate improvement is not in sight. Makers of mechanical and boiler tubing are not finding tonnage as heavy as it was in November, and of course business is considerably behind the same period of last year. Pipe prices are holding very well in this territory.

Wire Products.—Shipments to jobbers are normally rather light during December on account of inventory, and this year is no exception. Occasional orders for carload lots of nails are reaching local mills, and the urgency for shipment indicates the low stocks of the buyers. Shipments of manufacturers' wire to the automotive and allied industries are about equal to those of November and have shown slight improvement with some companies during the last week. The price is holding at 2.40c. Pittsburgh. On wire nails the $2.40 to $2.50, Pittsburgh, quotation is better established than it was, and as business taken at lower prices is cleaned up at the year-end, the market is expected to gain more stability. Annealed fence wire is unchanged at 2.55c. to 2.65c., Pittsburgh.

Stainless Steel Products.—Prices on the low carbon stainless steel products have been reduced and quantity differentials have been set up for large lots, according to an announcement by the American Stainless Steel Co. The reduction reflects the lower quotations on ferrochrome announced a few weeks ago. Under the new classifications, grades of stainless steel containing 0.12 per cent carbon and under are grouped in four ranges, according

The Iron Age Composite Prices

Finished Steel

Dec. 23, 1929, 2.362c. a Lb.

One week ago	2.362c.
One month ago	2.362c.
One year ago	2.391c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products make 87 per cent of the United States output of finished steel.

	High	Low
1929	2.412c., April 2;	2.362c., Oct. 29
1928	2.391c., Dec. 11;	2.314c., Jan. 3
1927	2.453c., Jan. 4;	2.293c., Oct. 25
1926	2.453c., Jan. 5;	2.403c., May 18
1925	2.560c., Jan. 6;	2.396c., Aug. 18

Pig Iron

Dec. 23, 1929, $18.21 a Gross Ton

One week ago	$18.21
One month ago	18.29
One year ago	18.46
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High	Low
1929	$18.71, May 14;	$18.21, Dec. 17
1928	18.59, Nov. 27;	17.04, July 24
1927	19.71, Jan. 4;	17.54, Nov. 1
1926	21.54, Jan. 5;	19.46, July 13
1925	22.50, Jan. 13;	18.96, July 7

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base per Lb.
F.o.b. Pittsburgh mill	1.90c.
F.o.b. Chicago	2.00c.
Del'd Philadelphia	2.22c.
Del'd New York	2.24c.
Del'd Cleveland	1.85c. to 1.90c.
F.o.b. Cleveland	1.85c. to 1.90c.
F.o.b. Lackawanna	2.00c.
F.o.b. Birmingham	2.10c.
C.i.f. Pacific ports	2.35c.
F.o.b. San Francisco mills	2.35c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills, 40, 50, 60-ft.	2.00c.
F.o.b. Pittsburgh mills, cut lengths	2.25c.
F.o.b. Birmingham, mill lengths	2.10c.

Rail Steel

F.o.b. mills, east of Chicago dist.	1.90c.
F.o.b. Chicago Heights mill	1.90c.
Del'd Philadelphia	2.27c.

Iron

Common iron, f.o.b. Chicago	2.00c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	2.12c.
Common iron, del'd New York	2.14c.

Tank Plates

	Base per Lb.
F.o.b. Pittsburgh mill	1.90c.
F.o.b. Chicago	2.00c.
F.o.b. Birmingham	2.05c.
Del'd Cleveland	2.09c.
Del'd Philadelphia	2.10c. to 2.15c.
F.o.b. Coatesville	2.00c. to 2.05c.
F.o.b. Sparrows Point	2.00c. to 2.05c.
F.o.b. Lackawanna	2.00c. to 2.05c.
Del'd New York	2.17½c. to 2.22½c.
C.i.f. Pacific ports	2.25c. to 2.35c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh mill	1.90c.
F.o.b. Chicago	2.00c.
F.o.b. Birmingham	2.05c.
F.o.b. Lackawanna	2.00c. to 2.05c.
F.o.b. Bethlehem	2.00c.
Del'd Cleveland	2.09c.
Del'd Philadelphia	1.96c. to 2.06c.
Del'd New York	2.09½c. to 2.14½c.
C.i.f. Pacific ports	2.35c.

Hot-Rolled Hoops, Bands and Strips

	Base per Lb.
6 in. and narrower, P'gh	2.00c.
Wider than 6 in., P'gh	1.90c.
6 in. and narrower, Chicago	2.10c.
Wider than 6 in., Chicago	2.00c.
Cooperage stock, P'gh	2.20c.
Cooperage stock, Chicago	2.30c.

Cold-Finished Steel

	Base per Lb.
Bars, f.o.b. Pittsburgh mill	2.20c.
Bars, f.o.b. Chicago	2.20c.
Bars, Cleveland	2.20c.
Bars, Buffalo	2.20c.
Shafting, ground, f.o.b. mill	*2.55c. to 3.50c.
Strips, P'gh	2.75c.
Strips, Cleveland	2.75c.
Strips, del'd Chicago	3.05c.
Strips, Worcester	2.90c.
Fender stock, No. 20 gage, Pittsburgh or Cleveland	4.25c.

*According to size.

Wire Products

(Carload lots, f.o.b. Pittsburgh and Cleveland.)

	Base per Keg
To Merchant Trade	
Standard wire nails	$2.40 to $2.50
Cement coated nails	2.40 to 2.50
Galvanized nails	4.40 to 4.50

	Base per Lb.
Polished staples	2.85c. to 2.95c.
Galvanized staples	3.10c. to 3.20c.
Barbed wire, galvanized	3.05c. to 3.15c.
Annealed fence wire	2.55c. to 2.65c.
Galvanized wire, No. 9	3.00c. to 3.10c.
Woven wire fence (per net ton to retailers)	$65.00
To Manufacturing Trade	
Bright hard wire, Nos. 6 to 9 gage	2.40c.
Spring wire	3.50c.
(Carload lots, f.o.b. Chicago.)	
Wire nails	$2.45 to $2.55 (keg)
Annealed fence wire	2.60c. to 2.70c. (lb.)
Bright hard wire to manufacturing trade	2.45c.

Anderson, Ind., mill prices are ordinarily $1 a ton over Pittsburgh base; Duluth, Minn., mill $2 a ton over Pittsburgh, and Birmingham mill $3 a ton over Pittsburgh.

Cut Nails

	Per 100 Lb.
Carloads, Wheeling, Reading or Northumberland, Pa.	$2.70
Less carloads, Wheeling or Reading	2.80

Light Plates

No. 10, blue annealed, f.o.b. P'gh	2.20c.
No. 10, blue annealed, f.o.b. Chicago dist.	2.30c.
No. 10, blue annealed, del'd Phila.	2.42c. to 2.52c.
No. 10, blue annealed, B'ham	2.35c.

Sheets

	Base per Lb.
Blue Annealed	
No. 13, f.o.b. P'gh	2.35c.
No. 13, f.o.b. Chicago dist.	2.45c.
No. 13, del'd Philadelphia	2.57c. to 2.67c.
No. 13, blue annealed, B'ham	2.50c.
Box Annealed, One Pass Cold Rolled	
No. 24, f.o.b. Pittsburgh	2.75c.
No. 24, f.o.b. Chicago dist. mill	2.75c. to 2.85c.
No. 24, del'd Philadelphia	3.07c.
No. 24, f.o.b. Birmingham	3.00c. to 3.10c.
Metal Furniture Sheets	
No. 24, f.o.b. P'gh	4.00c.
Galvanized	
No. 24, f.o.b. Pittsburgh	3.40c. to 3.50c.
No. 24, f.o.b. Chicago dist. mill	3.50c. to 3.60c.
No. 24, del'd Cleveland	3.59c. to 3.69c.
No. 24, del'd Philadelphia	3.72c. to 3.82c.
No. 24, f.o.b. Birmingham	3.65c.
Tin Mill Black Plate	
No. 28, f.o.b. Pittsburgh	2.90c. to 3.00c.
No. 28, f.o.b. Chicago dist. mill	3.00c. to 3.10c.
Automobile Body Sheets	
No. 20, f.o.b. Pittsburgh	4.00c.
Long Ternes	
No. 24, 8-lb. coating, f.o.b. mill	3.90c. to 4.00c.
Vitreous Enameling Stock	
No. 24, f.o.b. Pittsburgh	3.90c.

Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills	$5.35
Standard cokes, f.o.b. Gary	5.45

Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)
(Per Package, 20 x 28 in.)

8-lb. coating I.C. $10.70	25-lb. coating I.C. $15.90
15-lb. coating I.C. 13.40	30-lb. coating I.C. 16.80
20-lb. coating I.C. 14.60	40-lb. coating I.C. 18.80

Alloy Steel Bars

(F.o.b. makers' mill)
Alloy Quality Bar Base, 2.65c. per Lb.

S.A.E. Series Numbers		Alloy Differential
2000	(1½% Nickel)	$0.25
2100	(1½% Nickel)	0.5b
2300	(3½% Nickel)	1.50
2500	(5% Nickel)	2.25
3100	Nickel Chromium	0.55
3200	Nickel Chromium	1.35
3300	Nickel Chromium	3.80
3400	Nickel Chromium	3.20
4100	Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50
4100	Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600	Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel)	1.05
5100	Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100	Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100	Chromium Spring Steel	0.20
6100	Chromium Vanadium Bars	1.20
6100	Chromium Vanadium Spring Steel	0.95
9250	Silicon Manganese Spring Steel (flats)	0.25
	Rounds and squares	0.50
	Chromium Nickel Vanadium	1.50
	Carbon Vanadium	0.95

Above prices are for hot rolled steel bars, forging quality. The differential for cold-drawn bars is ¾c. a lb. higher, with standard classification for cold-finished alloy steel bars applying. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis.

Billets under 4 x 4 in. carry the steel bar base. Slabs with a sectional area of 16 in. or over carry the billet price. Slabs with sectional area of less than 16 in. or less than 2½ in. thick, regardless of sectional area, take the bar price.

Rails

	Per Gross Ton
Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	36.00
Light (from rail steel), f.o.b. mill	34.00
Light (from billets), f.o.b. Ch'go mill	36.00

Track Equipment

	Base per 100 Lb.
Spikes, ⅝ in. and larger	$2.80
Spikes, ½ in. and smaller	2.80
Spikes, boat and barge	3.00
Tie plate, steel	2.15
Angle bars	$2.75
Track bolts, to steam railroads	$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel Inches	Black	Galv.	Iron Inches	Black	Galv.
⅛	45	19½	¼ and ⅜	+11	+36
¼ to ⅜	51	25½	½	23	5
½	56	42½	¾	28	11
¾	60	48½	1 and 1¼	31	15
1 to 3	62	50½	1½ and 2	35	18

Lap Weld

2	55	43½	2	23	9
2½ to 6	59	47½	2½ to 3½	28	13
7 and 8	56	43½	4 to 6	30	17
9 and 10	54	42½	7 and 8	29	16
11 and 12	53	40½	9 to 12	26	11

Butt Weld, extra strong, plain ends

⅛	41	24½	¼ and ⅜	+13	+46
¼ to ⅜	47	30½	½	23	7
½	58	42½	¾	28	12
¾	58	47½	1 to 2	34	18
1 to 1½	60	49½			
2 to 3	61	50½			

Lap Weld, extra strong, plain ends

2	53	42½	½	29	13
2½ to 4	57	46½	2½ to 4	34	20
4½ to 6	56	45½	4½ to 6	33	19
7 to 8	52	39½	7 and 8	31	17
9 and 10	45	32½	9 to 12	21	8
11 and 12	44	31½			

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Steel		Charcoal Iron	
2 in. and 2¼ in.	38	1½ in.	1
2½ in.—2¾ in.	46	1¾ in.	8
3 in.	52	2 in.—2¼ in.	13
3¼ in.—3¾ in.	54	2½ in.—2¾ in.	16
4 in.	57	3 in.	17
4½ in. to 6 in.	46	3¼ in. to 3½ in.	18
		4 in.	20
		4½ in.	21

On lots of a carload or more, the above base discounts are subject to a preferential of two fives on steel and of 10 per cent on charcoal iron tubes. Smaller quantities are subject to the following modifications from the base discounts:

Lap Welded Steel—Under 10,000 lb., 6 points under base and one five; 10,000 lb. to carload, 4 points under base and two fives. Charcoal Iron—Under 10,000 lb., 2 points under base; 10,000 lb. to carload, base and one five.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	61	3 in.	46
1¼ to 1½ in.	53	3½ to 3½ in.	48
1¾ in.	37	4 in.	51
2 to 2¼ in.	32	4½, 5 and 6 in.	40
2½ to 2¾ in.	40		

Hot Rolled

2 and 2¼ in.	38	3¼ to 3½ in.	54
2½ and 2¾ in.	46	4 in.	57
3 in.	52	4½, 5 and 6 in.	46

Beyond the above base discounts a preferential discount of 5 per cent is allowed on carload lots. On less than carloads to 10,000 lb., base discounts are reduced 4 points with 5 per cent preferential; on less than 10,000 lb., base discounts are reduced 6 points, with no preferential. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage take the mechanical tube list and discounts. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30%, base (carloads)	55
Carbon, 0.30% to 0.40% base	50

Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

to their percentage of chrome, namely, 15 per cent and under, 15 to 18 per cent inclusive, 18 to 23 per cent and 23 to 30 per cent. Formerly, chrome percentages were arranged in three groups. On stainless cold-rolled strips, the reduction amounts to 6c. a 100 lb., while the prices of stainless steel sheets are about 5 per cent less. Quantity differentials will amount to ½c. a lb. on lots of 10,000 to 36,000 lb. in single shipment orders of one size, and 1c. a lb. on lots of more than 36,000 lb. The base price, with usual extras, applies to orders of 2000 to 10,000 lb. of bars, billets and tube rounds, and 5000 to 10,000 lb. of sheets, plates and strip.

Sheets.—Sheet mill operations were slightly higher with most companies last week than they were in the first half of the month, but this week will see complete cessation of activities in many plants and production will drop to the lowest point of the year. As specifications have been improving a bit in the last few days, fairly good schedules are expected next week and the improvement will likely be carried into January. The trend of operations after that depends largely upon the automobile industry, which has not yet definitely committed itself on the volume of tonnage it will require in the first quarter. Other consuming lines are taking only small tonnages and in most cases shipments are rush. This leads to costly mill schedule, as some companies are forced to start up mills for very short runs in order to serve customers whom they do not wish to disappoint. Prices are generally unchanged. A large percentage of customers have placed their first quarter contracts at the present quotations, but this percentage does not include many of the large buyers who are still pressing for price concessions. In the last week one or two, mills have expressed their willingness to take business for immediate rolling at concessions in order to fill out operating schedules, but such mills would not take contract business at lower prices. On black sheets, the 2.75c., Pittsburgh, price is holding in most cases, while galvanized sheets are selling at 3.40c. to 3.50c, the higher price applying only on small tonnages. Blue annealed sheet and light plates are still quotable at 2.35c. and 2.20c., Pittsburgh, respectively, so far as jobbing mills are concerned, while companies making this material on wide strip mills are quoting $2 to $4 a ton less.

Tin Plate. — Mill operations last week were rather high, averaging from 60 to 80 per cent of capacity in this and nearby districts, but this week nearly all the tin mills have suspended operations entirely. However, specifications are gradually improving, and schedules will be higher in January.

Strip Steel.—Specifications are somewhat better, although generally for small tonnages on which shipments are deferred until January. Operations were heavier last week, although the industry as a whole is not running at more than 40 per cent of capacity. This week complete suspensions are in effect in a number of mills, but sufficient tonnage releases are expected to accumulate to provide a fair rate of operations the week following. Smaller buyers are under contract for first quarter at the full prices, but larger consumers are still holding off and one or two of them insist that quotations lower than 1.90c. and 2c., Pittsburgh, on hot-rolled strip have been made. On cold-rolled material, a price of 2.65c., Pittsburgh or Cleveland, has been mentioned in connection with a few sales to tubing manufacturers, but the 2.75c. quotation is holding on the general run of orders.

Cold-Finished Steel Bars.—Business shows a slight improvement, but December shipments are going to be very light. The most encouraging thing about the market is the price, which is holding well at 2.20c., Pittsburgh. Specifications from farm implement makers served by this district are in fair volume, but other consuming lines are taking little steel.

Coke.—The furnace coke market is distinctly weaker, and the $2.65, Connellsville, price no longer applies to much business. Production has not declined as rapidly as demand, and many sellers are very anxious to dispose of surplus tonnage. At present no sales at less than $2.60 have been reported, but sales would be made at less, and the market will possibly decline to lower levels. Heating coke is moving considerably better as a result of recent cold weather, but the foundry grade is very dull and shipments have practically ceased for the next week or two. Prices are weak and only nominal in the absence of significant buying.

Old Material.—The scrap market retains its renewed strength, and a recent sale of No. 1 heavy melting steel is said to have been made at $16. At least one or two dealers are willing to pay $15.50 or more for this grade, and, as this was the last price paid by a mill in this district, there is every reason to believe that the scrap market has advanced 50c. a ton and is now quotable at $15.50 to $16, delivered at local consumers' yards. Hydraulic compressed sheets are unchanged, but the No. 2 heavy melting steel grade is stronger, and the sentiment in the market is temporarily optimistic. The scrap market may be expected to gain strength even though steel mill operations are no higher, as the establishment of a fairly steady rate eliminates the uncertainty brought about by holdups in a declining market. In the opinion of some dealers, scrap may advance rather sharply in January, while others believe that present conditions do not suggest anything more than a gradual upward trend in quotations. Specialties are still strong, while the lighter grades, such as machine shop and blast furnace turnings, are unchanged in a listless market.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$15.50 to $16.00
No. 2 heavy melting steel	14.00 to 14.50
Scrap rails	14.00 to 14.50
Compressed sheet steel	15.00 to 15.50
Bundled sheets, sides and ends	14.00 to 14.50
Cast iron carwheels	14.00 to 14.50
Sheet bar crops, ordinary	18.00 to 18.50
Heavy breakable cast	11.00 to 11.50
No. 2 railroad wrought	15.50 to 16.00
Hvy. steel axle turnings	14.00 to 14.50
Machine shop turnings	10.00 to 10.50
Acid Open-Hearth Grades:	
Railr. knuckles and couplers	20.00 to 20.50
Railr. coil and leaf springs	20.00 to 20.50
Rolled steel wheels	20.00 to 20.50
Low phos. billet and bloom ends	20.50 to 21.00
Low phos., mill plates	20.50 to 21.00
Low phos., light grades	19.50 to 20.50
Low phos., sheet bar crops	20.50 to 21.00
Heavy steel axle turnings	14.00 to 14.50
Electric Furnace Grades:	
Low phos., punchings	18.50 to 19.00
Hvy. steel axle turnings	14.00 to 14.50
Blast Furnace Grades:	
Short shoveling steel turnings	10.50 to 11.00
Short mixed borings and turnings	10.50 to 11.00
Cast iron borings	10.50 to 11.00
Rolling Mill Grades:	
Steel car axles	19.50 to 20.50
Cupola Grades:	
No. 1 cast	14.00 to 15.00
Rails 3 ft. and under	17.50 to 18.50

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.25c.
Hoops	4.25c.
Black sheets (No. 24), 25 or more bundles	3.70c. to 3.80c.
Galv. sheets (No. 24), 25 or more bundles	4.35c. to 4.45c.
Light plates, blue annealed (No. 10), 1 to 24 plates	3.25c. to 3.35c.
Blue annealed sheets (No. 13), 1 to 24 sheets	3.40c. to 3.50c.
Galv. corrug. sheets (No. 28), per square	$4.33
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count,	60 per cent off list
Machine bolts, 100 count,	60 per cent off list
Carriage bolts, 100 count,	60 per cent off list
Nuts, all styles, 100 count,	60 per cent off list
Large rivets, base per 100 lb.	$3.50
Wire, black soft ann'l'd, base per 100 lb.	$2.90 to 3.00
Wire, galv. soft, base per 100 lb.	2.90 to 3.00
Common wire nails, per keg	2.80 to 2.90
Cement coated nails, per keg	2.95 to 3.05

Youngstown

Improvement in Steel in January Expected

YOUNGSTOWN, Dec. 23.—There is a growing feeling of optimism in the iron and steel trade of northeastern Ohio that conditions will show substantial improvement after the turn of the year. Sales departments report that inquiries are more numerous and that orders have been received the last 10 days in larger numbers and for larger tonnage. Hence, an upturn in schedules after the holiday season is expected.

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and under 10-in., Pittsburgh	$34.00
Rerolling, 4-in. and under 10-in., Youngstown	34.00
Rerolling, 4-in. and under 10-in., Cleveland	34.00
Rerolling, 4-in. and under 10-in., Chicago	36.00
Forging quality, Pittsburgh	40.00

Sheet Bars

(Open Hearth or Bessemer)

	Per Gross Ton
Pittsburgh	$34.00
Youngstown	34.00
Cleveland	34.00

Slabs

(8 in. x 2 in. and under 10 in. x 10 in.)

	Per Gross Ton
Pittsburgh	$34.00
Youngstown	34.00
Cleveland	34.00

Skelp

(F.o.b. Pittsburgh or Youngstown)

	Per Lb.
Grooved	1.85c. to 1.90c.
Universal	1.85c. to 1.90c.
Sheared	1.85c. to 1.90c.

Wire Rods

(Common soft, base)

	Per Gross Ton
Pittsburgh	$40.00
Cleveland	40.00
Chicago	41.00

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.80
Old range non-Bessemer, 51.50% iron	4.65
Mesabi Bessemer, 51.50% iron	4.65
Mesabi non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.40

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algerian	12.00c.
Iron ore, low phos., Swedish, average 68% iron	12.00c.
Iron ore, basic Swedish, average 65% iron	10.00c.
Manganese ore, washed, 52% manganese, from the Caucasus	30.00c.
Manganese ore, Brazilian, African or Indian, basic 50%	30.00c.
Tungsten ore, high grade, per unit, in 60% concentrates	$15.50 to $16.50

	Per Gross Ton
Chrome ore, 45 to 50% Cr_2O_3, crude, c.i.f. Atlantic seaboard	$22.00 to $24.00

	Per Lb.
Molybdenum ore, 85% concentrates of MoS_2, delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$2.60 to $2.75
Foundry, f.o.b. Connellsville prompt	3.75 to 4.75
Foundry, by-product, Ch'go ovens	8.00
Foundry, by-product, New England, del'd	11.00
Foundry, by-product, Newark or Jersey City, delivered	9.00 to 9.40
Foundry, by-product, Phila.	9.00
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry by-prod., del'd St. Louis	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.25 to $1.75
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, ¾-in. f.o.b. Pa. mines	1.90 to 2.00
Mine run gas coal, f.o.b. Pa. mines	1.65 to 1.75
Steam slack, f.o.b. W. Pa. mines	80c. to 90c.
Gas slack, f.o.b. W. Pa. mines	1.00 to 1.10

Ferromanganese

	Per Gross Ton
Domestic, 80%, seaboard	$100.00
Foreign, 80%, Atlantic or Gulf port, duty paid	100.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$31.00 to $34.00
Domestic, 16 to 19%	29.00 to 32.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$83.50
75%	130.00

	Per Gross Ton Furnace		Per Gross Ton Furnace
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	45.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		Per Gross Ton
10%	$30.00	12%	$34.00
11%	32.00		

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		Per Gross Ton
6%	$22.00 to $23.00	10%	$26.00 to $28.00
7%	23.00 to 24.00	11%	28.00 to 30.00
8%	24.00 to 25.00	12%	30.00 to 32.00
9%	25.00 to 26.00		

Other Ferroalloys

Ferrotungsten, per lb. contained metal del'd	$1.40 to $1.50
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.15 to $3.65
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	$160.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton	$91.00
Ferrophosphorus, electric 24%, f.o.b. Anniston, Ala., per gross ton	$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silicon, gravel, f.o.b. Illinois and Kentucky mines	$18.00
No. 2 lump, Illinois and Kentucky mines	20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	$18.25 to 18.75
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines	32.50

Fire Clay Brick

	Per 1000 f.o.b. Works	
	High-Heat Duty Brick	Intermediate Heavy Duty Brick
Pennsylvania	$43.00 to $46.00	$35.00 to $38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	.....
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00
Standard size	45.00

Chrome Brick

	Per Net Ton
Standard size	$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts, blank or tapped, hexagons	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	7.00c. to 6.75c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled thread up to and including ½ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagon nuts	70
Semi-finished hexagon castellated nuts, S.A.E.	70
Stove bolts in packages, P'gh	75, 20, 10 and 5
Stove bolts in packages, Chicago	75, 20, 10 and 5
Stove bolts in packages, Cleveland	75, 20, 10 and 5
Stove bolts in bulk, P'gh	75, 20, 10, 5 and 2½
Stove bolts in bulk, Chicago	75, 20, 10, 5 and 2½
Stove bolts in bulk, Cleveland	75, 20, 10, 5 and 2½
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55, 60 per cent apply.

Large Rivets

(½-in. and larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$3.10
F.o.b. Chicago	3.20

Small Rivets

(⅞-in. and smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70 and 10
F.o.b. Cleveland	70 and 10
F.o.b. Chicago	70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10 and 5
Milled standard set screws, case hardened,	80 and 5
Milled headless set screws, cut thread	75 and 10
Upset hex. head cap screws, U.S.S. thread	85
Upset hex. cap screws, S.A.E. thread	85
Upset set screws	80, 10 and 5
Milled studs	70

Chicago

Western Storms, Delaying Steel Shipments, Bring Larger Orders From Consumers Whose Stocks Are Low

CHICAGO, Dec. 23.—Shipments of finished steel from Chicago mills have been curtailed as a result of severe winter weather which not only has hindered mill transport departments but also has handicapped railroads in switch yards and on mail lines.

This situation has worked hardships on some manufacturing consumers of steel, who have permitted their stocks to run exceedingly low. In order to better cover their needs, many consumers are sending in increased specifications to the mills, and in many instances instructions for prompt shipment are included. As a result, specifications exceed shipments for the first time in many weeks. New buying also is heavier, with the total reaching close to the current rate of shipments.

Chicago mills will shut down this week only for the 24-hr. period of Christmas Day. Ingot output ranges from 60 to 65 per cent of capacity. Twenty-two of the 36 steel company blast furnaces in the district are active.

With transportation digging its way out from under ice and snow, it can reasonably be expected that the drop in output due to the holiday will be offset by the freer movement of cars in mill yards and on the railroads.

Car shops continue to take liberal quantities of steel. Shipments of plates to the Milwaukee pipe maker are expanding.

It is computed here that for the country as a whole more than 100,000 cars have been ordered this year and that about 75 per cent of these have been placed in Western shops.

Orders for structural material continue to expand from a wide territory surrounding Chicago. Public utility programs are well under way, with contracts placed this week for three large additions to power plants in the Middle West.

Pig Iron.—Although shipments of Northern pig iron are dropping as the holidays approach, there is the encouraging feature of this market that fresh inquiries are growing rapidly, and buying for the first quarter shows marked improvement. Requests for prices indicate that 5000 to 10,000 tons will be placed at an early date. The local Southern iron market is quiet, with most quotations at $13.50 a ton, Birmingham. Quotations on silvery remain mixed, a local user having been offered a small tonnage of the 15 per cent grade at $38.50 a ton, Jackson County furnace. The local charcoal iron market is quoted at $24, furnace, on a large part of current sales, but prices are quite frequently named near $20 a ton to a widening circle of so-called non-users.

Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	$20.00
N'th'n No. 1 fdy., sil. 2.25 to 2.75	20.50
Malleable, not over 2.25 sil.	20.00
High phosphorus	20.00
Lake Super. charcoal, sil. 1.50	27.04
So'th'n No. 2 fdy. (all rail)	$19.01 to 19.51
Low phos., sil. 1 to 2, copper free	29.50
Silvery, sil. 8 per cent	$28.79 to 29.79
Bess. ferrosilicon, 14-15 per cent	46.29

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Ferroalloys.—A small lot of resale spiegeleisen is being offered here at $29 a ton, Hazard, Pa. The ferromanganese market is quiet except for the signing of a few contracts which have been slow in being brought to a close. A Middle Western user has closed for 500 tons of 25 to 30 per cent of ferrosilicon.

Bolts, Nuts and Rivets.—This industry continues to produce between 55 and 60 per cent of capacity. Stocks in the hands of most users and distributers are of moderate size, as indicated by the frequency of orders. Quite a number of first quarter contracts have still to be signed by consumers, many of whom have not acted as quickly in this respect as has been their custom in previous years.

Plates.—Local plate mill operations are steady, with satisfactory schedules for shipment to the pipe maker and car shops. A Western oil refiner is in the market for 4000 tons of tank plates, and two gas holders in San Francisco will take 2500 tons. Recent surveys made in the West forecast a satisfactory volume of business to be placed in 1930 by oil producers and operators of gas and oil lines.

Bars. — Specifications from manufacturers of automobiles for mild steel bars, as well as alloy steel bars, show some improvement. Mild steel is moving in larger quantities to builders of farm machinery which are under way with harvesting machinery production programs. Releases by road machinery makers are smaller, but this is looked on as a seasonal condition, as their order books are of good size. Local rail steel bar mills continue to operate on a double turn basis, but incoming orders are light and backlogs are measurably smaller. Most users are pressing for deliveries, which can be made in about one week.

Structural Material. — Structural awards in the week total nearly 10,000 tons, of which fully 8000 tons is for four power plants being constructed by public utility companies. Of special note is the 3500 tons needed for the addition to the Waukegan, Ill., central station of the Public Service Co. of Northern Illinois. Fresh inquiry is for 1500 tons, in which is included steel for additions to two power plants. Shop schedules for the Illinois Steel Co.'s expansion program are growing rapidly, and some fabricated steel on these orders has been shipped to erection sites.

Mill prices on plain material, per lb.: 2.00c. base, Chicago.

Sheets.—This market is quiet, as is usual at this time of the year. Many consuming plants which are closing down for the holiday week are placing business for delivery after Jan. 1. Jobbers report distribution light and, as a result, their replacement-of-stock orders from mills are at the low point of the month. Output is holding this week at 60 per cent of capacity. The hot mills at Milwaukee are down for the remainder of the year, but orders for future delivery are accumulating and it now seems probable that these units will start to operate in the first week in January. Forward buying, even in view of small stocks in the hands of consumers, has been disappointing to sellers. In the absence of buying that would afford real tests, prices are steady at 2.80 to 2.90c. a lb., delivered, Chicago, for black sheets; 3.55 to 3.65c. for galvanized sheets, and 2.35c. for the blue annealed product. Deliveries are prompt on all classes of sheets.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 2.80c. to 2.90c.; No. 24 galv., 3.55c. to 3.65c.; No. 10 blue ann'l'd, 2.35c. Deliv'd prices at other Western points are equal to the freight from Gary, plus the mill prices, which are 5c. per 100 lb. lower than Chicago delivered prices.

Semi-Finished Steel. — The local market is quiet in both sales and shipments. Rerolling billets, 4 in. and under 10 in., Chicago, are quoted $36 a gross ton, Chicago.

Hot-Rolled Strip. — Mill schedules are a trifle heavier as specifications grow, principally from manufacturers of automobile frames. Prices are steady at 2.10c. a lb., Chicago, for strips 6 in. and narrower.

Cold-Rolled Strip.—New orders, both of future and spot character, are affording encouragement to producers of cold-rolled strip. Because of larger releases, output is growing, the average now being about 30 per cent of capacity. Deliveries are prompt.

Wire Products. — Winter weather, which, in recent days, has blanketed most of the country, has served as an

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars	3.00c.
Reinforc'g bars, billet steel	1.95c. to 2.10c.
Reinforc'g bars, rail steel	1.80c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Bands (1/4 in. in Nos. 10 and 12 gages)	3.20c.
Hoops (No. 14 gage and lighter)	3.75c.
Black sheets (No. 24)	4.05c.
Galv. sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.35c.
Spikes, 5/8 in. and larger	3.55c.
Track bolts	4.55c.
Rivets, structural	4.00c.
Rivets, boiler	4.00c.

	Per Cent Off List
Machine bolts	60
Carriage bolts	60
Coach or lag screws	60
Hot-pressed nuts, sq., tap. or blank	60
Hot-pressed nuts, hex., tap. or blank	60
No. 8 black ann'l'd wire, per 100 lb.	$3.45
Com. wire nails, base per keg	$2.75 to 2.95
Cement c't'd nails, base per keg	2.75 to 2.95

effective check to a growth in orders which was under way in the early days of last week. Storms have delayed mail and also have checked outdoor work. Although there is some enlargement in demands for wire by automobile parts makers, the pickup is less than the trade had hoped for earlier in the month. Wire mill stocks have been growing for many weeks and have reached the point where producers wish to hold them for the winter months. Accordingly, operations have been revised downward, the range now being 40 and 50 per cent of capacity. Western wire mills expect to close down for two days during the holiday period. Specifications for wire nails are in satisfactory volume, considering the time of the year. Much of this business is for prompt delivery, giving further evidence of the small size of stocks in jobbers' and dealers' hands.

Cast Iron Pipe.—St. Louis has closed for 50,000 ft. of 8-in. and 20,000 ft. of 6-in. pipe with the American Cast Iron Pipe Co., and 30,000 ft. of 12-in. and 10,000 ft. of 20-in. with the United States Pipe & Foundry Co. The latter order was for class B pipe and it was taken at $35.50 a ton, Birmingham. The freight rate to St. Louis is $5.58 a ton, bringing the delivered price to $41.08. This business was placed for immediate delivery. Detroit has closed for about 6500 tons of pipe with the Lynchburg Foundry Co. and the United States Pipe & Foundry Co. It is reported that prices did not hold in view of competition with foreign-made pipe. The quantities ordered were 1500 tons of 24-in., 2160 tons of 36-in., and 2900 tons of 42-in. Franklin County, Ohio, was to have taken bids Dec. 15 at Columbus on 15,000 ft. of 6 and 8-in. pipe. It is reported here that awards have been indefinitely postponed. James B. Clow & Sons have taken 200 tons of 8-in. pipe for Chicago. Several public utility companies have made inquiries for blanket prices on tonnages that are to be determined later. Among these is the United Gas Improvement Co.

Prices per net ton, deliv'd Chicago: Water pipe, 6-in. and over, $43.70 to $45.70; 4-in., $47.70 to $49.70; Class A and gas pipe, $3 extra.

Old Material.—The Chicago scrap market is gaining in strength, as indicated by the breadth of inquiries and the attitude of most brokers. Another indication is that railroads find bidding against offered lists to be more active, with resultant higher prices. The nearness of the end of the year causes most buyers to place orders for delivery after Jan. 1, but here and there urgent requests for prompt delivery are made by users who had underestimated nearby needs. One of the most severe blizzards in years has seriously handicapped preparation and loading of scrap in local yards. Switching facilities have been taxed to the limit and many delays in deliveries have occurred. This situation is a market factor and is readily used by sellers to support their contentions that consumers will pay higher prices. As to the extent to which the upward movement will go, there is little that can be said at this time. Most brokers, while looking for higher levels, do not anticipate that advances will be over a wide range. Dealers do not hesitate to pay $13 a gross ton, delivered, for heavy melting steel to be applied against old orders, and there is reason to believe that some brokers are going long of the market in this and several other heavy-tonnage grades. Visible supplies of cast iron borings have dwindled and, though users have offered $9.50 a ton, delivered, they have found no takers among sellers, who are paying $10 a ton for tonnages to apply against old orders and who wish to gain a long position in the market. The Santa Fe obtained $13.75 a gross ton, delivered, on a recent sale of heavy melting steel. Country scrap is still blocked from Chicago by low prices, curtailed melt and the strictness of inspections.

Prices deliv'd Chicago district consumers:

Per Gross Ton

Basic Open-Hearth Grades:	
Heavy melting steel	$12.50 to $13.00
Shoveling steel	12.50 to 13.00
Frogs, switches and guards, cut apart, and misc. rails	13.50 to 14.00
Hydraul. compressed sheets	11.00 to 11.50
Drop forge flashings	9.75 to 10.25
No. 1 busheling	11.00 to 11.50
Forg'd cast and r'l'd steel carwheels	17.50 to 18.00
Railroad tires, charg. box size	17.50 to 18.00
Railroad leaf springs cut apart	17.50 to 18.00
Acid Open-Hearth Grades:	
Steel couplers and knuckles	16.00 to 16.50
Coil springs	18.00 to 18.50
Electric Furnace Grades:	
Axle turnings	12.75 to 13.25
Low phos. punchings	15.00 to 15.50
Low phos. plates, 12 in. and under	15.00 to 15.50
Blast Furnace Grades:	
Axle turnings	10.50 to 11.00
Cast iron borings	9.25 to 9.75
Short shoveling turnings	9.25 to 9.75
Machine shop turnings	7.00 to 7.50
Rolling Mill Grades:	
Iron rails	14.50 to 15.00
Rerolling rails	14.50 to 15.00
Cupola Grades:	
Steel rails less than 3 ft.	16.50 to 17.50
Steel rails less than 2 ft.	18.50 to 19.00
Angle bars, steel	15.25 to 15.75
Cast iron carwheels	13.75 to 14.25
Malleable Grades:	
Railroad	16.25 to 16.75
Agricultural	14.50 to 15.00
Miscellaneous:	
*Relaying rails, 56 to 60 lb.	23.00 to 25.00
*Relaying rails, 65 lb. and heav.	26.00 to 31.00

Per Net Ton

Rolling Mill Grades:	
Iron angle and splice bars	15.00 to 15.50
Iron arch bars and transoms	17.50 to 18.00
Iron car axles	25.50 to 26.00
Steel car axles	15.75 to 16.25
No. 1 railroad wrought	12.00 to 12.50
No. 2 railroad wrought	11.00 to 11.50
No. 1 busheling	9.00 to 9.50
No. 2 busheling	7.00 to 7.50
Locomotive tires, smooth	14.50 to 15.00
Pipes and flues	9.50 to 10.00
Cupola Grades:	
No. 1 machinery cast	13.50 to 14.00
No. 1 railroad cast	12.50 to 13.00
No. 1 agricultural cast	12.00 to 12.50
Stove plate	10.50 to 11.00
Grate bars	10.75 to 11.25
Brake shoes	10.50 to 11.00

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Rails and Track Supplies.—Three purchases of rails, two of which were by railroads and one by a manufacturer of frogs and switches, total 20,000 tons. A week ago it was estimated that small Western railroads would place 100,000 tons of rails soon after the first of the year. Fresh inquiries have augmented this figure, so that, even with this week's purchases, there still remains, according to estimates of local producers, more than 100,000 tons which will be added to books in the early part of the new year. The New York Central has closed for 14,000 tons of track accessories. Although it is known that a large tonnage is to be taken to accompany recent rail orders, none of this business is definitely before the trade. Rail mill output remains at the high rate reached several weeks ago. Track accessory departments continue to hold at a moderate rate of output. The light rail market is quiet.

Prices f.o.b. mill, per gross ton: Standard section open-hearth and Bess. rails, $43; light rails, rolled from billets, $36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.07½c. to 2.15c.; angle bars, 2.75c.

Coke. — Shipments of by-product foundry coke are somewhat lighter, as most foundries plan to close down the last week in the month. However, production remains at the full capacity of local ovens. Prices are steady at $8 a ton, f.o.b. Chicago ovens, and $8.75 a ton, delivered in Chicago.

Reinforcing Bars.—Cold weather is cutting deeply into shipments of reinforcing bars from Chicago warehouses. Backlogs continue to dwindle, but the measurement of deliveries is taken more on the score of contractors' ability to place steel at this time of the year rather than by the size and number of orders placed. Shop operations are not above 30 per cent of capacity. Prices are still at the low point of the year, with only slight improvement in prospect on small tonnages of billet steel reinforcing bars. Estimators are busy on a fair amount of new business. The University of Illinois will build a new chemistry building at Urbana, Ill. School buildings in Chicago promise a substantial tonnage early in the new year.

Norton Co. Opens New Cleveland Building

The Norton Co., Worcester, Mass., has opened a new service building in Cleveland, at 1306 East Fifty-fifth Street, where all divisions of the company will have their district headquarters. This is the third district building opened by the Norton Co. within three years; the others are at Philadelphia and Detroit. The Cleveland building, a two-story structure, 100 x 140 ft., contains offices, a truing room, service department and store rooms for stocks of grinding wheels. The Cleveland district personnel of the company will be enlarged, but A. R. Sandine remains in charge of the grinding wheel division and M. E. Mattson continues as sales manager of the grinding machine division. The Cleveland Tool & Supply Co., 1427 West Sixth Street, Cleveland, continues as agent.

New York

50,000 Tons of Structural Steel for Empire State Building Awarded—Pig Iron Sales 8500 Tons

NEW YORK, Dec. 23.—Pig iron sales at 8500 tons, again represented an encouraging total in view of the inclusion of a considerable number of small lots. It is evident that, while most melters are not ready to commit themselves very far ahead, they must cover for their nearby requirements. Unshipped tonnage that will be carried over into 1930 will probably be below normal, since forward contracting has been light and there have been few suspensions of deliveries against past commitments. Some buyers will have enough iron to last them through the first quarter, but as a rule carryover tonnage will not last foundries through January. Many continue to buy spot iron for their closeby needs. Pending business in the market exceeds 10,000 tons. The General Electric Co. is inquiring for nearly 5000 tons, including 1150 tons for Bayway, N. J., 1000 tons for Pittsfield and Lynn, Mass., 700 tons for Schenectady, N. Y., and 2000 tons or more for other plants. The Eastern Malleable Iron Co., Bridgeport, Conn., is in the market for 1500 tons of foundry and malleable. The inquiry for the Worthington Pump & Machinery Corporation for 825 tons is still unsatisfied. Many foundries are shut down in the current week for inventories, but the outlook is for no further recession in melt than has recently occurred. Some of the manufacturers of radiators and domestic furnaces have suffered more than the usual seasonal slump, but electrical equipment and heavy machinery makers continue active. Prices on Southern iron for delivery in this section have been unaffected by the 50c. advance in the Alabama market, and prices on Northern brands are unchanged, although possibly more flexible than heretofore.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	$21.91 to $22.41
*Buff. No. 2, del'd east. N. J.	20.28 to 20.78
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	19.89 to 21.02
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	20.39 to 21.52

Freight rates: $4.91 from Buffalo, $1.39 to $2.52 from eastern Pennsylvania.
*Prices delivered to New Jersey cities having rate of $3.28 a ton from Buffalo.

Finished Steel.—Interest has centered on structural steel, which continues unusually active despite the proximity of the Christmas holidays. Contracts placed in the New York metropolitan area in the past week will require close to 70,000 tons of steel, of which about 50,000 tons will go into the Empire State Building at Fifth Avenue and Thirty-fourth Street on the former site of the Waldorf-Astoria Hotel. This job was let on Friday, Dec. 20, to the American Bridge Co. The exact tonnage which it will take is not known, since plans have not been completed. However, it is safe to say that it will be in the neighborhood of 50,000 tons, which puts it among the largest awards on record. A subway section needing 6800 tons of steel was another sizable letting of the past week. Action is expected soon on 17,800 tons of steel for an elevated section of the municipal subway in Brooklyn. Apartment construction is proceeding at a rapid rate in New York and a substantial amount of the tonnage awarded in the last month has been for that type of work. Aside from structural steel, the market reflects the dullness incident to the holiday season and to the inventory period. Orders and specifications have been light, and little improvement is expected until the second week of January. Sheet steel bookings have been of fair volume for this time of the year, while wire goods are sluggish. Bars and plates are moving slowly. Prices have not changed.

Mill prices per lb., deliv'd New York: Soft steel bars, 2.24c.; plates, 2.17½c. to 2.22½c.; structural shapes, 2.09½c. to 2.14½c.; bar iron, 2.14c.

Cast Iron Pipe.—A moderate tonnage of pressure pipe is being inquired for, but awards are not expected until after the first of the year. Contractors' bids for a sewage disposal plant requiring about 150 tons of 48-in. pipe and fittings have been opened by the Westchester County Sewage Commission, but no award has been announced. Sizable tonnages of gas pipe are pending for the United Gas Improvement Co., Philadelphia, and the American Construction & Securities Co., New York, and water pipe for the Federal Water Supply Co., New York. Prices of pipe continue irregular and lacking in firmness, with most foundries in need of tonnage.

Prices per net ton deliv'd New York: Water pipe, 6-in. and larger, $34.60 to $36.60; 4-in. and 5-in., $37.60 to $39.60; 3-in., $44.60 to $46.60. Class A and gas pipe $3 extra.

Reinforcing Bars.—The volume of business this month has dropped off sharply from the level maintained in November. There is a moderate amount of pending work, but almost all of it has been held up until early in January. Meanwhile, prices are steady and unchanged.

Warehouse Business.—December has been a decidedly quiet month, with considerably less business than a year ago. Galvanized sheet prices, which began to develop a tendency to weakness about a week ago, have been placed on a quantity differential basis, effective Dec. 21, so that No. 24 gage is quoted at 4.50c. a lb., for lots of less than 50 bundles and 4.25c. a lb., base, on orders for 50 bundles or more.

Coke.—Shipments have held up very well, although affected during the current week by plant shutdowns. Standard furnace coke ranges from $2.65 to $2.75 a net ton, Connellsville. By-product foundry coke is quoted at $9 to $9.40, Newark or Jersey City, and $10.06, New York or Brooklyn. Special grades of beehive foundry coke still bring $4.85, Connellsville, or $8.56, delivered Jersey City or Newark, and $9.44, New York or Brooklyn.

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.30c.
Soft steel bars, small shapes	3.25c.
Iron bars	3.24c.
Iron bars, Swed. charcoal	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons	3.50c.
Flats and squares	4.00c.
Cold-roll. strip, soft and quarter hard	5.15c. to 5.40c.
Hoops	4.25c.
Bands	3.75c.
Blue ann'l'd sheets (No. 10)	3.25c. to 3.90c.
Long terne sheets (No. 24)	5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galv. annealed	5.15c.
Tire steel, ½ x ½ in. and larger	3.40c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.75c.
Open-hearth spring steel, bases,	4.50c. to 7.00c.

	Per Cent Off List
Machine bolts, cut threads:	
¾ x 6 in. and smaller	60
1 x 30 in. and smaller	50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	60
¾ x 20 in. and smaller	50 to 50 and 10
Coach Screws:	
½ x 6 in. and smaller	60
1 x 6 in. and smaller	50 to 50 and 10

	Per 100 Ft.
Boiler Tubes—	
Lap welded, 2-in.	$17.33
Seamless steel, 2-in.	20.24
Charcoal iron, 2-in.	25.00
Charcoal iron, 4-in.	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
½-in. butt	46	29
¾-in. butt	51	37
1-3-in. butt	53	39
2½-6-in. lap	48	35
7 and 8-in. lap	44	17
11 and 12-in. lap	37	12
Wrought Iron—		
½-in. butt	5	+19
¾-in. butt	11	+ 9
1-1½-in. butt	14	+ 6
2-in. lap	5	+14
3-6-in. lap	11	+ 6
7-12-in. lap	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box	$6.45	$6.20
Charcoal, per Box—	A	AAA
IC	$9.70	$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating	$10.00 to $11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets, Box Annealed—Black, C. R. One Pass

	Per Lb.
Nos. 18 to 20	3.70c.
No. 22	3.85c.
No. 24	3.90c.
No. 26	4.00c.
No. 28*	4.15c.
No. 30	4.40c.

Sheets, Galvanized

	Per Lb.
No. 14	4.15c.
No. 16	4.00c.
No. 18	4.15c.
No. 20	4.25c.
No. 22	4.35c.
No. 24†	4.50c.
No. 26	4.75c.
No. 28*	5.00c.
No. 30	5.40c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.
†For 50 bundles or more, 25c. per 100 lb. less.

Old Material.—Consumer buying of scrap has practically ceased, except for offers made in a few cases to buy at 50c. a ton less than the current quotation. A mill at Claymont, Del., which recently closed on about 5000 tons of No. 1 heavy melting steel at $14.50 a ton, delivered, is not in the market for further material, but has expressed willingness to consider purchases of No. 1 steel at $14 a ton. Other grades are decidedly inactive and No. 2 heavy melting steel prices show no increasing strength, despite offers of $14.50 a ton, delivered to a western Pennsylvania plant, by brokers with contracts. This is equivalent to $9.20 a ton, New York, while $8 a ton, New York, is the maximum offered for No. 2 steel for delivery to eastern Pennsylvania consumers.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel	$10.50 to $11.35
Heavy melting steel (yard)	7.50 to 8.00
No. 1 hvy. breakable cast.	10.00 to 10.50
Stove plate (steel works).	8.00
Locomotive grate bars....	8.25
Machine shop turnings....	7.00 to 7.50
Short shoveling turnings..	7.25 to 7.50
Cast borings (blast fur. or steel works).....	7.00 to 7.50
Mixed borings and turnings	6.75 to 7.50
Steel car axles.....	15.25 to 16.25
Iron car axles.....	20.50 to 21.00
Iron and steel pipe (1 in. dia., not under 2 ft. long)	9.25 to 9.75
Forge fire	8.50 to 9.00
No. 1 railroad wrought...	11.50 to 12.50
No. 1 yard wrought, long..	10.50 to 11.50
Rails for rolling.....	10.50 to 11.00
Stove plate (foundry).....	8.25 to 8.50
Malleable cast (railroad).	12.50 to 13.00
Cast borings (chemical)..	8.50 to 9.50

Prices per gross ton, deliv'd local foundries:

No. 1 machry. cast.....	$15.00
No. 1 hvy. cast (columns, bldg. materials, etc.), cupola size.....	13.00
No. 2 cast (radiators, cast boilers, etc.)	12.50

Three Materials Handling Companies Merge

The Barrett-Cravens Co. and the Walker Vehicle Co., both of Chicago, and the Automatic Transportation Co., Buffalo, have been merged. All are manufacturers of materials handling equipment. The Walker Vehicle Co., a subsidiary of the Commonwealth Edison Co., Chicago, is one of the oldest truck manufacturers. The Barrett-Cravens Co. manufactures lift trucks, platforms, portable elevators and structural steel storage racks. The Automatic Transportation Co. is one of the pioneer manufacturers of electric industrial trucks and tractors.

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and struc. shapes.....	3.00c.
Soft steel bars.....	3.00c.
Reinforc. steel bars.....2.25c. to	2.50c.
Cold-fin. rounds and hex.....	3.65c.
Cold-fin. flats and sq.....	4.15c.
Hoops and bands, No. 12 to $\frac{1}{4}$ in., inclusive	3.25c.
Hoops and bands, No. 13 and lighter	3.65c.
Cold-finished strip .....*5.95c.	
Black sheets (No. 24).....3.70c. to	3.90c.
Galvanized sheets (No. 24).4.60c. to	4.75c.
Blue ann'l'd sheets (No. 10).....	3.25c.
No. 9 ann'l'd wire, per 100 lb.....	$2.65
No. 9 galv. wire, per 100 lb.....	3.00
Com. wire nails, base per keg.....	2.65

*Net base, including boxing and cutting to length.

Cleveland

Automobile Manufacturers Order Steel More Freely and Some Mills Increase Rolling Operations Slightly

CLEVELAND, Dec. 23.—Demand for finished steel from the automotive industry shows a considerable increase, mills having received during the week fairly good orders from some of the automobile manufacturers and parts makers for sheets, strip steel and steel bars. This business has enabled a few plants to further increase operations in their finishing departments to 50 per cent or more of capacity. Demand for steel from other consumers is light but fully as good as it was earlier in the month. As the inventory period is at hand, most consumers are paring their orders to a minimum in order to have stocks as low as possible on Jan. 1.

Several motor car manufacturers are lining up their steel requirements with a view of getting in production on new models or increasing their output of present models in January. The output of cars next month will show a considerable gain over that of December. The Ford Motor Co., which is planning a heavy production during the early months of the year, has placed some large orders with parts makers. It is understood that the Ford company aims to get its production up to 125,000 cars during January. Contracts for first quarter requirements of alloy steel bars have been placed by the two largest buyers of that steel in the automotive field. This industry has not done much contracting for the quarter for other steel products, most of the orders being for January requirements.

While some pressure for price concessions is coming from the automotive industry, mills report that automobile manufacturers generally appear satisfied with the continuation of the fourth quarter prices.

Pig Iron.—Considerable inquiry for first quarter contracts in lots up to 500 tons came out during the week. Sales were light and not much business is expected before the first of the year. The General Electric Co., which sent out a small inquiry recently, has put out an additional inquiry for several thousand tons for its various plants. Many foundries have shut down until after the holidays and have cut off on shipments. However, the decline in shipping orders this month has been less with some furnaces than expected because of releases that have come from some of the automotive foundries. Prices appear to be firmly maintained at $18.50, Cleveland, for foundry and malleable iron for out-of-town shipment and $19, furnace, for Cleveland delivery. In eastern Michigan, $20 furnace is being well maintained, but in the western part of the State $19.50 is rather commonly quoted.

Prices per gross ton at Cleveland:

N'th'n fdy., sil. 1.75 to 2.25	$19.50
S'th'n fdy., sil. 1.75 to 2.25	$19.51 to 20.51
Malleable	19.50
Ohio silvery, 8 per cent...	28.00
Basic Valley furnace.....	18.50
Stand. low phos., Valley...	26.50 to 27.00

Prices except on basic and low phosphorus are delivered Cleveland. Freight rates: 50c. from local furnaces; $3 from Jackson, Ohio; $6.01 from Birmingham.

Iron Ore.—The consumption of Lake Superior ore during November amounted to 4,700,925 tons, as compared with 5,365,813 tons in October, a decrease of 664,888 tons. In November, last year, the amount used was 4,897,404 tons. Furnace stocks Dec. 1 were 35,010,075 tons. The amount at furnaces and Lake Erie docks Dec. 1 was 41,499,687 tons, as compared with 40,080,106 tons on the same date a year ago. Central district furnaces consumed 2,263,513 tons in November, a decrease of 451,657 tons for the month. Lake front furnaces consumed 2,211,220 tons, a loss of 206,901 tons. Eastern furnaces used 115,302 tons, a decrease of 5404 tons, and all-rail furnaces used 110,890 tons, a decrease of 926 tons. There were 155 furnaces in blast using Lake ore Nov. 30, a loss of 25 for the month.

Semi-Finished Steel.—Specifications for sheet bars show a further slight gain, as some of the mills that cater to the automotive industry are getting busier. While a local mill has opened its books for first quarter contracts for sheet bars, billets and slabs at $34, Cleveland, consumers are as yet showing no interest in future commitments and no contracts have been closed. Considerable tonnage covered by fourth quarter contract will be carried over to the next quarter.

Wire Products.—There is considerable pressure for concessions on wire and, while there are reports of a 2.30c., Cleveland, price, the regular 2.40c. quotation appears to be well maintained. Nails are firm at $2.40 a keg. Orders are very light, as is usual at this time of year.

Sheets.—Orders for good-sized lots for January requirements were placed by the automotive industry in the Michigan territory during the week. These permitted some of the mills to increase operations. Several mills have shut down for the holidays. While there has been pressure for concessions on automobile body sheets in Michigan, if there has been any shading it has been exceptional. Prices on blue annealed sheets are still somewhat irregular. Black sheets are well maintained at 2.75c., Pittsburgh, and galvanized sheets are holding at a minimum of 3.40c.

Strip Steel.—Mills have taken some fair-sized orders from the automobile manufacturers in the Detroit terri-

tory, and several makers are operating their hot mills better than last week. Demand in the territory continues slow. Although prices on hot-rolled strip are holding fairly well, some round lot buyers appear to be able to secure concessions. Cold-rolled strip is firm at 2.75c., Cleveland.

Bars, Plates and Shapes.—There has been a moderate increase in steel bar specifications from the automotive industry, some for immediate delivery and some for shipment in January. Orders for small lots of plates show a slight gain. A local mill this week took several hundred tons from a locomotive manufacturer. While some bar business has been taken at 1.85c., Cleveland, and even as low as 1.80c. for a large tonnage, outside mills generally are holding to a 1.90c. base and have closed contracts at that price. One outside mill is naming 1.87½c., delivered, for Cleveland business. A number of consumers have closed first quarter contracts for plates and structural shapes at 1.90c., Pittsburgh. Reports of a 1.90c., Cleveland, price on plates are denied. While inquiry in the structural field is light, considerable building work is in prospect for the early part of the year.

Coke.—Ohio by-product foundry coke has been reestablished at $8.25, ovens, for January shipment. The demand is very light, as many foundries will be closed down the remainder of the month for inventories. Buying is of a hand-to-mouth character.

Old Material.—Sentiment in the market shows an improvement, and there is a little more activity than around the first of the month. This is probably due largely to the fact that mills in Youngstown, Warren and Canton, which were taking virtually no scrap two or three weeks ago, have released some shipments. Prices show a weak tone, although there is not enough business to offer a real test. No. 1 heavy melting steel is down about 50c. a ton. As high as $9.65 is being offered for machine shop turnings for shipment before the end of the month. Blast furnace scrap has declined about 25c. a ton. Dealers are now offering $9.50 to $10 for these grades. No. 1 cast scrap has declined 75c. a ton. A sale of forging crops is reported at $18.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$13.50 to $14.00
No. 2 heavy melting steel	13.00 to 13.50
Compressed sheet steel	12.50 to 13.00
Light bundled sheet stampings	11.50 to 12.00
Drop forge flashings	11.50 to 12.00
Machine shop turnings	9.00 to 9.50
Short shoveling turnings	11.00 to 11.50
No. 1 railroad wrought	13.00 to 13.50
No. 2 railroad wrought	14.00 to 14.50
No. 1 busheling	12.00 to 12.50
Pipes and flues	9.00 to 9.50
Steel axle turnings	12.50 to 13.00
Acid Open-Hearth Grades:	
Low phos., forging crops	17.75 to 18.00
Low phos., billet, bloom and slab crops	18.50 to 18.75
Low phos., sheet bar crops	18.00 to 18.50
Low phos., plate scrap	18.00 to 18.50
Blast Furnace Grades:	
Cast iron borings	9.75 to 10.00
Mixed borings and short turnings	9.75 to 10.00
No. 2 busheling	9.75 to 10.00
Cupola Grades:	
No. 1 cast	15.25 to 15.75
Railroad grate bars	11.00 to 12.00
Stove plate	12.00 to 12.50
Rails under 3 ft	18.50 to 19.50
Miscellaneous:	
Railroad malleable	18.00 to 18.50
Rails for rolling	16.25 to 16.50

Philadelphia

Steel and Pig Iron Contracting Small—Mills and Consumers Closing Over Holidays

PHILADELPHIA, Dec. 23.—Steel mills and many manufacturing consumers of steel in this district are closing over the holiday period for a few days to a week. Buying has declined, and deliveries of pig iron and steel are generally being postponed until after Jan. 1. Steel contracting for first quarter has been limited, most buyers preferring to wait until the new year before purchasing. Prices show no further recession, and are being maintained more firmly on quotations for first quarter contracts than on small tonnages bought for delivery during the next 30 days.

Pig Iron.—Contracting for first quarter has covered only a small percentage of foundry iron requirements, most consumers preferring to cover their needs a carload at a time until their business develops a definite trend and prices show more firmness. The Newport News Shipbuilding & Dry Dock Co., Newport News, Va., which recently bought a small tonnage of foundry iron, has asked for prices on two carloads to be delivered before Dec. 31. The American Engineering Co., Philadelphia, is inquiring for about 1000 tons of various grades. This company inquired for a similar tonnage in August, but later abandoned the inquiry and covered its requirements as they arose. With buying light during the present month and with numerous postponements of deliveries until the new year, furnaces in the district have been accumulating some iron on their yards.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil.	$20.76 to $21.76
East. Pa. No. 2, 2.25 to 2.75 sil.	21.26 to 22.26
East. Pa. No. 1X	21.72 to 22.76
Basic (del'd east. Pa.)	19.50 to 19.75
Gray forge	20.00 to 20.50
Malleable	21.25 to 21.75
Stand. low phos. (f.o.b. N. Y. State furnace)	22.00 to 23.00
Cop. br'g low phos. (f.o.b. furnace)	23.00 to 24.00
Va. No. 2 plain, 1.75 to 2.25 sil.	22.29
Va. No. 2X, 2.25 to 2.75 sil.	22.79

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces; $4.54 from Virginia furnaces.

Bars.—Contracts have been renewed in a few cases for the next quarter, with the price firm at 1.90c. a lb., Pittsburgh, or 2.22c., delivered Philadelphia.

Reinforcing Bars.—A moderate tonnage of bars has been inquired for in the past week, the Eighth Street subway, Philadelphia, requiring 750 tons and the Henry Avenue bridge, Philadelphia, on which new bids are being taken, about 600 tons. A small tonnage will be used in contract No. 7 of the Pennsylvania terminal improvement. Prices are unchanged, with billet steel bars at 1.95c., Pittsburgh, or 2.27c., delivered Philadelphia, and the extra for cutting to length usually omitted. Rail steel bars range from 1.80c. to 1.95c. per lb., Franklin, Pa., and Tonawanda, N. Y., or 2.12c. to 2.27c. delivered Philadelphia, with no extra for cutting to length or bending.

Shapes.—Tonnage on mill books is small, but some substantial structural steel projects are being inquired for, including 1000 tons in a new warehouse for Morris Wheeler & Co., Philadelphia, 2300 tons in the Eighth Street subway and 2400 tons in a new contract on the Pennsylvania terminal improvement. Prices continue at 1.90c. to 1.95c., f.o.b. nearest mill to consumer, or 1.96c. to 2.01c., delivered Philadelphia. Occasionally 1.85c., f.o.b. mill, or 1.91c. a lb., delivered Philadelphia, is quoted to preferred buyers.

Plates.—Mills have closed a few contracts for first quarter with consumers who regularly buy ahead, but most users are still delaying commitments until after the beginning of the new year. Both contracts and sales for prompt shipment are being made at 2c. a lb., Coatesville, Pa., or 2.10c., delivered Philadelphia. Shipbuilders and other large preferred buyers of plates obtain the usual concessions made to purchasers of large tonnages.

Sheets.—Most mills are endeavoring to maintain 2.75c. a lb., base, for first quarter black sheet contracts, but

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.70c.
Plates, ⅛-in.	2.90c.
Structural shapes	2.70c.
Soft steel bars, small shapes, iron bars (except bands)	2.80c.
Round-edge iron	3.50c.
Round-edge steel, iron finished 1½ x 1½ in.	3.50c.
Round-edge steel planished	4.30c.
Reinforc. steel bars, sq., twisted and deform.	2.60c. to 2.80c.
Cold-fin. steel, rounds and hex.	3.50c.
Cold-fin. steel, sq. and flats	4.00c.
Steel hoops	3.55c.
Steel bands, No. 12 to ⅛-in. inclus.	3.30c.
Spring steel	5.00c.
*Black sheets (No. 24)	3.90c.
†Galvanized sheets (No. 24)	4.65c.
Light plates, blue annealed (No. 10)	3.25c.
Blue ann'l'd sheets (No. 13)	3.40c.
Diam. pat. floor plates—	
¼-in.	5.30c.
⅛-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

*For 50 bundles or more; 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.
†For 50 bundles or more; 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

on current buying for delivery over the next 30 days, 2.65c., Pittsburgh, or 2.97c., Philadelphia, has been quoted and occasionally 2.60c., Pittsburgh, or 2.92c., Philadelphia. Galvanized sheets are being maintained at 3.40c., Pittsburgh, or 3.72c., Philadelphia, both for contracts and early delivery. Blue annealed sheets are quoted at 2.35c. a lb., Pittsburgh, or 2.67c., delivered Philadelphia, for No. 13 gage, and blue annealed plates, No. 10 gage, at 2.20c., Pittsburgh, or 2.52c., Philadelphia. The usual concessions of $2 to $4 a ton are granted to automobile manufacturers and other preferred buyers.

Imports.—In the week ended Dec. 21, arrivals at this port consisted of 2500 tons of iron ore from Persia, 1199 tons of pig iron from British India and 12 tons of chrome bearing steel from Sweden.

Old Material. — Consumer buying has reached the lowest point of the year, the only feature of the past week having been the purchase of about 10,000 tons of No. 1 heavy melting steel by a Coatesville, Pa., consumer at $14.50 a ton, delivered. Although mills are offering to buy heavy melting steel at $14 a ton, delivered, brokers are unwilling to enter into contracts, as they are encountering some difficulty in buying good material at $14 a ton, especially with a stronger scrap market in the Pittsburgh district.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel.	$14.50
Scrap T rails	14.00
No. 2 heavy melting steel.	$12.00 to 12.50
No. 1 railroad wrought	15.50 to 16.00
Bundled sheets (for steel works)	11.50
Hydraulic compressed, new	13.50
Hydraulic compressed, old.	12.00 to 12.50
Machine shop turnings (for steel works)	11.00
Heavy axle turnings (or equiv.)	12.50 to 13.50
Cast borings (for steel works and roll. mill)	11.00
Heavy breakable cast (for steel works)	13.50 to 14.00
Railroad grate bars	11.00 to 11.50
Stove plate (for steel works)	11.00 to 11.50
No. 1 low phos., hvy., 0.04% and under	21.00 to 22.00
Couplers and knuckles	19.00 to 19.50
Rolled steel wheels	19.00 to 19.50
No. 1 blast f'nace scrap	10.50 to 11.00
Wrot. iron and soft steel pipes and tubes (new specific.)	14.00
Shafting	19.00
Steel axles	20.00 to 21.00
No. 1 forge fire	13.00 to 13.50
Cast iron carwheels	15.50 to 15.75
No. 1 cast	15.00 to 15.50
Cast borings (for chem. plant)	14.00 to 14.50
Steel rails for rolling	15.50 to 16.00

Eaton, Rhodes & Co. to Sell Pig Iron for Republic

The appointment of Eaton, Rhodes & Co., Cincinnati, by the Republic Iron & Steel Co. as sales agents for Pioneer pig iron has been announced. The arrangement covers Ohio and parts of Indiana, Kentucky and West Virginia. Pioneer pig iron is produced at the Birmingham plant of the Republic Iron & Steel Co., which has recently been equipped to cater extensively to the demand of foundries in the territory above mentioned.

Canadian Pig Iron and Steel Output Declines

Production of pig iron in Canada for November, at 86,516 gross tons, was 5 per cent under the total of 91,409 tons of October. The decline was in the basic and malleable grades. Basic iron dropped to 59,914 tons from 63,011 tons and malleable iron, at 7160 tons, fell from 9084 tons in the previous month, while foundry iron, at 19,442 tons, made a slight gain over the 19,314 tons produced in October.

For the 11 months, the Canadian production of pig iron totaled 1,007,612 gross tons, a gain of 8 per cent over the 934,085 tons reported for the corresponding 11 months of 1928.

Output of ferroalloys in November amounted to 7418 tons, as compared with 7674 tons in October. For the year to Dec. 1, production totaled 73,024 tons, as against 40,073 tons for the corresponding period of 1928.

Production of steel ingots and direct steel castings in November, at 93,648 tons, reached the low point for the year.

This output was 19 per cent under the 115,674 tons produced in October and 14 per cent less than the 108,463 tons reported for November, last year. The decline was mostly in steel ingots, which dropped to 89,135 tons from 110,165 tons in the previous month, but steel castings also fell to 4513 tons, as compared with 5509 tons in October.

For the 11 months, the output of steel ingots and direct steel castings aggregated 1,297,273 tons, an advance of 14 per cent over the total of 1,137,160 tons made during the corresponding 11 months of 1928. This year's output to date included 1,233,154 tons of ingots and 64,119 tons of direct steel castings.

Sheet and Tube Company May Buy Acme Steel

James A. Campbell, chairman of the board, Youngstown Sheet & Tube Co. and James E. MacMurray, chairman, Acme Steel Co., Chicago, have confirmed reports that negotiations are in progress for the purchase of the Acme company by the Sheet & Tube company. No agreement has been reached. An appraisal of the Acme properties is being made for the Youngstown Sheet & Tube Co.

British 1929 Steel Output a Post-War Record

WASHINGTON, Dec. 24.—Estimates of the output of raw steel in Great Britain in 1929, based on production for the first 11 months, indicate that if the average rate of output is maintained during December a post-war record will be established, according to a report from London to the Department of Commerce. Pig iron output is almost as satisfactory and it is apparent that the 1929 total will be exceeded by only one post-war year. Estimates place steel production at 9,650,000 tons and pig iron at 7,500,000 tons.

The gain in output is ascribed to increased demand from the shipbuilding industry and to high prices and extended deliveries on Continental steel. It is stated, however, that British financial returns will not be commensurate with the increased production, as higher prices were more than offset by increases in costs of raw materials, particularly coke and iron ore.

Engineers Elect Technical Committee Chairman

Chairmen of the four standing technical committees of the American Society Mechanical Engineers for 1930, elected at the society's recent annual meeting in New York, are as follows: Fred R. Low, editor of *Power*, chairman of the power test codes committee (reelected): Robert L. Streeter, vice-president of the United States Aluminum Co., Pittsburgh, to head the research activities of the society; and Harold W. Mowery, safety engineer, American Abrasive Metals Co., New York, chairman of the standing committee on safety. Edward J. Kearney, secretary and treasurer of the Kearney & Trecker Corporation, Milwaukee, and a former president of the National Machine Tool Builders Association, was elected chairman of the standardization committee.

Skyscraper Is an Economic Necessity, Says Fabricator

Skyscrapers were declared to be economic necessities in modern city life by George E. J. Pistor, Hay Foundry & Iron Works, New York, a director of the American Institute of Steel Construction, in an address before a group of steel constructors of the New York district on Dec. 21. He stated that the skyscraper should be appraised for its contribution to the advancement of American civilization as well as for its contribution to architectural art.

American Rolling Mill Co. to Shut Down Elyria Mill

The American Rolling Mill Co. will shut down indefinitely its plant at Elyria, Ohio, and will produce cold-rolled strip steel hereafter at the plant at Butler, Pa. The Butler unit has been the source of supply of hot-rolled strip for the Elyria operation. It was considered more economical to transfer this finishing operation to Butler. The nucleus of an organization will be maintained at Elyria, and some cold-rolled products which cannot be made at Butler may be produced there. The Elyria unit was acquired by the American Rolling Mill Co. in its purchase of the Columbia Steel Co., which owned both the Butler and Elyria mills.

Birmingham

Furnaces Book Some First Quarter Pig Iron Orders at 50c Advance—New Steel Business Declines

BIRMINGHAM, Dec. 23. — Furnaces have booked a few pig iron tonnages for first quarter delivery at $15, base, an increase of 50c. a ton. The usual lull in buying that comes at this season prevents any estimate as to how well the new price will be taken by the trade, but the impression is general that the new year will usher in improved business and, as consumers' stocks in many instances are low, actual requirements are expected to force a demand. On the other hand, there is the unfavorable factor of a large carry-over by several of the important melters. Shipments were very light during the past week. Sixteen furnaces remain active. Of this number, nine are on foundry iron, six on basic and one on recarburizing iron.

Prices per gross ton, f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil.	$14.50 to $15.00
No. 1 fdy., 2.25 to 2.75 sil.	15.00 to 15.50
Basic	14.50 to 15.00

Finished Steel.—New business in all lines declined last week, as was expected under the influence of the inventory and holiday periods. However, in the several lines that had been moving exceptionally well in previous weeks, the decline is less than usual at this time of year. Specifications are likewise lighter. Major operations in the district are to be closed down for from three to five days this week. All prices are the same. Pending projects for structural steel give the market a good tone. Plants will begin the year with considerable business on the books. The Ingalls Iron Works Co. received an order for 400 tons for the Texas Gulf Sulphur Co., to be erected near Bowling, Texas, and the Virginia Bridge & Iron Co. will furnish 120 tons for an addition to the Lamson & Sessions Bolt Co. plant here. Reinforcing bar business continues light.

Cast Iron Pipe.—The only encouraging feature of the market is the increase in inquiries from utilities and municipalities, indicating that there will be a favorable season from these fields. Bids were opened last week on a few projects above 100 tons each, but no contracts were placed. Plants are closed down this week but, with a few exceptions, operations will be resumed first of next week. Shops have been taking advantage of recent light operations to make needed repairs in preparation for better activity expected next month. Quotations are firmer at $37 to $38 a net ton, Birmingham, for 6-in. and larger sizes.

Coke.—Foundry and industrial coke producers and dealers received numerous instructions last week to suspend shipments during the holiday season. Only eight ovens are idle of a total of 1380. The price remains at $5 a net ton, Birmingham.

Old Material.—Foundries have been closed down for the holiday period and only two or three of the larger mills continue to take scrap on contracts. The smaller foundries have light stocks and dealers are expecting a good demand for most grades of scrap when operations are resumed with the turn of the year. Quotations are unchanged.

Prices per gross ton, deliv'd Birmingham dist. consumers' yards:

Heavy melting steel	$13.00 to $13.50
Scrap steel rails	14.00
Short shoveling turnings	9.00
Cast iron borings	9.00
Stove plate	11.50 to 12.00
Steel axles	22.00
Iron axles	23.00
No. 1 railroad wrought	10.00 to 10.50
Rails for rolling	15.50
No. 1 cast	13.00
Tramcar wheels	12.50
Cast iron carwheels	13.00 to 13.50
Cast iron borings, chem	13.50 to 14.00

Boston

Large Volume of Structural Steel Work in Prospect—Pig Iron Weak, Scrap Firmer

BOSTON, Dec. 23.—The most important iron sale made the past week was 800 tons of malleable to a Worcester, Mass., foundry at the equivalent of $16.75 a ton, Buffalo. Business otherwise was confined to small lots, mostly No. 2X, at the equivalent of $17 and $17.50 a ton, Buffalo. Total bookings fell short of 4000 tons. A Vermont foundry, feeling out the market on 1000 tons of No. 2X, is reported to have obtained an offer of less than $17 a ton, Buffalo, and low prices are said to have been made on 2150 tons wanted by another foundry. Another inquiry for 500 tons is in the market. A consignment of Dutch iron arrived there the past week, the first in a long time.

Foundry iron prices per gross ton deliv'd to most New England points:

*Buffalo, sil. 1.75 to 2.25	$21.91 to $22.41
*Buffalo, sil. 2.25 to 2.75	21.91 to 22.41
East. Penn., sil. 1.75 to 2.25	22.65 to 23.15
East. Penn., sil. 2.25 to 2.75	23.15 to 23.65
Va., sil. 1.75 to 2.25	25.21
Va., sil. 2.25 to 2.75	25.71
*Ala., sil. 1.75 to 2.25	24.11
*Ala., sil. 2.25 to 2.75	24.61
†Ala., sil. 1.75 to 2.25	20.25
†Ala., sil. 2.25 to 2.75	20.75

Freight rates; $4.91 all rail from Buffalo; $3.65 all rail from eastern Pennsylvania; $5.21 all rail from Virginia; $9.61 all rail from Alabama and $5.75 rail and water from Alabama to New England seaboard.

*All rail rate.

†Rail and water rate.

Cast Iron Pipe.—A Massachusetts utility company has purchased 3000 tons of gas pipe. At least two other New England utilities are expected to close on 5000 tons within the next week. Salem, Mass., has placed 100 tons of 6 and 8-in. water pipe with the Warren Foundry & Pipe Co. Boston will, it is reported, be in the market shortly after Jan. 1 for several thousand tons of pipe, and numerous other New England municipalities will buy more heavily than usual during January and February. Foundries are offering fewer concessions on large sizes of pipe than heretofore, and the market on small appears firmer than it has been in some time. Foreign pipe apparently has faded out of the picture. Prices quoted on domestic pipe openly are: 4-in., $44.10 to $45.10 a ton, delivered common Boston freight rate points; 6 to 12-in., $40.10 to $41.10 ; 16 to 20-in., $39.60. A $4 differential is asked on Class A and gas pipe.

Fabricated Steel.—Steel fabricators report that never before was so much tonnage in the making as now. Specifications on the bulk of this work will come out early next year. Considerable interest is shown by fabricators in the proposed Edison Electric Illuminating Co.'s Boston office building, due to the fact that all of its field connections are to be welded and that many wind braces are involved. The building will be 15 stories and require approximately 1300 tons of steel.

Old Material.—Little or no gain in the movement of scrap is noted, but indications are that business will be better shortly after Jan 1. Pittsburgh mills are in the market for certain materials, supplies of which are limited in New England. Because of this demand prices in some cases are firmer. Consumers of chemical bor-

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars, small shapes	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway rounds	6.60c.
Norway squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tie steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold-rolled steel—	
Rounds and hex	*3.55c. to 5.55c.
Squares and flats	*4.05c. to 7.05c.
Toe calk steel	6.00c.
Rivets, structural or boiler	4.50c.

	Per Cent Off List
Machine bolts	50 and 5
Carriage bolts	50 and 5
Lag screws	50 and 5
Hot-pressed nuts	50 and 5
Cold-punched nuts	50 and 5
Stove bolts	70 and 10

*Including quantity differentials.

ings are again holding up shipments. In contrast with the generally better undertone of prices, the market for stove plate is decidedly easier. The limit the largest New England consumer will pay is $9.50 a ton, delivered.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel.	$9.50 to $10.00
Scrap T rails	9.50 to 10.00
Scrap girder rails	8.50 to 9.00
No. 1 railroad wrought	10.50 to 10.75
No. 1 yard wrought	9.50 to 10.00
Machine shop turnings	6.00 to 6.10
Cast iron borings (steel works and rolling mill).	6.00 to 6.10
Bundled skeleton, long	8.25 to 8.50
Forge flashings	8.00 to 8.50
Blast furnace borings and turnings	5.75 to 6.10
Forge scrap	8.50 to 9.00
Shafting	13.50 to 14.00
Steel car axles	15.50 to 16.00
Wrought pipe 1 in. in diameter (over 2 ft. long)	8.50 to 9.00
Rails for rolling	10.50 to 11.00
Cast iron borings, chemical	9.00 to 9.50

Prices per gross ton deliv'd consumers' yards:

Textile cast	$14.00 to $14.50
No. 1 machinery cast	15.00 to 15.25
No. 2 machinery cast	13.00 to 13.25
Stove plate	9.00 to 9.75
Railroad malleable	18.50 to 19.00

Canada

Forward Buying Starts in Pig Iron

TORONTO, ONT., Dec. 23.—First quarter pig iron buying is the feature of the market. Inquiries are growing in number. Substantial tonnages for forward delivery were booked during the week, and others are pending for closing before the end of the year. The chief demand is for foundry iron, although some booking has been done in malleable. The demand for basic iron is small. Prices are unchanged.

Prices per gross ton:

Delivered Toronto

No. 1 fdy., sil. 2.25 to 2.75	$23.60
No. 2 fdy., sil. 1.75 to 2.25	23.10
Malleable	23.60

Delivered Montreal

No. 1 fdy., sil. 2.25 to 2.75	$25.00
No. 2 fdy., sil. 1.75 to 2.25	24.50
Malleable	25.00
Basic	23.50

Imported Iron, Montreal Warehouse

Summerlee	$33.50
Carron	33.00

Old Material.—A slowing down in spot business has affected the Toronto and Montreal markets within the past few days. Consumers are taking in shipments against contracts and are placing small spot orders. Prices are unchanged.

Dealers' buying prices:

	Per Gross Ton	
	Toronto	Montreal
Heavy melting steel.	$10.00	$8.50
Rails, scrap	11.00	9.00
No. 1 wrought	10.00	12.00
Machine shop turnings	7.50	5.00
Boiler plate	7.50	6.00
Heavy axle turnings	8.00	7.50
Cast borings	7.50	5.00
Steel borings	7.50	6.50
Wrought pipe	6.00	6.00
Steel axles	15.00	20.00
Axles, wrought iron	17.00	22.00
No. 1 machinery cast	....	17.00
Stove plate	....	13.00
Standard carwheels	....	16.00
Malleable	....	13.00
Per Net Ton		
No. 1 mach'ry cast	$16.00	....
Stove plate	12.00	....
Standard carwheels	15.00	....
Malleable scrap	14.00	....

St. Louis

Pig Iron Market Strengthens Due to Birmingham Advance and Denial of Freight Rate Decrease

ST. LOUIS, Dec. 20.—The increase of 50c a ton in the price of Southern pig iron to $15, Birmingham, has tended to give the market a firmer tone, while another strengthening factor has been the action of the Interstate Commerce Commission in denying the application of Southern interests for a reduction of 73c. a ton in freight rates to St. Louis and related or intermediate points in Illinois or Indiana. Sales for immediate shipment are confined to small lots. Some inquiries are being received for first quarter delivery. Sales of a leading Southern maker for December are said to equal the average for December.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill.	$19.50 to $20.00
Malleable, f.o.b. Granite City	20.00
N'th'n No. 2 fdy., deliv'd St. Louis	22.16
Southern No. 2 fdy., deliv'd	18.92 to 19.42
Northern malleable, deliv'd	22.16
Northern basic, deliv'd	22.16

Freight rates: 75c. (average) Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

Finished Steel.—Business in plates, shapes, and bars and sheets during the past week has been quiet, due to the approach of the holiday period. No business of importance is expected until after the turn of the year. Warehouse trade also is seasonally quiet, and smaller in volume than a year ago. Structural fabricators complain of dull trade. The low bidder for the general contract for the River Des Peres sewer project, requiring 2000 tons of reinforcing bars, is the Stiers Brothers Construction Co., St. Louis.

Old Material.—The market for old material continues quiet. A few sales were made for prompt shipment, but the lots were small and for mixtures. Consumers generally are waiting until after Jan. 1 before making additional purchases, but dealers expect a good buying movement then. Prices are unchanged. Railroad lists: Atchison, Topeka & Santa Fe, 5160 tons; St. Louis-San Francisco, 44 carloads; New York, Chicago & St. Louis, 45 carloads.

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-fin. rounds, shafting, screw stock	3.75c.
Black sheets (No. 24)	4.25c.
Galv. sheets (No. 24)	5.10c.
Blue ann'l'd sheets (No. 10)	3.45c.
Black corrug. sheets (No. 24)	4.30c.
Galv. corrug. sheets	5.15c.
Structural rivets	4.15c.
Boiler rivets	4.15c.
	Per Cent Off List
Tank rivets, 7/8-in. and smaller, 100 lb. or more	65
Less than 100 lb	60
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-pressed nuts, sq., blank or tapped, 200 lb. or more	60
Less than 200 lb	50
Hot-pressed nuts, hex., blank or tapped, 200 lb. or more	60
Less than 200 lb	50

Dealers' buying prices per gross ton, f.o.b. St. Louis district:

No. 1 heavy melting or shoveling steel	$13.00 to $13.50
No. 2 heavy melting or shoveling steel	12.00 to 12.50
No. 1 locomotive tires	14.50 to 15.00
Misc. stand.-sec. rails including frogs, switches and guards, cut apart	14.00 to 14.50
Railroad springs	15.50 to 16.00
Bundled sheets	9.50 to 10.00
No. 2 railroad wrought	13.00 to 13.50
No. 1 busheling	9.75 to 10.25
Cast iron borings and shoveling turnings	9.25 to 9.75
Iron rails	13.00 to 13.50
Rails for rolling	15.00 to 15.50
Machine shop turnings	6.75 to 7.25
Heavy turnings	9.50 to 10.00
Steel car axles	18.00 to 18.50
Iron car axles	25.50 to 26.00
Wrot. iron bars and trans.	21.50 to 22.00
No. 1 railroad wrought	13.00 to 13.50
Steel rails, less than 3 ft.	17.00 to 17.50
Steel angle bars	14.00 to 14.50
Cast iron carwheels	14.00 to 14.50
No. 1 machinery cast	15.25 to 15.75
Railroad malleable	13.50 to 14.00
No. 1 railroad cast	14.50 to 15.00
Stove plate	11.75 to 12.25
Agricult. malleable	14.00 to 14.50
Relay. rails 60 lb. and under	20.50 to 23.50
Relay. rails 70 lb. and over	26.50 to 29.00

Buffalo

Pig Iron Sales Chiefly in Small Lots for Prompt Delivery—Demand for Finished Steel Low

BUFFALO, Dec. 24.—About the only sizable pig iron inquiries that are still open are those of the Worthington Pump & Machinery Corporation for 600 tons of foundry, and the General Electric Co. for 4000 tons of foundry and malleable. Most of the producers report quite a volume of 50 and 100-ton lots. Shipments against old orders are very good. Almost everything being sold at present is for prompt delivery. There is an inquiry for 300 or 400 tons of foundry and malleable from a district consumer. The price here in the district is steady at $19.50, with no immediate prospect of any change. Foundries appear to be satisfied with this price

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and struc. shapes	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.95c.
Cold-fin. flats, sq. and hex.	4.45c.
Rounds	3.95c.
Cold-rolled strip steel	5.85c.
Black sheets (No. 24)	4.20c.
Galv. sheets (No. 24)	4.85c.
Blue ann'l'd sheets (No. 10)	3.50c.
Com. wire nails, base per keg	$3.60
Black wire, base per 100 lb.	3.75

and, while they do not believe the price is going down, neither do they believe that it will go up, so they are buying only for immediate needs. The going price for New England business seems to be $17.50, though it is possible that $17 could be done on a sizable tonnage.

Prices per gross ton, f.o.b. furnace:

No. 2 fdy., sil. 1.75 to 2.25	$19.50
No. 2X fdy., sil. 2.25 to 2.75	20.00
No. 1 fdy., sil. 2.75 to 3.25	21.00
Malleable, sil. up to 2.25	20.00
Basic	$17.00 to 18.00
Lake Superior charcoal	27.28

Finished Steel.—Demand for most of the finished lines is low. The Lackawanna plant of the Bethlehem Steel Co. has increased operations to 18 of 24 open-hearths, with most mills on single turn and some on double turn. A local fabricator has taken 150 tons of structural steel for an addition to the plant of the Republic Carbon Co., Niagara Falls, N. Y. Half a dozen other small fabricated structural orders are reported, all less than 100 tons each. Demand for reinforcing bars has dropped off, with nothing of size in immediate prospect.

Old Material. — Consumers are watching their stock piles carefully during the inventory period, and there is no disposition on their part to add to their accumulations. No important sales have been made in this district during the past week. Dealers are buying against old orders for No. 1 heavy melting steel at $13.75, and it is possible that a mill seeking a tonnage of No. 1 could obtain it at $14, the last price paid here.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$14.00
No. 2 heavy melting scrap	12.50
Scrap rails	$13.00 to 14.00
Hydraul. comp. sheets	12.50
Hand bundled sheets	10.50 to 11.00
Drop forge flashings	12.50 to 13.00
No. 1 busheling	12.50
Hvy. steel axle turnings	12.50 to 13.00
Machine shop turnings	8.00 to 8.50
No. 1 railroad wrought	10.50 to 11.00
Acid Open-Hearth Grades:	
Knuckles and couplers	17.00 to 17.50
Coil and leaf springs	17.00 to 17.50
Rolled steel wheels	17.00 to 17.50
Low phos. billet and bloom ends	18.00 to 18.50
Electric Furnace Grades:	
Short shov. steel turnings	10.75 to 11.25
Blast Furnace Grades:	
Short mixed borings and turnings	10.75 to 11.25
Cast iron borings	10.75 to 11.25
No. 2 busheling	8.00
Rolling Mill Grades:	
Steel car axles	16.50 to 17.00
Iron axles	20.00 to 21.00
Cupola Grades:	
No 1 machinery cast	14.50 to 15.00
Stove plate	12.15
Locomotive grate bars	10.00 to 10.50
Steel rails, 3 ft. and under	17.75 to 18.00
Cast iron carwheels	11.50 to 12.00
Malleable Grades:	
Industrial	16.50 to 17.00
Railroad	16.50 to 17.00
Agricultural	16.50 to 17.00
Special Grades:	
Chemical borings	12.00 to 12.50

The New York Aviation Show will be held Feb. 7 to 15, in Grand Central Palace, New York, under the auspices of the Aviators' Post No. 743, American Legion.

Cincinnati

Pig Iron Sales Total 3500 Tons But Demand Is Below Normal—Sheet Sales Gain Slightly

CINCINNATI, Dec. 23.—District consumers of pig iron entered the market for a total of about 3500 tons of iron last week. While this is slightly more than in the preceding week, the general demand for first quarter is still sluggish. Among the sales last week were several totaling 800 tons to Michigan consumers of low phosphorus iron for special work. A Cincinnati buyer took 200 tons of Southern foundry iron at a price which figures about $14.50, base Birmingham. A Northern furnace received an order from a Connersville, Ind., consumer for 400 tons of foundry iron and one for 150 tons of the same grade from a Dayton, Ohio, melter. These sales were for first quarter delivery. The remainder of the week's business was in small quantities for early consumption. Although Southern furnaces announced last week an increase in the base price of Southern iron at Birmingham to $15, this new quotation does not affect the market north of the Ohio River. District furnace representatives indicate that the price in this area will continue at about $14.50, base Birmingham, with possible concessions of about 50c. on substantial tonnages. The only inquiry before the trade is from a central Ohio melter for 400 tons of Northern foundry iron for first quarter.

Prices per gross ton, deliv'd Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25	$19.89 to $20.39
Ala. fdy., sil. 1.75 to 2.25	17.69 to 18.19
Ala. fdy., sil. 2.25 to 2.75	18.19 to 18.69
Tenn. fdy., sil. 1.75 to 2.25	17.69 to 18.19
S'th'n Ohio silvery, 8 per cent	26.89

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

Finished Material.—With a slight increase in new bookings and a concurrent advance in production schedules, district sheet mills indicated that the low point in the demand had passed. In fact, a strengthening of buying confidence was reflected in the placing of several orders for advance rolling of approximately 30 days.

Output is about 60 per cent of capacity, a slight increase over the preceding week. Several automotive companies have specified their first quarter needs. Some are taking sheets only for production of new models.

Coke.—Prices on by-product foundry coke continue at about $10.05, delivered Cincinnati.

Old Material.—Although the continued steadiness of prices on old material is giving the market a slight undertone of firmness, dealers report that the movement of scrap both on contracts and on new orders is very slow.

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel	$12.00 to $12.50
Scrap rails for melting	13.00 to 13.50
Loose sheet clippings	8.00 to 8.50
Bundled sheets	10.75 to 11.25
Cast iron borings	8.25 to 8.75
Machine shop turnings	8.00 to 8.50
No. 1 busheling	10.00 to 10.50
No. 2 busheling	6.50 to 7.00
Rails for rolling	13.50 to 14.00
No. 1 locomotive tires	14.25 to 14.75
No. 2 railroad wrought	12.00 to 12.50
Short rails	17.50 to 18.00
Cast iron carwheels	12.00 to 12.50
No. 1 machinery cast	18.50 to 19.00
No. 1 railroad cast	15.00 to 15.50
Burnt cast	10.00 to 10.50
Stove plate	10.00 to 10.50
Brake shoes	10.00 to 10.50
Agricultural malleable	14.00 to 14.50
Railroad malleable	15.00 to 15.50

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and struc. shapes	3.40c.
Bars, soft steel or iron	3.30c.
New billet reinforc. bars	3.15c.
Rail steel reinforc. bars	3.00c.
Hoops	4.05c.
Bands	3.50c.
Cold-fin. rounds and hex	3.85c.
Squares	4.35c.
Black sheets (No. 24)	4.05c.
Galvanized sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.45c.
Structural rivets	3.85c.
Small rivets	65 per cent off list
No. 9 ann'l'd wire, per 100 lb	$3.00
Com. wire nails, base per keg	2.85
Cement c't'd nails, base 100 lb. keg	2.85
Chain, per 100 lb	8.75
	Net per 100 Ft.
Lap-welded steel boiler tubes, 2-in.	$16.50
4-in.	34.50
Seamless steel boiler tubes, 2-in.	17.50
4-in.	36.00

Pacific Coast

San Diego Pipe Line Calls For 5000 Tons of Plates—Good Structural Business in Sight

SAN FRANCISCO, Dec. 21. (*By Air Mail*).—Interest centers in the opening of bids next week on 5000 tons of plates for a pipe line at San Diego. Among the week's larger lettings were 450 tons of reinforcing bars for a grain elevator in Tacoma, booked by the Pacific Coast Steel Co., and 320 tons of structural shapes for a high school in South Gate, Cal., placed with Brombacher Iron Works.

Pig Iron.—Foundry activity has shown little sign of improvement and, as a result, sales and inquiries are limited to small lots for prompt shipment. Quotations are unchanged.

Prices per gross ton at San Francisco:

*Utah basic	$25.00 to $26.00
*Utah fdy., sil. 2.75 to 3.25	25.00 to 26.00
**Indian fdy., sil. 2.75 to 3.25	25.00 to 26.00

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Bars.—While awards of reinforcing steel bars this week were fairly numerous, the bulk of the lettings involved lots of less than 100 tons. In addition

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and struc. shapes	3.30c.
Soft steel bars	3.30c.
Small angles, ⅛-in. and over	3.15c.
Small angles, under ⅛-in.	3.55c.
Small channels and tees, ¾-in. to 2¾-in.	3.75c.
Spring steel, ¼-in. and thicker	5.00c.
Black sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.90c.
Galv. sheets (No. 24)	5.30c.
Struc. rivets, ½-in. and larger	5.65c.
Com. wire nails, base per keg	$3.40
Cement c't'd nails, 100 lb. keg	3.40

to the grain elevator mentioned above, 325 tons for a power house for the Lake Cushman project, Tacoma, was placed with the Pacific Coast Steel Co. and the United States Steel Products Co. The Los Angeles Iron & Steel Co. was low bidder on 104 tons for Los Angeles. Bids have been opened on 306 tons for paving work in Los Angeles County and on 267 tons for a bridge at Santa Ana, Cal. Los Angeles out-of-stock prices are unchanged at 2.40c., base, on carload quantities and at 2.70c. on smaller lots. San Francisco prices are $2 a ton lower. Merchant bar steel is not active, but prices remain firm at 2.35c., c.i.f., coast ports.

Plates.—Among plate lettings this week were 225 tons for a 500,000 gal. steel tank and tower for Los Angeles, placed with the Pittsburgh-Des Moines Steel Co., and 800 tons additional for a penstock in Vancouver for the British Columbia Electric Railway Co., booked by the Vancouver Engineering Works. Bids will be opened Dec. 23 on 5000 tons for a pipe line at San Diego. Plate prices are weak, and 2.25c., c.i.f., appears general now, with desirable lots bringing quotations of $1 to $2 a ton under this figure.

Shapes.—Only one structural award in excess of 100 tons was placed during the week. This was 320 tons for a school at South Gate. Pending business, however, calls for more than 9000 tons. Prices on plain material continue firm at 2.35c., c.i.f.

Cast Iron Pipe.—While no large lettings of cast iron pipe were reported this week, two projects involving good-sized lots came into the market for figures. Los Angeles will open bids on Dec. 23 for 2650 tons of 16 and 24-in. Class C pipe, and Vancouver, B. C., will open bids on Jan. 6 for 358 tons of 6-in. Class C pipe. Bids have been opened on 134 tons of 2 to 8-in. Class B pipe for the improvement of Flower Street, Santa Ana, Cal. Bids were also opened at West Salem, Ore., for 140 tons of 4 to 8-in. Class B pipe. Pipe mill representatives look for a decided increase in demand in the early part of January.

New York Edison Co. and associated electric light and power companies serving the five boroughs of New York have approved a budget of $76,848,053 for construction purposes in 1930, according to an announcement by Matthew S. Sloan, president of these companies.

Business Survey Committee Appointed

Steps Being Taken by Chamber of Commerce of United States to Observe Developments in Trade and Industry

WASHINGTON, Dec. 24. — Reports indicate that various industries are already taking steps to fortify their position and to carry into effect the general purpose of maintaining economic stability, formulated at the conferences called by President Hoover and the subsequent National Business Survey Conference held on Dec. 5 under the auspices of the Chamber of Commerce of the United States. Announcement to this effect was made by Chairman Julius Barnes of the National Chamber in connection with making public a list of upward of 100 business executives to serve as the Business Survey Conference Committee. It will be the duty of this committee "to bring to a common focus information concerning conditions in typical lines of industry and trade and keep under continuous observation developments in the national business field."

Members of the committee will be asked to interpret and report from time to time on the condition and outlook in their several lines of industry. These reports are expected to disclose the major trends in business and to reveal whether there are weaknesses in the national economic structure. They will be submitted to the executive committee of the conference, previously announced, and made the basis for determining whether corrective measures are practicable and necessary. If such measures are decided upon, they will be brought to the attention of the individual members of trade associations through the conference committee.

In connection with steps being taken to accomplish the purpose of the business survey, it was stated that chambers of commerce are looking especially to the furtherance of public building programs and the stimulation of repair, replacement and betterment work during the winter months. Mr. Barnes has communicated with commercial organizations and trade associations concerning repairs and general betterment during the next few months.

He pointed out that the conference had suggested that advantage be taken in the next two or three months for repairs, maintenance, clean-up, general betterments, improvement, re-equipment and replacements prior to the spring period when the large public and private construction programs reported to the conference will be getting into full swing with consequent enlarged demand for labor and materials. It was stated that the Department of Commerce has set up a division of public construction, which is actively working to assist Federal, State and local authorities in development and coordination of their programs, while the trade associations and chambers of commerce are also cooperating in connection with both public and private major construction programs. It was suggested that "it will be distinctly helpful if you could set up some way to estimate the volume of the expenditures for repairs and betterments that will result for 1930 as compared with 1929 and particularly for the first three months of 1930 compared, if possible, with the corresponding period of the past year."

Mr. Barnes said it is quite likely that for the purpose of checking progress and comparison to guide action which may later be helpful, the chamber would in the near future suggest some method for these organizations to report progress at given intervals, perhaps monthly, for a short time.

Request has also been made by Mr. Barnes that the advisory committee report briefly on the existing situation and outlook in their respective fields as the year closes, so that information concerning business activities and the immediate outlook may be available for consideration in determining further steps to be taken to carry out the purposes of the conference. It was suggested that the reports be put into the mails by Dec. 28.

Among those named on the Business Survey Conference Committee are: James B. Bonner, Philadelphia, American Iron and Steel Institute; Gen. Otto H. Falk, Milwaukee, president, Allis-Chalmers Mfg. Co., representing machinery manufacturers; W. W. Coleman, Milwaukee, National Metal Trades Association; A. E. McKinstry, Chicago, National Association of Farm Equipment Manufacturers; Charles Piez, Chicago, Shovel and Crane Manufacturers' Association, and W. W. Wood, Decatur, Ill., American Institute of Steel Construction, Inc.

Westinghouse to Build $1,500,000 Laboratory

The Westinghouse Electric & Mfg. Co., East Pittsburgh, has announced the construction of a central engineering laboratory and an addition to the present direct current power laboratory at East Pittsburgh, to cost approximately $1,500,000. The new laboratory will eventually replace numerous smaller laboratories and experimental test stations now scattered throughout the plant, and will be in keeping with the company's tendency toward consolidation of its facilities at central points. Six upper floors of the new building will house engineering offices, and the remaining area will be devoted to miscellaneous experimental work. The new laboratory will be 11 stories, 80 ft. x 225 ft.

Exports Lower in November

Year's Total Will Be Largest Since 1920—Imports Well Below Last Year

WASHINGTON, Dec. 21.—Exports of iron and steel products from the United States for 1929 will be the largest since 1920, when they aggregated 4,927,800 gross tons. This became evident with the returns for November of 1929 showing exports to be 241,829 tons, bringing the total for the 11 months to 2,817,110 tons or only 45,887 tons under the total for 12 months in 1928, amounting to 2,862,997 tons, which was the largest annual movement since 1920. For the first 11 months of 1928 they aggregated 2,642,912 tons, which now is exceeded by 6½ per cent.

Assuming that December, 1929, exports are only 240,000 tons, or less than the monthly average of 256,101 tons for the 11 months, the aggregate for 1929 would be 3,057,000 tons. The record export movement was in the war year 1917, with a total of 6,414,120 tons.

Imports in November, 1929, were 54,041 tons and for the 11 months of 1929 they amounted to 691,433 tons as against 727,310 tons for the corresponding period of 1928. For the 12 months of 1928 they were 782,694 tons.

Exports in November declined 54,041 tons from those for October. The principal exports in November, 1929, were scrap, 55,565 tons; plain structural shapes, 25,465 tons; skelp, 17,499 tons; tin plate, 16,781 tons; and plates, 16,698 tons. Canada was the principal market for the month, taking 102,524 tons in all. Other outstanding markets were Japan, 42,550 tons; Chile, 14,296 tons; Mexico, 7090 tons; the Philippine Islands, 7023 tons; and Italy, 6182 tons.

Imports in November were the next to lowest for any month of the year. Pig iron was the principal item of importation, incoming shipments being 12,702 tons. Next came structural shapes, 11,961 tons; scrap, 6843 tons; ferromanganese, 4654 tons; and wrought pipe, 3767 tons. Belgium supplied 10,410 tons of the total; Germany, 9218 tons; Canada, 9010 tons; India, 7053 tons; and the United Kingdom, 6473 tons.

Future of Coal a Chemical Problem

New Outlets to Compensate for Losses to Other Fuels and New Technique to Win Inherent Possibilities of Coal

"MODERN science dealing with fuel may draw to the coal fields new industries not thought of a generation ago," said Dr. Thomas S. Baker, Pittsburgh, president, Carnegie Institute of Technology, in addressing the recent convention of the American Mining Congress in Washington. Doctor Baker spoke on "The Laboratory as the Open Door to the Future of Coal."

He declared that the processing of coal will produce great quantities of gas which formerly was wasted, but which in the future may be piped to distant cities, so that some day the gas to be burned in New York may come from the coke ovens of Pennsylvania. Continuing Doctor Baker said, in part:

"Processing of coal will also produce great quantities of tar, which will be distilled probably near the mines, and the various stages of refining will create new enterprises out of what are now only laboratory experiments. Chemical industries are likely to draw more closely toward coal fields. Localities where coal is situated will grow in importance. The newer chemistry will bring about new industrial developments, many of which will take place in the regions where the basic material is found.

"Whatever may happen to other parts of our country, we can prophesy that those regions where soft coal is found will enjoy an ever-increasing activity and probably an expanding prosperity. We cannot foresee in just what respects science would cure the ills of the coal industry. We may be certain that it would not banish them as if by magic, but we may be confident that some of the apparently insurmountable difficulties will yield to the patience and hard work of the investigator.

"We are entering upon a new era of fuel technology and the demand for men educated in the new science will be very insistent. Our wealth of coal assures our country a long continuance of its industrial greatness. Undoubtedly coal will serve as the chief source of energy until some revolutionary discovery makes obsolete the physical theories of today. Even though we may harness every stream and watercourse in the country, the electricity thus gained will hardly furnish more than a third of the power demanded by future generations.

"We see inroads into the coal industry by new engineering and scientific developments. Railroads are moving more of their trains by electric power, generated in many instances not from coal, and oil-electric locomotives are supplanting some coal-burning engines. The problem of the coal industry is to find new uses, new outlets, and new employment for its commodity, and we are beginning to see that science can help in finding them.

"Search is being made for a satisfactory low-temperature distillation process which will increase the value of coal and provide a cheaper substitute for anthracite for domestic purposes, by transmitting low-grade bituminous into high-grade fuel. A development in coal chemistry is the production of synthetic petroleum from coal. One of the far-reaching discoveries of the coal chemist in an economic sense is the production of synthetic fertilizers. In time it may be profitable for the mine owner to fabricate his product and thus add to the value and the wealth of the country."

Stanley Electric Tool Co. Buys Two More

The Stanley Works, New Britain, Conn., through its subsidiary, the Stanley Electric Tool Co., has purchased two additional companies, the Crowe Mfg. Corporation, Cincinnati, and the L. R. Carter Co., Syracuse, N. Y. Both are manufacturers of electrically operated tools. A few weeks ago the Stanley company announced the purchase of the Unishear Co., New York, and the Ajax Electric Hammer Corporation, New York. These new acquisitions make the Stanley company one of the largest in the country in the manufacture of electric tools.

All of the companies except the Carter company will move to New Britain at once. The Carter plant will be moved later. The Stanley company plans the expansion of its district sales offices throughout the country.

Republic May Move Head Offices to Cleveland

The new Republic Steel Corporation may move its general offices to Cleveland, following the completion of the merger of the Republic Iron & Steel Co., the Central Alloy Steel Corporation, the Donner Steel Co. and the Bourne-Fuller Co. Meanwhile, industrial and business leaders of Youngstown have joined in an effort to retain the headquarters in that city.

Directors of the consolidated company have not yet chosen the executive headquarters. For years the Republic Iron & Steel Co. has maintained executive and general sales offices in its own building in Youngstown. Leaders in the movement to retain the headquarters in Youngstown include John T. Harrington and Philip Wick, who are associated with Cyrus S. Eaton in his merger plans; A. E. Adams, president First National-Dollar Banks, and H. W. Grant, president, Youngstown Chamber of Commerce.

Formal notices to stockholders of the proposed merger probably will be mailed shortly. Until the stockholders ratify the proposed action, further developments probably will proceed slowly.

Non-Ferrous Metal Markets

Copper Quiet, With Prices Firm—Zinc and Lead Sales Are Good

NEW YORK, Dec. 23.

Copper.—There has been little change during the past week. The amount of business has been small and for immediate delivery. Consumers see no reason to buy ahead, since they doubt whether the present price of electrolytic copper will be maintained long into the coming year. Furthermore, the nearness of the inventory period has been another factor in their decision to satisfy only current requirements. Large users still are pressing for an abandonment of the 18c. schedule, but seem less confident of success than a few weeks ago. Producers have previously demonstrated their ability to maintain the price under stress. A leading market observer predicts that if any break occurs, it will not come until the second quarter of 1930 and only then because producers think it expedient for the best interests of the industry as a whole rather than because of being compelled to yield to the pressure exerted by their customers. The few orders that have been placed have been well distributed among foreign and domestic consumers. Electrolytic copper for export is unchanged at 18.30c., c.i.f. usual European ports. Lake copper is firm at 18c. to 18.12½c., delivered.

Tin.—The trade is in the midst of a holiday market, with little interest being shown by consumers. The small sales reported in the past week have been mostly to dealers. The dullness has affected the price of spot Straits tin, which today was quoted at 39.50c., New York. Scarcely any news has come from London in regard to the group activities there and the developments in proposed mergers. The London market has declined slightly in the past week, and today spot standard was selling at £178 2s. 6d. and future standard and spot Straits at £181 2s. 6d. The price at Singapore was £184 12s. 6d.

Zinc.—At the beginning of the week, prime Western zinc dropped further to 5.45c., East St. Louis. The decline brought out heavy orders from users, who felt that the bottom had been reached. In fact, the volume of sales in the last fortnight, at 5.50c. and 5.45c., has been the best in several months. However, producers are reluctant to let consumers have all of the material they want at the pres-

THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY

	Dec. 23	Dec. 21	Dec. 20	Dec. 19	Dec. 18
Lake copper, New York	18.12½	18.12½	18.12½	18.12½	18.12½
Electrolytic copper, N. Y.*	17.75	17.75	17.75	17.75	17.75
Straits tin, spot, N. Y.	39.50	39.62½	39.62½	40.50	40.50
Zinc, East St. Louis	5.45	5.45	5.45	5.45	5.45
Zinc, New York	5.80	5.80	5.80	5.80	5.80
Lead, St. Louis	6.10	6.10	6.10	6.10	6.10
Lead, New York	6.25	6.25	6.25	6.25	6.25

*Refinery quotation; price ¼c. higher delivered in the Connecticut Valley.

Rolled Products

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—
- High brass ..... 23.25c.
- Copper, hot rolled ..... 26.75c.
- Zinc ..... 10.50c.
- Lead (full sheets) ..... 10.00c.

Seamless Tubes—
- High brass ..... 28.25c.
- Copper ..... 29.25c.

Rods—
- High brass ..... 21.25c.
- Naval brass ..... 24.00c.

Wire—
- Copper ..... 19.87½c.
- High brass ..... 23.75c.

Copper in Rolls ..... 26.75c.
Brazed Brass Tubing ..... 30.87½c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also to St. Louis on shipments to points west of that river.

- Sheets, 0 to 10 gage, 3 to 30 in. wide ..... 33.00c.
- Tubes, base ..... 42.00c.
- Machine rods ..... 34.00c.

Chicago Warehouse

(Prices Cover Trucking to Customers' Doors in City Limits)

Sheets—	Base per Lb.
High brass	23.25c.
Copper, hot rolled	27.75c.
Copper, cold rolled, 14 oz. and heavier	30.00c.
Zinc	10.75c.
Lead, wide	10.30c.
Seamless Tubes—	
Brass	28.25c.
Copper	29.25c.
Brass Rods	21.25c.
Brazed Brass Tubes	31.00c.

New York or Cleveland Warehouse

Delivered Prices, Base per Lb.

High brass	21.12½c.	to 22.12½c.
Copper, hot rolled, base sizes	27.75c.	to 28.75c.
Copper, cold rolled, 14 oz. and heavier, base sizes	30.00c.	to 31.00c.
Seamless Tubes—		
Brass	26.00c.	to 27.00c.
Copper	29.12½c.	to 30.12½c.
Brass Rods	18.87½c.	to 19.87½c.
Brazed Brass Tubes	29.12½c.	to 30.12½c.

New York Warehouse

Delivered Prices, Base per Lb.

- *Zinc sheets (No. 9), casks* ..... 10.75c. to 11.25c.
- *Zinc sheets, open* ..... 11.50c. to 12.00c.

Metals from New York Warehouse

Delivered Prices, Per Lb.

Tin, Straits pig	43.50c. to 44.50c.
Tin, bar	45.50c. to 46.50c.
Copper, Lake	19.50c.
Copper, electrolytic	19.25c.
Copper, casting	19.00c.
Zinc, slab	7.00c. to 7.50c.
Lead, American pig	7.00c. to 7.50c.
Lead, bar	9.00c. to 9.50c.
Antimony, Asiatic	10.50c. to 11.00c.
Aluminum No. 1 ingots for remelting (guaranteed over 99% pure)	25.00c. to 26.00c.
Alum. ingots, No. 12 alloy	24.00c. to 25.00c.
Babbitt metal, commercial grade	25.00c. to 35.00c.
Solder, ½ and ½	28.50c. to 29.50c.

Metals from Cleveland Warehouse

Delivered Prices, Per Lb.

Tin, Straits pig	46.25c.
Tin, bar	48.25c.
Copper, Lake	19.50c.
Copper, electrolytic	19.25c.
Copper, casting	18.75c.
Zinc, slab	8.00c. to 8.25c.
Lead, American pig	7.00c. to 7.20c.
Lead, bar	9.25c.
Antimony, Asiatic	16.00c.
Babbitt metal, medium grade	18.00c.
Babbitt metal, high grade	49.00c.
Solder, ½ and ½	30.50c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged consumers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	14.75c.	16.00c.
Copper, hvy. and wire	14.50c.	15.50c.
Copper, light and bottoms	12.50c.	13.50c.
Brass, heavy	8.00c.	9.00c.
Brass, light	6.75c.	7.75c.
Hvy. machine composition	11.00c.	12.00c.
No. 1 yel. brass turnings	9.00c.	9.50c.
No. 1 red brass or compos. turnings	10.50c.	11.75c.
Lead, heavy	4.75c.	5.25c.
Lead, tea	3.75c.	4.25c.
Zinc	3.25c.	3.75c.
Sheet aluminum	11.00c.	13.00c.
Cast aluminum	10.00c.	12.00c.

ent level and therefore are not actively soliciting business. They are content to let their customers cover their requirements for the first quarter, but prefer not to make bookings indiscriminately at 5.45c.

Lead.—Substantial orders for January shipment have been received by producers. Some inquiries for February have appeared, but sellers are not willing to book business that far ahead. The good volume of sales is due to the belief of users that prices have been stabilized at 6.10c., St. Louis, and 6.25c., New York.

Antimony.—The market for Chinese metal remains dull, with prices for spot and future delivery at 8.37½c., New York, duty paid.

Nickel.—Ingot nickel in wholesale lots is quoted at 35c. a lb., shot nickel at 36c. and electrolytic nickel in cathodes at 35c.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at 23.90c. a lb., delivered.

Non-Ferrous Metals at Chicago

CHICAGO, Dec. 23.—Prices for copper and lead remain steady. Quotations on zinc, tin and antimony are lower. Sales in the past week have been in small volume. The old metal market is without feature.

Prices per lb., in carload lots: Lake copper, 18.50c.; tin, 40.75c.; lead, 6.20c.; zinc, 5.60c.; in less-than-carload lots, antimony, 9.25c. On old metals we quote copper wire, crucible shapes and copper clips, 14c.; copper bottoms, 11.50c.; red brass, 11.50c.; yellow brass, 8c.; lead pipe, 4.50c.; zinc, 3c.; pewter, No. 1, 24.50c.; tin foil, 22c.; block tin, 32c.; aluminum, 12.87½c.; all being dealers' prices for less-than-carload lots.

St. Louis Improvements to Cost $12,000,000

Expenditure of $12,000,000 on public improvements during 1930 is planned by the city of St. Louis, according to William E. Rolfe, associate to the president of the Board of Public Service.

New buildings will involve $1,500,000, while $500,000 will go for the erection of bridges and viaducts. Foremost among the new buildings projects will be a $600,000 nurses' home and a bird house in the Zoo costing $202,000.

The remaining $10,000,000 will be spent for street paving, street reconstruction, sewer and drainage work. W. W. Horner, chief engineer of paving and sewers for the city, has estimated that in 1930 sewer and drainage work will aggregate about $4,050,000, while $5,650,000 will be spent for paving. Drainage, paving and surface work on the municipal airport will call for another $300,000.

A report entitled "Sharing Profits with Employees" has just been published by the Policyholders Service Bureau of the Metropolitan Life Insurance Co., New York. The survey is based on the experience of more than 80 companies.

Fabricated Structural Steel

Awards, at 90,000 Tons, Include 50,000 Tons for Empire State Building, New York

WITH awards at 90,000 tons, the past week was the second best of the year. This is regarded as a remarkable showing for late December, when the Christmas holidays generally cause a slump in activities. Over 75 per cent of the lettings were in the New York metropolitan area. The outstanding contract was for the Empire State Building, New York, which will be erected on the old site of the Waldorf-Astoria Hotel. This project, awarded on Dec. 20, will require about 50,000 tons of steel, although the exact amount is not yet known.

New work which appeared for bids in the past week totaled about 24,000 tons, of which 4000 tons is for a New York hotel. Awards follow:

BUCKSPORT, ME., 3500 tons, paper manufacturing plant, to New England Structural Co.

NEW YORK, 6800 tons, subway section, to Bethlehem Steel Co.; general contractor, Arthur A. Johnson Corporation.

NEW YORK, 1100 tons, apartment building, to Taylor-Fichter Steel Construction Co.; James Stewart & Co., general contractors.

NEW YORK, 200 tons, residence on East Side, to Easton Structural Steel Co.

NEW YORK, 50,000 tons, Empire State Building, to American Bridge Co.

NEW YORK, 1200 tons, trade school on Sixty-seventh Street, to Levering & Garrigues Co.

NEW YORK, 1000 tons, buildings for Hunter College, to unnamed fabricator.

NEW YORK, 1500 tons, apartment building at Eighty-ninth and Park Avenue, to Hay Foundry & Iron Works.

NEW YORK, 2000 tons, apartment building at Seventy-ninth Street and Amsterdam Avenue, to Hay Foundry & Iron Works.

NEW YORK, 300 tons, building at Seventy-ninth Street and Amsterdam Avenue, to Harris Structural Steel Co.

NEW YORK, 700 tons, 12-story apartment building on West Ninety-second Street, to Dreier Iron Works.

NEW YORK, 1100 tons, public school No. 238, to Bethlehem Fabricators, Inc.

NEW YORK, 400 tons, public school No. 224, to Bethlehem Fabricators, Inc.

NEW YORK, 1000 tons, apartment building at 250 West Seventy-second Street, to Harris Structural Steel Co.

NEW YORK, 1250 tons, building for Hanover Bank & Trust Co. at Church and Franklin Streets, to Heddon Iron Works.

BROOKLYN, 600 tons, 15-story apartment on Hanson Place, to Berkshire Iron Works.

BROOKLYN, 1100 tons, public school No. 241, to Easton Structural Steel Co.

SCHENECTADY, N. Y., 500 tons, City Hall, to Belmont Iron Works.

PENNSYLVANIA RAILROAD, 200 tons, bridge, to American Bridge Co.

NEW YORK, 200 tons, memorial building at 124 East 112th Street, to Grand Iron Works.

CLEVELAND, 1365 tons, building for National Town and Country Club, to McClintic-Marshall Co.

NAPERVILLE, ILL., 375 tons, building for Naperville College, to an unnamed bidder.

NIAGARA FALLS, N. Y., 150 tons, addition for Republic Carbon Co., to McClintic-Marshall Co.

PENSACOLA, FLA., 400 tons, Armstrong Court building, to Worden-Allen Co., Milwaukee.

BOWLING, TEX., 400 tons, Texas Gulf Sulphur Co., to Ingalls Iron Works.

BIRMINGHAM, 120 tons, addition to Lamson & Sessions Bolt Co. plant, to Virginia Bridge & Iron Co.

CINCINNATI, 1750 tons, railroad bridge for Cincinnati Union Terminals Co., to Mount Vernon Bridge Co.

GRANITE FALLS, MINN., 1900 tons, power plant, to Minneapolis-Moline Power Implement Co.

WAUKEGAN, ILL., 3500 tons, power house for Public Service Co. of Northern Illinois, to Mississippi Valley Structural Steel Co.

DULUTH, MISSABE & NORTHERN RAILROAD, 400 tons, bridge work, to American Bridge Co.

MILWAUKEE, 1500 tons, addition to Lakeside power plant of Milwaukee Electric Railway & Light Co., to Worden-Allen Co.

OKLAHOMA CITY, OKLA., 1000 tons, power house, to Stupp Brothers Bridge & Iron Co., St. Louis.

SOUTH GATE, CAL., 320 tons, high school, to Brombacher Iron Works.

LOS ANGELES, 225 tons plates, 500,000-gal. tank and tower, to Pittsburgh-Des Moines Steel Co.

VANCOUVER, B. C., 800 tons plates additional, penstock for British Columbia Electric Railway, to Vancouver Engineering Works.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

BOSTON, 1800 tons, Edison Electric Illuminating Co. office building.

NEW YORK, 4000 tons, hotel at 228 West Forty-seventh Street.

NEW YORK, 1200 tons, apartment building on Seventy-second Street.

PHILADELPHIA, 2000 tons, highway bridge.

PHILADELPHIA, 1000 tons, Henry Street bridge.

PHILADELPHIA, 2400 tons, Contract No. 7 on Pennsylvania terminal improvement.

PHILADELPHIA, 2300 tons, Eighth Street subway; bids open Dec. 30.

PHILADELPHIA, 1000 tons, new warehouse for Morris Wheeler & Co.

ATLANTIC COAST LINE RAILROAD, 100 tons, bridge.

PITTSBURGH, 1300 tons, addition to Duquesne Club.

ROGERS CITY, MICH., 600 tons, power house for Michigan Limestone & Chemical Co.

CHICAGO, 500 tons, building for Dallas Brass & Copper Co.

SAN ANTONIO, TEX., 3600 tons, administration building for Southwestern Bell Telephone Co.

ST. LOUIS, 250 tons, garage for Union Electric Light & Power Co.

SEATTLE, 1000 tons, Washington Athletic Club; general contract to Sound Construction Co.

MIDWAY, FLA., 180 tons, mill building for Fuller's Earth Co., Cleveland.

CANTON, OHIO, 200 tons, store for Halle Brothers Co.

TOLEDO, 100 tons, branch exchange building for Ohio Bell Telephone Co.

RACINE, WIS., 300 tons, vocational school.

PERSONAL

JOHN A. TOPPING, chairman of the board, Republic Iron & Steel Co., has announced his retirement from active business. He has completed more than a half century in the iron and steel industry. Mr. Topping said that he had for some time contemplated retiring, and that the formation of the new Republic Steel Corporation afforded him the opportunity to shift the responsibility of business management to others. Mr. Topping said further that he was heartily in accord with

JOHN A. TOPPING

the merger, which, when concluded, would be highly beneficial to all interests. Mr. Topping started in the iron business in 1878 with the Aetna Iron & Nail Co., and became its president in 1898. Later the company was merged with another to become the Aetna-Standard Iron & Steel Co., and this in turn went into another merger and became a part of the American Sheet Steel Co., of which Mr. Topping was first vice-president. He resigned in 1903 and undertook the reorganization of the La Belle Iron Works. In July, 1904, he was elected president of the American Sheet & Tin Plate Co., remaining in that position until January, 1906, when he was made president of the Republic Iron & Steel Co. and chairman of the Tennessee, Coal, Iron & Railroad Co. He was made chairman of the Republic company in 1908, and had continued in that position for nearly 22 years. Mr. Topping has taken a very active part in the affairs of the American Iron and Steel Institute, of which he is vice-president.

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GEORGE G. SMALL, vice-president, United Engineering & Foundry Co., Pittsburgh, has tendered his resignation and will retire from active business Jan. 1. He has been associated with the company and its predecessor for 36 years. Mr. Small was born near East McKeesport, Pa., in 1864, and attended the Indiana State Normal College, Indiana, Pa. Later he became identified with the Apollo Foundry Co. and the Apollo Iron & Steel Co., Apollo, Pa., the latter concern now the Vandergrift plant of the American Sheet & Tin Plate Co. In 1893 he became associated with the Lincoln Foundry Co., and when the United Engineering & Foundry Co. was organized in 1901, he was made manager of the Lincoln Foundry Co. department. He was elected second vice-president of the company in 1905, and first vice-president 10 years later. During his career with the company, Mr. Small has given special attention to the manufacture of chilled, sand and alloy iron rolls, and has become widely known for his technical and practical knowledge of this subject.

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E. F. MARRESFORD, formerly with the American Machine & Foundry Co., has joined the sales staff of the Watson-Stillman Co., New York.

—

L. B. GREEN, formerly development engineer of the Borden Co., Warren, Ohio, has become works manager of the Globe Machine & Stamping Co., Cleveland.

—

W. B. PICKUP has been appointed special representative of the Positive Lock Washer Co., Newark, N. J.

—

F. H. DALRYMPLE has been placed in charge of the newly-opened Cleveland district office of the Union Chain & Mfg. Co., Sandusky, Ohio.

—

ARTHUR E. NORTON, Harvard Engineering School, Cambridge, Mass., discussed design and lubrication of bearings at the monthly meeting of the Plant Engineers' Club, Dec. 18, at the University Club, Boston.

—

RAY M. HUDSON resigns post as assistant director of the Bureau of Standards, in charge of commercial standardization, to become secretary of the Massachusetts Division of the New England Council, with headquarters in Boston. Ever since his graduation from Syracuse University in 1908, he has devoted himself largely to the study of simplification, standardization and scientific management methods, and today is recognized nationally as an authority on the elimination of industrial waste. Before being called by Mr. Hoover, then Secretary of Commerce, as technical assistant in the Division of Simplified Practice, he was associated for several years with Col. George D. Babcock, a member of the Hoover Committee on Waste in Industry, in the installation of scientific management methods in the plants of the H. H. Franklin Mfg. Co., Syracuse, and of the Holt Mfg. Co., at Peoria, Ill. During the war he served with the Emergency Fleet Corporation, as a production engineer in the procurement of machinery. In 1923, Mr. Hudson was made Assistant Chief of the Division of Simplified Practice, and in 1925, its Chief. With the creation, in September, 1927, of the commercial standardization group within the Bureau of Standards, he became an assistant director of the Bureau in charge of this work.

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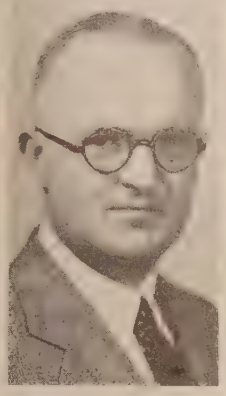
CHARLES E. MITCHELL has been appointed associate manager of the Gray Iron Institute, Cleveland, and will act as an assistant to Arthur J. Tuscany, the manager, in the executive work of the Institute. Mr. Mitchell is regarded as well qualified



CHARLES E. MITCHELL

for his duties dealing with accounting, merchandising and association promotional work as he has devoted his time to that work during the past 18 years. For 10 years he was accountant and office manager of the Ohio Bell Telephone Co., Cleveland. More recently he has been engaged in organization work, being the manager of a local Cleveland association from which he resigned to take up his duties with the institute.

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C. K. EVERITT, heretofore managing director of Edgar Allen & Co., Ltd., Sheffield, England, has been elected chairman of the board of directors, succeeding ROBERT WOODWARD, who resigned.

—

JAMES H. EDWARDS, chief engineer, American Bridge Co., New York, has made the following appointments in the engineering department, effective Jan. 1:

R. R. GRAHAM, as assistant engineer, Eastern division, at 30 Church Street, New York; J. E. ELLIOTT, assistant engineer, Central division, Frick Building, Pittsburgh; F. W. DENCER, assistant engineer, Western division, 208 South La Salle Street, Chicago.

—

H. W. BOYD, formerly secretary, Tinius Olsen Testing Machinery Co.,

Philadelphia, who was elected vice-president, succeeding Thorsten Y. Olsen, the new president, has been connected with the company since 1888. He was successively shop foreman, superintendent for about 20 years and secretary for eight years.

—

HARRY G. UPHOUSE of the Donner Steel Co., Buffalo, who has been transferred by the company to the Buffalo office, where he will have charge of district sales of steel and pig iron, will be given a farewell dinner by friends in the Philadelphia district on Dec. 30, at the Penn Athletic Club.

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FRANK W. FUNK has become managing engineer of the Jackson, Mich., division of Stevens & Wood, New York, engineers and constructors.

—

A. H. BOARDMAN, for the past seven years in the purchasing department of the Shell Oil Co., has been appointed manager of the San Francisco district, with offices at 39 Stevenson Street, San Francisco, for the Monarch Foundry Co., Stockton, Cal.

Obituary

J. C. WATERBURY, president, Waterbury Co., New York, manufacturer of wire rope, died from a fall from a train at Weehawken, N. J., Dec. 20, aged 49 years.

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PRESCOTT I. JOHNSTON, for many years shop superintendent of the Consolidated Machine Tool Corporation of America, Rochester, N. Y., died in that city on Dec. 14.

—

SAMUEL BATES, president, Pioneer Thresher Co., Shortsville, N. Y., died suddenly as his home in Rochester on Dec. 18, aged 66 years.

—

E. H. PEARSON, New York district manager of the Electric Machinery Mfg. Co., Minneapolis, died on Dec. 7, aged 36 years.

—

ELLIOT J. BROWN, for the past 25 years chief engineer at the Washburn Wire Co., Philipsdale, R. I., died suddenly on Dec. 17. He was born at Mapleton, Pa., in 1871. Leaving Juniata College before he was graduated, he studied engineering and later was chief engineer at plants located at Altoona, Pa., and New Haven, Conn.

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IRVING T. HARTZ, president, Morden Frog & Crossing Works, Chicago, died Dec. 17. He was, successively, secretary and manager of the Calumet Iron & Steel Co., president of the Union Cold Storage Co., vice-president of the Morden Works, and its president since 1907.

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WILLIAM PATON THOMSON, vice-president, Rail Joint Co., New York, died in Atlantic City, Dec. 21, aged 57 years. Since his graduation from Princeton University in 1896, he had been identified with railroad engineering, devoting most of his time since 1906 to track problems.

Railroad Equipment

Reading Buys 2000 Cars; Inquiries Delayed

EXPECTED inquiries for railroad equipment have failed to materialize in the past week. Several roads are at the point of asking for bids on an aggregate of about 20,000 to 25,000 cars, but these prospects may not formally develop until January. The year's orders have totaled about 100,000 cars, the largest number purchased in one year since 1924. Details of the week's business follow:

Reading Railroad has awarded 2000 50-ton box cars, 600 each to the American Car & Foundry Co. and Bethlehem Steel Co. and 400 each to Pressed Steel Car Co. and the Standard Steel Car Co.

Southern Pacific will buy 10 baggage, five lounge and five dining cars.

Reinforcing Steel

Reinforcing Steel Awards

TACOMA, WASH., 450 tons, grain elevator, to Pacific Coast Steel Co.

TACOMA, 325 tons, power house for Lake Cushman project, to Pacific Coast Steel Co. and the United States Steel Products Co.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

PHILADELPHIA, 600 tons, Henry Avenue bridge; bids open Dec. 27.

PHILADELPHIA, 750 tons, Eighth Street subway; bids open Dec. 30.

CHICAGO, 360 tons, apartment building.

URBANA, ILL., tonnage being estimated, chemistry building for University of Illinois.

SACRAMENTO, CAL., 159 tons, highway work, San Mateo County; bids Jan. 8.

SACRAMENTO, 121 tons, highway work, Santa Clara County; bids Jan. 8.

LOS ANGELES, 104 tons for city; Los Angeles Iron & Steel Co., low bidder.

FLORENCE, ARIZ., 119 tons, cell house; bids opened.

Sheet Production and Sales Off in November

Sharp curtailment in the automotive industry is indicated by a reduction in sales of sheets by independent mills, during November, of approximately 50 per cent as compared with October, a reduction of 33 per cent in production and of about 30 per cent in shipments, according to the monthly report of the National Association of Flat Rolled Steel Manufacturers.

Unfilled orders on Dec. 1 declined over 80,000 tons as compared with Nov. 1. Unshipped orders increased slightly.

Production in November decreased to a point slightly below shipments. Sales during the month were 134,391 tons, compared with 258,810 tons during October. Production dropped to 204,071 tons, compared with 319,660 tons during the previous month. November shipments were 207,200 tons, against 291,135 tons during October. The November report and comparisons in net tons follow:

	Nov.	Oct.	Sept.
Total number of mills.	708	712	715
Capacity per month...	461,800	498,300	459,075
Percentage reporting...	67.1	67.3	67.4
Sales	134,391	258,810	274,568
Production	204,071	319,660	302,490
Shipments	207,200	291,135	301,330
Unfilled orders.....	395,696	478,038	522,803
Unshipped orders.....	107,056	106,216	111,042
Unsold stocks.....	71,680	63,174	43,886
Percentages of Capacity			
Sales	43.3	77.2	88.7
Production	65.8	95.3	97.7
Shipments	66.8	86.8	97.4
Unfilled orders.....	127.6	142.6	168.9
Unshipped orders.....	34.5	31.7	35.9
Unsold stocks.....	23.1	18.8	14.2

Commodity Prices Lowest in Two Years

Commodity prices in November are reported by the United States Bureau of Labor Statistics at 94.4, compared with 96.3 in October and with 96.7 a year ago. The November level is the lowest since July, 1927. The figures are based on the average of 1926 as 100 and cover prices on 550 items analyzed monthly by the bureau.

Of the ten major groups of commodities all showed declines from October with the exception of fuel and lighting and house-furnishing goods. Many of the drops were 2 or more points. Metals and metal products went from 103.6 to 102.3, but remained higher than the 101.7 of a year ago.

Of the components of this group the iron and steel factor, non-ferrous metals and automobiles showed declines, while agricultural implements and other metal products remained at the October level. Under building materials, structural steel showed no change.

Fabricated Steel—Structural and Plate

	November, 1929	October, 1929	November, 1928
Fabricated structural steel, orders, (a) net tons, computed.....	227,150	350,350	242,550
do., do., eleven months.....	3,534,300	....	3,041,500
do., shipments	284,900	358,050(b)	273,350
do., do., eleven months.....	3,318,700(c)	....	2,845,150
Fabricated steel plate, orders, total (d) net tons.....	41,287	32,099	54,418
do., do., eleven months.....	487,323	....	492,369
do., oil-storage tanks.....	9,033	8,786	32,381
do., refinery materials, etc.....	2,523	3,316	7,509
do., tank cars.....	13,362(e)	2,393	1,153
do., gas holders	1,857	985	2,081
do., blast furnaces.....	1,019	853	563
do., stacks and miscellaneous...	13,493	15,766	10,731

(a) United States Department of Commerce; figures are from 233 identical firms. (b) High record. (c) Exceeds 12 months, 1928 (3,126,200 tons). (d) United States Department of Commerce. (e) Largest figure in several years.

Machinery Markets and News of the Works

Tool Market Is Quiet

Sales in December Are Less in Volume Than Same Month Last Year

MACHINE tool bookings have receded further in the past week and in some cases December sales are somewhat less than in the corresponding month of 1928.

While the dullness is partly accounted for by the usual lull in buying at the Christmas season and the year-end inventory period, the hesitancy on the part of users to close for much equipment until the industrial outlook is better clarified is also an important factor.

In the New York district purchases have been confined chiefly to a few companies whose expansion programs have not been affected by the stock market debacle. In at least one instance contracts were placed for about $50,000 worth of tools.

Although builders do not expect much business from the automobile industry for some time, a fair amount of buying is expected from automobile parts makers. Farm machinery manufacturers are reported to be preparing programs for the ordering of new tool equipment. The Allis-Chalmers Mfg. Co. and the A. O. Smith Corporation, Milwaukee, also may be in the market soon.

The absence of many cancellations of orders indicates the relative stability of the market. One line of shapers has been advanced 10 per cent.

New York

NEW YORK, Dec. 23.—Some machine tool dealers in this district have had fairly good orders in the past week, though the bulk of the buying has come from a few sources. Wide distribution of buying which prevailed during a greater part of the year is not at present in evidence. December business, on the whole, has held up to a better volume than was expected. A few local offices whose December sales are low report that prospects for January are encouraging. Considerable business is pending that will not be released until after Jan. 1. The week's orders, one of which totaled nearly $50,000, were from substantial companies whose expansion programs have not been affected by the recent stock market collapse.

Board of Water Supply, Municipal Building, New York, has plans for pumping plant on Avenue Z, Brooklyn, to cost $100,000 with machinery. G. J. Gillespie is president.

Board of Education, Delmar, N. Y., is considering installation of manual training equipment in new junior high school to cost $250,000 for which plans will be drawn by Pember & Dembers, 126 Washington Avenue, Albany, N. Y., architects.

Consolidated Gas Co., 4 Irving Place, New York, is arranging an expansion and improvement program to cost $100,000,000, of which about $75,000,000 will be used for power plants, substations and other structures, including lines for electric division, and $25,000,000 for gas generating and distributing division.

Murcott & Campbell, 298 Union Avenue, Brooklyn, manufacturer of files, rasps, etc., has plans for new two-story plant, 120 x 125 ft., to cost about $65,000 with equipment. Tillion & Tillion, 415 Lexington Avenue, are architects.

I. M. Uppercu, president of Uppercu Cadillac Corporation, 70 Columbus Avenue, New York, representative for Cadillac automobile, and associates have organized Uppercu-Burnelli Aircraft Corporation, with capital of 1,000,000 shares of stock, no par value, and plans operation of plant for production of 12-passenger trimotored transport planes, including parts manufacture and assembling. Vincent J. Burnelli, aeronautical engineer, will be an official of new company.

Armstrong Electric & Mfg. Corporation, 25 West Broadway, New York, is disposing of a bond issue of $300,000, part of fund to be used for expansion in production.

Tomkins Brothers, Inc., 74 Passaic Street, Newark, building materials, has asked bids on general contract for one-story storage and distributing plant at Yonkers, N. Y., to cost about $60,000 with mechanical handling equipment, etc. Robert Bolton, 45 Branford Place, Newark, is architect.

Atlas Portland Cement Co., 25 Broadway, New York, has 1000 acre tract near Rochester, Minn., and is considering new mill at that location, to cost more than $1,400,000 with equipment. A power house and machine shop will be included.

General Cable Corporation, 420 Lexington Avenue, New York, has purchased plant and business of Peerless Insulated Wire & Cable Co., Pennington, N. J., and will consolidate with its Standard Underground Cable Co. division, with main plant at Perth Amboy, N. J. Acquired plant will be continued as branch works. Company has expansion program under way at Perth Amboy, including additional manufacturing units. Part of works at Pittsburgh will be removed to this location.

United Die & Tool Works, 10 Johnson Street, Newark, has leased part of four-story factory at 158-60 Summit Street and will remove to new location early in January.

J. Strum & Co., 65 Commercial Street, Newark, manufacturers of commercial automobile bodies and wagons, parts, etc., have purchased former plant of H. F. Sommer & Co., 225 Wilson Avenue, for new works and will remove to new location and increase facilities.

Gilby Wire Co., 122 Riverside Avenue, Newark, has completed a two-story addition and will install equipment for production of fine wires, including wire mesh manufacturing division, to cost more than $40,000.

Art Wire & Stamping Co., manufacturer of wire specialties, recently moved from 449 Central Avenue, Newark, to 119 Coit Street, Irvington, N. J. Company also does metal stamping.

Reed-Prentice Corporation, Worcester, Mass., machine tool manufacturer, has moved its New York sales office to 41 Broad Street.

New England

BOSTON, Dec. 23.—Machine tool dealers are receiving some good inquiries for one and two-tool lots, and the outlook for business early next year is more encouraging. Inquiries include large lathes, boring machines, radial drills, and at least one large planer. Current activity is confined to an occasional small tool on which comparatively early delivery can be made. The used tool market is quiet.

Reid Brothers, Beverly, Mass., have started work on a one-story machine shop, 60 x 200 ft., to cost $20,000 without equipment.

Norwood Press Co., Norwood, Mass., will soon ask bids on a one-story foundry addition, 26 x 62 ft., and other extensions.

New Bedford Gas & Edison Light Co., New Bedford, Mass., contemplates building a power plant addition early next year. A crane is under consideration.

Standard Mailing Machine Co., Everett, Mass., has started work on an addition, 65 x 80 ft.

Hartford Empire Co., Hartford, Conn., has plans for a one-story steel storage plant, 40 & 100 ft., for which conveying equipment will be required.

In connection with an expansion program, New York, New Haven & Hartford Railroad Co., New Haven, Conn., is arranging fund of $1,000,000, for new steam-operated electric power plant for shop service, and extensions in steam-heating facilities at repair shops.

United States Bobbin & Shuttle Co., Lawrence, Mass., manufacturer of textile mill equipment, will concentrate production at local plant in future and will discontinue operations at branch works at Lowell, Mass. Machinery from last noted plant will be removed to Lawrence.

Church Mfg. Co., Holyoke, Mass., manufacturer of sanitary ware, has begun work on an addition, to cost about $50,000 with equipment.

Chicago

CHICAGO, Dec. 23.—Both sales and inquiries continue to taper as buyers defer machine tool programs until after the first of the year. Some dealers find December the dullest twelfth month in two years, while others report it only moderately under December, 1928. The contrast between the closing month of 1928 and this year lies in the fact that sales in the past few months have been gradually tapering, whereas the opposite was the condition in the closing months of 1928. The absence of cancellations indicates the relative stability of the market. Prices tend upward with the announcement this week of a 10 per cent advance on one line of shapers.

The Caterpillar Tractor Co., Peoria, Ill., may buy some tools before the new year starts. Inquiries from other farm machinery manufacturers are promising. Allis-Chalmers Mfg. Co., and A. O. Smith Corporation, both of Milwaukee, have well shaped programs. Local dealers show no concern over the outlook for the early part of the next year.

Tips Tool Co., Taylorville, Ill., has placed a general contract for a foundry building, 25 x 40 ft.

Harry W. Leighton Co., Chicago, Ill., has recently been incorporated as representative in Illinois, Indiana, Michigan, Wisconsin and Iowa for Cleveland Steel Tool Co., Cleveland; Buckeye Portable Tool Co., Dayton Pneumatic Tool Co., Precision Gauge & Tool Co., all of Dayton, Ohio, and Schauer Machine Co., Cincinnati. Harry W. Leighton is president and treasurer; William E. Thurber, for a number of years manufacturers' representative in Chicago territory for Colonial Tool & Steel Co., is vice-president and secretary.

American Boiler & Tank Co., Chicago, has purchased property south of Clearing Industrial District for future development.

Garden City Plating & Mfg. Co., 1430 South Talman Avenue, Chicago, has leased space in adjoining building, totaling 23,000 sq. ft., for expansion.

Illinois Power & Light Corporation, 231 South La Salle Street, Chicago, is disposing of a bond issue of $5,000,000, part of proceeds to be used for expansion and improvements in power plants and transmission lines.

Board of Education, Iowa State Bank Building, Burlington, Iowa, has plans for a two-story and basement vocational school, to cost about $45,000 with equipment. W. F. Weibley, Tama Building, is architect. William B. Ittner, 911 Locust Street, St. Louis, is consulting architect.

Raymer Hardware Co., 58 East Fifth Street, St. Paul, Minn., has leased one-story building to be erected on University Avenue for establishment of a storage and distributing plant, to cost $40,000. Lang, Raugland & Lewis, 1953 University Avenue, are architects.

Southern Colorado Power Co., Colorado Building, Pueblo, Colo., plans extensions and improvements in power plants at Pueblo, Canon City and Skaguay, to cost $150,000 with equipment. Engineering department of company is in charge.

Western Electric Co., Hawthorne, Ill., has awarded general contract to H. K. Ferguson Co., Cleveland, for automobile service and garage building at works, 137 x 176 ft., for company cars, motor trucks and trailers, to cost about $100,000. Present garage unit will be converted for manufacturing.

Board of Education, City Hall, Minneapolis, has plans for an equipment, repair and supply shop, with metal, woodworking and other departments, to cost $250,000 with equipment. Bureau of Buildings, Division of Design and Inspection, 245 Ninth Avenue North, is in charge.

Atchison, Topeka Santa Fe Railway Co., 80 East Jackson Boulevard, Chicago, has begun work on new engine house at Fort Madison, Iowa, with one-story locomotive service and repair shop, 30 x 170 ft., for which general contract recently was let to A. W. Smith & Son, Fort Madison, to cost about $100,000 with equipment.

Lourie Mfg. Co., 565 Washington Boulevard, Chicago, plans a large expansion program in 1930, not only in plant equipment but in manufacture of new lines. Present products include hydraulic machinery, high-speed and heavy-duty presses and high-pressure pumps. O. C. Keckley, president, who purchased a controlling interest in company in 1928, reports that 1929 business showed an increase of 100 per cent over that of preceding year, and that a large volume of unfilled orders will be carried over into new year.

The Crane Market

NO new inquiries of consequence have appeared in the past week for either electric overhead cranes or locomotive cranes. Of the pending business, sellers expect but little to be placed before the end of the year. The Standard Oil Co. of New York has purchased a 15-ton, 37-ft. 9-in. span hand power crane for Ingleside, Tex., and has been taking bids on a 5-ton electric crane for Baytown, Tex. In the locomotive crane field, the Boston & Albany Railroad, has closed on a 20-ton locomotive crane.

Among recent purchases are:

S. S. Hepworth Co., New York, two 2-ton, 1-motor, underhung cranes for a new plant in Long Island City from H. D. Conkey & Co., through Florandin Equipment Co.

Walling Transportation Lines, Tottenville, S. I., New York, 5-ton, 3-motor, underhung crane from H. D. Conkey & Co., through Florandin Equipment Co.

Boston & Albany Railroad, Albany, N. Y., 20-ton locomotive crane with bucket, reported from Ohio Locomotive Crane Co.

Blackhawk Machine & Foundry Co., Davenport, Iowa, has recently completed an extension costing $50,000 which provides 18,000 additional sq. ft. of floor space. Company specializes in gray iron and aluminum castings and maintains an experimental laboratory.

Milwaukee

MILWAUKEE, Dec. 23.—The holiday season has accentuated the relatively quiet tone of the machine tool market, but a general improvement is looked for after the first week in January. Inquiry the past week has been in fair volume. With the two holidays coming in midweek, production schedules are interrupted to an extent hardly warranted by orders on hand and delivery specifications.

Walter E. Lippmann, 432 Herman Street, Milwaukee, has organized Lippmann Engineering Works to manufacture sand and gravel washing machinery, coal and ash handling plants and similar special machinery. A site has been purchased in West Milwaukee, and contracts have been placed for a one-story plant, 90 x 200 ft., costing about $65,000 with equipment. Inquiry is being made for a 5 to 10-ton traveling crane, and after Jan. 1 on other machinery.

Milwaukee Stamping Co., 300 Sixty-fourth Avenue, West Allis, Milwaukee, manufacturer of automobile and builders' hardware, finished stamping specialties and dies, has taken over Litterer Brothers Mfg. Co., 3022-3032 North Rockwell Street, Chicago, and is consolidating operation in Milwaukee works. Litterer company's main product is metal partitions. While no new construction will be done at Milwaukee for present, additions to equipment of this department will be made. Chicago plant will be retained as a storage and shipping warehouse and a branch office. Ben A. Otten is secretary of Milwaukee company.

J. F. Devine Pattern Mfg. Co., 5911 Greenfield Avenue, West Allis, Milwaukee, manufacturer of wood and metal patterns, templates, etc., is building a one-story addition, 45 x 100 ft.

Gray iron foundry of the McNally-Tollefson Co., Stoughton, Wis., operated for two years as a division of Liberty Foundry Co., Inc., Sixty-sixth and State Streets, Milwaukee, with a branch plant at Waukesha, Wis., has reverted to McNally-Tollefson interests and henceforth will operate in conjunction with Stoughton Co., Stoughton. This company is transferring its gray iron work to McNally-Tollefson shop, and is now concentrating on non-ferrous casting. Gray iron shop specializes in cylinder blocks, pistons and other internal combustion engine castings. J. E. McNally is general manager.

Butler Bin Co., Waukesha, Wis., manufacturer of steel bins and gravity loading devices for sand and gravel pits, concrete contractors, etc., will enlarge its plant at a cost of about $40,000 early in 1930. Detailed plans are in formation.

Jacobsen Mfg. Co., Eighth Street and Washington Avenue, Racine, Wis., manufacturer of power driven lawn mowers, is erecting a two-story addition costing about $40,000, to be used largely for office purposes and experimental shop. Company recently completed alterations of a four-story shop building acquired from Murray Body Corporation, with 93,000 sq. ft. Some additional equipment for this shop is being purchased from time to time.

Buffalo

BUFFALO, Dec. 23.—Sikes-Cutler Desk Corporation, 20 Churchill Street, Buffalo, has filed plans for a one-story addition to cost about $35,000.

Niagara Falls Power Co., Niagara Falls, N. Y., operated by Buffalo, Niagara & Eastern Power Corporation, Electric Building, is planning construction of steam-operated electric power plant near station of Buffalo General Electric Co., an affiliated organization, to cost over $500,000 with equipment.

Meyer-Smith, Inc., Buffalo, has been organized with capital of $500,000, to take over and consolidate Smith Supply & Equipment Co., Inc., 50 Broadway, and A. F. Meyer & Son, 408 Broadway, manufacturers of refrigerators, meat market equipment and fixtures soda fountain apparatus, etc. New company will concentrate production at last noted location, and will operate storage and distributing plant at 294-98 Pratt Street; increased output will be arranged. Edward J. Meyer is president, and George M. Wiedmer, vice-president and treasurer.

Alfred C. and J. Victor Coty, 260 Flower Avenue East, Watertown, N. Y., have organized Coty Machine Co., with capital of $200,000, and plan early operation of general machine works for production of finished iron and steel products. T. Earl Coty, 211 Arlington Street, will be an official of new company.

LaFrance-Republic Sales Corporation, Elmira, N. Y., manufacturer of motor trucks, with main plants at Alma, Mich., and Bloomfield, N. J., has leased building at Frelinghuysen Avenue and Hunter Street, Newark, N. J., for new factory branch, service and garage building.

Weber Machine Corporation, Rochester, N. Y., manufacturer of Syncrodisk talking picture devices, has acquired additional space of 15,000 sq. ft. in Likly Building on Lyell Avenue, for assembly and shipment of Syncrodisk turntables. Company will also soon commence production and marketing of a "sound on film" device.

International Business Machines Corporation has approved plans for an addition to its factory at Endicott, N. Y., to cost about $700,000.

Philadelphia

PHILADELPHIA, Dec. 23.—Monarch Mfg. Works, Inc., Salmon Street, Philadelphia, general machinist, has awarded general contract to A. Earl Barnes Co., 2044 East Clementine Street, for one-story machine shop addition, to cost about $20,000 with equipment.

Barrett Co., Thirty-sixth Street and Grays Ferry Avenue, Philadelphia, manufacturer of roofing products, etc., is planning to rebuild plant unit recently destroyed by fire, with loss reported over $400,000 including equipment.

Springfield Metallic Casket Co., Springfield, Ohio, has leased building at 1411-17 Spring Garden Street, Philadelphia, for new factory branch, storage and distributing plant.

American Ice Co., City Center Building, Philadelphia, is arranging for expansion to cost $1,500,000, including erection of three electrically-operated ice-manufacturing plants at East Boston, Mass., for Boston Ice Co., a subsidiary, and on East Sixtieth Street and East River, New York, for Knickerbocker Ice Co., another subsidiary; work on last noted has begun.

C. F. Simonin's Sons, Inc., Tioga and Belgrade Streets, Philadelphia, manufacturer of vegetable oils, etc., is planning to rebuild part of plant destroyed by fire Dec. 16, with estimated loss of $100,000 with equipment.

McCloskey Varnish Co., Thirtieth and Locust Streets, Philadelphia, has plans for a two-story factory, on site 150 x 600 ft., at Holmesburg Junction, to cost about $150,000 with equipment, and will remove to new location and increase capacity.

Shell Eastern Petroleum Products Co., 122 East Forty-second Street, New York, is concluding arrangements for purchase of property near Trenton, N. J., as site for oil storage and distributing plant, to cost over $80,000 with equipment.

Board of Trustees, Hill School, Pottstown, Pa., will take bids in about 60 days for new power plant, to cost about $40,000 with equipment. C. Z. Klauder, 1429 Walnut Street, Philadelphia, is architect.

Philadelphia Range Boiler & Steel Tank Co., Philadelphia, has been organized with capital of $50,000 to take over and expand company of same name, with plant at 2656 Salmon Street.

School Board, Hellertown, Pa., is considering installation of manual training equipment in new two-story junior high school, to cost about $135,000, for which plans will be drawn by Jacoby & Everett, Commonwealth Building, Allentown, Pa., architects.

Reilly-Whiteman Co., Canal Bank, Conshohocken, Pa., manufacturer of oils, greases, etc., is planning new two-story plant at Spring Mill, Pa., to cost about $70,000 with equipment.

Board of Trustees, University of Delaware, Newark, plans addition to steam power plant to cost $75,000. Appropriation has been authorized.

Pittsburgh

PITTSBURGH, Dec. 23.—Machinery business has been very quiet in the last few days and practically no activity is expected this week. A fair volume of inquiry is in the hands of dealers, but no action is expected on this before next month and practically no new work is coming out now. The first quarter list of the Westinghouse Electric & Mfg. Co. is expected in a few days, but local dealers have no intimation as yet regarding its size. Reports from railroads in the Pittsburgh district are encouraging and dealers look for inquiry from this source early in the year.

Heavy machinery and equipment builders in this district will enter 1930 with the best order books in several years and with the prospect of continued activity. No action has been taken on a number of steel mill expansion programs announced in the last few weeks and orders for machinery on these jobs will likely be placed in the first quarter. Prominent among the projects definitely assured are the $7,000,000 program of the Weirton Steel Co., Weirton, W. Va., the new sheet mill to be erected at Tarentum by the Tarentum Steel Corporation, an extensive program to be undertaken by the American Steel & Wire Co. at Donora, Pa., and extensions and improvements at the Etna, Pa., works of Spang, Chalfant & Co., Inc.

Dravo Contracting Co., Neville Island, Pittsburgh, operating a plant for construction of barges, tugs, etc., is planning extensions in marine ways and will provide additional shop facilities.

Westinghouse Electric & Mfg. Co., East Pittsburgh, is arranging an expansion and improvement program to cost $10,000,000, including plants in this vicinity and branch factories in different parts of country. Early in January company will begin commercial production of new electric refrigerator, including parts and assembling. Work has begun on eleven-story electrical and mechanical laboratory, 80 x 225 ft., at Pittsburgh, to cost $1,500,000 with equipment.

Segal Lock & Hardware Co., 155 Leonard Street, New York, with Lenox Tile Co., 114 East 124th Street, same city, and Charles H. De Voe, formerly head of Old Bridge Enamel Brick & Tile Co., Old Bridge, N. J., have acquired plant and business of Kenilworth Tile Co., Newell, W. Va. New owners will reorganize company and plan expansion.

Duquesne Light Co., 435 Sixth Avenue, Pittsburgh, is arranging an expansion program to cost about $700,000, including additional generating facilities, power substations and transmission lines.

Monongahela County School Board, Morgantown, W. Va., plans installation of manual training equipment in new high school on West Virginia University Campus, for Cass, Grant and Union Districts, to cost $300,000. Davis, Dunlap & Barney, 1805 Walnut Street, Philadelphia, are architects.

Technical Products Co., Pittsburgh, maker of acid-proof cements, is occupying a new factory at 2308 Main Street.

South Atlantic

BALTIMORE, Dec. 23.—Kitchen Cabinet Corporation, Baltimore, headed by F. X. Ganter, president of F. X. Ganter Co., Sharp and Ostend Streets, manufacturer of show cases, etc., has plans for extensions and improvements in factory at Hillsdale, to cost over $35,000. William Ganter and Associates, 210 East Lexington Street, are architects.

Appalachian Electric Power Co., Roanoke, Va., is arranging an expansion program to cost about $500,000, including addition to steam-operated electric generating plant at Glen Lyn, W. Va., extensions in other power stations, substations and transmission lines at Bluefield, Welch, W. Va., and vicinity.

Aeronautical Retarding Gear, Inc., 507 East Franklin Street, Richmond, Va., recently organized by R. T. Lipscombe, industrial engineer, and associates, has purchased 40-acre tract near city limits, part of site to be used for establishment of new plant to manufacture mechanical devices and equipment for aircraft; an aircraft assembling plant is also planned, entire project to cost more than $50,000 with equipment.

American Oil Co., American Building, Baltimore, has plans for new storage and distributing plant at Greensburg, Pa., to cost about $60,000 with equipment. T. J. O'Connell is company engineer.

Davison Chemical Co., Garrett Building, Baltimore, is arranging an expansion program for Southern Phosphate Corporation, Bartow, Fla., a subsidiary, for development of phosphate rock properties in Polk County, Fla., and opening of similar deposit near Bartow, entire program to cost over $400,000 with conveying machinery, loading equipment, mechanical conveyors, etc. Davison company will also complete construction of new fertilizer plant now under way at Houston, Tex., to represent an investment of $1,000,000.

Vidalia Coca Cola Bottling Co., Vidalia, Ga., has plans for new one-story bottling

plant, to cost about $55,000 with conveying, elevating and other mechanical equipment. Pringle & Smith, Norris Building, Atlanta, Ga., are architects.

Shenandoah River Power Co., Harrisonburg, Va., will begin work in 60 or 90 days on new hydroelectric generating plant on Shenandoah River, to cost over $300,000 with transmission line. L. E. Long is general superintendent.

Board of Education, Baltimore, plans installation of industrial art and manual training department in new school at Brehm's Lane and Chesterfield Avenue, to cost about $300,000 for which superstructure will soon be placed under way. McKenzie & Cross, Professional Building, are architects.

City Council, Danville, Va., has plans for additional hangars and mechanical shops at municipal airport, to be occupied under lease by Lynchburg Flying Service, Inc., Lynchburg, Va., to cost more than $45,000 with equipment.

Shell Eastern Petroleum Products Co., 122 East Forty-second Street, New York, is said to be arranging for purchase of oil storage and distributing plant of Mecklenburg Oil Co., Charlotte, N. C., and plans extensions and installation of additional equipment.

New construction costing $16,000,000 is planned for 1930 by Georgia Power Co., and affiliated companies, Columbus Electric & Power Co., and South Georgia Power Co. This will be largest amount spent by company in any single year of its history. A steam plant in Atkinson, near Atlanta, and a hydroelectric plant at Furman Shoals, near Milledgeville, are chief among 1930 construction plans.

Detroit

DETROIT, Dec. 23.—Kelsey Wheel Co., 3600 Military Avenue, Detroit, manufacturer of steel automobile wheels, has plans for a one and two-story addition, 300 x 800 ft., to cost more than $450,000 with machinery. Albert Kahn, Inc., Marquette Building, is architect and engineer.

Ziv Steel & Wire Co., 2945 West Harrison Street, Chicago, has plans for new branch plant at Meyers Road and Union Belt Railroad, Detroit.

Lansing Steel Corporation, Lansing, Mich., has plans for a one-story unit for structural steel fabrication and ornamental iron work, to cost about $30,000 with equipment.

Detroit Aircraft Corporation, Union Trust Building, Detroit, has purchased plant and business of Gilders, Inc., Orion, Mich., manufacturer of airplane equipment and will consolidate. Orion plant will be removed to main works at Detroit where production will be concentrated.

Hill Diesel Engine Co., Lansing, manufacturer of Diesel engine units, parts, etc., has arranged for increase in capital from $125,000 to $1,000,000, part of fund to be used for general expansion.

Accuralite Co., Muskegon, Mich., manufacturer of pistons, automobile engine pistons, etc., is considering one-story addition to cost more than $30,000 with equipment.

Hospital Commission, Dearborn, plans power plant and mechanical laundry at new institutional building, entire project to cost $1,000,000. Smith, Hinchman & Grylls, Marquette Building, Detroit, are architects and engineers.

Scott Engineering Co. Lindbergh Field, Kalamazoo, Mich., aircraft equipment, has awarded general contract to O. F. Miller, Kalamazoo, for one-story plant unit, to cost about $25,000.

Timken-Detroit Axle Co., West Fort Street, Detroit, has plans for a two-story addition, 100 x 100 ft., to cost more than $85,000 with equipment.

Indiana

INDIANAPOLIS, Dec. 23.—Connersville Blower Co., Connersville, manufacturer of rotary blowers, rotary pumps, gas boosters, etc., is considering one-story addition to cost over $35,000 with equipment.

Standard Oil Co. of Indiana, Inc., 910 South Michigan Avenue, Chicago, has approved plans for one-story addition, 50 x 150 ft., to refinery at Whiting, Ind., for acid concentrating plant, to cost about $60,000 with machinery.

Electric Steel Castings Co., Speedway City, Indianapolis, will begin superstructure for a one-story addition, 54 x 200 ft., to cost about $50,000 with equipment, general contract recently let to Hetherington & Berner, 701 Kentucky Avenue.

Apex Stamping Co., Crawfordsville, manufacturer of metal stampings, is considering one-story plant at Elmore Street, to cost about $30,000 with equipment.

Municipal Airport Department, City Hall, Indianapolis, Paul Moore, superintendent, will soon begin erection of hangars, with repair facilities and administration building at municipal airport, Natonal Road, Ben Davis, about seven miles from city, to cost about $100,000 with equipment. McGuire & Shook, 941 North Meridian Street, are architects.

Buhner Fertilizer Co., Jeffersonville Avenue, Seymour, will erect one-story plant, 60 x 250 ft., to cost about $40,000 with equipment.

Cleveland

CLEVELAND, Dec. 23.—Machine tool sales and inquiry fell off the past week. However, several single tool orders were placed. The quieting down that usually occurs during the holiday season is in evidence and not much activity is looked for during the remainder of the month. Outlook for the early part of January appears promising as a number of inquiries are pending for fair sized lots of tools. While machinery manufacturers do not look for much business from motor car builders for some time, a fair amount of buying is expected from some of the parts manufacturers.

Accural Metal Products Co., Terminal Tower Building, Cleveland, has plans by Ernest McGeorge, 3030 Euclid Avenue, architect and engineer, for a one-story plant, 95 x 200 ft., to cost about $50,000 with equipment.

Tuscan Tire & Rubber Co., Carrollton, Ohio, is considering call for bids early in January for rebuilding part of plant recently destroyed by fire, new unit to be one-story, 40 x 180 ft.

Board of Education, Shady Side, Ohio, is considering installation of manual training equipment in new high and grade school, to cost about $175,000. J. E. Lewis, 205 Cleveland Avenue, N. W., Canton, Ohio, is architect.

Ohio Injector Co., Wadsworth, Ohio, is contemplating one-story addition to steam specialty manufacturing plant, to cost more than $50,000 with equipment.

Lewis Machine Co., Cleveland, has moved from 6303 Central Avenue to 1600 East Twenty-fourth Street.

St. Louis

ST. LOUIS, Dec. 23.—Union Electric Light & Power Co., Twelfth and Locust Streets, St. Louis, has plans for one-story equipment storage and distributing plant, 160 x 300 ft., including garage, service and repair unit, to cost over $120,000 with equipment. Beaume & Klein, American Trust Building are architects.

Home Convenience Mfg. Co., 1423 Illinois Avenue, Kansas City, Mo., recently formed by Philip D. Morelock of Shouse, Doolittle & Morelock, Land Bank Building, and associates, plans early operation of local factory for production of metal domestic specialties, including hand-operated washing machines and parts, bread-slicing devices, etc. E. B. Jones, inventor, will be identified with company.

Empire Gas & Fuel Co., Bartlesville, Okla., has begun construction of aviation field on 400-acre tract and plans hangar, with repair and reconditioning facilities, and other mechanical field units, to cost more than $65,000 with equipment.

Metal-Air Corporation, Oklahoma City, Okla., is considering construction of one-story aircraft manufacturing plant, including parts and assembling departments, to cost over $80,000 with equipment.

City Commission, Morrilton, Ark., will soon take bids for municipal steam-operated electric power plant, to cost about $100,000. Burns & McDonnell Engineering Co., Interstate Building, Kansas City, Mo., is consulting engineer.

Wheat Farming Co., Hays, Kan., Fred Beeby, head, plans construction of grain elevator, including conveying, elevating and screening equipment, with one-story machine shop on adjoining site, 40 x 75 ft., entire project to cost over $60,000.

Carter-Waters Co., 2049 Main Street, Kansas City, Mo., road-building materials and supplies, will soon take bids on general contract for a four-story storage and distributing plant, 75 x 100 ft., to cost over $100,000 with equipment. Archer & Gloyd, Pioneer Building, are architects.

Missouri & North Arkansas Railroad Co., Harrison, Ark., will proceed with superstructure for engine house, 75 x 100 ft., with shop facilities at Kennett, Ark., to cost about $70,000 with equipment. H. J. Armstrong is chief engineer.

Reeves & Skinner Machinery Co., St. Louis, has been appointed by American Fluid Motors Co., Philadelphia, as its sales representative for Hele-Shaw pumps in Missouri and southern Illinois.

The St. Louis-San Francisco Railway Co., St. Louis, B. T. Wood, vice-president and chief purchasing officer, is taking bids until Jan. 10 on the following equipment:

One 100-in. 600-ton wheel press with a 15 hp. Allis-Chalmers motor.

One 9-in. motor-driven bench type lathe, similar to South Bend model.

One 3/16-in. power ring and circular shears, similar to Peck, Stow & Wilcox No. 537.

Three radius link grinding machine, similar to H. G. Hammet's.

One bending brake, similar to Dries & Krump No. 207, with 10-hp. motor.

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